



MERCURY

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**Operation
Maintenance
and
Installation
Manual**

40 Jet FourStroke

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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.

⚠ WARNING

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

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.

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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
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 the difference in handling characteristics between a jet drive boat and a propeller driven boat. If you have any questions, contact your dealer.

STEERING AT LOW SPEEDS

Unlike propeller driven boats, the jet drive boat tends to lose steering control as less water is drawn in and expelled. Increase speed slightly to regain steering.

MANEUVERABILITY

The jet drive is highly maneuverable at higher speeds, more so, than propeller driven boats. Use caution when turning to prevent spin-outs.

IN NEUTRAL

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

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 alerts¹ to draw your attention to special safety instructions that should be followed.

DANGER

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

WARNING

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

1. These safety alerts follow ANSI standard Z535.6-2006 for product safety information in product manuals, instructions, and other collateral materials.

GENERAL INFORMATION

⚠ 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.

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

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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.

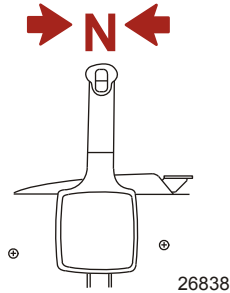
GENERAL INFORMATION

Outboard Remote Control Models

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

⚠ WARNING

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

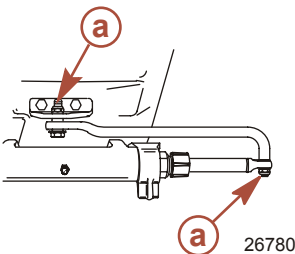


Remote Steering Notice

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

⚠ WARNING

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



a - Self-locking nuts

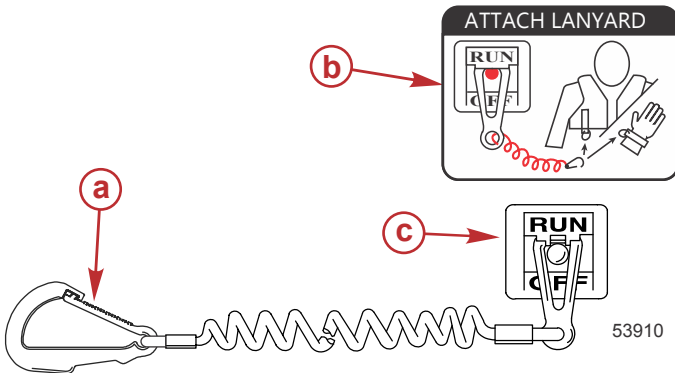
GENERAL INFORMATION

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.

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



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

Read the following Safety Information before proceeding.

GENERAL INFORMATION

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

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

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

GENERAL INFORMATION

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

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

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

Stopping the Boat in an Emergency

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

▲ WARNING

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

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

Protecting People In The Water

WHILE YOU ARE CRUISING

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



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

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

GENERAL INFORMATION

WHILE BOAT IS STATIONARY

▲ WARNING

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

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

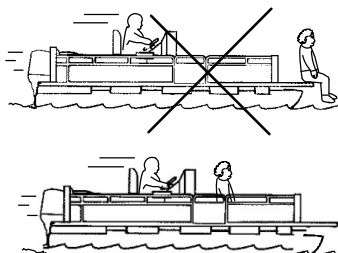
Passenger Safety Message - Pontoon Boats and Deck Boats

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

BOATS HAVING AN OPEN FRONT DECK

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

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



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▲ WARNING

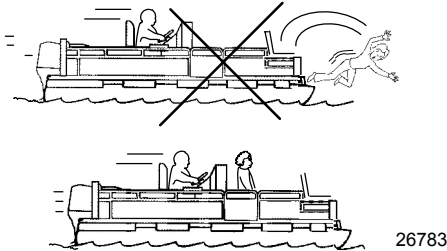
Sitting or standing in an area of the boat not designed for passengers at speeds above idle can cause serious injury or death. Stay back from the front end of deck boats or raised platforms and remain seated while the boat is in motion.

GENERAL INFORMATION

BOATS WITH FRONT MOUNTED, RAISED PEDESTAL FISHING SEATS

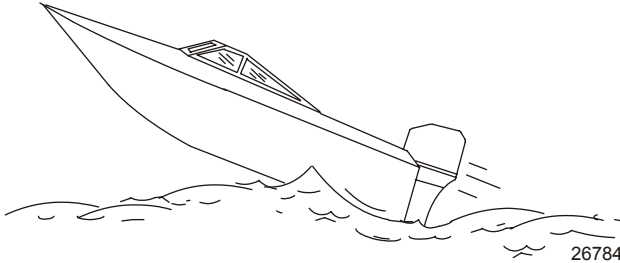
Elevated fishing seats are not intended for use when the boat is traveling faster than idle or trolling speed. Sit only in seats designated for traveling at faster speeds.

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



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.

GENERAL INFORMATION

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.

Safety Instructions for Hand-Tilted 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 **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.

If an obstacle is struck at planing speed and the outboard is not securely fastened to the transom, it is possible the outboard could lift off the transom and land in the boat.

Exhaust Emissions

BE ALERT TO CARBON MONOXIDE POISONING

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

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

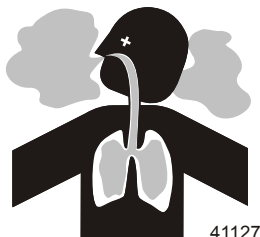
GENERAL INFORMATION

⚠ WARNING

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

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

STAY CLEAR OF EXHAUST AREAS

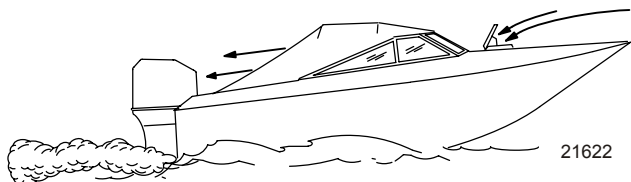


Engine exhaust gases contain harmful carbon monoxide. Avoid areas of concentrated engine exhaust gases. When engines are running, keep swimmers away from the boat, and do not sit, lie, or stand on swim platforms or boarding ladders. While underway, do not allow passengers to be positioned immediately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

GOOD VENTILATION

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

Example of desired air flow through the boat:



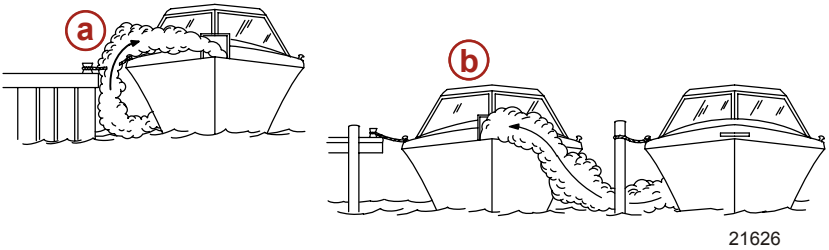
POOR VENTILATION

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

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

GENERAL INFORMATION

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



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

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



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

Selecting Accessories for Your Outboard

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

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

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

Refer to **Outboard Installation - Accessories Mounted to the Transom Clamp Bracket** for important information on mounting accessories to the transom clamp bracket.

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.

GENERAL INFORMATION

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

- 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.

GENERAL INFORMATION

Prepare other boat operators.

- 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.

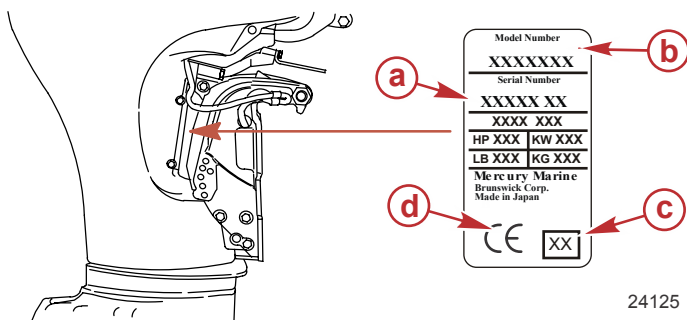
Report accidents.

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** - Year manufactured
- d** - Certified Europe Insignia (as applicable)

24125

40 Jet FourStroke Specifications

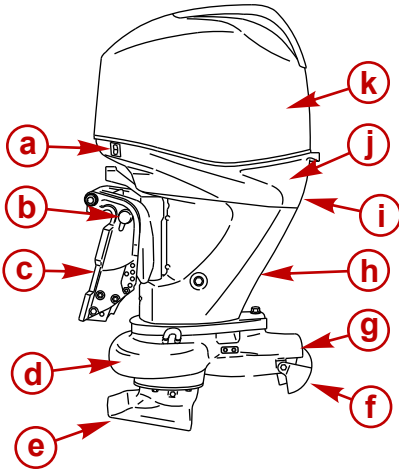
Models	40 Jet
Horsepower	40
Kilowatts	29.4
Full throttle RPM range	5000–5500 RPM
Number of cylinders	4
Idle speed in forward gear	Controlled by ECM
Piston displacement	995 cc (60.8 in ³)
Cylinder bore	65 mm (2.559 in.)
Stroke	75 mm (2.953 in.)
Valve clearance (cold)	

GENERAL INFORMATION

Models	40 Jet
Intake valve	0.15–0.25 mm (0.006–0.010 in.)
Exhaust valve	0.25–0.35 mm (0.010–0.014 in.)
Recommended spark plug	Champion RA8HC
Spark plug gap	1.0 mm (0.040 in.)
Recommended gasoline	Refer to Fuel and Oil
Recommended oil	Refer to Fuel and Oil
Engine oil capacity	3.0 L (3 US qt)
Emission control system	Electronic engine control (EC)
Battery rating*	
Operation above 0 °C (32 °F)	465 marine cranking amps (MCA) or 350 cold cranking amps (CCA)
Operation below 0 °C (32 °F)	1000 marine cranking amps (MCA) or 750 cold cranking amps (CCA)
Ampere hours (Ah)	70–100

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

Component Identification



28684

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

TRANSPORTING

Trailing Boat/Outboard

The boat should be trailered with the outboard tilted down in a vertical operating position.

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.

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.

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/m²/24 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:

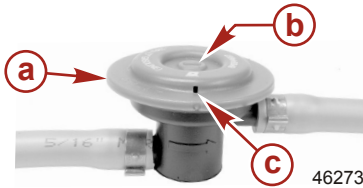
- An air inlet that opens to allow air to enter as the fuel is drawn out of the tank.
- An air outlet that opens (vents) to the atmosphere if pressure exceeds 34.4 kPa (5.0 psi).

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

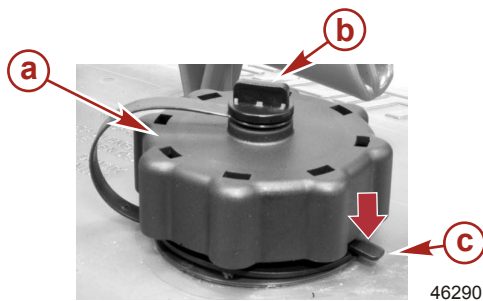
Mercury Marine has created a new portable pressurized fuel tank that meets the preceding EPA requirements. These fuel tanks are available as an accessory or are provided with certain portable outboard models.

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

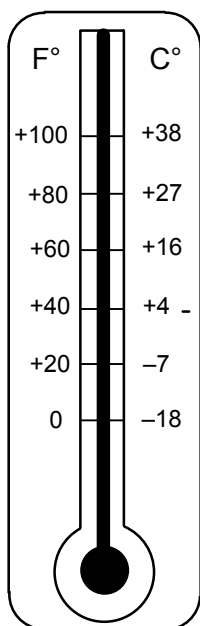
Place the fuel tank in the boat so the vent is higher than the fuel level under normal boat operating conditions.

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

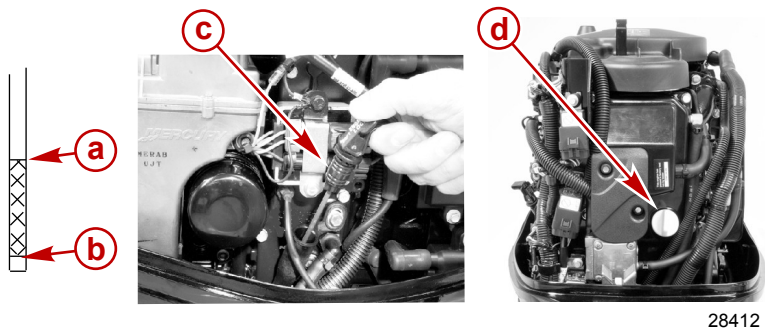
IMPORTANT: Do not overfill. Be sure that the outboard is upright (not tilted) when checking oil.

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.

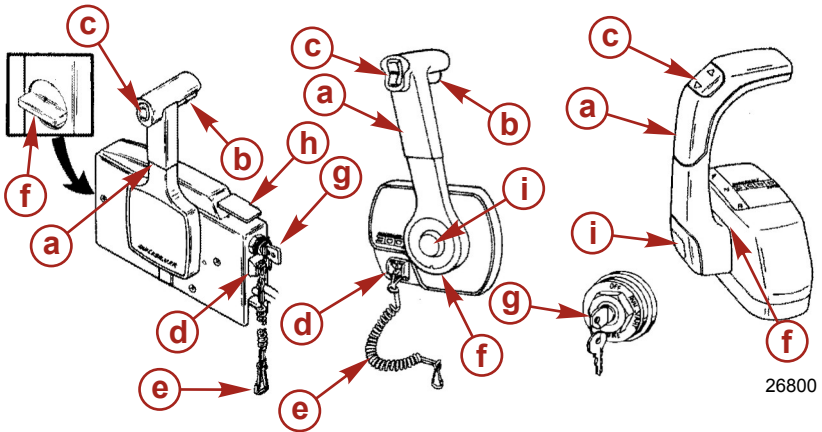


- a** - Full mark
- b** - Add mark
- c** - Dipstick
- d** - Oil filler cap

FEATURES AND CONTROLS

Remote Control Features

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



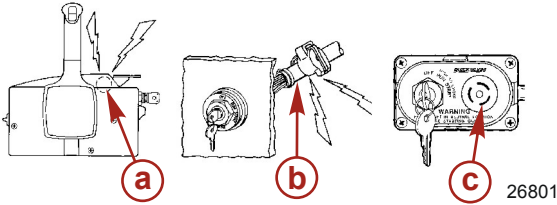
- a** - Control handle – forward, neutral, reverse
- b** - Neutral release lever
- c** - Trim/tilt switch (if equipped) – Refer to **Features and Controls – Power Trim and Tilt**
- d** - Lanyard stop switch – Refer to **General Information – Lanyard Stop Switch**
- e** - Lanyard – Refer to **General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

FEATURES AND CONTROLS

Warning System

WARNING HORN SIGNALS

The outboard warning system incorporates a warning horn inside the boat. Remote control models will have the warning horn located inside the remote control or connected to the ignition key switch. Tiller handle models will have the warning horn located in the ignition key panel.



- a** - Horn inside remote control
- b** - Horn connected to ignition key switch
- c** - Horn in ignition key panel

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

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

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

The operator is able to correct a couple engine problems indicated by the warning horn. These conditions are as follows:

- Cooling system (water pressure or engine temperature) problem. The warning horn will sound Intermittent short beeps for six seconds. Stop the engine and check the water intake holes in the gearcase for obstruction.
- Low oil pressure problem. The warning horn will sound a continuous six second beep. Stop the engine and check for low engine oil level. Refer to **Fuel and Oil – Checking and Adding Engine Oil.**

FEATURES AND CONTROLS

ENGINE GUARDIAN SYSTEM

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

If the Guardian System has been activated, reduce throttle speed. The problem will need to be identified and corrected, if possible. The system must be reset before the engine will operate at higher speeds. Moving the throttle lever back to the idle position will reset the system.

SMARTCRAFT PRODUCT

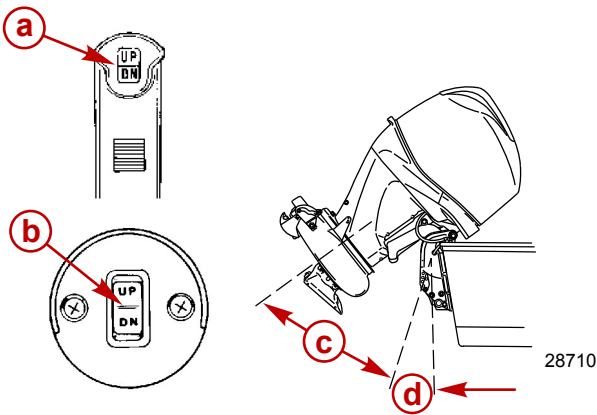
A Mercury SmartCraft System instrument package can be purchased for this outboard. A few of the functions the instrument package will display are engine RPM, coolant temperature, oil pressure, water pressure, battery voltage, fuel consumption, and engine operating hours.

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

FEATURES AND CONTROLS

Power Trim and Tilt

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



- a** - Remote control trim switch
- b** - Panel mount trim switch
- c** - Tilt range of travel
- d** - Trim range of travel

POWER TRIM OPERATION

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

The most significant control hazard is a pull or torque that can be felt on the steering wheel or tiller handle. This steering torque results from the outboard being trimmed so that the propeller shaft is not parallel to the water surface.

FEATURES AND CONTROLS

⚠ WARNING

Trimming the outboard beyond a neutral steering condition may result in a pull on the steering wheel or tiller handle and loss of boat control. Maintain control of the boat if trimming beyond a neutral steering condition.

Consider the following lists carefully.

Trimming in or down can:

- Lower the bow
- Result in quicker planing off, especially with a heavy load or a stern heavy boat
- Generally improve the ride in choppy water
- 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.

⚠ WARNING

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

- In rare circumstances, the owner may decide to limit the trim in. This can be accomplished by repositioning the tilt stop pins into the desired transom bracket adjustment holes.

Trimming out or up can:

- Lift the bow higher out of the water
- Generally increase top speed
- Increase clearance over submerged objects or a shallow bottom
- 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
- Cause engine overheating if any cooling water intake holes are above the waterline

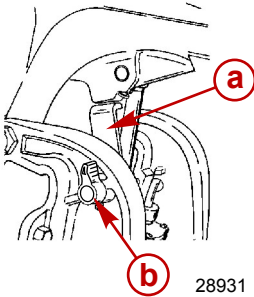
TILTING OPERATION

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

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

FEATURES AND CONTROLS

2. Lower outboard to rest on the tilt support lever.
3. Disengage the tilt support lever, by raising the outboard off the support lever and rotating the lever down. Lower the outboard.

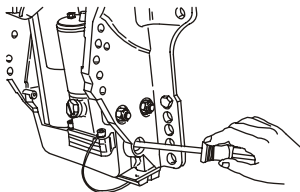


- a - Tilt support lever
- b - Knob

MANUAL TILTING

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

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

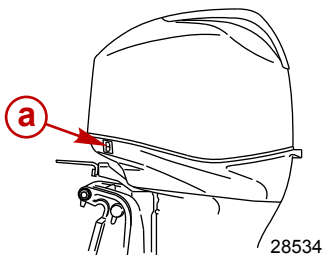


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NOTE: The manual tilt release valve must be tightened before operating the outboard to prevent the outboard from tilting up during reverse operation.

AUXILIARY TILT SWITCH

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

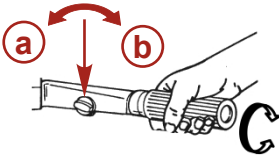


- a - Auxiliary tilt switch

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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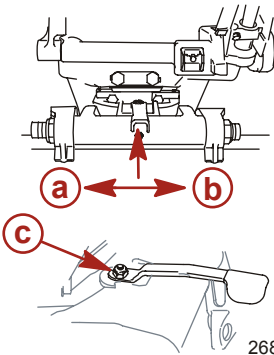
- a - Loosen friction
- b - Tighten friction

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

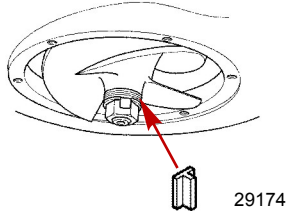
⚠ WARNING

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

Replaceable Jet Drive Shear Key

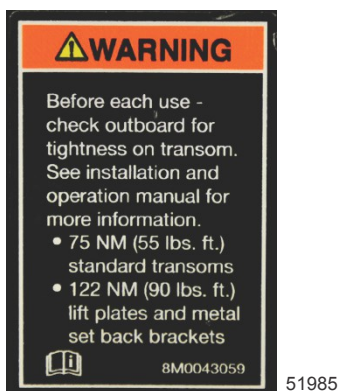
The jet drive is equipped with a shear key to protect it in the event of a lodged impeller. The shear key can be reached by removing the water intake housing and impeller.



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.
- Oil supply (oil injection) OK.
- Ensure the boat drain plug is installed.
- Arrange passengers and load in the boat so the weight is distributed evenly and everyone is seated in a proper seat.
- Tell someone where you are going and when you expect to return.
- It is illegal to operate a boat while under the influence of alcohol or drugs.
- Know the waters and area you will be boating; tides, currents, sand bars, rocks, and other hazards.
- Make inspection checks listed in **Maintenance - Inspection and Maintenance Schedule**.
- Check steering for free operation.

OPERATION

- Check for debris around the rudder and reverse gate which may jam or hinder operation.
- Before launching, examine the jet drive water intake for obstructions which may prevent pumping of water.
- Ensure the driveshaft bearing on the jet drive is lubricated.

Operating in Freezing Temperatures

If there is a chance of ice forming on the water, the jet drive 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. Do not start the engine until the ice is clear.

Operating in Saltwater or Polluted Water

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

Wash down the outboard exterior and flush out the exhaust outlet of the jet drive with fresh water after each use. Each month, spray Mercury Precision or Quicksilver Corrosion Guard on external metal surfaces.

NOTE: *Do not spray on corrosion control anodes as this will reduce the effectiveness of the anodes.*

Operating in Shallow Water

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

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

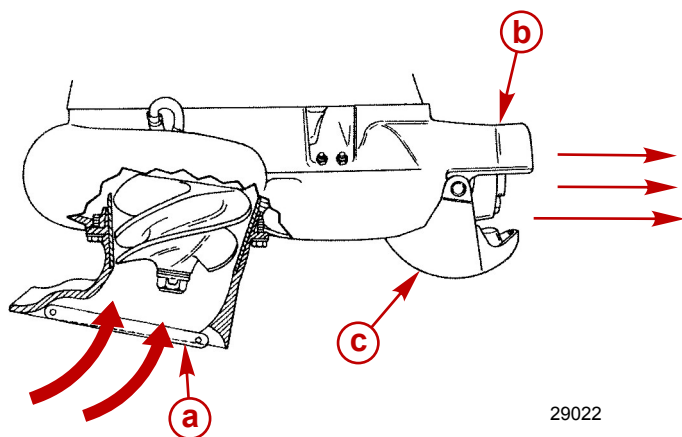
When boating through shallow water areas, choose a course of travel that avoids sharp rocks and other underwater obstacles that could damage the boat. Running the boat through these areas on full plane may be helpful as the boat will be riding higher in the water. If the boat gets stuck on the bottom,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

How the Jet Drive Operates

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

OPERATION

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



29022

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

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

▲ WARNING

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

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

OPERATION

Stopping the Boat in an Emergency

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

WARNING

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

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

Steering the Boat

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

WARNING

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

WARNING

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

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

OPERATION

Mooring the Boat

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

Water Intake Blockage

▲ WARNING

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

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

Clearing A Lodged Impeller

▲ WARNING

Rotating the flywheel to free a lodged impeller can accidentally start the engine, resulting in serious injury or death. Always turn the ignition key or lanyard stop switch to the "OFF" position and remove all spark plug leads from the spark plugs.

It is possible for debris to lodge between the impeller and jet housing wall, especially after the engine has been stopped. This will lock the driveshaft and will prevent the engine from being able to crank over for starting. Following are steps for dislodging the impeller.

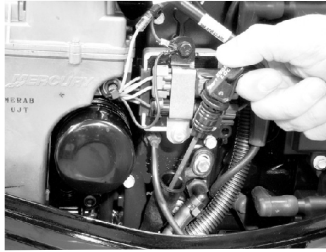
1. Position the lanyard stop switch to the "OFF" position.
2. Remove the spark plug leads to prevent the engine from accidentally starting.
3. Remove the flywheel or rewind cover and rotate the engine flywheel counterclockwise.

If this does not dislodge the impeller, it will be necessary to remove the six screws and water intake housing.

OPERATION

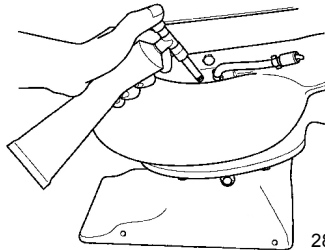
Pre-Starting Instructions

1. Check the engine oil level.



28525

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



28664

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 - Remote Control Models

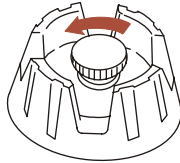
Before starting, read the pre-starting check list, special operating instructions, and engine break-in procedure in the **Operation** section.

OPERATION

NOTICE

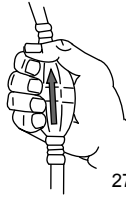
Failure to provide sufficient cooling water will damage the water pump and cause the engine to overheat. Never start or operate the engine without the intake housing in the water.

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



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2. 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.



27348

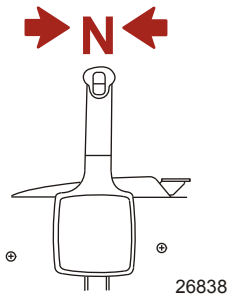
3. Set the lanyard stop switch to "RUN" position. Refer to **General Information - Lanyard Stop Switch**.



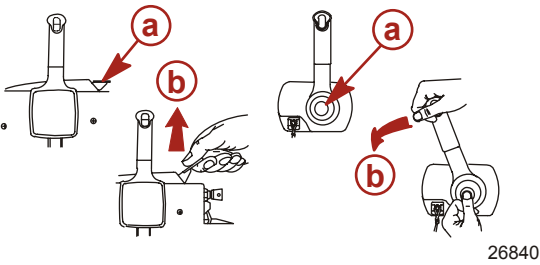
19791

OPERATION

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

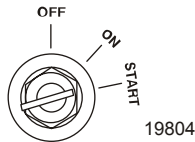


- Move the throttle-only lever to the fully closed position or press the throttle-only button.



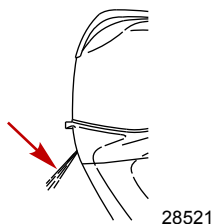
- a** - Fully closed position
- b** - Maximum fast idle speed position

- Starting a flooded engine - Advance the throttle-only lever or control handle to the maximum throttle-only position and continue to crank the engine for starting. Immediately reduce engine speed after engine starts.
- Turn ignition key to the "START" position. If the engine fails to start in ten seconds, return the key to the "ON" position, wait 30 seconds and try again.



OPERATION

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



IMPORTANT: If no water is coming out of the water pump indicator hole, stop engine and check 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 will cause engine damage.

WARMING UP ENGINE

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

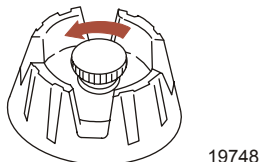
Starting the Engine - Tiller Handle Models

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

NOTICE

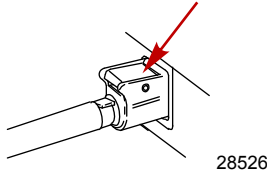
Failure to provide sufficient cooling water will damage the water pump and cause the engine to overheat. Never start or operate the engine without the intake housing in the water.

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

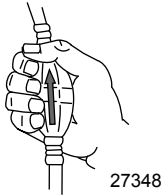


OPERATION

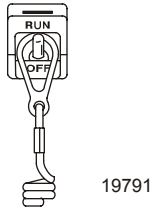
2. Connect the remote fuel line to the outboard. Make sure the connector is snapped into place.



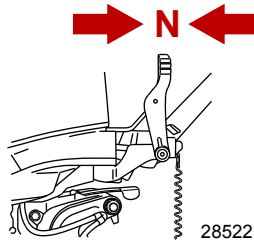
3. Position the fuel line primer bulb so the arrow on the side of the bulb is pointing up. Squeeze the fuel line primer bulb several times until it feels firm.



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



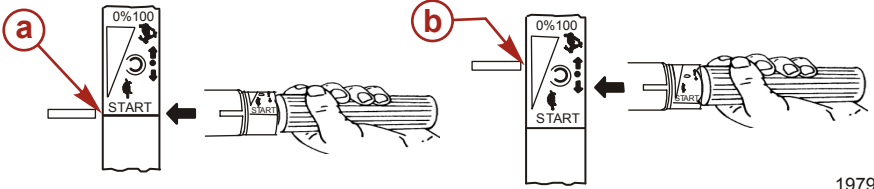
5. Shift outboard to neutral ("N") position.



6. Set the throttle grip to start position.

OPERATION

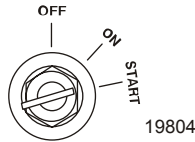
7. Starting a flooded engine - Set the throttle grip to half-way position.



19799

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

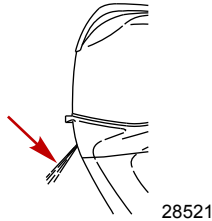
8. Turn the ignition key to the "START" position. If the engine fails to start in ten seconds, return the key to the "ON" position, wait 30 seconds and try again.



⚠ WARNING

Rapid acceleration can result in serious injury or death from being thrown within or out of the boat. Decrease engine speed before shifting into gear.

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 engine and check 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

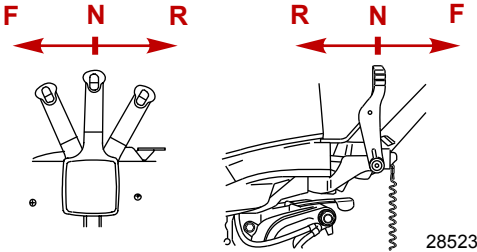
Before beginning operation, allow the engine to warm up at idling speed for three minutes.

OPERATION

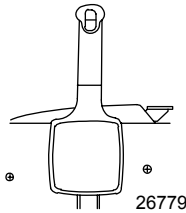
Gear Shifting

IMPORTANT: Observe the following:

- **Never shift outboard into gear unless engine speed is at idle.**
- Your outboard has three gear shift positions to provide operation: forward, neutral (out of gear), and reverse.



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



- Tiller handle models - Reduce the engine speed to idle before shifting.

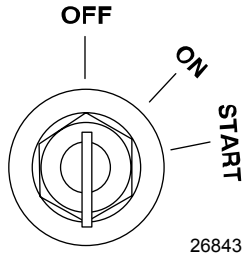


- Always shift the outboard into gear with a quick motion.
- After shifting the outboard into gear, advance the remote control lever or rotate the throttle grip (tiller handle) to increase speed.

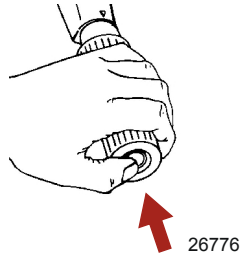
OPERATION

Stopping the Engine

1. **Remote control models** - Reduce the engine speed and shift the outboard to neutral position. Turn the ignition key to "OFF" position.



2. **Tiller handle models** - Reduce the engine speed and shift the outboard to neutral position. Push in the engine stop button or turn the ignition key to "OFF" position.

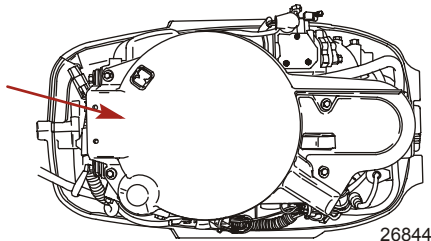


Emergency Starting

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

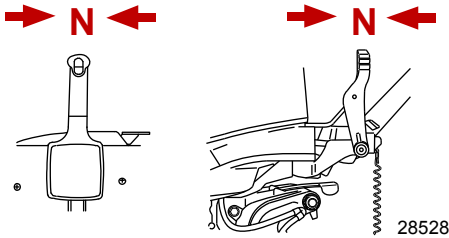
NOTE: *EFI models - Engine must have a fully charged battery to start the engine.*

1. Remove flywheel cover or manual starter assembly.



OPERATION

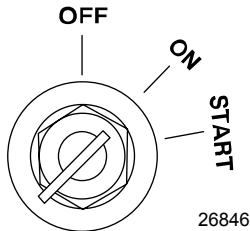
- Shift outboard to neutral ("N") position.



▲ 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.

- Electric start models - Turn the ignition key to "ON" position.



▲ WARNING

High voltage is present any time the key is turned on, especially when starting or operating the engine. Do not touch ignition components or metal test probes and stay clear of spark plug leads when performing live tests.

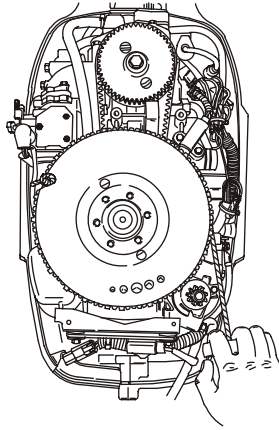
▲ WARNING

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.

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

OPERATION

5. Pull the starter rope to start the engine.



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MAINTENANCE

Outboard Care

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

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

SELECTING REPLACEMENT PARTS FOR YOUR OUTBOARD

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

EPA Emissions Regulations

All new outboards manufactured by Mercury Marine are certified to the United States Environmental Protection Agency, as conforming to the requirements of the regulations for the control of air pollution from new outboard motors. This certification is contingent on certain adjustments set to factory standards. For this reason, the factory procedure for servicing the product must be strictly followed and, wherever practicable, returned to the original intent of the design.

Maintenance, replacement, or repair of the emission control devices and systems may be performed by any marine spark ignition (SI) engine repair establishment or individual.

MAINTENANCE

EMISSION CERTIFICATION LABEL

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

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

43210

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

OWNER RESPONSIBILITY

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

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

Inspection and Maintenance Schedule

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

MAINTENANCE

- 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 anti-seize to the spark plug threads
- Replace the gear lubricant
- Inspect the corrosion control anodes
- Replace all filters on the suction side of the fuel system—dealer item
- Lubricate the driveshaft splines—dealer item
- Lubricate the propeller shaft 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—dealer item

THREE YEARS OR 300 HOURS

- Replace the spark plugs
- Replace the water pump impeller—dealer item
- Inspect the carbon fiber reeds—dealer item
- Inspect the wire harness connectors—dealer item
- Check the remote control cable adjustment, if applicable—dealer item
- Replace the high-pressure fuel filter—dealer item
- Replace the accessory drive belt—dealer item
- Check the power trim fluid level—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.

MAINTENANCE

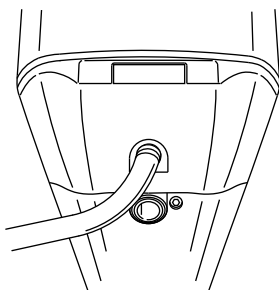
⚠ WARNING

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.



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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

Exterior Care

Your outboard is protected with a durable baked enamel finish. Clean and wax often using marine cleaners and waxes.

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.

MAINTENANCE

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

Fuel System

WARNING

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

Before servicing any part of the fuel system, stop the engine and disconnect the battery. Drain the fuel system completely. Use an approved container to collect and store the 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

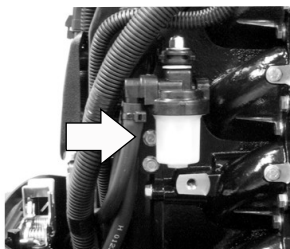
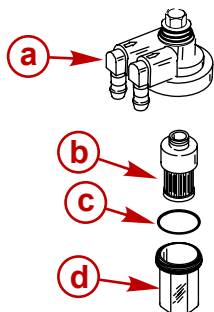
Check the fuel filter for water accumulation or sediment. If water is in the fuel, remove the sight bowl and drain the water. If the filter appears to be contaminated, remove and replace.

REMOVAL

1. Read the preceding fuel system servicing information and warning.
2. Pull out the filter assembly from the mount. Hold onto the cover to prevent it from turning and remove the sight bowl. Empty contents into an approved container.

MAINTENANCE

3. Inspect the filter element. If replacement is necessary, replace the filter assembly.



28414

- a - Cover
- b - Filter element
- c - O-ring seal
- d - Sight bowl

INSTALLATION

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

1. Push the filter element into the cover.
2. Place the O-ring seal into its proper position on the sight bowl and screw the sight bowl hand-tight into the cover.
3. Push the filter assembly back into the mount.

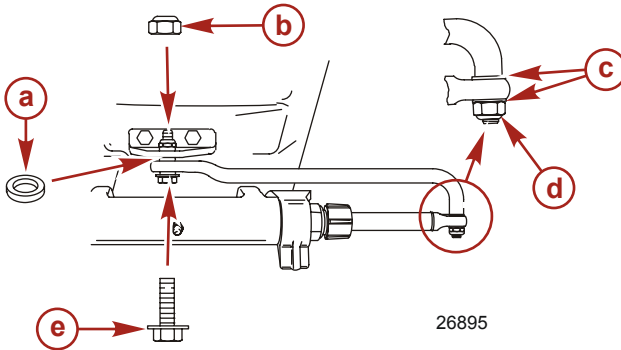
Steering Link Rod Fasteners

IMPORTANT: The steering link rod that connects the steering cable to the engine must be fastened using special washer head bolt ("e" - Part Number 10-856680) and self-locking nylon insert locknuts ("b" and "d" - Part Number 11-826709113). These locknuts must never be replaced with common nuts (nonlocking) as they will work loose and vibrate off, freeing the link rod to disengage.

MAINTENANCE

⚠ WARNING

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



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- a** - Spacer (12-71970)
- b** - Nylon insert locknut (11-826709113)
- c** - Flat washer (2)
- d** - Nylon insert locknut (11-826709113)
- e** - Special washer head bolt (10-856680)

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

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

Assemble steering link rod to engine with special washer head bolt, locknut, and spacer. First torque bolt, then locknut to specification.

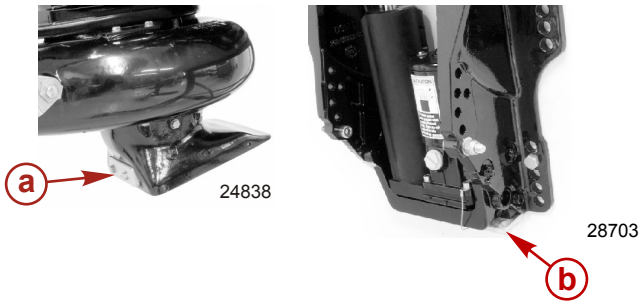
Corrosion Control Anode

Your 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.

MAINTENANCE

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.

One anode is installed on the bottom of the transom bracket assembly and the other anode is located on the water intake housing.



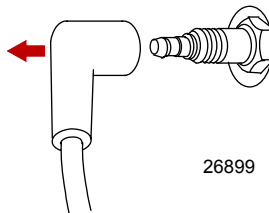
- a - Water intake housing anode
- b - Transom bracket anode

Spark Plug Inspection and Replacement

⚠ WARNING

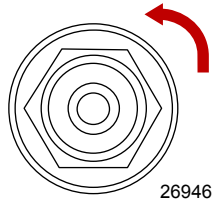
Damaged spark plug boots may emit sparks that can ignite fuel vapors under the engine cowl, resulting in serious injury or death from a fire or explosion. To avoid damaging the spark plug boots, do not use any sharp object or metal tool to remove the spark plug boots.

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

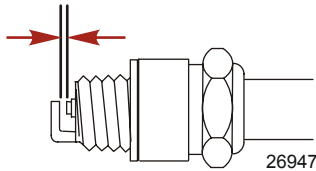


MAINTENANCE

- 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.



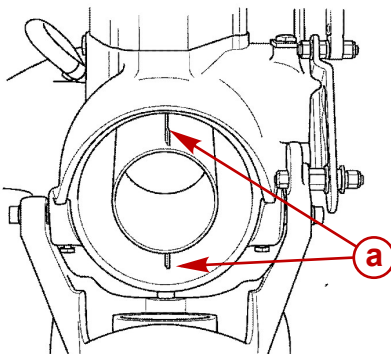
Spark Plug	
Spark plug gap	1.0 mm (0.040 in.)

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

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

Steering Pull Adjustment

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



a - Exhaust fins

29573

MAINTENANCE

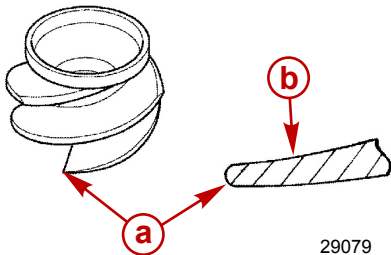
Worn/Dull Impeller

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

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

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

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



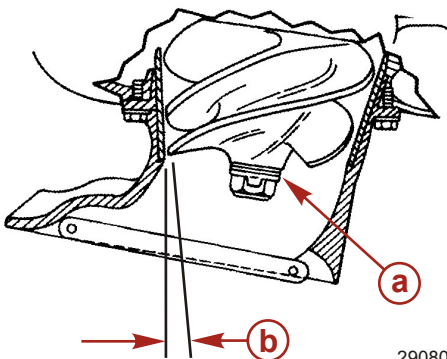
- a - Leading edge
- b - Top side lifting angle

29079

Impeller Clearance Adjustment

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

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



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

29080

MAINTENANCE

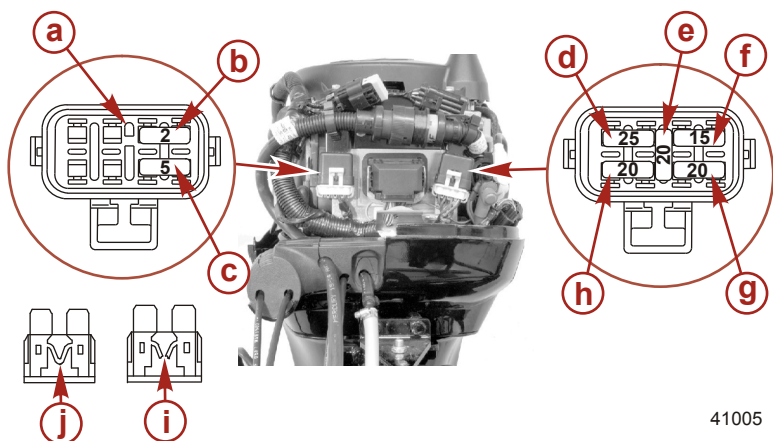
Check the impeller clearance by sliding a feeler gauge through the intake grate and measure the clearance between the impeller edge and liner.

Fuse Replacement

IMPORTANT: Always carry spare 20 amp fuses.

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

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



41005

- a** - Spare fuse slot
- b** - Diagnostic circuit 4 pin connector - 2 amp fuse
- c** - SmartCraft data bus circuit - 5 amp fuse
- d** - Main circuit - 25 amp fuse
- e** - Spare 20 amp fuse
- f** - Main relay/accessories - 15 amp fuse
- g** - Ignition coil circuit - 20 amp fuse
- h** - Fuel pump/idle air control/fuel injector circuits - 20 amp fuse
- i** - Blown fuse
- j** - Good fuse

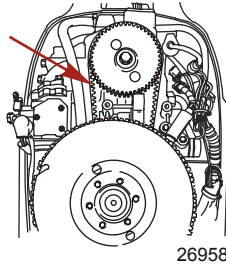
Timing Belt Inspection

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.


MAINTENANCE

- Rubber portion swollen by oil.
- Belt surfaces roughened.
- Signs of wear on edges or outer surfaces of belt.



Lubrication Points

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

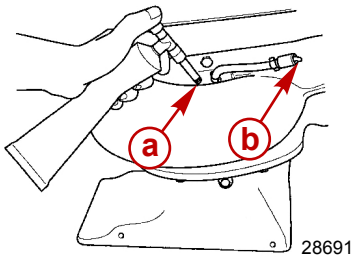
Tube Ref No.	Description	Where Used	Part No.
95 	2-4-C with PTFE	Driveshaft bearing	92-802859A 1

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

- Driveshaft bearing
 - i. Pull vent hose off of the grease fitting.
 - ii. Pump in grease through the grease fitting, using the grease gun provided, until excess grease starts to exit the vent hose.

MAINTENANCE


- iii. Connect the vent hose onto the grease fitting after greasing.



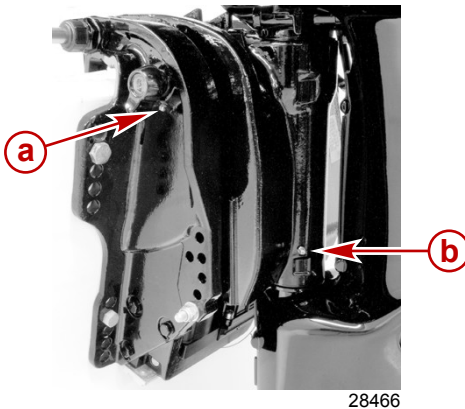
- a** - Grease fitting
b - Vent hose

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

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

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with PTFE	Tilt support lever, swivel bracket, tilt tube, steering cable grease fitting	92-802859A 1

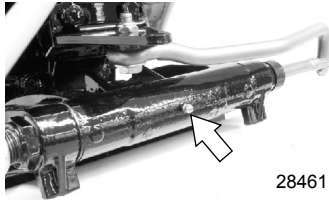
- Tilt support lever - Lubricate through fitting.
- Swivel bracket - Lubricate through fitting.



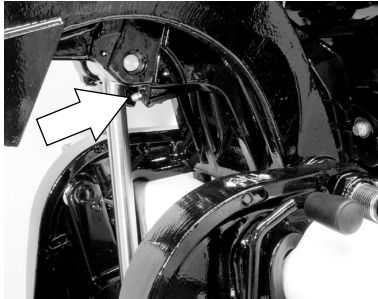
- a** - Tilt support lever
b - Swivel bracket

MAINTENANCE

- Tilt tube - Lubricate through fitting.



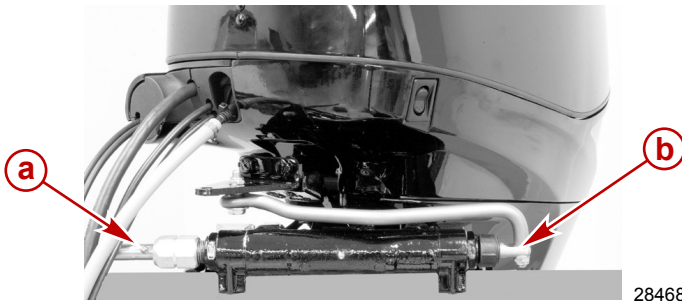
- Co-pilot shaft (tiller handle models) - Lubricate through fitting. Move the steering friction lever back and forth while lubricating.



⚠ WARNING

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

- Steering cable grease fitting (if equipped) - Rotate steering wheel to fully retract the steering cable end into the outboard tilt tube. Lubricate through fitting.



- a** - Fitting
- b** - Steering cable end

MAINTENANCE

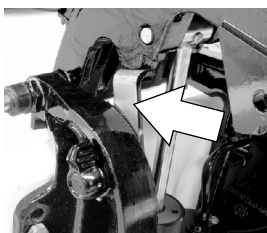
3. Lubricate the following with lightweight oil.
 - Steering link rod pivot points - Lubricate points.



28471

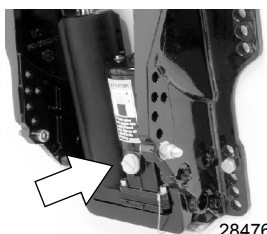
Checking Power Trim Fluid

1. Tilt the outboard to the full up position and engage the tilt support lock.




28474

2. Remove the fill cap and check the fluid level. The fluid level should be even with the bottom of the fill hole. Add Quicksilver or Mercury Precision Lubricants Power Trim and Steering Fluid. If not available, use automotive automatic transmission fluid (ATF).



28476

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

MAINTENANCE

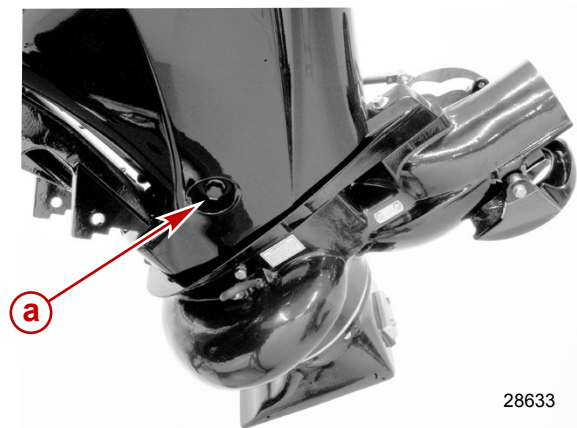
Changing Engine Oil

ENGINE OIL CAPACITY

	Capacity	Fluid Type
Engine oil	3.0 Liter (3 U.S. Quarts)	Mercury Precision Parts or Quicksilver Synthetic Blend 25W-40 4-Stroke Outboard Oil
		Mercury Precision Parts or Quicksilver 10W-30 4-Stroke Outboard Oil

OIL CHANGING PROCEDURE

1. Tilt the outboard up to the trailer position.
2. Turn the steering on the outboard so that the drain hole is facing downward. Remove drain plug and drain engine oil into an appropriate container. Lubricate the seal on the drain plug with oil and reinstall.



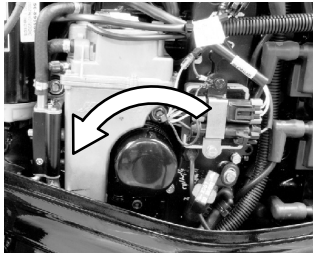
a - Drain plug

CHANGING OIL FILTER

1. Place a rag or towel below the oil filter to absorb any spilled oil.
2. Unscrew the old filter by turning the filter to the left.
3. Clean the mounting base. Apply a film of clean oil to the filter gasket. Do not use grease

MAINTENANCE

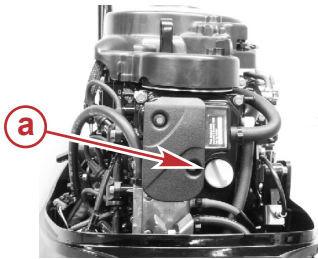
4. Screw the new filter on until the gasket contacts the base, then tighten 3/4 to 1 turn.



28417

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

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 following instructions.

- Portable fuel tank - Pour the required amount of gasoline stabilizer (follow instructions on container) into fuel tank. Tip fuel tank back and forth to mix 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 liter (one quart) of gasoline. Pour this mixture into fuel tank.
- Remove the fuel filter sight bowl and empty contents in a suitable container. Refer to **Maintenance - Fuel System** for removal and installation of filter. Add 3 cc (1/2 tsp.) of gasoline stabilizer into the fuel filter sight bowl and reinstall.
- Place the outboard in water or connect flushing attachment for circulating cooling water. Run the engine for 15 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

STORAGE

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

Jet Drive

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

Positioning Outboard for Storage

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

Battery Storage

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

TROUBLESHOOTING

Starter Motor Will Not Crank the Engine (Electric Start Models)

POSSIBLE CAUSES

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

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.
- Blown fuse. Refer to **Maintenance** section.
- Ignition system component failure.
- Spark plugs fouled or defective. Refer to **Maintenance** section.

Engine Runs Erratically

POSSIBLE CAUSES

- Guardian System activated. Refer to **Features and Controls - Warning System**.
- 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.

TROUBLESHOOTING

- 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.
- Fuel injection component failure (EFI Models).

Engine Overspeed (Excessive RPM)

POSSIBLE CAUSES

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

Performance Loss

POSSIBLE CAUSES

- Throttle not fully open.
- Damaged impeller.
- 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

Local Repair Service

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

Service Away from Home

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

Parts and Accessories Inquiries

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

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.

OWNER SERVICE ASSISTANCE

REPLACEMENT SERVICE PARTS

WARNING

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

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

PARTS AND ACCESSORIES INQUIRIES

Direct any inquiries concerning 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

OWNER SERVICE ASSISTANCE

CONTACT INFORMATION FOR MERCURY MARINE CUSTOMER SERVICE

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

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

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

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

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

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

Asia, Singapore		
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:

OWNER SERVICE ASSISTANCE

Model		Serial Number	
Horsepower		Year	

UNITED STATES AND CANADA

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

Mercury Marine		
Telephone	Fax	Mail
(920) 929-5110 (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)

Name	
Address	
City, State, Province	
ZIP or postal code	
Country	

Quantity	Item	Stock Number	Price	Total
			.	.
			.	.
			.	.
			.	.
			.	.
Total Due				.

OUTBOARD 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.



51965

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.

OUTBOARD INSTALLATION

⚠ WARNING

Avoid serious injury or death resulting from a loss of boat control. Loose engine fasteners could cause the transom bracket to fail, resulting in a loss of the driver's ability to control the boat. Always ensure that the engine fasteners are tightened to the specified torque.

ACCEPTABLE ACCESSORY MOUNTING TO THE TRANSOM CLAMP BRACKET

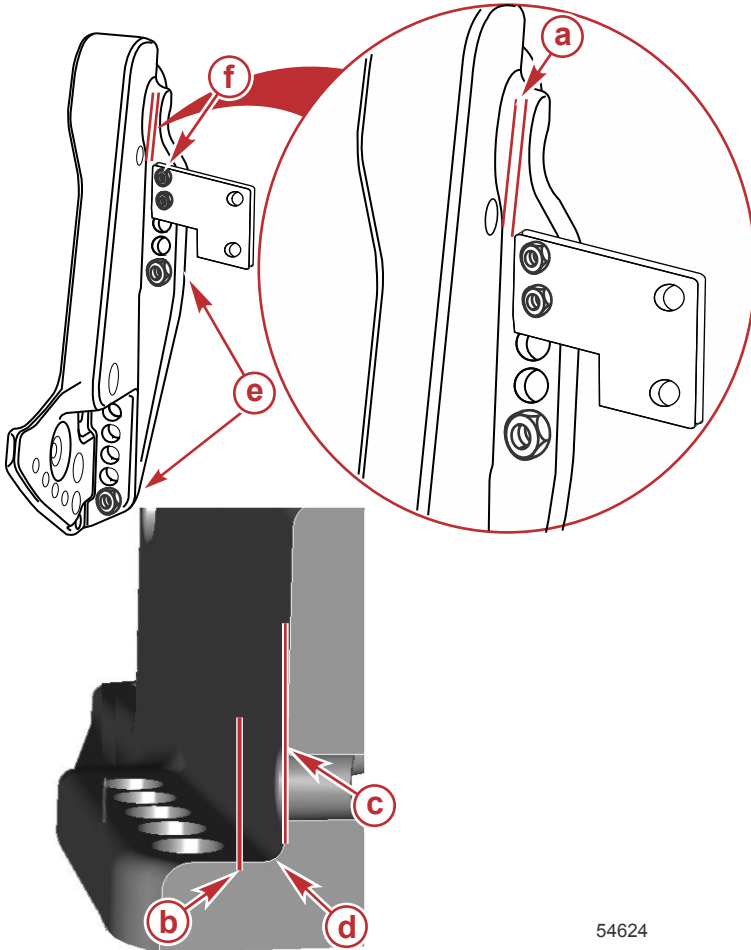
After the engine is mounted to the transom or jack plate in accordance with the engine installation instructions, it is acceptable to attach an accessory to the boat by use of the unused bolt holes in the transom clamp bracket as shown in Figure 1.

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.

OUTBOARD 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.



54624

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

OUTBOARD 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.

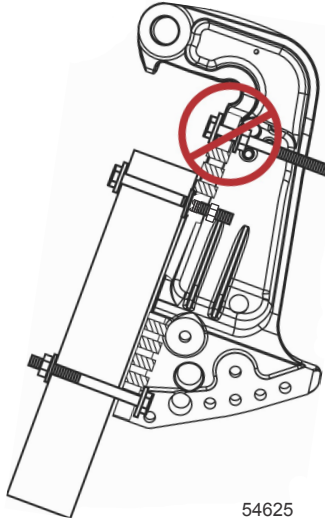


Figure 2

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

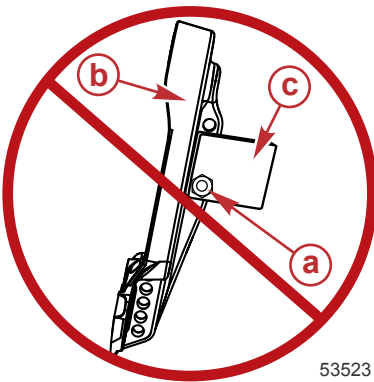


Figure 3

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

OUTBOARD INSTALLATION

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

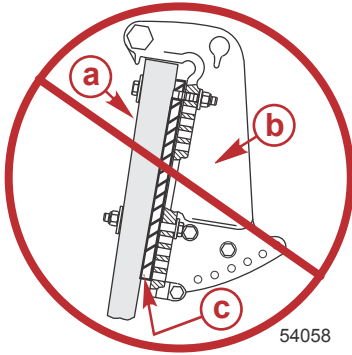


Figure 4

- 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

OUTBOARD 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.

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/m²/24 h with CE 10 fuel at 23 °C as specified in SAE J 1527 - marine fuel hose.

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.

OUTBOARD INSTALLATION

LIFTING OUTBOARD

Use the lifting eye on the engine.



28510

Determining the Mounting Height of the Outboard Jet

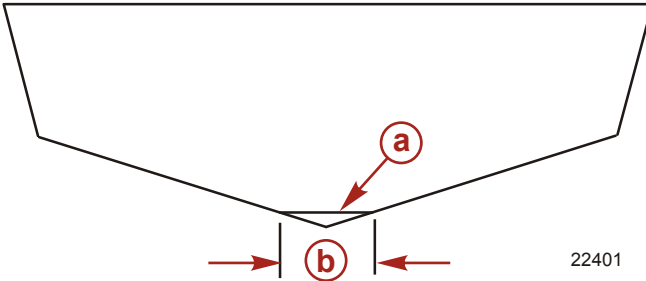
The following outboard mounting height settings will work good for most applications, however, because of different boat/hull designs, the setting should be checked by test running the boat. Refer to **Water Testing**.

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

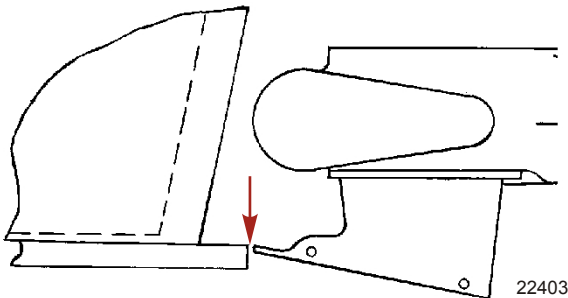
OUTBOARD INSTALLATION

BOATS WITH A "V" BOTTOM HULL

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



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

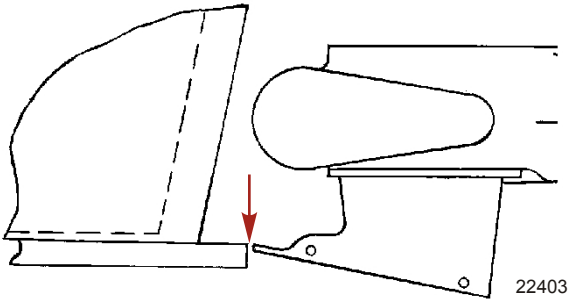


BOATS WITH A FLAT BOTTOM HULL

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

OUTBOARD INSTALLATION

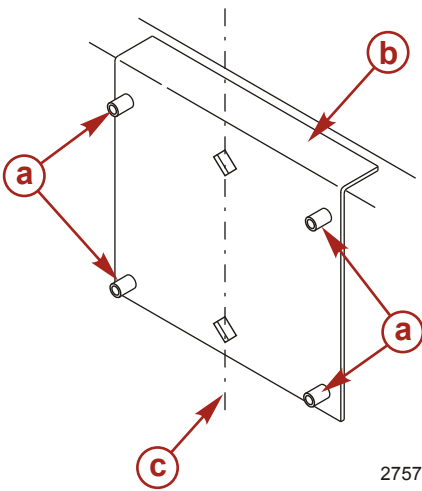
2. Fasten outboard to the transom at this height. Refer to **Fastening the Outboard**.



Installing Outboard

DRILLING OUTBOARD MOUNTING HOLES

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



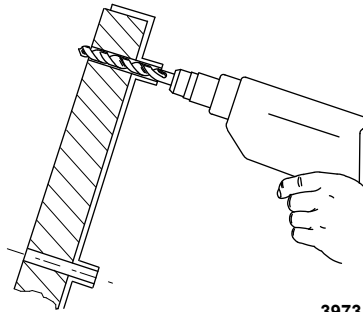
- a - Drill guide holes
- b - Transom drilling fixture
- c - Transom centerline

2757

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

OUTBOARD INSTALLATION

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



Fastening the Outboard to the Transom

MOUNTING BOLTS

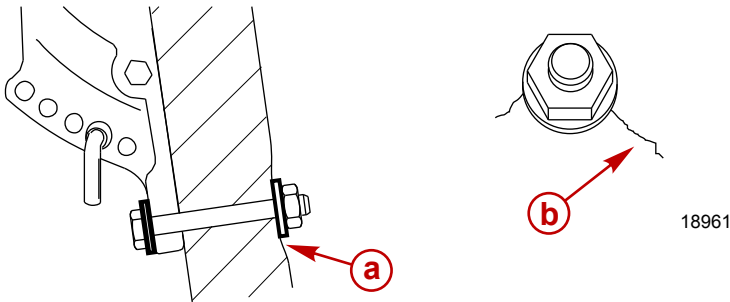
Outboard Transom Mounting Hardware - Supplied with Outboard		
Part Number	Part Name	Description
8M0071543	Outboard mounting bolt	½-20 x 5.00 in. long (3.25 in. thread)
826711-17	Nylon insert locknut	½-20
28421	Flat washer	1.50 in. diameter
54012	Flat washer	0.875 in. diameter

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

OUTBOARD INSTALLATION

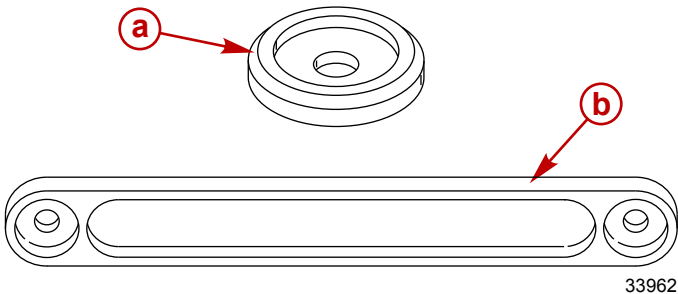
CHECKING BOAT TRANSOM CONSTRUCTION

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



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

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

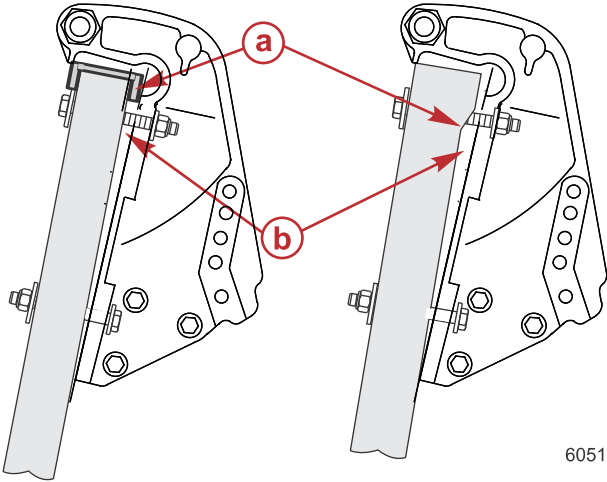


- a** - Large transom washer
- b** - Transom reinforcement plate

OUTBOARD INSTALLATION

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.).

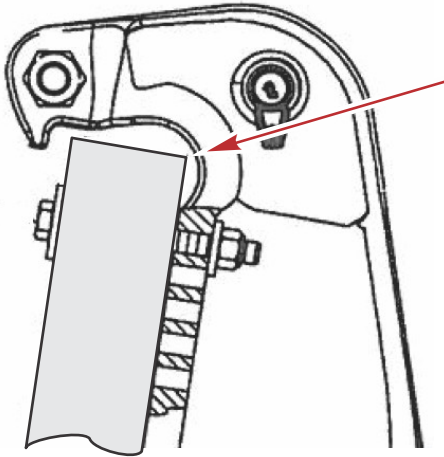


60511

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

OUTBOARD 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.



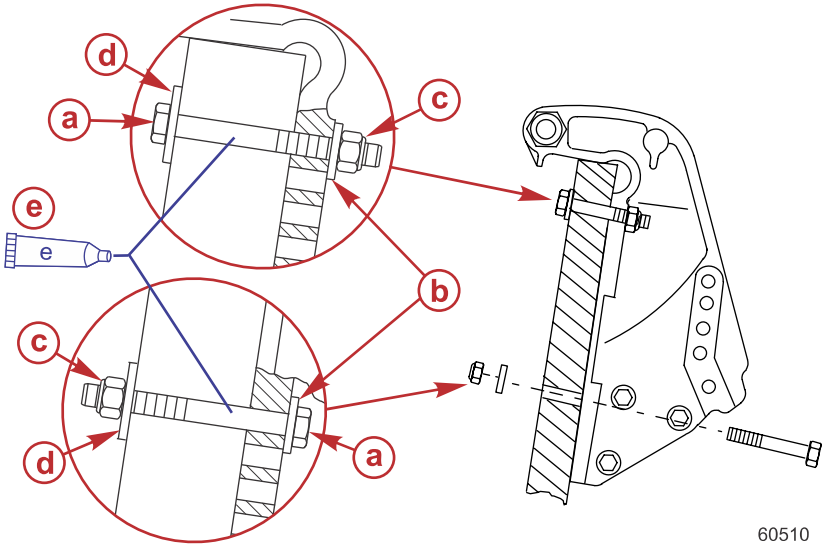
Installation

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.

OUTBOARD INSTALLATION

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



60510

- 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

OUTBOARD INSTALLATION

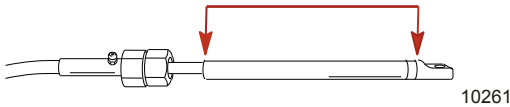
A decal on the transom bracket reminds the owner to check the fasteners securing the outboard to the transom before each use.




Decal on the transom bracket

Steering Cable - Starboard Side Routed Cable

1. Lubricate the entire cable end.



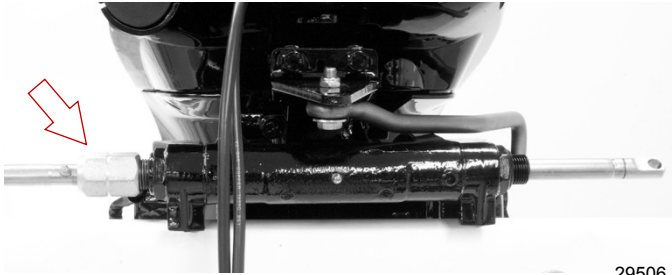
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with PTFE	Steering cable end	92-802859A 1

2. Insert the steering cable into the tilt tube.



OUTBOARD INSTALLATION

3. Tighten the nut to the specified torque.



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

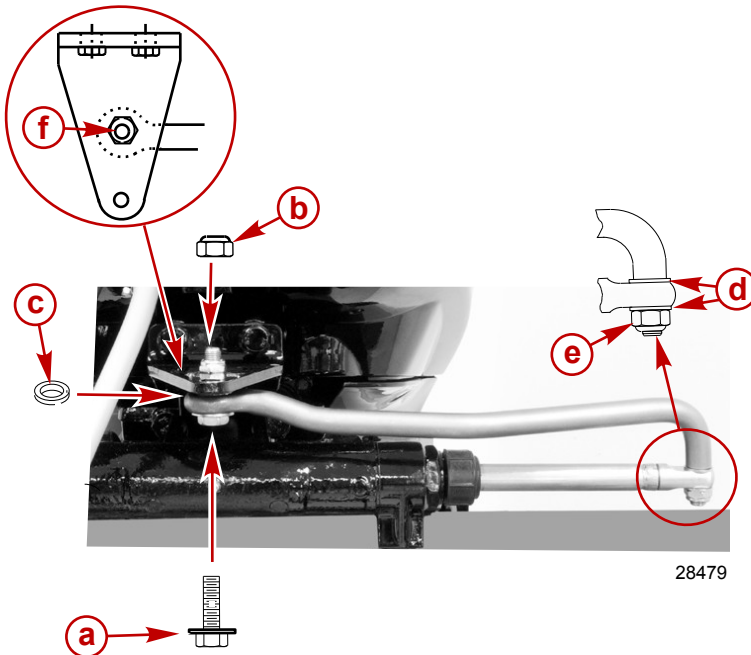
Steering Link Rod Fasteners

IMPORTANT: The steering link rod that connects the steering cable to the engine must be fastened using special washer head bolt ("a" - Part Number 10-856680) and self-locking nylon insert locknuts ("b" & "e" - Part Number 11-826709113). These locknuts must never be replaced with common nuts (non-locking) as they will work loose and vibrate off, freeing the link rod to disengage.

OUTBOARD INSTALLATION

⚠ WARNING

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



- a** - Special washer head bolt (10-856680)
- b** - Nylon insert locknut (11-826709113)
- c** - Spacer (12-71970)
- d** - Flat washer (2)
- e** - Nylon insert locknut (11-826709113)
- f** - Use middle hole - steer outboard to the side to gain hole access

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

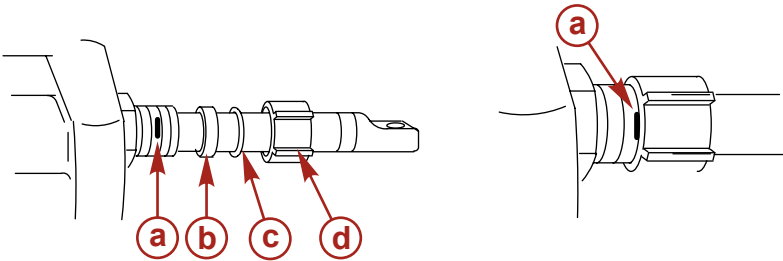
OUTBOARD INSTALLATION

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

Assemble steering link rod to engine with special washer head bolt, locknut and spacer. First torque bolt, then torque locknut to specifications.

Steering Cable Seal

1. Mark tilt tube 6.4 mm (0.25 in.) from end. Install seal components.
2. Thread cap to the mark.



8041

- a** - 6.4 mm (1/4 in.)
- b** - Plastic spacer
- c** - O-ring seal
- d** - Cap

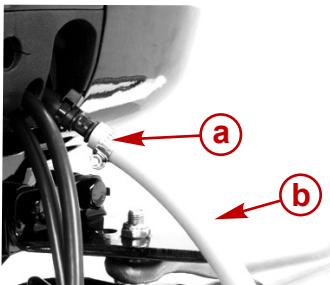
Fuel Hose Connection - Remote Control Models

REMOTE FUEL HOSE SIZE

Minimum fuel hose inside diameter (ID) is 8 mm (5/16 in.). Use a separate fuel hose/fuel tank pickup for each engine.

FUEL HOSE CONNECTION

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.



- a** - Hose clamp
- b** - Remote fuel hose

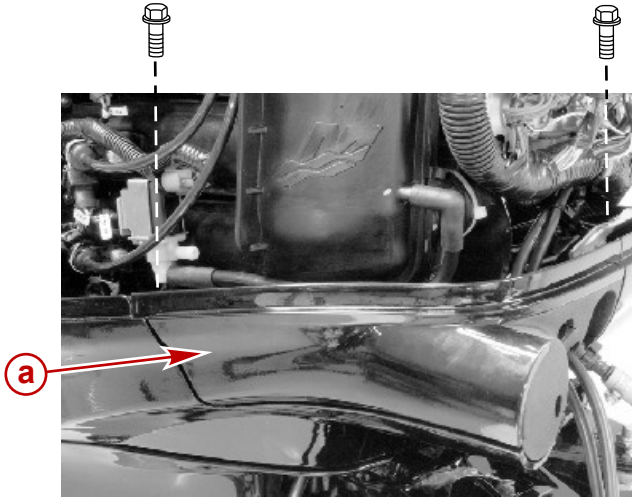
28511

OUTBOARD INSTALLATION

Electrical Connections and Control Cable Installation

REMOTE WIRING HARNESS

Remove the access cover.

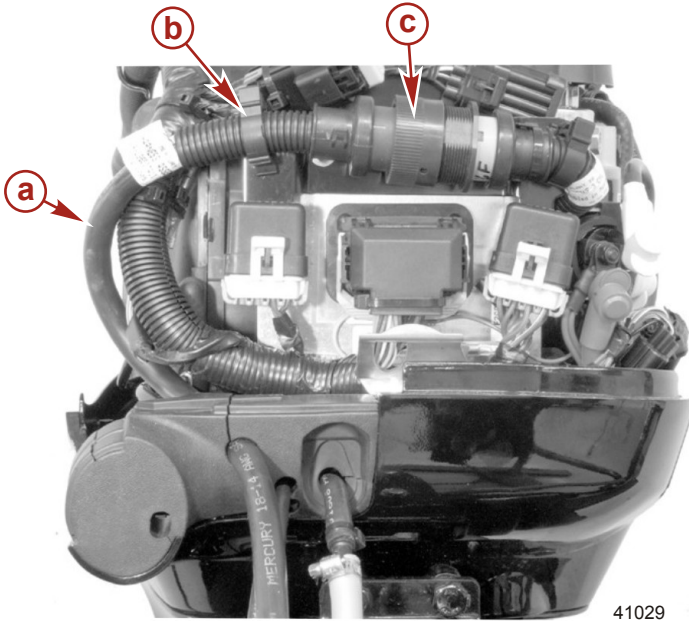


28696

a - Access cover

OUTBOARD INSTALLATION

Route the remote wiring harness through the rubber grommet. Connect the 14 pin connector to the engine harness. Fasten the harness with the retainer.



41029

- a** - Remote wiring harness
- b** - Retainer
- c** - 14 pin connector

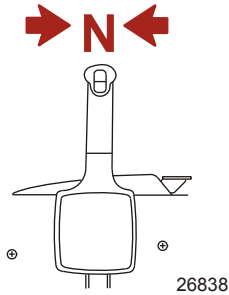
THROTTLE CABLE INSTALLATION

Install the cables into the remote control following the instructions provided with the remote control.

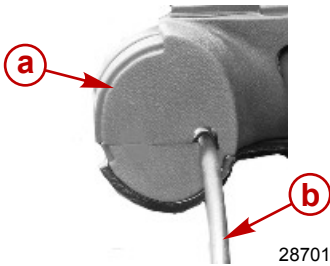
1. Place the throttle cable on the throttle lever pin and lock in place with the retainer.

OUTBOARD INSTALLATION

- Center the roller with the alignment mark on the cam. Adjust the cable barrel so that it fits into the anchor pocket.



- Fit the throttle cable through the rubber grommet.

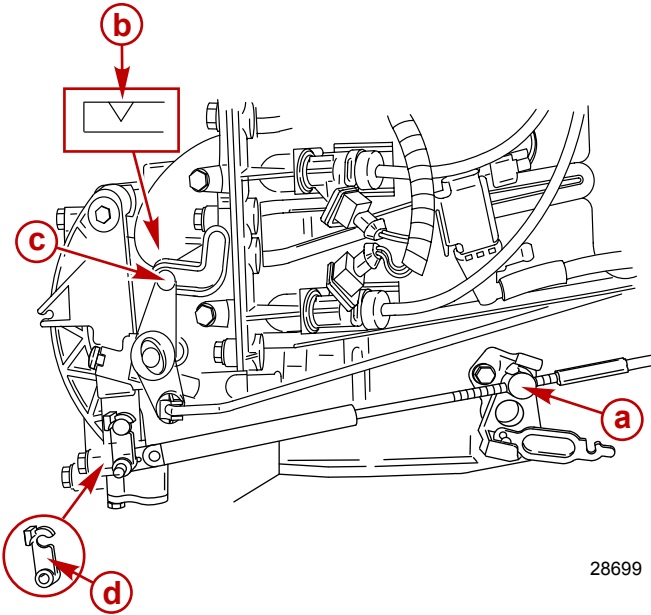


- a** - Rubber grommet
- b** - Throttle cable

- Place the throttle cable on the throttle lever pin. Lock in place with the retainer.

OUTBOARD INSTALLATION

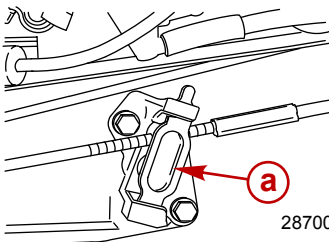
- Adjust the cable barrel so the center of the roller is lined up with the alignment mark on the cam when the cable barrel is placed in the barrel receptacle.



28699

- a** - Cable barrel
- b** - Alignment mark
- c** - Roller
- d** - Retainer

- Place the cable barrel into the barrel receptacle.
- Lock in barrel in place with the barrel latch.

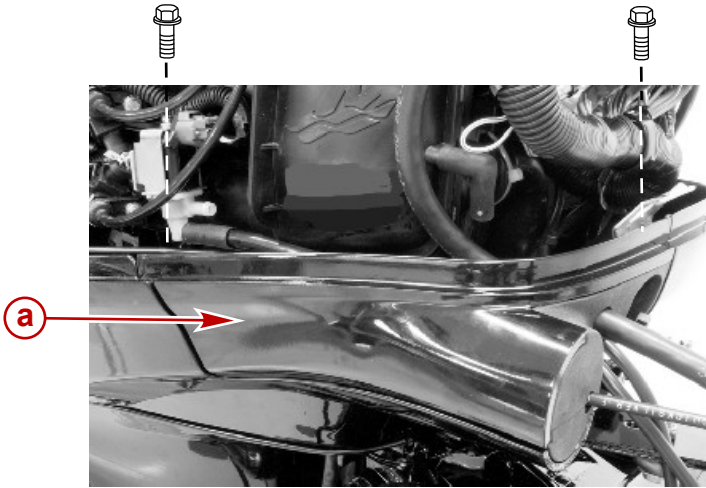


a - Barrel latch

28700

OUTBOARD INSTALLATION

8. Install the access cover with two bolts. Tighten the bolts to the specified torque.



28702

a - Access cover

Description	Nm	lb-in.	lb-ft
Access cover bolt	6	53	

SHIFT CABLE INSTALLATION—OUTBOARD JET

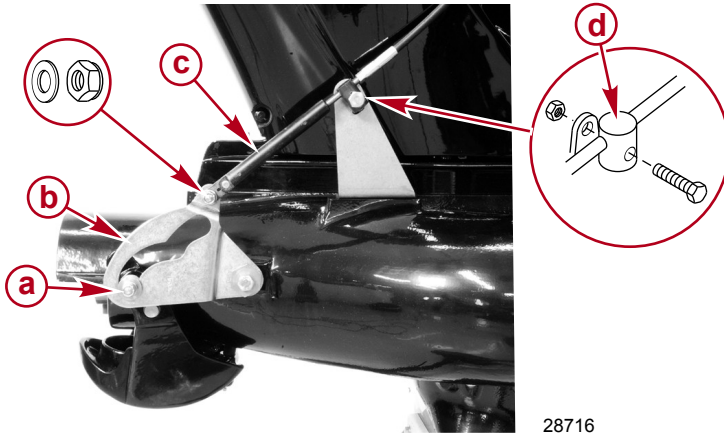
⚠ WARNING

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

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

OUTBOARD INSTALLATION

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



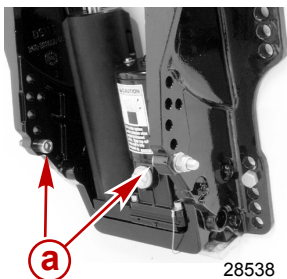
- a - Roller
- b - Shift cam
- c - Shift cable
- d - Shift cable adjustment barrel

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

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

Trim-In Stop Adjustment - Power Trim Models

If an adjustment is required to the trim-in stop, reposition the tilt stop pins in the desired holes. Tighten the tilt stop pins to the specified torque.



- a - Tilt stop pins

OUTBOARD INSTALLATION

Description	Nm	lb-in.	lb-ft
Tilt stop pins	24.4		18

Water Testing

CHECKING FOR CAVITATION

The initial outboard height setting should be close to the optimum setting for the outboard. However, because of the hull design of some boats, obstructions, or imperfections in the hull ahead of the water intake, adjustments may be required to prevent cavitation at running speeds.

When operating the boat, the outboard driveshaft housing should be vertical, or tilted toward the boat, when planing to provide a scooping angle on the water intake. Tilting the outboard out beyond a vertical position reduces the scoop angle and can cause impeller slippage and cavitation.

IMPORTANT: If the angle of the boat transom does not allow the driveshaft housing to be positioned vertical, a wedge kit should be installed behind the transom brackets to increase the tilt-in angle.

NOTE: Slight cavitation in sharp turns and rough water is acceptable, but excessive cavitation is harmful to the outboard and should be avoided.

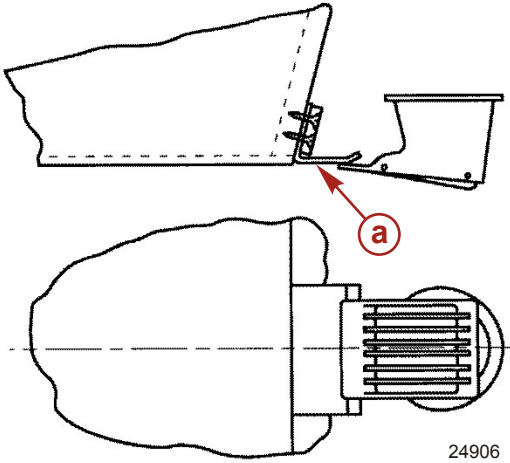
Test run the boat. If cavitation occurs (air enters the pump), the first thing to try is lowering the outboard mounting height.

If cavitation still exists after lowering the outboard, it may be helpful to seek advice from the boat manufacturer.

Another option to further reduce cavitation is a rough water plate.

OUTBOARD INSTALLATION

A rough water plate may be helpful in reducing cavitation when running in windy, rough water conditions where air is sucked into the water intake when jumping waves. Install a 0.8 mm (1/32 in.) metal plate that extends from the hull bottom to the top of the water intake housing. This plate tends to reduce air intake as well as reduce spray.



24906

a - Rough water plate

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