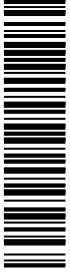




**MERCURY**  
**GO BOLDLY.™**

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**Operation  
Maintenance  
and  
Installation  
Manual**

**40 FourStroke**

© 2018 Mercury Marine



## 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. We suggest that this manual remain with the product for ready reference whenever you are on the water.

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

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

### Name / function:

John Pfeifer, 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 starting and operating procedures.

## Notice

Throughout this publication, and on your power package, warnings, cautions,

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

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

### WARNING

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

### CAUTION

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

## NOTICE

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

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

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

**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. We strongly recommend 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](http://www.P65Warnings.ca.gov).

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.**

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 **limited warranty** from Mercury Marine; the terms of the warranty are set forth in the Warranty Manual included with the product. 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 and limitations of damages**, and other related information. Please review this important information.

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

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## Identification Records

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)		



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# 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

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## 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.

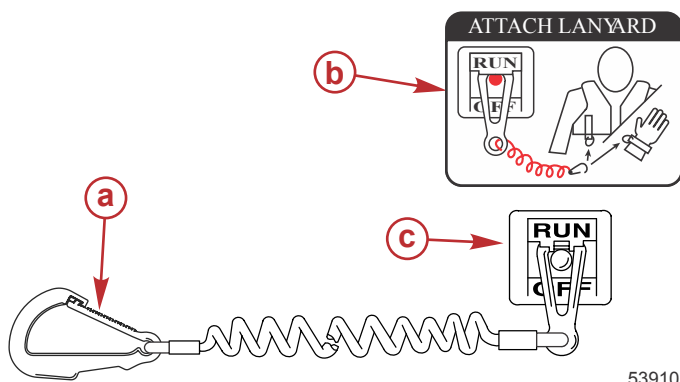
## Lanyard Stop Switch

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.



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- 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.

# GENERAL INFORMATION

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.

# GENERAL INFORMATION

## 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.



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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

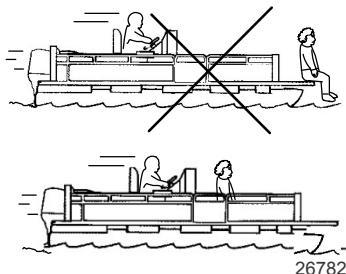
Whenever the boat is in motion, observe the location of all passengers. Do not allow any passengers to stand or use seats other than those designated for traveling faster than idle speed. A sudden reduction in boat speed, such as plunging into a large wave or wake, a sudden throttle reduction, or a sharp 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.

# GENERAL INFORMATION

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



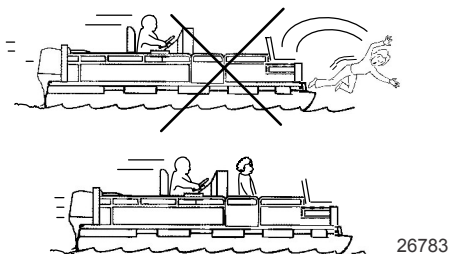
## ⚠ WARNING

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

### BOATS WITH FRONT MOUNTED, RAISED PEDESTAL FISHING SEATS

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

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

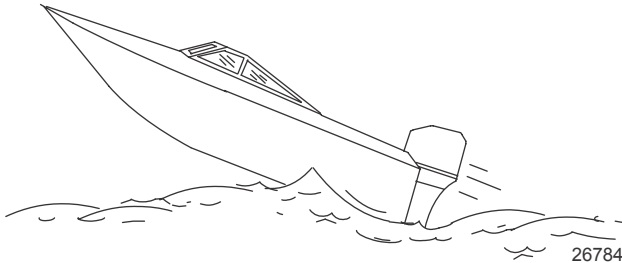




# GENERAL INFORMATION

## Wave and Wake Jumping

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

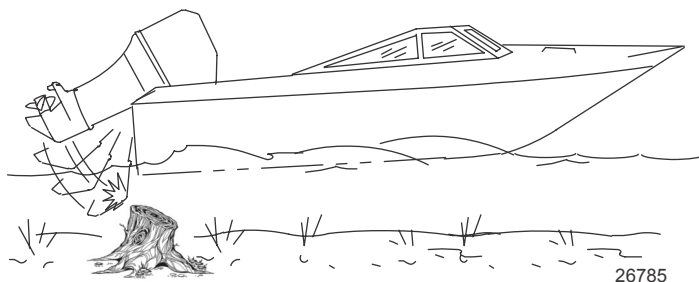
## Impact with Underwater Hazards

Your outboard may be 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.

# GENERAL INFORMATION

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.

# GENERAL INFORMATION

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.

## SAFETY INSTRUCTIONS FOR HAND-TILLED OUTBOARDS

No person or cargo should occupy the area directly in front of the outboard while the boat is in motion. If an underwater obstacle is struck, the outboard will tilt up and could seriously injure anyone occupying this area.

### Models with Clamp Screws:

Some outboards come with transom bracket clamp screws. The use of clamp bracket screws alone is insufficient to properly and safely secure the outboard to the transom. Proper installation of the outboard includes bolting the engine to the boat through the transom. Refer to **Engine Installation - Installing Outboard** for more complete installation information.

## ▲ WARNING

Failure to correctly fasten the outboard could result in the outboard propelling off the boat transom resulting in property damage, serious injury, or death. Before operation, the outboard must be correctly installed with the required mounting hardware.

This product must be secured to the transom with the required mounting hardware. If the outboard strikes an underwater object, the required mounting hardware prevents the outboard from propelling off the transom. A decal on the swivel bracket reminds the installer of the potential hazard.



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# GENERAL INFORMATION

## Exhaust Emissions

### BE ALERT TO CARBON MONOXIDE POISONING

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

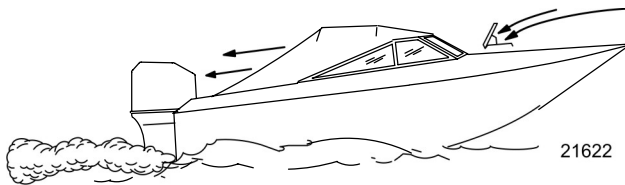
Early symptoms of carbon monoxide poisoning which should not be confused with seasickness or intoxication, include headache, dizziness, drowsiness, and nausea.

#### **▲ WARNING**

**Carbon monoxide poisoning can lead to unconsciousness, brain damage, or death. Keep the boat well ventilated while at rest or underway and avoid prolonged exposure to carbon monoxide.**

### GOOD VENTILATION

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



**Example of desired air flow through the boat**

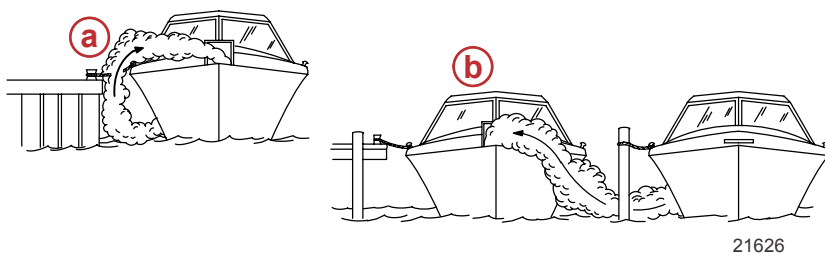
### POOR VENTILATION

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 enclosed area of a stationary boat that contains or is near a running engine may be exposed to a hazardous level of carbon monoxide.

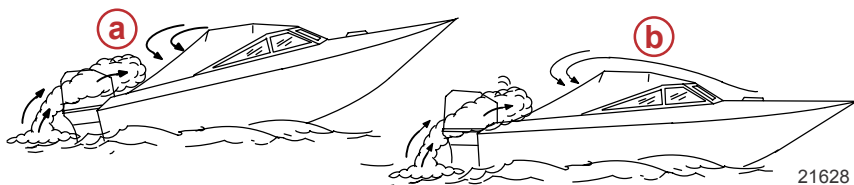
# GENERAL INFORMATION

## WHILE BOAT IS STATIONARY



- a** - Running the engine when the boat is moored in a confined space
- b** - Mooring close to another boat that has its engine running

## WHILE BOAT IS MOVING



- a** - Running the boat with the trim angle of the bow too high
- b** - Running the boat with no forward hatches open

## 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, familiarize yourself with local and all other governmental boating regulations and restrictions and consider the following suggestions.

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

# GENERAL INFORMATION

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

## **Perform safety checks and required maintenance.**

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

## **Check safety equipment onboard.**

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

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

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

## **Passenger boarding.**

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

## **Use personal flotation devices.**

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

## **Prepare other boat operators.**

# GENERAL INFORMATION

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

## **Do not overload your boat.**

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

## **Ensure that everyone in the boat is properly seated.**

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

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

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

## **Know your boating area and avoid hazardous locations.**

### **Be alert.**

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

## **Never drive your boat directly behind a water-skier.**

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

## **Watch fallen skiers.**

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

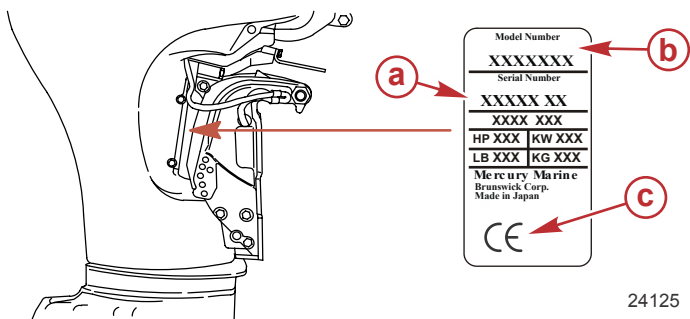
## **Report accidents.**

# GENERAL INFORMATION

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

## Recording Serial Number

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



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

## 40 FourStroke Specifications

Models	40
Horsepower	40
Kilowatts	29.4
Full Throttle RPM Range	5500–6000 RPM
Idle Speed in Forward Gear	800 ± 25 RPM
Number of Cylinders	3
Piston Displacement	747 cc (45.6 cu. in.)
Cylinder Bore	65 mm (2.559 in.)
Stroke	75 mm (2.953 in.)
Valve Clearance (Cold)	
Intake Valve	0.15–0.25 mm (0.006–0.010 in.)
Exhaust Valve	0.25–0.35 mm (0.010–0.014 in.)

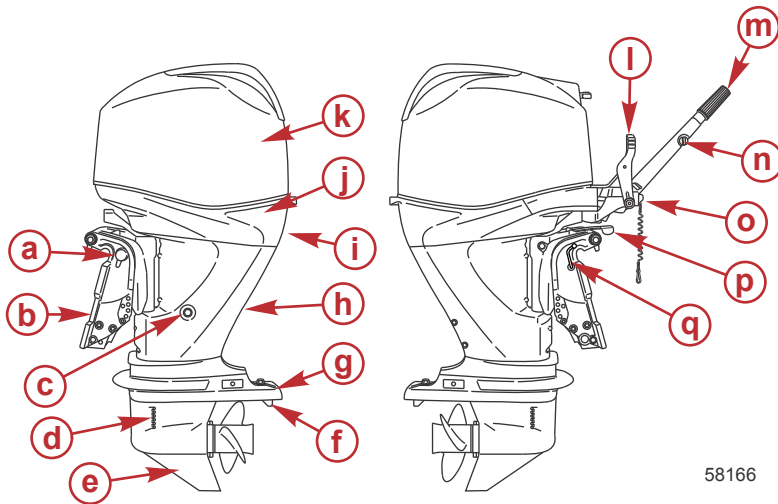


## GENERAL INFORMATION

<b>Models</b>	<b>40</b>
Recommended Spark Plug	
Carburetor Models	NGK DPR6EA-9
Spark Plug Gap	0.9 mm (0.035 in.)
Gear Ratio	2.00:1
Recommended Gasoline	Refer to <b>Fuel and Oil</b>
Recommended Oil	Refer to <b>Fuel and Oil</b>
Gearcase Lubricant Capacity	440 ml (14.9 fl oz)
Engine Oil Capacity	3.0 L (3 U.S. qt)

# GENERAL INFORMATION

## Component Identification



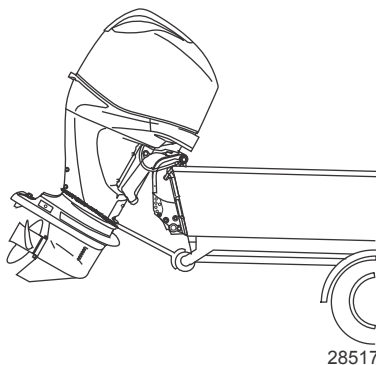
58166

- a** - Tilt support knob
- b** - Transom brackets
- c** - Oil drain plug
- d** - Primary cooling water intake
- e** - Gearcase
- f** - Trim tab
- g** - Antiventilation plate
- h** - Driveshaft housing
- i** - Water pump indicator hole
- j** - Bottom cowl
- k** - Top cowl
- l** - Shift handle
- m** - Engine stop switch
- n** - Throttle friction adjustment knob
- o** - Lanyard stop switch
- p** - Steering friction adjustment lever
- q** - Tilt lock lever

# TRANSPORTING

## Trailing Boat/Outboard

Trailer your boat with the outboard tilted down in a vertical operating position. If additional ground clearance is required, the outboard should be tilted up using an accessory outboard support device. Refer to your local dealer for recommendations. Additional clearance may be required for railroad crossings, driveways, and trailer bouncing.



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

# FUEL AND OIL

## Fuel 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 87 (R+M)/2, minimum, for most models. Premium gasoline 91 (R+M)/2 octane is also acceptable for most models. **Do not** use leaded gasoline.

**Outside USA and Canada** - A posted pump octane rating of 91 RON, minimum, for most models. Premium gasoline (95 RON) is also acceptable for all models. **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)

# FUEL AND OIL

## 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.

## Low Permeation Fuel Hose Requirement

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

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

## EPA Pressurized Portable Fuel Tank Requirements

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

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

## Fuel Demand Valve (FDV) Requirement

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

# FUEL AND OIL

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



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

## Mercury Marine's Pressurized Portable Fuel Tank

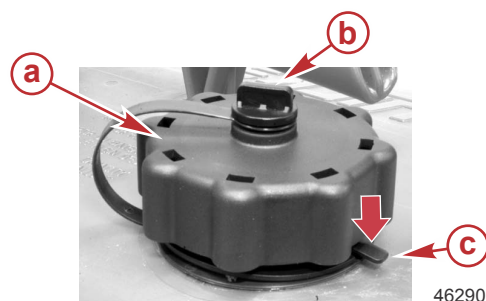
Mercury Marine has created a new portable pressurized fuel tank that meets the preceding EPA requirements. These fuel tanks are available as an accessory or are provided with certain portable outboard models.

### SPECIAL FEATURES OF THE PORTABLE FUEL TANK

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

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

### REMOVING THE FUEL CAP



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

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

# FUEL AND OIL

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

## DIRECTIONS FOR USING THE PRESSURIZED PORTABLE FUEL TANK

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

## Filling Fuel Tank

### WARNING

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

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

Remove the portable fuel tanks from the boat to fill them.

Always stop the engine before filling the tanks.

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

## PORTABLE FUEL TANK PLACEMENT IN THE BOAT

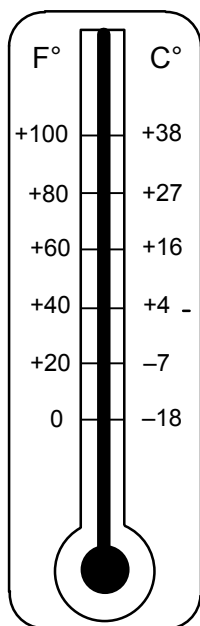
Place the fuel tank in the boat so the vent is higher than the fuel level under normal boat operating conditions.

## Engine Oil Recommendations

Mercury or Quicksilver NMMA FC-W certified SAE 10W-30 4-Stroke Marine Engine Oil is recommended for general, all-temperature use. If NMMA certified synthetic blend oil is preferred, use Mercury or Quicksilver SAE 25W-40 Synthetic Blend Marine 4-Stroke Engine Oil. If the recommended Mercury or Quicksilver NMMA FC-W certified outboard oils are not available, a major FC-W certified 4-stroke outboard oil may be used.

# FUEL AND OIL

**IMPORTANT:** The use of nondetergent oils, multi-viscosity oils (other than Mercury or Quicksilver NMMA FC-W certified oil or a major brand NMMA FC-W certified oil), synthetic oils, low quality or oils that contain solid additives are not recommended.



26795

## Recommended SAE viscosity for engine oil

- a** - Mercury or Quicksilver SAE 25W-40 Synthetic Blend Marine 4-Stroke Engine Oil may be used at temperatures above 4 °C (40 °F)
- b** - Mercury or Quicksilver SAE 10W-30 4-Stroke Marine Engine Oil is recommended for use in all temperatures

## Checking and Adding Engine Oil

**IMPORTANT:** Do not overfill. Be sure that the outboard is upright (not tilted) when checking oil.

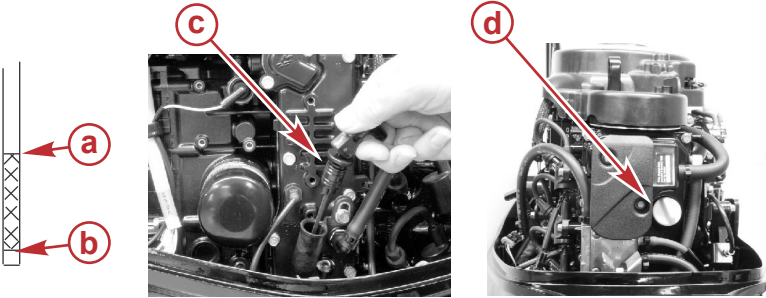
1. Turn the engine off. Have the outboard in a level operating position. Remove the top cowl.
2. Flip the handle up and pull out the dipstick. Wipe it with a clean rag or towel and push it back in all the way.
3. Pull the dipstick back out again and observe the oil level. If the oil level is low, remove the oil filler cap and fill to (but not over) the upper oil level with the recommended 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

4. Push the dipstick back in all the way, then flip the handle down to lock the dipstick in place. Reinstall the oil filler cap and hand tighten securely.



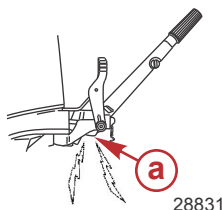
28813

- a** - Full mark
- b** - Add mark
- c** - Dipstick
- d** - Oil filler cap

# FEATURES AND CONTROLS

## Warning System - Manual Starting Models

The outboard warning system incorporates a warning horn below the tiller handle.



**a** - Warning horn below tiller handle

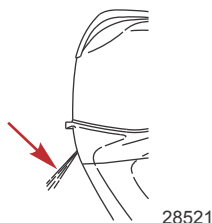
## WARNING SYSTEM OPERATION

The warning horn will emit either a continuous beep or intermittent short beeps, and engine speed will be limited to 2000 RPM. This will alert the operator and help identify the following situations.

Warning System		
Function	Sound	Description
Engine Over Temperature	Continuous	Engine Overheat
Low Oil Pressure	Intermittent Short Beeps	Low Oil Pressure

## ENGINE OVERHEAT

If the engine overheats, immediately reduce throttle speed to idle. Shift the outboard into neutral and check for a steady stream of water coming out of the water pump indicator hole.



If no water is coming out of the water pump indicator hole or flow is intermittent, stop engine and check cooling water intake holes for obstruction. If no obstruction is found, this may indicate a blockage in the cooling system or a water pump problem. Have the outboard checked by your dealer. Operating the engine while overheated will cause engine damage.

If a steady flow of water is coming out of the water pump indicator hole and the engine continues to overheat, consult your dealer. Operating an overheated engine will cause engine damage.

# FEATURES AND CONTROLS

**NOTE:** Should overheating occur and you are stranded, stop the engine and allow it to cool down. This will usually allow some additional low speed (idle) running time before the engine starts to overheat again.

## LOW OIL PRESSURE

The warning system will be activated if the oil pressure drops too low. First, stop the engine and check the oil level. Add oil if necessary. If the oil is at the recommended level and the warning horn continues to sound, consult your dealer. Engine speed will be limited to 2000 RPM, however you should not continue to run engine.

## 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.

## Manual Tilt System

Models without power trim are equipped with a tilt assist system that allows the operator to easily tilt and lock the outboard at any tilt position from full down to full up.

This tilt system is designed to be adjusted when the outboard is idling in neutral or with the engine turned off.

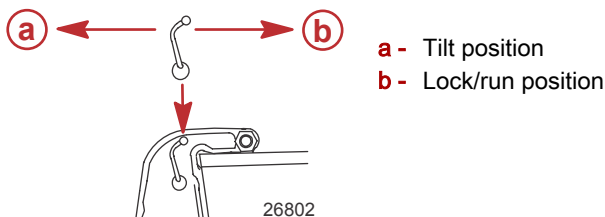
Before operating, the outboard must be locked in its tilt position by moving the tilt lock lever to the **lock/run** position.

### ⚠ WARNING

Operating the engine without engaging the tilt lock lever can cause serious injury or death. The outboard can tilt upwards when decelerating or operating in reverse, causing loss of boat control. Always lock the outboard in its run position before operating.

## BASIC TILTING OPERATION

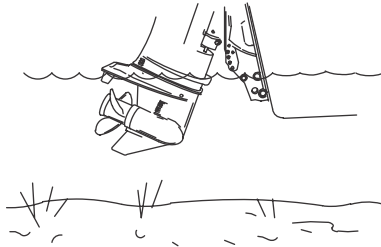
Move tilt lock lever to the tilt position. Tilt outboard to desired position and lock in place by moving the tilt lock lever back to the lock/run position.



# FEATURES AND CONTROLS

## SHALLOW WATER OPERATION

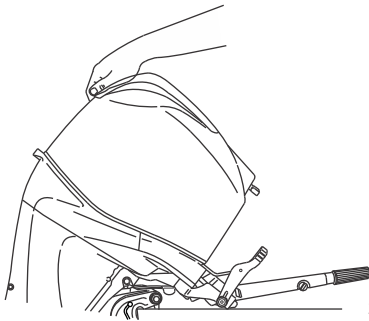
When operating your boat in shallow water, the outboard can be adjusted and locked at a higher tilt angle. Operate your outboard at slow speed while tilted up for shallow water operation. Keep the cooling water intake holes submerged in the water and continue to check for water discharge from the water pump indicator hole.



26803

## TILTING OUTBOARD TO FULL UP POSITION

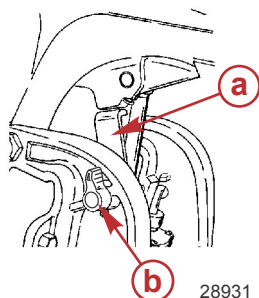
1. Stop the engine. Move the tilt lock lever to the tilt position. Take hold of the top cowl grip and raise outboard to full tilt up position. Lock the outboard in place by moving the tilt lock lever to the lock/run position.



28916

## FEATURES AND CONTROLS

2. Engage the tilt support lever by rotating the knob to bring the support lever upward.



- a - Tilt support lever
- b - Knob

28931

3. Lower the outboard to rest on the tilt support lever.
4. Disengage the tilt support lever by raising the outboard off the support lever and rotating the lever down. Lower the outboard.
5. Move the tilt lock lever to the lock/run position.

### OPERATING ANGLE ADJUSTMENT

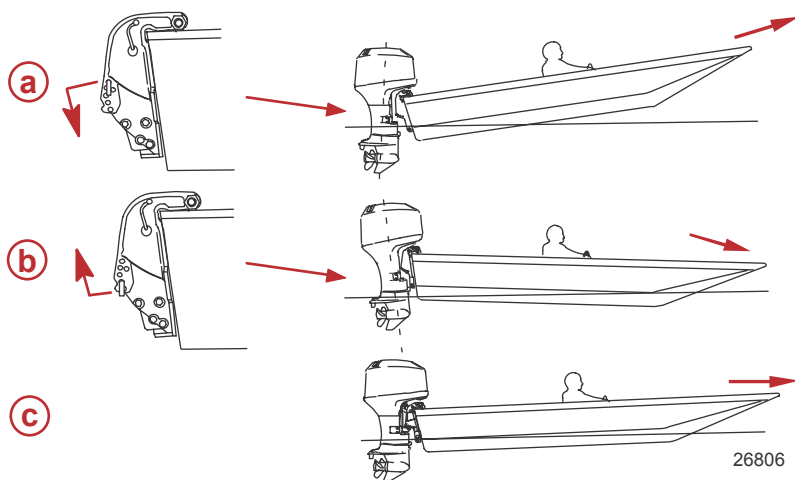
The vertical operating angle of your outboard is adjusted by changing the position of the tilt pin in the five adjustment holes provided. The outboard should be locked against this tilt pin by setting the tilt lock lever to the lock/run position. Proper adjustment allows the boat to run stably, achieve optimum performance, and minimize steering effort.

**NOTE:** Refer to the following lists when adjusting the operating angle of your outboard.

The tilt pin should be adjusted so the outboard is positioned to run perpendicular to the water when the boat is running at full speed. This allows the boat to be driven parallel to the water.

# FEATURES AND CONTROLS

Arrange passengers and load in the boat so the weight is distributed evenly.



- a** - Too much angle (stern down - bow up)
- b** - Not enough angle (stern up - bow down)
- c** - Angle adjusted properly (bow slightly up)

Consider the following lists carefully when adjusting the operating angle of your outboard.

Adjusting the outboard close to the boat transom 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
- Increase steering torque or pull to the right (with the normal right-hand rotation propeller)
- 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.

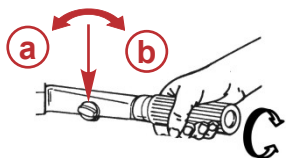
Adjusting the outboard away from the boat transom can:

- Lift the bow out of the water
- Generally increase top speed
- Increase clearance over submerged objects or a shallow bottom
- Increase steering torque or pull to the left at a normal installation height (with the normal right-hand rotation propeller)
- In excess, can cause boat porpoising (bouncing) or propeller ventilation

# FEATURES AND CONTROLS

## Throttle Grip Friction Adjustment - Tiller Handle Models

Throttle grip friction knob - Turn friction knob to set and maintain the throttle at desired speed. Turn knob clockwise to tighten friction and turn knob counterclockwise to loosen friction.



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**a** - Loosen friction

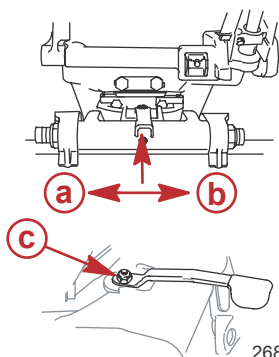
**b** - Tighten friction

## Steering Friction Adjustment - Tiller Handle Models

**NOTE:** Steering friction adjustment is only provided on models with tiller handles.

Adjust this lever to achieve the desired steering friction (drag) on the tiller handle. Move lever to the left to tighten friction or move to the right to loosen friction.

**NOTE:** To maintain proper adjustment, the locknut located on top of the steering friction lever pivot shaft can be tightened.



26811

**a** - Tighten friction

**b** - Loosen friction

**c** - Locknut

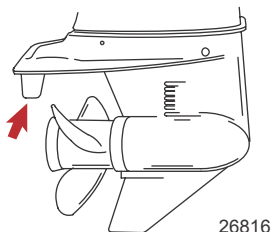
### ▲ WARNING

Insufficient friction adjustment can cause serious injury or death due to loss of boat control. When setting the friction adjustment, maintain sufficient steering friction to prevent the outboard from steering into a full turn if the tiller handle is released.

# FEATURES AND CONTROLS

## Trim Tab Adjustment

Propeller steering torque will cause your boat to pull in one direction. This steering torque is a normal result from your outboard not trimmed with the propeller shaft parallel to the water surface. The trim tab can help to compensate for this steering torque in many cases and can be adjusted within limits to reduce any unequal steering effort.



**NOTE:** Trim tab adjustment will have little effect reducing steering torque if the outboard is installed with the antiventilation plate approximately 50 mm (2 in.) or more above the boat bottom.

Operate your boat at normal cruising speed, trimmed to desired position. Turn your boat left and right and note the direction the boat turns more easily.

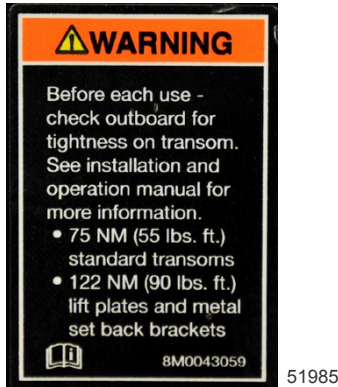
If adjustment is necessary, loosen the trim tab bolt and make small adjustments at a time. If the boat turns more easily to the left, move the trailing edge of the trim tab to the left. If the boat turns more easily to the right, move the trailing edge of the trim tab to the right. Tighten the bolt and test.



# OPERATION

## 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.



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 boats' 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**.

# OPERATION

## Operating in Freezing Temperatures

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

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

## Operating in Saltwater or Polluted Water

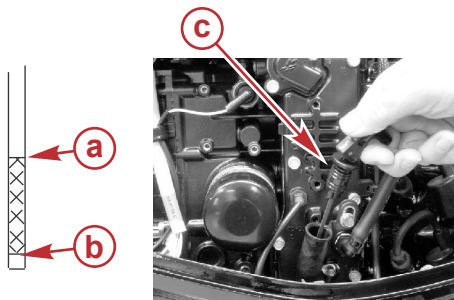
We recommend that you flush the internal water passages of your outboard with fresh water after each use in salt or polluted water. This will prevent a buildup of deposits from clogging the water passages. Refer to **Maintenance - Flushing the Cooling System**.

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

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

## Prestarting Instructions

1. Check the engine oil level.



- a - Full mark
- b - Add mark
- c - Dipstick

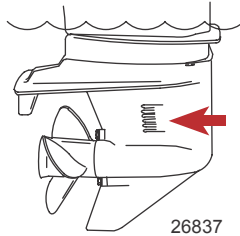
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2. Verify the cooling water intake is submerged.

# OPERATION

## NOTICE

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



## 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.

1. For the first hour of operation, run the engine at varied throttle settings up to 3500 RPM or at approximately half throttle.
2. For the second hour of operation, run the engine at varied throttle settings up to 4500 RPM or at three-quarter throttle, and during this period of time, run it 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.

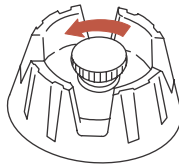
## Starting the Engine - Tiller Handle Models

Before starting, read the **Prestarting Check List**, special operating instructions, and **Engine Break-in Procedure** in this section.

## NOTICE

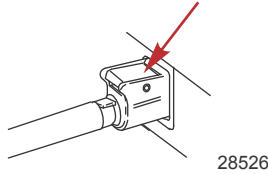
Without sufficient cooling water, the engine, the water pump, and other components will overheat and suffer damage. Provide a sufficient supply of water to the water inlets during operation.

1. Open the fuel tank vent screw (in filler cap) on manual venting type fuel tanks.

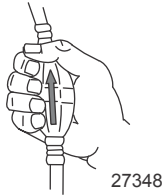


# OPERATION

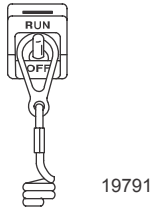
2. Connect the remote fuel line to the outboard. Verify the connector is snapped into place.



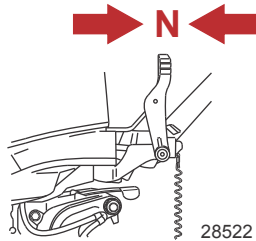
3. Position the fuel line primer bulb so the arrow on the side of the bulb is pointing up. Squeeze the fuel line primer bulb several times until it feels firm.



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

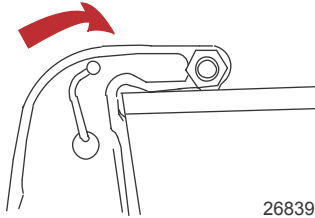


5. Shift the outboard to the neutral (N) position.



# OPERATION

6. Models without power trim - Position the tilt lock lever to the lock position.

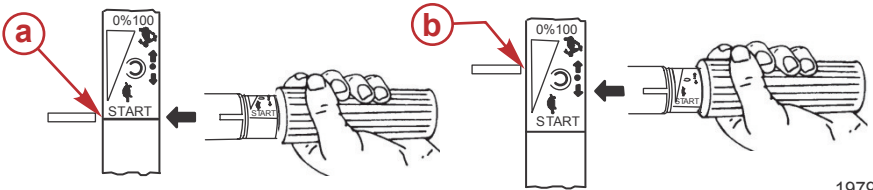


26839

7. Position the throttle grip as follows:

- **Cold engine** - Set the throttle grip to the start position.
- **Warm engine** - Set the throttle grip to the half-way position.
- **Flooded engine** - Set the throttle grip to the half-way position.

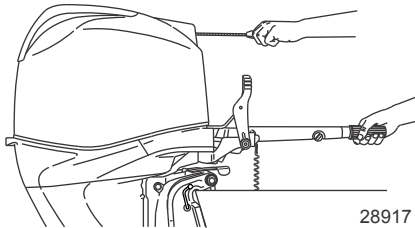
**NOTE:** After starting a cold engine (air temperature below 4 °C [40 °F]), slowly advance the throttle speed until the engine is warmed up.



19799

- a** - Start position  
**b** - Half-way position

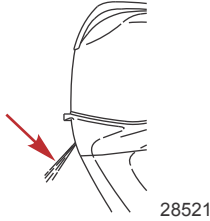
8. Manual start models - Pull the starter rope slowly until you feel the starter engage, then pull rapidly to crank the engine. Allow the rope to return slowly. Repeat until the engine starts.



28917

# OPERATION

9. 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 your dealer. Operating the engine while overheated may cause serious engine damage.

## WARMING UP ENGINE

Before beginning operation, allow the engine to warm up at idling speed for three minutes.

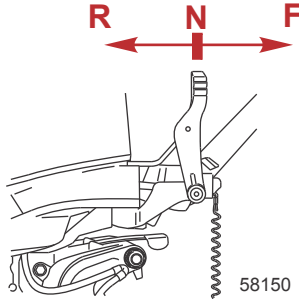
## Gear Shifting

**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.**
- **Do not shift the outboard into reverse when the engine is not running. Damage to the shift linkage could occur.**

# OPERATION

- Your outboard has three gear shift positions to provide operation: forward, neutral (out of gear), and reverse.



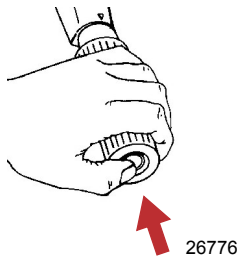
- Reduce the engine speed to idle before shifting.



- Always shift the outboard into gear with a quick motion.
- After shifting the outboard into gear, advance the remote control lever or rotate the throttle grip (tiller handle) to increase speed.

## Stopping the Engine

Reduce the engine speed and shift the outboard to neutral position and push the engine stop button in.

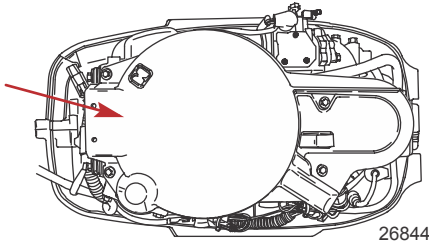


## Emergency Starting

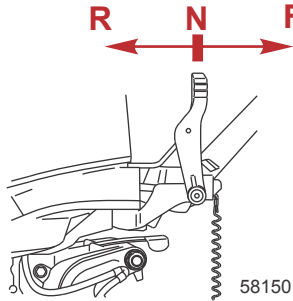
If the starter system fails, use the spare starter rope (provided) and follow procedure.

# OPERATION

1. Remove flywheel cover or manual starter assembly.



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



## **▲ WARNING**

The neutral-speed-protection device is inoperative when starting the engine with the emergency starter rope. Set the engine speed at idle and the gear shift in neutral to prevent the outboard from starting in gear.

## **▲ WARNING**

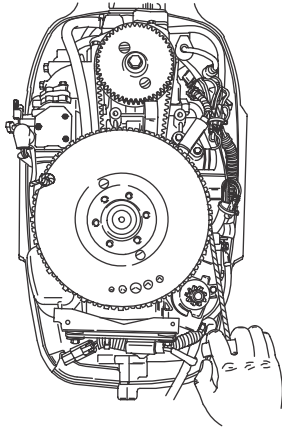
The exposed moving flywheel can cause serious injury. Keep your hands, hair, clothing, tools, and other objects away from engine when starting or running the engine. Do not attempt to reinstall the flywheel cover or top cowl when engine is running.

3. Place the starter rope knot into the flywheel notch and wind the rope clockwise around the flywheel.



# OPERATION

4. Pull the starter rope to start the engine.



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# 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)

If the outboard is operated in saltwater, remove the top cowl and flywheel cover. Inspect the powerhead and powerhead components for salt buildup. Wash off any salt buildup 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 or belt pulleys.

**IMPORTANT: Do not allow lubricant or Corrosion Guard spray to come in contact with the alternator drive belt or the belt pulleys. The alternator drive belt could slip and be damaged if it becomes coated with any lubricant or Corrosion Guard spray.**

# MAINTENANCE

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

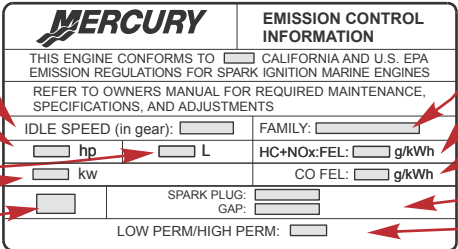
## EPA Emissions Regulations

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.



The image shows a Mercury Emission Certification Label with various fields and callouts. The label is divided into sections for engine specifications, emission limits, and maintenance information. Callouts a through j point to specific fields on the label.

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

43210

- a - Idle speed
- b - Engine horsepower
- c - Piston displacement
- d - Engine power - kilowatts
- e - Date of manufacture
- f - 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

## OWNER RESPONSIBILITY

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

# MAINTENANCE

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

### DAILY CHECKS

- Check the engine oil level
- Check the lanyard stop switch
- Inspect the fuel system for leaks
- Inspect the engine tightness on the transom
- Check the steering system for binding
- Check the propeller for damage
- Inspect the hydraulic steering fittings and hoses for leaks or signs of damage, if equipped
- Check the hydraulic steering fluid level, if equipped

### AFTER EACH USE

- Wash the power package exterior with fresh water
- Flush the outboard cooling system, saltwater or brackish water only

### ANNUALLY OR 100 HOURS

- Grease the engine, if applicable
- Change the engine oil and filter, if equipped
- Inspect the thermostat, saltwater or brackish water only
- Add Quickleen to the fuel tank, once per year, per engine
- Apply antiseize to the spark plug threads
- Replace the gear lubricant
- Inspect the corrosion control anodes
- Lubricate the propeller shaft splines
- Replace all filters on the suction side of the fuel system—dealer item
- Lubricate the driveshaft splines—dealer item
- Check the tightness on all the fasteners—dealer item
- Check the torque of the outboard mounting hardware—dealer item
- Check the battery condition and tightness of the battery cable connection, if equipped—dealer item

### THREE YEARS OR 300 HOURS

- Replace the spark plugs
- Replace the water pump impeller—dealer item
- Inspect the carbon fiber reeds, if equipped—dealer item
- Inspect the wire harness connectors—dealer item

# MAINTENANCE

- Check the remote control cable adjustment, if equipped—dealer item
- Replace the high-pressure fuel filter, if equipped—dealer item
- Replace the accessory drive belt, if equipped—dealer item
- Check the power trim fluid level, if equipped—dealer item
- Inspect the engine motor mounts—dealer item

## 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.

**IMPORTANT: The engine must be run during flushing in order to open the thermostat and circulate water through the water passages.**

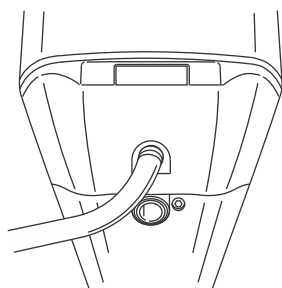
### ⚠ WARNING

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

1. Place the outboard in either the operating position (vertical) or in a tilted position.
2. Remove the propeller. Refer to **Propeller Replacement**.
3. Thread a water hose into the rear fitting. Partially open the water tap (1/2 maximum). Do not open the water tap all the way as this allows a high pressure flow of water.

**IMPORTANT: Do not run engine above idle when flushing.**

4. Shift the outboard into neutral. Start the engine and flush the cooling system for at least five minutes. Keep the engine speed at idle.
5. Stop the engine. Turn off the water and remove the hose. Reinstall the propeller.



28518

# MAINTENANCE

## Top Cowl Removal and Installation

### REMOVAL

Pull out the rear lock lever and remove the top cowl.



28439

### INSTALLATION

1. Lower the top cowl over the engine.
2. Bring the front of the cowl down first and engage the front hook. Lower the cowl into its seated position and apply downward pressure to the back of the cowl to lock it in place. Gently pull up on the back of cowl to make sure it is securely fastened.



28445

## 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.

# MAINTENANCE

4. Ensure the battery is equipped with a nonconductive shield to prevent accidental shorting of battery terminals.

## Fuel System

### ⚠ WARNING

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

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

## FUEL LINE INSPECTION

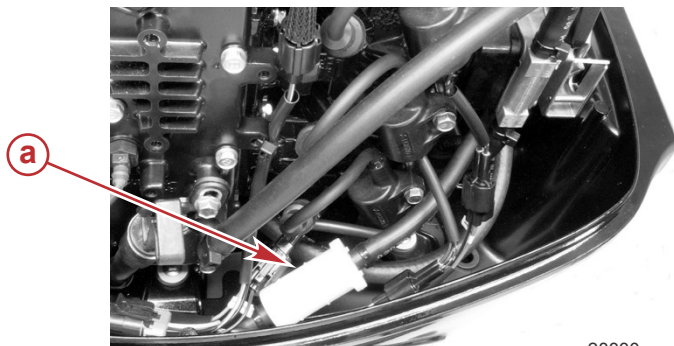
Visually inspect the fuel line and primer bulb for cracks, swelling, leaks, hardness, or other signs of deterioration or damage. If any of these conditions are found, the fuel line or primer bulb must be replaced.

## Engine Fuel Filter - Manual Starting Models

Read the preceding fuel system servicing information and warning.

Inspect the fuel filter. If the filter appears to be contaminated, remove and replace.

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



28830

**a** - Fuel filter



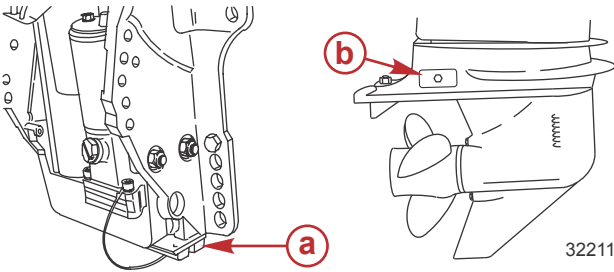
# MAINTENANCE

## Corrosion Control Anode

The outboard has corrosion control anodes at different locations. An anode helps protect the outboard against galvanic corrosion by sacrificing its metal to be slowly corroded instead of the outboard metals.

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

This model has an anode installed on each side of the gearcase and one on the bottom of the transom bracket assembly.



- a** - Anode on transom bracket assembly
- b** - Gearcase anodes

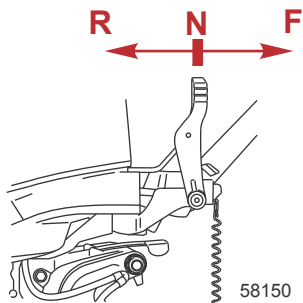
## Propeller Replacement

### ⚠ WARNING

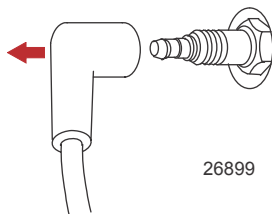
Rotating propellers can cause serious injury or death. Never operate the boat out of the water with a propeller installed. Before installing or removing a propeller, place the drive unit in neutral and engage the lanyard stop switch to prevent the engine from starting. Place a block of wood between the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

# MAINTENANCE

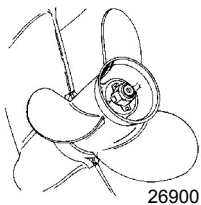
1. Shift the outboard to the neutral (N) position.



2. Remove the spark plug leads to prevent the engine from starting.



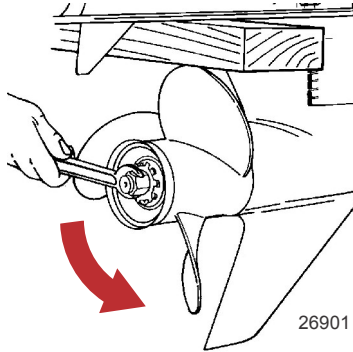
3. Straighten the bent tabs on the propeller nut retainer.



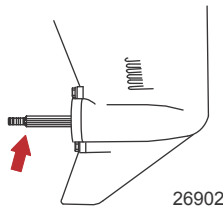
4. Place a block of wood between the gearcase and propeller. Remove the propeller nut.


# MAINTENANCE

5. 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.



6. Apply 2-4-C with PTFE to the propeller shaft.

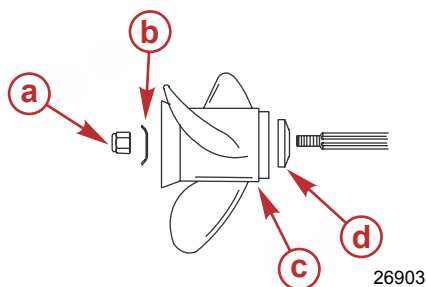


Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with PTFE	Propeller shaft	92-802859A 1

**IMPORTANT:** To prevent the propeller hub from corroding and seizing to the propeller shaft (especially in saltwater), always apply the recommended lubricant to the entire propeller shaft at the recommended maintenance intervals, and also each time the propeller is removed.

# MAINTENANCE

7. Flo-Torq I drive hub propellers - Install the forward thrust hub, propeller, propeller nut retainer, and propeller nut onto the shaft.

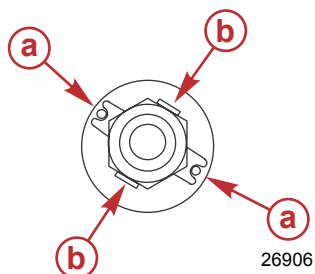


- a - Propeller nut
- b - Propeller nut retainer
- c - Propeller
- d - Forward thrust hub

8. Place the propeller nut retainer over the pins. Place a block of wood between the gearcase and propeller. Tighten propeller nut to the specified torque.

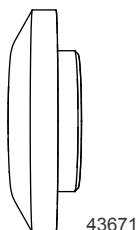
Description	Nm	lb-in.	lb-ft
Propeller nut	75	-	55

9. Align the flat sides of the propeller nut with the tabs on the propeller nut retainer. Secure the propeller nut by bending the tabs up and against the flats on the propeller nut.



- a - Pins
- b - Tabs

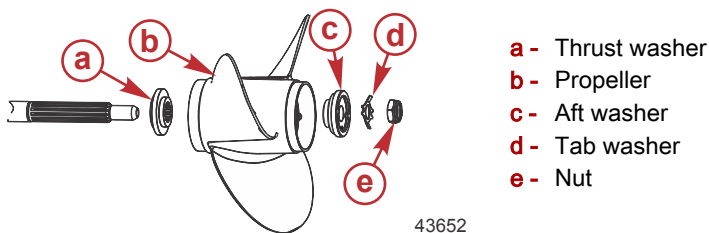
10. Reflex hub - Install the thrust washer onto the propeller shaft.



11. Install the propeller.
12. Install the aft washer, the tab washer, and secure with the propeller nut included with the kit. Tighten the nut to the specified torque. Bend the tabs on the tab washer onto the nut.

# MAINTENANCE

**IMPORTANT:** The Flo-Torq Reflex drive hub requires the use of the propeller nut included with the drive hub kit. The use of a propeller nut that was not included with the Flo-Torq Reflex drive hub kit will result with the nylon portion of the locknut not fully engaging the propeller shaft threads.



13. Rotate the propeller to verify interference or binding does not exist between the gear housing and the propeller.

Description	Nm	lb-in.	lb-ft
Nut	75	-	55

**NOTE:** A small amount of rotation play is normal.

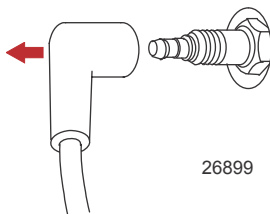
14. Install the spark plug leads.

## Spark Plug Inspection and Replacement

### ⚠ WARNING

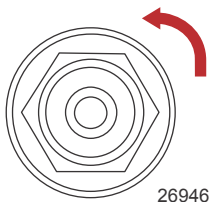
Damaged spark plug boots may emit sparks that can ignite fuel vapors under the engine cowl, resulting in serious injury or death from a fire or explosion. To avoid damaging the spark plug boots, do not use any sharp object or metal tool to remove the spark plug boots.

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

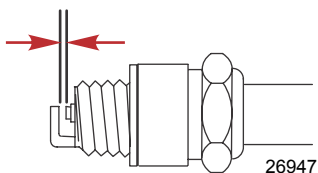


# MAINTENANCE

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



- Set the spark plug gap to specification.



Spark Plug	
Spark plug gap	0.9 mm (0.035 in.)

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

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

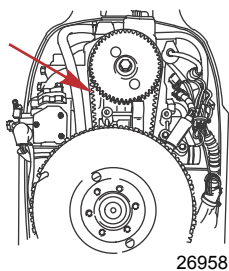
## Timing Belt Inspection

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

- Cracks in the back of the belt or in the base of the belt teeth.
- Excessive wear at the roots of the cogs.
- Rubber portion swollen by oil.
- Belt surfaces roughened.

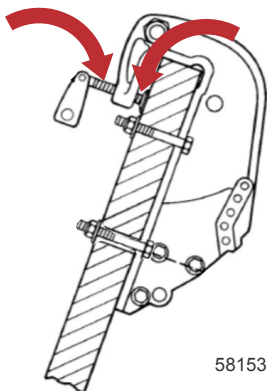
# MAINTENANCE

- Signs of wear on edges or outer surfaces of belt.




## Lubrication Points

1. Apply a liberal amount of oil to the clamp bracket screw threads.



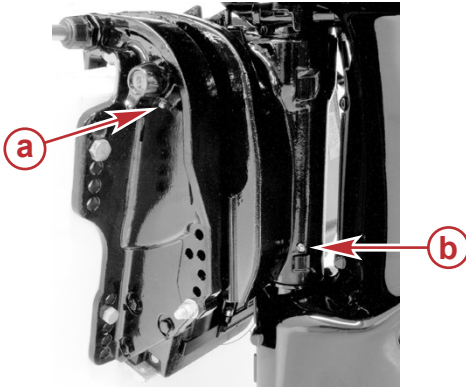
2. Lubricate the following with 2-4-C with PTFE:

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with PTFE	Tilt support lever, swivel bracket, copilot shaft, propeller shaft	92-802859A 1

- Tilt support lever - Lubricate through fitting.

# MAINTENANCE

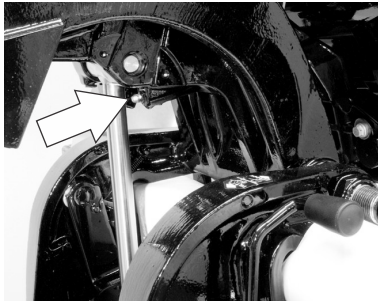
- Swivel bracket - Lubricate through fitting.



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

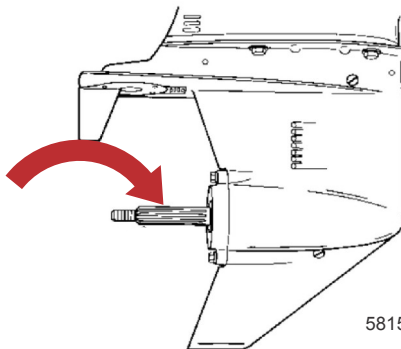
28466

- Copilot shaft (tiller handle models) - Lubricate through fitting. Move the steering friction lever back and forth while lubricating.



28823

- Propeller shaft - Apply a liberal amount on the splines of the propeller shaft.



58155



# MAINTENANCE

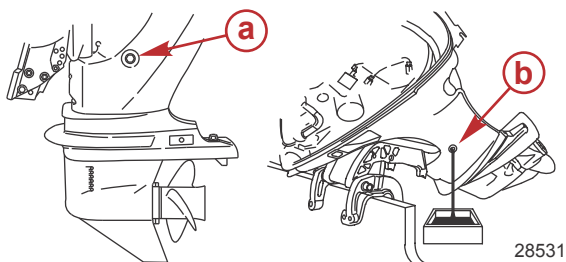
## Changing Engine Oil

### ENGINE OIL CAPACITY

	Capacity	Fluid Type
Engine oil	3 Liter (3 US qt)	Mercury or Quicksilver SAE 25W-40 Synthetic Blend Marine 4-Stroke Engine Oil
		Mercury or Quicksilver SAE 10W-30 4-Stroke Marine Engine Oil

### OIL CHANGING PROCEDURE

1. Tilt the outboard up to the trailer position.
2. Turn the outboard so the drain hole is facing down. Remove the drain plug and drain the engine oil into an appropriate container. Allow several minutes for the engine oil to drain.
3. Lubricate the seal on the drain plug with oil and install. Tighten the drain plug securely.



**a** - Drain plug

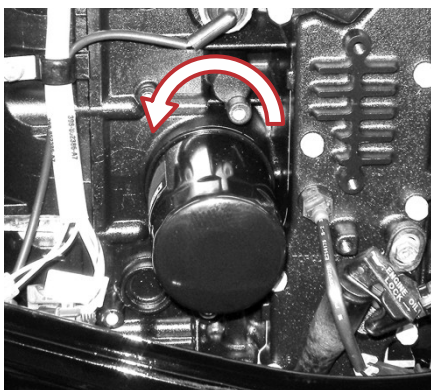
**b** - Drain hole

### CHANGING OIL FILTER

1. Place a rag or towel below the oil filter to absorb any spilled oil.

# MAINTENANCE

2. Remove the filter by turning the filter counterclockwise.

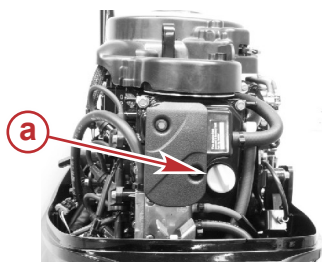


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3. Clean the mounting base. Lubricate the new oil filter gasket with engine oil. Do not use grease. Thread the filter on until the gasket contacts the base, then tighten 3/4 to 1 turn.

## OIL FILLING

1. Remove the oil fill cap and add oil to the proper operating level.
2. Idle the engine for five minutes and check for leaks. Stop the engine and check the oil level on the dipstick. Add oil if necessary.



28418

**a** - Oil fill cap

## Gearcase Lubrication

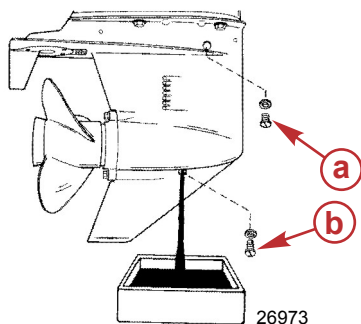
When adding or changing gearcase lubricant, visually check for the presence of water in the lubricant. If water is present, it may have settled to the bottom and will drain out prior to the lubricant, or it may be mixed with the lubricant, giving it a milky colored appearance. If water is noticed, have 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 fine 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.

# MAINTENANCE

## DRAINING GEARCASE

1. Place outboard in a vertical operating position.
2. Place a drain pan below outboard.
3. Remove vent plug and fill/drain plug and drain lubricant.



- a - Vent plug  
b - Fill/drain plug

## GEARCASE LUBRICANT CAPACITY

Gearcase lubricant capacity is approximately 440 ml (14.9 fl oz).

## CHECKING GEARCASE LUBRICANT LEVEL AND REFILLING GEARCASE

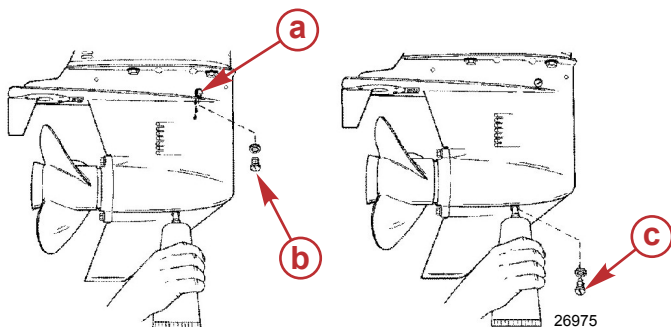
1. Place outboard in a vertical operating position.
2. Remove vent plug.
3. Place lubricant tube into the fill hole and add lubricant until it appears at the vent hole.

**IMPORTANT: Replace sealing washers if damaged.**

4. Stop adding lubricant. Install the vent plug and sealing washer before removing the lubricant tube.

# MAINTENANCE

5. Remove lubricant tube and reinstall cleaned fill/drain plug and sealing washer.



- a - Vent hole
- b - Vent plug
- c - Fill/drain plug

## Gearcase Lubricant Recommendation

Mercury or Quicksilver Premium or High Performance Gear Lubricant.

## Submerged Outboard

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

# STORAGE

## Storage Preparation

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

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

### NOTICE

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

## FUEL SYSTEM

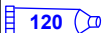
**IMPORTANT:** Gasoline containing alcohol (ethanol or methanol) can cause a formation of acid during storage and can damage the fuel system. If the gasoline being used contains alcohol, it is advisable to drain as much of the remaining gasoline as possible from the fuel tank, remote fuel line, and engine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

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.

- Portable fuel tank - Pour the required amount of gasoline stabilizer (follow instructions on container) into the fuel tank. Tip the fuel tank back and forth to mix the stabilizer with the fuel.
- Permanently installed fuel tank - Pour the required amount of gasoline stabilizer (follow instructions on container) into a separate container and mix with approximately one quart (one liter) of gasoline. Pour this mixture into fuel tank.
- Place the outboard in water or connect a flushing attachment for circulating cooling water. Run the engine for ten minutes to fill the engine fuel system.

## Protecting External Outboard Components

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

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

## Protecting Internal Engine Components

- Remove the spark plugs and add approximately 30 ml (1 oz) of engine oil or inject a five second spray of storage seal into each spark plug hole.

# STORAGE

- Rotate the flywheel manually several times to distribute the oil in the cylinders. Reinstall spark plugs.
- Change the engine oil.

## 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

## Engine Will Not Start

### POSSIBLE CAUSES

- Lanyard stop switch not in RUN position.
- Incorrect starting procedure. Refer to **Operation** section.
- Old or contaminated gasoline.
- Engine flooded. Refer to **Operation** section.
- Fuel is not reaching the engine.
  - a. Fuel tank is empty.
  - b. Fuel tank vent not open or restricted.
  - c. Fuel line is disconnected or kinked.
  - d. Primer bulb not squeezed.
  - e. Primer bulb check valve is faulty.
  - f. Fuel filter is obstructed. Refer to **Maintenance** section.
  - g. Fuel pump failure.
  - h. Fuel tank filter obstructed.
- Ignition system component failure.
- Wiring or electrical connection faulty.
- Spark plugs fouled or defective. Refer to **Maintenance** section.

## Engine Runs Erratically

### POSSIBLE CAUSES

- Guardian System activated. Refer to **Features and Controls—Warning System - Manually Starting Models**.
- 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 pump failure.
- Ignition system component failure.

## Performance Loss

### POSSIBLE CAUSES

- Engine Guardian System activated. Refer to **Features and Controls—Warning System - Manually Starting Models**.
- Throttle not fully open.

# TROUBLESHOOTING

- Damaged or improper size propeller.
- Incorrect engine timing, adjustments, or setup.
- Boat overloaded or load improperly distributed.
- Excessive water in bilge.
- Boat bottom is dirty or damaged.

## **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.



# 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.

# OWNER SERVICE ASSISTANCE

## PARTS AND ACCESSORIES INQUIRIES

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

## RESOLVING A PROBLEM

Satisfaction with your Mercury 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. Contact the owner of the dealership if the sales manager and service manager have been unable to resolve the problem.
2. If your question, concern, or problem cannot be resolved by your dealership, please contact 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	

# OWNER SERVICE ASSISTANCE

<b>Australia, Pacific</b>		
Telephone	+61 3 9791 5822	Brunswick Asia Pacific Group 41-71 Bessemer Drive Dandenong South, Victoria 3175 Australia
Fax	+61 3 9706 7228	

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

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

<b>Japan</b>		
Telephone	+072 233 8888	Kisaka Co., Ltd. 4-130 Kannabecho, Sakai-ku Sakai-shi, Osaka 590-0984, Japan
Fax	+072 233 8833	

<b>Asia, Singapore</b>		
Telephone	+65 65466160	Brunswick Asia Pacific Group T/A Mercury Marine Singapore Pte Ltd 29 Loyang Drive Singapore, 508944
Fax	+65 65467789	

## 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:

# OWNER SERVICE ASSISTANCE

Mercury Marine		
Telephone	Fax	Mail
(920) 929-5110 (USA only)	(920) 929-4894 (USA only)	Mercury Marine Attn: Publications Department P.O. Box 1939 Fond du Lac, WI 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
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**Ship To: (Copy this form and print or type—This is your shipping label)**

<b>Name</b>	
<b>Address</b>	
<b>City, State, Province</b>	
<b>ZIP or postal code</b>	
<b>Country</b>	

Quantity	Item	Stock Number	Price	Total
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<b>Total Due</b>				.

# ENGINE INSTALLATION

## Mercury Marine Validated Engine Mounting Hardware

**IMPORTANT:** Mercury Marine provides validated fasteners and installation instructions, including torque specifications, with all of our outboards so they can be properly secured to boat transoms. Improper installation of the outboard can cause performance and reliability issues that can lead to safety concerns. Follow all of the instructions relating to the outboard installation. **DO NOT** mount any other accessory onto the boat with the fasteners provided with the outboard. For example, do not mount tow sport bars or boarding ladders onto the boat using the mounting hardware included with the outboard. Installing other products onto the boat that utilize the outboard mounting hardware will compromise the ability of that hardware to properly and safely secure the outboard to the transom.

Outboards that require validated mounting hardware will have the following decal on the transom clamp.



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## Fastening the Outboard to the Transom

### MOUNTING BOLTS

Outboard Transom Mounting Hardware - Supplied with Outboard		
Part Number	Part Name	Description
8M0071543	Outboard mounting bolt	½-20 x 5.00 in. long (3.25 in. thread)
826711-17	Nylon insert locknut	½-20
28421	Flat washer	1.50 in. diameter
54012	Flat washer	0.875 in. diameter

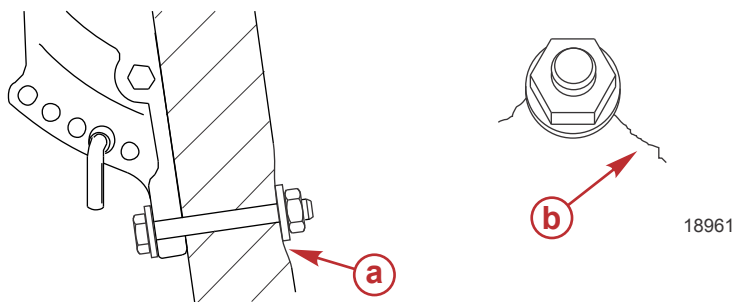
Available Outboard Mounting Bolts	
Part Number	Description
67755005	½-20 x 2.50 in. long (1.25 in. thread)

# ENGINE INSTALLATION

Available Outboard Mounting Bolts	
Part Number	Description
67755006	½-20 x 3.50 in. long (1.25 in. thread)
814259	½-20 x 4.00 in. long (2.25 in. thread)
67755-1	½-20 x 4.50 in. long (2.25 in. thread)
8M0071543	½-20 x 5.00 in. long (3.25 in. thread)
8M0038370	½-20 x 5.50 in. long (3.25 in. thread)
67755-2	½-20 x 6.50 in. long (2.75 in. thread)
8M0028080	½-20 x 7.50 in. long (2.75 in. thread)
8M0032860	½-20 x 8.00 in. long (2.75 in. thread)

## CHECKING BOAT TRANSOM CONSTRUCTION

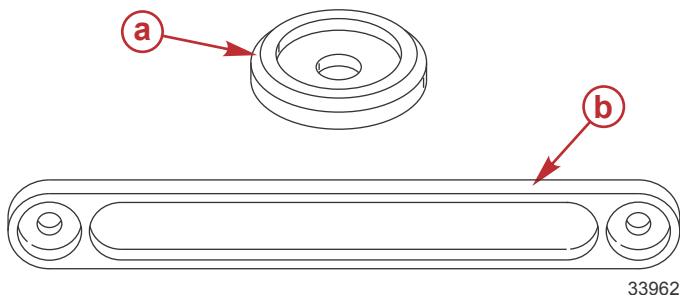
**IMPORTANT:** Determine the strength of the boat transom. The outboard mounting locknuts and bolts should be able to hold 75 Nm (55 lb-ft) of torque without the boat transom yielding or cracking. If the boat transom yields or cracks under this torque, the construction of the transom may not be adequate.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



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

# ENGINE INSTALLATION

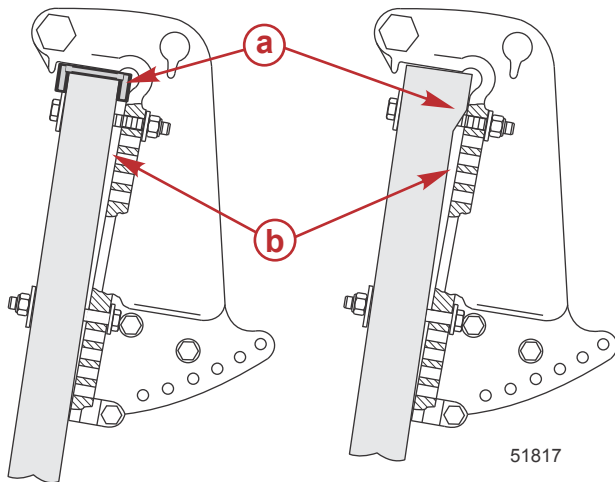
Use a dial torque wrench to determine transom strength. If the bolt or nut continues to turn without the torque reading on the dial increasing, it is an indication that the transom is yielding. The load area can be increased by using a larger washer or a transom reinforcement plate.



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

## FASTENING THE OUTBOARD TO THE TRANSOM

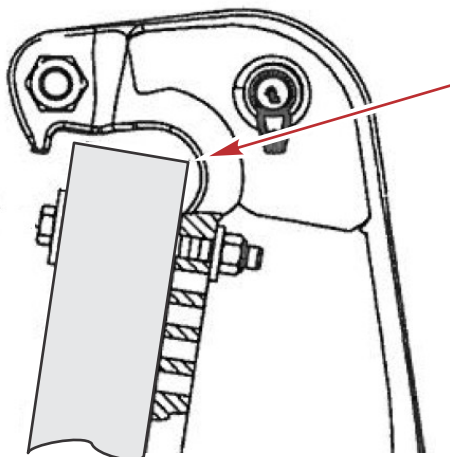
**IMPORTANT:** The transom mounting surface must be flat within 3.17 mm (0.125 in.). No step in the transom mounting surface is allowed. The inside transom mounting bolt washer surface must be flat within 3.17 mm (0.125 in.).



- a** - Step (not allowed)
- b** - Gap between transom clamp and boat transom (not allowed)

# ENGINE INSTALLATION

**IMPORTANT:** Clearance must be maintained between the vessel transom and the outboard transom bracket relief radius area. Failure to maintain clearance may damage the transom bracket and cause the transom bracket to fail. Adjustments to the position of the Mercury Marine transom drilling fixture may be required to ensure proper clearance of the transom bracket relief radius area.



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## Installation

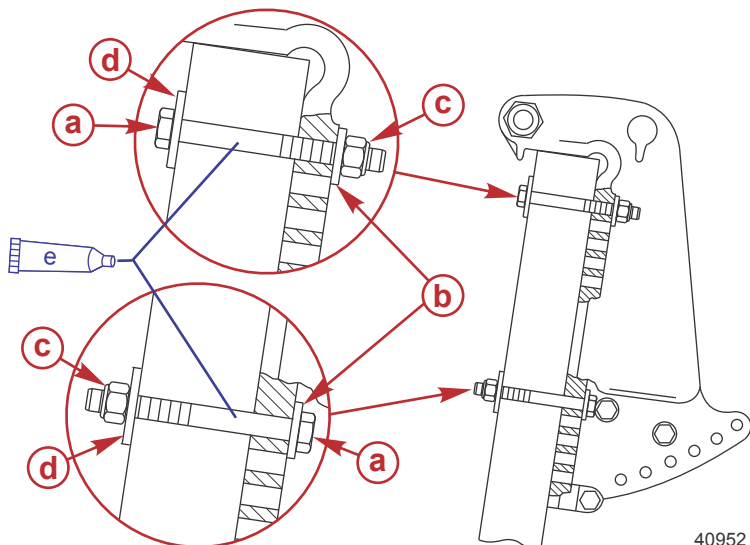
1. Apply marine sealer to the shanks of the bolts, not to the threads.
2. Fasten the outboard with the correct mounting hardware. Tighten the locknuts to the specified torque.

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



# ENGINE INSTALLATION

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



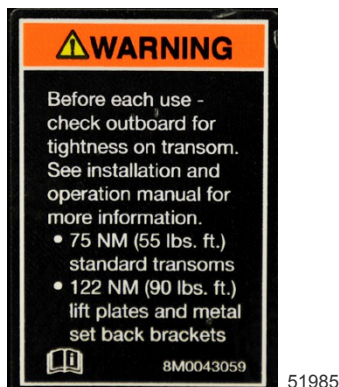
40952

- a** - 0.500 in. diameter outboard mounting bolt (4)
- b** - 0.875 in. flat washer (4)
- c** - Nylon insert locknut (4)
- d** - 1.500 in. flat washer (4)
- e** - Marine sealer – apply to the shank of the bolts, not the threads

Description	Nm	lb-in.	lb-ft
Outboard mounting locknuts and bolts – standard boat transom	75	–	55
Outboard mounting locknuts and bolts – metal lift plates and setback brackets	122	–	90

# ENGINE INSTALLATION

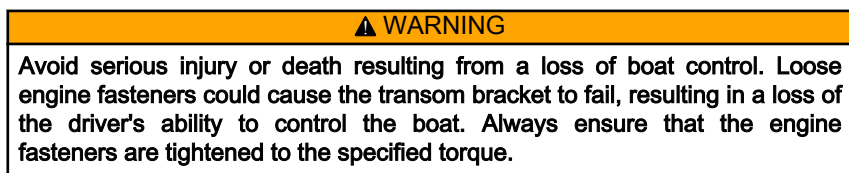
A decal on the transom bracket reminds the owner to check the fasteners securing the outboard to the transom before each use.



Decal on the transom bracket

## Accessories Mounted to the Transom Clamp Bracket

Mercury Marine has been made aware that certain aftermarket marine accessories, such as emergency boarding ladders, shallow water anchors, transom wedge kits, and tow sport attaching devices, have been mounted to the boat by use of the same fasteners that secure the outboard to the transom or jack plate. Using the same fastener to secure both an accessory and the engine to the boat compromises the ability of the fasteners to maintain the proper clamp load. A boat with loose engine mounting fasteners creates the possibility of performance, durability, and safety issues.



## ACCEPTABLE ACCESSORY MOUNTING TO THE TRANSOM CLAMP BRACKET

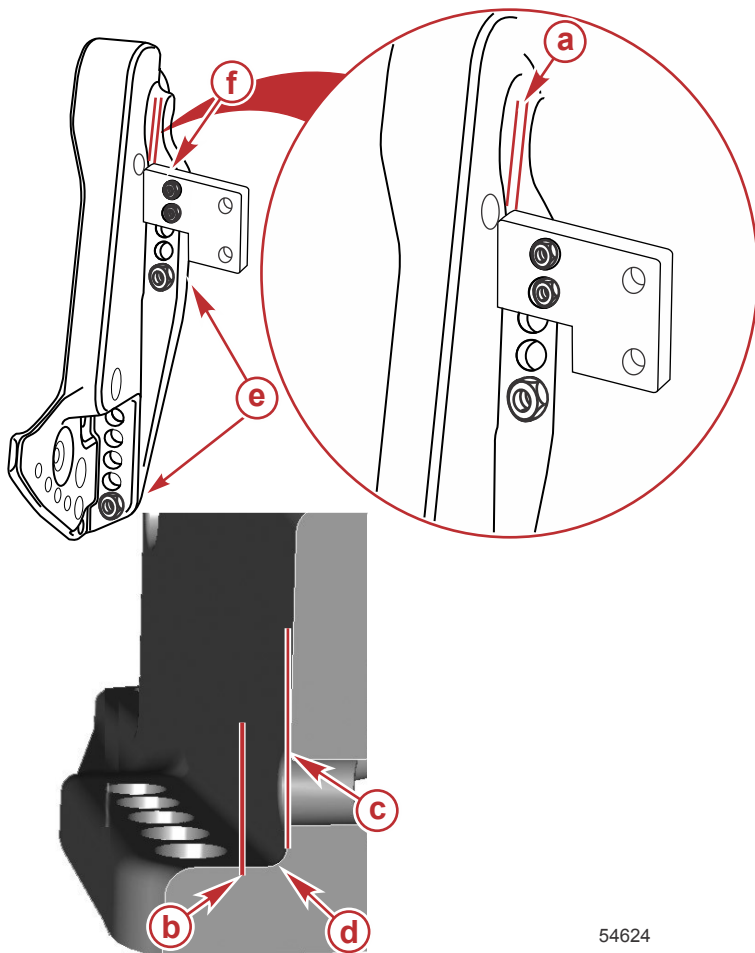
After the engine is mounted to the transom or jack plate in accordance with the engine installation instructions, it is acceptable to attach an accessory to the boat by use of the unused bolt holes in the transom clamp bracket as shown in Figure 1.

The following list provides additional guidelines for mounting accessories to the transom clamp bracket.

- The accessory fasteners must pass through the boat transom or jack plate.

# ENGINE INSTALLATION

- The installation must not create interference issues, as would an accessory mounting plate resting in the radius of the transom clamp bracket. Refer to Figure 1.



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**Figure 1**

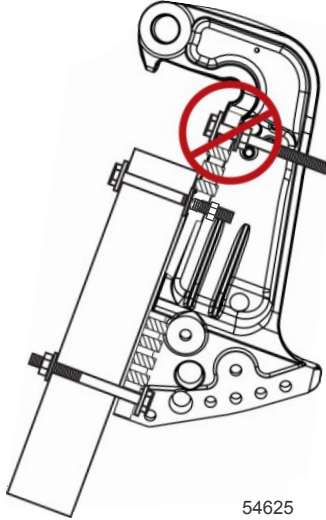
- a** - Minimum clearance 3.175 mm (0.125 in.)
- b** - Edge of accessory bracket
- c** - Transom clamp bracket wall
- d** - Radius
- e** - Engine supplied mounting fasteners
- f** - Fasteners supplied by the accessory manufacturer installed through unused engine mounting bracket holes

# ENGINE INSTALLATION

## UNACCEPTABLE ACCESSORY MOUNTING

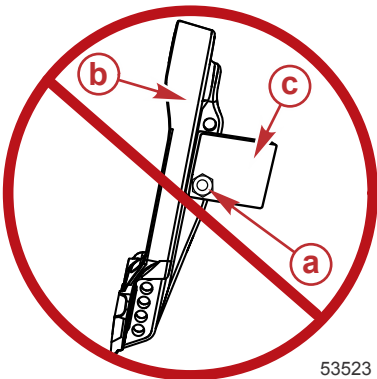
**IMPORTANT:** Do not use the fasteners that secure the engine to the boat (either the transom or the jack plate) for any purpose other than securing the engine to the boat.

1. Do not mount an accessory to the transom clamp bracket in an unsupported condition. Refer to Figure 2.



**Figure 2**

2. Do not attach an accessory to the boat by use of the engine mounting hardware. Refer to Figure 3.

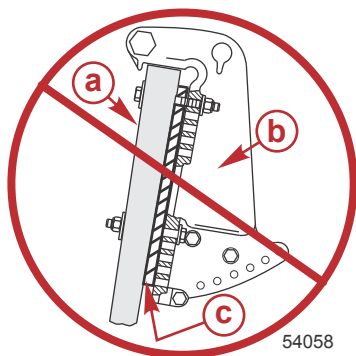


**Figure 3**

- a** - Engine supplied mounting fasteners
- b** - Transom clamp bracket
- c** - Accessory

# ENGINE INSTALLATION

3. Do not install wedges or plates between the transom clamp brackets and the transom (or jack plate). Refer to Figure 4.



**Figure 4**

- a** - Boat transom or jack plate
- b** - Transom clamp bracket
- c** - Wedge/plate

## Installation Information

### BOAT HORSEPOWER CAPACITY

**⚠ WARNING**

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

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

#### U.S. COAST GUARD CAPACITY

MAXIMUM HORSEPOWER	XXX
MAXIMUM PERSON CAPACITY (POUNDS)	XXX
MAXIMUM WEIGHT CAPACITY	XXX

26777

# ENGINE INSTALLATION

## START IN GEAR PROTECTION

### ⚠ WARNING

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

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

## SELECTING ACCESSORIES FOR YOUR OUTBOARD

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

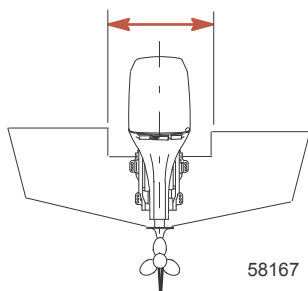
**IMPORTANT: Check with your dealer before installing accessories. The misuse of approved accessories or the use of nonapproved accessories can damage the product.**

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

## ELECTRIC FUEL PUMP

If an electric fuel pump is used, the fuel pressure must not exceed 27.58 kPa (4 psi) at the engine. If necessary, install a pressure regulator to regulate the pressure.

## INSTALLATION SPECIFICATIONS

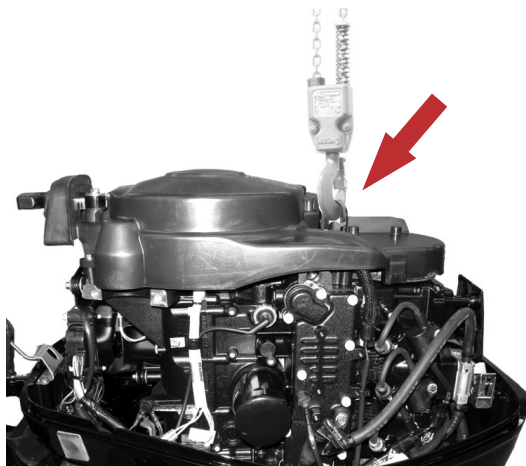


Minimum Transom Opening	
Single engine (tiller)	76.2 cm (30 in.)

# ENGINE INSTALLATION

## LIFTING OUTBOARD

Use the lifting eye on the engine.

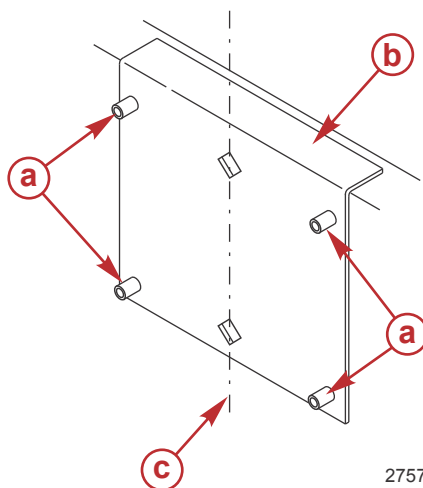


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## INSTALLING OUTBOARD

### Drilling Outboard Mounting Holes

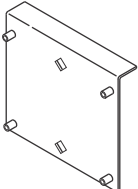
1. Mark four mounting holes on the transom using the transom drill fixture.



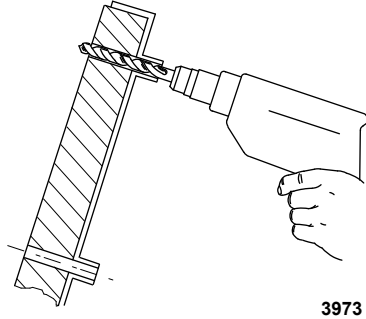
- a - Drill guide holes
- b - Transom drilling fixture
- c - Transom centerline

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# ENGINE INSTALLATION

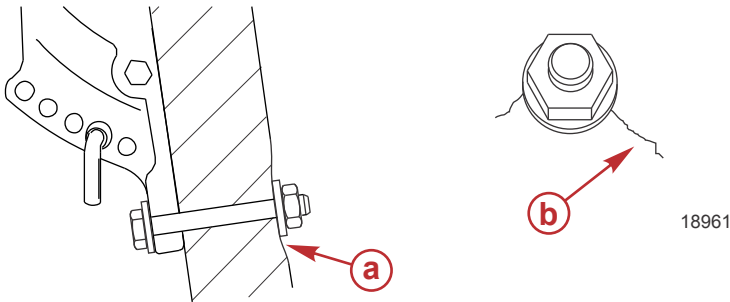
Transom Drilling Fixture	91-98234A2
 5489	Aids in engine installation by acting as a template for engine mounting holes.

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



## Checking Boat Transom Construction

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



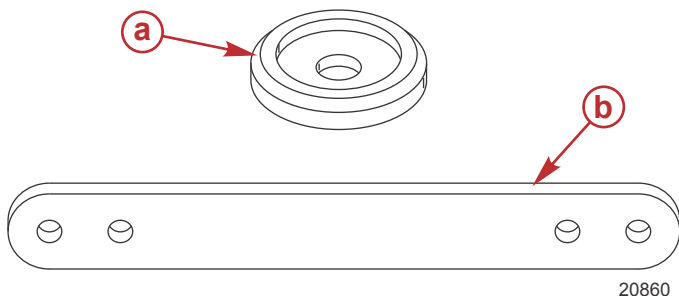
- a - Transom yielding under bolt torque
- b - Transom cracking under bolt torque



# ENGINE INSTALLATION

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

**NOTE:** The inside holes on the transom reinforcement plate are for the lower transom bolts and the outside holes are for the upper transom bolts.

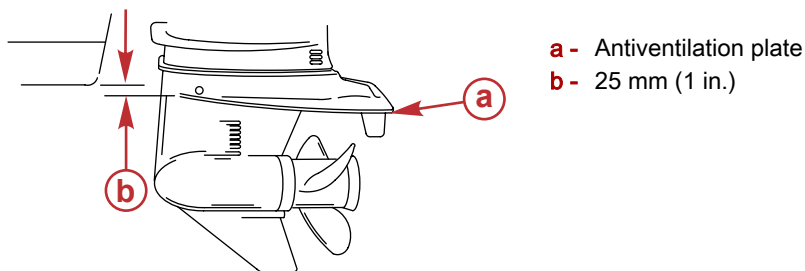


- a** - Large transom washer
- b** - Transom reinforcement plate

Description	Part Number
Large transom washer	67-896392
Transom reinforcement plate	67-896305

## Fastening the Outboard to the Transom

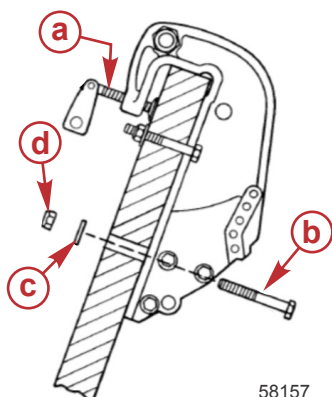
1. Install the outboard so that the antiventilation plate is in-line or within 25 mm (1 in.) below the bottom of the boat.



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

# ENGINE INSTALLATION

**NOTE:** For a more accurate torque, tighten the locknuts rather than turning the mounting bolts.



- a - Clamp bracket screw
- b - 1/2 in. diameter bolt (4)
- c - Flat washer (4)
- d - Locknut (4)

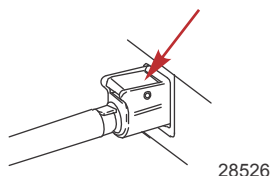
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Description	Nm	lb-in.	lb-ft
Outboard mounting hardware	75	-	55

4. Tighten the clamp bracket screws securely.

## Fuel Hose Connection

The minimum fuel hose inside diameter (ID) is 8 mm (5/16 in.). The fuel hose connection on this engine model is a snap lock design. Fasten the remote fuel hose to the fitting with a metal hose clamp or the plastic type hose clamp that is provided with the outboard.



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## Flo-Torq I Propeller Installation

### ⚠ WARNING

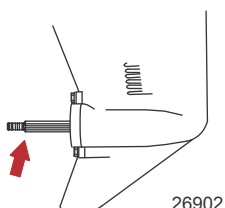
Performing service or maintenance without first disconnecting the battery can cause product damage, personal injury, or death due to fire, explosion, electrical shock, or unexpected engine starting. Always disconnect the battery cables from the battery before maintaining, servicing, installing, or removing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


# ENGINE INSTALLATION

## ⚠ WARNING

Rotating the propeller shaft may cause the engine to crank over and start. To prevent this type of accidental engine starting and possible serious injury caused from being struck by a rotating propeller, always turn the ignition key or lanyard stop switch to the "OFF" position and remove the spark plug leads from the spark plugs while servicing.

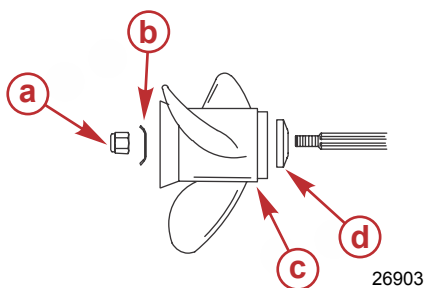
1. Lubricate the propeller shaft with 2-4-C with PTFE.



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

**IMPORTANT:** To prevent the propeller hub from corroding and seizing to the propeller shaft (especially in saltwater), always apply a coat of the recommended lubricant to the entire propeller shaft at the recommended maintenance intervals, and also each time the propeller is removed.

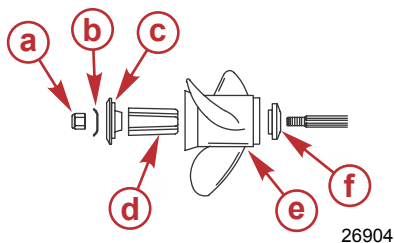
2. Flo-Torq I drive hub propellers - Install forward thrust hub, propeller, propeller nut retainer, and propeller nut onto the shaft.



- a - Propeller nut
- b - Propeller nut retainer
- c - Propeller
- d - Forward thrust hub

## ENGINE INSTALLATION

- Flo-Torq II drive hub propellers - Install forward thrust hub, propeller, replaceable drive sleeve, rear thrust hub, propeller nut retainer, and propeller nut onto the shaft.

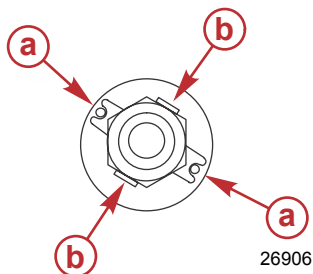


- a - Propeller nut
- b - Propeller nut retainer
- c - Rear thrust hub
- d - Replaceable drive sleeve
- e - Propeller
- f - Forward thrust hub

- Place the propeller nut retainer over the pins. Place a block of wood between the gearcase and propeller. Tighten the propeller nut to the specified torque.

Description	Nm	lb-in.	lb-ft
Propeller nut	75	-	55

- Align the flat sides of the propeller nut with the tabs on the propeller nut retainer. Secure the propeller nut by bending the tabs up and against the flats on the propeller nut.



- a - Pins
- b - Tabs

- Install the spark plug leads.

### Flo-Torq Reflex Drive Hub Propeller Installation

#### ⚠ WARNING

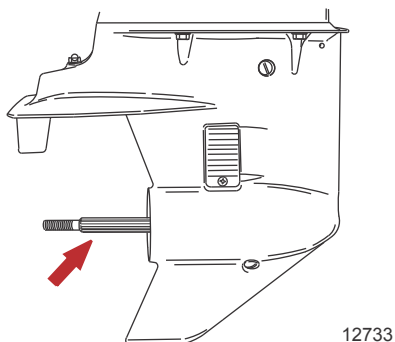
Performing service or maintenance without first disconnecting the battery can cause product damage, personal injury, or death due to fire, explosion, electrical shock, or unexpected engine starting. Always disconnect the battery cables from the battery before maintaining, servicing, installing, or removing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



# ENGINE INSTALLATION

## ⚠ WARNING

Rotating the propeller shaft may cause the engine to crank over and start. To prevent this type of accidental engine starting and possible serious injury caused from being struck by a rotating propeller, always turn the ignition key or lanyard stop switch to the "OFF" position and remove the spark plug leads from the spark plugs while servicing.

Lubricate the propeller shaft splines with 2-4-C with PTFE.



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

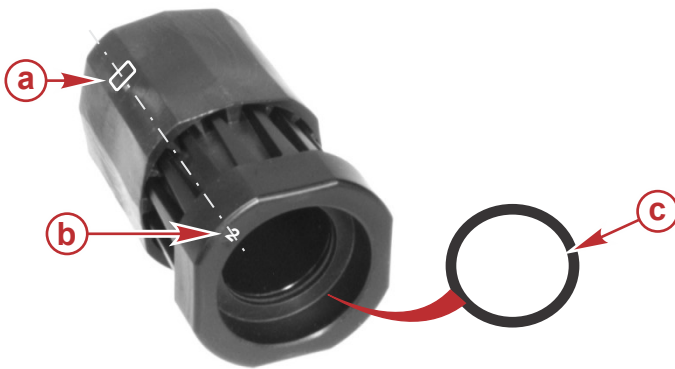
## DRIVE SLEEVE ALIGNMENT

### Alignment Method 1

1. Align the identification number on the aft drive sleeve with the rectangular mark on the front drive sleeve.

# ENGINE INSTALLATION

2. Insert the aft drive sleeve into the front drive sleeve.



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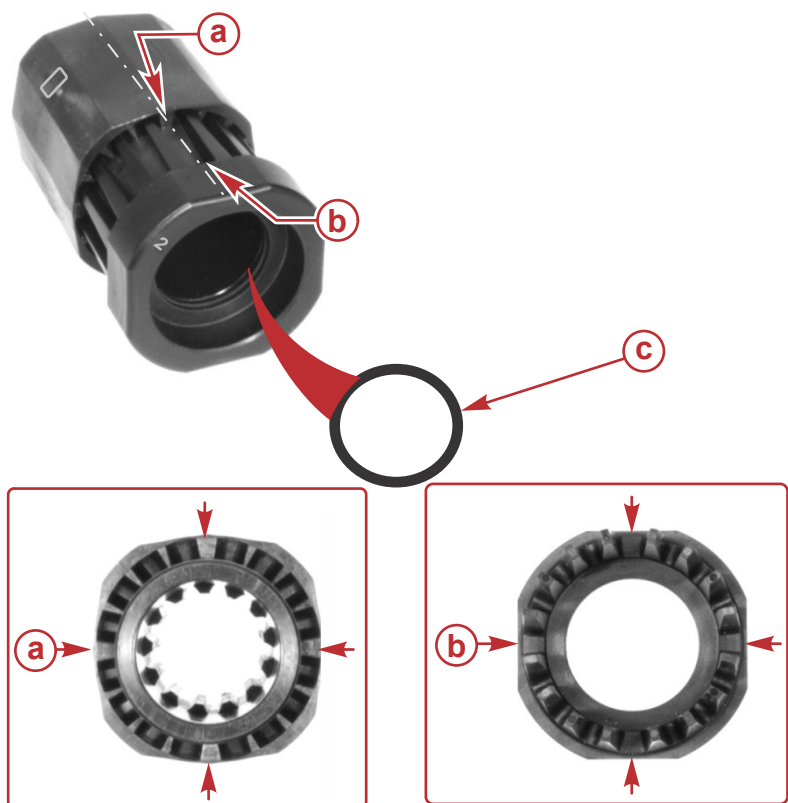
- a** - Rectangular mark on the front drive sleeve
- b** - Identification number on the aft drive sleeve (1 or 2)
- c** - O-ring

## Alignment Method 2

1. Align the fingers of the aft drive sleeve with the pockets of the front drive sleeve, as shown.

# ENGINE INSTALLATION

2. Insert the aft drive sleeve into the front drive sleeve.



58186

- a** - Wide spacer on front drive sleeve
- b** - Wide gap between fingers on the aft drive sleeve
- c** - O-ring

# ENGINE INSTALLATION

## INSTALLING THE DRIVE SLEEVE INTO THE PROPELLER

1. Ensure that there is no gap between the front drive sleeve and the aft drive sleeve.



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2. Insert the drive sleeve assembly onto the propeller and push the drive sleeve assembly onto the propeller.



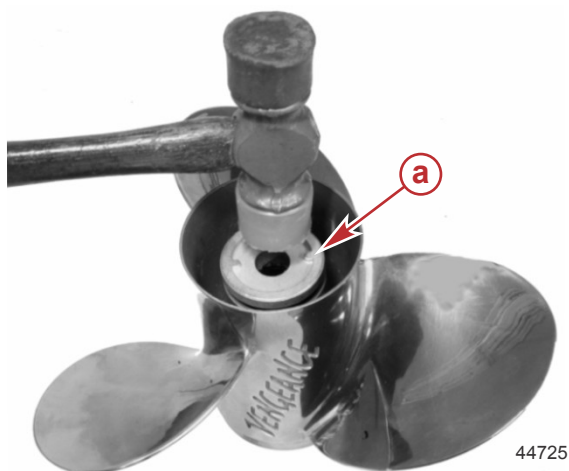
56279

**NOTE:** Ensure that the O-ring is seated in the counterbore of the aft drive sleeve.



## ENGINE INSTALLATION

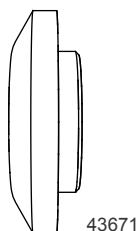
3. Install the aft washer onto the drive sleeve assembly and lightly tap the drive sleeve assembly into the propeller. The aft washer will contact the propeller when the drive sleeve assembly is properly seated.



**a** - Aft washer

4. Install the thrust washer onto the propeller shaft.

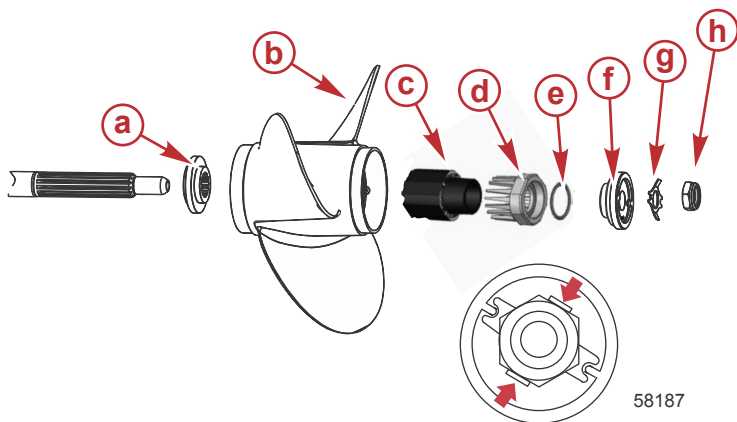
**IMPORTANT:** The Flo-Torq Reflex drive hub requires the use of the thrust washer that is included with the drive hub kit.



5. Install the propeller.
6. Install the aft washer, the tab washer, and secure with the propeller nut included with the kit. Tighten the nut to the specified torque. Bend the washer tabs onto the nut.

# ENGINE INSTALLATION

**IMPORTANT:** The Flo-Torq Reflex drive hub requires the use of the propeller nut included with the drive hub kit. The use of a propeller nut that was not included with the Flo-Torq Reflex drive hub kit will result with the nylon portion of the locknut not fully engaging the propeller shaft threads.



- a** - Forward thrust washer
- b** - Propeller
- c** - Front drive sleeve
- d** - Aft drive sleeve
- e** - O-ring
- f** - Drive sleeve adapter
- g** - Tab washer
- h** - Locknut

7. Rotate the propeller to verify interference or binding does not exist between the gear housing and the propeller.

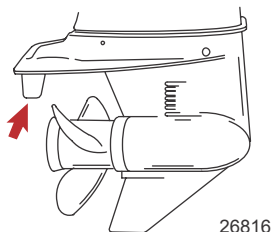
Description	Nm	lb-in.	lb-ft
Nut	75	-	55

**NOTE:** A small amount of rotation play is normal.

# ENGINE INSTALLATION

## Trim Tab Adjustment

Propeller steering torque will cause your boat to pull in one direction. This steering torque is a normal thing that results from your outboard not being trimmed so the propeller shaft is parallel to the water surface. The trim tab can help compensate for this steering torque in many cases and can be adjusted within limits to reduce any unequal steering effort.



26816

**NOTE:** Trim tab adjustment will have little effect reducing steering torque if the outboard is installed with the anti-ventilation plate approximately 50 mm (2 inches) or more above the boat bottom.

Operate your boat at normal cruising speed, trimmed to the desired position. Turn your boat left and right and note the direction the boat turns more easily.

If adjustment is necessary, loosen trim tab bolt and make small adjustments at a time. If the boat turns more easily to the left, move the trailing edge of trim tab to the left. If the boat turns more easily to the right, move the trailing edge of trim tab to the right. Tighten bolt and retest.

# 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