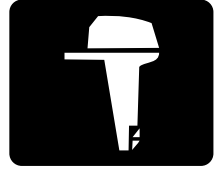




YAMAHA



**F6A
F6B
F8C
FT8D**

OWNER'S MANUAL

60R-F8199-70-E0

Read this owner's manual carefully before operating your outboard motor.

Important manual information

EMU25100

To the owner

Thank you for choosing a Yamaha outboard motor. This Owner's Manual contains information needed for proper operation, maintenance and care. A thorough understanding of these simple instructions will help you obtain maximum enjoyment from your new Yamaha. If you have any question about the operation or maintenance of your outboard motor, please consult a Yamaha dealer.

In this Owner's Manual particularly important information is distinguished in the following ways.



The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

EWMO0780



WARNING

Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the outboard motor.

ECMO0700

CAUTION:

A CAUTION indicates special precautions that must be taken to avoid damage to the outboard motor.

NOTE:

A NOTE provides key information to make procedures easier or clearer.

Yamaha continually seeks advancements in product design and quality. Therefore, while this manual contains the most current product information available at the time of printing, there may be minor discrepancies between

your machine and this manual. If there is any question concerning this manual, please consult your Yamaha dealer.

NOTE:

The F6AMH, F6BMH, F8CMH, FT8DMH, FT8DE, FT8DEP and the standard accessories are used as a base for the explanations and illustrations in this manual. Therefore some items may not apply to every model.

EMU25140

**F6A, F6B, F8C, FT8D
OWNER'S MANUAL
©2004 by Yamaha Motor Co., Ltd.
1st Edition, January 2004
All rights reserved.
Any reprinting or unauthorized use
without the written permission of
Yamaha Motor Co., Ltd.
is expressly prohibited.
Printed in France**

Table of contents

General information 1

Identification numbers record	1
Outboard motor serial number	1
Key number	1
EC label.....	1
Emission control information	2
SAV models.....	2
Safety information	2
Important labels.....	3
Warning labels.....	3
Caution labels.....	4
Fueling instructions	4
Gasoline	5
Engine oil.....	5
Battery requirement.....	5
Battery specifications	5
Without a rectifier or Rectifier Regulator	5
Propeller selection.....	6
Start-in-gear protection	7

Basic components 8

Main components.....	8
Fuel tank.....	9
Fuel joint.....	10
Fuel gauge	10
Fuel tank cap.....	10
Air vent screw.....	10
Remote control.....	10
Remote control lever	10
Neutral interlock trigger	11
Neutral throttle lever	11
Choke switch.....	11
Tiller handle.....	11
Gear shift lever.....	11
Throttle grip	12
Throttle indicator.....	12
Throttle friction adjuster.....	12
Engine stop lanyard switch.....	13
Engine stop button	14
Choke knob for pull type.....	14
Manual starter handle.....	14
Main switch.....	15

Power tilt switch.....	15
Steering friction adjuster.....	15
Trim rod (tilt pin)	16
Tilt lock mechanism.....	16
Tilt support knob.....	16
Tilt support bar	16
Power tilt unit.....	16
Top cowling lock lever (pull up type)	17
Flushing device	17
Warning indicator	17
Low oil pressure warning indicator	17
Warning system	18
Low oil pressure warning.....	18

Operation 19

Installation.....	19
Mounting the outboard motor	19
Clamping the outboard motor	20
Breaking in engine	21
Procedure for 4-stroke models	21
Preoperation checks	21
Fuel	21
Controls	21
Engine	22
Checking the engine oil level.....	22
Filling fuel.....	22
Operating engine	22
Feeding fuel (portable tank)	22
Starting engine	23
Warming up engine.....	27
Manual start models	27
Shifting	28
Forward (tiller handle and remote control models)	28
Reverse (manual tilt and hydro tilt models).....	29
Stopping engine.....	30
Procedure.....	30
Procedure.....	30
Trimming outboard motor.....	31
Adjusting trim angle for manual tilt models.....	31

Table of contents

Adjusting trim angle (power tilt models).....	32	Exhaust leakage.....	53
Adjusting boat trim.....	33	Water leakage	54
Tilting up and down	33	Engine oil leakage	54
Procedure for tilting up (manual tilt models).....	34	Checking power trim and tilt system	54
Procedure for tilting up	35	Checking propeller	54
Procedure for tilting down (manual tilt models).....	35	Removing the propeller	55
Procedure for tilting down.....	36	Installing the propeller	56
Cruising in shallow water	36	Changing gear oil	56
Cruising in shallow water (manual tilt models).....	36	Cleaning fuel tank.....	57
Power trim and tilt models / power tilt models	38	Inspecting and replacing anode(s)	58
Cruising in other conditions.....	38	Checking battery (for electric start models)	58
Maintenance.....	40	Connecting the battery	59
Specifications	40	Disconnecting the battery	60
Transporting and storing outboard motor.....	42	Checking top cowling	60
Clamp screw mounting models ...	42	Coating the boat bottom	60
Storing outboard motor.....	42	Trouble Recovery.....	61
Procedure.....	43	Troubleshooting	61
Lubrication (except oil injection models).....	44	Temporary action in emergency	64
Battery care	44	Impact damage.....	64
Flushing power unit	45	Replacing fuse.....	64
Cleaning the outboard motor.....	45	Power trim and tilt will not operate	65
Checking painted surface of motor	46	Starter will not operate	65
Periodic maintenance.....	46	Emergency starting engine.....	65
Replacement parts	46	Engine fails to operate	67
Maintenance chart.....	47	Ignition system malfunction	67
Maintenance chart (additional)	48	Treatment of submerged motor.....	67
Greasing.....	49	Procedure	67
Cleaning and adjusting spark plug	50		
Checking fuel system	50		
Checking fuel filter.....	51		
Inspecting idling speed.....	51		
Changing engine oil.....	52		
Checking wiring and connectors	53		

General information

EMU25170

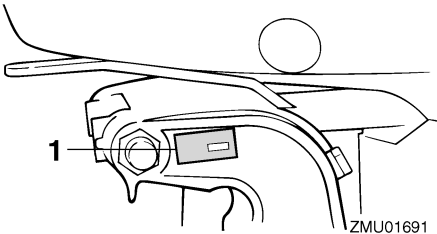
Identification numbers record

EMU25182

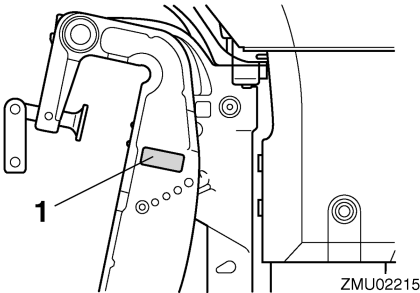
Outboard motor serial number

The outboard motor serial number is stamped on the label attached to the port side of the clamp bracket or the upper part of the swivel bracket.

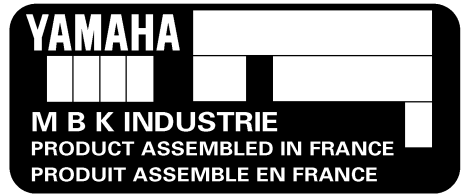
Record your outboard motor serial number in the spaces provided to assist you in ordering spare parts from your Yamaha dealer or for reference in case your outboard motor is stolen.



1. Outboard motor serial number location



1. Outboard motor serial number location



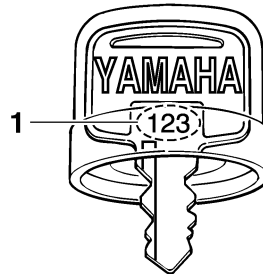
EMU25190

Key number

If a main key switch is equipped with the motor, the key identification number is stamped on your key as shown in the illustration. Record this number in the space provided for reference in case you need a new key.



ZMU01693



1. Key number

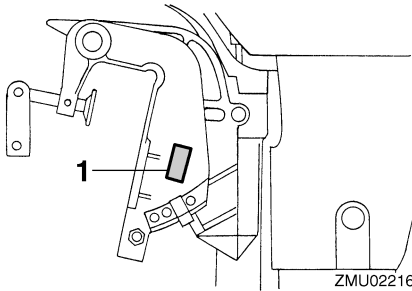
EMU25201

EC label

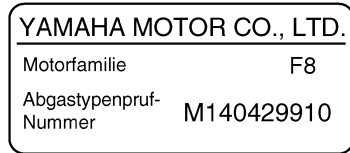
Engines affixed with this label conform to certain portions of the European Parliament directive relating to machinery. Refer to the label and the EC Declaration of Conformity for more details.

General information

Approval label of emission control certificate

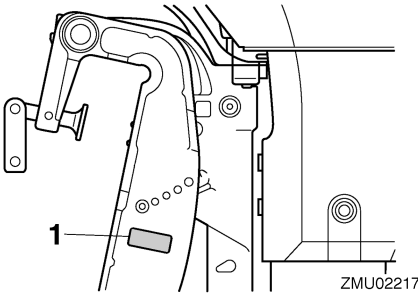


1. EC label location



ZMU02192

Fuel requirement label

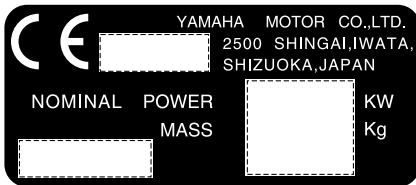


1. EC label location



ZMU02193

EMU25370



ZMU01696

EMU25220

Emission control information

EMU25351

SAV models

Engines affixed with the label pictured below conform to SAV (the Swiss exhaust emission regulations for Swiss inshore waters).

Safety information

- Before mounting or operating the outboard motor, read this entire manual. Reading it should give you an understanding of the motor and its operation.
- Before operating the boat, read any owner's or operator's manuals supplied with it and all labels. Be sure you understand each item before operating.
- Do not overpower the boat with this outboard motor. Overpowering the boat could result in loss of control. The rated power of the outboard should be equal to or less than the rated horsepower capacity of the boat. If the rated horsepower capacity of the boat is unknown, consult the dealer or boat manufacturer.

General information

- Do not modify the outboard. Modifications could make the motor unfit or unsafe to use.
- Never operate after drinking alcohol or taking drugs. About 50% of all boating fatalities involve intoxication.
- Have an approved personal flotation device (PFD) on board for every occupant. It is a good idea to wear a PFD whenever boating. At a minimum, children and non-swimmers should always wear PFDs, and everyone should wear PFDs when there are potentially hazardous boating conditions.
- Gasoline is highly flammable, and its vapors are flammable and explosive. Handle and store gasoline carefully. Make sure there are no gas fumes or leaking fuel before starting the engine.
- This product emits exhaust gases which contain carbon monoxide, a colorless, odorless gas which may cause brain damage or death when inhaled. Symptoms include nausea, dizziness, and drowsiness. Keep cockpit and cabin areas well ventilated. Avoid blocking exhaust outlets.
- Check throttle, shift, and steering for proper operation before starting the engine.
- Attach the engine stop switch lanyard to a secure place on your clothing, or your arm or leg while operating. If you accidentally leave the helm, the lanyard will pull from the switch, stopping the engine.
- Know the marine laws and regulations where you will be boating - and obey them.
- Stay informed about the weather. Check weather forecasts before boating. Avoid boating in hazardous weather.
- Tell someone where you are going: leave a Float Plan with a responsible person. Be sure to cancel the Float Plan when you return.

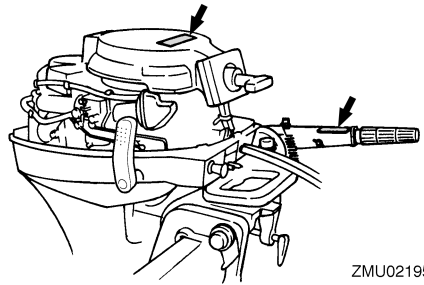
- Use common sense and good judgment when boating. Know your abilities, and be sure you understand how your boat handles under the different boating conditions you may encounter. Operate within your limits, and the limits of your boat. Always operate at safe speeds, and keep a careful watch for obstacles and other traffic.
- Always watch carefully for swimmers during the engine operation.
- Stay away from swimming areas.
- When a swimmer is in the water near you shift into neutral and shut off the engine.

EMU25380

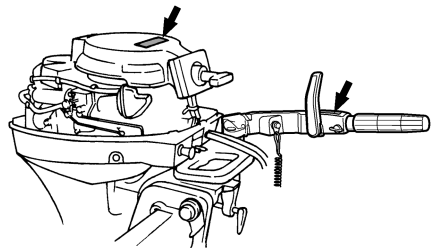
Important labels

EMU25395

Warning labels



ZMU02195



ZMU02326

EMU25401

Label

EWMO1260



- Be sure shift control is in neutral before starting engine. (except 2HP)

General information

- Do not touch or remove electrical parts when starting or during operation.
- Keep hands, hair, and clothes away from flywheel and other rotating parts while engine is running.

EMU25431
Label

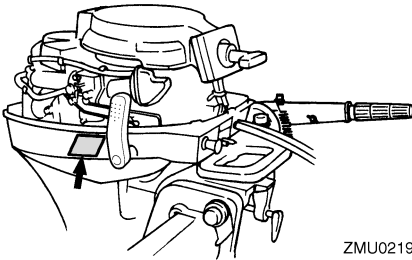
EWM01300

WARNING

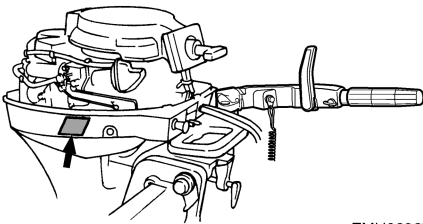
- This engine is equipped with a neutral starting device.
- The engine will not start unless the shift control is in neutral position.

EMU25464

Caution labels



ZMU02197



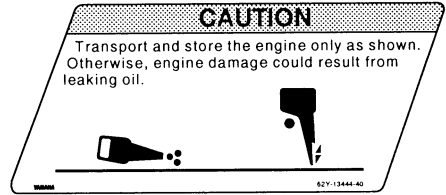
ZMU02327

EMU25472
Label

ECM01190

CAUTION:

Transport and store the engine only as shown. Otherwise, engine damage could result from Leaking oil.



ZMU02357

EMU25540

Fueling instructions

EWM00010

WARNING

GASOLINE AND ITS VAPORS ARE HIGHLY FLAMMABLE AND EXPLOSIVE!

- Do not smoke when refueling, and keep away from sparks, flames, or other sources of ignition.
- Stop engine before refueling.
- Refuel in a well-ventilated area. Refuel portable fuel tanks off the boat.
- Take care not to spill gasoline. If gasoline spills, wipe it up immediately with dry rags.
- Do not overfill the fuel tank.
- Tighten the filler cap securely after refueling.
- If you should swallow some gasoline, inhale a lot of gasoline vapor, or get gasoline in your eyes, get immediate medical attention.
- If any gasoline spills onto your skin, immediately wash with soap and water. Change clothing if gasoline spills on it.

General information

- Touch the fuel nozzle to the filler opening or funnel to help prevent electrostatic sparks.

ECM00010

CAUTION:

Use only new clean gasoline which has been stored in clean containers and is not contaminated with water or foreign matter.

EMU25580

Gasoline

Recommended gasoline:

Regular unleaded gasoline with a minimum octane rating of 90 (Research Octane Number).

If knocking or pinging occurs, use a different brand of gasoline or premium unleaded fuel.

EMU25680

Engine oil

Recommended engine oil:

4-stroke motor oil with a combination of corresponding SAE and API as shown in the chart

Engine oil quantity (excluding oil filter):
0.8 L (0.85 US qt) (0.70 Imp.qt)

SAE				API	
-4	32	68	104 °F	SE	
-20	0	20	40 °C	SF	
				SG	
				SH	
				SJ	

ZMU01709

ECM01050

CAUTION:

All 4-stroke engines are shipped from the factory without engine oil.



ZMU01710

EMU25690

Battery requirement

ECM01060

CAUTION:

Do not use a battery that does not meet the specified capacity. If a battery which does not meet specifications is used, the electric system could perform poorly or be overloaded, causing electric system damage.

For electric start models, choose a battery which meets the following specifications.

EMU25720

Battery specifications

Minimum cold cranking amps (CCA/EN):
FT8DEP 347.0 A
FT8DE 347.0 A
Minimum rated capacity (20HR/IEC):
FT8DEP 40.0 Ah
FT8DE 40.0 Ah

EMU25730

Without a rectifier or Rectifier Regulator

ECM01090

CAUTION:

A battery cannot be connected to models that do not have a rectifier or Rectifier Regulator.

If you wish to use a battery with the models without a rectifier or Rectifier Regulator, install an optional Rectifier Regulator.

General information

Using a maintenance-free battery with the above models can shorten the life of the battery significantly.

Install an optional Rectifier Regulator or use accessories rated to withstand 18 volts or higher with the above models. Consult your Yamaha dealer for details on installing an optional Rectifier Regulator.

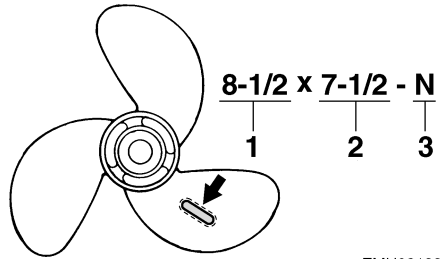
EMU25741

Propeller selection

The performance of your outboard motor will be critically affected by your choice of propeller, as an incorrect choice could adversely affect performance and could also seriously damage the motor. Engine speed depends on the propeller size and boat load. If engine speed is too high or too low for good engine performance, this will have an adverse effect on the engine.

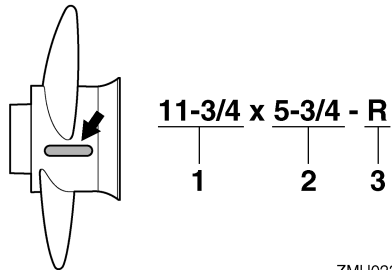
Yamaha outboard motors are fitted with propellers chosen to perform well over a range of applications, but there may be uses where a propeller with a different pitch would be more appropriate. For a greater operating load, a smaller-pitch propeller is more suitable as it enables the correct engine speed to be maintained. Conversely, a larger-pitch propeller is more suitable for a smaller operating load.

Yamaha dealers stock a range of propellers, and can advise you and install a propeller on your outboard that is best suited to your application.



ZMU02199

1. Propeller diameter in inches
2. Propeller pitch in inches
3. Type of propeller (propeller mark)



ZMU02358

1. Propeller diameter in inches
2. Propeller pitch in inches
3. Type of propeller (propeller mark)

NOTE:

Select a propeller which will allow the engine to reach the middle or upper half of the operating range at full throttle with the maximum boat load. If operating conditions such as light boat loads then allow the engine r/min to rise above the maximum recommended range, reduce the throttle setting to maintain the engine in the proper operating range.

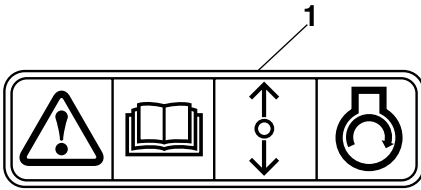
For instructions on propeller removal and installation, see page 54.

General information

EMU25760

Start-in-gear protection

Yamaha outboard motors affixed with the pictured label or Yamaha-approved remote control units are equipped with start-in-gear protection device(s). This feature permits the engine to be started only when it is in neutral. Always select neutral before starting the engine.



ZMU01713

1. Start-in-gear protection label

Basic components

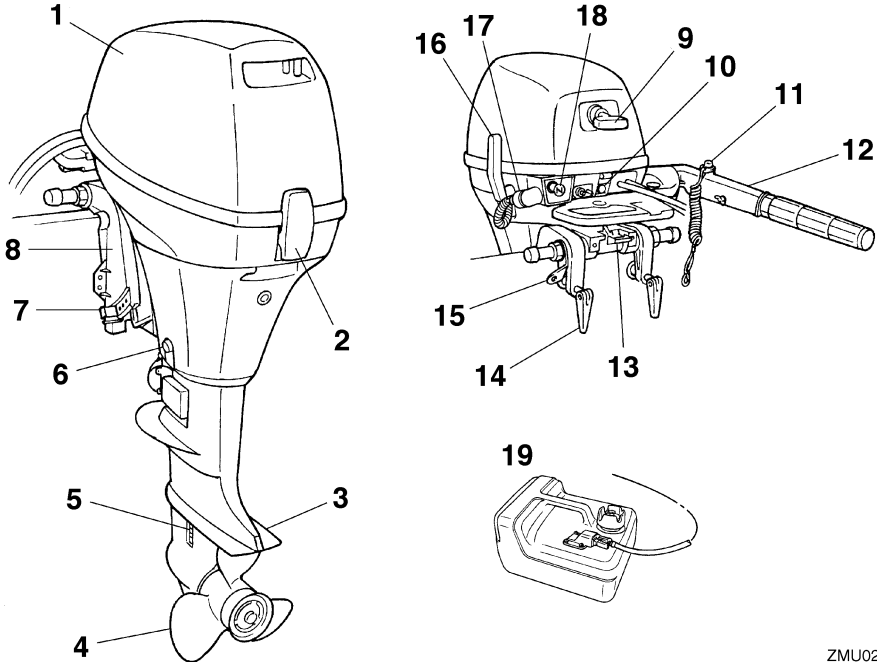
EMU25795

Main components

NOTE:

* May not be exactly as shown; also may not be included as standard equipment on all models.

F6, F8



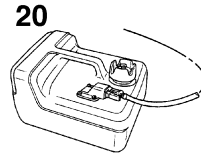
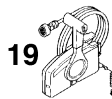
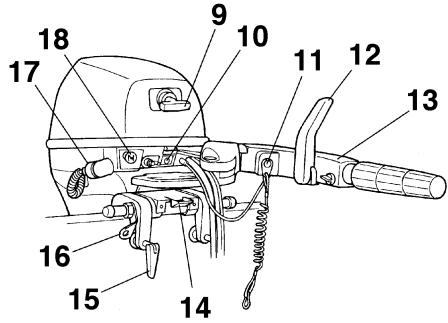
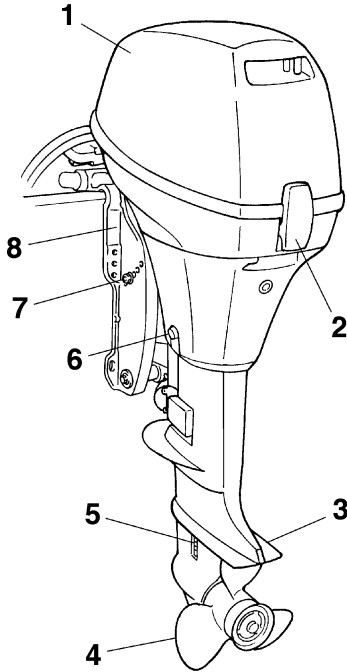
1. Top cowling
2. Top cowling lock lever
3. Anti-cavitation plate
4. Propeller
5. Cooling water inlet
6. Drain screw
7. Trim rod
8. Clamp bracket
9. Manual starter handle
10. Warning indicator
11. Engine stop button/Engine stop lanyard switch*
12. Tiller handle*
13. Tilt lock lever
14. Clamp screw
15. Rope attachment

16. Gear shift lever*
17. Flushing device
18. Choke knob
19. Fuel tank

ZMU02202

Basic components

FT8



1. Top cowling
2. Top cowling lock lever
3. Anti-cavitation plate
4. Propeller
5. Cooling water inlet
6. Drain screw
7. Trim rod
8. Clamp bracket
9. Manual starter handle
10. Warning indicator
11. Engine stop button/Engine stop lanyard switch*
12. Gear shift lever*
13. Tiller handle*
14. Tilt lock lever
15. Clamp screw
16. Rope attachment
17. Flushing device
18. Choke knob
19. Remote control box (side mount type)*
20. Fuel tank

ZMU02204

EMU25802

Fuel tank

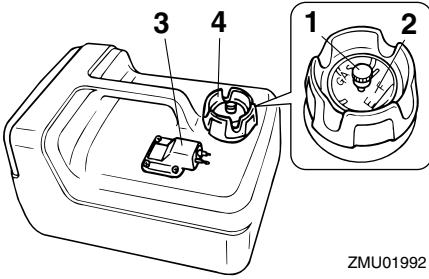
If your model was equipped with a portable fuel tank, its function is as follows.

EWM00020

WARNING

The fuel tank supplied with this engine is its dedicated fuel reservoir and must not be used as a fuel storage container. Commercial users should conform to relevant licensing or approval authority regulations.

Basic components



ZMU01992

1. Air vent screw
2. Fuel gauge
3. Fuel joint
4. Fuel tank cap

EMU25830

Fuel joint

This joint is used to connect the fuel line.

EMU25841

Fuel gauge

This gauge is located on either the fuel tank cap or on the fuel joint base. It shows the approximate amount of fuel remaining in the tank.

EMU25850

Fuel tank cap

This cap seals the fuel tank. When removed, the tank can be filled with fuel. To remove the cap, turn it counterclockwise.

EMU25860

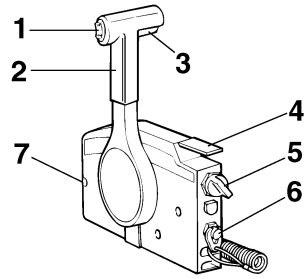
Air vent screw

This screw is on the fuel tank cap. To loosen the screw, turn it counterclockwise.

EMU26180

Remote control

The remote control lever actuates both the shifter and the throttle. The electrical switches are mounted on the remote control box.



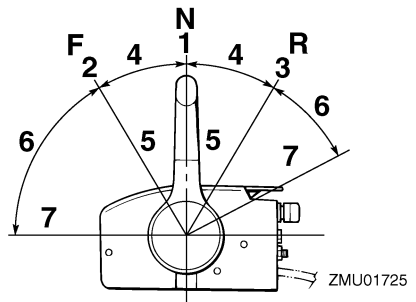
ZMU01723

1. Power trim and tilt switch
2. Remote control lever
3. Neutral interlock trigger
4. Neutral throttle lever
5. Main switch / choke switch
6. Engine stop lanyard switch
7. Throttle friction adjuster

EMU26190

Remote control lever

Moving the lever forward from the neutral position engages forward gear. Pulling the lever back from neutral engages reverse. The engine will continue to run at idle until the lever is moved about 35° (a detent can be felt). Moving the lever farther opens the throttle, and the engine will begin to accelerate.



ZMU01725

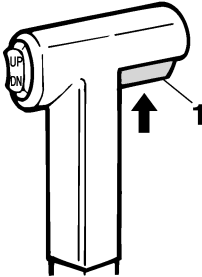
1. Neutral "N"
2. Forward "F"
3. Reverse "R"
4. Shift
5. Fully closed
6. Throttle
7. Fully open

Basic components

EMU26201

Neutral interlock trigger

To shift out of neutral, first pull the neutral interlock trigger up.



ZMU01727

1. Neutral interlock trigger

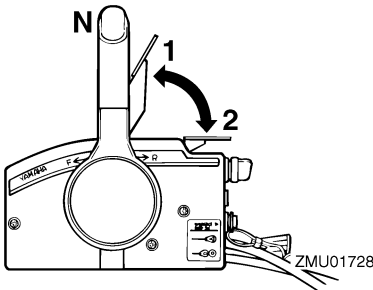
EMU26211

Neutral throttle lever

To open the throttle without shifting into either forward or reverse, put the remote control lever in the neutral position and lift the neutral throttle lever.

NOTE:

The neutral throttle lever will operate only when the remote control lever is in neutral. The remote control lever will operate only when the neutral throttle lever is in the closed position.

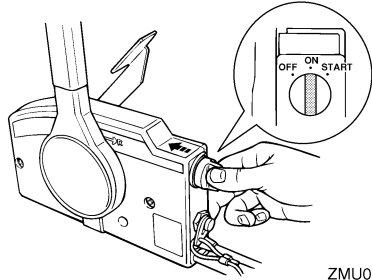


1. Fully open
2. Fully closed

EMU26221

Choke switch

To activate the choke system, press in the main switch while the key is turned to the “ON” (on) or “START” (start) position. The choke system will then supply the rich fuel mixture required to start the engine. When the key is released, the choke will switch off automatically.

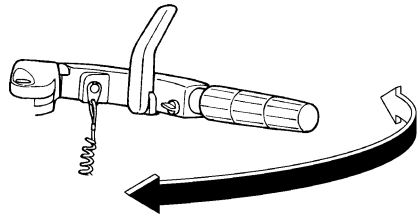


ZMU02206

EMU25911

Tiller handle

To change direction, move the tiller handle to the left or right as necessary.



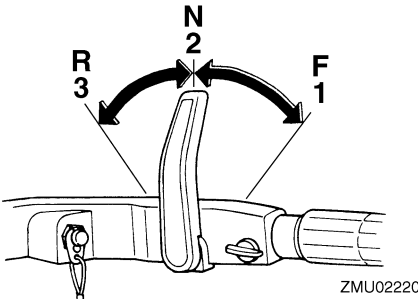
ZMU02207

EMU25921

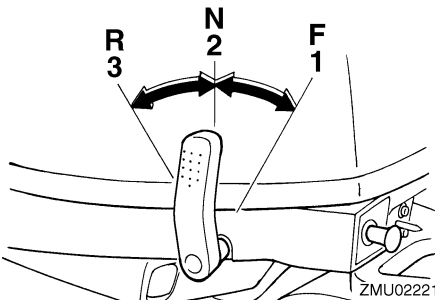
Gear shift lever

Pulling the gear shift lever towards you puts the engine in forward gear so that the boat moves ahead. Pushing the lever away from you puts the engine in reverse gear so that the boat moves astern.

Basic components



1. Forward "F"
2. Neutral "N"
3. Reverse "R"

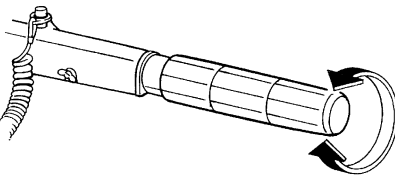


1. Forward "F"
2. Neutral "N"
3. Reverse "R"

EMU25941

Throttle grip

The throttle grip is on the tiller handle. Turn the grip counterclockwise to increase speed and clockwise to decrease speed.

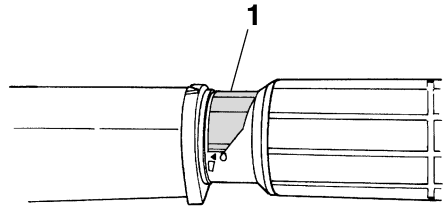


ZMU02222

EMU25961

Throttle indicator

The fuel consumption curve on the throttle indicator shows the relative amount of fuel consumed for each throttle position. Choose the setting that offers the best performance and fuel economy for the desired operation.



ZMU02223

1. Throttle indicator

EMU25970

Throttle friction adjuster

A friction device provides adjustable resistance to movement of the throttle grip or the remote control lever, and can be set according to operator preference.

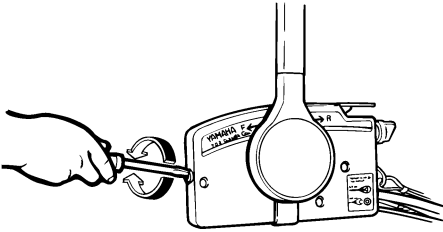
To increase resistance, turn the adjuster clockwise. To decrease resistance, turn the adjuster counterclockwise.

EWM00030

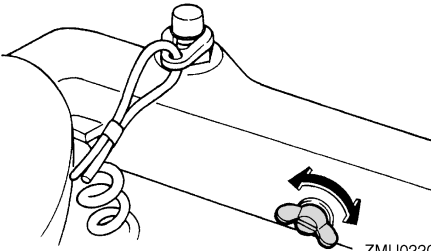
WARNING

Do not overtighten the friction adjuster. If there is too much resistance, it could be difficult to move throttle lever or grip, which could result in an accident.

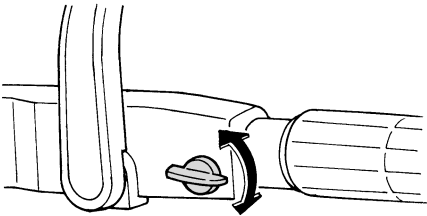
Basic components



ZMU01714



ZMU02208



ZMU02209

When constant speed is desired, tighten the adjuster to maintain the desired throttle setting.

EMU25990

Engine stop lanyard switch

The lock plate must be attached to the engine stop switch for the engine to run. The lanyard should be attached to a secure place on the operator's clothing, or arm or leg. Should the operator fall overboard or leave the helm, the

lanyard will pull out the lock plate, stopping ignition to the engine. This will prevent the boat from running away under power.

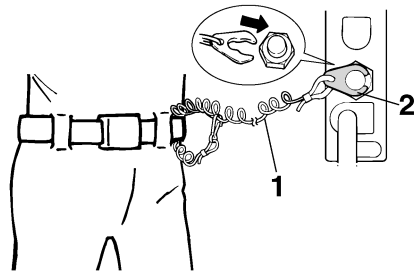
EWM00120

WARNING

- Attach the engine stop switch lanyard to a secure place on your clothing, or your arm or leg while operating.
- Do not attach the lanyard to clothing that could tear loose. Do not route the lanyard where it could become entangled, preventing it from functioning.
- Avoid accidentally pulling the lanyard during normal operation. Loss of engine power means the loss of most steering control. Also, without engine power, the boat could slow rapidly. This could cause people and objects in the boat to be thrown forward.

NOTE:

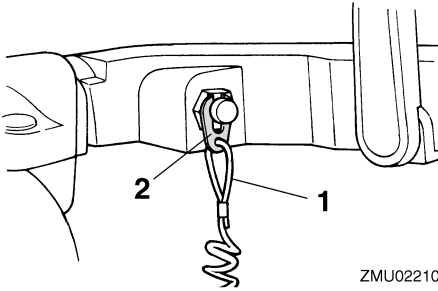
The engine cannot be started with the lock plate removed.



ZMU01716

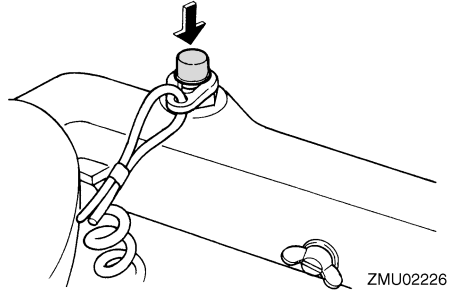
1. Lanyard
2. Lock plate

Basic components



1. Lanyard
2. Lock plate

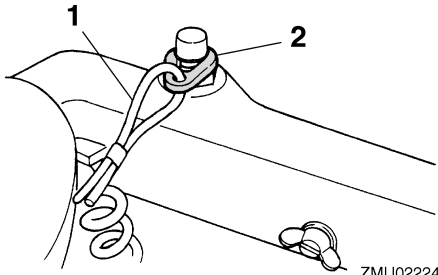
ZMU02210



EMU26011

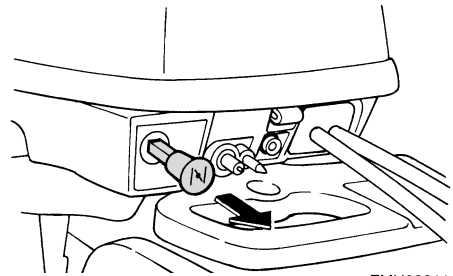
Choke knob for pull type

To supply the engine with the rich fuel mixture required to start, pull out this knob.



1. Lanyard
2. Lock plate

ZMU02224

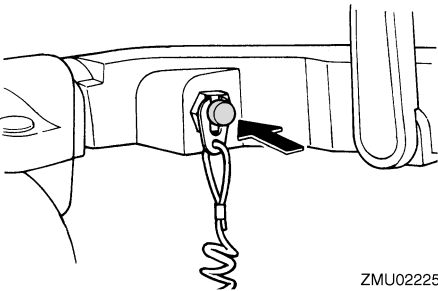


ZMU02211

EMU26001

Engine stop button

To open the ignition circuit and stop the engine, push this button.

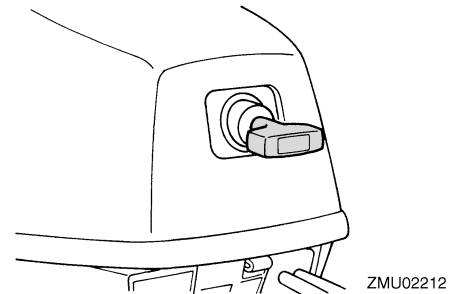


ZMU02225

EMU26070

Manual starter handle

To start the engine, first gently pull the handle out until resistance is felt. From that position, then pull the handle straight out quickly to crank the engine.



ZMU02212

Basic components

EMU26090

Main switch

The main switch controls the ignition system; its operation is described below.

- “OFF” (off)

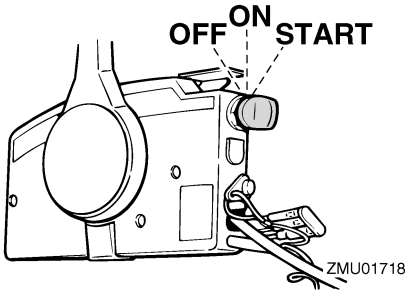
With the main switch in the “OFF” (off) position, the electrical circuits are off, and the key can be removed.

- “ON” (on)

With the main switch in the “ON” (on) position, the electrical circuits are on, and the key cannot be removed.

- “START” (start)

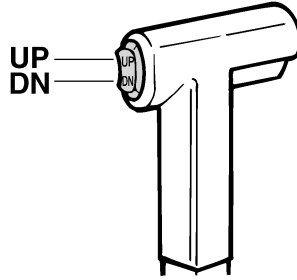
With the main switch in the “START” (start) position, the starter motor turns to start the engine. When the key is released, it returns automatically to the “ON” (on) position.



EMU26102

Power tilt switch

The power tilt system adjusts the outboard motor angle in relation to the transom. Pushing the switch “UP” (up) tilts the outboard motor up. Pressing the switch “DN” (down) tilts the outboard motor down. When the switch is released, the outboard motor will stop in its current position.



ZMU01720

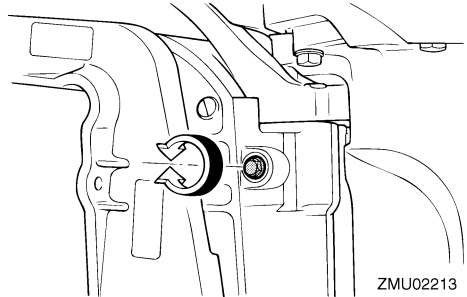
NOTE:

For instructions on using the power tilt switch, see pages 31 and 33.

EMU26121

Steering friction adjuster

A friction device provides adjustable resistance to the steering mechanism, and can be set according to operator preference. An adjusting screw or bolt is located on the swivel bracket.



ZMU02213

To increase resistance, turn the adjuster clockwise.

To decrease resistance, turn the adjuster counterclockwise.

EWM00040

WARNING

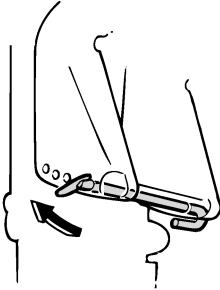
Do not overtighten the friction adjuster. If there is too much resistance, it could be difficult to steer, which could result in an accident.

Basic components

EMU26261

Trim rod (tilt pin)

The position of the trim rod determines the minimum trim angle of the outboard motor in relation to the transom.

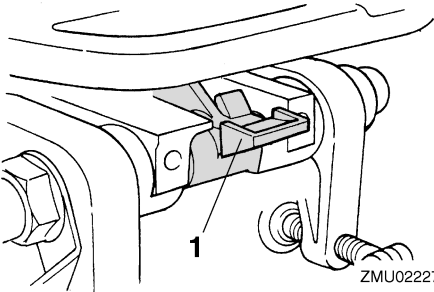


ZMU02214

EMU26312



Tilt lock mechanism

The tilt lock mechanism is used to prevent the outboard motor from lifting out of the water when in reverse gear.



ZMU02227

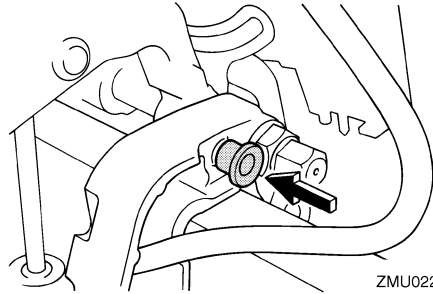
1. Tilt lock lever

To lock it, set the tilt lock lever in the “” (lock) position. To release, push the tilt lock lever in the “” (release) position.

EMU26320

Tilt support knob

To keep the outboard motor in the tilted up position, push the tilt support knob under the swivel bracket.

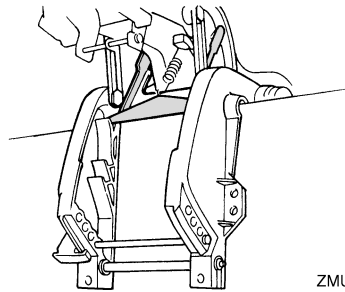


ZMU02228

EMU26330

Tilt support bar

The tilt support bar keeps the outboard motor in the tilted up position.



ZMU02230

EMU26360

Power tilt unit

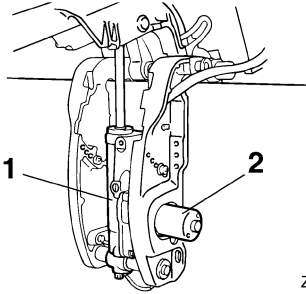
This unit tilts the outboard motor up and down and is controlled with the power tilt switch.

ECM00630

CAUTION:

Do not step on or exert pressure on the power tilt motor. The power tilt unit could be damaged as a result.

Basic components



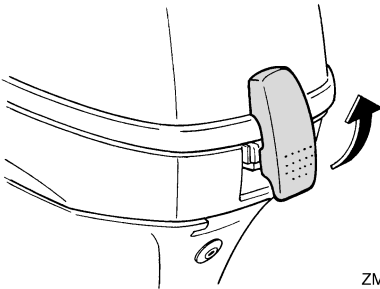
ZMU02231

1. Power tilt unit
2. Power tilt motor

EMU26382

Top cowling lock lever (pull up type)

To remove the engine top cowling, pull up the lock lever(s) and lift off the cowling. When installing the cowling, check to be sure it fits properly in the rubber seal. Then lock the cowling by moving the lever(s) downward.



ZMU02232

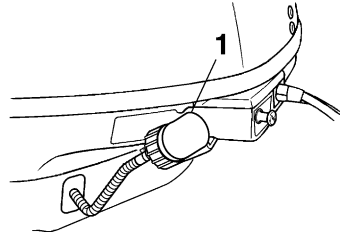
EMU26460

Flushing device

This device is used to clean the cooling water passages of the motor using a garden hose and tap water.

NOTE:

For details on usage, see page 45.



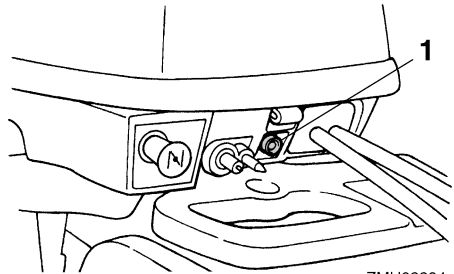
ZMU02233

1. Flushing device

EMU26300

Warning indicator

If the engine develops a condition which is cause for warning, the indicator lights up. For details on how to read the warning indicator, see page 18.



ZMU02234

1. Warning indicator

EMU26501

Low oil pressure warning indicator

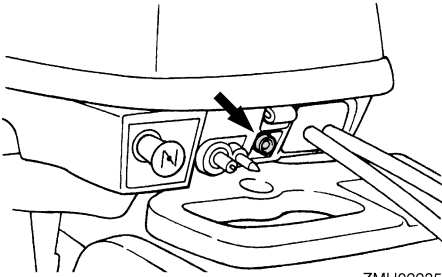
If oil pressure drops too low, this indicator will flash. For further information, see page 18.

ECM00020

CAUTION:

- Do not continue to run the engine if the low oil pressure warning indicator is on and the engine oil level is lower. Serious engine damage will occur.

- The low oil pressure warning indicator does not indicate the engine oil level. Use the oil dipstick to check the remaining oil quantity. For further information, see page 22.



ZMU02235

EMU26801

Warning system

ECM00090

CAUTION:

Do not continue to operate the engine if a warning device has activated. Consult your Yamaha dealer if the problem cannot be located and corrected.

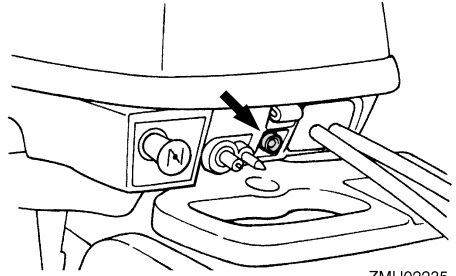
EMU30164

Low oil pressure warning

If the oil pressure drops too low, the warning device will activate.

Activation of warning device

- The engine speed will automatically decrease to about 2000 r/min.
- The low oil pressure warning indicator will light.



ZMU02235

- The buzzer will sound (if equipped on the tiller handle, remote control box, or main switch panel).

If the warning system has activated, stop the engine as soon as it is safe to do so. Check the oil level and add oil as needed. If the oil level is correct and the warning device does not switch off, consult your Yamaha dealer.

ECM00100

CAUTION:

Do not continue to run the engine if the low oil pressure warning indicator is on. Serious engine damage could occur.

Operation

EMU26901

Installation

ECM00110

CAUTION:

Incorrect engine height or obstructions to smooth water flow (such as the design or condition of the boat, or accessories such as transom ladders or depth finder transducers) can create airborne water spray while the boat is cruising. Severe engine damage may result if the motor is operated continuously in the presence of airborne water spray.

NOTE:

During water testing check the buoyancy of the boat, at rest, with its maximum load. Check that the static water level on the exhaust housing is low enough to prevent water entry into the powerhead, when water rises due to waves when the outboard is not running.

EMU26910

Mounting the outboard motor

EWM00820

WARNING

- Overpowering a boat could cause severe instability. Do not install an outboard motor with more horsepower than the maximum rating on the capacity plate of the boat. If the boat does not have a capacity plate, consult the boat manufacturer.
- The information presented in this section is intended as reference only. It is not possible to provide complete instructions for every possible boat and motor combination. Proper mounting depends in part on experience and the specific boat and motor combination.

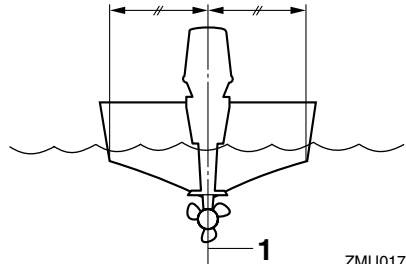
EWM00830

WARNING

Improper mounting of the outboard motor could result in hazardous conditions such as poor handling, loss of control, or fire hazards. Observe the following:

- For permanently mounted models, your dealer or other person experienced in proper rigging should mount the motor. If you are mounting the motor yourself, you should be trained by an experienced person.
- For portable models, your dealer or other person experienced in proper outboard motor mounting should show you how to mount your motor.

Mount the outboard motor on the center line (keel line) of the boat, and ensure that the boat itself is well balanced. Otherwise the boat will be hard to steer. For boats without a keel or which are asymmetrical, consult your dealer.



ZMU01760

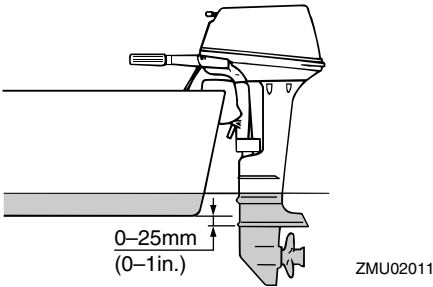
1. Center line (keel line)

EMU26920

Mounting height

To run your boat at optimum efficiency, the water resistance (drag) of the boat and outboard motor must be made as little as possible. The mounting height of the outboard motor greatly affects the water resistance. If the mounting height is too high, cavitation

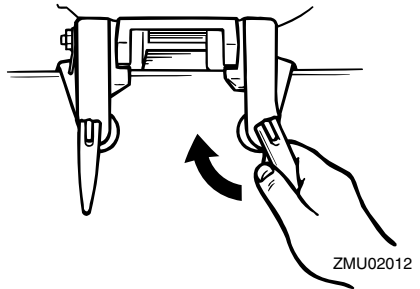
tends to occur, thus reducing the propulsion; and if the propeller tips cut the air, the engine speed will rise abnormally and cause the engine to overheat. If the mounting height is too low, the water resistance will increase and thereby reduce engine efficiency. Mount the outboard motor so that the anti-cavitation plate is between the bottom of the boat and a level 25 mm (1 in.) below it.



EWV00640

WARNING

Loose clamp screws could allow the outboard motor to fall off or move on the transom. This could cause loss of control and serious injury. Make sure the transom screws are tightened securely. Occasionally check the screws for tightness during operation.



NOTE:

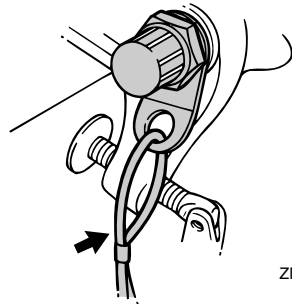
- The optimum mounting height of the outboard motor is affected by the boat and motor combination and the desired use. Test runs at different heights can help determine the optimum mounting height. Consult your Yamaha dealer or boat manufacturer for further information on determining the proper mounting height.
- For instructions on setting the trim angle of the outboard motor, see page 31.

2. If the engine restraint cable attachment is equipped on your engine, an engine restraint cable or chain should be used. Attach one end to the engine restraint cable attachment and the other to a secure mounting point on the boat. Otherwise the engine could be completely lost if it accidentally falls off the transom.

EMU26970

Clamping the outboard motor

1. Place the outboard motor on the transom so that it is positioned as close to the center as possible. Tighten the transom clamp screws evenly and securely. Occasionally check the clamp screws for tightness during operation of the outboard motor because they could become loose due to engine vibration.



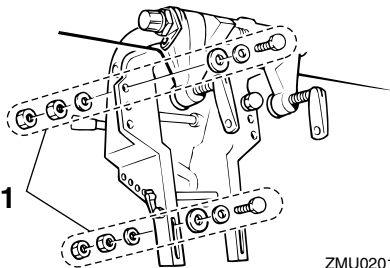
Operation

- Secure the clamp bracket to the transom using the bolts provided with the outboard (if packed). For details, consult your Yamaha dealer.

EWM00650

WARNING

Avoid using bolts, nuts or washers other than those contained in the engine packaging. If used, they must be of at least the same quality of material and strength and must be tightened securely. After tightening, test run the engine and check their tightness.



ZMU02014

1. Bolts

EMU30171

Breaking in engine

Your new engine requires a period of break-in to allow mating surfaces of moving parts to wear in evenly. Correct break-in will help ensure proper performance and longer engine life.

ECM00800

CAUTION:

Failure to follow the break-in procedure could result in reduced engine life or even severe engine damage.

EMU27080

Procedure for 4-stroke models

Run the engine under load (in gear with a propeller installed) as follows.

- For the first hour of operation:
Run the engine at 2000 r/min or at approximately half throttle.
- For the second hour of operation:
Run the engine at 3000 r/min or at approximately three-quarter throttle.
- For the next eight hours of operation:
Avoid continuous operation at full throttle for more than five minutes at a time.
- After the first 10 hours:
Operate the engine normally.

EMU27101

Preoperation checks

EWM00080

WARNING

If any item in the preoperation check is not working properly, have it inspected and repaired before operating the outboard motor. Otherwise an accident could occur.

ECM00120

CAUTION:

Do not start the engine out of water. Overheating and serious engine damage can occur.

EMU27110

Fuel

- Check to be sure you have plenty of fuel for your trip.
- Make sure there are no fuel leaks or gasoline fumes.
- Check fuel line connections to be sure they are tight (if equipped Yamaha fuel tank or boat tank).
- Be sure the fuel tank is positioned on a secure, flat surface, and that the fuel line is not twisted or flattened, or likely to contact sharp objects (if equipped Yamaha fuel tank or boat tank).

EMU27130

Controls

- Check throttle, shift, and steering for proper operation before starting the engine.

- The controls should work smoothly, without binding or unusual free play.
- Look for loose or damaged connections.
- Check operation of the starter and stop switches when the outboard motor is in the water.

EMU27140

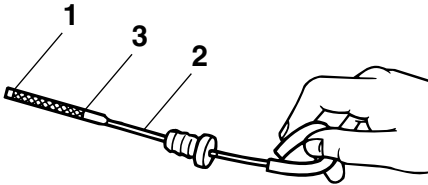
Engine

- Check the engine and engine mounting.
- Look for loose or damaged fasteners.
- Check the propeller for damage.

EMU27163

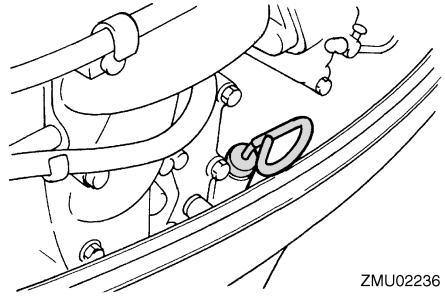
Checking the engine oil level

1. Put the outboard motor in an upright position (not tilted).
2. Remove oil dipstick and wipe it clean.
3. Completely insert the dipstick and remove it again.
4. Check the oil level using the dipstick to be sure the level falls between the upper and lower marks. Fill with oil if it is below the lower mark, or drain to the specified level if it is above the upper mark.



ZMU02082

1. Lower level mark
2. Oil dipstick
3. Upper level mark



ZMU02236

NOTE:

Be sure to completely insert the dipstick into the dipstick guide.

EMU27432

Filling fuel

EWM00060

! WARNING

Gasoline and its vapors are highly flammable and explosive. Keep away from sparks, cigarettes, flames, or other sources of ignition.

1. Remove the fuel tank cap.
2. Carefully fill the fuel tank.
3. Securely close the cap after filling the tank. Wipe up any spilled fuel.

Fuel tank capacity:
12 L (3.17 US gal) (2.64 Imp.gal)

EMU27450

Operating engine

EMU27461

Feeding fuel (portable tank)

EWM00420

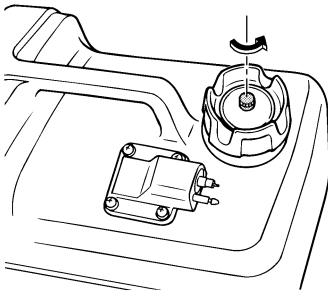
! WARNING

- **Before starting the engine, make sure that the boat is tightly moored and that you can steer clear of any obstructions. Be sure there are no swimmers in the water near you.**

Operation

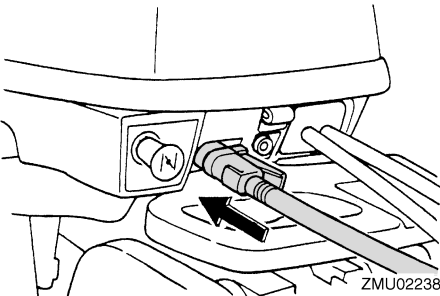
- When the air vent screw is loosened, gasoline vapor will be released. Gasoline is highly flammable, and its vapors are flammable and explosive. Refrain from smoking, and keep away from open flames and sparks while loosening the air vent screw.
- This product emits exhaust gases which contain carbon monoxide, a colorless, odorless gas which could cause brain damage or death when inhaled. Symptoms include nausea, dizziness, and drowsiness. Keep cockpit and cabin areas well ventilated. Avoid blocking exhaust outlets.

1. If there is an air vent screw on the fuel tank cap, loosen it 2 or 3 turns.

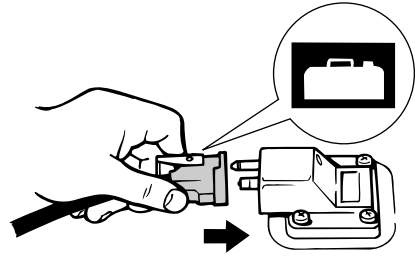


ZMU02237

2. If there is a fuel joint on the motor, firmly connect the fuel line to the joint. Then firmly connect the other end of the fuel line to the joint on the fuel tank.



ZMU02238



ZMU02024

3. If a steering friction adjuster is provided on your outboard motor, securely attach the fuel line to the fuel line clamp.

NOTE:

During engine operation place the tank horizontally, otherwise fuel cannot be drawn from the fuel tank.

4. Squeeze the primer pump with the outlet end up until you feel it become firm.



ZMU02025

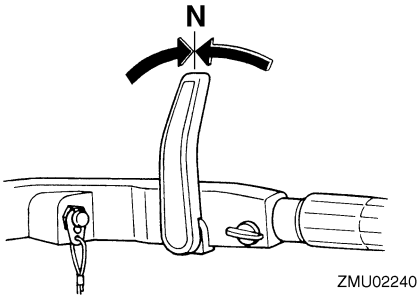
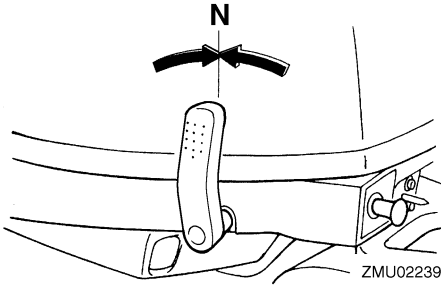
EMU27490

Starting engine

EMU27505

Manual start models (tiller control)

1. Place the gear shift lever in neutral.



NOTE:

The start-in-gear protection device prevents the engine from starting except when in neutral.

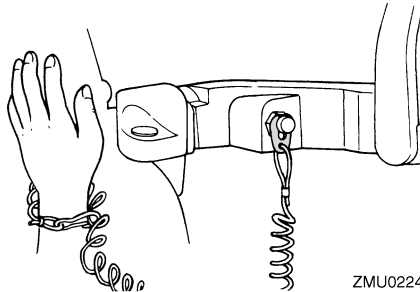
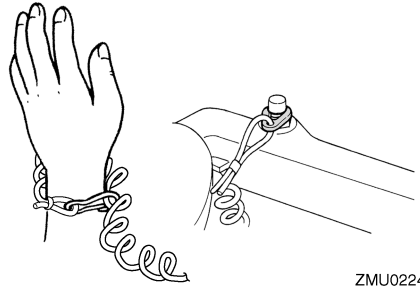
2. Attach the engine stop switch lanyard to a secure place on your clothing, or your arm or leg. Then install the lock plate on the other end of the lanyard into the engine stop switch.

EWM00120

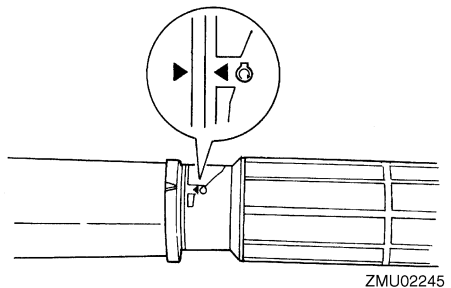
WARNING

- Attach the engine stop switch lanyard to a secure place on your clothing, or your arm or leg while operating.
- Do not attach the lanyard to clothing that could tear loose. Do not route the lanyard where it could become entangled, preventing it from functioning.

- Avoid accidentally pulling the lanyard during normal operation. Loss of engine power means the loss of most steering control. Also, without engine power, the boat could slow rapidly. This could cause people and objects in the boat to be thrown forward.

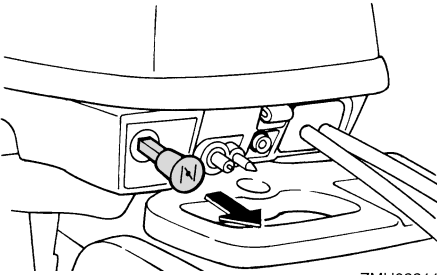


3. Place the throttle grip in the "START" (start) position.



Operation

4. Pull out / turn the choke knob fully. After the engine starts, replace / return the knob to the home position.

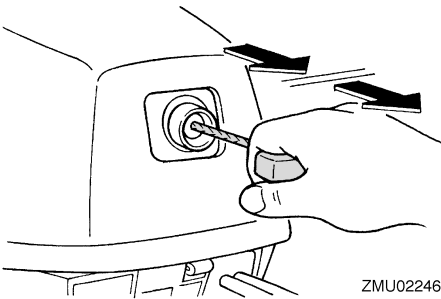


ZMU02211

NOTE:

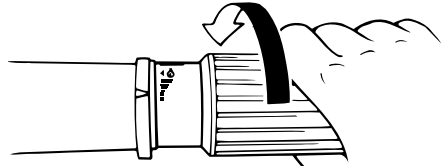
- It is not necessary to use the choke when starting a warm engine.
- If the choke knob is left in the "START" (start) position while the engine is running, the engine will run poorly or stall.

5. Pull the manual starter handle slowly until you feel resistance. Then give a strong pull straight out to crank and start the engine. Repeat if necessary.



ZMU02246

6. After the engine starts, slowly return the manual starter handle to its original position before releasing it.
7. Slowly return the throttle grip to the fully closed position.



ZMU02030

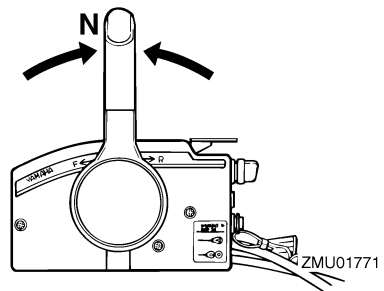
NOTE:

- When the engine is cold, it needs to be warmed up. For further information, see page 27.
- If the engine does not start on the first try, repeat the procedure. If the engine fails to start after 4 or 5 tries, open the throttle a small amount (between 1/8 and 1/4) and try again. Also if the engine is warm and fails to start, open the throttle a same amount and try to start the engine again. If the engine still fails to start, see page 61.

EMU27642

Electric start / remote control models

1. Place the remote control lever in neutral.



ZMU01771

NOTE:

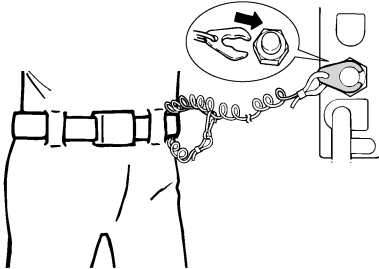
The start-in-gear protection device prevents the engine from starting except when in neutral.

2. Attach the engine stop switch lanyard to a secure place on your clothing, or your arm or leg. Then install the lock plate on the other end of the lanyard into the engine stop switch.

EWM00120

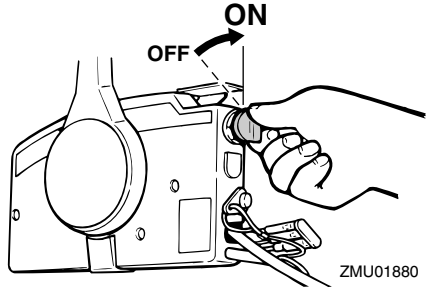
WARNING

- Attach the engine stop switch lanyard to a secure place on your clothing, or your arm or leg while operating.
- Do not attach the lanyard to clothing that could tear loose. Do not route the lanyard where it could become entangled, preventing it from functioning.
- Avoid accidentally pulling the lanyard during normal operation. Loss of engine power means the loss of most steering control. Also, without engine power, the boat could slow rapidly. This could cause people and objects in the boat to be thrown forward.



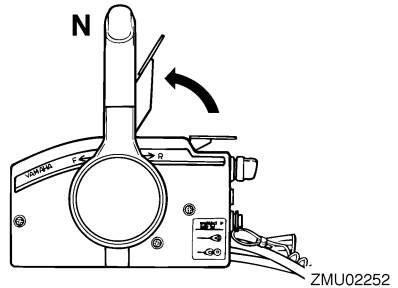
ZMU01772

3. Turn the main switch to "ON" (on).



ZMU01880

4. Open the throttle slightly without shifting using the neutral throttle lever or free accelerator. You may need to change the throttle opening slightly depending on engine temperature. After the engine starts, return the throttle to the original position.

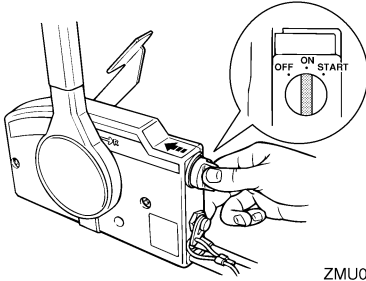


ZMU02252

NOTE:

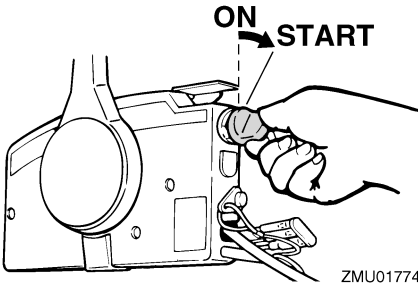
- On remote controls equipped with a neutral throttle lever, a good starting point is to lift the lever just until you feel resistance, then lift slightly more.
 - The neutral throttle lever or free accelerator can only be used when the remote control lever is in neutral.
5. Press in and hold the main switch to operate the remote choke system. The remote choke switch automatically returns to its normal position when you release your hand. Therefore keep the switch pressed in.

Operation



NOTE:

- It is not necessary to use the choke when starting a warm engine.
 - Push in the main switch fully, or the remote choke system will not operate.
6. Turn the main switch to “START” (start), and hold it for a maximum of 5 seconds.



7. Immediately after the engine starts, release the main switch and allow it to return to “ON” (on).

ECM00191

CAUTION:

- Never turn the main switch to “START” (start) while the engine is running.
- Do not keep the starter motor turning for more than 5 seconds. If the starter motor is turned continuously for more than 5 seconds, the battery will be quickly discharged, thus making it impossible to start the engine. The starter can also be

damaged. If the engine will not start after 5 seconds of cranking, return the main switch to “ON” (on), wait 10 seconds, then crank the engine again.

EMU27670

Warming up engine

EMU27731

Manual start models

1. After starting the engine, return the choke knob to the halfway position. For approximately the first 5 minutes after starting, warm up the engine by operating at one fifth throttle or less. After the engine has warmed up, push the choke knob in fully. Failure to do so will shorten engine life.

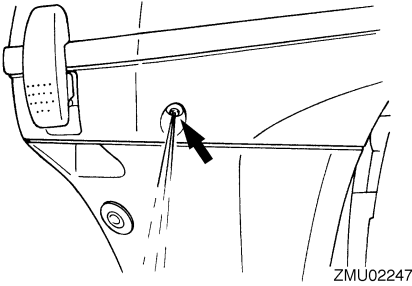
NOTE:

- If the choke knob is left pulled out after the engine starts, the engine will stall.
 - In temperatures of -5°C or less, leave the choke knob pulled out fully for approximately 30 seconds after starting.
2. Check for a steady flow of water from the cooling water pilot hole.

ECM00510

CAUTION:

A flow of water from the hole on the exhaust cover shows that the water pump is pumping water through the cooling passages. If water is not flowing out of the hole at all times while the engine is running, overheating and serious damage could occur. Stop the engine and check whether the cooling water inlet on the lower case or the cooling water pilot hole is blocked. Consult your Yamaha dealer if the problem cannot be located and corrected.



EMU27740

Shifting

EWM00180

WARNING

Before shifting, make sure there are no swimmers or obstacles in the water near you.

ECM00220

CAUTION:

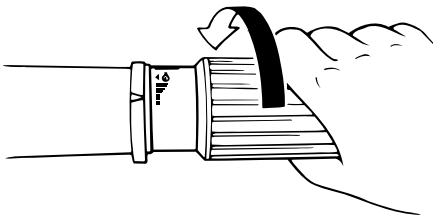
To change the boat direction or shifting position from forward to reverse or vice-versa, first close the throttle so that the engine idles (or runs at low speeds).

EMU27763

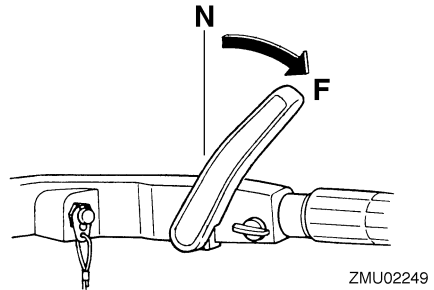
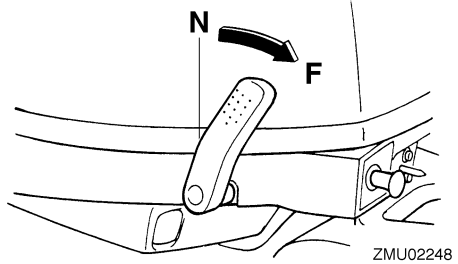
Forward (tiller handle and remote control models)

Tiller control models

1. Place the throttle grip in the fully closed position.

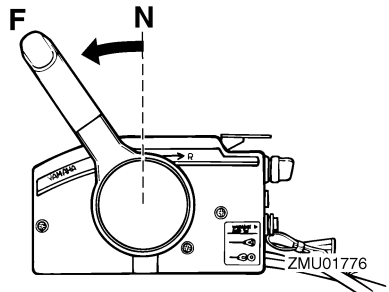


2. Move the gear shift lever quickly and firmly from neutral to forward.



Remote control models

Pull up the neutral interlock trigger (if equipped) and move the remote control lever quickly and firmly from neutral to forward.



Operation

EMU27795

Reverse (manual tilt and hydro tilt models)

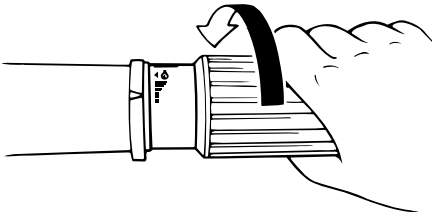
EWM00190

WARNING

When operating in reverse, go slowly. Do not open the throttle more than half. Otherwise the boat could become unstable, which could result in loss of control and an accident.

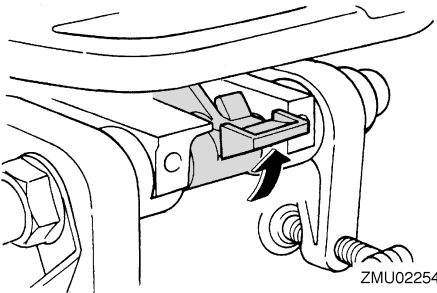
Tiller control models

1. Place the throttle grip in the fully closed position.



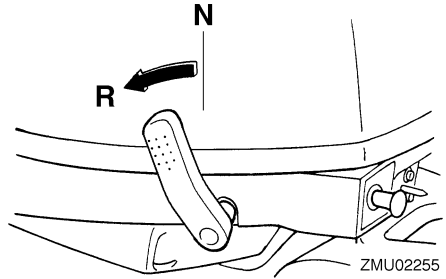
ZMU02030

2. On models equipped with a tilt lock lever, check that it is in the lock/down position.

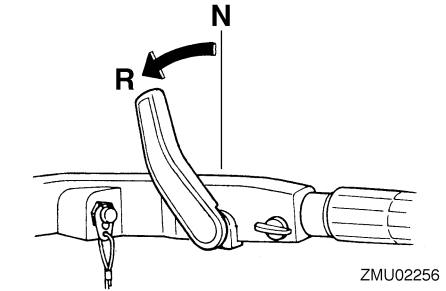


ZMU02254

3. Move the gear shift lever quickly and firmly from neutral to reverse.



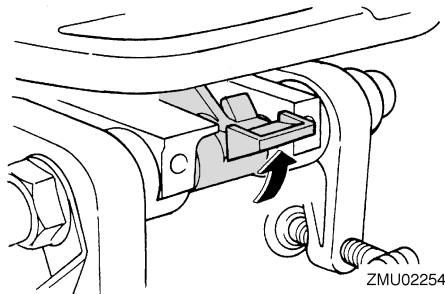
ZMU02255



ZMU02256

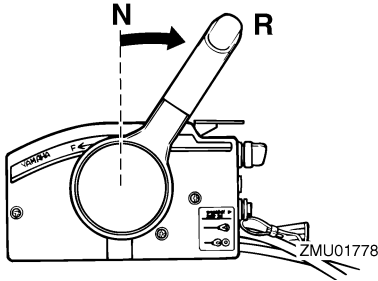
Remote control models

1. Check that the tilt lock lever is in the lock position.



ZMU02254

2. Pull up the neutral interlock trigger (if equipped) and move the remote control lever quickly and firmly from neutral to reverse.



EMU27820

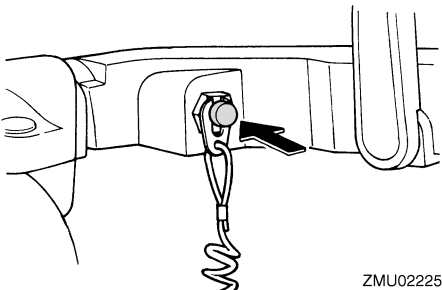
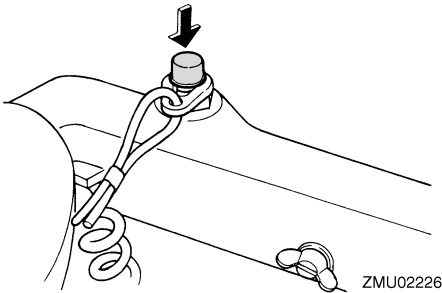
Stopping engine

Before stopping the engine, first let it cool off for a few minutes at idle or low speed. Stopping the engine immediately after operating at high speed is not recommended.

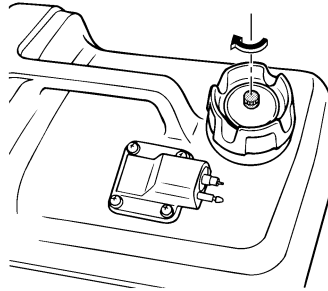
EMU27832

Procedure

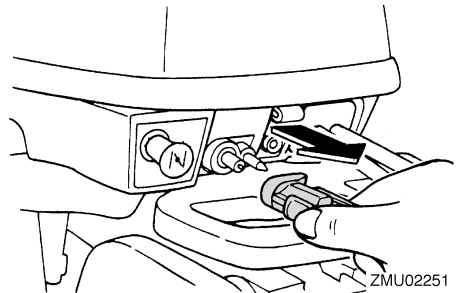
1. Push and hold the engine stop button until the engine comes to a complete stop.



2. After stopping the engine, tighten the air vent screw on the fuel tank cap and set the fuel cock lever or knob to the closed position, if equipped.



3. Disconnect the fuel line if you are using an external fuel tank.



NOTE:

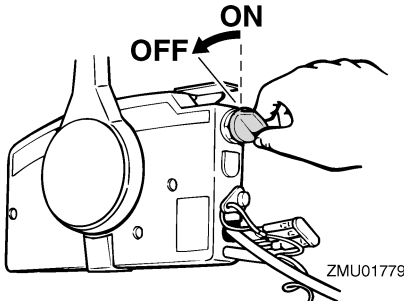
If the outboard motor is equipped with an engine stop switch lanyard, the engine can also be stopped by pulling the lanyard and removing the lock plate from the engine stop switch.

EMU27851

Procedure

1. Turn the main switch to "OFF" (off).

Operation



2. After stopping the engine, disconnect the fuel line or close the fuel cock if there is a fuel joint or a fuel cock on the boat.
3. Tighten the air vent screw on the fuel tank cap (if equipped).
4. Remove the key if the boat will be left unattended.

NOTE:

The engine can also be stopped by pulling the lanyard and removing the clip from the engine stop switch, then turning the main switch to "OFF" (off).

EMU27861

Trimming outboard motor

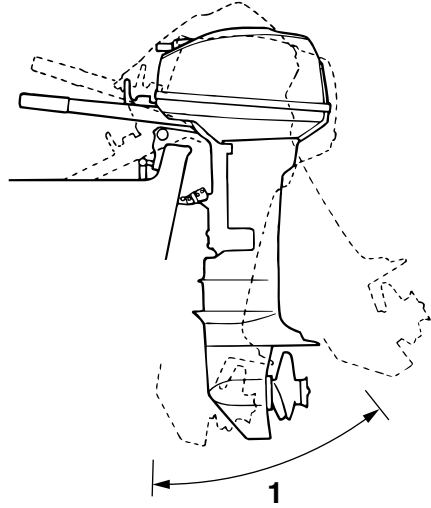
The trim angle of the outboard motor helps determine the position of the bow of the boat in the water. Correct trim angle will help improve performance and fuel economy while reducing strain on the engine. Correct trim angle depends upon the combination of boat, engine, and propeller. Correct trim is also affected by variables such as the load in the boat, sea conditions, and running speed.

EWM00740



Excessive trim for the operating conditions (either trim up or trim down) can cause boat instability and can make steering the boat more difficult. This increases

the possibility of an accident. If the boat begins to feel unstable or is hard to steer, slow down and/or readjust the trim angle.



ZMU02043

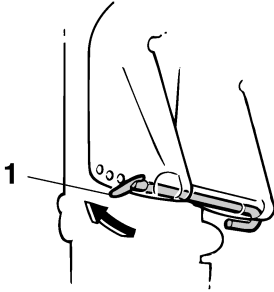
1. Trim operating angle

EMU27871

Adjusting trim angle for manual tilt models

There are 4 or 5 holes provided in the clamp bracket to adjust the outboard motor trim angle.

1. Stop the engine.
2. Remove the trim rod from the clamp bracket while slightly tilting the outboard motor up.



ZMU02257

1. Trim rod

3. Reposition the rod in the desired hole.

To raise the bow ("trim-out"), move the rod away from the transom.

To lower the bow ("trim-in"), move the rod toward the transom.

Make test runs with the trim set to different angles to find the position that works best for your boat and operating conditions.

EWM00400

WARNING

- Stop the engine before adjusting the trim angle.
- Use care to avoid being pinched when removing or installing the rod.
- Use caution when trying a trim position for the first time. Increase speed gradually and watch for any signs of instability or control problems. Improper trim angle can cause loss of control.

NOTE:

The outboard motor trim angle can be changed approximately 4 degrees by shifting the trim rod one hole.

EMU27901

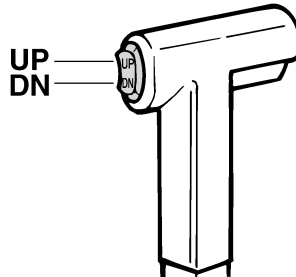
Adjusting trim angle (power tilt models)

EWM00750

WARNING

- Be sure all people are clear of the outboard motor when adjusting the tilt angle, also be careful not to pinch any body parts between the drive unit and clamp bracket.
- Use caution when trying a trim position for the first time. Increase speed gradually and watch for any signs of instability or control problems. Improper trim angle can cause loss of control.
- Use the power tilt switch located on the bottom engine cowling (if equipped) only when the boat is at a complete stop with the engine off.

Tilt the engine to the desired angle using the power tilt switch.



ZMU01720

NOTE:

Stay within the trim operating angle when trimming the outboard motor using the power tilt system.

To raise the bow ("trim-out"), tilt the engine up. To lower the bow ("trim-in"), tilt the engine down.

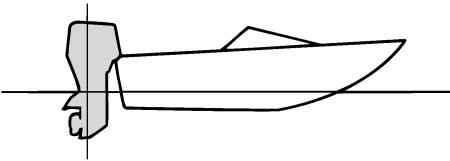
Operation

Make test runs with the trim set to different angles to find the position that works best for your boat and operating conditions.

EMU27911

Adjusting boat trim

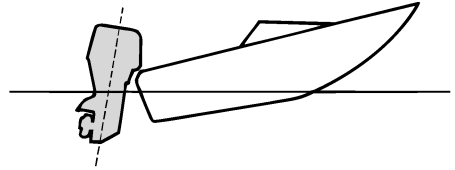
When the boat is on plane, a bow-up attitude results in less drag, greater stability and efficiency. This is generally when the keel line of the boat is up about 3 to 5 degrees. With the bow up, the boat may have a greater tendency to steer to one side or the other. Compensate for this as you steer. The trim tab can also be adjusted to help offset this effect. When the bow of the boat is down, it is easier to accelerate from a standing start onto plane.



ZMU01784

Bow Up

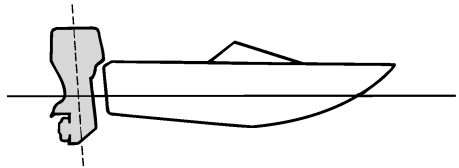
Too much trim-out puts the bow of the boat too high in the water. Performance and economy are decreased because the hull of the boat is pushing the water and there is more air drag. Excessive trim-out can also cause the propeller to ventilate, which reduces performance further, and the boat may “porpoise” (hop in the water), which could throw the operator and passengers overboard.



ZMU01785

Bow Down

Too much trim-in causes the boat to “plow” through the water, decreasing fuel economy and making it hard to increase speed. Operating with excessive trim-in at higher speeds also makes the boat unstable. Resistance at the bow is greatly increased, heightening the danger of “bow steering” and making operation difficult and dangerous.



ZMU01786

NOTE:

Depending on the type of boat, the outboard motor trim angle may have little effect on the trim of the boat when operating.

EMU27931

Tilting up and down

If the engine will be stopped for some time or if the boat is moored in shallows, the outboard motor should be tilted up to protect the propeller and casing from damage by collision with obstructions, and also to reduce salt corrosion.

EWM00220

WARNING

Be sure all people are clear of the outboard motor when tilting up and down, also be careful not to pinch any body parts between the drive unit and engine bracket.

EWM00250

WARNING

Leaking fuel is a fire hazard. If there is a fuel joint on the outboard motor, disconnect the fuel line or close the fuel cock if the engine will be tilted for more than a few minutes. Otherwise fuel may leak.

ECM00241

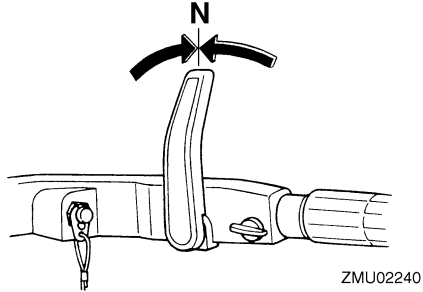
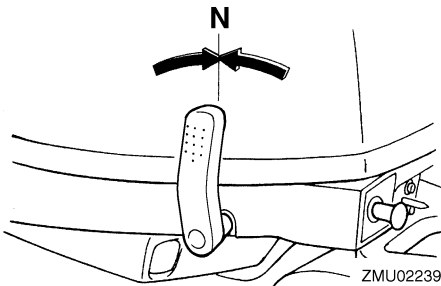
CAUTION:

- Before tilting the outboard motor, stop the engine by following the procedure on page 30. Never tilt the outboard motor while the engine is running. Severe damage from overheating can result.
- Do not tilt up the engine by pushing the tiller handle (if equipped) because this could break the handle.

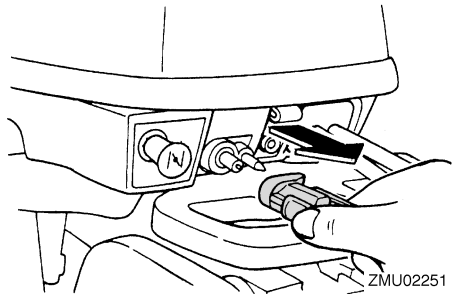
EMU27975

Procedure for tilting up (manual tilt models)

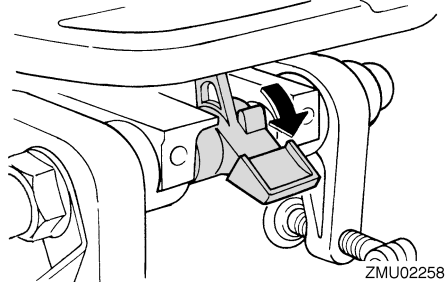
1. Place the gear shift lever in neutral.



2. Disconnect the fuel line from the outboard motor.

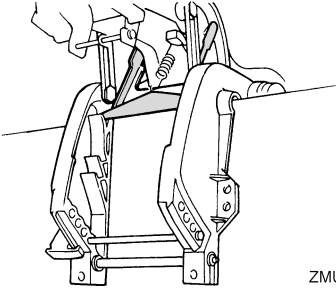


3. Place the tilt lock lever (if equipped) in the release/up position.

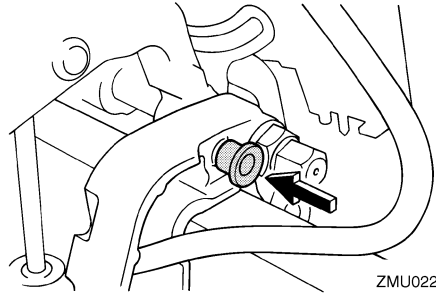


4. Pull up the shallow water lever (if equipped).
5. Hold the rear of the top cowling with one hand and tilt the engine up fully.
6. Push the tilt support knob into the clamp bracket. Or the tilt support bar will turn to the lock position automatically.

Operation



ZMU02259



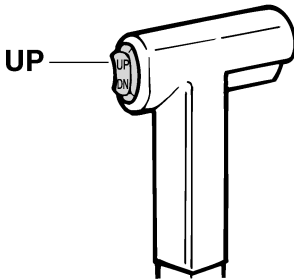
ZMU02228

EMU28004

Procedure for tilting up

Power trim and tilt models / power tilt models

1. Place the remote control lever / the gear shift lever in neutral.
2. Disconnect the fuel line from the outboard motor or close the fuel cock.
3. Press the power trim and tilt switch / power tilt switch "UP" (up) until the outboard motor has tilted up completely.



ZMU01787

4. Push the tilt support knob into the clamp bracket or pull the tilt support lever toward you to support the engine.

EWM00260

WARNING

After tilting the outboard motor, be sure to support it with the tilt support knob or tilt support lever. Otherwise the outboard motor could fall back down suddenly if oil in the power trim and tilt unit loses pressure.

5. Models equipped with trim rods: Once the outboard motor is supported with the tilt support lever, press the power trim and tilt switch "DN" (down) to retract the trim rods.

ECM00250

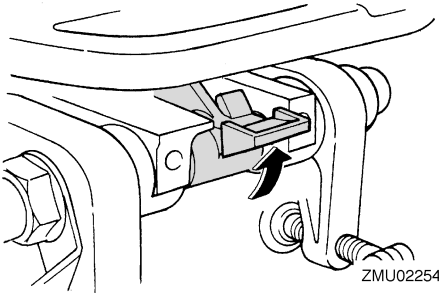
CAUTION:

Be sure to retract the trim rods completely during mooring. This protects the rods from marine growth and corrosion which could damage the power trim and tilt mechanism.

EMU30190

Procedure for tilting down (manual tilt models)

1. Place the tilt lock lever in the lock position.



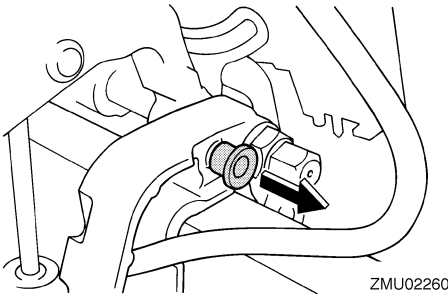
2. Slightly tilt the engine up until the tilt support bar is automatically released.
3. Slowly tilt the engine down.

EMU28052

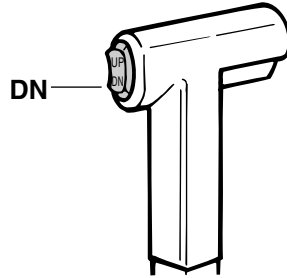
Procedure for tilting down

Power trim and tilt models / power tilt models

1. Push the power tilt / power trim and tilt switch “UP” (up) until the outboard motor is supported by the tilt rod and the tilt support lever / tilt support knob becomes free.
2. Release the tilt support lever or pull out the tilt support knob.



3. Push the power tilt / power trim and tilt switch “DN” (down) to lower the outboard motor to the desired position.



EMU28060

Cruising in shallow water

The outboard motor can be tilted up partially to allow operation in shallow water.

EMU28071

Cruising in shallow water (manual tilt models)

EWMO0710

⚠ WARNING

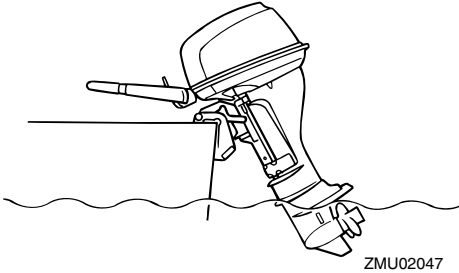
- Place the gear shift in neutral before using the shallow water cruising system.
- Run the boat at the lowest possible speed when using the shallow water cruising system. The tilt lock mechanism does not work while the shallow water cruising system is being used. Hitting an underwater obstacle could cause the outboard motor to lift out of the water, resulting in loss of control.
- Do not rotate the outboard motor 180° and operate the boat in reverse. Place the gear shift in reverse to operate the boat in reverse.
- Use extra care when operating in reverse. Too much reverse thrust can cause the outboard motor to lift out of the water, increasing the chance of accident and personal injury.
- Return the outboard motor to its normal position as soon as the boat is back in deeper water.

Operation

ECM00260

CAUTION:

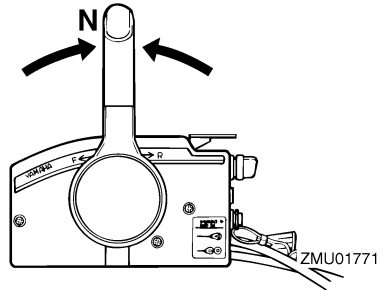
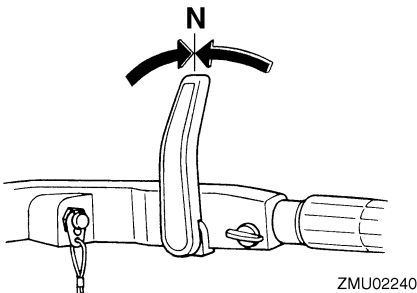
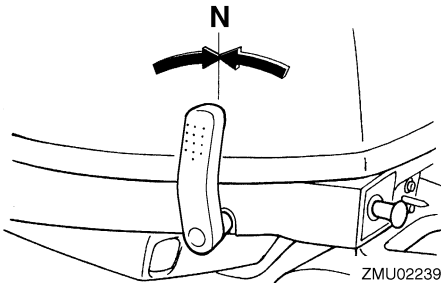
Do not tilt the outboard motor up so that the cooling water inlet on the lower unit is above the surface of the water when setting up for and cruising in shallow water. Otherwise severe damage from overheating can result.



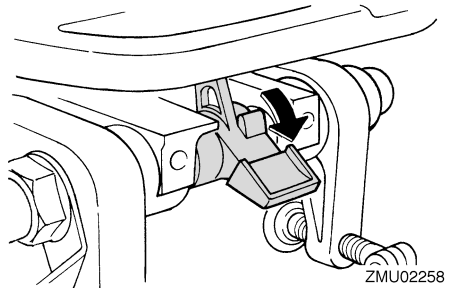
EMU28123

Procedure

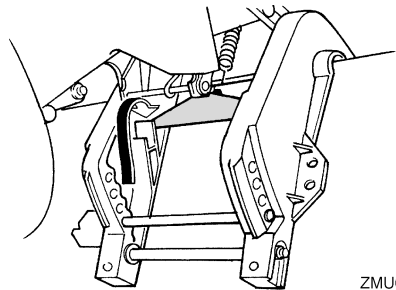
1. Place the gear shift lever in neutral.



2. Place the tilt lock lever in the release/up position.



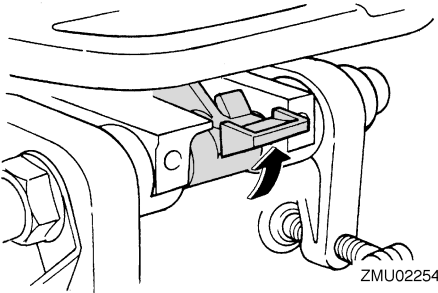
3. Slightly tilt the outboard motor up. The tilt support bar will lock automatically, supporting the outboard motor in a partially raised position.



NOTE:

This outboard motor has 2 positions for shallow water cruising.

4. To return the outboard motor to the normal running position, place the gear shift lever in neutral, then place the tilt lock lever in the lock/down position.



5. Slightly tilt the outboard motor up until the tilt support bar automatically returns to the free position.
6. Slowly lower the outboard motor to the normal position.

EMU28090

Power trim and tilt models / power tilt models

The outboard motor can be tilted up partially to allow operation in shallow water.

EWM00660

WARNING

- Place the gear shift in neutral before setting up for shallow water cruising.
- Return the outboard motor to its normal position as soon as the boat is back in deeper water.

ECM00260

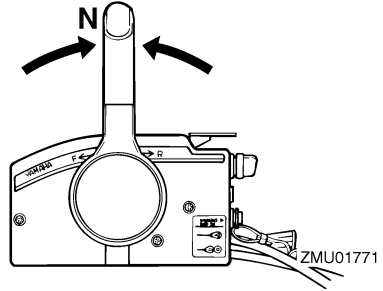
CAUTION:

Do not tilt the outboard motor up so that the cooling water inlet on the lower unit is above the surface of the water when setting up for and cruising in shallow water. Otherwise severe damage from overheating can result.

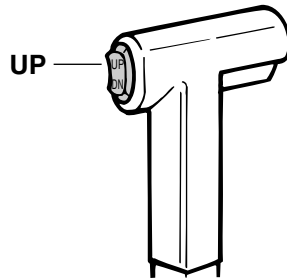
EMU28183

Procedure for power trim and tilt / power tilt models

1. Place the gear shift lever in neutral.



2. Slightly tilt the outboard motor up to the desired position using the power trim / tilt switch.



3. To return the outboard motor to the normal running position, press the power trim / tilt switch and slowly tilt the outboard motor down.

EMU28190

Cruising in other conditions

Cruising in salt water

After operating in salt water, wash out the cooling water passages with fresh water to prevent them from becoming clogged with salt deposits.

NOTE:

For cooling system flushing instructions, see page 42.

Operation

Cruising in turbid water

Yamaha strongly recommends that you use the optional chromium-plated water pump kit if you use the outboard motor in turbid (muddy) water conditions.

EMU28213

Specifications

Dimension:

Overall length:

- F6AMH 927 mm (36.5 in)
- F6BMH 927 mm (36.5 in)
- F8CMH 927 mm (36.5 in)
- FT8DMH 1038 mm (40.9 in)
- FT8DEP 552 mm (21.7 in)
- FT8DE 552 mm (21.7 in)

Overall width:

- F6AMH 377 mm (14.8 in)
- F6BMH 377 mm (14.8 in)
- F8CMH 377 mm (14.8 in)
- FT8DMH 371 mm (14.6 in)
- FT8DEP 312 mm (12.3 in)
- FT8DE 312 mm (12.3 in)

Overall height S:

- F6AMH 998 mm (39.3 in)
- F6BMH 998 mm (39.3 in)
- F8CMH 998 mm (39.3 in)

Overall height L:

- F6AMH 1125 mm (44.3 in)
- F6BMH 1125 mm (44.3 in)
- F8CMH 1125 mm (44.3 in)
- FT8DMH 1187 mm (46.7 in)
- FT8DEP 1187 mm (46.7 in)
- FT8DE 1187 mm (46.7 in)

Overall height X:

- FT8DMH 1255 mm (49.4 in)
- FT8DE 1255 mm (49.4 in)

Transom height S:

- F6AMH 435 mm (17.1 in)
- F6BMH 435 mm (17.1 in)
- F8CMH 435 mm (17.1 in)

Transom height L:

- F6AMH 562 mm (22.1 in)
- F6BMH 562 mm (22.1 in)
- F8CMH 562 mm (22.1 in)
- FT8DMH 557 mm (21.9 in)
- FT8DEP 557 mm (21.9 in)
- FT8DE 557 mm (21.9 in)

Transom height X:

- FT8DMH 625 mm (24.6 in)
- FT8DE 625 mm (24.6 in)

Weight (AL) S:

- F6AMH 37.0 kg (82 lb)
- F6BMH 37.0 kg (82 lb)
- F8CMH 37.0 kg (82 lb)

Weight (AL) L:

- F6AMH 38.5 kg (85 lb)
- F6BMH 38.5 kg (85 lb)
- F8CMH 38.5 kg (85 lb)
- FT8DMH 44.0 kg (97 lb)
- FT8DEP 49.0 kg (108 lb)
- FT8DE 44.0 kg (97 lb)

Weight (AL) X:

- FT8DE 45.0 kg (99 lb)
- FT8DMH 45.0 kg (99 lb)

Performance:

Full throttle operating range:

- F6AMH 4500–5500 r/min
- F6BMH 4000–5000 r/min
- F8CMH 5000–6000 r/min
- FT8DMH 5000–6000 r/min
- FT8DEP 5000–6000 r/min
- FT8DE 5000–6000 r/min

Maximum output:

- F6AMH 4.4 kW@5000 r/min (6 HP@5000 r/min)
- F6BMH 3.7 kW@4500 r/min (5 HP@4500 r/min)
- F8CMH 5.9 kW@5500 r/min (8 HP@5500 r/min)
- FT8DMH 5.9 kW@5500 r/min (8 HP@5500 r/min)
- FT8DEP 5.9 kW@5500 r/min (8 HP@5500 r/min)
- FT8DE 5.9 kW@5500 r/min (8 HP@5500 r/min)

Idling speed (in neutral):

- 1050 ±50 r/min

Engine:

Type:

- 4-stroke L

Displacement:

- 197.0 cm³ (12.02 cu.in)

Bore × stroke:

- 56.0 × 40.0 mm (2.20 × 1.57 in)

Ignition system:

- CDI

Spark plug (NGK):

- BR6HS-10

Spark plug gap:

- 0.9–1.0 mm (0.035–0.039 in)

Maintenance

Control system:

F6AMH Tiller
F6BMH Tiller
F8CMH Tiller
FT8DMH Tiller
FT8DEP Remote control
FT8DE Remote control

Starting system:

F6AMH Manual
F6BMH Manual
F8CMH Manual
FT8DMH Manual
FT8DEP Electric
FT8DE Electric

Starting carburetion system:

Choke valve

Valve clearance (cold engine) IN:

0.15–0.20 mm (0.0059–0.0079 in)

Valve clearance (cold engine) EX:

0.20–0.25 mm (0.0079–0.0098 in)

Battery:

Min. cold cranking amps (CCA/EN):

FT8DEP 347.0 A
FT8DE 347.0 A

Min. rated capacity (20HR/IEC):

FT8DEP 40.0 Ah
FT8DE 40.0 Ah

Alternator output for battery DC:

6.0 A

Drive unit:

Gear positions:

Forward-neutral-reverse

Gear ratio:

F6AMH 2.08 (27/13)
F6BMH 2.08 (27/13)
F8CMH 2.08 (27/13)
FT8DMH 2.92 (38/13)
FT8DEP 2.92 (38/13)
FT8DE 2.92 (38/13)

Trim and tilt system:

F6AMH Manual tilt
F6BMH Manual tilt
F8CMH Manual tilt
FT8DMH Manual tilt
FT8DEP Power tilt
FT8DE Manual tilt

Propeller mark:

F6AMH N
F6BMH N
F8CMH N
FT8DMH R
FT8DEP R
FT8DE R

Fuel and oil:

Recommended fuel:

Unleaded regular gasoline

Min. research octane:

90

Fuel tank capacity:

12 L (3.17 US gal) (2.64 Imp.gal)

Recommended engine oil:

4-stroke outboard motor oil

Engine oil grade API:

API SE, SF, SG, SH, SJ

Engine oil type SAE:

SAE10W30 or SAE10W40

Lubrication:

Wet sump

Engine oil quantity (excluding oil filter):

0.8 L (0.85 US qt) (0.70 Imp.qt)

Recommended gear oil:

Hypoid gear oil SAE#90

Gear oil quantity:

F6AMH 150.0 cm³ (5.07 US oz) (5.29 Imp.oz)
F6BMH 150.0 cm³ (5.07 US oz) (5.29 Imp.oz)
F8CMH 150.0 cm³ (5.07 US oz) (5.29 Imp.oz)
FT8DMH 370.0 cm³ (12.51 US oz) (13.05 Imp.oz)
FT8DEP 370.0 cm³ (12.51 US oz) (13.05 Imp.oz)
FT8DE 370.0 cm³ (12.51 US oz) (13.05 Imp.oz)

Tightening torque for engine:

Spark plug:

25.0 Nm (18.4 ft-lb) (2.55 kgf-m)

Propeller nut:

F6AMH 17.0 Nm (12.5 ft-lb) (1.73 kgf-m)
F6BMH 17.0 Nm (12.5 ft-lb) (1.73 kgf-m)
F8CMH 17.0 Nm (12.5 ft-lb) (1.73 kgf-m)
FT8DMH 21.0 Nm (15.5 ft-lb) (2.14 kgf-m)
FT8DEP 21.0 Nm (15.5 ft-lb) (2.14 kgf-m)
FT8DE 21.0 Nm (15.5 ft-lb) (2.14 kgf-m)

Engine oil drain bolt:

24.0 Nm (17.7 ft-lb) (2.45 kgf-m)

EMU28222

Transporting and storing outboard motor

EWM00690

WARNING

- Leaking fuel is a fire hazard. When transporting and storing the outboard motor, close the air vent screw and fuel cock to prevent fuel from leaking.
- USE CARE when transporting fuel tank, whether in a boat or car.
- DO NOT fill fuel container to maximum capacity. Gasoline will expand considerably as it warms up and can build up pressure in the fuel container. This can cause fuel leakage and a potential fire hazard.

EWM00700

WARNING

Never get under the lower unit while it is tilted, even if a motor support bar is used. Severe injury could occur if the outboard motor accidentally falls.

ECM00660

CAUTION:

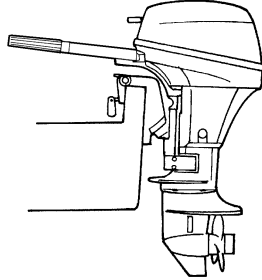
Do not use the tilt support lever or knob when trailering the boat. The outboard motor could shake loose from the tilt support and fall. If the motor cannot be trailered in the normal running position, use an additional support device to secure it in the tilt position.

The outboard motor should be trailered and stored in the normal running position. If there is insufficient road clearance in this position, then trailer the outboard motor in the tilt position using a motor support device such as a transom saver bar. Consult your Yamaha dealer for further details.

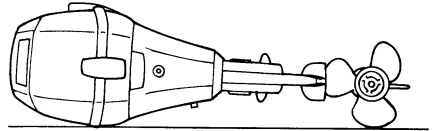
EMU28235

Clamp screw mounting models

When transporting or storing the outboard motor while removed from a boat, keep the outboard motor in the attitude shown.



ZMU02263



ZMU02264

NOTE:

Place a towel or something similar under the outboard motor to protect it from damage.

EMU28241

Storing outboard motor

When storing your Yamaha outboard motor for prolonged periods of time (2 months or longer), several important procedures must be performed to prevent excessive damage. It is advisable to have your outboard motor serviced by an authorized Yamaha dealer prior to storage. However, you, the owner, with a minimum of tools, can perform the following procedures.

Maintenance

ECM01080

CAUTION:

- To prevent problems which can be caused by oil entering the cylinder from the sump, keep the outboard motor in the attitude shown when transporting and storing it. If storing or transporting the outboard motor on its side (not upright), put it on a cushion after draining the engine oil.
- Do not place the outboard motor on its side before the cooling water has drained from it completely, otherwise water may enter the cylinder through the exhaust port and cause engine trouble.
- Store the outboard motor in a dry, well-ventilated place, not in direct sunlight.

EMU28301

Procedure

EMU28332

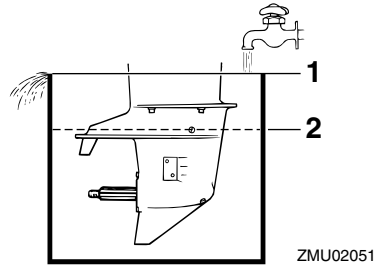
Flushing in a test tank

ECM00300

CAUTION:

Do not run the engine without supplying it with cooling water. Either the engine water pump will be damaged or the engine will be damaged from overheating. Before starting the engine, be sure to supply water to the cooling water passages.

1. Wash the outboard motor body using fresh water. For further information, see page 45.
2. Disconnect the fuel line from the motor or shut off the fuel cock, if equipped.
3. Remove the engine top cowling and silencer cover. Remove the propeller.
4. Install the outboard motor on the test tank. Fill the tank with fresh water to above the level of the anti-cavitation plate.



1. Water surface
2. Lowest water level

ECM00290

CAUTION:

If the fresh water level is below the level of the anti-cavitation plate, or if the water supply is insufficient, engine seizure may occur.

5. Cooling system flushing is essential to prevent the cooling system from clogging up with salt, sand, or dirt. In addition, fogging/lubricating of the engine is mandatory to prevent excessive engine damage due to rust. Perform the flushing and fogging at the same time.

EWM00090

WARNING

- Do not touch or remove electrical parts when starting or during operation.
 - Keep hands, hair, and clothes away from the flywheel and other rotating parts while the engine is running.
6. Run the engine at a fast idle for a few minutes in neutral position.
 7. Just prior to turning off the engine, quickly spray "Fogging Oil" alternately into each carburetor or the fogging hole of the silencer cover, if equipped. When properly done, the engine will smoke excessively and almost stall.

8. Remove the outboard motor from the test tank.
9. Install the silencer cover/cap of fogging hole and top cowling.
10. If the "Fogging Oil" is not available, run the engine at a fast idle until the fuel system becomes empty and the engine stops.
11. Drain the cooling water completely out of the motor. Clean the body thoroughly.
12. If the "Fogging Oil" is not available, remove the spark plug(s). Pour a teaspoonful of clean engine oil into each cylinder. Crank several times manually. Replace the spark plug(s).
13. Drain the fuel from the fuel tank.

NOTE: _____

Store the fuel tank in a dry, well-ventilated place, not in direct sunlight.

EMU28400

Lubrication (except oil injection models)

1. Grease the spark plug threads and install the spark plug(s) and torque to proper specification. For information on spark plug installation, see page 50.
2. Change the gear oil. For instructions, see page 56. Inspect the oil for the presence of water that indicates a leaky seal. Seal replacement should be performed by an authorized Yamaha dealer prior to use.
3. Grease all grease fittings. For further details, see page 49.

EMU28430

Battery care

EWMM00330



Battery electrolytic fluid is dangerous; it contains sulfuric acid and therefore is poisonous and highly caustic.

Always follow these preventive measures:

- **Avoid bodily contact with electrolytic fluid as it can cause severe burns or permanent eye injury.**
- **Wear protective eye gear when handling or working near batteries.**

Antidote (EXTERNAL):

- **SKIN - Flush with water.**
- **EYES - Flush with water for 15 minutes and get immediate medical attention.**

Antidote (INTERNAL):

- **Drink large quantities of water or milk followed by milk of magnesia, beaten egg, or vegetable oil. Get immediate medical attention.**

Batteries also generate explosive hydrogen gas; therefore, you should always follow these preventive measures:

- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks, or open flames (for example: welding equipment, lighted cigarettes, and so on.)**
- **DO NOT SMOKE when charging or handling batteries.**

KEEP BATTERIES AND ELECTROLYTIC FLUID OUT OF REACH OF CHILDREN.

Batteries vary among manufacturers. Therefore the following procedures may not always apply. Consult your battery manufacturer's instructions.

Procedure

1. Disconnect and remove the battery from the boat. Always disconnect the black negative cable first to prevent the risk of shorting.
2. Clean the battery casing and terminals. Fill each cell to the upper level with distilled water.

Maintenance

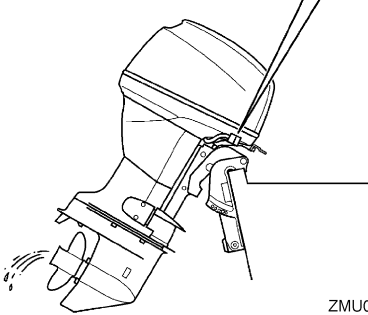
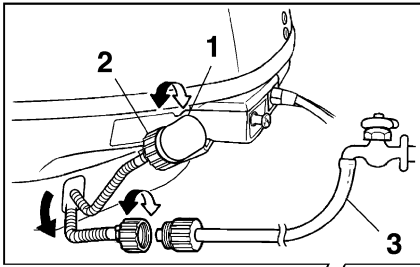
3. Store the battery on a level surface in a cool, dry, well-ventilated place out of direct sunlight.
4. Once a month, check the specific gravity of the electrolyte and recharge as required to prolong battery life.

EMU28440

Flushing power unit

Perform this procedure right after operation for the most thorough flushing.

1. After shutting off the engine, unscrew the garden hose connector from the fitting on the bottom cowling.



ZMU02265

2. Screw the garden hose connector onto a garden hose which is connected to a fresh water supply.

3. With the engine off, turn on the water tap and let the water flush through the cooling passages for about 15 minutes. Turn off the water and disconnect the garden hose.
4. When flushing is complete, reinstall the garden hose connector on the fitting on the bottom cowling. Tighten the connector securely.

ECM00540

CAUTION:

Do not leave the garden hose connector loose on the bottom cowling fitting or let the hose hang free during normal operation. Water will leak out of the connector instead of cooling the engine, which can cause serious overheating. Be sure the connector is tightened securely on the fitting after flushing the engine.

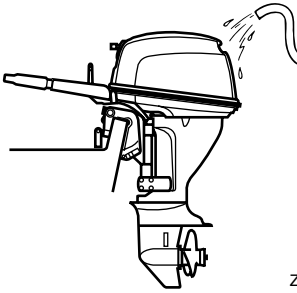
NOTE:

- When flushing the engine with the boat in the water, tilting up the outboard motor until it is completely out of the water will achieve better results.
- For cooling system flushing instructions, see page 42.

EMU28450

Cleaning the outboard motor

After use, wash the exterior of the outboard motor with fresh water. Flush the cooling system with fresh water.



ZMU02052

NOTE: _____
For cooling system flushing instructions, see page 42.

EMU28460

Checking painted surface of motor

Check the motor for scratches, nicks, or flaking paint. Areas with damaged paint are more likely to corrode. If necessary, clean and paint the areas. A touch-up paint is available from your Yamaha dealer.

EMU28474

Periodic maintenance

EWM01070

WARNING _____

Be sure to turn off the engine when you perform maintenance unless otherwise specified. If you or the owner is not familiar with machine servicing, this work should be done by your Yamaha dealer or other qualified mechanic.

EMU28510

Replacement parts

If replacement parts are necessary, use only genuine Yamaha parts or parts of the same type and of equivalent strength and materials. Any part of inferior quality may malfunction, and the resulting loss of control could endanger the operator and passengers. Yamaha genuine parts and accessories are available from your Yamaha dealer.

Maintenance

EMU28521

Maintenance chart

Frequency of maintenance operations may be adjusted according to the operating conditions, but the following table gives general guidelines. Refer to the sections in this chapter for explanations of each owner-specific action.

The “●” symbol indicates the check-ups which you may carry out yourself.

The “○” symbol indicates work to be carried out by your Yamaha dealer.

Item	Actions	Initial		Every	
		10 hours (1 month)	50 hours (3 months)	100 hours (6 months)	200 hours (1 year)
Anode(s) (external)	Inspection / replacement		●/○	●/○	
Anode(s) (internal)	Inspection / replacement				○
Battery	Inspection / charging	●/○			
Cooling water passages	Cleaning		●	●	
Cowling clamp	Inspection				●
Fuel filter (disposable)	Inspection / replacement	●/○	●/○	●/○	
Fuel system	Inspection	●	●	●	
Fuel tank (Yamaha portable tank)	Inspection / cleaning				●
Gear oil	Change	●		●	
Greasing points	Greasing			●	
Idling speed (carburetor models)	Inspection / adjustment	●/○		●/○	
Power trim and tilt unit	Inspection				○
Propeller and cotter pin	Inspection / replacement		●	●	
Shift link / shift cable	Inspection / adjustment				○
Thermostat	Inspection				○
Throttle link / throttle cable / throttle pick-up timing	Inspection / adjustment				○
Water pump	Inspection				○
Engine oil	Inspection / change	●		●	
Oil filter (built into oil pan)	Inspection / cleaning / change				○
Spark plug(s)	Cleaning / adjustment / replacement	●			●
Timing belt	Inspection / replacement			○	○

Maintenance

Item	Actions	Initial		Every	
		10 hours (1 month)	50 hours (3 months)	100 hours (6 months)	200 hours (1 year)
Valve clearance (OHC, OHV)	Inspection / adjustment	○		○	

NOTE: _____

When operating in salt water, turbid or muddy water, the engine should be flushed with clean water after each use.

EMU28871

Maintenance chart (additional)

Item	Actions	Every	
		500 hours (2.5 years)	1000 hours (5 years)
Timing belt	Replacement		○

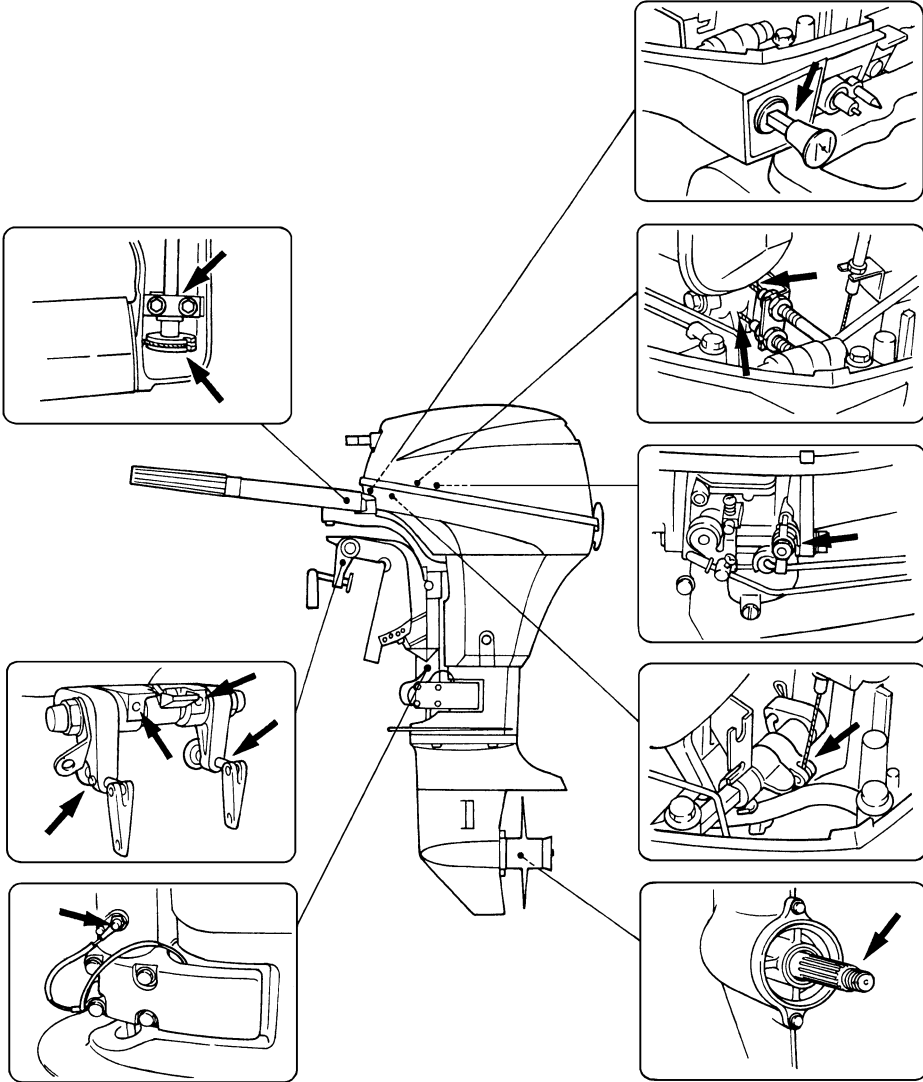
Maintenance

EMU28940

Greasing

Yamaha grease A (water resistant grease)

Yamaha grease D (corrosion resistant grease; for propeller shaft)



ZMU02266

EMU28950

Cleaning and adjusting spark plug

EWM00560

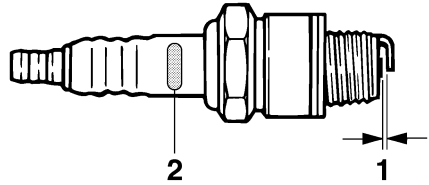
WARNING

When removing or installing a spark plug, be careful not to damage the insulator. A damaged insulator could allow external sparks, which could lead to explosion or fire.

The spark plug is an important engine component and is easy to inspect. The condition of the spark plug can indicate something about the condition of the engine. For example, if the center electrode porcelain is very white, this could indicate an intake air leak or carburetion problem in that cylinder. Do not attempt to diagnose any problems yourself. Instead, take the outboard motor to a Yamaha dealer. You should periodically remove and inspect the spark plug because heat and deposits will cause the spark plug to slowly break down and erode. If electrode erosion becomes excessive, or if carbon and other deposits are excessive, you should replace the spark plug with another of the correct type.

Standard spark plug:
BR6HS-10

Before fitting the spark plug, measure the electrode gap with a wire thickness gauge; adjust the gap to specification if necessary.



ZMU02179

1. Spark plug gap
2. Spark plug I.D. mark (NGK)

Spark plug gap:
0.9–1.0 mm (0.035–0.039 in)

When fitting the plug, always clean the gasket surface and use a new gasket. Wipe off any dirt from the threads and screw in the spark plug to the correct torque.

Spark plug torque:
25.0 Nm (18.4 ft-lb) (2.55 kgf-m)

NOTE:

If a torque-wrench is not available when you are fitting a spark plug, a good estimate of the correct torque is 1/4 to 1/2 a turn past finger-tight. Have the spark plug adjusted to the correct torque as soon as possible with a torque-wrench.

EMU28961

Checking fuel system

EWM00900

WARNING

Gasoline and its vapors are highly flammable and explosive. Keep away from sparks, cigarettes, flames, or other sources of ignition.

EWM00910

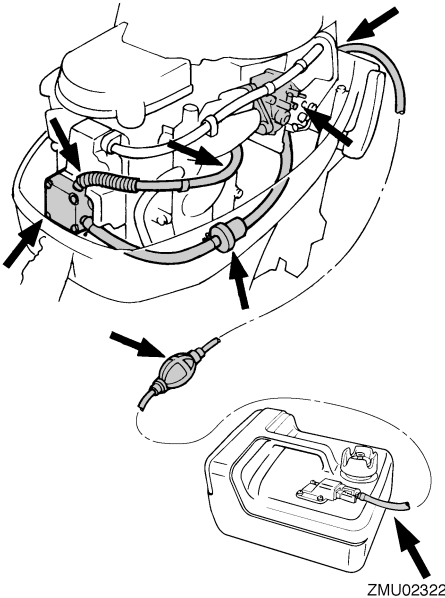
WARNING

Leaking fuel can result in fire or explosion.

Maintenance

- Check for fuel leakage regularly.
- If any fuel leakage is found, the fuel system must be repaired by a qualified mechanic. Improper repairs can make the outboard unsafe to operate.

Check the fuel lines for leaks, crack, or malfunction. If a problem is found, your Yamaha dealer or other qualified mechanic should repair it immediately.



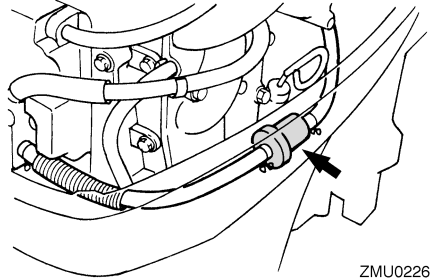
Checkpoints

- Fuel system parts leakage
- Fuel line joint leakage
- Fuel line cracks or other damage
- Fuel connector leakage

EMU28990

Checking fuel filter

Check the fuel filter periodically. The fuel filter is a one piece, disposable type. If foreign matter is found in the filter, replace it. For replacement of the fuel filter, consult your Yamaha dealer.



EMU29040

Inspecting idling speed

EWM00450

WARNING

- Do not touch or remove electrical parts when starting or during operation.
- Keep hands, hair, and clothes away from the flywheel and other rotating parts while the engine is running.
- 2-hp models: The propeller rotates whenever the engine is running. Do not move the throttle control lever from the start position during warm-up. The boat could unexpectedly start to move, which could result in an accident.

ECM00490

CAUTION:

This procedure must be performed while the outboard motor is in the water. A flushing attachment or test tank can be used.

A diagnostic tachometer should be used for this procedure. Results may vary depending on whether testing is conducted with the flushing attachment, in a test tank, or with the outboard motor in the water.

1. Start the engine and allow it to warm up fully in neutral until it is running smoothly. 2-hp model: Warm the engine with the throttle in the start position or less. If the outboard is mounted on a boat, be sure the boat is tightly moored.

NOTE:

Correct idling speed inspection is only possible if the engine is fully warmed up. If not warmed up fully, the idle speed will measure higher than normal. If you have difficulty verifying the idle speed, or the idle speed requires adjustment, consult a Yamaha dealer or other qualified mechanic.

2. Verify whether the idle speed is set to specification. For idle speed specifications, see page 40.

EMU29072

Changing engine oil

EWM00760

WARNING

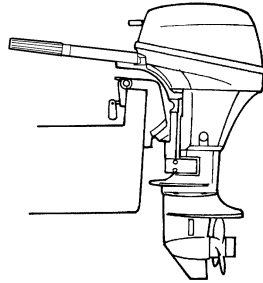
- Avoid draining the engine oil immediately after stopping the engine. The oil is hot and should be handled with care to avoid burns.
- Be sure the outboard motor is securely fastened to the transom or a stable stand.

ECM00970

CAUTION:

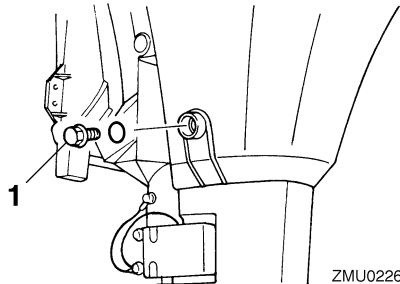
- Do not overfill the oil, and be sure the outboard motor is upright (not tilted) when checking and changing the engine oil.
- If the oil level is above the upper level mark, drain until the level meets the specified capacity. Overfilling the oil could cause leakage or damage.

1. Put the outboard motor in an upright position (not tilted).



ZMU02263

2. Prepare a suitable container that holds a larger amount than the engine oil capacity. Loosen and remove the drain screw while holding the container under the drain hole. Then remove the oil filler cap. Let the oil drain completely. Wipe up any spilled oil immediately.



ZMU02269

1. Drain screw
3. Put a new gasket on the oil drain screw. Apply a light coat of oil to the gasket and install the drain screw.

Drain screw tightening torque:
24.0 Nm (17.7 ft-lb) (2.45 kgf-m)

NOTE:

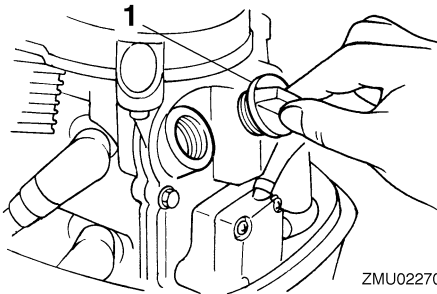
If a torque wrench is not available when you are installing the drain screw, finger tighten the screw just until the gasket comes into contact with the surface of the drain hole. Then

Maintenance

tighten 1/4 to 1/2 turn more. Tighten the drain screw to the correct torque with a torque wrench as soon as possible.

4. Add the correct amount of oil through the filler hole. Install the filler cap.

Recommended engine oil:
4-stroke outboard motor oil
Engine oil quantity (excluding oil filter):
0.8 L (0.85 US qt) (0.70 Imp.qt)



ZMU02270

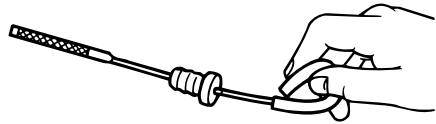
1. Oil filler cap
5. Start the engine and watch to make sure the low oil pressure warning indicator (if equipped) turns off. Make sure that there are no oil leaks.

ECM00680

CAUTION:

If the low oil pressure warning indicator does not turn off or if there are oil leaks, stop the engine and find the cause. Continued operation with a problem could cause severe engine damage. Consult your Yamaha dealer if the problem cannot be located and corrected.

6. Turn off the engine and wait 3 minutes. Recheck the oil level using the dipstick to be sure the level falls between the upper and lower marks. Fill with oil if it is below the lower mark, or drain to the specified level if it is above the upper mark.



ZMU02058

7. Dispose of used oil according to local regulations.

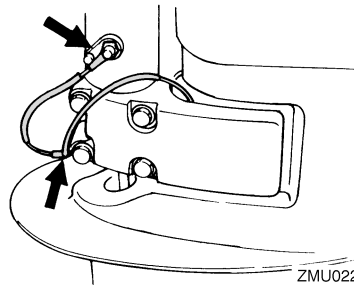
NOTE:

- For more information on the disposal of used oil, consult your Yamaha dealer.
- Change the oil more often when operating the engine under adverse conditions such as extended trolling.

EMU29111

Checking wiring and connectors

- Check that each grounding wire is properly secured.
- Check that each connector is engaged securely.



ZMU02271

EMU29120

Exhaust leakage

Start the engine and check that no exhaust leaks from the joints between the exhaust cover, cylinder head, and body cylinder.

EMU29130

Water leakage

Start the engine and check that no water leaks from the joints between the exhaust cover, cylinder head, and body cylinder.

EMU29140

Engine oil leakage

Check for oil leaks on the around the engine.

NOTE:

If any leaks are found, consult your Yamaha dealer.

EMU29161

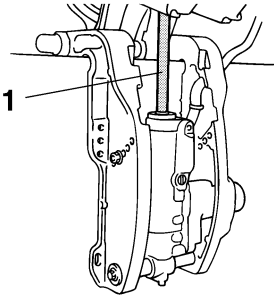
Checking power trim and tilt system

EWM00430

! WARNING

- Never get under the lower unit while it is tilted, even when the tilt support lever is locked. Severe injury could occur if the outboard motor accidentally falls.
- Make sure no one is under the outboard motor before performing this test.

1. Check the power trim and tilt unit for any sign of oil leaks.



ZMU02272

1. Tilt rod
2. Operate each of the power trim and tilt switches / the power tilt switches on the remote control and engine bottom cowl (if equipped) to check that all switches work.

3. Tilt the outboard motor up and check that the trim and tilt rod is pushed out completely.
4. Check that the trim and tilt rod is free of corrosion or other flaws.
5. Tilt the outboard motor down. Check that the trim and tilt rod operates smoothly.

NOTE:

Consult your Yamaha dealer if any operation is abnormal.

EMU29171

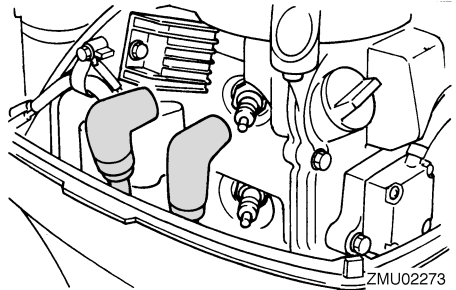
Checking propeller

EWM00321

! WARNING

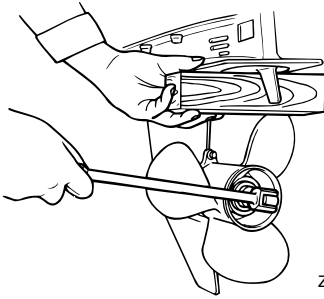
You could be seriously injured if the engine accidentally starts when you are near the propeller.

- Before inspecting, removing, or installing the propeller, remove the spark plug caps from the spark plugs. Also, place the shift control in neutral, turn the main switch to "OFF" (off) and remove the key, and remove the lanyard from the engine stop switch. Turn off the battery cut-off switch if your boat has one.
- Do not use your hand to hold the propeller when loosening or tightening the propeller nut. Put a wood block between the anti-cavitation plate and the propeller to prevent the propeller from turning.



ZMU02273

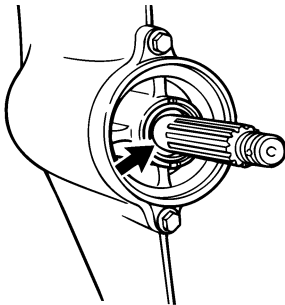
Maintenance



ZMU01897

Checkpoints

- Check each of the propeller blades for wear, erosion from cavitation or ventilation, or other damage.
- Check the propeller shaft for damage.
- Check the splines / shear pin for wear or damage.
- Check for fish line tangled around the propeller shaft.



ZMU02274

- Check the propeller shaft oil seal for damage.

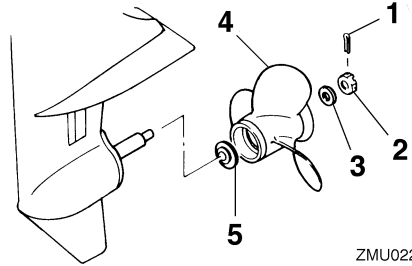
NOTE:

If the shear pin equipped: it is designed to break if the propeller hits a hard underwater obstacle to help protect the propeller and drive mechanism. The propeller will then spin freely on the shaft. If this happens, the shear pin must be replaced.

EMU29193

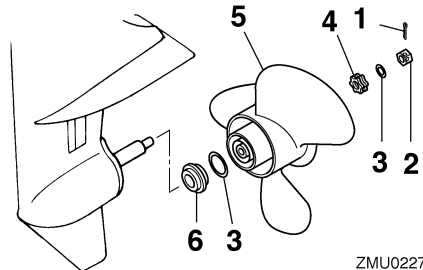
Removing the propeller

1. Straighten the cotter pin and pull it out using a pair of pliers.
2. Remove the propeller nut, washer, and spacer (if equipped).



ZMU02275

1. Cotter pin
2. Propeller nut
3. Washer
4. Propeller
5. Thrust washer



ZMU02276

1. Cotter pin
 2. Propeller nut
 3. Washer
 4. Spacer
 5. Propeller
 6. Thrust washer
3. Remove the propeller and thrust washer.

EMU29230

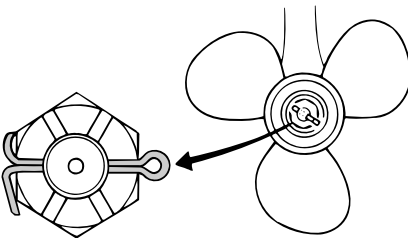
Installing the propeller

ECM00340

CAUTION:

- Be sure to install the thrust washer before installing the propeller, otherwise the lower case and propeller boss could be damaged.
- Be sure to use a new cotter pin and bend the ends over securely. Otherwise the propeller could come off during operation and be lost.

1. Apply Yamaha marine grease or a corrosion resistant grease to the propeller shaft.
2. Install the spacer(if equipped), thrust washer, and propeller on the propeller shaft.
3. Install the spacer (if equipped) and the washer. Tighten the propeller nut to the specified torque.
4. Align the propeller nut with the propeller shaft hole. Insert a new cotter pin in the hole and bend the cotter pin ends.



ZMU02063

NOTE:

If the propeller nut does not align with the propeller shaft hole after tightening to the specified torque, tighten the nut further to align it with the hole.

EMU29280

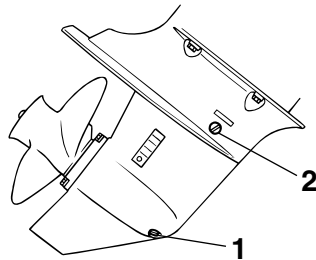
Changing gear oil

EWM00800

WARNING

- Be sure the outboard motor is securely fastened to the transom or a stable stand. You could be severely injured if the outboard motor falls on you.
- Never get under the lower unit while it is tilted, even when the tilt support lever or knob is locked. Severe injury could occur if the outboard motor accidentally falls.

1. Tilt the outboard motor so that the gear oil drain screw is at the lowest point possible.
2. Place a suitable container under the gear case.
3. Remove the gear oil drain screw.



ZMU02064

1. Gear oil drain screw
2. Oil level plug

NOTE:

If the magnetic gear oil drain screw equipped: remove all metal particles from the screw before installing it.

4. Remove the oil level plug to allow the oil to drain completely.

Maintenance

ECM00710

CAUTION:

Inspect the used oil after it has been drained. If the oil is milky, water is getting into the gear case which can cause gear damage. Consult a Yamaha dealer for repair of the lower unit seals.

NOTE:

For disposal of used oil consult your Yamaha dealer.

5. With the outboard motor in a vertical position, and using a flexible or pressurized filling device, inject the gear oil into the gear oil drain screw hole.

Recommended gear oil:

Hypoid gear oil SAE#90

Gear oil quantity:

F6AMH 150.0 cm³ (5.07 US oz) (5.29 Imp.oz)

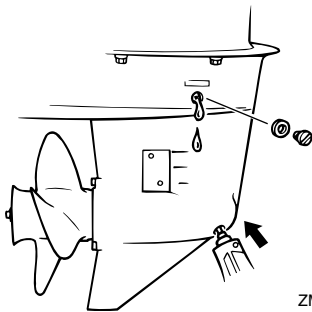
F6BMH 150.0 cm³ (5.07 US oz) (5.29 Imp.oz)

F8CMH 150.0 cm³ (5.07 US oz) (5.29 Imp.oz)

FT8DMH 370.0 cm³ (12.51 US oz) (13.05 Imp.oz)

FT8DEP 370.0 cm³ (12.51 US oz) (13.05 Imp.oz)

FT8DE 370.0 cm³ (12.51 US oz) (13.05 Imp.oz)



ZMU02065

6. When the oil begins to flow out of the oil level plug hole, insert and tighten the oil level plug.
7. Insert and tighten the gear oil drain screw.

EMU29302

Cleaning fuel tank

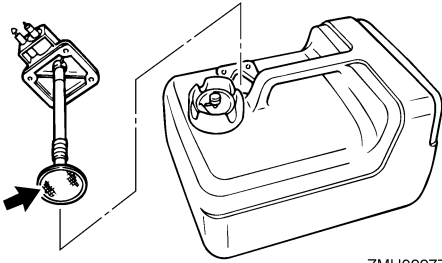
EWM00920

WARNING

Gasoline is highly flammable, and its vapors are flammable and explosive.

- If you have any question about properly doing this procedure, consult your Yamaha dealer.
- Keep away from sparks, cigarettes, flames, or other sources of ignition when cleaning the fuel tank.
- Remove the fuel tank from the boat before cleaning it. Work only outdoors in an area with good ventilation.
- Wipe up any spilled fuel immediately.
- Reassemble the fuel tank carefully. Improper assembly can result in a fuel leak, which could result in a fire or explosion hazard.
- Dispose of old gasoline according to local regulations.

1. Empty the fuel tank into an approved container.
2. Pour a small amount of suitable solvent into the tank. Install the cap and shake the tank. Drain the solvent completely.
3. Remove the screws holding the fuel joint assembly. Pull the assembly out of the tank.



ZMU02277

4. Clean the filter (located on the end of the suction pipe) in a suitable cleaning solvent. Allow the filter to dry.
5. Replace the gasket with a new one. Reinstall the fuel joint assembly and tighten the screws firmly.

EMU29312

Inspecting and replacing anode(s)

Yamaha outboard motors are protected from corrosion by sacrificial anodes. Inspect the external anodes periodically. Remove scales from the surfaces of the anodes. Consult a Yamaha dealer for replacement of external anodes.

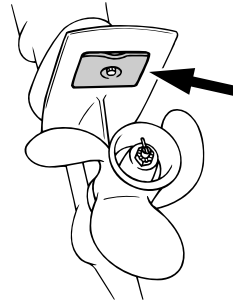
ECM00720

CAUTION:

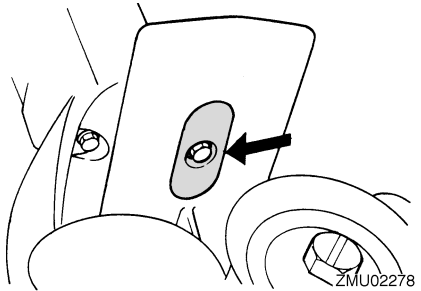
Do not paint anodes, as this would render them ineffective.

NOTE:

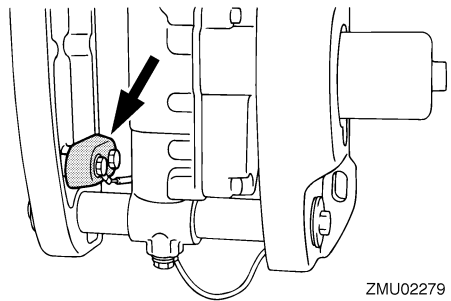
Inspect ground leads attached to external anodes on equipped models. Consult a Yamaha dealer for inspection and replacement of internal anodes attached to the power unit.



ZMU02067



ZMU02278



ZMU02279

EMU29320

Checking battery (for electric start models)

EWM00330

WARNING

Battery electrolytic fluid is dangerous; it contains sulfuric acid and therefore is poisonous and highly caustic.

Always follow these preventive measures:

Maintenance

- Avoid bodily contact with electrolytic fluid as it can cause severe burns or permanent eye injury.
- Wear protective eye gear when handling or working near batteries.

Antidote (EXTERNAL):

- SKIN - Flush with water.
- EYES - Flush with water for 15 minutes and get immediate medical attention.

Antidote (INTERNAL):

- Drink large quantities of water or milk followed by milk of magnesia, beaten egg, or vegetable oil. Get immediate medical attention.

Batteries also generate explosive hydrogen gas; therefore, you should always follow these preventive measures:

- Charge batteries in a well-ventilated area.
- Keep batteries away from fire, sparks, or open flames (for example: welding equipment, lighted cigarettes, and so on.)
- DO NOT SMOKE when charging or handling batteries.

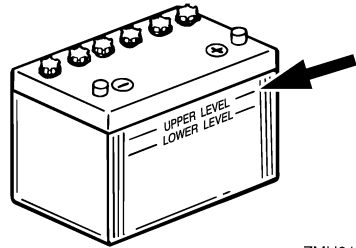
KEEP BATTERIES AND ELECTROLYTIC FLUID OUT OF REACH OF CHILDREN.

ECM00360

CAUTION:

- A poorly maintained battery will quickly deteriorate.
- Ordinary tap water contains minerals harmful to a battery, and should not be used for topping up.

1. Check the electrolyte level at least once a month. Fill to the manufacturer's recommended level when necessary. Top up only with distilled water (or pure de-ionized water suitable to use in batteries).



ZMU01810

2. Always keep the battery in a good state of charge. Installing a voltmeter will help you monitor your battery. If you will not use the boat for a month or more, remove the battery from the boat and store it in a cool, dark place. Completely recharge the battery before using it.
3. If the battery will be stored for longer than a month, check the specific gravity of the fluid at least once a month and recharge the battery when it is low.

NOTE:

Consult a Yamaha dealer when charging or re-charging batteries.

EMU29331

Connecting the battery

EWM00570

WARNING

Mount the battery holder securely in a dry, well-ventilated, vibration-free location in the boat. Install a fully charged battery in the holder.

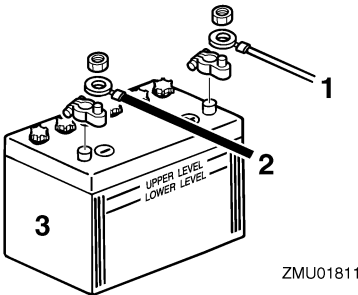
ECM01121

CAUTION:

- Make sure the main switch (on applicable models) is "OFF" (off) before working on the battery.
- Reversal of the battery cables will damage the electrical parts.

- **Connect the red battery cable first when installing the battery and disconnect the black battery cable first when removing it. Otherwise, the electrical parts can be damaged.**
- **The electrical contacts of the battery and cables must be clean and properly connected, or the battery will not start the engine.**

Connect the red battery cable to the POSITIVE (+) terminal first. Then connect the black battery cable to the NEGATIVE (-) terminal.



1. Red cable
2. Black cable
3. Battery

EMU29370

Disconnecting the battery

Disconnect the BLACK cable from the NEGATIVE (-) terminal first. Then disconnect the RED cable from the POSITIVE (+) terminal.

EMU29390

Checking top cowling

Check the fitting of the top cowling by pushing it with both hands. If it is loose have it repaired by your Yamaha dealer.

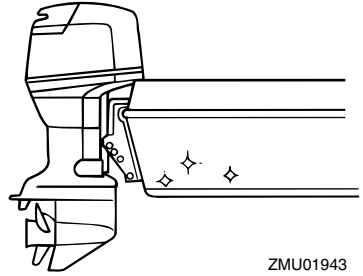
EMU29400

Coating the boat bottom

A clean hull improves boat performance. The boat bottom should be kept as clean of marine growth as possible. If necessary, the boat bot-

tom can be coated with an anti-fouling paint approved for your area to inhibit marine growth.

Do not use anti-fouling paint which includes copper or graphite. These paints can cause more rapid engine corrosion.



Trouble Recovery

EMU29422

Troubleshooting

A problem in the fuel, compression, or ignition systems can cause poor starting, loss of power, or other problems. This section describes basic checks and possible remedies, and covers all Yamaha outboard motors. Therefore some items may not apply to your model.

If your outboard motor requires repair, bring it to your Yamaha dealer.

If the engine trouble warning indicator is flashing, consult your Yamaha dealer.

Starter will not operate.

Q. Is battery capacity weak or low?

A. Check battery condition. Use battery of recommended capacity.

Q. Are battery connections loose or corroded?

A. Tighten battery cables and clean battery terminals.

Q. Is fuse for electric start relay or electric circuit blown?

A. Check for cause of electric overload and repair. Replace fuse with one of correct amperage.

Q. Are starter components faulty?

A. Have serviced by a Yamaha dealer.

Q. Is shift lever in gear?

A. Shift to neutral.

Engine will not start (starter operates).

Q. Is fuel tank empty?

A. Fill tank with clean, fresh fuel.

Q. Is fuel contaminated or stale?

A. Fill tank with clean, fresh fuel.

Q. Is fuel filter clogged?

A. Clean or replace filter.

Q. Is starting procedure incorrect?

A. See page 23.

Q. Has fuel pump malfunctioned?

A. Have serviced by a Yamaha dealer.

Q. Are spark plug(s) fouled or of incorrect type?

A. Inspect spark plug(s). Clean or replace with recommended type.

Q. Are spark plug cap(s) fitted incorrectly?

A. Check and re-fit cap(s).

Q. Is ignition wiring damaged or poorly connected?

A. Check wires for wear or breaks. Tighten all loose connections. Replace worn or broken wires.

Q. Are ignition parts faulty?

A. Have serviced by a Yamaha dealer.

Q. Is engine stop switch lanyard not attached?

A. Attach lanyard.

Q. Are engine inner parts damaged?

A. Have serviced by a Yamaha dealer.

Engine idles irregularly or stalls.

Q. Are spark plug(s) fouled or of incorrect type?

A. Inspect spark plug(s). Clean or replace with recommended type.

Q. Is fuel system obstructed?

Trouble Recovery

A. Check for pinched or kinked fuel line or other obstructions in fuel system.

Q. Is fuel contaminated or stale?

A. Fill tank with clean, fresh fuel.

Q. Is fuel filter clogged?

A. Clean or replace filter.

Q. Have ignition parts failed?

A. Have serviced by a Yamaha dealer.

Q. Has warning system activated?

A. Find and correct cause of warning.

Q. Is spark plug gap incorrect?

A. Inspect and adjust as specified.

Q. Is ignition wiring damaged or poorly connected?

A. Check wires for wear or breaks. Tighten all loose connections. Replace worn or broken wires.

Q. Is specified engine oil not being used?

A. Check and replace oil as specified.

Q. Is thermostat faulty or clogged?

A. Have serviced by a Yamaha dealer.

Q. Are carburetor adjustments incorrect?

A. Have serviced by a Yamaha dealer.

Q. Is fuel pump damaged?

A. Have serviced by a Yamaha dealer.

Q. Is air vent screw on fuel tank closed?

A. Open air vent screw.

Q. Is choke knob pulled out?

A. Return to home position.

Q. Is motor angle too high?

A. Return to normal operating position.

Q. Is carburetor clogged?

A. Have serviced by a Yamaha dealer.

Q. Is fuel joint connection incorrect?

A. Connect correctly.

Q. Is throttle valve adjustment incorrect?

A. Have serviced by a Yamaha dealer.

Q. Is battery cable disconnected?

A. Connect securely.

Warning buzzer sounds or indicator lights.

Q. Is cooling system clogged?

A. Check water intake for restriction.

Q. Is engine oil level low?

A. Fill oil tank with specified engine oil.

Q. Is heat range of spark plug incorrect?

A. Inspect spark plug and replace it with recommended type.

Q. Is specified engine oil not being used?

A. Check and replace oil with specified type.

Q. Is engine oil contaminated or deteriorated?

A. Replace oil with fresh, specified type.

Q. Is oil filter clogged?

A. Have serviced by a Yamaha dealer.

Q. Has oil feed/injection pump malfunctioned?

A. Have serviced by a Yamaha dealer.

Trouble Recovery

Q. Is load on boat improperly distributed?

A. Distribute load to place boat on an even plane.

Q. Is water pump or thermostat faulty?

A. Have serviced by a Yamaha dealer.

Q. Is there excess water in fuel filter cup?

A. Drain filter cup.

Engine power loss.

Q. Is propeller damaged?

A. Have propeller repaired or replaced.

Q. Is propeller pitch or diameter incorrect?

A. Install correct propeller to operate outboard at its recommended speed (r/min) range.

Q. Is trim angle incorrect?

A. Adjust trim angle to achieve most efficient operation.

Q. Is motor mounted at incorrect height on transom?

A. Have motor adjusted to proper transom height.

Q. Has warning system activated?

A. Find and correct cause of warning.

Q. Is boat bottom fouled with marine growth?

A. Clean boat bottom.

Q. Are spark plug(s) fouled or of incorrect type?

A. Inspect spark plug(s). Clean or replace with recommended type.

Q. Are weeds or other foreign matter tangled on gear housing?

A. Remove foreign matter and clean lower unit.

Q. Is fuel system obstructed?

A. Check for pinched or kinked fuel line or other obstructions in fuel system.

Q. Is fuel filter clogged?

A. Clean or replace filter.

Q. Is fuel contaminated or stale?

A. Fill tank with clean, fresh fuel.

Q. Is spark plug gap incorrect?

A. Inspect and adjust as specified.

Q. Is ignition wiring damaged or poorly connected?

A. Check wires for wear or breaks. Tighten all loose connections. Replace worn or broken wires.

Q. Have ignition parts failed?

A. Have serviced by a Yamaha dealer.

Q. Is specified engine oil not being used?

A. Check and replace oil with specified type.

Q. Is thermostat faulty or clogged?

A. Have serviced by a Yamaha dealer.

Q. Is air vent screw closed?

A. Open the air vent screw.

Q. Is fuel pump damaged?

A. Have serviced by a Yamaha dealer.

Q. Is fuel joint connection incorrect?

A. Connect correctly.

Q. Is heat range of spark plug incorrect?

A. Inspect spark plug and replace it with recommended type.

Q. Is high pressure fuel pump drive belt broken?

A. Have serviced by a Yamaha dealer.

Q. Is engine not responding properly to shift lever position?

A. Have serviced by a Yamaha dealer.

Engine vibrates excessively.

Q. Is propeller damaged?

A. Have propeller repaired or replaced.

Q. Is propeller shaft damaged?

A. Have serviced by a Yamaha dealer.

Q. Are weeds or other foreign matter tangled on propeller?

A. Remove and clean propeller.

Q. Is motor mounting bolt loose?

A. Tighten bolt.

Q. Is steering pivot loose or damaged?

A. Tighten or have serviced by a Yamaha dealer.

EMU29431

Temporary action in emergency

EMU29440

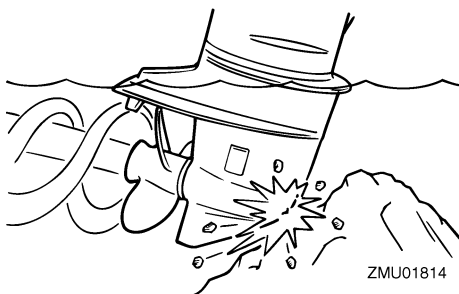
Impact damage

EWM00870

WARNING

The outboard motor can be seriously damaged by a collision while operating or trailering. Damage could make the outboard motor unsafe to operate.

If the outboard motor hits an object in the water, follow the procedure below.



1. Stop the engine immediately.
2. Inspect the control system and all components for damage. Also inspect the boat for damage.
3. Whether damage is found or not, return to the nearest harbor slowly and carefully.
4. Have a Yamaha dealer inspect the outboard motor before operating it again.

EMU29462

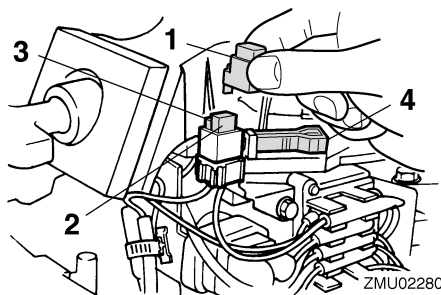
Replacing fuse

If the fuse has blown on an electric start model, open the fuse holder and replace the fuse with a new one of the proper amperage.

EWM00630

WARNING

Be sure to use the specified fuse. An incorrect fuse or a piece of wire could allow excessive current flow. This could cause electric system damage and a fire hazard.



1. Fuse box

Trouble Recovery

2. Fuse (10 A)
3. Spare fuse (10 A)
4. Fuse puller

NOTE:

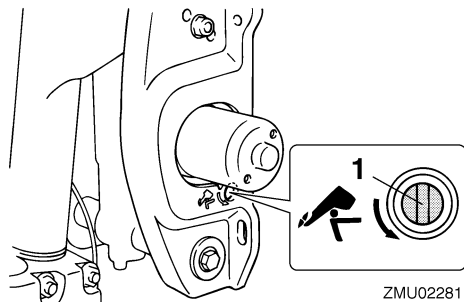
Consult your Yamaha dealer if the new fuse immediately blows again.

EMU29520

Power trim and tilt will not operate

If the engine cannot be tilted up or down with the power trim and tilt/ the power tilt because of a discharged battery or a failure with the power trim and tilt unit/the power tilt, the engine can be tilted manually.

1. Loosen the manual valve screw by turning it counterclockwise until it stops.



ZMU02281

1. Manual valve screw
2. Put the engine in the desired position, then tighten the manual valve screw by turning it clockwise.

EMU29531

Starter will not operate

If the starter mechanism does not operate (the engine cannot be cranked with the starter), the engine can be started with an emergency starter rope.

EWM01020



- Use this procedure only in an emergency and only to return to port for repairs.

- When the emergency starter rope is used to start the engine, the start-in-gear protection device does not operate. Make sure the remote control lever is in neutral. Otherwise the boat could unexpectedly start to move, which could result in an accident.
- Attach the engine stop switch lanyard to a secure place on your clothing, or your arm or leg while operating.
- Do not attach the lanyard to clothing that could tear loose. Do not route the cord where it could become entangled, preventing it from functioning.
- Avoid accidentally pulling the lanyard during normal operation. Loss of engine power means the loss of most steering control. Also, without engine power, the boat could slow rapidly. This could cause people and objects in the boat to be thrown forward.
- Be sure no one is standing behind you when pulling the starter rope. It could whip behind you and injure someone.
- An unguarded, rotating flywheel is very dangerous. Keep loose clothing and other objects away when starting the engine. Use the emergency starter rope only as instructed. Do not touch the flywheel or other moving parts when the engine is running. Do not install the starter mechanism or top cowling after the engine is running.
- Do not touch the ignition coil, spark plug wire, spark plug cap, or other electrical components when starting or operating the motor. You could get an electrical shock.

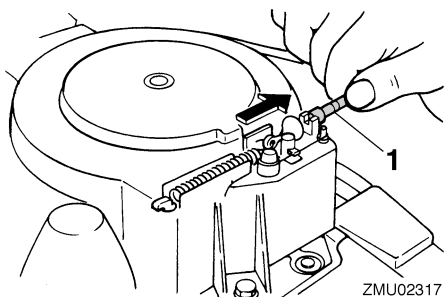
EMU29561

Emergency starting engine

1. Remove the top cowling.

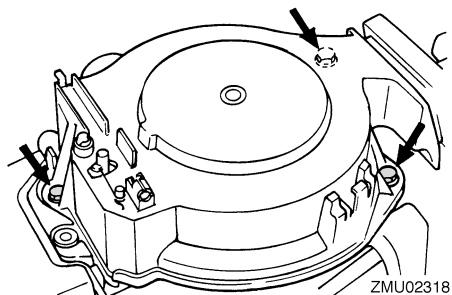
Trouble Recovery

2. Remove the start-in-gear protection cable from the starter, if equipped.

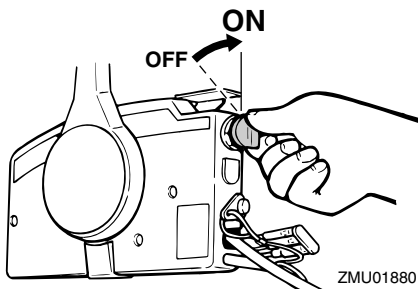


1. Start-in-gear protection cable

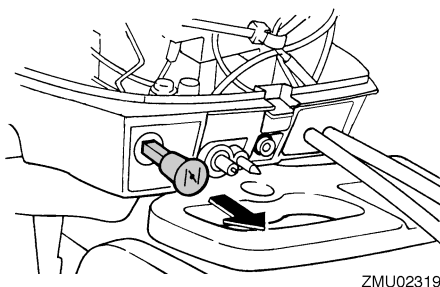
3. Remove the starter/flywheel cover after removing the bolt(s).



4. Prepare the engine for starting. For further information, see page 23. Be sure the engine is in neutral and that the engine stop switch lanyard lock plate is attached to the engine stop switch. The main switch must be "ON" (on), if equipped.

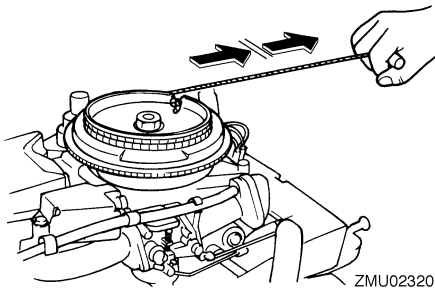


5. If equipped the choke knob, pull out it when the engine is cold. After the engine starts, gradually return the choke knob to its home position as the engine warms up.



6. Insert the knotted end of the emergency starter rope into the notch in the flywheel rotor and wind the rope several turns around the flywheel clockwise.
7. Give a strong pull straight out to crank and start the engine. Repeat if necessary.

Trouble Recovery



EMU29670

Engine fails to operate

EMU29691

Ignition system malfunction

If the battery voltage is low or in the unlikely event of an ignition system malfunction, the engine speed may become erratic or the engine may stop. In such a situation, follow the procedure below.

1. Remove the CDI unit cover or electrical cover, if equipped.
2. Disconnect the yellow cord (emergency circuit) of the CDI unit to return to port.

EWM00350

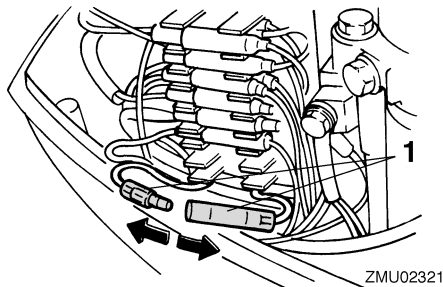
WARNING

When the yellow cord is disconnected, the idle and low speeds are slightly higher than normal. Use care when starting off or stopping.

ECM00380

CAUTION:

Follow this procedure only in an emergency and just long enough to return to port for repairs.



1. Yellow cord

EMU29760

Treatment of submerged motor

If the outboard motor is submerged, immediately take it to a Yamaha dealer. Otherwise some corrosion may begin almost immediately.

If you cannot immediately take the outboard motor to a Yamaha dealer, follow the procedure below in order to minimize engine damage.

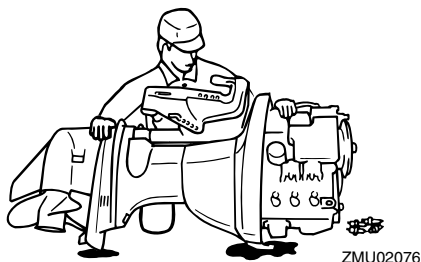
EMU29783

Procedure

1. Thoroughly wash away mud, salt, seaweed, and so on, with fresh water.



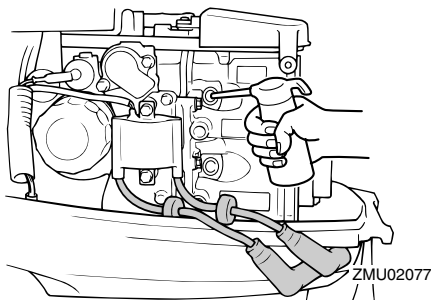
2. Remove the spark plug(s), then face the spark plug holes downward to allow any water, mud, or contaminants to drain.



3. Drain the fuel from the carburetor, fuel filter, and fuel line. Drain the engine oil completely.
4. Fill the sump with the fresh engine oil.

Engine oil capacity:
0.8 L (0.85 US qt) (0.70 Imp.qt)

5. Feed engine fogging oil or engine oil through the carburetor(s) and spark plug holes while cranking the engine with the manual starter or emergency starter rope.



6. Take the outboard motor to a Yamaha dealer as soon as possible.

ECM00400

CAUTION: _____
Do not attempt to run the outboard motor until it has been completely inspected.



YAMAHA MOTOR CO., LTD.

Printed in France

January 2004-0.3 × 1 CR