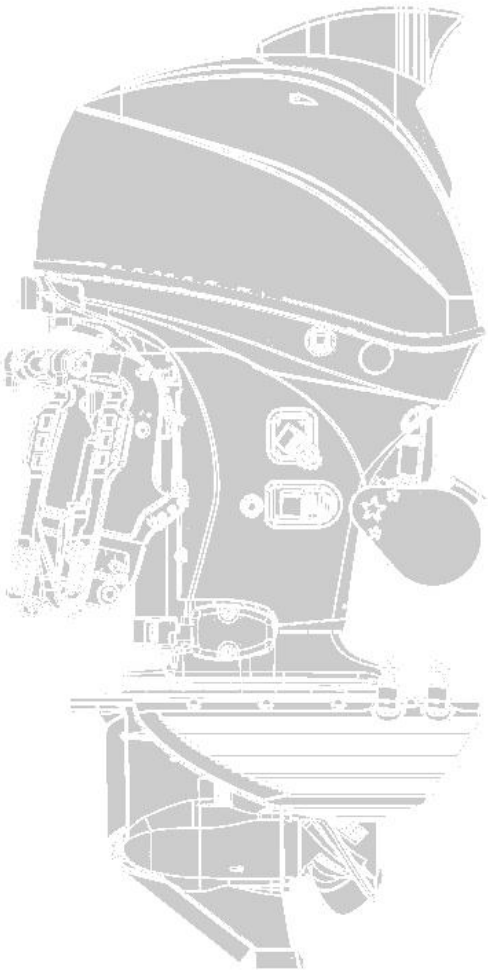
Owners Manual

SM0060-00-00

SM0050-00-00

SM0040-00-00



Version 1.0

January 2025

Freedom Outboard
7385 Willowbrook Road, Victor, NY 14564
Phone: (888) 239-2628
Website: www.Freedom-Outboard.com

⚠ **WARNING:** This product can expose you to chemicals including gasoline engine exhaust, which is known to the State of California to cause cancer, and carbon monoxide, which is known to the State of California to cause birth defects or other reproductive harm

For more information go to www.p65warnings.ca.govThe information provided indicates potential for moderate bodily harm if the notification instructions are not followed.

⚠ DANGER ⚠

READ THIS MANUAL BEFORE USING THE OUTBOARD MOTOR.

FAILURE TO FOLLOW THE INSTRUCTIONS AND SAFETY PRECAUTIONS IN THIS MANUAL CAN RESULT IN SERIOUS INJURY OR DEATH.

KEEP THIS MANUAL IN A SAFE LOCATION FOR FUTURE REFRENCE.

YOUR FREEDOM OUTBOARD MOTOR

To You, Our Customer

Thank you for choosing Freedom Outboard for your boating needs. Before you hit the water, please read this manual in its entirety. Familiarizing yourself with the motor maintenance as well as the cooling system will help ensure that you are venturing forth with confidence. If a problem arises that cannot be solved through the troubleshooting section of this manual, please contact Freedom Outboard for assistance.

All information in the manual is based upon the most current adaptation of Freedom Outboard's 40hp-60hp line at the time of printing. Freedom Outboard reserves the right to make changes at any time without notice and without incurring any obligation.

This manual plays an important part in keeping the motor fully functional for as long as possible. Please keep the manual intact and ensure the manual remains with the motor when purchased or given to other users.

Freedom Outboard Motors

Warranty Information

All Freedom Outboard motors are covered by a limited 5-year warranty. This consists of a five (5) year powerhead warranty, three (3) year cooling system warranty and two (2) year drivetrain warranty. This warranty does not apply to damage from misuse, alterations, modifications, abuse, normal wear and tear, lack of maintenance, accidents, or repairs made or attempted by an unauthorized service center. Proof of purchase must be presented when requesting warranty service.

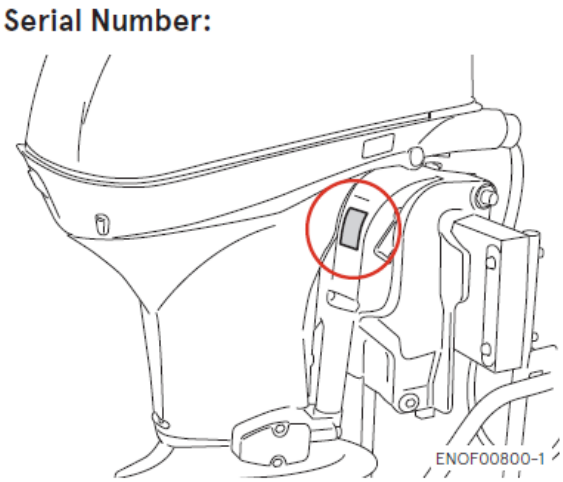
Please contact Freedom Outboard for more warranty details.

www.Freedome-Outboard.com

Serial Number

In the space below, please record the outboard motor's serial number (indicated both on the swivel bracket and on the cylinder block). The serial number will be needed when ordering parts, and when making technical or warranty inquires.

Serial Number:



Serial Number: Date of Purchase:

NOTICE: DANGER/WARNING/CAUTION/Note

Before installing, operating or otherwise handling your outboard motor, be sure to thoroughly read and understand this Owner's Manual and carefully follow all the instructions. Of particular importance is information preceded by the words "DANGER", "WARNING", "CAUTION", and "Note". Always pay special attention to such information to ensure safe operation of the outboard motor at all times.

DANGER

Failure to observe will result in severe personal injury or death, and possibly property damage.

WARNING

Failure to observe could result in sever personal injury or death, or properly damage.

CAUTION

Failure to observe could result in personal injury or property damage.

NOTES

This instruction provides special information to facilitate the use or maintenance of the outboard motor or to clarify important points.

Contents

1. GENERAL SAFETY INFORMATION

SAFE OPERATION OF BOAT

As the operator/driver of the boat, you are responsible for the safety of those aboard and those in other boats around yours, and for following local boating regulations. You should be thoroughly knowledgeable on how to correctly operate the boat, outboard motor, and accessories. To learn about the correct operation and maintenance of the outboard motor, please read through this manual carefully.

It is very difficult for a person standing or floating in the water to take evasive action should he or she see a power boat heading in his/her direction, even at a slow speed. Therefore, when your boat is in the immediate vicinity of people in the water, the outboard motor should be shifted to neutral and shut off.

⚠ WARNING

SERIOUS INJURY IS LIKELY IF A PERSON IN THE WATER MAKES CONTACT WITH A MOVING BOAT, GEAR HOUSING, PROPELLER, OR ANY SOLID DEVICE RIGIDLY ATTACHED TO A BOAT OR GEAR HOUSING.

STOP SWITCH LANYARD

The engine can be stopped by pulling out the stop switch lock from the stop switch. The stop switch lanyard is the coiled red cord with the stop switch lock on one end and a metal clip on the other end. With attaching the stop switch lanyard to the operator's body part or operator’s personal flotation device (PFD), the engine will stop when the stop switch lanyard is being stretched and pulled out the lock from the switch when the operator falls accidentally overboard or leaves from operator’s position. This function can prevent losing control of and minimize or prevent risk of collision with boats, people and other objects. It is the operator’s responsibility to use the stop switch lanyard.

⚠ WARNING

Accidental activation of the Stop Switch (such as the tether being pulled out in heavy seas) could cause passengers to lose their balance and even fall overboard, or it could result in loss of power in heavy seas, strong currents, or high winds. Loss of control while mooring is another potential hazard.

To minimize accidental activation of the Stop Switch, the 500mm (20inch) stop switch lanyard is coiled and can be extended to a full 1300mm (51inch).

PERSONAL FLOATATION DEVICE

As the operator/driver and passenger of the boat, you are responsible to wear a PFD (Personal Flotation Device) while on the boat.

SERVICING, REPLACEMENT PARTS & LUBRICANTS

We recommend that only an authorized service shop perform service or maintenance on this outboard motor. Be sure to use genuine parts, genuine lubricants, or recommended lubricants.

MAINTENANCE

As the owner of this outboard motor, you should be acquainted with correct maintenance procedures following the maintenance section of this manual (See page 64). It is the operator's responsibility to perform all safety checks and to ensure that all lubrication and maintenance instructions are completed for safe operation. Please comply with all instructions concerning lubrication and maintenance. You should take the engine to an authorized dealer or service shop for periodic inspection at the prescribed intervals. Correct periodic maintenance and proper care of this outboard motor will reduce the chance of problems and limit overall operating expenses.

Carbon Monoxide Poisoning Hazard

Exhaust gas contains carbon monoxide, a colorless and odorless gas which can be fatal if inhaled for any length of time.

Never start or operate the engine indoors or in any space which is not well ventilated

Gasoline

Gasoline and its vapors are very flammable and can be explosive. Use extreme care when handling gasoline. You should be thoroughly knowledgeable on how to correctly handle gasoline by reading this manual.

2. SPECIFICATIONS

Item	MODEL	F40A/50A/60A Standard Outboard		
Overall Length	mm (in)	783 (30.8)		
Overall Width	mm (in)	404 (15.9)		
Overall Height	mm (in)	1390 (54.7)		
Transom Height	mm (in)	538 (21.2)		
Weight***2**	kg (lb)	36.07(300)		
Max. Output	kW (ps)	40A : 29.4 (40)	50A : 37 (50)	60A : 44 (60)
Max. Operating Range	Min^{-1}(rpm)	5000–6000		
Idle Speed	Min^{-1}(rpm)	850		
Engine Type		4-Stroke fuel injection		
Number of Cylinder		3		
Bore × Stroke	mm (in)	70 × 75 (2.76 × 2.95)		
Piston Displacement	mL (Cu in)	866 (52.8)		
Exhaust System		Through hub exhaust		
Cooling System		Ethylene Glycol Based Anti-Freeze		
Engine Lubrication		Wet sump (Trochoid pump)		
Starting System		Electric starter motor		
Ignition System		Battery ignition		
Spark Plug		NGK DCPR6EIX		
Alternator		12V dual output 252W (21amp) 380W (31.7amp)		
Trim position		4		
Trim angle	Degree	9-20		
Tilt up angle	Degree	74		
Steering angle	Degree	70		
Engine Oil	Grade	API standard SH, SJ, SL, SAE10W-30/40		
	mL (US qt)	2200 (2.3)		
Gear Oil	Grade	Genuine Gear Oil or API GL5, SAE #80-90		
	mL (US qt)	500 (0.53)		
Fuel		Unleaded Regular Gasoline: R+M/2: 87or higher RON:91 or higher		
Fuel Tank Capacity	L (US gal)	25 (6.60)		
Gear shift		Dog clutch (F-N-R)		
Gear Reduction Ratio		2.08 (13:27)		

Item MODEL	F40A/50A/60A ET (with RC)	F40A/50A/60A ET (with multi-function tiller handle)
Tachometer Pole Setting	4	
Emission Control System	MFI (Multiport Fuel Injection)	
Operator Sound Pressure (ICOMIA39/94Rev.1)dB(A)	81.8	
Hand Vibration Level (ICOMIA38/94Rev.1)m/sec2	--	2.9

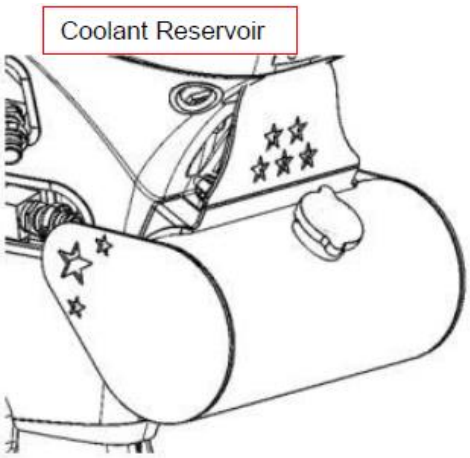
Remarks: Specifications subject to change without notice.

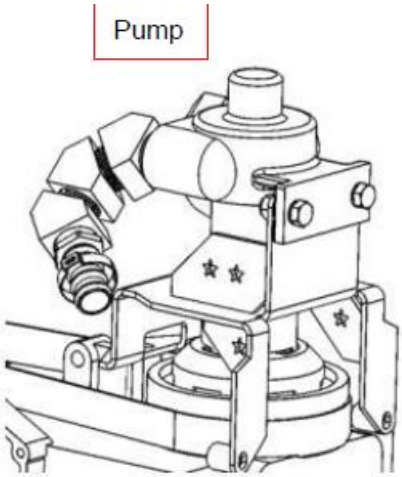
***1** Type I is a conventional multi-function tiller handle. Type II is equipped with a PTT switch on the end of throttle grip.

***2** With propeller

Freedom Outboard is power rated in accordance with ISO8665 (propeller shaft output).

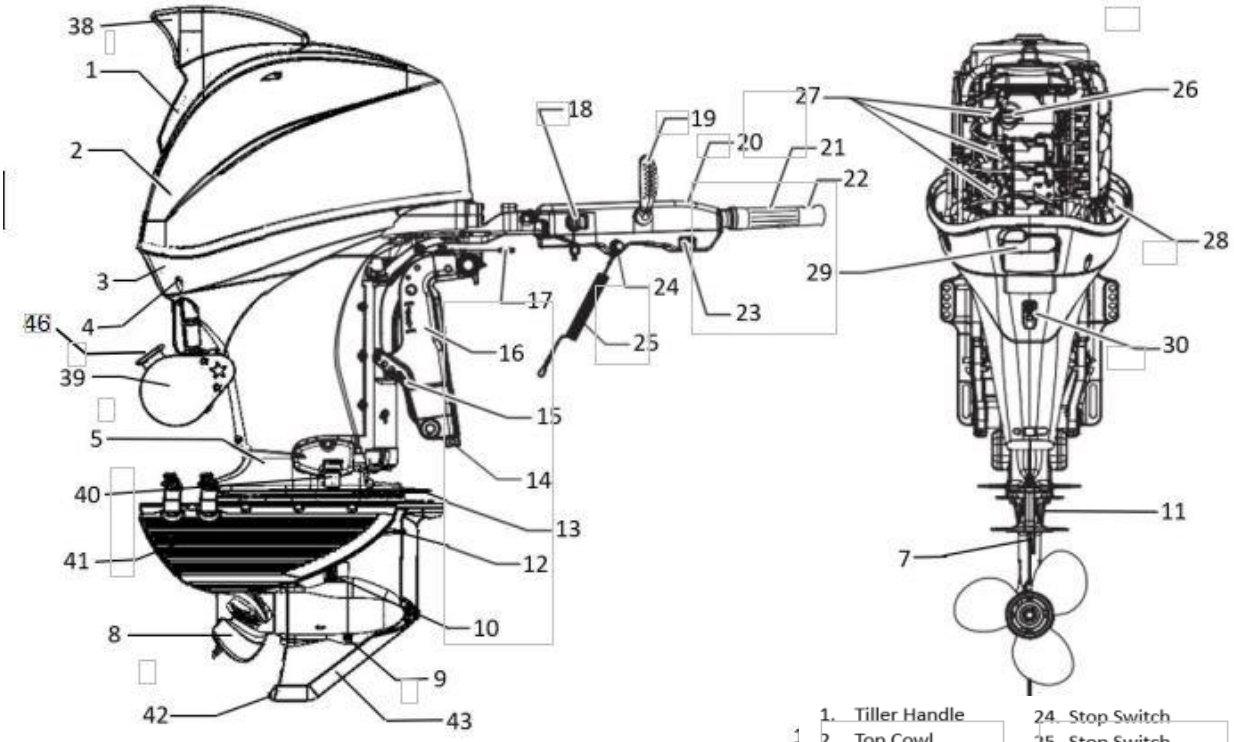
Coolant Reservoir and Pump

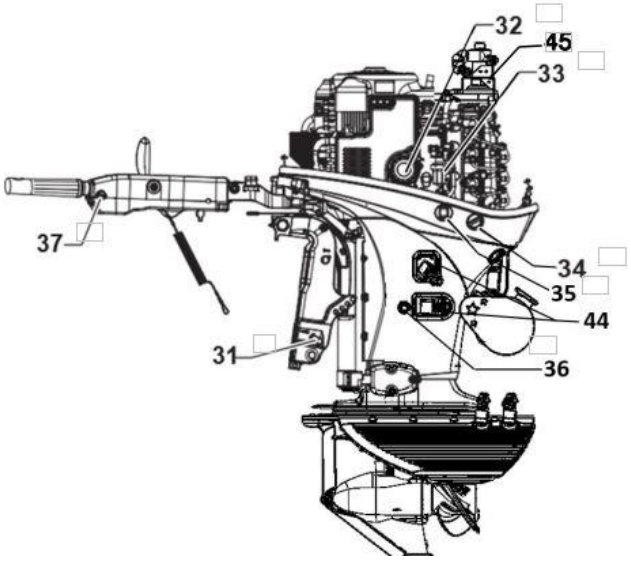




3. PART NAMES

ET (with multi-function tiller handle)

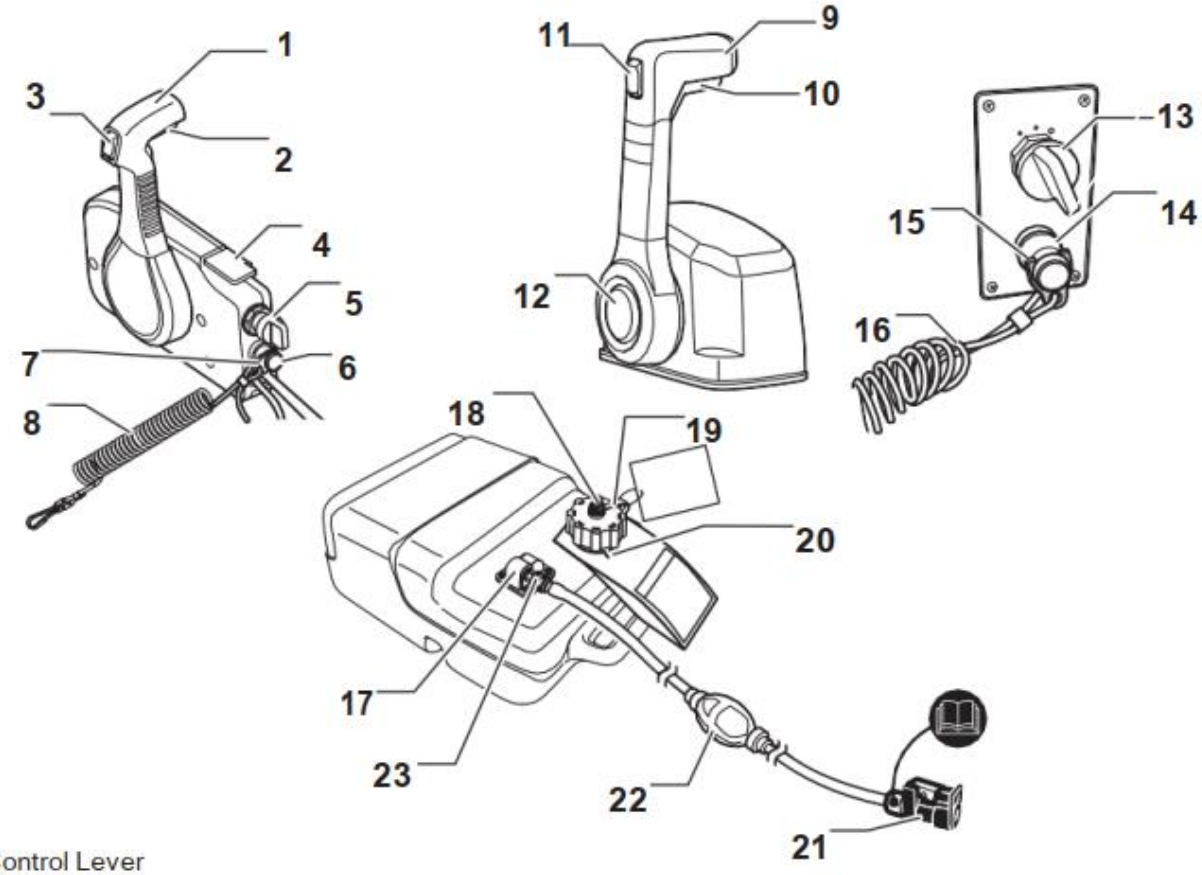




1. Tiller Handle
2. Top Cowl
3. Bottom Cowl
4. Cooling Water Check Port (Not In Use)
5. Drive Shaft Housing
6. Anode
7. Trim Tab
8. Propeller
9. Oil Plug (Lower)
10. Cooling Water Inlet (Not In Use)
11. Oil Plug (Upper)
12. Anti-Ventilation Plate
13. Splash Plate
14. Anode
15. Thrust Rod
16. Clamp Bracket
17. Steering Friction Lever
18. Main Switch Key
19. Shift Lever
20. Tiller Handle
21. Throttle Grip
22. PTT Switch
23. Warning Lamp
24. Stop Switch
25. Stop Switch Lanyard
26. Oil Filler Cap
27. Spark Plug
28. Oil Level Gauge
29. Cowl Hook Lever
30. Idle Port
31. Manual Valve*
32. Oil Filter
33. Fuel Filter
34. Flushing Connector Cap
35. PTT Switch*
36. Oil Drain Bolt
37. Throttle Friction Screw
38. Cowling Mohawk
39. Coolant Reservoir
40. Coolant Inlet
41. Heat Exchangers
42. Bumper Keeper
43. Bumper
44. Coolant Outlet
45. Pump
46. Coolant Reservoir Cap

*: Only ET Model

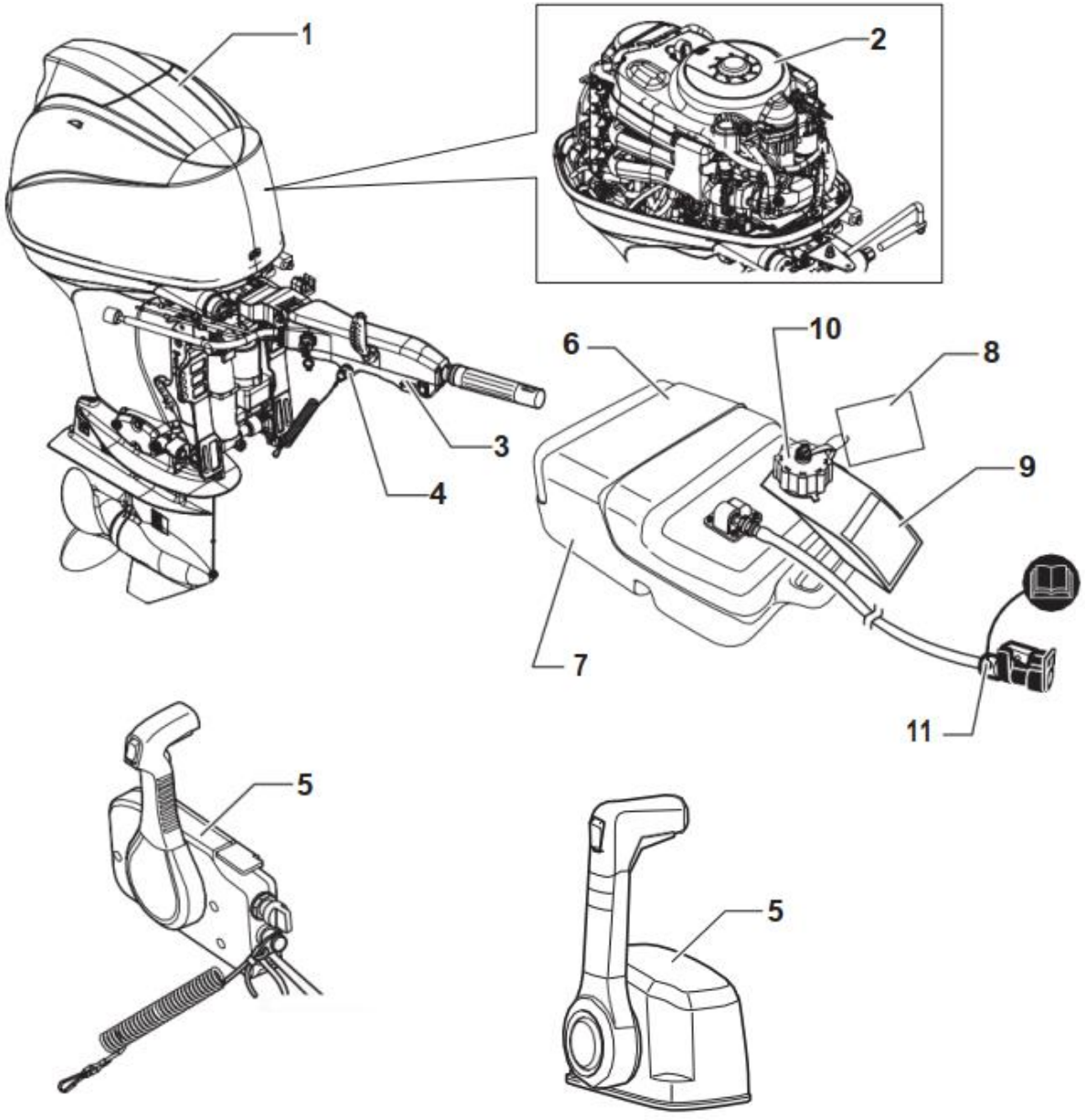
Remote control box & Fuel tank (Optional part)



1 Control Lever
2 Neutral lock arm
3 PTT switch
4 Free throttle lever
5 Main switch
6 Stop switch
7 Stop switch lock
8 Stop switch lanyard
9 Control lever
10 Neutral lock arm
11 PTT switch
12 Neutral throttle button
13 Main switch
14 Stop switch
15 Stop switch lock
16 Stop switch lanyard
17 Fuel gauge
18 Air vent screw
19 Fuel tank cap
20 Tab lock
21 Fuel connector (Engine side)
22 Primer bulb
23 Fuel connector (Fuel tank side)

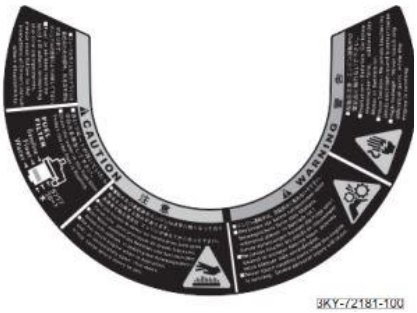
4. LABEL LOCATIONS

Warning label locations



1. Warning regarding urge to read the owner's manual.

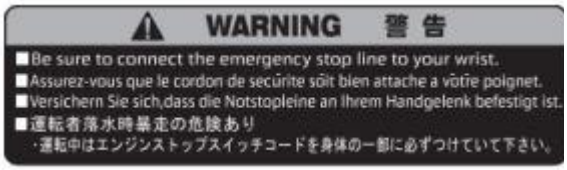
2. Warning regarding rotating parts, electrical shock, high temperature and fuel treatment.



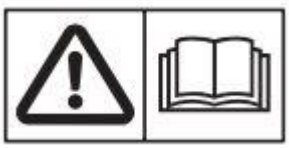
3. For tiller handle model only. Indicator regarding engine failure/malfunction (see page 32).

4. For tiller handle model only. Warning regarding stop switch (See page 40 and page 52)

5. For RC model only. Warning regarding stop switch lanyard.



6. For Top mount RC only. Warning urge to read the owner's manual.



7. Warning regarding gasoline.

8. Warning regarding gasoline (See page 27).

9. Warning tag regarding combination of the fuel tank and primer bulb assembly (See page37).

10. Waring tag regarding instructions of the fuel tank cap (See page 28).

11. Warning regarding fuel tank cap (See page 28.

12. Warning regarding fuel connector (See page 37).

5. INSTALLATION

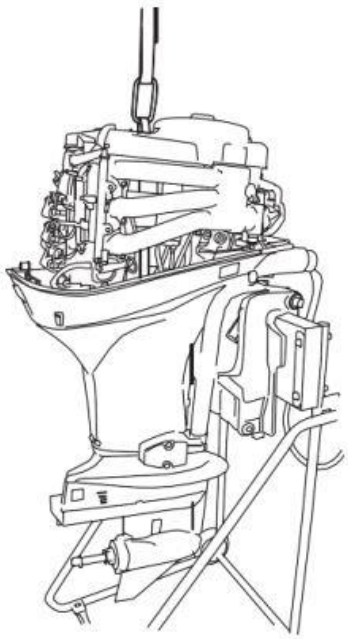
5.1 Mounting the outboard motor on boat

⚠ WARNING

Gas assist type:

- When removing the outboard motor from the packaging or removing outboard motor from the boat, never release the lock lever. If the lock lever is released, it will be very easy for the clamp bracket to spring up to the tilting direction because it is not fixed.
- Before installing the outboard motor on the boat, hang the outboard motor with the hoist or equivalent device by attaching the engine hanger to the outboard. Use a hoist whose allowable load is 250kg (550 lbs) or above.

Outboard motor mounting must be performed by trained service personnel using a lift or hoist with sufficient capacity.



⚠ WARNING

Most boats are rated and certified in terms of their maximum allowable horsepower, as shown on the boat's certification plate. Do not equip your boat with an outboard motor that exceeds this limit. If in doubt, contact your dealer.

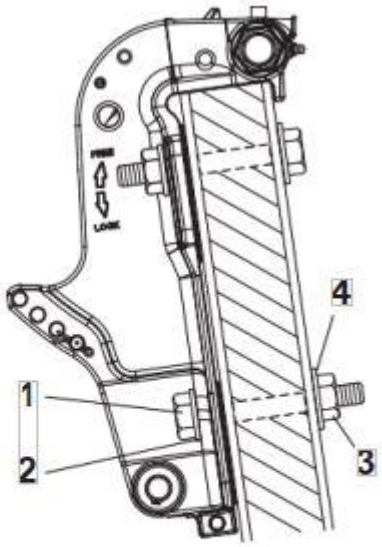
Do not operate the outboard motor until it has been securely mounted on the boat in accordance with the instructions below.

⚠ WARNING

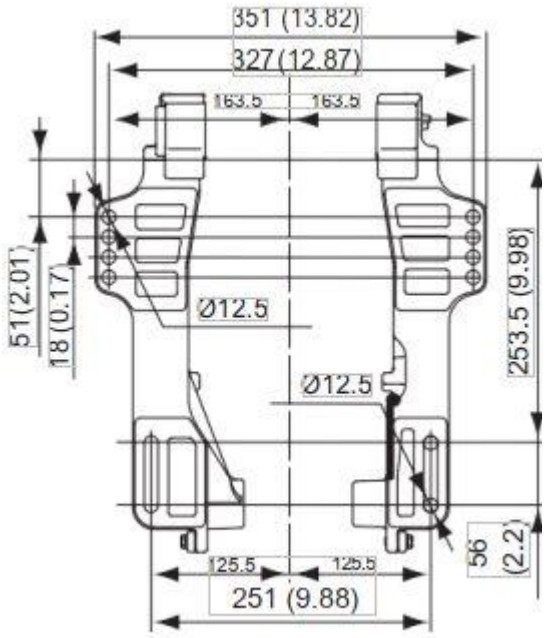
- Mounting the outboard motor without following this manual can lead to unsafe conditions such as poor maneuverability, lack of control or fire.
- Loose clamp screws and/or mounting bolts can lead to the release or displacement of the outboard motor, possibly resulting in loss of control and/or serious personal injury. Be sure that the fasteners are tightened to the specified torque (30 Nm (3.0 kgf) 13 ft-lb). Check the fasteners for tightness from time to time.
- Be sure to use outboard mounting fasteners included in the outboard motor package or their equivalents in terms of size, material, quality and strength.

Mounting the outboard motor

1. Set the outboard motor to the appropriate position.
2. Secure the clamp brackets to the transom board using bolts, flat washers and nuts.



1. Bolt (12 × 105)
2. Washer (small diameter)
3. Nut
4. Washer (large diameter)



⚠CAUTION

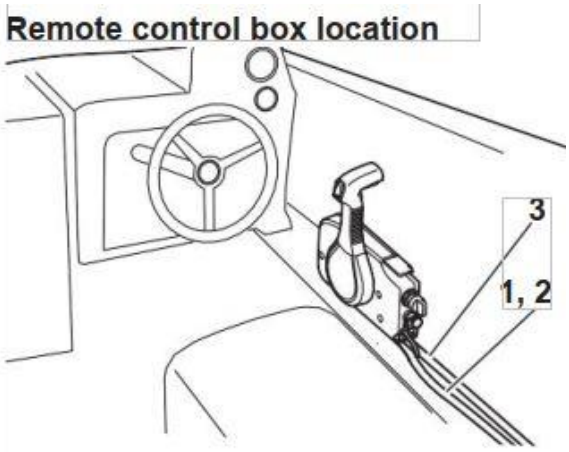
- Upper mounting bolts should be installed with the bolt head on the inside surface of the transom. Mounting bolts installed with the thread end on the inside surface of the transom can cause personal injury.
- Tighten the bolts sufficiently, otherwise falling of outboard could occur.

NOTES

1. Apply sealing agent, such as silicone, between the bolts and the transom board holes before tightening the bolts.
2. Be sure to tighten the mounting bolt nuts to the specified torque.
   (30 Nm (3.0 kgf) 13 ft-lb)

5.2 Remote control device installation

Remote control box location



1. Shift cable
2. Throttle cable
3. Cable harness B

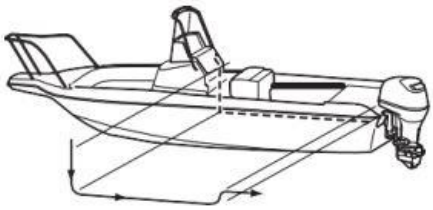
3. Install the remote-control box in a position where it is easy to reach and operate the controls.

   Make sure there are no obstacles that can interfere with the operation of the remote-control cable.

Remote control cable length

⚠CAUTION

Be careful not to loop the remote-control cables to a diameter of 406 mm (16 inches) or less. Otherwise, it will affect the service lift of the cable.



4. Measure the distance from the remote-control box to the outboard motor where the remote-control cable should be routed.
5. Prepare a cable that is 300-450 mm (11.8-17.7 in) longer than the measured distance.
6. Temporarily pull the cable along the intended cable route to check that its length is sufficient.
7. Connect the remote-control cable to the engine, then run the cable to the remote control box, making sure it is not sharply bent, too taut and is free from obstructions that could interfere with steering.

5.3 Battery Install

⚠ WARNING

Battery electrolyte contains sulfuric acid and thus is hazardous, causing a burn if it comes in contact with your skin, or poisonous if swallowed.

Keep battery and electrolyte away from reach of children.

When handling the battery, be sure to:

- Read all warnings shown on the battery case.
- Prevent electrolyte from coming in contact with any part of your body. Contact can cause serious burn or, if it comes in contact with your eye, loss of sight. Use safety glasses and rubber gloves.

In case battery electrolyte comes in contact with:

- Skin, flush thoroughly with water.
- Eye, flush thoroughly with water, and then seek immediate medical treatment.

In case battery electrolyte is swallowed:

- Seek immediate medical treatment.

⚠ WARNING

Battery generates explosive hydrogen gas. Be sure to:

- Charge the battery in a well-ventilated area.
- Place the battery away from any source of fire, sparks and open flames such as burners or welding equipment.
- Do not smoke near the battery when the battery is charging.

⚠ CAUTION

- Make sure that the battery leads do not get stuck between the outboard motor and boat when turning, etc.
- The starter motor may fail to operate if the leads are incorrectly connected.
- Be sure to correctly connect the (+) and (-) leads. If not, the charging system will be damaged.
- Do not disconnect the battery leads from the battery while the engine is operating, the electrical parts could be damaged.
- Always use a fully charged battery.

⚠ CAUTION

Do not use a battery that is not recommended. Use of a non-recommended battery can lead to poor performance of, and/or damage to, the electrical system.

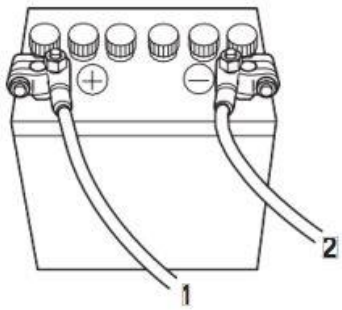
NOTE

Minimum battery requirements: 12v 70Ah/20HR, 512 Cold Cranking Amps (CCA).

A larger capacity battery is required when used in freezing conditions. Recommend connecting only the engine battery cables to the starting battery. Specifications and features of batteries vary among the manufacturers. Consult the manufacturer for details.

*The battery should be purchased separately and is not supplied with the outboard motor.

1. Place the battery box in a convenient position away from possible water spray. Securely fasten both the box and the battery so they do not shake loose.
2. Connect the positive lead (+) to the positive terminal (+) of the battery, then connect the negative lead (-). When disconnecting the battery always remove the negative lead (-) first. After connecting the positive terminal (+), securely place a cap on it to prevent short circuits.



1. Battery cord (red)
2. Battery cord (black)

5.4 Propeller Install

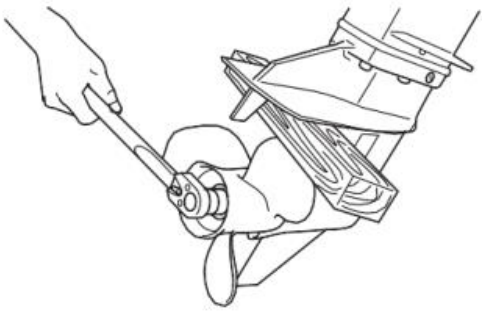
⚠ WARNING

Do not begin propeller removal and installation procedure with spark plug caps attached, shift in forward or reverse, main switch at other than “OFF”, engine stop switch lock attached to the switch, and starter key attached, or engine could accidentally start leading to serious personal injury.

Disconnect battery cable if possible.

⚠ WARNING

Do not hold propeller with hand(s) when loosening or tightening propeller nut. Put a piece of wood between the propeller blade and anti-ventilation plate to hold propeller.



⚠ CAUTION

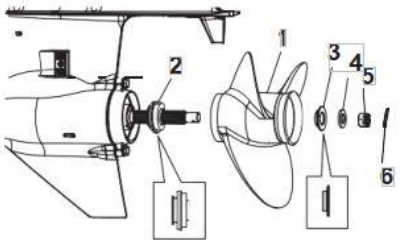
- Do not install propeller without thrust holder, or propeller boss could be damaged.
- Do not reuse split pin.
- After installing split pin, spread the pin apart to prevent it from falling out which could lead to the propeller coming off during operation.

Propeller must be selected that will allow the engine to reach recommended maximum operating range during cruising.

Wide-open throttle min^{-1}(rpm) range
5000-6000 min^{-1}(rpm)

Genuine propellers are listed on PROPELLER TABLE of this manual (See page 90).

1. Remove the split pin, propeller nut and washer.
2. Apply water proof grease to the propeller shaft before installing a new propeller.
3. Install the thrust holder, propeller stopper, washer and propeller nut onto the shaft.

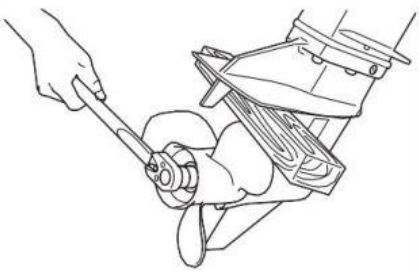


1. Propeller
2. Thrust holder
3. Stopper
4. Washer
5. Nut
6. Split pin

4. Tighten the propeller nut to specified torque while holding the propeller with a wood block, and align one of the grooves to the propeller shaft hole.

   Propeller nut torque:

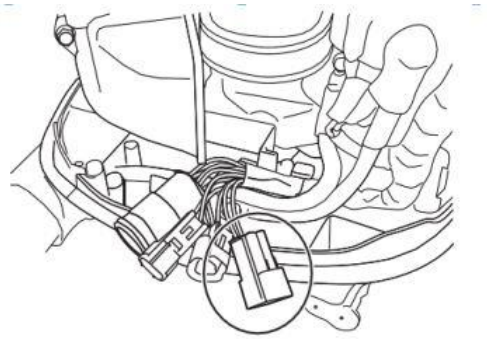
   35 Nm (25 ft-lb, 3.5kgf-m)



5. Install a new split pin into the nut hole and bend it.

5.5 OCS Installation

OCS (Onboard Communication System) interface coupler can provide information regarding engine speed, fuel consumption, and various malfunction via an optional interface cable. Contact an authorized Freedom Outboard dealer for more detail.



6. PRE-OPERATING PREPARATIONS

6.1 Fuel handling

⚠CAUTION

Use of improper gasoline can damage your engine. Engine damage resulting from the use of improper gasoline is considered misuse of the engine, and damage caused thereby will not be covered under the limited warranty.

FUEL RATING

Freedom Outboard engines will operate satisfactorily when using a major brand of unleaded gasoline meeting the following specifications:

USA and Canada: having a posted pump Octane Rating of 87 (R+M)/2 minimum. Premium gasoline (92 [R+M]/2 Octane) is also acceptable. Do not use leaded gasoline.

Outside USA and Canada: Use unleaded gasoline with declared octane rating of 91 RON or over. Use of premium gasoline of 98 RON is also allowed.

GASOLINES CONTAINING ALCOHOL

The fuel system components on your Freedom Outboard engine will withstand up to10% ethyl alcohol (herein after referred to as the "ethanol"), content in the gasoline. But even if the gasoline in your area contains ethanol less than10%, you should be aware of certain adverse effects that can occur. Increasing the percentage of ethanol in the fuel can also worsen these adverse effects. Some of these adverse effects are caused because the ethanol in the gasoline can absorb moisture from the air, resulting in a separation of the water/ethanol from the gasoline in the fuel tank.

These may cause increased:

- Corrosion of metal parts
- Deterioration of rubber or plastic parts
- Fuel permeation through rubber fuel lines
- Starting and operating difficulties

If the use of gasoline containing alcohol is inevitable, or presence of alcohol is suspected in the gasoline, it is recommended to add a filter that has water separating capability, and check the fuel system for leaks and mechanical parts for corrosion and abnormal wear more frequently. In case any such abnormality is found, discontinue the use of such gasoline and contact our dealer immediately. If the outboard motor will only be used infrequently, please see the remarks on fuel deterioration in the STORAGE chapter (P82) for additional information.

⚠CAUTION

When operating a Freedom Outboard engine on gasoline containing alcohol, storage of gasoline in the fuel tank for long periods should be avoided. Long periods of storage create unique problems. In cars, alcohol blend fuels normally are consumed before they can absorb enough moisture to cause trouble, but boats often sit idle long enough for phase separation to take place. In addition, internal corrosion may take place during storage if alcohol has washed protective oil films from internal components.

⚠ WARNING

Fuel leakage can cause fire or explosion, potentially leading to severe injury or loss of life. Every fuel system part should be checked periodically, especially after long term storage, for fuel leaks, change of hardness of rubber, and expansion and/or corrosion of metals. In case any indication of fuel leakage or degradation of fuel parts are found, replace relevant parts immediately before continuing operation.

6.2 Fuel Filling

⚠ WARNING

Do not fill the fuel tank over capacity. The rise of gasoline temperature may cause gasoline to expand which, may leak through air vent screw when it is open. Leaking gasoline is a dangerous fire hazard.

⚠ WARNING

When opening fuel tank cap, be sure to follow the procedure described below. Fuel could blast out through the fuel tank cap in the case that the cap is loosened by using another procedure when internal pressure of fuel tank is raised by heat from sources such as sunlight.

⚠ WARNING

Consult an authorized dealer for details on handling gasoline, if necessary.

Gasoline and its vapors are very flammable and can be explosive.

When carrying a fuel tank containing gasoline:

- Close the fuel tank cap and air vent screw of the fuel tank cap, or gasoline vapor will be emitted through the air vent screw, creating a fire hazard.
- Do not smoke.

When or before refueling:

- Be sure to remove the static electricity charged in your body before refueling.
- The sparks due to static electricity may cause explosions of flammable gasoline.
- Stop the engine, and do not start the engine during refueling.
- Do not smoke.
- Be careful not to over fill the fuel tank. Wipe up any spilled gasoline immediately.

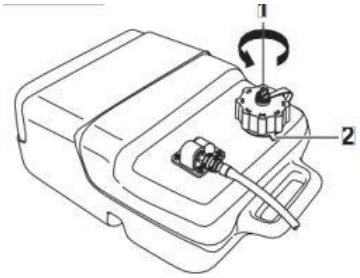
When or before cleaning the gasoline tank:

- Dismount fuel tank from the boat.
- Place the fuel tank away from every source of ignition, such as sparks or open flames.
- Do the work outdoors or in a well ventilated area.
- Wipe off gasoline immediately if spilled.

After cleaning gasoline tank:

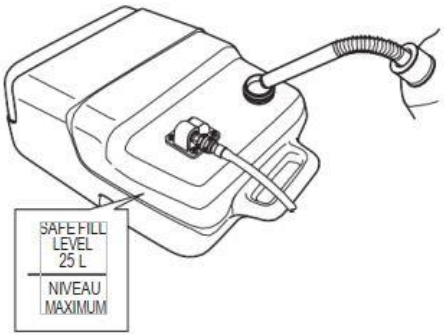
- Wipe off gasoline immediately if spilled.
- If the fuel tank is disassembled for cleaning, reassemble carefully. Imperfect assembly may cause a fuel leak, possibly leading to fire or explosion.
- Dispose of aged or contaminated gasoline in accordance with local regulations.

1. Fully open the air vent screw on the fuel tank cap and release internal pressure.



1. Air vent screw
2. Fuel tank cap

2. Loosen the tank cap until it contacts the tab lock and releases internal pressure completely. After that, press down the tab lock and open the tank cap.
3. Fill the fuel carefully not to overflow.



4. After filling the tank, close the fuel tank cap until two clicks are heard.

6.3 Engine Oil Filling

DANGER

Use of Synthetic Oil will cause catastrophic engine failure!

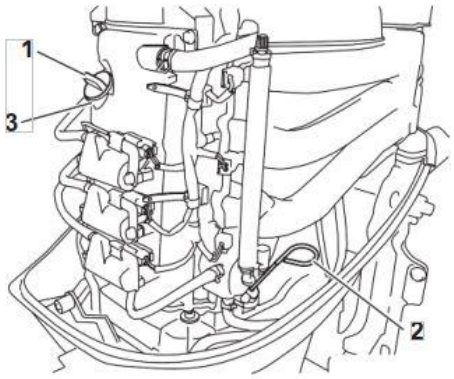
CAUTION

The engine oil is drained for shipping at the factory. Be sure to fill the engine to the proper level before starting the engine.

CAUTION

- Do not overfill engine oil, or engine oil could leak and/or engine could be damaged. If the engine oil level is over upper limit marks of oil gauge, drain oil to level lower than the upper limit.
- Be sure that the outboard motor is in an upright and level position when checking or changing oil.
- Stop engine immediately if low oil pressure warning lamp is lit or oil leak is found, or engine could be severely damaged. Then consult with dealer.
- Wipe off engine oil immediately if spilled and dispose of it in accordance with local fire prevention and environment protection regulations.

1. Place the engine in a vertical position.
2. Remove the top cowl and the oil filler cap.
3. Fill the engine through the filler port with recommended oil to between upper limit and lower limit shown on the dipstick.
4. Tighten the oil filler cap.



1. Filler cap
2. Dipstick
3. Filler port

1. Upper limit
2. Lower limit

Engine Oil Recommendation

Use only high quality 4-stroke outboard motor oil to insure performance and prolonged engine life.

10W-30 or 10W-40

Engine oil viscosity must be selected from the following chart according to the average temperatures in your area.

CAUTION

Use of engine oils that do not meet these requirements will result in reduced engine life, and other engine problems.

Engine oil volume
Approximately 2400 mL (2.5 US. qt.)

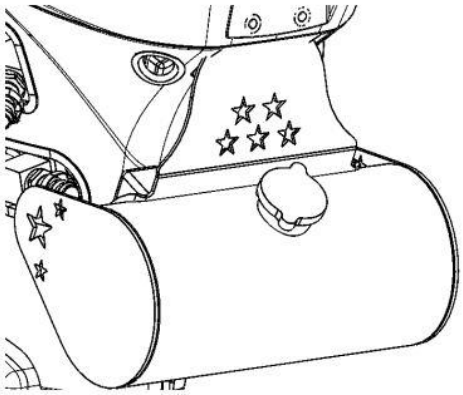
Engine oil type
10w-40

6.4 Coolant Filling

1. Fill coolant reservoir to the bottom of the filler neck.
2. Run the motor at idle for roughly 30 seconds.
3. Refill the coolant reservoir to the bottom of the filler neck.

Engine Coolant recommendation

Use 50/50Ethylene Glycol Antifreeze water mixture.



6.5 Break-in

Your new outboard motor and lower unit require break-in for the moving components according to the conditions described in the following timetable.

Please refer to ENGINE OPERATION section (See page 37) to learn how to correctly start and operate the outboard motor.

DANGER

Do not operate the outboard motor in closed areas or in areas with no forced ventilation.

Exhaust gas emitted by this outboard motor contains carbon monoxide that will cause death if inhaled continuously. Inhaling the gas initially causes symptoms such as feeling of sickness, drowsiness and headache.

During operation of the outboard motor:

- Keep peripheral area well ventilated.
- Always attempt to stay on the windward side of emission.

CAUTION

Operating the outboard motor without break-in can shorten service life.

If any abnormality is experienced during the break-in:

- Discontinue the operation immediately.
- Have the dealer check the product and take proper action(s) if necessary.

NOTE

- Proper break-in allows the outboard motor to deliver its full performance for a longer service life.
- Break-ins must be conducted under load in the water with propeller installed and in gear.

	1-10 min	10 min – 2 hrs	2 hrs – 3 hrs	3 hrs – 10 hrs	After 10 hrs
Throttle Position	Idle	Less than ½ throttle	Less than ¾ throttle	¾ throttle	Full throttle available
Speed		Approx. 3000 min^{-1}(rpm) max	Full throttle run allowed for1 min every 10 min	Approx.4000 min^{-1}(rpm). Full throttle run allowed for 2 min every 10 min	

6.6 Warning System

If outboard motor encounters an abnormal condition or fault, the warning buzzer will emit a continuous beep or intermittent short beeps and the warning lamp (LED) will synchronize with the buzzer and engine speed will be limited (engine will not be stopped).

See next page for conditions which will lead to an abnormal condition or fault.

Location of warning buzzer and lamps

Warning Buzzer

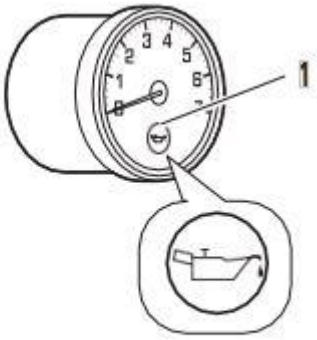
RC model: Located inside the remote control.

Tiller handle model: Located in the tiller handle.

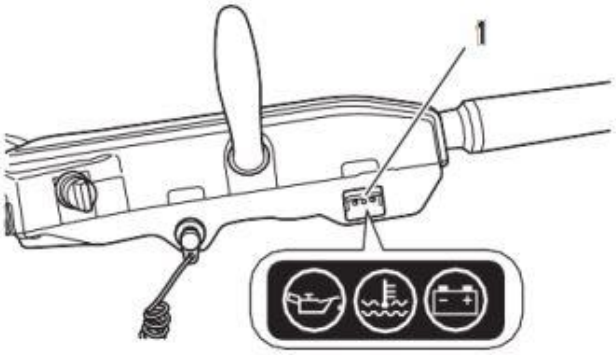
Warning Lamp (LED)

RC model: Located in the tachometer.

Tiller handle model: Located on the tiller handle.



1. Warning lamp



1. Warning lamp

Warning indicators, faults and remedy for RC model

Warning Indicators		ESG	Description of faults or notice	Remark	Remedy
Sound	 A lamp				
Continuous	ON		Normal system test when key on	1 second	
Continuous		High speed ESG	Engine speed exceeds maximum allowable RPM	Approx. 6,200 min^{-1}(rpm)	1
Continuous	ON	Low speed ESG	Low oil pressure		2
Continuous		Low speed ESG	Cooling water temp. is high	Over 85°C/185°F	3
	Flashing	Low speed ESG	Malfunction of sensor		5
	Flashing		Malfunction of electrical part	“A lamp” ON 1 sec. and OFF 1 sec.	5
			Inform the recommended timing of engine oil replacement (every 100hrs.)	“A lamp” ON 1 sec. and OFF 9 sec.	6
One beep			Lowest idling speed of variable idling system		
Two beep			Highest idling speed of variable idling system		

Highspeed ESG (Electronic Safety Governor)

High speed ESG is a device to prevent over revolution of the engine. If the load to the engine becomes light for some reason, it runs at a higher speed than usual. In such a case, the buzzer sounds and the ESG is activated to not ignite the spark plug, therefore, the engine speed varies and will be controlled under 6,200 min^{-1}(rpm).

Low speed ESG

Low speed ESG is a device to prevent the engine from getting damaged. If the engine has problems regarding coolant, oil pressure, and sensors, the lows peed ESG is activated to not ignite the spark plug, and disable fueling therefore, the engine speed varies and will be controlled under 3,000 min^{-1}(rpm).

Warning indicators, faults and remedy for Tiller handle model

Warning Indicators				ESG	Description of faults or notice	Remark	Remedy
Sound							
	A Lamp	B Lamp	C Lamp				
Continuous	ON				Normal system test when key on	1 second	
Continuous				High speed ESG	Engine speed exceeds maximum allowable RPM	Approx. 6,200 min^{-1}(rpm)	1
Continuous	ON			Low speed ESG	Low oil pressure		2
Continuous		Flashing		Low speed ESG	Cooling temp. is high	Over 85°C/185°F	3
			Flashing		Battery voltage is low	Engine is stopped under 9V	4
	Flashing	Flashing	Flashing	Low speed ESG	Malfunction of sensor		5
	Flashing	Flashing	Flashing		Malfunction of electrical part		5
	Flashing				Inform the recommended timing of engine oil replacement (every 100 hrs.)	“A lamp” ON 1 sec. and OFF 9 sec.	6
One beep					Lowest idling speed of variable idling system		
Two beeps					Highest idling speed of variable idling system		

Highspeed ESG (Electronic Safety Governor)

High speed ESG is a device to prevent over revolution of the engine. If the load to the engine becomes light for some reason, it runs at a higher speed than usual. In such a case, the buzzer sounds and the ESG is activated to not ignite the spark plug, therefore, the engine speed varies and will be controlled under 6,200 min^{-1}(rpm).

Low speed ESG

Low speed ESG is a device to prevent the engine from getting damaged. If the engine has problems regarding coolant, oil pressure, and sensors, the lows peed ESG is activated to not ignite the spark plug, and disable fueling therefore, the engine speed varies and will be controlled under 3,000 min^{-1}(rpm).

Remedies

1. Reduce the throttle to less than half opening, and move to safe place quickly, and stop the engine. Check the propeller for bent or damaged blades. Consult an authorized dealer if the engine shows the same result even after replacing the propeller with a new one.
2. Move to a safe place quickly and stop the engine. Check the engine oil level and add engine oil if necessary. Consult your dealer if the engine oil level is too low or too high.
3. Move to a safe place quickly and check the coolant from the coolant reservoir at idle speed and stop engine. Remove any foreign matter on the gear case and propeller if necessary. Consult an authorized dealer if there is no flow of coolant.
4. Charge or replace the battery.
5. Consult an authorized dealer.
6. Replace the engine oil (See page 71) and reset the indicator (See page35).

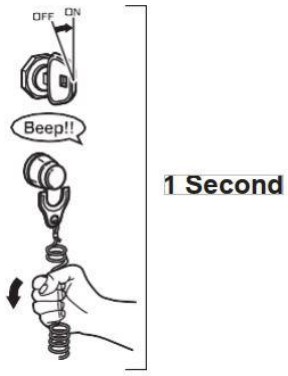
⚠CAUTION

- Low speed ESG ON: Engine speed will be limited to 2800 min^{-1}(rpm), however you should not continue to run engine.
- High speed ESG ON: Engine speed will be limited to 6200 min^{-1}(rpm) and engine will run rough until throttle is reduced.

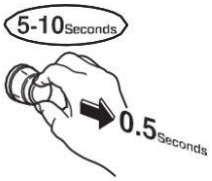
Engine oil replacement indicator function reset method

As for "Engine oil replacement indicator function", informing the appropriate timing of engine oil replacement by blinking of the lamp, when beyond100 hours operating.

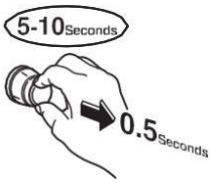
1. Be certain the safety lanyard is installed. Turn the key to the 'on' position and after the 'beep' pull the safety lanyard off.



2. Within 5-10 seconds, pull the red knob on the safety switch out and release.



3. Wait 5-10 seconds and pull the red knob out and release.



4. Within 5-10 seconds you will hear 3 beeps to inform you that you have successfully reset the system.

5. Turn the key to the 'off' position and replace the safety lanyard lock.

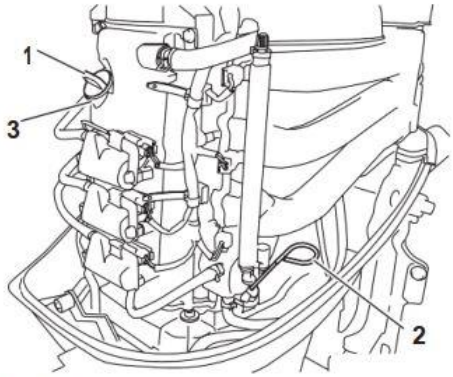
The engine oil replacement indicator's function operates again after 100 hours of operation from the reset this function.

7. ENGINE OPERATION

7.1 Before Starting

Oil Level checking

Check the engine oil level before each use. If the oil level is too low or too high, the life of the engine will be shortened significantly. (To properly check the engine oil level follow the instructions, see page 66)



1. Oil filler cap
2. Dipstick
3. Filler port

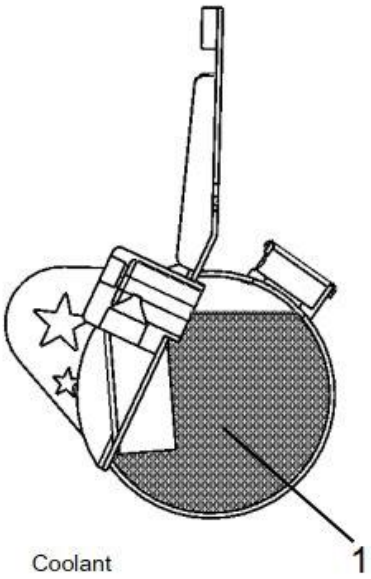
1. Upper limit
2. Lower limit

⚠CAUTION

Before starting engine for the first time after reassembling engine or off-season storage, disconnect stop switch lock and crank approximately 10 times in order to prime the oil pump.

Coolant Level Checking

Check the engine coolant level before each use. The coolant should be filled to the bottom of the filler neck as seen below.



1. Coolant

⚠ WARNING

Low coolant levels can cause motor to over heat and cause possible damage to the motor.

7.2 Fuel feeding

⚠ WARNING

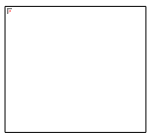
When opening the fuel tank cap, be sure to follow the procedure described below. Fuel could blast out through the fuel tank cap in the case that the cap is loosened by using another procedure when internal pressure of fuel tank is raised by head from sources such as sunlight.

⚠ WARNING

When using EPA approved fuel tank, only use a primer bulb/hose assembly that has a Fuel Demand Valve (FDV) installed in the fuel hose or a sealing mechanism in the fuel connector as shown below.

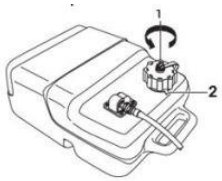
FDB and fuel connector that has a sealing mechanism prevent pressurized fuel spillage when the fuel connector is connected to the engine.

Do NOT use a primer bulb/hose assembly that does not contain a Fuel Demand Valve or a sealing mechanism as shown below: otherwise fuel spillage may occur when the connector is connected to the engine.



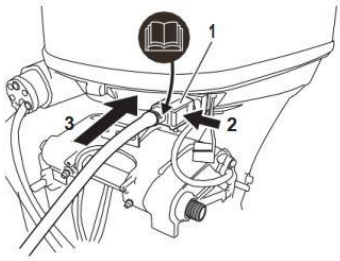
Do not connect fuel connector except when operating engine. Fuel leakage is a fire or explosion hazard, which can cause serious injury or death.

1. Fully open the air vent screw on the fuel tank cap.

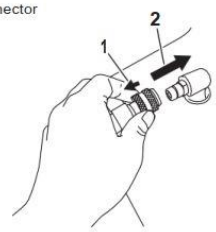


1. Air ventscrew
2. Fuel tank cap

2. Loosen the tank cap until it contacts the tab lock and release internal pressure completely. After that, close the tank cap until two clicks are heard.
3. Connect the fuel connector to the engine and fuel tank.



1. Fuel connector
2. Push
3. Insert



1. Pull
2. Insert

4. Squeeze the primer bulb until it becomes stiff to feed fuel to vapor separator. Direct arrow mark upward when priming.

   Do not squeeze the primer bulb with engine running or when the outboard motor is tilted up. Otherwise, fuel could overflow.

1. Engine side
2. Fuel tank side

7.3 Starting the engine

⚠WARNING

- Do not remove or install the top cowl after the engine has been started.
- The exposed rotating engine parts or moving parts may cause serious injury.

⚠CAUTION

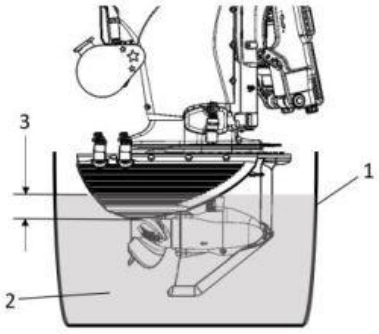
The top cowl must be installed while the engine is running except in an emergency. If the top cowl is not installed correctly, water splash could damage the engine.

⚠CAUTION

When the engine is started in the test tank, to avoid overheating, be sure the heat exchangers are submerged within the water.

Also be sure the remove the propeller when starting the engine in the test tank. (See page 76)

Run the engine only at ide.



1. Test tank
2. Water
3. Over 10 cm (4 in.)

⚠CAUTION

Do not hold turning starter for more than 5 seconds, or the battery may be consumed, potentially making the engine starting impossible and/or damaging the starter.

If cranking over 5 seconds fails to start engine, return main switch to “ON”, and crank engine again after 10 seconds or more. Do not try to crank after the engine has started.

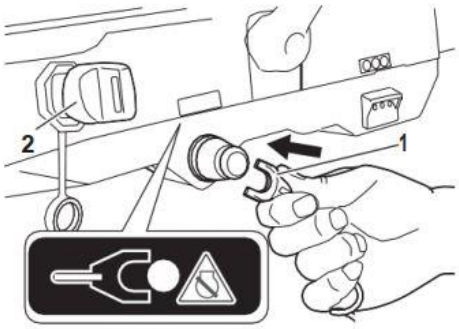
This model is provided with start in gear protection.

NOTE

Start-in-gear protection prevents the engine from starting at other than neutral shift. In-dear starting of engine will move the boat immediately, potentially leading to falling or causing passenger(s) to be thrown overboard.

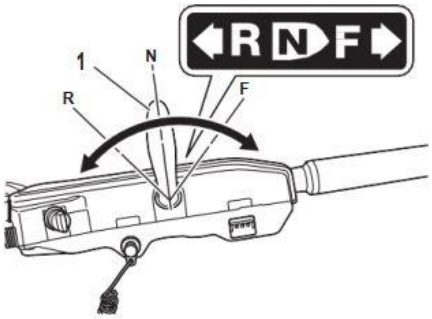
Tiller handle type

1. Be sure to install the stop switch lock to the stop switch, and attach the stop switch lanyard securely to the operator or to the operator's PFD (Personal Flotation Device).



1. Stop switch lock
2. Main switch key

2. Insert the main switch key.
3. Set the control lever to the Neutral position.

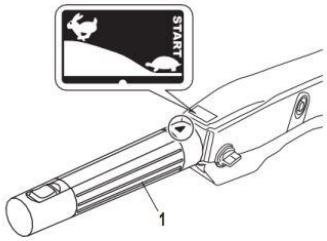


1. Shift lever

⚠CAUTION

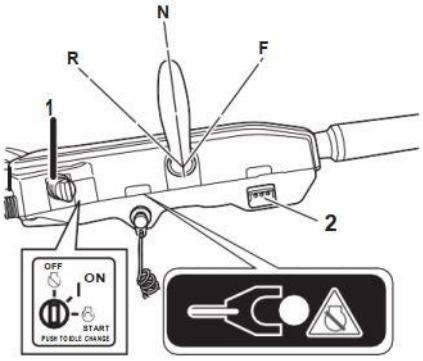
If the engine starts in gear, do not use it. Contact an authorized dealer.

4. Set the throttle grip to START position.



1. Throttle grip

5. Turn the main switch key to ON position and confirm three warning lamps light up with a buzzer sound.
6. Turn the main switch key to START position and release the key when the engine has started. The key returns to the original position, automatically.



1. Main switch key
2. Warning lamp

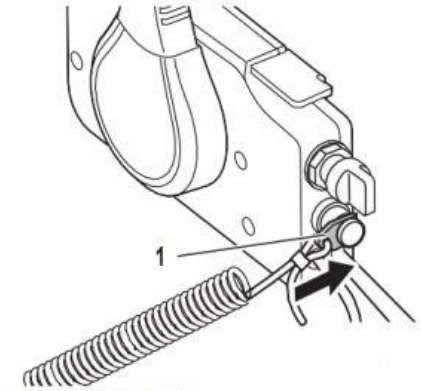
⚠CAUTION

Do not hold turning starter for more than 5 seconds, or the battery may be consumed, potentially making the engine starting impossible and/or damaging the starter.

If cranking over 5 seconds fails to start engine, return main switch to "ON", and crank engine again after 10 seconds or more.

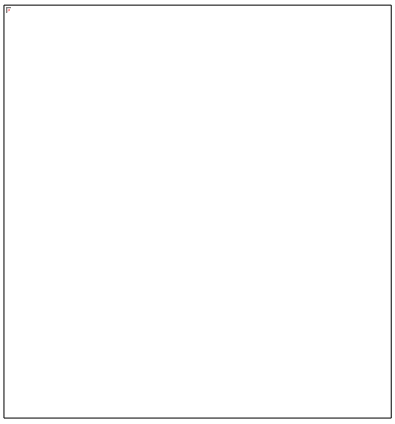
Side mount RC type

1. Be sure to install the stop switch lock to the stop switch, and attach the stop switch lanyard securely to the operator or to the operator's PFD (Personal Flotation Device).

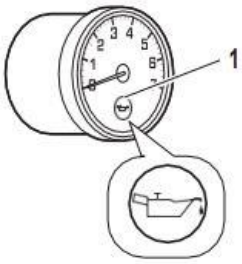


1. Stop switch lock

2. Insert the main switch key.
3. Set the control lever in the Neutral position. Do not raise the free throttle lever when starting the engine.

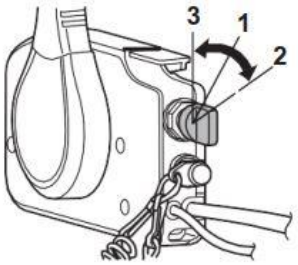


4. Turn the main switch key to the ON position and confirm warning lamp light up with buzzer sound.



1. Warning lamp

5. Turn the main switch key to START position and release the key when the engine has started. The key returns to the original position, automatically.



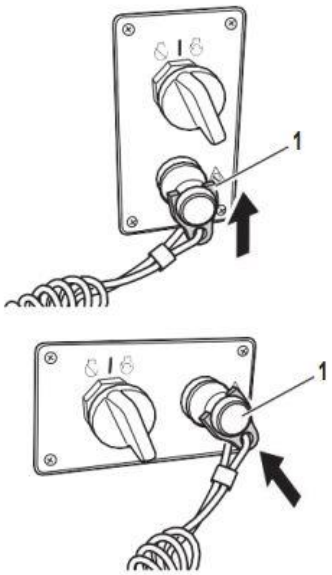
1. ON
2. START
3. OFF

NOTE

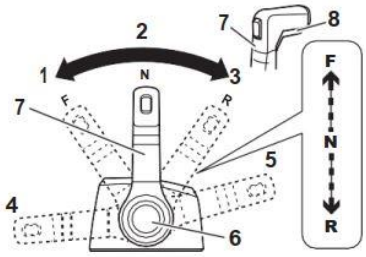
The free throttle lever cannot be raised when the shift control lever is in Forward or Reverse.

Top mount RC type

1. Be sure to install the stop switch lock to the stop switch, and attach the stop switch lanyard securely to the operator or to the operator's PFD (Personal Flotation Device).

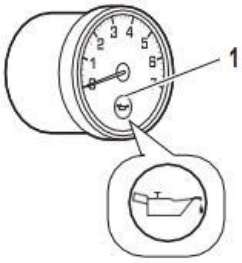


2. Insert the main switch key.
3. Set the control lever in the Neutral position. Do not use the Neutral throttle button to open the throttle when starting the engine.



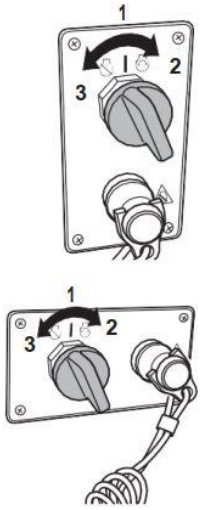
1. Forward (F)
2. Neutral (N)
3. Reverse (R)
4. Fully opened (Forward)
5. Fully opened (Reverse)
6. Neutral throttle button
7. Control lever
8. Neutral lock arm

4. Turn the main switch key to the ON position and confirm warning lamp light up with buzzer sound.



1. Warning lamp

5. Turn the main switch key to START position and release the key when the engine has started. The key returns to the original position, automatically.



1. ON
2. START
3. OFF

NOTE

The neutral throttle button cannot be pushed-in when the shift control lever is in Forward or Reverse.

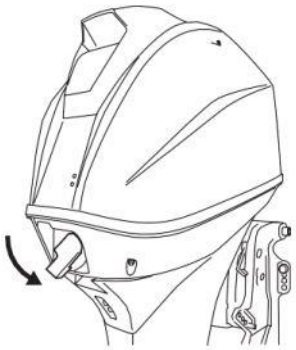
Emergency starting

⚠WARNING

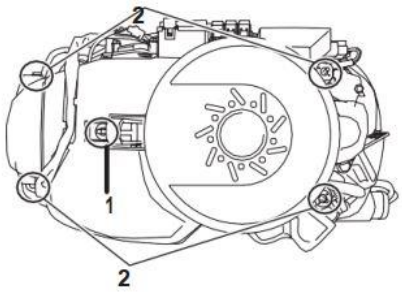
When the emergency starter rope is used for starting engine:

- Start in gear protection does not work. Be sure the shift is at the neutral position. Otherwise, the engine will move the boat immediately and cause personal injury.
- Be careful that your clothes or other items do not get caught in the rotating engine parts.
- To prevent accidents and injury by rotating parts, do not re-attach the flywheel cover and the top cowl after the engine has been started.
- Do not pull the starter rope if any bystander is behind. The action can injure the bystander.
- Attach engine stop switch lanyard to clothing or any part of body lie arm before starting engine.

1. Remove the top cowl.

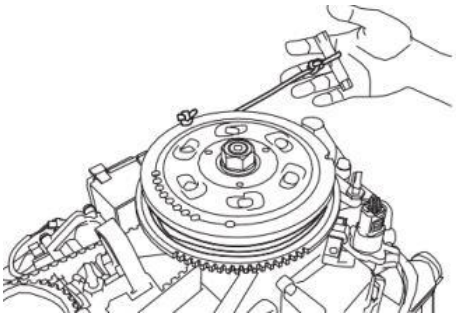


2. Remove the flywheel cover.



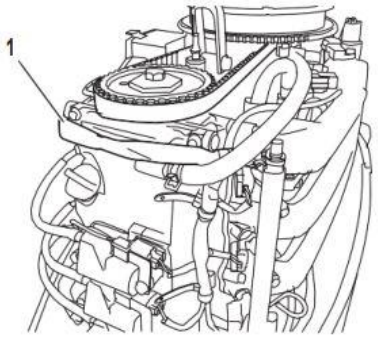
1. Bolt
2. Rubber grommet

3. Insert the knotted end of the starter rope into the notch in the flywheel and wind the rope around the flywheel several turns clockwise.
4. Tie a loop in the other end of the emergency starter rope and attach socket wrench that is included in the tool kit.



⚠CAUTION

Be sure to keep the harness away from the rotation parts.



1. Harness

5. Be sure to install the stop switch lock to the stop switch, and attach the stop switch lanyard securely to the operator or to the operator's PFD (Personal Flotation Device).
6. Set the control lever in the Neutral position.
7. Pull the starter handle slowly until you feel engagement, keep pulling till you feel less resistance. Then pull it quickly.
8. After the engine starts, do not reinstall flywheel cover or top cowl.

7.4 Warming up the engine

⚠CAUTION

Be sure to check that the coolant reservoir is full and coolant is flowing within the reservoir.

Warm the engine at low engine speeds for about

- 3 minutes: above 5°C (41°F)
- 5 minutes at 2000 min^{-1}(rpm): below 5°C (41°F)

This allows the lubricating oil to circulate to all parts of the engine. Operating the engine without warm up shortens the engine's life.

Engine Speeds

Idling speed after warming up.

NOTE

In case of cold engine starting, idling speed is increased about 400 min^{-1}(rpm) for several minutes.

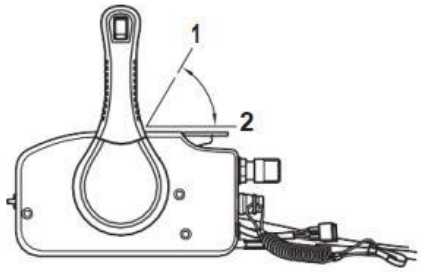
Clutch in (In gear)	Clutch off (Out of gear)
850 min^{-1}(rpm)	850 min^{-1}(rpm)

Free throttle lever (Side mount RC type)

⚠CAUTION

- Keep the free throttle lever fully in the closed position when starting the engine.
- The free throttle lever is inoperative unless the control lever is in neutral.
- Also, the control lever is inoperative unless the free throttle elver is returned to the fully closed position.

The free throttle lever is for warm-up operation. (Not required for engine starting). With the control lever in neutral, move the free throttle lever upward to open the throttle.



1. Fully-open
2. Fully-closed

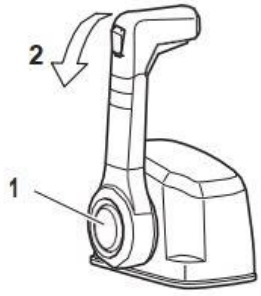
Neutral throttle button (Top mount RC type)

⚠CAUTION

The control lever does not operate unless the neutral lock arm is pulled.

The neutral throttle button is for warm-up operation (Not required for engine starting). When the control lever is in neutral, push and hold the neutral throttle button. While holding the button, move the lever forward to throttle up the engine.

When the control lever is returned to neutral position, the button will reset automatically.



1. Neutral throttle button
2. Forward

Trolling engine speed control function

If the main switch key is pressed for 1 (one) second during idling or trolling operation, engine revolutions change.

Each time the main switch key is pressed in the above manner, engine speed changes as follows.

Starting

$850min^{-1}$ (rpm) → $750min^{-1}$ (rpm) → $650min^{-1}$ (rpm)
↑ ↓
$950min^{-1}$ (rpm) ← $850min^{-1}$ (rpm) ← $750min^{-1}$

The buzzer will sound one time, when set to 650 min^{-1}(rpm) engine speed, and tells the lowest engine speed was set.

The buzzer will sound twice when set to 950 min^{-1}(rpm) engine speed and tells the highest engine speed was set.

Reset the engine speed when after engine restarted and or engine speed is about 3,000 min^{-1}(rpm), and then trolling engine speed to be 850 min^{-1}(rpm) as standard.

In addition, this function does not operate when battery voltage is lower than specified, engine idle and trolling engine speed will be set to 850 min^{-1}(rpm) automatically.

7.5 Forward, reverse, and acceleration

⚠WARNING

Before shifting into forward or reverse, make sure that boar is properly moored, and outboard motor can be steered fully to the right and left. Make sure that no swimmer(s) are ahead or astern of the boat.

⚠WARNING

- Attach the other end of the emergency stop switch lanyard to the operator's PFD (Personal Flotation Device) or arm and keep it attached during cruising.
- Do not attach the tether to a part of clothing that can be torn easily when pulled.
- Arrange the tether so that it will not be caught be any objects when pulled.
- Be careful not to pull the tether accidentally during cruising. Unintentional stop of engine can cause loss of control of outboard motor. Rapid loss of engine power can lead to falling down or causing passenger(s) to be thrown overboard.

⚠WARNING

- Do not shift into Reverse during planing, or control will be lost leading to serious personal injury, boat may swamp, and/or hull may be damaged.
- Do not shift into Reverse during cruising, or control may be lost, falling or causing passenger(s) to be thrown overboard. Leading to serious personal injury, and steering system and/or shifting mechanism may be damaged.

⚠WARNING

- Do not shift at high boat speed, or control may be lost, falling or causing passenger(s) to be thrown overboard. Leading to serious personal injury.

⚠CAUTION

Gear and clutch damage may occur if shifting at high engine speed. Engine must be in the slow idle position before shifting is attempted.

⚠CAUTION

Idle speed may be higher during warming up of engine. If shifted to Forward or Reverse during warming up, it may be difficult to shift back to neutral. In such case, stop engine, shift to neutral, and restart engine to warm up.

NOTE

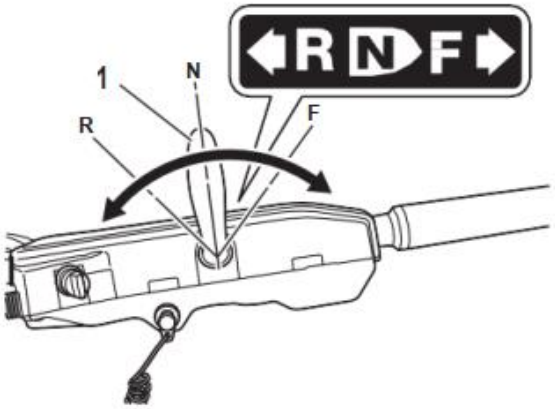
Frequent shifting to Forward or Reverse can accelerate wear or degradation of parts. In such case, replace gear oil earlier than the period specified.

⚠CAUTION

Do not increase engine speed unnecessarily when the shift is in Neutral and Reverse, or engine damage may occur.

Tiller Handle Type

> ⚠CAUTION
>
> Do not force the shift when the throttle grip os not in the fully closed position, otherwise the steering system and/or shifting mechanism may be damaged. The control lever is inoperative unless the throttle grip is in the fully closed position (Multi-function tiller type).



1. Shift lever

Forward

1. Turn the throttle grip to reduce engine speed.
2. When the engine reaches trolling (or idling) speed, quickly pull the shift lever to the Forward position.

Reverse

1. Turn the throttle grip to reduce engine speed.
2. When the engine reaches trolling (or idling) speed, quickly pull the shift lever to the Reverse position.

Acceleration

> ⚠**WARNING**
>
> Sudden acceleration and deceleration may cause passenger(s) to be thrown overboard or fall.

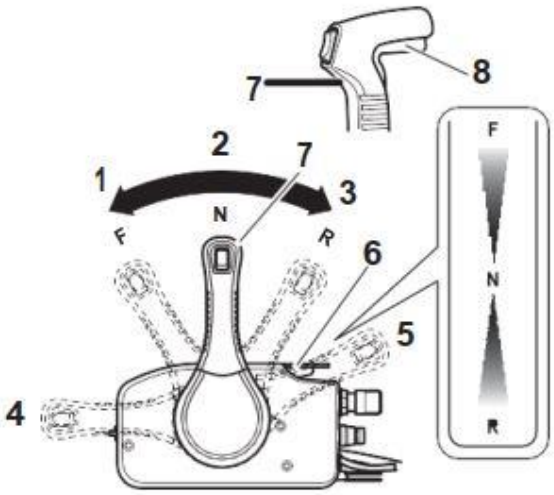
1. Open throttle grip gradually.

1. Throttle grip

Side Mount RC type

⚠WARNING

Sudden acceleration and deceleration may cause passenger(s) to be thrown overboard or fall.



1. Forward (F)
2. Neutral (N)
3. Reverse (R)
4. Fully opened (Forward)
5. Fullyopened (Reverse)
6. Free throttle lever
7. Control lever
8. Neutral lock arm

Forward

1. Quickly push the control lever to the Forward (F) position (32°), where the gear is engaged, while lifting up on the neutral lock arm located under the control lever grip.
2. Further forward motion will open the throttle.

Reverse

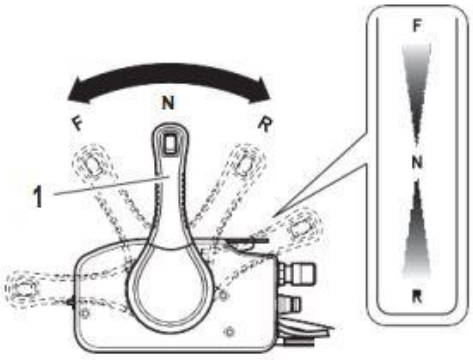
1. Quickly pull the control lever to the Reverse (R) position (32°), where the gear is engaged, while lifting up on the neutral lock arm located under the control lever grip.
2. Further reward motion will open the throttle.

Acceleration

⚠WARNING

Sudden acceleration and deceleration may cause passenger(s) to be thrown overboard or fall.

1. Open throttle grip or control lever gradually.

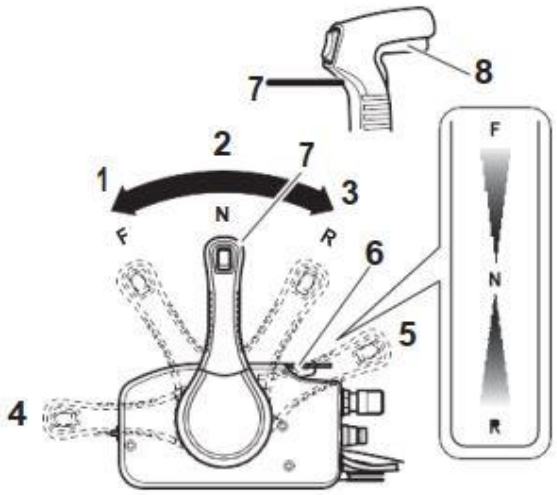


1. Control lever

Top Mount RC type

⚠WARNING

Sudden acceleration and deceleration may cause passenger(s) to be thrown overboard or fall.



1. Forward (F)
2. Neutral (N)
3. Reverse (R)
4. Fully opened (Forward)
5. Fullyopened (Reverse)
6. Free throttle lever
7. Control lever
8. Neutral lock arm

Forward

1. Quickly push the control lever to the Forward (F) position (32°), where the gear is engaged, while lifting up on the neutral lock arm located under the control lever grip.
2. Further forward motion will open the throttle.

Reverse

1. Quickly pull the control lever to the Reverse (R) position (32°), where the gear is engaged, while lifting up on the neutral lock arm located under the control lever grip.
2. Further reward motion will open the throttle.

Acceleration

⚠WARNING

Sudden acceleration and deceleration may cause passenger(s) to be thrown overboard or fall.

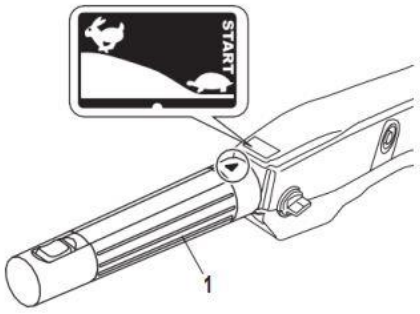
1. Open throttle grip or control lever gradually.

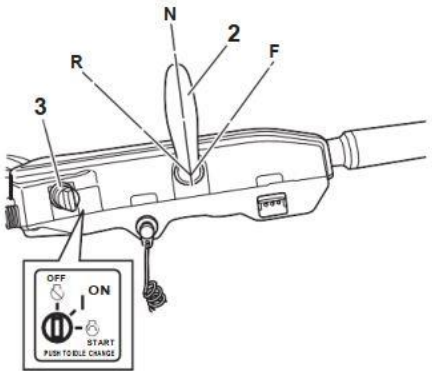
7.6 Stopping the engine

⚠WARNING

Be careful not to remove engine stop switch lanyard from engine accidentally while boar is running. Sudden stop of engine can cause loss of steering control. It can also cause loss of boat speed, possibly leading the crew(s) and or objects on the boat to be thrown forward due to inertial force.

Tiller handle type



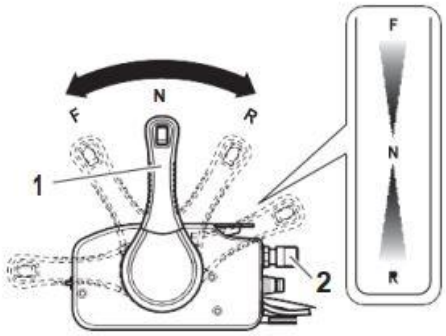


1. Throttle grip
2. Shift lever
3. Main switch key

1. Turn the throttle grip to the “slow” position.
2. Put the shift lever in the Neutral position.
3. Run the engine for 2-3 minutes at idling speed for cooling down if it has been running at full speed.
4. Turn the main switch key to the OFF position.

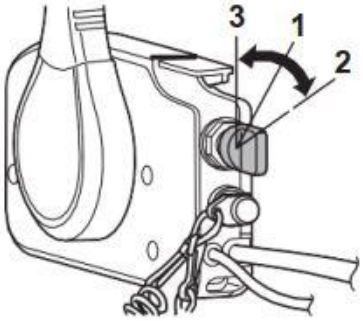
Side mount RC type

1. Put the control lever in the Neutral position and run the engine for 2-3 minutes at idle speed for cooling down if it has been running at full speed.



1. Control lever
2. Main switch key

2. Turn the main switch key to the OFF position.



1. ON
2. START
3. OFF

⚠WARNING

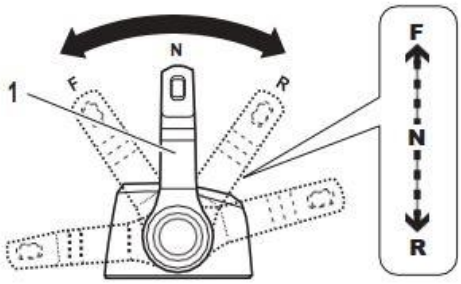
After stopping the engine:

- Close the air vent screw on the fuel tank cap.
- Disconnect the fuel connector of the engine and the fuel tank.

- Disconnect the battery cord, after each use.

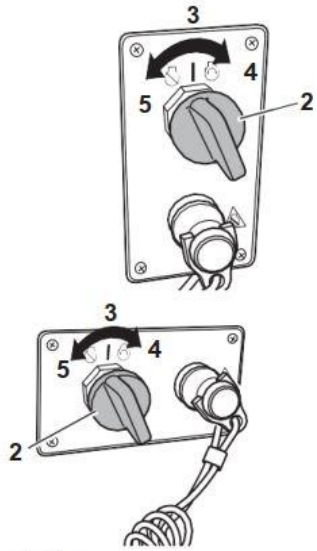
Top mount RC type

1. Put the control lever in the Neutral position and run the engine for 2-3 minutes at idle speed for cooling down if it has been running at full speed.



1. Control lever

2. Turn the main switch key to the OFF position.



2. Main switch key
3. ON
4. START
5. OFF

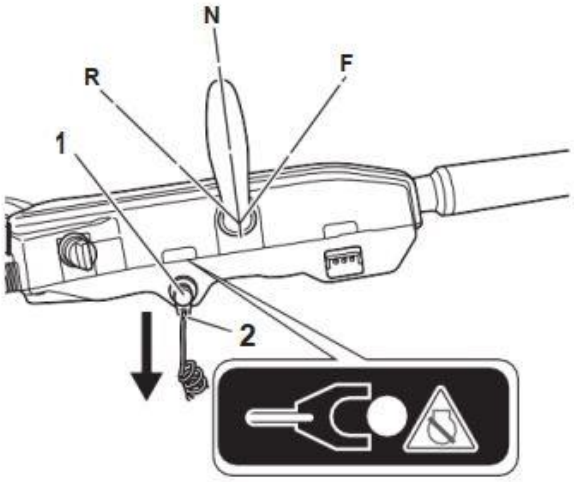
⚠WARNING

After stopping the engine:

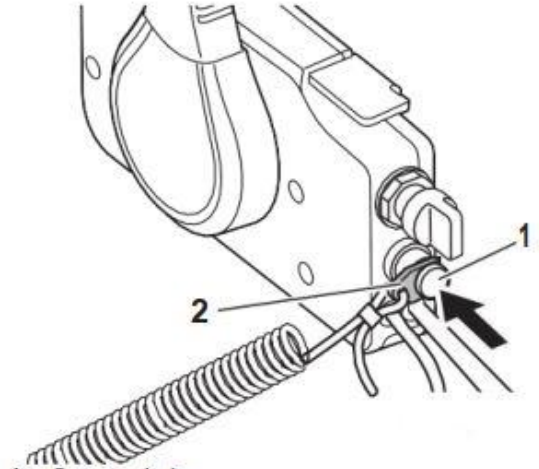
- Close the air vent screw on the fuel tank cap.
- Disconnect the fuel connector of the engine and the fuel tank.
- Disconnect the battery cord, after each use.

Emergency engine stopping

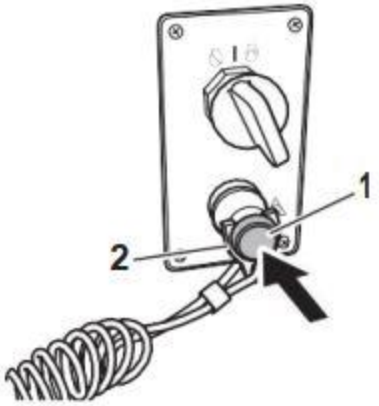
Press the emergency stop switch or remove the stop switch lock to stop the engine.

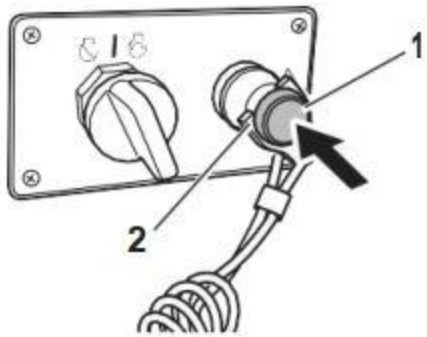


1. Stop switch
2. Stop switch lock



1. Stop switch
2. Stop switch lock



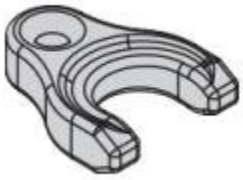


1. Stop switch
2. Stop switch lock

Spare emergency stop switch lock

A spare emergency stop switch lock is provided in the tool bag. When used as described, the emergency stop switch clip and emergency stop switch lanyard system stops the engine if the operator falls away from the controls. When an operator falls into the water, be sure to use the emergency stop switch lock of the spare.

Be sure to confirm the spare stop switch lock is in the tool bag before operation of the motor.



7.7 Steering

WARNING

Sudden steering may cause passenger(s) to be thrown overboard or fall.

Tiller handle type

Right turn

Move the tiller handle to the left.

Left turn

Move the tiller handle to the right.

Remote control type

Right turn

Turn the steering wheel to the right.

Left turn

Turn the steering wheel to the left.

7.8 Trim angle

WARNING

- Do not put hand or finger in between outboard motor body and clamp bracket when adjusting trim angle to prevent injury in case the outboard motor body falls.
- Unsuitable trim position can cause loss of control of boat. When testing a trim position, run the boat slow initially to see if it can be controlled safely.

WARNING

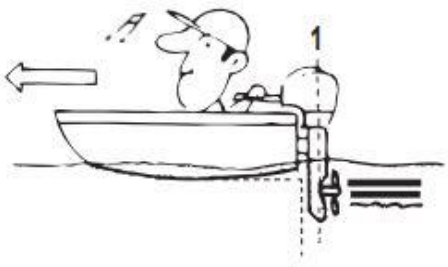
Excessive trim up or down may lead to unstable boat operation, potentially causing the steering difficulty that leads to accidents while cruising.

- Do not cruise at high speed if improper trim position is suspected. Stop the boat and readjust the trim angle before continuing cruise.
- For outboard motor models with PTT switch on the bottom cowl, do not operate the switch during cruising, or control of boat may be lost.

The trim angle of the outboard motor can be adjusted to suit the transom angle of the hull, and load conditions. Choose an appropriate trim angle that will allow the anti-ventilation plate to run parallel to the water surface during operation.

Proper trim angle

The position of the thrust rod is correct if the hull is horizontal during operation.



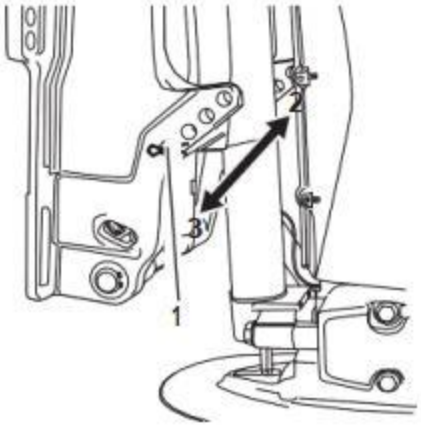
1. Perpendicular to the water surface

Improper trim angle (bow rises too high)

Set the trust rod lower if the bow of the boat rises above horizontal.

Improper trim angle (bow dips into the water)

Set the thrust rod higher if the bow of the boat is below horizontal.

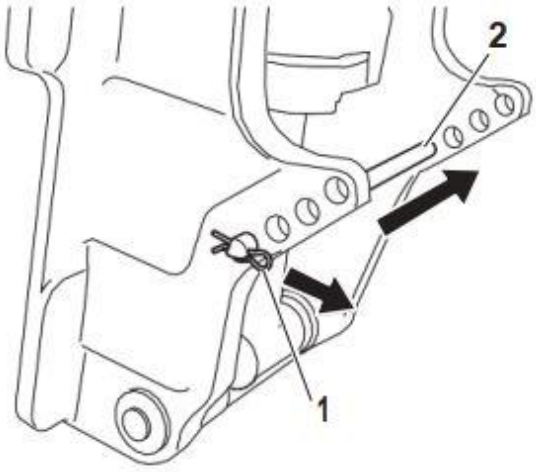


1. Thrust rod
2. Higher
3. Lower

Trim angle adjustment

The transom angle adjustment

1. Stop the engine.
2. Shift into neutral position.
3. Tilt up the outboard motor.
4. Lock the tilt stopper.
5. Remove the snap pin and thrust rod as shown in picture.



1. Snap pin
2. Thrust rod

6. Reinstall the thrust rod in the desired position securely.

7. Put the snap pin back and unlock the tilt stopper.
8. Gently tilt down the outboard motor.

7.9 Tilt up and down

WARNING

Do not tilt outboard motor up or down when swimmer(s) or passenger(s) are near to prevent them from being caught between outboard motor body and clamp bracket in case the outboard motor body fails.

WARNING

When tilting up or down, be careful not to place your hand between the swivel bracket and the stern bracket. Be sure to tolt the outboard motor down slowly.

WARNING

When tilting the outboard motor with fuel joint for over a few minutes, be sure to disconnect fuel hose, or fuel may leak, potentially catching fire.

CAUTION

Do not tilt up the outboard motor while engine operates, or no coolant may be fed, leading to engine seizure due to overheating.

Gas assist type

WARNING

When taking the outboard motor out of packaging or removing the outboard motor from the boat, never release the lock lever, If the lock lever is released, it will be very easy for the clamp bracket to spring up in the tilting direction because it is not fixed.

WARNING

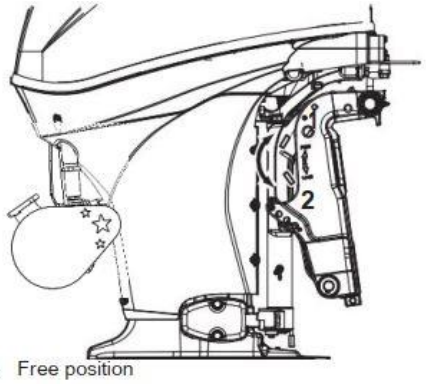
Never attempt to disassemble shock absorber of gas assist tilt system. It is dangerous because high pressure gas is included in the shock absorber.

Tilt up

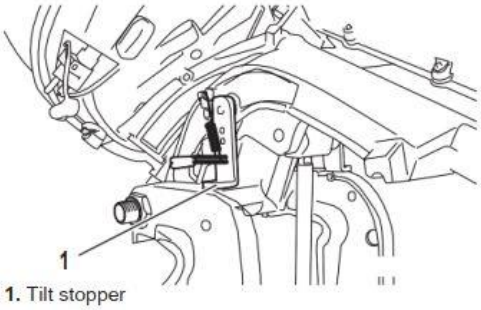
1. Move (UP) lock lever to “Free” position.
2. Fully tilt up the outboard motor.
3. While keeping the outboard motor in full tilt up position, move (DOWN) lock lever to “Lock” position.
4. For safety, set the tilt stoper into the setup position, even if the outboard motor is kept in the tilt up position after the lock lever is moved (DOWN to “Lock” position.

Tilt down

1. Move (UP) lock lever to “Free” position.
2. Release the tilt stopper from the setup position while slightly tilting up the outboard motor.
3. Release outboard motor down to thrust rod.
4. Move (DOWN) lock lever to “lock” position after the outboard motor is completely tilted down.



1. Free position
2. Lock position



1. Tilt stopper

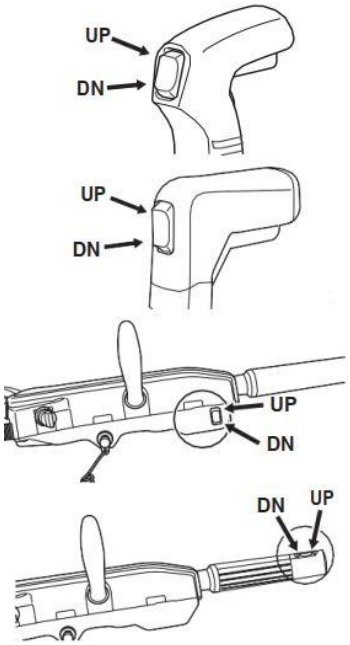
Power Trim & Tilt type

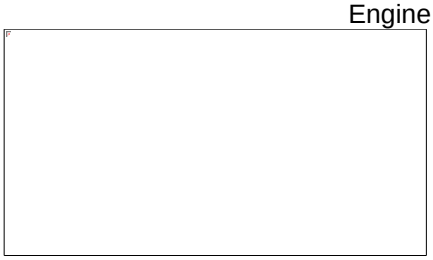
Tilt up

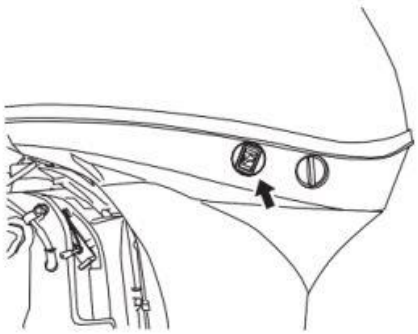
1. Operate the Power Trim & Tilt switch and tilt the outboard motor up.
2. Lock the tilt with the Tilt stopper after the outboard motor has been titled up.

Tilt down

1. Release the tilt stopper from the setup position while slightly tilting up outboard motor.
2. Operate the Power Trim & Tilt switch and tilt the outboard motor down until the motor touches to the thrust rod.
   - The outboard motor can also be tilted up and down using the switch provided under the bottom cowl.
   - It is possible to tilt up or down despite main switch being “ON” or “OFF”.







Manual relief valve

If the battery is dead, and the power trim & tilt switch are thus inoperative, open the manual valve completely in the Manual direction. This will allow the manual tilting of the outboard motor.

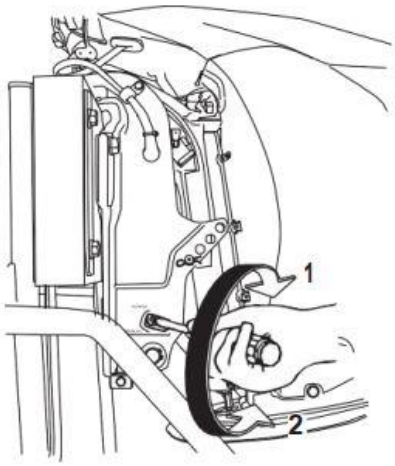
⚠WARNING

Make sure the manual relief valve is closed before operating the outboard motor. If the manual relief valve is not closed, the outboard motor will tilt up when operated in reverse.

⚠WARNING

Before opening the manual relief valve, make sure nobody is under the outboard motor. If the outboard motor is in the tilted up position, it will tilt down suddenly if the manual relief valve is loosened in the “Manual” direction.

Manual relieve valve specified torque: 1.8N-m (1.4ft-lb, 0.18 kgf-m)



1. Power
2. Manual

7.10 Shallow water operation

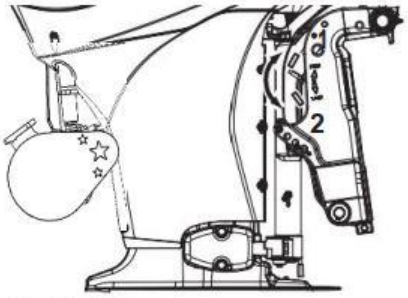
⚠WARNING

During shallow water operation, be careful not to place your hand between the swivel bracket and the clamp bracket. Be sure to tilt the outboard motor down slowly.

Gas assist type

To move to Shallow water operation

1. Move (UP) lock lever to “Free” position.
2. Tilt up the outboard motor into desired shallow water running position.
3. While keeping the outboard motor in the desired shallow water running position, move (DOWN) lock lever “Lock” position.



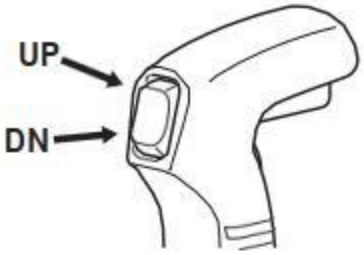
1. Free position
2. Lock position

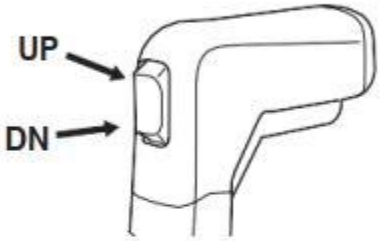
To return to normal running position

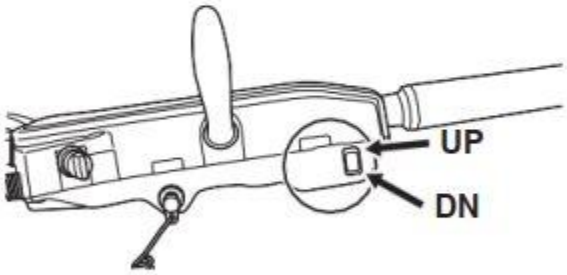
1. Move (UP) lock lever to “Free” position. The outboard motor will move down to thrust rod,
2. Move (DOWN) lock lever to “Lock” position.

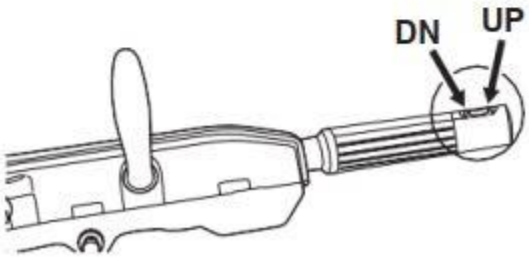
Power Trim & Tilt type

1. Operate the Power Trum & Tilt switch and tilt the outboard motor up into the desired shallow water running position.



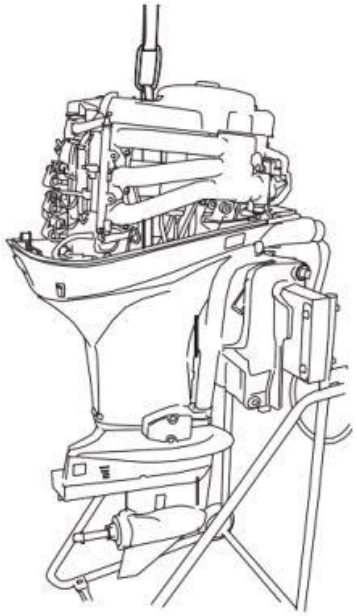






8. REMOVING AND CARRYING THE OUTBOARD MOTOR

8.1 Removing the outboard motor



⚠WARNING

Before installing the outboard motor on the boat, hand the outboard motor with the hoist or equivalent device by attaching the engine hanger to the outboard. Use a hoist whose allowable load is 250 kg (550 lbs) or above.

⚠CAUTION

Engine and heat exchangers may be hot immediately after operating and could cause burns if touched. Allow engine to cool down before attempting to carry the outboard.

1. Stop the engine.
2. Remove the top cowl.
3. Disconnect the fuel connector, the remove control cables and the battery cords from the outboard motor.
4. Attach the hoist hooks to the engine hanger.
5. Remove the outboard motor from boat and completely drain the water from the fear case.

8.2 Carrying the outboard motor

⚠WARNING

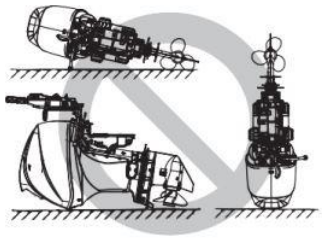
Be sure to disconnect the fuel connector except when operating engine. Fuel leakage is a fire or explosion hazard, which can cause serious injury or death.

⚠WARNING

Close air vent screw of fuel tank before carrying or storing outboard motor and fuel tank, or fuel may leak, potentially catching fire.

⚠CAUTION

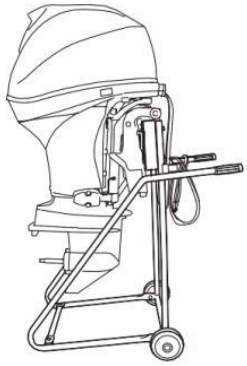
- Do not give a shock to an outboard motor during transportation. If becomes a cause of breakage.
- Do not carry or store outboard motor in any of the position shown below. Otherwise, engine oil or coolant may enter the cylinder and cause engine problems. Property damage could result from leaking oil.



Keep the outboard motor in a vertical position when carrying.

The optional outboard motor stand is recommended for keeping the outboard motor vertical both during transport and storage.

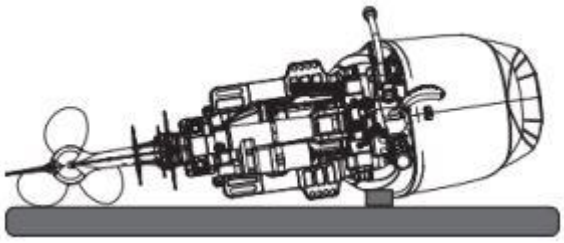
Removing and Carrying the Outboard Motor



NOTE

If the outboard motor must be laid down:

- Be sure to drain the remaining fuel in the fuel line and vapor separator and coolant reservoir (see page 84).
- When laying down the outboard motor, place port-side down on a cushion or any softer surface as shown below.
- Elevate the power unit 2 inches to 4 inches if traveling to avoid oil spillage.



8.3 Trailering

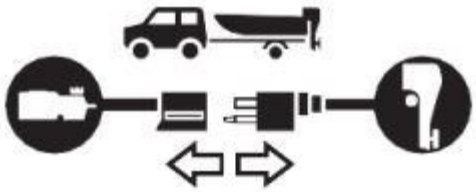
⚠CAUTION

Trailering in the tilted position may cause damage to the outboard motor, boat, etc.

⚠WARNING

Be sure to disconnect the fuel connector except when operating engine.

Fuel leakage is a fire or explosion hazard, which can cause serious injury or death.



⚠WARNING

Close air vent screw of fuel tank and fuel cap before carrying or storing outboard motor and fuel tank, or fuel may leak, potentially catching fire.

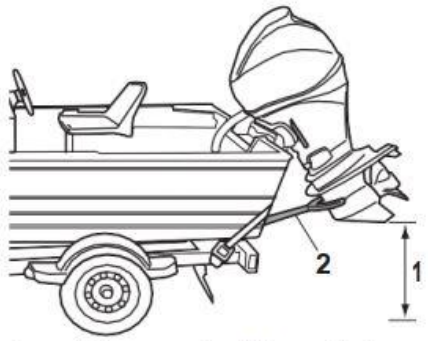
⚠CAUTION

The tilt support device supplied on your outboard motor is not intended for towing. It is intended to support the outboard motor while the boat is docked, beached, etc.

When transporting a boat on a trailer with the outboard motor still attached, disconnect the fuel line from the outboard motor beforehand and keep the outboard motor in the normal running position or on a transom saver bar.

Tiller handle type

To prevent the outboard motor from moving when it is attached to a boat during transport on a trailer, properly tighten the steering friction lever (page 62).



1. Ground clearance should be provided sufficiently.
2. Transom saver bar

9. ADJUSTMENT

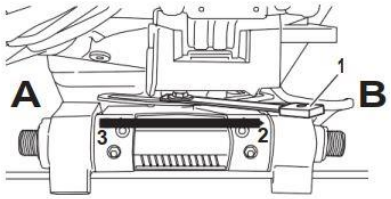
9.1 Steering friction

Tiller handle type

⚠WARNING

Do not overtighten the steering friction lever, it could result in difficulty of movement resulting in the loss of control causing an accident that could lead to severe injury.

Adjust this lever to achieve the desired steering friction (drag) on the tiller handle. Move lever towards (A) to tighten friction and move lever towards (B) to loosen friction.



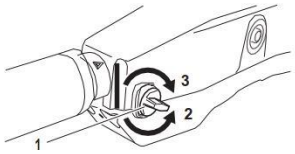
1. Steering friction lever
2. Lighter
3. Heavier

9.2 Throttle grip friction

⚠WARNING

Do not overtighten the throttle adjustment screw or it could result in difficulty of movement resulting in the loss of control causing an accident that could lead to severe injury.

Friction adjustment of the throttle grip can be made with the throttle adjustment screw.



1. Throttle friction adjustment screw
2. Lighter
3. Heavier

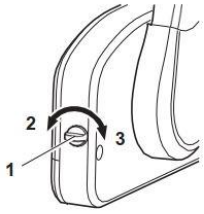
9.3 Remote control lever friction

⚠WARNING

Do not overtighten the remote control throttle friction adjustment screw or it could result in difficulty of movement resulting in the loss of control causing an accident that could lead to severe injury.

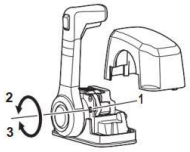
To adjust the friction of the remote control lever, turn the throttle friction adjustment screw on the front of the remote control. Turn clockwise to increase the friction and counterclockwise to decrease it.

Side mount type



1. Throttle friction adjustment screw
2. Decrease
3. Increase

Top mount type



1. Throttle friction adjustment screw
2. Lighter
3. Heavier

9.4 Trim tab adjustment

⚠ WARNING

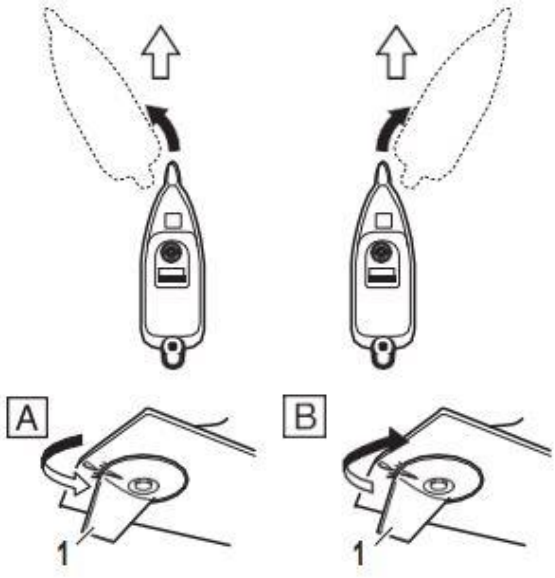
- Be sure that the outboard motor is secured to the transom or service stand, or accidental drop of fall of outboard motor could lead to sever personal injury.
- Be sure to lock outboard motor when it is tilted up, otherwise accidental fall of outboard motor could lead to sever personal injury.
- Do not go under outboard motor tilted up and locked, or accidental fall of outboard motor could lead to sever personal injury.

⚠ WARNING

Inappropriate adjustment of trim tab could cause steering difficulty. After installing or readjusting trim tab, check if steering load is even.

If straight-line cruising cannot be achieved, adjust the trim tab located under the anti-ventilation plate.

- If the boat veers toward the left direct, turn the trim tab towards A (left from rear of boat).
- If the boat veers toward the right direct, turn the trim tab towards B (right from rear of boat).



1. Trim tab

NOTE

- After adjustment securely tighten the trim tab fixing bolt.
- Check for looseness of the bolt and the trim tab at regular intervals.

10. INSPECTION AND MAINTENANCE

Care of your outboard motor

To keep your outboard motor in the best operating condition, it is very important that you perform daily, and periodic maintenance as suggested in the maintenance schedules that follow.

⚠CAUTION

- Your personal safety and that of your passengers depends on how well you maintain your outboard motor. Carefully observe all of the inspections and maintenance procedures described in this section.
- The maintenance intervals shown in the checklist apply to an outboard motor in normal use. If you use your outboard motor under sever conditions suck as frequent full-throttle operation, frequent operation in brackish water, or for commercial use, maintenance should be performed at shorter intervals. If in doubt, consult your dealer for advice.
- We strongly recommend that you use only genuine replacement parts on your outboard motor. Damage to your outboard motor arising from the use of other than genuine parts is not covered under the warranty.

10.1 Daily Inspection

Perform the following checks before and after use.

⚠WARNING

Do not use the outboard motor if any abnormalities are found during pre-operation check otherwise it could result in severe damage to the motor or severe personal injury.

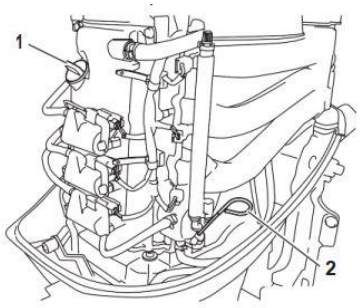
Item	Points to Check	Remedy
Fuel System	• Check the amount of fuel in the tank.	Replenish
	• Check for debris or water in the fuel filters.	Clean or replace if necessary
	• Check the rubber hoses for fuel leakage.	Replace if necessary
Fuel Tank Cap (Option)	• Check for crack, leakage, damage in the fuel tank cap.	Replace if necessary
	• Check for crack, damage in the gasket.	Replace if necessary
	• Check for leakage at full close.	Replace if necessary
	• Check for ratchet performance.	Replace if necessary
Engine Oil	• Check the oil level.	Fill oil
Electrical Equipment	• Check that the main switch functions normally.	Replace if necessary
	• Check that the battery electrolyte level and specific gravity are normal.	Replenish or recharge
	• Check for loose connections on the battery terminal.	Retighten
	• Check that the stop switch functions normally and make sure the stop switch lock is there.	Remedy or replace if necessary
	• Check cords for loose connections and damage.	Correct or replace if necessary
	• Check the spark plugs for dirt, wear and carbon build-up.	Clean or replace if necessary
	• Check the warning buzzer (one beep) and warning LED lamp (ON for 1 sec) when key is ON.	Repair

Item	Points to Check	Remedy
Clutch and Propeller System	• Check that clutch engages correctly when operating the shift lever.	Adjust
	• Visually check propeller for bent or damaged blades.	Replace if necessary
	• Check the propeller nut is tightened and the split pin is present.	Tighten or replace
Instalation of Motor	• Check all the bolts attaching the motor to the boat.	Tighten
	• Check the thrust rod installation.	Replace if necessary
Power Trum & Tilt	• Check working of the tilt up and down of the motor.	Repair
Coolant	• Check that the coolant level is full to the bottom of the fill neck and free of debris.	Refill/Replace
Tools and Spares	• Check that there are tools and spare parts for replacing spark plugs, the propeller, etc.	Order
	• Check that you have the spare rope and stop switch lock.	
Steering Devices	• Check the operation of the steering handle.	Repair
Other parts	• Check if the anode is securely installed.	Repair if necessary
	• Check the anode for corrosion and deformation.	Replace

Oil level checking

If the oil level is low, or too high, the lift of the engine will be shortened significantly.

1. Place the engine in a vertical position.
2. Remove the top cowl.
3. Remove the dipstick.
4. Wipe oil off the dipstick with a clean cloth.
5. Insert the dipstick into the hold completely.
6. Remove the dipstick again.
7. Check the oil level on the dipstick. The oil level must be between the upper limit and lower limit shown on the dipstick.
8. Return the dipstick.



1. Filler cap
2. Dipstick

1. Upper level 2200 mL
2. Lower level 1700 mL

NOTE

The oil level should be checked when the engine is cooled.

NOTE

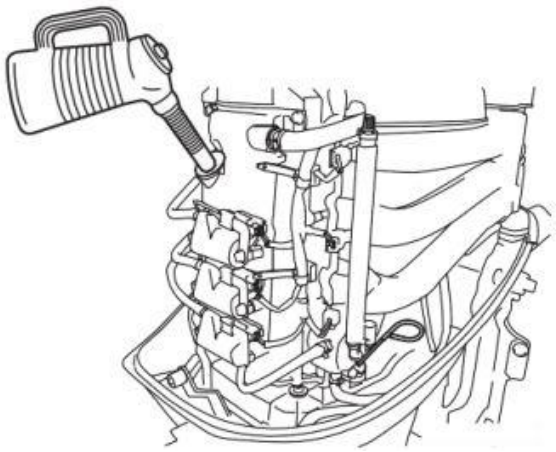
Consult with an authorized dealer if the engine oil is milky color or appears contaminated.

Engine oil replenishing

⚠CAUTION

- Do not add engine oil of brand and grade other than existing one. In case engine oil of other brand or grade is added, drain all oil and ask dealer for treatment.
- In case other than engine oil such as gasoline is put in the oil chamber, empty the chanber and ask dealer for treatment.
- When replenishing engine oil, be careful not to allow entry of foreign matters such as dust and water into the oil chamber.
- Wipe of engine immediately if spilled and dispose of it in accordance with local fire prevention and environment protection regulations.
- Do not replenish engine oil over the upper limit. If overfilled, remove oil to upper limit. If engine oil is over the upper limit, it can leak potentially leading to engine damage.

If the oil level is low, or at lowest mark, add recommended oil to the middle dipstick mark.



Washing outboard motor

⚠CAUTION

When washing the outboard motor, be careful not to spray the water inside of the top cowl, especially electrical components.

NOTE

It is recommended to check chemical properties of water on which your outboard motor is regularly used.

If outboard motor is used in salt water, brackish water or water with a high acidic level, use fresh water to remove salt, chemicals or mud for the outside of the motor.

Fuse replacement

⚠CAUTION

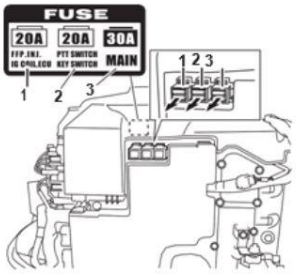
Before replacing a fuse, disconnect the battery cable from the battery negative (-) terminal. Failure to do so may cause a short circuit.

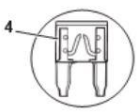
⚠CAUTION

Never use a fuse with a rating that exceeds the specified rating as this could cause serious damage to the electrical system.

If a blown fuse is detected, try to determine the cause for this and correct it. If the cause for the problem is not corrected, the fuse will likely blow again. If the fuse continues to blow, request an authorized FREEDOM OUTBOARD dealer to inspect the outboard motor.

1. Stop the engine and disconnect the battery cable from the battery negative (-) terminal.
2. Remove the engine cover.
3. Remove the fuse box lid.
4. Remove the fuse and check it. If the fuse is blown, replace it with a fuse of the same specified rating. The outboard motor is supplies with spare fuses in the spare fuse holder.





10.2 Periodic Inspection

It is important to inspect and maintain your outboard motor regularly. At each interval on the chart below, be sure to perform the indicated servicing.

Maintenance intervals should be determined according to the number of hours or number of months, whichever comes first.

Description		Inspection intervals				Inspection procedure	Remarks
		First 20 hours of 1 month	Every 50 hours of 3 month	Every 100 hours of 6 month	Every 200 hours of 1 year		
Fuel System	Fuel filter	✓	✓			Check and clean or replace if necessary (see page 75).	
	Piping/Hoses [2]	✓	✓			Check and clean or replace if necessary.	
	Fuel tank [2]	✓	✓			Clean (see page 74).	Option
	Fuel tank cap [2]	✓	✓			Check and clean or replace if necessary.	Option
	Fiel pump [1]	✓	✓			Check and clean or replace if necessary.	
Ignition	Spark plug	✓		✓		Check gaps. Remove carbon deposits or replace if necessary (see page77).	0.7-0.8 mm (0.028-0.031 in)
	Ignition timing [1]	✓		✓		Check timing.	
Starting System	Starter motor [1]			✓		Check for salt deposits and the battery cable connection.	
	Battery	✓	✓			Check installation, fluid quantity, gravity.	

Engine	**Engine oil**	Replace ✓		Replace ✓		Replace (see page 66).	2200 ml (2.3 US qt)
	Oil filter [1]	Replace ✓			Replace ✓	Replace every 200 hrs or 1 year (see page 73).	Entire cartridge
	Valve Clearance [1]	✓		✓		Check & adjust.	*IN: 0.15-0.25 mm (0.0059-0.0098 in) EX: 0.25-0.35 mm *0.098-0.0138 in)
	Toming belt [1]			✓		Check and replace if necessary.	
	Thermostat [1]			✓		Check and replace if necessary.	
Lower Unit	**Propeller**	✓	✓			Check for bent blades, damage, wear. Replace if necessary (see page 76).	
	Gear oil	Replace ✓	✓	Replace ✓		Change or replenish oil and check for water leaks (see page 75).	500 mL (16.9 fl. oz.)
	Water pump [1]		✓		Replace ✓	Check for wear or damage and replace if necessary	Replace impeller every 12 months
Power trim & tilt [1]		✓		✓		Check & replenish oil, manually operate	
Warning system [1]			✓			Check function	
Bolts and Nuts		✓	✓			Retighten	
Sliding and Rotating Parts, Grease Nipples		✓	✓			Apply and pump in grease (see page 81).	
Outer Equipment		✓	✓			Check for corrosion.	
Coolant System		✓	✓	✓		Check Coolant level.	Replenish if necessary
Anode				✓		Check for corrosion and deformation.	Replace if necessary

* 60A IN 0.20 – 0.25 mm (0.0079 – 0.0098 in)
EX 0.30 – 0.35 mm (0.0118 – 010138 in)

1: Have this handled by your FO DEALER

2: In the USA you have to use EPA approved part (see page 37)

NOTE

Your outboard motor should receive careful, and complete inspection at 300 hours. This is the best time for major maintenance procedures to be carried out.

Engine oil replacement

⚠CAUTION

You may be injured due to high engine temperatures if you fill engine oil just after stopping. Changing engine oil should be done after the engine has been cooled.

⚠CAUTION

- Do not overfill engine oil, or engine oil could leak and/or engine could be damaged. If the engine oil level is over the upper limit marks of oil gauge, drain oil to level lower than upper limit.
- Be sure that the outboard motor is in an upright and level position when checking or changing oil.
- Stop engine immediately if low oil pressure warning lamp is lit or oil leak is found, or engine could be severely damaged. Consult dealer.
- Wipe off engine oil immediately if spilled and dispose of it in accordance with local fire prevention and environmental protection regulations.

⚠CAUTION

Use of engine oils that do not meet these requirements will result in reduced engine life, and other engine problems.

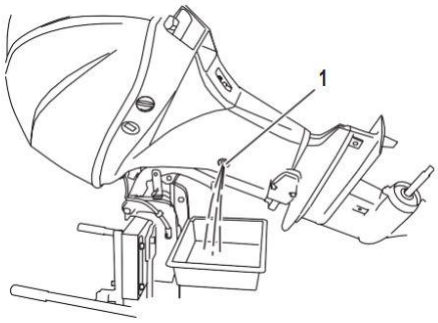
⚠CAUTION

Engine oil mixed with dust or water will dramatically shorten the lift of the engine.

To change engine oil:

Be sure to use the recommended engine oil.

1. Stop the engine and allow it to cool.
2. Tilt up the outboard motor and lock the tilt with the tilt stopper.
3. Turn the steering on the outboard motor so that the drain hole is facing downward.
4. Put an oil drain pan under the oil drain screw.
5. Remove the oil drain screw and completely drain oil from the engine.



1. Drain hole

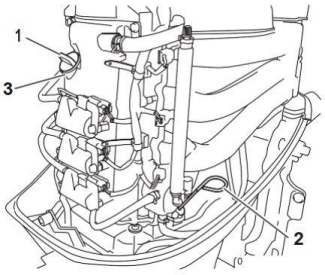
6. Tighten the oil drain screw after applying oil to the sealing surface of the screw (use new oil drain washer).

Oil drain screw specified torque
24Nm (17 ft-lb, 2.4 kgf-m)

NOTE

If a torque-wrench is not available when you are fitting an oil filter, a good estimate of the correct torque is ¾ to 1 turn past finger-tight. Have the oil filter adjusted to the correct torque as soon as possible with a torque-wrench.

7. Reset the engine to a vertical position.
8. Repeat steps 2-7, two or three times to drain the oil completely.
9. Remove the top cowl and the oil filler cap.
10. Fill the engine through filler port with recommended oil to the middle of dipstick mark.
11. Tighten the oil filler cap.



1. Filler cap
2. Dipstick
3. Filler port

1. Upper limit (Max.)
2. Lowerlimit (Min.)

NOTE

Use only recommended engine oil (see page 30).

Oil volume needed for complete oil replacement	
With oil filter replacement	**Without oil filter replacement**
Approximately 2400 mL (2.5 US qt.)	Approximately 2200 mL (2.3 US qt.)

⚠CAUTION

Wipe off engine oil immediately if spilled and dispose of it in accordance with local fire prevention and environment protection regulations.

NOTE

- If any amount of water is found in the engine oil, making it milky white, consult the dealer.
- If engine oil is contaminated with fuel, or is emitting strong fuel smell, consult dealer.
- Some oil dilution is normal if engine is idled or trolled for long periods, especially in cooler water temperatures.

Oil filter replacement

⚠CAUTION

You may be injured due to high engine temperatures if you fill engine oil just after stopping. Changing engine oil should be done after the engine has been cooled.

⚠CAUTION

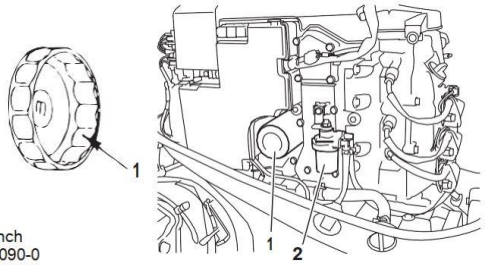
Wipe off engine oil immediately if spilled and dispose of it in accordance with local fire prevention and environment protection regulations.

1. Drain oil from the engine.
2. Place a rag or towel below the oil filter to absorb any spilled oil.
3. Unscrew the old filter by turning the filter counterclockwise.
4. Clean the mounting base. Apply film of clean oil to O-ring.
5. Do not use grease.
6. Insall oil filter and tighten it to specified torque by using an oil filter wrench.

Oil filter torque:
18 Nm (13 ft-lb, 1.8 kgf-m)

NOTE

If a torque wrench is not available when you are fitting an oil filter, a good estimate of the correct torque is ¾ to 1 turn past finger tight. Have the oil filter adjusted to the correct torque as soon as possible with a torque wrench.



1. Oil filter wrench
   P/N 3AC-99090-0
   P/N 3AC99090M
   (US. CANADA Only)

1. Oil filter
2. Fuel filter

Fuel filters and fuel tank cleaning

⚠WARNING

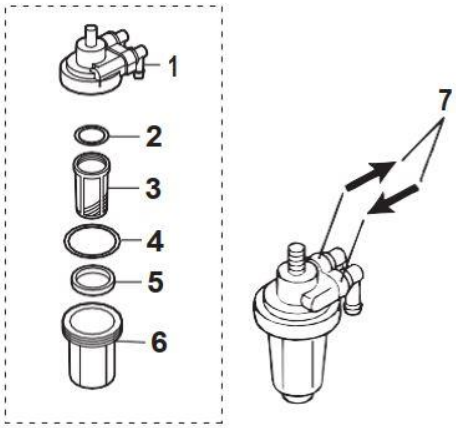
Gasoline and its vapors are very flammable and can be explosive.

- Do not start this procedure while engine is operating or hot even after stopping it.
- Place fuel filter away from every source of ignition such as sparks or open flames.
- Wipe off gasoline immediately if spilled and dispose of it in accordance with local fire prevention and environment protection regulations.
- Install fuel filter with all related parts in place, or fuel leak could occur, leading to catching fire or explosion.
- Check fuel system regularly for leakage.
- Contact authorized dealer for fuel system services. Services by unqualified person could lead to engine damage.

Fuel filters are provided inside the fuel tank and engine.

Fuel filter (for engine)

1. Check in the cup for water and debris.



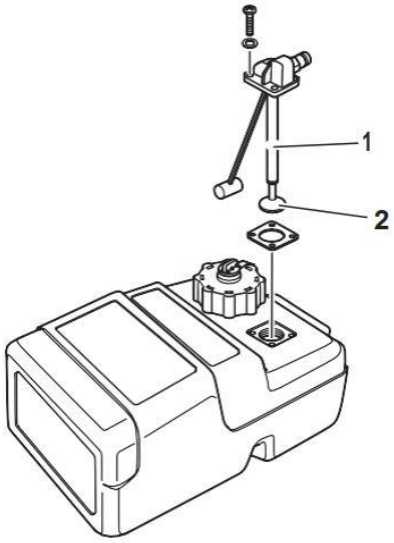
1. Body
2. O-ring
3. Filter
4. O-ring
5. Float
6. Cup
7. Indication of Fuel Flow.

2. If present, disconnect hoses from the fuel connector (male) and the fuel pump.
3. Remove the cup, filter and O-rings from the fuel filter body.
4. Check the wear and clogging of each parts, and replace if necessary.
5. Remove fuel and any water or debris from the cup, filter and hoses.
6. Reassemble all parts.

Fuel filter (for fuel tank)

Water or dirt in the fuel tank will cause engine performance problems. Check and clean the tank at specified times or after the outboard motor has been stored for along period of time (over three months).

1. Remove the four screws to remove the Fuel Pick-Up.
2. Clean the fuel filter and replace the gasket.
3. Reassemble all parts.



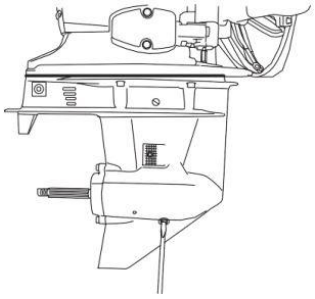
1. Fuel pick-up
2. Filter

Gear oil replacement

⚠WARNING

- Be sure that the outboard motor is secured to transom or service stand, or accidental drop of fall of outboard motor could lead to sever personal injury.
- Be sure to lock the outboard motor if it is tilted up, or accidental fall of outboard motor could lead to sever personal injury.
- Do not go under the outboard motor tilted up and locked, or accidental fall of outboard motor could lead to sever personal injury.

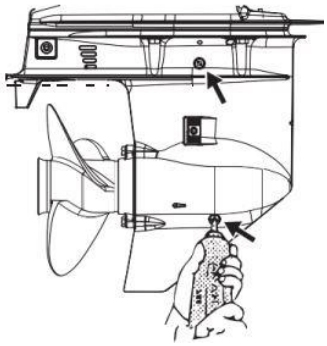
1. Tilt down the outboard motor.
2. Remove heat exchangers.
3. Remove the oil plugs (lower and upper), and completely drain the gear oil into a pan.



4. Insert the oil tube nozzle into the lower oil plug hole and fill with gear oil by squeezing the oil tube until oil flows out of the upper plug hole and bubbles disappear to remove the air.

NOTE

Use genuine gear oil or the recommended one (API GL-5: SAE #80 t0 #90).
Required volume: approx. 050 mL

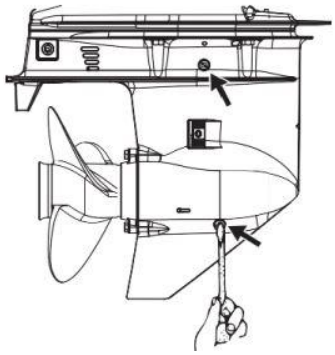


5. Install the upper oil plug and then remove the oil tube nozzle and install the lower oil plug. Then re-install heat exchangers.

Oil plug specified tightening torque
4N m(3 ft-lb, 0.4 kgf-m)

⚠CAUTION

Do not reuse oil plug gasket. Always use a new gasket and tighten oil plug properly to prevent entry of water into lower unit.



⚠CAUTION

Wipe off gear oil immediately if spilled and dispose of it in accordance with local fire prevention and environment protection regulations.

NOTE

If water is in the oil, it gives it a milky colored appearance. Contact your FO DEALER.

Propeller replacement

⚠WARNING

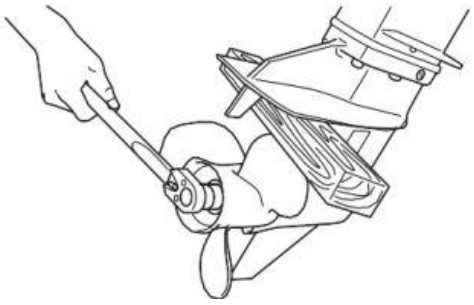
- Do not begin propeller removal and installation procedure with spark plug caps attached, shift in forward or reverse, main switch at other than “OFF”, engine stop switch lock attached to the switch, and starter key attached, or engine could accidentally start leading to serious personal injury. Disconnect battery cable is possible.
- The propeller edge is thin and sharp. Wear gloves during replacement to protect your hands.

⚠CAUTION

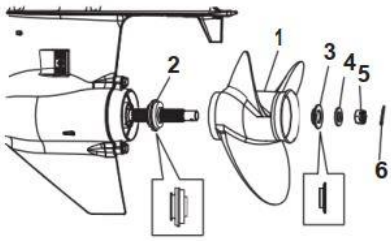
- Do not install propeller without thrust holder, or propeller boss could be damaged.
- Do not reuse split pin.
- After installing split pin, spread the pin apart to prevent it from falling out which could lead to the propeller coming off during operation.

A worn-out or bent propeller will lower the motor’s performance, and cause engine trouble.

1. Put a piece of wood between propeller blade and anti-ventilation plate to hold propeller.



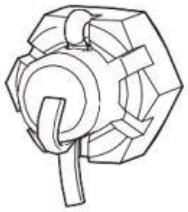
2. Remove the split pin, propeller nut and washer.
3. Remove the propeller and thrust holder.
4. Apply waterproof grease to the propeller shaft before installing a new propeller.
5. Install the thrust holder, propeller, stopper, washer and propeller nut onto the shaft.



6. Tighten the propeller nut to specified torque and align one of the grooves to the propeller shaft hole.

Propeller nut torque:
35 Nm (25 ft-lb, 3.25 kgf-m)

7. Install a new split pin into the nut hold and bend it.



Spark plugs replacement

WARNING

- Do not reuse spark plugs with damaged insulation, or sparks can leak through cracks, potentially leading to electric shock, explosion and/or fire.
- Do not touch spark plugs immediately after stopping the engine as they will be hot and could cause severe burns if touched. Allow the motor to cool down first.

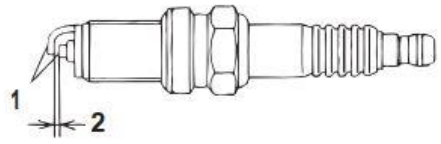
CAUTION

- Use only the recommended spark plugs. Spark plugs which have different heat ranges may cause engine damage.
- Do not clean electrodes of iridium spark plug. If it is contaminated with carbon deposits or dirt, replace it with a new one.

If the spark plug(s) is fouled, has carbon build up, or is own, it should be replaced.

1. Stop the engine.
2. Remove the top cowl.
3. Remove the spark plug caps.
4. Remove the spark plugs by turning it counterclockwise, using a 5/8” (16 mm) socket wrench and handle that is provided in tool bag.
5. Inspect the spark plug. Replace the spark plug if the electrodes are worn or if the insulators are cracked or chipped.
6. Measure the spark plug electrode gap with a wire type feeler gauge. The gap should be 0.7-0.8 mm (0.028-0.031 inches). If the gap is different, replace the spark plug with a new one.

Use spark plug NGK DCPR6EIX



1. Electrode
2. Spark gap (0.7–0.8 mm, 0.028–0.031 in)

7. Install the spark plug by hand and turn.
8. Tighten the spark plug to the specified torque.

NOTE

- Spark plug torque:
  18.0 Nm (13.3 ft-lb) [1.84 -m]

If a torque wrench is not available when you are fitting a spark plug, a good estimate of the correct torque is ¼ to ½ a turn past finger tight. Have the spark plug adjusted to the correct torque as soon as possible with a torque wrench.

NOTE

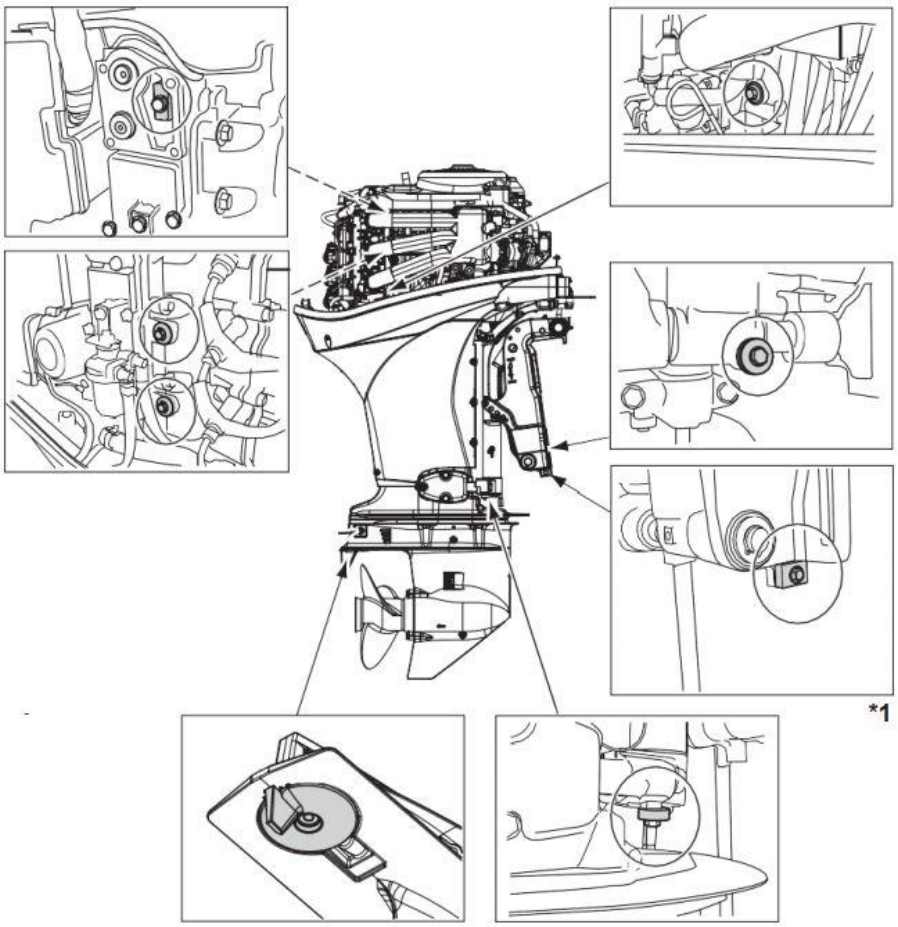
- Do not clean electrodes of the spark plug with a brush, or the iridium tip on the electrodes could be damaged.
- Do not adjust the plug gap, if it is out of specification replace the spark plug with a new one.

Anode replacement

A sacrificial anode protects the outboard motor from electrolytic corrosion. Anodes are located on the gear case, cylinder, etc. When the anode is eroded more than 1/3 of original size, replace it.

NOTE

- Never grease or paint the anode.
- At each inspection re-tighten the anode attaching bolt. As it is likely to be subjected to electrolytic corrosion.



*1 : Both side

Power Trim & Tilt oil checking

⚠WARNING

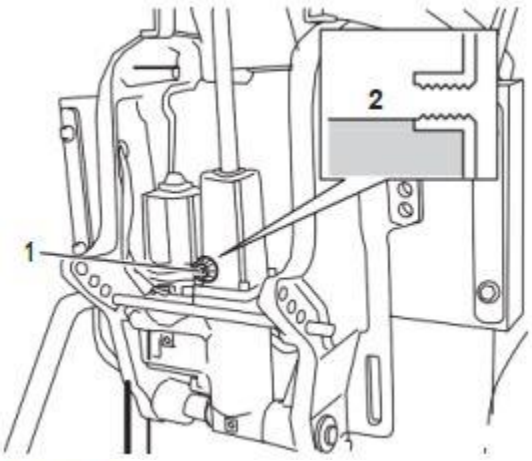
- Be sure that the outboard motor is secured to transom or service stand, or accidental drop or fall of outboard motor could lead to severe personal injury.
- Be sure to lock the outboard motor if it is tilted up, or accidental fall of outboard motor could lead to severe personal injury.
- Do not go under the outboard motor tilted up and locked, or accidental fall of outboard motor could lead to sever personal injury.

⚠CAUTION

Do not unscrew the oil plug with the outboard motor tilted down. Pressurized oil in the oil tank may spurt out.

Check the oil level in the reservoir tank while the tank is kept in a vertical position.

1. Tilt the outboard motor up and lock the tilt with the tilt stopper.
2. Remove the oil cap by turning counterclockwise, then check if the oil level reaches the bottom line of the plug hole.



1. Oil cap
2. Oil level

Recommended oil

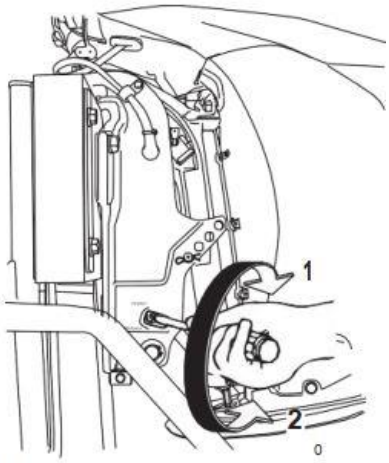
Use an automatic transmission fluid or equivalent.

Recommended oil is **ATF Dexron III**.

Air purging from the Power Trim and Tilt unit

Entrapped air in the Power Trum & Tilt unit will cause poor tilting movement and increased noise.

1. With the outboard motor mounted on the boat, set the manual release valve to the Manual side, and tilt the outboard motor manually up/down 5-6 times while checking the oil level.
2. When done, close the valve by turning it clockwise towards the Power side.

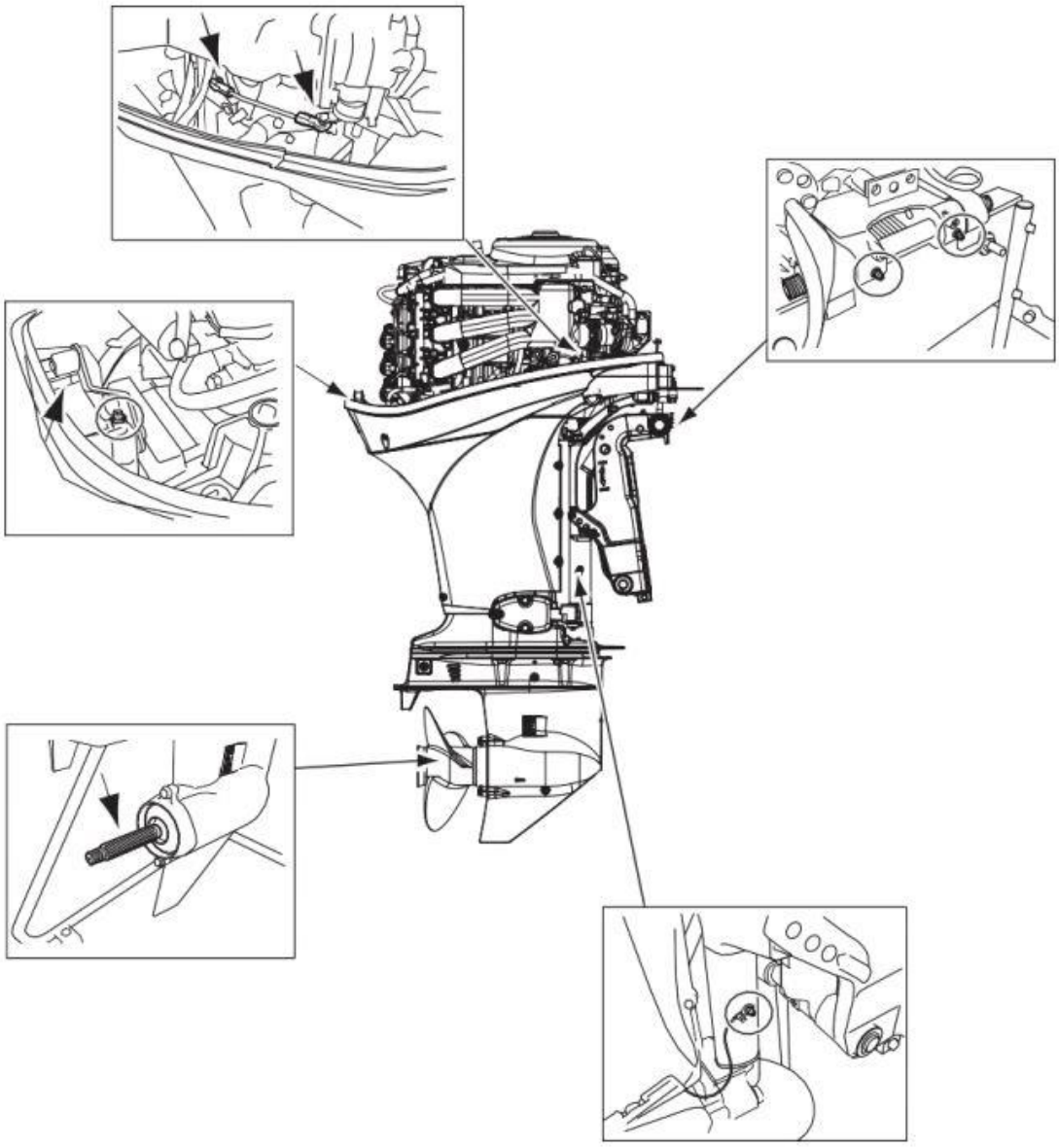


1. POWER
2. MANUAL

Manual relief valve specified torque:
1.8 N-m (1.4 ft-lb, 1.18 kgf-m)

Grease point

Apply waterproof grease to the parts shown below.



10.3 Off-season storage

⚠WARNING

- Be sure to disconnect the fuel connector except when operating engine.
- Fuel leakage is afire or explosion hazard, which can cause serious injury or death.

⚠WARNING

Be sure to use cloth to remove fuel remaining in the cowl and dispose of it in accordance with local fire prevention and environment protection regulations.

⚠CAUTION

Before servicing the motor for storage:

- Remove the battery cables.
- Remove the spark plug caps from the spark plugs.
- Do not run the motor out of the water for extended periods.

Before you put your outboard motor in storage, it is a good opportunity to have it serviced and prepared by your dealer.

Be sure to use fuel stabilizer while running the motor before storage (see page 83).

Engine

1. Wash the engine exterior using a clean dry cloth.
2. Use a dry cloth to completely wipe off water and salt from the electrical components.
3. Drain all fuel from the fuel hoses, fuel pump, fuel filter (see page 74) and vapor separator (see page 84) and clean these parts.

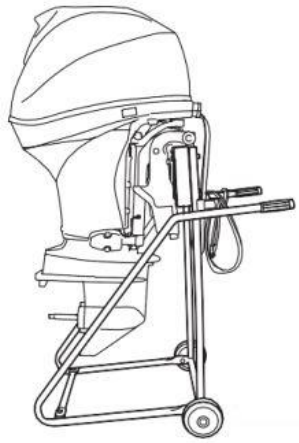
   Keep in mind that if gasoline is kept in the vapor separator for a long time, gum and varnish will develop, causing the float valve to stick, restricting the fuel flow.
4. Remove the spark plugs and put a teaspoon of engine oil or spray storage oil into the combustion chamber through the spark plug holes.
5. Turn the starter motor several turns to lubricate inside the cylinder.

⚠WARNING

- Be sure to remove the stop switch lock to prevent ignition of the spark plugs.
- Put a cloth over the spark plug hole and wipe up any spilled engine oil, when cranking the outboard motor.

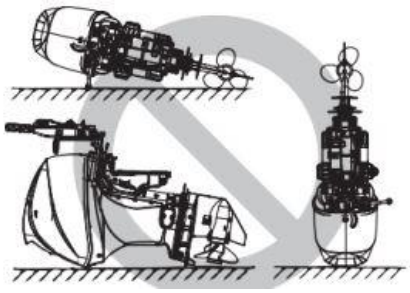
6. Change the engine oil (see page 71).
7. Change the gear oil in the gear case (see page 75).
8. Apply grease to grease points (see page 81).

9. Stand the outboard motor up vertically in a dry place.



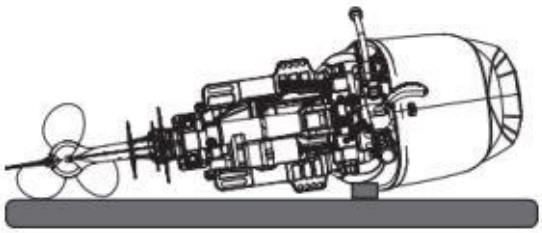
⚠CAUTION

Do not carry or store outboard motor in any of the positions shown below. Otherwise, engine oil or coolant may enter the cylinder causing engine problems. Property damage could result from leaking oil out.



NOTE

- If the outboard motor must be laid down, be sure to drain the remaining fuel in the fuel line and vapor separator (see page 84). When the outboard motor is laid down, place the port side down on a cushion or softer surface shown below.
- Elevate the power unit 2 inches to 4 inches if traveling to avoid oil spillage.



Adding a fuel stabilizer

When adding a fuel stabilizer additive (commercially available), first fill the fuel tank with fresh fuel. If the fuel tank is only partially filled, air in the tank can cause the fuel to deteriorate during storage.

1. Before adding fuel stabilizer additive, drain the vapor separator (see page 84).
2. Follow the instructions on the label when adding the fuel stabilizer additive.
3. After adding the additive, let the outboard motor run in the water for 10 minutes to make sure any old fuel in the fuel system has been completely replaced by the fuel with additive.
4. Turn the engine OFF.

NOTE

If your motor is used occasionally, it is recommended to use a good fuel stabilizer in every tank of fuel and keep the container full to reduce condensation and evaporation.

Fuel system draining

⚠WARNING

For details on handling fuel, contact a FO DEALER.

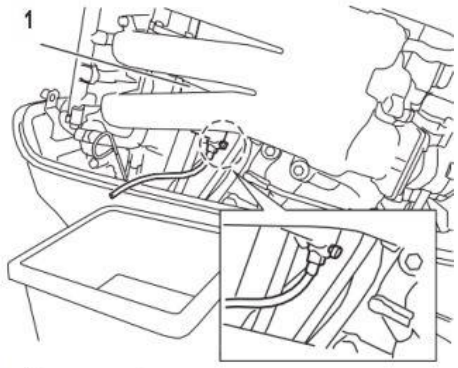
Fuel and fuel vapors are extremely flammable and can be explosive.

- If fuel is spilled, wipe it up immediately.
- Keep the fuel tank well away from sources of ignition, e.g. sparks or open flames.
- Perform all work outdoors or in a well ventilated area.

⚠WARNING

Be sure to use a cloth to remove fuel remaining in the cowl and dispose of it in accordance with local fire prevention and environment protection regulations.

1. Disconnect the fuel hose from the outboard motor.
2. Remove the top cowl.
3. Release the drain tube from the clamp and pull the tube outside the bottom cowl. Place an approved fuel container under the drain tube end and use a funnel to avoid spilling fuel.
4. Loosen the vapor separator drain screw.
5. Tilt up the outboard motor until fuel flows out of the drain tube.
6. Leave the outboard motor in this position until all fuel has been drained.
7. When thoroughly drained, retighten the drain screw securely.
8. Check the drained fuel for the presence of water or other contaminants. If either is present, reassemble the outboard motor, refill the vapor separator with fuel, and then drain the fuel again.
9. Repeat this procedure until no water or other contaminants are present in the drained fuel.



1. Vapor separator

Battery

⚠WARNING

- Place the battery away from any source of fire, sparks and open flames such as burners or welding equipment.
- Place the battery away from the fuel tank. Accidental sparks of battery may cause explosion of gasoline.

1. Disconnect the battery cables and be sure to remove the negative terminal first.
2. Wipe off any chemical deposits, dirt, or grease.
3. Apply grease to the battery terminals.
4. Charge the battery completely before storing it for the winter.
5. Recharge the battery once a month to prevent it from discharging and the electrolyte from deteriorating.
6. Store the battery in a dry place.

10.4 Pre-season check

The following steps must be taken when first using the engine after off season storage.

1. Check that the shift and throttle function properly. Be sure to turn the propeller shaft when checking the shift function or else the shift linkage may be damaged.
2. Check the electrolyte level and measure the voltage and specific gravity of the battery.

Specfic Gravity at 20°	Terminal Voltage (V)	Charge Condition
1.120	10.5	Fully discharged
1.160	11.1	¼ charged
1.210	11.7	½ charged
1.250	12	¾ charged
1.280	13.2	Fully charged

3. Check that the battery is secure, and the battery cables are properly installed.
4. Change the engine oil (see page 71).
5. Before starting the engine, disconnect stop switch lock and crank approximately 3 times in 3 sec. turning the starter motor in order to prime the oil pump.
6. Fill fuel tank completely.
7. Check and refill coolant reservoir.
8. Start the engine and warm up the engine for 3 minutes in the “NEUTRAL” position.
9. Run the engine for 5 minutes at the slowest speed.
10. Run the engine for 10 minutes at half throttle. The oil used for storage inside the engine will be circulated out to assure optimum performance.

10.5 Submerged outboard motor

⚠CAUTION

Do not attempt to start the submerged outboard motor immediately after it is recovered, or engine could be severely damaged.

After taking your outboard motor out of the water, immediately take it to your dealer.

The following are the emergency measures to be taken for a submerged outboard motor, if you cannot take it to your dealer right away.

1. Wash the outboard motor with fresh water to remove salt or dirt.
2. Remove the engine oil drain screw and completely drain the water from the engine.
3. Remove the spark plugs and completely drain the water from the engine by pulling emergency starter rope (see page 43) several times. Replace oil filer and oil to the correct level.

   The oil and filter may need to be change again after running a short period to get all moisture completely out of the crankcase.
4. Inject a sufficient amount of engine oil through the spark plug holes. Pull the emergency starter rope several times to circulate the oil throughout the outboard motor.

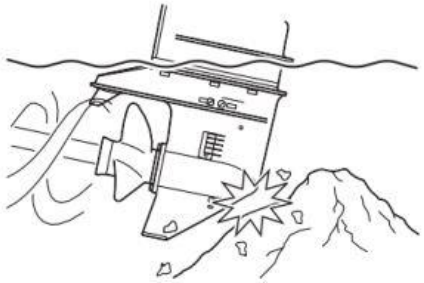
10.6 Striking underwater object

⚠CAUTION

Striking the sea bottom or an underwater object may severely damage the outboard motor.

Follow the procedure below and consult a dealer as soon as possible.

1. Stop the engine immediately.
2. Check the control system, gear case, boat transom, etc.
3. Return to the nearest harbor slowly and carefully.
4. Consult a dealer check the outboard motor before operation again.



10.7 Operator with multiple outboard motors

When operating the outboard motors in reverse at more than the lowest speed, be sure that all engines are running.

If any engine has stopped, be sure to tilt the outboard motor up and keep its propeller out of the water.

Otherwise, water could enter the engine and cause damage to it.

11. TROUBLESHOOTING

If you encounter a problem, consult the check list below to determine the cause and to take the proper action. A FO DEALER will always be happy to provide any assistance and information.

	Difficult to start engine	Engine runs erratically	Low engine speed/Poor boat speed	Battery will not hold charge	Starter motor will not crank	Power T & T inoperative	*1 Warning lamp A " ON"	*1 Warning lamp B " Flash"	Warning lamp C " Flash"	Three warning lamps " Flash"	Warning buzzer " ON"	Possible cause
FUEL SYSTEM	■											Empty fuel tank
	■	■	■									Incorrect connection of fuel system
	■	■	■									Air entering fuel line
	■	■	■									Deformed or damaged fuel hose
	■	■	■									Closed air vent on fuel tank
	■	■	■									Clogged fuel filter or fuel pump
	■	■	■									Fuel pump malfunction
			■				■					Use of improper engine oil
	■	■	■									Use of improper gasoline
	■											Not enough fuel supply by primer
ELECTRICAL SYSTEM	■	■	■	■	■	■	■	■	■	■		Electric components out of range or improper or loose wiring connection
		■	■									Spark plug other than specified
	■	■	■									Dirt, soot, etc. on spark plug
	■	■	■									No spark or weak spark
	■											Short circuit of engine stop switch
	■											Lack of stop switch lock plate
				■					■			Rectifier failure
	■				■	■						Blown 30 amp fuse in the starting circuit
	■				■							Not shifted into neutral position
	■			■	■	■			■			Weak battery or battery connections are loose or corroded
	■				■	■						Ignition key switch failure
	■				■							Starter motor or starter solenoid failure
						■						Power trim & tilt switch defective, solenoid is defective.

	Difficult to start engine	Engine runs erratically	Low engine speed/Poor boat speed	Battery will not hold charge	Starter motor will not crank	Power T & T inoperative	*1 Warning lamp A " ON"	*1 Warning lamp B " Flash"	Warning lamp C " Flash"	Three warning lamps " Flash"	Warning buzzer " ON"	Possible cause
COMPRESSION & OIL SYSTEM	■	■	■									Low compression
		■	■									Carbon deposits in the combustion chamber
		■	■									Incorrect valve clearance
			■				■				■	Low oil pressure/level, oil pump failure, clogged oil filer (pressure switch ON)
		■	■					■				Insufficient cooling water flow, clogged or defective pump
OTHERS		■	■					■				Faulty thermostat
		■	■					■			■	Cavitation or ventilation
		■	■								■	Incorrect propeller selection
		■	■								■	Damaged or bent propeller
			■									Improper thrust rod position
			■									Unbalanced load on boat
		■	■								■	Transom too high or too low
						■						A great deal of air is contained inside pump
			■									Insufficient throttle aperture
		■	■					■				Plug in cooling lines/low coolant

* 1 Warning lamp B & C are only equipped on multi-tiller handle model as a standard.

12. TOOL KIT AND SPARE PARTS

The following is a list of the tools and spare parts provided with the motor.

Items	Quantity	Remark
Tool bag	1	Socket wrench 16
	1	Socket wrench 10-13
	1	Socket wrench handle
	1	Pliers
	1	+- Screwdriver
Emergency starter rope	1	
Spark plug	1	NGK IKR6G8
Propeller nut split pin	1	In tool bag
Owner’s manual	1	
Spare stop switch lock	1	
Rigging bolt set	4	Bolt M12 P1.25 x 105 mm
	4	Washer 13-34-3
	4	Washer M12
	4	Nut M12 P1.25
Cable joint set	2	Cable joint
	2	Washer 8.5-18-1.6
	2	Snap pin
Remote control fitting assy	1	Drag link assy
	1	Steering hook plate
	2	Bold M10
	2	Washer M10

13. PROPELLER TABLE

Use a genuine propeller.

A propeller must be selected so that the engine RPM measured at wide open throttle while cruising is within the recommended range.

5000-6000 min^{-1}(rpm)

	Propeller Mark	Propeller Size (Number of Blades x Pitch x Diameter)
Light Boats	CS17	3 x 432 x 280
	CS16	3 x 406 x 279
	CS15	3 x 381 x 278
	CS14	3 x 356 x 279
	CS13	3 x 330 x 277
	CS12	3 x 305 x 283
	CS11	3 x 279 x 290
	CS9	3 x 229 x 311
Heavy Boats	7	2 x 180 x 290

14. EMISSION CONTROL SYSTEM INFORMATION

Emission Sources

Carbon monoxide, oxides of nitrogen and hydrocarbons are produced in the course of the combustion process. Controlling production of oxides of nitrogen and hydrocarbons is very important because they react to form a photochemical smog under certain conditions when subjected to sunlight. Carbon monoxide does not react in the same way but is a toxic byproduct.

Ignition Timing Control System

To reduce the amount of HC, CO and Nox produced, the ignition timing control system continuously adjusts the ignition timing.

Fuel Injection System

The Fuel Injection System relies on multiport fuel injection for both engine control and fuel control. The Engine Control Unit (ECU) has several sensors to determine how much fuel is needed for injection under all operating conditions.

Clean Air Acts of the United States and California, and Environment Canada

EPA, California, and Canadian regulations require all manufacturers to provide written instructions that describe the operation and maintenance of commercial emission control systems.

The following instructions and procedures must be followed in order to keep the emissions from your engine within these emission standards.

Tampering and Modifications

Tampering is a violation of the Federal Laws of the United States and Canada.

Tampering with or altering the emission control system could cause emissions to increase beyond legal limits. The following acts, although not all inclusive, are considered as tampering:

- Removing or modifying any part of the intake, fuel or exhaust system.
- Modifications that cause the engine to operate outside its design parameters.

Problems that can affect emissions

If you notice any of the following symptoms, have your outboard motor inspected and repaired by an authorized FO DEALER before further use.

- Hard starting or stalling immediately after starting
- Rough idling
- Misfiring/backfiring under load
- Afterburning (backfiring)
- Black exhaust smoke or increased fuel consumption

Maintenance

Follow the maintenance schedule presented on page 70. Keep in mind that this schedule assumes that the outboard motor will only be used for its intended purpose. Operation under sustained high loads or other unusual conditions will require more frequent service.

Star Labels

This outboard motor is labeled with the California Air Resources Board (CARB) star label. A description of this label is presented below.

One Star-Low Emission

The one-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2001 exhaust emissions 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.

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 emissions standards.

Engines meeting these standards have 20% lower emissions than One Star – Low Emission engines.

These engines are equivalent to the U.S. EPA's 2006 standards for marine engines.

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 emissions 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.

Four Starts-Ultra Low Emission

The four-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2009 exhaust emissions standards.

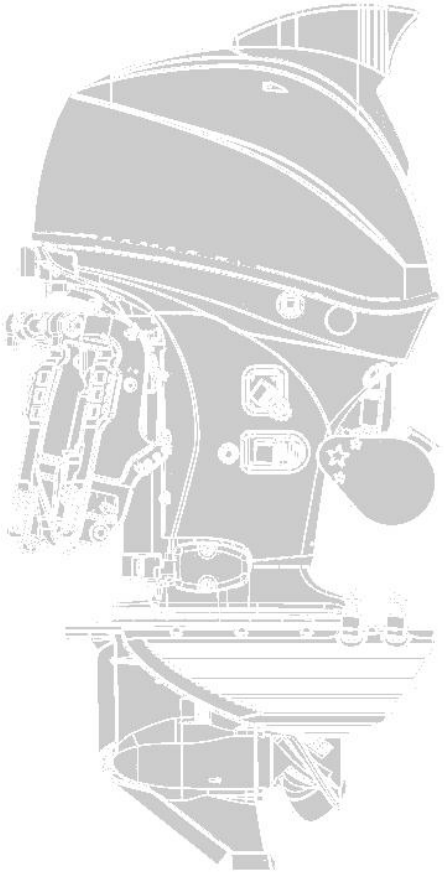
Personal Watercraft and Outboard marine engines may also comply with these standards.

Engines meeting these standards have 90% lower emissions than One Star-Low Emission engines.

SM0060-00-00

SM0050-00-00

SM0040-00-00



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