

ENGINE OPERATION

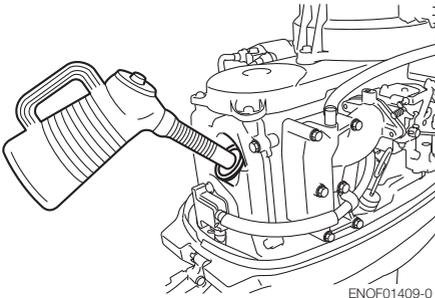
ENOM00042-0

Before starting

ENOW00022-A

CAUTION

The engine oil is drained for shipping from the factory. Be sure to fill the engine to the proper level before starting engine. (To properly fill the engine with oil follow the instructions. See page 62)



ENOW00027-A

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.

ENOM00044-C

1. Fuel feeding

ENOW00029-A

WARNING

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

ENOW00030-B

WARNING

When using EPA approval 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.

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



1. FDV in fuel hose
2. Sealing mechanism in fuel connector
3. Identification

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.



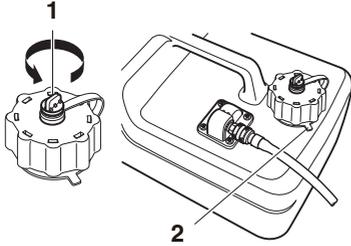
Do not connect fuel connector except when operating engine. Fuel leakage is a fire or explosion hazard, which can cause serious injury or death.

ENOW0947-0

CAUTION

When using a separate tank, be sure that the fuel line is not kinked and is connected securely.

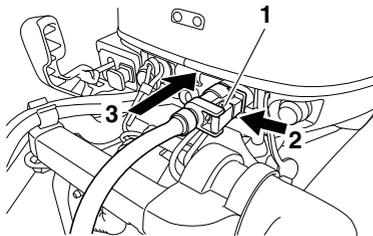
1. Full open the air vent screw on the fuel tank cap.



ENOF00421-0

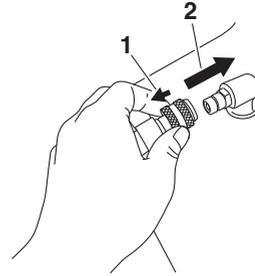
1. Air vent screw
2. Fuel tank cap

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 sound is heard.
3. Connect the fuel connector to the engine and fuel tank.



ENOF00514-0

1. Fuel connector
2. Push
3. Insert



ENOF00861-A

1. Pull
2. Insert
4. Squeeze primer bulb until it becomes stiff to feed fuel to carburetor. Direct arrow mark upward when priming.



ENOF00862-0

1. Engine side
2. Fuel tank side

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

ENOM00045-C

2. Starting the engine

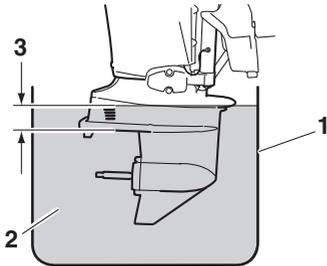
ENOW00036-A

CAUTION

When the engine is started in the test tank, to avoid over heating and water pump damage, be sure the water level is at least 10 cm (4 in.) above the anti ventilation plate.

And be sure to remove the propeller, when starting the engine in the test tank. (See page 71)

Run the engine only at idling.



ENOF00863-0

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

ENOW00036-0

CAUTION

Be sure to stop engine immediately if cooling water check port is not discharging water, and check if cooling water intake is blocked. Operating engine could lead to overheating potentially leading to engine damage. Consult an authorized dealer if the cause cannot be found.

ENOW00032-A

CAUTION

Do not hold turning starter motor 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 engine has started.

This model is provided with start in gear protection.

ENON00010-0

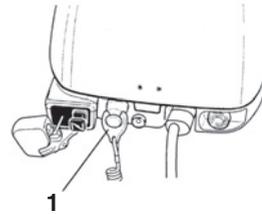
Note

Start-in-gear protection prevents engine from starting at other than neutral shift. In-

gear starting of engine will move the boat immediately, potentially leading to falling down or causing passenger(s) to be thrown overboard.

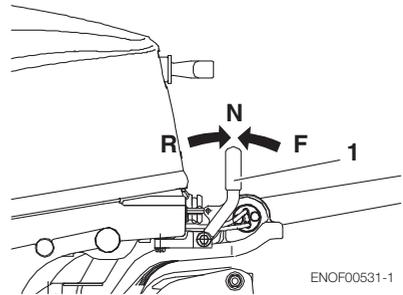
Tiller handle type

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 Flo-tation Device.)



ENOF00516-0

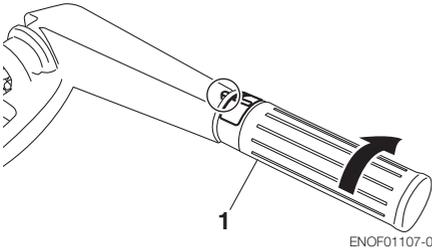
1. Stop switch lock
2. Set the control lever in the Neutral position.



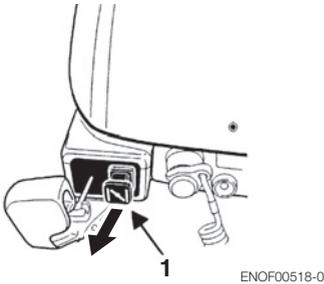
ENOF00531-1

1. Shift lever

3. Set the throttle grip to START position.



1. Throttle grip
4. Pull the choke knob fully.



1. Choke knob

ENON00501-0

Note

Choke is not necessary when the engine is warm. Set the throttle grip to "RE-START" position.

ENON00502-0

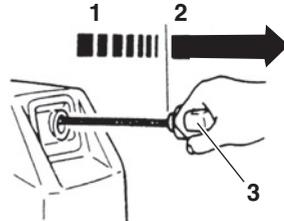
Note

If engine does not start with 4 or 5 times starting operation, push the knob back and restart.

(For manual starter type)

This engine is equipped with a compression release mechanism.

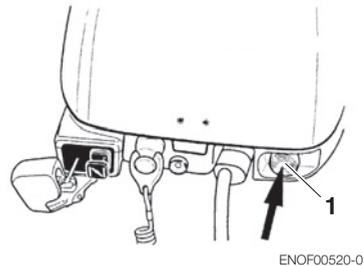
6. Pull the starter handle slowly until you feel engagement, keep pulling till you feel less resistance. Then pull it quickly. Repeat if necessary until started.



1. Slowly
2. Quickly

(For electrical starter type)

4. Push the starter switch button and release the button when the engine has started.



1. Starter Button

ENOW00032-1

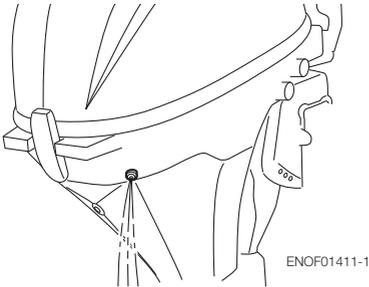
CAUTION

Do not hold turning starter motor 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

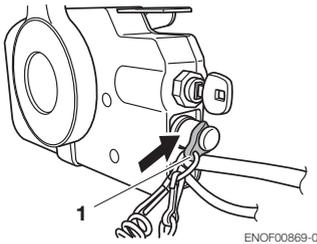
crank engine again after 10 seconds or more.

5. Check the cooling water from cooling water check port.

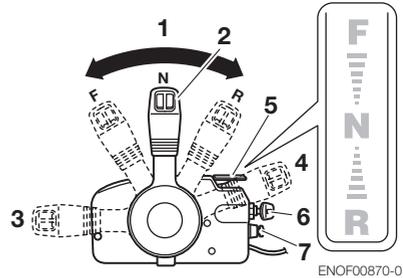


Side mount RC type

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.
4. Raise the free accel lever a little (both of cold engine and warm engine).



1. Neutral (N)
2. Control lever
3. Fully open (Forward)
4. Fully open (Reverse)
5. Free throttle lever
6. Main switch key
7. Stop switch

ENON00035-A

Note

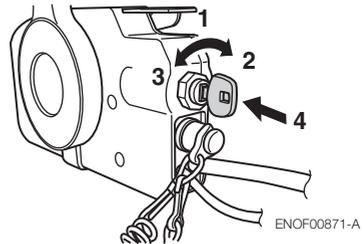
The free throttle lever can not be raised when the control lever shift is in Forward or Reverse.

5. Turn the main switch key to ON position. Then, continuously push the key to operate the choke.

ENON00503-0

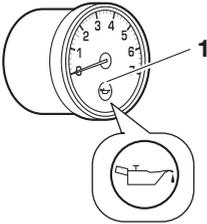
Note

Choke operation is not necessary if the engine is warm.



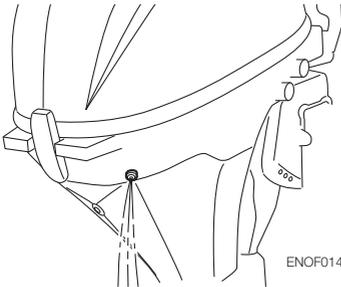
1. ON
2. START
3. OFF
4. Push to operate choke knob.

6. Stop pushing the key when the engine has started.
The key returns to the original position, automatically.
7. Returns the Free accel lever to close position.
8. Confirm warning lamp light up and then go off after engine has started.



ENOF00851-A

1. Warning lamp
9. Check the cooling water from cooling water check port.



ENOF01411-1

ENOM00042-A

Emergency starting

ENOW00099-A

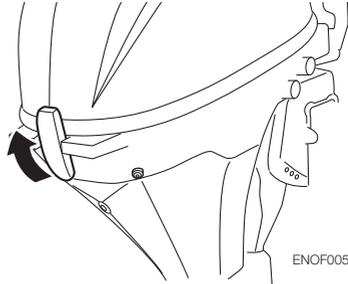
⚠ WARNING

When the emergency starter rope is used for starting engine;

- **Start in gear protection does not work. Be sure to shift is at neutral position. Otherwise the engine will move the boat immediately and cause personal injury.**

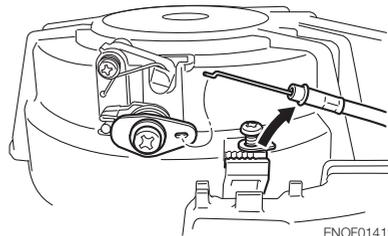
- **Be careful that your clothes or other items do not get caught in the rotating engine parts.**
- **To prevent accident and injury by rotating parts, do not re-attach flywheel cover and the top cowl after the engine has been started.**
- **Do not pull starter rope if any bystander is behind. The action can injure the bystander.**
- **Attach engine stop switch lanyard to clothing or any part of body like arm before starting engine.**

1. Remove the top cowl.



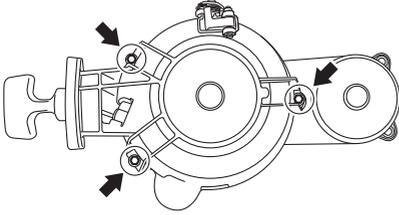
ENOF00521-1

2. Remove starter lock cable from recoil starter by loosening the screw for the starter lock cable.



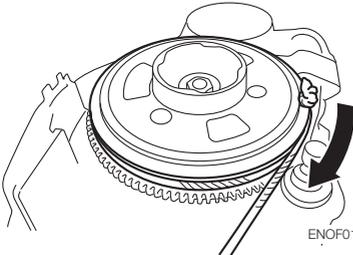
ENOF01412-0

- Remove the bolts (3 pcs) and remove the recoil starter.



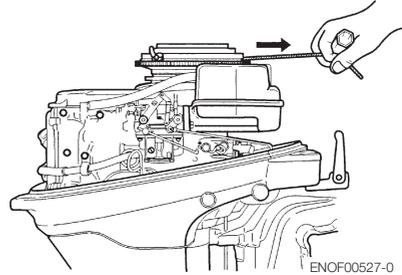
ENOF01434-0

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



ENOF01435-0

- Tie a loop in the another end of the emergency starter rope and attach socket wrench that is included in the tool kit.



ENOF00527-0

ENOW00860-0

CAUTION

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

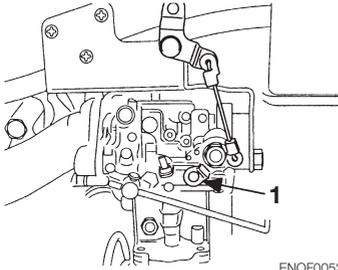
- Be sure to install the stop switch lock to the stop switch, and attach the stop switch lanyard securely to the operator or to the operator's PFD (Personal Flotation Device.)
- Set the control lever in the Neutral position.
- Pull the starter handle slowly until you feel engagement, keep pulling till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

ENOM00518-0

If the choke solenoid fails to operate (EP and EPT type only)

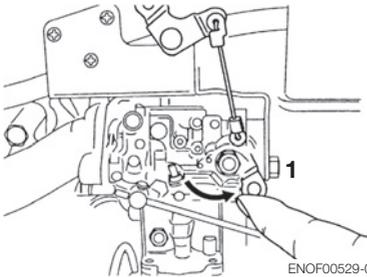
- Remove the top cowl.
- Close the choke plate by finger.

3. Raise the Free accel lever a little.
4. Turn the main switch key to start position.
5. Stop pushing the key when the engine has started.
6. Return the choke plate to open position.



ENOF00528-0

1. Choke plate (open position)



ENOF00529-0

1. Choke plate (closed position)

ENOM00043-A

3. Warming up the engine

ENOW00932-0

CAUTION

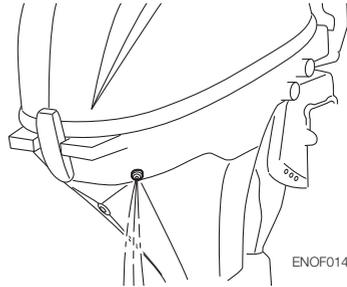
Be sure to check that cooling water is coming out of the cooling water check port during warm up.

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.



ENOF01411-1

ENOM00044-0

Engine speeds

Idling speed after warming up.

Remark: 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)
900 min ⁻¹ (rpm)	950 min ⁻¹ (rpm)

ENOM00046-A

4. Forward, reverse, and acceleration

ENOW00037-0

WARNING

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

ENOW00038-A

 **WARNING**

- Attach other end of 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 will not be caught by any object 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.

ENOW00042-0

 **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 down or causing passenger(s) to be thrown overboard. Leading to serious personal injury, and steering system and/or shifting mechanism may be damaged.

ENOW00861-0

 **WARNING**

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

ENOW00862-0

 **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.

ENOW00863-0

 **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.

ENOM00014-0

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.

ENOW00864-0

 **CAUTION**

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

ENOM00890-A

Tiller handle type

ENOW00867-0

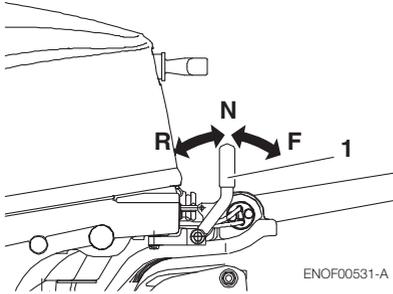
 **WARNING**

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

ENOW00865-A

 **CAUTION**

Do not force to shift when the throttle grip is not in the fully closed position, otherwise, steering system and/or shifting mechanism may be damaged.



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.

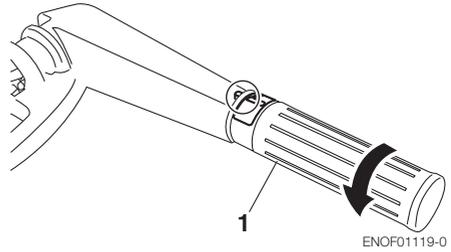
Acceleration

ENOW00867-0

⚠ WARNING

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

Open throttle grip or control lever gradually.



1. Throttle grip

ENOM0900-0

Side mount RC type

ENOW00867-0

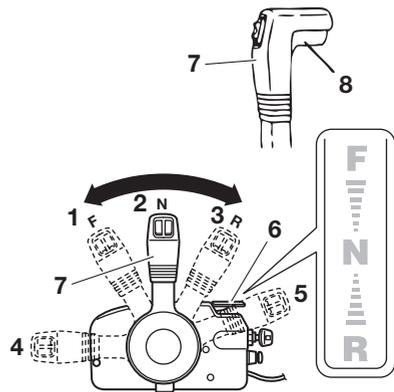
⚠ WARNING

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

ENOW00865-A

⚠ CAUTION

Do not force to shift when the throttle grip is not in the fully closed position, otherwise, steering system and/or shifting mechanism may be damaged.



ENOF00877-0

1. Forward (F)
2. Neutral (N)
3. Reverse (R)
4. Fully open (Forward)
5. Fully open (Reverse)
6. Free throttle lever
7. Control lever
8. Lock button

Forward

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

Acceleration

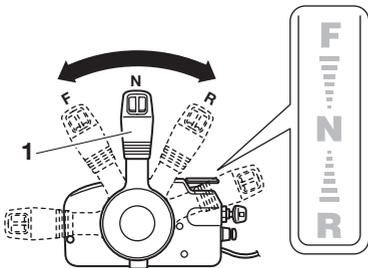
ENOW00867-A



CAUTION

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

Open throttle grip or control lever gradually.



ENOF00879-0

1. Control lever

ENOM00049-A

5. Stopping the engine

ENOW00868-0

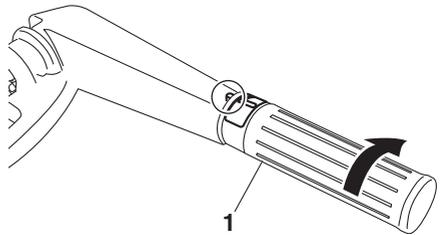


WARNING

Be careful not to remove engine stop switch lanyard from engine accidentally while boat 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.

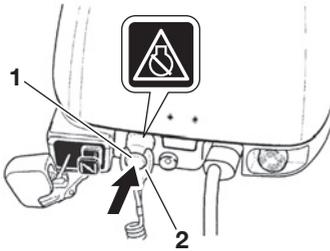
Tiller handle type

1. Turn the throttle grip to the slow position.



ENOF01107-0

1. Throttle grip
2. Put the shift lever in the Neutral position.
Run the engine for 2-3 minutes at idling speed for cooling down if it has been running at full speed.
3. Push the stop switch for a few seconds to stop the engine.

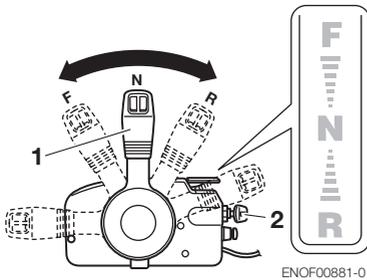


ENOF00569-1

1. Stop Switch

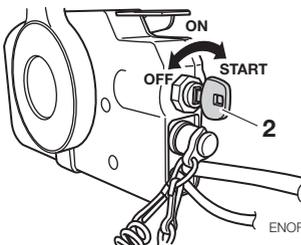
Side mount RC type

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



ENOF00881-0

2. Turn the main switch key to the OFF position or push the stop switch. (Do not forget to turn the key off).



ENOF00882-0

1. Control lever
2. Main switch key

ENOW00869-0

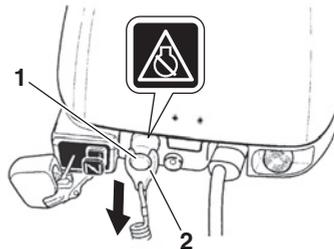
⚠ WARNING

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.

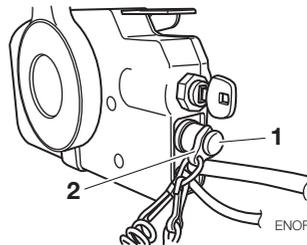
Emergency engine stopping

Remove stop switch lock to stop the engine.



ENOF00569-C

7



ENOF00884-0

1. Stop switch
2. Stop switch lock

ENOM00910-0

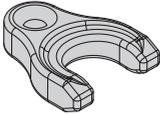
Spare emergency stop switch lock

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 water, be sure to use emergency stop switch lock of the spare.

Be sure to confirm the spare stop switch lock is in the tool bag before begin to operate.



ENOF00891-0



ENOF00892-0

Remote control type

Right turn

Turn the steering wheel to the right.

Left turn

Turn the steering wheel to the left.

7

ENOM00920-0

6. Steering

ENOW00870-0



WARNING

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

Tiller handle type

Right turn

Move the tiller handle to the left

Left turn

Move the tiller handle to the right.



ENOF00893-0

ENOM00050-0

7. Trim angle

ENOW00043-A



WARNING

- Adjust the trim angle when the engine is stopped.
- 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 boat slow initially to see if it can be controlled safely.

ENOW00044-0

⚠ WARNING

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

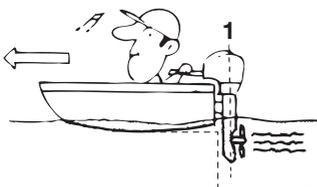
- Do not cruise at high speed if improper trim position is suspected. Stop the boat and readjust trim angle before continuing cruise.
- For outboard motor model with PTT switch on the bottom cowl, do not operate the switch during cruising, or control of boat may be lost.

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.

ENOM00052-0

Proper trim angle

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



ENOF00051-1

1. Perpendicular to the water surface

ENOM00053-A

Improper trim angle (bow rises too high)

Set the thrust rod (or preset knob) lower if the bow of the boat rises above horizontal.



ENOF00052-0

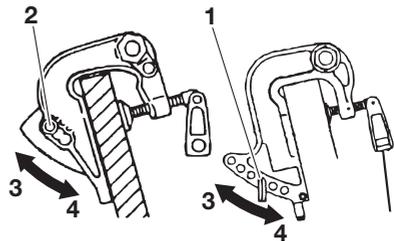
ENOM00054-0

Improper trim angle (bow dips into the water)

Set the thrust rod (or preset knob) higher if the bow of the boat is below horizontal.

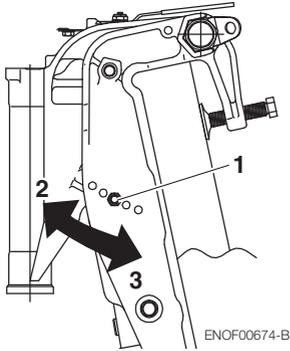


ENOF00053-0



ENOF000532-0

1. Thrust rod
2. Preset knob
3. Higher
4. Lower



ENOF00674-B

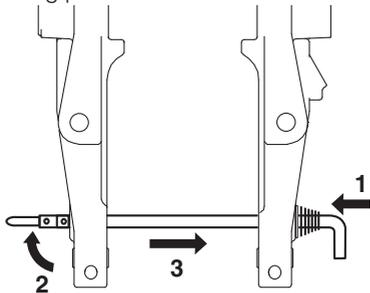
- 1. Thrust rod
- 2. Higher
- 3. Lower

Remark: Thrust rod is for MF and EF, and preset knob is for EP.

7 Trim angle adjustment (Manual tilt type)

The transom angle adjustment

1. Stop the engine.
2. Shift into neutral.
3. Raise the outboard motor to the tilt up position.
4. Change the thrust rod position as following picture.



ENOF01238-1

- 1. Push in
- 2. Rise the stopper
- 3. Pull out

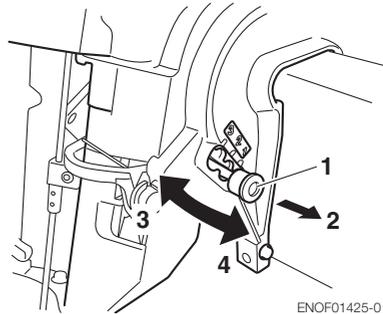
5. Reinstall the thurst rod securely.

6. Gentry lower the outboard.

Trim angle adjustment (Manual tilt RC type)

The transom angle adjustment

1. Stop the engine
2. Shift into forward.
3. Raise the outboard motor to the tilt up position.
4. Change the trim lock pin position as following picture.



ENOF01425-0

- 1. Preset knob
- 1. Pull
- 2. Higher
- 3. Lower

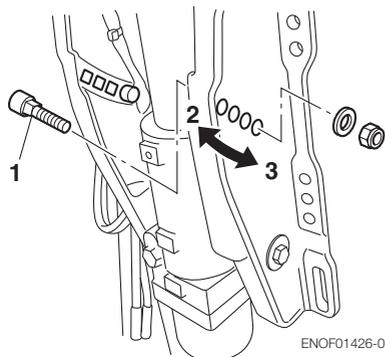
5. Reinstall preset knob securely.
6. Gentry lower the outboard.

Trim angle adjustment (Power tilt type)

The transom angle adjustment

1. Stop the engine
2. Operate the Power Tilt switch and raise the outboard motor to the tilt up position.
3. Lock the tilt with the Tilt stopper.

- Change the trim lock pin position as following picture.



- Trim lock pin
 - Higher
 - Lower
- Reinstall the tilt lock pin securely.
 - Operate the Power Tilt switch and lower the outboard.

ENOM00060-A

8. Tilt up and down

ENOW00055-0

WARNING

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

ENOW00048-0

WARNING

When tilting up or down, be careful not to place your hand between the swivel bracket and the stern bracket.

Be sure to tilt the outboard motor down slowly.

ENOW00056-A

WARNING

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

ENOW00057-0

CAUTION

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

ENON00921-0

Note

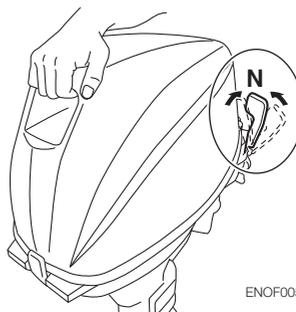
Before tilting the outboard motor up, after stopping the motor leave it in the running position for about a minute to allow water to drain from inside the engine.

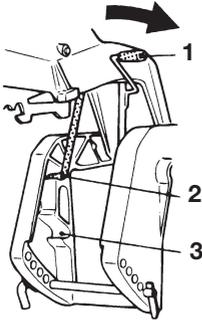
ENOM00062-A

Manual Tilt type

Tilt up

With the shift lever in Neutral or Forward, fully tilt the motor up toward you by holding the tilt handle provide at the rear of the top cowl. Then slightly lower the motor for locking in the up position.





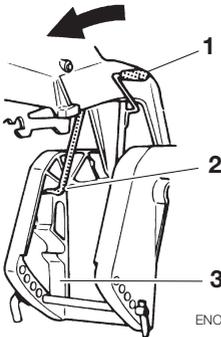
ENOF00544-0

1. Tilt lever
2. Tilt up position
3. Shallow water operating position

ENOM00063-A

Tilt down

Slightly tilt the motor up, and pull the tilt lever toward you to release the tilt-lock. Then lower the motor slowly.



ENOF00545-1

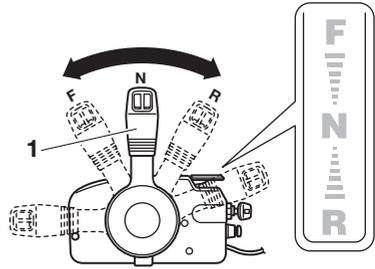
1. Tilt lever
2. Tilt up position
3. Tilt down position

ENOM00564-0

Manual Tilt RC type

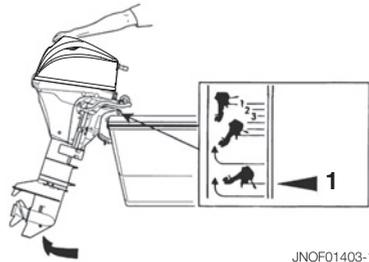
Tilt up

1. Put the control lever to the Forward (F) position.



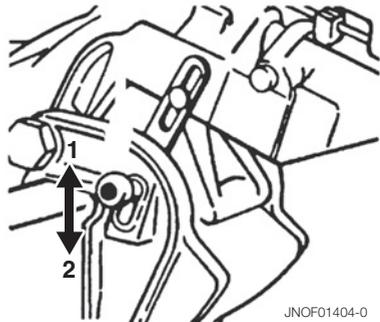
ENOF00879-0

1. Control lever
2. Tilt the outboard motor all the way up until it is in tilted - up position.



JNOF01403-1

1. Tilt up position
3. Set the knob to Lock position, then secure the tilt locking.

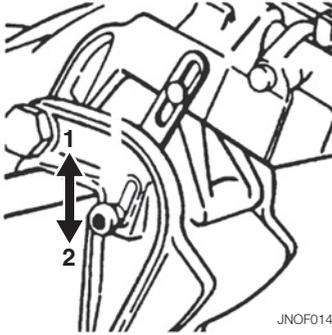


JNOF01404-0

1. LOCK
2. UN-LOCK

Tilt down

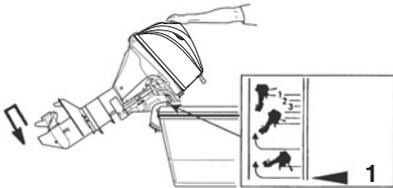
1. Set the knob to Unlock position.



JNOF01405-0

1. LOCK
2. UN-LOCK

2. Lift up the outboard motor slightly until it is in Release position, and then outboard motor tilted down.



JNOF01406-1

1. Tilt release position

ENOM00069-B

Power Tilt type

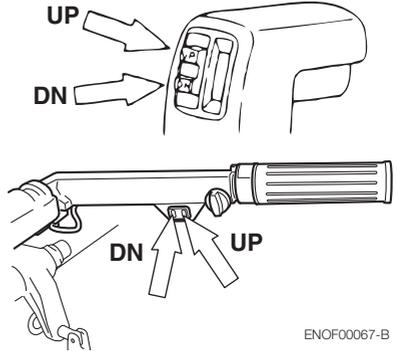
Tilt up

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

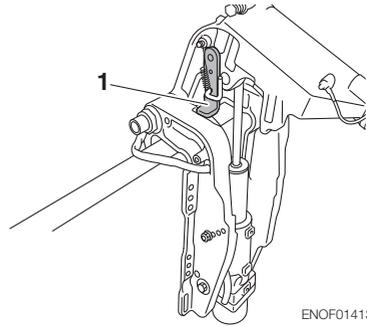
Tilt down

1. Release the tilt stopper from the set-up position while slightly tilting up outboard motor.

2. Operate the Power Tilt switch and tilt the outboard motor down until the motor touches to the thrust rod.



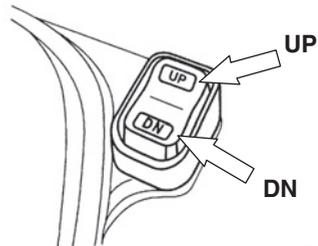
ENOF00067-B



ENOF01413-0

1. Tilt stopper

The outboard motor can also be tilted up and down using the switch provided on the bottom cowl.



ENOF00539-0

It is possible to tilt up or down in spite of main switch "ON" or "OFF".

ENOM00940-0

Manual relief valve

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

ENOW00872-0

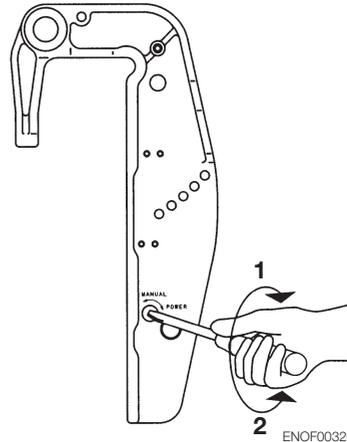
WARNING

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.

ENOW00873-0

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.



ENOF00326-0

- 1. Power
- 2. Manual

ENOM00068-A

9. Shallow water operation

ENOW00051-0

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.

ENOW00053-0

CAUTION

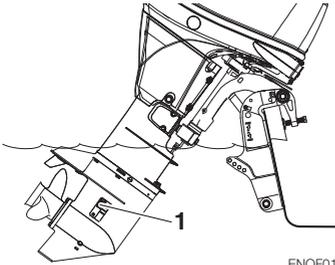
While in shallow water drive position, do not operate the outboard motor in Reverse. Operate the outboard motor at slow speed and keep the cooling water intake submerged.

ENOW00054-A

CAUTION

Do not overtilt outboard motor when driving shallow water, or air may be sucked

through water inlet, potentially leading to engine overheating.



ENOF01144-A

1. Water inlet

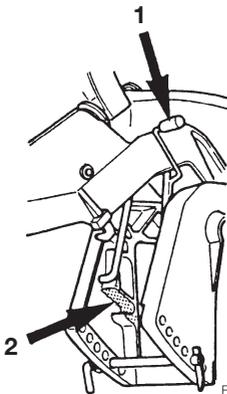
Manual tilt type (MF, EF type)

Shallow water running position:

1. With the shift lever in Neutral or Forward, tilt the motor up slowly by about 40° and then lower the tilt lever for setting at the shallow water running position.

Return to normal running position:

2. Tilt the motor up fully and then return the motor down slowly to the normal running position.



ENOF00549-0

1. Tilt lever
2. Shallow water running position

ENOM00541-A

Manual tilt type (EP type)

Shallow water running position

1. Stop the engine.
2. Shift the outboard into forward.
3. Tilt the outboard up to one of the shallow water positions.

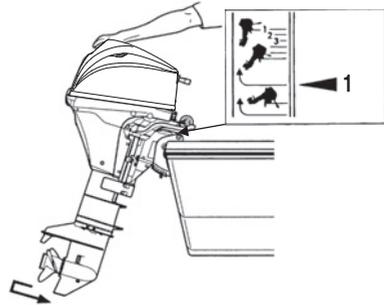


ENOF00550-1

1. Shallow water drive position

Return to normal running position

1. Stop the engine.
2. Tilt the outboard up to the tilt release position.
3. Gently lower the outboard.



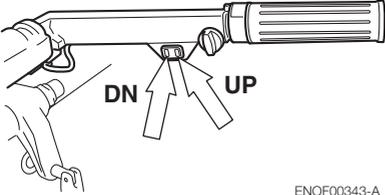
ENOF00551-1

1. Tilt release position

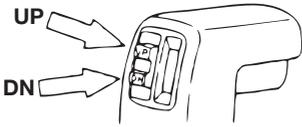
ENOM00069-A

Power Tilt type

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



ENOF00343-A



ENOF00067-0