MERCURY

GO BOLDLY.™

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Operation and Maintenance Manual

Mercury Racing 500R

Scan for service and support information

Welcome

You have selected one of the finest marine power packages available. It incorporates numerous design features to ensure operating ease and durability. With proper care and maintenance, you will 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 and Maintenance Manual contains specific instructions for using and maintaining your product. Keep this manual with the product for ready reference whenever you are on the water.

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

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

Name / function:
John Buelow, President,
Mercury Marine

Read This Manual Thoroughly

IMPORTANT: If you do not understand any portion of this manual, contact your dealer. Your dealer can also provide a demonstration of actual operating procedures.

Notice

Throughout this publication and on your power package, safety alerts labeled WARNING and CAUTION (accompanied by the symbol ⚠), are used to alert you to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly. Observe these alerts carefully.

These safety alerts alone cannot eliminate the hazards that they signal. Strict compliance to these special instructions when performing the service, plus common sense operation, are major accident prevention measures.

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

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

Additional alerts provide information that requires special attention:

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

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

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

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

California Proposition 65

WARNING: This product can expose you to chemicals including gasoline engine exhaust, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Descriptions and specifications contained herein were in effect at the time this was approved for printing. Mercury Marine, whose policies are based on continuous improvement, reserves the right to discontinue models at any time or to change specifications or designs without notice and without incurring obligation.

Warranty Message

The product you have purchased comes with a **Mercury Marine Limited Warranty**. The terms of the warranty are set forth in the Warranty Manual, which can be accessed any time on the Mercury Marine website, at http://www.mercurymarine.com/warranty-manual. The Warranty Manual contains a description of what is covered, what is not covered, the duration of coverage, how to best obtain warranty coverage, **important disclaimers, limitations, and waivers**, and other related information. Please review this important information.

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

Copyright and Trademark Information

Identification Records

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

Please record the following applicable information:

Outboard		
Engine Model and Horsepower		
Engine Serial Number		
Gear Ratio		
Propeller Number	**Pitch**	**Diameter**
Watercraft Identification Number (WIN) or **Hull Identification Number (HIN)**		**Purchase Date**
Boat Manufacturer	**Boat Model**	**Length**
Exhaust Gas Emissions Certification Number (Europe Only)		

General Information

Transporting

Fuel and Oil

Features and Controls

Operation

Maintenance

Storage

Troubleshooting

Owner Service Assistance

Maintenance Log

GENERAL INFORMATION

Boater's Responsibilities

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

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

Before Operating Your Outboard

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

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

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

Boat Horsepower Capacity

⚠ WARNING

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

GENERAL INFORMATION

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

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

26777

High-Speed and High-Performance Boat Operation

If your outboard is to be used on a high-speed or high-performance boat with which you are unfamiliar, we recommend that you do not operate it at its high-speed capability without first requesting an initial orientation and familiarization demonstration ride with your dealer or an operator experienced with your boat/outboard combination. For additional information, obtain a copy of our **Hi-Performance Boat Operation** booklet from your dealer, distributor, or Mercury Marine.

Propeller Selection

The propeller on your outboard is one of the most important components in the propulsion system. An improper propeller choice can significantly affect the performance of your boat and could result in damage to the outboard engine.

When choosing a propeller, a full selection of aluminum and stainless steel propellers specifically designed for your outboard are available through Mercury Racing. To view the entire product offering and find the correct propeller that is best suited for your application, visit www.mercuryracing.com or see your local authorized Mercury dealer.

SELECTING THE CORRECT PROPELLER

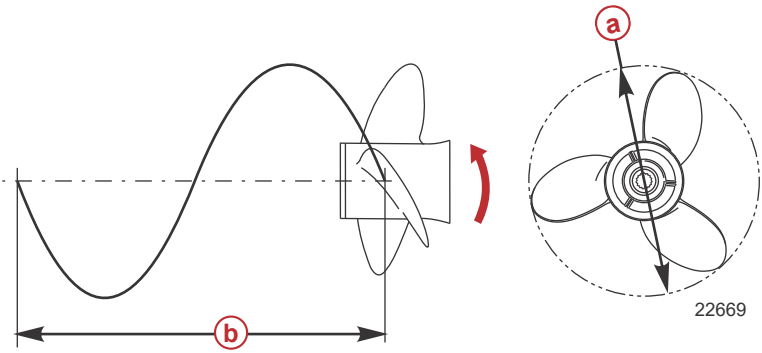
An accurate tachometer for measuring engine speed is important in choosing the correct propeller.

Choose a propeller for your boating application that will allow the engine to operate within the specified full throttle operating range. When operating the boat at full throttle under normal load conditions, the engine RPM should be in the upper half of the recommended full throttle RPM range. Refer to **Specifications**. If engine RPM is above that range, select a propeller of increased pitch in order to reduce engine RPM. If engine RPM is below the recommended range, select a propeller of reduced pitch to increase engine RPM.

GENERAL INFORMATION

IMPORTANT: To ensure proper fit and performance, Mercury Marine recommends the use of Mercury or Quicksilver branded propellers and mounting hardware.

Propellers are designated by the diameter, pitch, number of blades, and material. The diameter and pitch are stamped (cast) into the side or the end of the propeller hub. The first number represents the diameter of the propeller and the second number represents the pitch. For example, 14x19 represents a propeller with a 14 inch diameter and 19 inches of pitch.



a - Diameter
b - Pitch - Travel during one revolution

The following are some propeller basics that will help you determine the correct propeller for your boating application.

Diameter - The diameter is the distance across the imaginary circle that is made when the propeller rotates. The correct diameter for each propeller has been predetermined for the design of your outboard. However, when more than one diameter is available for the same pitch, use a larger diameter for heavy boat applications and a smaller diameter for lighter applications.

Pitch - The pitch is the theoretical distance, in inches, that a propeller travels forward during one revolution. Pitch can be thought of similar to gears in a car. The lower the gear, the faster the car will accelerate, but with lower overall top speed. Likewise, a lower pitch propeller will accelerate quickly, but top-end speed will be reduced. The higher the propeller pitch the faster the boat will usually go; though typically slowing acceleration.

Determining the correct pitch size - The 500R outboard is equipped with Adaptive Speed Control (ASC), a feature that automatically adjusts the engine load to maintain engine speed (RPM). For more information about ASC, refer to **Adaptive Speed Control**.

Determining the correct propeller pitch requires that certain procedures be followed to ensure the best performance. Refer to **Adaptive Speed Control (ASC) Propping with G3** if G3 software is available. If G3 software is not available, refer to **Adaptive Speed Control (ASC) Propping without G3**.

The following list explains the effects of propeller pitch and propeller blade selection. These are general guidelines and may vary depending on the application.

- Adding 1 inch of pitch will reduce the full throttle RPM by 150 to 200 RPM.
- Subtracting 1 inch of pitch will increase full throttle RPM by 150 to 200 RPM.
- Upgrading from a 3-blade propeller to a 4-blade propeller will generally decrease full throttle RPM by 50 to 100 RPM.

IMPORTANT: Avoid damage to the engine. Never use a propeller that allows the engine to exceed the recommended full throttle RPM range when under normal full throttle operation.

PROPELLER MATERIAL

Most propellers manufactured by Mercury Marine are made from either aluminum or stainless steel. Aluminum is suitable for general purpose use and is standard equipment on many new boats. Stainless steel is over five times more durable than aluminum and typically provides performance gains in acceleration and top end speed due to design efficiencies. Stainless steel propellers also come in a larger variety of sizes and styles that allow you to dial in the ultimate performance for your boat.

3-BLADE VS. 4-BLADE

Available in many sizes of both aluminum and stainless, 3 and 4-blade propellers have unique performance characteristics. In general, 3-blade propellers offer good all around performance and higher top speed than 4-blade propellers. However, 4-blade propellers are usually faster to plane and more efficient at cruising speeds, but lack the top end speed of a 3-blade propeller.

Outboard Remote Control Models

The outboard must be equipped with a Mercury remote control designed for Digital Throttle and Shift (DTS). Start-in-gear protection is provided by the remote control system.

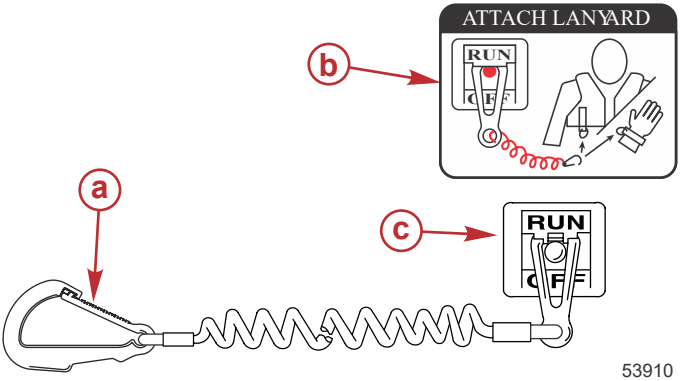
Lanyard Stop Switch

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

A decal near the lanyard stop switch is a visual reminder for the operator to attach the lanyard to their personal flotation device (PFD) or wrist.

GENERAL INFORMATION

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



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

Read the following Safety Information before proceeding.

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

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

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

⚠ WARNING

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

⚠ WARNING

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

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

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

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

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

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

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 outboard gear shift 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 THE BOAT IS STATIONARY

⚠ WARNING

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

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

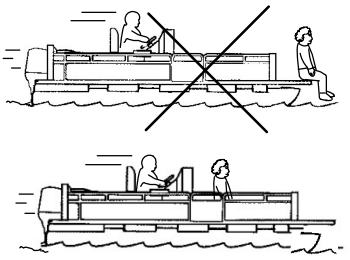
Passenger Safety Message - Pontoon Boats and Deck Boats

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

BOATS HAVING AN OPEN FRONT DECK

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

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



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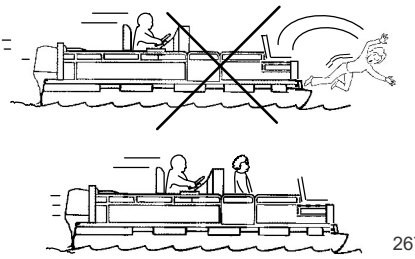
⚠ WARNING

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

BOATS WITH FRONT-MOUNTED, RAISED PEDESTAL FISHING SEATS

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

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



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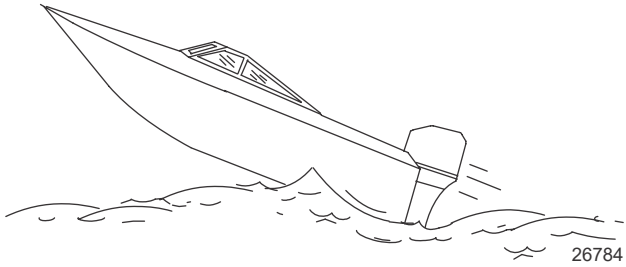
Wave and Wake Jumping

Operating recreational boats over waves and wake is a natural part of boating. However, when this activity is done with sufficient speed to force the boat hull partially or completely out of the water, certain hazards arise, particularly when the boat 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 veer violently in a new direction. Such a sharp change in direction can cause occupants to be thrown out of their seats, or out of the boat.

⚠ WARNING

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

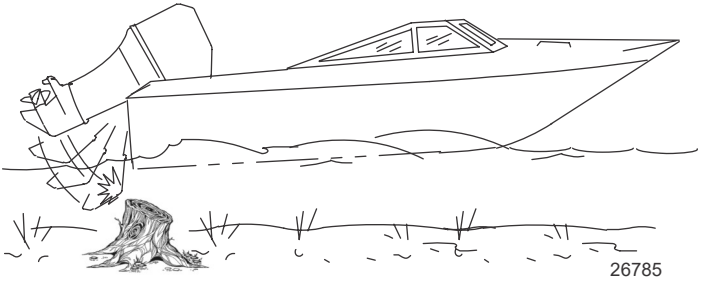
There is another less common hazardous result from allowing your boat to launch off a wave or wake. If the bow of your boat pitches down far enough while airborne, upon water contact it may penetrate under the water surface and submarine for an instant. This will bring the boat to a nearly instantaneous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

Impact with Underwater Hazards

Your outboard is equipped with a hydraulic trim and tilt system that also contains a shock absorbing feature. This feature helps the outboard withstand damage in the case of impact with an underwater object at low to moderate speeds. At higher speeds, the force of the impact may exceed the system's ability to absorb the energy of the impact and cause serious product damage.

No impact protection exists while in reverse. Use extreme caution when operating in reverse to avoid striking underwater objects.

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



⚠ WARNING

Avoid serious injury or death from all or part of an outboard or drive unit coming into the boat after striking a floating or underwater object. When operating in waters where objects may be at the surface or just under the surface of the water, reduce your speed and keep a vigilant lookout.

Examples of objects that can cause engine damage are dredging pipes, bridge supports, wing dams, trees, stumps, and rocks.

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

- Part of the outboard or the entire outboard could break loose and fly into the boat.
- The boat could move suddenly in a new direction. A sharp change in direction can cause occupants to be thrown out of their seats or out of the boat.
- The boat's speed could rapidly reduce. This will cause occupants to be thrown forward or even out of the boat.
- The outboard or boat could sustain impact damage.

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

The boat should also be checked for any hull fractures, transom fractures, or water leaks. If water leaks are discovered after an impact, immediately activate the bilge pump.

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

⚠ WARNING

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

Exhaust Emissions

BE ALERT TO CARBON MONOXIDE POISONING

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

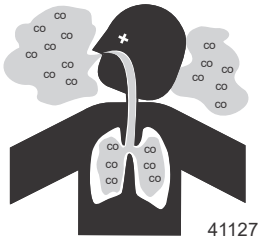
Early symptoms of carbon monoxide poisoning, which are similar to the symptoms of seasickness and intoxication, include headache, dizziness, drowsiness, and nausea.

⚠ WARNING

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

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

STAY CLEAR OF EXHAUST AREAS



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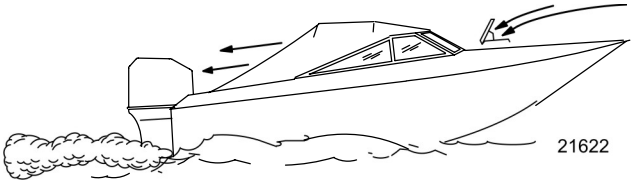
GENERAL INFORMATION

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

GOOD VENTILATION

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

Example of desired air flow through the boat:

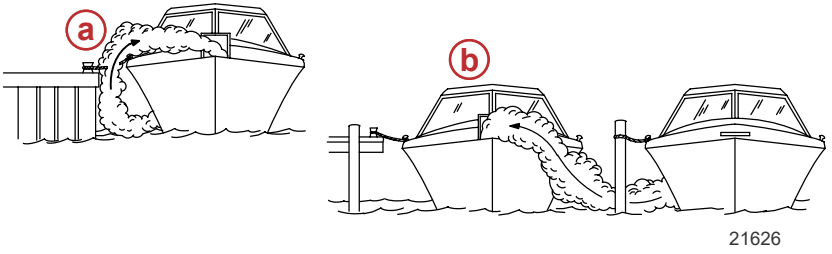


POOR VENTILATION

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

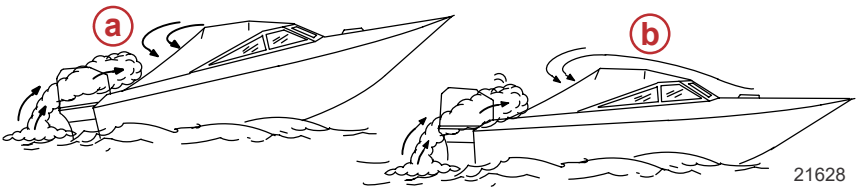
Although the occurrence is rare, on a very calm day, swimmers and passengers in an open area of a stationary boat that contains, or is near, a running engine may be exposed to a hazardous level of carbon monoxide.

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



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

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



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

Selecting Accessories for Your Outboard

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

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

Some accessories not manufactured or sold by Mercury Marine are not designed to be safely used with your power package and may void warranty. Acquire and read the installation and operation manuals for each selected accessory.

Safe Boating Recommendations

To safely enjoy the waterways, boat operators must be familiarized with local and all other governmental boating regulations and restrictions and consider the following suggestions.

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

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

Perform safety checks and required maintenance.

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

Check safety equipment onboard.

- Here are some suggestions of the types of safety equipment to carry when boating:
  - ☐ Approved fire extinguishers
  - ☐ Signal devices: flashlight, rockets or flares, flag, and whistle or horn
  - ☐ Tools necessary for minor repairs

- ☐ Anchor and extra anchor line
- ☐ Manual bilge pump and extra drain plugs
- ☐ Drinking water
- ☐ Radio
- ☐ Paddle or oar
- ☐ Spare propeller, thrust hubs, and an appropriate wrench
- ☐ First aid kit and instructions
- ☐ Waterproof storage containers
- ☐ Spare operating equipment, batteries, bulbs, and fuses
- ☐ Compass and map or chart of the area
- ☐ Personal flotation device (one per person onboard)

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

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

Passenger boarding.

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

Use personal flotation devices.

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

Prepare other boat operators.

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

Do not overload the boat.

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

Ensure that everyone in the boat is properly seated.

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

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

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

Know the boating area and avoid hazardous locations.

Be alert.

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

Never drive the boat directly behind a water-skier.

- A boat traveling at 40 km/h (25 mph) will overtake a fallen skier who is 61 m (200 ft) in front of the boat in only five seconds.

Watch fallen skiers.

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

Report accidents.

- Boat operators are required by law to file a boating accident report with their state boating law enforcement agency when their boat is involved in certain boating accidents. A boating accident must be reported if 1) there is loss of life or probable loss of life, 2) there is personal injury requiring medical treatment beyond first aid, 3) there is damage to boats or other property where the damage value exceeds $2,000.00 (lower amounts in some states and territories), or 4) there is complete loss of the boat. Seek further assistance from local law enforcement.

Rear-Mounted Steering Tie Bar Requirements for Multiple Engine Applications Capable of 161 km/h (100 mph) Top Speeds or Higher

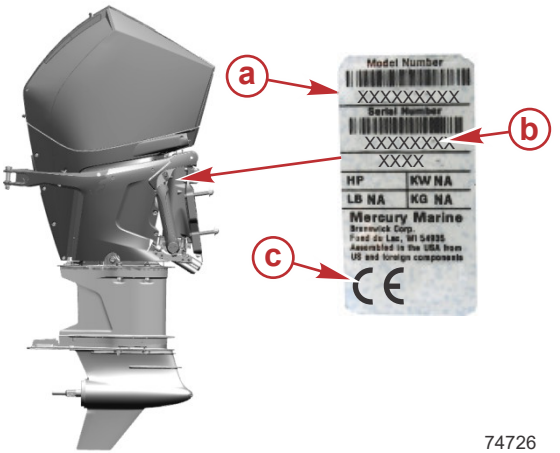
Multiple engine applications capable of 161 km/h (100 mph) top speeds or higher are **required** to be equipped with a rear-mounted steering tie bar (or tie bars, depending on the number of engines). Rear-mounted steering tie bars attach to brackets on the aft end of the outboard. Rear-mounted steering tie bars can reduce steering backlash and improve stability while operating at high speeds.

Multiple engine applications capable of 145 km/h (90 mph) top speeds or higher are recommended to be equipped with a rear-mounted steering tie bar (or tie bars, depending on the number of engines).

IMPORTANT: Failures resulting from not using rear-mounted steering tie bars on multiple engine applications capable of 161 km/h (100 mph) top speeds or higher may result in the denial of engine warranty claims.

Recording the Serial Number

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



74726

a - Model designation
b - Serial number
c - Certified Europe insignia (as applicable)

Specifications—500R

ENGINE OPERATION AND PERFORMANCE SPECIFICATIONS

Refer to the following tables for engine operation and performance specifications. This information will help set up a new boat for maximum performance and reliability, and provide information about certain operating conditions that may reduce performance.

Engine Performance	
Wide-open throttle (WOT) engine RPM range	6000–6600 RPM
Peak power RPM range	6400–6600 RPM
Peak torque	4250 RPM

Block Water Pressure at WOT (6000–6600 RPM)	
Nominal	150–200 kPa (21.8–29.0 psi)
Marginal high pressure	200–250 kPa (29.0–36.3 psi)
Marginal low pressure (refer to **IMPORTANT** remark following this table)	125–150 kPa (18.1–21.8 psi)
Critical high pressure	More than 300 kPa (43.5 psi)

IMPORTANT: Marginal low water pressure can cause the exhaust gas temperature (EGT) and intake air temperature (IAT) to rise, causing Engine Guardian to limit engine power during hot ambient temperature conditions. EGT or IAT readings that are too high will sound the warning horn and display a message on the VesselView display (if installed).

Critical low water pressure can cause the exhaust gas temperature (EGT) and intake air temperature (IAT) to rise, causing Engine Guardian to limit engine power during normal ambient temperature conditions. EGT or IAT readings that are too high will sound the warning horn and display a message on the VesselView display (if installed).

IMPORTANT: Water pressure above the critical high pressure limit will sound the warning horn and display a message on the VesselView display (if installed). It will also cause Engine Guardian to limit engine power to prevent damage to the cooling system. If the water pressure is consistently high, a pressure relief valve kit should be installed.

Block Water Temperature	
Thermostat opening	71.1 °C (160 °F)
Nominal operating temperature	67–76 °C (152.6–168.8 °F)
Marginal operating temperature (hot)	77–80 °C (170.6–176 °F)

Oil Temperature	
Nominal temperature at WOT	110–145 °C (230–293 °F)
Guardian power limit (hot) (refer to **IMPORTANT** remark following this table)	155 °C (311 °F)
Guardian power limit (cold) (refer to **IMPORTANT** remark following this table)	Less than 50 °C (122 °F)

IMPORTANT: Oil temperatures below 55 °C (131 °F) will cause Engine Guardian to limit the available power. Sufficient power will be available to bring the boat on plane and run at a low cruise speed. Oil temperatures below 50 °C (122 °F) will not sound the warning horn.

Oil temperatures above 155 °C (311 °F) will cause Engine Guardian to limit engine power, and the warning horn will sound.

In certain special scenarios, the 500R outboard may enter Guardian mode without alerting the operator with a horn or visual display warning. This is part of the intended control system behavior and does not mean that service is required.

Examples of this are:

- When the operator is trying to demand full power before the oil temperature has reached a safe value.
- Under certain conditions when the supercharger outlet air temperature (intake air temp) is temporarily high.
- This can happen if the operator commands 100% power immediately upon a hot restart before allowing the engine time to fully circulate water through the system.
- It can also be power reduced due to supercharger outlet air temperature if the engine height is marginally high or aerated water is being introduced on high-speed applications.

In these cases, no warnings are sent to the operator and no faults are stored in Freeze Frame as there is not an engine problem. The power reduction serves to protect the engine while deterring the driver from operating the engine in this manner and preventing nuisance faults that do not require engine service from being stored in the PCM. In all cases, power reduction of this type can be remedied through altering operator behavior, or a change in boat setup/engine height.

500R SPECIFICATIONS

Attribute	500R
Horsepower	500
Kilowatts	372

Attribute		500R
Full throttle RPM range		6000–6600
Idle RPM in neutral gear*		600
Idle charge compensation**		600–725
Troll control RPM limit		600–1200
Number of cylinders		8
Displacement		4.6 Liter 4,576 cc (279.2 cid)
Cylinder bore		92 mm (3.62 in.)
Stroke		86 mm (3.38 in.)
Spark plug		8M0135348
Spark plug gap		0.9 mm (0.035 in.)
Spark plug hex size		14 mm
Spark plug torque		20 Nm (15 lb-ft)
R-Drive Sport gear ratio		1.60:1
R-Drive gear ratio		1.60:1
Gearcase capacity	R-Drive Sport (RH)	820 mL (27.7 fl oz)
	R-Drive Sport (LH)	820 mL (27.7 fl oz)
	R-Drive (RH)	820 mL (27.7 fl oz)
	R-Drive (LH)	820 mL (27.7 fl oz)
Recommended gasoline		89 (R+M)/2 or 95 RON minimum, 10% maximum ethanol content Refer to **Fuel Requirements** for more information.
Recommended oil		Mercury Racing 10W-30 MRX Full Synthetic Oil (for best performance)
		Mercury Racing 25W-50 NMMA certified FC-W® Marine Synthetic Blend Marine Engine Oil (if Mercury Racing 10W-30 MRX Full Synthetic Oil is not available)
Engine oil capacity with oil filter replacement		6.6 Liter (7.0 US qt)
Required battery type		12-volt absorbed glass mat (AGM) battery
Battery type***	USA (SAE)	Refer to **Engine Battery Specifications**
	International (EN)	Refer to **Engine Battery Specifications**

*Engine at normal operating temperature.

**The idle charge compensation may automatically increase the engine speed up to 725 RPM to compensate for a low battery charge condition. The increased idle RPM will charge the battery at a higher rate. Activating troll control (optional accessory) will override the idle charge compensation feature.

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

ENGINE BATTERY SPECIFICATIONS

IMPORTANT: This engine requires a 12-volt absorbed glass mat (AGM) marine starting battery that meets the minimum ratings.

Do not use flooded (wet cell) lead acid batteries, gel cell lead acid batteries, or lithium-ion batteries for starting marine engines.

Each engine must be equipped with its own starting battery.

If the boat application requires additional battery loads for boat accessories or marine electronics, install an auxiliary battery or batteries.

Required 12-Volt Absorbed Glass Mat (AGM) Battery Ratings		
USA (SAE) starting battery rating:	With dedicated house battery	1000 minimum marine cranking amps (MCA) with a minimum reserve capacity of 100 minutes RC25 rating
	Cranking battery only	1000 minimum marine cranking amps (MCA) with a minimum reserve capacity of 135 minutes RC25 rating
International (EN) starting battery rating:		800 minimum cold cranking amps (CCA) with a minimum of 65-amp hours (Ah)

NOTE: *Do not use an engine starting battery that does not meet the specified ratings. If a battery that does not meet the ratings is used, the electrical system may perform poorly.*

IMPORTANT: Boating industry standards (BIA, ABYC, etc.), federal standards, and Coast Guard regulations must be adhered to when installing the battery. Ensure that the battery cable installation meets the pull test requirements and that the positive battery terminal is properly insulated in accordance with regulations.

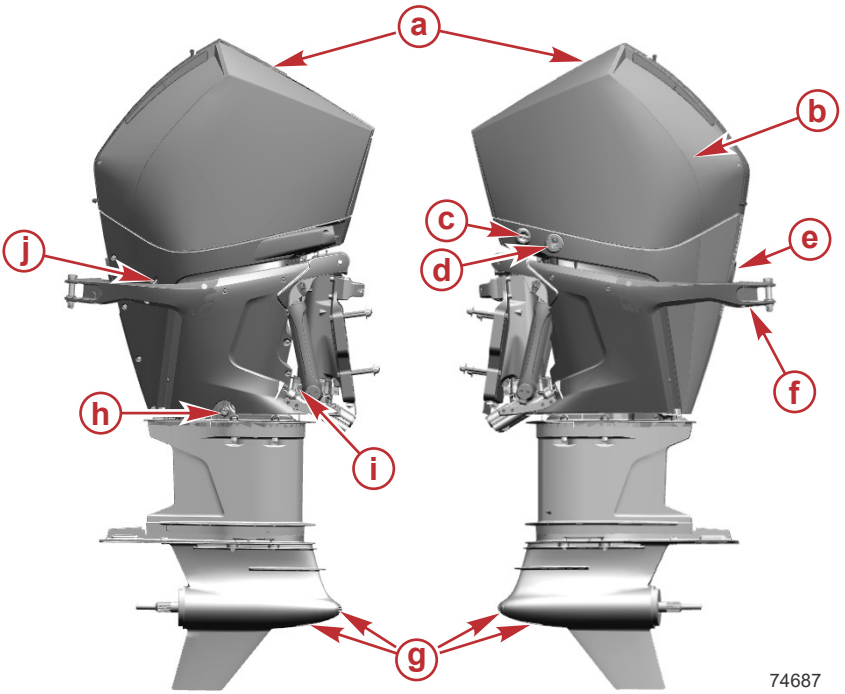
It is recommended (required in some states) that the battery be installed in an enclosed case. Refer to local regulations.

⚠ WARNING

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

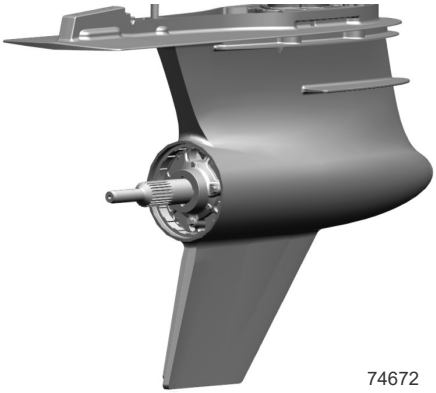
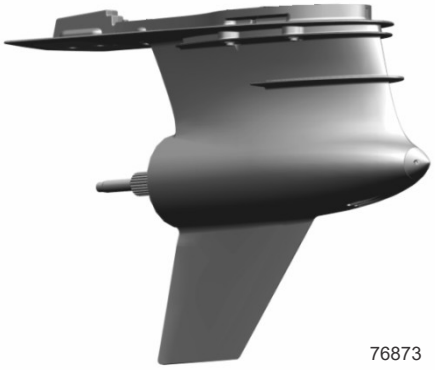
Description	Nm	lb-in.	lb-ft
Battery hex nuts	13.5	120	–

Component Identification



- **a -** Service access door
- **b -** Top cowl
- **c -** Engine flush hose attachment point
- **d -** Auxiliary tilt switch
- **e -** Exhaust relief
- **f -** Rear tie bar bracket (optional)
- **g -** Cooling water intake holes
- **h -** Engine oil drain
- **i -** Manual tilt release
- **j -** Water pump indicator hole

Gearcase Identification

Diameter or Type	Identification Features	Illustration
150 mm (5.9 in.) R-Drive	Interchangeable nose cap—up to 14 water pickup holes can be added Four low water pickups 1.6 ratio gearset Skeg optimized for partial surfacing applications	 74672
150 mm (5.9 in.) R-Drive Sport	Interchangeable nose cap— comes with a tapered surface piercing nose cap as stock Four low water pickups 1.60 ratio gearset Skeg optimized for fully surfacing applications	 76873

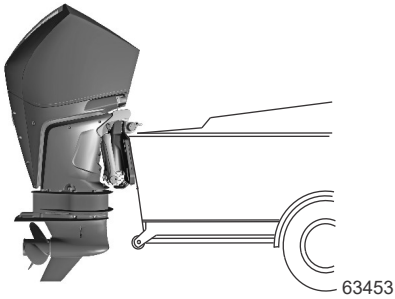
GENERAL INFORMATION

Notes:

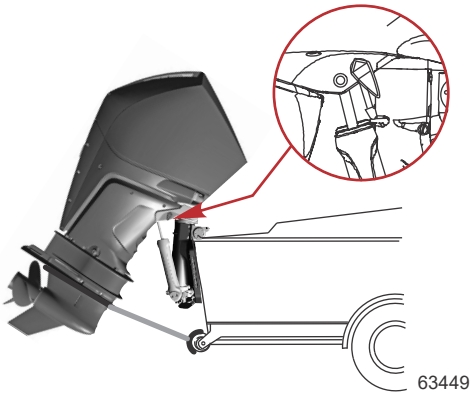
Trailering Boat/Outboard

When transporting the boat on a trailer, the outboard should be positioned and supported in one of the following ways:

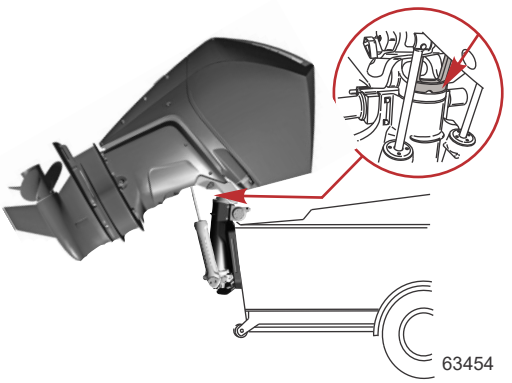
1. If the boat trailer provides sufficient ground clearance, the outboard may be tilted down to the vertical operating position with no additional support required.



2. If additional ground clearance is required, the outboard should be tilted up and supported using the outboard's tilt support bracket (trailering position) in addition to using an accessory transom support device. Refer to **Features and Controls - Power Trim and Tilt**.



3. For maximum ground clearance, the outboard can be tilted to the full tilt position and supported using the outboard tilt support bracket or an accessory transom support device.



Additional clearance may be required for railroad crossings, driveways, and trailer bouncing. See your local dealer for recommendations.

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

Aquatic Invasive Species (AIS)

STOP AQUATIC HITCHHIKERS!™
Be A Good Steward. Clean. Drain. Dry.

For additional information, visit StopAquaticHitchhikers.org.

AIS and their spread can detrimentally impact the boating experience and the future of the boating lifestyle. Reducing the spread of AIS has led to significant national efforts to inspect boats moving between water bodies or across state and federal boundaries and could lead to delayed or denied access if AIS are suspected or found on board.

AIS include plant life such as Eurasian watermilfoil and water hyacinth, and animals such as spiny water flea, quagga, and zebra mussels. AIS may vary in size from microscopic, to easily visible to the naked eye, and can live in residual water or mud. These species damage ecosystems and negatively impact fishing by depleting natural food resources, altering the water environment, and changing the structure of the ecosystem.

TRANSPORTING

The impact of AIS has already resulted in the limiting of boating access to many waterways throughout North America, the closure of public boat ramps, and the reduction of availability for fishing and boating across the United States. Many federal, state, and local agencies have enacted laws and regulations for inspections, permits, launch availability, and water access for vessels entering public waterways.

Boats and associated equipment are major contributors to the spread of AIS. Boats that have come into contact with AIS can become a means of transportation through attachment and entrapment.

You should be aware that water passes in and out of the space under the lower cowls on your engine during normal operation of the boat. When flushing and cleaning your boat to control the spread of AIS, pay attention to this space by directing flushing water into the spaces under the lower cowl. The engine cooling system can be flushed by operating the engine with the appropriate flushing attachment and introducing heated water to the engine.

For more information about the control of AIS in your area, please contact your area wildlife conservation office or local governmental natural resources office.

Notes:

FUEL AND OIL

Fuel Requirements

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

FUEL RATINGS

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

USA and Canada - A posted pump octane rating of 89 (R+M)/2, minimum, for most models. Premium gasoline 91 (R+M)/2 octane is also acceptable. **Do not** use leaded gasoline.

Outside USA and Canada - A posted pump octane rating of 95 RON, minimum, for most models. Premium gasoline (98 RON) is also acceptable. **Do not** use leaded gasoline.

USING REFORMULATED (OXYGENATED) GASOLINE (USA ONLY)

Reformulated gasoline is required in certain areas of the USA and is acceptable for use in your Mercury Marine engine. The only oxygenate currently in use in the USA is alcohol (ethanol, methanol, or butanol).

GASOLINE CONTAINING ALCOHOL

Bu16 Butanol Fuel Blends

Fuel blends of up to 16.1% butanol (Bu16) that meet the published Mercury Marine fuel rating requirements are an acceptable substitute for unleaded gasoline. Contact your boat manufacturer for specific recommendations on your boat's fuel system components (fuel tanks, fuel lines, and fittings).

Methanol and Ethanol Fuel Blends

IMPORTANT: The fuel system components on your Mercury Marine engine will withstand up to 10% alcohol (methanol or ethanol) content in the gasoline. Your boat's fuel system may not be capable of withstanding the same percentage of alcohol. Contact your boat manufacturer for specific recommendations on your boat's fuel system components (fuel tanks, fuel lines, and fittings).

Be aware that gasoline containing methanol or ethanol may cause increased:

- Corrosion of metal parts
- Deterioration of rubber or plastic parts
- Fuel permeation through the rubber fuel lines
- Likelihood of phase separation (water and alcohol separating from the gasoline in the fuel tank)

⚠ WARNING

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

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

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

Fuel Additives

To minimize carbon deposit buildup in the engine, add Mercury or Quicksilver Quickleen Engine and Fuel System Cleaner to the engine's fuel at each tank throughout the boating season. Use the additive as directed on the container.

Low Permeation Fuel Hose Requirement

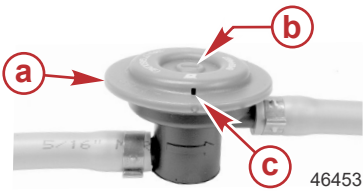
Low permeation fuel hoses are required for outboards manufactured for sale, sold, or offered for sale in the United States. The 500R requires 12.7 mm (0.5 in.) inside diameter fuel hoses.

- The Environmental Protection Agency (EPA) requires that any outboard manufactured after January 1, 2009, must use low permeation fuel hose for the primary fuel hose connecting the fuel tank to the outboard.
- Low permeation hose is USCG Type B1-15 or Type A1-15, defined as not exceeding 15 g/m²/24 h with CE 10 fuel at 23 °C as specified in SAE J 1527 - marine fuel hose.

Fuel Demand Valve

Some boat fuel systems incorporate a fuel demand valve between the fuel tank and the engine and others do not. This engine can be operated with or without a fuel demand valve.

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



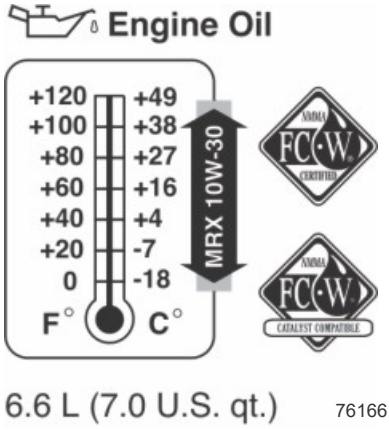
a - Fuel demand valve - installed in the fuel hose between the fuel tank and engine
b - Manual release
c - Vent/water drain holes

Engine Oil Recommendations—500R

Mercury Racing 10W-30 MRX Full Synthetic Oil is the preferred choice for best performance and general, all-temperature use. Use Mercury Racing 25W-50 NMMA certified FC-W® Marine Synthetic Blend Marine Engine Oil if Mercury Racing 10W-30 MRX Full Synthetic Oil is not available.

If the recommended Mercury Racing FC-W certified oils are not available, a major outboard manufacturer's brand of NMMA FC-W certified 4-Stroke outboard oil of the same viscosity may be used.

IMPORTANT: The use of nondetergent oils or multiviscosity oils (other than Mercury or Quicksilver NMMA FC-W certified oil or a major brand NMMA FC-W certified oils) are not recommended.



Checking and Adding Engine Oil

IMPORTANT: Inspect oil for signs of contamination. Oil contaminated with water will have a milky color to it; oil contaminated with fuel will have a strong fuel smell. If contaminated oil is noticed, have the engine checked by your dealer.

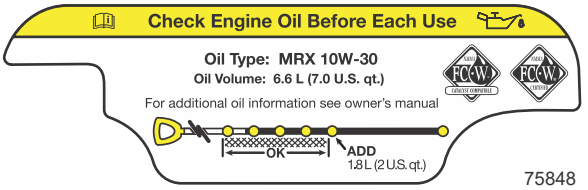
FUEL AND OIL

IMPORTANT: Do not overfill. Tilt the outboard out/up past vertical for approximately one minute to allow trapped oil to drain back to the oil sump. The outboard must be in a vertical (not tilted) position when checking the engine oil. For accurate readings, check the oil only when the engine is cold or after the engine has not run for at least an hour.

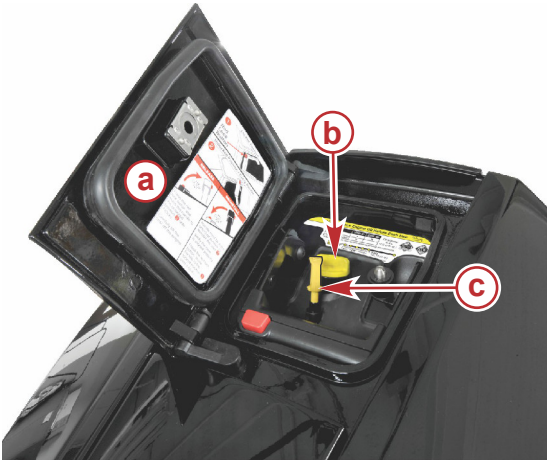
1. Before starting a cold engine, tilt the outboard out/up past vertical to allow trapped oil to drain back to the oil sump. Allow the outboard to remain tilted for approximately one minute.
2. Tilt the outboard to a vertical operating position.
3. Push down on the port side of the service access door to unlock and open the door.

Push here to unlock

NOTE: *On the underside of the service access door is a quick reference decal which lists the type of oil to use and how to read the dipstick.*

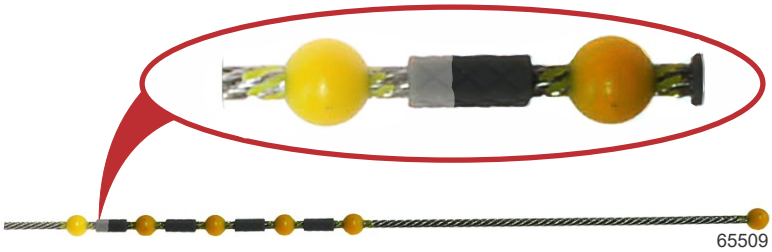


4. Remove the dipstick and observe the area of the five beads.



a - Service access door
b - Oil fill cap
c - Dipstick

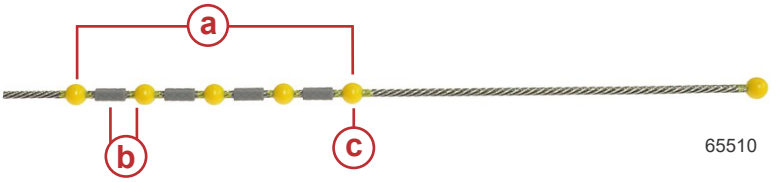
5. The bead or crosshatch which shows oil furthest from the end is the oil level.



Oil level example

NOTE: *With new oil in the engine, it may be difficult to view the oil level on the dipstick. The crosshatch areas between the beads on the dipstick assembly help identify the oil level. The oil level is within the safe operating range if oil is present on any of the five oil range beads, or on the four crosshatch areas. When the oil level is only on the lowest oil range bead, the operator can add 1.8 Liter (2 US qt) of oil and the level will remain within the safe operating range. When the oil becomes dark from hours of product use, it will be easier to identify the oil level on the dipstick.*

IMPORTANT: Repeated removal and insertion of the dipstick will subsequently deposit oil further up the dipstick tube which could cause an error reading the oil level.



a - Safe operating range
b - General area after an oil change
c - Add 1.8 Liter (2 US qt) of oil

6. If none of the beads show the oil level, remove the oil filler cap and add 1.8 Liter (2 US qt) of the specified outboard motor oil.

Description	Where Used	Part No.
Mercury Racing 10W-30 MRX Full Synthetic Oil	500R crankcase	8M0169264

7. Allow a few minutes for the oil to drain into the sump and insert the oil dipstick.
8. Remove the dipstick and inspect whether the oil level is within the safe operating range.
9. Install the dipstick and oil filler cap hand-tight.
10. Close the service access door and lock it into place by pushing on the port side of the door.

Electronic Remote Control (ERC)

Electric steering requires a Digital Throttle and Shift (DTS) electronic remote control (ERC). Because it is electronic, an ERC is capable of several features beyond the basic remote control functions of throttle and shift. These additional features are described in **Digital Throttle and Shift (DTS) Features**.

There are several DTS ERCs that can be used with electric steering, depending on the number of engines and the desired features. The following images show the current Mercury ERCs that will function with electric steering.

71712

Panel mount ERC - ES


71715

Single-engine console ERC - ES


71716

Dual-engine console ERC - no trim


71717

Dual-engine console ERC - with trim

Dual-engine console ERC - premier

Triple-engine console ERC - standard

Triple-engine console ERC - premier

Quad-engine console ERC - standard

Quad-engine console ERC - premier

Five or six-engine console ERC

The basic styles of ERC are panel mount (single-engine only), single-handle console (single-engine only), and dual-handle console (two or more engines).

PANEL MOUNT ERC

Panel mount ERCs control a single engine. There are several variations, but only one of these can be used with electric steering (ES).

Ref	Control/LED	Function
a	Neutral (**N**) LED	Illuminates when the engine is in the neutral gear position. The light flashes when the engine is in throttle-only mode.
b	Brightness (**+** and **–**)	Increases and decreases the brightness settings for the lights on the ERC and Mercury helm components.
c	**THROTTLE ONLY**	Allows the boat operator to increase engine RPM without shifting into gear. Refer to **Throttle-Only Mode**.
d	**QUICK STEER** (if equipped)	Decreases the number of steering helm turns, lock-to-lock, for quicker response during docking. This feature also limits engine speed. Refer to **Quick Steer**.

FEATURES AND CONTROLS

Ref	Control/LED	Function
e	**ACTIVE TRIM** (if equipped)	The **ACTIVE TRIM** button turns the Active Trim feature **ON** or **OFF**. Refer to **Active Trim**.
	Profile ▲ and ▼	Changes the selected Active Trim profile.
	Active Trim LEDs (**1, 2, 3, 4, 5**)	Indicates the currently selected Active Trim profile. ***NOTE:*** *If the LED indicators are flashing, Active Trim is in setup mode.*
f	Lanyard stop switch (emergency stop)	In conjunction with the lanyard cord, shuts off the engine when the operator moves away from the ERC.
g	**START/STOP ENGINE**	Starts or stops the engine.
h	**UP** ▲ and **DN** ▼— trim control	Raises and lowers the engine/drive for best efficiency, or for conditions such as shallow water or trailering. Some boats are equipped with separately-mounted trim controls.
i	Mechanical lock bar	Pressing the mechanical lock bar allows the engine to shift. The mechanical lock bar must always be pressed when moving the control handle out of the neutral position.

FEATURES AND CONTROLS

SINGLE-HANDLE CONSOLE ERC

Single-handle console ERCs control a single engine. There are several variations, but only one of these can be used with electric steering (ES).

Ref	Control/LED	Function
a	Neutral (**N**) LED	Illuminates when the engine is in the neutral gear position. The light flashes when the engine is in throttle-only mode.
b	Brightness (**+** and **–**)	Increases and decreases the brightness settings for the lights on the ERC and Mercury helm components.
c	**TRANSFER**	Allows boat control to be transferred to a different helm. (The LED will be ON at the active helm.) Refer to **Helm Transfer**.
d	**THROTTLE ONLY**	Allows the boat operator to increase engine RPM without shifting into gear. Refer to **Throttle-Only Mode**.
e	**QUICK STEER** (if equipped)	Decreases the number of steering helm turns, lock-to-lock, for quicker response during docking. This feature also limits engine speed. Refer to **Quick Steer**.
f	**ACTIVE TRIM** (if equipped)	The **ACTIVE TRIM** button turns the Active Trim feature **ON** or **OFF**. Refer to **Active Trim**.
	Profile ▲ and ▼	Changes the selected Active Trim profile.
	Active Trim LEDs (**1, 2, 3, 4, 5**)	Indicates the currently selected Active Trim profile. ***NOTE:*** *If the LED indicators are flashing, Active Trim is in setup mode.*
g	**START/STOP ENGINE**	Starts or stops the engine.

Ref	Control/LED	Function
h	**UP** ▲ and **DN** ▼— trim control	Raises and lowers the engine/drive for best efficiency, or for conditions such as shallow water or trailering. Some boats are equipped with separately-mounted trim controls.
i	Mechanical lock bar	Pressing the mechanical lock bar allows the engine to shift. The mechanical lock bar must always be pressed when moving the control handle out of the neutral position.

DUAL-HANDLE CONSOLE ERC

Dual-handle console ERCs control two, three, four, five, or six-engines. Dual-engine ERCs are available with or without integral trim switches.

FEATURES AND CONTROLS

Premier ERCs have an integral, supplemental display, and are available for dual, triple, or quad-engine configurations. Refer to **ERC Supplemental Display** for details.

Dual-handle, quad-engine premier ERC shown, others similar

Ref	Control/LED	Function
a	Neutral (**N**) LEDs (one on each handle)	Illuminate when the engine is in the neutral gear position. The lights flash when the engine is in throttle-only mode.
b	Brightness (**+** and **–**)	Increases and decreases the brightness settings for the lights and display (if equipped) on the ERC and Mercury helm components.
c	**1 LEVER**	Enables the throttle and shift functions of all engines to be controlled by the port lever. Refer to **Single-Lever Mode**.
d	**TRANSFER**	Allows boat control to be transferred to a different helm. (The LED will be ON at the active helm.) Refer to **Helm Transfer**.
e	**THROTTLE ONLY**	Allows the boat operator to increase engine RPM without shifting into gear. Refer to **Throttle-Only Mode**.
f	**ACTIVE TRIM** (if equipped)	The **ACTIVE TRIM** button turns the Active Trim feature **ON** or **OFF**. Refer to **Active Trim**.
	Profile ▲ and ▼	Changes the selected Active Trim profile.
	Active Trim LEDs (**1, 2, 3, 4, 5**)	Indicates the currently selected Active Trim profile. ***NOTE:*** *If the LED indicators are flashing, Active Trim is in setup mode.*

Ref	Control/LED	Function
g	**START/STOP** individual engines	Press to start or stop the indicated engine, as equipped: **P** (port), **PC** (port center), **C** (center), **SC** (starboard center), **S** (starboard)
h	Display and display buttons (premier ERCs only)	Refer to **ERC Supplemental Display** for details.
i	**START/STOP - ALL ENGINES**	Starts or stops all engines. If some, but not all engines are running, pressing this button will stop all running engines. Refer to **Start/Stop All Engines**.
j	**UP ▲** and **DN ▼** —trim control (if equipped)	Raises and lowers the engines/drives for best efficiency, or for conditions such as shallow water or trailering. ***NOTE:*** *Trim switches for the individual engines are located on the front (bow side) of the ERC.* Some boats are equipped with separately-mounted trim controls.

ERC SUPPLEMENTAL DISPLAY

The ERC supplemental display will show the faults and the status of various features. Warnings for advanced features, such as Skyhook and Active Trim, will appear on the ERC supplemental display. Visit mercurymarine.com for additional details.

- **a -** Port engine gear indicator
- **b -** Active Trim status
- **c -** Starboard engine gear indicator
- **d -** Display
- **e -** ENTER button
- **f -** Up/down selection buttons
- **g -** Menu button

ELECTRONIC REMOTE CONTROL (ERC) OPERATION

Operation of the shift and throttle is controlled by the movement of the control handle. Push the control handle forward from neutral to the first detent for forward gear. Continue pushing forward to increase speed. Pull the control handle from the forward position to the neutral position to decrease speed and eventually stop. Pull the control handle back from neutral to the first detent for reverse gear. Continue pulling back to increase speed in reverse.

NOTE: *On panel mount and single-handle console ERCs, press the mechanical lock bar when moving the control handle out of the neutral position.*

71972

ERC HANDLE FRICTION AND DETENT ADJUSTMENT

The control handle friction adjustment screw can be used to increase or decrease the tension on the control handle. This will help prevent unwanted motion of the handle in rough water.

The detent adjustment screw can be used to increase or decrease the effort it takes to move the control handle out of the detent position.

NOTE: *The control handle friction and detent adjustment screws may require periodic maintenance adjustment.*

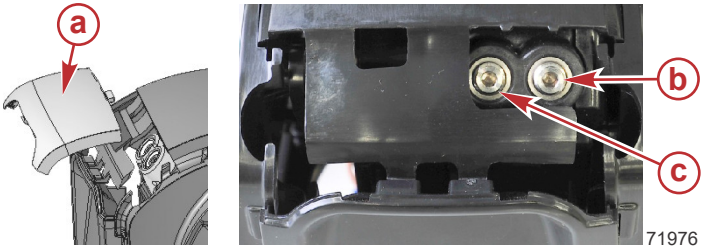
Remove the access cover from the front of the ERC to expose the adjustment screws. Using a hex wrench turn the desired screw clockwise to increase tension, or counterclockwise to decrease tension. Install the access cover after the desired tension is achieved.

71261

Panel mount ERC (ERC shown not installed, access cover removed)

a - Handle friction adjustment screw

b - Detent adjustment screw



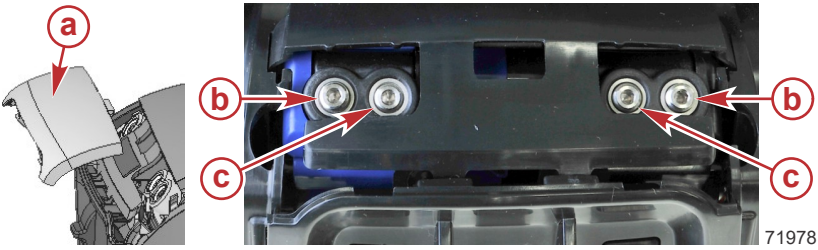
71976

Single-handle console ERC

a - Access cover

b - Detent adjustment screw

c - Handle friction adjustment screw



Dual-handle console ERC

- **a -** Access cover
- **b -** Detent adjustment screws
- **c -** Handle friction adjustment screws

ZERO EFFORT CONTROLS

Zero Effort controls allow the operator to control the shifting and throttle with separate control handles. Zero Effort controls are available in single, and multiple engine applications including shadow mode operation.

Hot Foot

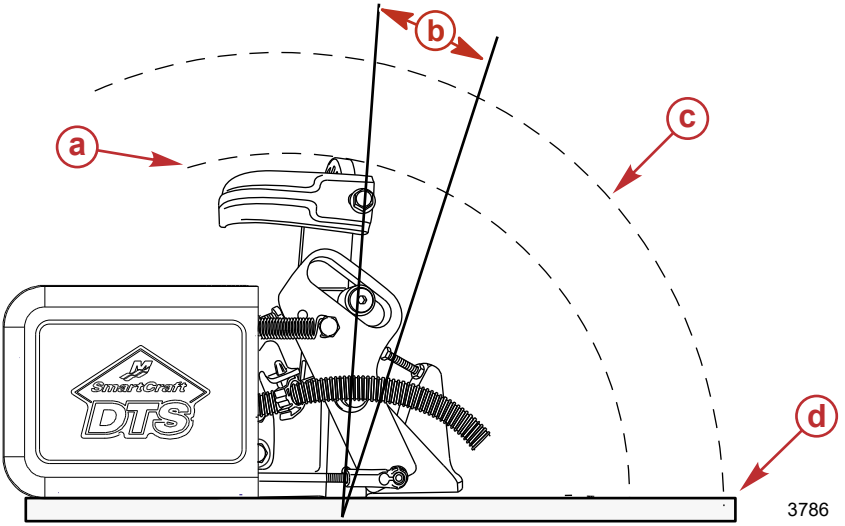
REQUIREMENTS FOR OPERATION OF A HOT FOOT

Engine speed is controlled from idle to WOT by either the foot throttle or the panel mount control handle. Hot foot throttle operation requires the DTS system be set up with a switch that can turn the hot foot throttle control off or on. This will allow the boat operator to select the throttle operation through the electronic remote control assembly or through the hot foot control assembly.

DTS HOT FOOT OPERATION

DTS Hot Foot

DTS hot foot operation use is unique and is generally used on boats that can reach significant speeds. The use of a hot foot allows the operator to keep both hands on the steering wheel at all speeds, which allows the operator a greater control of the boat.



a - Pedal radius—241 mm (9.5 in.)
b - Maximum pedal travel—30°
c - Required added clearance for shoe
d - Boat deck

Hand and Foot Control Operation with Hand Throttle On/Off Switch

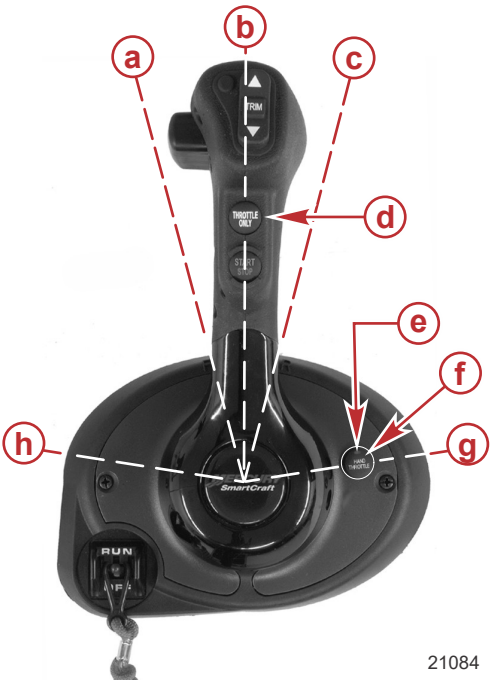
1. Engine speed is controlled from idle to WOT by either the foot throttle or the panel mount control handle.
2. **The default setting when the engine is started:**
   a. Throttle control at the foot throttle.
   b. The hand throttle indicator light is off.
3. **To transfer throttle control to the panel mount remote control handle:**
   a. Place the throttle control handle in neutral or in the forward/reverse detent position.
   b. Push the hand throttle on/off switch button.
   c. A single horn beep will sound.
   d. The hand throttle indicator light is on.

e. Throttle control at the panel mount remote control handle.

NOTE: *If the transfer fails, a double horn beep will sound.*

4. **To return throttle control to the foot throttle:**
   a. Place the throttle control handle in neutral or in the forward/reverse detent position.
   b. Push the hand throttle on/off switch button.
   c. A single horn beep will sound.
   d. The hand throttle indicator light is off.
   e. Throttle control at the foot throttle.

NOTE: *If the transfer fails, a double horn beep will sound.*



- **a -** Forward detent position
- **b -** Neutral detent position
- **c -** Reverse detent position
- **d -** Throttle only button
- **e -** Hand throttle indicator light
- **f -** Hand throttle on/off switch button
- **g -** Full reverse position
- **h -** Full forward position

Active Trim

INTRODUCTION TO ACTIVE TRIM

Active Trim is Mercury Marine's patented GPS-based automatic trim system. This intuitive, hands-free system continually adjusts engine or drive trim for changes in operating conditions to improve performance, fuel economy, and ease of operation. It responds to boat maneuvers with precision and delivers a better overall driving experience. No knowledge of trimming an engine or drive is needed to take advantage of Active Trim.

- As the boat accelerates, the engine or drive will trim out.
- As the boat decelerates, for example, while making a turn, the engine or drive will trim in.
- Active Trim can be overridden at any time by using the regular, manual trim buttons.
- Active Trim allows the boat operator to compensate for changes in boat load, driver preferences, and weather conditions while maintaining full automatic control.

Modes of Operation

The Active Trim system has four modes of operation:

61896

1. Idle speeds
Maintains the existing trim position.

61897

2. Acceleration (hole shot)
Tucks the engine or drive under to minimize bow rise and improve time-to-plane.

61898

3. Planing speeds
Progressively trims the engine or drive based on GPS speed to maintain the most efficient running attitude.

61899

4. Override
When the boat operator uses manual trim, the Active Trim system is immediately overridden, returning full control to the operator.

Setup and Configuration

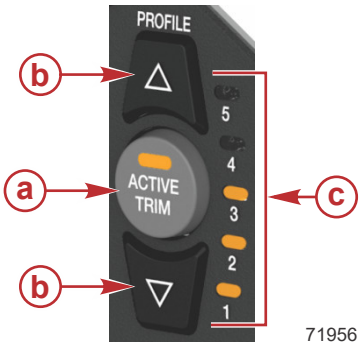
Refer to your authorized Mercury dealer for setup and configuration instructions.

ACTIVE TRIM ERC CONTROLS

IMPORTANT: Authorized Mercury dealers have the ability to disable the Active Trim feature. In this case, the Active Trim buttons and lights on the ERC will not function.

FEATURES AND CONTROLS

Use the buttons and lights on the ERC to control the Active Trim feature.



Active Trim controls on the ERC

Ref	Control/LED	Function
a	**ACTIVE TRIM** button	Turns the Active Trim feature on or off.
	System status light	Provides Active Trim status information: • A constant amber light indicates that the system is working normally. • A flashing amber light indicates that the Active Trim system is not controlling trim (user override). Press the **ACTIVE TRIM** button to resume Active Trim control. • A flashing red light indicates a problem with the system. Refer to **Active Trim Red Status Light**.
b	**PROFILE** select buttons (▲ and ▼)	Up (▲) - Changes the adjustable trim profile to a more aggressive trim curve (more trim angle).
		Down (▼) - Changes the adjustable trim profile to a less aggressive trim curve (less trim angle).
c	Selected profile indicator LEDs (1, 2, 3, 4, 5)	Indicates the adjustable profile currently engaged. 1 is the least aggressive trim profile; 5 is the most aggressive. ***NOTE:*** *If the LED indicators are flashing, Active Trim is in setup mode.*

ACTIVE TRIM OPERATION

- Active Trim automatically controls trim to maintain the optimum engine or drive position based on engine RPM and boat speed.
- Active Trim progressively trims out the engine or drive to maintain an efficient running attitude.

- Active Trim will maintain the last known trim position when operating at speeds in excess of 80 km/h (50 mph).
- Operation above 80 km/h (50 mph) may require trim adjustments using the panel mounted or control handle trim position switch.
- Active Trim will gradually return the engine or drive to the down position during deceleration.
- Active Trim will only function when the engine or drive is in the normal trim range.

GPS

Active Trim uses a GPS signal to determine vessel speed. The Active Trim system will not automatically control trim until the GPS unit has acquired a signal.

Resume Functionality

If the boat operator overrides the Active Trim system at planing speeds using the trim button, or exceeds 80 km/h (50 mph), the system will stop controlling the trim. Active Trim will resume automatically under the following conditions:

- Override occurred above 80 km/h (50 mph) and the boat operator then decelerates to below 80 km/h (50 mph).
- Override occurred above 80% of the rated engine RPM and the boat operator then decelerates to below 80% of the rated engine RPM.
- Override occurred in the cruising speed range and then the boat operator decelerates to idle. Active Trim will become active on the next acceleration.

Shallow Water Operation

Active Trim cannot detect water depth and will not trim up automatically in shallow water. The boat operator will need to override Active Trim by trimming the engine or drive manually or pressing the **Active Trim** button.

Trailer Position

Placing the engine or drive in trailer position—over 50% of the adapted trim range, will prevent Active Trim from engaging. Any time the engine or drive is trimmed above its normal range—to navigate shallow water, launch the boat from a trailer, or load the boat onto a trailer, for example—you must manually trim down before Active Trim will function. This safety feature is meant to prevent the engine or drive from automatically trimming down and hitting something.

SELECTING THE CORRECT PROFILE

With so many available trim profiles, it can be difficult to determine which profile is the correct one. In making this determination, it is important to understand what trim is, how it affects boat operation, and how boat loading can influence the required trim angle. Armed with a clear understanding of these concepts, selecting the correct trim profile becomes simple.

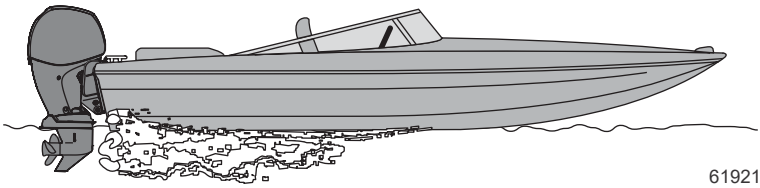
What Trim Is

The trim angle of an outboard or sterndrive is the angle between the boat bottom and the propeller shaft formed by moving the engine or sterndrive closer to the boat transom. This movement is called trimming in or down. Moving the engine or sterndrive further away from the transom is called trimming out or up. When a boat is cruising on plane and the trim is adjusted so that the propeller shaft is parallel to the surface of the water, that is said to be running at zero trim.

The term "trim" is generally used when referring to adjusting the outboard or sterndrive within the first 20° range of travel. This is the range used while operating your boat on plane. The term "tilt" is generally used when referring to adjusting the outboard or sterndrive further up or out of the water.

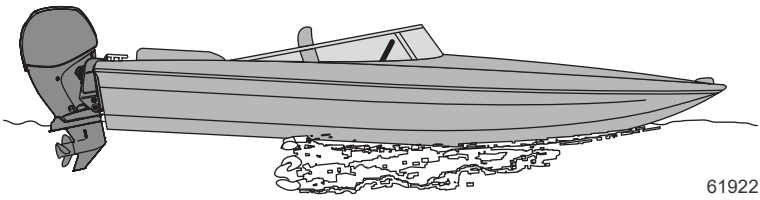
How Trim Affects Boat Operation

The trim angle of the outboard or sterndrive has a distinct effect on the planing angle of the boat, which in turn significantly alters the top speed and handling. The engine or drive should be trimmed in for best start-up acceleration and shortest time to plane. The engine or drive would then be trimmed out for peak performance. Active Trim automatically handles this transition for you.



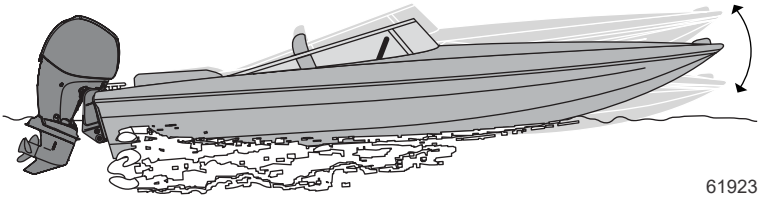
Engine or drive properly trimmed

If the engine or drive is trimmed in too far, the bow drops and the boat runs too wet. In this condition, top speed drops, fuel economy decreases, the boat may oversteer in one direction or the other (bow steering), and steering torque will increase (to the right with a right-hand rotation propeller). Occasionally, extreme trim down can cause a boat to list to the left (with a right-hand propeller).



Engine or drive trimmed in (bow too low)

If the engine or drive is trimmed out too far, the propeller may lose its hold on the water, fast V-bottom boats may start to walk from side to side (chine walking), steering torque will increase in the opposite direction to that when trimmed in, and getting on plane may be difficult or labored. Porpoising of the boat may also occur.



Engine or drive trimmed out (bow too high); porpoising

Boat Loading and Trim

Under normal loading and operating conditions while on plane, the boat bottom is roughly parallel to the surface of the water. Changing the loading of the boat will not change the trim angle as previously defined, but it will change the running attitude of the boat with respect to the surface of the water. Adding weight toward the stern of the boat will cause the bow to rise. Similarly, adding weight toward the bow of the boat will cause the bow to lower.

Changing the trim angle can compensate for a change in the running attitude of the boat. Increasing the trim angle will raise the bow of the boat, compensating for bow heavy loading. Decreasing the trim angle will lower the bow of the boat, compensating for stern heavy loading.

Choosing an Active Trim Profile

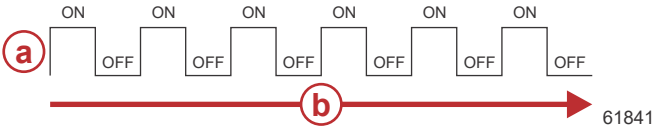
If Active Trim is configured properly, the normal setting for running on plane will be profile 2, 3, or 4. This allows the operator the flexibility to change the trim angle to compensate for variations in boat loading or other operating conditions. Selecting a higher number profile will raise the bow and selecting a lower number profile will lower the bow.

Use the preceding descriptions of trim in and trim out to help determine whether or not your boat is trimmed properly (refer to **How Trim Affects Boat Operation**). In general, this means you can increase the trim profile until the bow begins to porpoise (rise and fall), and then back off one level.

ACTIVE TRIM RED STATUS LIGHT

A flashing red light can indicate different things, depending on if it is a single or a double flash sequence.

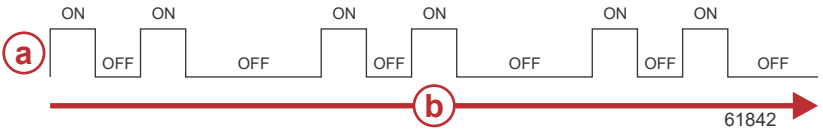
Single Flashing Red



a - Light (on or off)
b - Interval

Fault Condition	Description	Notes
GPS signal intermittent	GPS signal has achieved fix, but is dropping out intermittently.	Indicates loss of GPS signal.
GPS signal unavailable	GPS has not achieved fix since key on.	Indicates obstructed GPS antenna or weak signal.

Double Flashing Red



a - Light (on or off)
b - Interval

Fault Condition	Description	Notes
Trim up or trim down not achieved	The engine did not achieve its trim setpoint while attempting to trim up or down.	Indicates a problem with hydraulic pump operation, fuse, connection, trim sensor, or trim down circuit.

Adaptive Speed Control

This outboard package utilizes adaptive speed control which automatically adjusts the engine load (throttle) to maintain engine speed (RPM). For example, when the boat operator steers into a hard turn, which results in increased load on the engine and a loss of RPM, the propulsion control module (PCM) will open the throttle to maintain RPM through the turn, without the need for the operator to increase the remote control throttle handle. Another example is when cruising or utilizing the boat for tow sports, engine speed will remain constant, regardless of load changes due to waves, trim position, turning or load changes from tow sports. Adaptive speed control is active from idle RPM up to max rated RPM, however, can only maintain engine speed when the throttle is less than wide open.

Advanced Sound Control

Advanced sound control (ASC) is a standard feature on the 500R outboard.

- ASC allows the vessel operator to toggle between two modes of operation: **Stealth** or **Sport** mode.
- The mode of operation can be selected with an accessory dash switch, VesselView, or SmartCraft gauge; Off = Stealth mode, On = Sport mode.
- When Stealth mode is active, the engine noise levels are low (the typical smooth sound of Verado FourStroke power).
- When Sport mode is active, the engine noise levels are higher (a definitive audible indicator of the engine's power).
- Stealth mode is the default mode of operation. If the vessel does not have a VesselView display, SmartCraft gauge, or accessory switch, the ASC will remain in Stealth mode.

NOTE: *Stealth or Sport modes do not affect the engine horsepower or the running characteristics of the engine.*

When the engine is started, ASC will remain in the mode that was selected at the time when the engine was turned off.

Engine Synchronization (Multiple Engines)

Digital Throttle and Shift (DTS) engines have an automatic engine synchronization feature that engages automatically at key-up. Sync mode monitors the position of both ERC levers. If both levers are within 10% of one another, all engines synchronize to the starboard engine's RPM. The SmartCraft system will automatically disengage sync at the last 10% of the lever range to allow each engine the ability to reach the maximum available RPM. Sync mode cannot engage until its minimum RPM is met.

Helm Transfer

Some boats are designed to allow control of the vessel from more than one location. These locations are commonly referred to as helms or stations. Helm transfer is a term used to describe the method of transferring control from one helm (or station) to another helm.

⚠ WARNING

Avoid serious injury or death from loss of boat control. The boat operator should never leave the active station while engine is in gear. Helm transfer should only be attempted while both stations are manned. One-person helm transfer should only be performed while engine is in neutral.

The helm transfer function allows the boat operator to select which helm is in control of the vessel. Before a transfer can be initiated, the ERC levers at the active helm and at the helm intended for the transfer must be in the neutral position.

NOTE: *If you attempt to transfer helm control when the ERC levers are not in neutral, a beep will sound and the helm transfer will not succeed until the levers at the helms are moved to neutral and the transfer is requested again.*

Some fault codes may appear on the Mercury-approved multifunction display if other control or navigation functions are attempted after the helm transfer procedure is started. To remove the fault codes it may be necessary to cycle the key switch **OFF** and **ON**, and then restart the helm transfer procedure. Ensure that other control and navigation inputs are performed after the helm transfer is complete to avoid setting fault codes.

NOTICE

The ERC levers must be in neutral to perform a helm transfer. While in neutral your vessel could drift and collide with objects nearby resulting in damage. Keep an adequate look out while performing the helm transfer.

To avoid damage, use extra care when attempting a helm transfer while the vessel is close to docks, piers, or other fixed items or when near other vessels.

TRANSFER LIGHT AND SINGLE-HELM BOATS

IMPORTANT: On boats with a single-helm, the TRANSFER light is constantly on, whenever the ignition key switch is on. This is normal.

72258

REQUESTING HELM TRANSFER

NOTE: *Any movement of the joystick (if equipped) or ERC levers after pressing the transfer button terminates the helm transfer request. A single beep sounds and the transfer button light turns off signaling the end of the transfer request.*

72258

To request the transfer of vessel control from one helm to another:

1. All of the ignition keys must be in the **ON** position.
2. All of the vessel's ERC levers must be in the neutral position.
3. At the helm you are requesting to be made active, press the **TRANSFER** button once. The transfer light turns on and one beep will sound confirming the impending transfer.

NOTE: *If all ERC levers are not in neutral, the neutral lights will flash. Move all ERC levers to neutral and the neutral light will stop flashing.*

4. With the transfer light and neutral light on, press the **TRANSFER** button a second time to complete the helm transfer.
5. When the helm transfer is complete, another beep sounds. The transfer light stays on at the active helm location.

NOTE: *If the helm transfer is not completed in 10 seconds, the request is automatically cancelled and a double beep sounds. Control will remain at the existing active helm. Press the transfer button again to restart helm transfer.*

6. The helm where the transfer request was initiated is now active and controls the vessel.

HELM TRANSFER AND AUTOPILOT

Transferring control from an active helm to an inactive helm (from one station to another station) affects the functionality of autopilot modes. Some of the effects are listed.

- Auto heading mode will disengage when the ERC levers are moved to the neutral position. You must engage auto heading at the selected active helm.
- Requesting a helm transfer places the autopilot into standby mode. Any required inputs will need to be entered at the selected active helm.
- Skyhook will disengage when the transfer button is pressed the second time. Skyhook must be engaged at the selected active helm.
- If auto heading is activated, the helm transfer functionality is disabled. Turn this feature off and resume the transfer. At the selected active helm, engage auto heading.
- If route mode is activated, the helm transfer functionality is disabled. Turn this feature off and resume the transfer. At the selected active helm, engage route mode.

- Route mode (waypoint sequencing) control of the route and display of route data on your chartplotter does not automatically transfer to the chartplotter at the active helm. You must turn on the chartplotter at the selected active helm, input the waypoint route to be tracked, and engage route mode.

IMPORTANT: If faults are encountered while attempting to complete a helm transfer, all controlling modules for the engine and the joystick piloting system must be turned off. To turn these controlling modules off, turn both engines off and place both engine ERC handles in reverse full throttle for three seconds.

Quick Steer

Quick Steer is available on vessels equipped with Single Outboard Electric Steering. Electric steering versions of the panel mount and single-handle console ERCs have a button to enable the Quick Steer feature. This feature is meant to provide rapid steering and more precise throttle control when operating in tight quarters, such as when docking.

72260

- Quick Steer decreases the number of steering turns, lock-to-lock, at the helm to approximately quarter-turn each direction, while still providing full steering capacity.
- Quick steer limits engine speed.

Throttle and Shift Operation with Three or Four Engines

TRIPLE-ENGINE THROTTLE AND SHIFT OPERATION

Movement of the handles on the remote control allows the boat operator to control the engine throttle speed and gear shift positions of all three engines.

The throttle and shift function is dependent on what engines are running. Refer to the following table.

Port Engine	Center Engine	Starboard Engine	Control Handle Function
Running	Running	Running	Port engine throttle and shift = controlled by port control handle
			Starboard engine throttle and shift = controlled by starboard control handle
			Center engine throttle = shadows the engine with the lowest throttle setting until the port and starboard engine are within 10% of one another at which point all engines synchronize to the starboard engine's RPM.
			Center engine shift = neutral unless both engines are in the same gear

Port Engine	Center Engine	Starboard Engine	Control Handle Function
Running	Running	Off	Port and center engine throttle and shift = controlled by port control handle
Off	Running	Running	Starboard and center engine throttle and shift = controlled by starboard control handle
Running	Off	Running	Port engine throttle and shift = controlled by port control handle
			Starboard engine throttle and shift = controlled by starboard control handle
Running	Off	Off	Port engine throttle and shift = controlled by port control handle
Off	Off	Running	Starboard engine throttle and shift = controlled by starboard control handle
Off (ignition key switch turned **ON**)	Running	Off (ignition key switch turned **ON**)	Center engine throttle and shift = neutral/idle unless both control handles are in the same gear

Turning off one of the outer engines while underway will cause the center engine to go into forced neutral/idle. Operation to the center engine can be restored by moving the control handle of the functioning outer engine back into neutral position and then engaging. The center engine speed and gear shift will then be controlled by the functioning outer engine.

Turning off the center engine while underway will have no effect on the operation of the outer engines.

If a failure should occur while underway which causes one of the outer engines into forced neutral/idle condition, the center engine will also be forced to neutral/idle. Operation to the center engine can be restored by moving the control handle of the functioning outer engine back into neutral and then engaging.

QUAD-ENGINE THROTTLE AND SHIFT OPERATION

Movement of the handles on the remote control allows the boat operator to control the engine throttle speed and gear shift positions of all four engines.

The throttle and shift function is dependent on what engines are running. Refer to the following table.

Port Outer Engine	Port Inner Engine	Starboard Inner Engine	Starboard Outer Engine	Control Handle Function
Running	Running	Running	Running	Port inner and outer engines throttle and shift = controlled by port control handle
				Starboard inner and outer engines throttle and shift = controlled by starboard control handle
Running	Running	Off	Off	Port inner and outer engine throttle and shift = controlled by port control handle
Off	Off	Running	Running	Starboard inner and outer engine throttle and shift = controlled by starboard control handle
Off (ignition key switch turned **ON**)	Running	Running	Running	Port inner engine throttle and shift = controlled by port control handle
Running	Running	Running	Off (ignition key switch turned **ON**)	Starboard inner engine throttle and shift = controlled by starboard control handle
Off (ignition key switch turned **OFF**)	Running	Running	Running	Port inner engine throttle and shift = controlled by starboard control handle
Running	Running	Running	Off (ignition key switch turned **OFF**)	Starboard inner engine throttle and shift = controlled by port control handle
Running	Off	Off	Running	Port outer engine throttle and shift = controlled by port control handle
				Starboard outer engine throttle and shift = controlled by starboard control handle

Port Outer Engine	Port Inner Engine	Starboard Inner Engine	Starboard Outer Engine	Control Handle Function
Off (ignition key switch turned **ON**)	Running	Running	Off (ignition key switch turned **ON**)	Port inner engine throttle and shift = controlled by port control handle
				Starboard inner engine throttle and shift = controlled by starboard control handle

Turning off the starboard outer engine while underway will cause the starboard inner engine to go into forced neutral/idle. Operation to the inner engine can be restored by turning the starboard outer engine ignition key to the **ON** position and moving the starboard control handle back into neutral position and then engaging. The inner engine speed and gear shift will then be controlled by the starboard control handle.

Turning off the port outer engine while underway will cause the port inner engine to go into forced neutral/idle. Operation to the inner engine can be restored by turning the port outer engine ignition key to the **ON** position and moving the port control handle back into neutral position and then engaging. The inner engine speed and gear shift will then be controlled by the port control handle.

Turning off one of the inner engines while underway will have no effect on the operation of the outer engines.

If a failure should occur while underway which causes the starboard outer engines into forced neutral/idle condition, the inner starboard engine will also be forced to neutral/idle. Operation to the inner engine can be restored by moving the starboard control handle back into neutral and then engaging.

If a failure should occur while underway which causes the port outer engines into forced neutral/idle condition, the inner port engine will also be forced to neutral/idle. Operation to the inner engine can be restored by moving the port control handle back into neutral and then engaging.

Single-Lever Mode (Multiple Engines)

Dual-handle console ERCs feature the ability to command all engines with a single-lever. This feature simplifies engine management. Single-lever mode has no affect on the joystick function (if equipped).

72257

To engage single-lever mode:

1. Place both ERC levers in neutral.
2. Press **1 LEVER**. The single-lever light will turn on.

3. Place the port ERC lever into gear.
4. The RPM on all engines will increase and decrease in sync, while all drives remain in gear.

To disengage single-lever mode:

1. Place both ERC levers in neutral.
2. Press **1 LEVER**. The single-lever light will turn off.

Start/Stop All Engines

Dual-handle console ERCs have a **START/STOP ALL ENGINES** button, which allows starting or stopping all engines with a single button push. The exact behavior of the engines depends on:

1. How many engines are running when the button is pressed (none, all, or some)
2. Whether a particular engine's key switch is **ON** or **OFF**
3. What other actions the operator takes immediately after pressing the **START/STOP ALL ENGINES** button

72256

ENGINE INDICATOR LEDS

LEDs on the **START/STOP ALL ENGINES** button and the individual engine **START/STOP** buttons (on the aft end of the ERC) indicate the status of all engines.

NO ENGINES RUNNING - START ENGINES

When no engines are running (and no engine status LEDs are lit), press the **START/STOP ALL ENGINES** button to start all engines.

1. The LED on the **START/STOP ALL ENGINES** button turns on.
2. The engines will start according to the following sequence (as equipped):
   a. Starboard outer engine - the LED on the starboard outer (**S**) button will light when the engine starts.
   b. Port outer engine - the LED on the port outer (**P**) button will light when the engine starts.
   c. Starboard inner engine - the LED on the starboard inner (**C** or **SC**) button will light when the engine starts.
   d. Port inner engine - the LED on the port inner (**PC**) button will light when the engine starts.

Certain conditions will cause an engine to be skipped in the starting sequence. The starting sequence will ignore an engine and continue with any remaining engines, if:

1. SmartStart times out (around 8 seconds) for an engine
2. The ignition key switch is **OFF** for an engine (the starting sequence will proceed with no delay)

ALL ENGINES RUNNING - STOP ENGINES

When all engines are running (and all engine status LEDs are lit), press the **START/STOP ALL ENGINES** button to stop all engines. All engine status LEDs (individual and the **ALL ENGINES** LED) will turn off.

SOME (NOT ALL) ENGINES RUNNING - STOP ENGINES

When some but not all engines are running (and the corresponding engine status LEDs are lit), press the **START/STOP ALL ENGINES** button to stop all running engines. All engine status LEDs (individual and the **ALL ENGINES** LED) will turn off.

INTERRUPTING THE START ALL PROCESS

Pressing any **START/STOP** button or turning an ignition key switch during engine start up is not recommended.

Throttle-Only Mode

Placing the ERC in throttle-only mode will avoid unintended gear engagement. The engines or drives will turn using the steering wheel or the joystick and the RPM of the engines can be increased while in throttle-only mode, but the gear position will remain in neutral.

72259

To engage throttle-only mode:

1. Place both ERC levers into neutral.
2. Press **THROTTLE ONLY**. The throttle-only light will turn on and the neutral lights will blink.
3. Place either ERC lever into forward or reverse detent position. The warning horn will beep each time the levers are moved into or out of gear while in throttle-only mode, but the drive will remain in neutral.

NOTE: *Throttle-only mode also affects the joystick, if equipped. The drives will move and the RPM can be increased, but the gear position will remain in neutral.*

4. The RPM of the engines can be increased.

To disengage throttle-only mode:

1. Place both ERC levers into neutral. Throttle-only mode will not disengage unless the ERC levers are in neutral.

NOTE: *Pressing* ***THROTTLE ONLY*** *while the ERC levers are in gear will only turn off the throttle-only light. The engines will remain in throttle-only mode until the operator returns the levers to the neutral position.*

2. Press **THROTTLE ONLY**. The throttle-only light will turn off.
3. The neutral lights stop flashing and remain illuminated. Either the ERC levers or the joystick (if equipped) can now be used to control the boat's movement.

Warning System

WARNING HORN SIGNALS

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

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

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

It is important to note that in either of the above scenarios, the horn will only sound one time. If you key the engine off and restart it, the horn will sound again, one time, if the fault is still present. For visual display of the specific engine functions and additional engine data, refer to **SmartCraft Product** information, following.

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

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

ENGINE GUARDIAN SYSTEM

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

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

OVERSPEED REV LIMIT

The overspeed rev limit is set at an RPM greater than the operating range. In the event that the engine is operated at an RPM greater than or equal to the overspeed limit, the PCM does not allow the engine to maintain the power requested by the operator. Refer to **Specifications—500R** to determine this engine's RPM limit.

Upon reaching the beginning of the overspeed rev limit, Engine Guardian will cut spark incrementally from multiple cylinders until speed control is reached. There is no audible warning while Engine Guardian overspeed limit is active.

SMARTCRAFT PRODUCT

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

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

EXHAUST GAS OVER TEMPERATURE

When the Engine Guardian system detects the exhaust gas temperature is high (fault code 2124-20), the warning horn will beep and the engine RPM will be limited. SmartCraft gauges which have the ability display text, will alert the operator with a short text, long text, and the action which the operator should follow. This Guardian warning and engine power reduction can possibly be corrected by inspecting the gear housing water inlet for blockage.

SmartCraft Displayed Text	
Short text	Critical - Overtemp
Long text	Engine exhaust manifold is overheating
Action	Stop the engine and check for gear housing water inlet blockage. If condition persists, return to port immediately. Service the engine before next use.

1. Stop the engine.
2. Check the gear housing water inlet for blockage.

3. If there is no blockage and the condition persists, return to port immediately.

Power Trim and Tilt

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

- Below 2000 RPM the engine can be trimmed or tilted to any range. Caution is advised when operating the engine past the trim range. Ensure the water pickups are submerged.
- While in the trim range and the engine is above 2000 RPM, you can only trim to the maximum trim range.
- If the engine is below 2000 RPM and is in the trailer range, advancing the throttle will allow the engine to achieve a maximum RPM of 4250. Engine operation in this capacity (above the normal 2000 limit) should only be used for loading or unloading the boat onto or off the trailer. It should not be used during normal boat operation.

NOTE: *Exceeding 4250 RPMs the engine PCM will begin Engine Guardian protection.*

a - Trim switch
b - Tilt range
c - Trim range

POWER TRIM OPERATION

With most boats, operating around the middle of the trim range will give satisfactory results. However, to take full advantage of the trimming capability there may be times when you choose to trim the outboard all the way in or out. Along with an improvement in some performance aspects comes a greater responsibility for the operator, this being an awareness of some potential control hazards.

Consider the following lists carefully:

1. Trimming in or down can:
   - Lower the bow.
   - Result in quicker planing off, especially with a heavy load or a stern heavy boat.
   - Generally improve the ride in choppy water.
   - In excess, can lower the bow of some boats to a point where 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 oversteering) if any turn is attempted, or if a significant wave is encountered.

⚠ WARNING

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

2. Trimming out or up can:
   - Lift the bow higher out of the water.
   - Generally increase top speed.
   - Increase clearance over submerged objects or a shallow bottom.
   - In excess, can cause boat porpoising (bouncing) or propeller ventilation.
   - Cause engine overheating if any cooling water intake holes are above the waterline.

TILTING TO FULL UP POSITION

Tilt at Helm

NOTE: *The trim/tilt switch will remain active for 15 minutes after the ignition key switch has been turned off.*

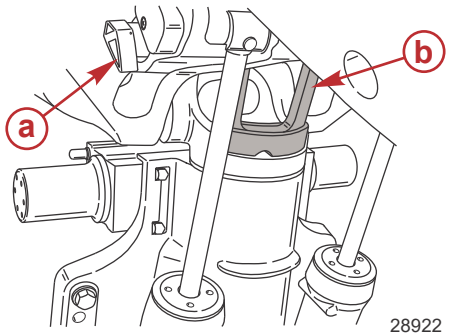
1. If the ignition key switch has been turned off for over 15 minutes, turn it to the **ON** position.
2. Press the trim/tilt switch to the up position. The outboard will tilt up until the switch is released or it reaches its maximum tilt position.

Tilt at Engine

The cowl mounted auxiliary tilt switch can be used to tilt the outboard with the key switch in the **OFF** position.

Tilt Support Lever

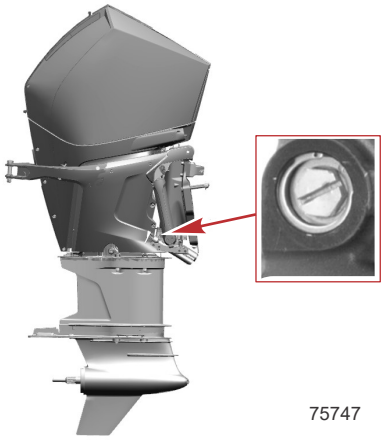
1. Rotate the tilt support lever down.
2. Lower outboard until tilt support bracket rests on the pedestal.
3. Disengage the tilt support bracket, by raising the outboard up and rotating the tilt support lever up. Lower the outboard.



a - Tilt support lever
b - Tilt support bracket

MANUAL TILTING

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



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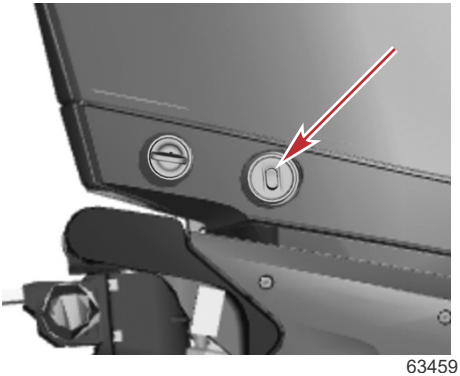
NOTE: *The manual tilt release valve must be tightened before operating the outboard to prevent the outboard from tilting up during reverse operation.*

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

AUXILIARY TILT SWITCH

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



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OPERATING IN SHALLOW WATER

When operating your boat in shallow water, you can tilt the outboard beyond the maximum trim range to prevent hitting bottom.

1. Reduce the engine speed below 2000 RPM.
2. Tilt the outboard up. Make sure all the cooling water intake holes stay submerged at all times.

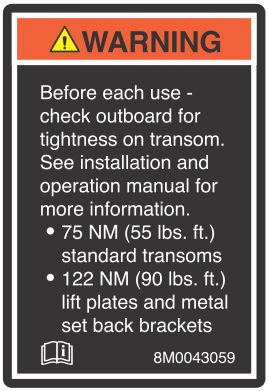
- Below 2000 RPM the engine can be trimmed or tilted to any range. Caution is advised when operating the engine past the tilt range. Ensure the water pickups are submerged.
- If the engine is below 2000 RPM and is in the trailer range, advancing the throttle will allow the engine to achieve a maximum RPM of 4250. Engine operation in this capacity (above the normal 2000 limit) should only be used for loading or unloading the boat onto or off the trailer. It should not be used during normal boat operation.

NOTE: *Exceeding 4250 RPMs the engine PCM will begin Engine Guardian protection.*

Notes:

Important Daily Inspection Before Each Use

Any outboard mounted on the boat must have the mounting hardware inspected and checked to ensure that the hardware has not become loose. A decal on the transom bracket reminds the owner to check the fasteners securing the outboard to the transom before each use.



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Decal on the transom bracket

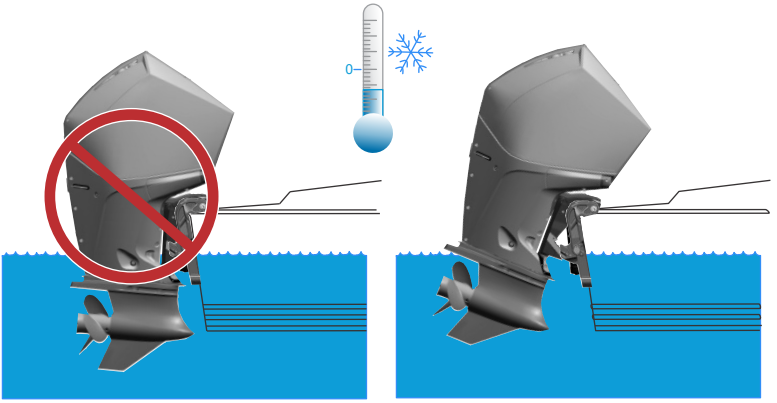
Prestarting Check List

- Operator knows safe navigation, boating, and operating procedures.
- An approved personal flotation device of suitable size for each person aboard and readily accessible (it is the law).
- A ring type life buoy or buoyant cushion designed to be thrown to a person in the water.
- Know your boat's maximum load capacity. Look at the boat capacity plate.
- Fuel supply OK.
- Arrange passengers and load in the boat so the weight is distributed evenly and everyone is seated in a proper seat.
- Tell someone where you are going and when you expect to return.
- It is illegal to operate a boat while under the influence of alcohol or drugs.
- Know the waters and area you will be boating; tides, currents, sand bars, rocks, and other hazards.
- Make inspection checks listed in **Maintenance - Inspection and Maintenance Schedule.**

Operating in Freezing Temperatures

If there is a chance of ice forming on the water, the outboard should be removed and drained completely of water. If ice should form at any level inside the outboard driveshaft housing between the water pump and the powerhead, it will block cooling water flow to the engine which may cause possible damage.

If the boat cannot be removed from the water during freezing temperatures, the outboard should be tilted up so the trailing edge of the antiventilation plate is protruding slightly above the water surface—refer to the following graphic illustration. At this tilt angle, the engine's water pump and cooling water passages are best protected from freezing up with ice.



Operating in Saltwater or Polluted Water

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

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

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

Operating at High Elevations

Your engine automatically compensates for high elevation changes. A different pitch propeller may help reduce some normal performance loss resulting from reduced oxygen in the air. Consult your dealer.

Effects of Elevation and Weather on Performance

The following conditions lower engine performance and cannot be compensated by the engine fuel or electronic management systems:

- Above sea level elevations
- High temperature
- Low barometric pressure
- High humidity

These conditions above reduce air density to the engine, which in turn lowers the following:

- Boost pressure on supercharged engines
- Horsepower and torque throughout the RPM range
- Peak RPM
- Cranking compression

EXAMPLE: An engine running at an elevation of 8,000 feet will have over a 30% power loss while a loss of engine power on a hot and humid day could be as much as 14%. These losses apply to normally aspirated and supercharged engines.

The 500R outboard is equipped with a humidity sensor in the intake tract which will compensate for changes in humidity.

Compensating for power robbing conditions:

- Switch to lower pitch propeller.
- Change gear ratio (if available).

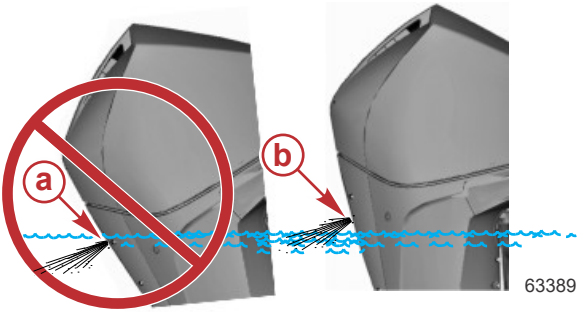
Some boat performance can be improved by dropping to a lower pitch propeller, but engine performance will still remain lower. In some cases, a gear ratio reduction may be more beneficial. To optimize engine performance, prop the engine to allow it to operate at or near the top end of the recommended maximum RPM range at wide-open throttle with a normal boat load.

Other advantages to propeller or gear ratio changes:

- Reduces the possibility of detonation
- Enhances overall reliability and durability of the engine

Setting Trim Angle while Running Engine at Idle Speed

The exhaust relief hole on the outboard can become submerged on some boats if the engine is trimmed full in while running at idle speed. This may result in exhaust restriction, rough idle, excessive smoke, and fouled spark plugs. If this condition exists, trim outboard up until exhaust relief hole is out of the water.



a - Relief hole submerged (wrong)
b - Relief hole above waterline (correct)

Engine Break-in Procedure

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

IMPORTANT: Do not run the engine at full throttle or allow the engine to activate the rev limiter during the first hour of operation.

1. For the first hour of operation, run the engine at varied throttle settings up to 4500 RPM or at three-quarter throttle. Do not run the engine at full throttle or allow the engine to activate the rev limiter during the first hour of operation.
2. For the second hour of operation, run the engine at varied throttle settings up to 4500 RPM or at three-quarter throttle, and at full throttle for approximately one minute every ten minutes.
3. For the next eight hours of operation, avoid continuous operation at full throttle for more than five minutes at a time.

Fuel Supply Module Priming Procedure

The fuel supply module (FSM) is not vented to the ambient air. The air trapped in the FSM, fuel lines, and fuel rail will be slightly compressed during the initial ignition key on with a dry or drained fuel system. Additional key on events under these conditions will not compress the air further to finish the priming of the FSM. An excessive number of key on events may eventually damage the fuel pumps. The volume of air trapped in the FSM must be purged to prime the fuel system. This can be achieved by connecting a tool to the fuel rail Schrader valve fitting to quickly purge the system into an approved container, or by cranking the engine.

PRIMING THE FSM WITH A PURGE TOOL

The use of a purge tool for priming the FSM is the preferred method, but is not always practical. The objective is to purge the air entrained in the fuel system through a purge tool connected to the fuel rail Schrader valve test port. During the key on, opening the dump valve will allow the air to be purged from the FSM and fuel rail. This method should be used on vessels when the fuel system leading to the outboard is restrictive; antisiphon valve or holds a relatively large volume of fuel because of a long fuel supply line or a vessel mounted water-separating fuel filter is installed.

1. Verify the engine is in a level vertical position.
2. Verify the vessel fuel supply line is connected to the outboard fuel system inlet fitting.
3. Connect a fuel pressure gauge to the fuel rail Schrader valve.
4. Secure the fuel pressure gauge purge hose into an appropriate fuel container to collect excess fuel.
5. Open the fuel pressure gauge purge valve and turn the ignition key **ON**. The fuel pumps will run for approximately five seconds.
6. Turn the ignition key **OFF** and then back **ON**. The fuel pumps will run for approximately five seconds. Continue this ignition key cycle until the purged fuel is relatively clear of air bubbles.

NOTE: *If the outboard fuel system does not prime within 15 key* ***ON*** *events, check for leaks in the fuel supply line to the outboard. Repair as needed. If no leak is found, the fuel supply system to the outboard may be too restrictive. Correct the condition and try again.*

7. Remove the fuel pressure gauge.
8. Turn the ignition key **ON**. When the fuel pumps stop running, start the engine. The engine may not start on the first attempt. The engine will run rough at idle for up to two minutes while the residual air is purged from the fuel system.

PRIMING THE FSM (RAN OUT OF FUEL CONDITION)

The use of a purge tool for priming the FSM is the preferred method, but is not always practical. When the vessel fuel system is void of fuel volume, it can be primed without the use of a purge tool. The objective is to purge the air entrained in the fuel system through the fuel injectors during engine cranking to allow fuel to enter the fuel module. This method can be used on vessels where the fuel inlet system to the outboard is less restrictive and holds a relatively small volume of fuel; a short fuel supply line, no water-separating fuel filter, or water-separating fuel filter is already primed.

NOTE: *In most cases, the priming procedure can be accomplished by purging the air from one fuel rail.*

1. Verify the engine is in a level vertical position.
2. Verify the vessel fuel supply line is connected to the outboard fuel system inlet fitting.
3. Turn the ignition key **ON**. The fuel pumps will run for approximately five seconds.
4. Turn the ignition key to the **START** position and release the key. The ECM controls the activation of the starter. The starter may continue cranking for up to eight seconds.

NOTE: *When priming a drained fuel system, residual fuel may cause the engine to flare and stall which shortens the engine cranking event.*

5. Continue with the ignition key **ON** and **START** sequence until the engine continues to run.

IMPORTANT: Allow the starter motor to cool for 20 to 30 seconds between full eight second crank events. Limit the number of attempts to a maximum of 10 full eight second cranking events.

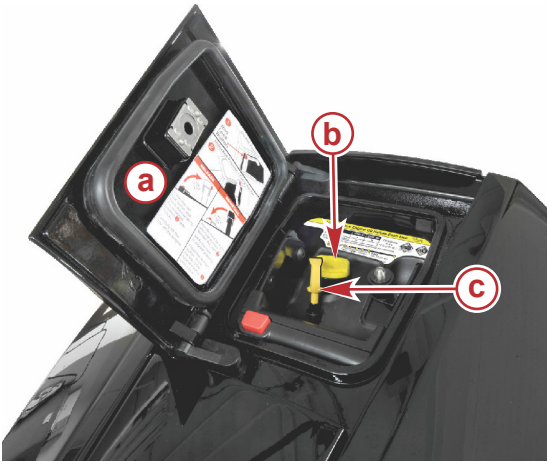
6. Once the engine starts, it may run rough at idle for up to two minutes while the residual air is purged from the fuel system.
7. If the fuel system will not prime within 10 full eight second cranking events, use the previous procedure **Priming the FSM with a Purge Tool** to prime the fuel system.

Starting the Engine

Before starting, read the **Prestarting Check List**, special operating instructions, **Engine Break-in Procedure**, **Gear Shifting** in this section, and the remote control features and operation in the **Features and Controls** section.

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

1. Check the engine oil level. Refer to **Fuel and Oil - Checking and Adding Engine Oil**.



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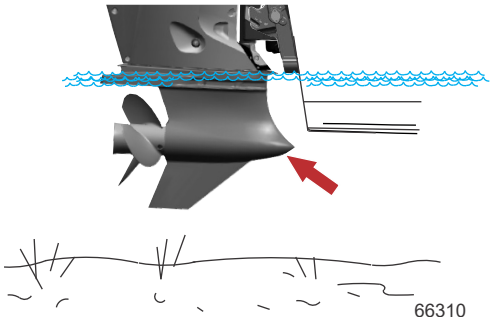
a - Service access door
b - Oil fill cap
c - Dipstick

2. Verify that the cooling water intake and antiventilation plate is submerged.

IMPORTANT: The antiventilation plate must be submerged or the water pump will not prime.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3. Set the lanyard stop switch to the **RUN** position. Refer to **General Information - Lanyard Stop Switch**.

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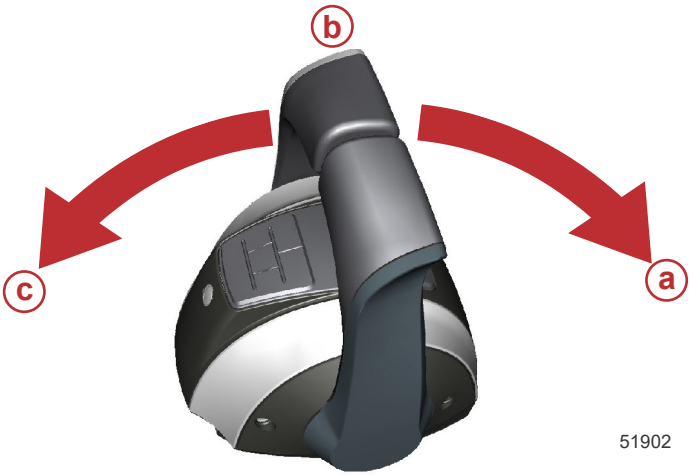
4. Shift the outboard to the neutral (N) position.



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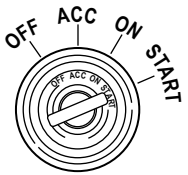
a - Forward
b - Neutral
c - Reverse

NOTE: *For initial start of a new engine or for an engine that ran out of fuel, refer to* ***Fuel Supply Module Priming Procedure****.*

5. Ignition key starting - Turn the ignition key to the **START** position and release the key. The electronic starting system will automatically crank the engine for starting. If the engine fails to start, the engine will stop cranking. Turn the key to the **START** position again until the engine starts.



3485

6. After the engine starts, check for a steady stream of water flowing out of the water pump indicator hole.

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

Gear Shifting

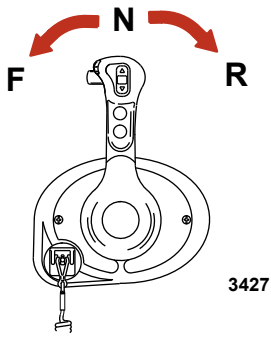
IMPORTANT: Observe the following:

- **Never shift the outboard into or out of gear unless the engine speed is at idle. Shifting at higher than engine idle speed could cause damage to the gearcase.**
- **Do not shift the outboard into reverse when the forward motion of the boat is greater than a no wake speed. Shifting into reverse at higher boat speeds could cause the engine to stall, and in some situations, this could cause water to be drawn into the cylinders, resulting in severe engine damage.**
- The outboard has three gear shift positions: forward (F), neutral (N), and reverse (R).
- When shifting, always stop at the neutral position and allow the engine idle speed to stabilize before shifting into another gear.
- Always shift the outboard into gear with a quick motion.
- After shifting the outboard into gear, advance the lever further to increase speed.

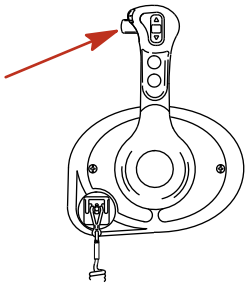
DTS PANEL MOUNT REMOTE CONTROL

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

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



- When shifting, always stop at the neutral position and allow the engine speed to return to idle.
- Panel mount remote control requires the operator to always press shift lock while moving the control handle out of the neutral position.

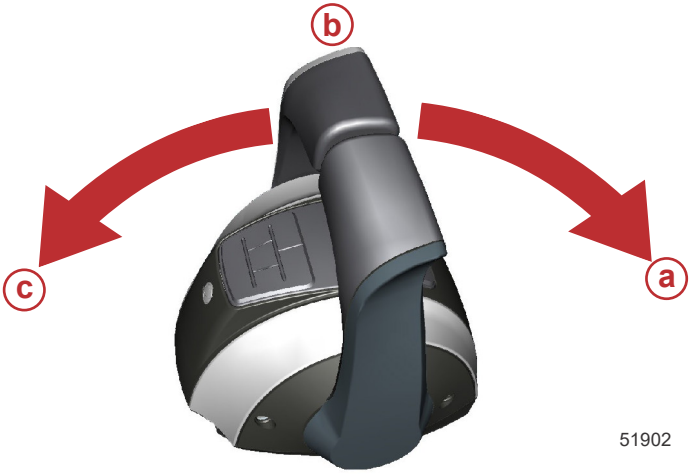


- Advance the control lever to further increase speed.

DTS CONSOLE MOUNT REMOTE CONTROL

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

- The outboard has three gear shift positions to provide operation: forward, neutral, and reverse.



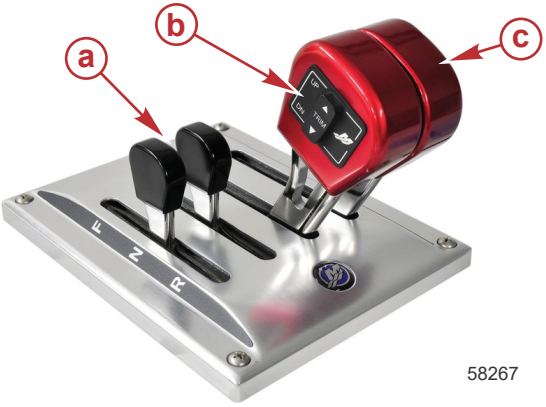
a - Forward
b - Neutral
c - Reverse

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

- Advance the control lever to further increase speed.

ZERO EFFORT CONTROL GEAR SHIFTING

1. Verify the throttle lever is at the idle position.
2. Move the shift lever forward or reverse.
3. Advance the throttle lever to apply power.



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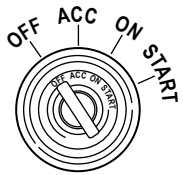
a - Shift levers in neutral position
b - Trim switch
c - Throttle levers at the idle position

Stopping the Engine

IMPORTANT: Turning key to the START position while the engine is running will result in engine shut down, while leaving the DTS system active. This will allow the use of the power trim/tilt from the remote control handle.

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



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Notes:

MAINTENANCE

Cleaning Care Recommendations

OUTBOARD CARE

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

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

Selecting Replacement Parts For Your Outboard

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

DO NOT USE CAUSTIC CLEANING CHEMICALS

IMPORTANT: Do not use caustic cleaning chemicals on the outboard power package. Some cleaning products contain strong caustic agents such as hull cleaners with hydrochloric acid. These cleaners can degrade some of the components they come in contact with including critical steering fasteners.

Damage to steering fasteners may not be obvious during visual inspection and this damage may lead to catastrophic failure. Some caustic cleaning chemicals may cause or accelerate corrosion. Exercise caution when using cleaning chemicals around the engine and follow the recommendations on the packaging of the cleaning product.

CLEANING GAUGES

IMPORTANT: Never use high-pressure water to clean gauges.

Routine cleaning of the gauges is recommended to prevent a buildup of salt and other environmental debris. Crystalized salt can scratch the gauge display lens when using a dry or damp cloth. Ensure that the cloth has a sufficient amount of fresh water to dissolve and remove salt or mineral deposits. Do not apply aggressive pressure on the display lens while cleaning.

When water marks cannot be removed with a damp cloth, mix a 50/50 solution of warm water and isopropyl alcohol to clean the display lens. **Do not use** acetone, mineral spirits, turpentine type solvents, or ammonia based cleaning products. The use of strong solvents or detergents may damage the coating, the plastics, or the rubber keys on the gauges. If the gauge has a sun cover available, it is recommended that the cover be installed when the unit is not in use to prevent UV damage to the plastic bezels and rubber keys.

CLEANING REMOTE CONTROLS

IMPORTANT: Never use high-pressure water to clean remote controls.

MAINTENANCE

Routine cleaning of the remote control external surfaces is recommended to prevent a buildup of salt and other environmental debris. Use a cloth towel which has a sufficient amount of fresh water to dissolve and remove salt or mineral deposits.

When water marks cannot be removed with a damp cloth, mix a 50/50 solution of warm water and isopropyl alcohol to clean the remote control. **Do not use** acetone, mineral spirits, turpentine type solvents, or ammonia based cleaning products. The use of strong solvents or detergents may damage the coating, the plastics, or the rubber components on the remote control.

CLEANING CARE FOR TOP AND BOTTOM COWLS

IMPORTANT: Dry wiping (wiping the plastic surface when it is dry) will result in minor surface scratches. Always wet the surface before cleaning. Do not use detergents containing hydrochloric acid. Follow the cleaning and waxing procedure.

Cleaning and Waxing Procedure

1. Before washing, rinse the cowls with clean water to remove dirt and dust that may scratch the surface.
2. Wash the cowls with clean water and a mild nonabrasive soap. Use a soft clean cloth when washing.
3. Dry thoroughly with a soft clean cloth.
4. Wax the surface using a nonabrasive automotive polish (polish designed for clear coat finishes). Remove the applied wax by hand using a clean soft cloth.
5. To remove minor scratches, use Mercury Marine Cowl Finishing Compound (92-859026K 1).

CLEANING CARE FOR THE POWERHEAD (SALTWATER USE)

IMPORTANT: If the outboard is operated in saltwater, remove the top cowl. Inspect the powerhead and powerhead components for salt build-up. Wash off any salt build-up from the powerhead and powerhead components with fresh water. Keep water spray out of the air filter/intake and alternator. After washing, allow the powerhead and components to dry. Apply Quicksilver or Mercury Precision Lubricants Corrosion Guard spray on the external metal surfaces of the powerhead and powerhead components. Do not allow the Corrosion Guard spray to come in contact with the alternator drive belt, belt pulleys, or the outboard motor mounts. The alternator drive belt could slip and be damaged if it becomes coated with any lubricant or Corrosion Guard spray.

Description	Where Used	Part No.
Corrosion Guard	External metal surfaces of the powerhead and powerhead components.	92-802878 55

ULTRAVIOLET (UV) PROTECTION FOR CARBON FIBER ACCENT PANELS

IMPORTANT: UV rays can damage the finish of the carbon fiber accent panels. When the engine is not in use, cover the carbon fiber accent panels to protect them from UV damage. Damage to the carbon fiber accent panels caused by UV rays is not covered by warranty.

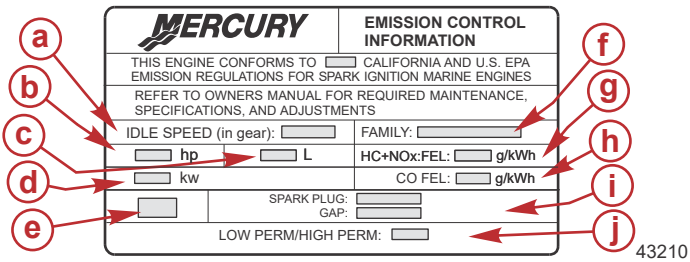
If desired, use a clear coat safe marine or automotive wax with UV inhibitors to protect the carbon fiber accent panels from UV damage.

EPA Emissions Regulations

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

EMISSION CERTIFICATION LABEL

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



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

MAINTENANCE

OWNER RESPONSIBILITY

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

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

Inspection and Maintenance Schedule

BEFORE EACH USE

- Check the engine oil level. Refer to **Checking Engine Oil Level**.
- Check that the lanyard stop switch stops the engine.
- Inspect the outboard for tightness to the boat transom. If any looseness of the outboard or mounting fasteners exist, tighten the outboard mounting fasteners to the specified torque. When looking for signs of looseness, look for loss of outboard transom bracket material or paint caused by movement between the outboard mounting fasteners and the outboard transom brackets. Also look for signs of movement between the outboard transom brackets and the boat transom (lift plate/setback bracket).

Description	Nm	lb-in.	lb-ft
Outboard mounting locknuts and bolts - standard boat transom	75	–	55.3
Outboard mounting locknuts and bolts - metal lift plates and setback brackets	122	–	90

- Visually inspect the fuel system for deterioration or leaks.
- Check the steering system for binding or loose components.
- Inspect all steering system fasteners for tightness.
- Check the propeller blades for damage.
- Inspect the hydraulic steering fittings and hoses for leaks or damage, if equipped.
- Inspect the hydraulic steering fluid level, if equipped.

AFTER EACH USE

- Flush out the outboard cooling system if operating in salt, polluted, or muddy water. Refer to **Flushing the Cooling System**.
- Wash off all salt deposits and flush out the exhaust outlet of the propeller and gearcase with fresh water if operating in saltwater.
- If operating in saltwater, inspect the powerhead and powerhead components for salt buildup. Refer to **Cleaning Care for the Powerhead (Saltwater Use)**.

AFTER 10 HOURS OF USE

- Change the engine oil and replace the oil filter. Refer to **Changing Engine Oil and Filter**.
- Drain and replace the gearcase lubricant. Refer to **Gearcase Lubrication**.
- Remove the in-line fuel filter from the fuel inlet hose on the outboard. Refer to **Fuel System**.

EVERY 25 HOURS OF USE (FOR EXTREME DUTY APPLICATIONS)

For extreme duty applications such as high-speed catamarans or surface piercing applications, perform the following:

- Change the engine oil and replace the oil filter. Refer to **Changing Engine Oil and Filter**.
- Drain and replace the gearcase lubricant. Refer to **Gearcase Lubrication**.

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

- Change the engine oil and replace the oil filter. The oil should be changed more often when the engine is operated under adverse conditions, such as extended trolling. Refer to **Changing Engine Oil and Filter**.
- Check the boat-mounted water-separating low-pressure fuel filter for water or contaminants. Drain the water or replace the filter if required. Refer to **Fuel System**.
- Remove the propeller and lubricate the propeller shaft. Refer to **Propeller Replacement**.
- Inspect the thermostat visually for corrosion or a broken spring. Ensure that the thermostat closes completely at room temperature—dealer service.
- Check the outboard mounting fasteners that fasten the outboard to the boat transom. Tighten the fasteners to the specified torque—dealer service.

Description	Nm	lb-in.	lb-ft
Outboard mounting locknuts and bolts - standard boat transom	75	–	55.3
Outboard mounting locknuts and bolts - metal lift plates and setback brackets	122	–	90

- Check the corrosion control anodes. Check more frequently when used in saltwater. Refer to **Corrosion Control Anode**.
- Drain and replace the gearcase lubricant. Refer to **Gearcase Lubrication**.
- Replace the supercharger belt—dealer service.

- Inspect the battery. Refer to **Battery Inspection**.
- Saltwater usage: Remove and inspect the spark plugs for corrosion and replace as necessary. Apply Anti-Seize Compound only on the threads of the spark plug prior to installation. Refer to **Spark Plug Inspection and Replacement**.

Description	Where Used	Part No.
Anti-Seize Compound	Spark plug threads	92-898101389

- Check the tightness of bolts, nuts, and other fasteners—dealer service.
- Add Quickleen Engine and Fuel System Cleaner to the fuel tank.

Description	Where Used	Part No.
Quickleen Engine & Fuel System Cleaner	Fuel tank	8M0047931

- Check the cowl seals to ensure seals are intact and not damaged.
- Check that the intake silencer is in place, if equipped.
- Check that the idle relief muffler is in place, if equipped.
- Check for loose hose clamps and rubber boots on the air intake assembly, if equipped.

EVERY 300 HOURS OF USE OR THREE YEARS

- Check the power trim fluid. Refer to **Checking Power Trim Fluid**.
- Replace the water pump impeller—dealer service.[1.]
- Lubricate the splines on the upper driveshaft—dealer service.
- Check all wiring and connectors—dealer service.
- Replace the accessory drive belts. Refer to **Accessory Drive Belts**.
- Replace the spark plugs.
- Replace the boat-mounted water-separating low-pressure fuel filter.
- Inspect the trim thrust guide wear pads.

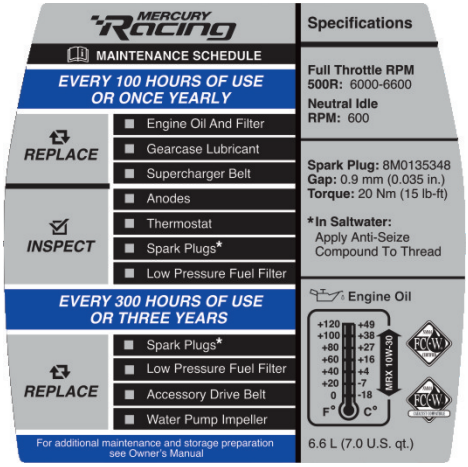
BEFORE PERIODS OF STORAGE

- Refer to the **Storage** section.

1. Replace the water pump impeller more often if overheating occurs or reduced water pressure is noted.

500R Maintenance Schedule Decal

The maintenance schedule decal is located under the engine cowling.



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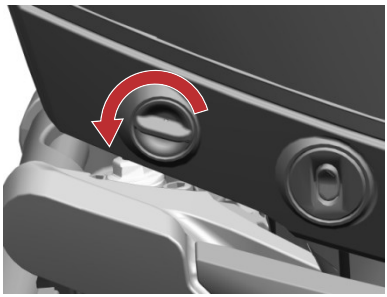
Flushing the Cooling System

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

SINGLE-ENGINE FLUSH

NOTE: *The outboard can be tilted or in the vertical operating position during flushing.*

1. With the engine turned off, place the outboard in either the operating position (vertical) or in a tilted position.
2. Remove the flush connector from the bottom cowl:
   a. Turn the flush connector 1/4 turn counterclockwise.
   b. Remove the flush connector and hose from the bottom cowl by pulling outward and to the rear of the outboard.



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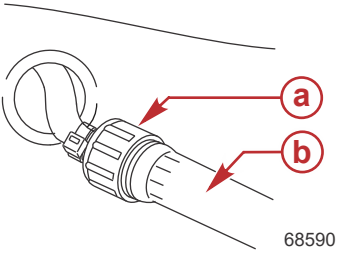
3. Remove the cover from the flush connector and thread a water hose into the flush connector.



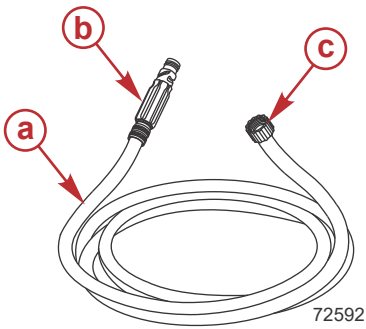
a - Flush connector
b - Water hose

4. Turn on the water tap (1/2 maximum) and let the water flush through the cooling system for about 15 minutes.
5. When flushing is complete, turn off the water and disconnect the water hose.
6. Install the cover onto the flush connector.
7. Guide the tether into the bottom cowl while pushing the flush connector back into the bottom cowl, then turn the flush connector 1/4 turn clockwise to secure.

IMPORTANT: If the tether interferes with the bottom cowl while pushing the flush connector in, turn the flush connector counterclockwise, then clockwise while pushing in to secure the connector.

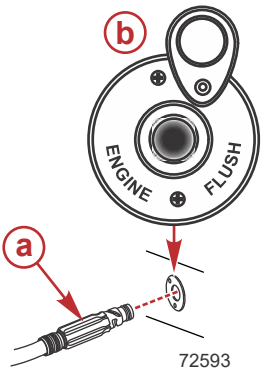
MULTIPLE ENGINE FLUSH (WITH AN AUTOMATIC OUTBOARD FLUSHING SYSTEM)

1. With the engines turned off, place the outboards in a convenient position.
2. Thread a water hose into the flush quick connector (5/8 in. garden hose recommended).



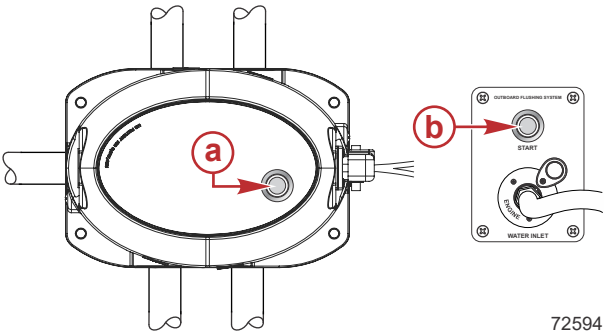
a - Water hose
b - Flush quick connector
c - To water tap

3. Locate the engine flush port on the boat transom and insert the quick-connect fitting.



a - Flush quick connector
b - Engine flush port on transom

4. Turn on the water tap.
5. Press the start button on the boat-mounted automatic outboard flushing system, or the remote-mounted button if equipped. See the user's manual that comes with the unit for more details.



a - Start button on automatic outboard flushing system
b - Remote-mounted start button (if equipped)

6. Once the system has completed the flushing procedure, turn off the water tap and remove the water hose.

Top Cowl Removal and Installation

NOTE: *It is recommended to remove and install the cowl while standing inside the boat.*

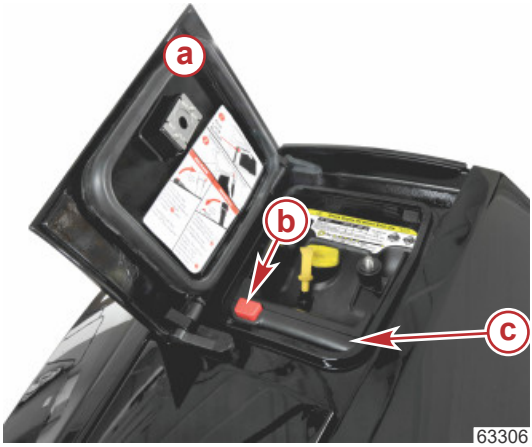
REMOVAL

1. Tilt the outboard up so the top of the cowl is facing you.

2. Push down on the port side of the service access door to unlock and open the door.

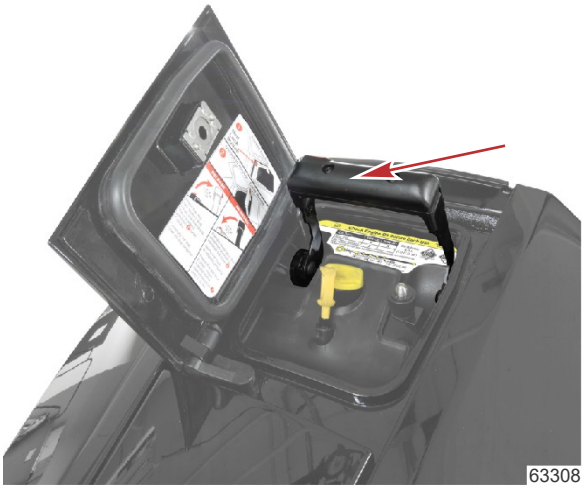
Push here to unlock

3. Press on the red lock button and lift the handle.



a - Service access door
b - Red lock button
c - Handle

4. Push the handle towards the aft to lock the handle into the cowl lift position.



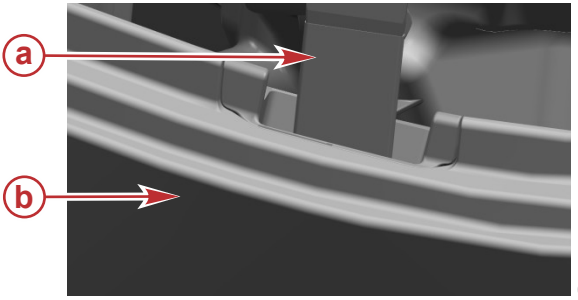
Handle locked in the lift position

5. With a firm grip on the handle, carefully lift the cowl off the engine.

INSTALLATION

1. With a firm grip on the handle, carefully lower the top cowl over the engine.
2. Verify the cowl is correctly aligned by checking the cowl alignment guides on the port and starboard side of the cowl. If there is misalignment, one side of the cowl will have a gap that is larger than the other side.

NOTE: *It may be necessary to slightly lift the larger gap side of the cowl to correctly position the alignment guides.*



Port side shown, starboard side similar

a - Cowl alignment guide

b - Bottom cowl

3. Gently push down on the cowl.
4. Push the red lock button and pull the handle. Continue to push the handle down into the locked position.
5. Close the service access door.

Battery Inspection

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

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

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

Battery Connections and Cables

BATTERY

IMPORTANT: Adhere to Boating industry standards (BIA, ABYC, etc.), federal standards, and Coast Guard regulations for proper battery installation. Install the battery cable to meet the pull test requirements and insulate the positive battery terminal in accordance with regulations.

- Use tapered post connectors or stud connections. Do not use a battery with wing nut connectors.

- Refer to NMMA, ABYC, and U.S. Coast Guard boating standards and regulations for complete guidelines.

BATTERY CABLE RECOMMENDATIONS

Refer to NMMA, ABYC, and U.S. Coast Guard boating standards and regulations for complete guidelines.

IMPORTANT: Solder the terminals to the cable ends to ensure good electrical contact. Use electrical grade (resin flux) solder only. Acid flux solder may cause corrosion and a subsequent failure.

1. Measure the length of the positive (+) battery cable.
2. Measure the length of the negative (–) battery cable.
3. Using the total cable length and the chart below, determine what gauge of wire to use for both cables.

NOTE: *Place the battery as close to the engine as possible.*

Total Cable Length (a + b)		Minimum Cable Size
Minimum	Maximum	
–	7.4 m (24.3 ft)	21.2 mm² (2 AWG)
7.4 m (24.3 ft)	12.2 m (40.0 ft)	33.6 mm² (2 AWG)
12.2 m (40.0 ft)	15.2 m (49.9 ft)	42.4 mm² (1 AWG)
15.2 m (49.9 ft)	19.6 m (64.3 ft)	53.5 mm² (0 AWG)
19.6 m (64.3 ft)	24.4 m (80.0 ft)	67.7 mm² (00 AWG)

PREFERRED CHARGING CIRCUIT

Modify the charging circuit so that both engines charge the auxiliary battery but also isolate the auxiliary battery from the port and starboard engine start batteries. This configuration provides enough current to operate the boat's accessories and still have current available to start the engines.

Positive battery terminals: Boats with multiengine EFI power packages require that each engine has its positive battery cable connected to its own battery. This ensures that the engine's propulsion control module (PCM) has a stable voltage source.

Negative battery terminals: Connect all negative battery cables at one source.

Auxiliary batteries: To ensure proper charging, properly switch or isolate single engine applications. In multiengine applications, do not consider the auxiliary battery as another engine's battery. Use proper switching or isolation of the auxiliary battery to ensure proper charging and separation of engine's positive battery cables.

Battery switches: Position battery switches so that each engine operates off its own battery. Do not use switches that have OFF, 1, 2, or both positions. Battery switches should be on, off or maybe an emergency only position. In an emergency, another engine's battery can be used to start an engine with a dead battery. Label all switches for proper operation.

Battery isolators: Use isolators to charge an auxiliary battery used for powering accessories in the boat. Do not use isolators to charge the battery of another engine in the boat unless the type of isolator is specifically designed for this purpose.

Fuel System

⚠ WARNING

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

IMPORTANT: Use an approved container to collect and store fuel. Wipe up spilled fuel immediately. Material used to contain spilled fuel must be disposed of in an approved receptacle.

Before servicing any part of the fuel system:

1. Stop engine and disconnect the battery.
2. Perform fuel system service in a well-ventilated area.
3. Inspect any completed service work for signs of fuel leakage.

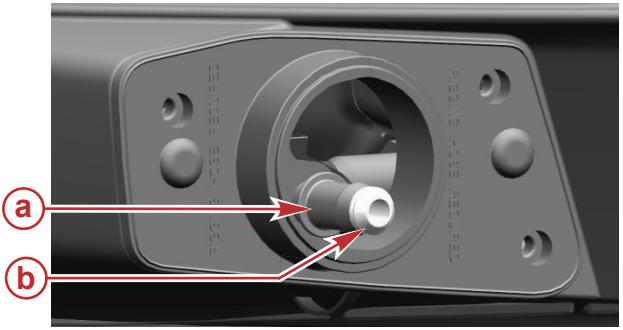
FUEL LINE INSPECTION

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

IN-LINE FUEL FILTER

IMPORTANT: The in-line fuel filter must remain in the fuel line when the outboard is installed. Keep the in-line fuel filter in place for 10 hours of engine run time before removal.

Install the fuel hose onto the quick-connect fitting with the in-line fuel filter in place. The in-line fuel filter will catch fuel system debris before it reaches the engine. This filter must remain in place for the first ten hours of engine run time.



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a - Quick-connect fitting
b - In-line fuel filter

BOAT-MOUNTED FUEL FILTER

The boat-mounted fuel filter can be serviced as a general maintenance item when the water-in-fuel alarm is activated.

⚠ WARNING

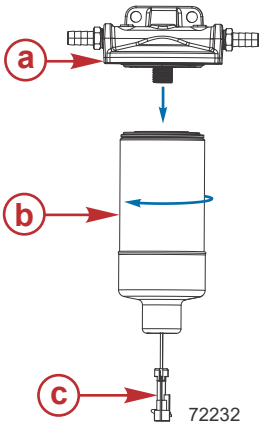
Fuel is flammable and explosive. Ensure that the key switch is OFF and the lanyard is positioned so that the engine cannot start. Do not smoke or allow sources of spark or open flame in the area while servicing. Keep the work area well ventilated and avoid prolonged exposure to vapors. Always check for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

Removal

IMPORTANT: Use an approved container to collect and store fuel. Wipe up spilled fuel immediately. Material used to contain spilled fuel must be disposed of in an approved container.

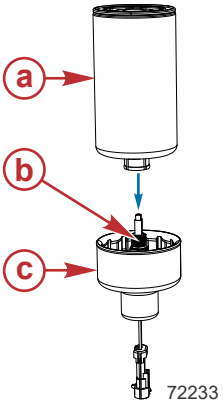
1. Verify the ignition key switch is in the **OFF** position and that the lanyard switch is positioned so the engine cannot start.
2. Shut off the fuel supply to the engine.
3. Locate the boat-mounted fuel filter.

4. Disconnect the water-in-fuel (WIF) sensor harness.



a - Fuel filter base
b - Fuel filter assembly
c - WIF sensor connection

5. Remove the filter assembly from the base by turning counterclockwise.
6. Empty the fuel filter contents into an approved container and dispose according to local regulations.
7. Remove the WIF sensor from the end of the fuel filter and retain for reuse.
   a. Remove the rubber boot from the bottom of the filter.
   b. Remove the WIF sensor by turning counterclockwise.



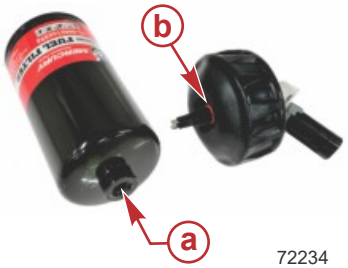
a - Fuel filter
b - WIF sensor
c - Rubber boot

8. Wipe up any spilled fuel.

Installation

1. Using a hex wrench, remove the plug from the end of the new fuel filter.

2. Verify that the O-ring is installed on the water-in-fuel (WIF) sensor. Lubricate the O-ring with clean engine oil.



72234

a - Plug removed
b - WIF sensor O-ring

3. Thread the WIF sensor clockwise into the fuel filter and tighten to the specified torque.

Description	Nm	lb-in.	lb-ft
Water-in-fuel sensor	2.5	22	–

NOTE: *Temporarily invert the rubber boot to ease installation.*

72235

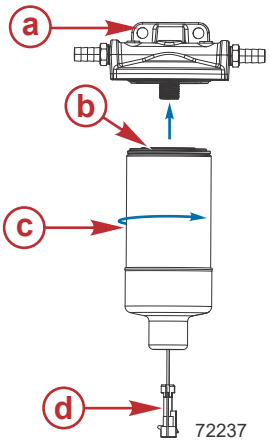
WIF sensor installed, rubber boot inverted

4. Push the rubber boot over the WIF sensor until the plastic cap within the boot is fully seated over the WIF sensor. Pull the remainder of the boot over the fuel filter.

72236

Rubber boot installed

5. Lightly lubricate the fuel filter O-ring with clean engine oil. Thread the fuel filter clockwise onto the fuel filter base until the O-ring makes contact with the base. Then tighten the filter another 2/3–1 turn.



a - Fuel filter base
b - Lubricate fuel filter O-ring
c - Fuel filter assembly
d - WIF sensor connection

6. Connect the water-in-fuel sensor to the fuel filter sensor harness.
7. Before starting the engine:
   a. Prime the fuel system. Refer to **Filling the Fuel System**.
   b. Inspect the installation for fuel leakage. Repair any fuel leaks if necessary.

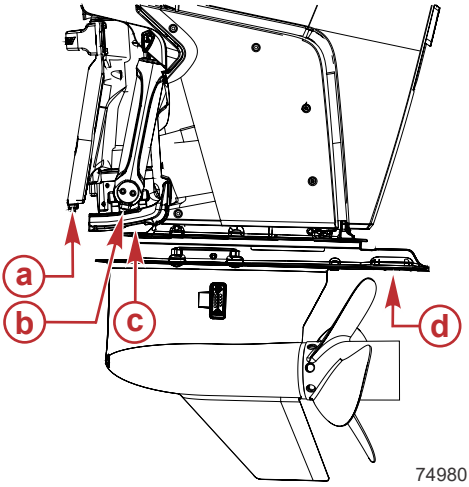
FILLING THE FUEL SYSTEM

Turn the ignition key switch to the **RUN** position for approximately six seconds to operate the fuel pumps. Start and operate the engine to purge any remaining air from the fuel system. The engine may run rough while the air is purging through the fuel injectors. Purging air may take longer if the vessel mounted fuel filter is installed further away from the engine. Increasing the throttle during engine operation will purge air from the fuel system more quickly.

Corrosion Control Anodes

The outboard has corrosion control anodes at different locations. Anodes help protect the outboard against galvanic corrosion by sacrificing its metal to be slowly eroded instead of the outboard metals.

Each anode requires periodic inspection, especially in saltwater, which will accelerate the corrosion. To maintain corrosion protection, always replace the anode before it is completely corroded. Never paint or apply a protective coating on the anode, as this will reduce the effectiveness of the anode.



a - Bottom of transom bracket (1)
b - Bottom of each power trim ram (2)
c - Bottom of power trim pedestal (1)
d - Underside of anti-ventilation plate (1)

Propeller Replacement—38.1 mm (1.5 in.) Diameter Propeller Shaft

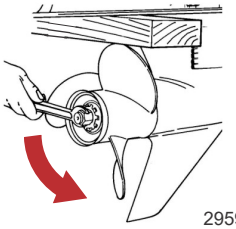
⚠ WARNING

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

PROPELLER REMOVAL

1. Shift the outboard into the neutral position and activate the lanyard stop switch.

2. Place a block of wood between the gearcase and the propeller to hold the propeller and remove the propeller locknut, the brass hex nut, and the washer from the propeller shaft.



3. Pull the propeller straight off the shaft. If the propeller is seized to the shaft and cannot be removed, have the propeller removed by an authorized dealer.
4. To aid in future removal of the propeller, liberally coat the propeller shaft splines with one of the following Mercury/Quicksilver products:

Description	Where Used	Part No.
Extreme Grease	Propeller shaft splines	8M0190472
2-4-C with PTFE	Propeller shaft splines	92-802859A 1

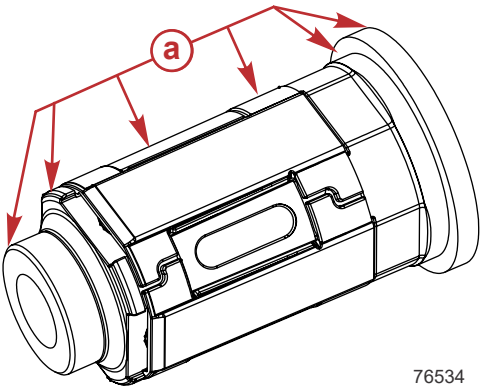
PROPELLER INSTALLATION

NOTICE

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

IMPORTANT: With the exception of CNC Cleaver propellers, all propellers used on the 38.1 mm (1.5 in.) diameter propeller shaft require the 500R propeller hub (8M0217764).

1. Apply a light layer of 2-4-C with PTFE to the outer diameter of the entire propeller hub prior to installation into the propeller.



a - Outer diameter of the entire propeller hub

Description	Where Used	Part No.
2-4-C with PTFE	Outer diameter of the entire propeller hub	92-802859A 1

2. Apply 2-4-C with PTFE or Extreme Grease to the propeller shaft splines.

Description	Where Used	Part No.
2-4-C with PTFE	Propeller shaft splines	92-802859A 1
Extreme Grease	Propeller shaft splines	8M0190472

3. Install the labyrinth propeller adapter into the propeller as shown, with the chamfered edge of the adapter facing the propeller.
4. Install the HD propeller hub into the propeller.

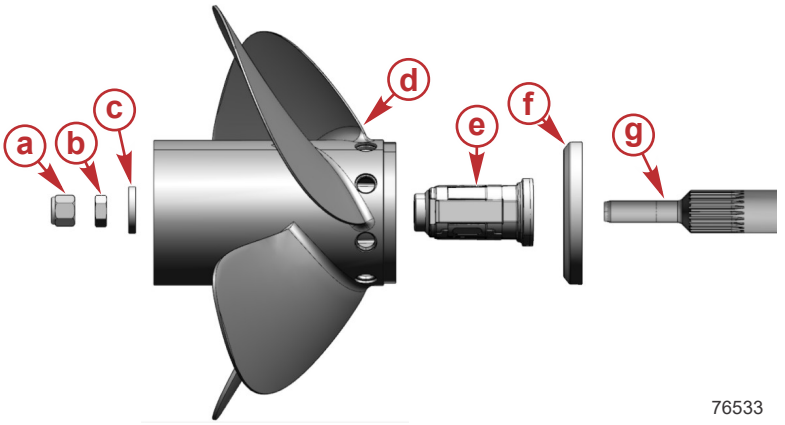
IMPORTANT: A rubber hammer may be needed to tap the last 6.35–12.7 mm (0.25–0.50 in.) of the hub into the propeller.

5. Install the propeller, labyrinth propeller adapter, and HD propeller hub onto the propeller shaft.
6. Install the washer onto the propeller shaft.
7. Install the 0.75-16 brass hex nut onto the propeller shaft. Place a block of wood between the gearcase and the propeller. Tighten the nut to the specified torque.

Description	Nm	lb-in.	lb-ft
0.75-16 brass hex nut	115.2	–	85

8. Install the locknut onto the propeller shaft. Place a block of wood between the gearcase and the propeller. Tighten the propeller nut to the specified torque.

Description	Nm	lb-in.	lb-ft
Locknut	115.2	–	85

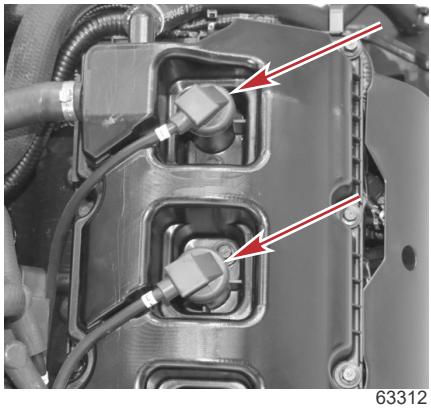


- **a -** Locknut
- **b -** 0.75-16 brass hex nut
- **c -** Washer
- **d -** Propeller
- **e -** HD propeller hub
- **f -** Labyrinth propeller seal
- **g -** Propeller shaft

Spark Plug Inspection and Replacement

1. Remove the top cowl. Refer to **Top Cowl Removal and Installation**.

2. Grasp the spark plug boot and use a twisting motion to assist removing the spark plug boot from the spark plugs.



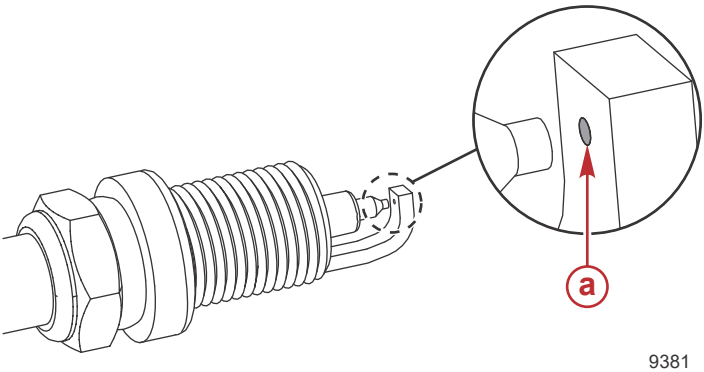
63312

Spark plug boot

3. Remove the spark plug with a 14 mm deep socket.

NOTE: *Replace the spark plug if the electrode is worn; the insulator is rough, cracked, broken, or blistered; or if the precious metal is not visible on the spark plug electrode.*

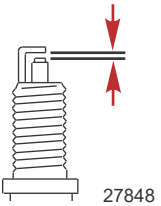
IMPORTANT: The color of the plug may not accurately reflect its condition. To accurately diagnose a faulty plug, inspect the precious metal on the plug's electrode. If no precious metal is visible, replace the plug.



9381

a - Precious metal

4. Check the spark plug gap. Refer to **General Information - Specification**.



   a. All of the spark plugs should have the gap checked and corrected as necessary before installation.
   b. Measure the gap with a feeler gauge or pin gauge. Never use a wedge-type gap checking tool to inspect or to adjust the gap.
   c. If an adjustment is necessary, do not pry or apply any force on the center electrode. This is critical with any type of spark plug that has a wear surface, such as platinum or iridium added to either the ground electrode or the center electrode.
   d. When it is necessary to widen the gap, use a tool that only pulls back on the ground electrode without touching the center electrode, the porcelain, or the wear portion of the ground electrode.
   e. When it is necessary to close the gap, gently tap the plug ground electrode on a hard surface.

5. Saltwater use—Apply Anti-Seize Compound only onto the threads of the spark plugs.

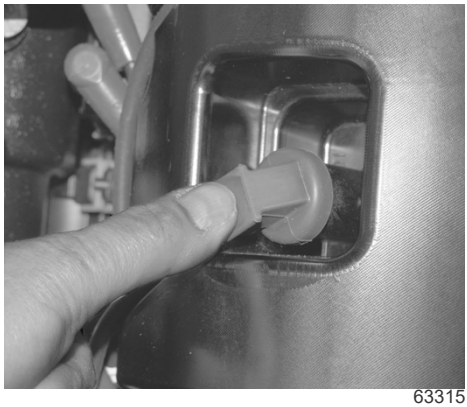
Description	Where Used	Part No.
Anti-Seize Compound	Spark plug threads	92-898101389

6. Before installing the spark plugs, remove any dirt on the spark plug seat area. Install the plugs finger-tight and then tighten an additional 1/4 turn or tighten to the specified torque.

Description	Nm	lb-in.	lb-ft
Spark plug	20	177	–

7. Insert the spark plug boot into the valve cover. The boot is self-aligning with the spark plug.

8. Push on the end of the spark plug boot to ensure the boot is completely engaged and seated onto the spark plug.



63315

Push the spark plug boot

9. Install the top cowl.

Fuses

⚠ CAUTION
Always use the appropriate size wire and fuse to protect the wiring or components from starting a fire due to high current draw.

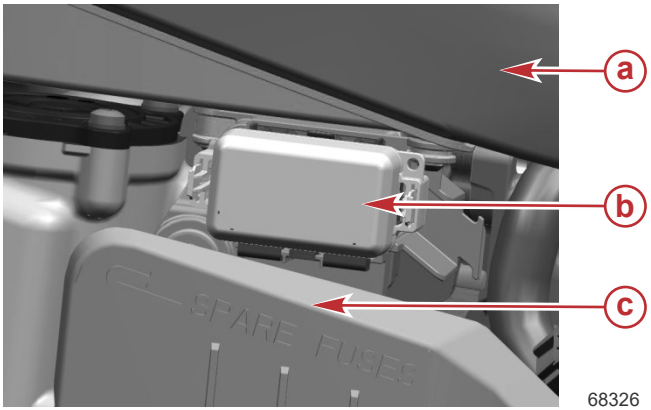
IMPORTANT: An ATC fuse has the fuse element enclosed or sealed inside the plastic housing. This type of fuse must be used for marine applications. Marine applications are exposed to environments that may have the potential to accumulate explosive vapors. ATO fuses have exposed elements and should never be used in marine applications.

ENGINE-MOUNTED FUSE PANEL

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

1. Locate the fuse holder on the starboard side of the engine and remove the cover from the fuse holder.

IMPORTANT: Spare fuses are located on the back of the PCM cover.

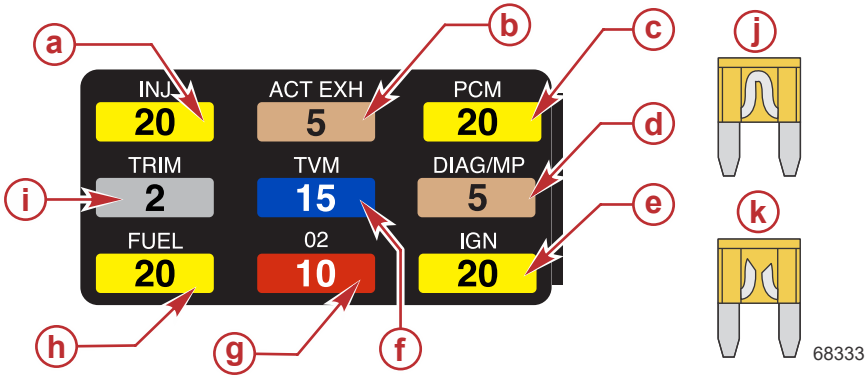


68326

a - Air inlet
b - Fuse holder cover
c - PCM cover (spare fuses located on the back)

2. Remove the suspected open fuse and look at the silver band inside the fuse. If the band is broken (open), replace the fuse.

IMPORTANT: Replace the fuse with a new fuse with the same amp rating.



- **a -** Fuel injectors - 20-amp
- **b -** Advanced sound control driver - 5-amp
- **c -** Propulsion control module (PCM) power - 20-amp
- **d -** Diagnostics/moving propeller (MP) alert - 5-amp
- **e -** Ignition coils - 20-amp
- **f -** Thrust vector module (TVM) power -15-amp
- **g -** Oxygen sensor - 10-amp
- **h -** Fuel pump - 20-amp
- **i -** Trim wake - 2-amp
- **j -** Good fuse
- **k -** Open (blown) fuse

RIG CENTER FUSE PANEL

The rig center fuse panel is equipped with five fuses. Refer to the following image for identification. Four spare fuses are attached to a harness on the inside of the rig center. A 30-amp spare for battery clean power is also included here.

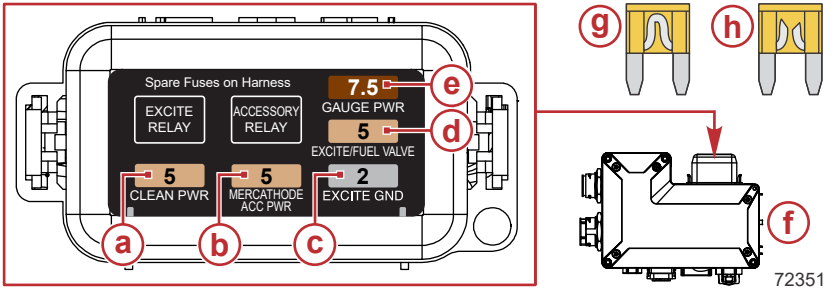
The electrical wiring circuits on the outboard are protected from overload with fuses. If a fuse is open, try to locate and correct the cause of the overload. If the cause is not found, the fuse may open again.

1. Locate the fuse holder on the boat-mounted rig center. Remove the cover from the fuse holder.

NOTE: *A fuse identification decal is located on the fuse holder cover.*

2. Remove the suspected open fuse and look at the silver band inside the fuse. If the band is broken (open), replace the fuse.

IMPORTANT: Replace the fuse with a new fuse with the same amp rating.



- **a -** Clean power - 5-amp
- **b -** Mercathode ACC power - 5-amp
- **c -** Excite ground - 2-amp
- **d -** Excite/fuel valve - 5-amp
- **e -** Gauge power - 7.5-amp
- **f -** Rig center
- **g -** Good fuse
- **h -** Open fuse

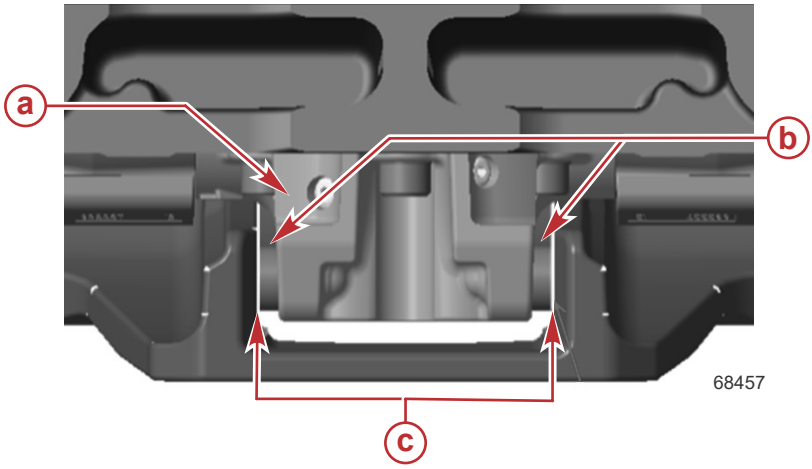
Accessory Drive Belts

The alternator drive belt and supercharger drive belts are located under the flywheel cover. The alternator and supercharger drive belt inspection must be completed by an authorized Mercury dealer at the recommended interval. Refer to **Inspection and Maintenance Schedule**.

Trim Thrust Guide Wear Pad

The 500R outboard utilizes thrust guide plates on either side of the driveshaft housing to improve stability of the engine. As the engine is trimmed up or down, the thrust guide plates will rub against the trim thrust guide wear pads that are mounted on either side of the trim manifold. Check the clearance between the trim thrust guide wear pad and the lower cradle on each side to determine if replacement is necessary. Failure to replace the trim thrust guide wear pad may cause damage to the swivel bracket. Damage to the swivel bracket caused by the trim thrust guide wear pad mounting hardware is not covered under warranty. Refer to the **Inspection and Maintenance Schedule** for the proper maintenance interval.

CHECKING TRIM WEAR PAD CLEARANCE



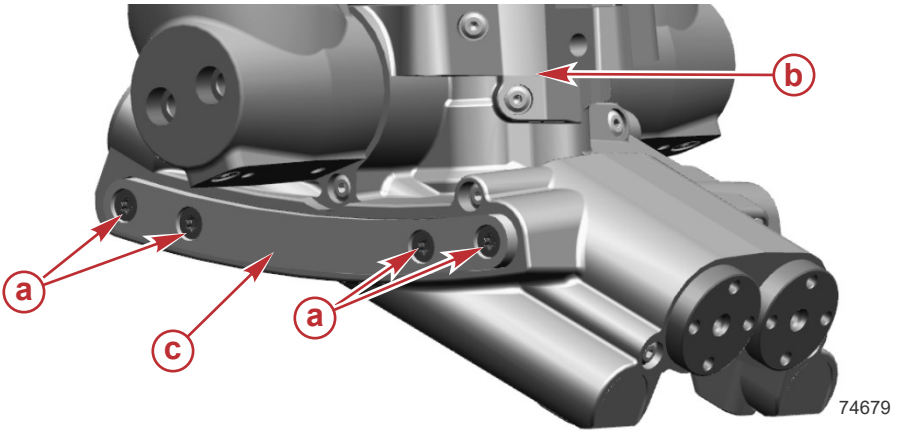
- **a -** Trim manifold
- **b -** Trim wear pads
- **c -** Clearance (refer to the following table)

IMPORTANT: The trim thrust guide wear pads must be shimmed for a maximum clearance of 0.5 mm (0.02 in.) per side.

Trim thrust guide wear pad to lower cradle clearance (per side)	
Minimum clearance	0.05 mm (0.002 in.)
Maximum clearance	0.5 mm (0.02 in.)

REPLACING THE TRIM THRUST GUIDE WEAR PADS

IMPORTANT: When replacing the trim thrust guide wear pads, replace both pads and install new retaining hardware.



- **a -** M6 x 20 screw with patch lock pad (8 quantity, 4 on each trim wear pad)
- **b -** Trim thrust guide wear pad (2 quantity)
- **c -** Trim manifold

Description	Nm	lb-in.	lb-ft
M6 x 20 screw (8)	6	53	–

Cooling System Strainers

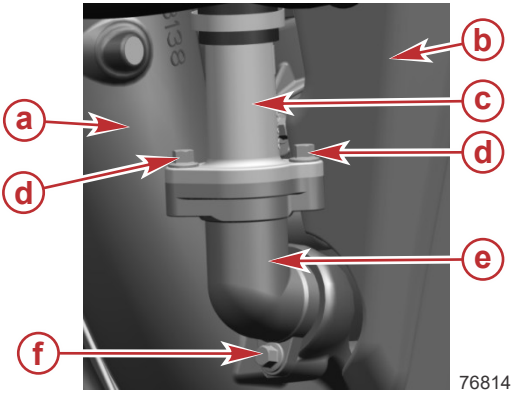
IMPORTANT: Lower cowl removal is necessary to access the strainers. Refer to the appropriate service manual section for lower cowl removal and installation procedures.

SUPPLY HOSE STRAINER

IMPORTANT: The two cooling hoses attached to the strainer housing can remain attached during disassembly and cleaning.

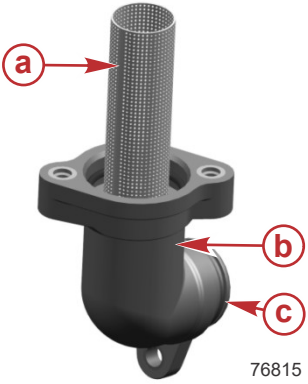
1. Remove the two M6 x 16 screws securing the elbow to the strainer housing.

2. Remove the M6 x 20 screw securing the elbow to the exhaust tube and remove the elbow.



a - Starboard side of exhaust tube
b - Starboard idle relief muffler
c - Strainer housing (with two hose connections, hidden)
d - M6 x 16 screws (2)
e - Elbow
f - M6 x 20 screw

3. Remove the strainer from the elbow. Remove any debris from the strainer.
4. Install the strainer into the elbow.



a - Strainer
b - Elbow
c - O-ring

5. Install the elbow and strainer into the strainer housing.
6. Install the elbow into the exhaust tube.

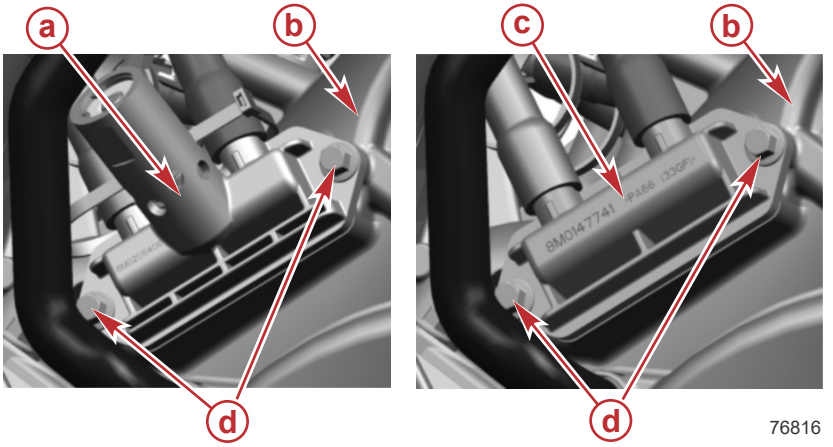
IMPORTANT: Ensure that the O-ring is in place on the elbow.

7. Apply Loctite 272 to the M6 x 16 and M6 x 20 screw threads.
8. Tighten the screws to the specified torque.

Description	Nm	lb-in.	lb-ft
M6 x 16 screws (2)	10	88.5	–
M6 x 20 screw	10	88.5	–

CHARGE AIR COOLER (CAC) STRAINER

1. Remove the two M6 x 16 screws securing the strainer to the exhaust tube.



Cowl support bracket not shown for visual clarity

- **a -** Strainer with poppet valve (not equipped on all models)
- **b -** Port side of exhaust tube
- **c -** Strainer
- **d -** M6 x 16 screws (2)

2. Remove any debris from the strainer.
3. Install the strainer into the exhaust tube.

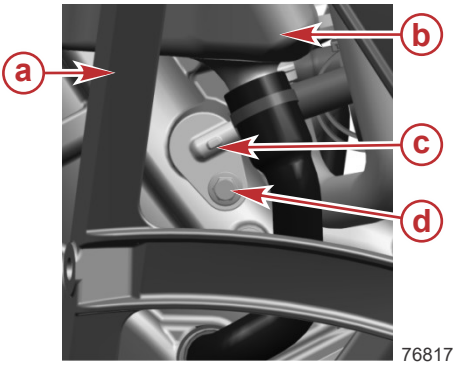
IMPORTANT: Ensure that the seal is in place on the strainer.

4. Apply Loctite 272 to the M6 x 16 screw threads.
5. Tighten the screws to the specified torque.

Description	Nm	lb-in.	lb-ft
M6 x 16 screws (2)	10	88.5	–

FUEL SUPPLY MODULE (FSM) STRAINER

1. Remove the M6 x 20 screw securing the strainer fitting to the exhaust tube.



a - Starboard lower cowl support bracket
b - Starboard idle relief muffler
c - Strainer fitting
d - M6 x 20 screw

2. Remove any debris from the strainer fitting.
3. Install the strainer fitting into the exhaust tube.

IMPORTANT: Ensure that the O-ring is in place on the strainer fitting.

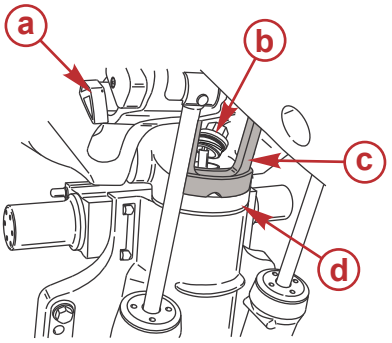
4. Apply Loctite 272 to the M6 x 20 screw threads.
5. Install the strainer into the exhaust tube.
6. Tighten the screw to the specified torque.

Description	Nm	lb-in.	lb-ft
M6 x 20 screw	10	88.5	–

Checking Power Trim Fluid

1. Tilt outboard to the full up position.
2. Rotate the tilt support bracket down.
3. Lower outboard until tilt support bracket rests on pedestal.

4. Remove the power trim fill cap. The fill cap only requires 1/4 turn to remove.



29312

a - Tilt support lever
b - Power trim fill cap
c - Tilt support bracket
d - Pedestal

5. The fluid level should be approximately 25 mm (1 in.) from the top of the fill neck. Add Quicksilver or Mercury Precision Lubricants Power Trim and Steering Fluid. If not available, use automotive automatic transmission fluid (ATF).

Description	Where Used	Part No.
Power Trim and Steering Fluid	Power trim system	92-858074K01

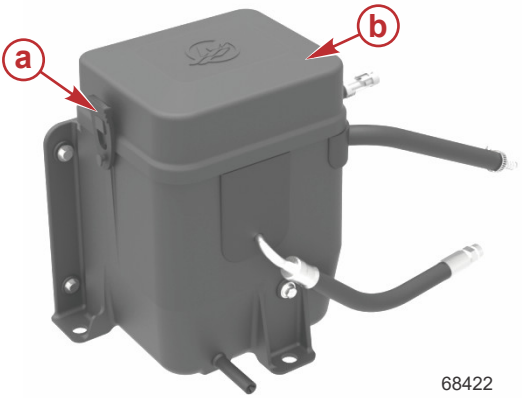
6. Install the power trim fill cap. Tighten fill cap 1/4 turn. Cap will snap in place. Do not tighten beyond this point.

Checking Power Steering Fluid

⚠ WARNING

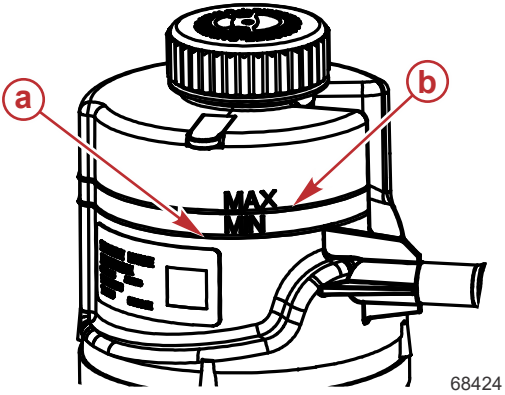
Dirt or contaminants in the hydraulic steering system can damage the steering system's internal components. Damaged components can lead to serious injury or death due to loss of boat control. Do not allow dirt or contamination to enter the helm, lines, or cylinder of this steering system and perform all hydraulic inspections, service, or assembly procedures in a clean work area.

1. Remove the power steering pump cover from the enclosure by releasing the straps and lifting the cover.



a - Straps (2)
b - Power steering pump cover

2. Observe the power steering fluid level inside the reservoir. The fluid level should be between the "MIN" and "MAX" lines on the reservoir.
3. If fluid needs to be added, remove the fill cap from the reservoir and add Synthetic Power Steering Fluid SAE 0W-30 until the fluid level is between the "MIN" and "MAX" lines on the reservoir.



a - Minimum fluid level
b - Maximum fluid level

Description	Where Used	Part No.
Synthetic Power Steering Fluid SAE 0W-30	Power steering system	92-858077K01

4. Install the fill cap and install the power steering pump cover. Secure the power steering pump cover with the straps.

Changing Engine Oil and Filter

ENGINE OIL CAPACITY

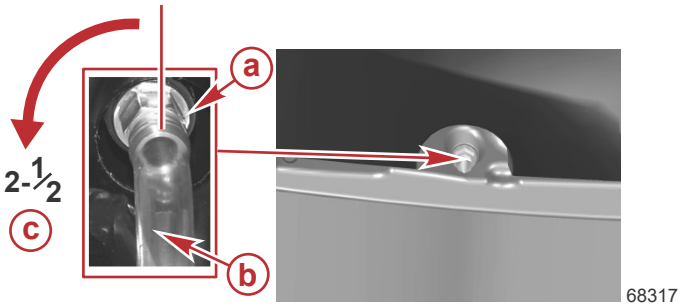
Engine oil capacity is approximately 6.6 Liter (7.0 US qt).

IMPORTANT: Tilt the outboard out/up past vertical for approximately one minute to allow any trapped oil to drain back to the oil sump.

OIL CHANGE ON LAND PROCEDURE

1. Tilt the outboard out/up past vertical for approximately one minute to allow any trapped oil to drain back to the oil sump.
2. Tilt the outboard to a vertical position.
3. Use a 16 mm (5/8 in.) wrench and loosen the oil drain valve so that it can be turned by hand. Be careful not to open the valve too far allowing oil to drain.
4. Attach a 12 mm (7/16 in.) inside diameter drain hose to the oil drain valve. Position the opposite end of the hose into an appropriate container. The container should be large enough to hold more than 9.8 Liter (10 US qt).
5. Loosen the oil drain valve 2-1/2 turns to allow oil to drain. Do not exceed 2-1/2 turns.

IMPORTANT: Do not loosen the oil drain valve more than 2-1/2 turns out. The oil seal could get damaged beyond 2-1/2 turns.



Starboard side of midsection

- **a -** Oil drain valve
- **b -** Drain hose
- **c -** Loosen 2-1/2 turns maximum

6. After the oil has drained, hand-tighten the oil drain valve (clockwise) and remove the oil drain hose.
7. Tighten the oil drain valve to the specified torque. Clean up any oil in the valve area.

Description	Nm	lb-in.	lb-ft
Oil drain valve	15	132.7	–

IMPORTANT: Overtightening the oil drain valve can damage the oil sump.

8. Add the appropriate amount of engine oil.

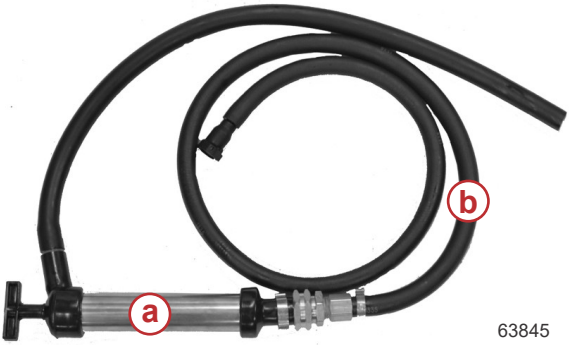
OIL CHANGE ON WATER PROCEDURE

1. Tilt the outboard out/up past vertical for approximately one minute to allow any trapped oil to drain back to the oil sump.
2. Tilt the outboard to a vertical position.
3. Push down on the port side of the service access door to unlock and open the door.

Push here to unlock

4. Remove the dipstick.

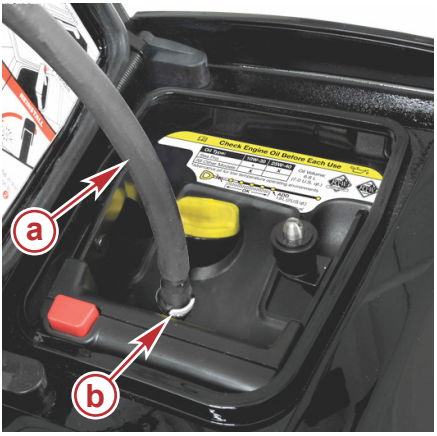
5. Install the oil drain hose onto the crankcase oil pump. Verify the hose is securely attached.



a - Crankcase oil pump
b - Oil drain hose

Crankcase Oil Pump	802889A1
 11591	Aids in the removal of engine oil without draining the crankcase.
Oil Drain Hose	8M0129230
 64627	Aids in the removal of engine oil without draining the crankcase. Connect to the crankcase oil pump.

6. Install the crankcase oil pump assembly onto the dipstick tube. Verify the pump is securely attached to the tube by pulling it up lightly.



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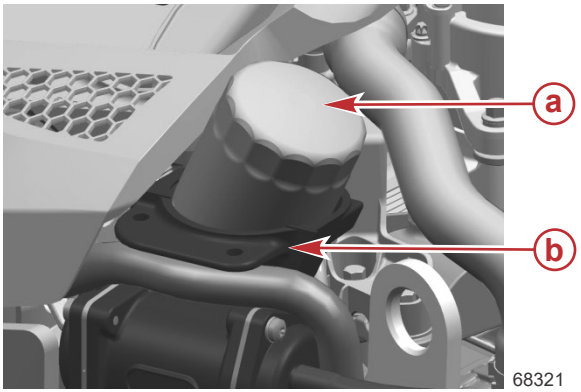
a - Oil drain hose
b - Lock button

7. Place the drain tube of the crankcase oil pump into an appropriate container. The container should be large enough to hold more than 9.8 Liter (10 US qt).
8. Extract the engine oil with the pump.
9. Allow the drain tube to completely drain before removing the oil pump from the dipstick tube.
10. Press on the oil drain hose lock button to release it from the dipstick tube.
11. Install the dipstick. Verify it is completely inserted.
12. Add the appropriate amount of engine oil.

CHANGING OIL FILTER

1. Remove the top cowl. Refer to **Top Cowl Removal and Installation.**

2. Remove the old filter by turning the filter counterclockwise.

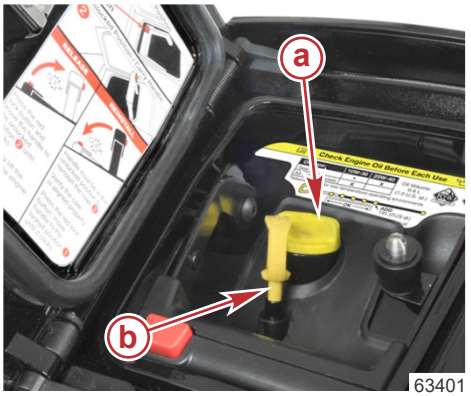


a - Oil filter
b - Oil filter mounting base

3. Allow the oil in the oil filter mounting base to drain.
4. Clean the remaining oil from the oil filter mounting base area.
5. Apply a film of clean oil to the filter gasket. Do not use grease.
6. Install the new filter until the gasket contacts the base and then tighten 3/4 to 1 turn.

OIL FILLING

Remove the oil fill cap and add approximately 6.6 Liter (7.0 US qt) of the recommended oil. This will bring the oil level within the operating range.



a - Oil fill cap
b - Dipstick

NOTE: *It is not necessary to check the oil level immediately after changing the oil. The engine must be run for a while and then turned off for one hour or longer before checking the oil level. Refer to* ***Checking Engine Oil Level.***

Checking and Adding Engine Oil

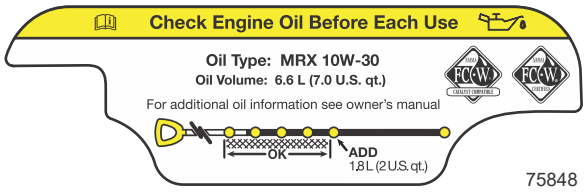
IMPORTANT: Inspect oil for signs of contamination. Oil contaminated with water will have a milky color to it; oil contaminated with fuel will have a strong fuel smell. If contaminated oil is noticed, have the engine checked by your dealer.

IMPORTANT: Do not overfill. Tilt the outboard out/up past vertical for approximately one minute to allow trapped oil to drain back to the oil sump. The outboard must be in a vertical (not tilted) position when checking the engine oil. For accurate readings, check the oil only when the engine is cold or after the engine has not run for at least an hour.

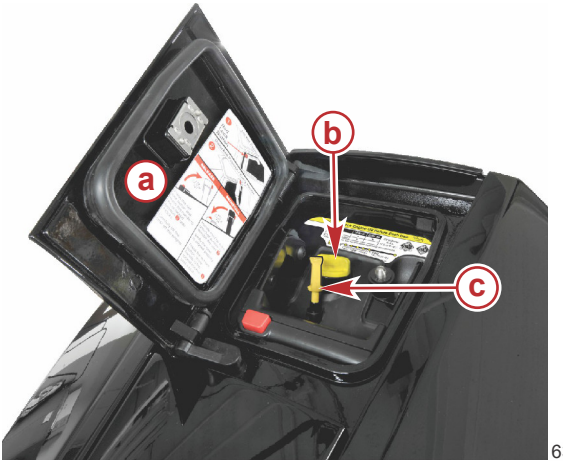
1. Before starting a cold engine, tilt the outboard out/up past vertical to allow trapped oil to drain back to the oil sump. Allow the outboard to remain tilted for approximately one minute.
2. Tilt the outboard to a vertical operating position.
3. Push down on the port side of the service access door to unlock and open the door.

Push here to unlock

NOTE: *On the underside of the service access door is a quick reference decal which lists the type of oil to use and how to read the dipstick.*



4. Remove the dipstick and observe the area of the five beads.



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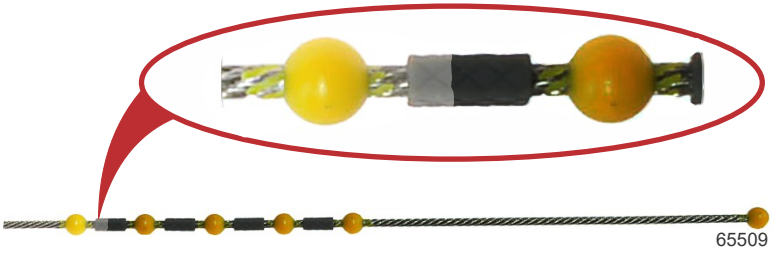
a - Service access door
b - Oil fill cap
c - Dipstick

5. The bead or crosshatch which shows oil furthest from the end is the oil level.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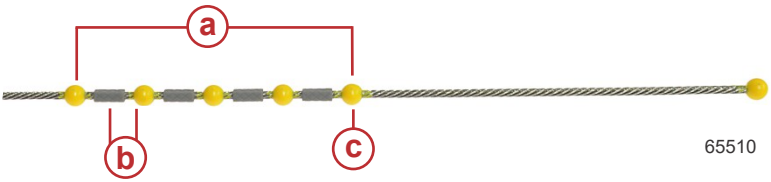
Oil level example

NOTE: *With new oil in the engine, it may be difficult to view the oil level on the dipstick. The crosshatch areas between the beads on the dipstick assembly help identify the oil level. The oil level is within the safe operating range if oil is present on any of the five oil range beads, or on the four crosshatch areas. When the oil level is only on the lowest oil range bead, the operator can add 1.8 Liter (2 US qt) of oil and the level will remain within the safe operating range. When the oil becomes dark from hours of product use, it will be easier to identify the oil level on the dipstick.*

IMPORTANT: Repeated removal and insertion of the dipstick will subsequently deposit oil further up the dipstick tube which could cause an error reading the oil level.



a - Safe operating range
b - General area after an oil change
c - Add 1.8 Liter (2 US qt) of oil

6. If none of the beads show the oil level, remove the oil filler cap and add 1.8 Liter (2 US qt) of the specified outboard motor oil.

Description	Where Used	Part No.
Mercury Racing 10W-30 MRX Full Synthetic Oil	500R crankcase	8M0169264

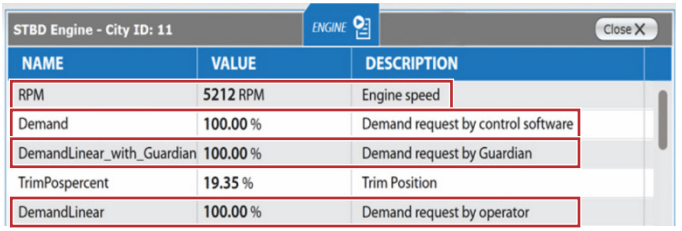
7. Allow a few minutes for the oil to drain into the sump and insert the oil dipstick.
8. Remove the dipstick and inspect whether the oil level is within the safe operating range.
9. Install the dipstick and oil filler cap hand-tight.
10. Close the service access door and lock it into place by pushing on the port side of the door.

Adaptive Speed Control Propping with CDS G3

A special propping procedure using CDS G3 should be used for optimum propping.

1. Install the best guess propeller.
2. Connect CDS G3 to the engine, and monitor the following values:
   - **RPM** - engine speed. In this example, for a new boat with a new engine, the ideal RPM is at the upper end of the RPM range.
   - **DemandLinear** - requested handle position. This should be at 100% at wide-open throttle. If this value is not at 100% when the handle is in the full forward position, DTS helm configuration needs to be performed.
   - **DemandLinear_with_Guardian** - software controlled limit with any engine protection/Guardian limits applied. This value should also be at 100% when underway and with the handle in the full forward position. If this value is less than the **DemandLinear** value, check faults for Guardian cause and correct the issue.

- **Demand** - the final demand value requested by the software. If the engine is propped correctly, with engine speed at wide-open throttle falling within the operating range at optimum trim, this value should be at 100%.



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3. Run the engine with the handle at wide-open throttle (100% **DemandLinear**) at optimum trim. Use the following chart to aid in final propeller selection.

Scenario		Engine Speed				
#	Description	<5,800 RPM	At or Just Above 5,800 RPM	Within Operating Range	At or Just Below 6,400 RPM	>6,400 RPM
1	DemandLinear = 100% DemandLinear with Guardian = 100% Demand = 100%	Decrease propeller pitch until engine speed falls within operating range.	Consider a slightly lower pitch propeller. (See NOTE 1.)	No change needed.	Consider a slightly higher pitch propeller. (See NOTE 2 and 3.)	N/A
2	DemandLinear = 100% DemandLinear with Guardian = 100% Demand < 100%	N/A	N/A	N/A	N/A	Increase propeller pitch until engine speed falls within operating range.
3	DemandLinear < 100% with throttle lever at max	Adjust throttle cable or reconfigure DTS handle so that 100% DemandLinear can be reached.				

Scenario		Engine Speed				
#	Description	<5,800 RPM	At or Just Above 5,800 RPM	Within Operating Range	At or Just Below 6,400 RPM	>6,400 RPM
4	DemandLinear = 100% DemandLinear with Guardian < 100%	Check faults for cause of Guardian condition.				

NOTE: *Refer to the following notes:*

1. *Lowering the pitch of the propeller will increase the engine speed above the 5,800 RPM lower threshold, to account for variations in loading and ambient conditions.*
2. *Increasing the pitch of the propeller will decrease the engine speed below the 6,400 RPM upper threshold, to account for variations in loading and ambient conditions.*
3. *Demand may be slightly less than 100%.*

Adaptive Speed Control Propping without CDS G3

IMPORTANT: Boat propping can be performed using the normal method used for Mercury Outboards. To achieve optimum propeller selection, however, follow the Adaptive Speed Control Propping with CDS G3 procedure.

IMPORTANT: To operate the engine at full throttle before the break-in period is complete, follow this procedure.

1. Place the remote control in neutral, idle speed and start the engine.
2. Slowly advance the throttle until the engine reaches 1300 RPM (± 100 RPM).
3. Watch all gauges for normal readings.
4. When the engine reaches normal operating temperature, run the boat up on plane.
5. Advance the engine RPM (in 200 RPM increments) until the engine reaches its maximum rated RPM. Refer to the following table for the wide-open throttle RPM range.

Engine Performance	
Wide-open throttle (WOT) engine RPM range	5800–6400 RPM
Peak power RPM range	6200–6400 RPM

6. To test if the correct propeller has been installed, operate the boat with a normal load on board at WOT and check the RPM with an accurate tachometer. The engine RPM should be near the top of the specified range so that, under a heavy load, the engine speed will not fall below the specified RPM range. If the engine speed is too low, replace the propeller with a lower pitch propeller. Normally a 25 mm (1 in.) propeller pitch change causes an RPM change of 150 RPM.

IMPORTANT: Adaptive Speed Control will not allow the engine to exceed 6400 RPM even if the boat is under propped. Adaptive Speed Control does not operate like a rev limiter. The operator may not notice that engine power is being limited because the engine will still reach, but not exceed 6400 RPM. If a heavy load on board the boat does not cause the engine RPM to drop at WOT, consider switching to a larger pitch propeller.

IMPORTANT: Using a target of 6350 RPM at WOT will provide the best results when propping the boat without using CDS G3. This ensures that Adaptive Speed Control is not limiting the available engine power.

7. Return to idle speed.
8. Shut off the engine.

Gearcase Lubricant

GEARCASE LUBRICATION

When adding or changing gearcase lubricant, visually check for the presence of water in the lubricant. If water is present, it may have settled to the bottom and will drain out prior to the lubricant, or it may be mixed with the lubricant, giving it a milky colored appearance. If water is noticed, have the gearcase checked by your dealer. Water in the lubricant may result in premature bearing failure or, in freezing temperatures, will turn to ice and damage the gearcase.

Examine the drained gearcase lubricant for metal particles. A small amount of metal particles indicates normal gear wear. An excessive amount of metal filings or larger particles (chips) may indicate abnormal gear wear and should be checked by an authorized dealer.

500R REQUIRED GEARCASE LUBRICATION

All 500R R-Drive and R-Drive Sport gearcases are factory filled with SAE 85W-90 Extreme Performance Gear Lube. This lubricant conforms to Enlube MGO-4-653-HP specifications and should not be mixed with other types of gear lubricant.

Description	Where Used	Part No.
SAE 85W-90 Extreme Performance Gear Lube	All 500R gearcases	8M0111677

GEARCASE LUBRICANT CAPACITY

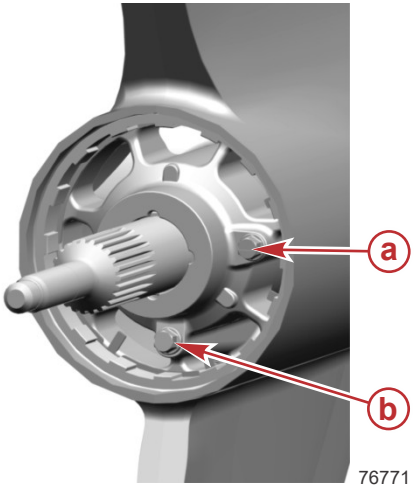
NOTE: *The specified gear lubricant quantity will put the lubricant level at the bottom of the lubricant level plug hole when full.*

Gearcase Lubricant Capacity		
R-Drive Sport	Right-hand rotation	940 mL (31.8 fl oz)
	Left-hand rotation	940 mL (31.8 fl oz)
R-Drive	Right-hand rotation	940 mL (31.8 fl oz)
	Left-hand rotation	940 mL (31.8 fl oz)

DRAINING AND FILLING THE GEARCASE

Draining Gearcase

1. Place the outboard in a vertical operating position.
2. Remove the propeller. Refer to **Propeller Replacement**.
3. Place a pan below the gear housing to capture the lubricant.
4. Remove the lubricant level plug and fill/drain plug. Allow a sufficient amount of time for the gearcase to drain. Depending on the ambient air temperature, it may take 30 minutes for the gearcase to completely drain.



a - Lubricant level plug
b - Fill/drain plug

Filling the Gearcase

1. After the gearcase has been drained, fill the gearcase through the fill/drain hole.
2. Add the specified gear lubricant.

IMPORTANT: Replace the sealing washers if damaged.

3. Allow a few minutes for the lubricant level to stabilize in the gearcase before installing the lubricant level plug. Install the lubricant level plug.

4. Remove the tube and install the fill/drain plug.
5. Tighten the plugs to the specified torque.

Description	Nm	lb-in.	lb-ft
Plugs	11.3	100	–

Checking Lubricant Level

1. Place the outboard in a vertical operating position. Allow up to 30 minutes for the lubricant level to stabilize in the gear housing.
2. Remove the lubricant level plug. Verify the sealing washer is not adhered to the bearing carrier. The lubricant should be level with the hole or slowly leak from the hole.

IMPORTANT: Replace the sealing washers if damaged.

3. If lubricant is not visible at the lubricant level hole, remove the fill/drain plug and add lubricant until it appears at the lubricant level hole.
4. Stop adding lubricant.
5. Remove the lubricant tube and install the fill/drain plug and sealing washer.
6. Tighten the plugs to the specified torque.

Description	Nm	lb-in.	lb-ft
Plugs	11.3	100	–

STORAGE

Storage Preparation

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

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

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

FUEL SYSTEM

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

IMPORTANT: This outboard is equipped with a closed fuel system. Fuel within the engine's fuel system, other than the fuel tank, will remain stable during normal storage periods without the addition of fuel treatment stabilizers.

Fill the fuel tank and engine fuel system with treated (stabilized) fuel to help prevent formation of varnish and gum. Proceed with the following instructions.

- Permanently installed fuel tank - Pour the required amount of Quickstor Fuel Stabilizer (follow instructions on container) into a separate container and mix with approximately one liter (one quart) of gasoline. Pour this mixture into the fuel tank.

Description	Where Used	Part No.
Quickstor Fuel Stabilizer	Fuel tank	92-8M0047932

Protecting External Outboard Components

- Touch up any paint nicks. See your dealer for touch-up paint.
- Spray Quicksilver or Mercury Precision Lubricants Corrosion Guard on external metal surfaces (except corrosion control anodes).

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

Protecting Internal Engine Components

IMPORTANT: Refer to Maintenance - Spark Plug Inspection and Replacement for correct procedure for removing spark plugs.

- Remove the high tension spark plug leads and spark plugs.

- Spray approximately 30 ml (1 fl oz) of Storage Seal Rust Inhibitor into each spark plug hole.

Description	Where Used	Part No.
Storage Seal Rust Inhibitor	Spark plug holes	92-858081K03

- Actuate key/push button start switch to crank the engine through one start cycle, which will distribute the storage seal throughout the cylinders.
- Install spark plugs and the high tension spark plug leads.

Gearcase

- Drain and refill the gearcase lubricant. Refer to **Gearcase Lubrication**.

Positioning Outboard for Storage

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

NOTICE

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

Battery Storage

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

TROUBLESHOOTING

Starter Motor Will Not Crank the Engine

POSSIBLE CAUSES

- Lanyard stop switch not in **RUN** position.
- Open clean power harness circuit fuse. Refer to **Maintenance** section.
- Remote control is not shifted to the neutral position.
- Shift actuator failure. Turn ignition key switch **OFF** to reset and then start the engine.
- Weak battery or battery connections are loose or corroded.
- Ignition key switch failure.
- Wiring or electrical connection faulty.
- Starter motor solenoid or starter relay failure.

Engine Will Not Start

POSSIBLE CAUSES

- Incorrect starting procedure. Refer to **Operation** section.
- Old or contaminated gasoline.
- Fuel is not reaching the engine.
    - Fuel tank is empty.
    - Fuel tank vent not open or restricted.
    - Fuel line is disconnected or kinked.
    - Fuel filter is obstructed. Refer to **Maintenance** section.
    - Fuel pump failure.
    - Fuel tank filter obstructed.
- Ignition system component failure.
- Spark plugs fouled or defective. Refer to **Maintenance** section.

Engine Starts But Will Not Shift Into Gear

- Throttle only mode is engaged.
- Shift actuator failure. Turn ignition key switch **OFF** to reset and then start the engine.

Engine Runs Erratically

POSSIBLE CAUSES

- Overheating—warning horn not working.
- Low oil pressure. Check oil level.
- Spark plugs fouled or defective. Refer to **Maintenance** section.
- Incorrect setup and adjustments.
- Fuel is being restricted to the engine.

a. Engine fuel filter is obstructed. Refer to **Maintenance** section.
b. Fuel tank filter obstructed.
c. Stuck anti-siphon valve located on permanently built-in type fuel tanks.
d. Fuel line is kinked or pinched.

- Fuel system is not primed.
- Fuel pump failure.
- Ignition system component failure.

Performance Loss

POSSIBLE CAUSES

- Overheating—warning horn not working.
- Low oil pressure. Check oil level.
- Throttle not opening fully.
- Damaged propeller or improper propeller size.
- Low water pressure.
- Low battery voltage.
- Worn, stretched or broken accessory belt.
- Boat overloaded or load improperly distributed.
- Excessive water in bilge.
- Boat bottom is dirty or damaged.
- Air filter or intake screen that is partially blocked with debris.

Battery Will Not Hold Charge

POSSIBLE CAUSES

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

OWNER SERVICE ASSISTANCE

Service Assistance

LOCAL REPAIR SERVICE

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

NOTE: *Quicksilver parts and accessories are engineered and built by Mercury Marine specifically for your power package.*

SERVICE AWAY FROM HOME

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

STOLEN POWER PACKAGE

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

ATTENTION REQUIRED AFTER SUBMERSION

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

REPLACEMENT SERVICE PARTS

⚠ WARNING

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

Marine engines are expected to operate at or near full throttle for most of their lives. They are also expected to operate in both fresh and saltwater environments. These conditions require numerous special parts.

PARTS AND ACCESSORIES INQUIRIES

Direct any inquiries concerning genuine Mercury Precision Parts® or Quicksilver Marine Parts and Accessories® to a local authorized dealer. Dealers have the proper systems to order parts and accessories, if they are not in stock. **Engine model** and **serial number** are required to order correct parts.

OWNER SERVICE ASSISTANCE

RESOLVING A PROBLEM

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

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

The following information will be needed by the Customer Service:

- Your name and address
- Your daytime telephone number
- The model and serial numbers of your power package
- The name and address of your dealership
- The nature of the problem

CONTACT INFORMATION FOR MERCURY MARINE CUSTOMER SERVICE

For assistance, call, fax, or write to the geographic office in your area. Please include your daytime telephone number with mail and fax correspondence.

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

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

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

OWNER SERVICE ASSISTANCE

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

Asia, Singapore, Japan		
Telephone	+65 68058100	Mercury Marine Singapore Pte Ltd 11 Changi South Street 3, #01-02 Singapore, 486122
Fax	+65 68058138	

Ordering Literature

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

Model		Serial Number	
Horsepower		Year	

UNITED STATES AND CANADA

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

Mercury Marine		
Telephone	**Fax**	**Mail**
(920) 929-5110	(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 Mercury Marine authorized service center to order additional literature that is available for your particular power package.

Submit the following order form with payment to:	Mercury Marine Attn: Publications Department W6250 Pioneer Road P.O. Box 1939 Fond du Lac, WI 54936-1939
Ship To: (Copy this form and print or type–This is your shipping label)	
Name	
Address	
City, State, Province	
ZIP or postal code	
Country	

OWNER SERVICE ASSISTANCE

Quantity	Item	Stock Number	Price	Total
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			Total Due	.

MAINTENANCE LOG

Maintenance Log

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

Date	Maintenance Performed	Engine Hours