



Gasoline Engine

Operator's Manual

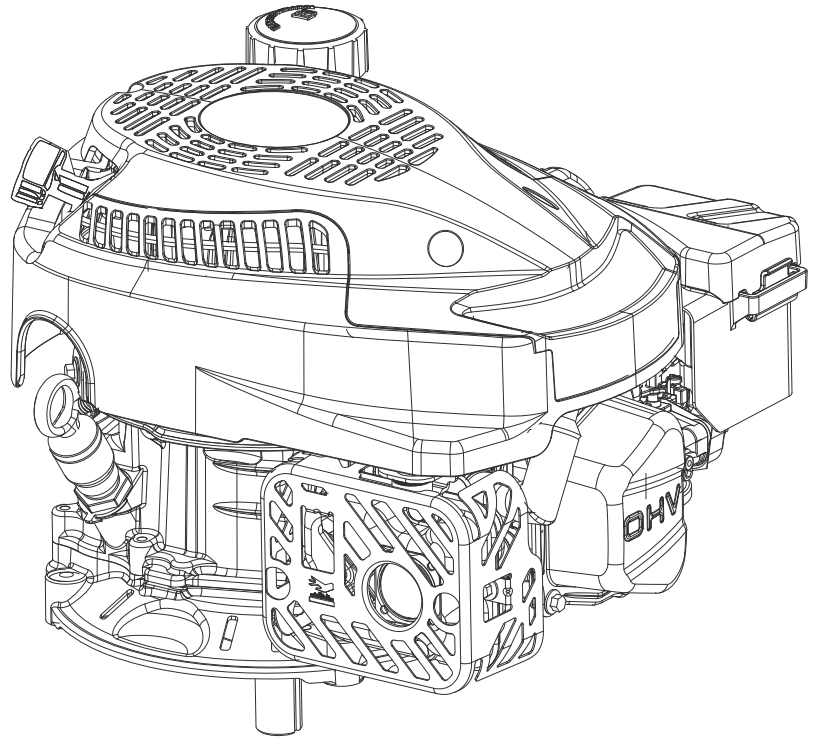
MODEL NUMBER

RV170-S

SERIAL NUMBER

PURCHASE DATE

Both model number and serial number may be found on the main label. You should record both of them in a safe place for future use.



FOR YOUR SAFETY

READ AND UNDERSTAND THE ENTIRE MANUAL BEFORE OPERATING MACHINE

Your new YARDMAX® engine offers quality construction, and is easy and safe to operate. With proper use and care, it is designed to give you many years of dependable service.

Prepare to experience the durability to take on any job with the ease, portability, and convenience of your new engine!

Discover the YARDMAX Advantage

At YARDMAX, we understand that land ownership definitely has its privileges, but it also comes with a great deal of responsibility. When duty calls and you need to respond, will you have what it takes to tame the great outdoors?

When looking for outdoor power equipment (OPE) to get the job done right, at the right price, YARDMAX delivers the perfect combination of performance and practicality. YARDMAX has a solution that's right for you.

MAX Performance, MAX Value, MAX Support — that's YARDMAX

- ✓ Backed by decades of proven manufacturing expertise
- ✓ Enhanced design features come standard
- ✓ Engineered for the best user experience
- ✓ Quality metal parts are used instead of plastic
- ✓ A robust warranty supports all products
- ✓ Budget-friendly prices make it practical



Up for the job? YARDMAX is.

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DISCLAIMER

Keep this owner's manual handy, so you can refer to it at any time.

This owner's manual is considered a permanent part of the engine and should remain with the engine if resold.

The information and specifications included in this publication were in effect at the time of approval for printing.

READ THIS OWNER'S MANUAL CAREFULLY. Pay special attention to these symbols and any instructions that follow:

⚠ WARNING *Indicates serious injury or death will result if instructions are not followed.*

⚠ DANGER *Indicates a strong possibility that serious injury or death could result if instructions are not followed.*

⚠ CAUTION *Indicates a possibility that minor injury or an result if instructions are not followed.*

📌 NOTE *Indicates that equipment or property damage can result if instructions are not followed.*

If a problem should arise, or if you have any questions about your engine, consult your engine dealer.

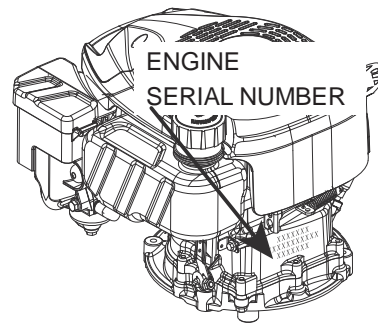
⚠ WARNING *Carefully read through this entire operator's manual before using your new engine. Pay attention to all cautions and warnings.*

ENVIRONMENTAL

Recycle unwanted materials instead of disposing of them as waste. All tools, hoses, and packaging should be resorted, taken to the local recycling center and disposed of in an environmentally safe way.

ENGINE SERIAL NUMBER

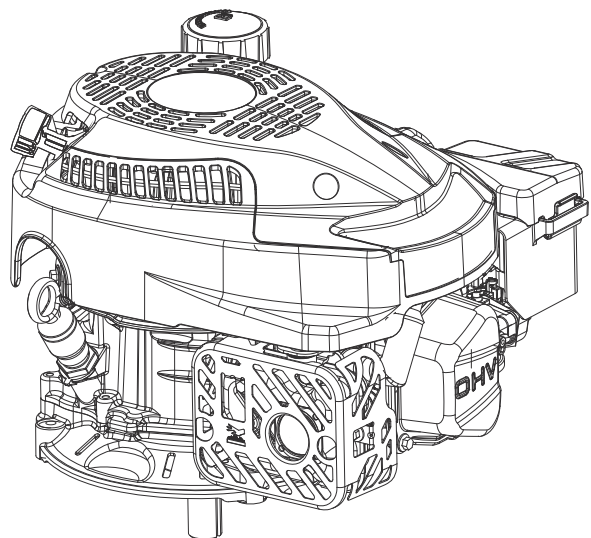
Record the engine serial number on the front cover of this manual. You will need this serial number when ordering parts, and when making technical or warranty inquiries.

**DISCLAIMER**

YARDMAX reserves the right to discontinue, change, and improve its products at any time without notice or obligation to the purchaser. The descriptions and specifications contained in this manual were in effect at printing. Equipment described within this manual may be optional. Some illustrations may not be applicable to your unit.

SUPPORT

Have questions about your YARDMAX equipment? Call us at 847-327-0566 or 844-YARDMAX, email us at support@yardmax.com, or contact us via your favorite social media site.



SPECIFICATIONS

Model	RV170-S
Type	Single cylinder, 4-Stroke, Forced Air Cooling, OHV
Net Power (KW/3600rpm)	2.8
Max. torque (N•m/rpm)	8.8/2500
Fuel consumption (g/kW•h)	420
Idle speed	-
Speed Fluctuating Ratio	-
Transmission Mode	-
Reduction Ratio	-
Bore×Stroke (mm)	70x44.2
Displacement (cc)	170
Compression Ratio	-

Lubricating mode	-
Starting Mode	Recoil start
Rotation	Counter-clockwise (from P.T.O. side)
Valve Clearance	input valve: 0.05 mm ~0.10mm, output valve: 0.05 mm ~0.10mm
Spark plug clearance	0.7 mm ~0.8mm
Igniting Mode	Capacitance discharge type
Air cleaner	-
Dimension (Length) (mm)	325
Dimension (Width) (mm)	305
Dimension (High) (mm)	250
Net weight (kg)	7.5



CAUTION

Specification is subject to change without notice. For further information, please contact our company dealer.

Torque Of Important Bolts

Items	Specifications	Torque valve	
		N•m	kg•m
Connection-rod bolt	M5×26	8	0.8
Flywheel nut	M14×1.5	60	6.0
Crankcase cover bolt	M6×30	10	1.0
Valve clearance adjusting nut	M5	8	0.8

SAFETY

OWNER RESPONSIBILITIES

- The engines are designed to give safe and dependable service if operated according to instructions. Read and understand this owner's manual before operating the engine. Failure to do so could result in personal injury or equipment damage.
- Know how to stop the engine quickly, and understand the operation of all controls. Never permit anyone to operate the engine without proper instructions.
- Do not allow children to operate the engine. Keep children and pets far away from the area of operation.

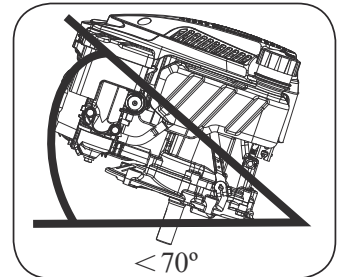
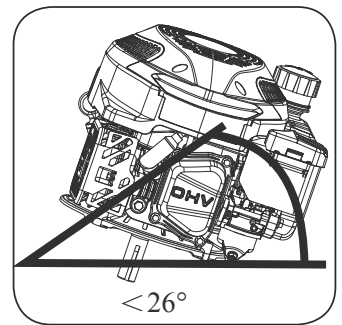
SAFETY PRECAUTIONS



DANGER

Indicate a possibility of invalid warranty and personal or equipment damage if instructions are not followed.

- Strictly set the engine according to the regulated power on the owner's manual. Do not overload, overrun the engine or run it with low load and at low speed in a long time.
- Use specified grade of gasoline. The fuel should be fully deposited and filtrated before use. Keep clean the fuel filler, change the oil periodically.
- Periodically check the installation, connection and the degree of tightness of the fixed bolt. Tighten it if necessary.
- Periodically clean the element of the air cleaner, change it when necessary.
- The engine is air-cooled, so clean the radiator, wind cover and fan in time in order to make the engine cool normally.
- The operator should be familiar with the working principle and structure of the gasoline engine, knowing how to make an emergent stop and the operation of all controlling parts. Any one without training is forbidden to operate the engine. Keep periodical maintenance. Solve problems in time. Do not nm the engine in spite of malfunction.
- Running die engine in a well-ventilated place, keep it at least one meter away from building walls or other equipments, keep away from inflammables such as gasoline, matties and so on to avoid possibility of fire.
- Refuel in a well-ventilated area with the engine stopped, and in places refueling or storing gasoline, no smoking and any flames or sparks.
- Refuel the fuel tank not too full so as to avoid fuel's spilling out. If there is spilled fuel around, be sure to clean it thoroughly before starting.
- Do not run the engine in airtight or ill-ventilated places.
- Inclination of gasoline engine which indicates the included angle between crankcase cover and level is less than 26° during its runing. If that is over 26°, oil will flow into combustion chamber and burn with white smoke, which will cause gasoline engine has lower power and higher emission.
- Please carefully read warning label before operating. Our company will not assume any responsibility for person hurt, or equipment damaged caused by disregarding this warning label.
- Engine alone or assembled on the ultimate machine, when it tilts towards the air filter, the angle should not beyond 26°, or oil would enter the air filter, which affects operation (engine tilts towards the muffler, the angle should be within 90°; towards the cylinder head, the angle should be within 26°).
- Engine alone or assembled on ultimate machine, the angle it tilting backwards should not beyond 70°, or it would accelerate gasoline leakage and affect operation.



REFUEL WITH CARE

Gasoline is extremely flammable, and gasoline vapor can explode. Refuel outdoors, in a well-ventilated area, with the engine stopped. Never smoke near gasoline, and keep other flames and sparks away. Always store gasoline in an approved container. If any fuel is spilled, make sure the area is dry before starting the engine.

HOT EXHAUST

- The muffler becomes very hot during operation and remains hot for a while after stopping the engine. Be careful not to touch the muffler while it is hot. Let the engine cool before storing it indoors.
- To prevent fire hazards and to provide adequate ventilation for stationary equipment applications, keep the engine at least 3 feet (1 meter) away from building walls and other equipment during operation. Do not place flammable objects close to the engine.

CARBON MONOXIDE HAZARD

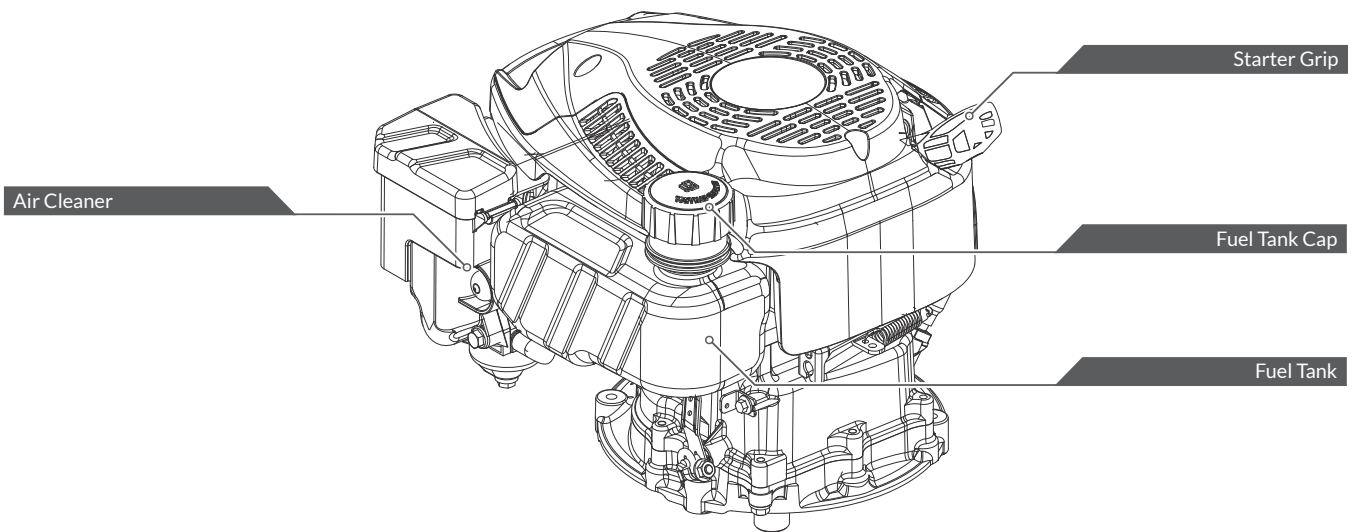
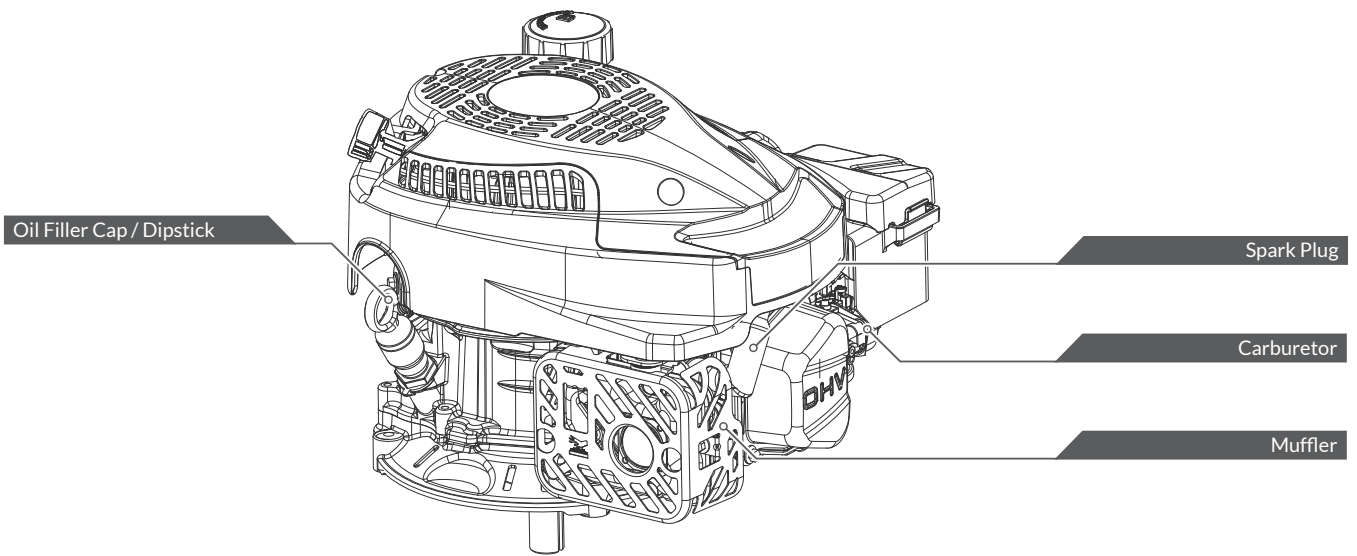
Exhaust gas contains poisonous carbon monoxide. Avoid inhalation of exhaust gas. Never run the engine in a closed garage or confined area.

OTHER EQUIPMENT

Review the instructions provided with the equipment powered by this engine for any additional safety precautions that should be observed in conjunction with engine startup, shutdown, operation, or protective apparel that may be needed to operate the equipment.

KNOW YOUR ENGINE

FEATURES AND CONTROLS



CHECK BEFORE OPERATION

IS YOUR ENGINE READY TO GO?

For your safety, and to maximize the service life of your equipment, it is very important to take a few moments before you operate the engine to check its condition. Be sure to take care of any problem you find, or have your servicing dealer correct it, before you operate the engine.

! WARNING *Improperly maintaining this engine, or failing to correct a problem before operation, could cause a malfunction in which you could be seriously injured. Always perform a preoperation inspection, and correct any problem.*

Before beginning your preoperation checks, be sure the engine is level and the engine switch is in the OFF position.

CHECK THE GENERAL CONDITION OF THE ENGINE

- Look around and underneath the engine for signs of oil or gasoline leaks.
- Remove any excessive dirt or debris, especially around the muffler and recoil starter.

- Look for signs of damage.
- Check that all shields and covers are in place, and all nuts, bolts, and screws are tightened.

CHECK THE ENGINE

Check the engine oil level. Running the engine with a low oil level can cause engine damage.

The Oil Alert system (applicable engine types) will automatically stop the engine before the oil level falls below safe limits. However, to avoid the inconvenience of an unexpected shutdown, always check the engine oil level before startup.

Check the air filter. A dirty air filter will restrict air flow to the carburetor, reducing engine performance.

Check the fuel level. Starting with a full tank will help to eliminate or reduce operating interruptions for refueling.

CHECK THE EQUIPMENT POWERED BY THIS ENGINE

Review the instructions provided with the equipment powered by this engine for any precautions and procedures that should be followed before engine startup.

OPERATION

SAFE OPERATING PRECAUTIONS

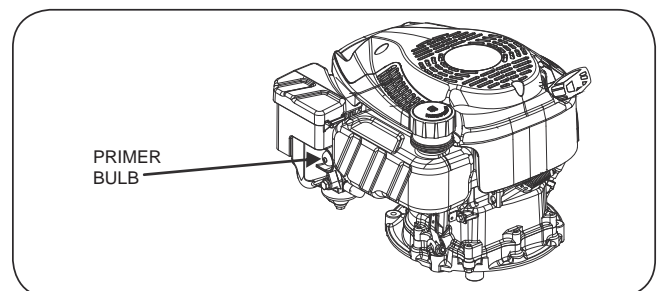
Before operating the engine for the first time, please review the IMPORTANT SAFETY INFORMATION and the chapter titled BEFORE OPERATION.

! WARNING *Carbon monoxide gas is toxic. Breathing it can cause unconsciousness and even kill you. Avoid any areas or actions that expose you to carbon monoxide.*

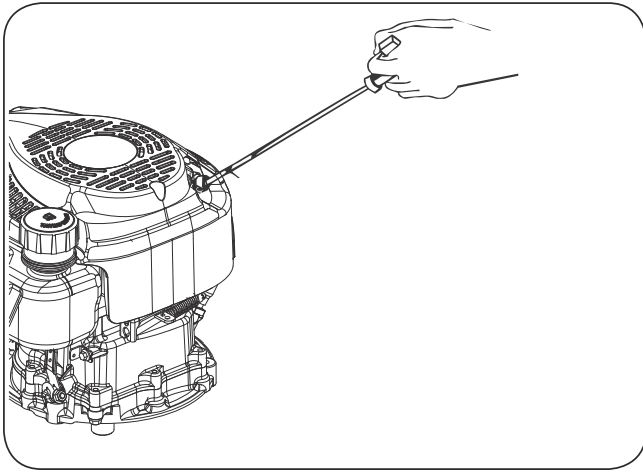
Review the instructions provided with the equipment powered by this engine for any safety precautions that should be observed in conjunction with engine startup, shutdown, or operation.

STARTING THE ENGINE

1. Starting primer bulb operation is important operation of the starting engine. For cold starting, slightly press the primer bulb one to three times in succession and quickly pull the recoil cable grip. For hot starting, directly pull the starter cable grip.



2. Pull the starter grip lightly until resistance is felt, then, briskly pull to syncline upper 30 degree out.

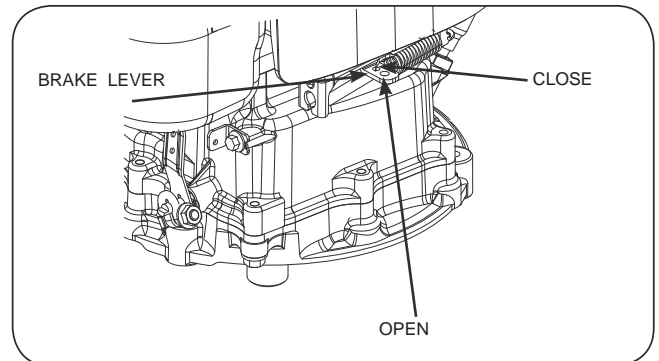


NOTE

Don't allow the starter grip to snap back against the engine. Return it gently to prevent damage to the starter.

STOPPING THE ENGINE

If the engine is controlled by brake lever, only turn the brake lever to "CLOSE" position for stopping engine



CAUTION

Sudden stopping at high speed under heavy load is forbidden, otherwise damage will result.

MAINTENANCE

THE IMPORTANCE OF MAINTENANCE

Good maintenance is essential for safe, economical, and trouble-free operation. It will also help reduce air pollution.



WARNING

Improperly maintaining this engine, or failure to correct a problem before operation, can cause a malfunction in which you can be seriously hurt or killed. Always follow the inspection and maintenance recommendations and schedules in this owner's manual.

To help you properly care for your engine, the following pages include a maintenance schedule, routine inspection procedures, and simple maintenance procedures using basic hand tools. Other service tasks that are more difficult, or require special tools, are best handled by professionals and are normally performed by a technician or other qualified mechanic.

The maintenance schedule applies to normal operating conditions. If you operate your engine under unusual conditions, such as sustained high-load or high-temperature operation, or use in unusually wet or dusty conditions, consult your servicing dealer for recommendations applicable to your individual needs and use.

MAINTENANCE SAFETY PRECAUTIONS

Some of the most important safety precautions are as follows: However, we cannot warn you of every conceivable hazard that can arise in performing maintenance. Only you can decide whether or not you should perform a given task.

1. Make sure the engine is off before you begin any maintenance or repairs. This will eliminate several potential hazards:
 - **Carbon monoxide poisoning from engine exhaust.**
Be sure there is adequate ventilation whenever you operate the engine.
 - **Burns from hot parts.**
Let the engine and exhaust system cool before touching.
 - **Injury from moving parts.**
Do not run the engine unless instructed to do so.
2. Read the instructions before you begin, and make sure you have the tools and skills required.
3. To reduce the possibility of fire or explosion, be careful when working around gasoline. Use only a nonflammable solvent, not gasoline, to clean parts. Keep cigarettes, sparks and flames away from all fuel-related parts.

Remember that your servicing dealer knows your engine best and is fully equipped to maintain and repair it.

To ensure the best quality and reliability, use only new, genuine parts or their equivalents for repair and replacement.

MAINTENANCE SCHEDULE

Frequency		Every time	First month or 10 hrs of operation	Thereafter, every 3 months or 30hrs of operation	Every 6 months or 50 hrs of operation	Every year or 100 hrs of operation
ITEM						
Engine oil	Check-Refill	√				
	Change		√	√		
Air filter element	Check	√				
	Clean			√		
	Change				√	
Spark plug	Clean-adjust				√*	
Spark arrester	Clean				√	
Valve clearance**	Check-adjust					√
Fuel hose	Check	Every 2 years (change if necessary)				
Cylinder head, Piston	Remove carbon deposits	Every 125 hours				

* These items should be serviced by company authorized dealer, unless you have the proper tools and mechanically proficient.

 **CAUTION**

Service more frequently when used in dusty areas.

REFUELING

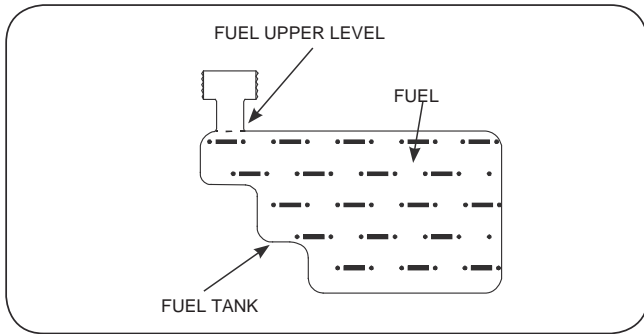
Fuel tank capacities : 0.21 gallons(0.8 L)

With the engine stopped, remove the fuel tank cap and check the fuel level. Refill the tank if the fuel level is low.

 **WARNING**

Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel.

- Stop the engine and keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.



Refuel in a well-ventilated area before starting the engine. If the engine has been running, allow it to cool. Refuel carefully to avoid spilling fuel. Do not fill above the fuel strainer shoulder. After refueling, tighten the fuel tank cap securely.

Never refuel the engine inside a building where gasoline fumes may reach flames or sparks. Keep gasoline away from appliance pilot lights, barbecues, electric appliances, power tools, etc.

Spilled fuel is not only a fire hazard, it causes environmental damage. Wipe up spills immediately.

⚠ WARNING *Fuel can damage paint and plastic. Be careful not to spill fuel when filling your fuel tank. Damage caused by spilled fuel is not covered under warranty.*

FUEL RECOMMENDATIONS

Use unleaded gasoline with a pump octane rating of 86 or higher.

These engines are certified to operate on unleaded gasoline. Unleaded gasoline produces fewer engine and spark plug deposits and extends exhaust system life.

Never use stale or contaminated gasoline or an oil/gasoline mixture. Avoid getting dirt or water in the fuel tank.

Occasionally you may hear a light “spark knock” or “pinging” (metallic rapping noise) while operating under heavy loads. This is no cause for concern.

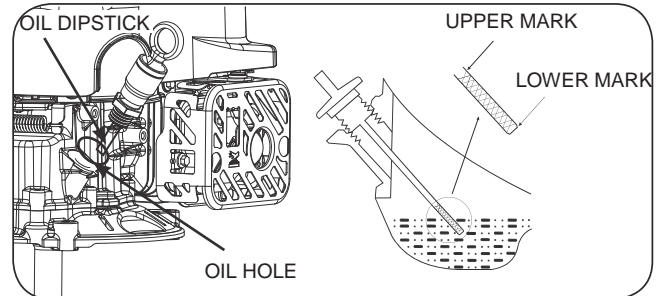
If spark knock or pinging occurs at a steady engine speed, under normal load, change brands of gasoline. If spark knock or pinging persists, see an authorized servicing dealer.

⚠ WARNING *Running the engine with persistent spark knock or pinging can cause engine damage. Running the engine with persistent spark knock or pinging is considered misuse, and the Distributor’s Limited Warranty does not cover parts damaged by misuse.*

ENGINE OIL LEVEL CHECK

Check the engine oil level with the engine stopped and in a level position.

1. Remove the filler cap/dipstick and wipe it clean.



2. Insert and remove the dipstick without screwing it into the filler neck. Check the oil level shown on the dipstick.
3. If the oil level is low, fill to the edge of the oil filler hole with the recommended oil.
4. Screw in the filler cap/dipstick securely.

⚠ WARNING *Running the engine with a low oil level can cause engine damage. The Oil Alert system (applicable engine types) will automatically stop the engine before the oil level falls below safe limit. However, to avoid the inconvenience of an unexpected shutdown, always check the engine oil level before startup.*

ENGINE OIL CHANGE

Drain the used oil while the engine is warm. Warm oil drains quickly and completely.

1. Place a suitable container below the engine to catch the used oil, and then remove the filler cap/dipstick and the drain plug.
2. Allow the used oil to drain completely, and then reinstall the drain plug, and tighten it securely.

Please dispose of used motor oil in an environmental friendly way. We suggest you take used oil in a sealed container to your local recycling center or service station for reclamation. Do not throw it in the trash; pour it on the ground; or down a drain.

3. With the engine in a level position, fill to the outer edge of the oil filler hole with the recommended oil.

Engine oil capacities: 0.34~0.57 US qt (0.3~0.5L)

Running the engine with a low oil level can cause engine damage.

The Oil Alert system (applicable engine types) will automatically stop the engine before the oil level falls below the safe limit.

However, to avoid the inconvenience of an unexpected shutdown, fill to the upper limit, and check the oil level regularly.

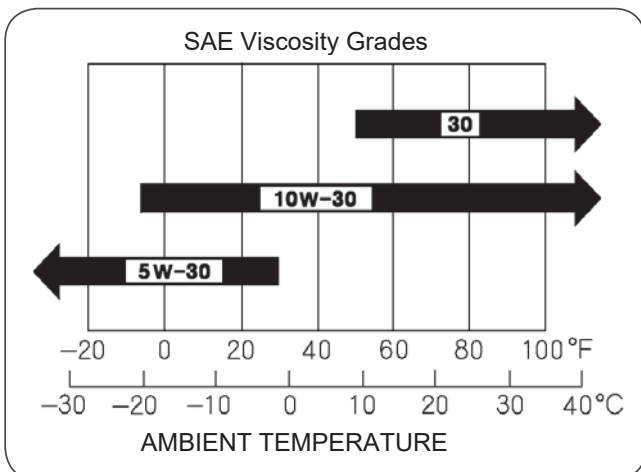
4. Screw in the filler cap/dipstick securely.

ENGINE OIL RECOMMENDATIONS

Oil is a major factor affecting performance and service life. Use 4-stroke automotive engine oil.

SAE 10W-30 is recommended for general use. Other viscosities shown in the chart may be used when the average temperature in your area is within the recommended range.

The SAE oil viscosity and service classification are in the API label on the oil container. We recommend that you use API SERVICE Category SJ class or above oil.



AIR FILTER INSPECTION

Remove the air cleaner cover and inspect the filter. Clean or replace dirty filter elements. Always replace damaged filter elements. If equipped with an oil-bath air cleaner, also check the oil level.

AIR CLEANER SERVICE

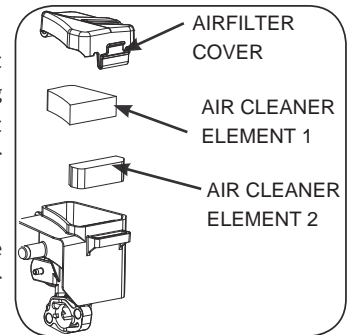
A dirty air filter will restrict air flow to the carburetor, reducing engine performance.

If you operate the engine in very dusty areas, clean the air filter more often than specified in the MAINTENANCE SCHEDULE.

WARNING Operating the engine without an air filter, or with a damaged air filter, will allow dirt to enter the engine, causing rapid engine wear. This type of damage is not covered by the Distributor's Limited Warranty.

Air Cleaner

1. Remove the air cleaner housing.
2. Remove foam element or paper element, paying attention to prevent dust and foreign matter entering into air cleaner.
3. Check, clean or replace damaged air cleaner parts.
4. Reinstall the air cleaner parts back.



CAUTION Never run the engine without an air cleaner, or severe wear of the engine may be resulted in.

A dirty or damaged air cleaner will allow dust entering into the engine, causing rapid engine wear. So, service the air cleaner in time.

- Remove the bolt and air cleaner cover. Be careful to prevent dirt and debris from falling into the air cleaner base opening.
- Remove the foam element or paper element.
- Check, clean or replace the damaged air cleaner parts.
- Reinstall the air cleaner parts, then bolt and screw down it.

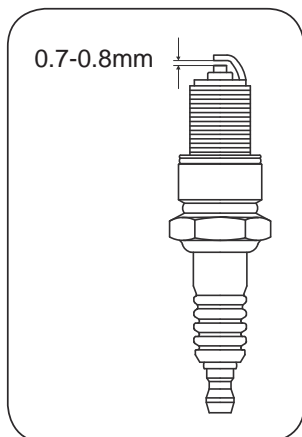
WARNING Never clean the air cleaner element with gasoline or low flash-point detergents, or explosion may happen.

CAUTION Clean the foam filter with soapy water, blow the paper element with compressed air or lightly tap off dust and never dry to brush.

WARNING Gasoline is extremely flammable and explosive in certain condition. Keep cigarette, sparks and fire away. After reinstalling the deposit cup, don't start the engine until the area around is dry.

SPARK PLUG SERVICE

In order to ensure the engine normal running, gap of the spark plug must be correct and no deposit around the spark plug.



⚠ WARNING Don't touch the muffler to avoid burn in the engine running or just stopping a moment.

1. Remove the spark plug cap.
2. Clear away dirt around the spark plug base.
3. Dismantle the spark plug with a spark plug wrench.

4. Visually check the spark plug. Clean with a steel brush. If the insulator is damaged, replace the spark plug instead.
5. Measure the spark plug clearance with a feeler. The clearance should be 0.7~0.8mm. If adjustment is necessary, bend the side electrode carefully.
6. To avoid cross-threading, first, screw in spark plug by hand, then tighten with a spark plug wrench to compress the gasket.
7. If a new spark plug is used, please replace it with same spark plug model as can as possible, and more twist 1/2 turns after compressing the gasket.
8. If reinstalling the used spark plug, just more twist 1/8-1/4 turns.

⚠ CAUTION The spark plug must be tightened securely, or it may become very hot damage the engine. Only use recommended spark plug or the equivalent. Incorrect heat range of the spark plug may damage the engine.

STORAGE/ TRANSPORTING

STORAGE PREPARATION

Proper storage preparation is essential for keeping your engine trouble free and looking good. The following steps will help to keep rust and corrosion from impairing your engine's function and appearance, and will make the engine easier to start after storage.

CLEANING

If the engine has been running, allow it to cool for at least half an hour before cleaning. Clean all exterior surfaces, touch up any damaged paint, and coat other areas that may rust with a light film of oil.

⚠ WARNING Using a garden hose or pressure washing equipment can force water into the air cleaner or muffler opening. Water in the air cleaner will soak the air filter, and water that passes through the air filter or muffler can enter the cylinder, causing damage. Water contacting a hot engine can cause damage. If the engine has been running, allow it to cool for at least half an hour before washing.

Do not incline the engine so as to avoid fuel's spill in transporting. Spilled fuel or fuel vapor may ignite to cause fire. If suspension for a long time, storage should be as following:

1. The storage area is dry and free of dust.
2. Completely drain fuel out of the fuel tank and carburetor.

⚠ WARNING Fuel is extremely flammable and explosive under certain conditions. Keep smoke, fire and spark away from operating site.

3. Replace engine oil.
4. Remove the spark plug. Fill about a spoon of fresh engine oil onto the cylinder. Crank the engine up to distribute engine oil evenly. Reinstall the spark plug.
5. Lightly pull the recoil starter rope until the resistance is felt. Close the choke to protect the dust from entering in.
6. Cover the engine to protect dust entering.

**WARNING**

The length of time that gasoline can be left in your fuel tank and carburetor without causing functional problems will vary with such factors as gasoline blend, your storage temperatures, and whether the fuel tank is partially or completely filled. The air in a partially filled fuel tank promotes fuel deterioration. Very warm storage temperatures accelerate fuel deterioration. Gasoline will oxidize and deteriorate in storage. Deteriorated gasoline will cause hard starting, and it leaves gum deposits that clog the fuel system. As a result, if the engine is not used for more than one month, the fuel oil shall be drained thoroughly to prevent from deterioration of the fuel in fuel system and carburetor.

The failures of fuel system or engine performance arising from improper storage are beyond the scope of the warranty.

STORAGE PRECAUTIONS

1. Change the engine oil.
2. Remove the spark plugs.
3. Pour a tablespoon (5-10 cc) of clean engine oil into the cylinder.
4. Pull the starter rope several times to distribute the oil in the cylinder.
5. Reinstall the spark plugs.
6. Pull the starter rope slowly until resistance is felt. This will close the valves so moisture cannot enter the engine cylinder. Return the starter rope gently.

If your engine will be stored with gasoline in the fuel tank and carburetor, it is important to reduce the hazard of gasoline vapor ignition. Select a well-ventilated storage area away from any appliance that operates with a flame, such as a furnace, water heater, or clothes dryer. Also avoid any area with a spark-producing electric motor, or where power tools are operated.

If possible, avoid storage areas with high humidity, because that promotes rust and corrosion.

Unless all fuel has been drained from the fuel tank, leave the fuel valve lever in the OFF position to reduce the possibility of fuel leakage.

Position the equipment so the engine is level. Tilting can cause fuel or oil leakage.

With the engine and exhaust system cool, cover the engine to keep out dust. A hot engine and exhaust system can ignite or melt some materials. Do not use sheet plastic as a dust cover. A nonporous cover will trap moisture around the engine, promoting rust and corrosion.

If equipped with a battery for an electric starter, recharge the battery once a month while the engine is in storage. This will help to extend the service life of the battery.

REMOVAL FROM STORAGE

Check your engine as described in the chapter CHECK BEFORE OPERATION.

If the fuel was drained during storage preparation, fill the tank with fresh gasoline. If you keep a container of gasoline for refueling, be sure that it contains only fresh gasoline. Gasoline oxidizes and deteriorates over time, causing hard starting.

If the cylinders were coated with oil during storage preparation, the engine may smoke briefly at startup. This is normal.

TRANSPORTING

If the engine has been running, allow it to cool for at least 15 minutes before loading the engine-powered equipment on the transport vehicle. A hot engine and exhaust system can burn you and can ignite some materials.

Keep the engine level when transporting to reduce the possibility of fuel leakage. Move the fuel valve lever to the OFF position.

TROUBLESHOOTING

Start Engine Difficultly (By using recoil starter)

TROUBLE		CAUSE	REMEDY	
Normal cylinder compression	Normal spark plug spark	Fuel supply is not smooth or no fuel supply 1. There is no enough fuel in fuel tank and fuel cock is closed. 2. Air vent in the fuel filler cap is clogged 3. Fuel cock is clogged 4. Improper or clogged main oil flow hole 5. Needle valve is not closed properly or start hole is clogged 6. Float is damaged or sticking	1. Fill fuel, open fuel cock. 2. Dredge air vent. 3. Clean first and then dredge 4. Readjust or clean, blow to get through 5. Dismantle needle valve and repair, clean, blow to get through 6. Repair float	
		Fuel supply is normal supply 1. Fuel is too filthy or deteriorated 2. There is water in fuel 3. Too much fuel in engine 4. Wrong fuel brand	1. Replace 2. Replace 3. Drain extra fuel, dry up spark plug electrodes 4. Select proper fuel brand corresponding with the requirements.	
	Normal fuel supply system	Normal high-tension line spark	Spark plug is in bad conditions 1. Too much carbon deposit and dirt around electrodes 2. Electrodes are badly damaged seriously or insulators damaged. 3. Improper electrodes gap.	1. Clear away. 2. Replace spark plug. 3. Adjust to proper value.
	Normal fuel supply system	High-tension line no spark	1. High tension line is damaged. 2. Ignition coil is damaged 3. Magneto loses magnetism 4. Wrong gap between ignition coil and flywheel	1. Replace 2. Replace 3. Replace 4. Adjust gap between ignition and flywheel
Abnormal cylinder compression	Normal fuel supply system	High-tension coil run out Normal ignition system	1. Piston ring is worn to or even over its wear limit 2. Piston ring is broken 3. Piston ring is sticking 4. Spark plug is not installed tight or without a gasket 5. Air leakage between cylinder block and cylinder head 6. Air leakage in the valves	1. Replace 2. Replace 3. Clear up carbon fouling 4. Tighten with a gasket in 5. Check cylinder gasket, and the flatness of the surface by which cylinder block contact with cylinder head Tighten cylinder head bolts in stipulated order to stipulated torque. 6. Check valve. Clearance and tightness, repair if necessary

Gasoline Engine Power Output Insufficiency

TROUBLE	CAUSE	REMEDY
When increasing throttle, speed increase slow or even decrease and stop running	Fuel supply system 1. Air in fuel line or fuel line clogged 2. Main oil flow hole is not adjusted properly 3. In carburetor, needle valve hole and main oil flow hole clogged 4. Fuel cock is clogged up 5. Too much carbon deposit incombusting chamber. 6. Too much carbon fouling in muffler and exhaust pipe 7. Air cleaner is clogged up 8. Intake pipe is leaking	1. Exhaust air or dredge fuel line 2. Readjust 3. Clean and blow to get through 4. Clean, replace damaged part 5. Clear away 6. Clear away 7. Clean air cleaner filter element 8. Repair or replace
	Poor compression 1. Piston or cylinder or piston ring is worn 2. Air leakage from the surface by which cylinder block contacting Replace cylinder gasket with cylinder head. 3. Too big or too small valve clearance 4. Valve tightness is poor	1. Replace the worn 2. Replace the cylinder gasket 3. Readjust 4. Repair

Gasoline Engine Can not Running Unsmoothly

TROUBLE	CAUSE	REMEDY
Knocking sound	1. Piston, cylinder or piston ring is worn excessively 2. Piston pin and piston pin hole are worn excessive 3. Tie rod small head is worn excessive 4. Roller bearing for crankshaft main shaft is worn	1. Replace the worn 2. Replace piston or piston pin 3. Replace tie rod 4. Replace roller bearing
Abnormal combustion	1. Engine is too hot 2. Too much carbon deposit in combustion chamber 3. Improper gasoline brand or low gasoline quality	1. Shoot trouble 2. Clear away 3. Replace with qualified gasoline
Spark lacking	1. There is water in float chamber 2. Improper spark plug electrodes clearance 3. Something wrong with induced coil, and so on	1. Clean 2. Adjust 3. Check and replace damaged parts

Stop Suddenly When Running

TROUBLE	CAUSE	REMEDY
Stop suddenly when running	Fuel supply system 1. Fuel is finished 2. Carburetor is clogged 3. Float chamber is leaking 4. Needle valve is stuck	1. Refill fuel 2. Check fuel line and dredge 3. Repair 4. Dismantle float chamber and eliminate it
	Ignition system 1. Spark plug is punctured, or short-circuited by carbon deposit 2. Side electrode of spark plug is dropped out 3. High-tension wire is dropped out 4. Ignition coil is punctured or short-circuited 5. Parking wire is located on engine body	1. Replace spark plug 2. Replace spark plug 3. Weld on 4. Replace ignition coil 5. Find out meeting and insulate
	The other 1. Cylinder is seriously scored and valve dropped out	1. Repair or replace damaged parts

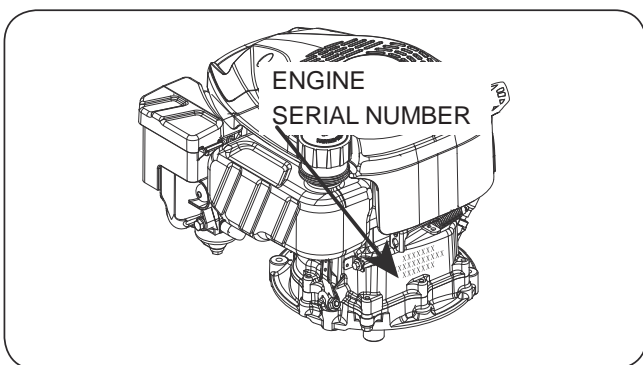
Gasoline Engine Is Overheat

TROUBLE	CAUSE	REMEDY
Gasoline engine is overheat	1. Oil insufficient or wrong oil ratio in the gasoline 2. Exhaust pipe blocked up 3. Shroud leaking 4. Cooling fins blocked by foreign matter 5. Connection rod deformation to make piston and cylinder bushing side wear 6. Cylinder or piston or piston ring is worn to make hunting between cylinder and crankcase 7. Improper adjustment of engine governor to produce speed high 8. Crankshaft main bearing burnt out	1. Refill engine oil 2. Clean exhaust pipe 3. Repair damaged part 4. Clear cooling fins 5. Replace connection rod 6. Replace the worn parts 7. Readjust engine governor 8. Replace main bearing

Abnormal Noise Exist When Engine Running

TROUBLE	CAUSE	REMEDY
Beating sound	<ol style="list-style-type: none"> 1. Piston, piston ring or cylinder is worn 2. Connection rod or piston pin and piston pin hole are worn 3. Crankshaft main neck is worn 4. Piston ring is broken 	<ol style="list-style-type: none"> 1. Replace the worn part 2. Replace the worn part 3. Replace bearing 4. Replace piston ring
Metal beating sound when abnormal combustion occurs	<ol style="list-style-type: none"> 1. Too much carbon deposit in combusting chamber 2. Improper fuel brand 3. Engine is overheat 	<ol style="list-style-type: none"> 1. Clear away carbon deposit 2. Replace fuel 3. Find a cause and eliminate it
The other	<ol style="list-style-type: none"> 1. Improper valve clearance 2. Fly wheel is not connected with crankshaft tightly 	<ol style="list-style-type: none"> 1. Readjust valve clearance properly 2. Connect tightly

TECHNICAL & CONSUMER INFORMATION

SERIAL NUMBER LOCATION

Record the engine serial number in the space below. You will need this serial number when ordering parts, and when making technical or warranty inquiries.

Engine serial number: _____

SOURCE OF EMISSIONS

The combustion process produces carbon monoxide, oxides of nitrogen, and hydrocarbons. Control of hydrocarbons and oxides of nitrogen is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

This utilizes lean carburetor settings and other systems to reduce the emissions of carbon monoxide, oxides of nitrogen and hydrocarbons.

Tampering and Altering

Tampering with or altering the emission control system may increase emissions beyond the legal limit. Among those acts that constitute tampering are:

- Removal or alteration of any part of the intake, fuel or exhaust systems.
- Altering or defeating the governor linkage or speed-adjusting mechanism to cause the engine to operate outside its design parameters.

PROBLEMS THAT MAY AFFECT EMISSIONS

If you are aware of any of the following symptoms, have your engine inspected and repaired by your servicing dealer.

- Hard starting or stalling after starting.
- Rough idle.
- Misfiring or backfiring under load.
- Afterburning (backfiring).
- Black exhaust smoke or high fuel consumption.

REPLACEMENT PARTS

The emission control systems on your engine were designed, built. We recommend the use of genuine parts whenever you have maintenance done. These original-design replacement parts are manufactured to the same standards as the original parts, so you can be confident of their performance. The use of replacement parts that are not of the original design and quality may impair the effectiveness of your emission control system.

A manufacturer of an aftermarket part assumes the responsibility that the part will not adversely affect emission performance. The manufacturer or rebuilder of the part must certify that use of the part will not result in a failure of the engine to comply with emission regulations.

MAINTENANCE

Follow the maintenance schedule. Remember that this schedule is based on the assumption that your machine will be used for its designed purpose. Sustained high-load or high-temperature operation, or use in unusually wet or dusty conditions, will require more frequent service.

ENGINE TUNE-UP

ITEM	SPECIFICATION
Spark plug gap	0.028-0.031 in (0.70 mm -0.80 mm)
Valve clearance	input valve: 0.05 mm~0.10mm, output valve: 0.05 mm ~0.10mm
Other specifications	No other adjustments needed

PUBLICATIONS

These publications will give you additional information for maintaining and repairing your engine. You may order them from your engine dealer.

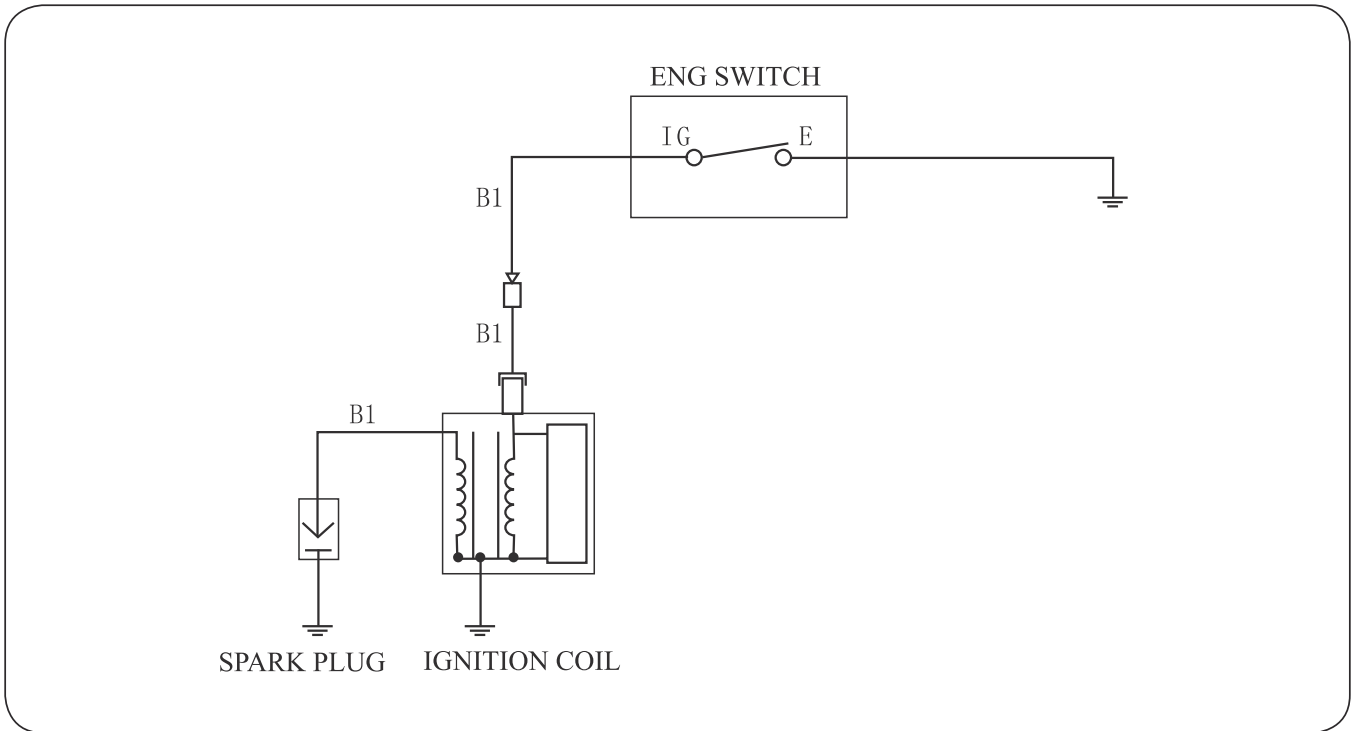
QUICK REFERENCE INFORMATION

Engine Oil	Type	SAE 10W-30,API SJ class or above, for general use
	Capacity	RV170-S: 0.3~0.5 L
Spark Plug	Type	F5TC/F5RTC
	Gap	0.028-0.031 in (0.70 mm-0.80 mm)
Maintenance	Each use	Check engine oil. Check air filter.
	First 20 hours	Change engine oil.
	Subsequent	Refer to the maintenance

WIRING DIAGRAMS

B1	BLACK
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	IG	E
OFF	○	○
ON		



EASY WORN PARTS AND ACCESSORIES LIST

Easy worn parts list
Cylinder head cover gasket
Cylinder head gasket
Spark plug
Oil sealing
Breath groove gasket
Recoil starter
Carburetor gasket
Carburetor insulation gasket
Insulation plate gasket
Exhaust vent gasket

Accessories list
Socket
Force bar

HIGH ALTITUDE KIT REPLACEMENT FOR EPAIII ENGINES

3000-6000ft. / 6000-8000ft. of elevation

- At high altitude, the standard carburetor air-fuel mixture will be too rich. Performance will decrease and fuel consumption will increase. A very rich mixture will also foul the spark plug and cause hard starting. Operation at an altitude that differs from that at which this engine was certified, for extended periods of time, may increase emissions.
- The fuel system on this engine/equipment may be influenced by operation at higher altitudes. Proper operation can be

ensured by installing an altitude kit when required. See the table below to determine when an altitude kit is required. Operating this engine/equipment without the proper altitude kit installed may increase the engine's emissions and decrease fuel economy and performance. Kits may be obtained from any dealer, and should be installed by a qualified individual.

Equipment *	Fuel	Altitude Range**	Kit Part Number
Equipment with engines above 80cc	Gasoline	0 - 3000 ft	Not Required
		3000 - 6000 ft	Altitude kit 1#
		6000 - 8000 ft	Altitude kit 2#

* Engine, Generator Set, Pressure Washer, Walk-Behind Lawnmower, Compressor, Pump, Tiller etc.

** Elevation above sea level.

- This high altitude jet is to be used at elevations above 3000 feet.
- At elevations above 8000 feet, the engine/equipment may experience decreased performance, even with the high altitude kit.
- If a carburetor is replaced, the proper high altitude kit jet will need to be installed into the replacement carburetor.

⚠ WARNING *To prevent serious injury from fire: Follow the kit procedures in a well-ventilated area away from ignition sources. If the engine is hot from use, shut the engine off and wait for it to cool before proceeding.*

📌 NOTE *The warranty may be void if necessary adjustments are not made for high altitude use.*

CALIFORNIA AND FEDERAL EXHAUST AND EVAPORATIVE EMISSIONS CONTROL WARRANTY STATEMENT

YOUR WARRANTY RIGHTS AND OBLIGATIONS

- The California Air Resources Board, the United States Environmental Protection Agency and Chongqing Rato Technology Co., Ltd. (Rato), are pleased to explain the exhaust and evaporative emissions ("emissions") control system warranty on your 2020/2021 small off-road engine/equipment. In California, new equipment that use small off-road engines must be designed, built, and equipped to meet the State's stringent anti-smog standards. Rato must warrant the emissions control system on your small off-road engine/equipment for the period listed below provided there has been no abuse, neglect or improper maintenance of your small off-road engine/equipment leading to the failure of the emissions control system.
- Your emissions control system may include parts such as the carburetor or fuel-injection system, the ignition system, catalytic converter, fuel tanks, fuel lines (for liquid fuel and fuel vapors), fuel caps, valves, canisters, filters, clamps and other associated components. Also included may be hoses, belts, connectors, and other emission-related assemblies.
- Where a warrantable condition exists, Rato will repair your small off-road engine/equipment at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE

- The exhaust and evaporative emissions control system on your small off-road engine/equipment is warranted for two years. If any emissions-related part on your small off-road engine/equipment is defective, the part will be repaired or replaced by Rato.

OWNER'S WARRANTY RESPONSIBILITIES

- As the small off-road engine/equipment owner, you are responsible for performance of the required maintenance listed in your owner's manual. Rato recommends that you retain all receipts covering maintenance on your small off-road engine/equipment, but Rato cannot deny warranty coverage solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

- As the small off-road engine/equipment owner, you should however be aware that Rato may deny you warranty coverage if your small off-road engine/equipment or a part has failed due to abuse, neglect, or improper maintenance or unapproved modifications.
- You are responsible for presenting your small off-road engine/equipment to a Rato distribution center or service center as soon as the problem exists. The warranty repairs shall be completed in a reasonable amount of time, not to exceed 30 days.
- If you have any questions regarding your warranty rights and responsibilities, you should contact Great Lakes Technologies, LLC. at 800-232-1195 or techsupport@wenproducts.com.

DEFECTS WARRANTY REQUIREMENTS

- The warranty period begins on the date the small off-road engine/equipment is delivered to an ultimate purchaser.
- General Emissions Warranty Coverage. Rato warrants to the ultimate purchaser and each subsequent owner that the engine or equipment is:
 - (1) Designed, built, and equipped so as to conform with all applicable regulations adopted by the Air Resources Board; and
 - (2) Free from defects in materials and workmanship that causes the failure of a warranted part for a period of two years.
- The warranty on emission-related parts will be interpreted as follows:
 - (1) Any warranted part that is not scheduled for replacement as required maintenance in the written instructions must be warranted for the warranty period defined in Subsection (b)(2). If any such part fails during the period of warranty coverage, it must be repaired or replaced by Rato according to Subsection (4) below. Any such part repaired or replaced under the warranty must be warranted for the

remaining warranty period.

(2) Any warranted part that is scheduled only for regular inspection in the written instructions must be warranted for the warranty period defined in Subsection (b)(2). A statement in such written instructions to the effect of "repair or replace as necessary" shall advise owners of the warranty coverage for emissions related parts. Replacement within the warranty period is covered by the warranty and will not reduce the period of warranty coverage. Any such part repaired or replaced under warranty must be warranted for the remaining warranty period.

(3) Any warranted part that is scheduled for replacement as required maintenance in the written instructions must be warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part must be repaired or replaced by Rato according to Subsection (4) below. Any such part repaired or replaced under warranty must be warranted for the remainder of the period prior to the first scheduled replacement point for the part.

(4) Repair or replacement of any warranted part under the warranty provisions must be performed at no charge to the owner at a warranty station.

(5) Notwithstanding the provisions of Subsection (4) above, warranty services or repairs must be provided at distribution centers that are franchised to service the subject engine/equipment.

(6) The owner must not be charged for diagnostic labor that leads to the determination that a warranted part is in fact defective, provided that such diagnostic work is performed at a warranty station.

(7) Rato is liable for damages to other engine/equipment components proximately caused by a failure under warranty of any warranted part.

(8) Throughout the emissions control system's warranty period set out in subsection (b)(2), Rato must maintain a supply of warranted parts sufficient to meet the expected demand for such parts and must obtain additional parts if that supply is exhausted.

(9) Manufacturer-approved replacement parts that do not increase the exhaust or evaporative emissions of the engine or emissions control system must be used in the performance of any warranty maintenance or repairs and must be provided without charge to the owner. Such use will not reduce the warranty obligations of Rato.

(10) Add-on or modified parts that are not exempted by the Air Resources Board may not be used. The use of any non-exempted add-on or modified parts will be grounds for disallowing a warranty claim. Rato will not be liable to

warranty failures of warranted parts caused by the use of a non-exempted add-on or modified part.

(11) Rato issuing the warranty shall provide any documents that describe that warranty procedures or policies within five working days of request by the Executive Officer.

- Emission Warranty Parts List for Exhaust
 - (1) Fuel Metering System
 - (i) Carburetor and internal parts (and/or pressure regulator or fuel injection system).
 - (ii) Air/fuel ratio feedback and control system.
 - (iii) Cold start enrichment system.
 - (2) Air Induction System
 - (i) Controlled hot air intake system.
 - (ii) Intake manifold.
 - (iii) Air filter.
 - (3) Ignition System
 - (i) Spark Plugs.
 - (ii) Magneto or electronic ignition system.
 - (iii) Spark advance/retard system.
 - (4) Exhaust Gas Recirculation (EGR) System
 - (i) EGR valve body, and carburetor spacer if applicable.
 - (ii) EGR rate feedback and control system.
 - (5) Air Injection System
 - (i) Air pump or pulse valve.
 - (ii) Valves affecting distribution of flow.
 - (iii) Distribution manifold.
 - (6) Catalyst or Thermal Reactor System
 - (i) Catalytic converter.
 - (ii) Thermal reactor.
 - (iii) Exhaust manifold.
 - (7) Particulate Controls
 - (i) Traps, filters, precipitators, and any other device used to capture particulate emissions.
 - (8) Miscellaneous Items Used in Above Systems
 - (i) Electronic controls.
 - (ii) Vacuum, temperature, and time sensitive valves and switches.
 - (iii) Hoses, belts, connectors, and assemblies.
- Emission Warranty Parts List for Evap
 - (1) Fuel Tank
 - (2) Fuel Cap
 - (3) Fuel Lines (for liquid fuel and fuel vapors)
 - (4) Fuel Line Fittings
 - (5) Clamps*
 - (6) Pressure Relief Valves*
 - (7) Control Valves*
 - (8) Control Solenoids*
 - (9) Electronic Controls*
 - (10) Vacuum Control Diaphragms*

- (11) Control Cables*
- (12) Control Linkages*
- (13) Purge Valves*
- (14) Gaskets*
- (15) Liquid/Vapor Separator
- (16) Carbon Canister
- (17) Canister Mounting Brackets
- (18) Carburetor Purge Port Connector

*Note: As they relate to the evaporative emission control system.

- Rato will furnish with each new small off-road engine/equipment written instructions for the maintenance and use of the engine/equipment by the owner.

Tame the Great Outdoors®

