



# YAMAHA



**40V  
50H**

## OWNER'S MANUAL

**⚠ Read this manual carefully before operating this outboard motor.**

**63B-28199-7N-E0**

**Read this manual carefully before operating this outboard motor. Keep this manual onboard in a waterproof bag when boating. This manual should stay with the outboard motor if it is sold.**

# Important manual information

EMU25108

## To the owner

Thank you for selecting 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.



: This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

EWMO0782



### **WARNING**

**A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**

ECMO0702

### **NOTICE**

**A NOTICE indicates special precautions that must be taken to avoid damage to the outboard motor or other property.**

### **TIP:**

A TIP 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.

To ensure long product life, Yamaha recommends that you use the product and perform the specified periodic inspections and maintenance by correctly following the instructions in the owner's manual. Any damage resulting from neglect of these instructions is not covered by warranty.

Some countries have laws or regulations restricting users from taking the product out of the country where it was purchased, and it may be impossible to register the product in the destination country. Additionally, the warranty may not apply in certain regions. When planning to take the product to another country, consult the dealer where the product was purchased for further information.

If the product was purchased used, please consult your closest dealer for customer re-registration, and to be eligible for the specified services.

### **TIP:**

The 40VEO, 40VMHO, 50HETO 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.

EMU25123

**40V, 50H**

**OWNER'S MANUAL**

**©2020 by Yamaha Motor Co., Ltd.**

**1st Edition, November 2019**

**All rights reserved.**

**Any reprinting or unauthorized use**

**without the written permission of**

**Yamaha Motor Co., Ltd.**

**is expressly prohibited.**

**Printed in Japan**

# Table of contents

---

<b>Safety information.....</b>	<b>1</b>	Battery specifications .....	12
Outboard motor safety .....	1	Propeller selection .....	12
Propeller .....	1	Start-in-gear protection .....	13
Rotating parts .....	1	Engine oil requirements .....	13
Hot parts .....	1	Why Yamalube .....	13
Electric shock .....	1	Fuel requirements .....	13
Power trim and tilt .....	1	Gasoline .....	13
Engine shut-off cord (lanyard) .....	1	Muddy or acidic water .....	14
Gasoline .....	2	Anti-fouling paint .....	14
Gasoline exposure and spills .....	2	Outboard motor disposal	
Carbon monoxide .....	2	requirements .....	14
Modifications .....	2	Emergency equipment .....	15
<b>Boating safety .....</b>	<b>2</b>		
Alcohol and drugs .....	2	<b>Components .....</b>	<b>16</b>
Personal flotation devices (PFDs) .....	2	Components diagram .....	16
People in the water .....	2	Fuel tank .....	18
Passengers .....	2	Fuel joint .....	19
Overloading .....	3	Fuel gauge .....	19
Avoid collisions .....	3	Fuel tank cap .....	19
Collisions with floating or submerged		Air vent screw .....	19
objects .....	3	Remote control box .....	19
Weather .....	4	Remote control lever .....	19
Passenger training .....	4	Neutral interlock trigger .....	20
Boating safety publications .....	4	Neutral throttle lever .....	20
Laws and regulations .....	4	Tiller handle .....	20
		Gear shift lever .....	20
<b>General information .....</b>	<b>5</b>	Throttle grip .....	20
Identification numbers record .....	5	Throttle indicator .....	21
Outboard motor serial number .....	5	Throttle friction adjuster .....	21
Key number .....	5	Engine shut-off cord (lanyard) and	
EC Declaration of Conformity		clip .....	21
(DoC) .....	5	Engine stop button .....	22
CE Marking .....	6	Pull-type choke knob .....	22
Read manuals and labels .....	7	Manual starter handle .....	22
Warning labels .....	7	Main switch .....	23
		Steering friction adjuster .....	23
<b>Specifications and requirements... 10</b>		Steering friction adjuster .....	23
Specifications .....	10	Power trim and tilt switch on remote	
Installation requirements .....	11	control or tiller handle .....	24
Boat horsepower rating .....	11	Power trim and tilt switch on bottom	
Mounting outboard motor .....	11	cowling .....	24
Remote control requirements .....	11	Trim tab with anode .....	25
Battery requirements .....	12	Trim rod (tilt pin) .....	25
		Tilt lock mechanism .....	25

# Table of contents

Tilt support lever for power trim and tilt model.....	26	Engine shut-off cord (lanyard) .....	40
Tilt support lever for manual tilt model .....	26	Oil .....	40
Cowling lock lever(s) (turn type).....	26	Engine .....	40
Alert indicator .....	27	Operation after long period of storage .....	40
<b>Instruments and indicators .....</b>	<b>28</b>	Install top cowling .....	41
Indicators .....	28	Power trim and tilt system .....	41
Alert indicator for three indicators.....	28	Battery .....	42
Overheat-alert indicator.....	28	Filling fuel and engine oil .....	42
Oil level-alert indicator.....	28	Filling fuel for portable tank .....	42
Digital tachometer .....	28	Filling oil for manual starter model ....	43
Tachometer .....	29	Filling oil for electric start models ....	43
Trim meter .....	29	Oil level indicator operation .....	45
Hour meter .....	29	Operating engine .....	46
Oil level indicator (digital type) .....	29	Sending fuel (portable tank) .....	46
Overheat-alert indicator.....	30	Starting engine .....	47
Analog tachometer .....	30	Checks after starting engine .....	51
Oil level indicators (three indicators 2) .....	30	Cooling water .....	51
Analog trim meter .....	31	Warming up engine.....	51
<b>Engine control system.....</b>	<b>32</b>	Choke start models .....	51
Alert system .....	32	Electric start and prime start models .....	52
Overheat alert.....	32	Checks after engine warm up .....	52
Oil level alert and oil filter clogging alert.....	33	Shifting .....	52
<b>Installation .....</b>	<b>35</b>	Stop switches .....	52
Installation .....	35	Shifting .....	52
Mounting the outboard motor .....	35	Stopping boat.....	53
Clamping the outboard motor.....	36	Stopping engine.....	54
<b>Operation .....</b>	<b>38</b>	Procedure .....	54
First-time operation .....	38	Trimming outboard motor.....	55
Breaking in engine.....	38	Adjusting trim angle for manual tilt models .....	55
Getting to know your boat .....	38	Adjusting trim angle (Power trim and tilt) .....	56
Checks before starting engine .....	38	Adjusting boat trim.....	57
Fuel level.....	39	Tilting up and down.....	58
Remove the top cowling.....	39	Procedure for tilting up (manual tilt models) .....	58
Fuel system .....	39	Procedure for tilting up (power trim and tilt models).....	59
Controls .....	39	Procedure for tilting down (manual tilt models).....	60
		Procedure for tilting down (power trim and tilt models).....	60

# Table of contents

---

Shallow water .....	61	Engine fails to operate .....	86
Power trim and tilt models .....	61	Cold engine fails to start .....	86
Cruising in other conditions .....	62	Treatment of submerged motor .....	88
<b>Maintenance.....</b>	<b>63</b>	<b>INDEX .....</b>	<b>89</b>
Transporting and storing outboard motor .....	63		
Clamp screw mounting models .....	63		
Storing outboard motor.....	63		
Procedure.....	64		
Lubrication.....	65		
Cleaning the outboard motor.....	65		
Checking painted surface of outboard motor.....	65		
Periodic maintenance.....	65		
Replacement parts .....	66		
Severe operating conditions.....	66		
Maintenance chart 1 .....	67		
Maintenance chart 2.....	69		
Greasing.....	70		
Cleaning and adjusting spark plug ....	71		
Checking fuel filter .....	72		
Inspecting idle speed.....	72		
Checking water in engine oil tank.....	73		
Inspecting wiring and connectors .....	73		
Checking propeller .....	73		
Removing propeller .....	74		
Installing propeller .....	74		
Changing gear oil .....	75		
Cleaning fuel tank.....	77		
Inspecting and replacing anode(s) ....	77		
Checking battery (for electric start models) .....	78		
Connecting the battery .....	78		
Disconnecting the battery.....	79		
<b>Trouble Recovery .....</b>	<b>80</b>		
Troubleshooting .....	80		
Temporary action in emergency.....	83		
Impact damage.....	83		
Replacing fuse.....	83		
Power trim and tilt will not operate ....	84		
Starter will not operate .....	84		
Emergency starting engine.....	85		

EMU33623

## Outboard motor safety

Observe these precautions at all times.

EMU36502

### Propeller

People can be injured or killed if they come in contact with the propeller. The propeller can keep moving even when the motor is in neutral, and sharp edges of the propeller can cut even when stationary.

- Stop the engine when a person is in the water near you.
- Keep people out of reach of the propeller, even when the engine is off.

EMU40272

### Rotating parts

Hands, feet, hair, jewelry, clothing, personal flotation device (PFD) straps, etc., can become entangled with internal rotating parts of the engine, resulting in serious injury or death.

Keep the top cowling in place whenever possible. Do not remove or replace the top cowling with the engine running.

Only operate the engine with the top cowling removed according to the specific instructions in the manual. Keep hands, feet, hair, jewelry, clothing, PFD straps, etc., away from any exposed moving parts.

EMU33641

### Hot parts

During and after operation, engine parts are hot enough to cause burns. Avoid touching any parts under the top cowling until the engine has cooled.

EMU33651

### Electric shock

Do not touch any electrical parts while starting or operating the engine. They can cause

shock or electrocution.

EMU33662

### Power trim and tilt

Body parts can be crushed between the motor and the clamp bracket when the motor is trimmed or tilted. Keep body parts out of this area at all times. Be sure no one is in this area before operating the power trim and tilt mechanism.

The power trim and tilt switches operate even when the main switch is off. Keep people away from the switches whenever working around the motor.

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.

EMU33672

### Engine shut-off cord (lanyard)

Attach the engine shut-off cord so that the engine stops if the operator falls overboard or leaves the helm. This prevents the boat from running away under power and leaving people stranded, or running over people or objects.

Always attach the engine shut-off cord to a secure place on your clothing or your arm or leg while operating. Do not remove it to leave the helm while the boat is moving. Do not attach the cord to clothing that could tear loose, or route the cord where it could become entangled, preventing it from functioning.

Do not route the cord where it is likely to be accidentally pulled out. If the cord is pulled during operation, the engine will shut off and you will lose most steering control. The boat could slow rapidly, throwing people and objects forward.

# Safety information

---

EMU33811

## **Gasoline**

**Gasoline and its vapors are highly flammable and explosive.** Always, refuel according to the procedure on page 46 to reduce the risk of fire and explosion.

EMU33821

## **Gasoline exposure and spills**

Take care not to spill gasoline. If gasoline spills, wipe it up immediately with dry rags. Dispose of rags properly.

If any gasoline spills onto your skin, immediately wash with soap and water. Change clothing if gasoline spills on it.

If you swallow gasoline, inhale a lot of gasoline vapor, or get gasoline in your eyes, get immediate medical attention. Never siphon fuel by mouth.

EMU33901

## **Carbon monoxide**

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.

EMU33781

## **Modifications**

Do not attempt to modify this outboard motor. Modifications to your outboard motor may reduce safety and reliability, and render the outboard unsafe or illegal to use.

EMU33742

## **Boating safety**

This section includes a few of the many important safety precautions that you should follow when boating.

EMU33711

## **Alcohol and drugs**

Never operate after drinking alcohol or taking drugs. Intoxication is one of the most common factors contributing to boating fatalities.

EMU40281

## **Personal flotation devices (PFDs)**

Have an approved PFD on board for every occupant. Yamaha recommends that you must 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.

EMU33732

## **People in the water**

Always watch carefully for people in the water, such as swimmers, skiers, or divers, whenever the engine is running. When someone is in the water near the boat, shift into neutral and stop the engine.

Stay away from swimming areas. Swimmers can be hard to see.

The propeller can keep moving even when the motor is in neutral. Stop the engine when a person is in the water near you.

EMU33752

## **Passengers**

Consult your boat manufacturer's instructions for details about appropriate passenger locations in your boat and be sure all passengers are positioned properly before accelerating and when operating above an idle speed. Standing or sitting in non-designated locations may result in being thrown either overboard or within the boat due to waves, wakes, or sudden changes in speed or direction. Even when people are positioned properly, alert your passengers if you must make

any unusual maneuver. Always avoid jumping waves or wakes.

EMU33763

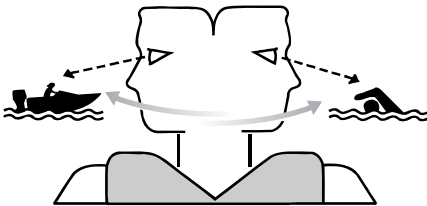
### Overloading

Do not overload the boat. Consult the boat capacity plate or boat manufacturer for maximum weight and number of passengers. Be sure that weight is properly distributed according to the boat manufacturer's instructions. Overloading or incorrect weight distribution can compromise the boat's handling and lead to an accident, capsizing or swamping.

EMU33773

### Avoid collisions

Scan constantly for people, objects, and other boats. Be alert for conditions that limit your visibility or block your vision of others.



ZMU06025

Operate defensively at safe speeds and keep a safe distance away from people, objects, and other boats.

- Do not follow directly behind other boats or waterskiers.
- Avoid sharp turns or other maneuvers that make it hard for others to avoid you or understand where you are going.
- Avoid areas with submerged objects or shallow water.
- Ride within your limits and avoid aggressive maneuvers to reduce the risk of loss

of control, ejection, and collision.

- Take early action to avoid collisions. Remember, boats do not have brakes, and stopping the engine or reducing throttle can reduce the ability to steer. If you are not sure that you can stop in time before hitting an obstacle, apply throttle and turn in another direction.

EMU48100

### Collisions with floating or submerged objects

If the outboard motor hits a floating object or an obstacle in the water while cruising, the following could occur:

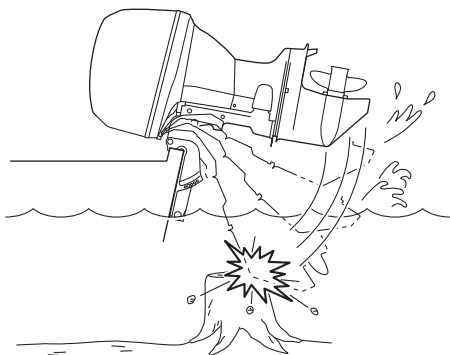
- The passengers and any loose equipment or luggage could be thrown forward due to the sudden deceleration.
- Parts of the outboard motor could come loose as a result of the impact and could be thrown into the boat.
- The boat or outboard motor could be damaged as a result of the impact.

When you operate the boat in an area where there might be floating objects or obstacles in the water, be sure to adjust the trim angle of the outboard motor, slow down, and operate carefully. For further information, see page 61.

If the outboard motor hits a floating object or an obstacle in the water, make sure that there are no abnormalities with the boat and the outboard motor. If anything abnormal is found, return to the nearest harbor at low speed and have a Yamaha dealer inspect the outboard motor.

## **Safety information**

---



EMU33791

### **Weather**

Stay informed about the weather. Check weather forecasts before boating. Avoid boating in hazardous weather.

EMU33881

### **Passenger training**

Make sure at least one other passenger is trained to operate the boat in the event of an emergency.

EMU33891

### **Boating safety publications**

Be informed about boating safety. Additional publications and information can be obtained from many boating organizations.

EMU33602

### **Laws and regulations**

Know the marine laws and regulations where you will be boating—and obey them. Several sets of rules prevail according to geographic location, but all are basically the same as the International Rules of the Road.

EMU25172

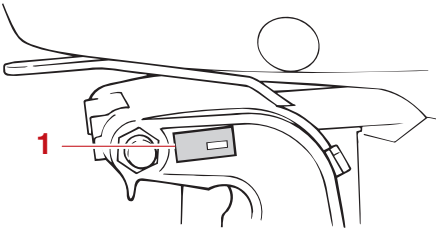
## Identification numbers record

EMU25186

### Outboard motor serial number

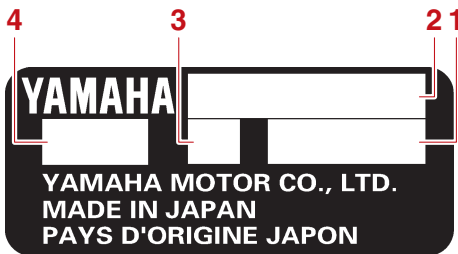
The outboard motor serial number is stamped on the label attached to the port side of the clamp bracket.

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.



ZMU02931

1. Outboard motor serial number location



1. Serial number
2. Model name
3. Motor transom height
4. Approved model code

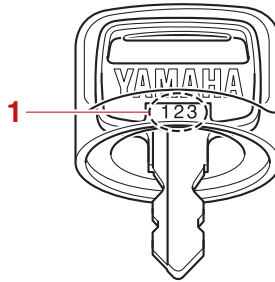
EMU25192

## 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

EMU38983

## EC Declaration of Conformity (DoC)

This declaration is included with outboard motors that conform to European regulations.

This outboard motor conforms to certain portions of the European Parliament directive relating to machinery.

Each conformed outboard motor accompanied with EC DoC. EC DoC contains the following information;

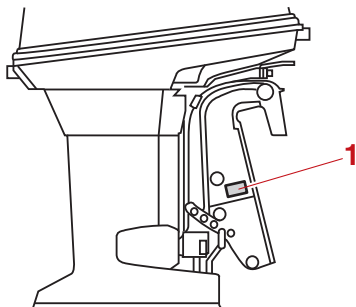
- Name of engine manufacturer
- Model name
- Product code of model (Approved model code)
- Code of conformed directives

# General information

EMU38995

## CE Marking

This label is affixed to outboard motors that conform to European regulations. Outboard motors affixed with this “CE” marking conform with the directives of; 2006/42/EC, 94/25/EC - 2003/44/EC, 2014/30/EU, and 2004/108/EC, 2013/53/EU.



1. CE marking location



ZMU06040

EMU33524

## Read manuals and labels

Before operating or working on this outboard motor:

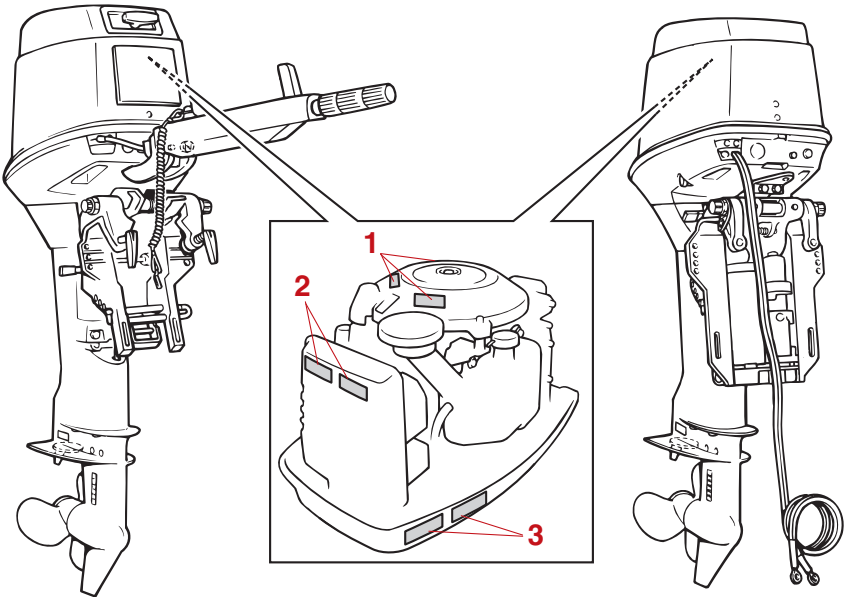
- Read this manual.
- Read any manuals supplied with the boat.
- Read all labels on the outboard motor and the boat.

If you need any additional information, contact your Yamaha dealer.

EMU33836

## Warning labels

If these labels are damaged or missing, contact your Yamaha dealer for replacements.



ZMU07315

# General information

1

**⚠ WARNING**

Emergency starting does not have start-in-gear protection. Ensure shift control is in neutral before starting engine.

6EE-H1995-40

**⚠ AVERTISSEMENT**



Le démarrage d'urgence ne comporte pas de sécurité de démarrage embrayé. Veiller à ce que le changement de vitesses se trouve au point mort avant de faire démarrer le moteur.

6EE-H1995-50



YAMAHA 6AG-B1995-00



2



**⚠ WARNING**

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

6EE-H1994-40



**⚠ AVERTISSEMENT**

- Garder les mains, les cheveux et les vêtements à l'écart des pièces en rotation lorsque le moteur tourne.
- Ne touchez et ne retirez aucune pièce électrique lors du démarrage ou de l'utilisation.

6EE-H1994-50

3

**⚠ WARNING**

- Read Owner's Manuals and labels.
- Wear an approved personal flotation device (PFD).
- Attach engine shut-off cord (lanyard) to your PFD, arm, or leg so the engine stops if you accidentally leave the helm, which could prevent a runaway boat.

6EE-G2794-40

**⚠ AVERTISSEMENT**

- Lire le Manuel de l'Utilisateur et les étiquettes.
- Portez un gilet de sauvetage homologué.
- Attachez le cordon d'arrêt du moteur (coupe-circuit) à votre gilet de sauvetage, à votre bras ou à votre jambe pour que le moteur s'arrête si vous quittez accidentellement la barre. Cela permet d'éviter que le bateau ne poursuive sa route sans contrôle.

6EE-G2794-50

EMU33913

## Contents of labels

The above warning labels mean as follows.

1

EWMO1692

**⚠ WARNING**

Emergency starting does not have start-in-gear protection. Ensure shift control is in neutral before starting engine.

2

EWMO1672

**⚠ WARNING**

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

3

EWMO1672

**⚠ WARNING**

- Read Owner's Manuals and labels.
- Wear an approved personal flotation device (PFD).
- Attach engine shut-off cord (lanyard) to your PFD, arm, or leg so the engine stops if you accidentally leave the helm, which could prevent a runaway boat.

# General information

EMU33844

## Symbols

The following symbols mean as follows.

Notice/Warning



ZMU05696

Read Owner's Manual



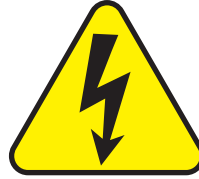
ZMU05664

Hazard caused by continuous rotation



ZMU05665

Electrical hazard



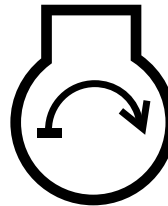
ZMU05666

Remote control lever/gear shift lever operating direction, dual direction



ZMU05667

Engine start/ Engine cranking



ZMU05668

# Specifications and requirements

---

EMU38092

## Specifications

### TIP:

“(AL)” stated in the specification data below represents the numerical value for the aluminum propeller installed.

EMU48360

### Dimension and weight:

Overall length:

1281 mm (50.4 in) (40VMHO)

670 mm (26.4 in) (40VEO, 50HETO)

Overall width:

349 mm (13.7 in) (40VEO, 40VMHO)

360 mm (14.2 in) (50HETO)

Overall height S:

1223 mm (48.1 in) (40VMHO)

Overall height L:

1319 mm (51.9 in) (40VEO, 50HETO)

1350 mm (53.1 in) (40VMHO)

Motor transom height S:

406 mm (16.0 in) (40VMHO)

Motor transom height L:

533 mm (21.0 in)

Dry weight (AL) S:

76 kg (167 lb) (40VMHO)

Dry weight (AL) L:

77 kg (170 lb) (40VEO)

78 kg (171 lb) (40VMHO)

88 kg (194 lb) (50HETO)

### Performance:

Full throttle operating range:

4500–5500 r/min

Rated power:

29.4 kW (40 HP) (40VEO, 40VMHO)

36.8 kW (50 HP) (50HETO)

Idle speed (in neutral):

750–850 r/min

### Power unit:

Type:

2-stroke L3

Total displacement:

698 cm<sup>3</sup> (42.6 c.i.)

Bore × stroke:

67.0 × 66.0 mm (2.64 × 2.60 in)

Ignition system:

CDI

Spark plug with resistor (NGK):

BR7HS-10 (40VEO, 40VMHO)

BR8HS-10 (50HETO)

Spark plug gap:

0.9–1.0 mm (0.035–0.039 in)

Steering system:

Remote steering (40VEO, 50HETO)

Tiller handle (40VMHO)

Starting system:

Electric starter (40VEO, 50HETO)

Manual starter (40VMHO)

Starting carburetion system:

Choke valve (40VMHO)

Prime start (40VEO, 50HETO)

Battery rating (CCA/EN):

347–411 A (40VEO, 50HETO)

Battery rating (20HR/IEC):

40 Ah (40VEO, 50HETO)

Alternator output:

80 W (40VMHO)

Maximum generator output:

6 A (40VEO, 50HETO)

### Lower unit:

Gear shift positions:

Forward-neutral-reverse

Gear ratio:

1.85 (24/13)

Trim and tilt system:

Manual tilt (40VEO, 40VMHO)

Power trim and tilt (50HETO)

Propeller mark:

G

# Specifications and requirements

## Fuel and oil:

Recommended fuel:

Regular unleaded gasoline

Min. research octane number (RON):

90

Fuel tank capacity:

24 L (6.34 US gal, 5.28 Imp.gal)

Recommended engine oil:

YAMALUBE 2-stroke outboard motor oil



Recommended engine oil:

TC-W3

Lubrication system:

Oil injection

Engine oil tank capacity:

1.5 L (1.59 US qt, 1.32 Imp.qt)

Recommended gear oil:

YAMALUBE outboard gear oil or Hypoid gear oil

Recommended gear oil grade:

SAE 90 API GL-4

Gear oil quantity:

0.430 L (0.455 US qt, 0.378 Imp.qt)

## Noise and vibration level:

Operator sound pressure level (ICOMIA 39/94):

89.5 dB(A) (40VEO, 40VMHO)

Vibration on tiller handle (ICOMIA 38/94):

Vibration on tiller handle is under 2.5 m/s<sup>2</sup> (40VMHO)

EMU33556

## Installation requirements

EMU33566

### Boat horsepower rating

EWM01561



**Overpowering a boat can cause severe instability.**

Before installing the outboard motor(s), confirm that the total horsepower of your outboard motor(s) does not exceed the boat's maximum horsepower rating. See the boat's capacity plate or contact the manufacturer.

EMU40491

### Mounting outboard motor

EWM02501



- **Improper mounting of the outboard motor could result in hazardous conditions such as poor handling, loss of control, or fire hazards.**
- **Because the outboard motor is very heavy, special equipment and training is required to mount it safely.**

Your dealer or other person experienced in proper rigging should mount the outboard motor using correct equipment and complete rigging instructions. For further information, see page 35.

EMU33582

## Remote control requirements

EWM01581



- **If the engine starts in gear, the boat can move suddenly and unexpectedly, possibly causing a collision or throwing passengers overboard.**
- **If the engine ever starts in gear, the**

# Specifications and requirements

**start-in-gear protection device is not working correctly and you should discontinue using the outboard. Contact your Yamaha dealer.**

The remote control unit must be equipped with a start-in-gear protection device(s). This device prevents the engine from starting unless it is in neutral.

EMU25695

## Battery requirements

EMU25723

### Battery specifications

**Battery rating (CCA/EN):**  
347–411 A (40VEO, 50HETO)  
**Battery rating (20HR/IEC):**  
40 Ah (40VEO, 50HETO)

The engine cannot be started if battery voltage is too low.

EMU36293

### Mounting battery

Mount the battery holder securely in a dry, well-ventilated, vibration-free location in the boat. **WARNING! Do not put flammable items, or loose heavy or metal objects in the same compartment as the battery. Fire, explosion or sparks could result.**

[EWM01821]

### Battery cable

The battery cable size and length are critical. Consult your Yamaha dealer about the battery cable size and length.

EMU34196

## Propeller selection

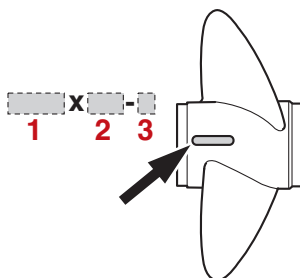
Next to selecting an outboard motor, selecting the right propeller is one of the most important purchasing decisions a boater can

make. The type, size, and design of your propeller have a direct impact on acceleration, top speed, fuel economy, and even engine life. Yamaha designs and manufactures propellers for every Yamaha outboard motor and every application.

Your outboard motor came with a Yamaha propeller selected to perform well over a range of applications, but there may be uses where a different propeller would be more appropriate.

Your Yamaha dealer can help you select the right propeller for your boating needs. Select a propeller that will allow the engine to reach the middle or upper half of the operating range at full throttle with the maximum boat-load. Generally, select a larger pitch propeller for a smaller operating load and a smaller pitch propeller for a heavier load. If you carry loads that vary widely, select the propeller that lets the engine run in the proper range for your maximum load but remember that you may need to reduce your throttle setting to stay within the recommended engine speed range when carrying lighter loads.

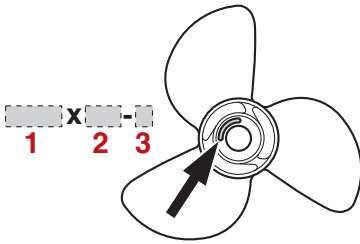
To check the propeller, see page 73.



ZMU04606

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

# Specifications and requirements



ZMU04607

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

EMU25771

## Start-in-gear protection

Yamaha outboard motors 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.

EMU25653

## Engine oil requirements

**Recommended engine oil:**  
YAMALUBE 2-stroke outboard motor oil

If the recommended engine oil is not available, another 2-stroke engine oil with an NMMA-certified TC-W3 rating may be used.

EMU48120

## Why Yamalube

YAMALUBE oil is a Genuine YAMAHA Part born of the engineers' passion and belief that engine oil is an important liquid engine component. We form teams of specialists in the fields of mechanical engineering, chemistry, electronics and track testing, and have them

develop the engine together with the oil it will use. Yamalube oils take full advantage of the base oil's qualities and blend in the ideal balance of additives to make sure the final oil clears our performance standards. Thus, Yamalube mineral, semisynthetic and synthetic oils have their own distinct characters and value. Yamaha's experience gained over many years of research and development into oil since the 1960's helps make Yamalube the best choice for your Yamaha engine.



EMU36361

## Fuel requirements

EMU40203

### Gasoline

Use a good quality gasoline that meets the minimum octane rating. If knocking or ping-ing occurs, use a different brand of gasoline or premium unleaded fuel.

**Recommended fuel:**  
Regular unleaded gasoline  
**Min. research octane number (RON):**  
90

ECM01982

## NOTICE

- **Do not use leaded gasoline. Leaded gasoline can seriously damage the engine.**
- **Avoid getting water and contaminants in the fuel tank. Contaminated fuel can cause poor performance or engine**

# Specifications and requirements

---

**damage. Use only fresh gasoline that has been stored in clean containers.**

---



## TIP:

- This mark identifies the recommended fuel for this outboard motor as specified by European regulation (EN228).
- Check that gasoline nozzle has the same identifier when fueling.

## Gasohol

There are two types of gasohol: gasohol containing ethanol (E5 and E10) and that containing methanol. Ethanol can be used if the ethanol content does not exceed 10% and the fuel meets the minimum octane ratings. E85 is a fuel containing 85% ethanol and must not be used in your outboard motor. All ethanol blends containing more than 10% ethanol can cause fuel system damage or cause engine starting and running problems. Yamaha does not recommend gasohol containing methanol because it can cause fuel system damage or engine performance problems.

It is recommended that you install a water-separating marine fuel filter assembly (10 micron minimum) between your boat's fuel tank and outboard motor when using ethanol. Ethanol is known to allow moisture to be absorbed into boat fuel tanks and systems. Moisture in the fuel can cause corrosion of metallic fuel system components, starting

and running complaints and require additional fuel system maintenance.

EMU36881

## Muddy or acidic water

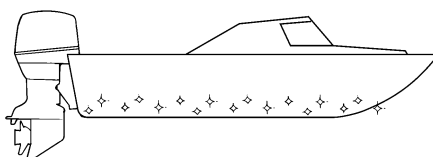
Yamaha strongly recommends that you have your dealer install the optional chromium-plated water pump kit if you use the outboard motor in muddy or acidic water conditions. However, depending on the model it might not be required.

EMU36331

## Anti-fouling paint

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



ZMU05176

EMU40302

## Outboard motor disposal requirements

Never illegally discard (dump) the outboard motor. Yamaha recommends consulting the dealer about discarding the outboard motor.

EMU36353

## **Emergency equipment**

Keep the following items onboard in case there is trouble with the outboard motor.

- A tool kit with assorted screwdrivers, pliers, wrenches (including metric sizes), and electrical tape.
- Waterproof flashlight with extra batteries.
- An extra engine shut-off cord (lanyard) with clip.
- Spare parts, such as an extra set of spark plugs.

Consult your Yamaha dealer for details.

# Components

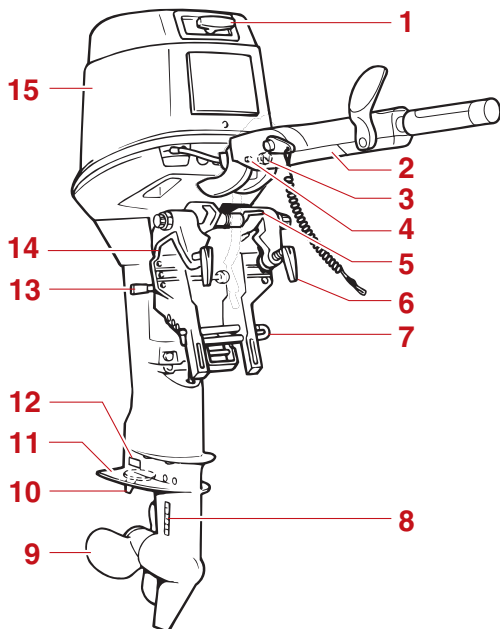
EMU46722

## Components diagram

### TIP:

\* May not be exactly as shown; also may not be included as standard equipment on all models (order from dealer).

### 40VMHO

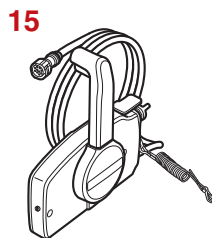
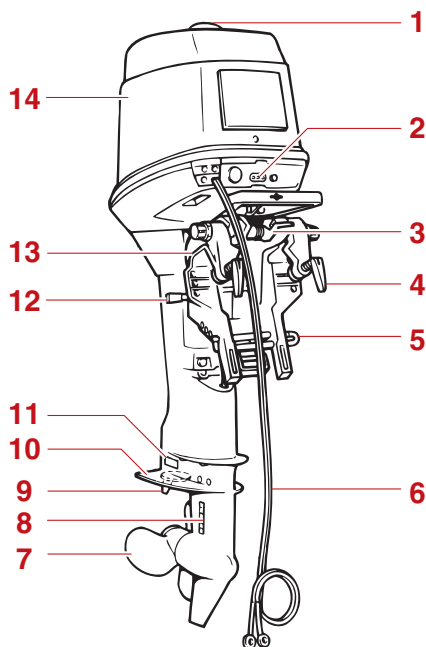


1. Manual starter handle
2. Tiller handle\*
3. Choke knob
4. Alert indicator
5. Tilt lock lever
6. Clamp screw
7. Trim rod
8. Cooling water inlet
9. Propeller
10. Trim tab (anode)
11. Anti-cavitation plate
12. Anode
13. Tilt support lever
14. Clamp bracket
15. Top cowling

16. Fuel tank\*

ZMU03344

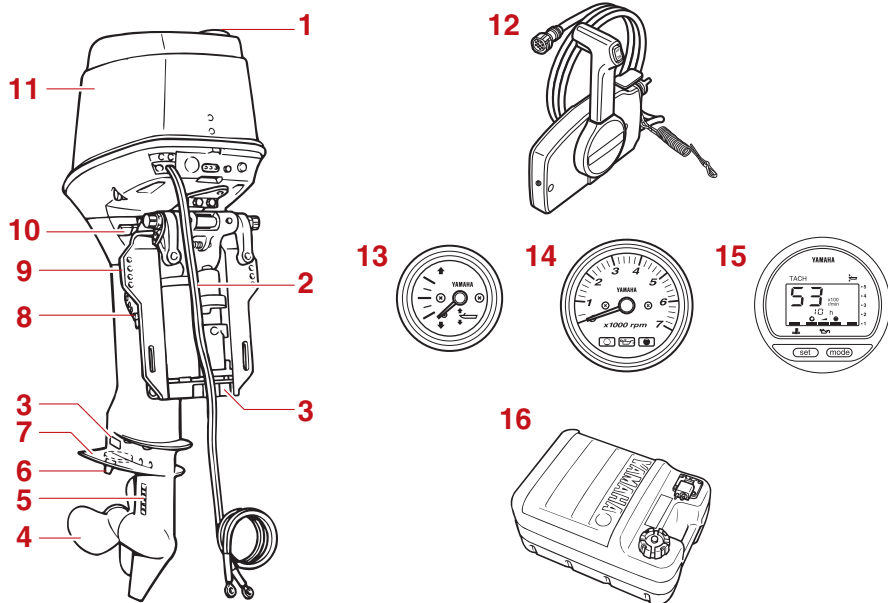
## 40VEO



- 1. Oil tank filler cap
- 2. Alert indicator(s)
- 3. Tilt lock lever
- 4. Clamp screw
- 5. Trim rod
- 6. Battery cable
- 7. Propeller
- 8. Cooling water inlet
- 9. Trim tab (anode)
- 10. Anti-cavitation plate
- 11. Anode
- 12. Tilt support lever
- 13. Clamp bracket
- 14. Top cowling
- 15. Remote control box (side mount type)
- 16. Fuel tank\*

# Components

## 50HETO



1. Oil tank filler cap
2. Battery cable
3. Anode(s)
4. Propeller
5. Cooling water inlet
6. Trim tab (anode)
7. Anti-cavitation plate
8. Trim rod
9. Clamp bracket
10. Tilt support lever
11. Top cowling
12. Remote control box (side mount type)
13. Trim meter\*
14. Tachometer\*
15. Digital tachometer
16. Fuel tank\*

EWM00021



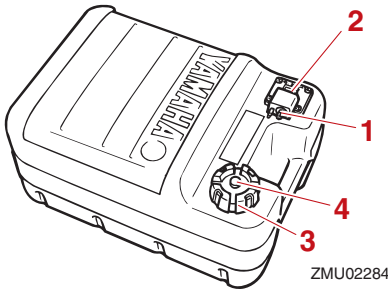
### WARNING

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.

EMU25804

### Fuel tank

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



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

EMU25831

## Fuel joint

This joint is used to connect the fuel line.

EMU25842

## 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.

EMU25851

## 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.

EMU25861

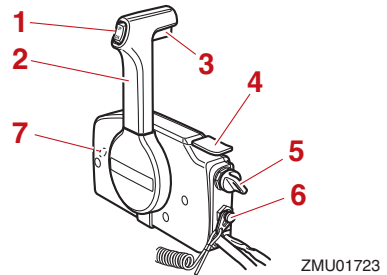
## Air vent screw

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

EMU26182

## Remote control box

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

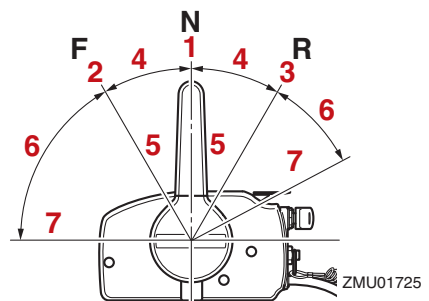


1. Power trim and tilt switch
2. Remote control lever
3. Neutral interlock trigger
4. Neutral throttle lever
5. Main switch
6. Engine shut-off switch
7. Throttle friction adjuster

EMU26191

## 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.



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

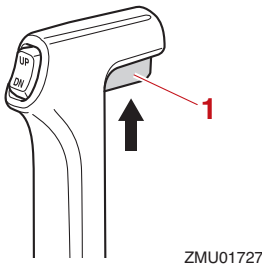
# Components

- 6. Throttle
- 7. Fully open

EMU26202

## Neutral interlock trigger

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

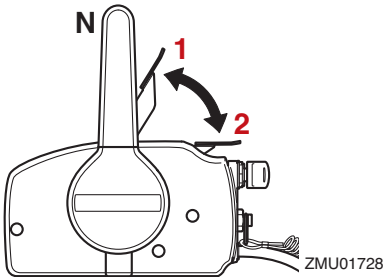


- 1. Neutral interlock trigger

EMU26213

## 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.



- 1. Fully open
- 2. Fully closed

### TIP:

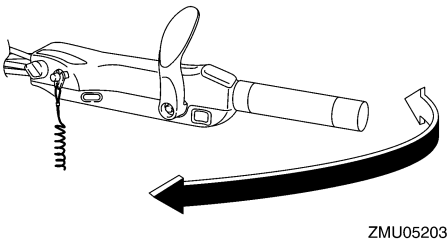
The neutral throttle lever will operate only when the remote control lever is in neutral. The remote control lever will operate only

when the neutral throttle lever is in the closed position.

EMU25914

## Tiller handle

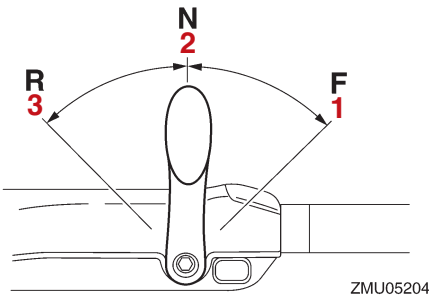
To change direction, move the tiller handle to the left or right as necessary.



EMU25925

## Gear shift lever

Move the gear shift lever forward to engage the forward gear or rearward to engage the reverse gear.

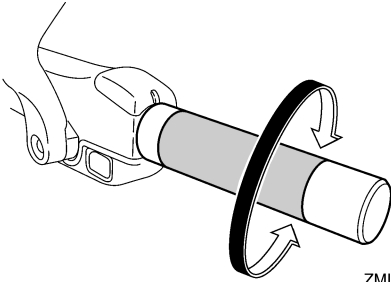


- 1. Forward "F"
- 2. Neutral "N"
- 3. Reverse "R"

EMU25943

## Throttle grip

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

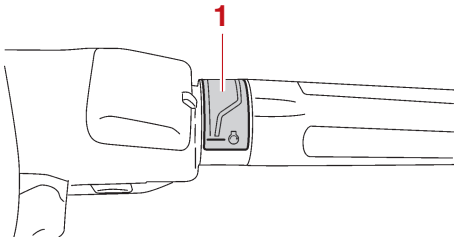


ZMU05205

EMU25963

## 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.



ZMU05206

1. Throttle indicator

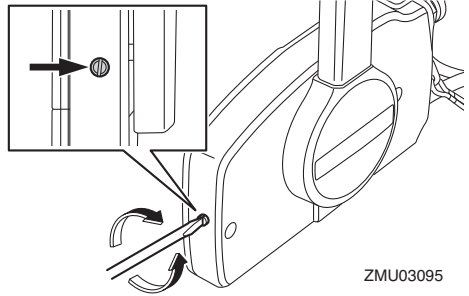
EMU25978

## Throttle friction adjuster

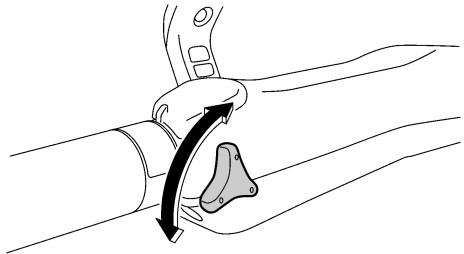
A friction device provides adjustable resistance to movement of the throttle grip or the remote control lever, and can be set according to operator preference.

To increase resistance, turn the adjuster clockwise. To decrease resistance, turn the adjuster counterclockwise. **WARNING! Do not overtighten the friction adjuster. If there is too much resistance, it could be**

**difficult to move the remote control lever or throttle grip, which could result in an accident.** [EWM00033]



ZMU03095



ZMU05207

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

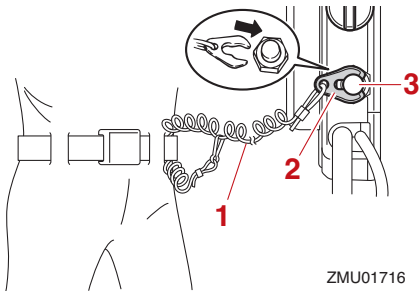
EMU25996

## Engine shut-off cord (lanyard) and clip

The clip must be attached to the engine shut-off switch for the engine to run. The cord 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 cord will pull out the clip, stopping ignition to the engine. This will prevent the boat from running away under power. **WARNING! Attach the engine shut-off cord to a secure place on your clothing, or your arm or leg while operating. Do not attach the cord to**

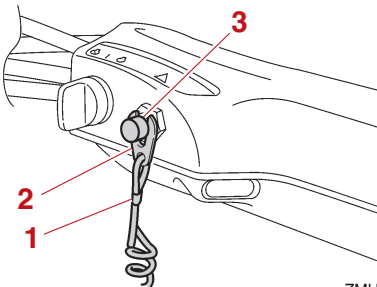
# Components

clothing that could tear loose. Do not route the cord where it could become entangled, preventing it from functioning. Avoid accidentally pulling the cord 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. [EWM00123]



ZMU01716

- 1. Engine shut-off cord (lanyard)
- 2. Clip
- 3. Engine shut-off switch



ZMU05208

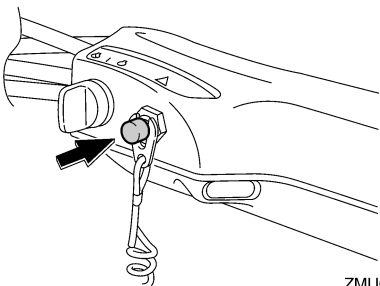
- 1. Engine shut-off cord (lanyard)
- 2. Clip
- 3. Engine shut-off switch

EMU26004

## Engine stop button

The engine stop button stops the engine

when the button is pushed.

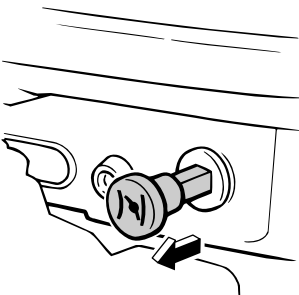


ZMU05209

EMU26015

## Pull-type choke knob

Pull the choke knob to supply a rich fuel mixture to the engine.

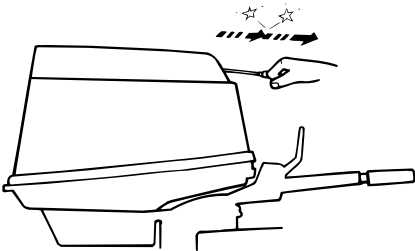


ZMU03355

EMU26075

## Manual starter handle

The manual starter handle is used to crank and start the engine.



ZMU02942

EMU26092

## Main switch

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

- “OFF” (off)

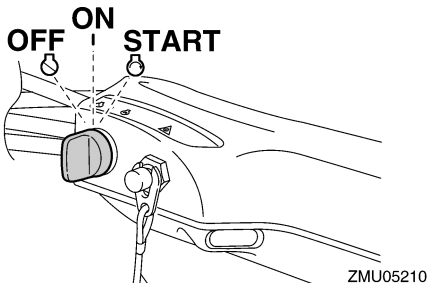
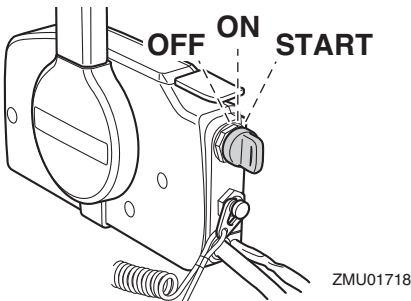
With the main switch in the “OFF” (off) position, the electrical circuits are off, and the key can be removed.

- “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.



EMU26113

## Steering friction adjuster

A friction device provides adjustable resistance to the steering mechanism, and can be

set according to operator preference. An adjuster lever is located on the bottom of the tiller handle bracket.

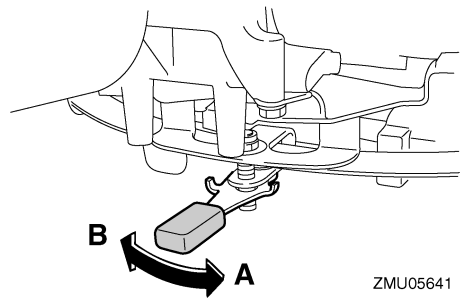
To increase resistance, turn the lever to the port side “A”.

To decrease resistance, turn the lever to the starboard side “B”.

EWMM00041



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



### TIP:

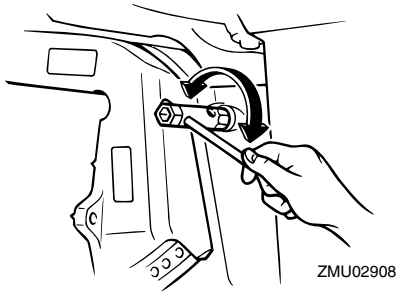
- Check the tiller handle for smooth movement when the lever is turned to the starboard side “B”.
- Do not apply lubricants such as grease to the friction areas of the steering friction adjuster.

EMU26124

## 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.

# Components



To increase resistance, turn the adjuster clockwise.

To decrease resistance, turn the adjuster counterclockwise.

EWM00041



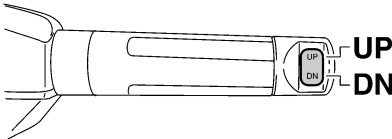
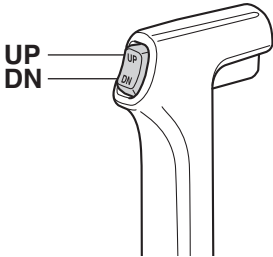
**Do not overtighten the friction adjuster. If there is too much resistance, it could be difficult to steer, which could result in an accident.**

EMU26144

## Power trim and tilt switch on remote control or tiller handle

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

For instructions on using the power trim and tilt switch, see pages 55 and 58.



EMU26156

## Power trim and tilt switch on bottom cowling

The power trim and tilt switch is located on the side of the bottom cowling. Pushing the switch “UP” (up) trims the outboard motor up, and then tilts it up. Pushing the switch “DN” (down) tilts the outboard motor down and trims it down. When the switch is released, the outboard motor will stop in its current position.

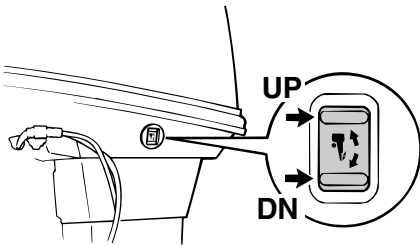
For instructions on using the power trim and tilt switch, see page 58.

EWM01032



**Use the power trim and tilt switch located on the bottom cowling only when the boat is at a complete stop with the engine off. Attempting to use this switch while the boat is moving could increase the risk of falling overboard and could distract the**

operator, increasing the risk of collision with another boat or an obstacle.



ZMU03096

EMU26246

## Trim tab with anode

EWM00841



An improperly adjusted trim tab could cause difficult steering. Always test run after the trim tab has been installed or replaced to be sure steering is correct. Be sure you have tightened the bolt after adjusting the trim tab.

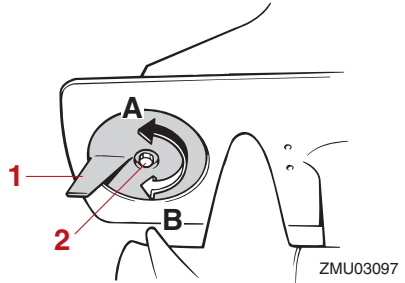
The trim tab should be adjusted so that the steering control can be turned to either the right or left by applying the same amount of force.

If the boat tends to veer to the left (port side), turn the trim tab rear end to the port side "A" in the figure. If the boat tends to veer to the right (starboard side), turn the trim tab end to the starboard side "B" in the figure.

ECM00841

## NOTICE

The trim tab also serves as an anode to protect the engine from electrochemical corrosion. Never paint the trim tab as it will become ineffective as an anode.



ZMU03097

1. Trim tab
2. Bolt

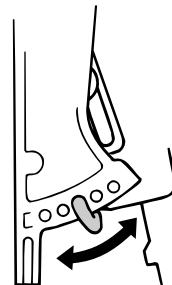
## Bolt tightening torque:

18 N·m (1.8 kgf·m, 13 lb·ft)

EMU26263

## Trim rod (tilt pin)

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



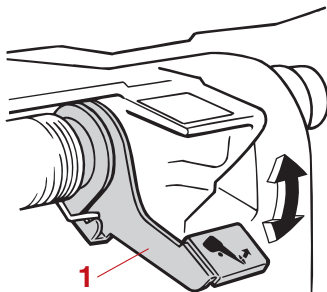
ZMU03098

EMU30531

## Tilt lock mechanism

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

# Components



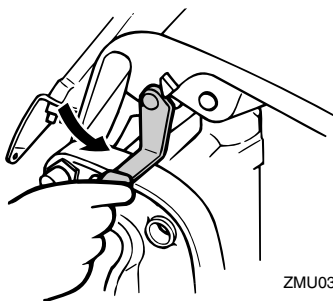
1. Tilt lock lever

To lock it, set the tilt lock lever in the lock position. To release, push the tilt lock lever in the release position.

EMU26342

## Tilt support lever for power trim and tilt model

To keep the outboard motor in the tilted up position, lock the tilt support lever to the clamp bracket.



ECM00661

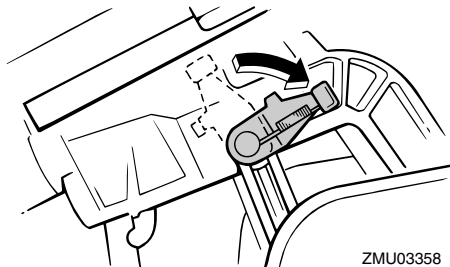
### NOTICE

**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.**

EMU30202

## Tilt support lever for manual tilt model

To keep the outboard motor in the tilted up position, lock the tilt support lever to the clamp bracket.



ECM00661

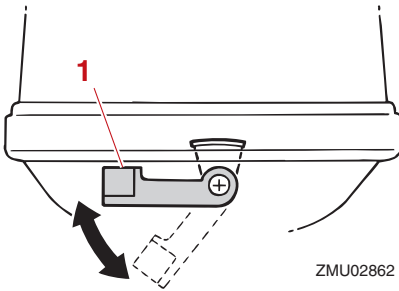
### NOTICE

**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.**

EMU26374

## Cowling lock lever(s) (turn type)

To remove the engine top cowling, turn the cowling 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 again by returning the cowling lock lever(s) to the lock position.

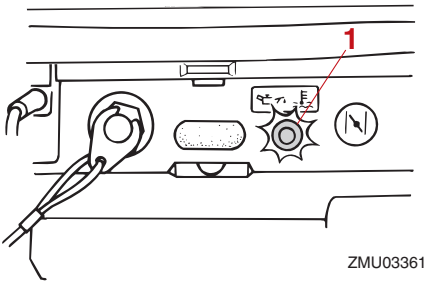


1. Cowling lock lever(s)

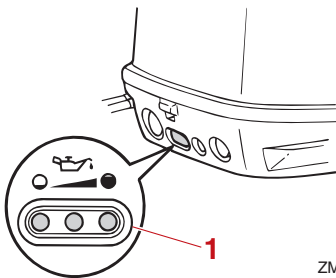
EMU26305

## Alert indicator

If the engine develops a condition which is cause for alert, the indicator lights up. For details on how to read the alert indicator, see page 32.



1. Alert indicator



1. Alert indicator(s)

# Instruments and indicators

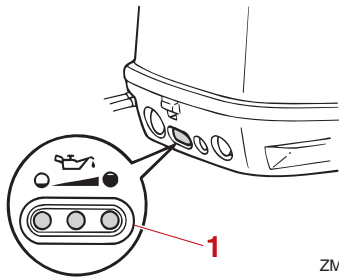
EMU36016

## Indicators

EMU26292

### Alert indicator for three indicators

If the engine develops a condition which is cause for alert, the indicator on the front of the bottom cowling lights up. The three indicators mounted on the bottom cowling also indicate the engine oil level. For details on how to read the alert indicators, see page 32.



ZMU03360

1. Alert indicator(s)

EMU36034

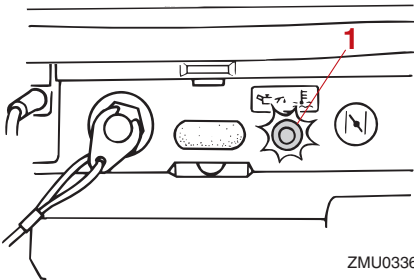
### Overheat-alert indicator

If the engine temperature rises too high, this indicator will light up. For further information on reading the indicator, see page 32.

ECM00053

### NOTICE

**Do not continue to run the engine if the overheat-alert indicator is on. Serious engine damage will occur.**



ZMU03361

1. Overheat-alert indicator

EMU37561

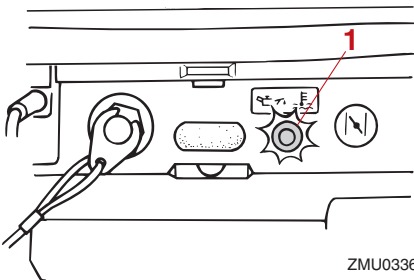
### Oil level-alert indicator

If the oil level falls below the lower limit, this indicator will light up. For further information, see page 32.

ECM00031

### NOTICE

**Do not operate the engine without oil. Serious engine damage will occur.**



ZMU03361

1. Oil level-alert indicator

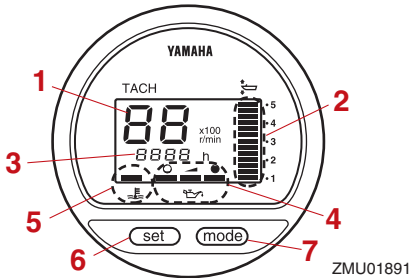
EMU26494

## Digital tachometer

The tachometer shows the engine speed and has the following functions.

All segments of the display will light momentarily after the main switch is turned on and will return to normal thereafter.

# Instruments and indicators



1. Tachometer
2. Trim meter
3. Hour meter
4. Oil level indicator
5. Overheat-alert indicator
6. Set button
7. Mode button

## TIP:

The water separator and engine trouble-alert indicators only operate when the engine is equipped with the appropriate functions.

EMU36051

## Tachometer

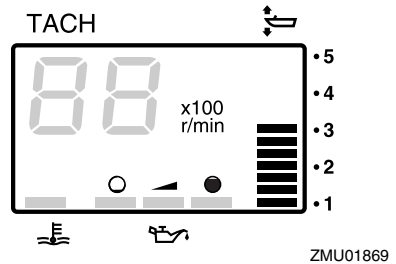
The tachometer displays engine speed in hundreds of revolutions per minute (r/min). For example, if the tachometer display reads “22” then the engine speed is 2200 r/min.

EMU26622

## Trim meter

This meter shows the trim angle of your out-board motor.

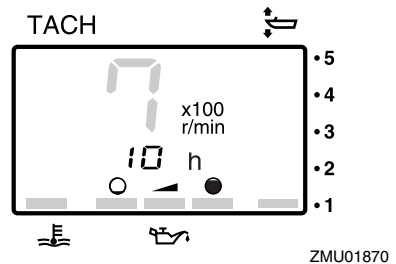
- Memorize the trim angles that work best for your boat under different conditions. Adjust the trim angle to the desired using the power trim and tilt switch.
- If the trim angle of your motor exceeds the trim operating range, the top segment on the trim meter display will blink.



EMU26652

## Hour meter

This meter shows the number of hours the engine has been run. It can be set to show the total number of hours or the number of hours for the current trip. The display can also be turned on and off.



ZMU01870

To change the display format, press the “mode” (mode) button. The display can show total hours or trip hours, or turn off.

To reset the trip hours, simultaneously press the “set” (set) and “mode” (mode) buttons for more than 1 second while the trip hours are displayed. This resets the trip counter to 0 (zero).

The total number of hours the engine has been run cannot be reset.

EMU26552

## Oil level indicator (digital type)

This indicator shows the engine oil level. If

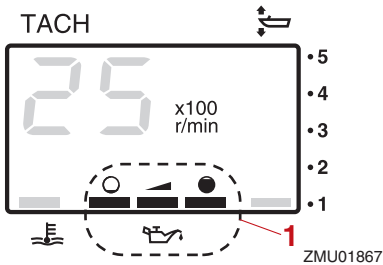
# Instruments and indicators

the oil level falls below the lower limit, the alert indicator will start to blink. For further information, see page 33.

ECM00031

## NOTICE

**Do not operate the engine without oil. Serious engine damage will occur.**



1. Oil level indicator

EMU26584

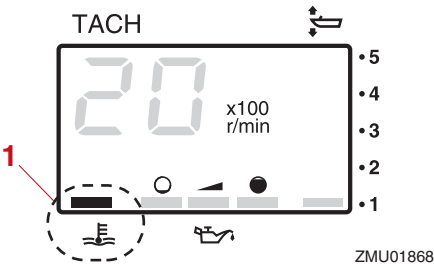
## Overheat-alert indicator

If the engine temperature rises too high, the alert indicator will start to blink. For further information on reading the indicator, see page 32.

ECM00053

## NOTICE

**Do not continue to run the engine if the overheat-alert indicator is on. Serious engine damage will occur.**

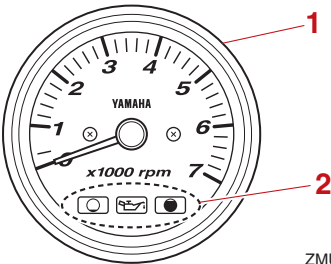


1. Overheat-alert indicator

EMU26472

## Analog tachometer

This gauge shows the engine speed and has the following functions.



1. Tachometer

2. Oil level indicator

EMU26542

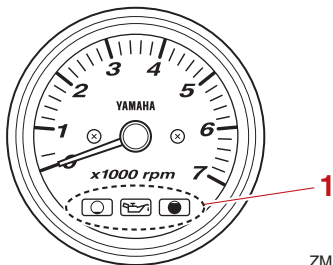
## Oil level indicators (three indicators 2)

The indicators on the gauge show the status of the oil level. For details on how to read the indicators, see page 45.

ECM00031

## NOTICE

**Do not operate the engine without oil. Serious engine damage will occur.**



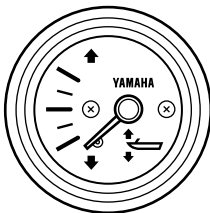
ZMU04580

## 1. Oil level indicators

EMU26612

### Analog trim meter

This gauge shows the trim angle of your out-board motor.



ZMU04581

Memorize the trim angles that work best for your boat under different conditions. Adjust the trim angle to the desired setting with the power trim and tilt switch.

# Engine control system

EMU26806

## Alert system

ECM00093

### NOTICE

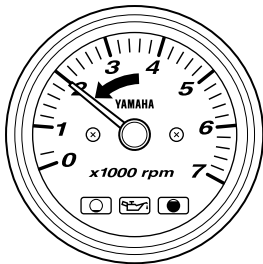
Do not continue to operate the engine if an alert device has activated. Consult your Yamaha dealer if the problem cannot be located and corrected.

EMU43754

### Overheat alert

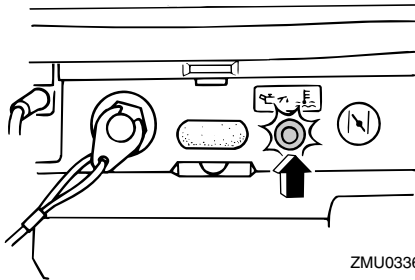
This engine has an overheat-alert device. If the engine temperature rises too high, the alert device will activate.

- The engine speed will automatically decrease to 2000–3500 r/min.

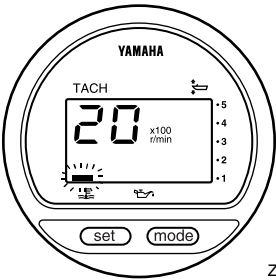


ZMU04766

- The overheat-alert indicator will light or blink (if equipped).

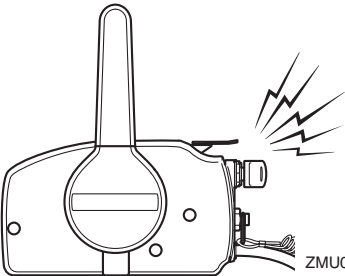


ZMU03364



ZMU01757

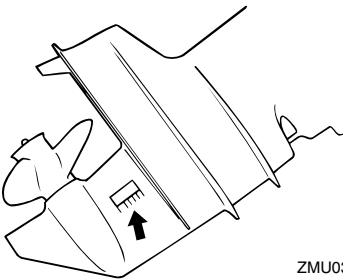
- The buzzer will sound (if equipped on the tiller handle, remote control box, or main switch panel).



ZMU03025

If the alert system has activated, stop the engine and check the cooling water inlets:

- Check trim angle to be sure that the cooling water inlet is submerged.
- Check the cooling water inlet for clogging.



ZMU03026

EMU2684B

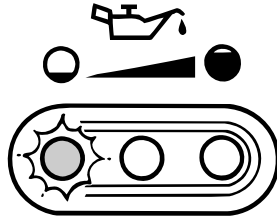
## Oil level alert and oil filter clogging alert

### Oil injection models

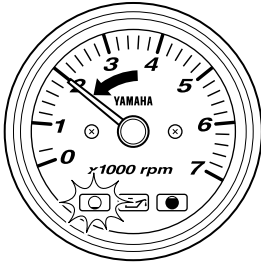
This engine has an oil level alert system. If the oil level falls below the lower limit, the alert system will activate.

#### Activation of alert device

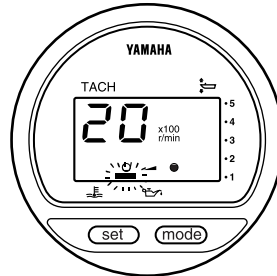
- Engine speed will automatically decrease to about 2000–3500 r/min.



ZMU03363

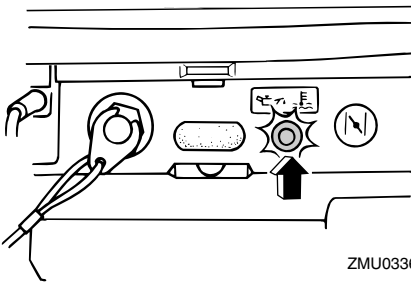


ZMU04586

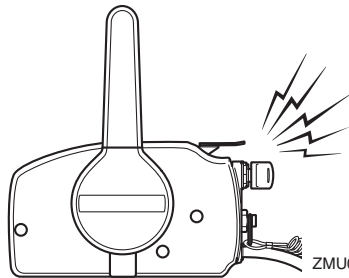


ZMU03942

- The oil level-alert indicator will light or blink.
- The buzzer will sound (if equipped on the tiller handle, remote control box, or main switch panel).



ZMU03364



ZMU01758

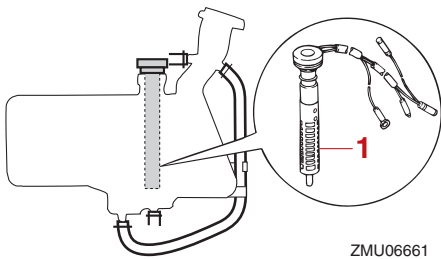
If the alert system has been activated, stop the engine and check for the cause.

#### TIP:

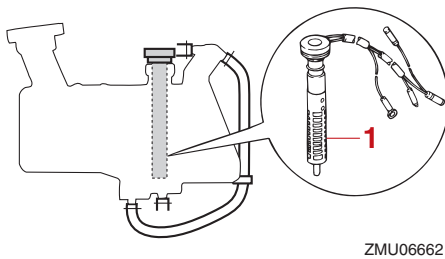
The alert for oil filter clogging is similar to the alerts for low oil level and overheating. To make troubleshooting easier, check for engine overheating first, then oil level, and finally oil filter clogging.

# Engine control system

---



1. Oil filter



1. Oil filter

EMU26903

## Installation

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.

EWMO1591



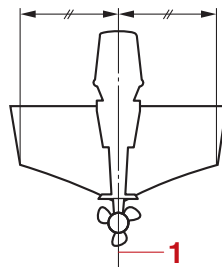
### WARNING

- **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.**
- **Improper mounting of the outboard motor could result in hazardous conditions such as poor handling, loss of control, or fire hazards. For permanently mounted models, your dealer or other person experienced in proper rigging should mount the motor.**

EMU33471

### Mounting the outboard motor

The outboard motor should be mounted so that the boat is well balanced. Otherwise, the boat could be hard to steer. For single-engine boats, mount the outboard motor on the centerline (keel line) of the boat.



ZMU01760

1. Center line (keel line)

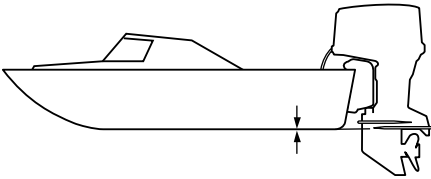
EMU26937

### Mounting height (boat bottom)

The mounting height of your outboard motor affects its efficiency and reliability. If it is mounted too high, propeller ventilation may occur, which will reduce propulsion due to excessive propeller slip, and the water intakes for the cooling system may not get an adequate water supply, which can cause engine overheating. If the engine is mounted too low, water resistance (drag) will increase, thereby reducing engine efficiency and performance.

Most commonly, an outboard motor should be mounted so that the anti-cavitation plate is in alignment with the bottom of the boat. The optimum mounting height of the outboard motor is affected by the boat/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.

# Installation



ZMU01762

ECM01635

## NOTICE

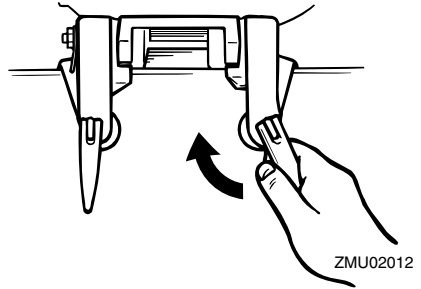
- Make sure that the idle hole is high enough to prevent water from entering the engine even if the boat is stationary with the maximum load.
- Incorrect engine height or obstructions to the smooth flow of water (such as the design or condition of the boat, or accessories, such as transom ladders or depth finder transducers) can create airborne water spray while the boat is cruising. If the outboard motor is operated continuously in the presence of airborne water spray, enough water could enter the engine through the air intake opening in the top cowling to cause severe engine damage. Remove the cause of the airborne water spray.

EMU26974

## Clamping the outboard motor

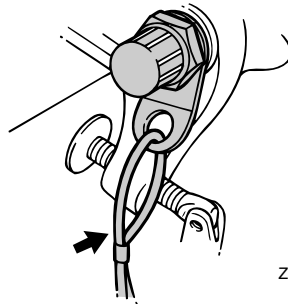
- (1) Place the outboard motor on the transom so that it is positioned as close to the center as possible. Tighten the transom clamp screws evenly and securely. Occasionally check the clamp screws for tightness during operation of the outboard motor because they could become loose due to engine vibration. **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 clamp screws are tightened securely. Occasionally check the screws for tightness during operation. [EWM00643]



ZMU02012

- (2) If the restraint cable attachment is equipped on your engine, a restraint cable or chain should be used. Attach one end to the 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.

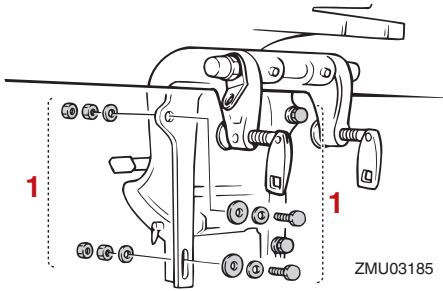


ZMU02013

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

[EWM00652]



1. Bolts

# Operation

EMU36382

## First-time operation

EMU27023

### 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.



ECM00142

#### NOTICE



- Failure to follow the break-in procedure could result in reduced engine life or even severe engine damage.
- Premixed fuel must be used during break-in.

EMU27061

### Gasoline and engine oil mixing chart (50:1)

	50:1			
	1 L (0.26 US gal, 0.22 Imp gal)	12 L (3.2 US gal, 2.6 Imp gal)	14 L (3.7 US gal, 3.1 Imp gal)	24 L (6.3 US gal, 5.3 Imp gal)
				
	0.02L (0.02 US qt, 0.02 Imp qt)	0.24 L (0.25 US qt, 0.21 Imp qt)	0.28 L (0.3US qt, 0.25 Imp qt)	0.48 L (0.51 US qt, 0.42Imp qt)

ZMU02442

1. : Gasoline
2. : Engine oil

ECM00151

#### NOTICE

Be sure to mix gasoline and oil completely, otherwise the engine may be damaged.

EMU30312

### Procedure for oil injection models

Run the engine under load (in gear with a propeller installed) for 10 hours as follows.

- (1) First 10 minutes:  
Run the engine at the lowest possible

speed. A fast idle in neutral is best.

- (2) Next 50 minutes:  
Do not exceed half throttle (approximately 3000 r/min). Vary engine speed occasionally. If you have an easy-planing boat, accelerate at full throttle onto plane, then immediately reduce the throttle to 3000 r/min or less.
- (3) Next two hours:  
Accelerate at full throttle onto plane, then reduce engine speed to three-quarter throttle (approximately 4000 r/min). Vary engine speed occasionally. Run at full throttle for one minute, then allow about 10 minutes of operation at three-quarter throttle or less to let the engine cool.
- (4) Remaining seven hours:  
Run the engine at any speed. However, avoid operating at full throttle for more than 5 minutes at a time.
- (5) After the first 10 hours:  
Operate the engine normally. Use only straight gasoline in the fuel tank. The Yamaha oil injection system provides proper lubrication for normal operation.

EMU36402

### Getting to know your boat

All boats have unique handling characteristics. Operate cautiously while you learn how your boat handles under different conditions and various trim angles (see page 55).

EMU36414

### Checks before starting engine

EWM01922

#### WARNING

If any item in “Checks before starting engine” is not working properly, have it inspected and repaired before operating the outboard motor. Otherwise, an acci-

dent could occur.

ECM00121

## NOTICE

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

EMU37142

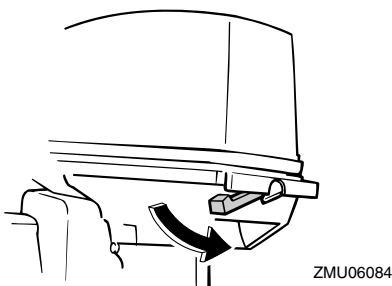
## Fuel level

Be sure you have plenty of fuel for your trip. A good rule is to use 1/3 of your fuel to get to the destination, 1/3 to return, and to keep 1/3 as an emergency reserve. With the boat level on a trailer or in the water, check the fuel level. For fuel filling instructions, see page 42.

EMU36573

## Remove the top cowling

For the following checks, remove the top cowling from the bottom cowling. To remove the top cowling, release the cowling lock lever and lift off the top cowling.



EMU36443

## Fuel system

EWMM00061

## WARNING

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

es of ignition.

EWMM00911

## WARNING

**Leaking fuel can result in fire or explosion.**

- 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.

EMU36453

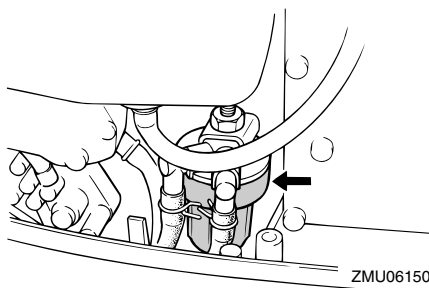
## Check for fuel leaks

- Check for fuel leaks or gasoline fumes in the boat.
- Check for fuel leakage from the fuel system.
- Check the fuel tank and fuel lines for cracks, swellings, or other damage.

EMU37323

## Checking the fuel filter

Check that the fuel filter is clean and free of water. If any water is found in the fuel, or if a significant amount of debris is found, the fuel tank should be checked and cleaned by a Yamaha dealer.



EMU36903

## Controls

Tiller handle models:

- Move the tiller handle fully to the left and right to make sure operation is smooth.

# Operation

- Turn the throttle grip from the fully closed to the fully open position. Make sure that it turns smoothly and that it completely returns to the fully closed position.
- Look for loose or damaged connections of the throttle and shift cables.

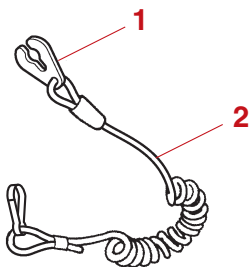
Remote control models:

- Turn the steering wheel full-right and full-left. Make sure operation is smooth and unrestricted throughout the whole range with no binding or excessive free play.
- Operate the throttle levers several times to make sure there is no hesitation in their travel. Operation should be smooth over the complete range of motion, and each lever should return completely to the idle position.
- Look for loose or damaged connections of the throttle and shift cables.

EMU36484

## Engine shut-off cord (lanyard)

Inspect the engine shut-off cord and clip for damage, such as cuts, breaks, and wear.



1. Clip
2. Engine shut-off cord (lanyard)

EMU27121

## Oil

- Check to be sure you have plenty of oil for your trip.

EMU27154

## Engine

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

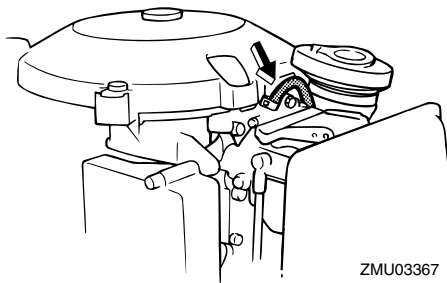
EMU27182

## Operation after long period of storage

### Oil injection models

When operating the engine after a long period (12 months) of storage, proceed as follows:

- (1) Use a 50:1 gasoline to oil mixture to start the engine.
- (2) Start the engine. Leave it idling.  
**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.** [EWM01332]
- (3) Watch for oil flowing through the oil feed pipes. After any air in the oil lines has been expelled, the oil injection system should supply oil normally. If no oil is flowing after 10 minutes of idling, consult your Yamaha dealer.



ECM01261

## NOTICE

Be sure to take the above steps when op-

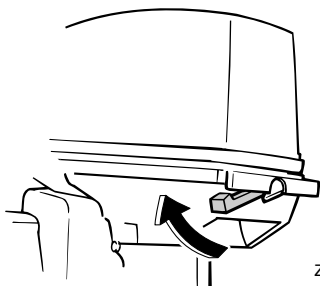
erating the engine after a long period of storage. Otherwise engine seizure could occur.

EMU36956

## Install top cowling

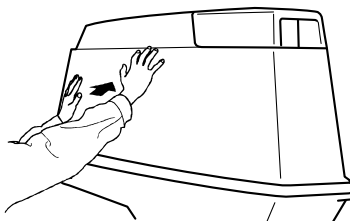
- (1) Be sure that the cowling lock lever is released.
- (2) Be sure that the rubber seal is seated all the way around the top cowling.
- (3) Place the top cowling on the bottom cowling.
- (4) Check to be sure the rubber seal is seated correctly between the top cowling and the bottom cowling.
- (5) Move the cowling lock lever to lock the top cowling as shown. **NOTICE: If the top cowling is not installed correctly, water spray under the top cowling can damage the engine, or the top cowling can blow off at high speeds.**

[ECM01992]



ZMU06109

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



ZMU04678

EMU34582

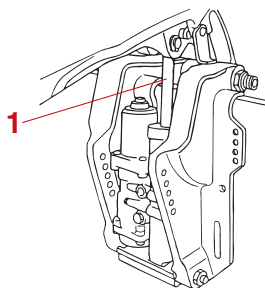
## Power trim and tilt system

EWM01931



- 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.
- Body parts can be crushed between the motor and the clamp bracket when the motor is trimmed or tilted.
- Be sure no one is near the outboard motor before performing this check.

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



ZMU07311

1. Trim and tilt rod

- (2) Operate each of the power trim and tilt switches to check that all switches work.
- (3) Tilt the outboard motor up and check

# Operation

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.

EMU36585

## Battery

Check the battery's charge. If your boat is equipped with a Yamaha digital speedometer, the voltmeter and low battery alert functions will help you monitor the battery's charge. A battery in good condition will provide a minimum of 12 volts. Check that the battery connections are clean, secure and covered by insulating covers. The electrical connections of the battery and cables must be clean and properly connected or the battery will not start the engine.

If the battery needs charging, consult your Yamaha dealer or the battery manufacturer's instructions.

EMU27235

## Filling fuel and engine oil

EMU2724A

### Filling fuel for portable tank

EWMO1831

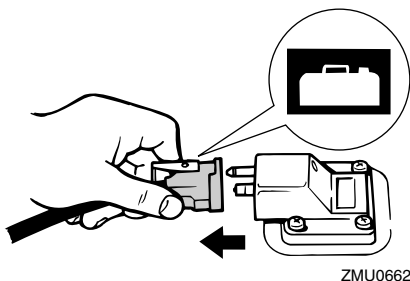


#### WARNING

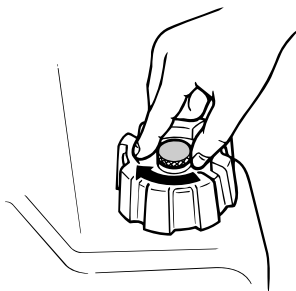
- **Gasoline and its vapors are highly flammable and explosive. Always refuel according to this procedure to reduce the risk of fire and explosion.**
- **Gasoline is poisonous and can cause injury or death. Handle gasoline with care. Never siphon gasoline by mouth. If you should swallow some gasoline or inhale a lot of gasoline vapor, or get some gasoline in your eyes, see your doctor immediately. If gasoline spills**

**on your skin, wash with soap and water. If gasoline spills on your clothing, change your clothes.**

- (1) Be sure the engine is stopped.
- (2) Disconnect the fuel line from the fuel tank and tighten the air vent screw on the fuel tank cap.



ZMU06621

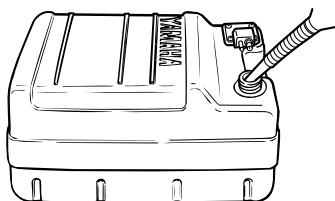


ZMU02301

- (3) Remove the portable tank from the boat.
- (4) Be sure you are in a well-ventilated outdoor area, either securely moored or trailered.
- (5) Do not smoke and keep away from sparks, flames, static electric discharge, or other sources of ignition.
- (6) If you use a portable container to store and dispense fuel, use only an approved GASOLINE container.
- (7) Touch the fuel nozzle to the filler opening or funnel to help prevent electrostatic sparks.

- (8) Fill the fuel tank, but do not overfill.  
**WARNING! Do not overfill. Otherwise fuel can expand and overflow if the temperature increases.** [EWM02611]

**Fuel tank capacity:**  
 24 L (6.34 US gal, 5.28 Imp.gal)



ZMU02834

- (9) Tighten the filler cap securely.  
 (10) Wipe up any spilled gasoline immediately with dry rags. Dispose of rags properly according to local laws or regulations.

EMU27302

## Filling oil for manual starter model

EWM00531

### **WARNING**

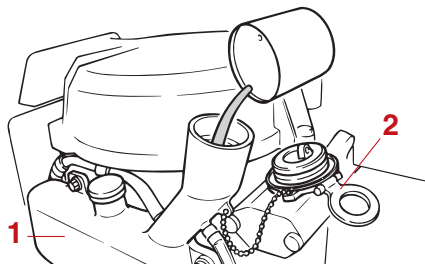
**Do not add gasoline into the oil tank. Fire or explosion could result.**

This engine uses the Yamaha oil injection system, which provides superior lubrication by ensuring the proper oil ratio for all operating conditions. No fuel premixing is needed. Simply pour gasoline into the fuel tank and oil into the oil tank. Convenient indicator segments indicate the status of the oil supply. For details on reading the indicator segments, see page 45.

To fill the engine oil tank, proceed as follows:

**Engine oil tank capacity:**  
 1.5 L (1.59 US qt, 1.32 Imp.qt)

- (1) Remove the top cowl.  
 (2) Open the oil tank filler cap by pulling the tab.  
 (3) Slowly fill the engine oil into the engine oil tank.



ZMU03368

1. Engine oil tank  
 2. Oil tank filler cap

- (4) After filling, replace the cap securely.

EMU27312

## Filling oil for electric start models

EWM00531

### **WARNING**

**Do not add gasoline into the oil tank. Fire or explosion could result.**

This engine uses the Yamaha oil injection system, which provides superior lubrication by ensuring the proper oil ratio for all operating conditions. No fuel premixing is needed. Simply pour gasoline into the fuel tank and oil into the oil tank. Convenient indicator segments indicate the status of the oil supply. For details on reading the indicator segments, see page 45.

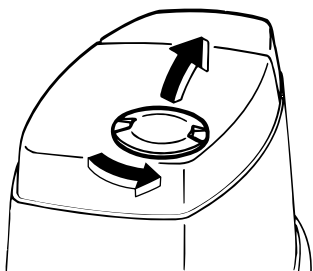
To fill the engine oil tank, proceed as follows:

**Engine oil tank capacity:**  
 1.5 L (1.59 US qt, 1.32 Imp.qt)

- (1) Turn the oil filler access cap on the top cowl counterclockwise and open it.

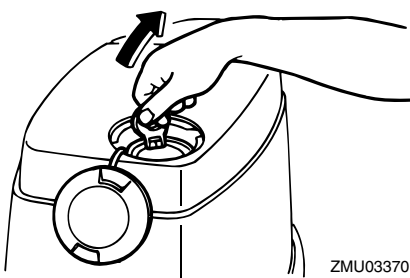
# Operation

---



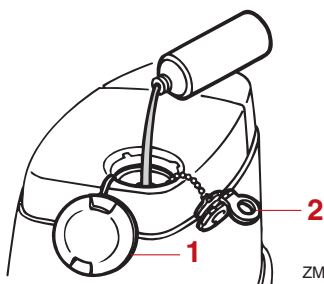
ZMU03369

- (2) Open the oil tank filler cap by pulling the tab on the cap.



ZMU03370

- (3) Slowly pour the engine oil into the engine oil tank.



ZMU03371

1. Oil filler access cap  
2. Oil tank filler cap
- (4) After filling, replace the all caps securely.



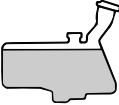


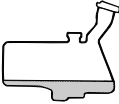
EMU27322

## Oil level indicator operation









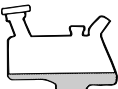
The various functions of the oil level system are as follows:

EMU27343

### Manual start models

Oil level-alert indicator		Engine oil tank	Remarks
OFF	 	 <p>more than 200 cm<sup>3</sup> (0.21 US qt, 0.181 Imp qt)</p>	No refilling necessary.
ON	<p>Red</p>  	 <p>200 cm<sup>3</sup> (0.21 US qt, 0.181 Imp qt) or less</p>	<ul style="list-style-type: none"> <li>● Buzzer sounds in remote control box and engine speed is limited to about 2000 r/min to help conserve oil.</li> <li>● Check oil filter for clogging.</li> <li>● Add oil; see page 43.</li> </ul>

### Electric start models

Oil level-alert indicator (digital tachometer)	Oil level-alert indicator (analog tachometer/ bottom cowling)	Engine oil tank	Remarks
	<p>Green</p> 	 <p>more than 450 cm<sup>3</sup> (0.48 US qt, 0.40 Imp qt)</p>	No refilling necessary.
	<p>Yellow</p> 	 <p>from 450 cm<sup>3</sup> (0.48 US qt, 0.40 Imp qt) down to 200 cm<sup>3</sup> (0.21 US qt, 0.18 Imp qt)</p>	Add oil; see page 43.
	<p>Red</p> 	 <p>200 cm<sup>3</sup> (0.21 US qt, 0.18 Imp qt) or less</p>	<ul style="list-style-type: none"> <li>● Buzzer sounds in remote control box and engine speed is limited to about 2000 r/min to help conserve oil.</li> <li>● Check oil filter for clogging.</li> </ul>

# Operation

EMU27453

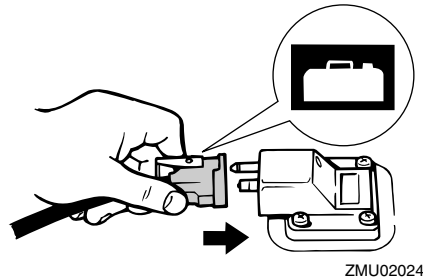
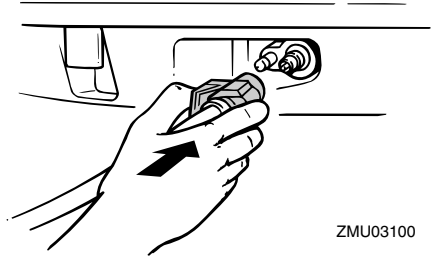
## Operating engine

EWM00421

### **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.
- 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.

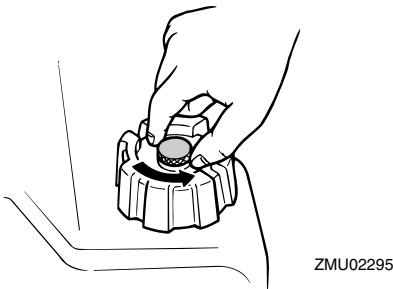
joint on the motor and firmly connect the fuel line to the joint while pinching the joint. Then firmly connect the other end of the fuel line to the joint on the fuel tank.



EMU35706

### Sending fuel (portable tank)

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

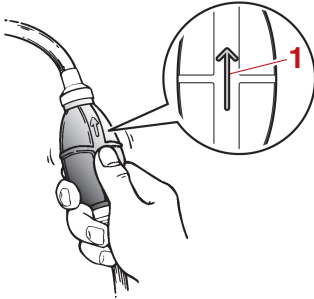


- (2) If there is a fuel joint on the motor, align the fuel joint on the fuel line with the fuel

### TIP:

Wipe up any spilled gasoline immediately with dry rags. Dispose of rags properly according to local laws or regulations.

- (3) If a steering friction adjuster is provided on your outboard motor, securely attach the fuel line to the fuel line clamp.
- (4) Squeeze the primer pump, with the arrow pointing up, until you feel it become firm. During engine operation place the tank horizontally, otherwise fuel cannot be drawn from the fuel tank.



1. Arrow

EMU27495

## Starting engine

EWM01601



**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.**

EMU2750A

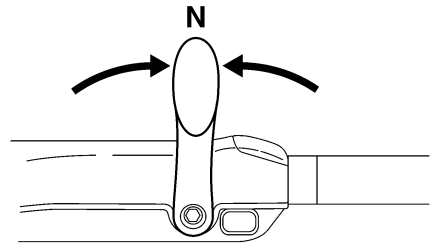
## Manual start models (tiller control)

EWM01842



- Failure to attach the engine shut-off cord could result in a runaway boat if operator is ejected. Attach the engine shut-off cord to a secure place on your clothing, or your arm or leg while operating. Do not attach the cord to clothing that could tear loose. Do not route the cord where it could become entangled, preventing it from functioning.
- Avoid accidentally pulling the cord 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.

- (1) Place the gear shift lever in neutral.

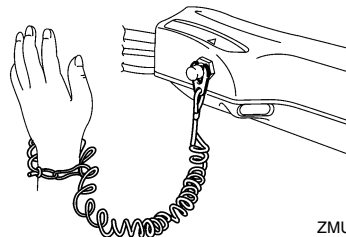


ZMU05215

### TIP:

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

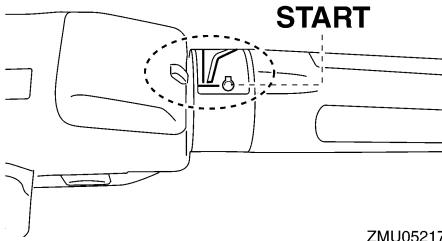
- (2) Attach the engine shut-off cord to a secure place on your clothing, or your arm or leg. Then install the clip on the other end of the cord into the engine shut-off switch.



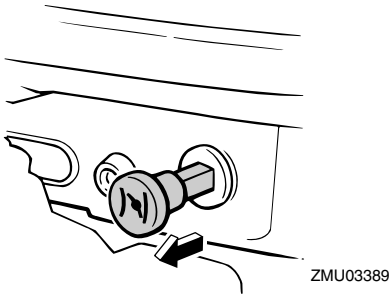
ZMU07329

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

# Operation

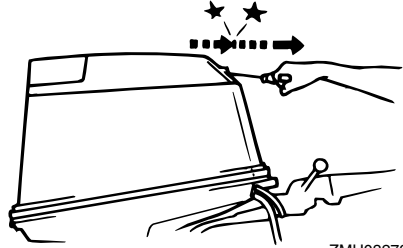


- (4) Pull out / turn the choke knob fully. After the engine starts, replace / return the knob to the home position.

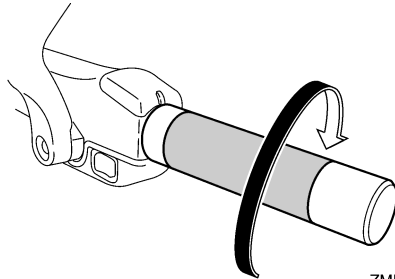


## TIP:

- 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.



- (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.



## TIP:

- When the engine is cold, it needs to be warmed up. For further information, see page 51.
- 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 80.

EMU27597

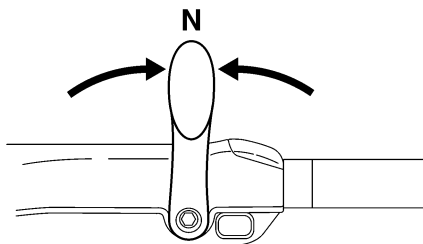
## Electric start / prime start models

EWM01842

### **WARNING**

- Failure to attach the engine shut-off cord could result in a runaway boat if operator is ejected. Attach the engine shut-off cord to a secure place on your clothing, or your arm or leg while operating. Do not attach the cord to clothing that could tear loose. Do not route the cord where it could become entangled, preventing it from functioning.
- Avoid accidentally pulling the cord 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.

- (1) Place the gear shift lever in neutral.

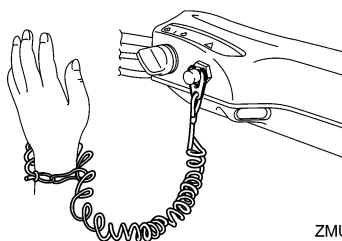


ZMU05215

### **TIP:**

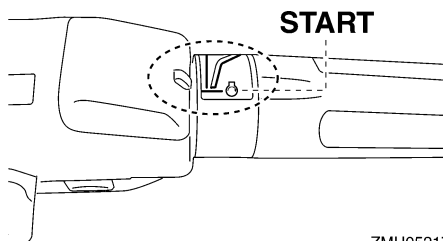
The start-in-gear protection device prevents the engine from starting except when in neutral.

- (2) Attach the engine shut-off cord to a secure place on your clothing, or your arm or leg. Then install the clip on the other end of the cord into the engine shut-off switch.



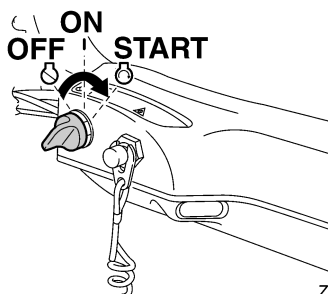
ZMU05216

- (3) Place the throttle grip in the “START” (start) position. After the engine starts, return the throttle to the fully closed position.



ZMU05217

- (4) Turn the main switch to “START” (start), and hold it for a maximum of 5 seconds.



ZMU05218

- (5) Immediately after the engine starts, release the main switch and allow it to return to “ON” (on). **NOTICE: Never turn the main switch to “START” (start) while the engine is running. Do not**

# Operation

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. [ECM000193]

## TIP:

- When the engine is cold, it needs to be warmed up. For further information, see page 51.
- If the engine is warm and fails to start, open the throttle slightly and try to start the engine again. If the engine still fails to start, see page 80.

EMU27666

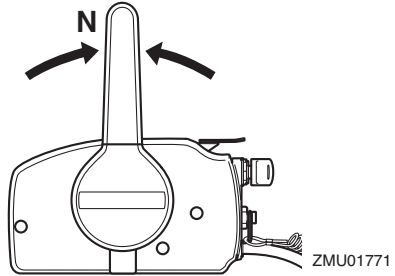
## Electric start and remote control models

EWM01842

### **WARNING**

- Failure to attach the engine shut-off cord could result in a runaway boat if operator is ejected. Attach the engine shut-off cord to a secure place on your clothing, or your arm or leg while operating. Do not attach the cord to clothing that could tear loose. Do not route the cord where it could become entangled, preventing it from functioning.
- Avoid accidentally pulling the cord 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.

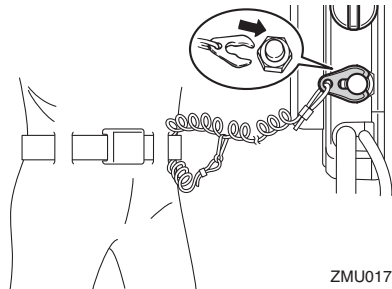
- (1) Place the remote control lever in neutral.



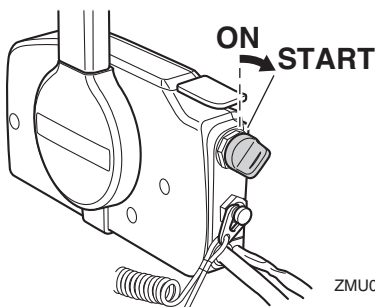
## TIP:

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

- (2) Attach the engine shut-off cord to a secure place on your clothing, or your arm or leg. Then install the clip on the other end of the cord into the engine shut-off switch.



- (3) Turn the main switch to “ON” (on).
- (4) Turn the main switch to “START” (start), and hold it for a maximum of 5 seconds.



- (5) Immediately after the engine starts, release the main switch and allow it to return to “ON” (on). **NOTICE:** 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. [ECM00193]

## TIP:

- When the engine is cold, it needs to be warmed up. For further information, see page 51.
- If the engine is warm and fails to start, open the throttle slightly and try to start the engine again. If the engine still fails to start, see page 80.

EMU36511

## Checks after starting engine

EMU36524

### Cooling water

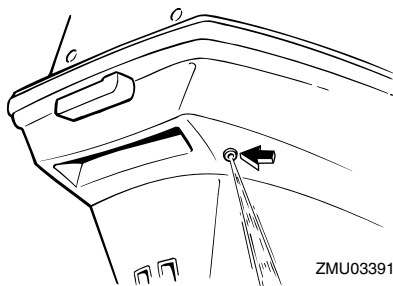
Check for a steady flow of water from the

cooling water pilot hole. A continuous flow of water from the pilot hole indicates that the water pump is pumping water through the cooling water passages. If the cooling water passages are frozen, it may take a while for water to start flowing out of the pilot hole.

ECM01811

## NOTICE

If water is not flowing out of the pilot 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.



EMU27671

## Warming up engine

EMU27685

### Choke start models

After starting the engine, allow it to idle for 3 minutes to warm up. **NOTICE:** Failure to do so will shorten engine life. [ECM04550] Gradually return the choke knob to its home position as the engine warms up.

# Operation

EMU27705

## Electric start and prime start models

After starting the engine, allow it to idle for 3 minutes to warm up. Failure to do so will shorten engine life.

EMU36532

## Checks after engine warm up

EMU36542

### Shifting

While the boat is tightly moored, and without applying throttle, confirm that the engine shifts smoothly into forward and reverse, and back to neutral.

EMU40461

### Stop switches

Perform the following procedure to check that the main switch and engine shut-off switch operate properly.

- Check that the engine stops when the main switch is turned to the “OFF” (off) position.
- Check that the engine stops when the clip is pulled from the engine shut-off switch.
- Check that the engine cannot be started with the clip removed from the engine shut-off switch.

EMU34531

## Shifting

EWMO0181



**WARNING**

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

ECM01611

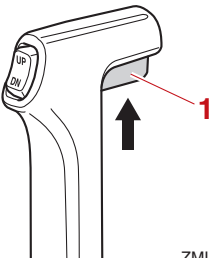


Warm up the engine before shifting into gear. Until the engine is warm, the idle speed may be higher than normal. High

idle speed can prevent you from shifting back to neutral. If this occurs, stop the engine, shift to neutral, then restart the engine and allow it to warm up.

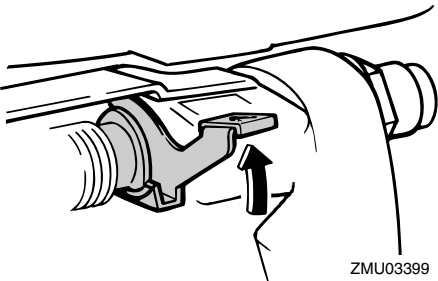
### To shift out of neutral

- (1) Pull the neutral interlock trigger up (if equipped).

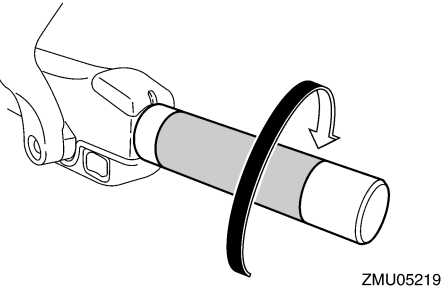
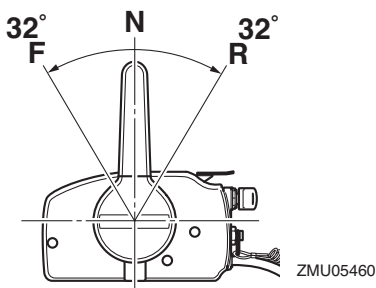


ZMU01727

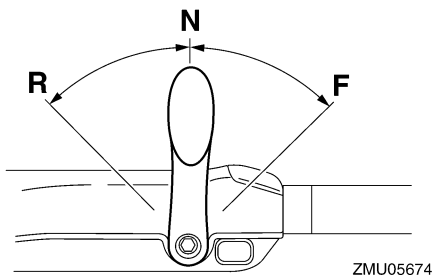
1. Neutral interlock trigger
- (2) Move the remote control lever / gear shift lever firmly and crisply forward (for forward gear) or backward (for reverse gear) [about 35° (a detent can felt) for remote control models]. Be sure to check that the tilt lock lever is in the lock/down position (if equipped) before operating in reverse.



ZMU03399

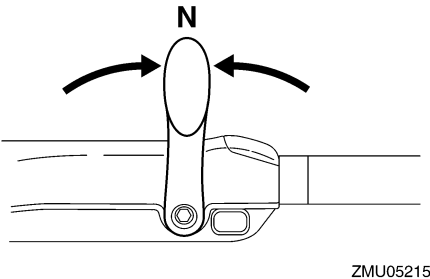
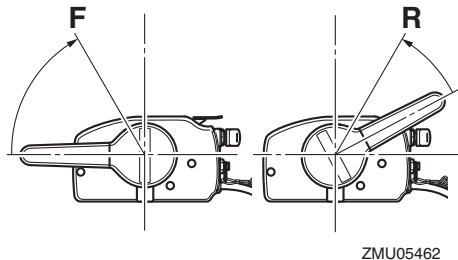
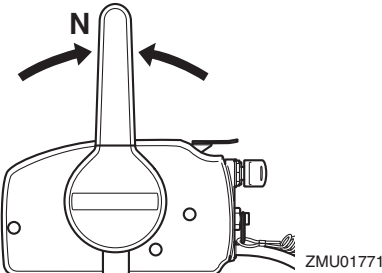


- (2) After the engine is at idle speed in gear move the remote control lever / gear shift lever firmly and crisply into the neutral position.



To shift from in gear (forward/reverse) to neutral

- (1) Close the throttle so that the engine slows to idle speed.



EMU31743

## Stopping boat

EWM01511



- Do not use the reverse function to slow down or stop the boat as it could cause

# Operation

you to lose control, be ejected, or impact the steering wheel or other parts of the boat. This could increase the risk of serious injury. It could also damage the shift mechanism.

- **Do not shift into reverse while traveling at planing speeds. Loss of control, boat swamping, or damage to the boat could occur.**

The boat is not equipped with a separate braking system. Water resistance stops it after the throttle lever is moved back to idle. The stopping distance varies depending on gross weight, water surface conditions, and wind direction.

EMU27822

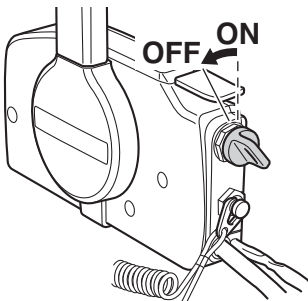
## Stopping engine

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.

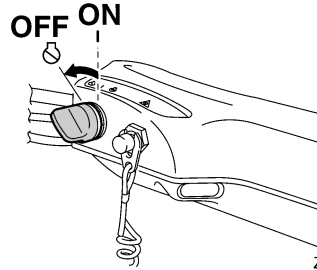
EMU2784A

### Procedure

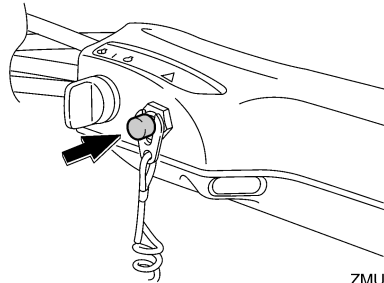
- (1) Push and hold the engine stop button or turn the main switch to "OFF" (off).



ZMU01779

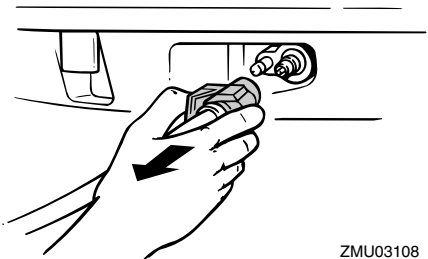


ZMU05223



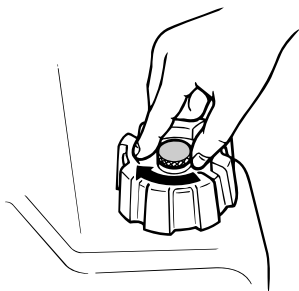
ZMU05209

- (2) After stopping the engine, disconnect the fuel line if there is a fuel joint on the outboard motor.



ZMU03108

- (3) Tighten the air vent screw on the fuel tank cap (if equipped).



ZMU02301

- (4) Remove the key if the boat will be left unattended.

## TIP:

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

EMU27865

## Trimming outboard motor

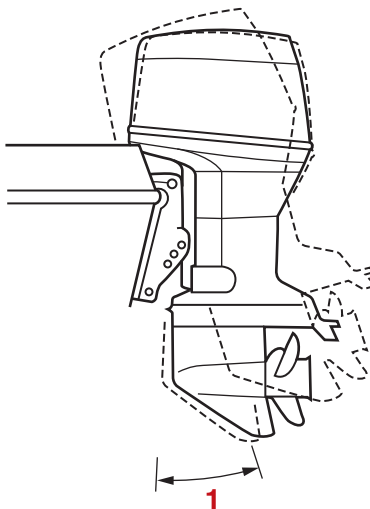
EWMO0741



### WARNING

**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.**

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.



ZMU03109

1. Trim operating angle

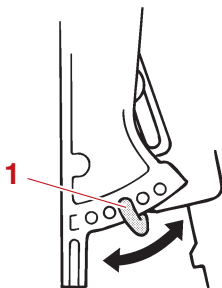
EMU27873

## 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) Tilt the outboard motor up, and then remove the trim rod from the clamp bracket.

# Operation



ZMU02408

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.

EWMM00401

## 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.**

## TIP:

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

EMU27889

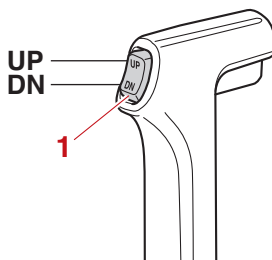
## Adjusting trim angle (Power trim and tilt)

EWMM00754

### WARNING

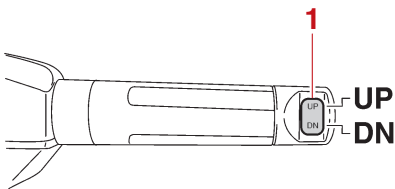
- **Be sure all people are clear of the outboard motor when adjusting the trim angle. Body parts can be crushed between the motor and the clamp bracket when the motor is trimmed or tilted.**
- **Use caution when trying a trim position for the first time. Increase speed gradually and watch for any signs of instability or control problems. Improper trim angle can cause loss of control.**
- **If equipped with a power trim and tilt switch located on the bottom cowling, use the switch only when the boat is at a complete stop with the engine off. Do not adjust the trim angle with this switch while the boat is moving.**

Adjust the outboard motor trim angle using the power trim and tilt switch.



ZMU01781

1. Power trim and tilt switch



ZMU05224

## 1. Power trim and tilt switch

To raise the bow (trim-out), press the switch “UP” (up).

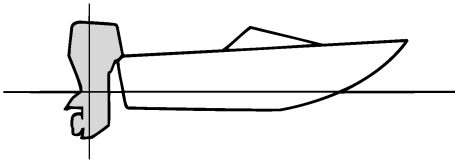
To lower the bow (trim-in), press the switch “DN” (down).

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

EMU27913

## Adjusting boat trim

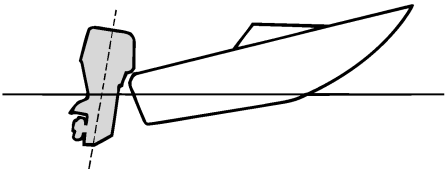
When the boat is on plane, a bow-up attitude results in less drag, greater stability and efficiency. This is generally when the keel line of the boat is up about 3 to 5 degrees. With the bow up, the boat may have a greater tendency to steer to one side or the other. Compensate for this as you steer.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



ZMU01784

## Bow Up

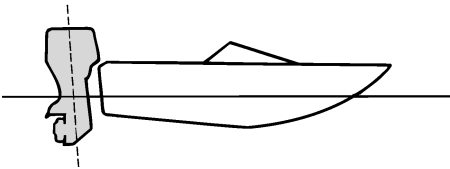
Too much trim-out puts the bow of the boat too high in the water. Performance and economy are decreased because the hull of the boat is pushing the water and there is more air drag. Excessive trim-out can also cause the propeller to ventilate, which reduces performance further, and the boat may “porpoise”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

## TIP:

Depending on the type of boat, the outboard

# Operation

motor trim angle may have little effect on the trim of the boat when operating.

EMU27936

## 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 lower casing from damage by collision with obstructions, and also to reduce salt corrosion.

EWM00223

 **WARNING**

Make sure that no one is near the outboard motor when tilting the outboard motor up or down. Otherwise, body parts could be crushed between the outboard motor and the clamp bracket.

EWM00251

 **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.

ECM00242

**NOTICE**

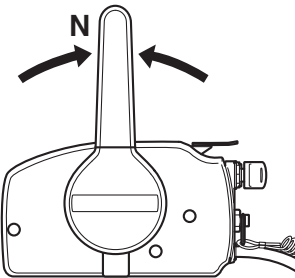
- Before tilting the outboard motor, stop the engine by following the procedure on page 54. Never tilt the outboard motor while the engine is running. Severe damage from overheating can result.
- Do not tilt up the engine by pushing the tiller handle (if equipped) because this could break the handle.

EMU27956

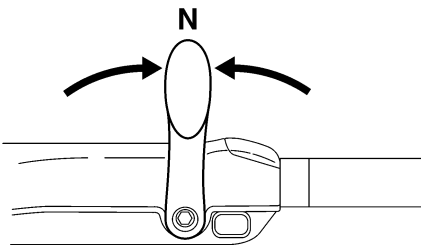
## Procedure for tilting up (manual tilt models)

- (1) Place the remote control lever / gear

shift lever in neutral.

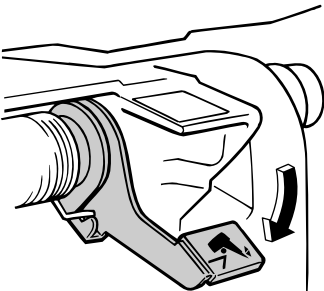


ZMU01771



ZMU05215

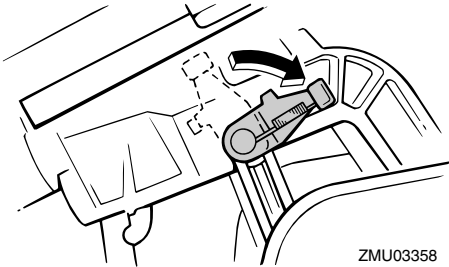
- (2) Place the tilt lock lever in the release position.



ZMU03405

- (3) Hold the rear of the top cowling with one hand, tilt the engine up, and turn the tilt support lever to the lock position and support the engine. **NOTICE:** 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

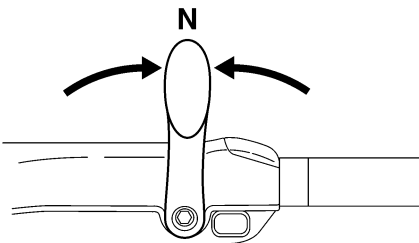
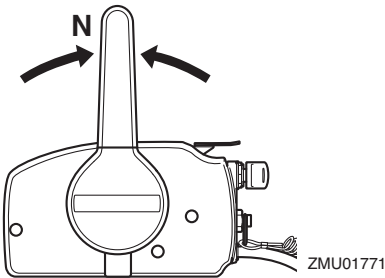
cannot be trailered in the normal running position, use an additional support device to secure it in the tilt position. For more detailed information, see page 63. [ECM01642]



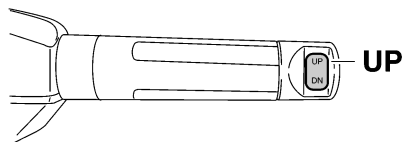
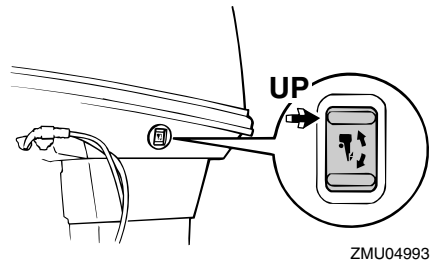
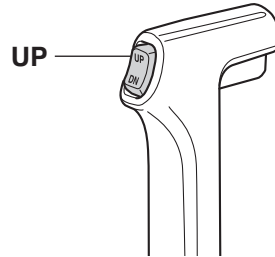
EMU42693

## Procedure for tilting up (power trim and tilt models)

- (1) Place the remote control lever / gear shift lever in neutral.



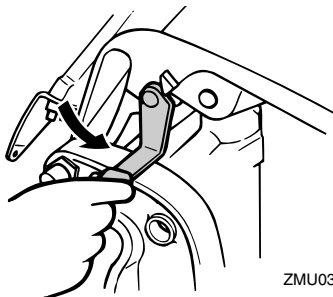
- (2) Press the power trim and tilt switch “UP” (up) until the outboard motor has tilted up completely.



- (3) Pull the tilt support lever toward you to support the engine. **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**

# Operation

tilt unit or in the power tilt unit loses pressure. [EWM00263] **NOTICE:** 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. For more detailed information, see page 63. [ECM01642]

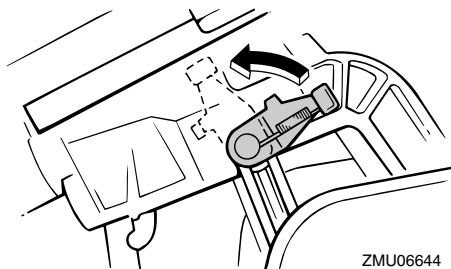


- (4) Once the outboard motor is supported with the tilt support lever, press the power trim and tilt switch “DN” (down) to retract the trim rods. **NOTICE:** Make sure that the trim rods retract completely during mooring. This protects the rods from marine growth and corrosion, which could damage the power trim and tilt mechanism. [ECM00254]

EMU30412

## Procedure for tilting down (manual tilt models)

- (1) Slightly tilt the engine up.
- (2) On models equipped with a tilt support lever, return it to the release position.

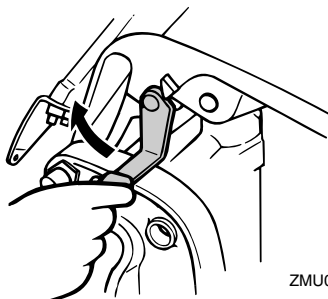


- (3) Slowly tilt the engine down.

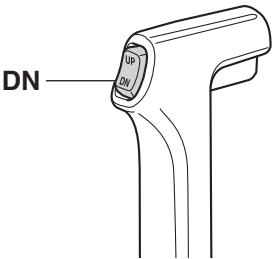
EMU35517

## Procedure for tilting down (power trim and tilt models)

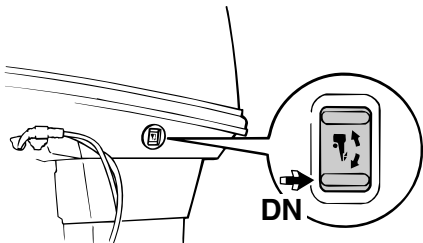
- (1) Push the power trim and tilt switch “UP” (up) until the outboard motor is supported by the tilt rod and the tilt support lever becomes free.
- (2) Release the tilt support lever.



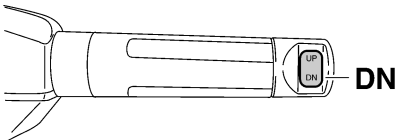
- (3) Push the power trim and tilt switch “DN” (down) to lower the outboard motor to the desired position.



ZMU01936



ZMU03410



ZMU05228

EMU28063

## Shallow water

EMU32852

### Power trim and tilt models

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

ECM00261

### NOTICE

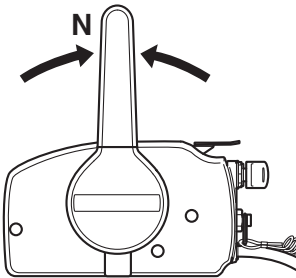
**Do not tilt the outboard motor up so that the cooling water inlet on the lower unit is**

**above the surface of the water when setting up for and cruising in shallow water. Otherwise severe damage from overheating can result.**

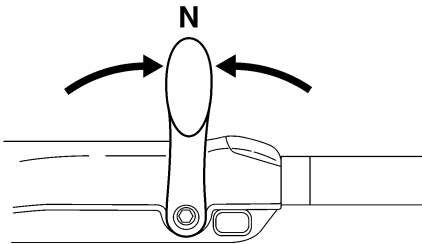
EMU32914

### Procedure for power trim and tilt models

- (1) Place the remote control lever / gear shift lever in neutral.



ZMU01771

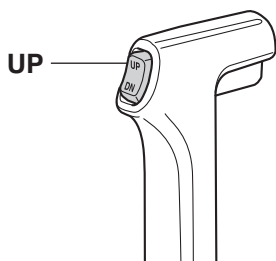


ZMU05215

- (2) Slightly tilt the outboard motor up to the desired position using the power trim and tilt switch. **WARNING! Using the power trim and tilt switch on the bottom cowling while the boat is moving or engine is on could increase the risk of falling overboard and could distract the operator, increasing the risk of collision with another boat or an obstacle.** [EWM01851]

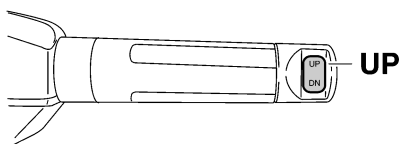
# Operation

---



ZMU01935

rosion. Also rinse the outside of the outboard motor with fresh water.



ZMU05226

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

EMU28196

## Cruising in other conditions

### Cruising in salt water

After operating in salt water, flush the cooling water passages with fresh water to prevent them from becoming clogged. Also rinse the outside of the outboard motor with fresh water.

### Cruising in muddy, turbid, or acidic water

Yamaha strongly recommends that you use the optional chromium-plated water pump kit (see page 14) if you use the outboard motor in acidic water or water with a lot of sediment in it, such as muddy or turbid (cloudy) water. After operating in such water, flush the cooling passages with fresh water to prevent cor-

EMU2822B

## Transporting and storing outboard motor

EWMO2821

### **WARNING**

- **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.
- **Leaking fuel is a fire hazard. When transporting and storing the outboard motor, disconnect the fuel line from the outboard motor to prevent fuel from leaking.**
- **Never get under the outboard motor while it is tilted. Severe injury could occur if the outboard motor accidentally falls.**
- **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 outboard motor cannot be trailered in the normal running position, use an additional support device to secure it in the tilt position.**

ECMO2441

### **NOTICE**

**When storing the outboard motor for prolonged time, fuel must be drained from the fuel tank. The deteriorated fuel could clog the fuel line causing engine start difficulty or malfunction.**

When storing or transporting the outboard motor, make sure to follow the procedure listed below.

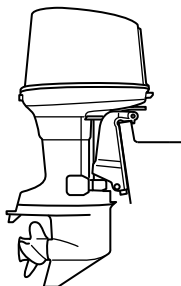
- Disconnect the fuel line from the outboard motor.
- Tighten the fuel tank cap and its air vent screw.
- When the outboard motor is tilted prolonged time for mooring or trailering the boat, disconnect the fuel line from the outboard motor. Tighten the fuel tank cap and its air vent screw.

The outboard motor should be transported 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.

EMU28237

### **Clamp screw mounting models**

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



ZMU03122

### **TIP:**

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

EMU30273

### **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.

# Maintenance

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.

ECM01412

## NOTICE

- **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.**

EMU28306

## Procedure

EMU28336

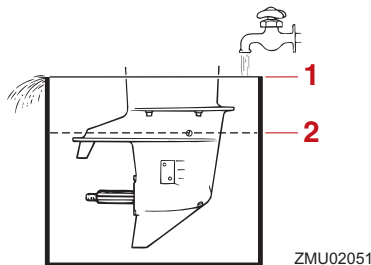
### Flushing in a test tank

ECM00302

## NOTICE

**Before starting the engine, make sure to supply water to the cooling water passages. Otherwise, the engine could overheat and be damaged.**

- (1) Wash the outboard motor body using fresh water. **NOTICE: Do not spray water into the air intake.** [ECM01841] For further information, see page 65.
- (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. **NOTICE: 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.** [ECM00292]
- (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. **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.** [EWM00092]
- (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



1. Water surface
2. Lowest water level

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.

### TIP:

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

EMU41072

## Lubrication

- (1) Change the gear oil. For instructions, see page 75. Check the gear oil for the presence of water that indicates a leaky seal. Seal replacement should be performed by an authorized Yamaha dealer prior to use.
- (2) Lubricate all grease fittings. For further details, see page 70.

### TIP:

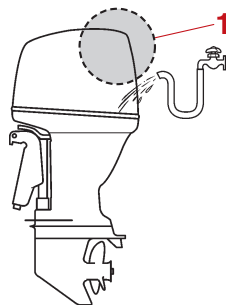
For long-term storage, fogging the engine with fogging oil is recommended. Contact your Yamaha dealer for information about fogging oil and procedures for your outboard motor.

EMU44342

## Cleaning the outboard motor

When cleaning the outboard motor, the top cowling must be installed.

- (1) Wash the exterior of the outboard motor using fresh water. **NOTICE: Do not spray water into the air intake.** [ECM01841]



ZMU07861

1. Air intake

- (2) Drain the cooling water completely out of the outboard motor. Clean the body thoroughly.

EMU28463

## Checking painted surface of outboard motor

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

EMU2847G

## Periodic maintenance

EWM01872



**These procedures require mechanical skills, tools, and supplies. If you do not have the proper skills, tools, or supplies to perform a maintenance procedure, have a Yamaha dealer or other qualified mechanic do the work.**

**The procedures involve disassembling the motor and exposing dangerous parts. To reduce the risk of injury from moving, hot, or electrical parts:**

- Turn off the engine and keep the key(s) and engine shut-off cord (lanyard) with

# Maintenance

---

**you when you perform maintenance unless otherwise specified.**

- **The power trim and tilt switches operate even when the ignition key is off. Keep people away from the switches whenever working around the motor. When the motor is tilted, keep away from the area under it or between it and the clamp bracket. Be sure no one is in this area before operating the power trim and tilt mechanism.**
  - **Allow the engine to cool before handling hot parts or fluids.**
  - **Always completely reassemble the motor before operation.**
- 

- Frequently starting and stopping the engine(s)
  - Operation that fluctuates often between light and heavy cargo loads
- Outboard motors operating under any of these above conditions require more frequent maintenance. Yamaha recommends that you do this service twice as often as specified in the maintenance chart. For example, if a particular service should be done at 50 hours, do it instead at 25 hours. This will help prevent more rapid deterioration of engine components.

EMU28512

## Replacement parts

If replacement parts are necessary, use only genuine Yamaha parts or parts of equivalent design and quality. 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.

EMU34152

## Severe operating conditions

Severe operating conditions involve one or more of the following types of operation on a regular basis:

- Operating continuously at or near maximum engine speed (rpm) for many hours
- Operating continuously at a low engine speed (rpm) for many hours
- Operating without sufficient time for engine to warm up and cool down
- Frequent quick acceleration and deceleration
- Frequent shifting

EMU34449

## Maintenance chart 1

### TIP:

- Refer to the sections in this chapter for explanations of each owner-specific action.
- The maintenance cycle on these charts assume usage of 100 hours per year and regular flushing of the cooling water passages. Maintenance frequency should be adjusted when operating the engine under adverse conditions such as extended trolling.
- Disassembly or repairs may be necessary depending on the outcome of maintenance checks.
- Expendable or consumable parts and lubricants will lose their effectiveness over time and through normal usage regardless of the warranty period.
- When operating in salt water, muddy, other turbid (cloudy), acidic water, the engine should be flushed with clean water after each use.

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			
		20 hours (3 months)	100 hours (1 year)	300 hours (3 years)	500 hours (5 years)	
Anode(s) (external)	Inspection or replacement as necessary		●/○			
Anode(s) (cylinder head, thermostat cover)	Inspection or replacement as necessary				○	
Anodes (exhaust cover, cooling water passage cover, Rectifier Regulator cover)	Replacement				○	
Battery (electrolyte level, terminal)	Inspection	●/○	●/○			
Battery (electrolyte level, terminal)	Fill, charging or replacing as necessary		○			
Cooling water leakage	Inspection or replacement as necessary	○	○			
Cowling lock lever	Inspection		●/○			
Engine starting condition/noise	Inspection	●/○	●/○			
Engine idle speed/noise	Inspection	●/○	●/○			
Fuel filter (can be disassembled)	Inspection or replacement as necessary	●/○	●/○			
Fuel line	Inspection	●	●			
Fuel line	Inspection or replacement as necessary	○	○			

# Maintenance

Item	Actions	Initial	Every			
		20 hours (3 months)	100 hours (1 year)	300 hours (3 years)	500 hours (5 years)	
Fuel pump	Inspection or replacement as necessary			○		
Fuel/engine oil leakage	Inspection	○	○			
Gear oil	Replacement	●/○	●/○			
Greasing points	Greasing	●/○	●/○			
Impeller/water pump housing	Inspection or replacement as necessary		○			
Impeller/water pump housing	Replacement			○		
Oil tank water drain	Inspection or cleaning	●/○	●/○			
Oil injection pump/oil feed pump	Inspection or Adjustment	○	○			
Power trim and tilt unit/Operation, noise and oil leakage	Inspection	●/○	●/○			
Propeller/propeller nut/cotter pin	Inspection or replacement as necessary	●/○	●/○			
Shift link/shift cable	Inspection, adjustment or replacement as necessary	○	○			
Spark plug(s)	Inspection or replacement as necessary		●/○			
Spark plug caps/spark plug wires	Inspection or replacement as necessary	○	○			
Water from the cooling water pilot hole	Inspection	●/○	●/○			
Throttle link/throttle cable/throttle pick-up timing	Inspection, adjustment or replacement as necessary	○	○			
Thermostat	Inspection or replacement as necessary		○			
Cooling water inlet	Inspection	●/○	●/○			
Main switch/stop switch/choke switch	Inspection or replacement as necessary	○	○			
Wire harness connections/wire coupler connections	Inspection or replacement as necessary	○	○			
(Yamaha) Meter/gauge	Inspection	○	○			
Fuel tank (Yamaha portable tank)	Inspection and cleaning as necessary		○			

EMU34452

Maintenance chart 2

Item	Actions	Every
		1000 hours
Exhaust guide/exhaust manifold	Inspection or replacement as necessary	○

# Maintenance

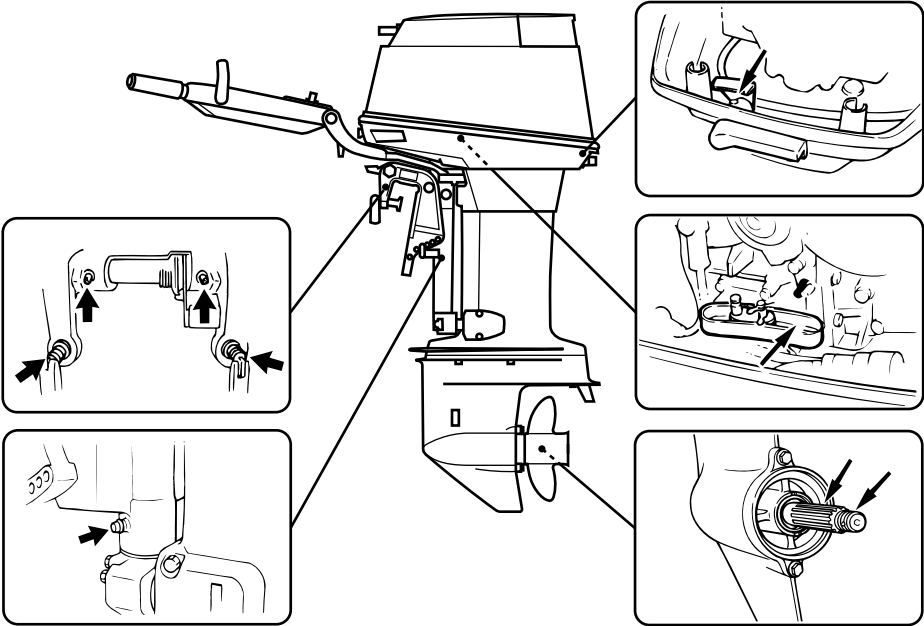
EMU28945

## Greasing

Yamaha grease A (water resistant grease)

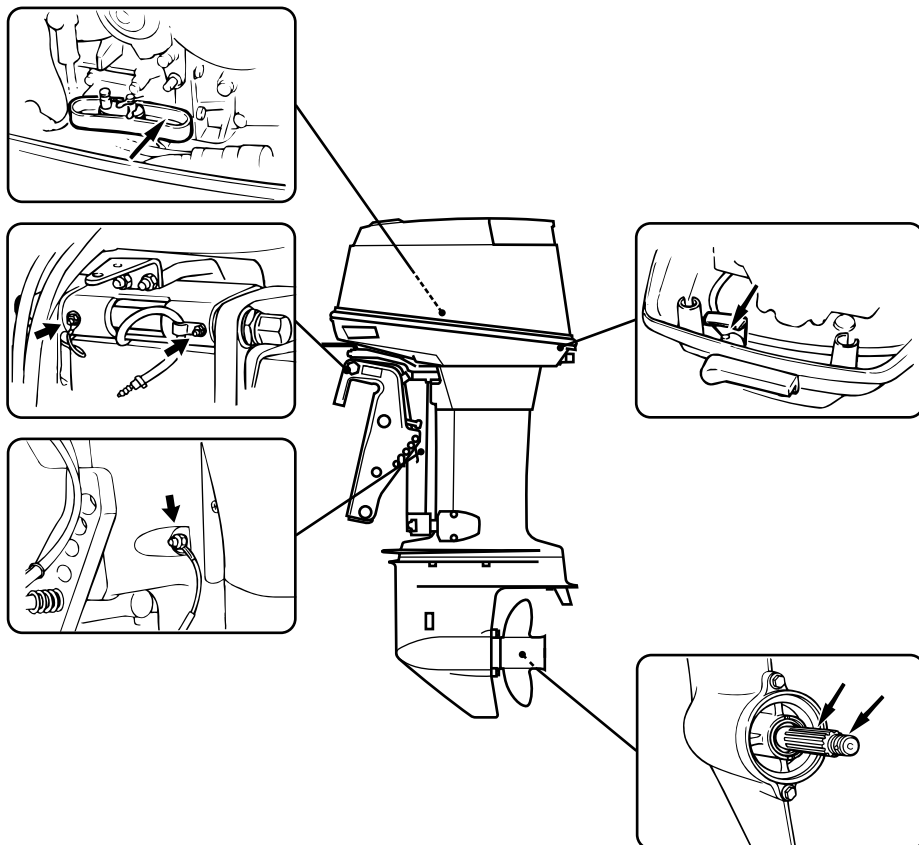
Yamaha grease D (corrosion resistant grease; for propeller shaft)

40VMHO



ZMU03415

## 40VEO, 50HETO



ZMU03414

EMU44493

### Cleaning and adjusting spark plug

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 re-

move and inspect the spark plug because heat and deposits will cause the spark plug to slowly break down and erode.

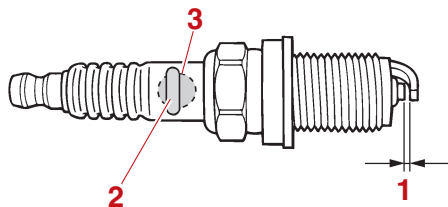
- (1) Remove the spark plug caps from the spark plugs.
- (2) Remove the spark plug. If electrode erosion becomes excessive, or if carbon and other deposits are excessive, you should replace the spark plug with another of the correct type. **WARNING!** When removing or installing a spark

# Maintenance

**plug, be careful not to damage the insulator. A damaged insulator could allow external sparks, which could lead to explosion or fire.** [EWM00562]

**Standard spark plug:**  
BR7HS-10 (40VEO, 40VMHO)  
BR8HS-10 (50HETO)

- (3) Be sure to use the specified spark plug, otherwise the engine may not operate properly. Before fitting the spark plug, measure the electrode gap with a wire thickness gauge; replace it if out of specification.



ZMU01797

- 1. Spark plug gap
- 2. Spark plug part number
- 3. Spark plug I.D. mark (NGK)

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

- (4) When fitting the plug, wipe off any dirt from the threads, and then screw it in to the correct torque.

**Spark plug torque:**  
25 N·m (2.5 kgf·m, 18 lb·ft)

**TIP:**

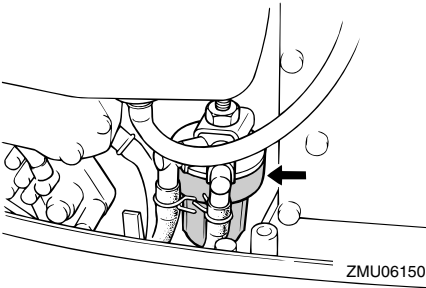
If a torque-wrench is not available when you are reinstalling a spark plug, a good estimate of the correct torque is 1/12 turn past finger-

tight. When you are installing a new spark plug, a good estimate of the correct torque is 1/2 to 2/3 turn past finger-tight.

EMU37451

**Checking fuel filter**

Check the fuel filter periodically. If any water or foreign matter is found in the filter, clean or replace it. For cleaning or replacement of the fuel filter, consult your Yamaha dealer.



EMU29045

**Inspecting idle speed**

EWM00452

**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.

ECM00491

**NOTICE**

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

If the boat is not equipped with a tachometer for the outboard motor, use a diagnostic tachometer for this procedure. Results may vary depending on whether testing is conducted with the flushing attachment, in a test

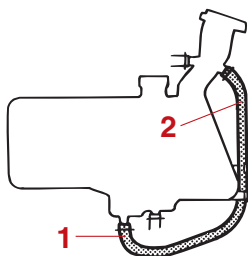
tank, or with the outboard motor in the water.

- (1) Start the engine and allow it to warm up fully in neutral until it is running smoothly.
- (2) Once the engine has warmed up, verify whether the idle speed is set to specification. For idle speed specifications, see page 10. If you have difficulty verifying the idle speed, or the idle speed requires adjustment, consult a Yamaha dealer or other qualified mechanic.

EMU29062

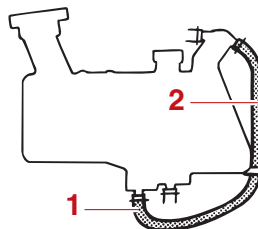
## Checking water in engine oil tank

A translucent water drain hose is connected from the bottom of the oil tank to the filler neck. If water or foreign matter collects in this hose, consult a Yamaha dealer.



ZMU03416

1. Drain hose
2. Filler neck side



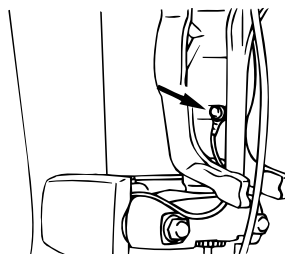
ZMU04989

1. Drain hose
2. Filler neck side

EMU29116

## Inspecting wiring and connectors

- Inspect that each connector is engaged securely.
- Inspect that each ground lead is properly secured.



ZMU03240

EMU32113

## Checking propeller

EWMO1882



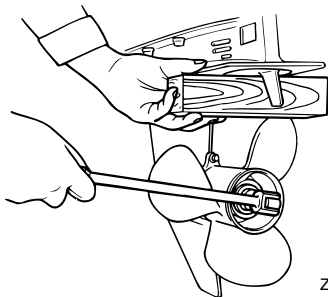
**WARNING**

You could be seriously injured if the engine accidentally starts when you are near the propeller. Before inspecting, removing, or installing the propeller, place the shift control in neutral, turn the main switch to “OFF” (off) and remove the key, and remove the clip from the engine shut-off switch. Turn off the battery cut-off

# Maintenance

## switch if your boat has one.

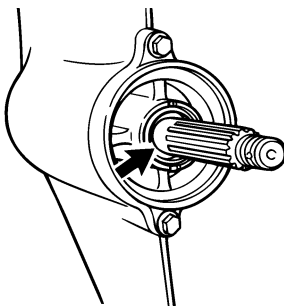
Do not use your hand to hold the propeller when loosening or tightening the propeller nut. Put a wood block between the anti-cavitation plate and the propeller to prevent the propeller from turning.



ZMU01897

### Checkpoints

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



ZMU02274

- Check the propeller shaft oil seal for damage.

EMU30663

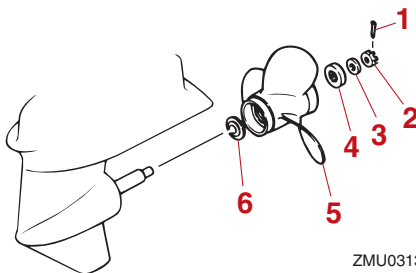
## Removing propeller

EMU29198

### Spline models

- (1) Straighten the cotter pin and pull it out using a pair of pliers.
- (2) Remove the propeller nut, washer, and spacer (if equipped). **WARNING! Do not use your hand to hold the propeller when loosening the propeller nut.**

[EWM01891]



ZMU03131

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

- (3) Remove the propeller, washer (if equipped), and thrust washer.

EMU30673

## Installing propeller

EMU46121

### Spline models

ECM00502

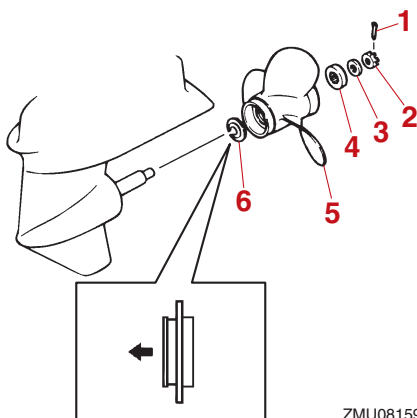
### NOTICE

**Make 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 Yamalube Marine Grease or a corrosion resistant grease to the propeller.

ler shaft.

- (2) Install the spacer (if equipped), thrust washer, washer (if equipped), and propeller on the propeller shaft. **NOTICE: Make sure to install the thrust washer before installing the propeller. Otherwise, the lower case and propeller boss could be damaged.** [ECM01882]
- (3) Install the spacer (if equipped) and the washer. Tighten the propeller nut to the specified torque.

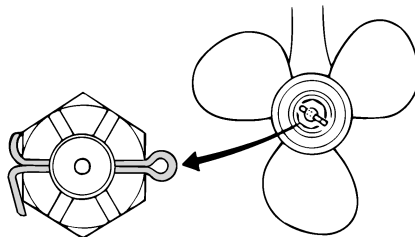


ZMU08159

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

**Propeller nut tightening torque:**  
39 N·m (3.9 kgf·m, 29 lb·ft)

- (4) Align the propeller nut slot with the propeller shaft hole. Insert a new cotter pin in the hole and bend the cotter pin ends. **NOTICE: Do not reuse the cotter pin. Otherwise, the propeller can come off during operation.** [ECM01892]



ZMU01805

## TIP:

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

EMU47070

## Changing gear oil

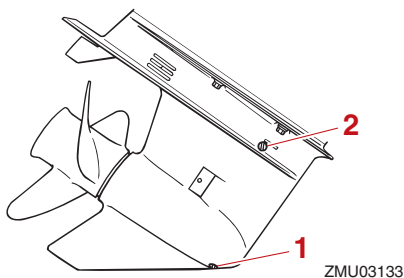
EWM00801

### **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 and gasket. **NOTICE: If there is an excessive quantity of metal particles on the magnetic gear oil drain screw, this can indicate lower unit problem. Consult your Yamaha dealer.** [ECM01901]

# Maintenance



1. Gear oil drain screw
2. Oil level plug

## TIP:

- If a magnetic gear oil drain screw is equipped, remove all metal particles from the screw before installing it.
- Always use new gaskets. Do not reuse the removed gaskets.

- (4) Remove the oil level plug and gasket to allow the oil to drain completely.

**NOTICE:** Check the used gear oil after it has been drained. If the gear oil is milky or contains water or a large amount of metal particles, the gear case may be damaged. Have a Yamaha dealer check and repair the outboard motor. [ECM00714]

## TIP:

For disposal of used oil, consult your Yamaha dealer.

- (5) Put the outboard motor in a vertical position. Using a flexible or pressurized filling device, inject the gear oil into the gear oil drain screw hole.

## Recommended gear oil:

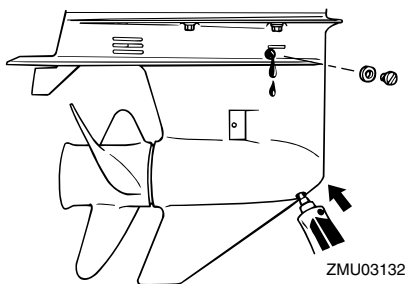
YAMALUBE outboard gear oil or Hypoid gear oil

## Recommended gear oil grade:

SAE 90 API GL-4

## Gear oil quantity:

0.430 L (0.455 US qt, 0.378 Imp.qt)



- (6) Put a new gasket on the oil level plug. When the oil begins to flow out of the oil level plug hole, insert and tighten the oil level plug.

## TIP:

Apply a light coat of gear oil to the oil level plug thread and gasket before installation.

## Tightening torque:

7 N·m (0.7 kgf·m, 5.2 lb·ft)

- (7) Put a new gasket on the gear oil drain screw. Insert and tighten the gear oil drain screw.

## TIP:

Apply a light coat of gear oil to the gear oil drain screw thread and gasket before installation.

## Tightening torque:

7 N·m (0.7 kgf·m, 5.2 lb·ft)

EMU29304

## Cleaning fuel tank

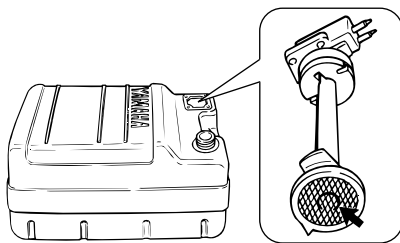
EWM00921

### **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.



ZMU02324

- (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.

EMU29318

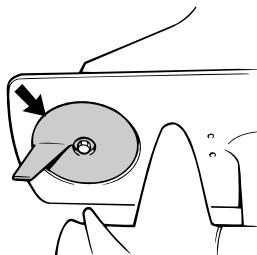
## Inspecting and replacing anode(s)

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.

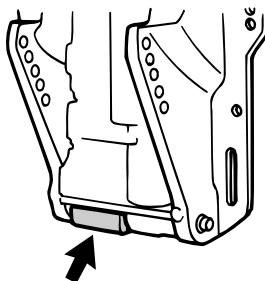
ECM00721

### **NOTICE**

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

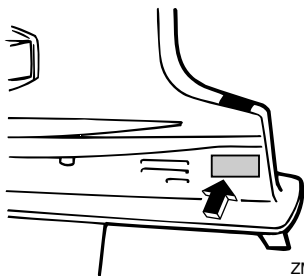


ZMU03134

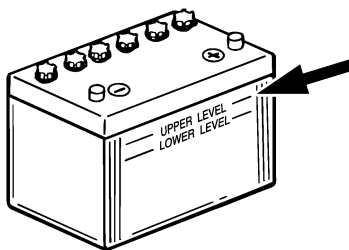


ZMU03135

# Maintenance



ZMU03418



ZMU01810

## TIP:

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.

EMU29324

## Checking battery (for electric start models)

EWMO1903

### **WARNING**

**Battery electrolyte is poisonous and caustic, and batteries generate explosive hydrogen gas. When working near the battery:**

- Wear protective eye gear and rubber gloves.
- Do not smoke or bring any other source of ignition near the battery.

The procedure for checking the battery varies for different batteries. This procedure contains typical checks that apply to many batteries, but you should always refer to the battery manufacturer's instructions.

ECMO1921

### **NOTICE**

**A poorly maintained battery will quickly deteriorate.**

- (1) Check the electrolyte level.

- (2) Check the battery's charge. If your boat is equipped with the digital speedometer, the voltmeter and low battery alert functions will help you monitor the battery's charge. If the battery needs charging, consult your Yamaha dealer.
- (3) Check the battery connections. They should be clean, secure, and covered by an insulating cover. **WARNING! Bad connections can produce shorting or arcing and cause an explosion.**

[EWMO1913]

EMU29335

## Connecting the battery

EWMO0573

### **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.**

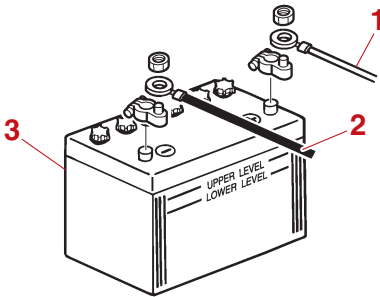
ECMO1125

### **NOTICE**

**Do not reverse the battery cables. Otherwise, the electrical parts could be damaged.**

- (1) Make sure the main switch (on applicable models) is "OFF" (off) before working on the battery.
- (2) Connect the red battery cable to the POSITIVE (+) terminal first. Then con-

nect the black battery cable to the NEG-  
ATIVE (-) terminal.



1. Red cable
2. Black cable
3. Battery

- (3) The electrical contacts of the battery and cables must be clean and properly connected, or the battery will not start the engine.

EMU29372

## Disconnecting the battery

- (1) Turn off the battery cut-off switch (if equipped) and main switch. **NOTICE: If they are left on, the electrical system can be damaged.** [ECM01931]
- (2) Disconnect the negative cable(s) from the negative (-) terminal. **NOTICE: Always disconnect all negative (-) cables first to avoid a short circuit and damage to the electrical system.** [ECM01941]
- (3) Disconnect the positive cable(s) and remove the battery from the boat.
- (4) Clean, maintain, and store the battery according to the manufacturer's instructions.

# Trouble Recovery

---

EMU29428

## 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-alert 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 47.

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 shut-off cord (lanyard) not attached?

A. Attach cord.

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?

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 alert system activated?

A. Find and correct cause of alert.

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.

## **Alert 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 out-board 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 alert system activated?

A. Find and correct cause of alert.

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 electrical parts failed?

A. Have serviced by a Yamaha dealer.

Q. Is specified fuel not being used?

A. Replace fuel with specified type.

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.

EMU29435

## **Temporary action in emergency**

EMU29442

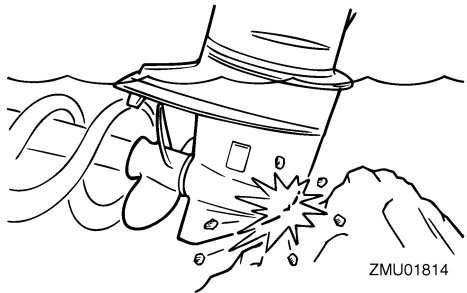
### **Impact damage**

EWM00871



**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) Check the control system and all components for damage. Also, check the boat for damage.
- (3) Whether damage is found or not, return to the nearest harbor slowly and carefully.
- (4) Have a Yamaha dealer check the outboard motor before operating it again.

EMU29464

### **Replacing fuse**

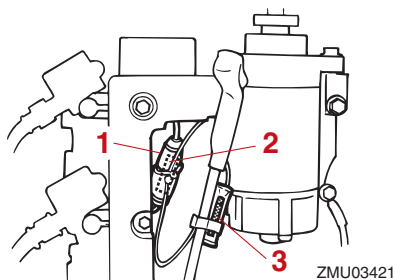
If the fuse has blown on an electric start model, open the fuse holder and replace the fuse with a new one of the proper amperage.

# Trouble Recovery

EWM00632

## WARNING

**Substituting 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 holder
2. Fuse (20 A)
3. Spare fuse (20 A)

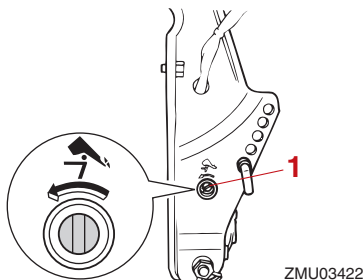
Consult your Yamaha dealer if the new fuse immediately blows again.

EMU29526

## **Power trim and tilt will not operate**

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

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



1. Manual valve screw

- (2) Put the engine in the desired position, then tighten the manual valve screw by turning it clockwise.

EMU29534

## **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.

EWU01023

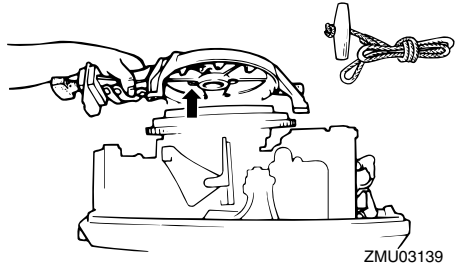
## WARNING

- Use this procedure only in an emergency to return to the nearest 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 shut-off cord to a secure place on your clothing, or your arm or leg while operating the boat.
- Do not attach the cord to clothing that could tear loose. Do not route the cord where it could become entangled, preventing it from functioning.

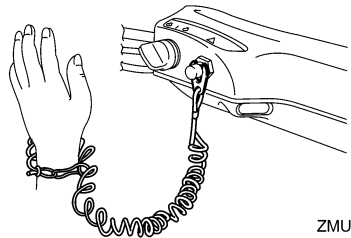
# Trouble Recovery

- **Avoid accidentally pulling the cord 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.**
- **Make 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.**

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



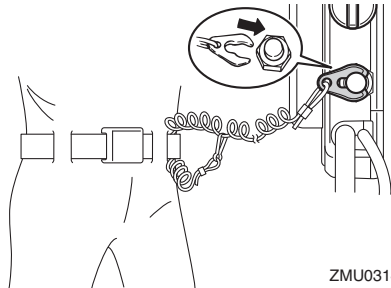
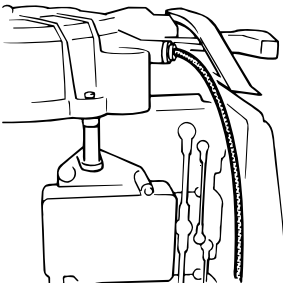
- (4) Prepare the engine for starting. For further information, see page 47. Be sure the engine is in neutral and that the clip is attached to the engine shut-off switch. The main switch must be “ON” (on), if equipped.



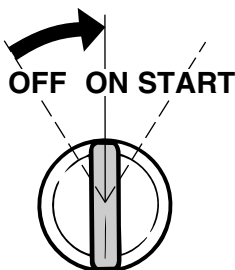
EMU29563

## Emergency starting engine

- (1) Remove the top cowling.
- (2) Remove the start-in-gear protection cable from the starter, if equipped.

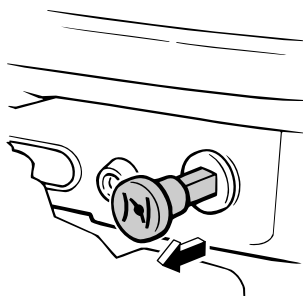


# Trouble Recovery



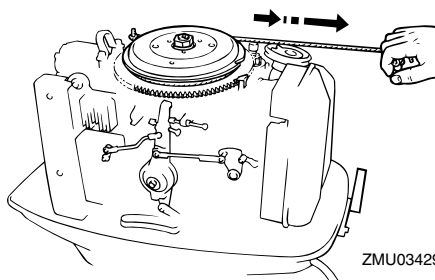
ZMU01906

- (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.



ZMU03355

- (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.



ZMU03429

EMU29672

## Engine fails to operate

EMU29707

### Cold engine fails to start

If the engine fails to start when it is cold, use the following procedure.

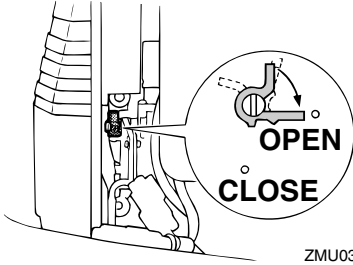
EWWM00411



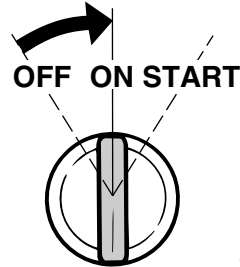
**WARNING**

**When starting or operating the engine, do not touch the ignition coil, spark plug wire, spark plug cap, or other electrical parts carrying high voltage. Keep loose clothing and other objects away from the engine when starting it. Do not touch the flywheel or other moving parts when the engine is running.**

- (1) Adjust the trim angle so that the drive shaft is at right angles to the water surface or is trimmed in.
- (2) On models equipped with an emergency starter valve, open it. The valve is located behind the silencer cover on the front of the engine.



ZMU03141



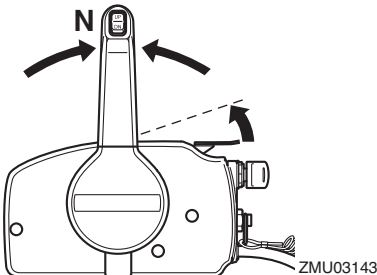
ZMU03144

- (3) Squeeze the primer pump two or three times to feed fuel.



ZMU03142

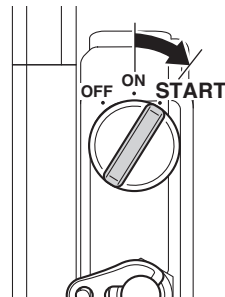
- (4) Open the throttle slightly without shifting using the throttle grip, neutral throttle lever or free accelerator. It is necessary to change the throttle opening slightly depending on the engine temperature. After the engine starts, return the throttle to its original position.



ZMU03143

- (6) Turn the main switch to “START” (start).  
**NOTICE:** 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.

[ECM00193]



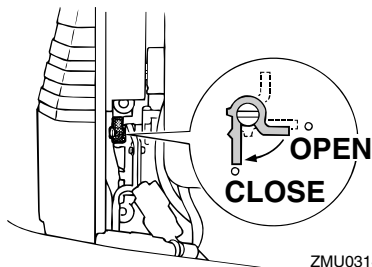
ZMU03335

- (7) After the engine starts, close the emergency starter valve (if used), then return the throttle to its original position.

- (5) Turn the main switch to “ON” (on).

# Trouble Recovery

---



ZMU03145

## TIP:

When the starter mechanism malfunctions, see page 84.

EMU33502

## Treatment of submerged motor

If the outboard motor is submerged, immediately take it to a Yamaha dealer. Otherwise some corrosion may begin almost immediately. **NOTICE: Do not attempt to run the outboard motor until it has been completely inspected.** [ECM00402]

<b>A</b>		<b>E</b>	
Alcohol and drugs .....	2	EC Declaration of Conformity (DoC) .....	5
Alert indicator .....	27	Electric shock .....	1
Alert indicator for three indicators .....	28	Emergency equipment .....	15
Alert system .....	32	Emergency starting engine .....	85
Analog tachometer .....	30	Emergency, temporary action in .....	83
Analog trim meter .....	31	Engine, checking .....	40
Anode(s), inspecting and replacing .....	77	Engine fails to operate .....	86
Anti-fouling paint .....	14	Engine oil, checking .....	40
Avoid collisions .....	3	Engine oil requirements .....	13
		Engine oil tank, checking water in .....	73
<b>B</b>		Engine shut-off cord (lanyard) .....	1, 40
Battery .....	42	Engine shut-off cord (lanyard) and clip .....	21
Battery, checking (electric start models) .....	78	Engine stop button .....	22
Battery, connecting .....	78		
Battery, disconnecting .....	79	<b>F</b>	
Battery requirements .....	12	Filling fuel for portable tank .....	42
Boat horsepower rating .....	11	Filling oil for electric start models .....	43
Boating safety .....	2	Filling oil for manual starter model .....	43
Boating safety publications .....	4	First-time operation .....	38
Breaking in engine .....	38	Flushing in a test tank .....	64
		Fuel and engine oil, filling .....	42
<b>C</b>		Fuel filter, checking .....	39, 72
Carbon monoxide .....	2	Fuel leaks, checking for .....	39
CE Marking .....	6	Fuel level .....	39
Checks after engine warm up .....	52	Fuel requirements .....	13
Checks after starting engine .....	51	Fuel system .....	39
Checks before starting engine .....	38	Fuel tank .....	18
Choke knob .....	22	Fuel tank, cleaning .....	77
Clamping the outboard motor .....	36	Fuse, replacing .....	83
Cleaning the outboard motor .....	65		
Cold engine fails to start .....	86	<b>G</b>	
Collisions with floating or submerged objects .....	3	Gasoline .....	2, 13
Components diagram .....	16	Gasoline exposure and spills .....	2
Control functions, checking .....	39	Gear oil, changing .....	75
Cooling water .....	51	Gear shift lever .....	20
Cowling lock lever .....	26	Greasing .....	70
Cruising in salt water or other conditions .....	62		
		<b>H</b>	
<b>D</b>		Hot parts .....	1
Digital tachometer .....	28	Hour meter .....	29

# INDEX

---

<b>I</b>	Identification numbers record .....	5	Outboard motor serial number .....	5
	Idle speed, inspecting .....	72	Overheat alert .....	32
	Impact damage .....	83	Overheat-alert indicator .....	28, 30
	Installation requirements .....	11	Overloading .....	3
	Instruments and indicators .....	28		
<b>K</b>			<b>P</b>	
	Key number .....	5	Passengers .....	2
<b>L</b>			Passenger training .....	4
	Laws and regulations .....	4	People in the water .....	2
	Lubrication .....	65	Periodic maintenance .....	65
<b>M</b>			Personal flotation devices (PFDs) .....	2
	Main switch .....	23	Power trim and tilt .....	1
	Maintenance chart 1 .....	67	Power trim and tilt switch (bottom cowling) .....	24
	Maintenance chart 2 .....	69	Power trim and tilt switch (remote control or tiller handle) .....	24
	Manual starter handle .....	22	Power trim and tilt system .....	41
	Modifications .....	2	Power trim and tilt will not operate .....	84
	Mounting height .....	35	Propeller .....	1
	Mounting outboard motor .....	11	Propeller, checking .....	73
	Mounting the outboard motor .....	35	Propeller, installing .....	74
	Muddy or acidic water .....	14	Propeller, removing .....	74
			Propeller selection .....	12
<b>N</b>			<b>R</b>	
	Neutral interlock trigger .....	20	Read manuals and labels .....	7
	Neutral throttle lever .....	20	Remote control box .....	19
<b>O</b>			Remote control lever .....	19
	Oil level alert and oil filter clogging alert .....	33	Remote control requirements .....	11
	Oil level-alert indicator .....	28	Replacement parts .....	66
	Oil level indicator (digital type) .....	29	Rotating parts .....	1
	Oil level indicator operation .....	45		
	Oil level indicators .....	30	<b>S</b>	
	Operating engine .....	46	Sending fuel (portable tank) .....	46
	Operation after long period of storage .....	40	Severe operating conditions .....	66
	Outboard motor disposal requirements .....	14	Shallow water .....	61
	Outboard motor (painted surface), checking .....	65	Shifting .....	52
	Outboard motor safety .....	1	Shifting (checks after engine warm up) .....	52
			Spark plug, cleaning and adjusting .....	71
			Specifications .....	10
			Starter will not operate .....	84
			Start-in-gear protection .....	13
			Starting engine .....	47

Steering friction adjuster .....	23
Stopping boat .....	53
Stopping engine .....	54
Stop switches .....	52
Storing outboard motor .....	63
Submerged outboard motor .....	88

## T

Tachometer .....	29
Throttle friction adjuster .....	21
Throttle grip .....	20
Throttle indicator .....	21
Tiller handle .....	20
Tilting up and down .....	58
Tilt lock mechanism .....	25
Tilt support lever .....	26
Top cowling, installing .....	41
Top cowling, removing .....	39
Transporting and storing outboard motor .....	63
Trim meter .....	29
Trimming outboard motor .....	55
Trim rod (tilt pin) .....	25
Trim tab with anode .....	25
Troubleshooting .....	80

## W

Warming up engine .....	51
Warning labels .....	7
Weather .....	4
Wiring and connectors, inspecting .....	73

## Y

Yamalube .....	13
----------------	----

