NURSIA
OUTBOARD MOTORS
POWER YOUR ADVENTURE



User Manual
Four Stroke

Reliable Performance

New Model

User's Manual

Four-stroke outboard engine

NURSIA Four-Stroke Outboard

Quick Start & Safety Notes

1. Use only four-stroke engine oil (do not mix with gasoline).
2. Always check oil level with the dipstick before use.
3. Start and run the motor only in water. Never dry-run on land.
4. Confirm cooling water is flowing after launching.
5. 10-hour break-in period: Do NOT use full throttle during break-in.

四冲程水冷船外机/FOUR STROKE WATER COOLED OUTBOARD



四冲程水冷船外机数据/DATA FOR FOUR STROKE WATER COOLED OUTBOARD

注释： 四冲程最大马力为 30 马力， 船外机区分为长轴和短轴， 长轴比短轴长 10 公分

NOTE:The maximum horsepower of the four-stroke is 30 horsepower,and the off-board aircraft is divided into long axis and short axis.The longer than axis is 10cm longer than the short axis

产品项目 PRODUCT ITEMS	F4.0	F6.0	F8.0	F12	F15	F20	F25	F30
全功率运行转速 FULL THROTTLE	4250-4750	4000-5000	4000-5000	5000-6000	5000-6000	4500-5500	5000-6000	5000-6000
最大输出功率 MAXIMUM POWER	2.9(4)	4.4(6)	5.8(8)	8.8(12)	11(15)	14.7(20)	18.4(25)	22.1(30)
艉板高度 STERN HEIGHT	420	420	420	420	420	420	420	420
气缸数目 NUMBER OF CYLINDERS	1	1	1	2	2	2	2	2
排量 DISPLACEMENT	72	139	139	216	323	246	498	497
缸径 X 冲程 BORE X STROKE	54X31.5	62X46	62X46	56X43	59X59	62X59	62X62	65X62
操作方式 CONTROL SYSTEM	手柄 HANDLE	手柄 HANDLE	手柄 HANDLE	手柄 HANDLE	手柄 HANDLE	手柄 HANDLE	手柄 HANDLE	手柄 HANDLE
启动方式 STARTUP MODE	手动启动 MANUAL START	手动启动 MANUAL START	手动启动 MANUAL START	手动启动 MANUAL START	手动启动 MANUAL START	手动启动 MANUAL START	手动启动 MANUAL START	手动启动 MANUAL START
换挡方式 GEAR CHANGEOVER	F-N	F-N-R	F-N-R	F-N-R	F-N-R	F-N-R	F-N-R	F-N-R
传动比 RATIO	2.08(27:13)	2.08(27:13)	2.08(27:13)	2.08(27:13)	2.08(27:13)	2.08(27:13)	2.08(27:13)	2.08(27:13)
燃油箱容积 FUEL TANK VOLUME	1.8L	2.1L	2.1L	12L	24L	24L	24L	24L
点火系统 IGNITION SYSTEM	CDI	CDI	CDI	CDI	CDI	CDI	CDI	CDI
齿轮油量 GEAR OIL VOLUME	60	100	100	160	250	330	330	330
螺旋桨规格 PROPELLER	3-7.1/4X6	3-7.1/7X7	3-7.1/7X7	3-9.1/4X8	3-9.1/4X9	3-9.1/4X9	11 寸	11 寸



Announcements for users

Before operating an outboard engine, please read this user manual carefully. When you set out, please use a waterproof bag to package this manual and carry it to the boat. If you plan to sell waterproof bag, this manual should be sold together.

Important information of the manual

In this manual, information that we must pay attention to has been differentiated and users must read them.

**Warning**

It involves safety requirements and we must pay special attention to this.

Advice

It hints that operators should carry out operation in accordance with requirements to avoid damaging machines.

'Note'

It provides key information which makes procedures easier and clearer.

As quality of products is improved constantly and product design is enhanced continuously, some information in this manual may be a little different from your machine. If you have any question about the manual, please consult your distributor.

Any damage caused by ignoring these instructions is not included in warranty.

When some dealers fail to provide warranty service, consumers can ask their distributors to offer information related to maintenance as they purchase products in order to eliminate their worry about after-sale service. As a manufacturer, the company will provide various parts of all sold products.

Note:

In this manual, a four-stroke 15-HP machine and its standard parts are used as a base of explanation and demonstration. Thus, not all clauses are appropriate for all types.

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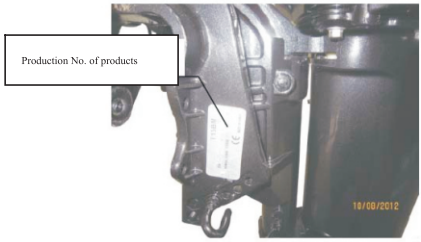
1. General information

1.1 identification number

Outboard engine serial number is printed on the label attached to the port of the clamp bracket.



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Record the outboard engine serial number at the provided blank.

1.2 Important warnings

⚠ Warning

Before starting the engine, ensure the gear shift handle stays at the neutral position.

During the period of starting or operation, do not touch or dismantle electric parts.

When the engine works, keep hands, hair and clothes away from the flywheel and other rotating parts.

⚠ Warning

When the engine has neutral starting devices, non-neutral positions cannot be started. Forced starting will damage some parts of the outboard engine.

2 Safety

Safety instruction:

2.1 Rotating parts

When the engine has been started, it is essential to prohibit hands, feet, hair, life jackets and leather belts from touching rotating parts in the engine to prevent from twining and causing serious injuries.

When the engine works, do not take down or replace the overhead guard.

2.2 Thermal state parts

When the engine works or halts, parts are quite hot. Before the engine becomes cool, do not touch any part inside the overhead guard.

2.3 Electric shock

When the engine is started or works, do not touch any electric part. Otherwise, electric shock and even electrocution may be caused.

2.4 Engine stopping dragline

In the process of operation, do tie the engine stopping dragline to a safe place of your clothes, arms or legs. The engine will stop automatically if the bayonet of the dragline falls off when an operator falls out of the boat or leaves the rudder or other people are injured in the process in which the boat operates. In this way, it can prevent the boat and its crews from having accidents.

When the boat operates, do not take down or leave the rudder randomly. Do not tie the dragline to the place that may fall off from clothes. Avoid connecting the dragline to the place that may be twined in order to avoid sudden breakdown of the engine, prevent the rudder from being out of control and protect people from being injured.

A case about reliable button of stopping dragline



ALF 2001

2.5 Gasoline

Gasoline and gasoline steam are flammable and combustible to a large extent. Thus, it is essential to inject fuel oil according to technological process.

Be careful and do not spill gasoline. If gasoline is spilt, use a dry duster cloth to wipe off it at once and deal with the duster cloth correctly. If gasoline spatters to your clothes, please replace your clothes immediately.

Strictly prohibit from using mouth to extract fuel oil by a siphon.

2.6 Announcements for operation

Even if the engine stays at the neutral position, airscrew may keep revolving. Thus, prevent people in water from approaching the boat.

The boat does not have a brake, operate it carefully. Keep a safe speed and make people, objects and other boats keep a safe distance from the boat. Avoid a sudden turn and extreme operation in order to reduce risks of being out of control, cast and crash.

Avoid driving the boat to areas with underwater obstacles or shallow water religions.

Ensure there is at least one person accepting engine operation training on the boat to prevent emergency incidents from happening.

3 Basic requirements

3.1 Instruction for refueling

⚠ Warning

Gasoline and gasoline steam are highly flammable and combustible!

When fuel oil is added, do not smoke but keep away from all open fire and sparks.

Before adding fuel oil, stop the engine.

Add fuel oil at a draughty area. Add fuel oil for the portable oil tank outboard.

Do not spill gasoline. If gasoline is spilt, use a dry duster cloth to wipe off it at once.

Do not fill up the oil tank when oil is added because fuel oil will swelled and leakage and dangers tend to happen when it is heated or shaken.

After adding fuel oil, tighten up the filler cover.

If gasoline enters eyes, see a doctor immediately.

If gasoline spatters to skin, use a piece of soap and water to wash it. If gasoline spatters to clothes, please replace your clothes.

When gasoline is added, make the filler contact with the funnel so that oil can drop down and electrostatic sparks can be avoided.

Advice:

Only new clean gasoline that is put in a clean container and is not polluted by water or foreign matters can be used.

3.1.1 Gasoline

Recommended gasoline:

93# standard unleaded gasoline

3.1.2 Gasoline for engines

The outboard engines sold by the manufacture are not filled with four-stroke engine oil. Before using them, it is essential to add four-stroke engine oil.
Engines will be damaged if the outboard engines start or work without being added engine oil.

Recommended gasoline for engines:

Shell or Great Wall brand four-stroke engine oil

Recommendation:

Group 1: SAE10W-30 *f10W-40 f* SW-30

Group 2: SAE1SW-40 *f20W-40 f20W-SO*3.2

3.2 Installation requirements

Before installing the outboard engine, ensure total HP of your engine do not exceed the maximum HP of the boat.

⚠ Warning:

When power of the boat is too large, serious instability may be caused.

Install the engine

Distributors or other people with abundant and correct installation experience should use correct equipment and install the engine in accordance with the full set of installation instructions.

⚠ Warning:

Incorrect installation of the outboard engine may cause dangerous situations like improper settlement, being out of control or fire.

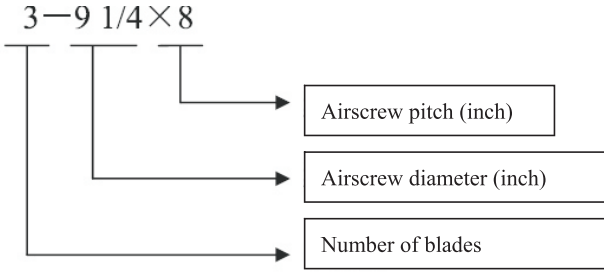
Since the engine is very heavy, we should learn knowledge about installation first to realize safe assembly. Specific equipment and training will be the most ideal.

3.3 Selection of airscrews

Selection of correct airscrews is one of the most important decisions that owners make when they purchase. Types and sizes of airscrews have direct impacts on accelerated speed, maximum speed, fuel efficiency and even engine life.

After selection, the airscrews that your outboard engine is equipped with may be operated well with good performance in several usages. However, they may be not ideal for some special usages. Thus, you can replace them with other more appropriate airscrews. When airscrews are selected, it is essential to make the engine achieve medium or middle range of operation under the situation of maximum load and full throttle. Generally, for small operation load, airscrews with small screw pitch can be chosen. If your loaded weight of your delivery changes obviously, appropriate airscrews can be chosen according to your maximum load, which can ensure your engine work within a suitable range. Please remember you need reduce the accelerator's set value when small load is carried in order that speed of then engine is kept in the recommended speed range.

HP	Randomly allocated airscrews	HP	Randomly allocated airscrews
2.5	3-7 1/7*7	9.9-15	3-9 1/4*11
4-6	3-7 1/7*8	20	3-9 7/8*11





ALF 3001

3.4 Starting protective device preventing from engaging a gear

Warning

The outboard engine is equipped with a Starting protective device preventing from engaging a gear. This security feature makes the engine can only be started when it stays at the neutral position. Before starting the engine, do choose the neutral position (consult Clause 6.6)

Advice:

In case the engine does not stay at the neutral position, it will be damaged undoubtedly and unexceptionally.



ALF 3002

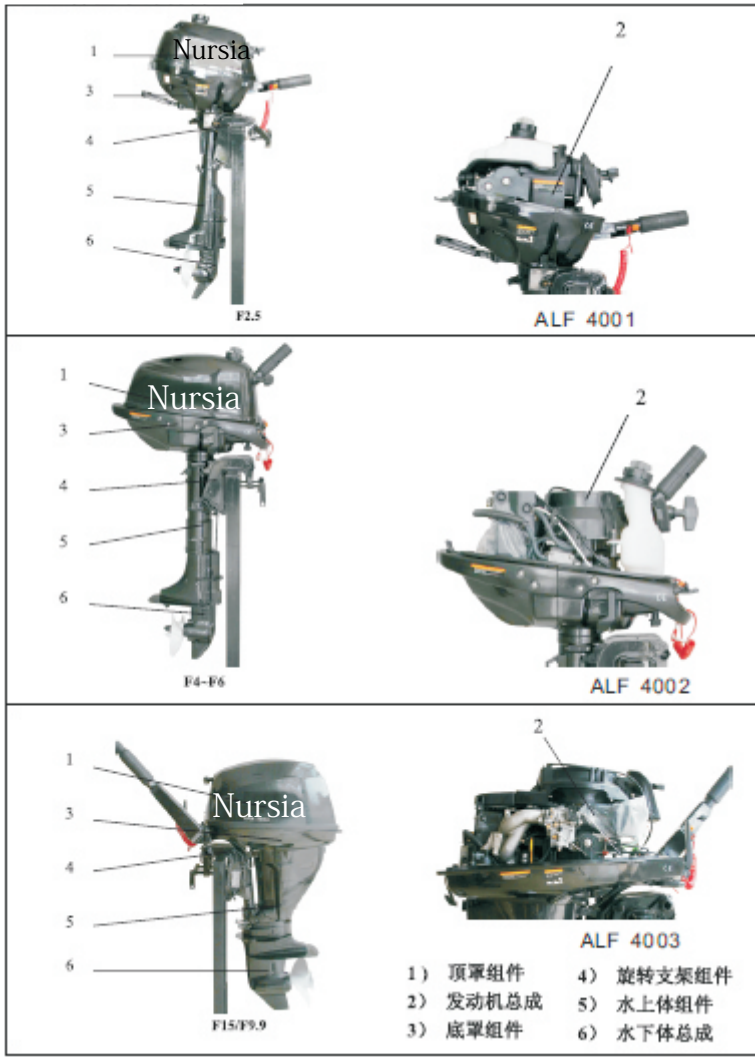


ALF 3003

Usually, the engine stays at the neutral position when it leaves the factory.

4 Basic functional units

4.1 Introduction to major basic parts



1） Overhead guard components

2） Engine assembly

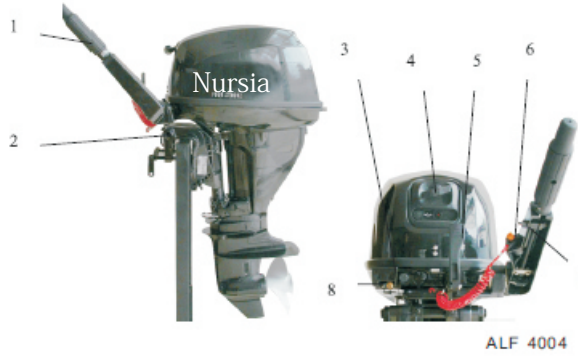
3） Bottom guard components

4） Swinging strut components

5) Water-diversion upper body components

5） Water lower body assembly

Introduction to functional parts:



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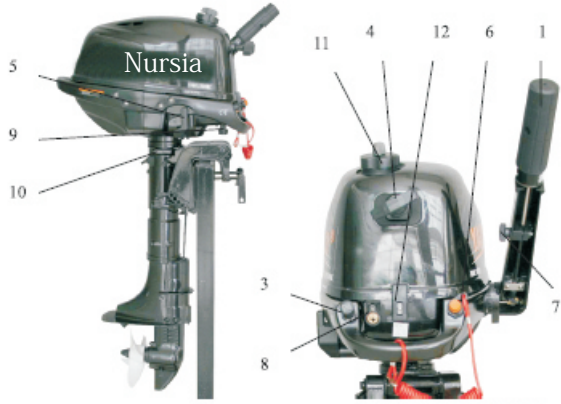
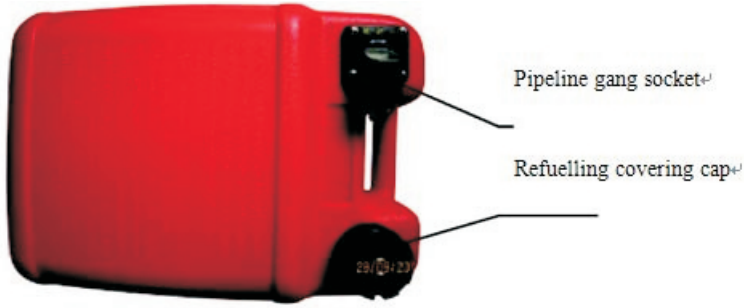


ALF 4005

1) Steering handle 2) clamp holder of boat board 3) choke valve button 4)starting handle 5) gear handle 6) flameout buttom·safe cable clamp 7) accelerator damp rottaty knob 8) pipe gang socket 9) oil switch knob 10) steering rotating damp handle 11) fule tank cap 12) overhead guard clamp handle

4.1.1 Fuel tank

If your machine is equipped with a portable oil tank, its functions are shown as follows.

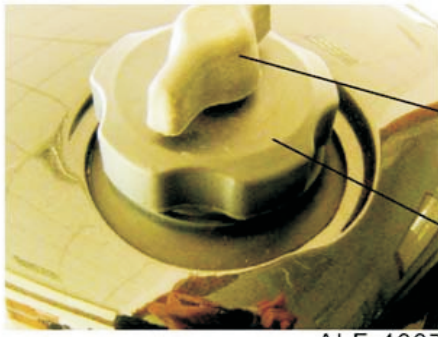


ALF 4006

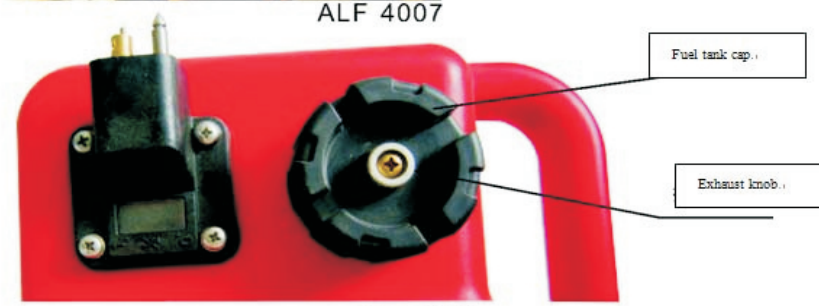
Warning

The oil tank that is provided together with the engine is a specialized one, so it cannot be used as a container saving oil. Commercial users should follow related safety rules to ensure sold oil tanks are dedicated for outboard engines.

1. Fuel tank lock and exhaust screw knob



ALF 4007



ALF 4008

4.1.1.1 Fuel tank cover

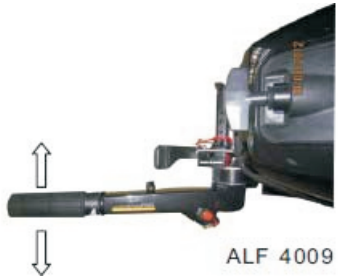
This fuel tank cover seals fuel oil. After disassembling it, fuel oil can be added to the tank. If you want to disassemble it, rotate it anticlockwise.

4.1.1.2 Exhaust screw

This exhaust screw locates on the fuel tank cover. If you want to loosen the screw, rotate it anticlockwise.

4.1.2 Steering handle

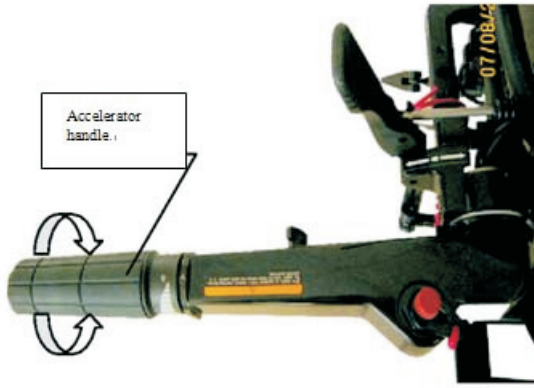
. If you want to change directions, moving the steering handle towards the left can make the boat sail towards the right and moving the steering handle to the right side will enable the boat to sail towards the left.



ALF 4009

4.1.3 Accelerator's handle

The accelerator's handle is on the steering handle. If we rotate the handle anticlockwise will make the boat speed up. In case we rotate the handle clockwise, the boat will slow down.



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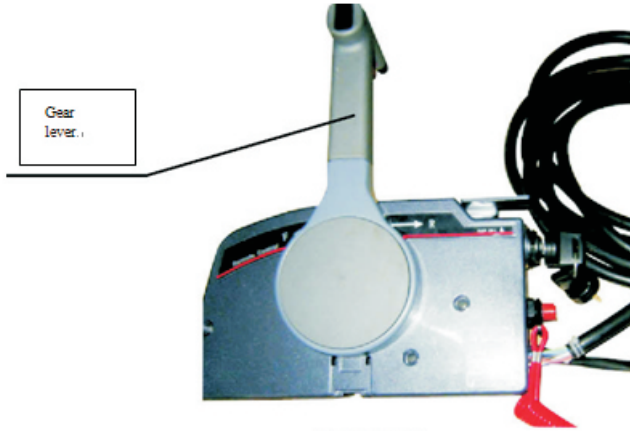
4.1.4 Gear lever (remote control)

Pushing the gear lever up will make the boat speed up.



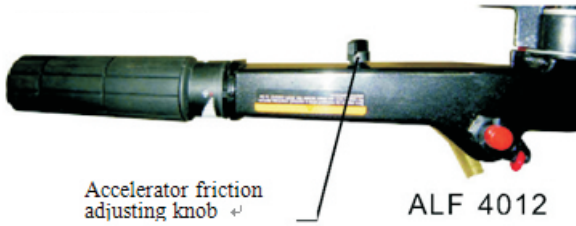
ALF 4011

4.1.5 Accelerator friction adjusting knob

Friction equipment provides adjustable resistance for movement of the accelerator's handle or remote-control lever. Settings can be carried out according to the operator's habits. If you want to increase resistance, rotate the adjuster clockwise. On the contrary, resistance will be reduced if you rotate the adjuster anticlockwise.

When you hope to keep a constant speed, tighten the adjuster to keep the required accelerator settings.

When you want to change the speed, loosen the adjuster in advance.



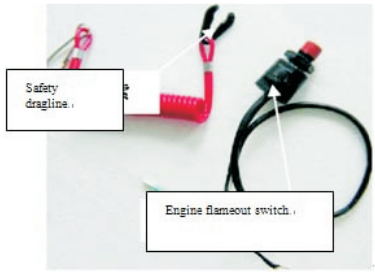
ALF 4012

⚠ Warning

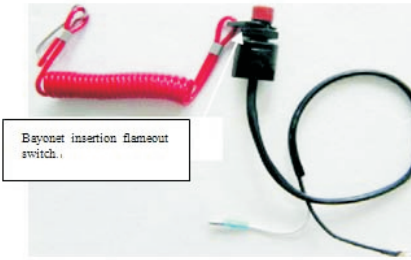
When normal operation is implemented, you had better not tighten the friction adjusting knob too closely. The reason for this is that too large resistance will affect ideal rotation and adjustment of the accelerator by the handle. In addition, this may also cause accidents.

4.1.6 Engine flameout switch

The engine can be started or operated only when the engine flameout switch is inserted with a dragline clamp. If the dragline clamp is taken off, the engine can get flameout.



ALF 4013



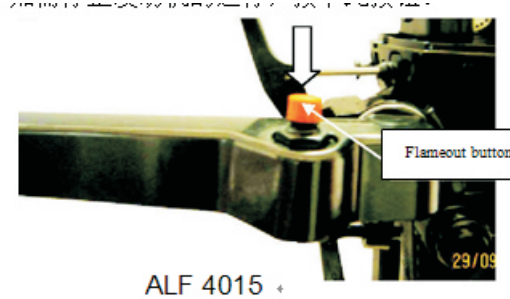
ALF 4014

⚠ Warning

In the process of operation, do tie the engine stopping dragline to a safe place of your clothes, arms or legs.
Do not tie the dragline to the place that may fall off from clothes.
Prevent risks caused by the situation that the driver leaves but the engine still works.
Avoid connecting the dragline to the place that may be twined. Otherwise, safety functions of the dragline will be lost.
Do not take off the dragline when the boat drives in order to avoid sudden breakdown of the engine and prevent the rudder from being out of control.

4.1.7 Engine stopping button (flameout switch)

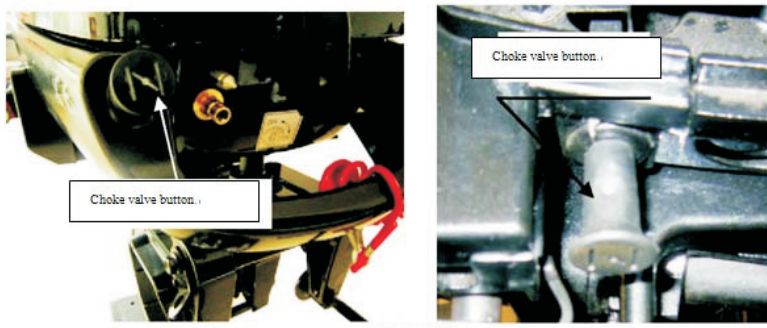
If you want to stop operating the engine, press this button.



ALF 4015

4.1.8 Choke valve button

If you want to provide concentrated fuel gas mixture needed by starting of engine, pull out this button.



ALF 4016

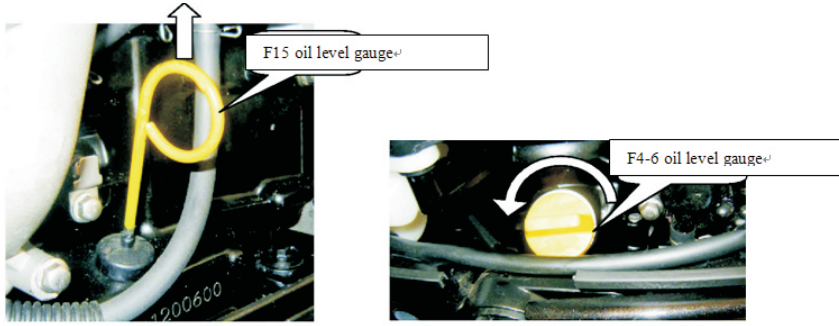
4.1.9 Oil filler cover and oil level gauge

Advice:

It is essential to check oil level of the engine before starting it and ensure the oil level reaches the standard level marked by the oil level gauge.

Pull out of screw off the oil level gauge anticlockwise and check whether the oil level is within the standard range marked by the oil level gauge by visual inspection. In case the oil level does not reach the standard level, add oil.

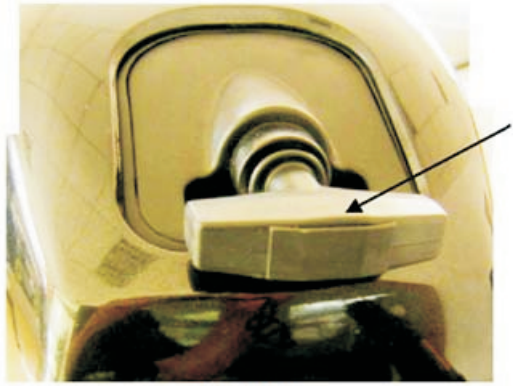




ALF 4017

4.1.10 Manual starting handle

If you want to start the engine, pull out the handle slightly first until you feel resistance. Then, pull it out quickly at this position to start the engine. If you fail to start the engine, repeat the operation.



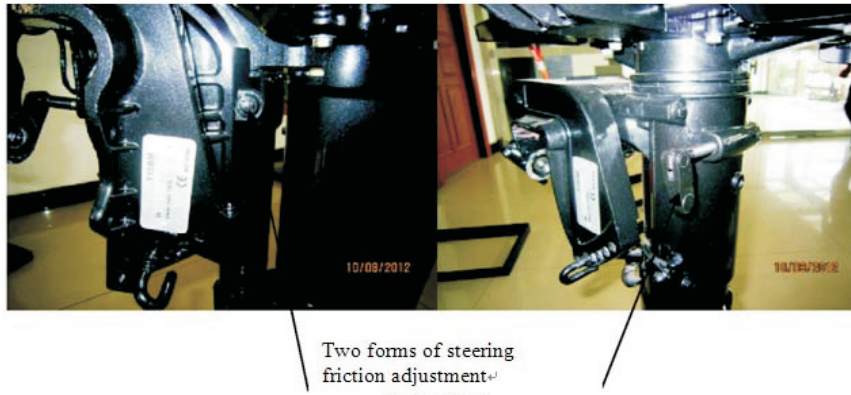
ALF 4018

4.1.11 Steering friction adjuster

Friction equipment can adjust resistance of the steering institution and be set according to the operator's selection. Adjusting screws or bolts are on the rotary bracket.

If you want to increase the resistance, rotate the adjuster clockwise.

If you want to reduce the resistance, rotate the adjuster anticlockwise.



ALF 4019

⚠ Warning

Do not tighten the friction adjusting knob too closely. The reason for this is that too large resistance will cause difficulty in controlling the steering and even lead to accidents.

4.1.12 Longitudinal inclination regulating lever (inclination gag lever post)

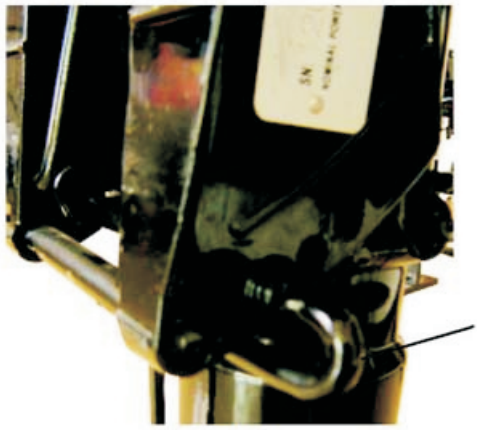
Position of the longitudinal inclination regulating lever decides the minimum trim angle between the outboard engine and the boat board.

4.1.13 Inclining lock mechanism

Inclining lock mechanism is used to prevent airscrews from being protruded on water surface when the outboard engine stays at a reverse gear.

1. Inclining lock mechanism

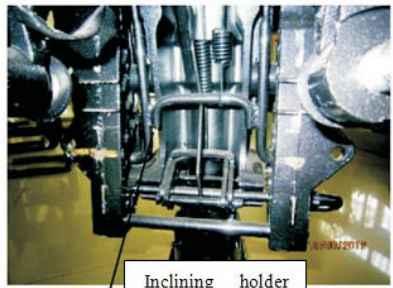
If you want to tilt the outboard engine upward, place the inclining lock mechanism into an upward hole. If you want to tilt the outboard engine down, place the inclining lock mechanism into an downward hole.



ALF 4020

2. Inclining holder

The Inclining holder can choose an appropriate position to tilt the outboard engine up to an appropriate position.



ALF 4021



ALF 4022

⚠ Warning

When a trailer is used to carry the boat, peas utilize an inclining holder, shock and shake may make the outboard engine be loosened and fall off. If the engine cannot be delivered by a position with normal operation, use other supporting positions to fix it to an inclined position.

5 Installation

Information offered in this part is only for reference. The information cannot provide complete explanation for all outboard engine units. Correct installation mainly relies on experience and specific outboard engine units.

⚠ Warning

Incorrect installation of the outboard engine may cause dangerous states like accidents, being out of control or fire. For a permanent installation model, the engine should be installed by the distributors or other people with abundant experience in installation.

5.1 Install the outboard engine

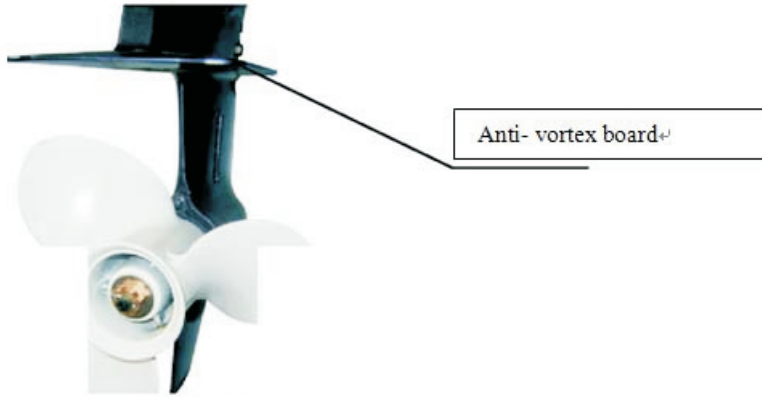
⚠ Warning

Your distributor should demonstrate how to install the outboard engine correctly to you.

Installation of the outboard engine should make the boat keep good balance. Otherwise, steering may be affected. for a single engine boat, the outbaord engine should be installed at the center line of the boat (keel-line of the boat).

Installation height

Unreasonable installation height of the outboard engine may affect optimization of hauling. If the installation height is too large, vortex may be caused so that impetus will be reduced. If the top of the airscrews are exposed to air, temperature of the engine will not rise normally, which will make engine overheat and reduce the engine's efficiency. For correct installation of the outboard engine, it is suggested that anti- vortex board should be located in the range which is 25mm lower than the bottom of the boat.



ALF 5001

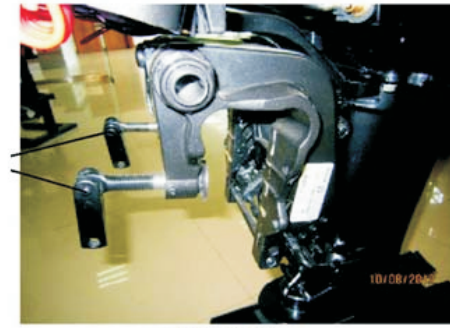
Note:

The optimum installation height of the outboard engine is affected by expected usage of the outboard engine units. Tests on different heights contribute to determining the best installation height. With respect to more explanation about setting of the outboard engine's trim angle, see details in Clause 6.9. Clamp the outboard engine

5.2 Clamp the outboard engine

1. Before installing the outboard engine on the boat board, its position must approach the center of the boat (keel) as much as possible. Screw two boat board clamp bolts uniformly and reliably. Because the clamp screws will be loosened by engine vibration, you should check whether the clamp screws are loosened in the process when the outboard engine operates.

Two clamp bolts for boat board installation



ALF 5002

Warning:

When the clamp screws are loosened, the outboard engine will drop out or move on the boat board, which will make the boat be out of control and cause series accidents.

1. If your engine has a fixation rope thimble, use the fixation rope or chain. Connect one end to the fixation rope thimble and tie the other end to the fixed installation point of the boat. Otherwise, the engine will fall into water when it drops from the tail-board.

2. Use the accessory bolts of the outboard engine (if there ware) to fix the clamp bracket on the boat board.

Warning:

Do not use bolts, nuts or gaskets that do not belong to packaging of the engine. If you want to use them, they must have the same material and strength and be tightened completely. After screwing them, try to operate the engine and check whether they have been tightened or not.

6 Operation

6. 1 Operation of the new engine

6.1. 1 Engine running-in

A new engine needs some running-in period in order to wear mating surface of moving parts evenly. Correct running-in can help ensure good performance and long engine life.

Advice:

If running-in procedures are not followed, the engine life will be affected and the engine will even be seriously damaged.

Suggested time range	Range of speed	Note
Operation during the first 10 and the last	Operation should obey the following	

50 minutes	two points (1 and 2)	
Operation in the second hour	Operation should obey the third point	
Operation in the following 5 hours	Avoid continuous 4-minute full-throttle operation	Overtime high-speed operation
Operation after eight hours	The engine can be operated under a normal state	The engine may be damaged easily

According to the following methods, make the engine operate 8 hours with load (airscrews are installed on the gear).
1. The first ten minutes
Operate the engine at a low speech as much as possible. The idling at the neutral position is the best.
2. During the following fifty minutes
Do not exceed half-throttle speed (about 2,200 RPM). Change the speed of the engine constantly. If your boat can slide easily, glide it with a full throttle and then reduce the throttle to 2,200 RPM or lower RPM at once.
3. During the following two hours
Accelerate to the full throttle and slide. Then, reduce the speed of the engine to 3/4 throttle (3,100 RPM). Change the speed of the engine constantly. Operate the engine at a full-throttle speed for one minute. Next, operate it for 10 minutes at 2/4 throttle or a lower speed to cool the engine.
4. Keep 5 hours:

Rotate the engine at any speed. However, do avoid rotating the engine at a full-throttle speed for over 4 minutes.

5. After the first eight hours, make the engine operate normally.

6.2 Inspection before operation

⚠ Warning:

If you find some parts work abnormally in the process of inspection before operation, you must repair them to exclude abnormality. Otherwise, accidents many happen.

Advice:

The engine is in the form of wind-cooling, so do not use your hand to touch it when it works. Otherwise, the engine will be damaged seriously.

6.2.1 Fuel oil

Check and ensure there is no fuel leakage and there is enough fuel oil for sailing.

Check connection of oil pipelines and ensure the connection is reliable and there is no fuel leakage a.

Ensure the oil tank is on a safe flat surface and the oil pipelines do not suffer warp, extrusion or possible friction or damage.

6.2.2 Engine oil

Before starting the engine, we must check its oil level.

If the oil level does not reach the one marked by the oil level gauge, supplement it to the specified oil level.

Choose the recommended four-stroke engine oil (see details in Clause 3.1.2).

6.2.3 Sontroller

Before starting the engine, check and ensure conversion of throttle, gear shift and steering conditions is stable, restoration is accurate and there is no jam.

Ensure input and output connection is reliable.

When the outboard engine is in water, check whether operation and functions of the starter and stop switch are normal.

6.2.4 Engine

Check whether the engine has loosened or damaged fasteners.

Check whether the airscrews are damaged.

6.3 Refuel oil

⚠ Warning:

Gasoline and gasoline steam are highly flammable and combustible! Keep it away from all kinds of open fire and combustion sources.

6.3.1 Procedure 1

1. Disassemble the fuel tank lock.

2. Refuel oil into the oil tank carefully.

3. After refueling oil, cover the fuel tank lock firmly and clean all spilt fuel oil.

6.3.2 Procedure 2

If there is an equipped portable fuel tank

1. Screw off the oil tank lock anticlockwise and take out the filter screen for cleaning. Then, replace the filter screen.

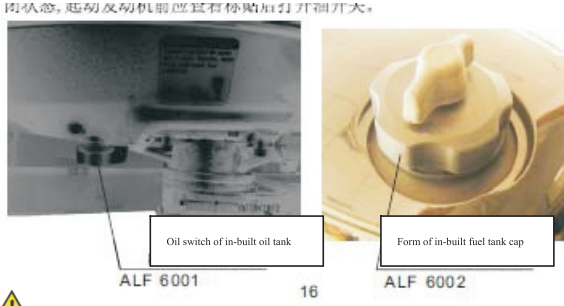
2. Use a funnel at the mouth of the oil tank and pour gasoline slowly. When the oil level reaches the bottom of the filter screen, the quantity of the poured gasoline is optimum

3. Screw the oil tank lock clockwise and tighten the oil tank lock.

4. If there is an equipped built-in oil tank, turn on the oil switch after finishing the foregoing procedures and before starting.

Note:

All built-in oil tanks are equipped with an oil switch (which is placed at the lower part of the base cover). Before starting, the switch is closed. Before starting the engine, check the label. Then, turn on the oil switch.



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⚠ Warning:

Before starting the engine and when exhaust screws are loosened, keep away from open fire and sparks.

1. There are exhaust screws on the oil tank lock. Loosen them by 2 or 3 circles (see details in the figure of Clause 4.1.1)

2. If there is a fuel oil splice on the engine, connect the oil pipeline to the splice firmly. Then, connect the other end of the oil pipeline to the pipeline socket of the oil tank.

Advice:

Before starting the engine, check whether the oil level of the engine reaches the one marketed by the oil level gauge. Insufficient oil level tends to damage the engine.

Advice:

When non-dedicated four-stroke lubricating oil is used, the lubricating oil with bad quality will seriously damage the engine.

6.4 Check and inject four-stroke engine oil

6.4.1 Check oil level of the engine

Pull out or screw out the oil level gauge where there is a mark of oil level.

Check whether the oil level of the engine reaches the one marketed by the oil level gauge by visual inspection.

If the specified oil level is not satisfied, add oil to the specified level timely.

6.4.2 Procedures

1. Pull out or screw out the oil level gauge (anti-clockwise direction). If it is found the oil level of the engine is lower than the specified mark, add oil to the specified level.

2. Screw off the oil tank lock anticlockwise (the oil level gauge and tank filler cap of the engine whose HP is lower than 6 is the same part).

3. Add the recommended engine oil into the engine by a funnel and make the oil level reach the scope marked by the oil level gauge.

4. Screw the filler cap clockwise and use a cloth to clean spilt oil near the filler.

5. If the added engine oil is excessive, release redundant oil from the oil discharge outlet of the engine (see details in Clause 7.2).

6.5 Start the engine

⚠ Warning:

Before starting the engine, ensure the boat is moored firmly, avoid various obstacles and guarantee there are no swimmers in neighboring water area.

Manual starting

1. Place the gear shift at the neutral position.
2. Insert the bayonet on the other side of the dragline to the flameout switch (see details in the figure of Clause 4.1.6).
3. Place the accelerator handle at the 'START' place (or accelerate the throttle to 1/5 full throttle).
4. Pull out or rotate the choke valve switch (see details in the figure of Clause 4.1.8). After the engine has been started, make the choke valve switch flinch or rotate to the place before starting immediately. If the starting encounters difficulty, repeat this step.

Note:

When an engine at thermal state is started, it is no need to use the choke valve switch.

5. Pull the manual starting handle slowly until you feel resistance. Then, pull it outward energetically to start the engine. When necessary, repeat this action.
6. After the engine has been started, return the manual starting handle to its initial position slowly.

Note:

If the engine is started under a cold state, it is necessary to operate it at neutral position and at idling to preheat it. If you fail to start the engine for the first time, repeat this operation. If you still fail to start it after 4 or 5 times' attempts, open the throttle slightly (from 1/8 to 1/4). Then, have another try.

6.6 Preheat the engine

After the engine has been started, operate it for three minutes at idling to preheat it. If you do not do so, engine life will be shortened. When the engine is preheated, return the choke valve button to its initial position gradually.

6.7 Gear shift

⚠ Warning:

Before gear shift, ensure there is no swimmer or obstacle in neighboring water area.

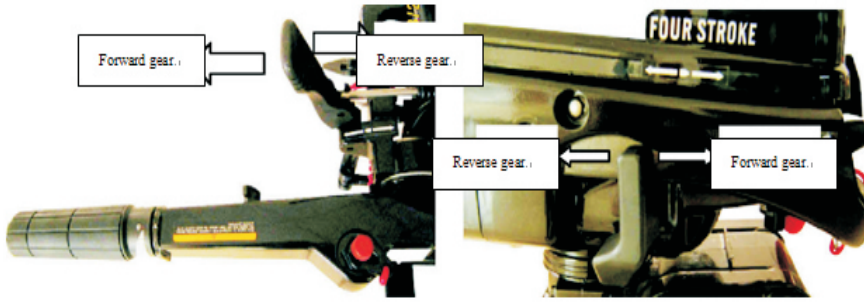
Advice:

Before gear shift, preheat the engine. When preheating the engine is not finished, the idling may exceed the normal value. High idling will obstruct gear shift. In case of such situations, stop gear shift and preheat the engine.

Switch the neutral position

Before neutral position (forward or reverse) operation, do ensure whether the inclining gag lever post stays at the latched position or not. Shift from a normal position to the neutral position.

1. Reduce the throttle and slow the engine to its idling slowly.
2. When the engine stays at idling, move the remote-control lever to the neutral position quickly (remote-control engines).



ALF 6004 ALF 6005

6.8 Stop the boat

⚠ Warning:

When we need slow down or stop the boat, we must not use the function of latched position. Otherwise, the boat will be out of control, people or things will be ejected, some pars will be damaged, risks of personal injury will be increased and the boat will be sunk or damaged.

When the throttle is switched back to the idling, resistance of water will make the boat stop quickly. The difference in the boat's braking length relies on dead weight capacity, water flow direction, wind direction and operational experience.

6.9 Stop the engine

Before stopping the engine, make it operate for several minutes at idling or a low speed. It is suggested that we should not stop the engine immediately after high-speed operation.

Procedures

1. Press the engine stopping button until the engine stops completely. After it has stopped, shut the gas vent on the fuel tank cap (see details in Figure ALF4008 of Clause 4.1.1). Turn off the oil switch of the built-in oil tank.
2. When an external oil tank is used, disassemble the fuel oil plug.

Note:

If the outboard engine is installed with a safety dragline, stop the engine by pulling the dragline and making the wire nail fall off.

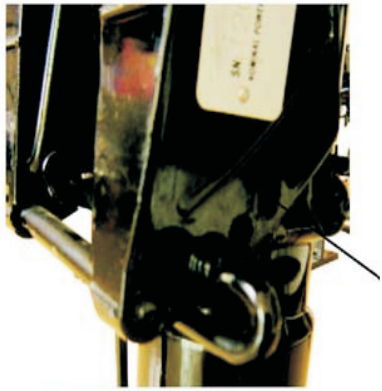
6.10 Longitudinal outboard engine

Warning:

If sailing is instable or it is hard to steer, we should reduce the speed or readjust the trim angle. Otherwise, the possibility of accidents will be increased.

Adjust inclining operating angles

There are 4 or 5 holes on the clamp bracket to adjust the trim angle of the outboard engine.



ALF 6008

1. Stop the engine.
2. Tilt the outboard engine upward, and then take out the longitudinal inclination gag lever post from the clamp bracket and insert it into an appropriate hole again.

Pilot run can be carried out by changing angles of the longitudinal inclination gag lever post to find out the most appropriate position for the boat's operating conditions.

Warning:

If the outboard engine inclines outward excessively, the nose of the boat will be raised too high, which will cause huge air resistance. Seriously, crews may be thrown out. In addition, this will easily make the airscrews break the surface of water, which not only reduces its usability but also may lead to suction air with discontinuous flow at the water inlet and decrease effects of cooled water yield.

Note:

When the longitudinal inclination gag lever post is moved by hole, the trim angle of the outboard engine will change about 4°.

Adjust longitudinal inclination of the boat

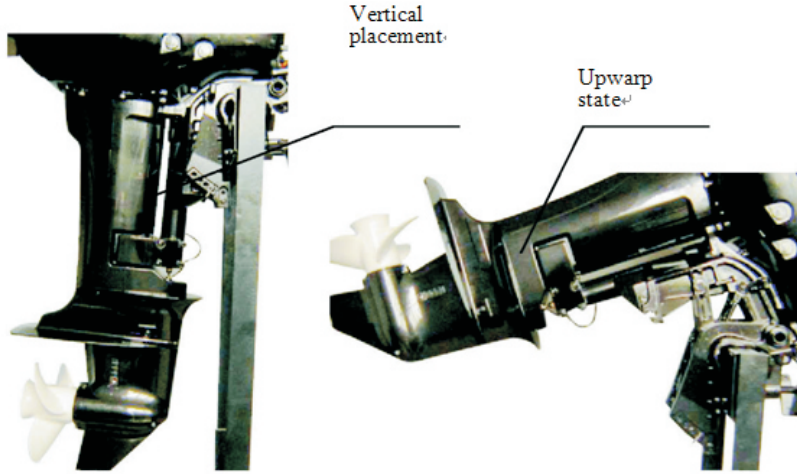
When the boat is sliding, resistance can be reduced when the nose of the boat is raised by 3-5°, which will increase both stability and efficiency. When the nose of the boat is raised, the boat will incline to one side or turn at the other side. Thus, when steering is implemented, it is essential to supplement this. Besides, this impact can also be counteracted by adjusting adjustment sheets about the course of the boat.

Note:

When there is excessive inward longitudinal inclination, the boat will process strenuously in water so that oil consumption will be increased. In addition, high-speed operation will make the boat instable and cause difficult and dangers for proceeding.

6.11 Incline upward and downward

If the engine will stop operating or the boat is berthed in shallow water, we should incline the outboard engine upward to the maximum position to protect the airscrews and underwater equipment shells from being striking by obstacles and prevent the engine from being damaged.



Warning:

Ensure all people keep away from the engine when the outboard engine inclines upward and downward. When the operator is adjusting longitudinal inclination or incline of the engine, other people must not take part or assist to prevent people from being injured by discordance.

Warning:

If the outboard engine has not worked for a long time and inclined, pipelines should be disconnected or fuel oil plug cock should be closed. Otherwise, oil leakage will happen.

Advice:

When the outboard engine is cocked and inclined, do not incline the engine by raising the steering handle because this will break off the steering handle.

6.11.1 Procedures in which the engine is tilted upward (manual incline)

1. Place the dear shift lever at the neutral position.

2. Place the incline locating pin (if there is) at the release/ upward position.

3. Use one hand to hold the rear end of the overhead guard and tilt the engine upward completely.

4. Boost the incline support handle to the clamp bracket. Otherwise, the incline bracket will automatically turn to the latched position.

6.11.2 Procedures in which the engine is tilted downward (manual incline)

1. Place the raising locating pin lever at the release position.

2. Tilt the engine upward until the incline locating pin can insert under the inclined engine.

3. Put down the inclined engine slowly to place it at the raising locating pin.

6.12 Cruise in shallow water

The outboard engine can be tilted upward appropriately in order that it can work in shallow water.

⚠ Warning:

Before using shallow water cruise system, place the gear shift lever at the neutral position.

When the shallow water cruise system is used, drive the boat at a low speed as much as possible. When the shallow water cruise system is used, the incline locking device does not work.

When the boat contacts with underwater obstacles, the outboard engine will break the surface of water. Thus, high navigational speed will make the boat be out of control easily.

To make the boat reverse, we should place the gear shift lever at the neutral position to reverse the boat slowly (if there is no function of reverse gear, rotate the engine at neutral position by 180°).

When reverse gear is operated, pay special attention and ensure the operation does not exceed 25% of throttle.

Too large reverse gear thrust will raise the outboard engine and increase possibility of accidents and casualties.

Once the boat returns to the abyssal region, recover the outboard engine to a normal position.

Advice:

When setting and shallow water cruise are carried out, the outboard engine must not be inclined to the water inlet of upper cooling water of underwater body or exceed the water surface. Otherwise, serious damage will be caused because of overheat.

6.13Sailing in the following environment

Used in saline water

After being used in saline water, use fresh water to wash the cooling water channel to prevent blocking. In addition, it is essential to use fresh water to wash the outside of the outboard engine. If possible, use a wet cloth to clean the power head under the overhead guard.

Used in acidity water

There may be acidity water in some areas. After being used in this kind of water, it is essential to use fresh water to wash the cooling water channel to prevent corrosion and utilize fresh water to wash the outside of the outboard engine.

7 Maintenance

7.1 Specification and related parameters

Tail-board height: (mm)

Specification	F2.5	F4-F5	F9.9-F15	TF20
Short leg (S)	417mm	444mm	440mm	423mm
Long leg (L)		571mm	567mm	550mm

Net weight (kilograms):

Specification	F2.5	F4~F5	F9.9~F15	F20
Short leg (S)	9.8KG	21KG	37KG	77KG
Long leg (L)		22KG	38.5KG	80.3KG

Revolving speed distribution: (revolving speed /minute): Revolving speed of operation under rated load

Specification	F2.5	F4-F5	F9.9-FI5	F20
Full-throttle revolving speed/ minute	4000-5000	4000-5000	4500-5500	4500-5500
Idling scope (revolving speed / minute)	1300-1500	1000-1200	970-1080	950-1050

7.2 Engine

1. Type: four-stroke
2. Ignition system: CDI

Sparking plug: (NGK): BPR7HS.BR7HS

Spark plug gap: 0.6-0.7mm for engines whose HP is lower than 6 (0.024-0.028 inch) and 0.7-0.9mm for engines whose HP is larger than 8 (0.028-0.035 inch)

3. Control system: rudder stock. It can be a remote-control form by re-configuration.
4. Fuel oil supply system: carburetor
5. Start-up system: engines whose HP is lower than 15 is manual type and the ones whose HP is larger than 20 have both manual and electric types.
6. Starting carburetor system: choke valve

7. The recommended fuel oil: 93# unleaded gasoline

Specification	F2.5	F4-F5	F6	Portable 12L	Portable 24L
Volume (L)	0.9L	1.1L	1.5L	12L	24L

8. The recommended four-stroke engine oil: (see details in 3.1.2)

Specification	F2.5	F4-F5	F9-F15	F20
Theoretical oil level (ml)	350	500	1200	1000

Advice:

It is essential to check and replace the engine oil and the gear oil inside the dear box regularly (see details in Table 1 of 7.4.1).

If the engine is reused after having been out of service for 3 months, check or replace the engine oil and the gear oil.

9. The recommended gear oil: hypoid gear oil SAE#90

The ideal injected oil level in the gearbox is that there is gear oil overflows from the air-bleed hole of underwater body in the process of injection.

10. Tightening torque: see details in Table 2 of 7.4.1.

7.3 Deliver and store the outboard engine

Warning:

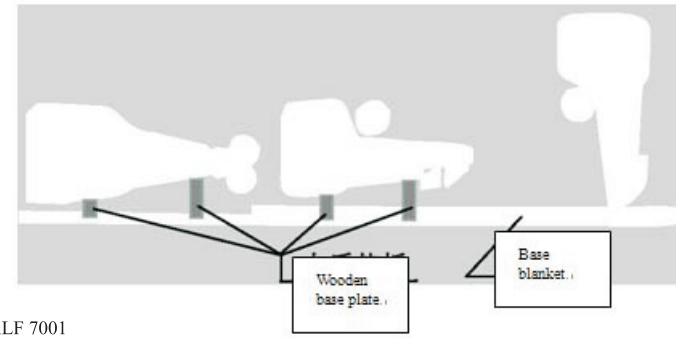
Fuel leakage will cause fire risk. When the outboard engine is transported and stored, close exhaust screws and turn off the oil switch of the fuel tank to prevent fuel leakage. Do not add the fuel oil container to the maximum. The reason for this is that gasoline will swell after being overheat so that pressure may accumulates in the fuel container. This will cause fuel leakage and potential fire risk.

Advice:

When the boat is dragged, drag the outboard engine by an inclining position. Do not use the incline bracing piece or supporting button. Otherwise, the outboard engine will be loosened and fall off from the incline supporting device. Use other supporting devices to fix it at the incline position.

7.3.1 State of the outboard engine's storage

When the outboard engine disassembled from the boat is transported and stored, make it stay in the state specified in the following figure.



ALF 7001

Note:

If the engine has will be stored for a long time (over 3 months), let the engine oil out and place a towel or a similar object to cover it and prevent damages.

Warning:

When the four-stroke engine is used or transported, the angle of inclination must be larger than 65° as long as the engine oil is not discharged when the engine is stored.

7.3.2 Store the outboard engine

If the outboard engine will be stored for a long time (two months or a longer period), we must obey several important rules to prevent excessive damages.

Advice:

Before the cooling water is discharged completely, do not put the outboard engine sidelong. Otherwise, the cooling water may enter the air cylinder by the drain hole and cause engine failure.

Note:

Before storing the engine board, we should discharge the four-stroke oil inside the engine completely first.

Procedures

1. Place the engine at the holder vertically and reliably.
2. Take an oil vessel and place it under the drain oil. Besides, loosen the tank filler cap.
3. Use a tool to screw off the oil drainage outlet anticlockwise and discharge the engine oil completely.
4. Add a gasket to the oil drainage outlet and screw it clockwise (replace it with a new gasket for oil drainage outlet). At the same time, screw the tank filler cap. Place the outboard engine at a place which is dry and draughty and does not

suffer perpendicular incidence of the sun.

7.3.3 Procedures
Washign in a testing water tank
Cleaning before storage

Advice:

Do not operate the engine when cooling water is not provided because this will damage the water pump of the engine or the engine because of being overheat.

1. Use fresh water to wash the main body of the outboard engine. See details in Clause 6.12.
2. Disconnect fuel oil pipeline on the engine or close fuel oil plug cock (if there is).
3. Disassemble the overhead guard, silencer cover of the engine and airscrews.
4. Intall the outboard engine on the testing water tank. Inject water into the water tank and make the water level is higher than the position of the anti-vortex board.

Advice:

If the water level is lower than the position of the anti-vortex board or water supply is insufficinet, scuffing of cylinder bore may be caused for the engine.

5. Washing the cooling system is important for prevention of the cooling system from being blocked by saline, sand or dust. In addition, it is essential to nebulizer and lubricate the engine to prevent it from suffering excessive corrosion. At the same time, carry out washing and nebulization.

⚠ Warning:

In the pocess of starting or operating, do not contact with or dismantle electrict parts.

6. At neutral position, operate the engine at idling for several minutes.

7. Before turning off the engine, spay fogging oil to each carburetor or silencer cover's holes (if there are) alternatively. After completing this correctly, the engine will smoking largely and nearly stalls.

8. Disassemble the outboard engine from the testing water tank.

9. Install the silencer cover/ nebulization-hole cover and the overhead guard.

10. If there is not fogging oil, use intermediate speed and idling to operate the engine alternatively until the fuel oil is run off and the engine stops.

11. Discharge the cooling water in the engine and wash the main body of the engine completely.

12. If there is not fogging oil, disassemble sparking plugs. Inject a teaspoon of clean engine oil into each cylinder. Start the engine manually several times. Replace the sparking plugs.

13. Discharge the fuel oil from the oil tank completely.

Note: Store the oil tank at a dry and draughty place to avoid perpendicular incidence of the sun.

7.3.4 Lubricating oil and lubricating grease

1. Check whether there is water in lubricating oil.

2. Inject lubricating grease to all fillers.

Note: in case of long-time storage, use oil to nebulizer the engine. About information related to use of fogging oil and the nebulization process, please consult fogging oil dealers.

7.3.5 Clean the outboard engine

After being used, utilize clean water to wash the outside of the outboard engine and adopt fresh water the wash the cooling system.

7.3.6 Check painted surface of the engine

Check whether there is bruise, cave or film desquamation on the engine. The regions with damaged paint may be corroded. When necessary, clean and paint these regions.

7.4 Scheduled maintenance

⚠ Warning:

Ensure the engine is turned off when maintenance is carried out. If you are not familiar with engine maintenance, ask your distributors or professional technicians to finish this work.

7.4.1 Maintenance table

When maintenance is carried out, frequency can be adjusted according to operating conditions. However, general principles are given in the following table.

Note:

When the engine operates in seawater, waste water or muddy water, the engine should be washed by clean water after being used each time.

Table 1: '●' refers to the work that should be finished by professional repairmen and '○' stands for the check/ maintenance that users can complete by themselves.

Table 1

Project content	Requirement	Initial stage		Normal use	
		10 hours (1 month)	50 hours (3 months)	100 hours (6 months)	200 hours (1 year)
Possitive electrode (external)	Check/ replace		●/○	●/○	
Possitive electrode (internal)	Check/ replace				O
Cooling water channel	Clean		●	●	
Shade clip	Check			●	
Fuel oil filter (dissoluble)	Check/ clean		●	●	
Fuel oil system	Check	●	●	●	
Fuel oil tank (portable oil tank)	Check/ clean				●
Gear oil and engine oil	Replace	●	●	●	
Lubricating grease	Inject lubricating grease			●	
Idling (carburetor-type)	Check	●/○		●/○	
Airscrews and cotters	Check/ replace		●	●	
Gear shift connecting rod/ Gear shift tightwire	Check/ adjust			O	
Thermostat	Check/ replace			O	O
Accelerator connecting rod/ accelerator tightwire/ correct timing of accelerator starting	Check/ adjust				
Water pump	Check/ replace			O	
Sparking plug	Clean/ adjsut/ replace	●	●	●	

Reference table for tightening torque of fasteners (fastening content involved in professional maintenance is not included in this table)

Table 2

Name of tigthened part	Thread specification	Tightening torque	
		n.M	Kgf.M
Thermostat housing	M6	Once: 6 Twice: 12	Once: 6 Twice: 12
Positive electrode	*M5/M6*	*5/8*	*0.5/0.8*
Sparking plug	*M12/M14*	*18/ 25*	1.8/2.5
Cooling water inflow cap bolt	M5-M6	5	0.5
Oil drainage bolt	*M81M14*	*9/25*	*0.9/2.5*
Check bolt	M8	9	0.9
Grease fitting	M6	3	0.3
Clamping nuts for airscrews	M10/ *M14/ M16*	17 /28/35	*1.7/* 2.8 */3.5*

7.4.2 Clean and adjust sparking plugs

Warning:

When we disassemble or install a sparking plug, do be careful and do not damage insulator. If the insulator is damaged, external sparks will enter the inside, which may cause explosion or fire.

Warning:

When the engine has just been turned off, it is quite hot. Do not touch it to avoid being scalded.

Sparking plugs are important components of the engine and their inspection is quite convenient. Conditions of sparking plugs can reflect situations of an engine. For instance, if the central electrode is quite white, it indicates there is air inflow leakage or the cylinder suffers vaporization malfunction. This kind of malfunction must be checked at a professional repair shop. Sparking plugs should be dismantled and checked regularly because heat and sediment incrustation have chronic corrosive effects on sparking plugs. When electrode corrosion reaches a serious degree, they should be replaced by the same type of sparking plugs.

Sparking plugs: identification marking NGK			
BPR6ES			
Distance between electrodes of a sparking plug			
2.5-5 HP	0.6-0.7mm	Over 9.9HP	0.8-0.9mm

When a spark plug is installed, clean surface of liner and use a new liner. Wipe off dirt retention inside thread and screw the spark plug to correct torque.

Torque of a sparking plug: see details in tightening torque table.

Note:

If there is no torque wrench when a spark plug is installed, estimated value of torque is that you should screw 1/4-1/2 circle by thrust augmentation when you feel the plug has been tightened.

7.4.3 Check the fuel system

Warning:

Fuel leakage will cause fire or explosion. Thus, it is essential to check whether there is fuel leakage regularly.

Check whether the fuel pipeline suffers leakage, crack or malfunction. In case of problems, ask professional mechanists to repair them at once.

Main points for inspection:

1. Leakage of carburetor's or the fuel system's parts
2. Leakage of splice of oil pipelines
3. Aging, crack or other damages of oil pipelines
4. Leakage of fuel connector

7.4.4 Check fuel filter

Warning:

Gasoline has high flammability and its steam is combustible and will lead to explosion.
Do not carry out the procedure on hot or operating engines. Let the engine be cool.
There is fuel oil in the fuel filter. Keep it away from open fire. If the filter is damaged, replace it.
In this procedure, some fuel oil will be spilt. Use a piece of cloth to catch the fuel oil. Wipe off spilt fuel oil immediately.
Clean the fuel filter (assembled type)

1. Dismantle the nuts which are sued to fix components of the fuel filter (if there are)
2. Dismantle the cup of the filter and use a duster cloth to wipe off overflowing fuel oil.
3. Dismantle the filter element and wash it in solvent. Wait for its desiccation. Check the filter element and O-shape ring to ensure they are in good conditions. If necessary, replace them. If there is water in fuel oil, check and clean the portable fuel oil tank and other oil tanks.
4. Reinstall the filter element at the cup of the filter. Ensure the O-shape ring is in a correct place in the cup. Install the cup on the shell of the filter firmly.
5. Install components of the filter on a bracket in order than fuel hose can be connected with such components of the filter.
6. Operate the engine and check whether the filter and pipelines have leakage or not.

7.4.5 Check idling

Warning:

In the process of starting or operation, do not touch or dismantle electric parts or approach rotating parts.

Advice:

When the outboard engine is in water, carry out the following procedures. Use attachments of the flusher or the testing water tank.

Note:

For the procedure, a diagnosing tachometer should be used. Results may not be completely the same each time.

1. Start the engine and preheat at the neutral position completely until it operates stably.

Note:

2. After the engine has been preheated completely, check idling correctly. Otherwise, the measured idling will be higher than the normal value. If it is difficult to confirm the idling or whether the idling need be adjusted, please consult professional technicians.
3. Ensure the idling has been set at a reasonable value. We should consider it can be relatively lower but cannot affect the situation that we engage a gear or reverse gears and speed can be accelerated. It can be relatively higher, but gears do not have abnormal sounds and there is no impact phenomenon when a gear is engaged.

7.4.6 Check wiring and connection

Check whether each ground wire has been fixed correctly.

Check whether all parts that are connected with one another have been connected firmly or not.

7.4.7 Exhaust leakage and cooling water leakage

Start the engine, and check whether the exhaust or cooling water leaks from the junction surface of exhaust hood, cylinder head and cylinder block. For the inspection method, soapy water (cleanser essence liquid) with 40% of concentration can be used to smear periphery of the foregoing joint surface and check whether there are generated bubbles.

7.4.8 Check airscrews

Warning:

Before checking, dismantling or installing aircrews, it is essential to dismantle spark plug cap from the spark plug.

Place the gear at the neutral position, turn the master switch to 'OFF' (close), take down the key and disassemble cable clamps from the stop switch of the engine. Turn off storage battery and disconnect the switch (if your boat has been equipped with them).

When we unscrew or screw propeller nuts, do not use your hands to hold the airscrew but place a wood brick between the anti-vortex board and the airscrew to prevent the airscrew from rotating.

Check whether there is abrasion, corrosion (caused by vortex or ventilation) or other damages on each blade of the airscrew.

Check whether the airscrew shaft is damaged or not.

Check whether the spline is worn or damaged.

Remove objects twining the airscrew or the shaft.

Check whether oil seal of the airscrew shaft is damaged.

7.4.9 Take down the airscrew

1. Use a vice to straighten and pull out the cotter.

2. Take down nuts, gaskets and spacers of the airscrew.

3. Take down the airscrew and the thrust washer.

7.4.10 Install the airscrew

Advice:

Before installing the airscrew, ensure the thrust washer has been installed. Otherwise, the shell of underwater device and hub of the airscrew will be damaged.

Ensure the used cotter is new and curve its ends firmly. Otherwise, the airscrew will fall off and be lost in the process of operation.

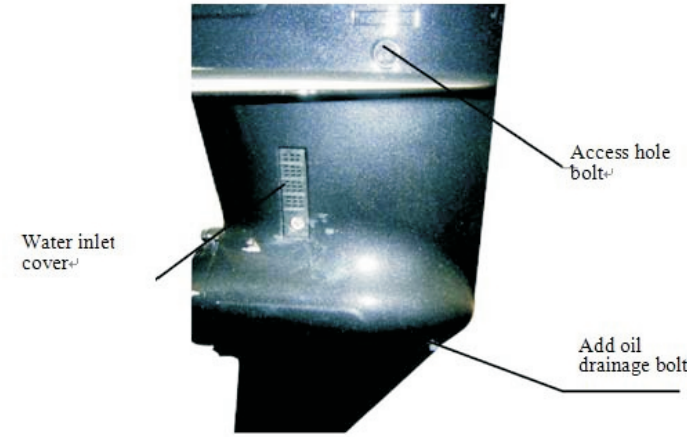
1. Apply lubricating grease or anti-corrosion grease to the airscrew shaft.

2. Install gaskets (if there are), the thrust washer and the airscrew on the ariscre shaft.

3. Install gaskets (if there are) and the thrust washer. Screw nuts of the airscrew to the specified torque. Align nut slot of the airscrew at the airscrew shaft. If the hole is not aligned, screw the nut until it is aligned at the hole. Insert a new cotter into the hole and curve two ends of the cotter.

7.4.11 Replace gear oil

1. Incline the outboard engine and make the oil extraction screw stay at the lowest position.
2. Place an appropriate contained under the gearbox.
3. Dismantle the oil extraction screw and sealing gasket.
4. Dismantle the access hole screw and the sealing gasket to discharge of the engine oil completely.



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Advice:

Check the discharged gear oil. If the gear oil takes the shape of milk, it will indicate that water has permeated into the gearbox. You should ask a professional person to repair the underwater device. Otherwise, the gear will be damaged.

Note:

Deal with the used engine oil according to requirements of environmental protection.

5. Make the outboard engine stay at a vertical position and use a soft oil-filling device to inject the gar oil into the oil drainage screw holes.

Introduction to oil filling level of different types of outboard engine gearbox						
Type	F2.5	F4-F5	F15/ F9.9	F20		
Oil filling level	65ml	100ml	250ml	260ml		

The recommended gear oil: hypoid gear oil SAE#90

6. Place a new sealing gasket on the exhaust hoe of the gearbox. When the engine flows out from the exhaust hole, insert and screw the exhaust-hole bolt.

7. Place a new sealing gasket on the oil drainage screw of the gearbox, as well as insert and tighten the oil drainage screw of the gear oil.

7.4.12 Clean the fuel tank

⚠ Warning:

Before cleaning the fuel tank, dismantle it from the boat. Clean it outdoors where there is good ventilation. When the fuel tank is cleaned, keep it far away from open fire. Incorrect assembly will cause fuel leakage and even lead to fire or explosion.

Deal with used gasoline according to local laws.

1. Discharge the fuel oil in the oil tank to a permitted container.
2. Inject a little solvent into the oil tank. Close the cover and shake the oil tank. Then, discharge the solvent completely.
3. Dismantle the screw that fixed fuel adapter assembly and pull out the assembly from the oil tank.
4. Wash the fuel filter in appropriate clean solvent (the end of the straw) and dry it in the air.
5. Use a new liner to replace it. Reinstall the fuel adapter assembly and tighten the screw firmly.
6. Check the fuel tank and the fuel adapter assembly. There must not be leakage at the pipeline.

7.4.13 Check and replace the positive electrode

The outboard engine realizes anti-corrosion by sacrificial anode. Check the external positive electrode regularly. Remove incrustation from the surface of the electrode. About replacement of the internal positive electrode, please consult professional dealers.

Check the ground electrode connected to the external positive electrode (types of installed positive electrode). With respect to checking and replacing the internal positive electrode connected to the power unit, consult professional technicians.

Advice:

Do not paint the positive electrode. Otherwise, the positive electrode will be invalid.

7.4.14 Check the overhead guard

Advice:

Ensure the overhead guard stays at a closed state after installation and there is no gap, loosening or wrong connection. Otherwise, the engine may be filed with water and the overhead guard will fall off.

Use your hands to push the overhead guard to check whether its connection is reliable. If the adapting piece is loosened, ask a professional technician to repair it.

8 Fault correcting

8.1 Breakdowns that people who use the engine for the first time usually encounter

1. They do not read operation instruction carefully or systematically so that wrong or incorrect operation causes breakdowns.

Solutions: re-read the operation instruction and learn related chapters to help people who use the engine for the first time to start the outboard engine successfully.

2. They do not inject four-stroke engine oil into the tank before starting. About 20 minutes after starting, the engine reduces its speed and even suffers flameout.

Solutions: shut down the engine immediately. After engine becomes cool, dismantle the spark plug and add a little four-stroke engine oil into the holes. After having pulled the starting handle for 3-5 times, install the spark plug (if it can be pulled) and add engine oil according to procedures in 6.4.2. Then, restart the engine. After starting and operation, use the shortest approach or the least time to ask a professional engineer to check and maintain it. It the starter cannot be boosted, send it to the suppler for treatment.

3. About 8 minutes after starting, the engine suffers flameout. Within 3-6 minutes after re-starting, the engine shuts down again. Such a situation repeats.

Solution: check whether the oil switch and the air inlet of the oil tank tap have been closed or not.

4. Under the condition that the air door is completely opened, the engine has failed to be started over 6-10 times.

Solutions: after failing to starting the engine after the air door has been completely opened, open the oil drainage bolt of the carburetor to discharge overflowing fuel oil in the carburetor. Under the situation that there is no ignition spark, adjust quantity of the air door and restart the engine.

5. When the engine is used at the second time, it can be started only when oil in the carburetor has been discharged (built-in oil tank).

Solutions: After ending use each time, both the oil switch and deflation knob of the fuel tank cap must be turned off or closed.

When you use the outboard engine for the first time, you will encounter a number of problems. It is impossible to list all of them. Operators can master use of the outboard engine only when they have read the operation instruction carefully.

8.2 General instruction to removal of faults

Any problem of the fuel system, noumenon of the engine, the cooling system or the ignition system may result in starting breakdowns or other problems. This part will describes basic inspection and some causes for problems. Some parts may not be appropriate for your type. If breakdown warning indicator of the engine twinkles, consult a professional maintenance engineer.

8.2.1 The starter fails to operate

Question: Is the capacitance of the storage battery is too weak or too low? (electric starting type)

Answer: Check the storage battery and use the storage battery with recommend capacitance.

Question: Is the connection of the storage battery is loosened or corroded? (electric starting type)

Answer: Tighten cables of the storage battery and clean ends of the storage battery.

Question: Does fuse or circuit of the electric starter relay suffer burnout? (electric starting type)

Answer: Check causes for electric overload and maintain it. Use a fuse with correct amperage to replace the original one.

Question: Does the starter's components suffer breakdown or not?

Answer: As a professional maintenance engineer to repair it.

Question: Does the engine fail to stay at the neutral position?

Answer: Shift to the neutral position.

8.2.2 The engine fails to be started (operation of the starter)

Question: Does the oil tank have no oil?

Answer: Inject clean and fresh fuel oil into the tank.
Question: Is the fuel oil polluted or old?
Answer: Inject clean and fresh fuel oil into the tank.
Question: Is the oil filter blocked?
Answer: Clean or replace the filter.
Question: Is the starting procedure wrong?
Answer: See details in Clause 6.5.
Question: Does the fuel pump suffer broke down?
Answer: Ask a professional maintenance person to repair it.
Question: Is there dirt or abnormality on the spark plug?
Answer: Check the spark plug and use a recommended type to clean or replace it.
Question: For poor ignition, should we check whether the wire is damaged or disconnected and whether the cable clamp has fallen off?
Answer: Check whether the wire is worn out or not, tighten all loose connection, replace the worn wiring and attach a cable clamp.
Question: Is the ignition normal?
Answer: Pull the starting handle to check electrode spark of the spark plug.
Question: Is the engine damaged?
Answer: Ask a professional maintenance person to repair it.
8.2.3 The engine's idling is not stable and tends to suffer flameout
Question: Is there dirt or abnormality on the spark plug?
Answer: Check the spark plug and use a recommended type to clean or replace it.
Question: Is there dirt on the carburetor?
Answer: Ask a professional maintenance person to repair it.
Question: Is the fuel system blocked?
Answer: Check whether oil supply is blocked in crimpled or crooked fuel pipeline or other fuel systems.
Question: Is the fuel oil polluted or old?
Answer: Inject clean and fresh fuel oil into the tank.
Question: Is the oil filter blocked?
Answer: Clean or replace the filter.
Question: Is the alarm system activated?
Answer: Ask a professional maintenance person to find causes for alarm.
Question: Is the gap between spark plugs wrong?
Answer: Check and adjust it according to specifications.
Question: Is the ignition wire damaged or disconnected?
Answer: Check whether the wire is worn out or not, tighten all loose connection, replace the worn wiring and attach a cable clamp.
Question: Has the specified engine oil not been used?
Answer: Check and replace the oil according to specifications.
Question: Does the thermostat have malfunction or is the water channel blocked?
Answer: Ask a professional maintenance person to repair it.
Question: Is adjustment of the carburetor is wrong?
Answer: Ask a professional maintenance person to repair it.
Question: Is the exhaust screw on the oil tank closed?
Answer: Open the exhaust screw.
Question: Is the choke valve knob pulled out?
Answer: Return it to the initial position.
Question: Is the carburetor blocked?
Answer: Ask a professional maintenance person to repair it.
Question: Is the connection of the fuel pipeline correct?
Answer: Re-connect it correctly.
8.2.4 Alarm buzzer rings or the indicator twinkles
Question: Is the oil level of the engine too low? (four-stroke)
Answer: Inject the specified engine oil until the required oil level is achieved.
Question: Has the specified engine oil not been used?
Answer: Check and use a specified type of oil to replace the original one.

Question: Is the engine oil polluted or is it metamorphic?
Answer: Use fresh and specified oil to replace the original one.
Question: Is the oil filter blocked?
Answer: Ask a professional maintenance person to repair it.
8.2.5 Power of the engine suffers breakdown
Question: Is the airscrew damaged?
Answer: Repair or replace the airscrew.
Question: Is the airscrew pitch or diameter wrong?
Answer: Install a correct airscrew and operate it within the recommended speed range (RPM)?
Question: Is the trim angle wrong?
Answer: Adjust the trim angle to realize the optimum operation.
Question: Is the height at which the engine is installed on the boat board wrong?
Answer: Adjust the engine to an appropriate height.
Question: Is there any dirt at the bottom of the boat because of underwater creatures?
Answer: Clean the bottom of the boat.
Question: Is there any weed or other external maters twining the gear room?
Answer: Remove external maters and clean underwater device.
Question: Is the fuel system blocked?
Answer: Check whether there are obstacles in crimpled or crooked fuel pipeline or other fuel systems.
Question: Is the oil filter blocked?
Answer: Clean and replace the filter.
Question: Is the fuel oil polluted or old?
Answer: Inject clean and fresh fuel oil into the tank.
Question: Is the gap between spark plugs wrong?
Answer: Check and adjust it according to specifications.
Question: Is the ignition wire damaged or disconnected?
Answer: Check whether the wire is worn out or not, tighten all loose connection, replace the worn wiring and attach a cable clamp.
Question: Does electric components suffer breakdown?
Answer: Ask a professional maintenance person to repair it.
Question: Has the specified fuel oil not been used?
Answer: Use the specified oil to replace the original one.
Question: Has the specified engine oil not been used?
Answer: Check and replace the oil according to specifications.
Question: Is the connection of fuel pipeline abnormal?
Answer: Connect it correctly.
Question: Is the range in which the spark plug is heated wrong?
Answer: Check the spark plug and use the recommended one to replace the original one?
Question: Does the neutral gear starting equipment make wrong responses to position of the gear shit lever?
Answer: Ask a professional maintenance engineer to repair it.
8.2.6 The engine is vibrated excessively
Question: Is the airscrew damaged?
Answer: Repair or replace the airscrew.
Question: Is the airscrew shaft damaged?
Answer: Ask a professional maintenance engineer to repair it.
Question: Is there any weed or other external maters twining the airscrew?
Answer: take it down and clean the airscrew.
Question: Is erection bolt of the engine loosened?
Answer: Screw the bolt.
Question: Is the steering pivot loosened or damaged?
Answer: Screw it or ask a professional maintenance engineer to repair it.

8.3 Provisional measures under emergency

8.3.1 Impact failure

If the outboard engine runs into objects in water, implement the following procedures.

1. Stop the engine immediately.
2. Check whether the control system and all parts are damaged. At the same time, inspect whether the boat is damaged.

3. Regardless of the situation that there is damage or no damage, drive the boat to the nearest harbor slowly.
4. Before another operation, ask a professional engineer to check the outboard engine.

8.3.2 The starter does not work

If the starting equipment of the engine does not work (the engine fails to be started by following the starter), the emergency starting dragline can be used to start the engine.

⚠ Warning:

The engine will be started in this method only when the situation is urgent and the boat needs to be driven to the nearest harbor.

If the emergency starting dragline is used to start the engine, the linkage protector will not work at the time of starting. Please do place the remote-control lever at the neutral position. Otherwise, the boat may unexceptionally move and cause accidents.

When you drive the boat, please connect the flameout rope of the engine to a safe place of your clothes, arms or legs. When you pull the dragline of the starter, please confirm there is nobody surrounding you. The dragline may be thrown rearward, which may hurt people.

The rotating and unprotected flywheel is very dangerous. When you start the engine, please place the dismantled cover and other objects at a remote site. Do use the starting dragline for emergency according to the specification. When the engine operates, do not touch the flywheel or other moving parts. When the engine operates, do not install the starting equipment or the head cover of the engine.

8.3.3 Start the engine under emergency

1. Take down the overhead guard.
2. Take down the protective tightwire which prevents the gear from being engaged (if there is) from the starter.
3. After taking down the bolt, get down the shield of the starter/ the flywheel/
4. For more information about preparation before starting the engine, see details in Clause 6.4. Ensure the engine stays at the neutral position, and the cable clamp is connected to the stop switch of the engine.
5. If there is the choke valve knob, pull it out when the engine stays at a cool state. After the engine has been started, return the choke valve knob to its original position gradually in the preheating process.
6. Insert ends of the emergency starting dragline into slot of the flywheel and twine the dragline on the flywheel clockwise by several circles.
7. Pull out the emergency starting dragline energetically to drive the bent axle to start the engine. When necessary, repeat this operation.

8.3.4 Deal with the soggy engine

If the outboard engine is immersed into water, send it to a special maintenance shop for treatment.

Procedures

1. Use fresh water to wash mud, salt and seaweed etc.
2. Dismantle the spark plug and put the spark plug holes down to discharge water, mud and other dirt.
3. Discharge fuel oil from the carburetor, fuel filter and fuel pipeline completely.
4. When we start the engine by hands or by the emergency dragline, inject fogging oil or engine oil into the carburetor and the spark plug holes.
5. If the engine can be started, drive the boat to the shore at a medium or low speed and by the shortest approach to ask a maintenance shop to repair it.

Advice:

Before exhaustive inspection, do not try to start the engine.

NURSIA Outboard Motor



2 HP	9.8HR	12HR	20HR	30HR	40HR	60HR	4-speed 3HP to 60HP
6HP	12HR	15HR	20HR	30HR	40HR	60HR	to 60HP Boat Engine

E-FI
Electronic Fuel Injection

4-Cylinder Power

High efficiency and low consumption

High efficiency and low consumption
Marine-grade corrosion prevention

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