



# YAMAHA



**F50  
F60  
F70  
T50  
T60**

## OWNER'S MANUAL

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

**U.S.A. Edition  
LIT-18626-08-72  
6C1-28199-19**

EMU25052

**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

EMU31285

## 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.

EWMM00781



### **WARNING**

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

ECM00701

### **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.

### **TIP:**

The F50TR, F60TR, F70A, F70HA, T50TR, T60TR 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.

EMU25112

### **F50, F60, F70, T50, T60 OWNER'S MANUAL**

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EMU33622

## Outboard motor safety

Observe these precautions at all times.

EMU336501

### 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.

EMU33630

### Rotating parts

Hands, feet, hair, jewelry, clothing, 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 cowling with the engine running.

Only operate the engine with the 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.

EMU33640

### 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.

EMU33650

### Electric shock

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

EMU33660

### Power trim and tilt

Body parts can be crushed between the mo-

tor 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.

EMU33671

### 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.

EMU33810

### Gasoline

**Gasoline and its vapors are highly flammable and explosive.** Always, refuel according to the procedure on page 56 to reduce the risk of fire and explosion.

# Safety information

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EMU33820

## **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.

EMU33900

## **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.

EMU33780

## **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.

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## **Boating safety**

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

EMU33710

## **Alcohol and drugs**

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

EMU33720

## **Personal flotation devices**

Have an approved personal flotation device (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.

EMU33731

## **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.

EMU33751

## **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.

EMU33760

## **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 manufacturers instructions. Overloading or incorrect weight distribution can compromise the boats handling and lead to an accident, capsizing or

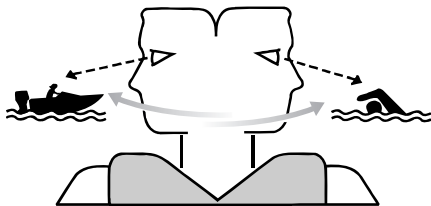


swamping.

EMU33772

## Avoid collisions

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



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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.

EMU33790

## Weather

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

EMU33800

## Accident reporting

Boat operators are required by law to file a Boating Accident Report with their state boating law enforcement agency if their boat is involved in any of the following accidents:

1. There is loss of life or probable loss of life.
2. There is personal injury that requires medical attention beyond first aid.
3. There is property damage to boats or other property over a certain amount.
4. There is complete loss of a boat.

Contact local law enforcement personnel if a report is necessary.

EMU33870

## Boat education and training

Operators should take a boating safety course. This may be required in your state. Many of the organizations listed in the next section can provide information about courses in your area.

You may also want to consider an Internet-based program for basic boater education. The Online Boating Safety Course provided by the BoatU.S. Foundation, is approved by the National Association of State Boating Law Administrators (NASBLA) and recognized by the United States Coast Guard. Most, but not all, states accept this course to meet their minimum requirements. While it cannot replace an in-depth course such as one offered by the U.S. Coast Guard, U.S. Power Squadron, or other organization, this online course does provide a general overview of the basics in boating safety, requirements, navigation, and operation. Upon successful completion of the course, the user can download a certificate of completion immediately or, for a small charge, request one by mail. To take this free course, go to [boatus.org](http://boatus.org).

## Safety information

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EMU33880

### **Passenger training**

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

EMU33890

### **Boating safety publications**

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

EMU33590

### **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. The rules presented in the following section are condensed- and have been provided for your convenience only.

Contact the U.S. Coast Guard, the National Association of State Boating Law Administrators, or your local Power Squadron for a complete set of rules governing the waters in which you will be using your boat.

EMU33682

### **Boating organizations**

The following organizations provide boating safety training and information about boating safety and laws.

#### **United States Coast Guard**

Consumer Affairs Staff (G-BC)

Office of Boating, Public, and Consumer Affairs

U.S. Coast Guard Headquarters

Washington, D.C. 20593-0001

<http://www.uscgboating.org/>

#### **United States Power Squadrons**

1-888-FOR-USPS (1-888-367-8777)

<http://www.usps.org/>

#### **Boat Owners Association of The United States**

1-800-336-BOAT (1-800-336-2628)

<http://www.boatus.com/>

#### **National Association of State Boating Law Administrators (NASBLA)**

1500 Leestown Road, Suite 330

Lexington, KY 40511 859-225-9497

<http://www.nasbla.org/>

#### **National Marine Manufacturers Association (NMMA)**

200 East Randolph Drive

Suite 5100

Chicago, IL 60601

<http://www.nmma.org/>

#### **Marine Retailers Association of America**

155 N. Michigan Ave. Chicago,

IL 60304

<http://www.mraa.com/>

EMU33691

### **Basic boating rules (Rules of the road)**

Just as there are rules that apply when you are driving on streets and highways, there are waterway rules that apply when you are driving your boat. These rules are used internationally. (For U.S.A.: and are also enforced by the United States Coast Guard and local agencies.) You should be aware of these rules, and follow them whenever you encounter another vessel on the water.

EMU33700

### **Steering and sailing rules and sound signals**

Whenever two vessels on the water meet one another, one vessel has the right-of-

way; it is called the “stand-on” vessel. The vessel that does not have the right-of-way is called the “give-way” or “burdened” vessel. These rules determine which vessel has the right-of-way, and what each vessel should do.

## Stand-on vessel

The vessel with the right-of-way has the duty to continue its course and speed, except to avoid an immediate collision. When you maintain your direction and speed, the other vessel will be able to determine how best to avoid you.

## Give-way vessel

The vessel that does not have the right-of-way has the duty to take positive and timely action to stay out of the way of the Stand-On vessel. Normally, you should not cross in front of the vessel with the right-of-way. You should slow down or change directions briefly and pass behind the other vessel. You should always move in such a way that the operator of the other vessel can see what you are doing.

### “ The general prudential rule ”

This rule is called Rule 2 in the International Rules and says,

“ In obeying and construing these rules due regard shall be had to all dangers of navigation and collision, and to any special circumstances, which may render a departure from the above rules necessary in order to avoid immediate danger.”

In other words, follow the standard rules except when a collision will occur unless both vessels try to avoid each other. If that is the case, both vessels become “ Give-Way ” vessels.

EMU25521

## Rules when encountering vessels

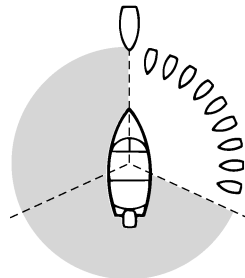
There are three main situations that you may encounter with other vessels which could lead to a collision unless the Steering Rules are followed:

**Meeting:** (you are approaching another vessel head-on)

**Crossing:** (you are traveling across the other vessel's path)

**Overtaking:** (you are passing or being passed by another vessel)

In the following illustration, your boat is in the center. You should give the right-of-way to any vessels shown in white area (you are the Give-Way vessel). Any vessels in the shaded area must yield to you (they are the Give-Way vessels). Both you and the meeting vessel must alter course to avoid each other.

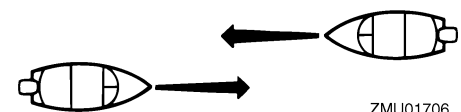
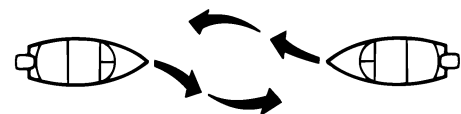


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## Meeting

If you are meeting another power vessel head on, and are close enough to run the risk of collision, neither of you has the right-of-way. Both of you should alter course to avoid an accident. You should keep the other vessel on your port (left) side. This rule doesn't apply if both of you will clear one another if you continue on your set course and speed.

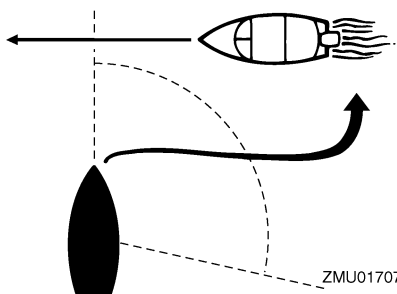
## Safety information



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### Crossing

When two power driven vessels are crossing each other's path close enough to run the risk of collision, the vessel which has the other on the starboard (right) side must keep out of the way of the other. If the other vessel is on your right, you must keep out of its way; you are the Give-Way vessel. If the other vessel is on your port (left) side, remember that you should maintain course and direction, provided the other vessel gives you the right-of-way as it should.



ZMU01707

### Overtaking

If you are passing another vessel, you are the "Give-Way" vessel. This means that the other vessel is expected to maintain its course and speed. You must stay out of its way until you are clear of it. Likewise, if another vessel is passing you, you should maintain your speed and direction so that the other vessel can steer itself around you.

EMU25531

### Other special situations

There are three other rules you should be aware of when driving your boat around other vessels.

#### Narrow channels and bends

When navigating in narrow channels, you should keep to the right when it is safe and practical to do so. If the operator of a power-driven vessel is preparing to go around a bend that may obstruct the view of other water vessels, the operator should sound a prolonged blast on the whistle (4 to 6 seconds). If another vessel is around the bend, it too should sound the whistle. Even if no reply is heard, however, the vessel should still proceed around the bend with caution. If you navigate such waters with your boat, you will need to carry a portable air horn, available from local marine supply stores.

#### Fishing vessel right-of-way

All vessels that are fishing with nets, lines or trawls are considered to be "fishing vessels" under the International Rules. Vessels with trolling lines are not considered fishing vessels. Fishing vessels have the right-of-way regardless of position. Fishing vessels cannot, however, impede the passage of other vessels in narrow channels.

#### Sailing vessel right-of-way

Sailing vessels should normally be given the right-of-way. The exceptions to this are:

1. When the sailing vessel is overtaking the power-driven vessel, the power-driven vessel has the right-of-way.
2. Sailing vessels should keep clear of any fishing vessel.
3. In a narrow channel, a sailing vessel should not hamper the safe passage of a power-driven vessel that can navigate only in such a channel.

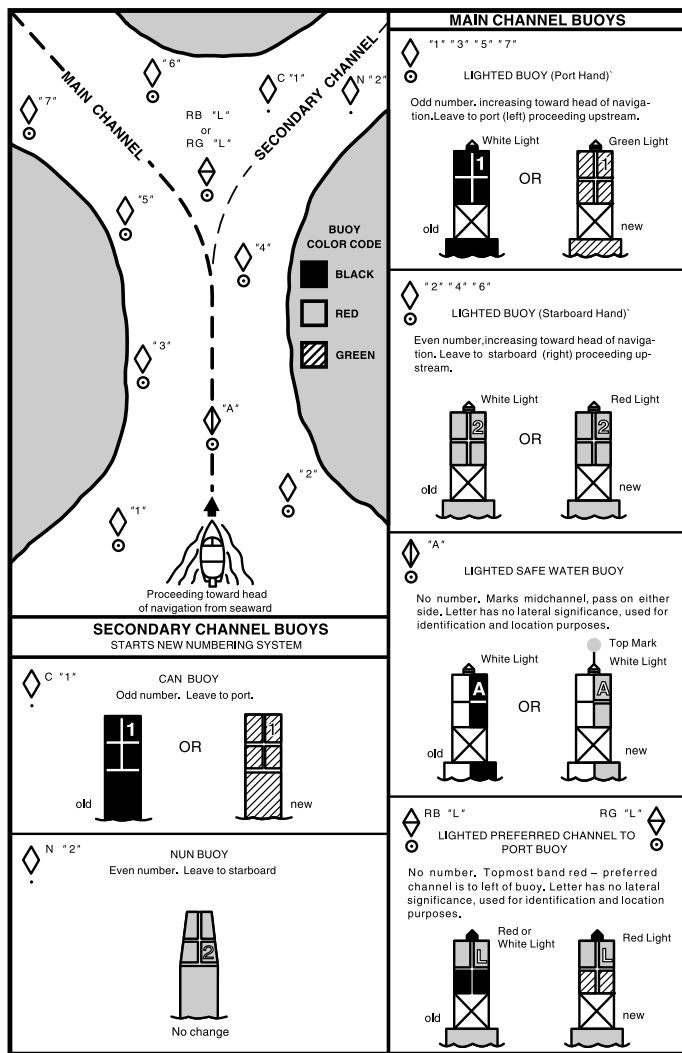
**Reading buoys and other markers**

The waters of the United States are marked for safe navigation by the lateral system of buoyage. Simply put, buoys and markers have an arrangement of shapes, colors, numbers and lights to show which side of the buoy a boater should pass on when navigating in a particular direction. The markings on these buoys are oriented from the perspective of being entered from seaward (the boater is going towards the port). This means that red buoys are passed on the starboard (right) side when proceeding from open water into port, and black buoys are to port (left) side. When navigating out of port, your position with respect to the buoys should be reversed; red buoys should be to port and black buoys to starboard.

Many bodies of water used by boaters are entirely within the boundaries of a particular state. The Uniform State Waterway Marking System has been devised for these waters. This system uses buoys and signs with distinctive shapes and colors to show regulatory or advisory information. These markers are white with black letters and orange borders. They signify speed zones, restricted areas, danger areas, and general information.

Remember, markings may vary by geographic location. Always consult local boating authorities before driving your boat in unfamiliar waters.

# **Safety information**



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## Identification numbers record

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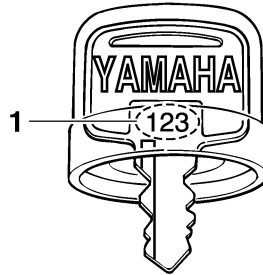
EMU25183

### Outboard motor serial number

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

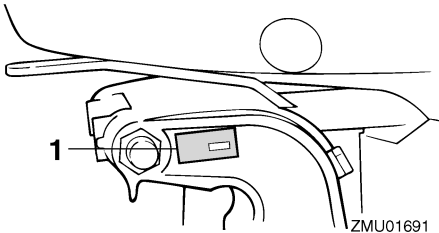
Record your outboard motor serial number in the spaces provided to assist you in ordering spare parts from your Yamaha dealer or for reference in case your outboard motor is stolen.

ZMU01693



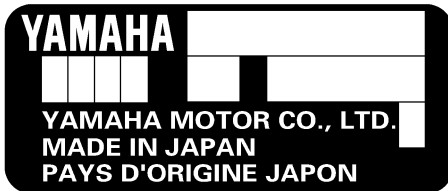
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1. Key number



ZMU01691

1. Outboard motor serial number location



ZMU01692

EMU25190

### Key number

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

# General information

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EMU33522

## 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.

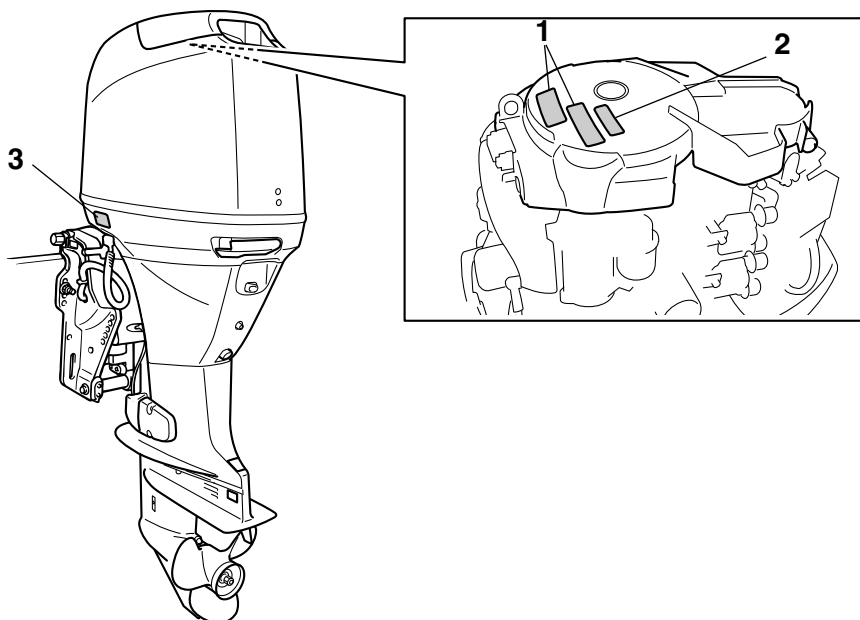
If you need any additional information, contact your Yamaha dealer.

EMU33832

## Warning labels

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

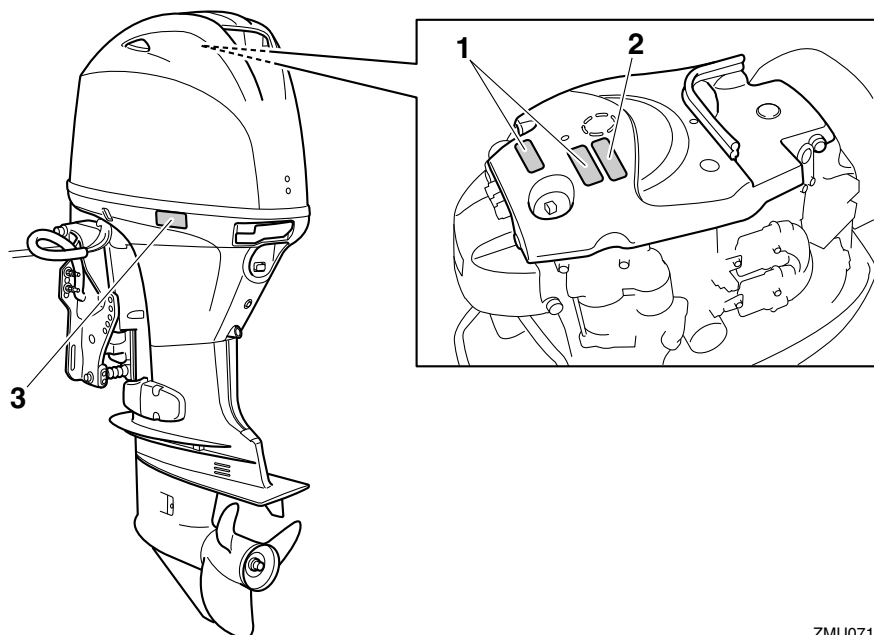
**F50, F60, T50, T60**



ZMU05676



F70



ZMU07102

# General information

1

**WARNING**

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

YAMAHA



6AH-81995-40



YAMAHA

6AG-81996-00

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.

YAMAHA

6AH-81994-40

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.

YAMAHA

6AH-42794-40

ZMU05670

# General information

EMU33843

## Symbols

The following symbols mean as follows.

Notice/Warning



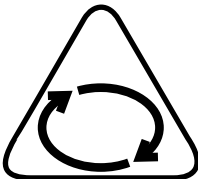
ZMU05696

Read Owner's Manual



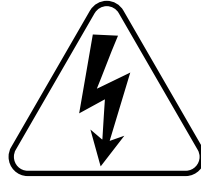
ZMU05664

Hazard caused by continuous rotation



ZMU05665

Electrical hazard



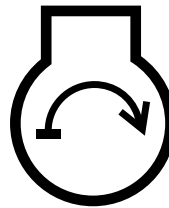
ZMU05666

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



ZMU05667

Engine start/ Engine cranking



ZMU05668

# Specifications and requirements

EMU34520

## Specifications

### TIP:

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

Likewise, “(SUS)” represents the value for stainless steel propeller installed and “(PL)” for plastic propeller installed.

### TIP:

“(\*)” means, select the engine oil referring to the chart of engine oil paragraph. For further information, see page 18.

EMU2821J

### Dimension:

Overall length:

F50TR 706 mm (27.8 in)

F60TR 706 mm (27.8 in)

F70A 713 mm (28.1 in)

T50TR 706 mm (27.8 in)

T60TR 706 mm (27.8 in)

Overall width:

F50TR 385 mm (15.2 in)

F60TR 385 mm (15.2 in)

F70A 386 mm (15.2 in)

T50TR 385 mm (15.2 in)

T60TR 385 mm (15.2 in)

Overall height L:

F50TR 1414 mm (55.7 in)

F60TR 1414 mm (55.7 in)

F70A 1476 mm (58.1 in)

T50TR 1455 mm (57.3 in)

T60TR 1455 mm (57.3 in)

Transom height L:

F50TR 527 mm (20.7 in)

F60TR 527 mm (20.7 in)

F70A 534 mm (21.0 in)

T50TR 530 mm (20.9 in)

T60TR 530 mm (20.9 in)

Weight (AL) L:

F50TR 113.0 kg (249 lb)

F60TR 113.0 kg (249 lb)

F70A 119.0 kg (262 lb)

T50TR 118.0 kg (260 lb)

T60TR 123.0 kg (271 lb)

### Performance:

Full throttle operating range:

F50TR 5000–6000 r/min

F60TR 5000–6000 r/min

F70A 5300–6300 r/min

T50TR 5000–6000 r/min

T60TR 5000–6000 r/min

Maximum output:

F50TR 36.8 kW @5500 r/min  
(50 HP @5500 r/min)

F60TR 44.1 kW @5500 r/min  
(60 HP @5500 r/min)

F70A 51.5 kW @5800 r/min  
(70 HP @5800 r/min)

T50TR 36.8 kW @5500 r/min  
(50 HP @5500 r/min)

T60TR 44.1 kW @5500 r/min  
(60 HP @5500 r/min)

Idle speed (in neutral):

750 ±50 r/min

### Engine:

Type:

4-stroke L

Displacement:

996.0 cm<sup>3</sup>

Bore × stroke:

65.0 × 75.0 mm (2.56 × 2.95 in)

Ignition system:

TCI

Spark plug (NGK):

F50TR DPR6EB-9

F60TR DPR6EB-9

F70A LKR7E

T50TR DPR6EB-9

T60TR DPR6EB-9

Spark plug gap:

# Specifications and requirements

0.8–0.9 mm (0.031–0.035 in)

Control system:

Remote control

Starting system:

Electric starter

Starting carburetion system:

Electronic fuel injection

Valve clearance (cold engine) IN:

0.15–0.25 mm (0.0059–0.0098 in)

Valve clearance (cold engine) EX:

0.25–0.35 mm (0.0098–0.0138 in)

Min. cold cranking amps (CCA/SAE):

380.0 A

Min. marine cranking amps (MCA/ABYC):

502.0 A

Min. reserve capacity (RC/SAE):

124 minutes

Maximum generator output:

F50TR 16 A

F60TR 16 A

F70A 15 A

T50TR 16 A

T60TR 16 A

## Drive unit:

Gear positions:

Forward-neutral-reverse

Gear ratio:

F50TR 1.85(24/13)

F60TR 1.85(24/13)

F70A 2.33(28/12)

T50TR 2.33(28/12)

T60TR 2.33(28/12)

Trim and tilt system:

Power trim and tilt

Propeller mark:

F50TR G

F60TR G

F70A K

T50TR K

T60TR K

## Fuel and oil:

Recommended fuel:

Regular unleaded gasoline

Min. pump octane:

86

Fuel tank capacity:

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

Recommended engine oil:

4-stroke outboard motor oil

Recommended engine oil group 1\*:

SAE 10W-30/10W-40/5W-30

API SE/SF/SG/SH/SJ/SL

Recommended engine oil group 2\*:

SAE 15W-40/20W-40/20W-50

API SH/SJ/SL

Total engine oil quantity (oil pan capacity):

2.5 L (2.64 US qt, 2.20 Imp.qt)

Lubrication:

Wet sump

Recommended gear oil:

Hypoid gear oil SAE#90

Gear oil quantity:

F50TR 0.430 L

(0.455 US qt, 0.378 Imp.qt)

F60TR 0.430 L

(0.455 US qt, 0.378 Imp.qt)

F70A 0.670 L

(0.708 US qt, 0.590 Imp.qt)

T50TR 0.670 L

(0.708 US qt, 0.590 Imp.qt)

T60TR 0.670 L

(0.708 US qt, 0.590 Imp.qt)

## Tightening torque for engine:

Spark plug:

F50TR 18.0 Nm

(1.84 kgf-m, 13.3 ft-lb)

F60TR 18.0 Nm

(1.84 kgf-m, 13.3 ft-lb)

F70A 17.0 Nm

(1.73 kgf-m, 12.5 ft-lb)

T50TR 18.0 Nm

# Specifications and requirements

(1.84 kgf-m, 13.3 ft-lb)

T60TR 18.0 Nm

(1.84 kgf-m, 13.3 ft-lb)

Propeller nut:

F50TR 35.0 Nm

(3.57 kgf-m, 25.8 ft-lb)

F60TR 35.0 Nm

(3.57 kgf-m, 25.8 ft-lb)

F70A 34.0 Nm

(3.47 kgf-m, 25.1 ft-lb)

T50TR 35.0 Nm

(3.57 kgf-m, 25.8 ft-lb)

T60TR 35.0 Nm

(3.57 kgf-m, 25.8 ft-lb)

Engine oil drain bolt:

F50TR 28.0 Nm

(2.86 kgf-m, 20.7 ft-lb)

F60TR 28.0 Nm

(2.86 kgf-m, 20.7 ft-lb)

F70A 27.0 Nm

(2.75 kgf-m, 19.9 ft-lb)

T50TR 28.0 Nm

(2.86 kgf-m, 20.7 ft-lb)

T60TR 28.0 Nm

(2.86 kgf-m, 20.7 ft-lb)

Engine oil filter:

18.0 Nm (1.84 kgf-m, 13.3 ft-lb)

EMU33581

## Remote control requirements

EWM01580



### WARNING

- 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 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.

EMU25694

## Battery requirements

EMU25713

### Specifications of Battery

Use a fully charged battery that meets the following specifications. The engine cannot be started if battery voltage is too low.

Minimum cold cranking amps

(CCA/SAE):

380.0 A

Minimum marine cranking amps

(MCA/ABYC):

502.0 A

Minimum reserve capacity (RC/SAE):

124 minutes

ECM01061

### NOTICE

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

EMU36290

### 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.**

[EWM01820]

EMU36300

### Multiple batteries

To connect multiple batteries, such as for multiple engine configurations or for an accessory battery, consult your Yamaha dealer

# Specifications and requirements

about battery selection and correct wiring.

EMU34194

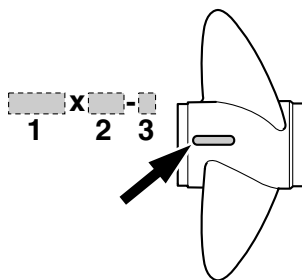
## Propeller selection

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.

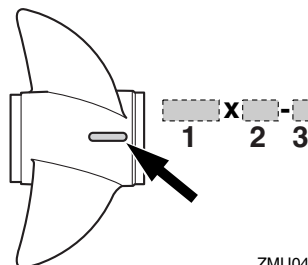
Your Yamaha dealer can help you select the right propeller for your boating needs. Select a propeller that will allow the engine to reach the middle or upper half of the operating range at full throttle with the maximum boat-load. Generally, select a larger pitch propeller for a smaller operating load 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 85.



ZMU04606

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



ZMU04605

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

EMU25770

## 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.

# Specifications and requirements

EMU31445

## Engine oil requirements

Recommended engine oil:

YAMALUBE 4-M FC-W oil or 4-stroke motor oil with a combination of the following SAE and API oil classifications

Engine oil type SAE:

10W-30 or 10W-40

Engine oil grade API:

SE, SF, SG, SH, SJ, SL

Total engine oil quantity (oil pan capacity):

2.5 L (2.64 US qt, 2.20 Imp.qt)

Replacement engine oil quantity (at periodic maintenance):

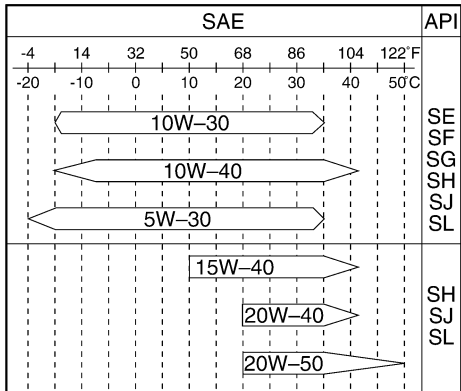
Without oil filter replacement:

1.9 L (2.01 US qt, 1.67 Imp.qt)

With oil filter replacement:

2.1 L (2.22 US qt, 1.85 Imp.qt)

If the recommended engine oil grades are not available, select an alternative from the following chart according to the average temperatures in your area.



ZMU05190

EMU36360

## Fuel requirements

EMU36781

### Gasoline

Use a good quality gasoline that meets the minimum octane rating. If knocking or pinging occurs, use a different brand of gasoline or premium unleaded fuel. Yamaha recommends that you use alcohol-free (see Gasohol) gasoline whenever possible.

Recommended gasoline:

Regular unleaded gasoline with a minimum Octane rating of 86 (Pump Octane Number) = (R+M)/2

ECM01981

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

### Gasohol

There are two types of gasohol: gasohol containing ethanol (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 mi-



# Specifications and requirements

cron 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.

EMU27270

## Ring Free Fuel Additive

Gasoline is a precise blend of many different substances, each chosen to give certain characteristics. Gasoline blends have been changing in recent years in response to concerns about pollution and resulting emissions regulations. One of the most obvious changes has been the elimination of lead from most fuels.

As gasoline has changed, the amount of additives such as aromatics and oxygenates has increased. These additives are important for the engines in passenger cars, but they can have detrimental effects in marine engines, because of increased deposits in the combustion chamber. When enough deposits collect, piston rings begin sticking. Performance drops and engine wear increases dramatically.

While many additives available may reduce deposits, Yamaha recommends the use of **Ring Free Fuel Additive**, available from your Yamaha dealer. **Ring Free Fuel Additive** has repeatedly proven its ability to clean combustion deposits from inside the engine, notably the critical piston-ring-land area, and fuel system components. Follow product labeling for use instructions.

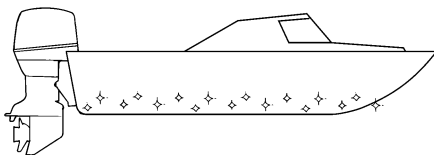
EMU36330

## Anti-fouling paint

A clean hull improves boat performance. The boat bottom should be kept as clean of ma-

rine 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

EMU36341

## Motor disposal requirements

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

EMU36352

## 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.

EMU25221

## Emission control information

EMU25230

### North American models

This engine conforms to U.S. Environmental Protection Agency (EPA) regulations for ma-

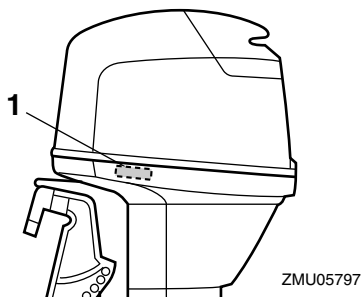
## Specifications and requirements

rine SI engines. See the label affixed to your engine for details.

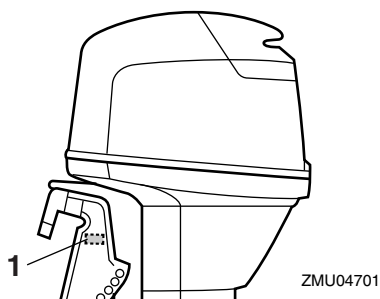
EMUJ31560

### Approval label of emission control certificate

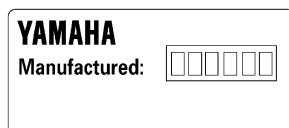
This label is attached to the bottom cowling.  
New Technology; (4-stroke) MFI



### 1. Approval label location



1. Manufactured date label location



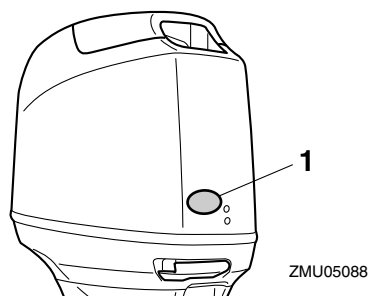
EMISSION CONTROL INFORMATION				MFI
THIS ENGINE CONFORMS TO: _____ CALIFORNIA AND U.S. EPA EXHAUST EMISSIONS REGULATIONS FOR _____ MARINE ENGINES. REFER TO THE OWNER'S MANUAL FOR MAINTENANCE SPECIFICATIONS AND ADJUSTMENTS.				
MEETS U.S. EPA EVAP STANDARDS USING CERTIFIED COMPONENTS.				
FAMILY:	_____	FELH (HC+N <sub>2</sub> O, CO) <sub>1</sub>	_____ g/kW-hr	MAX POWER: _____ kW
DISPLACEMENT:	_____ liters	IDLE SPEED:	_____ rpm	IN NEUTRAL
SPARK PLUG:	_____	SPARK PLUG GAP (mm):	_____	
FUEL: GASOLINE		VALVE LASH (mm) IN:	_____	EX: _____
YAMAHA MOTOR CO., LTD.				

ZMU06894

EMU25262

### Manufactured date label

This label is attached to the clamp bracket or the swivel bracket.



### 1. Star labels location

ZMU01701

EMU25273

## Star labels

Your outboard motor is labeled with a California Air Resources Board (CARB) star label. See below for a description of your particular label.

# Specifications and requirements

EMU25280

## One Star—Low Emission

The one-star label identifies engines that meet the Air Resources Board's 2001 exhaust emission standards. Engines meeting these standards have 75% lower emissions than conventional carbureted two-stroke engines. These engines are equivalent to the U.S. EPA's 2006 standards for marine engines.



ZMU01702

EMU40340

## Two Stars—Very Low Emission

The two-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2004 exhaust emission standards. Engines meeting these standards have 20% lower emissions than One Star-Low-Emission engines.



ZMU01703

EMU40350

## Three Stars—Ultra Low Emission

The three-star label identifies engines that

meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2008 exhaust emission standards or the Sterndrive and Inboard marine engine 2003-2008 exhaust emission standards. Engines meeting these standards have 65% lower emissions than One Star-Low-Emission engines.



ZMU01704

EMU33861

## Four Stars—Super Ultra Low Emission

The four-star label identifies engines that meet the Air Resources Board's Sterndrive and Inboard marine engine 2009 exhaust emission standards. Personal Watercraft and Outboard marine engines may also comply with these standards. Engines meeting these standards have 90% lower emissions than One Star-Low-Emission engines.



ZMU05663

# Components

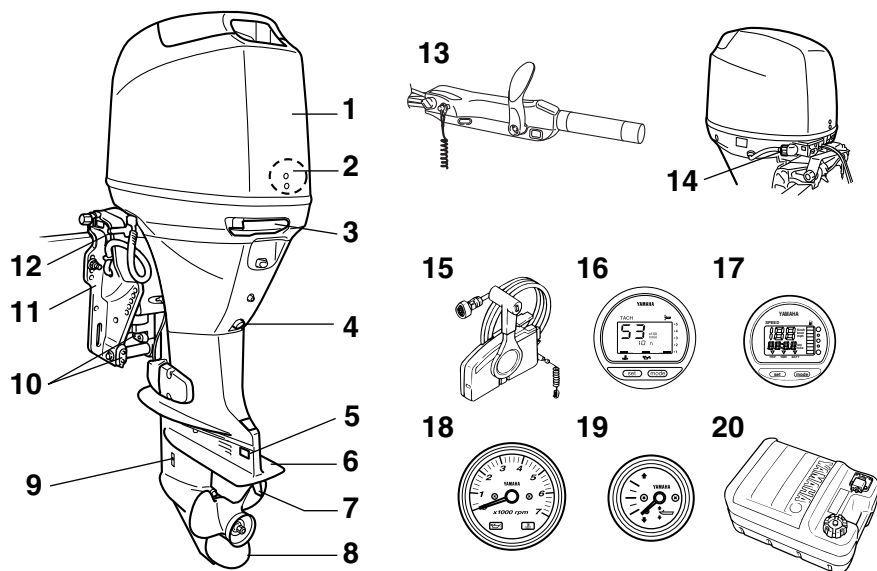
EMU2579T

## Components diagram

### TIP:

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

**F50, F60, T50, T60**

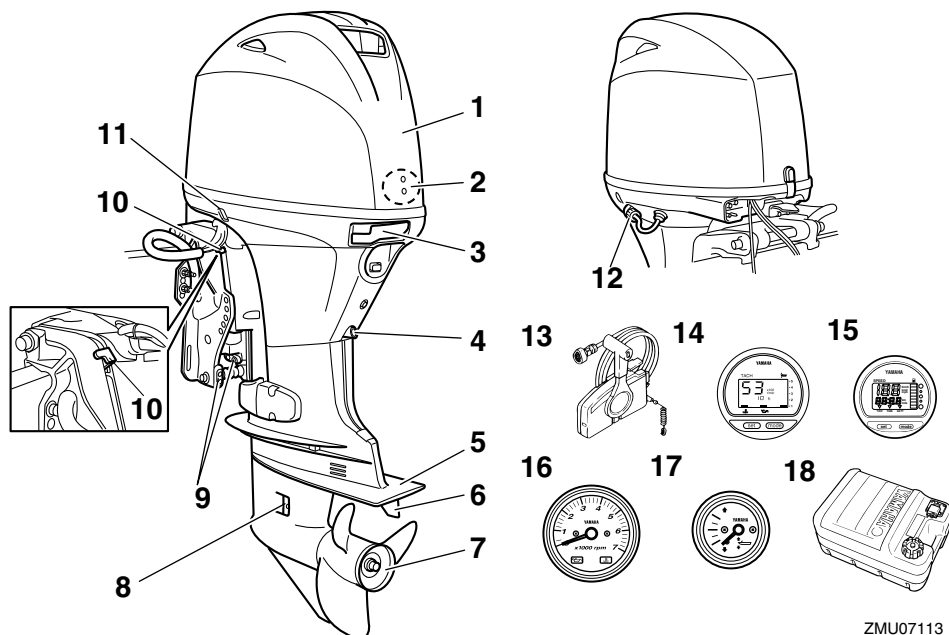


ZMU05090

1. Top cowling
2. Water separator
3. Cowling lock lever
4. Drain screw
5. Anode\*
6. Anti-cavitation plate
7. Trim tab (anode)
8. Propeller\*
9. Cooling water inlet
10. Anode(s)
11. Clamp bracket
12. Tilt support lever
13. Tiller handle\*
14. Flushing device
15. Remote control box (side mount type)\*

16. Digital tachometer\*
17. Digital speedometer\*
18. Tachometer\*
19. Trim meter\*
20. Fuel tank\*

## F70A

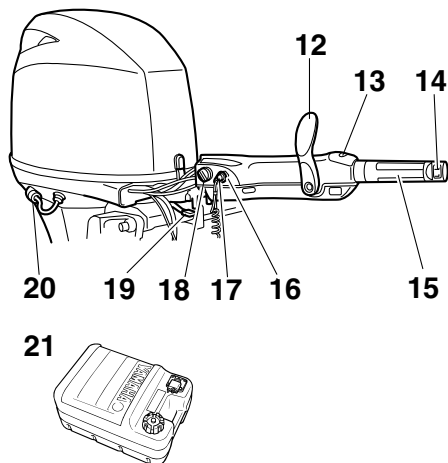
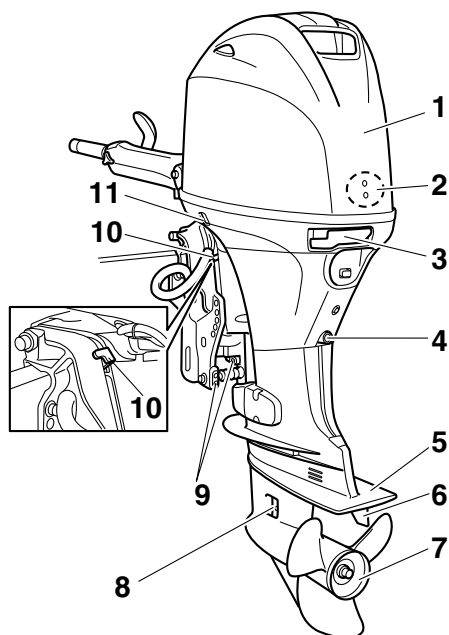


ZMU07113

1. Top cowling
2. Water separator
3. Cowling lock lever
4. Drain screw
5. Anti-cavitation plate
6. Trim tab (anode)
7. Propeller\*
8. Cooling water inlet
9. Anode(s)
10. Tilt support lever
11. Power trim and tilt switch
12. Flushing device
13. Remote control box (side mount type)\*
14. Digital tachometer\*
15. Digital speedometer\*
16. Tachometer\*
17. Trim meter\*
18. Fuel tank\*

# Components

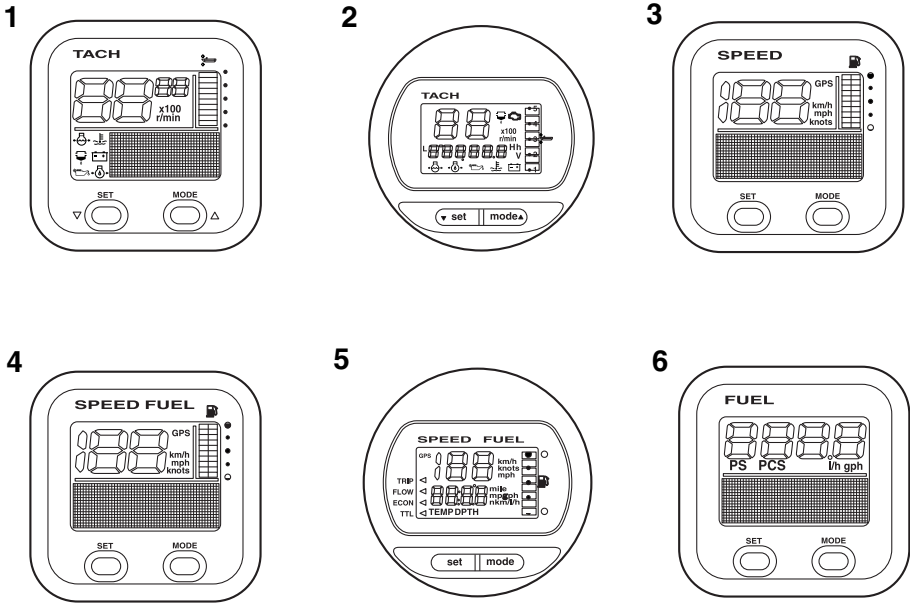
## F70HA



ZMU07120

- 1. Top cowling
- 2. Water separator
- 3. Cowling lock lever
- 4. Drain screw
- 5. Anti-cavitation plate
- 6. Trim tab (anode)
- 7. Propeller\*
- 8. Cooling water inlet
- 9. Anode(s)
- 10. Tilt support lever
- 11. Power trim and tilt switch
- 12. Gear shift lever
- 13. Variable trolling RPM switch
- 14. Power trim and tilt switch
- 15. Throttle grip
- 16. Engine stop button/Engine shut-off switch
- 17. Clip
- 18. Main switch
- 19. Steering friction adjuster
- 20. Flushing device

21. Fuel tank\*



ZMU05429

1. Tachometer unit (Square type)\*
2. Tachometer unit (Round type)\*
3. Speedometer unit (Square type)\*
4. Speed & fuel meter unit (Square type)\*
5. Speed & fuel meter unit (Round type)\*
6. Fuel management meter (Square type)\*

EMU25802

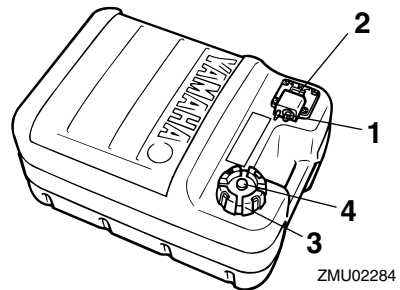
## Fuel tank

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

EWM00020

### WARNING

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



ZMU02284

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

EMU25830

## Fuel joint

This joint is used to connect the fuel line.

# Components

EMU25841

## Fuel gauge

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

EMU25850

## Fuel tank cap

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

EMU25860

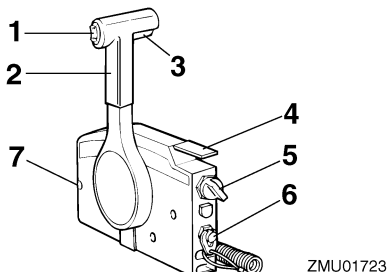
## Air vent screw

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

EMU26181

## Remote control box

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



ZMU01723

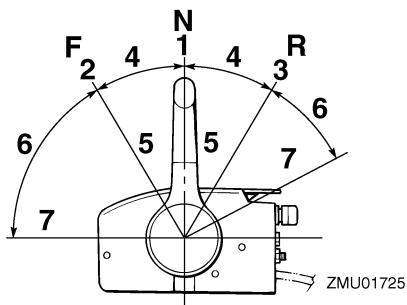
1. Power trim and tilt switch
2. Remote control lever
3. Neutral interlock trigger
4. Neutral throttle lever
5. Main switch
6. Engine shut-off switch
7. Throttle friction adjuster

EMU26190

## Remote control lever

Moving the lever forward from the neutral position engages forward gear. Pulling the lever back from neutral engages reverse. The

engine will continue to run at idle until the lever is moved about 35° (a detent can be felt). Moving the lever farther opens the throttle, and the engine will begin to accelerate.

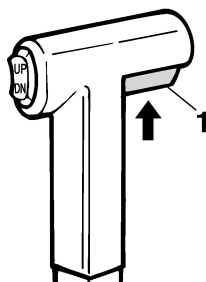


1. Neutral "N"
2. Forward "F"
3. Reverse "R"
4. Shift
5. Fully closed
6. Throttle
7. Fully open

EMU26201

## Neutral interlock trigger

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



ZMU01727

1. Neutral interlock trigger

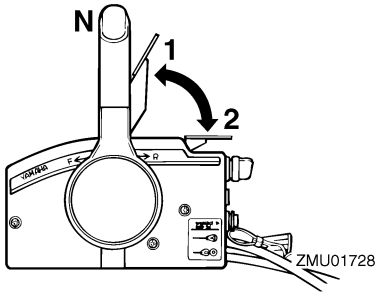
EMU26212

## Neutral throttle lever

To open the throttle without shifting into either forward or reverse, put the remote con-



trol lever in the neutral position and lift the neutral throttle lever.



1. Fully open
2. Fully closed

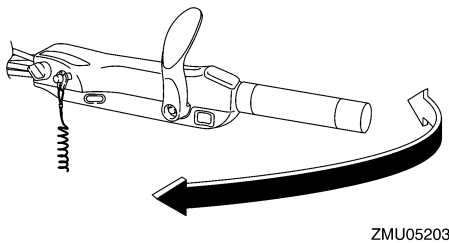
## TIP:

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.

EMU25912

## Tiller handle

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

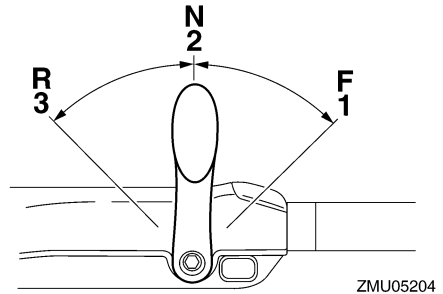


ZMU05203

EMU25923

## Gear shift lever

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



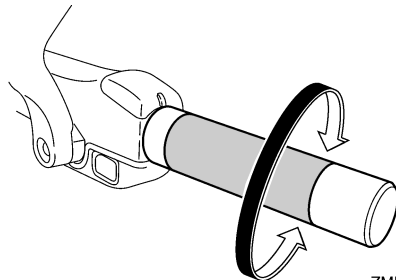
ZMU05204

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

EMU25941

## Throttle grip

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



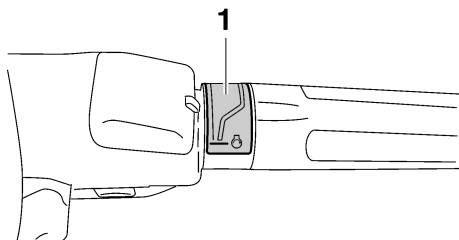
ZMU05205

EMU25961

## Throttle indicator

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

# Components



ZMU05206

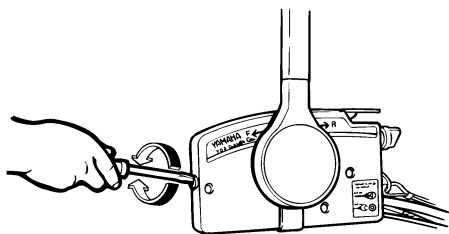
## 1. Throttle indicator

EMU25976

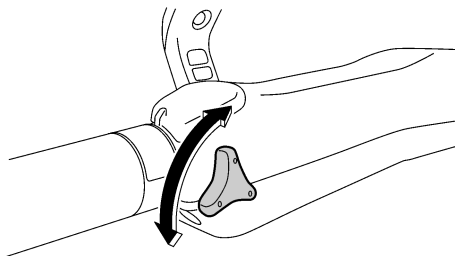
### Throttle friction adjuster

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.** [EWM00032]



ZMU01714



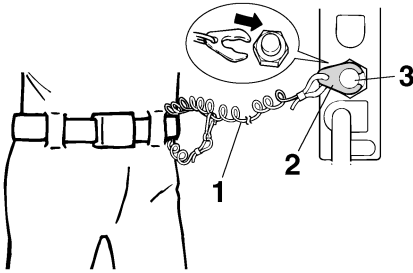
ZMU05207

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

EMU25994

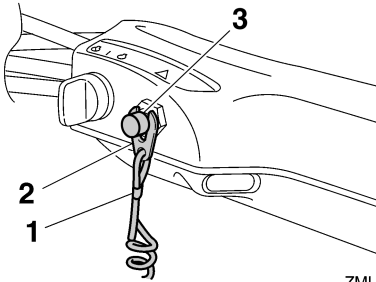
### Engine shut-off cord (lanyard) and clip

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 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.** [EWM00122]



ZMU01716

1. Cord
2. Clip
3. Engine shut-off switch



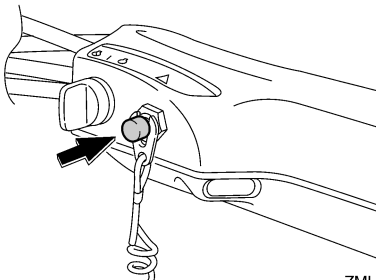
ZMU05208

1. Cord
2. Clip
3. Engine shut-off switch

EMU26002

## Engine stop button

The engine stop button stops the engine when the button is pushed.



ZMU05209

EMU26091

## Main switch

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

### ● "OFF" (off)

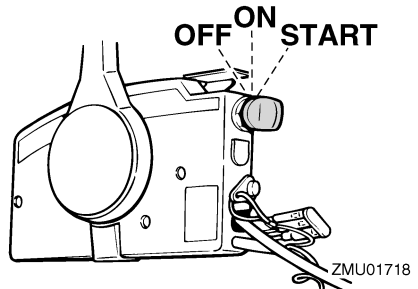
With the main switch in the "OFF" (off) position, the electrical circuits are off, and the key can be removed.

### ● "ON" (on)

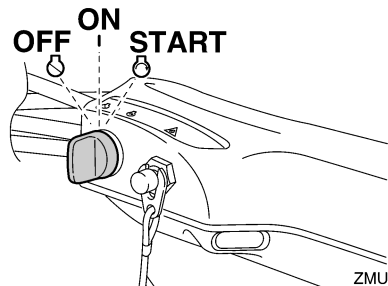
With the main switch in the "ON" (on) position, the electrical circuits are on, and the key cannot be removed.

### ● "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.



ZMU01718



ZMU05210

EMU31432

## Steering friction adjuster

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

# Components

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".

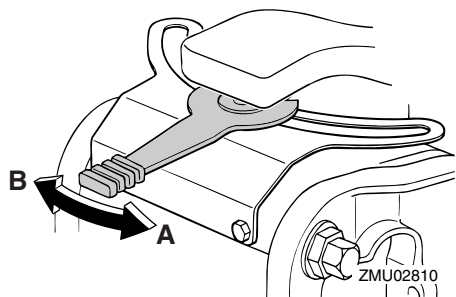
To decrease resistance, turn the lever to the starboard side "B".

EWMM00040

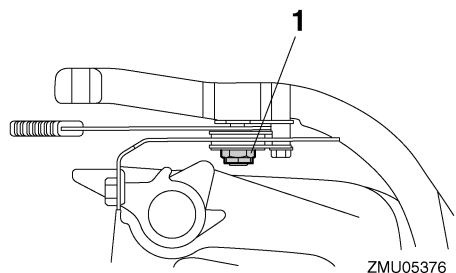


## WARNING

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



If the resistance does not increase even when the lever is turned to the port side "A", make sure that the nut is tightened to the specified torque.



1. Nut

Nut tightening torque:

3.8 Nm (0.38 kgf-m, 2.8 ft-lb)

## TIP:

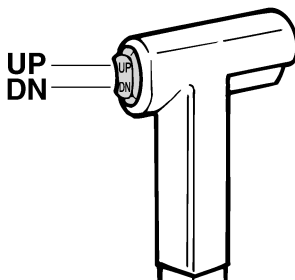
- Steering movement is blocked when the adjuster lever is set to the "A" position.
- Check the tiller handle for smooth movement when the lever is turned to the starboard side "B".
- Do not apply lubricants such as grease to the friction areas of the steering friction adjuster.

EMU26143

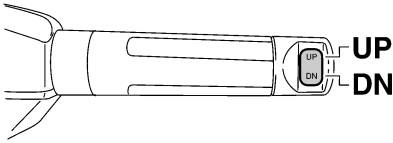
## Power trim and tilt switch on remote control or tiller handle

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 64 and 66.



ZMU01720



ZMU05211

EMU26154

## Power trim and tilt switch on bottom cowling

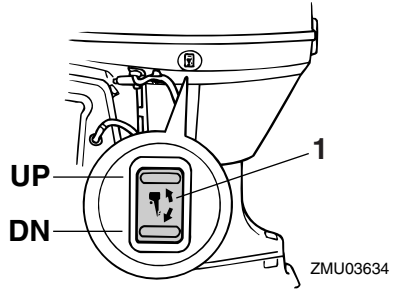
The power trim and tilt switch is located on the side of the bottom cowling. Pushing the switch “UP” (up) trims the outboard motor up, and then tilts it up. Pushing the switch “DN” (down) tilts the outboard motor down and trims it down. When the switch is released, the outboard motor will stop in its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

For instructions on using the power trim and tilt switch, see page 66.

EWM01031

### **WARNING**

**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.**



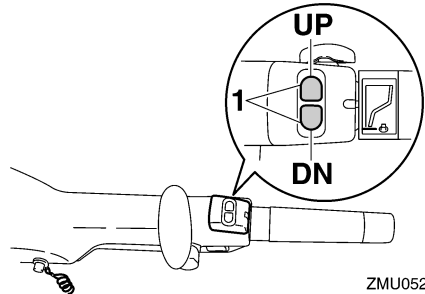
ZMU03634

### 1. Power trim and tilt switch

EMU30901

## Variable trolling RPM switches

The trolling speed can be adjusted when the outboard motor is trolling. Press the “UP” switch to increase the trolling speed and press the “DN” switch to decrease the trolling speed.



ZMU05213

### 1. Variable trolling RPM switch

## TIP:

- The trolling speed changes approximately 50 r/min each time a switch is pressed.
- If the trolling speed has been adjusted, the engine returns to the normal trolling speed when the engine is stopped and restarted or when the engine speed exceeds approximately 3000 r/min.
- For instructions on using the variable trolling RPM switches, see page 63.

# Components

EMU26244

## Trim tab with anode

EWM00840

### **WARNING**

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.

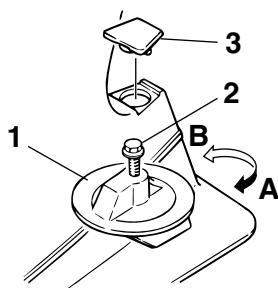
The trim tab should be adjusted so that the steering control can be turned to either the right or left by applying the same amount of force.

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.

ECM00840

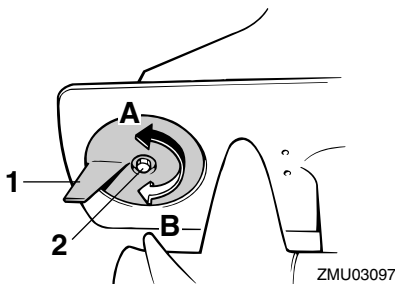
### **NOTICE**

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.



ZMU02525

1. Trim tab
2. Bolt
3. Cap



ZMU03097

1. Trim tab
2. Bolt

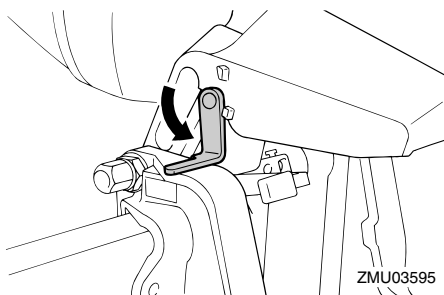
Bolt tightening torque:

F50, F60 18.0 Nm (1.8 kgf-m, 13 ft-lb)  
F70, T50, T60 36.0 Nm  
(3.6 kgf-m, 26 ft-lb)

EMU26341

## 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.



ZMU03595

ECM00660

### **NOTICE**

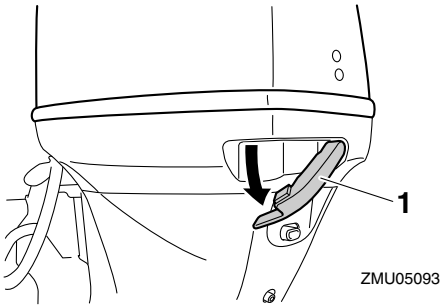
Do not use the tilt support lever or knob when trailering the boat. The outboard motor could shake loose from the tilt support and fall. If the motor cannot be trailered in the normal running position, use

**an additional support device to secure it in the tilt position.**

EMU26373

## 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.

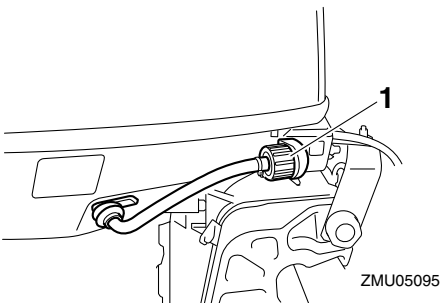


1. Cowling lock lever(s)

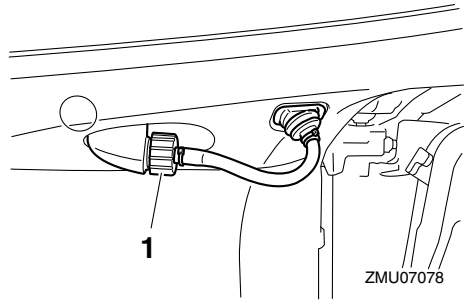
EMU26462

## Flushing device

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



1. Flushing device



1. Flushing device

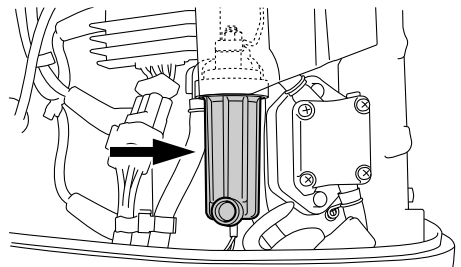
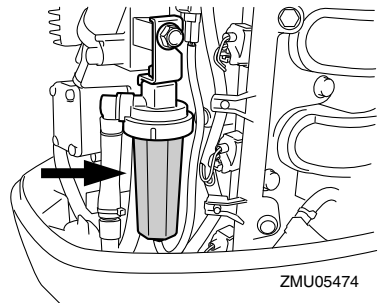
## TIP:

For details on usage, see page 73.

EMU33463

## Fuel filter/Water separator

This engine has a combination fuel filter/water separator and associated alert system. If water separated from the fuel exceeds a specific volume, the alert device of Command Link Tachometer will activate.



# Components

---

## Activation of alert device

- The water separator-alert indicator of Command Link Tachometer will blink.
- The buzzer will sound intermittently only when the gear shift is in neutral.
- If the alert system has activated, stop the engine and consult a Yamaha dealer immediately.

### **TIP:**

Adding an in-line 10-micron fuel filter has been shown to greatly reduce the chance of fuel contamination problems. Consult your dealer for information about Yamaha 10-micron fuel filters if your boat does not have one.

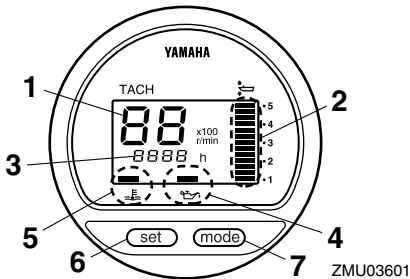


EMU26493

## 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.



1. Tachometer
2. Trim meter
3. Hour meter
4. Low oil pressure-alert 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.

EMU36050

## 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.

EMU26621

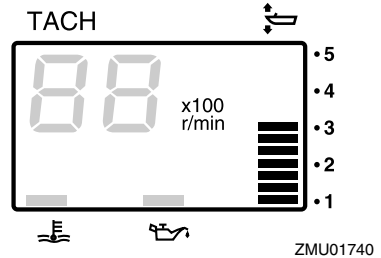
## Trim meter

This meter shows the trim angle of your outboard 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.

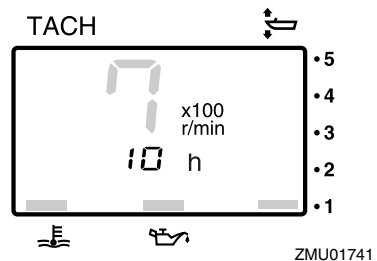
- If the trim angle of your motor exceeds the trim operating range, the top segment on the trim meter display will blink.



EMU26651

## 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.



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.

# Instruments and indicators

EMU26524

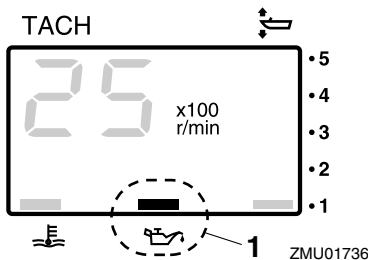
## Low oil pressure-alert indicator

If oil pressure drops too low, the alert indicator will start to blink. For further information, see page 47.

ECM00022

### NOTICE

- Do not continue to run the engine if the low oil pressure-alert indicator is on and the engine oil level is lower. Serious engine damage will occur.
- The low oil pressure-alert indicator does not indicate the engine oil level. Use the oil dipstick to check the remaining oil quantity. For further information, see page 53.



1. Low oil pressure-alert indicator

EMU26583

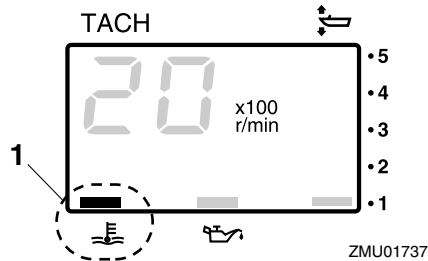
## Overheat-alert indicator

If the engine temperature rises too high, the alert indicator will start to blink. For further information on reading the indicator, see page 47.

ECM00052

### NOTICE

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

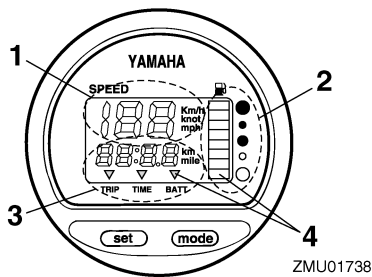


1. Overheat-alert indicator

EMU26602

## Digital speedometer

This gauge shows the boat speed and other information.



1. Speedometer
2. Fuel gauge
3. Trip meter/clock/voltmeter
4. Alert indicator(s)

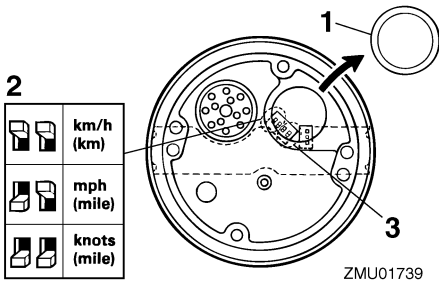
All segments of the display will light momentarily after the main switch is turned on and will return to normal thereafter.

EMU36061

## Speedometer

The speedometer displays km/h, mph, or knots, according to operator preference. Select the desired units of measurement by setting the selector switch on the back of the gauge. See the illustration for settings.

# Instruments and indicators



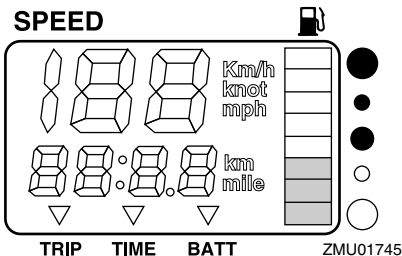
ZMU01739

1. Cap
2. Selector switch (for speed unit)
3. Selector switch (for fuel sensor)

EMU26713

## Fuel gauge

Eight segments indicate the fuel level. When all segments are showing, the fuel tank is full.



ZMU01745

The fuel level reading can be inaccurate due to the position of the sensor in the fuel tank and the attitude of the boat in the water. Operation with bow-up trim or continuous turning can give false readings.

Do not adjust the selector switch for fuel sensor. Incorrectly setting the selector switch on the gauge will give false readings. Consult your Yamaha dealer on how to correctly set the selector switch. **NOTICE: Running out of fuel can damage the engine.** [ECM01770]

EMU36071

## Trip meter / Clock / Voltmeter

The display shows either the trip meter, the clock, or the voltmeter.

To change the display, press the “mode” (mode) button repeatedly until the indicator on the face of the gauge points to “TRIP” (trip meter), “TIME” (clock), or “BATT” (voltmeter).

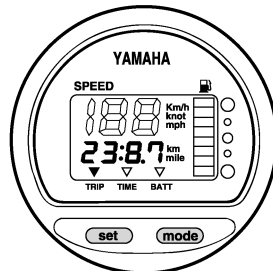
EMU26691

## Trip meter

This gauge displays the distance the boat has traveled since the gauge was last reset. The trip distance is shown in kilometers or miles depending upon the unit of measurement selected for the speedometer.

To reset the trip meter to zero, press the “set” (set) and “mode” (mode) buttons at the same time.

The trip distance is kept in memory by battery power. The stored data will be lost if the battery is disconnected.



ZMU01743

EMU26701

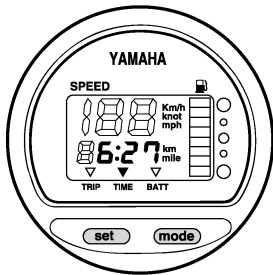
## Clock

To set the clock:

1. Be sure the gauge is in the “TIME” (time) mode.
2. Press the “set” (set) button; the hour display will begin blinking.
3. Press the “mode” (mode) button until the desired hour is displayed.
4. Press the “set” (set) button again, the minute display will begin blinking.

# Instruments and indicators

- 5. Press the “mode” (mode) button until the desired minute is displayed.
- 6. Press the “set” (set) button again to start the clock.



ZMU01744

The clock operates on battery power. Disconnecting the battery will stop the clock. Reset the clock after connecting the battery.

EMU36080

## Voltmeter

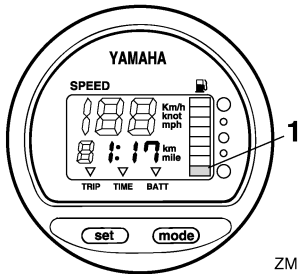
The voltmeter displays the charge of the battery in volts(V).

EMU26721

## Fuel level-alert indicator

If the fuel level decreases to one segment, the fuel level alert segment will blink.

Do not continue to operate the engine with full throttle if an alert device has activated. Get back to the port within trolling engine speed. **NOTICE: Running out of fuel can damage the engine.** [ECM01770]



ZMU01746

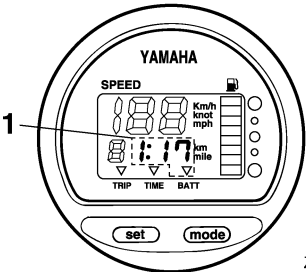
- 1. Fuel level-alert segment

EMU26732

## Low battery voltage-alert indicator

If battery voltage drops, the display will automatically turn on and blink.

Get back to the port soon if an alert device has activated. For charging the battery, consult your Yamaha dealer.



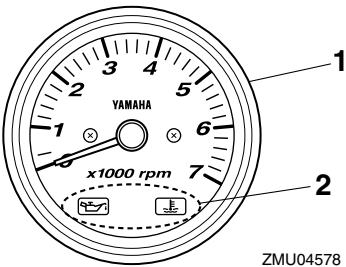
ZMU01747

- 1. Low battery indicator

EMU26471

## Analog tachometer

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



ZMU04578

- 1. Tachometer
- 2. Alert indicator(s)

EMU26506

## Low oil pressure-alert indicator

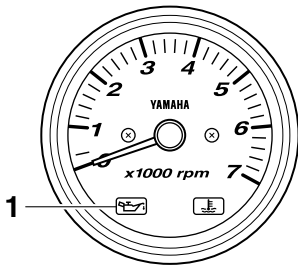
If oil pressure drops too low, this indicator will flash. For further information, see page 47.

# Instruments and indicators

ECM00022

## NOTICE

- Do not continue to run the engine if the low oil pressure-alert indicator is on and the engine oil level is lower. Serious engine damage will occur.
- The low oil pressure-alert indicator does not indicate the engine oil level. Use the oil dipstick to check the remaining oil quantity. For further information, see page 53.



ZMU06156

1. Low oil pressure-alert indicator

EMU26574

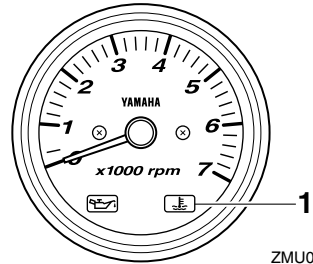
## Overheat-alert indicator

If the engine temperature rises too high, this indicator will flash. For further information on reading the indicator, see page 47.

ECM00052

## NOTICE

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



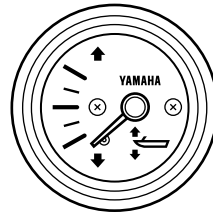
ZMU06157

1. Overheat-alert indicator

EMU26611

## 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.

EMU31642

## Command link multifunction meters

Command link multifunction meters have 6 kinds of meter units; tachometer unit (square or round types), speedometer unit (square type), speed & fuel meter unit (square or round types), and fuel management meter (square type). The indicator system is slightly different between the round and square types. Check the model and type of your unit

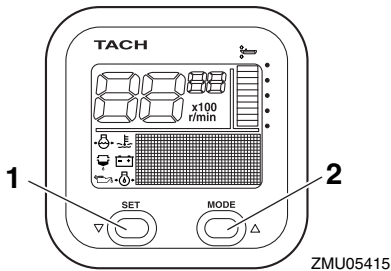
# Instruments and indicators

carefully. This manual describes mainly the alert indicators. For more details on setting meters or changing indicator systems, see the attached operation manual.

EMU36103

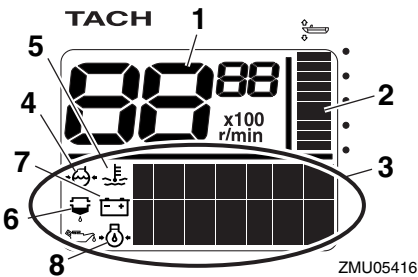
## Command link multifunction tachometers

The tachometer shows the engine revolutions per minute. It has functions of trim meter, adjusting trolling speed, cooling water/engine temperature display, battery voltage display, total hour/trip hour display, oil pressure display, water detection alert, engine trouble alert, and periodic maintenance notification. If the cooling water pressure sensor is installed, the unit can also show the cooling water pressure display. However, even if the cooling water pressure sensor is not installed, the cooling water pressure display can be shown by connecting an optional sensor to the unit. For the optional sensor, consult your Yamaha dealer. The tachometer unit is available in round or square types. Check your tachometer unit type.



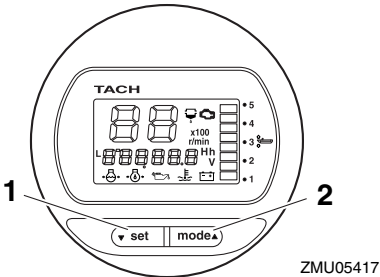
ZMU05415

- 1. Set button
- 2. Mode button



ZMU05416

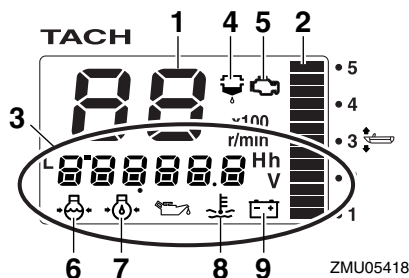
- 1. Tachometer
- 2. Trim meter
- 3. Multifunction display
- 4. Cooling water pressure
- 5. Cooling water/engine temperature
- 6. Water detection-alert indicator
- 7. Battery voltage
- 8. Oil pressure (4-stroke models)



ZMU05417

- 1. Set button
- 2. Mode button

# Instruments and indicators



1. Tachometer
2. Trim meter
3. Multifunction display
4. Water detection-alert indicator
5. Engine trouble alert/maintenance indicator
6. Cooling water pressure
7. Oil pressure (4-stroke models)
8. Cooling water/engine temperature
9. Battery voltage

EMU36190

## Start-up checks

Place the remote control lever / gear shift lever in neutral and turn the main switch to “ON” (on). After all the displays come on and the total hour display comes on, the gauge will change to normal operation. If the buzzer sounds and the water separator-alert indicator blinks, consult your Yamaha dealer immediately.

### TIP:

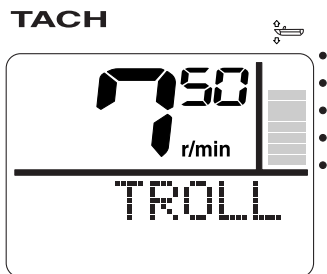
To stop the buzzer, press the “set” (set) or “mode” (mode) button.

EMU37690

## Adjusting trolling speed

You can adjust the trolling speed randomly by increasing or decreasing it approximately 50 r/min. When in the trolling speed setting mode, the display switches to the normal display when the engine speed is increased (within 3000 r/min) using the throttle. When the throttle is closed, the display returns to

the trolling speed setting mode. For details, see the attached operation manual.



ZMU05931



ZMU06309

### TIP:

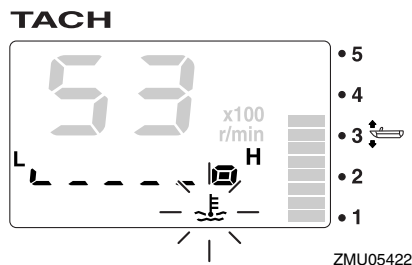
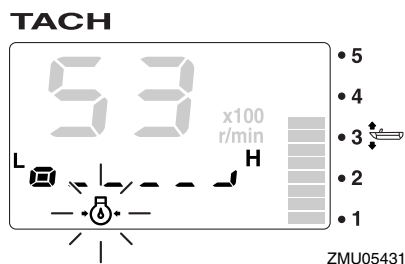
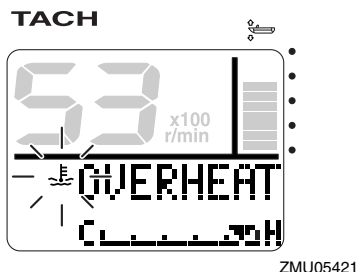
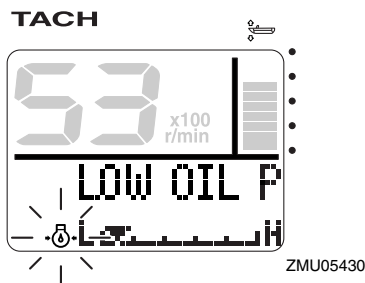
- Trolling is affected by currents and other operating conditions and may differ from the actual engine speed.
- The default engine idle speed is reset automatically when the display is switched to the normal display. The default engine idle speed is also reset automatically when the engine is turned off or when the engine speed exceeds 3000 r/min.
- When warming up a cold engine, the trolling speed cannot be decreased below the specified engine idle speed.

EMU36130

## Low oil pressure-alert

If the engine oil pressure drops too low, the low oil pressure-alert indicator will start to blink, and the engine speed will automatically decrease to about 2000 r/min.

# Instruments and indicators



Stop the engine immediately if the buzzer sounds and the low oil pressure-alert indicator blinks. Check the engine oil quantity and replenish oil if necessary. If the alert device has activated while the appropriate engine oil quantity is maintained, consult your Yamaha dealer.

ECM01601

## NOTICE

**Do not continue to run the engine if the low oil pressure alert device has activated. Serious engine damage will occur.**

EMU36221

## Overheat alert

If the engine temperature rises too high while cruising, the overheat-alert indicator will start to blink. The engine speed will automatically decrease to about 2000 r/min.

Stop the engine immediately if the buzzer sounds and the overheat alert device has activated. Check the cooling water inlet for clogging.

ECM01592

## NOTICE

- Do not continue to run the engine if the overheat-alert indicator blinks. Serious engine damage will occur.
- Do not continue to operate the engine if a alert device has activated. Consult your Yamaha dealer if the problem cannot be located and corrected.

EMU36150

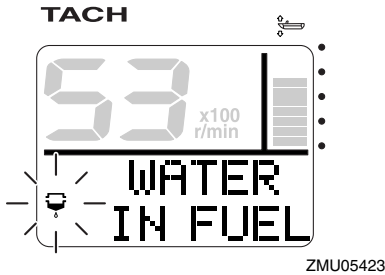
## Water separator alert

This indicator will blink if water has accumulated in the water separator (fuel filter) while cruising. In such an event, stop the engine immediately and see page 95 of this manual to drain the water from the fuel filter. Get back to the port soon and consult a Yamaha

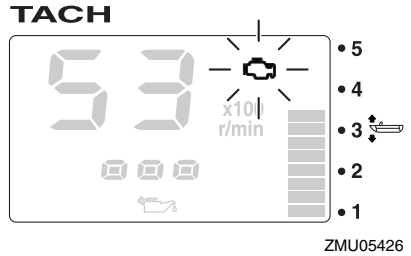


# Instruments and indicators

dealer immediately.



ZMU05423



ZMU05426

ECM00920

## NOTICE

In such an event, the engine will not operate properly. Consult a Yamaha dealer immediately.

EMU36170

## Low battery voltage-alert

If the battery voltage drops, the low battery voltage-alert indicator and the battery voltage value will start to blink. Get back to the port soon if the low battery voltage-alert device has activated. For charging the battery, consult your Yamaha dealer.

ECM00910

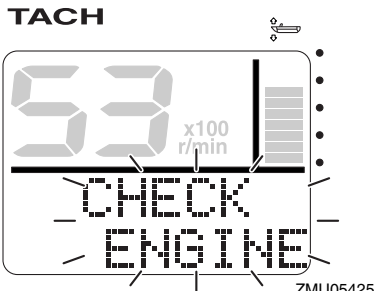
## NOTICE

Gasoline mixed with water could cause damage to the engine.

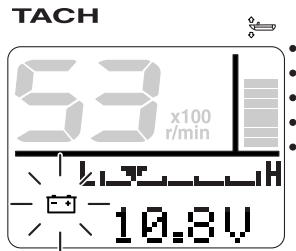
EMU36160

## Engine trouble alert

This indicator will blink if the engine malfunctions while cruising. Get back to the port soon and consult a Yamaha dealer immediately.

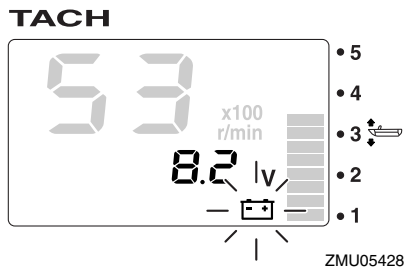


ZMU05425



ZMU05427

# Instruments and indicators



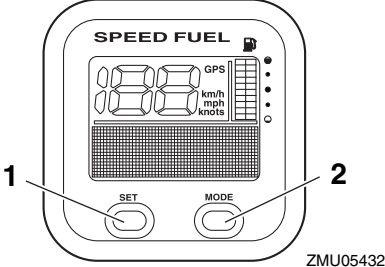
EMU31613

## Command link multifunction speed & fuel meters

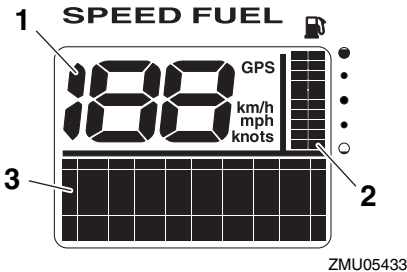
The speed & fuel meter unit shows the boat speed and has the functions of fuel meter, total fuel consumption display, fuel economy display, fuel flow display, and system voltage display. The chosen display is selected by using the “set” (set) and “mode” (mode) buttons as described in this section. If the speed sensor is installed, the unit can also show the trip display. However, even if the speed sensor is not installed, the trip display can be shown by connecting an optional sensor to the unit. In addition, if optional sensors are connected to the unit, water surface temperature display, depth display, and clock will also be available. For the optional sensors, consult your Yamaha dealer.

The speed & fuel meter unit is available in round or square types. Check your speed & fuel meter unit type for operation information. After the main switch is first turned on, all the displays come on as a test. After a few seconds, the gauge will change to normal operation.

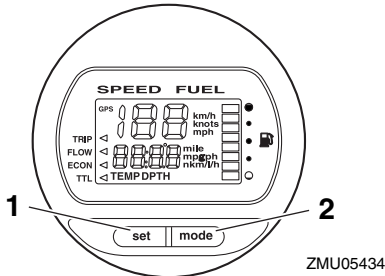
For more information, see the operation manual originally supplied with the meter.



1. Set button
2. Mode button

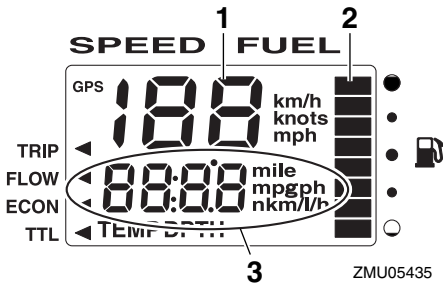


1. Speedometer
2. Fuel meter
3. Multifunction display



1. Set button
2. Mode button

# Instruments and indicators



1. Speedometer
2. Fuel meter
3. Multifunction display

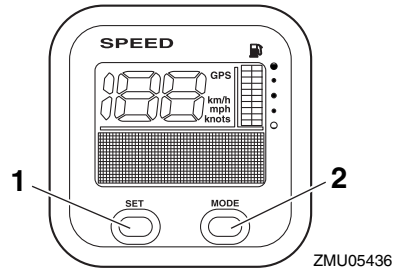
EMU31622

## Command link multifunction speedometers

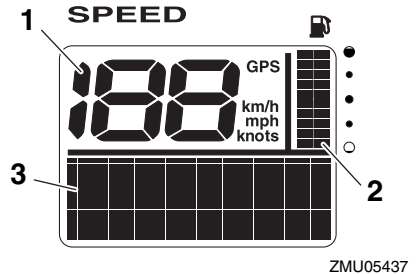
The speedometer unit shows the boat speed and has functions of fuel meter and system voltage display. The chosen display is selected by using the “set” (set) and “mode” (mode) buttons as described in this section. In addition, the speedometer can show the desired unit of measurement such as km/h, mph, or knots. If the speed sensor is installed, the unit can also show the trip display. However, even if the speed sensor is not installed, the trip display can be shown by connecting an optional sensor to the unit. In addition, if optional sensors are connected to the unit, water surface temperature display, depth display, and clock will also be available. For the optional sensors, consult your Yamaha dealer.

After the main switch is first turned on, all the displays come on as a test. After a few seconds, the gauge will change to normal operation.

For more information, see the operation manual originally supplied with the meter.



1. Set button
2. Mode button



1. Speedometer
2. Fuel meter
3. Multifunction display

EMU31632

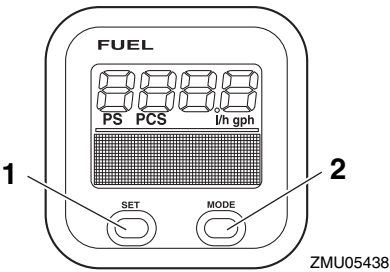
## Command link multifunction fuel management meters

The fuel management meter has the functions of fuel flow meter, total consumption display, fuel economy display, and remaining fuel display. The chosen display is selected by using the “set” (set) and “mode” (mode) buttons as described in this section. For more information, see the operation manual originally supplied with the meter.

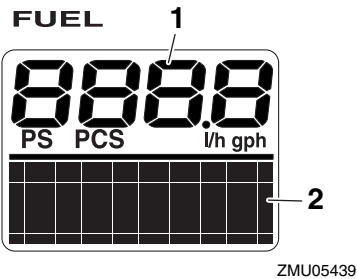
After the main switch is first turned on, all the displays come on as a test. After a few seconds, the gauge will change to normal operation.

# Instruments and indicators

ation.  
For more information, see the operation manual originally supplied with the meter.



- 1. Set button
- 2. Mode button



- 1. Fuel flow meter
- 2. Multifunction display

EMU26803

## Alert system

ECM00091

### NOTICE

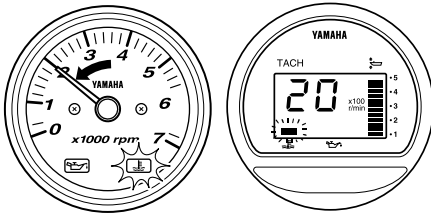
**Do not continue to operate the engine if a alert device has activated. Consult your Yamaha dealer if the problem cannot be located and corrected.**

EMU2681C

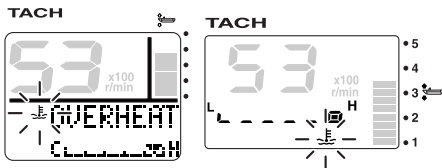
### Overheat alert

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 about 2000 r/min.
- The overheat-alert indicator will light or blink.

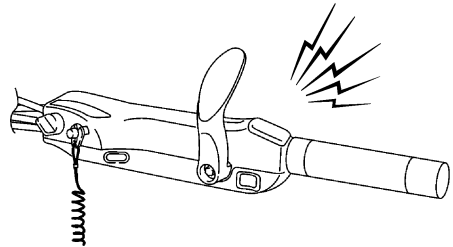
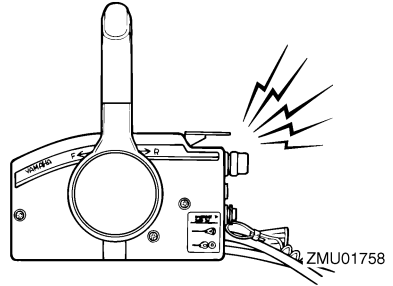


ZMU05028



ZMU07103

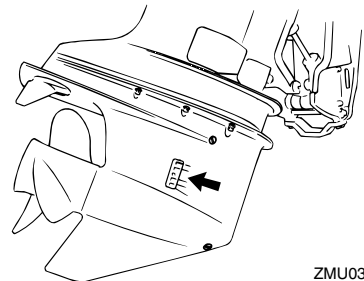
- The buzzer will sound (if equipped on the tiller handle, remote control box, or main switch panel).



ZMU05326

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.



ZMU03604

EMU3016B

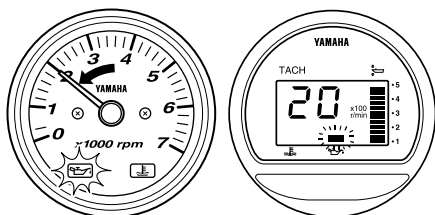
### Low oil pressure alert

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

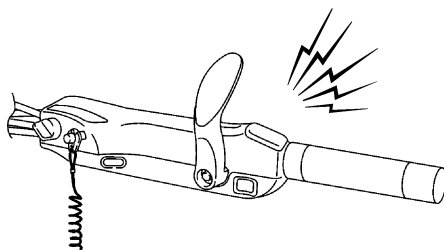
- The engine speed will automatically decrease to about 2000 r/min. If equipped

# Engine control system

with a low oil pressure-alert indicator, it will light or blink.

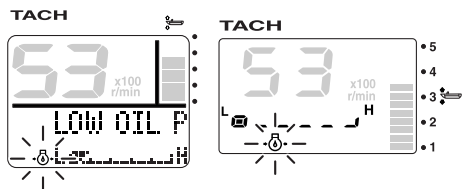


ZMU04994



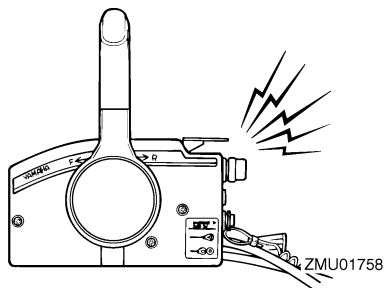
ZMU05326

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



ZMU07104

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



ZMU01758

EMU26902

## 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.

EWMO1590

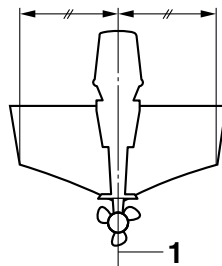
### **WARNING**

- **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.**

EMU33470

### **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)

EMU26933

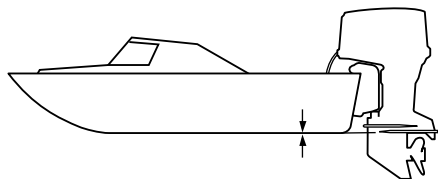
### **Mounting height (boat bottom)**

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 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, 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

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ZMU01762

ECM01634

## **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.



EMU36381

## First-time operation

EMU36391

### Fill engine oil

The engine is shipped from the factory without engine oil. If your dealer did not fill the oil, you must fill it before starting the engine. **NOTICE: Check that the engine is filled with oil before first-time operation to avoid severe engine damage.** [ECM01781]

The engine is shipped with the following sticker, which should be removed after engine oil is filled for the first time. For more information on checking the engine oil level, see page 53.



ZMU01710

EMU30174

### 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. **NOTICE: Failure to follow the break-in procedure could result in reduced engine life or even severe engine damage.** [ECM00801]

EMU27085

### Procedure for 4-stroke models

Your new engine requires a period of 10 hours break-in to allow mating surfaces of moving parts to wear in evenly.

#### TIP:

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

For 10 hours for breaking in engine avoid extended idling, rough water and crowded areas.

1. For the first hour of operation:  
Run the engine at varying speeds up to 2000 r/min or approximately half throttle.
2. For the second hour of operation:  
Increase engine speed as much as necessary to put the boat on plane (but avoid full-throttle operation), then back off on the throttle while keeping the boat at a planing speed.
3. Remaining 8 hours:  
Run the engine at any speed. However, avoid operating at full throttle for more than 5 minutes at a time.
4. After the first 10 hours:  
Operate the engine normally.

EMU36400

### Getting to know your boat

Different boats handle differently. Operate cautiously while you learn how your boat handles under different conditions and with different trim angles (see page 64).

EMU36413

### Checks before starting engine

EWMO1921



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

ECM00120

### NOTICE

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

EMU36421

### Fuel level

Be sure you have plenty of fuel for your trip.

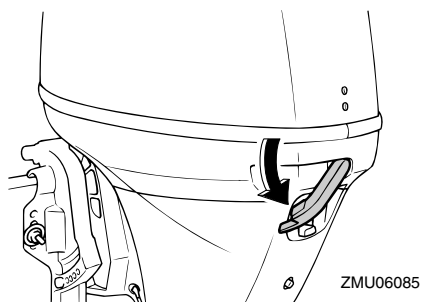
# Operation

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, turn the key to "ON" (on) and check the fuel level. For fuel filling instructions, see page 55.

EMU36571

## 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.



EMU36442

## Fuel system

EWMO0060

### WARNING

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

EWMO0910

### 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.

EMU36451

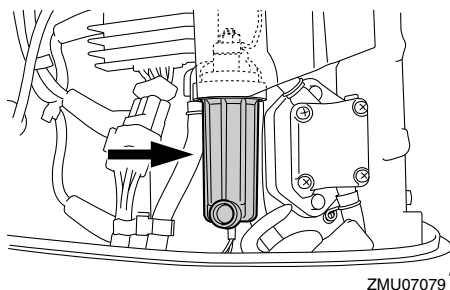
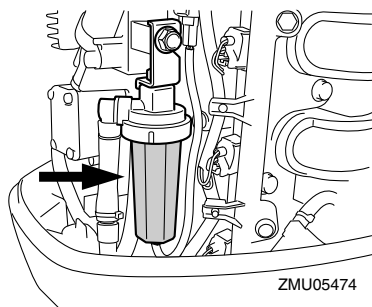
## Check for fuel leaks

- 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 damages.

EMU36471

## Check the fuel filter

Check that the fuel filter is clean and free of water. If enough water to raise the float ring 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.



EMU36902

## Controls

Tiller handle models:

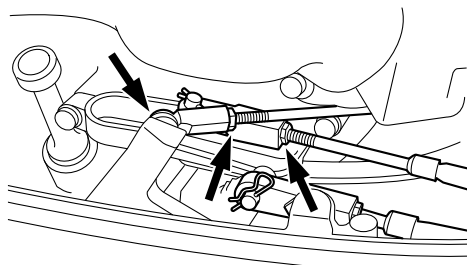
- Move the tiller handle fully to the left and right to make sure operation is smooth.
- Turn the throttle grip from the fully closed to the fully open position. Make sure that it

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.

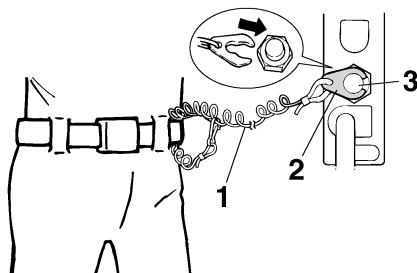


ZMU07105

EMU36483

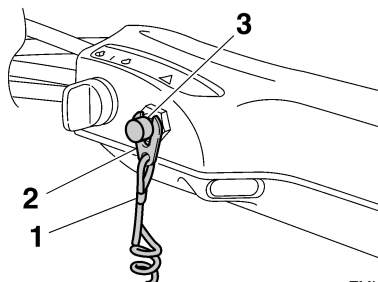
## Engine shut-off cord (lanyard)

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



ZMU01716

1. Cord
2. Clip
3. Engine shut-off switch



ZMU05208

1. Cord
2. Clip
3. Engine shut-off switch

EMU37052

## Engine oil

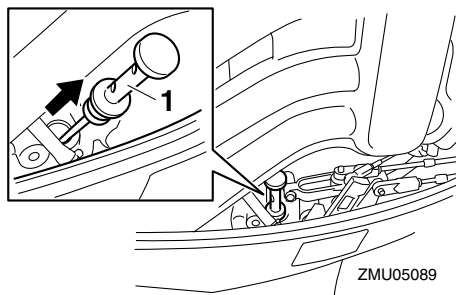
1. Put the outboard motor in an upright position (not tilted). **NOTICE: If the motor is not level, the oil level indicated on the dipstick may not be accurate.**

[ECM01790]

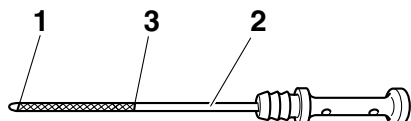
2. Remove oil dipstick and wipe it clean.
3. Insert the dipstick and remove it again. Be sure to completely insert the dipstick into the dipstick guide, otherwise the oil level measurement will be incorrect.
4. Check the oil level using the dipstick to be sure the level falls between the upper

# Operation

level mark and lower level mark. Consult your Yamaha dealer if the oil level is out of specified level or if it appears milky or dirty.



1. Oil dipstick



ZMU05091

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

EMU27153

## Engine

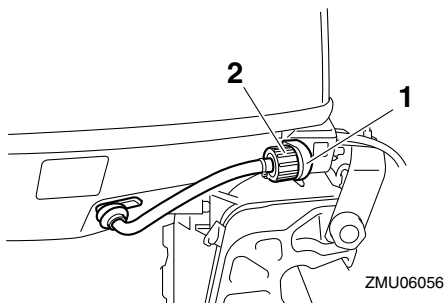
- Check the engine and engine mounting.
- Look for loose or damaged fasteners.
- Check the propeller for damage.
- Check for engine oil leaks.

EMU36492

## Flushing device

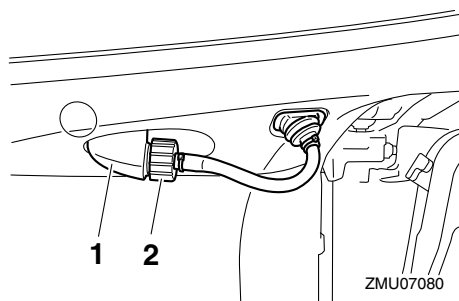
Check that the flushing device's garden hose connector is securely screwed on to the fitting on the bottom cowling. **NOTICE: If the garden hose connector is not properly**

**connected, cooling water can leak out and the engine can overheat during operation.** [ECM01801]



ZMU06056

1. Fitting
2. Flushing device



ZMU07080

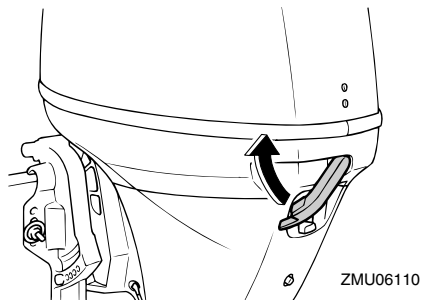
1. Fitting
2. Flushing device

EMU36954

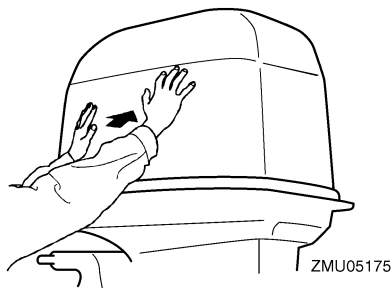
## Install top cowling

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 lever to lock the 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. [ECM01991]



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.



EMU34581

## Power trim and tilt system

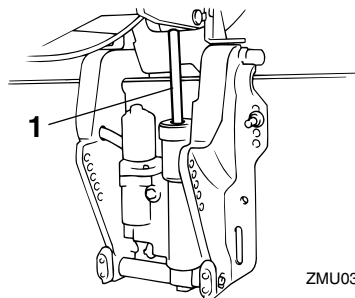
EWMO1930

### **WARNING**

- Never get under the lower unit while it is tilted, even when the tilt support lever is locked. Severe injury could occur if the outboard motor accidentally falls.
- 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.
2. Operate each of the power trim and tilt switches to check that all switches work.
3. Tilt the outboard motor up and check that the trim and tilt rod is pushed out completely.



#### 1. Trim and tilt rod

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.

EMU36582

## Battery

Check that the battery is in good condition, and fully charged. Check that the battery connections are clean, secure and covered by insulating covers. The electrical contacts of the battery and cables must be clean and properly connected or the battery will not start the engine.

Refer to the battery manufacturer's instructions for checks for your particular battery.

EMU27438

## Filling fuel

EWMO1830

### **WARNING**

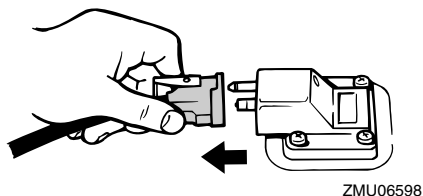
- Gasoline and its vapors are highly flammable and explosive. Always refuel ac-

# Operation

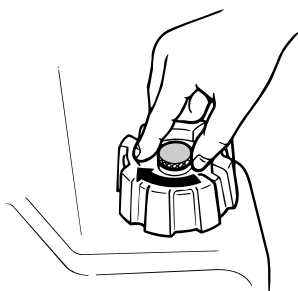
according to this procedure to reduce the risk of fire and explosion.

- **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.



ZMU06598

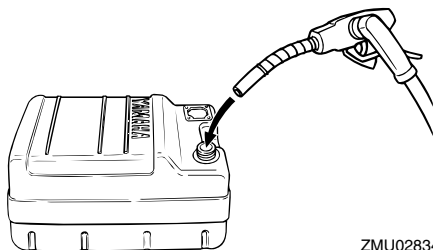


ZMU02301

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.** [EWM02610]

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 rags properly according to local laws or regulations.

EMU27452

## Operating engine

EWM00420

### **WARNING**

- **Before starting the engine, make sure that the boat is tightly moored and that you can steer clear of any obstructions. Be sure there are no swimmers in the water near you.**
- **When the air vent screw is loosened, gasoline vapor will be released. Gas-**

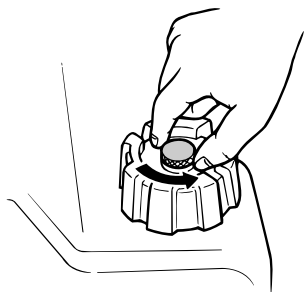
line is highly flammable, and its vapors are flammable and explosive. Refrain from smoking, and keep away from open flames and sparks while loosening the air vent screw.

- 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.

EMU27468

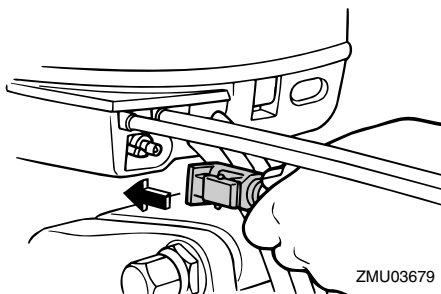
## Sending fuel (portable tank)

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

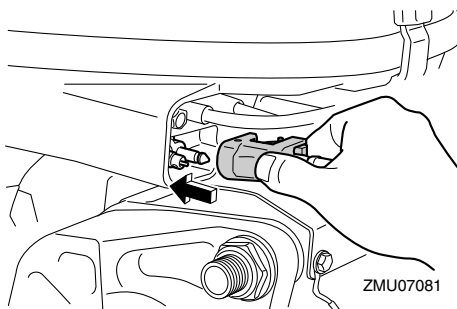


ZMU02295

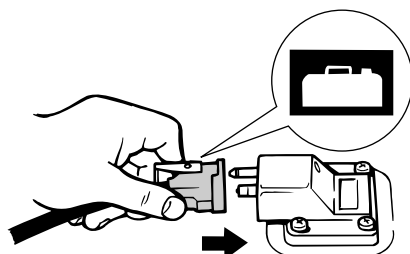
2. If there is a fuel joint on the motor, align the fuel joint on the fuel line with the fuel joint on the motor and firmly connect the fuel line to the joint while pinching the joint. Then firmly connect the other end of the fuel line to the joint on the fuel tank.



ZMU03679



ZMU07081



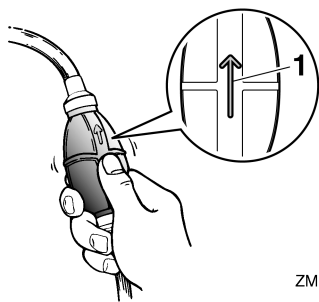
ZMU02024

## TIP:

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

3. 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.

# Operation



ZMU02025

1. Arrow

EMU27493

## Starting engine

EWM01600

### 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.

EMU27595

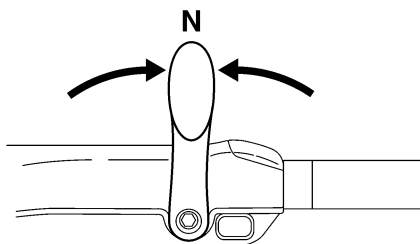
## Electric start / prime start models

EWM01840

### WARNING

- Failure to attached 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.

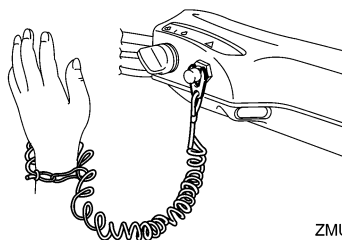


ZMU05215

### TIP:

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

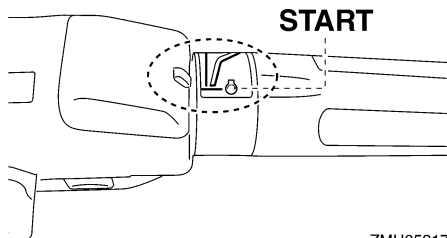
2. Attach the engine shut-off cord to a secure place on your clothing, or your arm or leg. Then install the clip on the other end of the cord into the engine shut-off switch.



ZMU05216

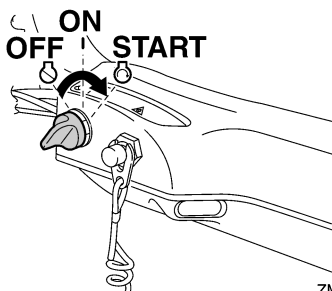
3. Place the throttle grip in the "START" (start) position. After the engine starts, return the throttle to the fully closed position.





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 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. [ECM00192]

## TIP:

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

page 61.

- 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 92.

EMU27664

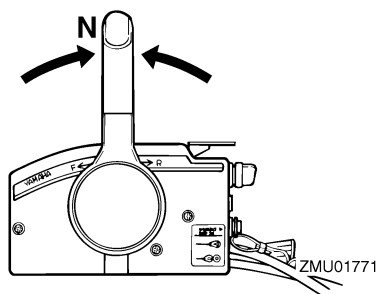
## Electric start and remote control models

EWMO1840

## WARNING

- Failure to attached 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.



ZMU01771

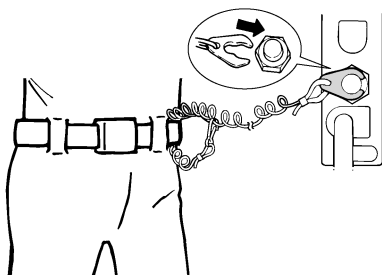
## TIP:

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

2. Attach the engine shut-off cord to a se-

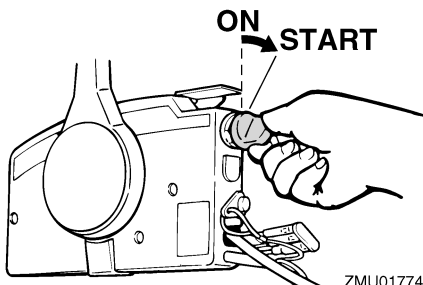
# Operation

cure 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.



ZMU01772

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.



ZMU01774

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. [ECM00192]

## TIP:

- When the engine is cold, it needs to be warmed up. For further information, see page 61.
- 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 92.

EMU36510

## Checks after starting engine

EMU36522

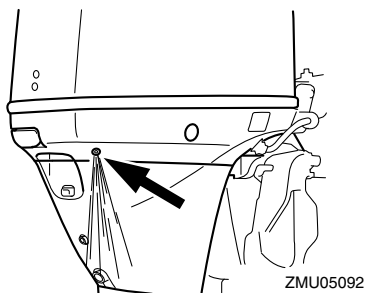
### Cooling water

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.

ECM01810

## 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.



EMU27670

## Warming up engine

EMU27716

### Manual start and electric start models

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

2. Be sure the low oil pressure-alert indicator goes off after starting the engine.

**NOTICE:** If the low oil pressure-alert indicator blinks after the engine starts, stop the engine. Otherwise, serious engine damage could occur. Check the oil level and add engine oil if necessary. Consult your Yamaha dealer if the cause for the low oil pressure alert cannot be found.

[ECM01831]

EMU36531

## Checks after engine warm up

EMU36541

### 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.

EMU36980

### Stop switches

- Turn the main switch to “OFF”, or press the engine stop button and make sure the engine stops.

- Confirm that removing the clip from the engine shut-off switch stops the engine.
- Confirm that the engine cannot be started with the clip removed from the engine shut-off switch.

EMU33492

## Shifting

EWMO0180

### WARNING

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

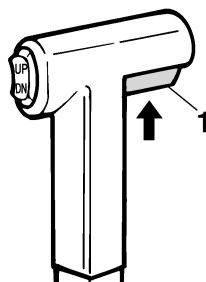
ECM01610

### NOTICE

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

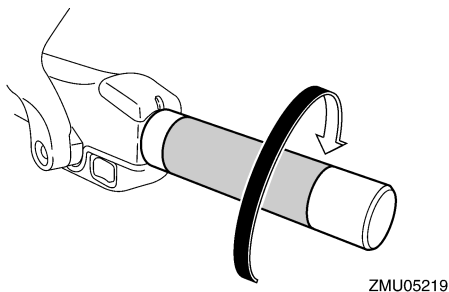
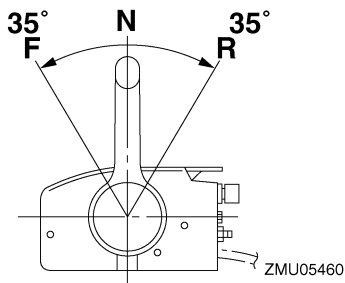
1. Pull the neutral interlock trigger up (if equipped).



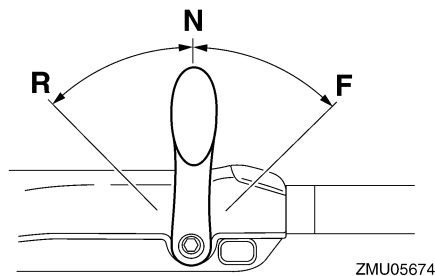
ZMU01727

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].

# Operation

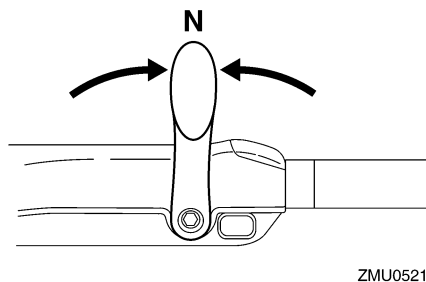
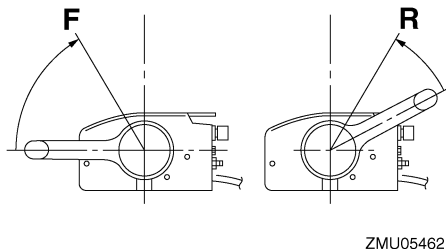
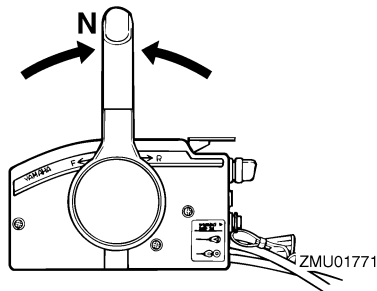


2. After the engine is at idle speed in gear move the remote control lever / gear shift lever firmly and crisply into the neutral position.



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

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



EMU31742

## Stopping boat

EWM01510



- Do not use the reverse function to slow down or stop the boat as it could cause you to lose control, be ejected, or im-

**Do not touch 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.

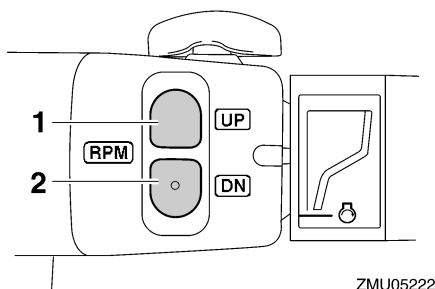
EMU30880

## Trolling

EMU30890

### Adjusting trolling speed

The trolling speed on outboard motors equipped with the variable trolling RPM switches can be adjusted approximately 50 r/min with each press of a switch.



ZMU05222

1. "UP" switch
2. "DN" switch

To increase the trolling speed, press the "UP" switch.

To decrease the trolling speed, press the "DN" switch.

### TIP:

- The trolling speed changes approximately

50 r/min each time a switch is pressed.

- If the trolling speed has been adjusted, the engine returns to the normal trolling speed when the engine is stopped and restarted or when the engine speed exceeds approximately 3000 r/min.

EMU27821

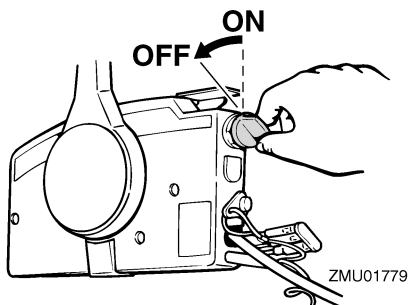
## Stopping engine

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.

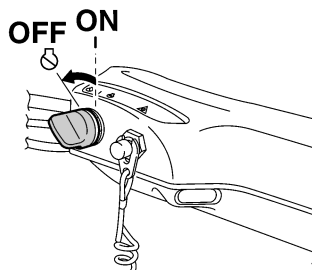
EMU27847

### Procedure

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

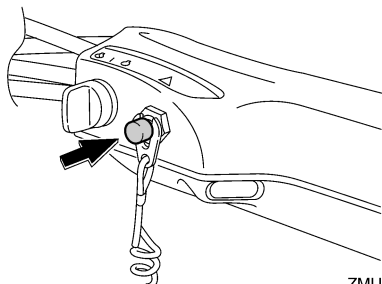


ZMU01779



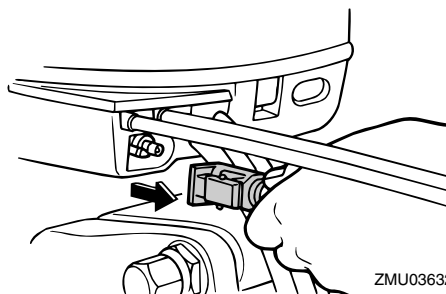
ZMU05223

# Operation

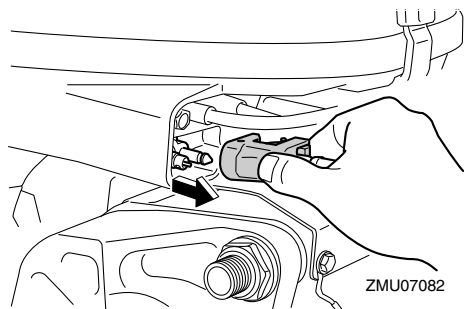


ZMU05209

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

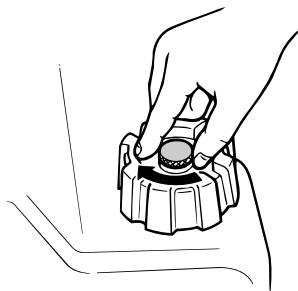


ZMU03632



ZMU07082

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).

EMU27862

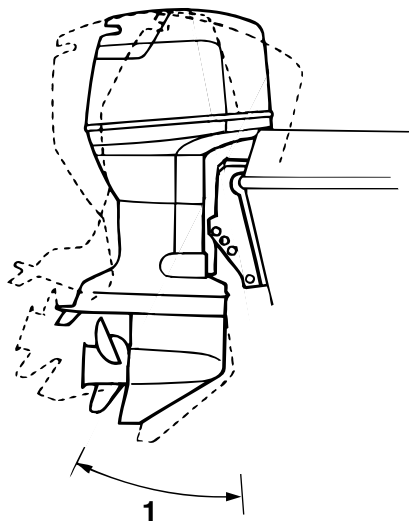
## Trimming outboard motor

EWMO0740

### 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.



ZMU03633

1. Trim operating angle

EMU27885

## Adjusting trim angle (Power trim and tilt)

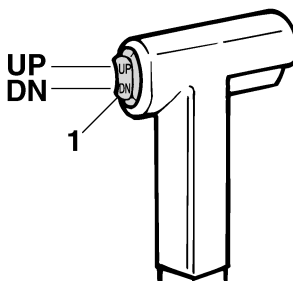
EWMO0753

### **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

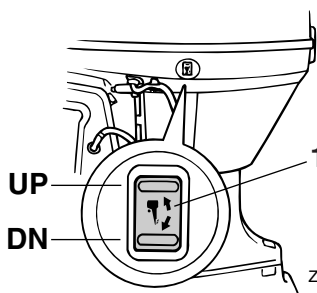
**switch while the boat is moving.**

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



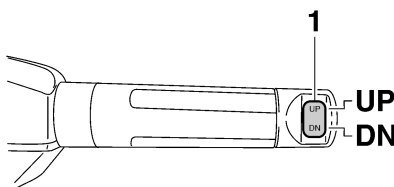
ZMU01781

1. Power trim and tilt switch



ZMU03634

1. Power trim and tilt switch



ZMU05224

1. Power trim and tilt switch

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

# Operation

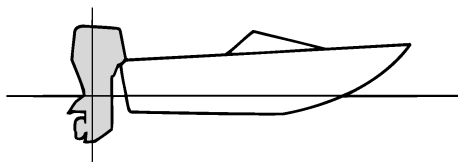
To lower the bow (trim-in), press the switch “DN” (down).

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

EMU27912

## Adjusting boat trim

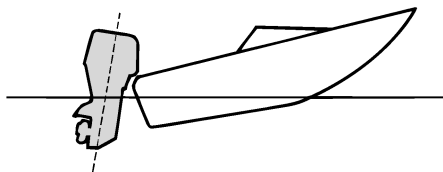
When the boat is on plane, a bow-up attitude results in less drag, greater stability and efficiency. This is generally when the keel line of the boat is up about 3 to 5 degrees. With the bow up, the boat may have a greater tendency to steer to one side or the other. Compensate for this as you steer.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



ZMU01784

### Bow Up

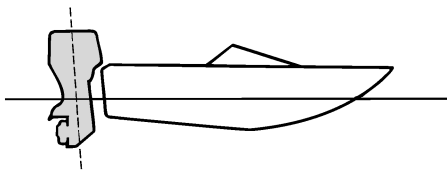
Too much trim-out puts the bow of the boat too high in the water. Performance and economy are decreased because the hull of the boat is pushing the water and there is more air drag. Excessive trim-out can also cause the propeller to ventilate, which reduces performance further, and the boat may “porpoise”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

EMU27935

## 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.



EWM00222

## **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.

EWM00250

## **WARNING**

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

ECM00241

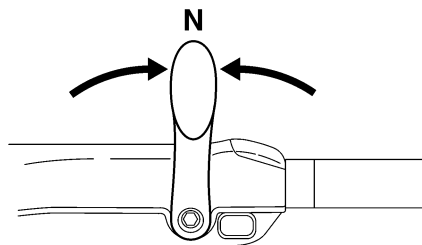
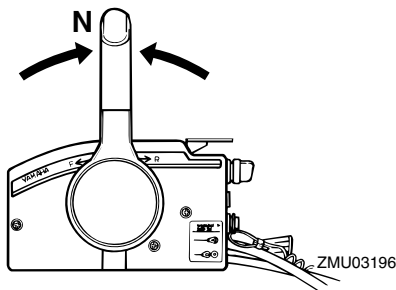
## **NOTICE**

- Before tilting the outboard motor, stop the engine by following the procedure on page 63. 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.

EMU32724

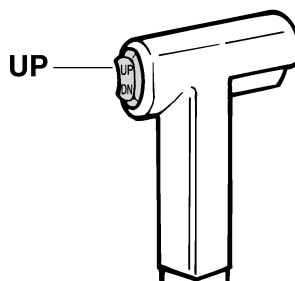
## **Procedure for tilting up (power trim and tilt models)**

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

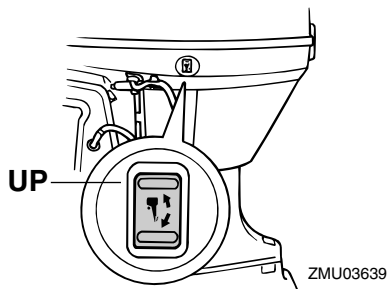


ZMU05215

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

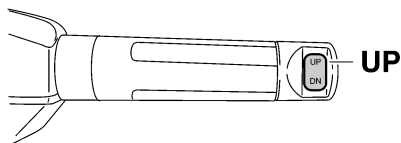


ZMU01787



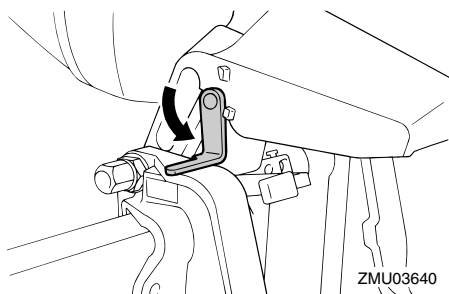
ZMU03639

# Operation



ZMU05226

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 tilt unit or in the power tilt unit loses pressure.** [EWM00262] **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 71.** [ECM01641]



ZMU03640

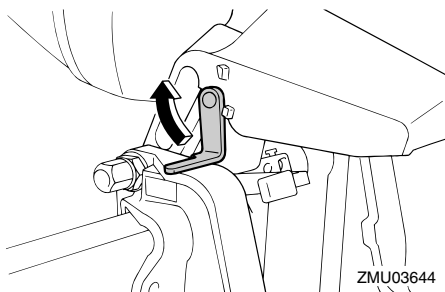
4. Models equipped with trim rods: Once the outboard motor is supported with the tilt support lever, press the power trim

and tilt switch “DN” (down) to retract the trim rods. **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.** [ECM00252]

EMU33121

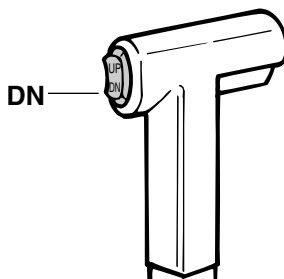
## Procedure for tilting down (power trim and tilt models)

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.

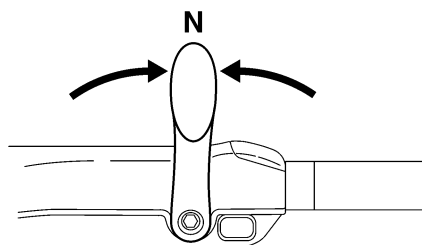
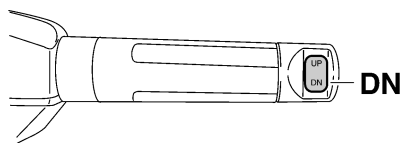
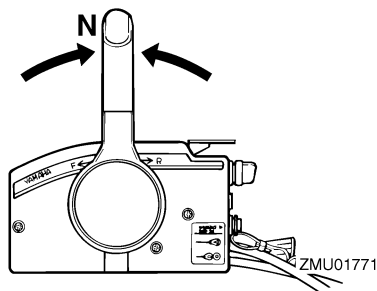
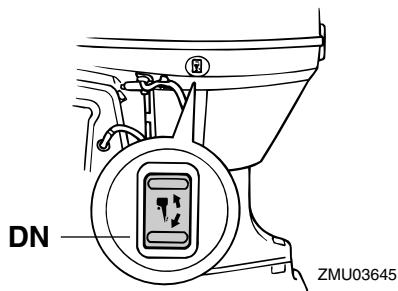


ZMU03644

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



ZMU01936



EMU28061

## Shallow water

EMU32851

### Power trim and tilt models

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

ECM00260

### NOTICE

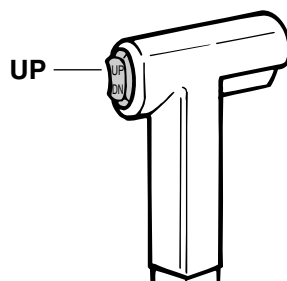
Do not tilt the outboard motor up so that the cooling water inlet on the lower unit is above the surface of the water when setting up for and cruising in shallow water. Otherwise severe damage from overheating can result.

EMU32913

### Procedure for power trim and tilt models

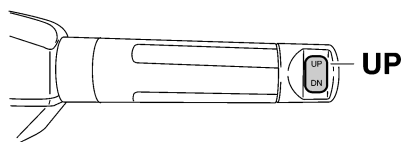
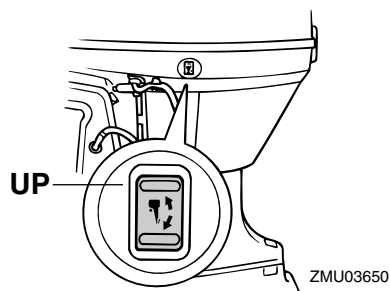
1. Place the remote control lever / gear shift lever in neutral.

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.** [EWM01850]



# Operation

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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.

EMU35391

## 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

Water in some areas can be acidic or 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 corrosion. Also rinse the outside of the outboard motor with fresh water.

EMU41510

## Transporting and storing outboard motor

EWMO2620

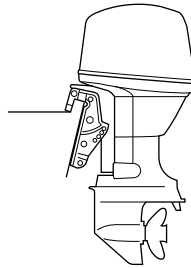
### WARNING

- **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.

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.



ZMU03659

EMU28280

### Storing outboard motor

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

ECM01080

### **NOTICE**

- To prevent problems which can be caused by oil entering the cylinder from

# Maintenance

the sump, keep the outboard motor in the attitude shown when transporting and storing it. If storing or transporting the outboard motor on its side (not upright), put it on a cushion after draining the engine oil.

- Do not place the outboard motor on its side before the cooling water has drained from it completely, otherwise water may enter the cylinder through the exhaust port and cause engine trouble.
- Store the outboard motor in a dry, well-ventilated place, not in direct sunlight.

EMU28305

## Procedure

EMU30007

### Flushing with the flushing attachment

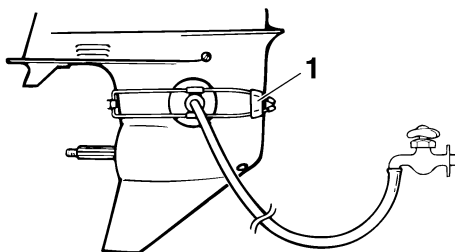
1. Wash the outboard motor body using fresh water. **NOTICE: Do not spray water into the air intake.** [ECM01840] For further information, see page 75.
2. Fill the fuel tank with fresh fuel and add one ounce of “Yamaha Fuel Conditioner and Stabilizer” to each gallon of fuel.

### TIP:

The use of “Yamaha Fuel Conditioner and Stabilizer” eliminates the need to drain the fuel system. Consult your Yamaha dealer or other qualified mechanic if the fuel system is to be drained instead.

3. Remove the top cowling and propeller.
4. Install the flushing attachment over the cooling water inlet. **NOTICE: Do not run the engine without supplying it with cooling water. Either the engine water pump will be damaged or the engine will be damaged from overheating. Before starting the engine, be sure to supply water to the cooling water passages. Avoid running the out-**

**board motor at high speed while on the flushing attachment, otherwise overheating could occur.** [ECM02000]



ZMU01830

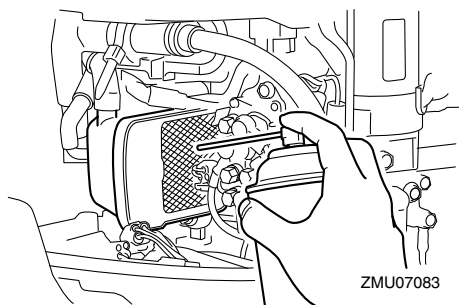
1. Flushing attachment

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.** [EWM00091]

### TIP:

- When using the flushing attachment, maintain adequate water pressure and a steady water flow.
  - If the overheat alert device is activated, turn the engine off, and consult your Yamaha dealer.
6. Run the engine at a fast idle for a few minutes in neutral position while supplying fresh water.
  7. Just prior to turning off the engine, quickly spray “Yamaha Stor-Rite Engine Fogging Oil” alternately into the intake

silencer or the fogging hole of the silencer cover, if equipped. When properly done, the engine will smoke excessively and almost stall.



8. Remove the flushing attachment and wipe off any excess water.
9. Install the top cowling and propeller.
10. Drain the cooling water completely out of the motor. Clean the body thoroughly.

### TIP:

A flushing attachment is available from your Yamaha dealer.

EMU28402

### Lubrication

1. Install the spark plug(s) and torque to proper specification. For information on spark plug installation, see page 82.
2. Change the gear oil. For instructions, see page 87. Inspect the oil for the presence of water that indicates a leaky seal. Seal replacement should be performed by an authorized Yamaha dealer prior to use.
3. Grease all grease fittings. For further details, see page 80.

### TIP:

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

EMU30266

### Cleaning and anticorrosion measures

1. Wash down the exterior of the outboard motor with fresh water and dry off completely. **NOTICE: Do not spray water into the air intake.** [ECM01840]
2. Spray the outboard motor exterior with "Yamaha Silicone Protectant". **NOTICE: Do not spray when the engine is running. Also, do not spray near the silencer or into the engine. Otherwise the engine could be damaged.** [ECM01402]
3. Wax the cowling with a non-abrasive wax such as "Yamaha Silicone Wax".

EMU28444

### Flushing power unit

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

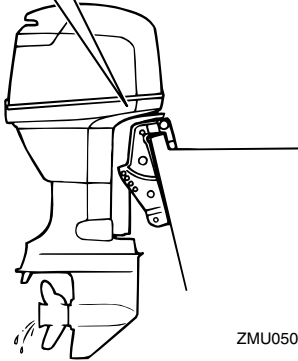
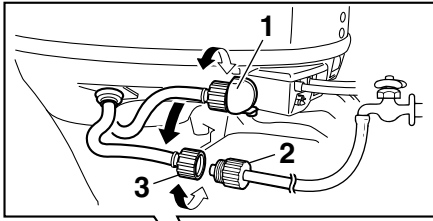
ECM01530

### NOTICE

**Do not perform this procedure while the engine is running. The water pump may be damaged and severe damage from overheating can result.**

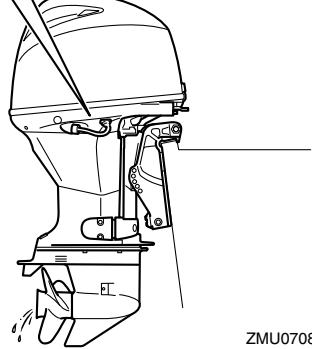
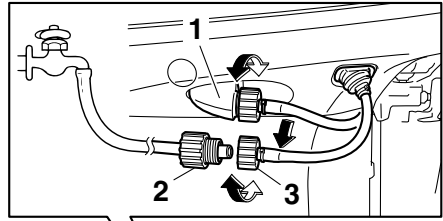
1. After shutting off the engine, unscrew the garden hose connector from the fitting on the bottom cowling.

# Maintenance



ZMU05096

1. Fitting
2. Garden hose adapter
3. Garden hose connector



ZMU07087

1. Fitting
  2. Garden hose adapter
  3. Garden hose connector
2. Screw the garden hose adapter onto a garden hose, which is connected to a fresh water supply, and then connect it to the garden hose connector.
  3. With the engine off, turn on the water tap and let the water flush through the cooling passages for about 15 minutes. Turn off the water and disconnect the garden hose adapter from the garden hose connector.
  4. Reinstall the garden hose connector onto the fitting on the bottom cowling. Tighten the connector securely.
- NOTICE:** Do not leave the garden hose connector loose on the bottom cowling fitting or let the hose hang free during normal operation. Water will leak out of the connector instead



of cooling the engine, which can cause serious overheating. Be sure the connector is tightened securely on the fitting after flushing the engine. [ECM00541]

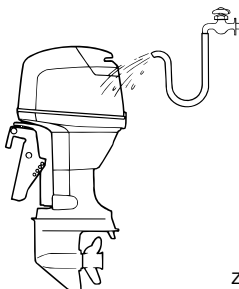
## TIP:

- When flushing the engine with the boat in the water, tilting up the outboard motor until it is completely out of the water will achieve better results.
- For cooling system flushing instructions, see page 71.

EMU28451

## Cleaning the outboard motor

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



ZMU02550

EMU28461

## 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. A touch-up paint is available from your Yamaha dealer.

EMU2848A

## Periodic maintenance

EWM01871



**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 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.

Maintenance, replacement, or repair of the emission control devices and systems may be performed by any marine engine repair establishment or individual. All warranty repairs, however, including those to the emission control system, must be performed by an authorized Yamaha marine dealership.

A service manual is available for purchase through your Yamaha dealer for owners who have the mechanical skills, tools, and other equipment necessary to perform maintenance not covered by this owner's manual.

EMU28511

## Replacement parts

If replacement parts are necessary, use only

# Maintenance

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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.

EMU35521

## **Maintenance interval guidelines**

The service intervals provided in the Maintenance Chart were developed based upon “typical” use that includes operating at varied speeds, with sufficient time for engine warm up and cool-down, a medium to light load, and an average cruising speed near the 3000 to 4000 rpm range. As with any engine, however, if your normal operating conditions are different, you should consider service more often than shown, especially how often you change your engine oil and gear oil. Examples might include extended wide-open-throttle use or long periods of trolling or idling, carrying heavy loads, or frequent starting and stopping or shifting. More frequent maintenance will often pay off many times over in increased engine life and greater owner satisfaction. Consult your Yamaha dealer for additional maintenance recommendations.

EMU34446

## 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	●/○	●/○		
Engine oil	Replacement	●/○	●/○		
Engine oil filter (cartridge)	Replacement		●/○		

# Maintenance

Item	Actions	Initial	Every			
		20 hours (3 months)	100 hours (1 year)	300 hours (3 years)	500 hours (5 years)	
Fuel filter (can be dis-assembled)	Inspection or replacement as necessary	●/○	●/○			
Fuel line (High pressure)	Inspection	●	●			
Fuel line (High pressure)	Inspection or replacement as necessary	○	○			
Fuel line (Low pressure)	Inspection	●	●			
Fuel line (Low pressure)	Inspection or replacement as necessary	○	○			
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			○		
Power trim and tilt unit	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		○			
Timing belt	Inspection or replacement as necessary		○			
Valve clearance	Inspection and adjustment				○	

# Maintenance

Item	Actions	Initial	Every			
		20 hours (3 months)	100 hours (1 year)	300 hours (3 years)	500 hours (5 years)	
Cooling water inlet	Inspection	●/○	●/○			
Main switch/stop 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		○			

EMU34451

## Maintenance chart 2

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

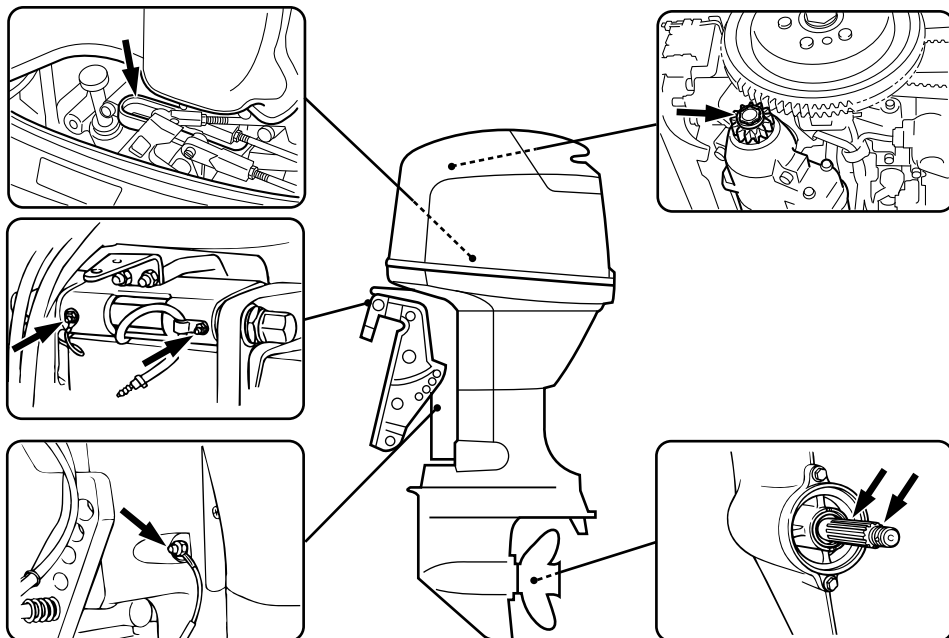
# Maintenance

EMU28933

## Greasing

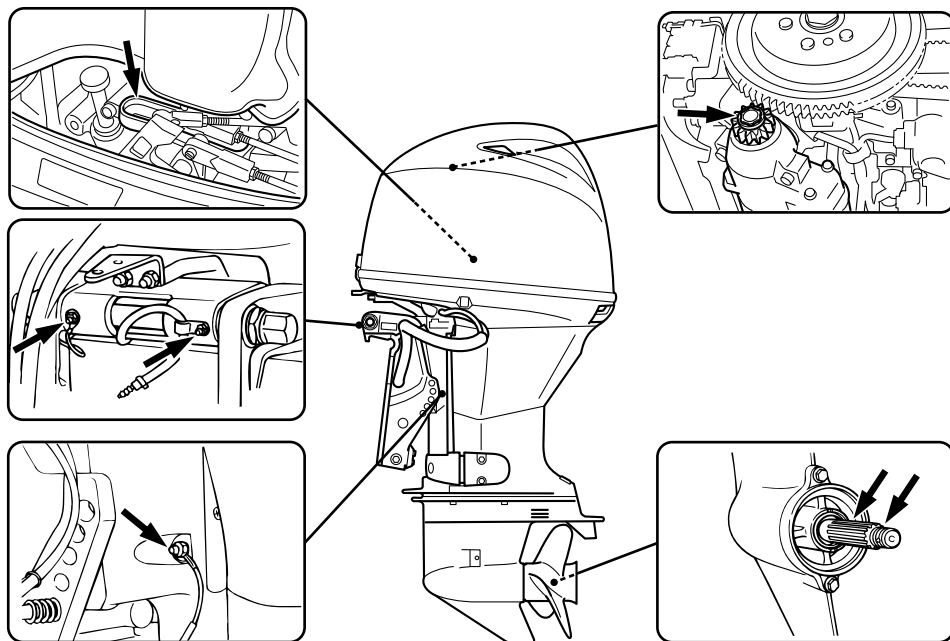
Yamaha marine grease (Water resistant grease)

F50, F60, T50, T60



ZMU05087

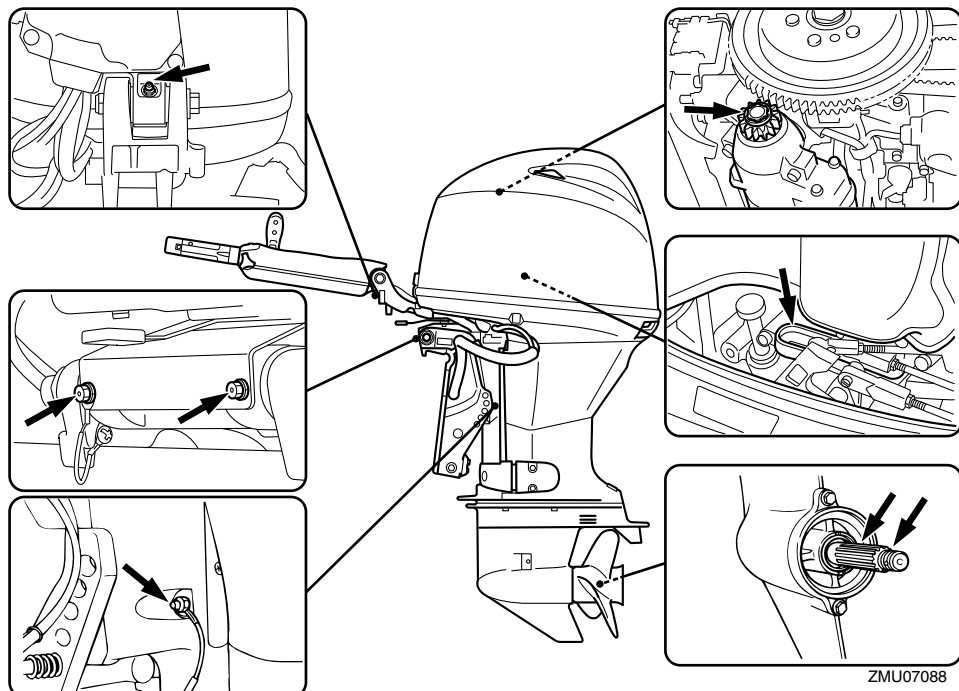
## F70A



ZMU07089

# Maintenance

## F70HA



EMU28957

ZMU07088

### 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 remove 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 plug, be careful not to damage the insulator. A damaged insulator could allow external sparks, which could lead to explosion or fire. [EWM00561]

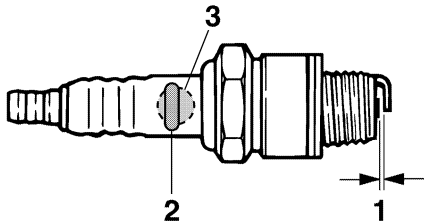
Standard spark plug:

F50TR DPR6EB-9  
F60TR DPR6EB-9  
F70A LKR7E  
T50TR DPR6EB-9  
T60TR DPR6EB-9

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.



ZMU02179

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

#### Spark plug gap:

0.8–0.9 mm (0.031–0.035 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:

F50TR 18.0 Nm (1.84 kgf-m, 13.3 ft-lb)  
F60TR 18.0 Nm (1.84 kgf-m, 13.3 ft-lb)  
F70A 17.0 Nm (1.73 kgf-m, 12.5 ft-lb)  
T50TR 18.0 Nm (1.84 kgf-m, 13.3 ft-lb)  
T60TR 18.0 Nm (1.84 kgf-m, 13.3 ft-lb)

#### TIP:

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

EMU29044

## Inspecting idle speed

EWMM00451

### 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.

ECM00490

### 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 14. If you have difficulty verifying the idle speed, or the idle speed requires adjustment, consult a Yamaha dealer or other qualified mechanic.

EMU37494

## Changing engine oil

ECM01710

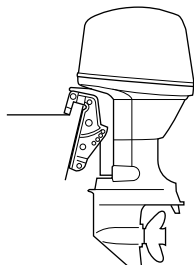
### NOTICE

**Change the engine oil after the first 20 hours of operation or 3 months, and every 100 hours or at 1-year intervals thereafter. Otherwise the engine will wear quickly.**

# Maintenance

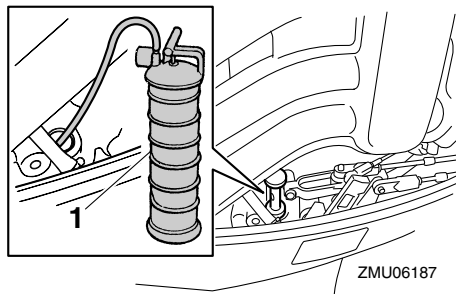
The engine oil should be extracted with an oil changer.

1. Put the outboard motor in an upright position (not tilted). **NOTICE: If the outboard motor is not level, the oil level indicated on the oil dipstick may not be accurate.** [ECM01861]



ZMU03659

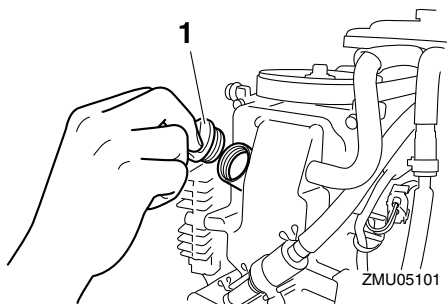
2. Start the engine. Warm it up and keep the idle speed for 5-10 minutes.
3. Stop the engine and leave it for 5-10 minutes.
4. Remove the top cowling.
5. Remove the oil filler cap. Pull out the dipstick and use the oil changer to extract the oil completely.



ZMU06187

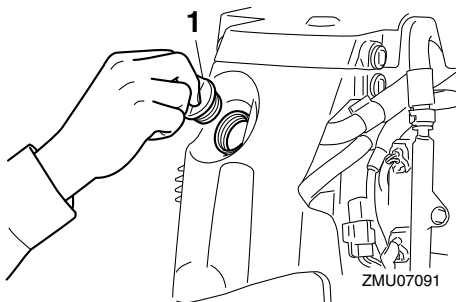
1. Oil changer
6. Add the correct amount of oil through the filler hole. Put back the filler cap and the dipstick. **NOTICE: Overfilling the oil could cause leakage or damage. If the**

**oil level is above the upper level mark, drain until the level meets the specified capacity.** [ECM01850]



ZMU05101

1. Oil filler cap



ZMU07091

1. Oil filler cap

Recommended engine oil:

4-stroke outboard motor oil

Replacement engine oil quantity (at periodic maintenance):

Without oil filter replacement:

1.9 L (2.01 US qt, 1.67 Imp.qt)

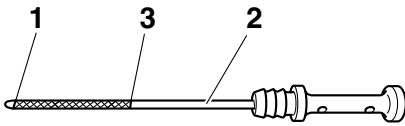
With oil filter replacement:

2.1 L (2.22 US qt, 1.85 Imp.qt)

7. Leave the outboard motor for 5-10 minutes.
8. Remove oil dipstick and wipe it clean.
9. Insert the dipstick and remove it again. Be sure to completely insert the dipstick

into the dipstick guide, otherwise the oil level measurement will be incorrect.

10. Recheck the oil level using the dipstick to be sure the level falls between the upper and lower marks. Consult your Yamaha dealer if the oil level is out of specified level.



ZMU05091

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

11. Start the engine and make sure that the low oil pressure-alert indicator remains off. Also, make sure that there are no oil leaks. **NOTICE: If the low oil pressure-alert indicator comes on or if there are oil leaks, stop the engine and find the cause. Continued operation with a problem could cause severe engine damage. Consult your Yamaha dealer if the problem cannot be located and corrected.** [ECM01622]
12. Dispose of used oil according to local regulations.

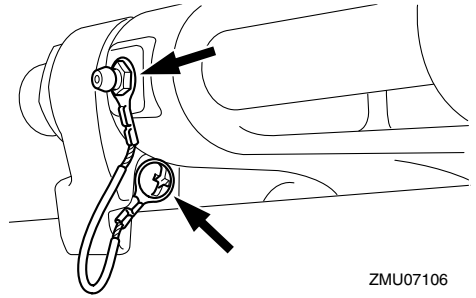
### TIP:

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

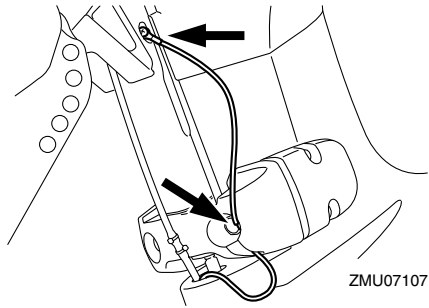
EMU29114

### Inspecting wiring and connectors

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



ZMU07106



ZMU07107

EMU32112

### Checking propeller

EWMO1881



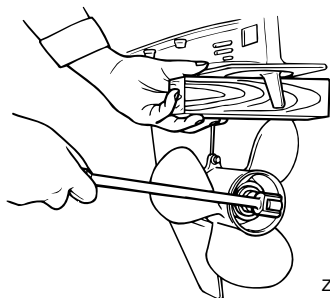
**WARNING**

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 switch if your boat has one.

Do not use your hand to hold the propeller when loosening or tightening the propeller

# Maintenance

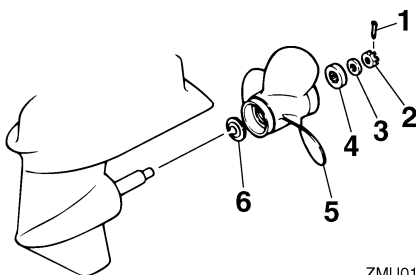
nut. Put a wood block between the anti-cavitation plate and the propeller to prevent the propeller from turning.



ZMU01897

**not use your hand to hold the propeller when loosening the propeller nut.**

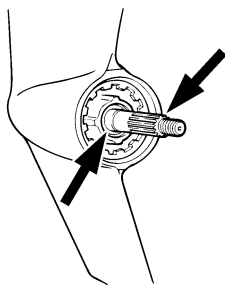
[EWM01890]



ZMU01804

## 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.



ZMU01803

- Check the propeller shaft oil seal for damage.

EMU30662

## Removing propeller

EMU29197

### 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**

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.

EMU30672

## Installing propeller

EMU29234

### Spline models

ECM00501

### 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.**

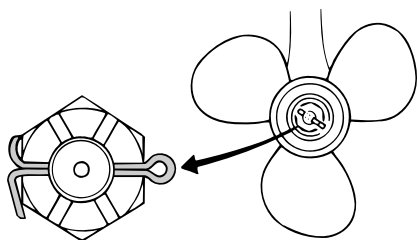
1. Apply Yamaha marine grease or a corrosion resistant grease to the propeller shaft.
2. Install the spacer (if equipped), thrust washer, washer (if equipped), and propeller on the propeller shaft. **NOTICE: Make sure to install the thrust washer before installing the propeller. Otherwise, the lower case and propeller boss could be damaged.** [ECM01881]

3. Install the spacer (if equipped) and the washer. Tighten the propeller nut to the specified torque.

Propeller nut tightening torque:

F50TR 35.0 Nm (3.57 kgf-m, 25.8 ft-lb)  
 F60TR 35.0 Nm (3.57 kgf-m, 25.8 ft-lb)  
 F70A 34.0 Nm (3.47 kgf-m, 25.1 ft-lb)  
 T50TR 35.0 Nm (3.57 kgf-m, 25.8 ft-lb)  
 T60TR 35.0 Nm (3.57 kgf-m, 25.8 ft-lb)

4. Align the propeller nut 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.** [ECM01891]



ZMU02063

## TIP:

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

EMU29289

## Changing gear oil

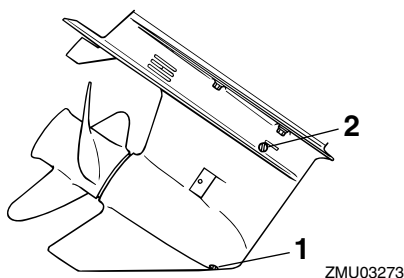
EWMO0800

### 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.** [ECM01900]



ZMU03273

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**

# Maintenance

**outboard motor.** [ECM00713]

## TIP:

For disposal of used oil, consult your Yamaha dealer.

- 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:

Hypoid gear oil SAE#90

Gear oil quantity:

F50TR 0.430 L

(0.455 US qt, 0.378 Imp.qt)

F60TR 0.430 L

(0.455 US qt, 0.378 Imp.qt)

F70A 0.670 L

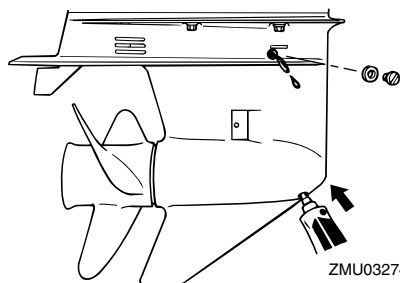
(0.708 US qt, 0.590 Imp.qt)

T50TR 0.670 L

(0.708 US qt, 0.590 Imp.qt)

T60TR 0.670 L

(0.708 US qt, 0.590 Imp.qt)



- 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.

Tightening torque:

9 Nm (0.9 kgf-m, 6.6 ft-lb)

screw. Insert and tighten the gear oil drain screw.

Tightening torque:

9 Nm (0.9 kgf-m, 6.6 ft-lb)

EMU29302

## Cleaning fuel tank

EWM00920

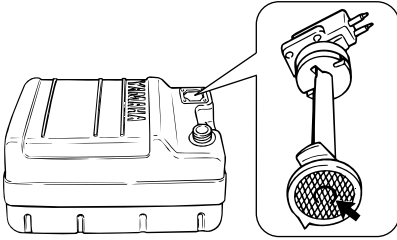
### WARNING

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

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

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

- Put a new gasket on the gear oil drain



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.

EMU29313

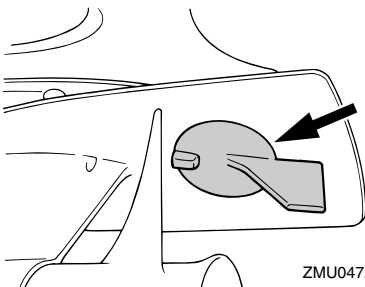
## Inspecting and replacing anode(s)

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

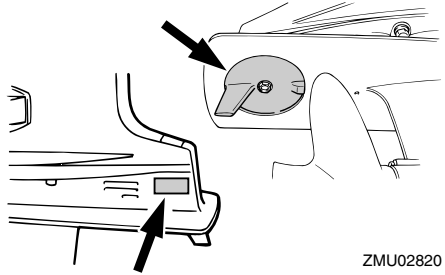
ECM00720

### NOTICE

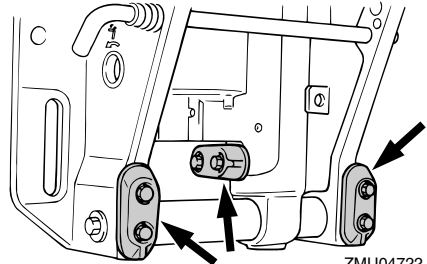
**Do not paint anodes, as this would render them ineffective.**



ZMU04721



ZMU02820



ZMU04722

### 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.

EMU29323

## Checking battery (for electric start models)

EWV01902

### 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

# Maintenance

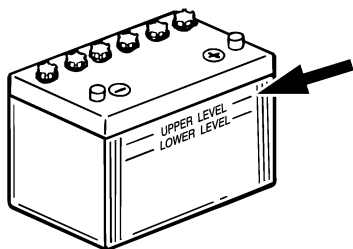
contains typical checks that apply to many batteries, but you should always refer to the battery manufacturer's instructions.

ECM01920

## NOTICE

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

1. Check the electrolyte level.



ZMU01810

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.**

[EWM01912]

EMU29343

## Connecting the battery

EWM00572

## ! 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.**

ECM01124

## NOTICE

**Do not reverse the battery cables. Other-**

**wise, the electrical parts could be damaged.**

Connect the RED cable to the POSITIVE (+) terminal first. Then connect the BLACK cable to the NEGATIVE (-) terminal.

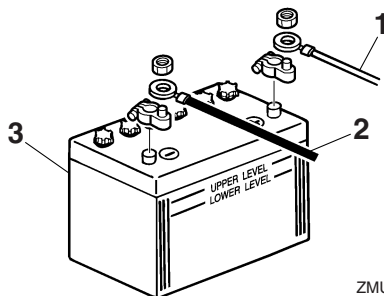
## Using a single battery

Connect both red cables to the (+) terminal.

EWM00590

## ! WARNING

**Do not leave cable unconnected. If it accidentally contacts the NEGATIVE (-) terminal of the battery, there will be a short circuit. Electric system damage and a fire could result.**



ZMU01811

1. Red cable
2. Black cable
3. Battery

## Using an accessory battery

Use a connecting cable between the (-) terminals of the starting battery and accessory battery. See the illustrations of the wiring connections. This cable must be made from wire equivalent to the starting battery cable.

EWM00600

## ! WARNING

**Use of smaller wire could lead to a fire.**

## TIP:

Consult your Yamaha dealer about correct wiring if a battery selector switch is desired.



EMU29371

## 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.** [ECM01930]
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.** [ECM01940]
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

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EMU29427

## 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 58.

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.

# Trouble Recovery

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.

EMU29433

## Temporary action in emergency

EMU29441

### Impact damage

EWM00870



**WARNING**

The outboard motor can be seriously damaged by a collision while operating or

trailing. 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.

EMU30682

## Replacing fuse

If a fuse has blown, open the fuse holder and remove the fuse with a fuse puller. Replace it with a spare one of the proper amperage.

EWM00631

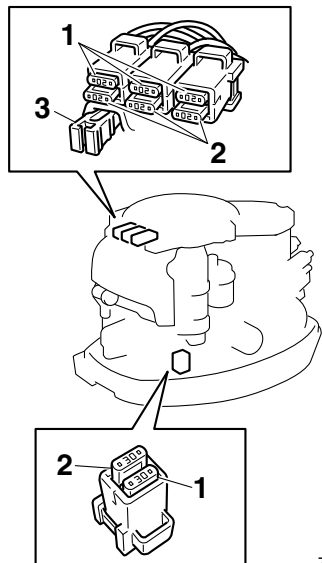


**WARNING**

**Substituting an incorrect fuse or a piece of wire could allow excessive current flow. This could cause electric system damage and a fire hazard.**

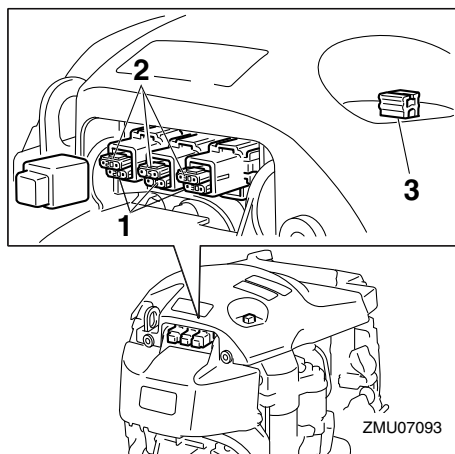
Consult your Yamaha dealer if the new fuse immediately blows again.

# Trouble Recovery



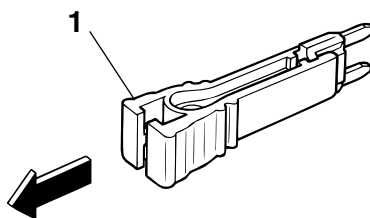
ZMU05099

1. Fuse (20 A × 3, 30 A)
2. Spare fuse (20 A × 3, 30 A)
3. Fuse puller



ZMU07093

1. Fuse (15A, 20 A, 30 A)
2. Spare fuse (15A, 20 A, 30 A)
3. Fuse puller



ZMU04337

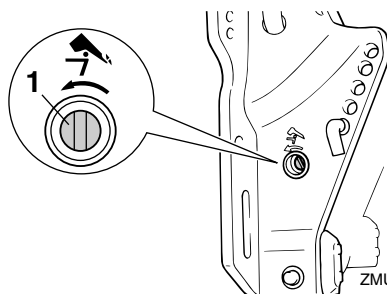
1. Fuse puller

EMU29524

## 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.



ZMU03668

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

# Trouble Recovery

EMU41460

## Water separator-alert indicator blinks while cruising

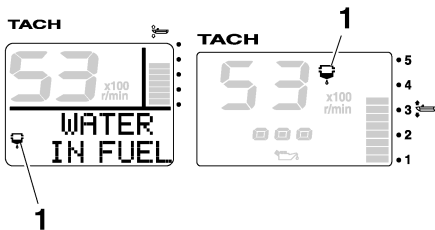
EWMO1500

### **WARNING**

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

- Do not perform this procedure on a hot or running engine. Allow the engine to cool.
- There will be fuel in the fuel filter. Keep away from sparks, cigarettes, flames or other sources of ignition.
- This procedure will allow some fuel to spill. Catch fuel in a rag. Wipe up any spilled fuel immediately.
- The fuel filter must be reassembled carefully with the O-ring, filter cup, and hoses in place. Improper assembly or replacement could result in a fuel leak, which could result in a fire or explosion hazard.

If the water separator-alert indicator on the Command Link tachometer blinks, perform the following procedure.

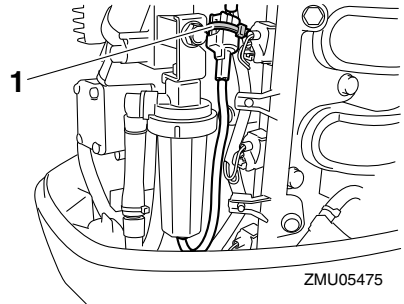


ZMU05442

1. Water separator-alert indicator

### F50, F60, T50, T60

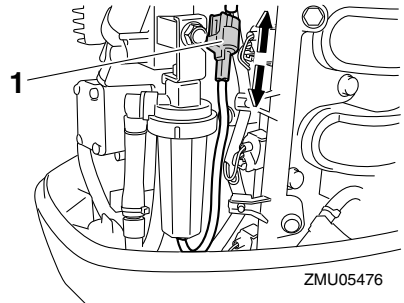
1. Stop the engine.
2. Remove the top cowling.
3. Remove the plastic tie.



ZMU05475

1. Plastic tie

4. Disconnect the water detection switch coupler. **NOTICE:** Be careful not to get any water on the water detection switch coupler, otherwise a malfunction could occur. [ECM01950]



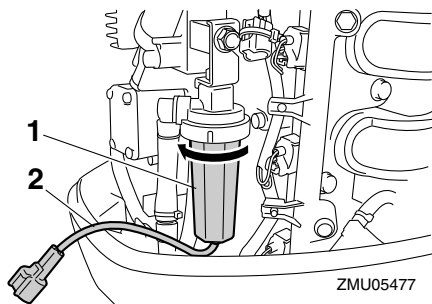
ZMU05476

1. Water detection switch coupler

5. Unscrew the filter cup from the filter housing. **NOTICE:** Be careful not to twist the water detection switch lead when unscrewing the filter cup.

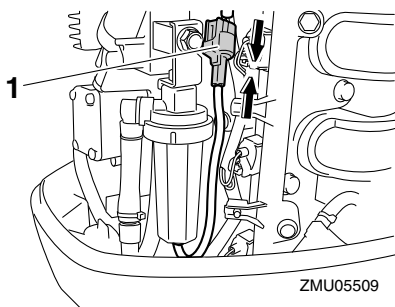
[ECM01960]

# Trouble Recovery

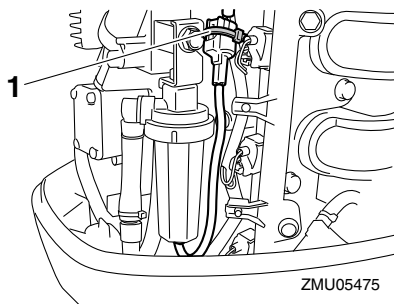


1. Filter cup
2. Water detection switch lead

6. Drain the water in the filter cup by soaking it up with a rag.
7. Firmly screw the filter cup onto the filter housing. **NOTICE: Be careful not to twist the water detection switch lead when screwing the filter cup onto the filter housing.** [ECM01970]
8. Connect the water detection switch coupler securely until a click is heard.



1. Water detection switch coupler
9. Fasten the water detection switch lead with the plastic tie.

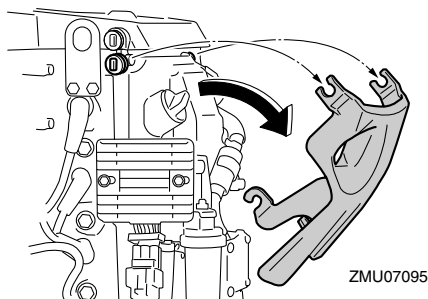


1. Plastic tie

10. Install the top cowl.
11. Start the engine and make sure that the water separator-alert indicator remains off. Have a Yamaha dealer inspect the outboard motor after returning to port.

## F70

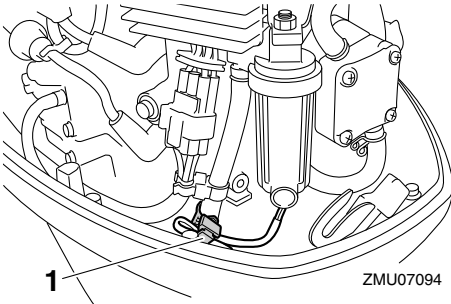
1. Stop the engine.
2. Remove the top cowl.
3. Remove the cover.



4. Remove the holder.

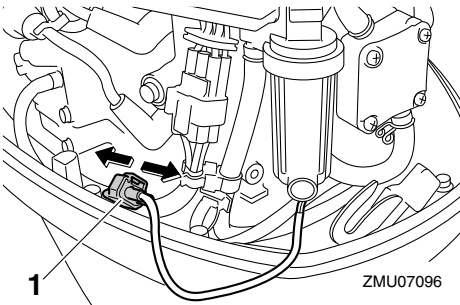


# Trouble Recovery



1. Holder

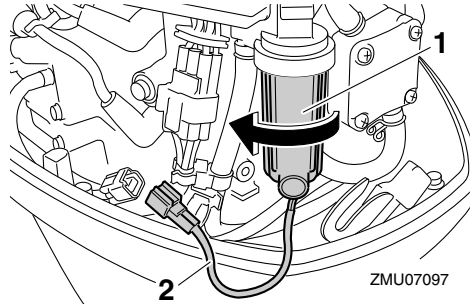
5. Disconnect the water detection switch coupler. **NOTICE: Be careful not to get any water on the water detection switch coupler, otherwise a malfunction could occur.** [ECM01950]



1. Water detection switch coupler

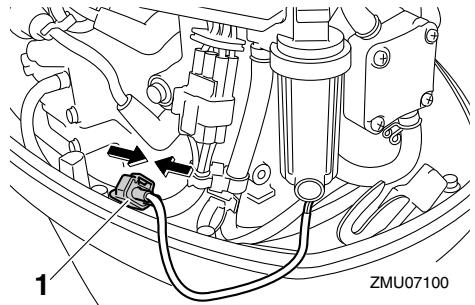
6. Unscrew the filter cup from the filter housing. **NOTICE: Be careful not to twist the water detection switch lead when unscrewing the filter cup.**

[ECM01960]



1. Filter cup
2. Water detection switch lead

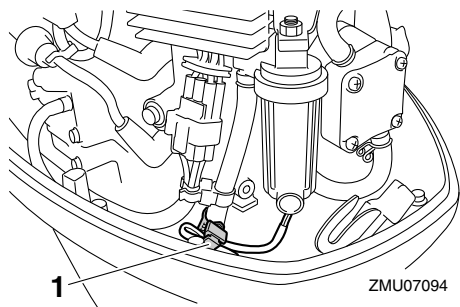
7. Drain the water in the filter cup by soaking it up with a rag.
8. Firmly screw the filter cup onto the filter housing. **NOTICE: Be careful not to twist the water detection switch lead when screwing the filter cup onto the filter housing.** [ECM01970]
9. Connect the water detection switch coupler securely until a click is heard.



1. Water detection switch coupler

10. Fasten the water detection switch lead with the holder.

# Trouble Recovery



1. Holder

11. Install the cover.
12. Install the top cowling.
13. Start the engine and make sure that the water separator-alert indicator remains off. Have a Yamaha dealer inspect the outboard motor after returning to port.

EMU29542

## Starter will not operate

If the starter mechanism does not operate (the engine cannot be cranked with the starter), the engine can be started manually with an emergency starter rope. However, the engine cannot be started manually if the battery voltage is low. If the battery is discharged to 9 volts or below, the electric fuel pump will not operate.

EWMO1022

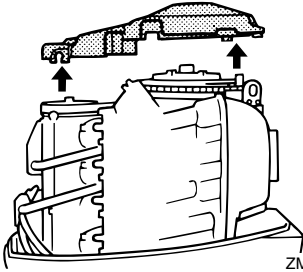
### **WARNING**

- 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.
- 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.

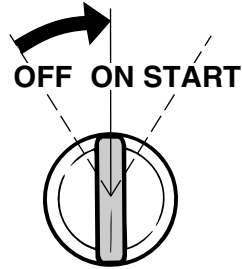
EMU29583

## Emergency starting engine

1. Remove the top cowling.
2. Remove the flywheel cover.

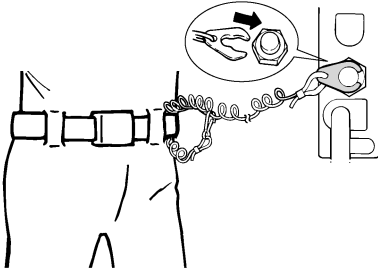


ZMU03670

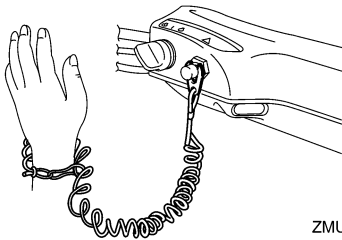


ZMU01906

3. Prepare the engine for starting. For further information, see page 58. Be sure the engine is in neutral and that the clip is attached to the engine shut-off switch.



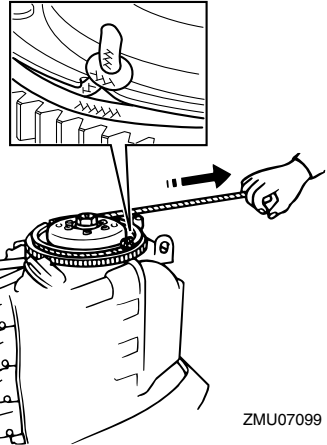
ZMU01772



ZMU05216

4. Turn on the main switch.

5. Insert the knotted end of the emergency starter rope into the notch in the flywheel rotor and wind the rope around the flywheel several turns clockwise.



ZMU07099

6. Give a strong pull straight out to crank the engine. Repeat if necessary.  
**WARNING! Do not install the top cowling when engine is running.**

[EWM00621]

EMU33501

## 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.** [ECM00401]

# Consumer information

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EMU29830

## YAMAHA MOTOR CORPORATION, U.S.A. FOUR-STROKE OUTBOARD MOTOR THREE-YEAR LIMITED WARRANTY

Yamaha Motor Corporation, U.S.A. hereby warrants that new Yamaha 1999-or-later model four-stroke outboard motors originally distributed by Yamaha Motor Corporation, U.S.A. will be free from defects in material and workmanship for the period of time stated herein, subject to certain stated limitations.

**PERIOD OF WARRANTY.** Any new Yamaha 1999-or-later model four-stroke outboard motor purchased and registered with Yamaha Motor Corporation, U.S.A. for pleasure use in the United States, will be warranted against defects in material or workmanship for a period of three (3) years from the date of purchase, subject to exclusions noted herein. Any Yamaha outboard motor purchased and utilized for commercial applications will be warranted for a period of one (1) year from the date of purchase, subject to exclusions noted herein. Yamaha peripheral equipment (control cables, propellers, gauges, remote control boxes, key switches, engine harnesses, throttle and shift cables, and wiring external from the motor unit) installed with the motor will be warranted for one (1) year from the date of purchase of either pleasure or commercial use. Replacement parts used in warranty repairs will be warranted for the balance of the applicable warranty period.

The second and third year of warranty (if applicable) shall be limited to covering the cost of parts and labor for major components only. The major components covered are:

### **Power Unit Section**

- Power Head
- Intake Manifold
- Carburetor Assembly and its Related Components
- Fuel Injection System and its Related Components
- Fuel and Oil Pump Assemblies
- Ignition System (Standard and Microcomputer)

### **Lower Unit Section**

- Exhaust System
- Upper Casing
- Lower Unit Assembly

### **Bracket Section**

- Bracket System
- Power Trim and Tilt Assembly

**WARRANTY REGISTRATION.** To be eligible for warranty coverage, the outboard motor must be registered with Yamaha Motor Corporation, U.S.A. Warranty registration can be accomplished by any authorized Yamaha Outboard Motor Dealer. Upon receipt of the registration, an Owner's Warranty Card will be sent by Yamaha to the registered purchaser.

**OBTAINING REPAIRS UNDER WARRANTY.** To receive repairs under this warranty, a valid Owner's Warranty Card must be presented to an authorized Yamaha Outboard Motor Dealer.

During the period of warranty, any authorized Yamaha outboard dealer will, free of charge, repair or replace, at Yamaha's option, any parts adjudged defective by Yamaha due to faulty workmanship or material from the factory. All replaced parts will become the property of Yamaha Motor Corporation, U.S.A.

**CUSTOMER'S RESPONSIBILITY.** Under the terms of this warranty, the customer will be responsible for ensuring that the outboard motor is properly operated, maintained, and stored as specified in the applicable Owner's Manual.

The owner of the outboard motor shall give notice to an authorized Yamaha Outboard Motor Dealer of any and all apparent defects within ten (10) days of discovery and make the motor available at that time for inspection and repairs at the dealer's place of business.

**GENERAL EXCLUSIONS FROM WARRANTY.** This warranty will not cover the repair of damage if the damage is a result of abuse or neglect of the product. Examples of abuse and neglect include, but are not limited to:

1. Racing or competition use, modification of original parts, abnormal strain.
2. Lack of proper maintenance and off season storage as described in the Owner's Manual; installation of parts or accessories that are not equivalent in design and quality to genuine Yamaha parts.
3. Operation of the motor at an rpm other than specified, use of lubricants or oils that are not suitable for outboard motor use.
4. Damage as a result of accidents, collisions, contact with foreign materials, or submersion.
5. Growth of marine organism on motor surfaces.
6. Normal deterioration.

ZMU07048

# Consumer information

**SPECIFIC PARTS EXCLUDED FROM WARRANTY.** Parts replaced due to normal wear or routine maintenance such as oil, spark plugs, shear pins, propellers, hubs, fuel and oil filters, brushes for the starter motor and power tilt motor, water pump impellers, and anodes, are not covered by warranty.

Charges for removal of the motor from a boat and transporting the motor to and from an authorized Yamaha Outboard Motor Dealer are excluded from warranty coverage.

Specific parts excluded from the second and third year of warranty (if applicable) are:

- Top and Bottom Cowling
- Electric Components (other than ignition system)
- Rubber Components (such as hoses, tubes, rubber seals, fittings, and clamps)

**EMISSION CONTROL WARRANTY.** Yamaha warrants to the ultimate purchaser and any subsequent owner, that the emission control components on this engine are designed, built and equipped so as to conform at the time of sale with applicable regulations under section 213 of the Clean Air Act and that this engine, if manufactured from January 2004 through December 2009, is free from defects in materials and workmanship which cause said engine to fail to conform with applicable regulations for two (2) years from the date of purchase or 200 hours of operation, whichever comes first, except for certain major emission components, if equipped, which are covered for three (3) years from the date of purchase or 200 hours, whichever comes first. For engines manufactured January 2010 or after, the coverage for exhaust emissions is five (5) years from the date of purchase or 175 hours of operation, whichever comes first, and hoses under the cowl are covered for evaporative emissions for two (2) years from the date of purchase. Some states have different emission control warranty provisions. As these vary from state to state, consult your Yamaha dealer or contact Yamaha Customer Relations at 1-866-894-1626 for more information.

**TRANSFER OF WARRANTY.** Transfer of the warranty from the original purchaser to any subsequent purchaser is possible by having the motor inspected by an authorized Yamaha Outboard Motor Dealer and requesting the dealer to submit a change of registration to Yamaha Motor Corporation, U.S.A. within ten (10) days of the transfer.

***YAMAHA MOTOR CORPORATION, U.S.A. MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE OBLIGATIONS AND TIME LIMITS STATED IN THIS WARRANTY ARE HEREBY DISCLAIMED BY YAMAHA MOTOR CORPORATION, U.S.A. AND EXCLUDED FROM THIS WARRANTY.***

***SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. ALSO EXCLUDED FROM THIS WARRANTY ARE ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING LOSS OF USE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU.***

***THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.***

**YAMAHA MOTOR CORPORATION, U.S.A.  
1270 Chastain Road  
Kennesaw, GA 30144**

ZMU07047

# Consumer information

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EMU29841

## **IMPORTANT WARRANTY INFORMATION IF YOU USE YOUR YAMAHA OUTSIDE THE USA OR CANADA**

**Welcome to the Yamaha Family!**

**Congratulations on the purchase of your new Yamaha Products. Yamaha is committed to exceptional customer satisfaction, and we want your ownership experience to be a satisfying one. Please read the following warranty information to help ensure satisfaction with your Yamaha.**

This model was manufactured as a USA specification model, and the warranty statement shown in this manual is for the United States market.

Please note the following information:

1. As explained in the Limited Warranty Statement, the Yamaha warranty covers your Yamaha when it is registered and used in the United States or Canada.
2. If you need repairs while temporarily using your Yamaha in another country, contact the local authorized Yamaha distributor for that country. Yamaha will work with that distributor to make the needed repairs as quickly as possible. If you have to pay for a repair that you believe your warranty would have covered at home, present all repair orders, receipts, or other related documents to your local dealer when you return home. He will be able to contact Yamaha on your behalf to see if any refund can be provided.

### **TIP:**

Your Yamaha model may not be sold in some countries. Therefore, a Yamaha dealer outside the United States or Canada may not have all of the replacement parts or technical information available to provide proper service. This may unavoidably delay repairs. Thank you for your understanding should this happen.

3. If your Yamaha is registered or used primarily outside the United States or Canada, the warranty printed in this manual does not apply to you. Contact the dealer who sold the Yamaha marine power unit to you for customer support information.

ZMU05199





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