



MERCURY
GO BOLDLY.™

8M0133624 617 eng



**Operation
Maintenance
and
Installation
Manual**

250 and 300 XS OptiMax

© 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.

Copyright and Trademark Information

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

Alpha, Axis, Bravo One, Bravo Two, Bravo Three, 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.....	6
Passenger Safety Message - Pontoon Boats and Deck Boats.....	6
Wave and Wake Jumping.....	8
Impact with Underwater Hazards.....	9
Exhaust Emissions.....	10
Selecting Accessories for Your Outboard.....	12
Safe Boating Recommendations.....	12
Recording Serial Number.....	14
Specifications—250 XS OptiMax.....	15
Specifications—300XS OptiMax.....	16
Special Tools and Kits.....	18
Component Identification.....	18
Propeller Selection.....	19

Transporting

Trailerling Boat/Outboard	20
---------------------------------	----

Fuel and Oil

Fuel Requirements.....	21
Oil Recommendation.....	22
Fuel Additives.....	22
Avoiding Fuel Flow Restrictions.....	23
Low Permeation Fuel Hose Requirement	23
EPA Pressurized Portable Fuel Tank Requirements.....	23
Fuel Demand Valve (FDV) Requirement.....	23
Mercury Marine's Pressurized Portable Fuel Tank.....	24
Filling Remote Oil Tank.....	25
Filling Engine Mounted Oil Reservoir Tank.....	25
Filling Fuel Tank.....	26

Features and Controls

Remote Control Features.....	27
Zero Effort Control Features.....	28
Warning System.....	28
Power Trim and Tilt.....	30
Power Trim Operation	30
Power Tilt Operation (Single-Ram Systems).....	32
Power Tilt Operation (Three-Ram Trim Systems).....	32
Auxiliary Tilt Switch.....	33
Manual Tilt Operation.....	33

Operation

Important Information.....	35
Engine Break-in.....	35
Engine Break-in Fuel Mixture.....	36
Prestarting Check List.....	36
Operating in Freezing Temperatures.....	36
Operating in Saltwater or Polluted Water.....	37
Operating at High Elevations.....	37
Effects of Elevation and Weather on Performance.....	37
Setting Trim Angle While Running Engine at Idle Speed.....	38
Operating in Shallow Water.....	38
Oil Injection System.....	39
Starting the Engine.....	41
Gear Shifting.....	44
Stopping the Engine.....	44

Maintenance

Cleaning Care Recommendations.....	45
Power Package Care.....	47
Replacement Parts for Your Power Package.....	47
EPA Emissions Regulations.....	47
Inspection and Maintenance Schedule.....	48
Flushing the Cooling System (Powerhead).....	50
Flushing the Cooling System (Lower Unit).....	51
Top Cowl Removal and Installation.....	52
Fuel System.....	52
Steering Link Rod Fasteners.....	55
Fuses	56
Corrosion Control Anodes.....	57
Spark Plug Inspection and Replacement.....	58
Battery Inspection	60
Charging System Fusible Link.....	60
Replacing the Propeller.....	61
Lubrication Points.....	63
Single-Ram Trim System.....	64
Three-Ram Trim System.....	67
Gearcase Lubricant.....	70
Submerged Power Package.....	71

Storage

Storage Preparation.....	72
Protecting Internal Engine Components.....	73
Protecting External Outboard Components.....	74
Gearcase.....	74
Positioning Outboard for Storage.....	74
Battery Storage.....	74

Troubleshooting

Starter Motor Will Not Crank the Engine.....	75
Engine Will Not Start.....	75
Engine Runs Erratically.....	75
Performance Loss.....	76
Warning Horn Activates (With Power Loss).....	76
Warning Horn Activates (No Power Loss).....	76
Battery Will Not Hold Charge.....	77

Owner Service Assistance

Service Assistance.....	78
Ordering Literature.....	80

Outboard Installation

Mercury Marine Validated Engine Mounting Hardware.....	82
Accessories Mounted to the Transom Clamp Bracket.....	82
Boat Horsepower Capacity.....	86
Start in Gear Protection.....	86
Fuel System.....	87
Installation Specifications.....	89
Lifting the Outboard.....	89
Steering Cable - Starboard Side Routed Cable.....	90
Steering Link Rod Fasteners.....	91
Rear-Mounted Steering Rams or Tie Bars.....	92
Determining Outboard Mounting Height.....	93
Drilling Outboard Mounting Holes.....	96
Fastening the Outboard to the Transom.....	98
Electrical, Hoses, Control Cables, and Front Clamp.....	103
Oil Injection Set-Up.....	114
Engine Well Inlet Cover Installation (Models with Remote Trim Pump).....	116
Trim In Pin.....	119

Maintenance Log

Maintenance Log.....	121
----------------------	-----

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.

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.

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.



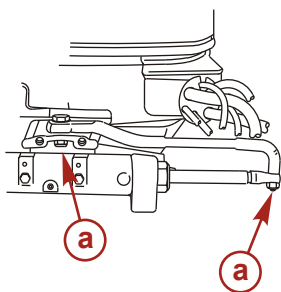
GENERAL INFORMATION

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 nuts (nonlocking) as they will work loose and vibrate off, freeing the link rod to disengage.

⚠ WARNING

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



a - Self-locking nuts

27740

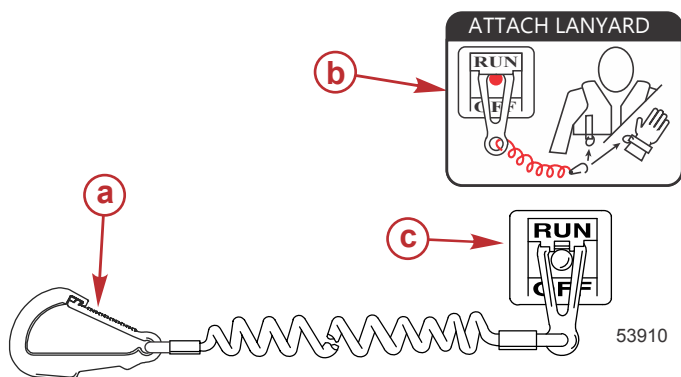
Lanyard Stop Switch

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

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

GENERAL INFORMATION

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



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

Read the following Safety Information before proceeding.

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

GENERAL INFORMATION

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

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

WARNING

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

WARNING

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

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

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

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

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

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

GENERAL INFORMATION

Protecting People in the Water

WHILE YOU ARE CRUISING

It is very difficult for a person in the water to take quick action to avoid a boat heading in their direction, even at slow speeds.



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 (even coasting) and the gear shift is in neutral, there is sufficient force by the water on the propeller to cause the propeller to rotate. This neutral propeller rotation can cause serious injury.

WHILE BOAT IS STATIONARY

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

Passenger Safety Message - Pontoon Boats and Deck Boats

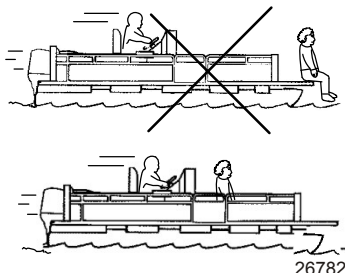
Whenever the boat is in motion, observe the location of all passengers. Do not allow any passengers to stand or use seats other than those designated for traveling faster than idle speed. A sudden reduction in boat speed, such as plunging into a large wave or wake, a sudden throttle reduction, or a sharp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

BOATS HAVING AN OPEN FRONT DECK

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

GENERAL INFORMATION

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



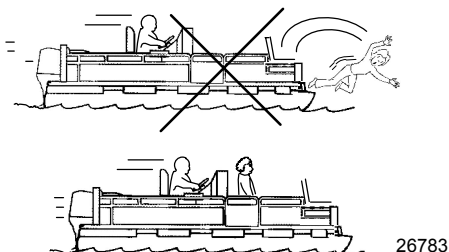
⚠ WARNING

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

BOATS WITH FRONT MOUNTED, RAISED PEDESTAL FISHING SEATS

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

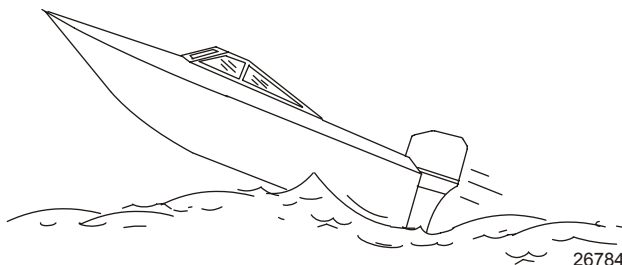
Any unexpected, sudden reduction in boat speed could result in the elevated passenger falling over the front of the boat.



GENERAL INFORMATION

Wave and Wake Jumping

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



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

⚠ WARNING

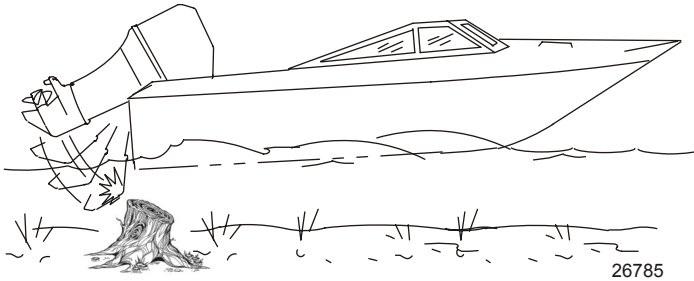
Wave or wake jumping can cause serious injury or death from occupants being thrown within or out of the boat. Avoid wave or wake jumping whenever possible.

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

GENERAL INFORMATION

Impact with Underwater Hazards

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 which could be struck by the outboard or the boat bottom. **The most important thing you can do to help reduce injury or impact damage from striking a floating or underwater object is to control the boat speed. Under these conditions, boat speed should be kept to a minimum planing speed of 24 to 40 km/h (15 to 25 mph).**



Striking a floating or underwater object could result in an infinite number of situations. Some of these situations could result in 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. Such a sharp change in direction can cause occupants to be thrown out of their seats or out of the boat.
- A rapid reduction in speed. This will cause occupants to be thrown forward, or even out of the boat.
- Impact damage to the outboard and/or boat.

Keep in mind, the most important thing you can do to help reduce injury or impact damage during an impact is control the boat speed. Boat speed should be kept to a minimum planing speed when driving in waters known to have underwater obstacles.

After striking a submerged object, stop 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.

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.

GENERAL INFORMATION

⚠ WARNING

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

Exhaust Emissions

BE ALERT TO CARBON MONOXIDE POISONING

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

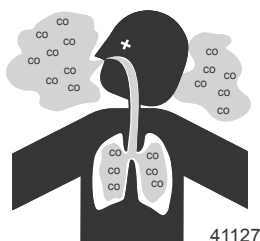
Early symptoms of carbon monoxide poisoning, which are similar to the symptoms of seasickness and intoxication, include headache, dizziness, drowsiness, and nausea.

⚠ WARNING

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

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

STAY CLEAR OF EXHAUST AREAS



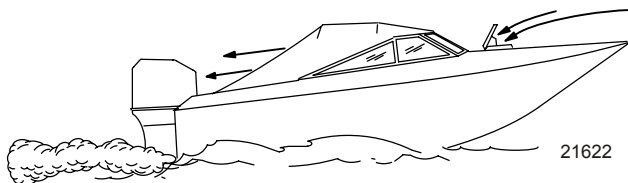
Engine exhaust gases contain harmful carbon monoxide. Avoid areas of concentrated engine exhaust gases. When engines are running, keep swimmers away from the boat, and do not sit, lie, or stand on swim platforms or boarding ladders. While underway, do not allow passengers to be positioned immediately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

GENERAL INFORMATION

GOOD VENTILATION

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

Example of desired air flow through the boat:

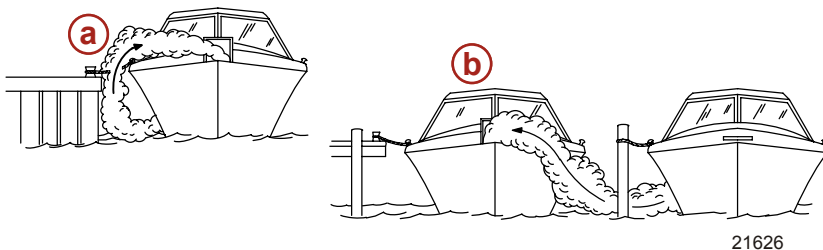


POOR VENTILATION

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

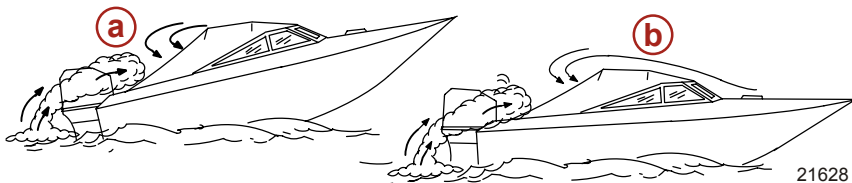
Although the occurrence is rare, on a very calm day, swimmers and passengers in an open area of a stationary boat that contains, or is near, a running engine may be exposed to a hazardous level of carbon monoxide.

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



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

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



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

GENERAL INFORMATION

Selecting Accessories for Your Outboard

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

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

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

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

Safe Boating Recommendations

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

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

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

Perform safety checks and required maintenance.

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

Check safety equipment onboard.

- Here are some suggestions of the types of safety equipment to carry when boating:
 - ☐ Approved fire extinguishers
 - ☐ Signal devices: flashlight, rockets or flares, flag, and whistle or horn
 - ☐ Tools necessary for minor repairs
 - ☐ Anchor and extra anchor line
 - ☐ Manual bilge pump and extra drain plugs
 - ☐ Drinking water
 - ☐ Radio
 - ☐ Paddle or oar
 - ☐ Spare propeller, thrust hubs, and an appropriate wrench

GENERAL INFORMATION

- ☐ 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.

- 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.

GENERAL INFORMATION

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.

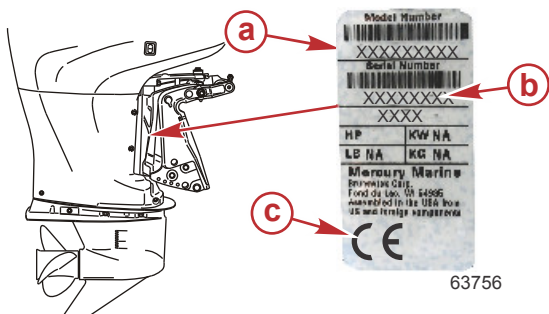
- When using your boat for waterskiing or similar activities, always keep a fallen or down skier on the operator's side of the boat while returning to attend to the skier. The operator should always have the down skier in sight and never back up to the skier or anyone in the water.

Report accidents.

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

GENERAL INFORMATION

Specifications—250 XS OptiMax

Attribute		Specifications
Horsepower		250 HP (184 kw)
Engine displacement		3038 cc (185 cid)
Engine weight	20 in. Sport Master	229 kg (505 lb)
	25 in. Fleet Master	237 kg (522 lb)
	30 in. Fleet Master	242 kg (533 lb)
Full throttle RPM range		5500–6000 RPM
Overspeed rev limit		6300 RPM
Idle RPM		585 RPM
Neutral rev limit		2250 RPM
Cylinder configuration		60° V6
Cylinder bore		92.075 mm (3.625 in.)
Stroke		76.2 mm (3.000 in.)
Recommended spark plug		NGK IZFR6J-11 (factory installed)
		NGK IZFR6J (service)
Spark plug gap		1.1 mm (0.042 in.)
Firing order		1-2-3-4-5-6
Maximum timing		Controlled by PCM
Idle timing		Controlled by PCM
Fuel line pressure		655 ± 13.8 kPa (95 ± 2 psi)
Air pressure		758 ± 13.8 kPa (110 ± 2 psi)
Gear ratio	Sport Master	1.62:1
		1.75:1
Gear ratio	Fleet Master	1.75:1
Required fuel		Unleaded gasoline 87 R+M/2 octane (90 RON)
Recommended oil		Mercury Racing 2-Stroke Oil
Gearcase oil		Mercury Racing Gear Lube
Gearcase lubricant capacity		710 ml (24 fl oz)
Battery rating*		1000 marine cranking amps (MCA), 800 cold cranking amps (CCA), 105 Ah
Charging system output		50 A maximum

GENERAL INFORMATION

Attribute		Specifications
Trim system	20 in.	Three-ram (integral) trim
	25/30 in.	Single-ram (remote pump) trim
Emission control system		Electronic engine control (EC)

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

Specifications—300XS OptiMax

Specifications		
Propshaft horsepower		300 HP (221 kw)
Engine displacement		3160 cc (193 cid)
Engine weight	20 in. (Torque Master)	218 kg (480 lb)
	20 in. (Sport Master)	229 kg (505 lb)
	25 in. (Torque Master)	239 kg (528 lb)
	25 in. (Fleet Master)	237 kg (522 lb)
	30 in. (Fleet Master)	242 kg (533 lb)
Full throttle RPM range	20 in. (Torque Master)	5500–6300 RPM
	20 in. (Sport Master)	5500–6300 RPM
	25 in. (Torque Master)	5500–6300 RPM
	25 in. (Fleet Master)	5300–5800 RPM
	30 in. (Fleet Master)	5300–5800 RPM

GENERAL INFORMATION

Specifications		
Overspeed rev limit	20 in. (Torque Master)	6350 RPM
	20 in. (Sport Master)	6350 RPM
	25 in. (Torque Master)	6350 RPM
	25 in. (Fleet Master)	5900 RPM
	30 in. Models (Fleet Master)	5900 RPM
Idle RPM		585 RPM
Neutral rev limit		1900 RPM
Cylinder configuration		60° V6
Cylinder bore		92.075 mm (3.625 in.)
Stroke		78.9 mm (3.110 in.)
Spark plug		NGK IZFR7M
Spark plug gap		0.81 mm (0.032 in.)
Firing order		1-2-3-4-5-6
Maximum timing		Controlled by PCM
Idle timing		Controlled by PCM
Fuel pressure		655 ± 13.8 kPa (95 ± 2 psi)
Air pressure		758 ± 13.8 kPa (110 ± 2 psi)
Gear ratio	Torque Master	1.62:1 1.75:1
		1.62:1 1.75:1
	Fleet Master	1.75:1
Required fuel		Premium unleaded 91 R+M/2 octane (96 RON)
Recommended oil		Premium Plus TC-W3 2-Cycle
Gearcase oil		High-Performance gear lube
Gearcase lubricant capacity		710 ml (24 fl oz)
Battery rating		1000 marine cranking amps, 800 cold cranking amps 105 amp hours ¹ .
Charging system output		50 A maximum

1. Battery manufacturers may rate and test their batteries to different standards. Consult with the specific battery manufacturer for comparison ratings.

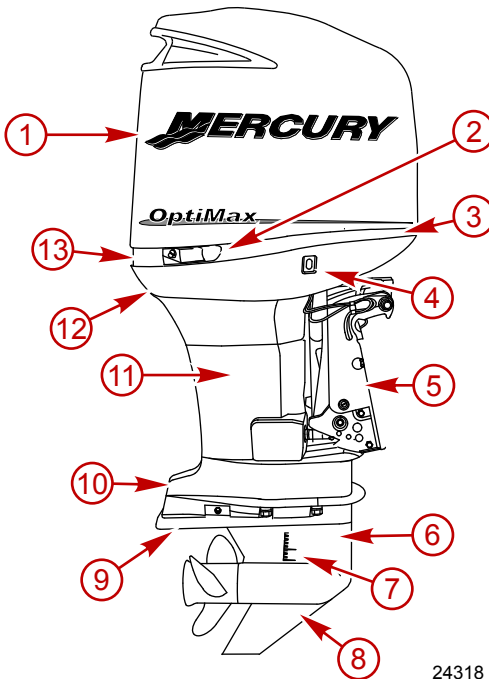
GENERAL INFORMATION

Specifications	
Emission control system	Electronic engine control (EC)

Special Tools and Kits

Description	Part Number
Stainless Steel Tilt Pin (Three-Ram Trim Systems)	17-49930A1
Oil Syringe	91-803976T
Flushing Attachment (for Torque/Fleet Master gearcase)	44357T2
Flushing Attachment (for Sport Master gearcase)	848998A1
Dual Water Pick-Up Flush Seal Kit (Fleet/Torque Master gearcase)	881150K1

Component Identification



- 1 - Top cowl
- 2 - Side cowl latches (both sides)
- 3 - Front cowl latch
- 4 - Auxiliary tilt switch
- 5 - Clamp/swivel bracket
- 6 - Gearcase
- 7 - Cooling water intake (location dependent on gearcase)
- 8 - Skeg
- 9 - Anode plate
- 10 - Anti-ventilation plate
- 11 - Driveshaft housing
- 12 - Water pump indicator
- 13 - Bottom cowl

24318

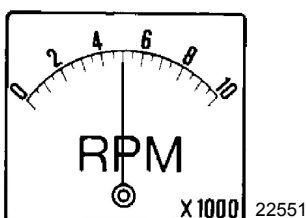
GENERAL INFORMATION

Propeller Selection

Propping the engine at the higher end of the RPM range may increase acceleration, but decrease top boat speed. Conversely, propping the engine at the lower end of the range may increase top boat speed but hinder acceleration. Mercury Marine recommends selecting a propeller that allows the engine to operate in the upper half of the recommended full throttle RPM range with the boat normally loaded (refer to **General Information - Specifications**). This RPM range allows for better acceleration while maintaining maximum boat speed.

All "L" models (20 in. driveshaft) are capable of operating at engine speeds of up to 6000 RPM. This increased engine speed gives the operator a greater range of pitch selection. However, propping at the uppermost limit of the RPM range may not necessarily result in improved high speed performance. Boat weight and hull design influence the effectiveness of this increased engine speed and may decrease top boat speed.

If full throttle operation is below the recommended full throttle 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 or damage. Generally, there is a 200-300 RPM change between propeller pitches.



If changing conditions cause the RPM to drop below the recommended range (such as warmer, more humid weather, operation at higher elevations, increased boat load, or a dirty boat bottom/gearcase), a propeller change or cleaning may be required to maintain performance and ensure the outboards durability.

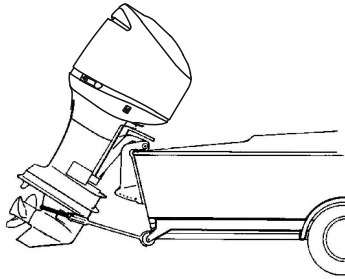
Check full-throttle RPM, using an accurate tachometer, with the engine trimmed out to a balanced-steering condition (steering effort equal in both directions) without causing the propeller to break loose.

TRANSPORTING

Trailing Boat/Outboard

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

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



2722

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

Shift the outboard to forward gear. This prevents the propeller from spinning freely.

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.

Oil Recommendation

Recommended oil	Mercury Racing 2-Stroke Oil
Alternate oil	OptiMax DFI engine oil
	Premium Plus 2-Cycle Outboard Oil

Mercury Racing 2-Stroke Oil is recommended for OptiMax engines that are used in applications of extreme loads associated with commercial, work, or extended periods of high RPM. The added lubrication and protection properties with Mercury Racing 2-Stroke oil, maximizes engine horsepower while protecting against heat, reduces wear and carbon deposit build-up.

OptiMax DFI engine oil or Premium Plus 2-Cycle Outboard Oil can be used as an alternate oil.

IMPORTANT: Oil must be NMMA certified TC-W3 2-Cycle oil.

Periodically consult with your dealer to get the latest gasoline and oil recommendations. If Quicksilver 2-Cycle Outboard Oil is not available, substitute another brand of 2-Cycle outboard oil that is NMMA Certified TC-W3. The use of an inferior 2-Cycle outboard oil can reduce engine durability. Damage from use of inferior oil may not be covered under the limited warranty.

Fuel Additives

To minimize carbon deposit buildup in the engine, it is recommended to add Mercury or Quicksilver Quickstor fuel stabilizer additive to the engine's fuel at each tank fill throughout the boating season. Use additive as directed on container.

FUEL AND OIL

Avoiding Fuel Flow Restrictions

NOTICE

Adding components to the fuel supply system can damage the engine. These additions can restrict fuel flow, stall the engine at low speeds, and create lean fuel conditions at high speeds. Follow all regulations for fuel system installation and do not add any additional components to the fuel system.

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

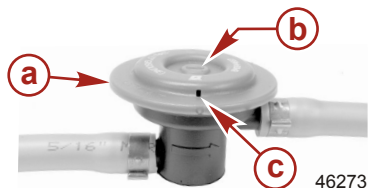
The Environmental Protection Agency (EPA) requires portable fuel systems that are produced after January 1, 2011, for use with outboard engines to remain fully sealed (pressurized) up to 34.4 kPa (5.0 psi). These tanks may contain the following:

- 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.

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

FUEL AND OIL

Mercury Marine's Pressurized Portable Fuel Tank

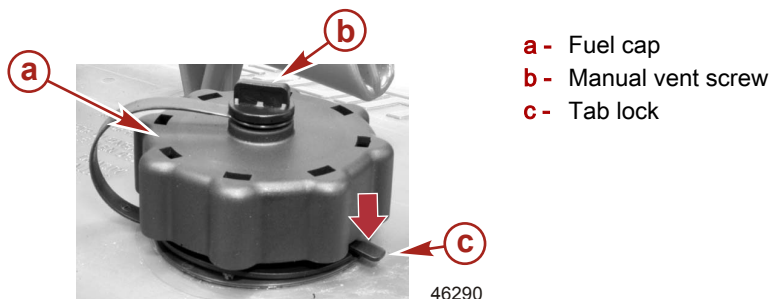
Mercury Marine has created a new portable pressurized fuel tank that meets the preceding EPA requirements. These fuel tanks are available as an accessory or are provided with certain portable outboard models.

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



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

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.

FUEL AND OIL

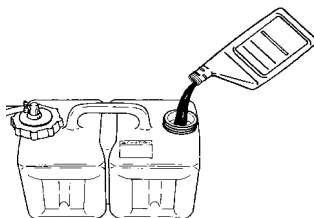
DIRECTIONS FOR USING THE PRESSURIZED PORTABLE FUEL TANK

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 Remote Oil Tank

Remove the filler cap and fill with the specified oil. Oil tank capacity is 11.5 liters (3 gallons). Replace the filler cap and tighten securely.

IMPORTANT: Always make sure the oil tank caps are threaded on tight. An air leak will prevent oil flow to the engine.

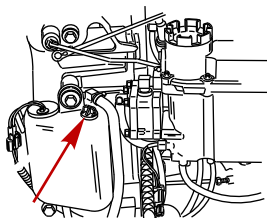


2723

Filling Engine Mounted Oil Reservoir Tank

NOTE: Filling this tank is only necessary if the oil level should ever drop and the low oil warning system is activated.

1. Remove the top cowl.
2. Loosen the fill cap on the engine oil reservoir tank. Run the engine until all the air has been vented out of the oil reservoir tank and tank is filled with oil to the point of overflow.
3. Tighten the fill cap. Stop the engine and replace the top cowl.



29424

FUEL AND OIL

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 refill them.

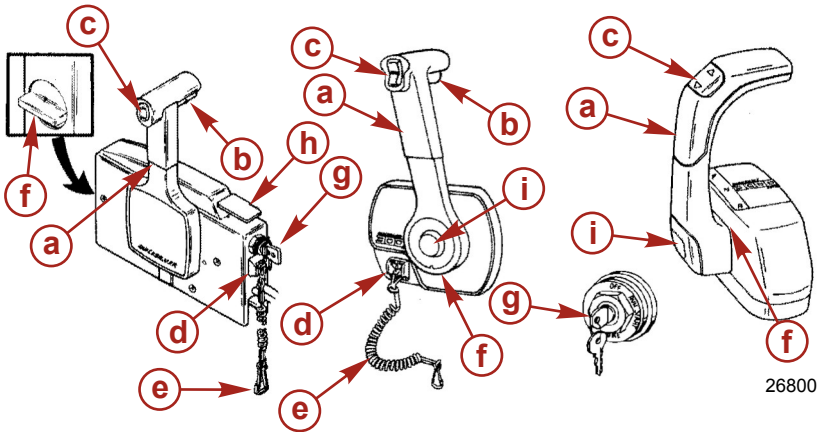
Always stop the engine before filling the tanks.

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.

FEATURES AND CONTROLS

Remote Control Features

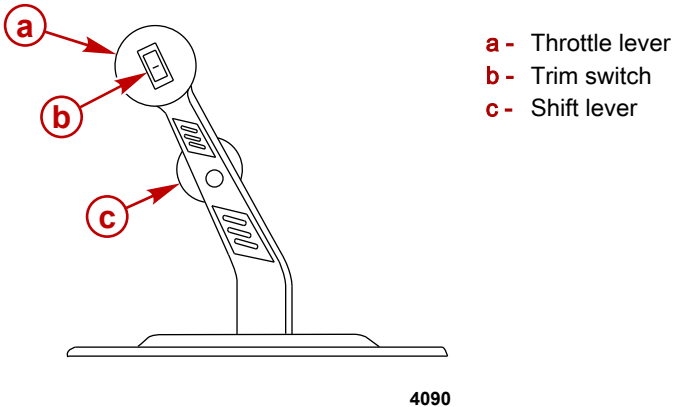
Your boat may be equipped with one of the Mercury Precision or Quicksilver remote controls shown. If not, consult your dealer for a description of the functions and operations of the remote control.



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

FEATURES AND CONTROLS

Zero Effort Control Features



Warning System

WARNING HORN SIGNALS

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

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

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

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

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

- Water in the engine mounted fuel filter. Refer to **Maintenance – Water Separating Fuel Filter**.

FEATURES AND CONTROLS

- Cooling system (water pressure or engine temperature) problem. Stop the engine and check the water intake holes in the lower unit for obstruction.
- Low engine oil level. Refer to **Fuel and Oil – Filling Engine Mounted Oil Reservoir Tank**.

ENGINE GUARDIAN SYSTEM

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

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

OVERSPEED REV LIMIT

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

Upon reaching the beginning of the rev limit, Engine Guardian will cut-out the ignition to specific cylinders. If the operator does not reduce engine speed, Engine Guardian will cut-out the ignition to all the cylinders. There is no audible warning while Engine Guardian overspeed limit is active.

To reset the Engine Guardian protection:

1. Completely reduce the throttle for three seconds.
2. Engage the throttle. If the engine does not respond, repeat step one.

SMARTCRAFT PRODUCT

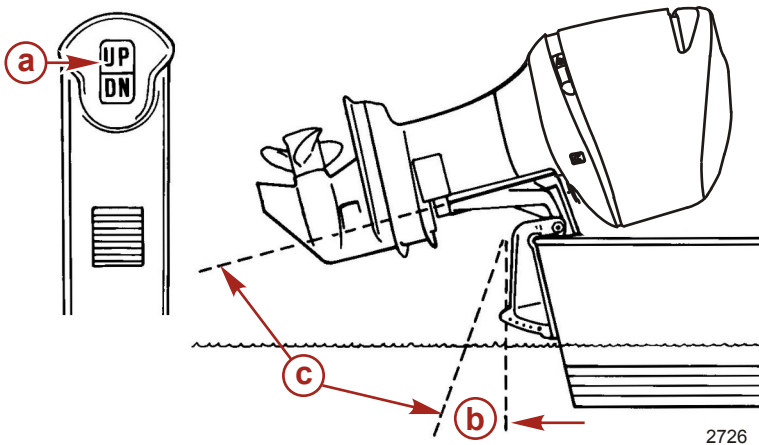
A Mercury SmartCraft System instrument package can be purchased for this outboard. A few of the functions the instrument package will display are engine RPM, coolant temperature, oil pressure, water pressure, battery voltage, fuel consumption, and engine operating hours.

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

FEATURES AND CONTROLS

Power Trim and Tilt

NOTE: Outboard position can be adjusted by pressing trim switch. This range is used while operating your boat on plane.



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

- **Pressing (DN):** Moves the outboard in closer to the boat transom, called trimming in or down.
- **Pressing (UP):** Moves the outboard further away from the boat transom, called trimming out or up.
- **The term trim** generally refers to the adjustment of the outboard within the first 20° range of travel.
- **The term tilt** generally refers to adjusting the outboard further up out of the water.

With the engine turned off, the outboard can be tilted out of the water. At low idle speed, the outboard can also be tilted up past the trim range to permit, for example, shallow water operation.

Power Trim Operation

With most boats, operating around the middle of the trim range will give satisfactory results. Trimming your outboard all the way in or out may improve performance, but cause some potential control hazards.

FEATURES AND CONTROLS

WARNING

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

Consider the following lists carefully.

Trimming in or down can:

- Lower the bow of the boat.
- Result in quicker planing off.
- Generally improve the ride in choppy water.
- Increase steering torque or pull to the right (with the normal right-hand rotation propeller).
- In excess, lower the bow to a point at which the boat begins to plow with the bow in the water while on plane. This can result in an unexpected turn in either direction called bow steering or over steering if any turn is attempted, or if a significant wave is encountered.

LIMITING TRIM IN

In rare circumstances, the owner may decide to limit the trim in to avoid unsafe handling or steering conditions at planing speeds.

WARNING

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

WARNING

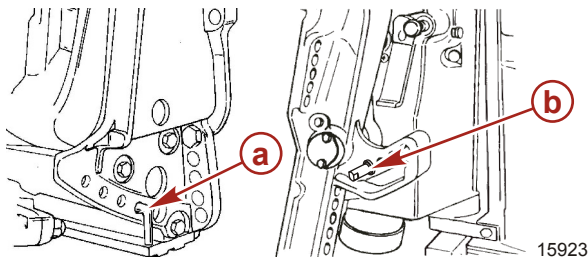
On some boats, increased trim-in range can cause handling problems at high speeds, resulting in personal injury or death. We recommend that only qualified personnel adjust the trim-in limit inserts and test the boat for handling problems.

IMPORTANT: Some boat/engine combinations not using a trim angle adjustment device, or trimmed to the full trim in position, may not exhibit any undesirable or unsafe handling or steering conditions. In these cases, a trim limiting device may not be advantageous to acceleration or planing. Always perform a water test to determine if these characteristics apply to a particular boat/engine combination.

To limit trim in on models with a three-ram trim system, purchase a stainless steel tilt pin from your dealer and insert it in whichever adjustment hole is desired.

FEATURES AND CONTROLS

To limit trim in on models with a single-ram trim system, use the cadmium plated bolt shipped with the engine.



- a -** Stainless steel tilt pin (Three-Ram trim system)
- b -** Bolt shipped with engine (Single-Ram trim system)

Trimming out or up can:

- Lift the bow higher out of the water.
- Generally increase top speed.
- Gain 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, cause boat porpoising (bouncing) or propeller ventilation.
- Cause engine overheating if any cooling water intake holes are above the water line.

Power Tilt Operation (Single-Ram Systems)

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

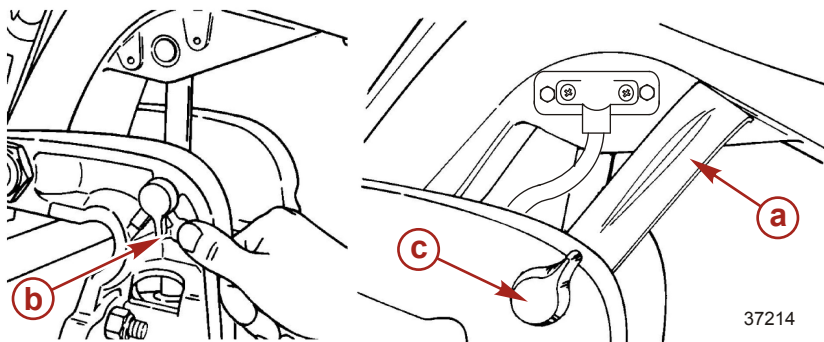
The hydraulic system is fully capable of supporting the outboard during normal tilting operation. However, if trailering the boat in the trim/tilt position, use an accessory outboard support device.

Power Tilt Operation (Three-Ram Trim Systems)

To tilt the outboard, shut off the engine and press the trim/tilt switch or the auxiliary tilt switch (located on the cowl) to the up position. The outboard tilts up until the switch is released or it reaches the maximum tilt position.

FEATURES AND CONTROLS

1. Engage the tilt support lever by pushing the metal stop and rotating the knob to bring the support lever upward.

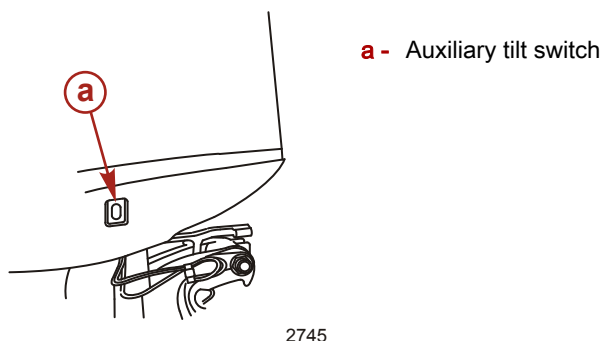


- a** - Tilt support lever
- b** - Metal stop
- c** - Knob

2. Lower the outboard to rest on the tilt support lever.
3. Disengage the tilt support lever by raising the outboard off the support lever and rotating the lever until it locks. Lower the outboard.

Auxiliary Tilt Switch

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

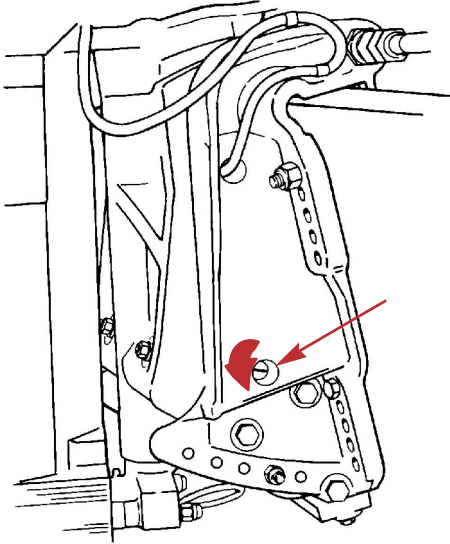


Manual Tilt Operation

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

FEATURES AND CONTROLS

1. Turn out the manual tilt release valve three turns (counterclockwise). This allows manual tilting of the outboard.



2728

2. Tilt the outboard to the desired position and tighten the manual tilt release valve.

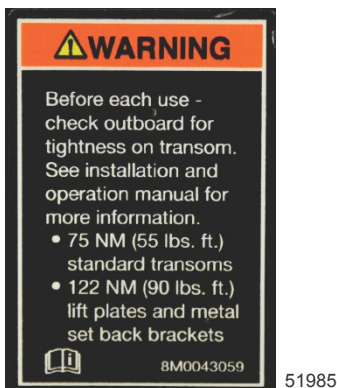
NOTE: The manual tilt release valve must be tightened before operating the outboard to prevent the outboard from tilting up during reverse operation.

OPERATION

Important Information

IMPORTANT DAILY INSPECTION BEFORE EACH USE

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



Decal on the transom bracket

BEFORE STARTING THE ENGINE

NOTICE
Lack of oil pressure in the system can cause severe internal engine damage during start-up. Prime the oil injection pump on new or rebuilt engines or after performing maintenance on the oiling system.

Refer to **Outboard Installation - Priming the Oil Injection Pump** for instructions.

FUEL REQUIREMENTS

Do not use premixed gas and oil in this engine. The engine automatically receives extra oil during engine break-in. Use a fresh supply of the recommended gasoline during engine break-in and after engine break-in.

Engine Break-in

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

OPERATION

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.

Break-in Procedure
Always vary throttle settings during Break-in
1st Hour
<ul style="list-style-type: none">• Allow engine to warm-up for 30–60 seconds.
<ul style="list-style-type: none">• Do not idle for more than five (5) minutes
<ul style="list-style-type: none">• Run the engine the majority of the time between 4000–5400 RPM (approximately three quarter throttle).
<ul style="list-style-type: none">• Change engine speed approximately every two (2) minutes.
<ul style="list-style-type: none">• Avoid trimming the outboard out (up) beyond a vertical trim position during operation.
<ul style="list-style-type: none">• Avoid using hydraulic jack plate (if equipped) to raise engine during break-in cycle.
Next 3 Hours: Change engine speed every 10 minutes.

Engine Break-in Fuel Mixture

The propulsion control module (PCM) controls oil and fuel mixture during engine break-in.

Prestarting Check List

- ☐ Engine lowered to run position with all water intake holes submerged
- ☐ Fuel tank vent cap open or fuel drain valve on
- ☐ Fuel supply OK
- ☐ Lanyard stop switch in "RUN" position and cord connected
- ☐ Remote control in neutral
- ☐ Top cowl latches secure
- ☐ Make inspection checks listed in the **Inspection and Maintenance Schedule**. Refer to **Maintenance** section.

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.

OPERATION

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.

Operating at High Elevations

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

Effects of Elevation and Weather on Performance

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

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

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

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

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

Compensating for power robbing conditions:

- Switch to lower pitch propeller.
- Change gear ratio.

OPERATION

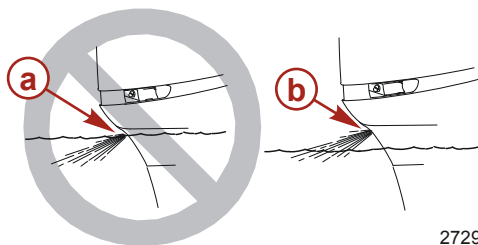
Some boat performance can be improved by dropping to a lower pitch propeller, but engine performance will still remain lower. In some cases, a gear ratio reduction may be more beneficial. To optimize engine performance, prop the engine to allow it to operate at or near the top end of the recommended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

Other advantages to propeller or gear ratio changes:

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

Setting Trim Angle While Running Engine at Idle Speed

Submerging the exhaust relief hole on the outboard can happen on some boats if you trim full in while running at idle speed, resulting in, exhaust restriction, rough idle, excessive smoke, and fouled spark plugs. If this condition exists, trim outboard up until exhaust relief hole is out of the water.



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

2729

Operating in Shallow Water

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

NOTICE

Operating the engine with the outboard in the tilt range can damage the engine or the transom. If operating the engine in the tilt range, such as in shallow water, do not exceed 2000 RPM.

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

Models with a three-ram trim system: If engine speed exceeds 2000 RPM, the outboard will automatically return down to the maximum trim range.

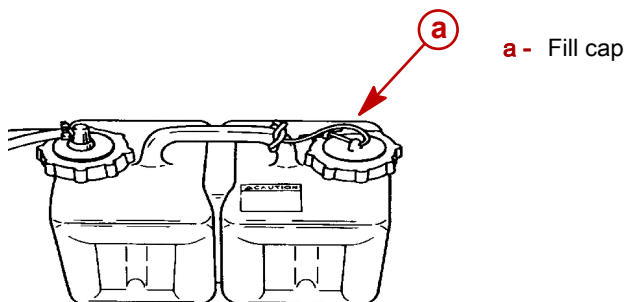
Models with a single-ram trim system: The outboard will remain at the selected tilt position, regardless of engine RPM.

OPERATION

Oil Injection System

FILLING THE OIL TANKS

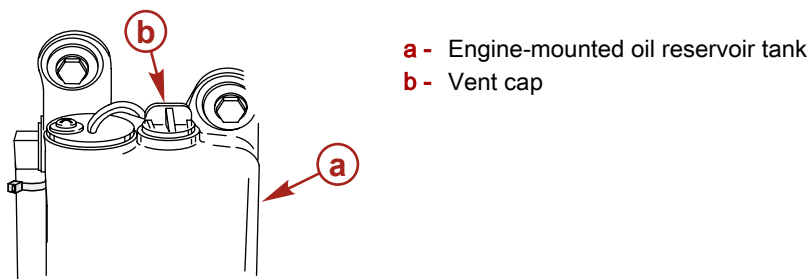
1. Remove the fill cap from the remote oil tank and fill the tank with the recommended oil. Install the fill cap and tighten securely.



2683

IMPORTANT: Do not remove the vent cap from the engine-mounted oil reservoir tank when filling the tank. Removal of the vent cap may damage the threads in the oil reservoir tank. Damaged threads may result in future oil leakage.

2. Check the oil level in the engine-mounted oil reservoir tank. The tank must contain at least 118 ml (4 oz) of oil prior to starting the engine.
3. If the oil level is less than 118 ml (4 oz), loosen the vent cap. Use a squirt can and fill the tank with at least 118 ml (4 oz) of the recommended oil. Tighten the vent cap.

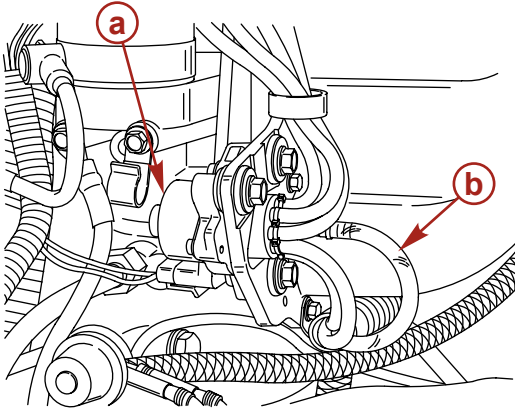


7745

OPERATION

PRIMING THE OIL INJECTION PUMP

Before starting the engine for the first time, prime the oil injection pump. Priming will remove any air that may be in the pump, oil supply hose, or internal passages.



7747

- a -** Oil injection pump
- b -** Oil supply hose

IMPORTANT: Fill the engine fuel system with fuel before priming the oil injection pump. Otherwise, the fuel pump will run without fuel during the priming process and may be damaged.

Prime the oil injection pump as follows:

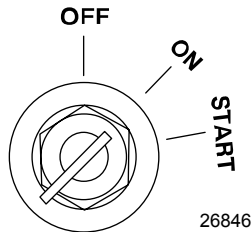
1. Fill the engine fuel tank with fuel.
2. Position the fuel primer bulb so the arrow on the side of the bulb is pointing up. Squeeze the fuel hose primer bulb until it feels firm.



27348

OPERATION

3. Turn the ignition key switch to the "ON" position.



4. Within the first 10 seconds after the key switch has been turned on, move the remote control handle from neutral into forward gear 3 to 5 times. This will automatically start the priming process.

NOTE: It may take a few minutes for the pump to complete the priming process.

PURGING AIR FROM THE ENGINE MOUNTED OIL RESERVOIR TANK

1. Loosen the vent cap on the engine mounted oil reservoir tank.
2. Start the engine.
3. Operate the engine until all the air has vented out and oil starts to flow out of the tank.
4. Tighten the vent cap.

Starting the Engine

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.

INITIAL STARTING PROCEDURE

NOTE: For initial start up of a new engine, or for an engine that ran out of fuel or was drained of fuel, the fuel system should be filled according to the following procedure.

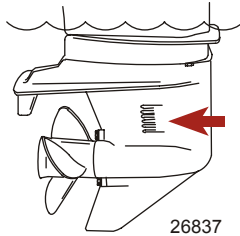
1. Squeeze the fuel line primer bulb until it feels firm.
2. Turn the ignition key switch to the ON position for three seconds. This operates the electric fuel pump.
3. Turn the ignition key switch back to the OFF position, and squeeze the primer bulb again until it feels firm. Turn the ignition key switch to the ON position again for three seconds. Continue this procedure until the fuel line primer bulb stays firm.

Before starting, read the **Prestarting Check List**, special operating instructions in the **Operation** section.

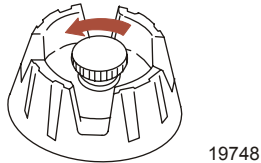
OPERATION

STARTING PROCEDURE

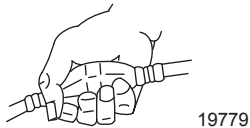
1. Lower the outboard to the RUN position. Make sure all the cooling water intake holes are submerged.



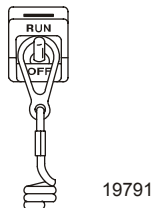
2. Open fuel tank filler cap vent screw (manual venting fuel tanks).



3. Squeeze the fuel line primer bulb several times until it feels firm.

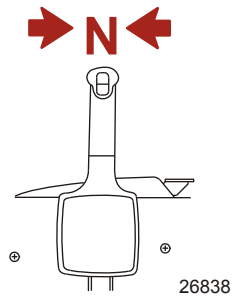


4. Set the lanyard stop switch to the RUN position. Read the **Lanyard Stop Switch** safety explanation and warning in the **General Information** section.

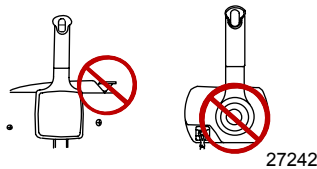


OPERATION

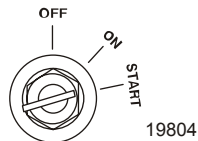
5. Shift the outboard to the neutral position.



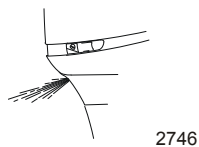
6. Do not advance the neutral fast idle speed feature on the remote control for starting (if equipped).



7. Turn the ignition key to the START position. Release the key when the engine starts. If the engine fails to start in ten seconds, return the key to the OFF position, wait one second, and try again.



8. Check for water coming out of the water pump indicator hole.



NOTE: The electronic starting system will automatically prime (choke) the engine and increase idle speed for starting.

OPERATION

NOTICE

Operating the engine while overheated can cause engine damage. If no water exits the water pump indicator hole, stop the engine and check the cooling water intake holes for obstruction. No obstruction may indicate a water pump failure or blockage in the cooling system, which can overheat the engine. Have an authorized Mercury Marine dealer check the system.

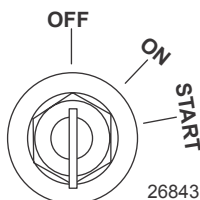
Gear Shifting

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.**
- The outboard has three gear shift positions: forward (F), neutral (N), and reverse (R).
- When shifting, always stop at the neutral position and allow the engine idle speed to stabilize before shifting into another gear.
- Always shift the outboard into gear with a quick motion.
- After shifting the outboard into gear, advance the lever further to increase speed.

Stopping the Engine

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



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. Crystallized salt can scratch the gauge display lens when using a dry or damp cloth. Ensure that the cloth has a sufficient amount of fresh water to dissolve and remove salt or mineral deposits. Do not apply aggressive pressure on the display lens while cleaning.

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

CLEANING REMOTE CONTROLS

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

MAINTENANCE

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

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

CLEANING CARE FOR TOP AND BOTTOM COWLS

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

Cleaning and Waxing Procedure



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

CLEANING CARE FOR THE POWERHEAD (SALTWATER USE)

If the outboard is operated in saltwater, remove the top cowl and flywheel cover. Inspect the powerhead and powerhead components for salt buildup. Wash off any salt buildup from the powerhead and powerhead components with fresh water. Keep water spray out of the air filter/intake and alternator. After washing, allow the powerhead and components to dry. Apply Quicksilver or Mercury Precision Lubricants Corrosion Guard spray on the external metal surfaces of the powerhead and powerhead components. Do not allow the Corrosion Guard spray to come in contact with the alternator drive belt or belt pulleys.

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

MAINTENANCE

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

Power Package Care

WARNING

Neglect or improper maintenance, repairs, or inspections of the power package can result in product damage or serious injury or death. Perform all procedures as described in this manual. If you are not familiar with proper maintenance or service procedures, consign the work to an authorized Mercury Marine dealer.

To ensure safety and retain dependability, keep your power package in the best operating condition by performing the periodic inspections and maintenance listed in the **Inspection and Maintenance Schedule**. Record maintenance performed in the **Maintenance Log** at the back of this book. Save all maintenance work orders and receipts.

Replacement Parts for Your Power Package

Mercury recommends using original Mercury Precision replacement parts and lubricants.

EPA Emissions Regulations

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

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

MAINTENANCE

EMISSION CERTIFICATION LABEL

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

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

43210

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

OWNER RESPONSIBILITY

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

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

Inspection and Maintenance Schedule

DAILY CHECKS

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

MAINTENANCE

- Check the hydraulic steering fluid level, if equipped

AFTER EACH USE

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

ANNUALLY OR 100 HOURS

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

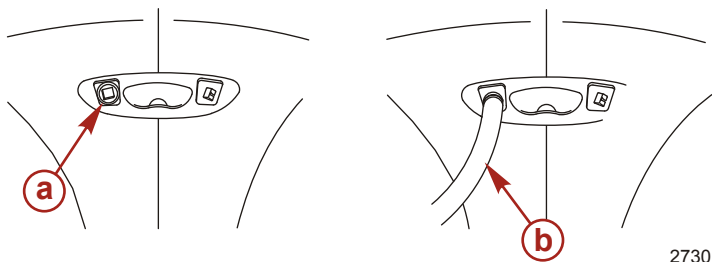
THREE YEARS OR 300 HOURS

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

MAINTENANCE

Flushing the Cooling System (Powerhead)

Flush the internal water passages of the engine 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.



- a** - Plug located on fitting
- b** - Water hose

1. Remove the plug from fitting in the bottom cowl.
2. Attach a water hose to the fitting. Turn on the water and flush for three to five minutes.

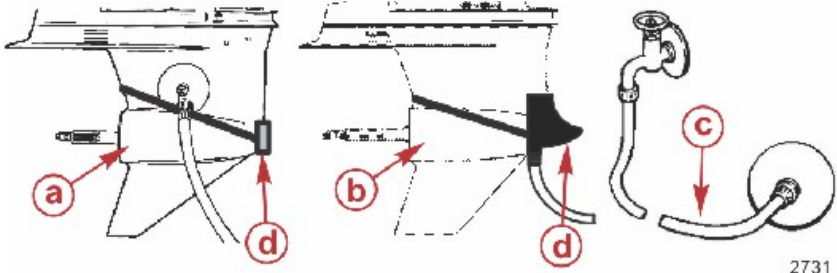
NOTE: The engine can be stopped or operated at idle speed when flushing the cooling system. Do not flush engine using a water system that exceeds 310 kPa (45 psi).

MAINTENANCE

Flushing the Cooling System (Lower Unit)

⚠ 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.



- a** - Fleet Master gearcase
- b** - Sport Master gearcase
- c** - Water hose
- d** - Flushing attachments

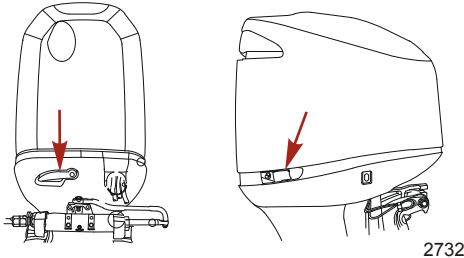
1. Remove the propeller. Refer to **Replacing the Propeller**.
2. Fleet Master gearcases – Install the appropriate flushing attachment so the rubber cups fit tightly over the strut intake holes. Attach the Dual Water Flush Seal over the nose inlets.
3. Sport Master gearcases – Install the appropriate flushing attachment so the nose cone cup fits tightly over the intake holes.
4. Attach a water hose to the flushing attachment. Turn on the water and adjust the flow so water is leaking around the rubber cups or nose cone cup to ensure the engine receives an adequate supply of cooling water.
5. Start the engine and run it at idle speed in neutral shift position.
6. Adjust water flow so excess water continues leaking out from around the rubber cups or nose cone cup to ensure the engine is receiving an adequate supply of cooling water.
7. Check for water coming out of the water pump indicator hole. Continue flushing for three to five minutes, carefully monitoring water supply at all times.
8. Stop the engine, turn off the water, and remove the flushing attachment. Install the propeller.

MAINTENANCE

Top Cowl Removal and Installation

REMOVAL

Release the front and side cowl latches. Lift the top cowl from the outboard.



INSTALLATION

Position the top cowl over the engine. Make sure the bottom rubber seal fits properly and lock the front and side latches.

Fuel System

FUEL SYSTEM SERVICE INFORMATION

⚠ WARNING

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

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

Before servicing any part of the fuel system:

- Stop engine and disconnect the battery.
- Drain the fuel system completely.
- Perform fuel system service 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.

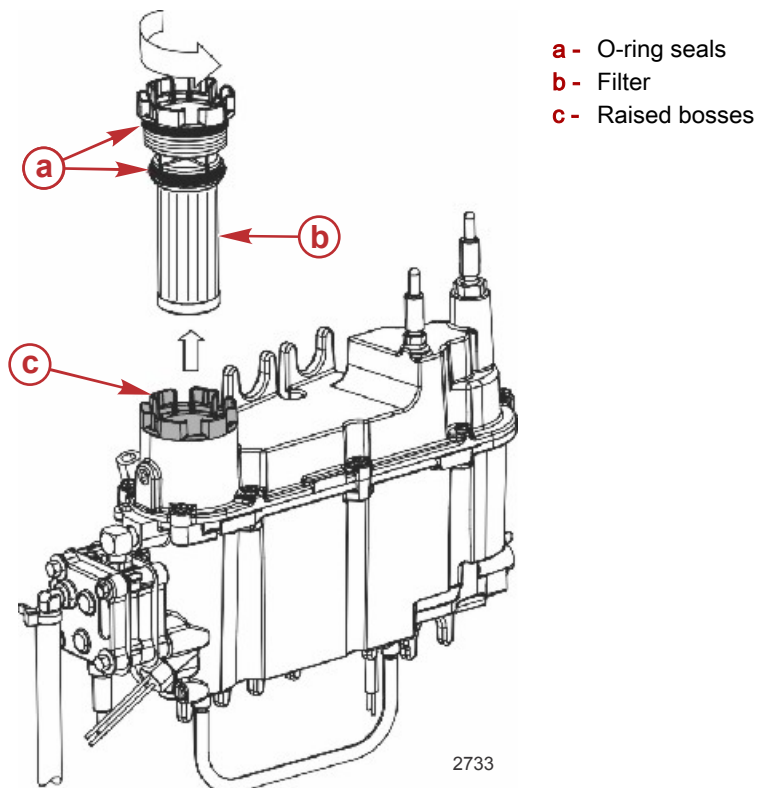
MAINTENANCE

WATER SEPARATING FUEL FILTER

This filter removes moisture and debris from the fuel. If the filter becomes filled with water, the water can be removed. If the filter becomes plugged with debris, replace the filter. The warning system engages when water in the fuel filter reaches the full level. Refer to **Warning System** in **Features and Controls**.

Refer to the **Inspection and Maintenance Schedule** for the proper maintenance interval.

Removal



1. Disconnect the link rod.
2. Use the shaft of a screwdriver between the filter cap bosses and unscrew the filter.

Installation

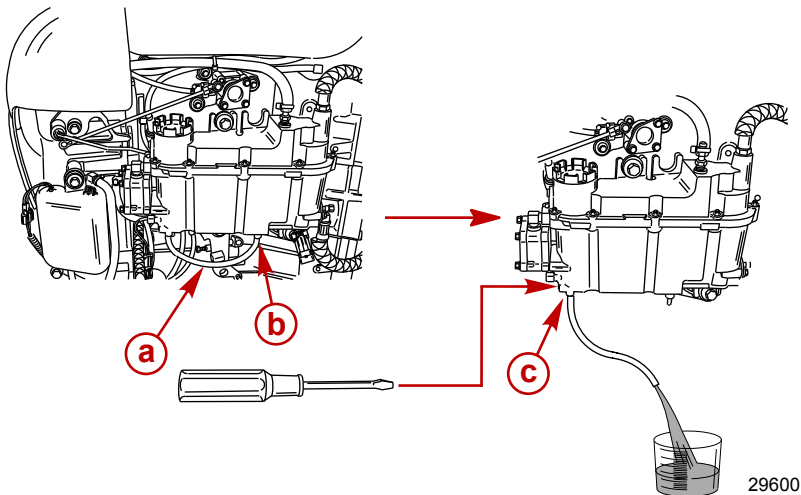
1. Lubricate the O-ring seals with oil.
2. Install the fuel filter and tighten securely.
3. Connect the link rod.

MAINTENANCE

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

DRAINING WATER FROM THE FUEL FILTER CHAMBER

NOTE: If a sufficient amount of water accumulates in the fuel filter chamber, the engine's warning system alerts the operator with the warning horn. Some SmartCraft gauges are capable of alerting the operator of this and other operating conditions/faults. Refer to **Warning System** in the **Features and Controls** section of this manual for more information. If the warning system alerts you to this condition, drain the water from the fuel filter chamber.



- a -** Drain hose
- b -** Aft hose fitting
- c -** Filter drain screw

1. Remove the drain hose from the aft hose fitting (right side of the chamber). Hold the unattached end of the hose over a suitable container.
2. Loosen the filter drain screw (left side of the chamber) and allow the contents to drain.

NOTE: If little or no liquid drains from the hose, loosen the red filter to vent the chamber.

3. Tighten the drain screw and attach the hose.

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

If you experience multiple issues with water in the fuel system over a short period of time, see your authorized Mercury dealer.

MAINTENANCE

Steering Link Rod Fasteners

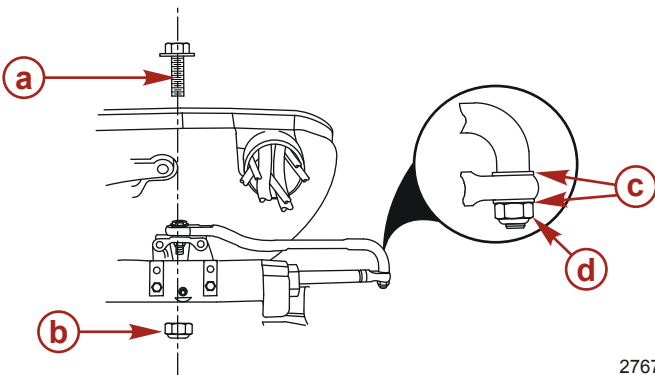
IMPORTANT: The steering link rod that connects the steering cable to the engine must be fastened using a special washer head bolt (P/N 10-849838) and self-locking nylon insert locknuts (P/N 11-826709113). Never replace locknuts with common nuts (nonlocking) as they will work loose and vibrate off, freeing the link rod to disengage.

⚠ WARNING

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

⚠ WARNING

Worn, loose, or seized steering components can lead to loss of boat control. Inspect all steering attachment components for wear, lubricate all attachment hardware, and check all fasteners for proper tightness in accordance with the inspection and maintenance schedule.



2767

- a** - Special washer head bolt (P/N 10-849838)
- b** - Nylon insert locknut (P/N 11-826709113) - used on head bolt
- c** - Flat washer (2)
- d** - Nylon insert locknut (P/N 11-826709113) - used on cable coupler

1. Assemble steering link rod to steering cable coupler with two flat washers "c" and a self-locking nylon insert locknut "d." Tighten the locknut until it seats, then loosen $\frac{1}{4}$ turn.
2. Assemble the steering link rod to the engine with the special washer head bolt "a" and self-locking nylon insert locknut "b."
3. Torque the head bolt, then the locknut to specifications.

MAINTENANCE

Description	Nm	lb-in.	lb-ft
Cable coupler nylon insert locknut "d"	Tighten locknut until it seats, then loosen $\frac{1}{4}$ turn.		
Head bolt nylon insert locknut "b"	27	–	20
Special washer head bolt	27	–	20

Fuses

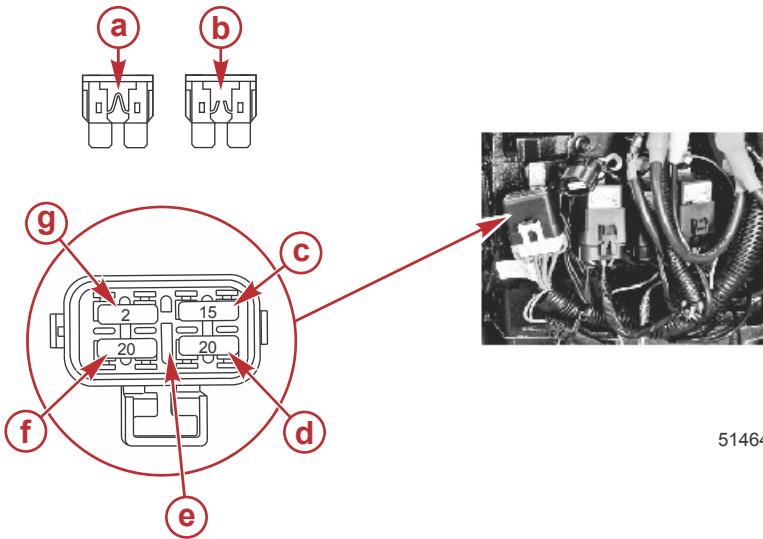
IMPORTANT: Always carry spare 2-, 15-, and 20-amp fuses.

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

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

MAINTENANCE

The fuses and circuits are identified as follows:



51464

Fuse location and identification

- a** - Good fuse
- b** - Blown fuse
- c** - Power-on circuit – 15-amp fuse
- d** - Ignition coil circuit – 20-amp fuse
- e** - Spare fuse slot
- f** - Fuel injector/direct injector/PCM and electric fuel pump circuits – 20-amp fuse
- g** - Diagnostic circuit – 2-amp fuse

Corrosion Control Anodes

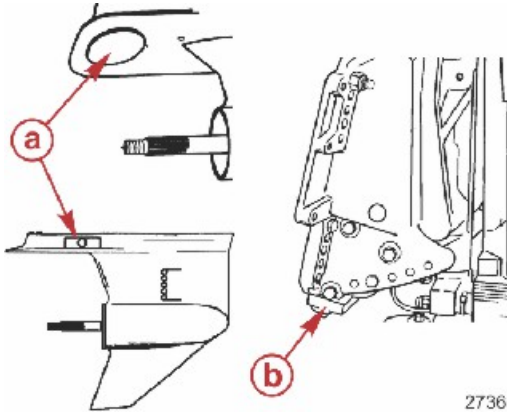
NOTICE

Anodes made of insufficiently pure aluminum alloys may not adequately protect critical drive components from corrosion. We recommend using anodes sold through Mercury Precision Parts only.

Anodes help protect the power package against galvanic corrosion by sacrificing their metal to be slowly eroded instead of other metals.

MAINTENANCE

This model has three corrosion control anodes on the gearcase—two above and one below the anti-ventilation plate. A fourth anode is located on the bottom of the clamp/swivel bracket assembly.



- a - Corrosion control anodes (three on gearcase)
- b - Corrosion control anode (one on clamp/swivel bracket)

2736

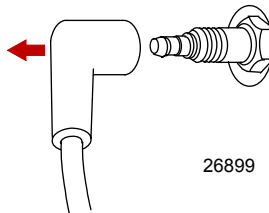
All anodes require periodic inspection, especially in saltwater (refer to the **Inspection and Maintenance Schedule**). Replace any anodes before they are 50% corroded. Never paint or apply protective coating on an anode, as effectiveness of the anode will be reduced.

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 leads by twisting the rubber boots while pulling them off the spark plugs.

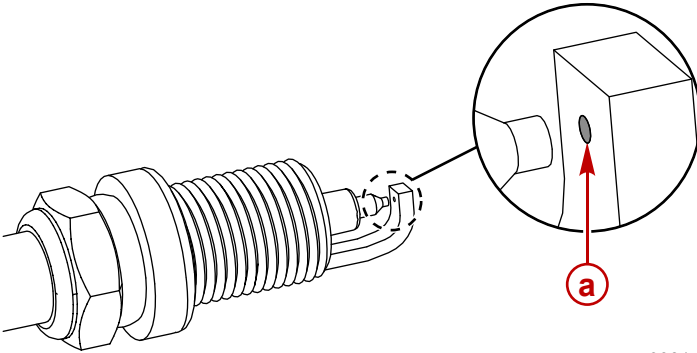


26899

2. Remove the spark plugs. Replace the spark plug if the electrode is worn; the insulator is rough, cracked, broken, or blistered; or if the precious metal is not visible on the spark plug electrode.

MAINTENANCE

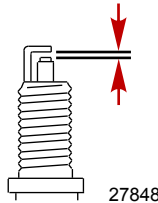
IMPORTANT: The color of the plug may not accurately reflect its condition. To accurately diagnose a faulty plug, inspect the precious metal on the plug's electrode. If no precious metal is visible, replace the plug.



9381

a - Precious metal

3. Set the spark plug gap. Refer to **Specifications**.



- a. All of the spark plugs should have the gap checked and corrected as necessary before installation.
 - b. Measure the gap with a feeler gauge or pin gauge. Never use a wedge-type gap checking tool to inspect or to adjust the gap.
 - c. If an adjustment is necessary, do not pry or apply any force on the center electrode. This is critical with any type of spark plug that has a wear surface, such as platinum or iridium added to either the ground electrode or the center electrode.
 - d. When it is necessary to widen the gap, use a tool that only pulls back on the ground electrode without touching the center electrode, the porcelain, or the wear portion of the ground electrode.
 - e. When it is necessary to close the gap, gently tap the plug ground electrode on a hard surface.
4. Before installing spark plugs, clean off any dirt on the spark plug seats. Install the plugs finger-tight and then tighten an additional 1/4 turn or tighten to the specified torque.

MAINTENANCE

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

Battery Inspection

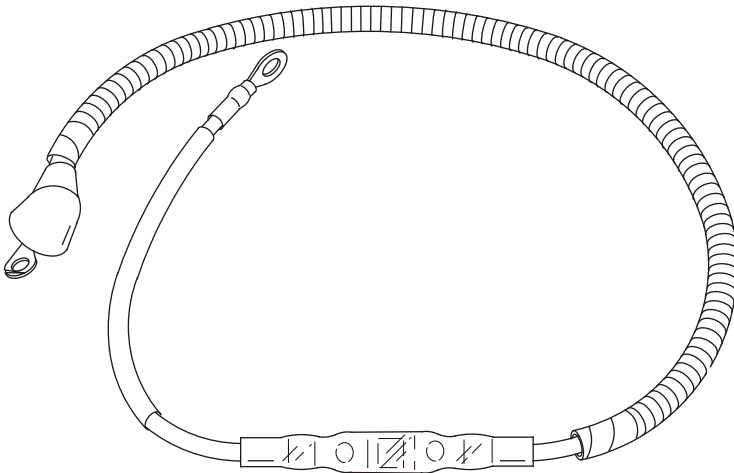
The battery should be inspected at periodic intervals to ensure proper engine starting capability.

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.

Charging System Fusible Link

This model has a 100 amp fusible link between the alternator and the +12 volt stud. This fusible link protects the alternator from damage due to accidental reverse battery connection. If the battery cables are reversed, the fusible link creates an open circuit, protecting the alternator. With the fusible link open, the engine can be started; however, the run time is limited, because the alternator is not charging the boat battery. If the fusible link circuit becomes open, contact your authorized Mercury Marine dealer.



3797

MAINTENANCE

Replacing the Propeller

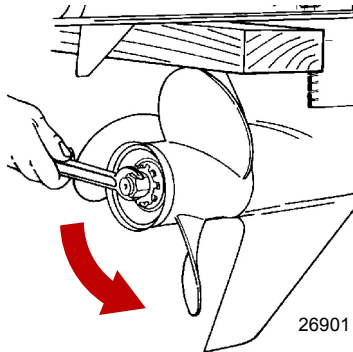
⚠ WARNING

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.

REMOVING THE PROPELLER

NOTE: If propeller is seized to the shaft and cannot be removed, consult your authorized Mercury dealer.

1. Shift the outboard to neutral.
2. Remove the keys from the ignition and engage the safety stop switch.
3. Straighten the bent tabs on the propeller nut retainer (if applicable).
4. Place a block of wood between the gearcase and the propeller to hold the propeller and remove the propeller nut.



5. Remove the propeller and associated hardware from the propeller shaft.

INSTALLING THE PROPELLER

NOTICE

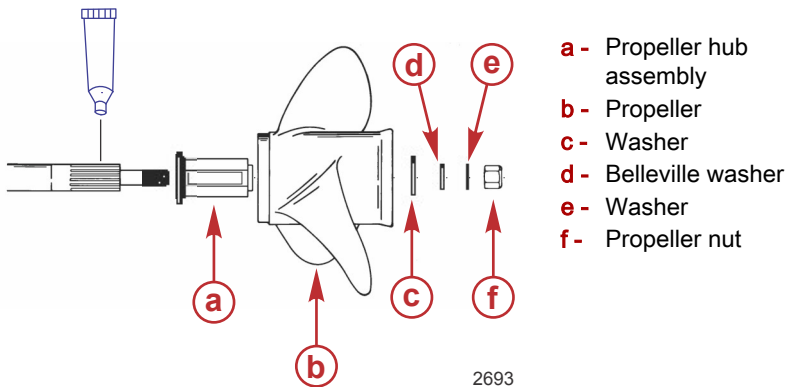
Operating the engine with the wrong propeller installed can limit power, increase fuel consumption, overheat the engine, or cause internal powerhead damage. Choose a propeller that allows the engine to operate at the specified wide open throttle RPM.

Mercury Racing applications use 19-spline propeller shafts and require installation of the Heavy-Duty Propeller Hub kit, included with most Mercury Racing propellers.

MAINTENANCE

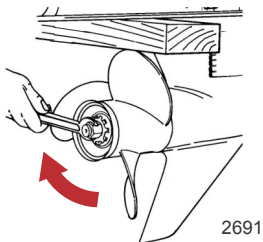
IMPORTANT: To prevent the propeller hub from corroding and seizing to the propeller shaft, especially in salt water, always apply a coat of Extreme Grease to the entire propeller shaft at the recommended maintenance intervals and also each time the propeller is removed.

1. Lubricate the propeller shaft splines with Extreme Grease.
2. Install the propeller hub assembly, propeller, washer, Belleville washer, washer, and propeller nut onto the propeller shaft.



Tube Ref No.	Description	Where Used	Part No.
	Extreme Grease	Propeller shaft splines	8M0071842

3. Place a block of wood between the gearcase and propeller and torque the propeller nut.



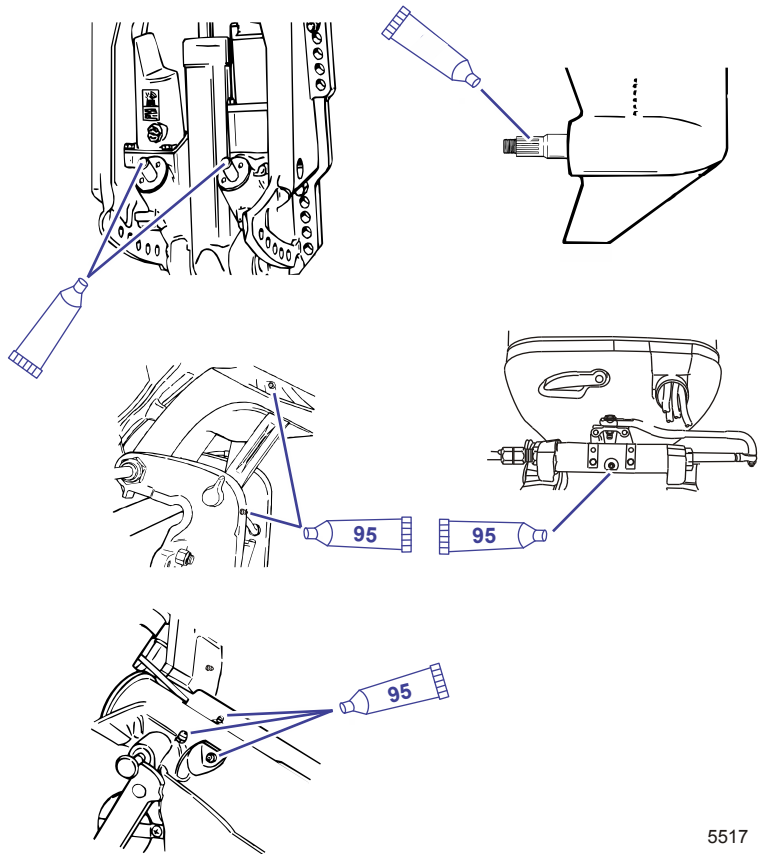
Description	Nm	lb-in.	lb-ft
Propeller nut	75	–	55

4. Disengage the safety stop switch by placing it in the RUN position and return the keys to the ignition switch.



MAINTENANCE

Lubrication Points

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



5517

Tube Ref No.	Description	Where Used	Part No.
	Extreme Grease	Trim rod ball ends, propeller shaft	8M0071842
	2-4-C with PTFE	Swivel bracket, tilt support lever, tilt tube	92-802859A 1

NOTE: Turn the ball ends to work the lubricant into the ball sockets. Lubricate through fittings.

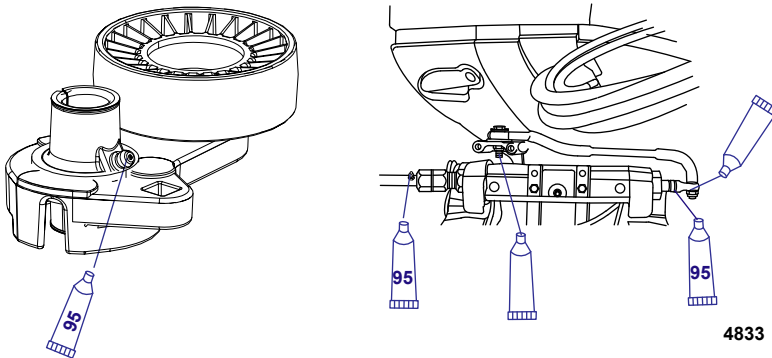
MAINTENANCE

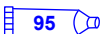
⚠ WARNING

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.

Lubricate the steering link with lightweight oil.

Lubricate the belt tensioner pulley and steering cable with 2-4-C with PTFE.



Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with PTFE	Steering cable, grease fitting on belt tensioner pulley	92-802859A 1

Single-Ram Trim System

GENERAL INFORMATION

The single-ram (heavy-duty) trim pump is installed in a remote location, usually inside the engine motor well. It is available on all offshore models. The heavy-duty trim system:

- Is intended for offshore applications.
- Is not integrated into the engine (like the three-ram system).
- Requires the heavy-duty (offshore) transom bracket and midsection.
- Includes a trim stop pin to limit the degree of which the outboard is tucked under.

IMPORTANT: The trim system has no trim out limits. Exercise care that engine is not trimmed out beyond safe operation limits.

To install the single-ram trim system, order the the Heavy-Duty Trim Pump assembly and refer to the instructions included with the pump for installation.

MAINTENANCE

Optional Accessories	
Assembly	Part Number
Floor Mount Kit	842109A01
Bracket Assembly	87762A2

POWER TRIM OPERATION (SINGLE-RAM SYSTEM)

The trim system has no trim out limits. Exercise care that engine is not trimmed out beyond safe operation limits.

⚠ WARNING

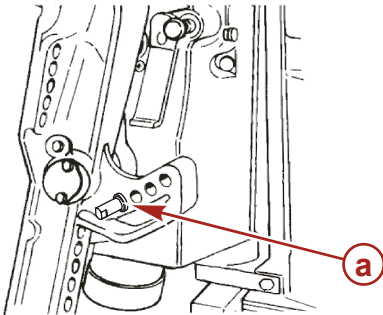
Trimming the outboard beyond a neutral steering condition may result in a pull on the steering wheel or tiller handle and loss of boat control. Maintain control of the boat if trimming beyond a neutral steering condition.

The outboard can be operated beyond the 20° trim limit if operating outboard in shallow water as long as the engine RPM is kept below 1200 RPM.

⚠ WARNING

Operating a boat in a trim up position can cause severe equipment damage or loss of boat control. This product may not have a trim out limiting device or trim indicator. Never trim up beyond the unit's side support flanges while the boat is underway or at engine speeds above 1200 RPM.

TRIM IN PIN (SINGLE-RAM)



a - Trim in pin

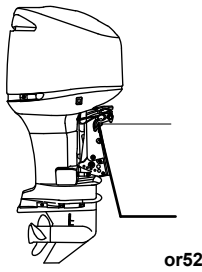
15280

Install the trim stop pin to the desired adjustment hole in the heavy duty swivel bracket. This pin is included with heavy-duty models.

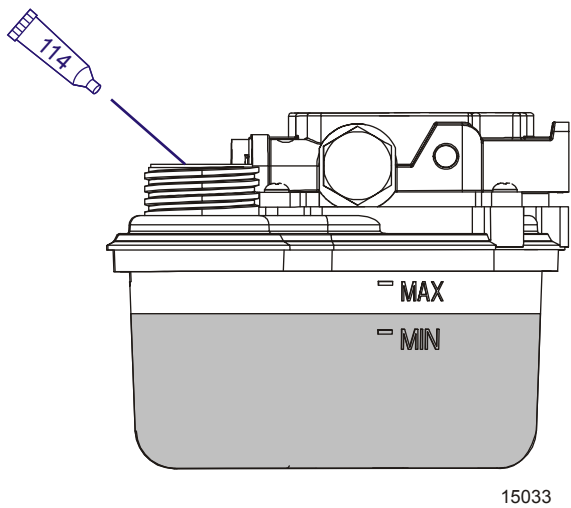
MAINTENANCE


CHECKING POWER TRIM FLUID (SINGLE-RAM TRIM SYSTEMS)

1. Place outboard in the full down/in position.



2. Check the fluid level in the trim pump reservoir. The level should be between the "MIN" and "MAX" level marks on the reservoir.
3. If necessary, remove the yellow fill cap and add Power Trim and Steering Fluid until the level in the reservoir reaches the "MIN" level mark. It is acceptable to fill the reservoir beyond the "MIN" level mark, but do not overfill past the "MAX" level mark.



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

4. Trim the outboard down to bleed air out of the system. The fluid level may drop. Add more Power Trim and Steering Fluid if necessary, but do not overfill past the "MAX" level mark.

MAINTENANCE

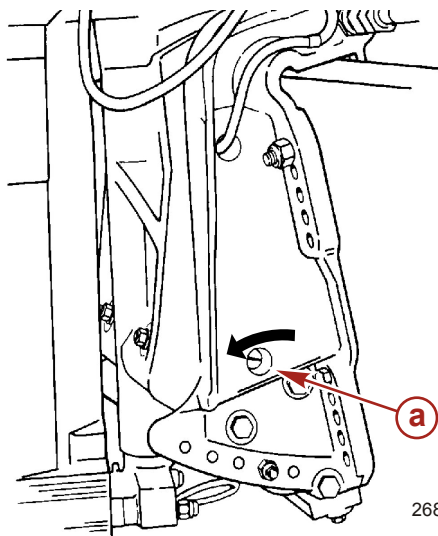
5. Replace the fill cap.

Three-Ram Trim System

GENERAL INFORMATION

The power trim system was filled prior to shipment and is ready for use.

The outboard can be raised or lowered manually by loosening the manual release valve four turns.



a - Manual release valve

The trim out angle of this outboard is not adjustable. The trim system has an internal valve, which will automatically stop the outward trim travel at 20° when engine RPM is approximately 2000 RPM or higher; outboard also has to be in water and in gear.

The outboard can be operated beyond the 20° trim limit for operating outboard in shallow water if engine RPM is kept below approximately 2000 RPM.

POWER TRIM OPERATION (THREE-RAM SYSTEM)

⚠ WARNING

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

MAINTENANCE

With most boats, operating around the middle of the trim range will give satisfactory results. However, to take full advantage of the trimming capability, there may be times when you choose to trim your outboard all the way in or out. Along with an improvement in some performance aspects comes a greater responsibility for the operator, and this is being aware of some potential control hazards. The most significant of which is a pull or torque, which can be felt on the steering wheel. This steering torque results from the outboard being trimmed so that the propeller shaft is not in a horizontal position.

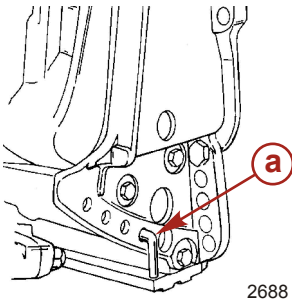
TRIM IN PIN (THREE-RAM)

⚠ WARNING

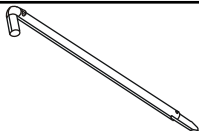
Operating the boat at high speeds with the outboard trimmed too far under can create excessive bow steer, resulting in the operator losing control of the boat. Install the trim limit pin in a position that prevents excessive trim under and operate the boat in a safe manner.

Some boats, particularly some bass boats, are built with a greater than normal transom angle, which will allow the outboard to be trimmed further in or under. This greater trim under capability is desirable to improve acceleration, reduce the angle and time spent in a bow high boat during planing off, and in some cases, may be necessary to plane off a boat with aft live wells, given the variety of available propellers and height range of engine installations.

However, once on plane, the engine should be trimmed to a more intermediate position to avoid a bow-down planing condition called plowing. Plowing can cause bow steering or oversteering and inefficiently consumes horsepower.



a - Tilt pin (not included with engine)

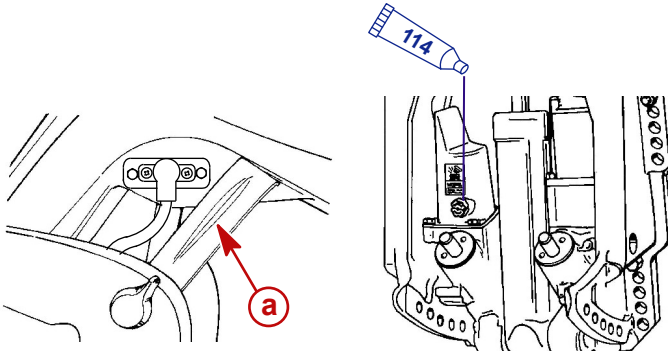
Stainless Steel Tilt Pin	17- 49930A 1
 2749	Limits the down trim angle of the power trim equipped engines, or aids in determining the trim out angle on non-power trim engines.

The owner may decide to limit the trim in. For standard models, purchase a stainless steel tilt pin from your dealer and insert it in whatever adjustment hole in the transom brackets is desired.

MAINTENANCE


CHECKING POWER TRIM FLUID (THREE-RAM TRIM SYSTEMS)

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



or47-1

a - Tilt support lock

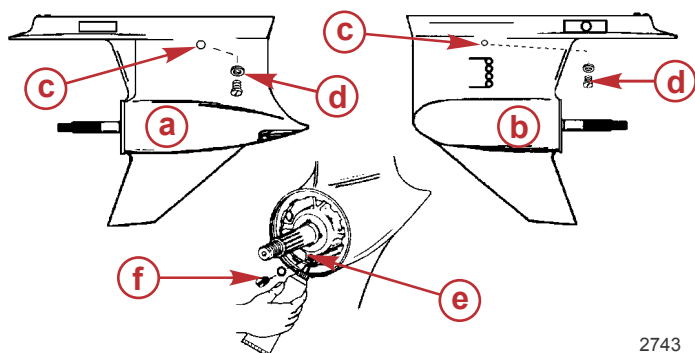
Tube Ref. No.	Description	Where Used	Part Number
 114	Power Trim and Steering Fluid	Fill hole	92-802880A1

2. Remove fill cap and check fluid level. The fluid level should be even with the bottom of the fill hole. Add fluid if required.

MAINTENANCE


Gearcase Lubricant

CHECKING/REFILLING GEARCASE LUBRICANT



2743

- a** - Sport Master gearcase (vertical operating position)
- b** - Fleet Master gearcase (vertical operating position)
- c** - Vent hole
- d** - Vent plug and sealing washer
- e** - Fill/drain hole
- f** - Fill/drain plug

Tube Ref No.	Description	Where Used	Part No.
	SAE 85W90 Mercury Racing Gear Oil	Gearcase	8M0078015

1. Place the outboard in a vertical operating position.
2. Remove the vent plug (upper plug) and sealing washer.
3. Remove the fill/drain plug (lower plug).
4. Quickly place lubricant tube into the fill hole.
5. Slowly add lubricant until it flows from the (upper) vent hole.
6. Stop adding lubricant. Install the (upper) vent plug and sealing washer before removing the lubricant tube.

IMPORTANT: Replace sealing washers if damaged.

NOTE: Examine the magnetic fill/drain plug for metal particles. A small amount of metal filings or fine metal particles indicates normal gear wear. An excessive amount of metal filings or larger particles (chips) should be checked by an authorized dealer.

7. Remove lubricant tube and reinstall cleaned (lower) fill/drain plug and sealing washer.

MAINTENANCE

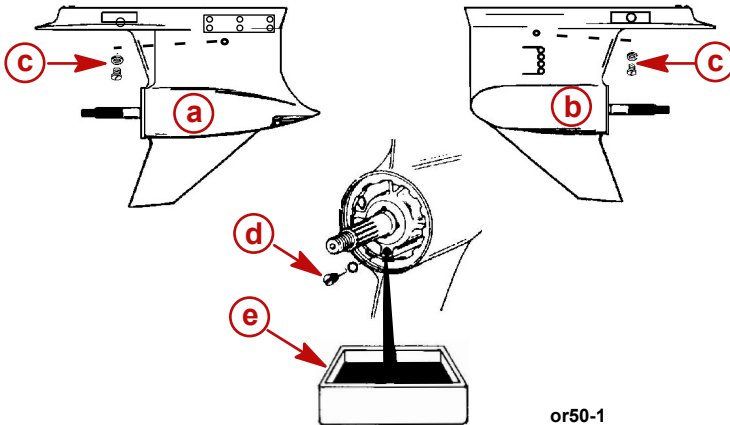
Water in gear lubricant may:

- Settle to bottom and drain out with the lubricant
- Be mixed with lubricant giving a milky color to the lubricant

Water in gear lubricant will:

- Result in premature bearing failure
- In freezing temperatures, turn to ice and damage gearcase

DRAINING THE GEARCASE



- a** - Sport Master gearcase (vertical operating position)
- b** - Fleet Master gearcase (vertical operating position)
- c** - Vent plug and sealing ring
- d** - Fill/drain plug and sealing ring
- e** - Drain pan

1. Place the outboard in a vertical operating position.
2. Place a drain pan below the outboard gearcase.
3. Remove the vent plug (upper plug) and sealing ring.
4. Remove the fill/drain plug (lower plug) and sealing ring and drain the lubricant.

GEARCASE LUBRICANT CAPACITY

Gearcase lubricant capacity is approximately 710 ml (24 oz).

Submerged Power Package

A submerged power package requires prompt service by an authorized dealer after recovery. This immediate attention 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. Follow these storage procedures to prepare your outboard for out-of-season or prolonged storage (two months or longer).

NOTICE

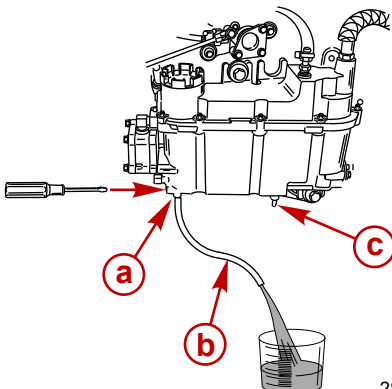
Without sufficient cooling water, the engine, the water pump, and other components will overheat and suffer damage. Provide a sufficient supply of water to the water inlets during operation.

FUEL SYSTEM

IMPORTANT: Fuel containing alcohol (ethanol or methanol) can cause a formation of acid during storage that can damage the fuel system. If the fuel being used contains alcohol, Mercury Marine recommends draining as much of the remaining fuel as possible from the fuel tank, remote fuel line, and engine fuel system.

The most effective method for storage preparation is to add the recommended amount of Mercury Precision Fuel Stabilizer and Mercury Precision Quickleen products, as described on their respective containers, to the fuel tank before the final operation of the boat prior to storage. Fuel Stabilizer helps prevent the formation of varnish and gum in the fuel. Quickleen helps clean and lubricate the fuel injectors.

1. Pour additives into the fuel:
 - a. Portable Fuel Tank - Pour the required amount of fuel stabilizer into fuel tank. Close the tank and tip back and forth to mix.
 - b. Permanently Installed Fuel Tank - Pour the required amount of fuel stabilizer into a separate container. Add approximately one quart of fuel to the container. Mix and pour into the fuel tank.
2. Remove the drain hose from the aft hose fitting (right side of the chamber). Hold the unattached end of the hose over a suitable container.



- a - Filter drain screw
- b - Drain hose
- c - Aft hose fitting

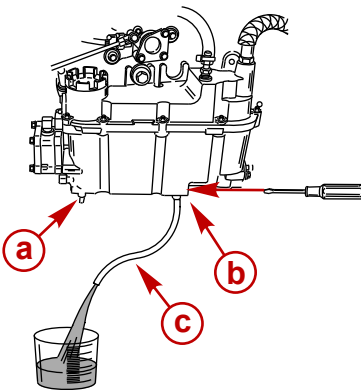
28956

STORAGE

3. Loosen the filter drain screw (left side of the chamber) and allow the contents to drain.

NOTE: *If little or no liquid drains from the hose, loosen the red filter to vent the chamber.*

4. Tighten drain screw and reattach the hose.
5. Remove the drain hose from the forward hose fitting (left side of the chamber). Hold the unattached end of the hose over a suitable container.



- a - Forward hose fitting
- b - Float chamber drain screw
- c - Drain hose

29451

6. Loosen the float chamber drain screw (right side of the chamber) and allow the contents to drain.
7. Tighten drain screw and reattach the hose.
8. Premix the following in a container:
 - 8 cc (0.3 oz.) or 2 teaspoons of Mercury Precision Quickleen lubricant.
 - 8 cc (0.3 oz.) or 2 teaspoons of Mercury Precision Fuel Stabilizer.
9. Remove the fuel filter. Refer to **Fuel System** in the **Maintenance** section of this manual.
10. Pour the mixture into the fuel filter opening.
11. Install the fuel filter.
12. Prime the fuel system as described in the **Starting the Engine** in the **Operation** section of this manual.
13. Place the outboard in water or use the flushing attachment for circulating cooling water. Start the engine and run at idle speed for 5 minutes to allow the treated fuel to fill the fuel system.

Protecting Internal Engine Components

NOTE: *Make sure the fuel system has been prepared for storage. Refer to **Fuel System**, preceding.*


IMPORTANT: Refer to **Spark Plug Inspection and Replacement** for correct procedure for removing spark plug leads.

STORAGE

1. Remove the spark plugs and add approximately 30 ml (1 oz) of engine oil into each spark plug hole.
2. Rotate the flywheel manually several times to distribute the oil in the cylinders.
3. Install the spark plugs.

Protecting External Outboard Components

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

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

Gearcase

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

Positioning Outboard for Storage

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

NOTICE

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

Battery Storage

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

TROUBLESHOOTING

Starter Motor Will Not Crank the Engine

POSSIBLE CAUSES

- Blown 20-amp fuse in the starting circuit. Refer to **Maintenance**.
- Outboard is not shifted to neutral position.
- Weak battery or battery connections are loose or corroded.
- Ignition key switch failure.
- Wiring or electrical connection faulty.
- Starter motor solenoid or slave solenoid failure.

Engine Will Not Start

POSSIBLE CAUSES

- Lanyard stop switch not in "RUN" position.
- Battery not fully charged.
- 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.
- Open 20-amp fuse. Check fuses, refer to **Maintenance** section.
- Threaded connection of an air hose is loose.
- Ignition system component failure.
- Spark plugs fouled or defective. Refer to **Maintenance** section.

Engine Runs Erratically

POSSIBLE CAUSES

- 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 on built-in fuel tank.

TROUBLESHOOTING

- d. Fuel line is kinked or pinched.
- e. Injector plugged.
- Threaded connection of an air hose is loose.
- Fuel pump failure.
- Ignition system component failure.

Performance Loss

POSSIBLE CAUSES

- Throttle not fully open.
- Damaged propeller or improper propeller size.
- Boat overloaded or load improperly distributed.
- Excessive water in bilge.
- Boat bottom is dirty or damaged.

Warning Horn Activates (With Power Loss)

POSSIBLE CAUSES

- Intermittent horn sound:
 - The oil level in the engine-mounted oil reservoir tank is low. Refill the reservoir tank and the remote oil tank. Refer to **Fuel and Oil** for details.
 - Battery voltage is out of limits.
 - Throttle position sensor failure.
- Continuous horn sound:
 - The oil level in the engine-mounted oil reservoir tank is critically low. Refill the reservoir tank and the remote oil tank. Refer to **Fuel and Oil** for details.
 - The oil pump has failed, halting the oil supply to the engine.
 - High engine temperature or low block water pressure.
 - Cooling system clogged.
 - Incorrect transom height (water pickups not getting adequate water supply).

Warning Horn Activates (No Power Loss)

POSSIBLE CAUSES

- Warning horn activates on start up. This is normal operation.
- Water is detected in the water-separating fuel filter. Refer to **Maintenance** for procedures on removing water from the filter.

TROUBLESHOOTING

Battery Will Not Hold Charge

POSSIBLE CAUSES

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

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				.

OUTBOARD INSTALLATION

Mercury Marine Validated Engine Mounting Hardware

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

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



51965

Accessories Mounted to the Transom Clamp Bracket

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

OUTBOARD INSTALLATION

⚠ WARNING

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

ACCEPTABLE ACCESSORY MOUNTING TO THE TRANSOM CLAMP BRACKET

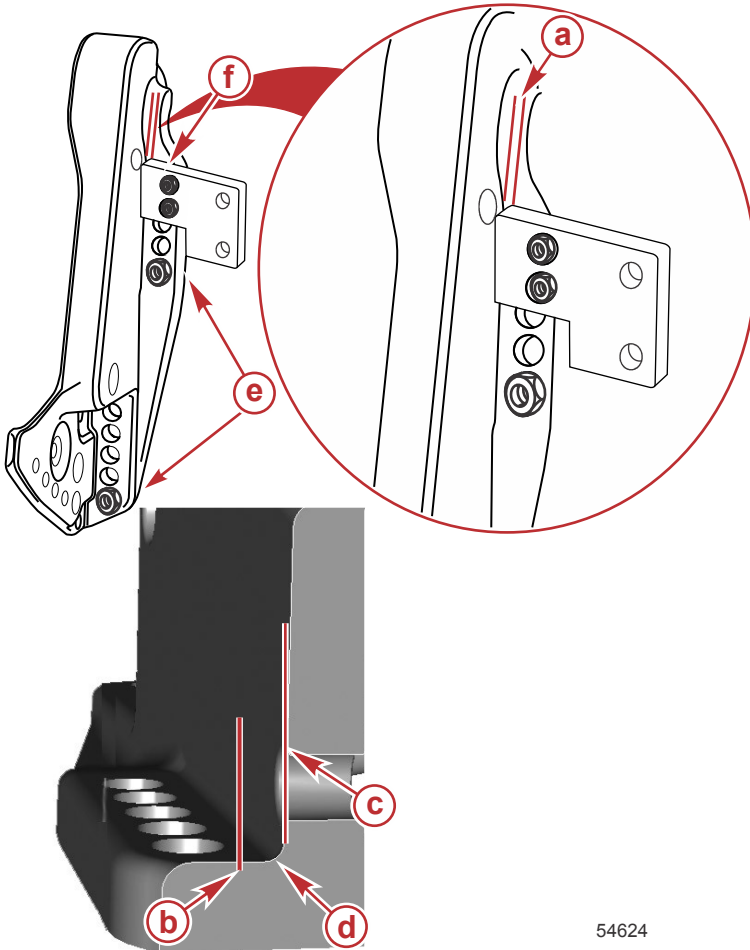
After the engine is mounted to the transom or jack plate in accordance with the engine installation instructions, it is acceptable to attach an accessory to the boat by use of the unused bolt holes in the transom clamp bracket as shown in Figure 1.

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

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

OUTBOARD INSTALLATION

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



54624

Figure 1

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

OUTBOARD INSTALLATION

UNACCEPTABLE ACCESSORY MOUNTING

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

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

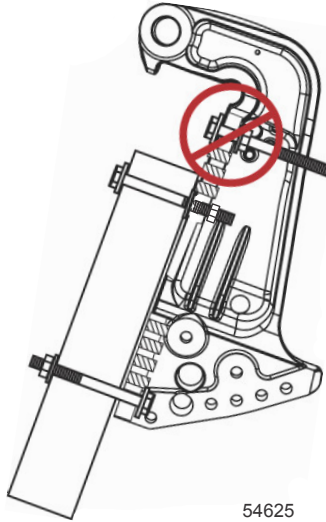


Figure 2

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

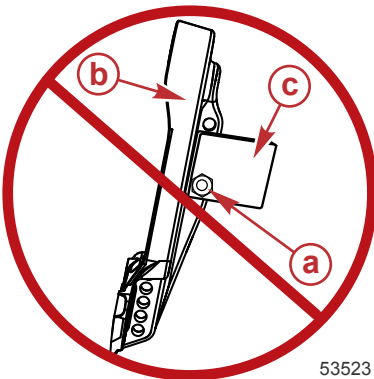


Figure 3

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

OUTBOARD INSTALLATION

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

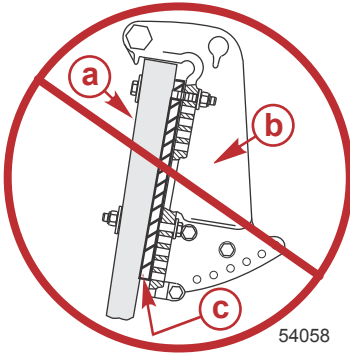


Figure 4

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

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.

OUTBOARD INSTALLATION

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.

Fuel System

AVOIDING FUEL FLOW RESTRICTION

IMPORTANT: Adding components to the fuel supply system (filters, valves, fittings, etc.) may restrict the fuel flow. This may cause engine stalling at low speed, and/or a lean fuel condition at high RPM that could cause engine damage.

ELECTRIC FUEL PUMP

The fuel pressure must not exceed 28 kPa (4 psi). If necessary, install a pressure regulator.

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:

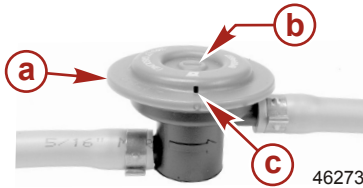
- An air inlet that opens to allow air to enter as the fuel is drawn out of the tank.
- An air outlet that opens (vents) to the atmosphere if pressure exceeds 34.4 kPa (5.0 psi).

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.

OUTBOARD INSTALLATION

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

FUEL TANKS

Portable Fuel Tank

Select a suitable location in the boat within the engine fuel line length limitations and secure the tank in place.

Permanent Fuel Tank

Permanent fuel tanks should be installed in accordance with industry and federal safety standards, which include recommendations applicable to grounding, antisiphon protection, ventilation, etc.

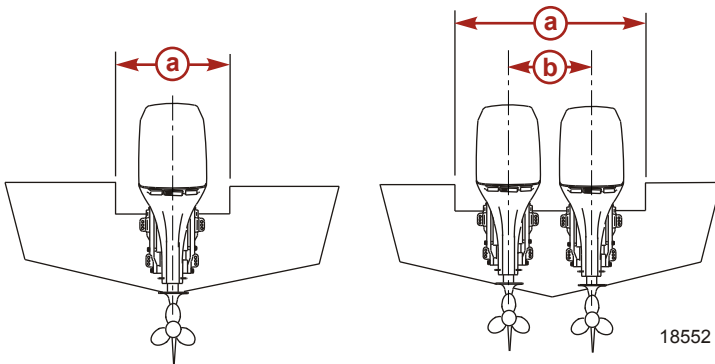
FILLING THE FUEL SYSTEM

For the initial start of a new engine, or for an engine that ran out of fuel or was drained of fuel, the fuel system should be filled as follows:

1. Squeeze the fuel line primer bulb until it feels firm.
2. Turn the ignition key switch to the "ON" position for three seconds. This operates the electric fuel pump.
3. Turn the ignition key switch back to the "OFF" position, and squeeze the primer bulb again until it feels firm. Turn the ignition key switch to the "ON" position again for three seconds. Continue this procedure until the fuel line primer bulb stays firm.

OUTBOARD INSTALLATION

Installation Specifications



- a** - Minimum transom opening
- b** - Engine centerline for dual engine - 66.0 cm (26 in.)

Minimum Transom Opening	
Single engine	84.8 cm (33-3/8 in.)
Dual engine	151.8 cm (59-3/4 in.)

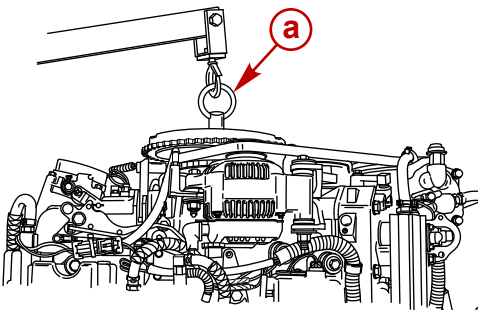
Lifting the Outboard

⚠ WARNING

Improperly supporting an engine during lifting can result in the engine falling, causing serious injury or death. Before lifting the engine, verify that the lifting ring is threaded into the flywheel for a minimum of five turns and that the hoist has the correct lifting capacity for the engine weight.

To lift the outboard:

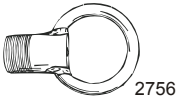
1. Remove the cowl from the outboard.
2. Thread the lifting eye into the flywheel hub for a minimum of five turns.



- a** - Lifting eye

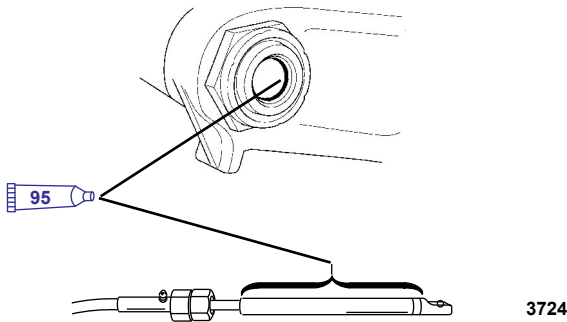
OUTBOARD INSTALLATION


- 3. Connect a hoist to the lifting eye.
- 4. Lift the outboard and place it on the boat transom.

Lifting Eye	91-90455--1
	Threads into the flywheel to remove the powerhead assembly from the driveshaft housing, or to lift entire engine for removal/installation.

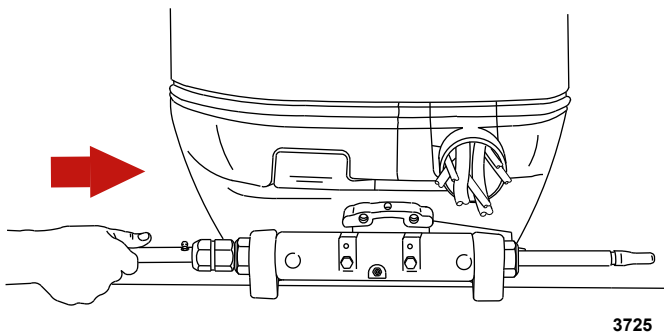
Steering Cable - Starboard Side Routed Cable

- 1. Lubricate the O-ring seal and the entire cable end.



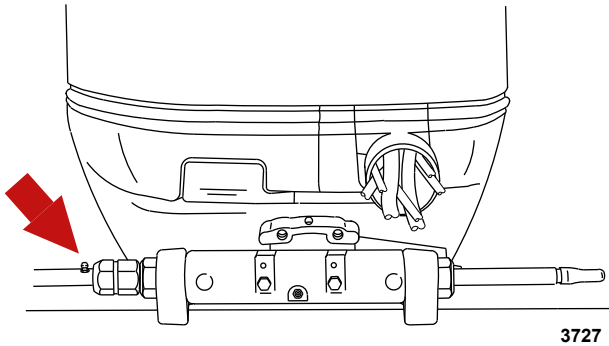
Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with PTFE	O-ring seal and entire cable end	92-802859A 1

- 2. Insert the steering cable into the tilt tube.



OUTBOARD INSTALLATION

3. Tighten the nut to the specified torque.



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

Steering Link Rod Fasteners

IMPORTANT: The steering link rod that connects the steering cable to the engine must be fastened using a special washer head bolt (P/N 10-849838) and self-locking nylon insert locknuts (P/N 11-826709113). Never replace locknuts with common nuts (nonlocking) as they will work loose and vibrate off, freeing the link rod to disengage.

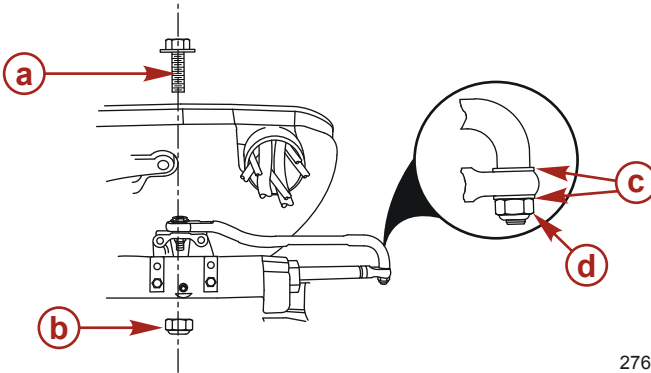
⚠ WARNING

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

OUTBOARD INSTALLATION

⚠ WARNING

Worn, loose, or seized steering components can lead to loss of boat control. Inspect all steering attachment components for wear, lubricate all attachment hardware, and check all fasteners for proper tightness in accordance with the inspection and maintenance schedule.



2767

- a** - Special washer head bolt (P/N 10-849838)
- b** - Nylon insert locknut (P/N 11-826709113) - used on head bolt
- c** - Flat washer (2)
- d** - Nylon insert locknut (P/N 11-826709113) - used on cable coupler

1. Assemble steering link rod to steering cable coupler with two flat washers "c" and a self-locking nylon insert locknut "d." Tighten the locknut until it seats, then loosen $\frac{1}{4}$ turn.
2. Assemble the steering link rod to the engine with the special washer head bolt "a" and self-locking nylon insert locknut "b."
3. Torque the head bolt, then the locknut to specifications.

Description	Nm	lb-in.	lb-ft
Cable coupler nylon insert locknut "d"	Tighten locknut until it seats, then loosen $\frac{1}{4}$ turn.		
Head bolt nylon insert locknut "b"	27	–	20
Special washer head bolt	27	–	20

Rear-Mounted Steering Rams or Tie Bars

Offshore Models Only

To install rear-mounted steering rams or tie bars, follow the instructions included with the steering kit and observe the following guidelines:

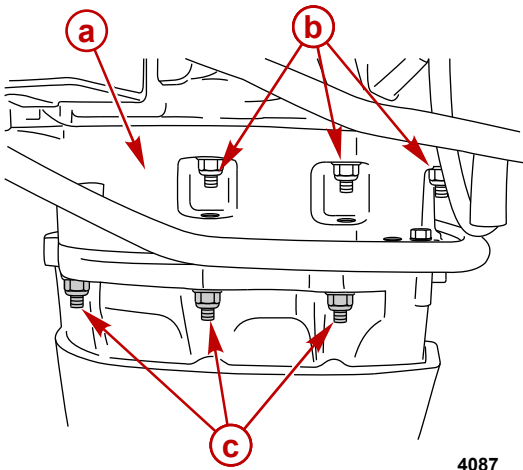
- Install the steering brackets to the driveshaft housing mounting studs (lower studs).

OUTBOARD INSTALLATION

- Do not install the steering brackets to the powerhead studs (upper studs).
- Trim the port and starboard bottom cowls as needed.

NOTICE

Attaching rear-mounted steering rams or tie bars to the powerhead studs may cause cylinder distortion and premature engine failure. Attach steering brackets to the correct installation locations.



- a - Exhaust adapter plate
- b - Powerhead studs
- c - Steering bracket mounting locations (driveshaft housing mounting studs)

Determining Outboard Mounting Height

INCREASING OUTBOARD MOUNTING HEIGHT

Increasing the height of the outboard generally provides more steering torque, more top speed, and more propeller cavitation, particularly noticeable when planing off or when operating with a heavy load.

Observe the following:

- Monitor water pressure and engine temperature at all times. Improper mounting height may result in reduced available power due to low water pressure and high temperature.
- Prevent exhaust restriction, which could result in poor idle performance, by mounting the outboard high enough on the transom to keep the exhaust relief hole at least 25 mm (1 in.) above the waterline when the engine is operating at idle speed.
- All gearcase models except Sport Master: Be sure that the outboard mounting height does not exceed 71.1 cm (28 in.). Mounting outboards with these gearcases too high exposes the upper water inlets, causing possible damage to the powerhead from loss of water pressure.

OUTBOARD INSTALLATION

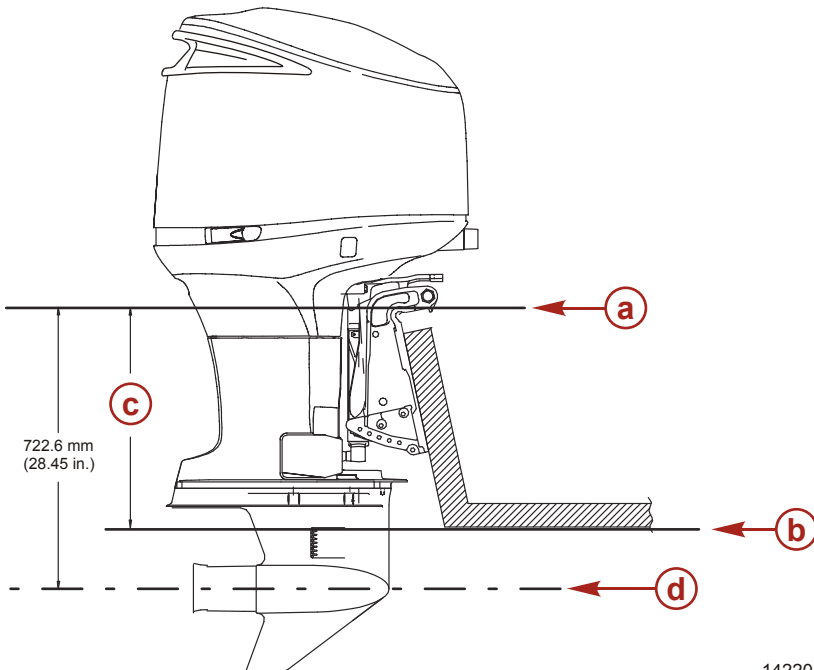
MOUNTING HEIGHT - FLEET MASTER GEARCASE

⚠ WARNING

Improper installation of an outboard can result in serious injury or death. Do not allow the upper outboard mounting bolts to be closer than 25 mm (1 in.) from the top of the boat transom, not including any shims used to increase transom mounting height. Never install the upper mounting bolts through these shims.

Install the outboard to a height so that the distance between the underside of transom bracket hooks and the bottom of the boat (measurement "c" in the diagram below) falls between the recommended mounting height range. Ensure that this measurement is to the actual bottom of the boat, not to any steps or notches in the hull.

IMPORTANT: The recommended mounting height is based on performance testing with single-engine applications on hulls with no stepped or notched transoms. Your results may vary, depending on hull design.



14220

- a** - Underside of transom bracket hooks
- b** - Bottom of the boat
- c** - Distance between "a" and "b"
- d** - Propeller shaft centerline

OUTBOARD INSTALLATION

Item	Model	Recommended Mounting Height Range
c	25 in. driveshaft models	533–609 mm (21–24 in.)
c	30 in. driveshaft models	660–736 mm (26–29 in.)

MOUNTING HEIGHT - SPORT MASTER GEARCASE

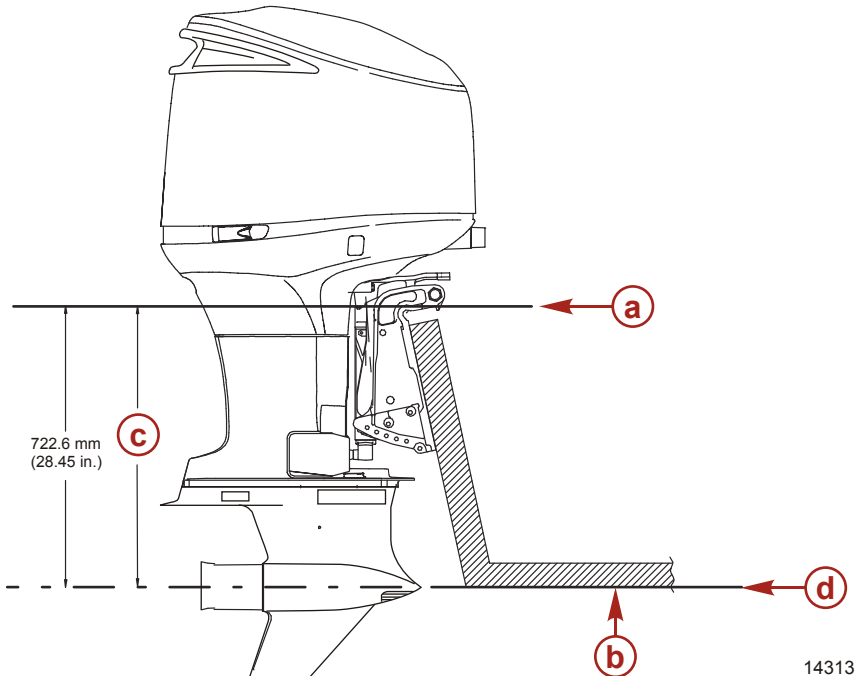
WARNING

Improper installation of an outboard can result in serious injury or death. Do not allow the upper outboard mounting bolts to be closer than 25 mm (1 in.) from the top of the boat transom, not including any shims used to increase transom mounting height. Never install the upper mounting bolts through these shims.

Install the outboard to a height so that the distance between the underside of transom bracket hooks and the bottom of the boat (measurement "c" in the diagram below) falls between the recommended mounting height range. Ensure that this measurement is to the actual bottom of the boat, not to any steps or notches in the hull.

OUTBOARD INSTALLATION

IMPORTANT: The recommended mounting height is based on performance testing with a single-engine application on a hull with no stepped or notched transoms. Your performance results may vary, depending on hull design. For best overall performance on boats with Sport Master gearcases, try to mount the outboard so the propeller shaft centerline is even with the bottom of the boat, as this gearcase is designed for surfacing applications.



- a** - Underside of transom bracket hooks
- b** - Bottom of the boat
- c** - Distance between "a" and "b"
- d** - Propeller shaft centerline

Item	Model ¹	Recommended Mounting Height Range
c	20 in. driveshaft models	685–732 mm (27–30 in.)

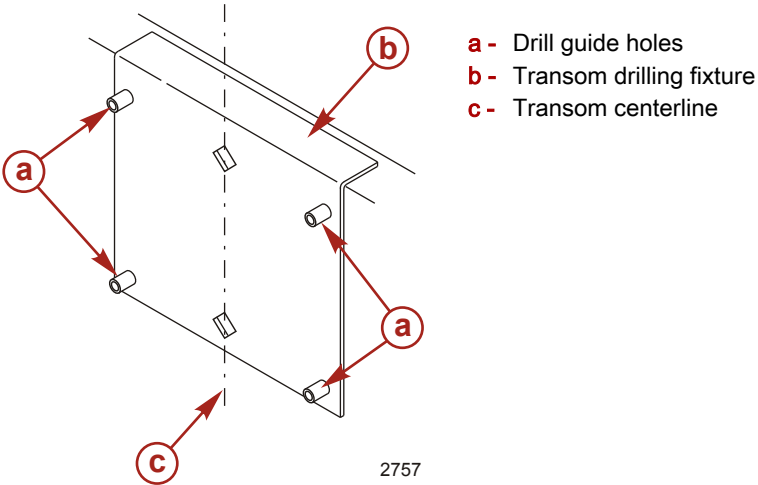
Drilling Outboard Mounting Holes

IMPORTANT: Before drilling any mounting holes, carefully read **Determining Outboard Mounting Height** and install outboard to the nearest recommended mounting height.

1. Some models may not be available with this outboard.

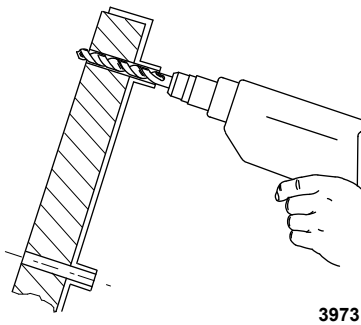
OUTBOARD INSTALLATION

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



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

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



OUTBOARD INSTALLATION

Fastening the Outboard to the Transom

MOUNTING BOLTS

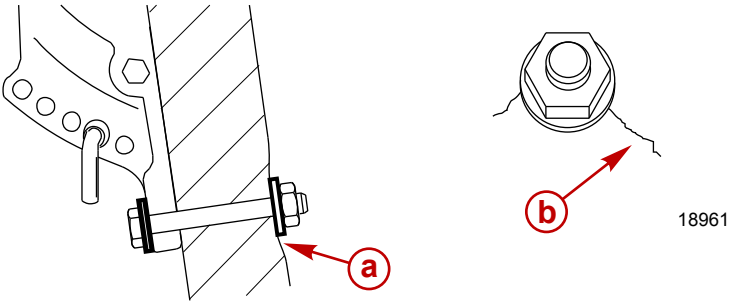
Outboard Transom Mounting Hardware - Supplied with Outboard		
Part Number	Part Name	Description
8M0071543	Outboard mounting bolt	½-20 x 5.00 in. long (3.25 in. thread)
826711-17	Nylon insert locknut	½-20
28421	Flat washer	1.50 in. diameter
54012	Flat washer	0.875 in. diameter

Available Outboard Mounting Bolts	
Part Number	Description
67755005	½-20 x 2.50 in. long (1.25 in. thread)
67755006	½-20 x 3.50 in. long (1.25 in. thread)
814259	½-20 x 4.00 in. long (2.25 in. thread)
67755-1	½-20 x 4.50 in. long (2.25 in. thread)
8M0071543	½-20 x 5.00 in. long (3.25 in. thread)
8M0038370	½-20 x 5.50 in. long (3.25 in. thread)
67755-2	½-20 x 6.50 in. long (2.75 in. thread)
8M0028080	½-20 x 7.50 in. long (2.75 in. thread)
8M0032860	½-20 x 8.00 in. long (2.75 in. thread)

OUTBOARD INSTALLATION

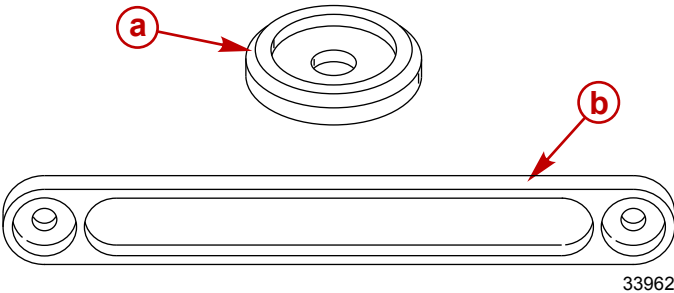
CHECKING BOAT TRANSM CONSTRUCTION

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



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

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

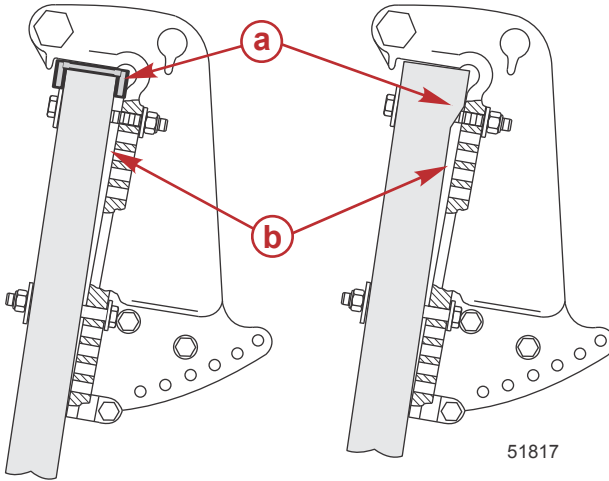


- a** - Large transom washer
- b** - Transom reinforcement plate

OUTBOARD INSTALLATION

FASTENING THE OUTBOARD TO THE TRANSOM

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

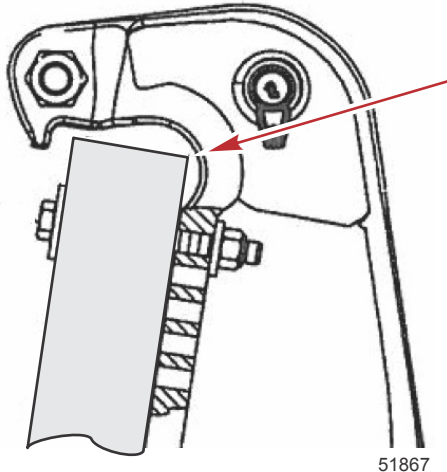


a - Step (not allowed)

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

OUTBOARD INSTALLATION

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



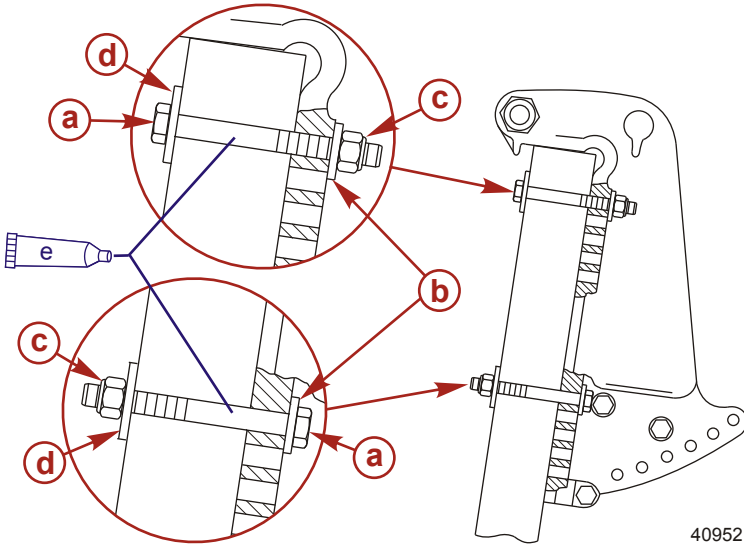
Installation

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

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

OUTBOARD INSTALLATION

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

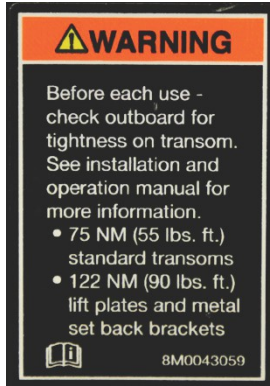


- a** - 0.500 in. diameter outboard mounting bolt (4)
- b** - 0.875 in. flat washer (4)
- c** - Nylon insert locknut (4)
- d** - 1.500 in. flat washer (4)
- e** - Marine sealer – apply to the shank of the bolts, not the threads

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

OUTBOARD INSTALLATION

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



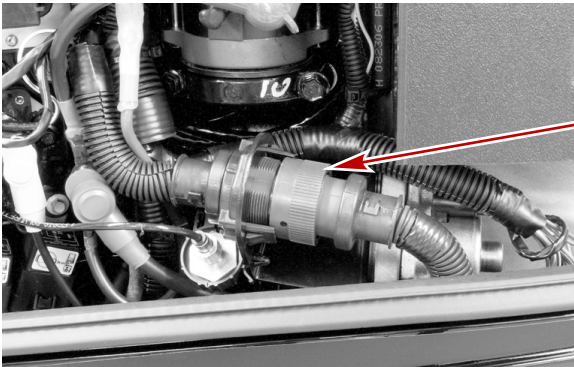
51985

Decal on the transom bracket

Electrical, Hoses, Control Cables, and Front Clamp

REMOTE WIRING HARNESS

Route the remote 14 pin boat harness through the front clamp opening in the bottom cowl. Connect remote harness to the 14 pin connector on the engine harness.



28742

a - 14 pin connector

OUTBOARD INSTALLATION

BATTERY INFORMATION (ALL BATTERIES INCLUDING DTS)

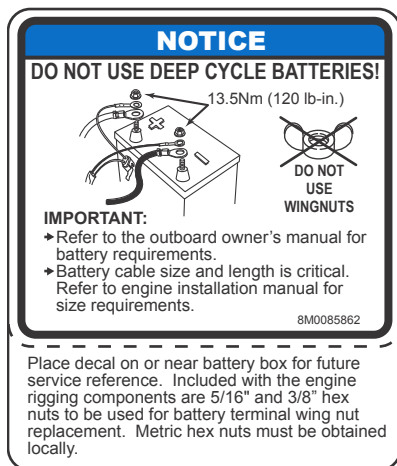
⚠ WARNING

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

- Do not use deep cycle batteries. The engine must use a marine starting battery with 1000 MCA, 800 CCA, or 180 Ah rating.
- When connecting the engine battery, use hex nuts to secure the battery leads to the battery posts. Tighten the nuts to the specified torque.

Description	Nm	lb-in.	lb-ft
Hex nuts	13.5	120	–

A decal advising against using deep cycle batteries and wing nuts should be placed on or near the battery box for future service reference. One 5/16 in. and one 3/8 in. hex nut is supplied per battery for wing nut replacement. Metric hex nuts are not supplied.

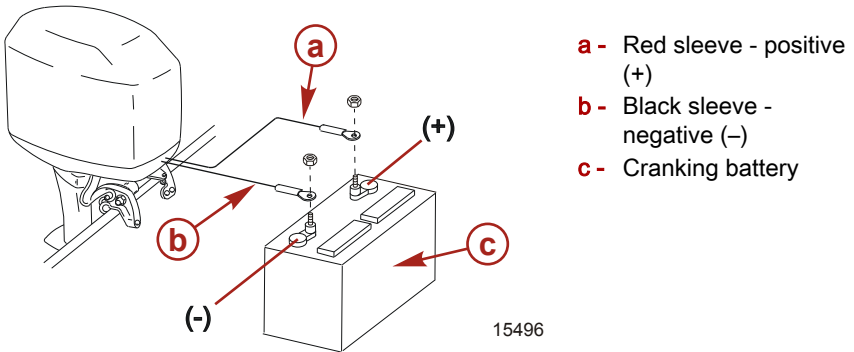


54395

OUTBOARD INSTALLATION

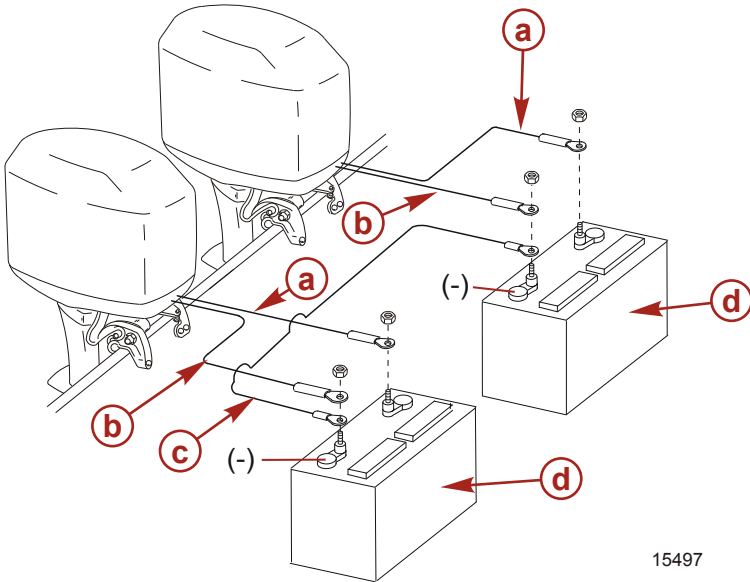
BATTERY CABLE CONNECTIONS

Single Outboard



Dual Outboards

Connect a common ground cable (wire size same as engine battery cables) between negative (-) terminals on starting batteries.



OUTBOARD INSTALLATION

HOSE AND TUBING CONNECTIONS

Fuel Hose

The minimum fuel line inside diameter (I.D.) is 8 mm (5/16 in.), with a separate fuel line/fuel tank pickup for each engine.

Fasten the remote fuel hose to the fitting with a hose clamp.

Oil Hoses

Connect the remote oil hoses to the engine hose connections. Fasten hose connections with cable ties.

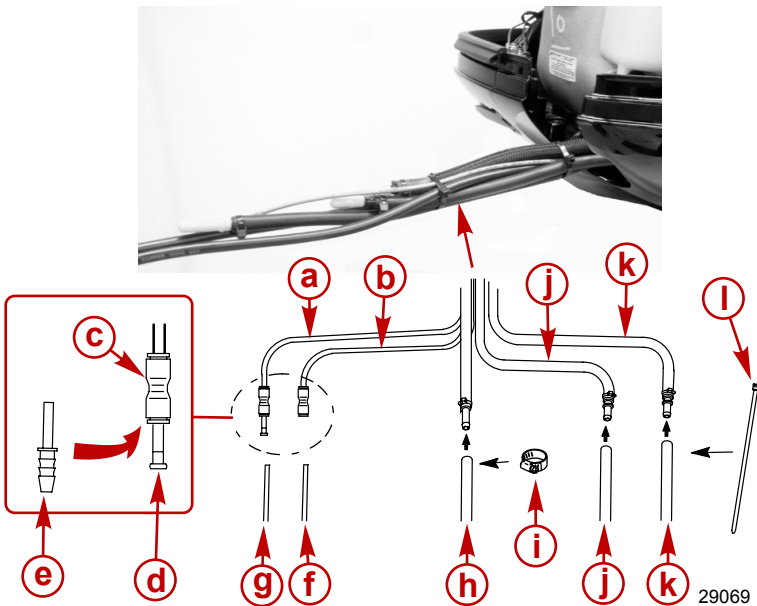
Water Pressure and Speedometer Hose or Tubing

NOTE: *This applies to models without SmartCraft gauges.*

This outboard has a speedometer water pickup located in the leading edge of the gearcase. If you want to use this water pickup for the speedometer, disconnect the water pickup tubing from the speedometer sensor and route tubing out of the cowl. Install the coupler provided with the outboard on the end of the tubing.

OUTBOARD INSTALLATION

Make the water pressure gauge hose connection to the tubing as shown.



- a - Water pressure tube
- b - Speedometer water pickup tube (if required)
- c - Coupler
- d - Plug
- e - Barb hose fitting
- f - Speedometer hose or tubing
- g - Water pressure tube
- h - Remote fuel hose
- i - Hose clamp
- j - Oil hose with blue stripe
- k - Oil hose without blue stripe
- l - Cable tie

INSTALLING THE SHIFT CABLE

IMPORTANT: The shift cable is the first cable to move when the remote control handle is moved out of neutral, so install/connect it to the engine first.

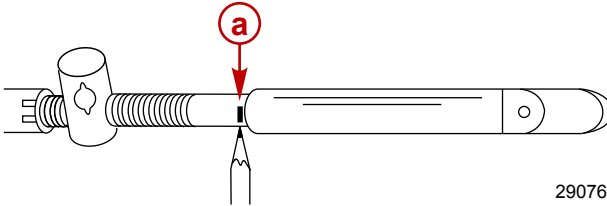
Locating the Center Point of the Shift Cable

IMPORTANT: Locate the center point of the slack or lost motion that exists in the shift cable for proper adjustment of the shift cable.

1. Mark the forward position as follows:

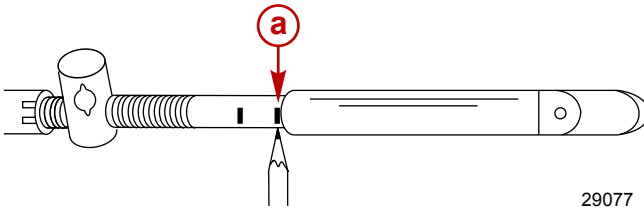
OUTBOARD INSTALLATION

- a. Move the remote control handle from neutral into forward and advance the handle to the full speed position. Ensure the throttle control lever is touching the throttle control lever stop screw.
- b. Slowly return the handle back to the neutral detent position.
- c. Place a mark on the shift cable against the cable end guide.



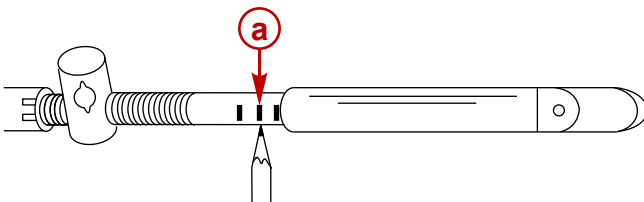
a - Forward position mark

2. Mark the reverse position as follows:
 - a. Move the remote control handle into reverse and advance the handle to the full speed position. Ensure the throttle control lever is touching the throttle control lever stop screw.
 - b. Slowly return the handle back to the neutral detent position.
 - c. Place a mark on the shift cable against the cable end guide.



a - Reverse position mark

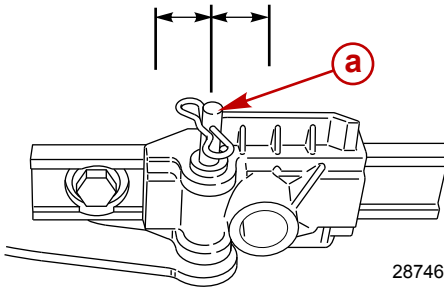
3. Mark the center on the shift cable midway between the forward and reverse marks.



a - Center mark

OUTBOARD INSTALLATION

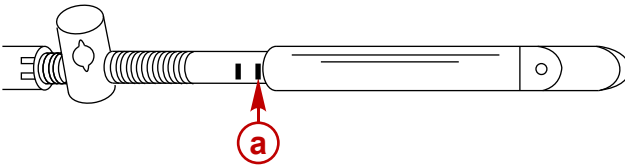
4. Align the cable end guide against this center mark when installing the cable to the engine.
5. Position the remote control and outboard into neutral position.
6. Slide the anchor pin forward until resistance is felt, then slide the anchor pin toward the rear until resistance is felt.
7. Center the anchor pin between these resistance points.



a - Anchor pin

Adjusting the Shift Cable

1. Align the shift cable end guide with the center mark as instructed in **Locating the Center Point of the Shift Cable.**

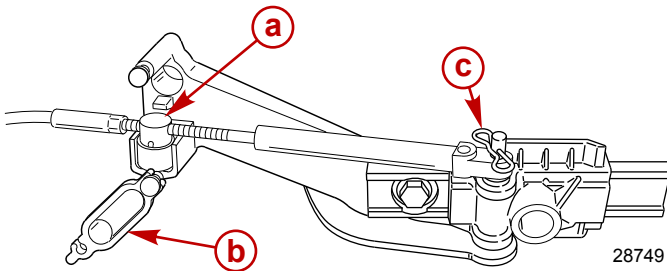


a - Center mark

2. Place the shift cable end guide on the anchor pin and adjust the cable barrel so that it slips freely into the barrel holder.

OUTBOARD INSTALLATION

3. Secure the shift cable to the anchor pin with the retainer clip.



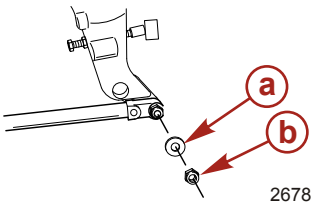
- a - Cable barrel
- b - Shift cable retainer
- c - Retainer clip

4. Check the shift cable adjustments as follows:
 - a. Shift the remote control to forward while turning the propeller shaft. If the propeller shaft does not lock in gear, adjust the cable barrel closer to the cable end guide.
 - b. Shift the remote control into neutral. If the propeller shaft does not turn freely without drag, adjust the barrel away from the cable end guide. Repeat steps a and b.
 - c. Shift the remote control into reverse while turning the propeller shaft. If the propeller shaft does not lock solidly in gear, adjust the barrel away from the cable end guide. Repeat steps a through c.
 - d. Return the remote control handle to neutral. If the propeller shaft does not turn freely without drag, adjust the barrel closer to the cable end guide. Repeat steps a through d.

INSTALLING THE THROTTLE CABLE

IMPORTANT: Attach the shift cable to the engine prior to attaching the throttle cable.

1. Shift the remote control into the neutral position.
2. Attach the throttle cable to the throttle lever. Secure with a washer and locknut. Tighten the locknut to the specified value.

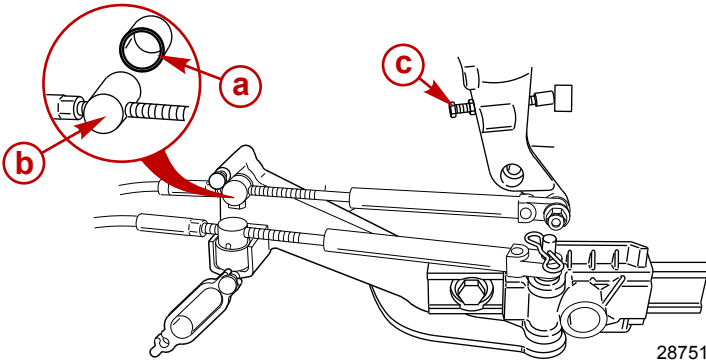


- a - Nylon washer
- b - Locknut

OUTBOARD INSTALLATION

Description	Nm	lb-in.	lb-ft
Throttle cable locknut "b"	Tighten, then loosen 1/4 turn		

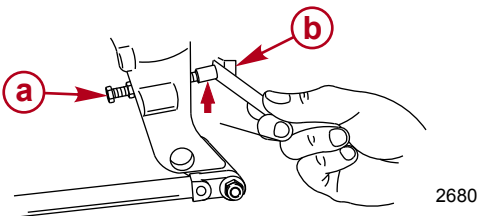
3. Adjust the cable barrel so the installed throttle cable will hold the idle stop screw against the stop.



- a - Barrel sleeve
- b - Cable barrel
- c - Idle stop screw

4. Check the throttle cable adjustment as follows:
 - a. Shift the outboard into gear a few times to activate the throttle linkage. Rotate the propeller shaft while shifting into reverse.
 - b. Return the remote control to neutral.
 - c. Place a thin piece of paper between the idle adjustment screw and the idle stop. The adjustment is correct when the paper can be removed without tearing, but has some drag on it.

IMPORTANT: The idle stop screw must be touching the stop.

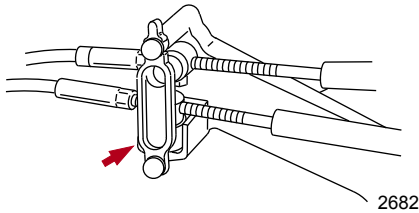


- a - Idle stop screw
- b - Idle stop

- d. Adjust the cable barrel if necessary.

OUTBOARD INSTALLATION

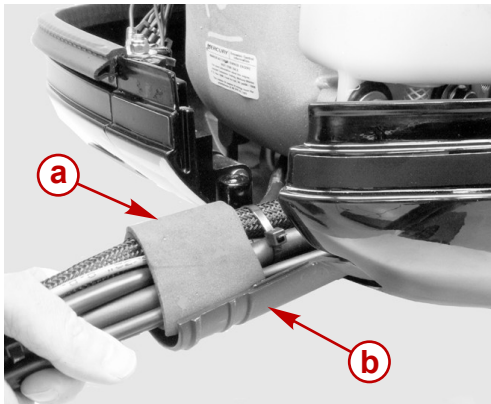
5. Lock the barrel holder in place with the cable latch.



FRONT CLAMP ASSEMBLY INSTALLATION

IMPORTANT: There must be sufficient slack in the engine wiring harness, battery cables, fuel hose, and oil hoses, between clamp and engine attachment point, to relieve stress and prevent hoses from being kinked or pinched.

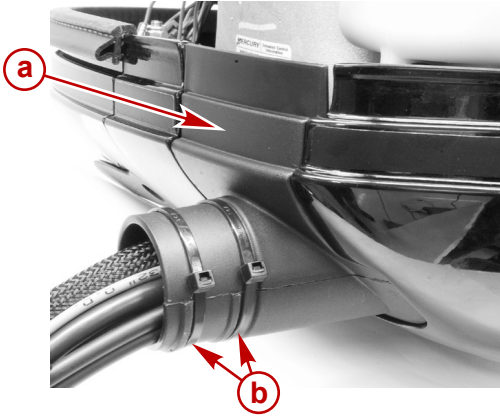
1. Place the lower half of the front clamp into the bottom cowl opening.
2. Place the neoprene wrap around the wiring, hoses, and control cables, and place into the lower half of the front clamp.



- a** - Neoprene wrap
- b** - Lower half of the front clamp

OUTBOARD INSTALLATION

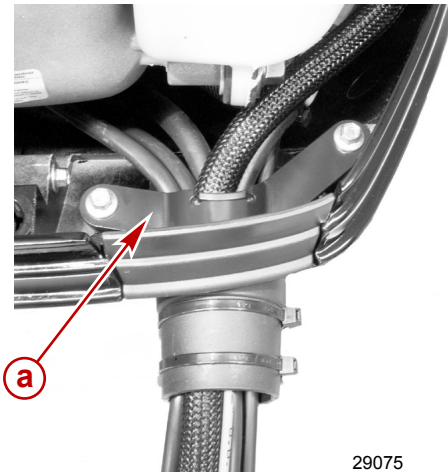
3. Join the top half of the front clamp with the bottom half. Secure both halves together with cables ties.



29074

- a** - Top half of the front clamp
- b** - Cable ties

4. Secure the front clamp into the bottom cowl with the retainer and two screws.
5. Install the cowl seal.



- a** - Retainer

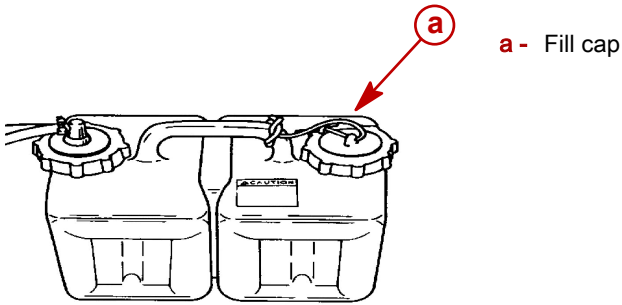
29075

OUTBOARD INSTALLATION

Oil Injection Set-Up

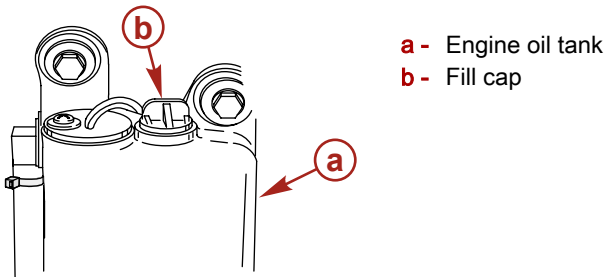
FILLING OIL SYSTEM

1. Fill the remote oil tank with the recommended oil listed in the **Operation and Maintenance Manual**. Tighten the fill cap.



2683

2. Remove the cap and fill the engine oil tank with oil. Install the fill cap.

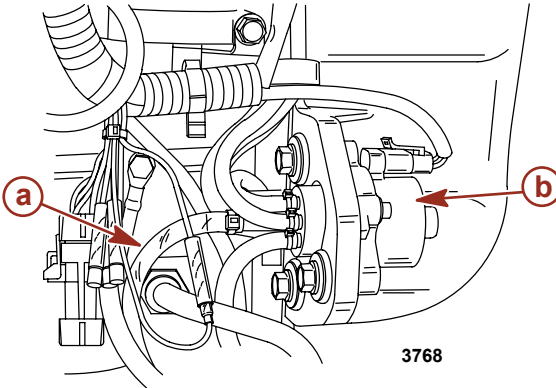


7745

OUTBOARD INSTALLATION

PRIMING THE OIL INJECTION PUMP

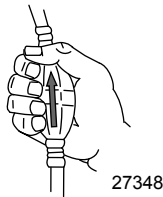
Before starting the engine for the first time, prime the oil injection pump. Priming will remove any air that may be in the pump, oil supply hose, or internal passages.



- a** - Oil supply hose
- b** - Oil injection pump

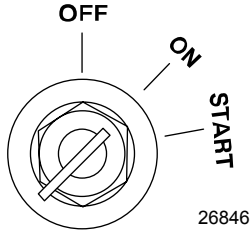
IMPORTANT: Fill the engine fuel system with fuel before priming the oil injection pump. Otherwise, the fuel pump will run without fuel during the priming process and may be damaged.

1. Fill the fuel system.
 - a. Connect fuel hose.
 - b. Fill the fuel system by squeezing the primer bulb.
 - c. Position the fuel line primer bulb so the arrow on the side of the bulb is pointing up. Squeeze the fuel line primer bulb until it feels firm.



OUTBOARD INSTALLATION

- d. Turn the ignition key switch to the "ON" position for three seconds.
This operates the electric fuel pump.



- e. Turn the ignition key switch back to the "OFF" position, and squeeze the primer bulb again until it feels firm.
- f. Turn the ignition key switch to the "ON" position again for three seconds.
- g. Continue this procedure until the fuel primer bulb stays firm.
2. Turn the ignition key switch to the "ON" position.
3. Within the first 10 seconds after the key switch has been turned on, move the remote control handle from neutral into forward. This will automatically start the priming process.

PURGING AIR FROM THE ENGINE OIL TANK

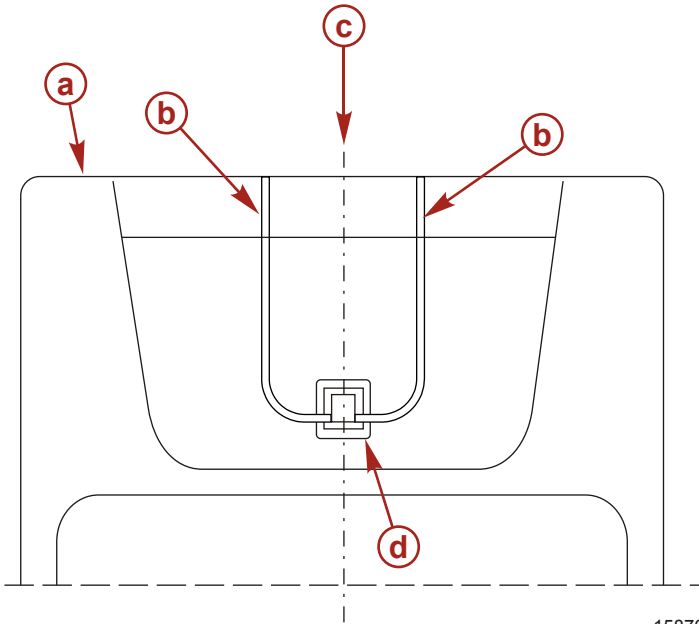
1. Loosen the fill cap on the engine oil tank.
2. Start the engine.
3. Operate the engine until all the air has vented out and oil starts to flow out of the tank.
4. Tighten the fill cap.

Engine Well Inlet Cover Installation (Models with Remote Trim Pump)

1. Select a location for the remote pump, so it is:
 - Mounted vertically on a flat surface.
 - In a dry location.
 - Within the limits of the hydraulic lines (without sharp bends or kinks).
 - In an area that does not interfere with the outboard when tilted to its maximum position.
 - In an area where battery cables and harnesses reach the pump easily.

OUTBOARD INSTALLATION

- Within easy access to the filler cap.



15870

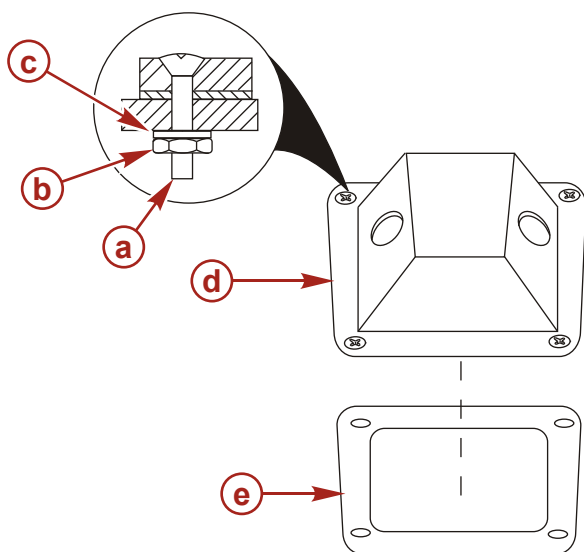
- a** - Transom
- b** - Trim lines
- c** - Engine centerline
- d** - Engine well cover

IMPORTANT: The power trim hoses must be able to extend to the rear edge of the transom to connect to the engine.

2. Make hydraulic connections to the remote pump assembly according to the instructions included with the pump.
3. Using the inlet cover gasket as a template, mark and drill four 3/16 in. mounting holes.

OUTBOARD INSTALLATION

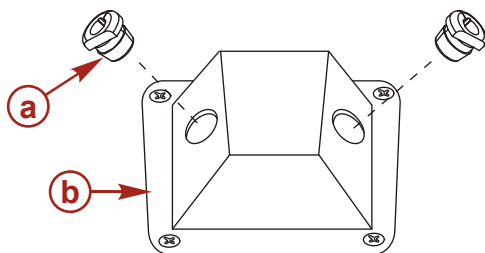
4. Install the gasket and cover using four 10-32 screws, lockwashers, and hex nuts. Cut off excess screw lengths.



15871

- a** - Screw (4)
- b** - Nut (4)
- c** - Lockwasher (4)
- d** - Cover
- e** - Gasket

5. Route the trim pump harness end through the cover and cowl and attach the harness to the pump and the main engine harness.
6. Install the grommet to protect the harness.
7. Route the trim hoses through the two holes provided in the cover and install the two grommets.

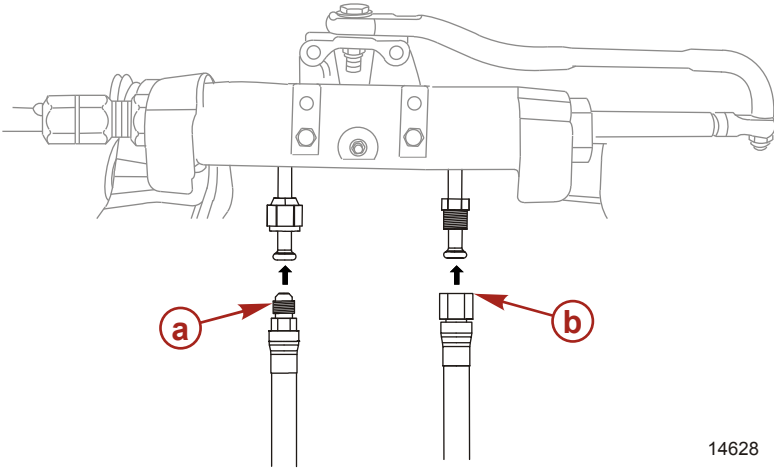


- a** - Grommet (2)
- b** - Cover

15886

OUTBOARD INSTALLATION

8. Connect the trim hoses to the fittings on the transom bracket as shown below.



14628

- a** - Power trim down circuit
b - Power trim up circuit

Trim In Pin

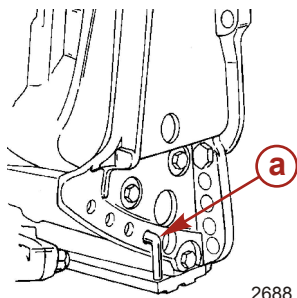
⚠ WARNING

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

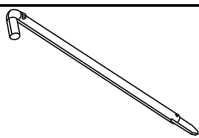
Some boats, particularly some bass boats, are built with a greater than normal transom angle, which will allow the outboard to be trimmed further in or under. This greater trim under capability is desirable to improve acceleration, reduce the angle and time spent in a bow high boat during planing off, and in some cases, may be necessary to plane off a boat with aft livewells, given the variety of available propellers and height range of engine installations.

OUTBOARD INSTALLATION

However, once on plane, the engine should be trimmed to a more intermediate position to avoid a bow-down planing condition called plowing. Plowing can cause bow steering or oversteering and inefficiently consumes horsepower.



a - Tilt pin (not included with engine)

Stainless Steel Tilt Pin	17-49930A 1
 2749	Limits the down trim angle of the power trim equipped engines, or aids in determining the trim out angle on non-power trim engines.

The owner may decide to limit the trim in. This can be accomplished by purchasing a stainless steel tilt pin from your dealer and insert it in whatever adjustment hole in the transom brackets is desired. A nonstainless steel shipping bolt should not be used in this application other than on a temporary basis.

MAINTENANCE LOG

Maintenance Log

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

Date	Maintenance Performed	Engine Hours