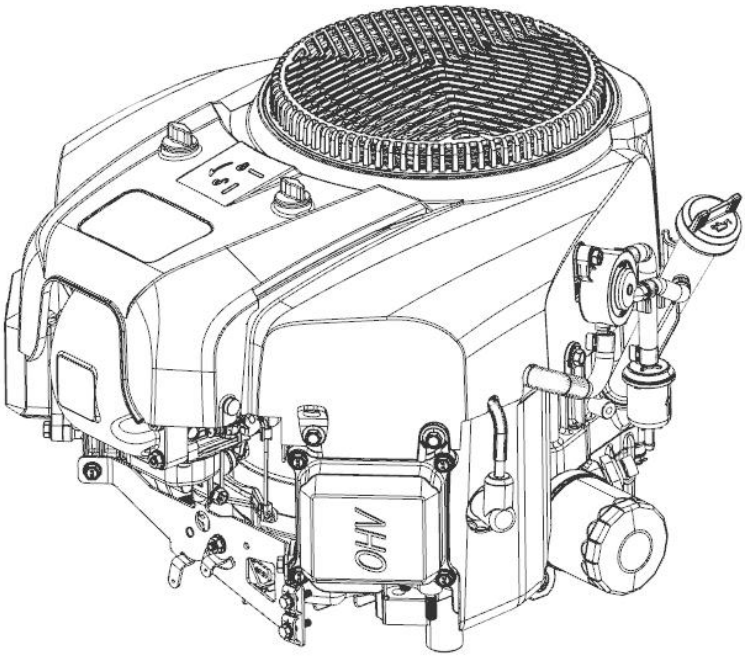
NV730FE

Engine User Manual



Please read this manual carefully before operating the engine

Preface

● The copyright of this manual belongs to the manufacturer.

● Without the prior written permission of the manufacturer, any form of reproduction, transmission, distribution, or storage of any content in this document is strictly prohibited.

● The manufacturer adheres to a strategy of continuous development. Therefore, The manufacturer reserves the right to make modifications and improvements to any product described in this document without prior notice.

● Keep this manual with you at all times for easy reference whenever necessary.

● This manual is a permanent part of the engine. If the engine is resold, this manual must accompany it.

● This manual contains operating instructions and maintenance procedures for the engine. Be sure to read it carefully before use, as improper operation may lead to safety hazards or equipment damage. Correct and safe operation will extend the service life of the engine.

● Our engines are safe and reliable when operated in accordance with the instructions in this manual. It is essential to read the manual before use, as improper operation may result in safety risks or equipment damage.

IMPORTANT NOTICE

Please read this manual carefully before operating the engine.

Especially critical information in this manual is indicated in the following ways. Users are advised to pay close attention.

WARNING:

Indicates that failure to follow the instructions may result in serious personal injury or equipment damage.

CAUTION:

Reminds you to take special precautions to prevent damage to the machine.

NOTE:

Provides useful information for operation.

This user manual is a permanent part of the engine and must accompany the engine if it is transferred to another user.

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Chapter 1: Safety

User Responsibility

- Carefully read and understand this manual before operating the engine. Failure to do so may result in personal injury or engine damage.
- Be familiar with the emergency shutdown procedure and all control operations. Never allow unauthorized persons to operate the engine.
- Do not allow children to operate the engine. Keep children and pets away from the operating area.

WARNING: Exercise Caution When Refueling

- Gasoline is flammable. Refuel only outdoors in a well-ventilated area with the engine stopped.
- Do not smoke while refueling. Keep away from open flames and sparks.
- Do not start the engine if gasoline has been spilled and the area has not fully dried.

WARNING: Hot Exhaust

- The muffler becomes extremely hot during engine operation and remains hot for some time after shutdown. Avoid contact with hot surfaces.
- If the engine needs to be moved indoors, allow it to cool completely outdoors first.
- To prevent fires, maintain a minimum distance of 1 meter between the operating engine and walls or other structures. Keep flammable or explosive materials even further away.

WARNING：Carbon Monoxide Poisoning

- Exhaust gases contain carbon monoxide, which is toxic and should not be inhaled.
- Do not operate the engine indoors.

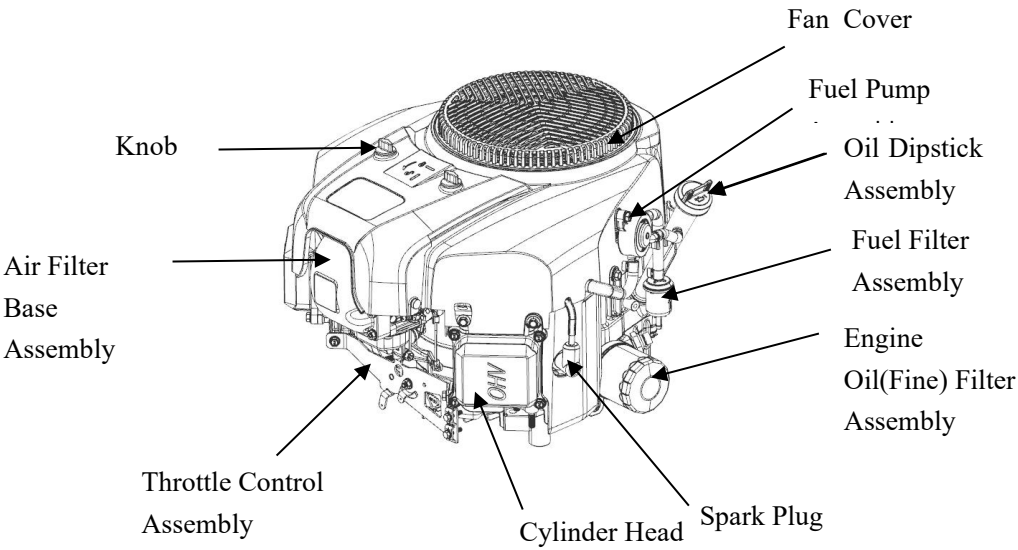
NOTE：Operating Temperature Range

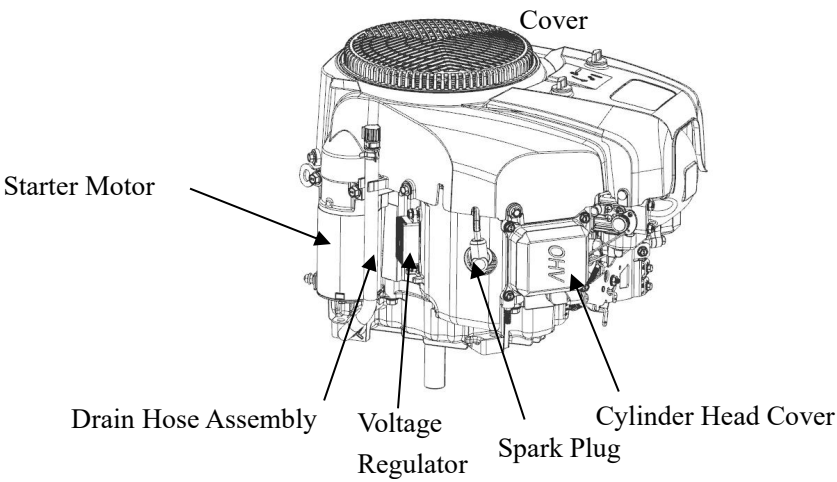
It is recommended to use the engine within an ambient temperature range of 0°C to 40°C. Operation outside this range may prevent the engine from functioning properly.

Chapter 2: Engine Specifications

Model	NV730FE
Engine Type	Twin-cylinder, four-stroke, forced air-cooled, overhead valve
Net Power (kW/3600 rpm)	16
Maximum Torque (N·m) / Corresponding Speed (rpm)	48/2400
Fuel Consumption Rate (g/kW·h)	≤395
Idle Speed (rpm)	1800±200 rpm
Bore × Stroke (mm)	78×76
Displacement (cc)	726
Compression Ratio	8.7:1
Lubrication System	Pressure + splash lubrication
Starting Method	Electric start
Rotation Direction	Counterclockwise (viewed from the output shaft end)
Valve Clearance (mm)	Intake: 0.10–0.15 Exhaust: 0.15–0.20
Spark Plug Gap (mm)	0.6~0.8
Ignition System	Transistorized non-contact ignition
Air Filter Type	Foam + paper filter element
Dimensions (L × W × H, mm)	475×470×447
Net Weight (kg)	40

Chapter 3: Component Identification

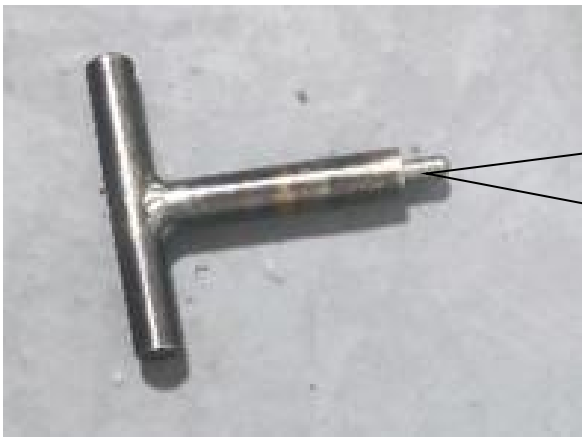




Chapter 4: Throttle and Choke Cable Assembly

1. Throttle Cable Assembly Positioning Fixture:

The positioning fixture is as shown in the diagram below:



Positioning Fixture
The positioning fixture features a pin with a diameter of φ4.5mm and a length of 12.5mm.

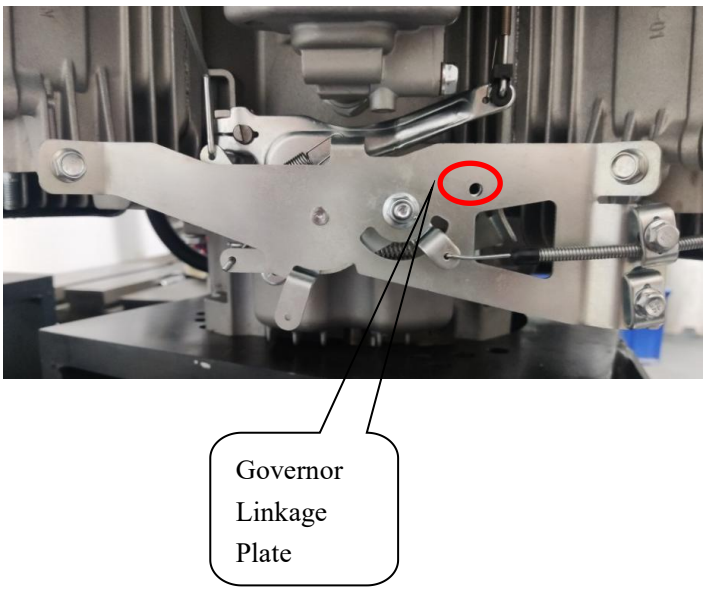
Throttle Cable Assembly Procedure

High Idle Speed Setting/Adjustment Instructions
(Specification requirement: 3300 ± 100 RPM)

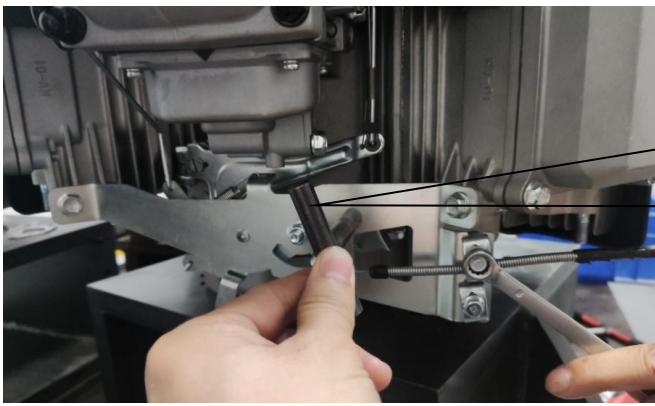
A. Operate the throttle cable control lever and position it at the (High Idle) position corresponding to the (Rabbit) icon.



B: Insert the throttle cable into the hole of the governor linkage plate. Pull the cable until the two holes indicated by the red circle in the diagram are aligned, then secure it in place using the positioning tool.



C: Secure the throttle cable using an 8mm socket wrench.



The prototype engine has been adjusted to meet the customer-specified speed before leaving the factory. After assembling the throttle cable according to steps A, B, and C, both the high-idle and low-idle speed requirements will be satisfied.

2. Choke Cable Assembly

To facilitate easier engine starting, the choke control lever should be placed in the "Choke Closed" position when starting a cold engine. During normal operation, the choke control lever should be placed in the "Choke Open" position.

Chapter 5: Pre-Operation Checks

Routine Inspection

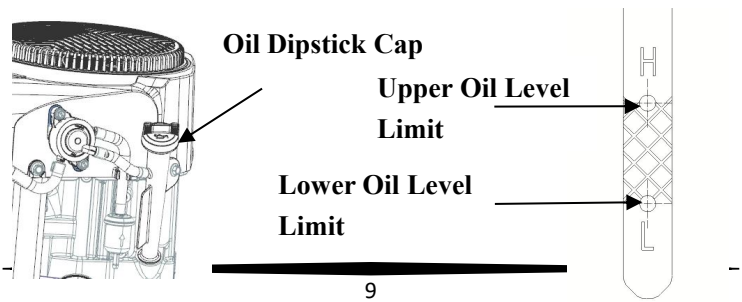
- Visually inspect and confirm that there are no leaks of engine oil or gasoline.
- Visually inspect and confirm that there are no signs of damage.
- Check the positioning of all protective covers and guards, and ensure that all bolts, nuts, and screws are securely tightened.

Checking Engine Oil

CAUTION: After shutting down the engine, place it on a level surface before checking the oil. Use oil that meets the required specifications. SAE 10W-30 oil is recommended.

Remove the oil dipstick from the filler port and wipe it clean.

1) Insert the dipstick, screw on the dipstick cap, and check the oil level.
2) If the oil level is too low, add the recommended oil until it reaches but does not exceed the upper limit mark.
3) After adding oil, be sure to securely tighten the oil dipstick cap.



Checking Fuel

It is recommended to use unleaded gasoline with an octane rating greater than or equal to 90, or ethanol gasoline that meets low-temperature requirements.

CAUTION： Do not use stale or contaminated gasoline. Avoid allowing dust, impurities, or water to enter the fuel tank.

Chapter 6: Starting the Engine

1. **Turn on the fuel valve.**
2. **Choke Control:**
    - When starting a cold engine, place the choke in the **"CLOSED"** position.
    - If the engine is warm, it may be started without closing the choke.
    - During normal operation, the choke must be in the **"OPEN"** position.
3. **Electric Start:**
    - Use a **12V battery**. A battery with a capacity exceeding **18AH** is recommended.
    - Connect the **positive (+) terminal** to the starter relay terminal.
    - Connect the **negative (-) terminal** to an engine mounting bolt, base screw, or another point connected to the engine. (Refer to **Chapter 11: Electrical Schematic Diagram** for details.)
    - First, turn the engine switch to the **ON** position.
    - Then, turn the key to the **START** position and hold it there until the engine starts.
    - If the engine does not start within **5 seconds**, release the key and wait at least **10 seconds** before attempting to start again.

CAUTION:

Cranking for more than **5 seconds** at a time may overheat and

damage the starter motor.

Once the engine starts, release the key, allowing it to return to the **ON** or **RUN** position.

Due to the very high starting current, do not hold the key in the **START** position if the starter motor fails to turn the engine. Doing so may cause excessive current to burn out the starter motor windings.

Chapter 7: Stopping the Engine

Turn the ignition/stop switch key to the (STOP) position.

Chapter 8: Engine Maintenance

8.1 Maintenance Schedule

Maintenance Item		Each Use	First Month or 50 hours	Every 3 Month or 50 hours	Every 6 Month or 50 hours	Every year or 100 hours	Every 2 year or 200 hours	300 hours
Engine Oil	Check Level	●						
	Replace		●			●		
Air Filter Element	Inspect	●						
	Clean			●(1)				
	Replace					●		
Oil Filter	Replace					●(2)		
Fuel Filter	Replace					●		
Spark Plug	Clean					●		
	Replace							●
Valve Clearance	Adjust						●(2)	
Cylinder Head	Clean							●(2)
Fuel Lines	Replace	Every 2 year (2)						

(1) Clean more frequently when operating in dusty conditions.

(2) Should be performed by an authorized service dealer unless you possess the appropriate tools and technical expertise.

8.2 Engine Oil Inspection and Replacement

Allowing the engine to warm up before draining the oil ensures a quicker and more complete oil discharge.

1. Clean the area around the oil dipstick cap and the oil drain plug, then remove the dipstick cap.

2. Drain the engine oil into a suitable container using the following method:

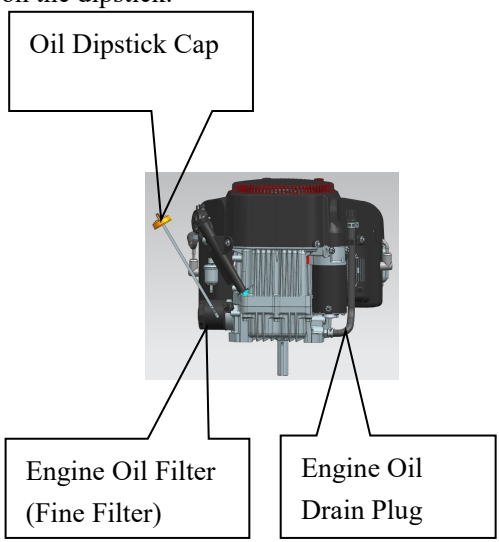
a. Remove the oil drain tube from the clips on the cooling shroud.

b. Unscrew the connector from the top end of the drain tube.

c. Allow the oil to flow into the container.

d. After draining is complete, reconnect the drain tube connector, reinstall the tube in its clips, and ensure the drain plug is tightly secured.

3. Fill with new oil through the oil filler port. Confirm the oil level is between the upper and lower marks on the dipstick.



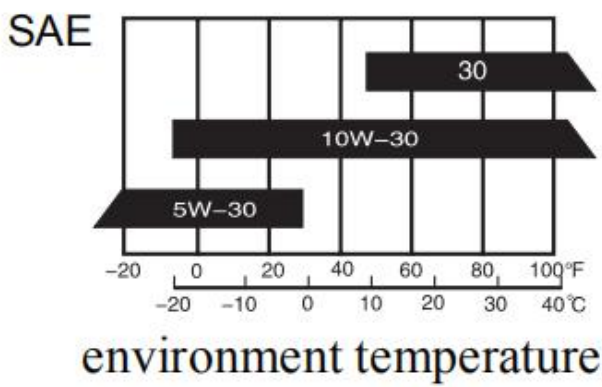
Engine Oil Capacity:
NV730FE: **2.0 Liters**

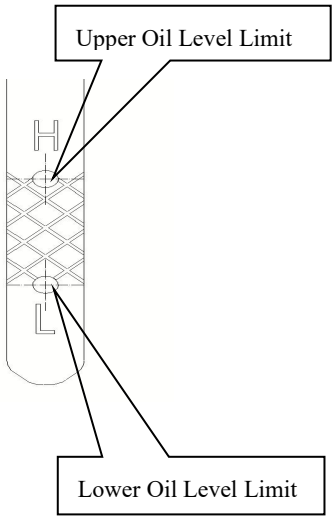
Use a high-detergent, premium-grade four-stroke engine oil that meets or exceeds recognized standards.

Recommended engine oils with API service classifications: SG, SH, SJ, SL, or higher.
(Note: SF is an older specification and may not be optimal for newer engines.)

SAE 10W-30 is recommended for general-purpose, all-temperature use. If the ambient temperature in your region falls within the range indicated for a specific viscosity grade on the chart, you may use that grade of oil.

Select viscosity based on ambient temperature as follows:



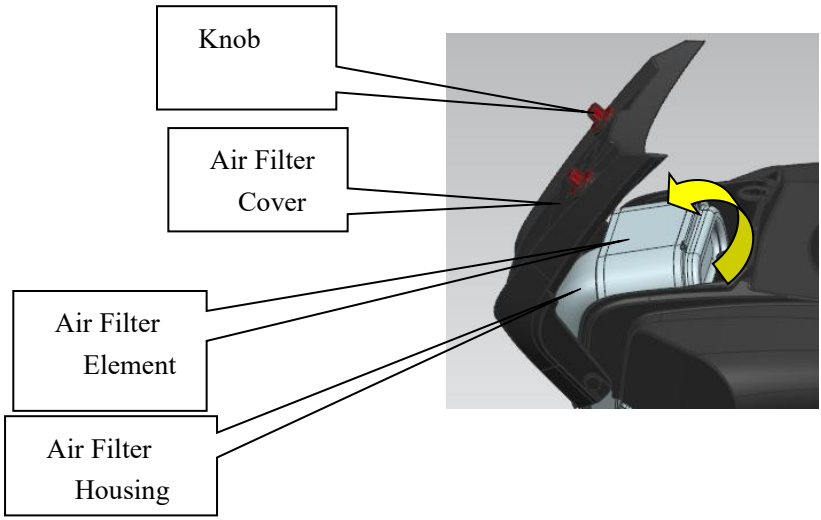


WARNING:

Waste oil is harmful to the environment. Please dispose of used oil and oil containers in an environmentally responsible manner. We recommend placing them in sealed containers and taking them to a local recycling center or service station for proper disposal. Never discard used oil in regular trash bins or pour it onto the ground, into sewers, or any water system.

8.3 Air Filter Element Replacement and Maintenance

1. Loosen the knob(s), open the air filter cover, and then gently lift from the rear side of the air filter element to remove it.



2. Cleaning the foam filter element: Gently squeeze the foam filter element in warm, soapy water, rinse it thoroughly, and allow it to air dry naturally.

3. Cleaning the paper filter element: Lightly tap the element several times, then use compressed air at a pressure not exceeding 200 kPa to blow from the inside out. Never brush a paper filter element, as this can easily clog its pores.

4. Clean dirt from both the inside and outside of the air filter housing and cover. Be careful not to let any debris enter the passage leading to the carburetor.

5. Install the air filter element in the reverse order of removal.

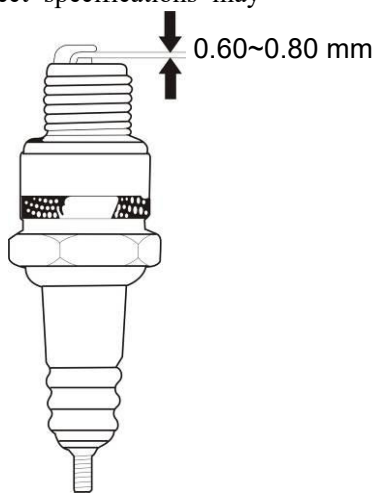
6. Place the air filter cover back on and tighten the knob(s).

WARNING： Operating the engine with a damaged air filter element or without any filter element allows dust to enter the engine, causing rapid wear. This type of damage is not covered under warranty.

8.4 Spark Plug Replacement and Maintenance

It is recommended to use spark plugs of the models F7RTC, RN9YC, or BPR6ES. Other spark plugs of equivalent specifications may also be used.

CAUTION： Using spark plugs of incorrect specifications may damage the engine.



1. Remove the spark plug cap and clean any dirt or debris from the area around the spark plug.
2. Use a spark plug socket wrench to remove the spark plug.
3. Inspect the spark plug:
   - Check the electrodes for excessive wear or heavy deposits.
   - Inspect the ceramic insulator for cracks or damage.
   - If there is any doubt about the spark plug's condition, replace it.
4. Use a feeler gauge to measure the electrode gap. Carefully bend the

ground electrode to adjust the gap to 0.6–0.8 mm.

5. Install the spark plug:

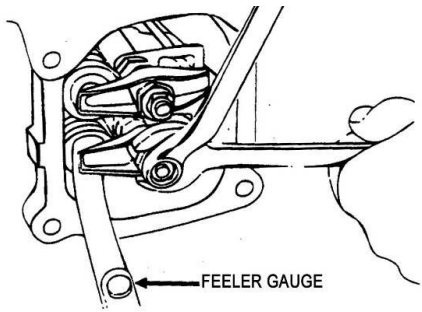
- To avoid cross-threading, start threading the spark plug by hand for 3–8 turns until it is properly seated.
- Once seated, tighten it using a spark plug socket wrench to compress the sealing washer.
- For a reused spark plug: Tighten an additional 1/8–1/4 turn after seating.
- For a new spark plug: Tighten an additional 1/2 turn after seating.

6. Reinstall the spark plug cap firmly onto the spark plug.

CAUTION：

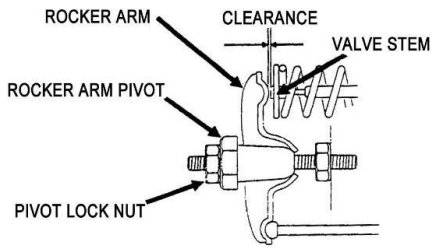
A loose spark plug may leak heat and damage the engine. Over-tightening the spark plug can damage the threads in the engine cylinder head.

8.5 Valve Clearance Adjustment



WARNING : Valve clearance adjustment must be performed with the engine COLD.

1. Remove the cylinder head cover bolts, cylinder head cover, and gasket. Position the piston at Top Dead Center (TDC) on the compression stroke (both intake and exhaust valves are fully closed).

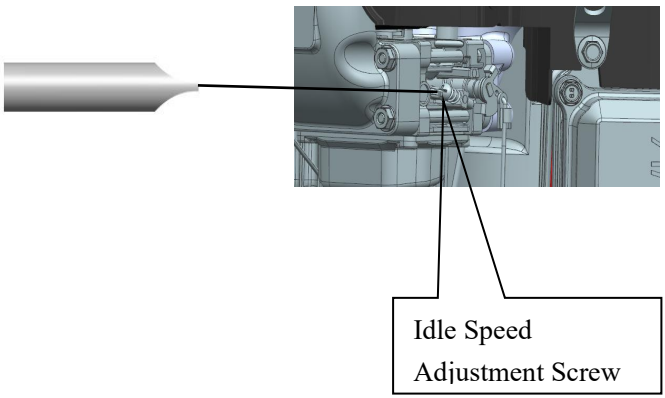


2. Measure the valve clearance by inserting a feeler gauge between the rocker arm and the valve stem.
Intake valve clearance: 0.10–0.15 mm
Exhaust valve clearance: 0.15–0.20 mm

3. Adjust the valve clearance:
Hold the rocker arm adjusting nut steady and loosen the valve locknut. Turn the adjusting nut to achieve the specified clearance. Once adjusted, hold the adjusting nut in place and securely tighten the locknut. Recheck the clearance and readjust if necessary.

4. Reinstall the cylinder head cover with a new gasket (if required) and tighten the bolts securely.

8.6 Idle Speed Adjustment



1. Start the engine and allow it to warm up to normal operating temperature.
2. With the engine idling, locate the idle speed adjustment screw on the carburetor.
3. Rotate the screw clockwise (right) to increase idle speed, or counterclockwise (left) to decrease idle speed.
4. Adjust until the idle speed reaches the recommended range: 1800 ± 200 rpm.

Chapter 9: Engine Storage

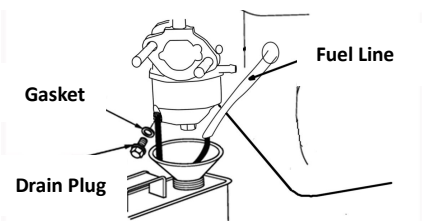
After the engine is stopped, allow it to cool for at least 30 minutes before cleaning. Clean all external surfaces, repair any damaged paint, and apply a thin layer of rust-preventive oil to areas prone to rust.

CAUTION： High-pressure water may enter the air filter and muffler, or even flow into the cylinder through the intake tract, causing rust and damage. Water splashed onto a hot engine can also cause harm. Therefore, cleaning must only be performed after the engine has cooled.

1. Drain the fuel system:

Place a suitable container beneath the carburetor and use a funnel to prevent fuel spillage.

Remove the carburetor drain bolt and ensure the fuel valve is in the OPEN (ON) position.



2. After the fuel has fully drained, immediately reinstall and tighten the drain bolt.

3. Change the engine oil.

4. Remove the spark plug and pour one tablespoon (5–10 ml) of clean engine oil into the cylinder. Rotate the crankshaft several times to distribute the oil inside the cylinder and cylinder head.
5. Reinstall the spark plug.
6. Cover the engine with a dust-proof cover and store it in a well-ventilated, dry area.

WARNING: The shelf life of gasoline in the fuel tank and carburetor depends on fuel additives, ambient temperature, and whether the tank is full. An incompletely filled tank contains oxygen that accelerates fuel degradation. Gasoline stored for extended periods can oxidize and deteriorate. Deteriorated fuel makes starting difficult and can form gums that clog the fuel system.

If the engine will not be used for more than one month, drain all fuel to prevent fuel system and carburetor damage.

Damage to the fuel system or engine performance issues caused by improper storage are not covered under warranty.

Chapter 10: Troubleshooting

1)Difficulty Starting

Symptoms/ Condition				Cause	Solution
Normal Compression	Normal Ignition	Fuel System Abnormal	Fuel Path Blocked	No fuel in tank, or fuel valve not open	Refill fuel, open fuel valve
				Blocked tank vent hole	Clear vent hole
				Blocked fuel valve	Clean fuel valve
				Main jet improperly adjusted or blocked	Readjust, clean, blow clear
				Needle valve or float stuck	Repair or replace
			Fuel Path Clear	Fuel dirty or deteriorated	Replace fuel and clean carburetor
				Water in fuel	Replace fuel and clean carburetor
				Excess fuel in cylinder	Drain fuel, dry spark plug
				Incorrect fuel grade	Use specified fuel grade
	Fuel System Normal	Ignition Faulty	Spark Plug Faulty	Fouling, dirty electrodes	Clean fouling/dirt
				Insulator damaged	Replace spark plug
				Electrodes severely eroded	Replace spark plug
				Incorrect spark plug gap	Adjust gap
			No Spark	Ignition cable (high-tension lead) damaged	Replace ignition cable
				Ignition coil damaged	Replace ignition coil
				Weak magnetic field (magneto)	Re-magnetize or replace

Abnormal Compression	Fuel System Normal	Ignition System Normal	Spark Plug Normal	Piston rings excessively worn or broken	Replace
				Piston rings stuck (coked)	Remove carbon deposits
				Spark plug missing gasket or not tightened	Install gasket or tighten
				Leak at cylinder head/block joint	Replace cylinder head gasket
				Valves not sealing properly	Lapping or replacement

2) Insufficient Power

Symptoms/ Condition	Cause		Solution
Engine speed increases slowly when throttle is opened; may decrease significantly or stall under load	Ignition System	Incorrect ignition timing	Replace ignition coil
	Fuel System	Air in fuel lines	Bleed air from system
		Main jet improperly adjusted	Readjust
		Clogged needle valve orifice or main jet	Clean, blow clear
		Blocked fuel valve	Clean or replace faulty part
		Carbon deposits in combustion chamber	Remove carbon deposits
	Air Intake System	Clogged air filter	Clean
		Air leak in intake system	Repair or replace
	Poor Compression	Worn piston, cylinder, or piston rings	Replace
		Leak at cylinder block/head joint	Replace cylinder head gasket
		Incorrect valve clearance	Readjust
		Valves not sealing properly	Lapping or replacement

3）Sudden Stalling

Symptoms/ Condition	Cause		Solution
Engine suddenly stalls during operation	Fuel System	Fuel exhausted	Refill fuel, clear lines
		Clogged carburetor	Check fuel lines, clear blockage
		Leaking carburetor float	Repair float
		Stuck needle valve	Repair needle valve
	Ignition System	Spark plug fouled or shorted (carbon tracking)	Replace spark plug
		Spark plug electrode broken off	Replace spark plug
		Ignition cable disconnected	Reconnect or replace
		Ignition coil failure	Replace
	Other	Severe cylinder scoring or valve failure	Repair or replace damaged parts

4) Engine Overheating

Symptoms/ Condition	Cause	Solution
Engine Overheating	Incorrect ignition timing	Replace ignition coil
	Insufficient engine oil	Add oil to proper level
	Blocked exhaust pipe	Clean exhaust pipe
	Air leak in cooling shroud/duct	Repair damaged area
	Obstruction in cooling air passage	Clean cooling fins
	Damaged cooling fan	Replace fan
	Piston ring failure causing blow by between cylinder and crankcase	Replace worn components
	Excessively high engine speed	Inspect/repair governor system or replace governor gear
	Seized/burned crankshaft bearing	Replace or repair

5) Abnormal Noises

Symptoms / Condition	Cause	Solution
Knocking/ Rapping Noise	Worn piston or piston rings	Replace worn parts
	Worn connecting rod, piston pin, or pin bore	Replace worn parts
	Worn crankshaft bearing	Replace or repair
	Broken piston ring	Replace piston ring(s)
Detonation/Pinging with Metallic Sound	Excessive carbon deposits in combustion chamber	Remove carbon deposits
	Spark plug gap too small	Adjust electrode gap
	Severe rich fuel mixture	Check carburetor
	Incorrect fuel grade/octane	Replace with specified fuel
	Engine overheating	Refer to "Engine Overheating" section
Other Abnormal Noises	Incorrect valve clearance adjustment	Readjust valve clearance
	Loose flywheel-to-crankshaft connection	Replace key and reinstall securely

Chapter 11: Electrical Schematic Diagram

The specifications of the engine wiring harness connectors and the functions of their terminals are explained in detail in the following diagram:

Wiring diagram

