



MERCURY[®]
GO BOLDLY.[™]

8M0125264 817 eng



**Outboard
Installation
Operation
Maintenance
Manual**

15/20 EFI FourStroke

© 2017 Mercury Marine

Welcome

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

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

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

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

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

Name / function:

John Pfeifer, President,
Mercury Marine



Read This Manual Thoroughly

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

Notice

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

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

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

WARNING

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

CAUTION

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

NOTICE

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

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

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

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

⚠ 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.

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

Copyright and Trademark Information

© MERCURY MARINE. All rights reserved. Reproduction in whole or in part without permission is prohibited.

Alpha, Axius, Bravo One, Bravo Two, Bravo Three, GO BOLDLY., Circle M with Waves Logo, K-planes, Mariner, MerCathode, MerCruiser, Mercury, Mercury with Waves Logo, Mercury Marine, Mercury Precision Parts, Mercury Propellers, Mercury Racing, MotorGuide, OptiMax, Quicksilver, SeaCore, Skyhook, SmartCraft, Sport-Jet, Verado, VesselView, Zero Effort, Zeus, #1 On the Water and We're Driven to Win are registered trademarks of Brunswick Corporation. Pro XS is a trademark of Brunswick Corporation. Mercury Product Protection is a registered service mark of Brunswick Corporation.

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)		

General Information

Boater's Responsibilities.....	1
Before Operating Your Outboard.....	1
Boat Horsepower Capacity.....	1
High-Speed and High-Performance Boat Operation.....	2
Outboard Remote Control Models	2
Remote Steering Notice.....	3
Lanyard Stop Switch.....	3
Protecting People in the Water.....	5
Passenger Safety Message - Pontoon Boats and Deck Boats.....	6
Wave and Wake Jumping.....	7
Impact with Underwater Hazards.....	8
Exhaust Emissions.....	10
Selecting Accessories for Your Outboard.....	12
Safe Boating Recommendations.....	12
Recording Serial Number	15
Model Year Production Code.....	16
Specifications—15, 20 HP.....	16
Conditions Affecting Performance.....	19

Transporting

Carrying, Storing, and Transporting Your Outboard when Removed from Boat	23
Trailing Boat/Outboard	24

Fuel and Oil

Fuel Requirements.....	26
Low Permeation Fuel Hose Requirement	27
EPA Pressurized Portable Fuel Tank Requirements.....	27
Fuel Demand Valve (FDV) Requirement.....	27
Mercury Marine's Pressurized Portable Fuel Tank.....	28
Filling Fuel Tank.....	29
Engine Oil Recommendations.....	29
Checking Engine Oil.....	30

Features and Controls

Tiller Handle Features.....	33
Remote Control Features.....	39
General Features.....	41
Manual Tilt Features and Operation.....	42
Power Tilt Features and Operation, if Equipped.....	47
Warning System.....	51

Operation

Prestarting Check List.....	55
Operating in Freezing Temperatures.....	55
Operating in Saltwater or Polluted Water.....	55
Operating Outboard as an Auxiliary Engine.....	56
Prestarting Instructions.....	56
Engine Break-in Procedure.....	58
Starting the Engine - Tiller Handle Models.....	58
Starting the Engine - Remote Control Models.....	61
Gear Shifting	64
Stopping the Engine	66
Emergency Starting Procedure.....	67

Maintenance

Cleaning Care Recommendations.....	71
EPA Emissions Regulations.....	72
Inspection and Maintenance Schedule.....	73
Flushing the Cooling System.....	75
Top Cowl Removal and Installation.....	76
Battery Inspection	77
Exterior Care.....	77
Fuel System.....	78
Propeller Replacement	83
Fuse Replacement - Electric Start Models	86
Spark Plug Inspection and Replacement.....	88
Timing Belt Inspection.....	89
Engine Oil.....	89
Corrosion Control Anodes and Continuity Wire.....	93
Lubrication Points	97
Gearcase Lubricant.....	99
Checking Power Tilt Fluid if Equipped.....	101
Submerged Outboard.....	102

Storage

Storage Preparation.....	103
Protecting External Outboard Components.....	103
Protecting Internal Engine Components.....	104
Gearcase.....	104
Positioning Outboard for Storage.....	104
Battery Storage.....	105

Troubleshooting

Starter Motor Will Not Crank the Engine (Electric Start Models)	106
Engine Will Not Start.....	106
Engine Runs Erratically.....	106
Performance Loss.....	107
Battery Will Not Hold Charge.....	107

Owner Service Assistance

Service Assistance.....	108
Ordering Literature.....	110

Engine Installation

Boat Horsepower Capacity.....	112
Start in Gear Protection.....	112
Selecting Accessories for Your Outboard.....	112
Low Permeation Fuel Hose Requirement	113
Lifting the Outboard.....	113
Installing Outboard.....	113
Steering Cable Installation.....	115
Steering Link Rod Fasteners.....	116
Remote Control Wiring Harness and Control Cable Installation.....	117
Changing the Tiller Handle Throttle Grip Rotation.....	124
Battery Installation - Electric Start Models.....	130
Battery Connections.....	131

Maintenance Log

Maintenance Log.....	132
----------------------	-----

GENERAL INFORMATION

Boater's Responsibilities

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

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

Before Operating Your Outboard

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

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

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

WARNING

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

CAUTION

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

NOTICE

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

Boat Horsepower Capacity

WARNING

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

GENERAL INFORMATION

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

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

26777

High-Speed and High-Performance Boat Operation

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

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.



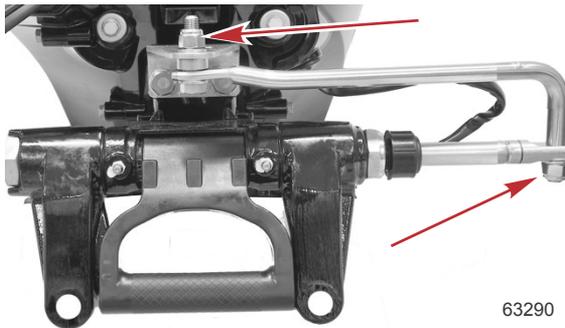
GENERAL INFORMATION

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 nonlocking nuts; they will work loose and vibrate off, allowing the link rod to disengage from the steering cable.

⚠ 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.



63290

Self-locking nuts

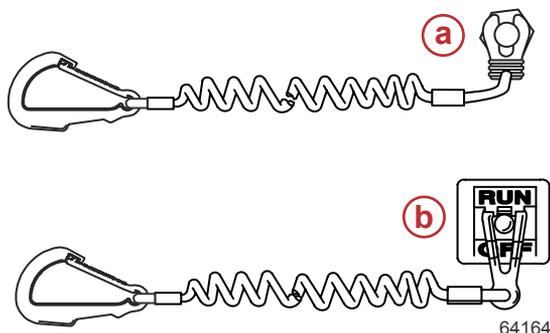
Lanyard Stop Switch

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

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

GENERAL INFORMATION

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



Lanyard stop switch and cord examples

- a - Tiller handle lanyard
- b - Remote control lanyard

64164

Read the following Safety Information before proceeding.

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

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

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

GENERAL INFORMATION

⚠ WARNING

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

⚠ WARNING

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

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

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

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

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

Before each use, visually inspect the lanyard cord to ensure it is in good working condition and that there are no breaks, cuts, or wear to the cord.

Check that the clips on the ends of the cord are in good condition. Replace any damaged or worn lanyard cords.

Protecting People in the Water

WHILE YOU ARE CRUISING

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



21604

GENERAL INFORMATION

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

Whenever a boat is moving (coasting) and the outboard gear shift is in neutral position, there is sufficient force by the water on the propeller to cause the propeller to rotate. This neutral propeller rotation can cause serious injury.

WHILE THE BOAT IS STATIONARY

▲ WARNING

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

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

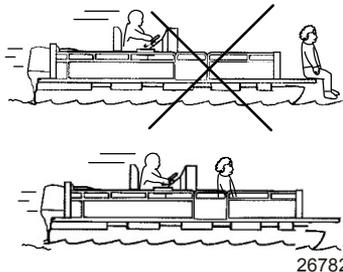
Passenger Safety Message - Pontoon Boats and Deck Boats

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

BOATS HAVING AN OPEN FRONT DECK

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

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



GENERAL INFORMATION

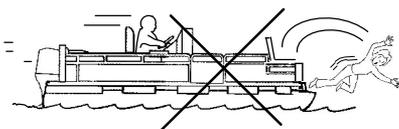
⚠ WARNING

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

BOATS WITH FRONT MOUNTED, RAISED PEDESTAL FISHING SEATS

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

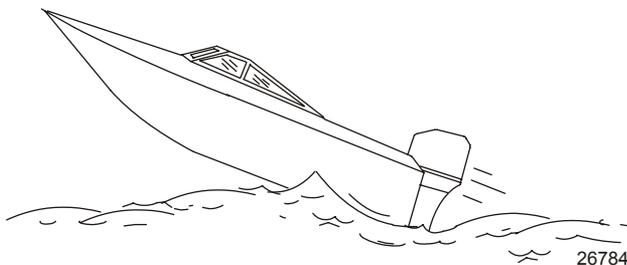
Any unexpected, sudden reduction in boat speed could result in the elevated passenger falling over the front of the boat.



26783

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.



26784

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.

GENERAL INFORMATION

⚠ WARNING

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

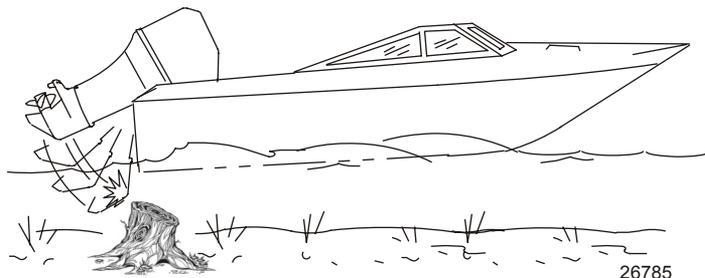
There is another less common hazardous result from allowing your boat to launch off a wave or wake. If the bow of your boat pitches down far enough while airborne, upon water contact it may penetrate under the water surface and submarine for an instant. This will bring the boat to a nearly instantaneous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

Impact with Underwater Hazards

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

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

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



GENERAL INFORMATION

WARNING

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

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

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

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

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

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

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

WARNING

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

SAFETY INSTRUCTIONS FOR HAND-TILLED OUTBOARDS

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

GENERAL INFORMATION

Models with Clamp Screws:

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

⚠ WARNING

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

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



52375

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.

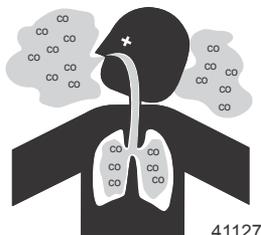
GENERAL INFORMATION

⚠ 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

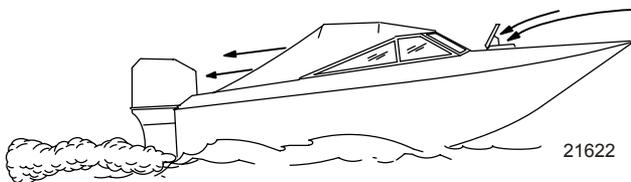


Engine exhaust gases contain harmful carbon monoxide. Avoid areas of concentrated engine exhaust gases. When engines are running, keep swimmers away from the boat, and do not sit, lie, or stand on swim platforms or boarding ladders. While underway, do not allow passengers to be positioned immediately 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:



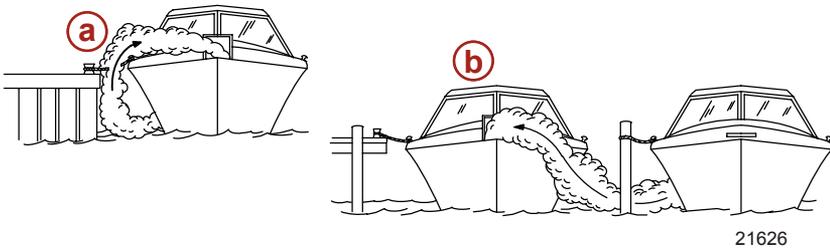
POOR VENTILATION

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.

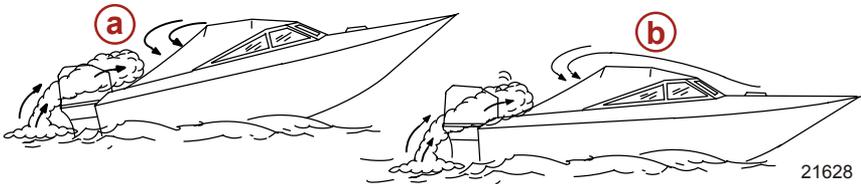
GENERAL INFORMATION

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. Acquire and read the installation, operation and maintenance manuals for all your selected accessories.

Safe Boating Recommendations

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

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

GENERAL INFORMATION

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

Perform safety checks and required maintenance.

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

Check safety equipment onboard.

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

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

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

Passenger boarding.

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

Use personal flotation devices.

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

Prepare other boat operators.

GENERAL INFORMATION

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

Do not overload your boat.

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

Ensure that everyone in the boat is properly seated.

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

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

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

Know your boating area and avoid hazardous locations.

Be alert.

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

Never drive your boat directly behind a water-skier.

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

Watch fallen skiers.

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

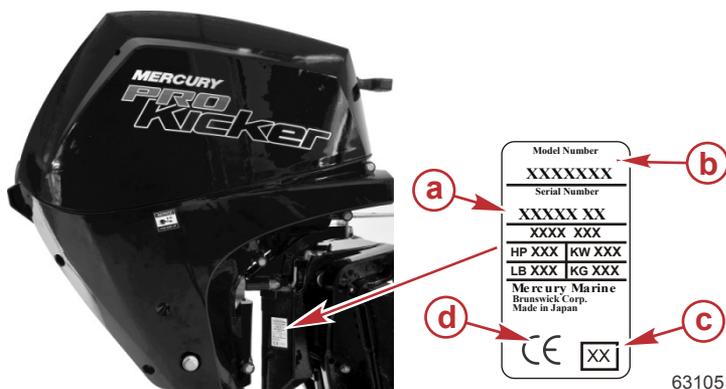
Report accidents.

GENERAL INFORMATION

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

Recording Serial Number

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



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

GENERAL INFORMATION

Model Year Production Code

The serial number decal lists the year of manufacture as an alpha code. This code can be deciphered into a corresponding number utilizing the following table.



Serial number decal alpha code

Model Year Manufactured Code											
Alpha Production Code	A	B	C	D	E	F	G	H	K	X	
Corresponding Number	1	2	3	4	5	6	7	8	9	0	

Examples:

- XX = 2000
- HK = 2089
- AG = 2017

Specifications—15, 20 HP

Attributes	Specification
Power rating	11.0 kW (15 hp)
	14.7 kW (20 hp)

GENERAL INFORMATION

Attributes		Specification
Weight	MH	46.7 kg (103 lbs)
	MRC	44 kg (97 lbs)
	MLH	48.5 kg (107 lbs)
	EH	50.3 kg (111 lbs)
	ELH	51.7 kg (114 lbs)
	E	47.6 kg (105 lbs)
	EL	49 kg (108 lbs)
	EPT	52.6 kg (116 lbs)
	ELPT	53.9 kg (119 lbs)
	ELHPT	57.6 kg (127 lbs)
	ProKicker-EXLHPT	58.9 kg (130 lbs)
	ProKicker-EXLPT	55.3 kg (122 lbs)
Engine idle speed	Not in gear	900–1000 RPM
	In gear	900–1000 RPM
Recommended RPM range at WOT	15/20 hp model	5700–6200 RPM
	15/20 JCI	5400–6100 RPM
Bore x stroke		61.0 mm x 57.0 mm (2.402 in. x 2.244 in.)
Compression ratio		10.0:1
Starting system		Manual/electric
Starter fuse		15 A, mini ATC
Ignition type		Computer controlled CDI (capacitor discharge ignition)
Voltage regulator fuse		20 A, mini ATC
Spark plug		NGK DCPR6E
Spark plug gap		0.9 mm (0.035 in.)
Ignition timing at idle		6° BTDC
Ignition timing at WOT		28° BTDC
RPM overspeed	All models except JCI	6500 RPM
	JCI models only	6300 RPM
ECM RPM limiter (Guardian)		2800 RPM
Over temperature		85 °C (185 °F)
Low oil pressure		26.3 kPa (3.8 psi)
Water pressure at idle		9 kPa (1.3 psi)
Water pressure at WOT		59 kPa (8.5 psi)

GENERAL INFORMATION

Attributes		Specification
Oil type	All temperatures	FC-W® 10W-30
	Alternate viscosity above 4 °C (40 °F)	FC-W® 25W-40
Oil capacity		1.0 L (1.1 U.S. qt)
Alternator type		Single phase
Alternator output at 900 RPM		4.6 A
Alternator output at 5000 RPM		11.5 A
Fuel system		Computer controlled sequential multiport electronic fuel injection
Fuel type		Automotive unleaded (regular) E10 maximum blend
Fuel pump type		Mechanical (low-pressure) Electric (high-pressure)
Gear ratio		2.15:1
Gearcase capacity		460 ml (15.6 fl oz)
Gear lubricant type		Premium Gear Lubricant or GL5 SAE 80W-90 Weight
Clutch		Dog type (forward-neutral-reverse)
Power tilt fluid		Power Trim and Steering Fluid or Automatic Transmission Fluid (ATF) (Type Dexron III)
Trim/tilt range	Power trim	-4° to 71°
	Manual	-4° to 76°
Transom height	Short	38 cm (15 in.)
	Long	51 cm (20 in.)
	Extra long	63.5 cm (25 in.)
Battery requirements	Above 0 °C (32 °F)	465 MCA, 350 CCA
	Below 0 °C (32 °F)	800 MCA, 650 CCA
Sound at drivers ear (ICOMIA 39-94) dBA		84.5
Tiller handle vibration (ICOMIA 38-94) m/s ²		2.58

GENERAL INFORMATION

Conditions Affecting Performance

WEATHER

It is a known fact that weather conditions exert a profound effect on the power output of internal combustion engines. Established horsepower ratings refer to the power the engine will produce at its rated RPM under a specific combination of weather conditions.

Corporations internationally have settled on adoption of International Standards Organization (ISO) engine test standards, as set forth in ISO 3046 standardizing the computation of horsepower from data obtained on the dynamometer. All values are corrected to the power the engine will produce at sea level, at 30% relative humidity, at 25 °C (77 °F) temperature, and a barometric pressure of 29.61 inches of mercury.

Summer conditions of high temperature, low barometric pressure, and high humidity all combine to reduce the engine power. This, in turn, is reflected in decreased boat speeds as much as 3 to 5 km/h (2 to 3 MPH) in some cases. Nothing will regain this speed for the boater but cooler, dry weather.

Pointing out the consequences of weather effects, an engine running on a hot, humid day may encounter a loss of as much as 14% of the horsepower it would produce on a dry, brisk day. The horsepower that any internal combustion engine produces, depends upon the density of the air that it consumes. The density of air is dependent upon the ambient air temperature, the barometric pressure, and the humidity (water vapor) content.

Accompanying the effects of weather inspired loss of power is a second, but more subtle loss. Consider a boat rigged during cooler, less humid weather with a propeller that allowed the engine to turn within its recommended RPM range at full throttle. Higher temperatures with high humidity weather will consequently decrease the available horsepower. The propeller, in effect, is too large for the atmospheric conditions and the engine operates at less than its recommended RPM.

The engine-rated horsepower is a direct relation to the engine's RPM. An engine with too large of a propeller will have a further loss of horsepower and subsequent decrease in boat speed. This secondary loss of RPM and boat speed can be regained by switching to a smaller pitch propeller that allows the engine to run at recommended RPM.

For boaters to realize optimum engine performance under changing weather conditions, it is essential the engine has the proper propeller to allow it to operate at, or near, the top end of the recommended maximum RPM range at wide-open throttle with a normal boat load. Not only does this allow the engine to develop full power, but equally important, the engine will be operating in an RPM range that discourages damaging detonation. This enhances overall reliability and durability of the engine.

GENERAL INFORMATION

WEIGHT DISTRIBUTION (PASSENGERS AND GEAR) INSIDE THE BOAT

Shifting weight to rear (stern):

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

Shifting weight to front (bow):

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

BOTTOM OF BOAT

For maximum speed, a boat bottom should be nearly a flat plane where it contacts the water and particularly straight and smooth in fore and aft direction.

- **Hook:** Exists when bottom is concave in fore and aft direction when viewed from the side. When boat is planing, hook causes more lift on bottom near transom and allows bow to drop, thus greatly increasing wetted surface and reducing boat speed. Hook frequently is caused by supporting boat too far ahead of transom while hauling on a trailer or during storage.
- **Rocker:** The reverse of hook and much less common. Rocker exists if bottom is convex in fore and aft direction when viewed from the side, and boat has strong tendency to porpoise.
- **Surface roughness:** Moss, barnacles, etc., on boat or corrosion of outboard's gear housing increase skin friction and cause speed loss. Clean surfaces when necessary.

WATER ABSORPTION

It is imperative that all through-the-hull fasteners be coated with a quality marine sealer at time of installation. Water intrusion into the transom core and/or inner hull will result in additional boat weight (reduced boat performance), hull decay, and eventual structural failure.

CAVITATION

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

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

GENERAL INFORMATION

ELEVATION AND CLIMATE

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

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

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

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

DETONATION

Detonation in a 4-cycle engine resembles the pinging heard in an automobile engine. It can be otherwise described as a tin-like rattling or plinking sound.

Detonation is the explosion of the unburned fuel/air charge after the spark plug has fired. Detonation creates severe shock waves in the engine. These shock waves often find or create a weakness: the dome of a piston, cylinder head or gasket, piston rings or piston ring lands, piston pin, and roller bearings.

A few of the most common causes of detonation in a marine 4-cycle application are as follows:

- Over-advanced ignition timing
- Use of low octane gasoline
- Propeller pitch too high: engine RPM below recommended maximum range
- Lean fuel mixture at, or near, wide-open throttle
- Spark plugs: heat range too hot, incorrect reach, cross-firing
- Deteriorated or inadequate engine cooling system
- Combustion chamber deposits: result in higher compression ratio

Detonation usually can be prevented if:

- The engine is correctly set up
- Regular maintenance is scheduled

PROPELLER SELECTION

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

GENERAL INFORMATION

The boat manufacturer and the selling dealer are responsible for equipping the power package with the correct propeller. Refer to Mercury Marine's web page <https://www.mercurymarine.com/en/us/propellers/selector/#/step-one>.

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

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

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

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

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

TRANSPORTING

Carrying, Storing, and Transporting Your Outboard when Removed from Boat

IMPORTANT: Ensure the proper procedures are followed for transportation and storage of the outboard to avoid the possibility of oil leaks.

1. With the outboard in the water, disconnect the remote fuel line and run the engine until it stops.
2. Remove the outboard and hold it upright until the water has drained out.
3. Carry, transport, or store the outboard in an upright position, horizontal with the front of the engine facing up (tiller handle facing up), or on the port side.



63254

Upright position

TRANSPORTING

- The port side lower cowl has two bumpers to help reduce damage to the cowl when the engine is stored in the laying down position. Storing the engine on the port side will prevent oil from draining out of the crankcase into the cylinders or crankcase ventilation system. There are bumpers on the aft side of the cowl also.



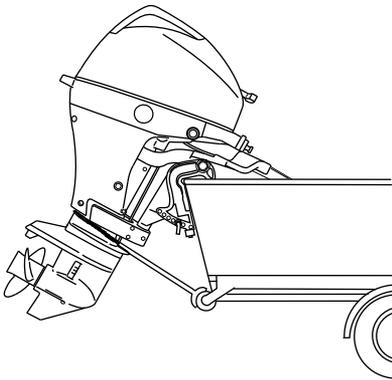
63255

Port side lower cowl bumpers

Trailing Boat/Outboard

Trailer your boat with the outboard tilted down in a vertical operating position.

If additional ground clearance is required, the outboard should be tilted up using an accessory outboard support device. Refer to your local dealer for recommendations. Additional clearance may be required for railroad crossings, driveways, and trailer bouncing.



32176

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

TRANSPORTING

Shift the outboard into reverse gear. This prevents the propeller from spinning.

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

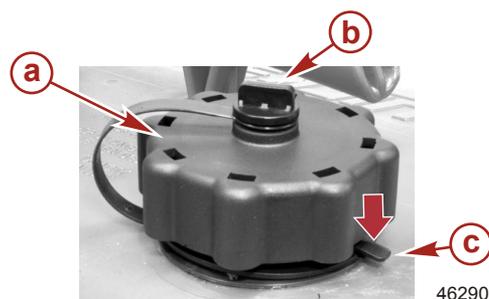
Mercury Marine has created a new portable pressurized fuel tank that meets the preceding EPA requirements. These fuel tanks are available as an accessory or are provided with certain portable outboard models.

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

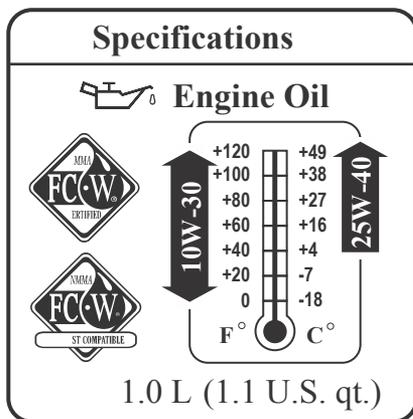
Place the fuel tank in the boat so the vent is higher than the fuel level under normal boat operating conditions.

Engine Oil Recommendations

Mercury or Quicksilver NMMA FC-W or NMMA FC-W catalyst compatible certified SAE 10W-30 Marine 4-Stroke Engine Oil is recommended for general all-temperature use. As an optional choice, Mercury or Quicksilver or SAE 25W-40 Marine 4-Stroke Engine Oil may be used when temperatures are above 4 °C (40 °F). If the recommended Mercury or Quicksilver NMMA FC-W certified oils are not available, a major outboard manufacturer's brand of NMMA FC-W certified 4-Stroke outboard oil of similar viscosity may be used.

FUEL AND OIL

IMPORTANT: The use of nondetergent oils, multiviscosity 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.



64133

Engine oil recommended SAE viscosity

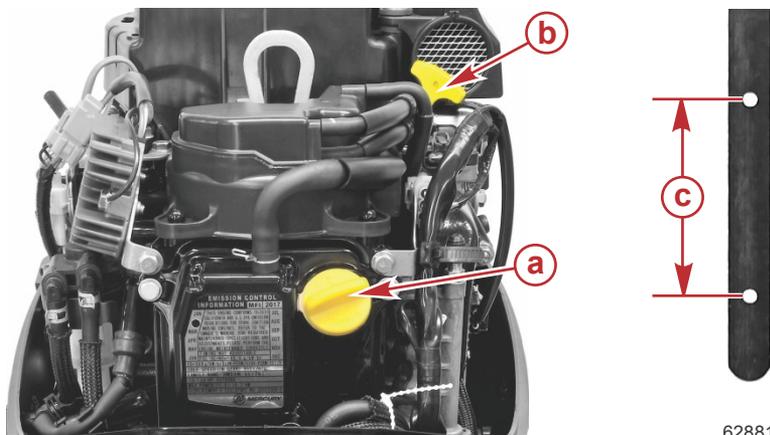
Checking Engine Oil

IMPORTANT: Do not overfill. For accurate readings, check oil only when engine is cold or after engine has not run for at least an hour.

1. Tilt the outboard to vertical operating position.
2. Remove the top cowl. Refer to **Maintenance - Top Cowl Removal and Installation**.
3. Pull out the dipstick. Wipe the dipstick end with a clean rag or towel and push it back in all the way.
4. Pull the dipstick back out again and observe the oil level. Oil should be in the operating range between the upper and lower hole.

FUEL AND OIL

IMPORTANT: Do not try to fill the oil level to the top of the operating range (upper hole). Oil level is correct as long as it appears in the operating range between the upper and lower hole.



- a** - Oil fill cap
- b** - Dipstick
- c** - Oil level operating range

5. If the oil level is below the operating range (lower hole), remove the oil fill cap and add approximately 200 ml (7 fl oz) of specified outboard motor oil. Allow a few minutes for the added oil to drain to the oil sump and check the dipstick. Repeat the process until oil level is in the operating range between the upper and lower holes. Do not try to fill to the upper end of the operation range (upper hole).

NOTE: Under certain conditions, the operating temperature of 4-stroke outboard engines may not get hot enough to evaporate the normal fuel and moisture that accumulate in the crankcase. These conditions include operating at idle for long periods, repeated short trips, slow speed or quick stop-and-go operation, and operating in cooler climates. This additional fuel and moisture that collects in the crankcase eventually ends up in the oil sump and will add to the total volume of oil that appears on the dipstick reading. This increase in oil volume is known as oil dilution. Outboard engines can typically handle large amounts of oil dilution without causing durability problems. However, to ensure extended life of the outboard engine, Mercury recommends that the oil and filter be changed regularly following the oil change interval and using the recommended oil quality. It is further recommended that if your outboard is operated frequently in the conditions described above, that more frequent oil change intervals be considered.

6. Push the dipstick back in all the way.
7. Install the oil fill cap hand-tight.

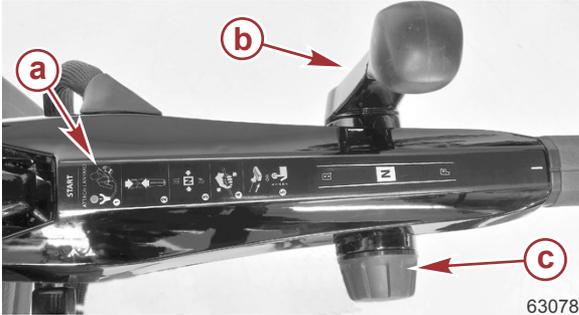
FUEL AND OIL

8. Install top cowl.

FEATURES AND CONTROLS

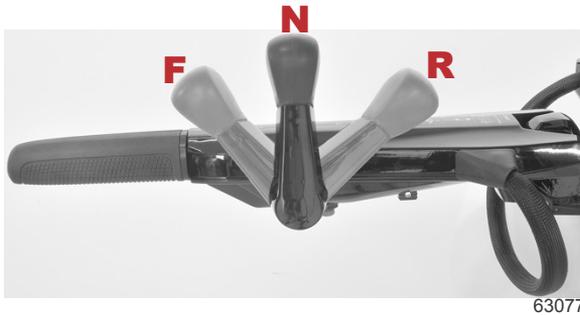
Tiller Handle Features

- A decal on the tiller handle is a quick reference guide for starting a cold or hot engine.
- Throttle grip friction knob - Turn the friction knob to set and maintain the throttle at desired speed. Turn the knob clockwise to increase the friction or turn the knob counterclockwise to decrease the friction.



- a** - Quick reference decal
- b** - Shift lever
- c** - Throttle grip friction knob

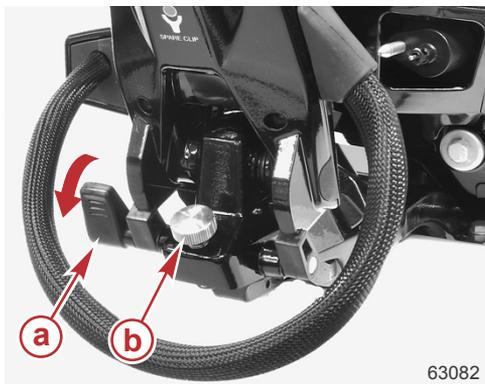
- Shift lever - The outboard has three gear shift positions to provide operation: forward (F), neutral (N), and reverse (R).



- Tiller handle - Handle can be tilted for convenient handling during transportation and storage.
- Tiller lock release lever - Push the lock release lever down to allow the tiller handle to be raised or lowered.

FEATURES AND CONTROLS

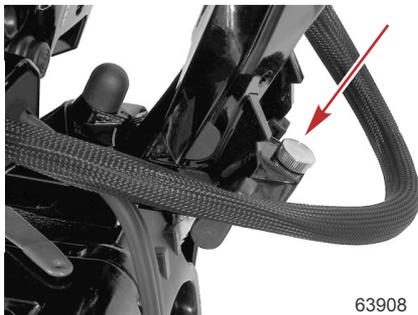
- Tiller handle adjustment knob - Turn the adjustment knob to raise or lower the tiller handle in its operating position.



- a** - Tiller lock release lever
- b** - Tiller handle adjustment knob

63082

- a. Adjustment knob at the lowest setting.



63908

- b. Adjustment knob at the highest setting.

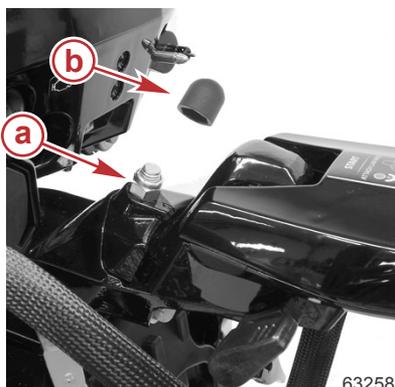


63909

- Tiller handle yaw - The tiller handle yaw allows the operator to change the angle of the handle up to 18° left or right of center. Each increment demarcation is 6°.
 - a. Remove the rubber boot covering the clamp screw nut.

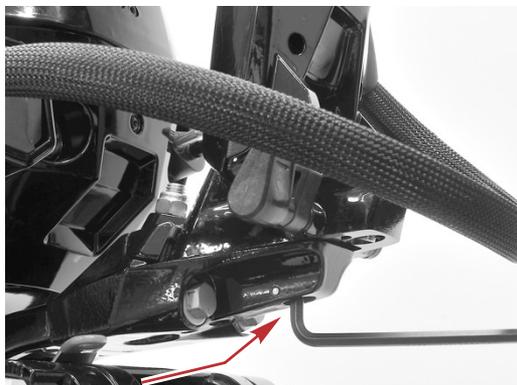
FEATURES AND CONTROLS

b. Loosen the 15 mm nut so it is almost completely off.



- a** - Clamp screw nut
- b** - Rubber boot

c. Loosen the 6 mm Allen socket head pivot screw.

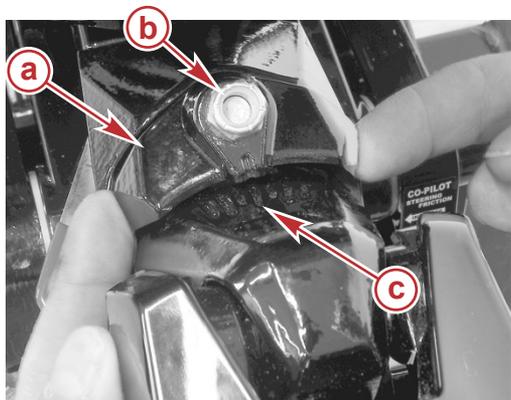


63259

6 mm Allen socket head pivot screw

FEATURES AND CONTROLS

- d. Lift the clamp with your fingers and rotate the tiller handle to the desired angle.



- a - Clamp
- b - Clamp screw nut
- c - Center demarcation

63260

- e. Tighten the clamp screw nut to the specified torque and install the rubber boot.

Description	Nm	lb-in.	lb-ft
Clamp screw nut	50	–	36.8

- f. Tighten the 6 mm Allen socket head pivot screw to the specified torque.

Description	Nm	lb-in.	lb-ft
6 mm Allen socket head pivot screw	24	–	17.7

- Lanyard stop switch - Refer to **General Information - Lanyard Stop Switch**.

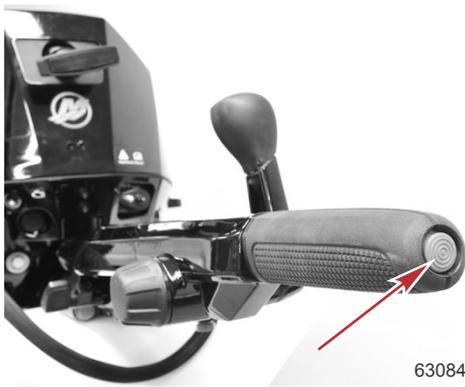
FEATURES AND CONTROLS

NOTE: A spare lanyard stop switch clip is stored on the tiller handle.



63083

- Engine stop switch - Push the button in to stop the engine.



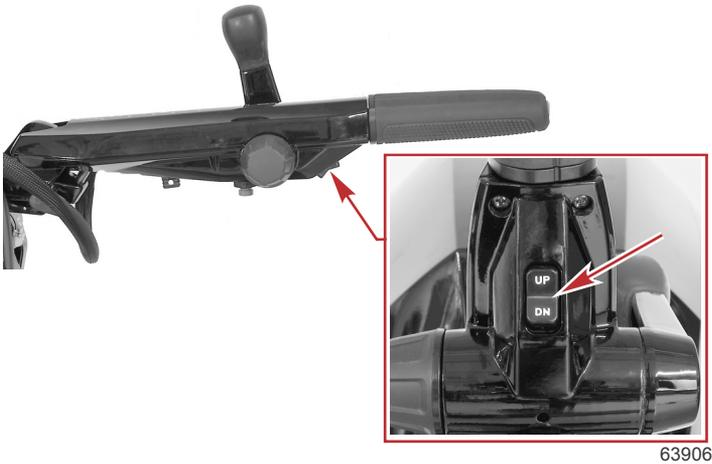
63084

FEATURES AND CONTROLS

- Throttle grip - Controls the engine speed. Align the throttle grip with the idle mark on the tiller handle when starting or shifting into or out of gear. Twist the throttle grip to increase the engine speed.



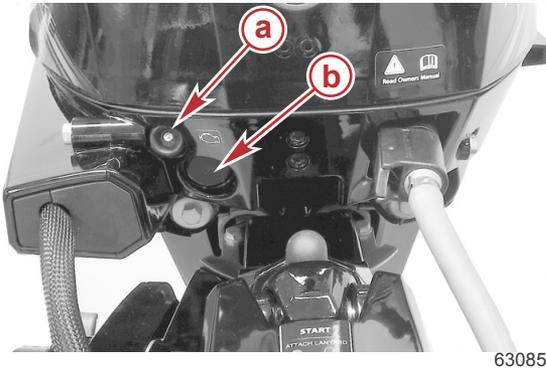
- Power tilt switch (if equipped) - Tiller handle models equipped with power tilt have a switch located on the underside of the tiller handle. Press the switch to raise (UP) or lower (DN) the engine.



- Electric start button (electric start models) - Press the button to start the engine, if equipped.

FEATURES AND CONTROLS

- **Warning light** - Warns the operator when the engine has low oil pressure, over temperature, exceeding the RPM limit, or sensor faults. Refer to **Warning System** in this section.



- a** - Warning light
- b** - Electric start button (electric start models)

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** - Tilt switch
- b** - Ignition key switch—OFF, ON, START
- c** - Throttle only button
- d** - Lanyard stop switch

- **Tilt switch** - Used to trim the drive during operation or raise the drive for trailering, launching, beaching, or shallow water operation.

FEATURES AND CONTROLS

- **Throttle only button** - The throttle only button allows throttle advancement without shifting the engine. The throttle only button disengages the shifting mechanism from the control handle. The throttle only button can be pressed and held in only when the remote control handle is in the neutral position. While holding the throttle only button in, move the throttle handle forward to assist in starting the engine.
- **Lanyard stop switch (if equipped)** - The purpose of a lanyard stop switch is to shut down the engine when the operator moves far enough away from the operator's position to activate the switch. A lanyard stop switch can be installed as an accessory, generally on the dashboard or side adjacent to the operator's position.
- **Control handle** - Operation of the shift and throttle is controlled by the movement of the control handle. Push the control handle forward from neutral with a quick firm motion to the first detent for forward gear. Continue pushing forward to increase speed. Pull the control handle back from neutral with a quick firm motion to the first detent for reverse gear. Continue pulling back to increase speed.

IMPORTANT: Forcing the shift mechanism while the engine is not operating can result in product damage.

GEAR SHIFTING

IMPORTANT: Observe the following:

- **Never shift the outboard into or out of gear unless the engine speed is at idle. Shifting at higher than engine idle speed could cause damage to the gearcase.**
- **Do not shift the outboard into reverse when the forward motion of the boat is greater than a no wake speed. Shifting into reverse at higher boat speeds could cause the engine to stall, and in some situations, this could cause water to be drawn into the cylinders, resulting in severe engine damage.**
- **Do not shift the outboard into reverse when the engine is not running. Damage to the shift linkage could occur.**
- Your power package has three gear shift positions to provide operation: forward (F), neutral (N), and reverse (R).
- When shifting, always stop at the neutral position and allow the engine speed to return to idle.
- Always shift into gear with a quick motion.

FEATURES AND CONTROLS

- After shifting into gear, advance the lever further to increase speed.

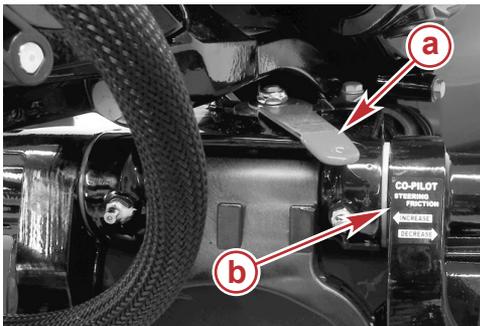


General Features

- Steering friction adjustment (if equipped) - Adjust this lever to achieve the desired steering friction (drag) on the tiller handle. Move the lever to the starboard to increase the friction, or move the lever to the port to decrease the friction. A quick reference decal is located on the transom clamp.

▲ 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 or steering wheel is released.



Tiller handle model shown

- a** - Friction adjustment lever
- b** - Decal
- c** - Increase friction
- d** - Decrease friction

63097

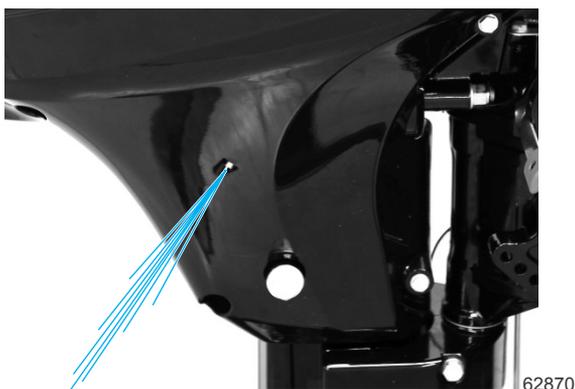
FEATURES AND CONTROLS

- Cooling water intake - The outboard water intake for cooling the engine is located on both sides of the gear housing. If overheating is encountered, this area should be inspected first for debris blocking the intake.



Cooling water intake

- Water pump indicator - Water spray from this location indicates the water pump is pumping cooling water up to the engine. If there is no water spray, inspect the water intake on the gear housing.



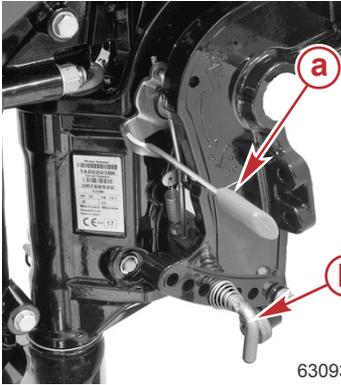
Water pump indicator

Manual Tilt Features and Operation

- Tilt lever - Allows the outboard to be locked into the shallow water drive position or the full up position. Refer to **Basic Tilt Lever Operation**.

FEATURES AND CONTROLS

- Tilt pin - Set the vertical operating angle on the outboard. Refer to **Setting the Operation Angle of the Outboard**.



Manual tilt models only

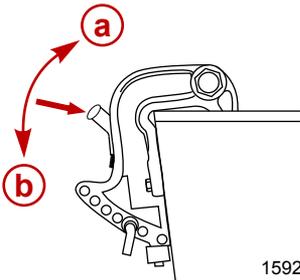
a - Tilt lever

b - Tilt pin

BASIC TILT LEVER OPERATION

When operating the outboard in forward gear, the tilt lever must be in the down position. This is the unlocked position which allows the outboard to pivot out of the running position if the outboard should strike an underwater obstacle, decreasing the potential of severe damage. This position also allows the outboard to lock into the shallow water drive position or the full up position.

When operating the outboard in reverse gear, the tilt lever must be in the up position. This is the locked position which prevents the outboard from pivoting out of the water.



a - Locked position for reverse operation and tilt release position

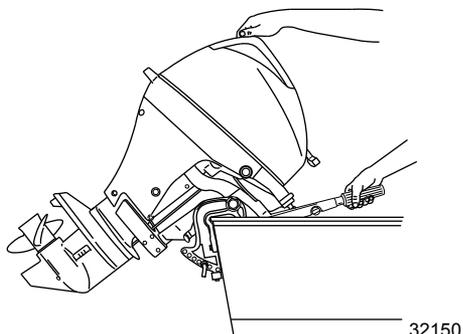
b - Unlocked position

TILTING OUTBOARD TO FULL UP POSITION

1. Stop the engine.
2. Shift the outboard to forward gear position.
3. Position the tilt lever to the unlocked position.

FEATURES AND CONTROLS

4. Take hold of the top cowl grip and tilt the outboard all the way up until it locks in place.



LOWERING OUTBOARD DOWN TO RUN POSITION

Position the tilt lever to the locked tilt release position. Raise the outboard slightly to release it from its locked position and gently lower it.

SHALLOW WATER OPERATION

IMPORTANT: Before tilting the outboard into the shallow water drive position, the engine speed must be at idle and in forward gear.

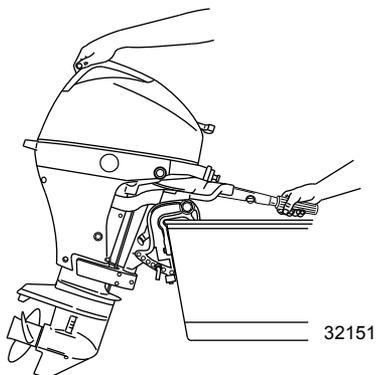
IMPORTANT: While in the shallow water drive position, do not operate the outboard in reverse. Operate the outboard at slow speed and keep the cooling water intake submerged.

The shallow water drive position on the outboard allows you to position the outboard at a higher tilt angle to prevent hitting bottom.

1. Reduce the engine speed to idle.
2. Shift the engine into forward gear position.
3. Position the tilt lever to the unlocked position.
4. Take hold of the top cowl grip and tilt up the outboard until it locks in the shallow water running position. There are two shallow water running positions.

FEATURES AND CONTROLS

5. To release the outboard out of shallow water drive, position the tilt lever to the locked tilt release position. Slightly lift up the outboard, and gently lower it down.



SETTING THE OPERATION ANGLE OF THE OUTBOARD

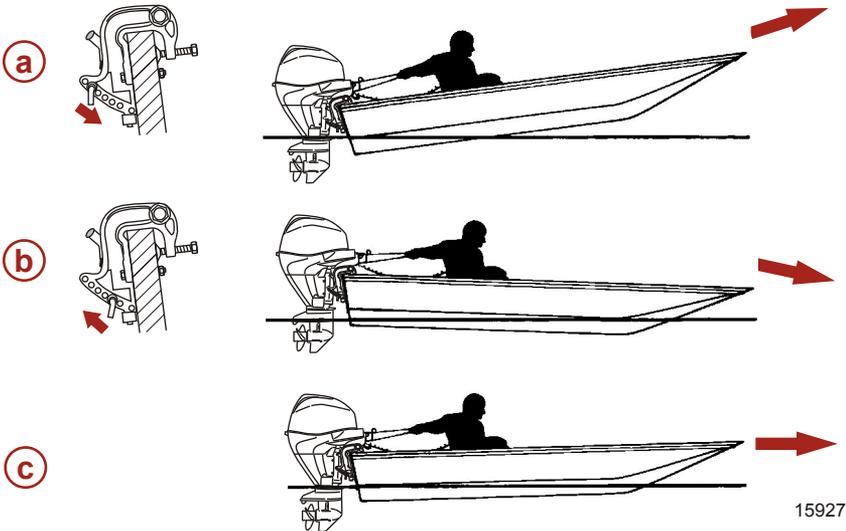
The vertical operating angle of your outboard is adjusted by changing the position of the tilt pin. There are six adjustment holes provided. Proper adjustment allows the boat to run stable, achieve optimum performance, and minimize steering effort.

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

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

FEATURES AND CONTROLS

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



15927

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

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

Adjusting the outboard close to the boat transom can:

- Lower the bow
- Result in quicker planing off, especially with a heavy load or a stern heavy boat
- Generally improve the ride in choppy water
- Increase steering torque or pull to the right (with the normal right-hand rotation propeller)
- In excess, can lower the bow of some boats to a point where they begin to plow with their bow in the water while on plane. This can result in an unexpected turn in either direction (called bow steering or oversteering) if any turn is attempted, or if a significant wave is encountered.

Adjusting the outboard away from the boat transom can:

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

FEATURES AND CONTROLS

- In excess, can cause boat porpoising (bouncing) or propeller ventilation

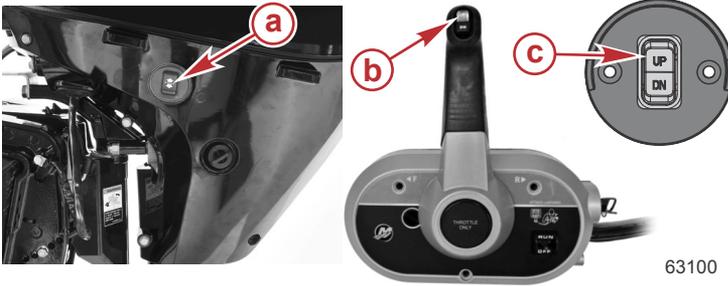
Power Tilt Features and Operation, if Equipped

POWER TILT

Models equipped with power tilt allows the operator to use the tilt switch to adjust the tilt position of the outboard from full down to full up.

This tilt system is designed to be adjusted when the engine speed is at idle speed or with the engine turned off.

At low idle speed, the outboard can be tilted up to permit shallow water operation.



- a** - Cowl mounted tilt switch
- b** - Remote control tilt switch
- c** - Panel mount tilt switch



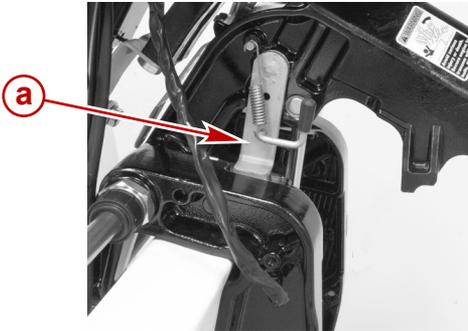
Tilt switch on tiller handle models

FEATURES AND CONTROLS

TILTING THE OUTBOARD TO FULL UP POSITION

To tilt the outboard, shut off the engine and press the 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 the lever down.
2. Lower the outboard to rest on the tilt support lever.
3. Disengage the tilt support lever by slightly tilting up the outboard and releasing the tilt support bracket. Lower the outboard.



a - Tilt support lever

31919

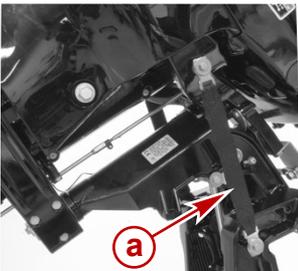
PROKICKER CENTERING STRAPS FEATURE

ProKicker centering straps (if equipped) will center the outboard and prevent the outboard from turning while the outboard is tilted up.

The ProKicker centering straps will prevent the outboard from turning when tilted up. If using a steering tie bar to a second outboard, disconnect the steering tie bar to allow steering of the second outboard.

⚠ WARNING

Avoid injury or death from loss of steering control. ProKicker centering straps prevent the outboard from turning when tilted up. If using a steering tie bar to a second outboard, disconnect the steering tie bar to allow steering of the second outboard before operating the boat.



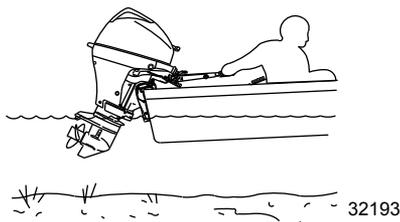
a - ProKicker centering straps

32201

FEATURES AND CONTROLS

SHALLOW WATER OPERATION

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



MANUAL TILT RELEASE

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

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

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

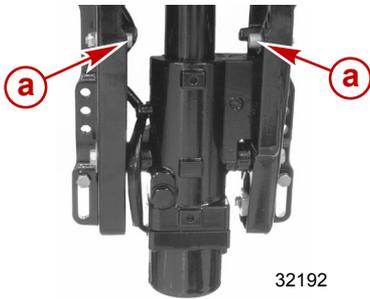


TILT-IN STOP ADJUSTMENT

NOTE: *The outboard should be positioned against the tilt-in stop pins during operation.*

FEATURES AND CONTROLS

The adjustment of the tilt-in stop pins will set the vertical operating angle of your outboard. Proper adjustment allows the boat to run stable, achieve optimum performance, and minimize steering effort.

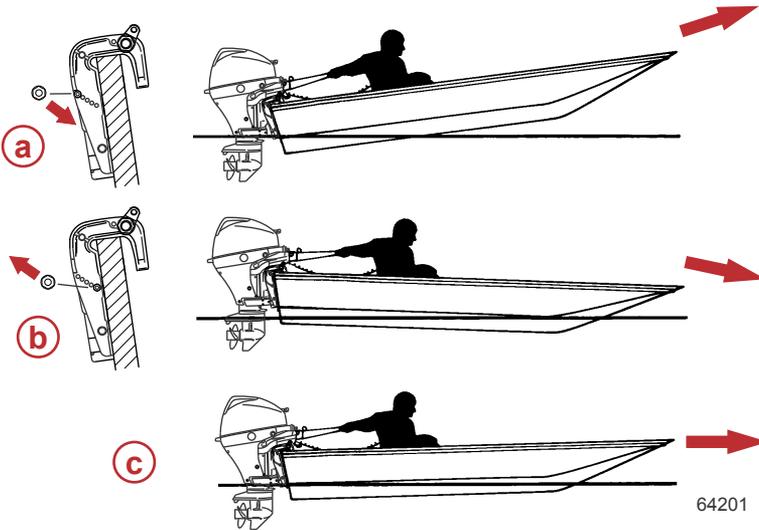


Power tilt models only
a - Tilt-in stop pins

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

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

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



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

FEATURES AND CONTROLS

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

Adjusting the outboard close to the boat transom can:

- Lower the bow
- Result in quicker planing off, especially with a heavy load or a stern heavy boat
- Generally improve the ride in choppy water
- Increase steering torque or pull to the right (with the normal right-hand rotation propeller)
- In excess, can lower the bow of some boats to a point where they begin to plow with their bow in the water while on plane. This can result in an unexpected turn in either direction (called bow steering or oversteering) if any turn is attempted, or if a significant wave is encountered.

Adjusting the outboard away from the boat transom can:

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

Warning System

WARNING HORN LOCATION

A warning horn is located near the front of the engine, under the cowl. On remote control models, an additional warning horn is located inside the remote control or connected to the ignition key switch.

WARNING LIGHT LOCATION

The warning light is located on the front of the engine, just below the top cowl. It will turn on or flash to alert the operator to the warning system situations listed in **Warning System Operation**.



62873

FEATURES AND CONTROLS

WARNING SYSTEM OPERATION

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

20 HP Warning System Operation

Function	Warning Horn	Warning Lamp	Description	RPM Limit
Start up	One second		System test	None
Overheat	Continuous for six seconds	On	Engine overheated	2800
Low oil pressure			Low oil pressure	
Sensor error	Six beeps no repeats	Six flashes repeats every five minutes	Engine sensor fault	
Overspeed *	None		Engine speed too high	Engine misfire may be noticed

* Refer to the **Specifications** table for RPM limits.

15 HP Warning System Operation

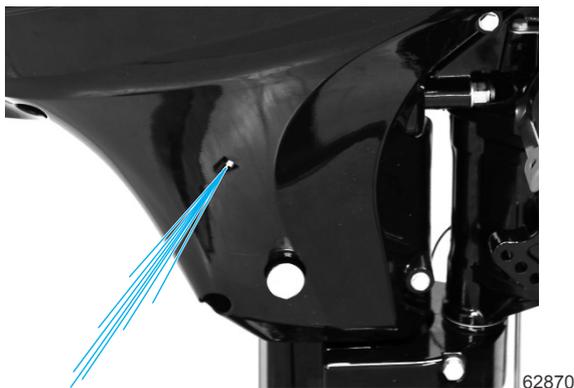
Function	Warning Horn	Warning Lamp	Description	RPM Limit
Start up	One second		System test	None
Overheat	Continuous for six seconds	On	Engine overheated	2800
Low oil pressure			Low oil pressure	
Sensor error	Six beeps no repeats	Six flashes repeats every five minutes	Engine sensor fault	
Overspeed *	None		Engine speed too high	Engine misfire may be noticed
Restrictor	Six beeps no repeats	Six flashes repeats every five minutes	Restrictor missing	2800

FEATURES AND CONTROLS

* Refer to the **Specifications** table for RPM limits.

ENGINE OVERHEAT

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



If no water is coming out of the water pump indicator hole, or flow is intermittent, stop the engine and check the cooling water intake holes for obstruction. If no obstruction is found, there may be a blockage in the cooling system or a water pump problem. Operating the engine while overheated will cause engine damage.

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

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

LOW OIL PRESSURE

The warning system will be activated if the oil pressure drops too low. First, stop the engine and check the oil level. Add oil if necessary. If the oil level is within the operating range and the warning horn continues to sound, service is required. Engine speed will be limited to 2800 RPM, however, you should not continue to run the engine.

ENGINE OVERSPEED LIMITER

Some causes of engine overspeed are as follows:

- Propeller ventilation
- A propeller that has an incorrect pitch or diameter
- Propeller hub slippage
- Outboard mounted too high on the transom

FEATURES AND CONTROLS

- Tilting the outboard out beyond a vertical position
- Cavitation of the propeller due to rough water or obstruction in the boat hull

When the engine overspeed limiter is activated, the engine timing will be momentarily retarded to decrease the engine speed. Excessive overspeed will result in the momentary removal of ignition to prevent operation above the RPM limit. Refer to **General Information - Specifications**.

SENSOR AND RESTRICTOR ERROR

The computer controlled CDI (capacitor discharge ignition) monitors various sensors on the engine and when a sensor is not within the normal operating range, the computer controlled CDI will limit the engine RPM to 2800, the warning light will flash, and the warning horn will beep six times every five minutes.

A restrictor in the air intake induction system restricts the amount of air that can enter the induction system. The restrictor cannot be removed to gain more horsepower. If the restrictor is removed, the computer controlled CDI will limit the engine RPM to 2800, the warning light will flash, and the warning horn will beep six times every five minutes.

OPERATION

Prestarting Check List

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

Operating in Freezing Temperatures

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

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

Operating in Saltwater or Polluted Water

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

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

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

OPERATION

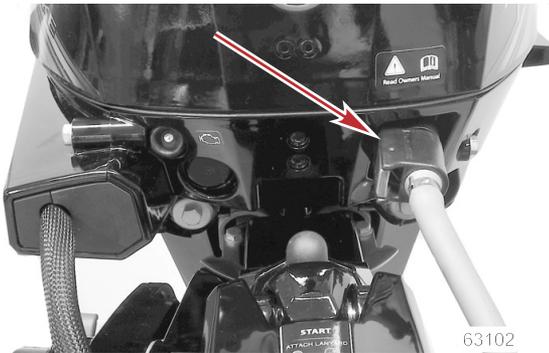
Operating Outboard as an Auxiliary Engine

If the outboard is used as an auxiliary engine, stop the engine and tilt the outboard out of the water when using the main power source.

IMPORTANT: The outboard must be restrained from bouncing while operating the boat using the main power source. Bouncing can damage the outboard and boat transom.

Prestarting Instructions

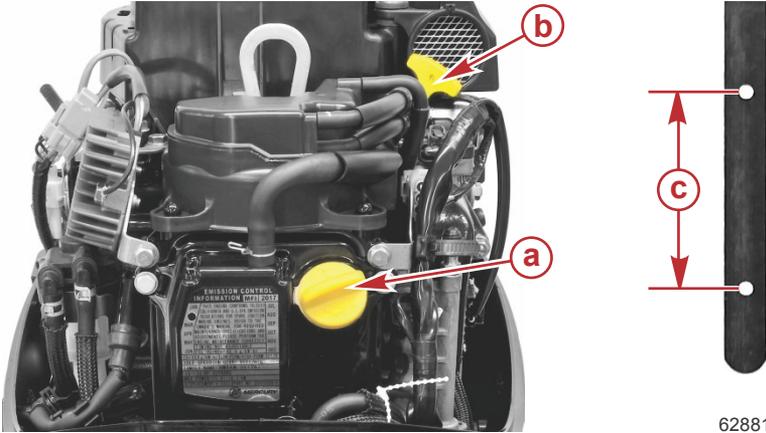
1. Connect the remote fuel line to the outboard. Ensure the connector is snapped into place.



Fuel line connector

OPERATION

2. Check the engine oil level.

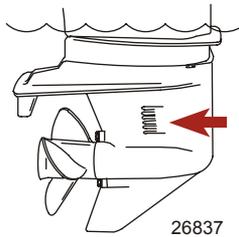


- a - Oil fill cap
- b - Dipstick
- c - Oil level operating range

NOTICE

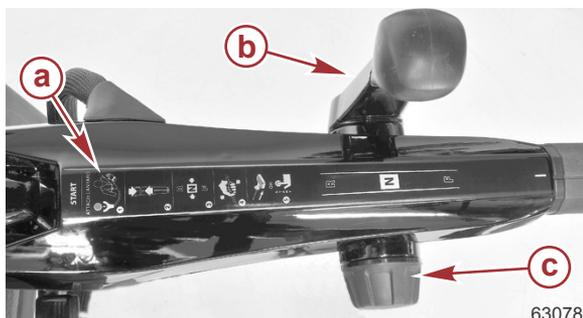
Without sufficient cooling water, the engine, the water pump, and other components will overheat and suffer damage. Provide a sufficient supply of water to the water inlets during operation.

3. Make sure the cooling water intake is submerged.



OPERATION

4. Tiller handle models with manual or electric start, have a quick reference decal on the tiller handle that shows the sequence for starting the engine. Use this quick reference for cold or hot starting.



- a - Quick reference decal
- b - Shift lever
- c - Throttle grip friction knob

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.

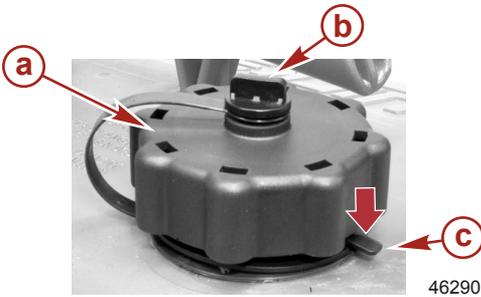
1. For the first hour of operation, run the engine at varied throttle settings up to 2000 RPM or at approximately half throttle.
2. For the second hour of operation, run the engine at varied throttle settings up to 3000 RPM or at three-quarter throttle, and at full throttle for approximately one minute every ten minutes.
3. For the next eight hours of operation, avoid continuous operation at full throttle for more than five minutes at a time.

Starting the Engine - Tiller Handle Models

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

OPERATION

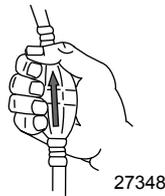
1. Open the fuel tank vent screw on the manual venting type tanks.



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

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.

IMPORTANT: To prevent engine flooding, do not squeeze the primer bulb after the engine has warmed up.



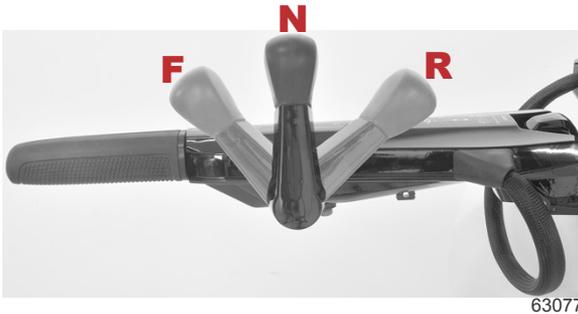
3. Insert the lanyard clip into the stop switch. This is the RUN position.



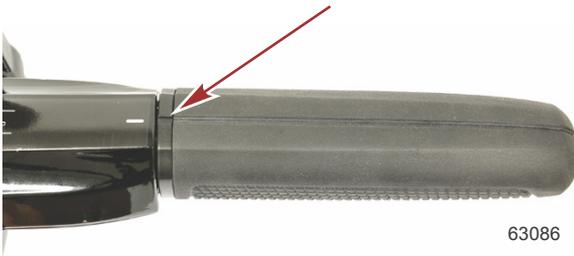
- a - Lanyard stop switch
- b - Spare lanyard stop switch clip
- c - Lanyard

OPERATION

4. Verify the shift handle is in the neutral (N) position.



5. Verify the throttle grip is set to the idle position.



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

IMPORTANT: Outboards with battery charging capabilities must not be operated with battery cables disconnected from the battery. Damage to the charging system may result.



7. **Electric starting models** - Push the starter button and crank the engine. Release button when the engine starts. Do not operate the starter motor continuously for longer than ten seconds at a time. If the engine fails to start, wait 30 seconds and try again.

OPERATION

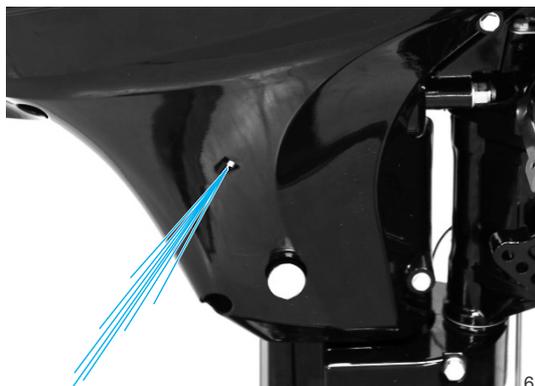
8. **Flooded engine** - If the engine will not start, advance the throttle grip slightly and attempt to start the engine. After the engine has started, immediately reduce the throttle speed to idle.
9. Verify the warning light turns off.

NOTE: The warning light will remain illuminated for up to five seconds after the outboard starts. If the light should stay on, refer to **Features and Controls - Warning System**.



62873

10. Check for a steady stream of water flowing out of the water pump indicator.



62870

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

WARMING UP ENGINE

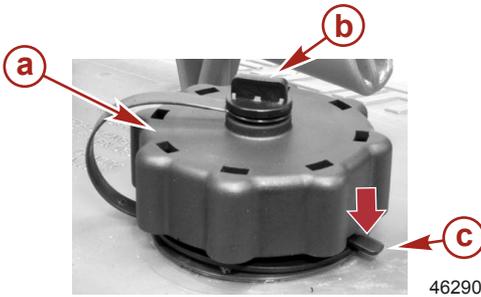
Before beginning operation, allow the engine to warm up at idling speed for three minutes.

Starting the Engine - Remote Control Models

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

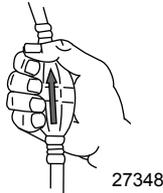
OPERATION

1. Open the fuel tank vent screw on the manual venting type tanks.

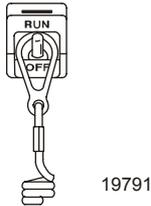


- a - Fuel cap
- b - Manual vent screw
- c - Tab lock

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.



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



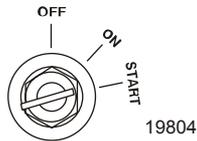
OPERATION

4. Verify the remote control handle is in the neutral position.



IMPORTANT: Outboards with battery charging capabilities must not be operated with battery cables disconnected from the battery. Damage to the charging system may result.

5. Turn the ignition key to the START position and start the engine. If the engine fails to start in ten seconds, wait 30 seconds and try again. If the engine begins to stall, use the throttle-only feature and advance the throttle. Do not exceed 2000 RPM.



6. Verify the warning light turns off.

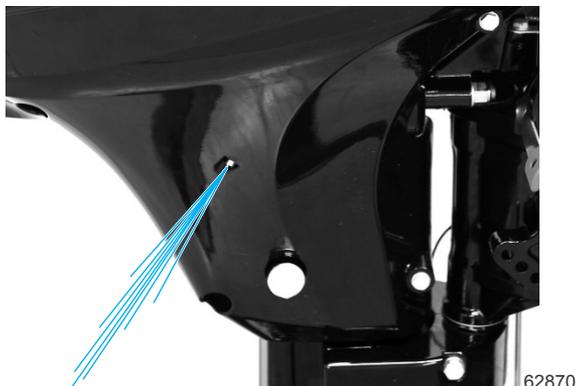
NOTE: The warning light will remain illuminated for up to five seconds after the outboard starts. If the light should stay on, refer to **Features and Controls - Warning System**.



62873

OPERATION

7. Check for a steady stream of water flowing out of the water pump indicator.



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

WARMING UP ENGINE

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

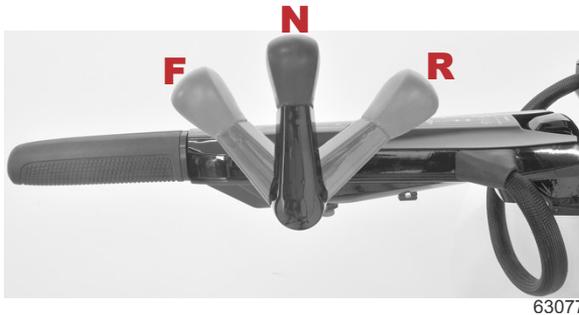
Gear Shifting

IMPORTANT: Observe the following:

- **Never shift the outboard into or out of gear unless the engine speed is at idle. Shifting at higher than engine idle speed could cause damage to the gearcase.**
- **Do not shift the outboard into reverse when the forward motion of the boat is greater than a no wake speed. Shifting into reverse at higher boat speeds could cause the engine to stall, and in some situations, this could cause water to be drawn into the cylinders, resulting in severe engine damage.**
- **Do not shift the outboard into reverse when the engine is not running. Damage to the shift linkage could occur.**

OPERATION

- **Tiller handle models** - Your outboard has three gear shift positions to provide operation: forward (F), neutral (N), and reverse (R). When shifting, always stop at the neutral position and allow the engine speed to return to idle.



- **Remote control models** - Your outboard has three gear shift positions to provide operation: forward (F), neutral (N), and reverse (R). When shifting, always stop at the neutral position and allow the engine speed to return to idle.

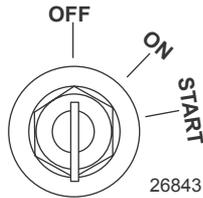


- Always shift the outboard into gear with a quick motion.
- After shifting the outboard into gear, advance the remote control lever or rotate the throttle grip on the tiller handle to increase the engine speed.

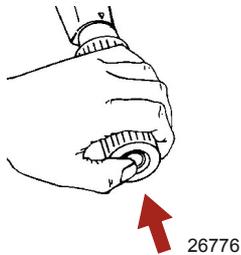
OPERATION

Stopping the Engine

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



2. **Tiller handle models** - Reduce the engine speed and shift the outboard to the neutral position. Push in the engine stop button.



OPERATION

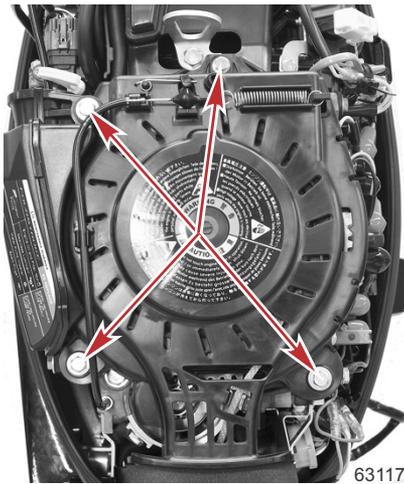
Emergency Starting Procedure

If the starter system fails, use the tools provided with the engine to remove the recoil assembly to start the engine. Read the following procedure before attempting to remove the recoil assembly.

⚠ 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.

1. Remove four short screws and washers securing the recoil assembly to the engine.

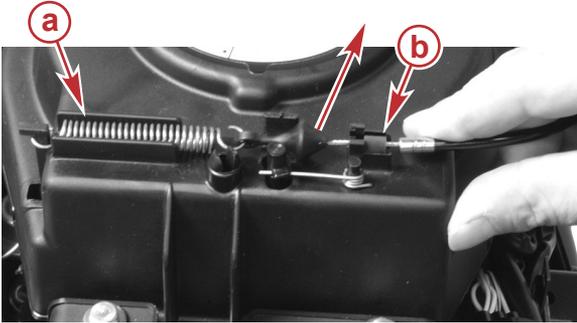


Four short screws securing recoil

2. Pull the neutral interlock cable to disengage the neutral interlock cable from the recoil housing.

OPERATION

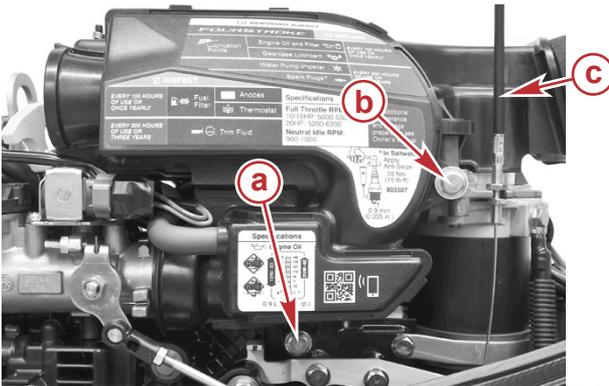
3. Lift the neutral interlock cable up and remove the neutral interlock cable tension spring from the recoil housing.



63118

- a** - Neutral interlock cable tension spring
- b** - Neutral interlock cable

4. Remove one long and one medium length screw and washers securing the air box to the engine.



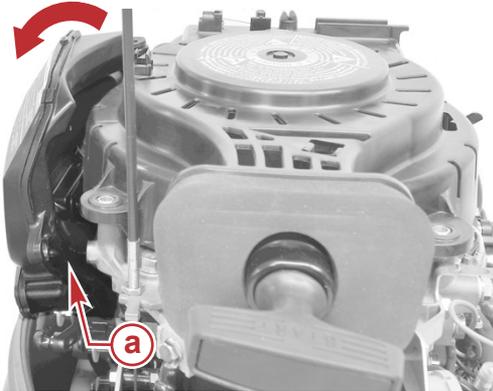
63119

- a** - Long screw
- b** - Medium screw
- c** - Neutral interlock cable

5. Rotate the air box slightly to allow the recoil to be removed.

OPERATION

IMPORTANT: If the air box is rotated too far, or disengages from the throttle body, a hose attached to the air box (hidden in the following illustration) could disengage. This hose must be restored to its original location. If this hose is not restored to its original location, the engine will not operate properly.



a - Note the distance after rotation

63120

- Carefully remove the recoil starter assembly.
- Install the medium length screw to retain the air box. Tighten the screw securely.



63146

- Shift the outboard into neutral.
- Ensure the lanyard stop switch is in the run position.
- Remote control models - Ensure the key switch is in the ON position.

⚠ WARNING

High voltage is present when starting or operating the engine. Do not touch any ignition component, wiring, or spark plug lead when starting or operating the engine.

OPERATION

▲ 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 rewind starter or top cowl when engine is running.

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



Emergency start rope on flywheel

12. Pull the rope quickly.

NOTE: This engine does not require a battery to run the fuel injection system or the ignition system. The fuel injection and ignition systems are powered by the alternator under the flywheel. Therefore, several attempts to start the engine with the emergency start rope may be required.

MAINTENANCE

Cleaning Care Recommendations

OUTBOARD CARE

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

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

Selecting Replacement Parts For Your Outboard

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

DO NOT USE CAUSTIC CLEANING CHEMICALS

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

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

CLEANING GAUGES

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

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

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

CLEANING REMOTE CONTROLS

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

MAINTENANCE

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

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

CLEANING CARE FOR TOP AND BOTTOM COWLS

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

Cleaning and Waxing Procedure

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

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.

EMISSION CONTROL INFORMATION MFI 20xx

THIS ENGINE CONFORMS TO 2017 CALIFORNIA AND U.S. EPA REGULATIONS FOR SPARK IGNITION MARINE ENGINES. REFER TO OWNERS MANUAL FOR MAINTENANCE SPECIFICATIONS AND ADJUSTMENTS.

JAN		JUL
FEB	EPA/CA HC+NO: FEL: xx.x g/kWh EPA CO FEL: xxx g/kWh	AUG
MAR	IDLE SPEED (IN GEAR) xxx r/min	SEP
APR	FAMILY NAME: xxxxxxxxxxxxxx xxx - xxx HP x-STROKE	OCT
MAY	MAX. POWER: xx.x - xx.x kW	NOV
JUN	DISPLACEMENT x.xxxL PART NO: xxx-xxxx-x	DEC

MERCURY

64172

a - Regulated emission limit for the engine family
b - Idle speed
c - US EPA engine family name
d - Engine horsepower
e - Engine power - kilowatts
f - Engine displacement
g - Decal part number
h - Year of manufacture

OWNER RESPONSIBILITY

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

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

Inspection and Maintenance Schedule

BEFORE EACH USE

- Check engine oil level. Refer to **Fuel and Oil - Checking Engine Oil**.
- Verify that the lanyard stop switch stops the engine.
- Inspect the outboard for tightness to the boat transom. If any looseness of the outboard or mounting fasteners exist, tighten the outboard mounting fasteners to the specified torque. Refer to **Engine Installation - Installing Outboard**.
- Visually inspect the fuel system for deterioration or leaks.
- Check steering system for binding or loose components.
- Check propeller blades for damage.
- Inspect the hydraulic steering fittings and hoses for leaks or damage, if equipped.
- Inspect the hydraulic steering fluid level, if equipped.

MAINTENANCE

AFTER EACH USE

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

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

- Change engine oil and replace the oil filter. The oil should be changed more often when the engine is operated under adverse conditions, such as extended trolling. Refer to **Engine Oil**.
- Change the gear lubricant. Refer to **Gearcase lubricant**.
- Check water-separating fuel filter for contaminants. Replace filter if required. Refer to **Fuel System**.
- Remove the propeller and lubricate the propeller shaft. Refer to **Propeller Replacement**.
- Check corrosion control anodes. Check more frequently when used in saltwater. Refer to **Corrosion Control Anodes and Continuity Wire**.
- Drain and replace gearcase lubricant. Refer to **Gearcase Lubricant**.
- Inspect battery. Refer to **Battery Inspection**.
- Saltwater usage: Remove and inspect spark plugs for corrosion and replace as necessary. Apply Anti-Seize Compound only onto the threads of spark plug prior to installation. Refer to **Spark Plug Inspection and Replacement**.

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

- Add Quickleen to the fuel tank.

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

- Check cowl seals to ensure seals are intact and not damaged.
- Check that the idle relief muffler is in place, if equipped.
- Inspect the thermostat visually for corrosion or a broken spring. Verify the thermostat closes completely at room temperature—dealer service.

MAINTENANCE

- Check the outboard mounting fasteners that secure the outboard to the boat transom. Tighten the fasteners to the specified torque—dealer service.
- Check tightness of bolts, nuts, and other fasteners—dealer service.
- Check for loose hose clamps and rubber boots on the air intake assembly—dealer service.
- Lubricate the driveshaft splines—dealer item

EVERY 300 HOURS OF USE OR THREE YEARS

- Lubricate the throttle and shift cable with oil—tiller handle models.
- Verify the throttle and shift cables are properly adjusted.
- Check the power trim fluid. Refer to **Checking Power Tilt Fluid**.
- Lubricate all lubrication points. Lubricate more frequently when used in saltwater. Refer to **Lubrication Points**.
- Replace the spark plugs. Refer to **Spark Plug Inspection and Replacement**.
- Check the remote control cable adjustment, if applicable—dealer service.
- Inspect the timing belt—dealer service.
- Lubricate the splines on the upper driveshaft—dealer service.
- Check the wiring and connectors—dealer service.
- Replace the water pump impeller—dealer service.¹

BEFORE PERIODS OF STORAGE

- Refer to **Storage** section.

Flushing the Cooling System

⚠ 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.

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.

1. Remove the propeller. Refer to **Propeller Replacement**.

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

MAINTENANCE

2. Remove the plug from the flush fitting, and attach a water hose. Turn on the water to half of the maximum flow.



Flush fitting

3. Start the engine and run it at idle speed in neutral shift position.
IMPORTANT: Do not run the engine above idle while flushing.
4. Check for a steady stream of water flowing out of the water pump indicator hole. Continue flushing the outboard for 3–5 minutes, carefully monitoring the water supply at all times.
5. Stop the engine, turn off the water, and remove the water hose.
6. Install the plug into the flush fitting.
7. Install the propeller.

Top Cowl Removal and Installation

REMOVAL

1. Release the rear latch.

MAINTENANCE

2. Lift up the rear of the cowl and push it towards the front of the engine to clear the front hook.



63227

INSTALLATION

1. Engage the front hook and position the cowl over the engine.
2. Lock the rear latch.

Battery Inspection

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

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

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

Exterior Care

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

MAINTENANCE

Fuel System

FUEL SYSTEM PRECAUTIONS

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 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.

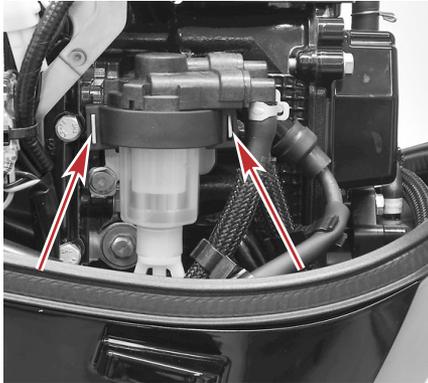
DRAINING WATER FROM THE FUEL FILTER

Check the fuel filter for water accumulation or sediment. If water is in the fuel, drain the filter into an appropriate container. If the filter appears to be contaminated, remove and replace.

1. Read **Fuel System Precautions**, preceding.
2. Inspect the water-separating fuel filter. If water is present, the red ring inside the filter assembly should float at the water level.

MAINTENANCE

3. Pull the filter assembly—including the rubber mount—off of the mounting bracket on the engine, and swing the assembly over the edge of the engine cowl.



63109

Filter assembly mounting bracket

4. Loosen the threaded drain fitting approximately 2.5 turns and empty the filter bowl's contents into an approved container. To protect the environment, immediately clean up spilled fluids and dispose of according to local laws and regulations.

NOTE: A drain hose can be temporarily installed onto the center drain port of the drain fitting to assist emptying the contents into an approved container.



63110

Drain fitting

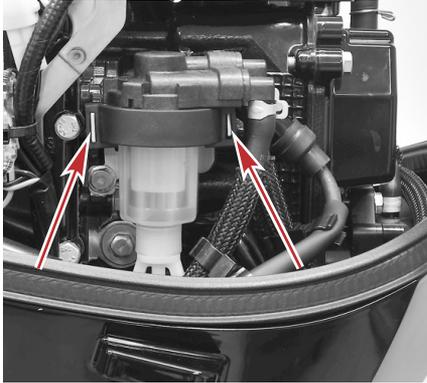
5. If installed, remove the drain hose and tighten the threaded drain fitting securely.
6. Install the filter assembly onto the mounting bracket.

MAINTENANCE

FUEL FILTER REPLACEMENT

Filter Removal

1. Pull the filter assembly—including the rubber mount—off of the mounting bracket on the engine, and swing the assembly over the edge of the engine cowl.



63109

Filter assembly mounting bracket

2. Remove the rubber mount from the filter assembly.
3. Remove the sight bowl from the filter housing.



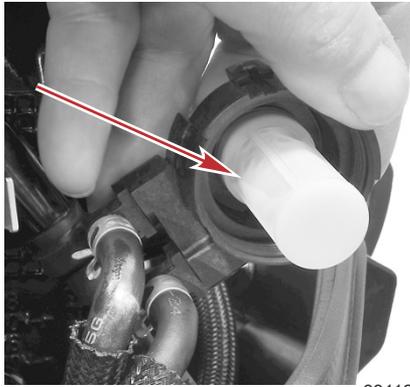
63111

- a** - Filter housing
- b** - Rubber mount
- c** - Sight bowl

4. Pull the filter element off the filter housing.

MAINTENANCE

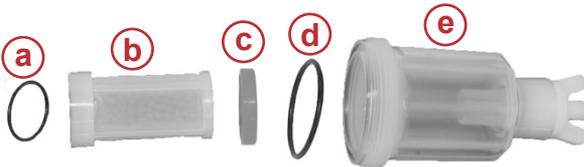
IMPORTANT: The filter is secured and sealed to the filter housing with an O-ring. The O-ring may remain on the filter housing. The O-ring should be removed before installing the fuel filter.



63112

Fuel filter

Filter Installation



63113

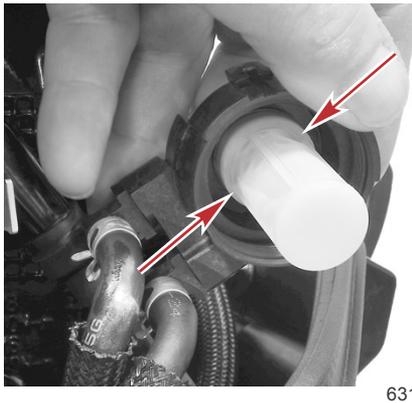
- a** - Fuel filter O-ring seal
- b** - Fuel filter
- c** - Red ring
- d** - Sight bowl O-ring seal
- e** - Sight bowl

MAINTENANCE

1. Install the fuel filter O-ring seal into the fuel filter. Verify the O-ring does not have any folds or kinks.



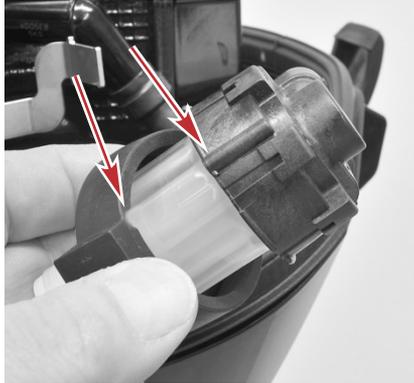
2. Lubricate the O-ring with clean engine oil.
3. Push the fuel filter element onto the filter housing. Verify the filter is completely installed by pushing on the filter in the locations shown in the following illustration.



4. Install the sight bowl O-ring seal onto the sight bowl and place the red ring into the sight bowl.
5. Install the sight bowl onto the filter housing hand-tight.

MAINTENANCE

6. Verify the rubber mount is properly aligned with the filter housing and install the rubber mount.



63116

Rubber mount properly aligned

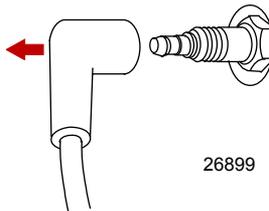
7. Install the filter assembly onto the mounting bracket.
8. Connect the fuel line to the engine and prime the engine fuel system. Inspect the fuel filter area for fuel leaks. Repair as needed.

Propeller Replacement

▲ WARNING

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

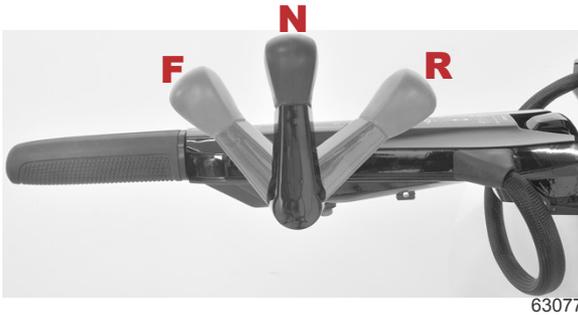
1. Remove the spark plug leads to prevent the engine from starting.



26899

MAINTENANCE

2. Shift the outboard into neutral (N).



Tiller handle models

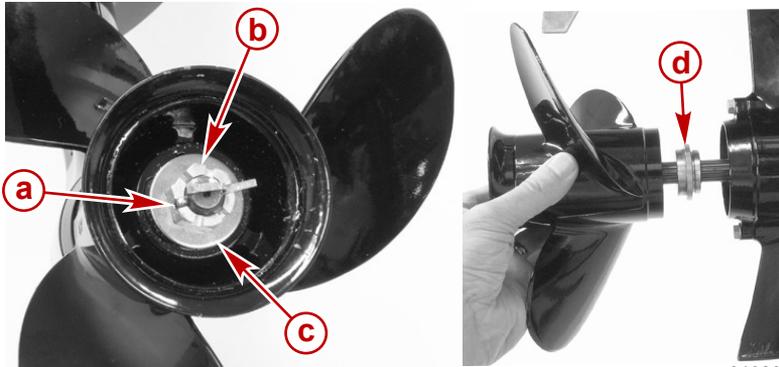


Remote control models

3. Straighten the cotter pin and pull it out using a pair of pliers.
4. Place a block of wood between the gearcase and the propeller to prevent rotation and remove the propeller nut.

MAINTENANCE

- Pull the propeller straight off of the shaft. If the propeller is seized to the shaft and cannot be removed, have the propeller removed by an authorized dealer.



31926

- a - Cotter pin
- b - Nut
- c - Rear thrust washer
- d - Front thrust hub

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

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



31927

Tube Ref No.	Description	Where Used	Part No.
	Extreme Grease	Propeller shaft	8M0071842
 95	2-4-C with PTFE	Propeller shaft	92-802859A 1

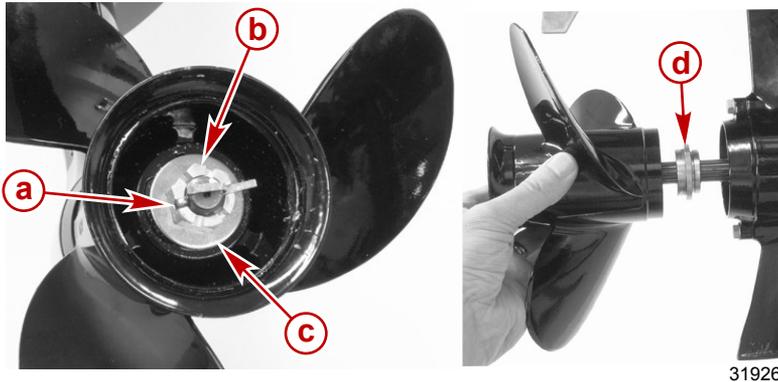
- Install the front thrust hub onto the shaft so that the larger diameter end is facing the propeller.

MAINTENANCE

8. Install the propeller, rear thrust washer, and propeller nut onto the shaft.
9. Place a block of wood between the gearcase and the propeller to prevent rotation and tighten the propeller nut to the specified torque.

NOTE: If the propeller nut doesn't align with the propeller shaft hole after tightening, tighten the nut further to align with the hole.

10. Align the propeller nut with the propeller shaft hole. Insert a new cotter pin in the hole and bend the ends.



- a - Cotter pin
- b - Propeller nut
- c - Rear thrust washer
- d - Front thrust hub - Larger diameter end towards propeller

Description	Nm	lb-in.	lb-ft
Propeller nut	12	106.2	-

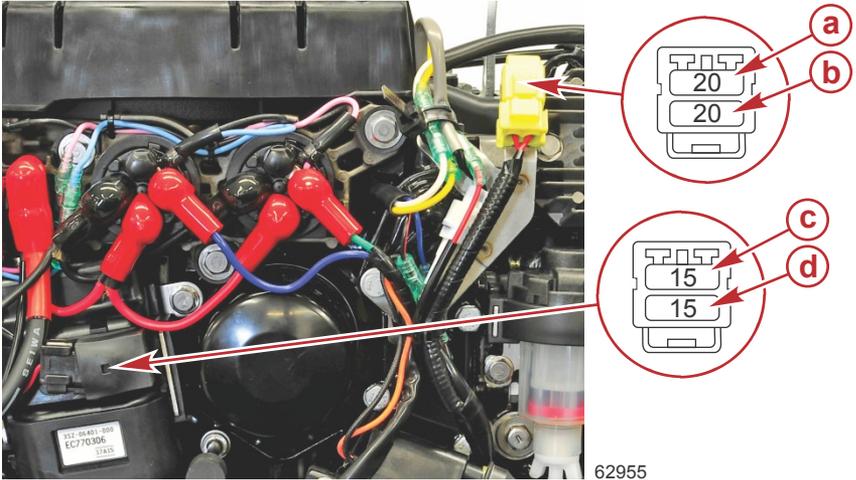
Fuse Replacement - Electric Start Models

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

NOTE: Both fuse holders have a space for a spare fuse. Always carry spare fuses.

MAINTENANCE

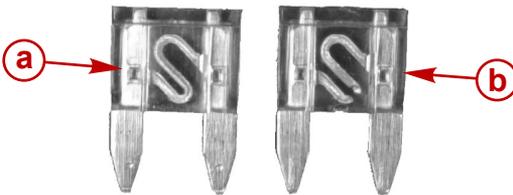
The voltage regulator circuit and the electric starting circuit are protected from overload by 20-amp and 15-amp ATC fuses, respectively. If a fuse opens, try to locate and correct the cause of the overload. If the cause is not found, the fuse may open again.



- a** - 20-amp fuse—Voltage regulator circuit
- b** - Spare 20-amp fuse
- c** - 15-amp fuse—Electric starting circuit
- d** - Spare 15-amp fuse

To access the 15-amp fuse, remove the fuse block from the pocket on the ECM rubber mount. Then remove the cap from the fuse block.

Remove the fuse and examine the silver colored band inside the fuse. If band is broken, replace the fuse. Replace the fuse with a new fuse of the same rating.



Identifying an open fuse

- a** - Good fuse
- b** - Open (blown) fuse

28619

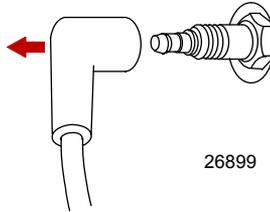
MAINTENANCE

Spark Plug Inspection and Replacement

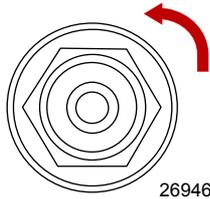
⚠ WARNING

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.

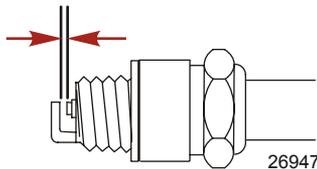
1. Remove the spark plug boots. Twist the rubber boots slightly and pull off.



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



3. Set the spark plug gap to specification.



Spark Plug

Spark plug gap

0.9 mm (0.035 in.)

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

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

MAINTENANCE

Timing Belt Inspection

Inspect the timing belt. Replace the belt if any of the following conditions are found:

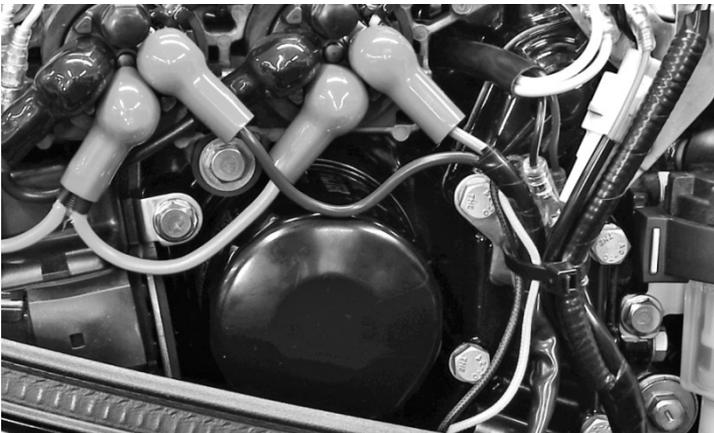
- Cracks in the back of the belt or in the base of the belt teeth
- Excessive wear at the roots of the cogs
- Rubber portion swollen by oil
- Belt surfaces roughened
- Signs of wear on edges or outer surfaces of belt



62878

Engine Oil

CHANGING THE OIL FILTER



62880

Oil filter

MAINTENANCE

1. Position the engine for a full starboard turn.

NOTE: For models with kicker straps, temporarily disconnect one end of the port kicker strap. This will allow the engine to be rotated when the engine is in the full tilt position.

2. Remove the top cowl and remove the oil filter drain hose from its storage location on the front of the engine.



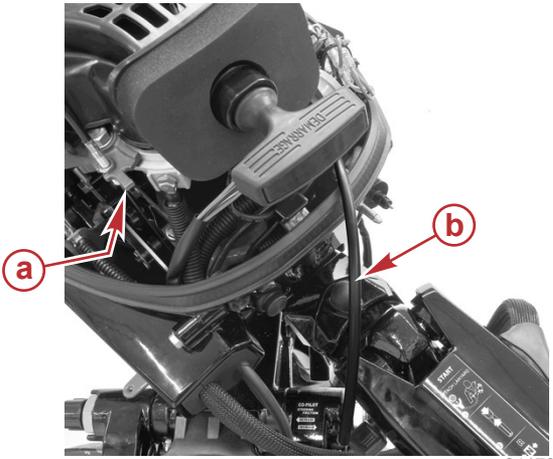
64178

Oil filter drain hose

3. Tilt the engine up and lock the outboard in the full tilt position. Allow a few minutes for the oil in the filter to drain into the engine.

MAINTENANCE

4. Route the oil filter drain hose into an approved container.



- a** - Drain hose storage location
 - b** - Drain hose
5. Remove the oil filter by turning the filter counterclockwise. If necessary, carefully move wires temporarily out of the way, to gain clearance for the oil filter wrench.
 6. Wipe up any spilled oil.
 7. Clean the mounting base. Apply a film of clean oil to the filter gasket. Do not use grease. Install the new filter. When the gasket contacts the base, tighten the filter an additional 3/4 to 1 turn.
 8. If any components were moved or removed to gain access to the oil filter, restore them to their original positions or install them accordingly.

DRAINING THE ENGINE OIL

1. Lock the outboard in the full tilt up position.
2. Position the outboard so the drain hole is facing downward.
3. Remove the drain plug and drain the engine oil into an appropriate container.

IMPORTANT: Do not use a crankcase oil pump when changing the oil or engine damage may occur.

4. After the initial oil has been drained, temporarily install the drain plug. Disengage the tilt lock and lower the outboard. Wait a minute to allow the remaining oil that was trapped in the engine to return to the drain. Return the outboard to the full tilt position and drain the remaining oil.

MAINTENANCE

5. Inspect the drain plug seal and replace it if damaged. Lubricate the seal on the drain plug with oil and install. Tighten to the specified torque.



Description	Nm	lb-in.	lb-ft
Drain plug	23.7	–	17.5

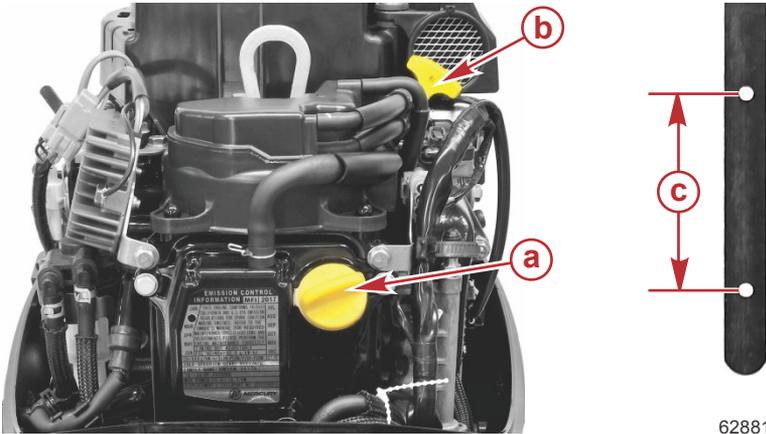
FILLING THE CRANKCASE WITH OIL

IMPORTANT: Do not try to fill the oil level to the top of the operating range (upper hole). The oil level is correct as long as it appears in the operating range between the upper and lower hole.

1. Position the outboard in a level operating position.

MAINTENANCE

2. Remove the oil fill cap and add the recommended oil to the midpoint of the oil level operating range. Adding approximately 1.0 liter (1.1 U.S. quart) of oil to an empty crankcase will bring the oil level to the midpoint of the oil level range. Reinstall the oil fill cap.



62881

- a - Oil fill cap
- b - Dipstick
- c - Oil level operating range

3. With cooling water properly supplied, 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.

Corrosion Control Anodes and Continuity Wire

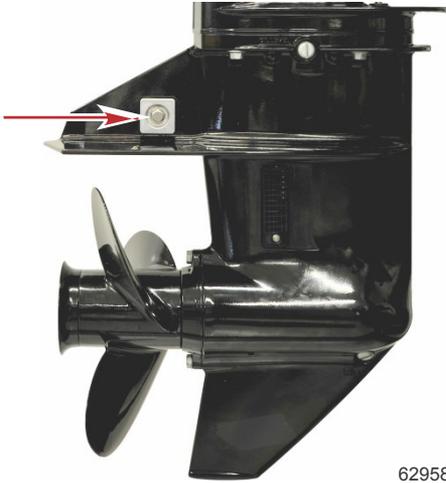
Your outboard has four corrosion control anodes. An anode helps protect the outboard against galvanic corrosion by sacrificing its' metal to be slowly corroded instead of the outboard metals. The continuity wire must be intact to ensure there is a good bonding circuit. Without this bonding continuity circuit, accelerated corrosion will occur.

The anodes require periodic inspection, especially in saltwater, which will accelerate the erosion. To maintain this corrosion protection, always replace an anode before it is completely eroded. Never paint or apply a protective coating to an anode; this will reduce the effectiveness of the anode.

The anodes are located as follows:

MAINTENANCE

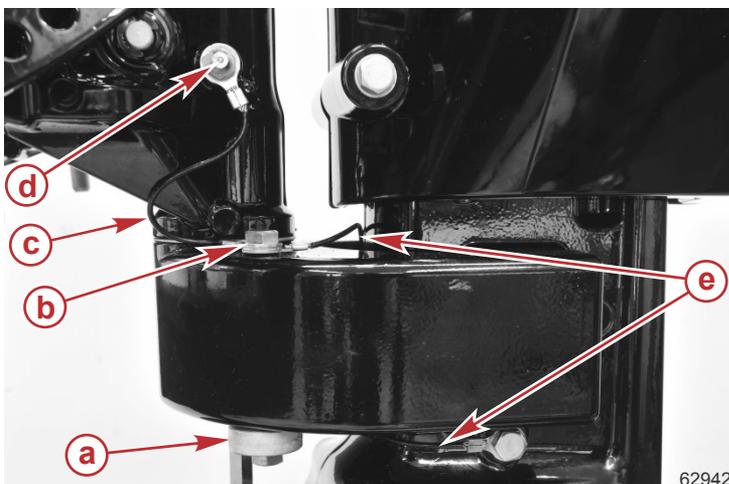
- One anode is mounted on the starboard side of the midsection, just above the antivibration plate. A screw and nut secure the anode to the midsection.



62958

MAINTENANCE

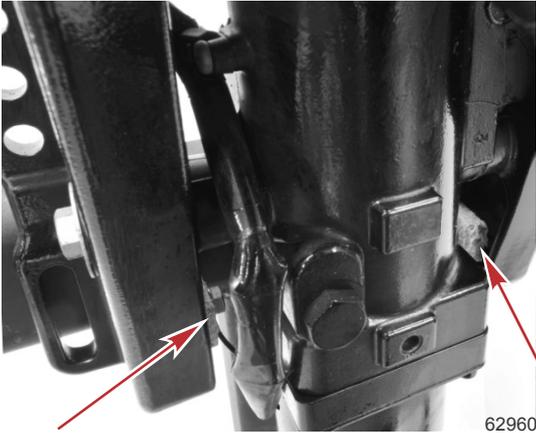
- One anode is located on the bottom of the lower engine mount. A screw secures it and two continuity wires to the mount.



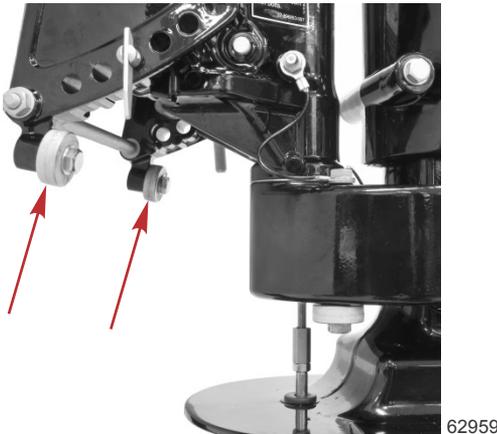
- a** - Anode
- b** - Screw
- c** - Continuity wire (from swivel bracket to lower mount)
- d** - Lubrication fitting
- e** - Continuity wire (from lower mount to driveshaft housing)

MAINTENANCE

- Two anodes are located near the bottom of the transom brackets. On power tilt models, the anodes are on the inside area of the brackets. On manual tilt models, the anodes are secured to the rear of the brackets. The anodes on both models are secured to the brackets with screws.



Power tilt model



Manual tilt model

When installing an anode, be certain to tighten the fasteners to the specified torque.

Description	Nm	lb-in.	lb-ft
Anode fasteners	6	53	–

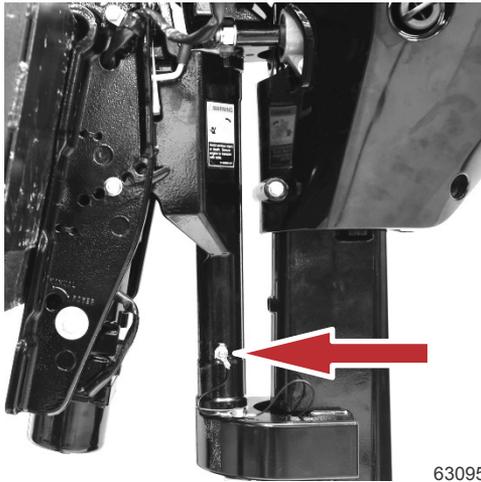
MAINTENANCE

Lubrication Points

1. Lubricate the following with 2-4-C with PTFE or Extreme Grease.

Tube Ref No.	Description	Where Used	Part No.
	Extreme Grease	Swivel bracket, transom clamp screws, tilt tube, propeller shaft, steering cable grease	8M0071842
	2-4-C with PTFE	Swivel bracket, transom clamp screws, tilt tube, throttle/shift cables, steering cable grease fitting	92-802859A 1

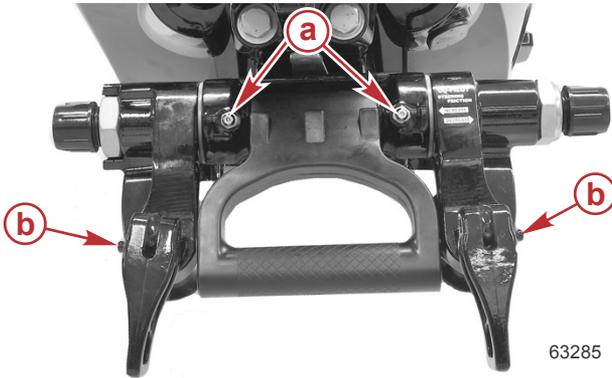
- Swivel bracket lubrication fitting.



- Tilt tube lubrication fittings.

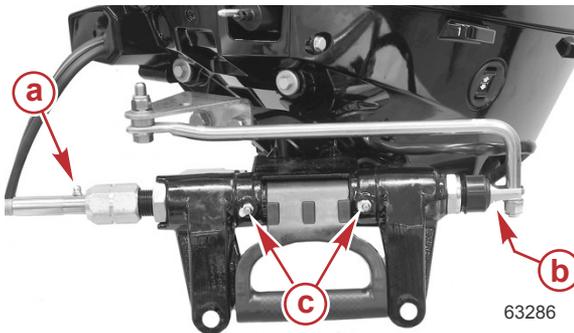
MAINTENANCE

- Transom clamp screws lubrication fittings.



- a** - Tilt tube lubrication fittings
- b** - Transom clamp screws lubrication fittings

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



- a** - Steering cable lubrication fitting
- b** - Steering cable end
- c** - Tilt tube lubrication fittings

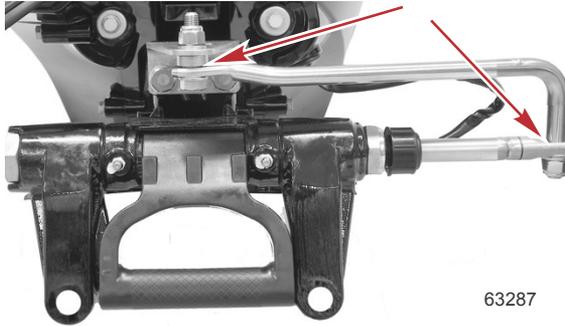
⚠ WARNING

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.

2. Lubricate the following with lightweight oil.

MAINTENANCE

- Steering link rod pivot points - Lubricate points.



63287

- Lubricate the following with Extreme Grease or 2-4-C with PTFE.

Tube Ref No.	Description	Where Used	Part No.
	Extreme Grease	Propeller shaft	8M0071842
	2-4-C with PTFE	Propeller shaft	92-802859A 1

- Propeller shaft - Refer to **Propeller Replacement** for removal and installation of the propeller. Coat the entire propeller shaft with lubricant to prevent the propeller hub from corroding to the shaft.



31927

Gearcase Lubricant

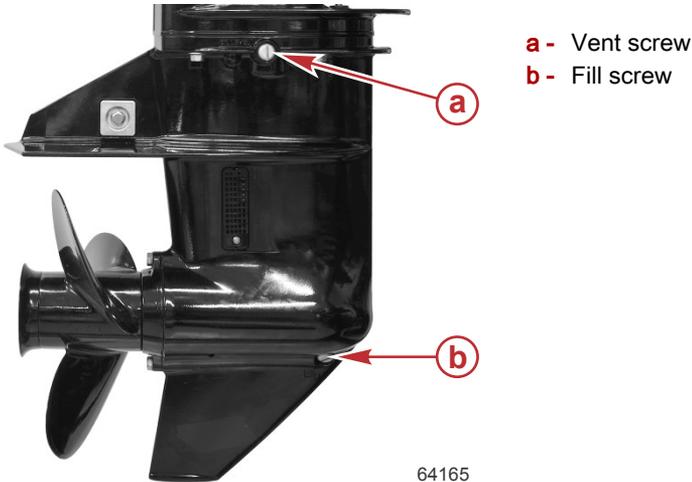
DRAINING AND INSPECTING GEAR HOUSING LUBRICANT

WARNING

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

MAINTENANCE

1. Position a clean drain pan under the gear housing and remove the fill and vent screws with gaskets from the gear housing.



2. Inspect the gear lubricant for metal particles. Presence of a small amount of fine metal particles resembling powder indicates normal wear. Presence of larger particles or a large quantity of fine particles indicates a need for gear housing disassembly and component inspection.
3. Note the color of the gear lubricant. White or cream color indicates the presence of water in the lubricant. Check the drain pan for water separation from the lubricant. Presence of water in the gear lubricant indicates the need for disassembly and inspection of oil seals, seal surfaces, O-rings, and gear housing components. Pressure check the gearcase prior to disassembly.

NOTE: When draining the gearcase for the first time, lubricant may appear cream colored due to the mixing of assembly lubricant and gear lubricant. This is not an indication of water intrusion. If, during subsequent draining of the gearcase, lubricant appears cream colored or milky, water may be present. The gearcase should be disassembled and all gaskets, seals, and O-rings replaced. Inspect all components for water damage.

NOTE: Gear lubricant drained from a recently run gearcase will be a light chocolate brown in color due to agitation/aeration. Oil that is stabilized will be a clear yellow brown in color.

GEARCASE LUBRICANT CAPACITY

Approximately 460 ml (15.6 fl oz).

GEARCASE LUBRICANT RECOMMENDATION

Mercury or Quicksilver Premium or High Performance Gear Lubricant.

MAINTENANCE

FILLING THE GEARCASE

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

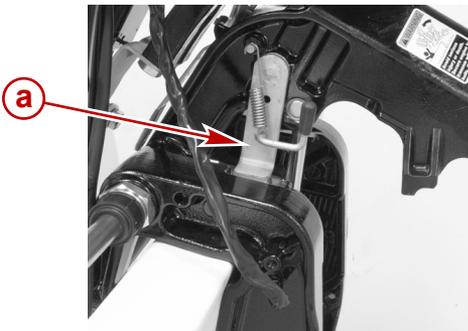


IMPORTANT: Replace the sealing washers with new sealing washers.

4. Stop adding lubricant. Install the vent plug and sealing washer before removing the lubricant tube.
5. Remove the lubricant tube and install the cleaned fill/drain plug and new sealing washer.

Checking Power Tilt Fluid if Equipped

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



a - Tilt support lever

MAINTENANCE

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



a - 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

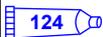
Without sufficient cooling water, the engine, the water pump, and other components will overheat and suffer damage. Provide a sufficient supply of water to the water inlets during operation.

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 the following instructions.

- Portable fuel tank—Pour the required amount of gasoline stabilizer (follow the instructions on container) into the fuel tank. Tip the fuel tank back and forth to mix the stabilizer with the fuel.
- Permanently installed fuel tank—Pour the required amount of gasoline stabilizer (follow the instructions on container) into a separate container and mix with approximately 1 Liter (1 US qt) of gasoline. Pour this mixture into the fuel tank.
- Remove the fuel filter sight bowl and empty its contents into a suitable container. Refer to **Section 6 - Fuel System** for removal and installation of the filter. Add 3 cc (1/2 tsp) of Quickstor Fuel Stabilizer into the fuel filter sight bowl and install.

Tube Ref No.	Description	Where Used	Part No.
 124	Quickstor Fuel Stabilizer	Fuel filter sight bowl	92-8M0047932

- Place the outboard in the water or connect a 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.

STORAGE

- Spray Quicksilver or Mercury Precision Lubricants Corrosion Guard on external metal surfaces (except corrosion control anodes).

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

Protecting Internal Engine Components

- Remove the spark plugs and add approximately 30 ml (1 oz) of engine oil or inject a five second spray of storage seal inside of each cylinder.
- Rotate the flywheel manually several times to distribute the oil in the cylinders. Install spark plugs.
- Change the engine oil.

Gearcase

- Drain and refill the gearcase lubricant (refer to **Gearcase Lubricant**).

Positioning Outboard for Storage

NOTICE

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

- Store the outboard in an upright position, horizontal with the front of the engine facing up (tiller handle facing up), or on the port side.



63254

Upright position

STORAGE

- The port side lower cowl has two bumpers to help reduce damage to the cowl when the engine is stored in the laying down position. Storing the engine on the port side will prevent oil from draining out of the crankcase into the cylinders or crankcase ventilation system. There are bumpers on the aft side of the top cowl also.



63255

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 15-amp fuse in the starting circuit. Refer to **Maintenance** section.

NOTE: Reverse battery connection will blow the 15-amp fuse.

- Outboard is not shifted to neutral position.
- Weak battery or battery connections are loose or corroded.
- Ignition key switch/start button 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 fuel.
- Fuel is not reaching the engine.
 - Fuel tank is empty.
 - Fuel tank vent not open or restricted.
 - Fuel line is disconnected or kinked.
 - Primer bulb not squeezed.
 - Primer bulb check valve is faulty.
 - Fuel filter is obstructed. Refer to **Maintenance** section.
 - Fuel pump failure.
 - Fuel tank filter obstructed.
- Ignition or electronic fuel injection system component failure.
- Spark plugs fouled or defective. Refer to **Maintenance** section.

Engine Runs Erratically

POSSIBLE CAUSES

- Low oil pressure. Check the oil level.
- Spark plugs fouled or defective. Refer to **Maintenance** section.
- Incorrect setup and adjustments.
- Fuel is being restricted to the engine.
 - a. Engine fuel filter is obstructed. Refer to **Maintenance** section.
 - b. Fuel tank filter obstructed.
 - c. Stuck antisiphon valve located on permanently built in type fuel tanks.
 - d. Fuel line is kinked or pinched.

TROUBLESHOOTING

- Fuel pump failure.
- Ignition system component failure.

Performance Loss

POSSIBLE CAUSES

- Low oil pressure. Check the oil level.
- Warning system activated.
- Throttle not fully open.
- Damaged or improper size propeller.
- Incorrect throttle linkage setup.
- Boat overloaded or load improperly distributed.
- Excessive water in bilge.
- Boat bottom is dirty or damaged.

Battery Will Not Hold Charge

POSSIBLE CAUSES

- Blown fuse.
- Battery connections are loose or corroded.
- Low electrolyte level in battery.
- Worn out or inefficient battery.
- Excessive use of electrical accessories.
- Defective rectifier, alternator, or voltage regulator.

OWNER SERVICE ASSISTANCE

Service Assistance

LOCAL REPAIR SERVICE

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

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

SERVICE AWAY FROM HOME

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

STOLEN POWER PACKAGE

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

ATTENTION REQUIRED AFTER SUBMERSION

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

REPLACEMENT SERVICE PARTS

WARNING

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

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

PARTS AND ACCESSORIES INQUIRIES

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

OWNER SERVICE ASSISTANCE

RESOLVING A PROBLEM

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

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

The following information will be needed by the Customer Service:

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

CONTACT INFORMATION FOR MERCURY MARINE CUSTOMER SERVICE

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

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

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

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

OWNER SERVICE ASSISTANCE

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

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:

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.

OWNER SERVICE ASSISTANCE

Submit the following order form with payment to:	Mercury Marine Attn: Publications Department W6250 Pioneer Road P.O. Box 1939 Fond du Lac, WI 54936-1939
--	--

Ship To: (Copy this form and print or type—This is your shipping label)	
Name	
Address	
City, State, Province	
ZIP or postal code	
Country	

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

ENGINE INSTALLATION

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

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.

ENGINE INSTALLATION

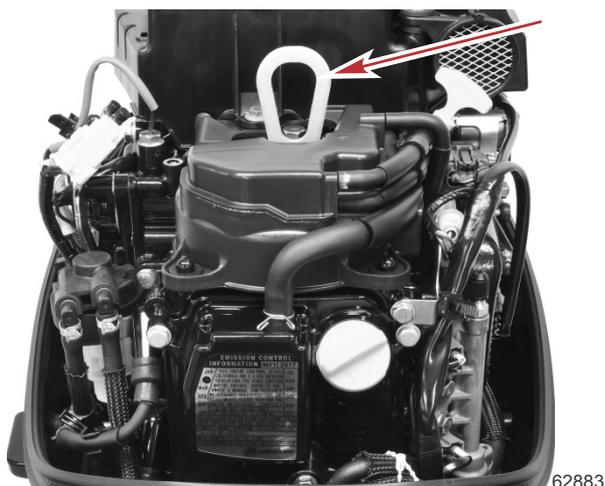
Low Permeation Fuel Hose Requirement

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.

Lifting the Outboard

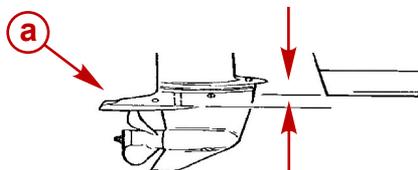
Use the lifting eye on the engine.



Installing Outboard

BOAT TRANSOM HEIGHT REQUIREMENT

Measure the transom height of your boat. The boat bottom should be aligned or be within 25 mm (1 in.) above the antiventilation plate of the outboard.



a - Antiventilation plate

27151

ENGINE INSTALLATION

INSTALLING OUTBOARD ON TRANSOM

▲ WARNING

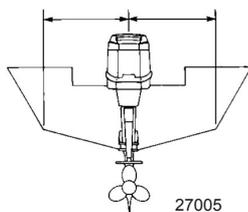
Failure to correctly fasten the outboard could result in the outboard propelling off the boat transom resulting in property damage, serious injury, or death. Before operation, the outboard must be correctly installed with the required mounting hardware.

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



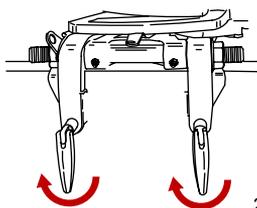
52375

1. Place the outboard on the centerline of the transom.



27005

2. Tighten the transom bracket clamp screws to the specified torque.

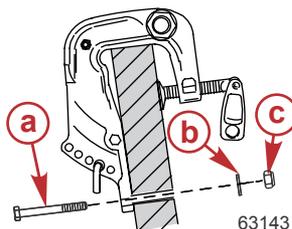
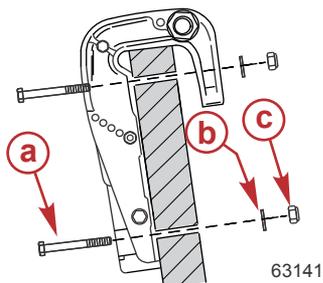


28501

Description	Nm	lb-in.	lb-ft
Transom bracket clamp screws	13.5	120	–

ENGINE INSTALLATION

- To prevent a loss of the outboard, secure the outboard to the transom with the supplied mounting hardware. Use a 7.9 mm (5/16 in.) drill bit to bore the holes into the transom. Use the transom bracket mounting holes for the alignment guide. Secure the bolts with flat washers and locknuts. Apply marine waterproofing sealer in the holes and around the bolts to make the installation water tight. Tighten the bolts to the specified torque.



Power tilt models

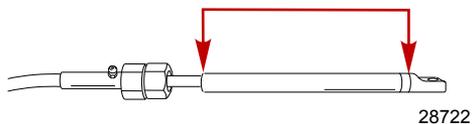
Manual tilt models

- a** - Power tilt models have four bolts, manual tilt models have two bolts
- b** - Power tilt models have four washers, manual tilt models have two washers
- c** - Power tilt models have four nuts, manual tilt models have two nuts

Description	Nm	lb-in.	lb-ft
Transom bracket mounting bolts— all models	13.5	120	–

Steering Cable Installation

- Lubricate the entire cable end with Mercury or Quicksilver 2-4-C with PTFE.



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

- Insert the steering cable into the tilt tube.
- Tighten the steering cable nut to the specified torque.

ENGINE INSTALLATION

4. Thread the steering cable seal onto the end of the tilt tube.



- a** - Steering cable nut
b - Steering cable seal

Description	Nm	lb-in.	lb-ft
Steering cable 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 the steering link rod fastening hardware supplied with the engine. Never replace the locknuts with common nonlocking nuts; they will work loose and vibrate off, allowing the link rod to disengage from the steering cable.

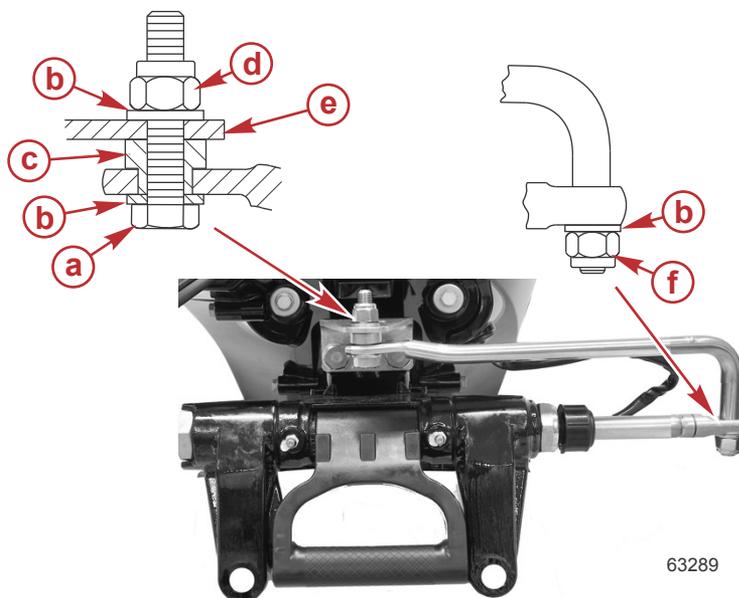
⚠ WARNING

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.

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

ENGINE INSTALLATION

Assemble the steering link rod to the engine with bolt, locknut, spacer, and flat washers. Tighten the locknut to the specified torque.



63289

- a** - Bolt
- b** - Flat washer
- c** - Spacer
- d** - Nylon insert locknut
- e** - Steering bracket
- f** - Nylon insert locknut - tighten until it seats, then back off 1/4 turn

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

Remote Control Wiring Harness and Control Cable Installation

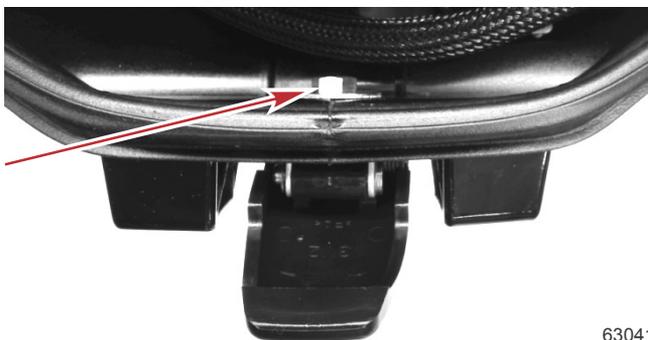
DRIVESHAFT HOUSING COVER REMOVAL AND INSTALLATION

Removal

1. Remove the top cowl.
2. Remove the cowl seal.

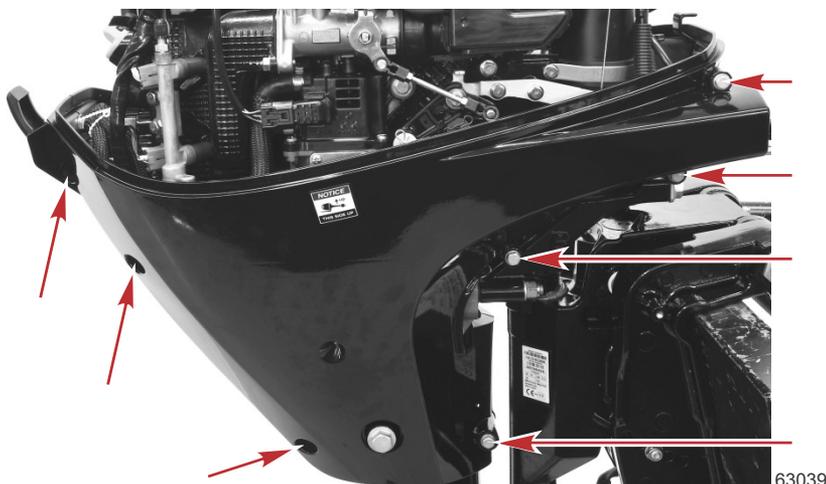
ENGINE INSTALLATION

- Loosen, but do not remove the screw that secures the cowl latch to the driveshaft housing covers.



63041

- Loosen the seven screws that secure the starboard driveshaft cover, and remove the cover.



63039

Installation

Install the starboard cover after the shift and throttle cables are installed.

- Position the starboard cover on the driveshaft housing and secure it with seven screws.
- Tighten the seven starboard-side screws and the cowl latch screw to the specified torque.

Description	Nm	lb-in.	lb-ft
Driveshaft housing cover and cowl latch screws (11)	6	53	–

ENGINE INSTALLATION

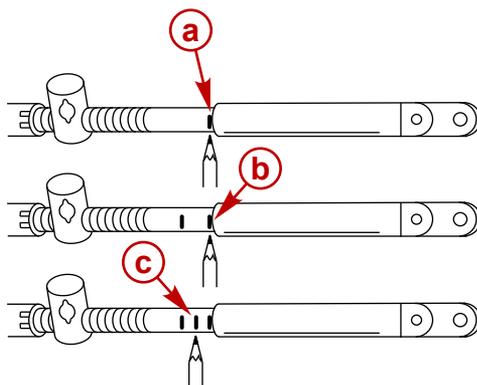
3. Attach the cowl seal.
4. Position the top cowl and secure it with the cowl latch.

SHIFT CABLE INSTALLATION

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

NOTE: *The shift cable is the first cable to move when moving the control box out of neutral.*

1. Locate the center point of the slack or lost motion that exists in the shift cable as follows:
 - a. Move the remote control handle from neutral into forward and advance the handle to full speed position. Slowly return the handle back to neutral. Place a mark (a) on the cable next to the end guide.
 - b. Move the remote control handle from neutral into reverse and advance the handle to full speed position. Slowly return the handle back to neutral. Place a mark (b) on the cable next to the end guide.
 - c. Make a center mark (c), midway between marks (a and b). Align the end guide with this center mark when installing the cable to the engine.

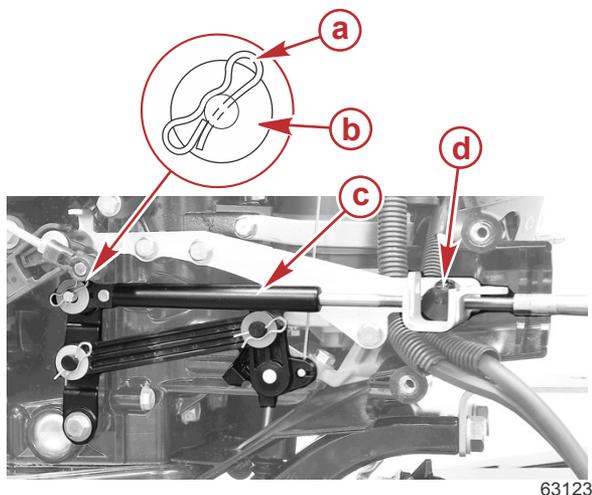


6098

2. Position the remote control handle into neutral.
3. Attach the shift cable to the shift lever with a washer and bow-tie retainer.

ENGINE INSTALLATION

- Adjust the cable barrel so the center mark on the cable is aligned with the end guide when the cable barrel is placed in the barrel receptacle.



- a** - Bow-tie retainer
- b** - Flat washer
- c** - Shift cable
- d** - Cable barrel

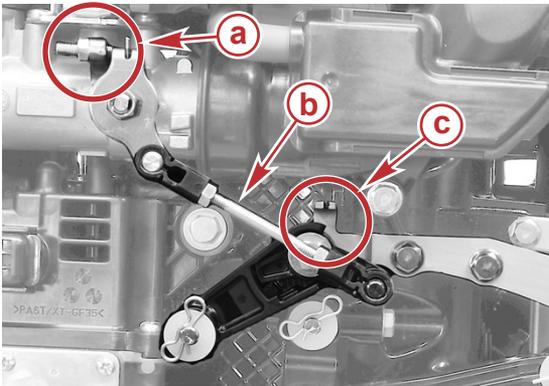
- Check shift cable adjustments as follows:
 - Shift the remote control into forward. The propeller shaft should be locked in gear. If not, adjust the barrel closer to the cable guide.
 - Shift the remote control into reverse while turning the propeller. The propeller shaft should be locked in gear. If not, adjust the barrel away from the cable guide.
 - Shift the remote control back to neutral. The propeller shaft should turn freely without drag. If not, adjust the barrel closer to the cable guide. Repeat steps a through c.

THROTTLE CABLE INSTALLATION

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

ENGINE INSTALLATION

1. Verify the throttle actuator timing mark is aligned with the timing mark on the bracket. Adjust the throttle link if necessary to achieve proper alignment.

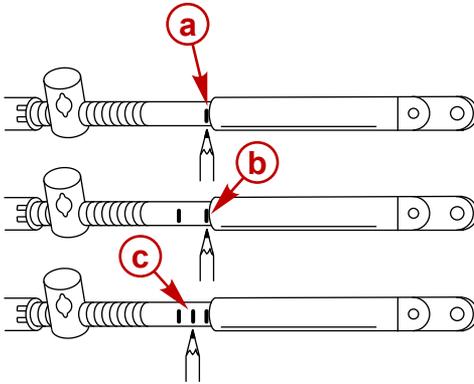


63126

- a** - Throttle against stop
 - b** - Throttle link
 - c** - Timing marks aligned
2. Locate the center point of the slack or lost motion that exists in the throttle cable as follows:
 - a. Move the remote control handle from neutral into forward and advance the handle to full speed position. Slowly return the handle back to neutral. Place a mark (a) on the cable next to the end guide.
 - b. Move the remote control handle from neutral into reverse and advance the handle to full speed position. Slowly return the handle back to neutral. Place a mark (b) on the cable next to the end guide.

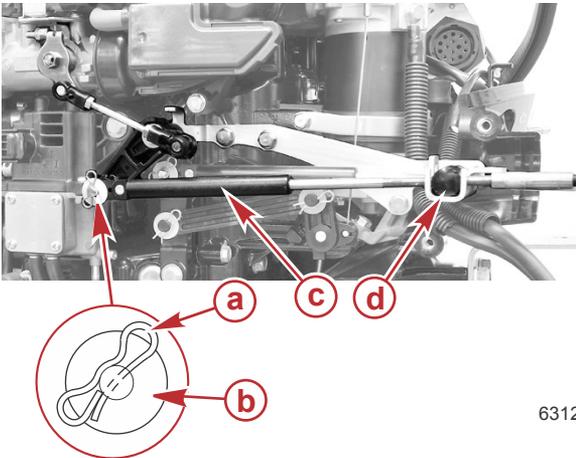
ENGINE INSTALLATION

- c. Make a center mark (c), midway between marks (a and b). Align the end guide with this center mark when installing the cable onto the engine.



6098

3. Attach the throttle cable end guide to the throttle lever with a washer and bow-tie retainer.
4. Adjust the cable barrel so the installed throttle cable will maintain alignment.
5. Position the throttle cable into the barrel receptacle.

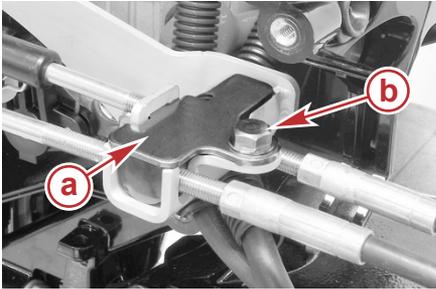


63129

- a** - Bow-tie retainer
- b** - Flat washer
- c** - Throttle cable
- d** - Cable barrel

ENGINE INSTALLATION

6. Install the cable barrel retainer and secure with the screw. Tighten the screw to the specified torque.



- a - Cable barrel retainer
- b - Screw

63131

Description	Nm	lb-in.	lb-ft
Screw	6	53	–

REMOTE WIRE HARNESS AND GROMMET INSTALLATION

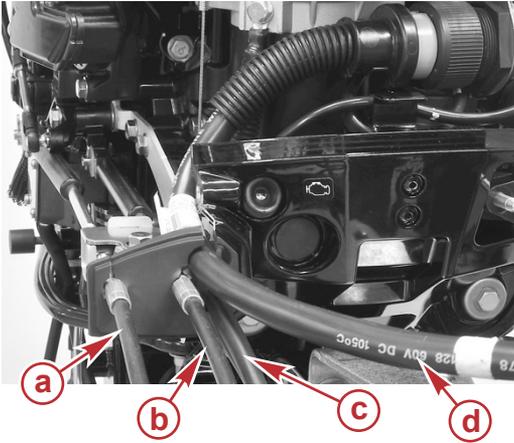
1. Connect the 14-pin remote wire harness connector to the engine harness.



63133

ENGINE INSTALLATION

2. Install the egress grommet.



- a - Throttle cable
- b - Shift cable
- c - Battery cables
- d - 14-pin harness

63135

3. Install the starboard driveshaft housing cover. Carefully align the egress grommet while installing the driveshaft housing cover. Be certain to tighten all screws to the specified torque.



63136

Description	Nm	lb-in.	lb-ft
Driveshaft housing cover screws	6	53	–

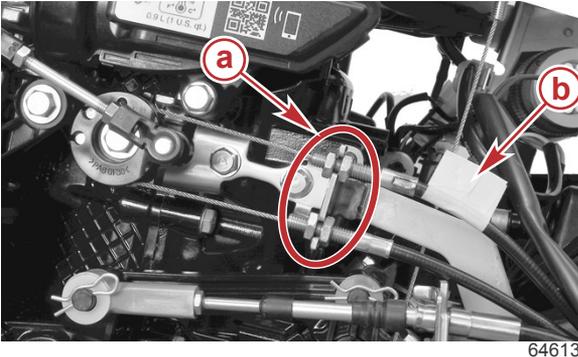
Changing the Tiller Handle Throttle Grip Rotation

The engine tiller handle throttle grip rotation can be changed to rotate in the opposite direction from the factory installation.

1. Remove the starboard driveshaft housing cover. Refer to **Driveshaft Housing Cover Removal and Installation**.
2. Install a flag (tape) onto the top throttle cable.

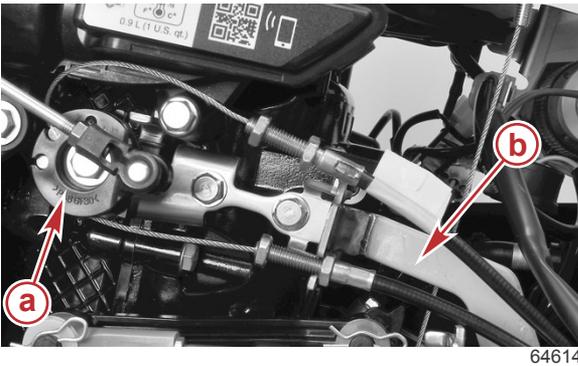
ENGINE INSTALLATION

3. Loosen the nuts securing the throttle cables to the bracket.



- a** - Nuts securing the throttle cables to the bracket
- b** - Flag on top throttle cable

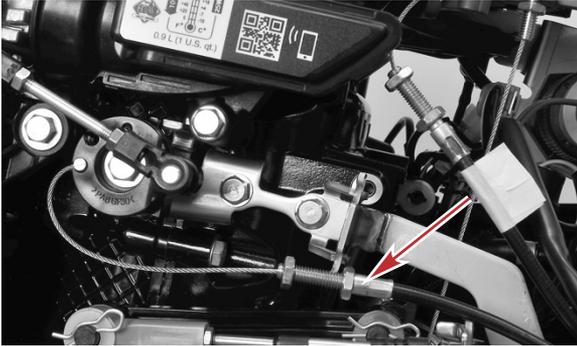
4. Remove the top cable from the bracket and the throttle drum.



- a** - Throttle drum
- b** - Bracket

ENGINE INSTALLATION

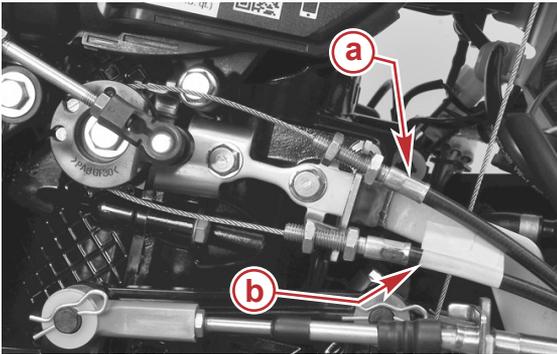
5. Remove the lower cable from the throttle drum and bracket.



64615

Lower cable

6. Install the cable with the flag onto the throttle drum lower guide and bracket.
7. Install the cable without the flag onto the throttle drum top guide and bracket.

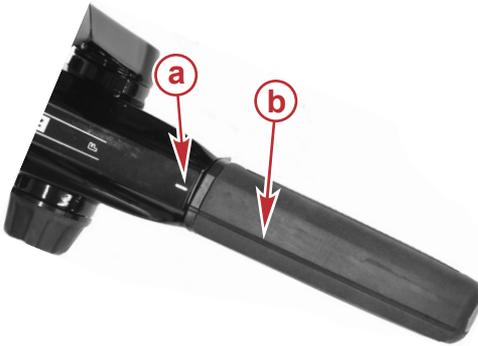


64616

- a** - Cable without flag
- b** - Cable with flag

ENGINE INSTALLATION

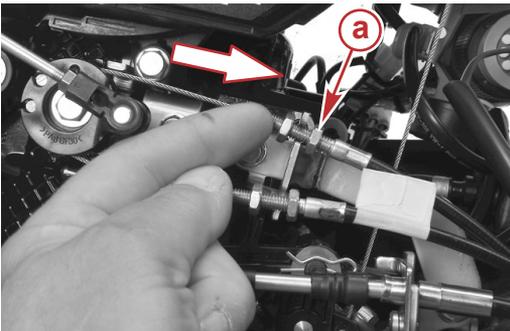
8. Rotate the throttle grip so the idle alignment mark is to the left of the idle alignment mark on the tiller handle.



- a - Idle mark on the tiller handle
- b - Throttle grip idle alignment mark

64617

9. Push on the top cable threaded end while observing the tiller handle idle alignment marks. When the marks are aligned, thread the nut that is on the right side up to the bracket. Thread the nut on the left side up to the bracket finger-tight.



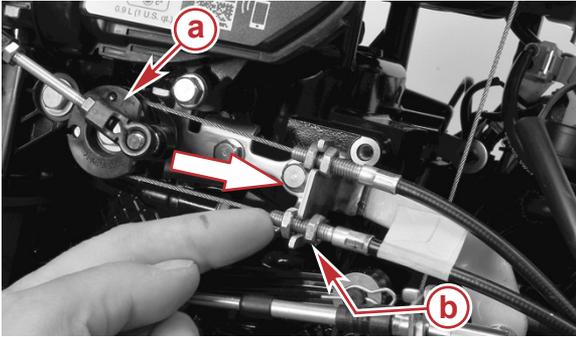
64618

Push on top cable threaded end

- a - Thread nut up to the bracket
- b - Tiller handle idle alignment marks

ENGINE INSTALLATION

10. Push on the lower cable threaded end while observing the throttle drum. When the throttle drum moves, the cable is too tight. Apply less tension and thread the lower cable nut that is on the right side up to the bracket. Thread the nut on the left side up to the bracket finger-tight.



Push on lower cable threaded end

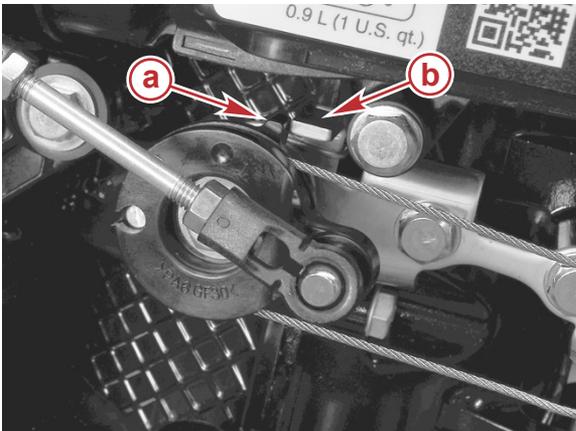
a - Throttle drum

b - Thread nut up to the bracket

11. Rotate the throttle grip to wide-open throttle (WOT) and release the grip. The marks should be aligned. If they are not aligned, rotate the grip to align the marks. There should be no resistance when turning the grip to align the marks.
12. Tighten the top cable nuts. Ensure the position of the cable does not change on the bracket.

ENGINE INSTALLATION

13. Verify the throttle drum idle stop is contacting the idle stop on the bracket when the idle marks on the tiller handle and grip are aligned.

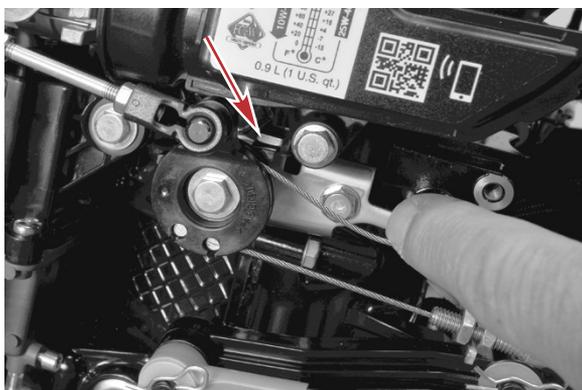


64620

- a** - Throttle drum idle stop
 - b** - Idle stop on bracket
14. Rotate the throttle grip to WOT and back to idle several times. The idle marks must be aligned and the throttle drum idle stop must be contacting the idle stop on the bracket.
 15. Rotate the throttle grip to the WOT position and observe the throttle drum. The throttle drum WOT stop should contact the stop on the bracket. If necessary, thread the nut on the right side of the lower cable more towards the bracket. Tighten the nuts on the lower cable.

ENGINE INSTALLATION

IMPORTANT: There should be a slight amount of cable slack on the upper cable when the throttle is at WOT.



64623

Throttle drum WOT stop and cable slack

16. Rotate the throttle grip to WOT and back to idle several times, checking to ensure the throttle drum stop is contacting the bracket stop.
17. After the cables are adjusted correctly, apply 2-4-C with PTFE onto the exposed cables, including the cable barrel and throttle drum guide.

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

18. Align the cowl egress grommet, install the driveshaft housing cover, and secure the cowl with the screws. Tighten the screws to the specified torque. Refer to **Driveshaft Housing Cover Removal and Installation**.

Description	Nm	lb-in.	lb-ft
Driveshaft housing cover screws	6	53	

Battery Installation - Electric Start Models

MOUNTING BATTERY

Follow the battery manufacturer's instructions carefully. Mount battery in the boat so it is secured against movement, preferably in a battery box. Make sure battery is equipped with a nonconductive shield to prevent accidental shorting of battery terminals.

NOTE: Electric starting outboards must have the battery cables connected to a battery whenever the engine is running, even if started manually, as damage to the charging system could result.

ENGINE INSTALLATION

Battery Connections

CONNECTING OUTBOARD BATTERY CABLES

First, connect the red battery cable to the (+) positive battery terminal and then connect the black battery cable to the (-) negative battery terminal.

DISCONNECTING OUTBOARD BATTERY CABLES

First, disconnect the black battery cable from the (-) negative terminal and then disconnect the red battery cable from the (+) positive terminal.

