

KIPOR

KIPOR POWER OPERATION MANUAL

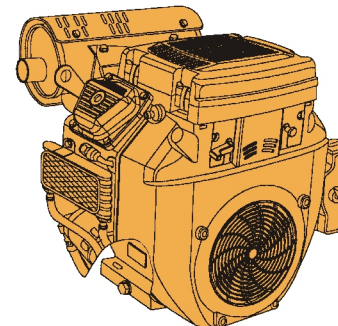
PLEASE READ THIS MANUAL CAREFULLY.
IT CONTAINS IMPORTANT SAFETY INFORMATION.

WWW.KIPOR.COM

KIPOR

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**GASOLINE
ENGINE**

**KG690
KG690G**

 **WARNING**

The engine exhaust from this product contains chemicals known to the State of California cause cancer, birth defects or other reproductive harm.

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. Illustrations are based on the KG690, KG690G type. KIPOR reserves the right, however, to discontinue or change specifications or design at any time without notice and without incurring any obligation whatever. No part of this publication may be reproduced without written permission.

The main specifications of KG690

Model	KG690
Type	V-twin, 4-stroke, overhead valve, air-cooled
Bore×stroke mm	78×72
Displacement ml	688
Compression Ratio	8.5:1
Max. power/Rated speed kW(HP)/r/min	12(16.3)/3000
Max. power/Rated speed kW(HP)/r/min	14(19)/3600
Fuel consumption capacity g/(kW·h)	370
Lube consumption capacity g/(kW·h)	6.8
Lube oil capacity L	1.4
Rotation direction (view from PTO)	Counterclockwise
Starting system	Electric starter
Ignition system	Transistorized magneto
Fuel type	Automobile unlead gasoline
Dimensions (length×wide×height) mm	425×480×472
Net weight kg	45*

* Not include muffler (5kg).

KG690 tuneup

ITEM	SPECIFICATION	
Spark plug gap	0.028 - 0.031 in (0.70 - 0.80mm)	Refer to page 23
Valve clearances (cold)	IN: 0.15±0.02mm EX: 0.20±0.02mm	See your authorized KIPOR dealer
Other specifications	No other adjustments needed	

INTRODUCTION

Congratulations on your selection of a KIPOR engine. We are certain you will be pleased with your purchase of one of the finest engines on the market.

We want to help you get the best results from your new engine and to operate it safely. This manual contains the information on how to do that, please read it carefully.

As you read this manual, you will find information preceded by a NOTICE symbol. That information is intended to help you avoid damage to your engine, other property, or the environment.

We suggest you read the warranty policy to fully understand its coverage and your responsibilities of ownership. The warranty policy is a separate document that should have been given to you by your dealer.

When your engine needs scheduled maintenance, keep in mind that your KIPOR servicing dealer is specially trained in servicing KIPOR engines. Your KIPOR servicing dealer is dedicated to your satisfaction and will be pleased to answer your questions and concern.

Best Wishes

KIPOR POWER CO., LTD.


A FEW WORDS ABOUT SAFETY

Your safety and the safety of others are very important. And using this engine safely is an important responsibility.


To help you make informed decisions about safety, we have provided operation procedures and other information on labels and in this manual. This information alerts you to potential hazards that could hurt you or others.


Of course, it is not practical or possible to warn you about all the hazards associated with operating or maintaining an engine. You must use your own good judgment.


You will find important safety information in a variety of forms, including:

■ Safety Messages-preceded by a safety alert symbol  and one of three signal words, DANGER, WARNING, or CAUTION.

These signal words mean:

 **DANGER** You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

 **WARNING** You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

 **CAUTION** You CAN be HURT if you don't follow instructions.

- Safety Headings-such as IMPORTANT SAFETY INFORMATION.
- Safety Section-such as ENGINE SAFETY.
- Instructions-how to use this engine correctly and safely.

This entire book is filled with important safety information. Please read it carefully.

Emission Control System Information

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.

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

Tempering and Altering

Tempering 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.

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.

Carburetor Modification for High Altitude Operation

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.

High altitude performance can be improved by specific modifications to the carburetor. If you always operate your engine at altitudes above 5,000 feet (1,500 meters), have your servicing dealer perform this carburetor modification.

Even with carburetor modification, engine horsepower will decrease about 3.5% for each 1,000-foot (300-meter) increase in altitude. The effect of altitude on horsepower will be greater than this if no carburetor modification is made.



NOTICE

When the carburetor has been modified for high altitude operation, the air-fuel mixture will be too lean for low altitude use. Operation at altitudes below 5,000 feet (1,500 meters) with a modified carburetor may cause the engine to overheat and result in serious engine damage. For use at low altitudes, have your servicing dealer return the carburetor to original factory specifications.

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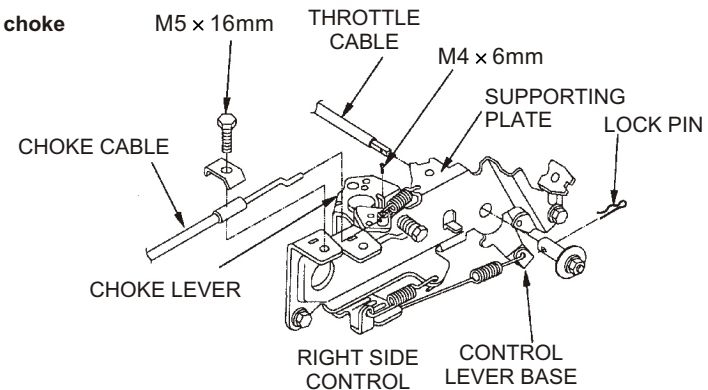
Remote Control Linkage

The throttle and choke control levers are provided with holes for optional cable attachment.

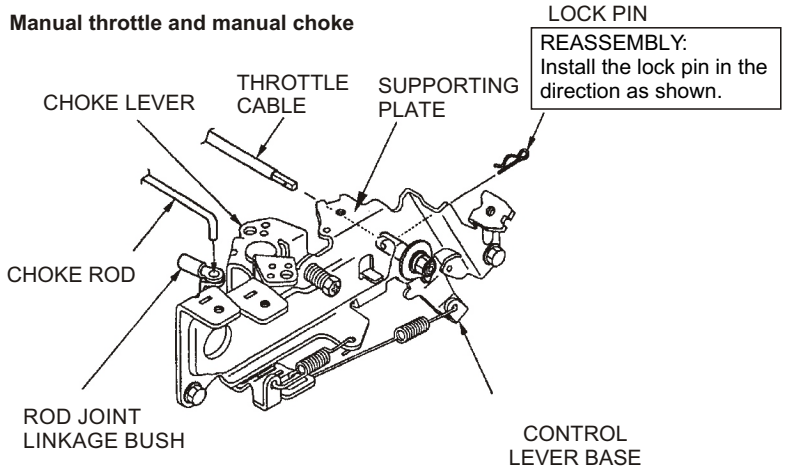
1. The following illustrations show installation examples for a solid wire cable and do not use a braided wire cable.

REMOTE THROTTLE AND REMOTE CHOKE

Remote choke



Manual throttle and manual choke



2. Install the choke cable or choke lever, throttle lever throttle supporting-plate on the supporting-plate.

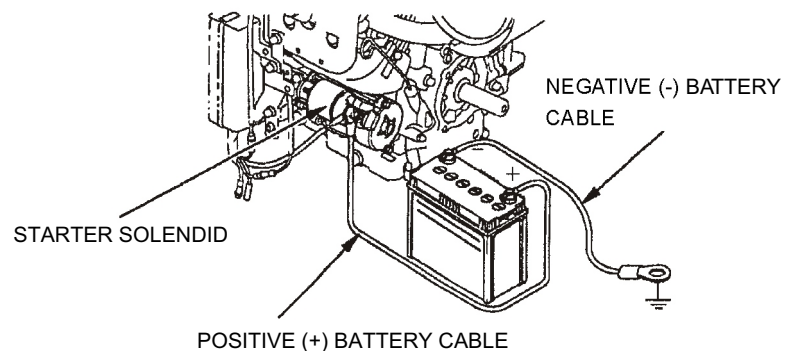
Battery Connections for Electric Starter

Use a 12-volt battery with an ampere-hour rating of at least 45 Ah.

Be careful not to connect the battery in reverse polarity, as this will short circuit the battery charging system. Always connect the positive (+) battery cable to the battery terminal before connecting the negative (-) battery cable, so your tools cannot cause a short circuit if they touch a grounded part while tightening the positive (+) battery cable end.

⚠ WARNING A battery can explode if you do not follow the correct procedure, seriously injuring anyone nearby.
Keep all sparks, open flames, and smoking materials away from the battery.

1. Connect the battery positive (+) cable to the starter solenoid terminal as shown.
2. Connect the battery negative (-) cable to an engine mounting bolt, frame bolt, or other good engine ground connection
3. Connect the battery positive (+) cable to the battery positive (+) terminal as shown.
4. Connect the battery negative (-) cable to the battery negative (-) terminal as shown.
5. Coat the terminals and cable ends with dielectric grease.



1. ENGINE SAFETY

IMPORTANT SAFETY INFORMATION

Most accidents with engines can be prevented if you follow all instructions in this manual and on the engine. Some of the most common hazards are discussed below, along with the best way to protect yourself and others.

Owner Responsibilities

- KIPOR 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 away from the area of 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.

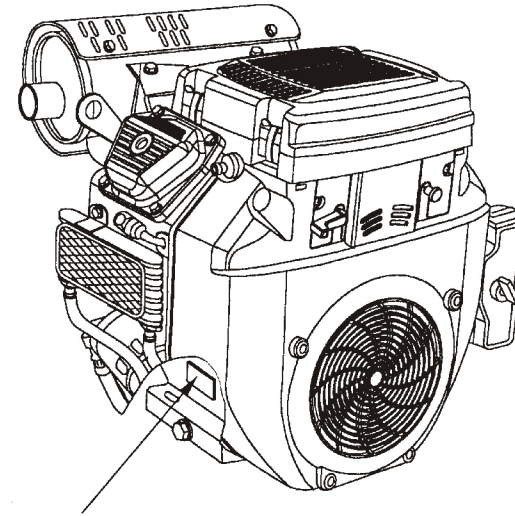
Other Equipment

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, or operation, or protective apparel that may be needed to operate the equipment.

8. TECHNICAL & CONSUMER INFORMATION

TECHNICAL INFORMATION

Serial Number Location



SERIAL NUMBER & ENGINE TYPE

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: _____

Replace the fuse (3A charging coil and switch box type)

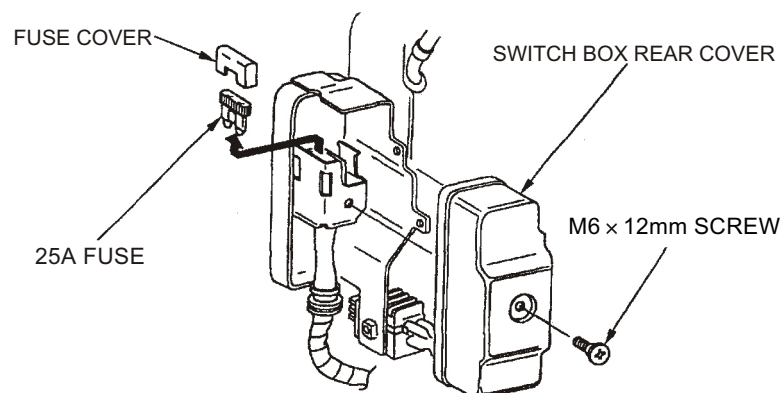
A 25A fuse is applied to protect the electric starting motor relay and battery charging circuit. The electric starting motor won't work when the fuse burns out, but the engine still can be started with recoil starter. Besides, the battery can't be charged pending the of engine under such condition.

1. Unscrew the M6 12mm screw on the rear cover of the engine switch box.
2. Remove the fuse cover and then check the fuse.

If the fuse burns out, remove the fuse cover. Pull out the damaged fuse and then mount a new 25A fuse, finally reassembling the fuse cover.

NOTICE Do not use the fuse with the rated current more than 25A. Otherwise, the electrical system will be seriously damaged or fired.

3. Tighten the M6 12mm screw after reassembled the fuse cover.



If the fuse often burns out, which indicates that the electrical system has short circuit or overload. Please take the engine to an authorized service dealer.

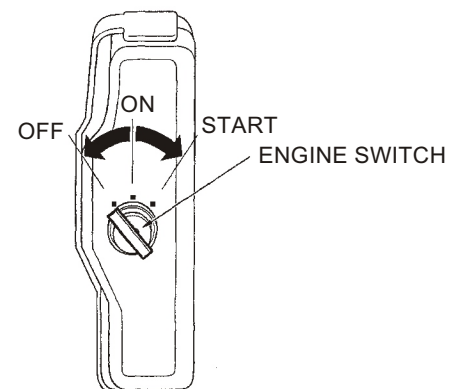
2. CONTROLS & FEATURES

CONTROLS

Engine switch

Engine switch starts and stops the ignition system. When the engine is running, the engine switch must stay at the ON position. Turn the engine switch to OFF position to stop the engine.

Turn engine switch to START position to start the engine. When released from START position, the key will return ON position automatically.



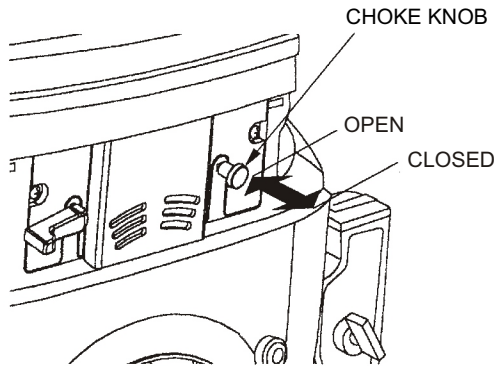
Choke Knob

The choke knob opens and closes the choke valve in the carburetor.

The CLOSED position enriches the fuel mixture for starting a cold engine.

The OPEN position provides to correct fuel mixture for operation after starting, and for restarting a warm engine.

Some engine applications use a engine-mounted choke control rather than the remote-mounted choke lever shown here. Refer to the instructions provided with the equipment powered by this engine for remote control information.

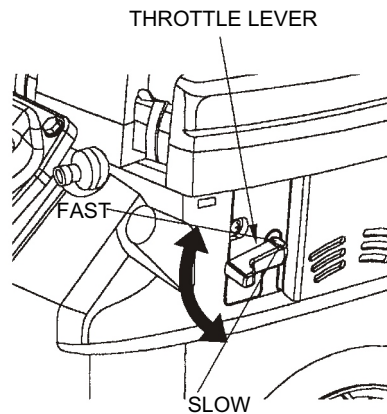


Throttle Lever

The throttle lever controls engine speed.

Moving the throttle lever in the directions shown makes the engine run faster or slower.

Some engine applications use a remotely-mounted throttle control rather than the engine-mounted throttle lever shown here. Refer to the instructions provided with the equipment powered by this engine for remote control information.



7. TAKING CARE OF UNEXPECTED PROBLEMS

ENGINE WILL NOT START	POSSIBLE CAUSE	CORRECTION
1. Check battery and fuse	Battery discharged	Recharge battery
	Fuse burnt out (if equipped)	Replace fuse
2. Check control positions	Fuel valve OFF (if equipped)	Move lever to ON
	Choke OPEN	Move lever to CLOSED unless engine is warm.
	Engine switch OFF	Turn engine switch to ON
3. Check fuel	Out of fuel	Refuel
	Bad fuel; engine stored without treating or draining gasoline. Or refueled with bad gasoline.	Drain fuel tank and carburetor. Refuel with fresh gasoline
4. Check engine oil level.	Low oil level will cause the engine to stop.	Add engine oil
5. Remove and inspect spark plugs.	Spark plugs wet with fuel (flooded engine)	Dry and reinstall spark plugs. Start engine with throttle lever in FAST position.
6. Take engine to an authorized KIPOR servicing dealer, or refer to shop manual	Fuel filter clogged, carburetor malfunction, ignition malfunction, valves stuck, etc.	Replace or repair faulty components as necessary

ENGINE LACKS POWER	POSSIBLE CAUSE	CORRECTION
1. Check air filter	Filter element(s) clogged	Clean or replace filter element(s)
2. Check fuel	Bad fuel; engine stored without treating or draining gasoline, or refueled with bad gasoline.	Drain fuel tank and carburetor. Refuel with fresh gasoline.
3. Take engine to an authorized KIPOR servicing dealer, or refer to shop manual	Fuel filter clogged, carburetor malfunction, ignition malfunction, valves stuck, etc.	Replace or repair faulty components as necessary.

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 installed, remove the battery and store it in a cool, dry place. 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 BEFORE OPERATION chapter of this manual.

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 to cool for at least 15 minutes before loading the engine-powered equipment on the transport vehicle. A hot engine and exhaust system can hurt and can ignite some materials.

Keep the engine level when transporting to reduce the possibility of fuel leakage. If the fuel tank is equipped with a fuel valve, move the fuel valve lever to OFF.

FEATURES

Oil Alert System

The Oil Alert system is designed to prevent engine damage caused by an insufficient amount of oil in the crankcase. Before the oil level in the crankcase falls below a safe limit, the Oil Alert System will automatically shut down the engine (the engine switch will remain in the ON position).

If the engine stops and will won't restart, check the engine oil level before troubleshooting in other areas.

Fuel-cut Solenoid

The engine is equipped with a fuel-cut solenoid that allows fuel to flow to the carburetor main jet when the engine switch is in the ON or START position and stops the flow of fuel to the main jet when the engine switch is in the OFF position.

The engine must be connected to the battery to energize the fuel-cut solenoid, allowing the engine to run. If the battery is disconnected, fuel flow to the carburetor main jet will stop.

Oil Cooler

The KG690 engine is equipped with an oil cooler to maintain the correct oil temperature.

3. 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 before each operation, 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

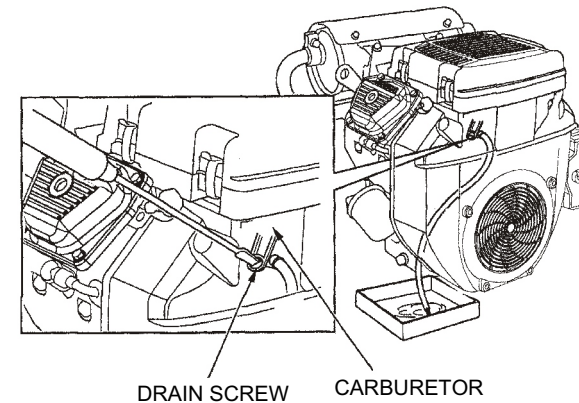
- Look around and underneath the engine for signs of oil or gasoline leaks.
- Remove any excessive dirt or debris, especially around the muffler and recoil starter.
- Look for signs of damage.
- Check that all shields and covers are in place, and all nuts, bolts, and screws are tightened.

Check the Engine

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



Engine Oil

1. Change the engine oil (See page 17)

Engine Cylinder

1. Remove the spark plugs (See page 23)
2. Pour a tablespoon (5-10cc) of clean engine oil into the cylinders.
3. Pull the starter rope several times to distribute oil in the cylinders.
4. Reinstall the spark plugs.

Storage Precautions

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 in the CLOSED or OFF position to reduce the possibility of fuel leakage.

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

The Distribute's Limited Warranty does not cover fuel system damage or engine performance problems resulting from neglected storage preparation.

You can extend fuel storage life by adding a fuel stabilizer that is formulated for that purpose, or you can avoid fuel deterioration problems by draining the fuel tank and carburetor.

ADDING A FUEL STABILIZER TO EXTEND FUEL STORAGE LIFE

When adding a fuel stabilizer, fill the fuel tank with fresh gasoline. If only partially filled, air in the tank will promote fuel deterioration during storage. If you keep a container of gasoline for refueling, be sure that it contains only fresh gasoline.

1. Add fuel stabilizer following the manufacturer's instructions.
2. After adding a fuel stabilizer, run the engine outdoors for 10 minutes to be sure that treated gasoline has replaced the untreated gasoline in the carburetor.
3. Stop the engine, and if the fuel tank is equipped with a fuel valve, move the fuel valve to the CLOSED or OFF position.

DRAINING THE FUEL TANK AND CARBURETOR

1. Disconnect the fuel line to the engine, and drain the fuel tank into an approved gasoline container. If the fuel tank is equipped with a valve, turn the fuel valve to the OPEN or ON position to enable draining. After draining is completed, reconnect the fuel line.
2. Loosen the carburetor drain screw, and drain the carburetor into an approved gasoline container. After draining is completed, tighten the carburetor drain screw.

⚠ WARNING

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

- Keep heat, sparks and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

4. OPERATION

SAFE OPERATION PRECAUTIONS

Before operating the engine for the first time, please 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.

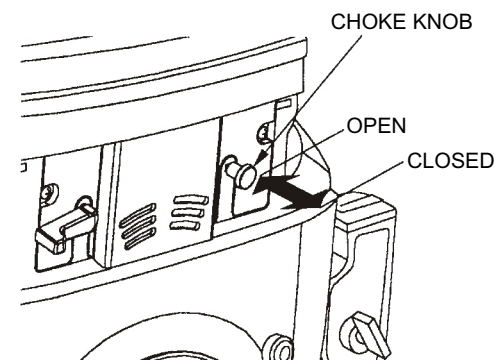
⚠ WARNING

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.

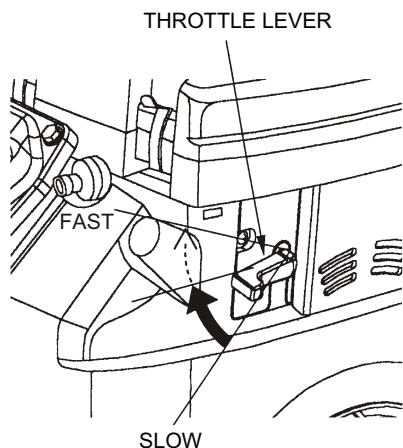
STARTING THE ENGINE

1. If the fuel tank is equipped with a valve, be sure the fuel valve is in the OPEN or ON position before attempting to start the engine.
2. To start a cold engine, pull the choke lever to the CLOSED position. To restart a warm engine, leave the choke lever in the OPEN position. Some engine applications use an engine-mounted choke control rather than the remote-mounted choke lever shown here. Refer to the instructions provided with the equipment powered by this engine for remote control information.

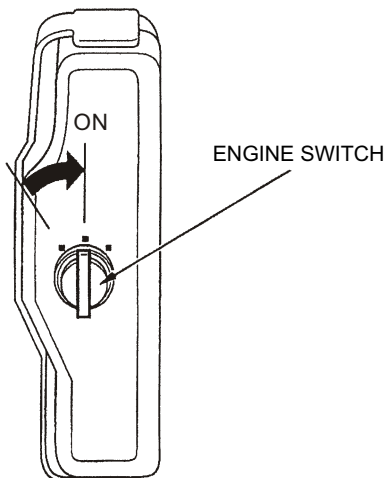


3. Move the throttle lever away from the SLOW position, about 1/3 of the way toward the FAST position.

Some engine applications use an engine-mounted throttle control rather than the remote-mounted throttle lever shown here. Refer to the instructions provided with the equipment powered by this engine for remote control information.



4. Turn the engine switch to the ON position.



6. HELPFUL TIPS & SUGGESTIONS

STORING YOUR ENGINE

Storage Preparation

Proper storage preparation is essential for keeping your engine troublefree 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 to start easier when you use it again.

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.

! NOTICE

- 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 cleaning.

Fuel

Gasoline will oxidize and deteriorate in storage. Old gasoline will cause hard starting, and it leaves gum deposits that clog the fuel system. If the gasoline in your engine deteriorates during storage, you may need to have the carburetor and other fuel system components serviced or replaced.

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. Fuel deterioration problems may occur within a few months, or even less if the gasoline was not fresh when you filled the fuel tank.

6. After the spark plug seats, tighten with a 13-16-inch spark plug wrench to compress the washer.

If reinstalling the used spark plug, 1/8-1/4 turn after the spark plug seats.

If installing a new spark plug tighten 1/2 turn after the spark plug seats.

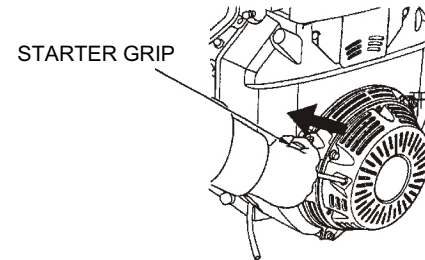
NOTICE A loose spark plug can overheat and damage the engine. Overtightening the spark plug can damage the threads in the cylinder head.

7. Attach the spark plug caps.

5. Operate the starter

RECOIL STARTER

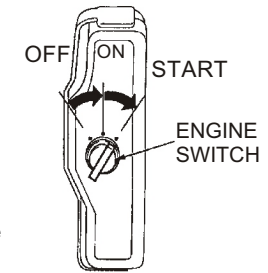
Pull the starter grip lightly until you feel resistance, then pull briskly. Return the starter grip gently.



ELECTRIC STARTER

Turn the key to the START position, and hold it there until the engine starts.

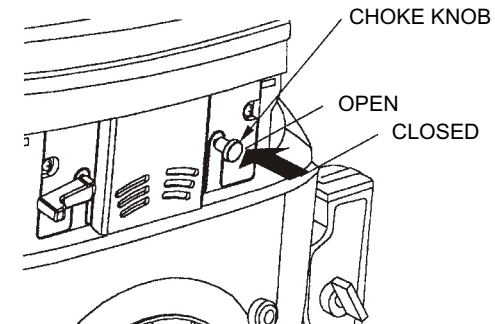
If the engine fails to start within 5 seconds, release the key, and wait at least 10 seconds before operating the starter again.



NOTICE Using the electric starter for more than 5 seconds at a time will overheat the starter motor and can damage it.

When the engine starts, release the key, allowing it to return to the ON position.

6. If the choke knob has been pulled to the CLOSED position to start the engine, gradually push it to the OPEN position as the engine warms up.

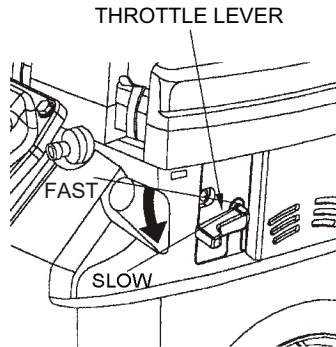


STOPPING THE ENGINE

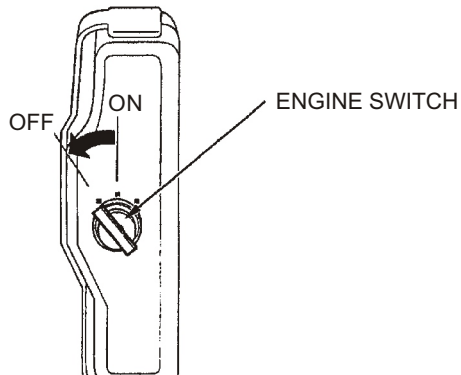
To stop the engine in an emergency, simply turn the engine switch to the OFF position. Under normal conditions, use the following procedure.

1. Move the throttle lever to the SLOW position.

Some engine applications use a remote-mounted throttle control rather than the engine-mounted throttle lever shown here. Refer to the instructions provided with the equipment powered by this engine for remote control information.



2. Turn the engine switch to the OFF position.



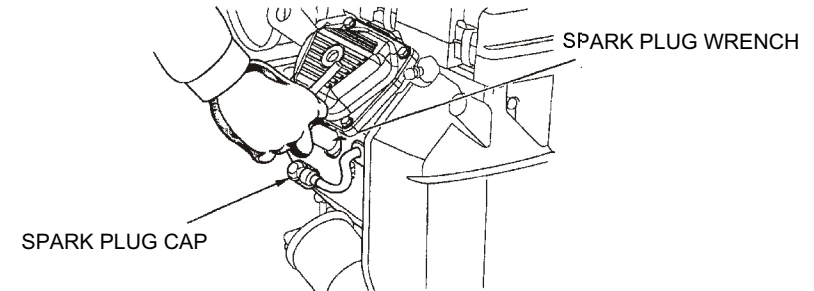
3. If the fuel tank is equipped with a valve, turn the fuel valve to the CLOSED or OFF position.

SPARK PLUG SERVICE

Recommended spark plugs: F6RTC

NOTICE Incorrect spark plugs can cause engine damage.

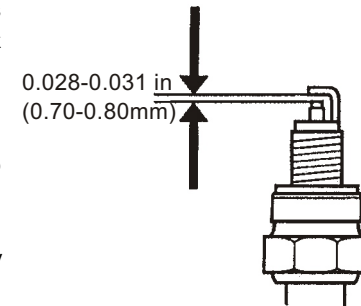
1. Disconnect the spark plug caps, and remove any dirt from around the spark plug area.
2. Remove the spark plugs with a 13/16-inch spark plug wrench.



3. Inspect the spark plug. Replace it if the electrode is worn, or if the insulator is cracked or chipped. Clean the spark plug with a wire brush if you are going to reuse it.

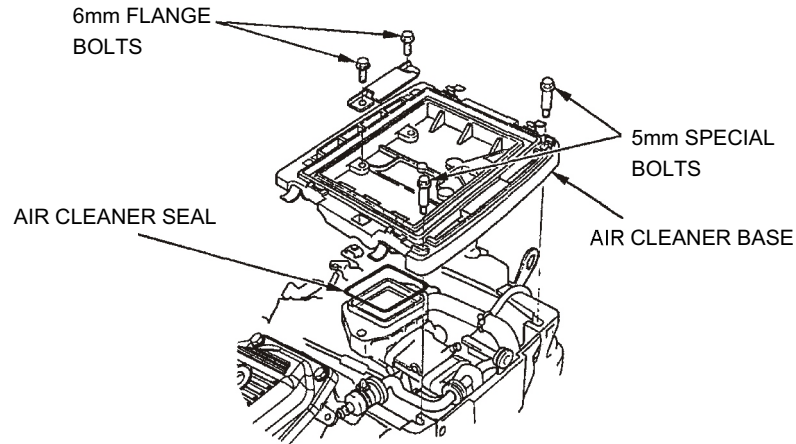
4. Measure the spark plug electrode gap with a suitable gauge. The gap should be 0.028-0.031 in (0.70-0.80mm). Correct the gap, if necessary, by carefully bending the side electrode).

5. Install the spark plug carefully, by hand, to avoid cross-threading.

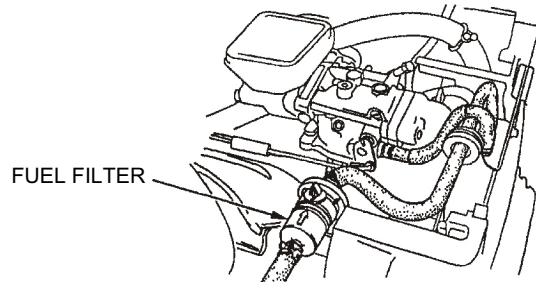


FUEL FILTER INSPECTION

1. Remove the air cleaner cover and the paper filter elements.
2. Remove two 6mm bolts and two 5mm special bolts, and then remove the air cleaner cap from the air cleaner cover.
3. Remove the fuel filter clamped behind the air cleaner base.



4. Check the fuel filter for water accumulation or sediment. If no water or sediment is found, reinstall the air cleaner base and the fuel filter.



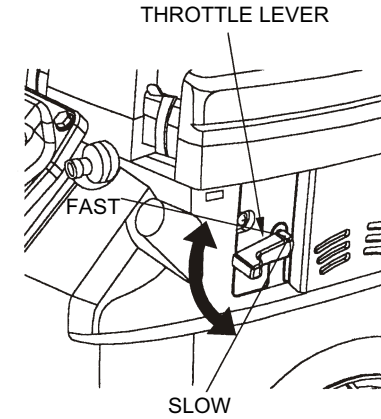
5. If the fuel filter is found with excessive water accumulation or sediment, take the engine to your authorized KIPOR servicing dealer.

SETTING ENGINE SPEED

Position the throttle lever for the desired engine speed.

Some engine applications use a remotely mounted throttle control rather than the engine mounted throttle lever shown here.

For engine speed recommendations, refer to the instructions provided with the equipment powered by this engine.



Do not disconnect the battery from the engine while the engine is running. Disconnecting the battery causes the fuel-cut solenoid to shut off the flow of fuel to the carburetor main jet, and the engine will stop.

5. SERVICING YOUR KIPOR ENGINE

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 KIPOR 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, replacement or repair of emission control devices and systems may be done by any engine repair establishment or individual, using parts that are "certified" to EPA standards.

5. Clean the air cleaner elements if they are to be reused.

Paper air cleaner element: Tap the filter element several times on a hard surface to remove dirt, or blow compressed air [not exceeding 30 psi (207 kPa, 2.1 kgf/cm²)] through the filter element from the clean side that faces the engine. Never try to brush off dirt: brushing will force dirt into the fibers. Replace the paper filter element if it is excessively dirty.

Foam filter element: Clean in warm soapy water, rinse, and allow to dry thoroughly. Or clean in nonflammable solvent and allow to dry. Do not put oil on the foam element.

6. Wipe dirt from the inside of the air cleaner base and cover, using a moist rag. Be careful to prevent dirt from entering the clean chamber that leads to the carburetor.
7. Place the foam air cleaner element in the air cleaner cover, then reinstall the paper air cleaner element and cover to the air cleaner base. Hook four spring tabs securely.

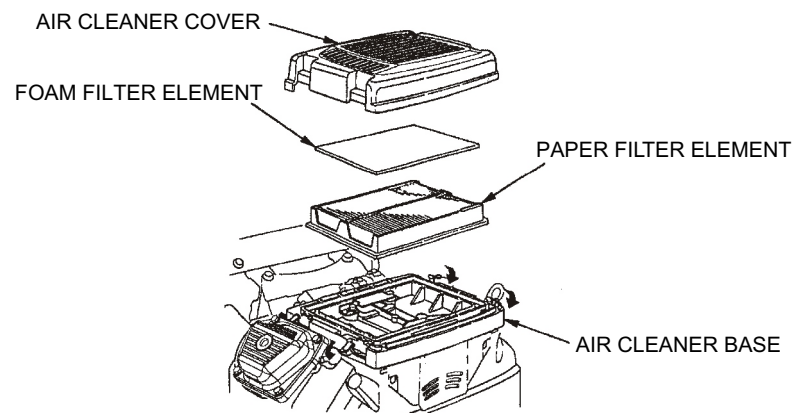
AIR CLEANER SERVICE

A dirty air filter will restrict air flow to the carburetor, reducing engine performance. If you operate the engine in very dust areas, clean the air filter more often than specified in the MAINTENANCE SCHEDULE.

NOTICE

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.

1. Release four latch tabs from the air cleaner cover, and remove the cover.
2. Remove the foam filter from the cover.
3. Remove the paper filter from the air cleaner case.



4. Inspect both air cleaner elements, and replace them if they are damaged. Always replace the paper air cleaner element at the scheduled interval.

MAINTENANCE SAFETY

Some of the most important safety precautions as follow. 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.

WARNING

Failure to properly follow maintenance instructions and precautions can cause you to be seriously hurt or killed.

Always follow the procedures and precautions in the owner's manual.

Safety Precautions

- Make sure the engine is off before you begin any maintenance or repairs. This will eliminate several potential hazards:
 - **Carbon 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.
- Read the instructions before you begin, and make sure you have the tools and skills required.
- 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 KIPOR parts or their equivalents for repair and replacement.

MAINTENANCE SCHEDULE

REGULAR SERVICE PERIOD(3)ITEM Perform at every indicated month		Each use	First month or 20 Hrs.	Every 3 months or 50 Hrs.	Every 6 months or 100 Hrs.	Each year or 300 Hrs.
● Engine oil	Check	○				
	Replace		○		○	
● Engine oil filter	Replace					Every 200 Hrs.(2)
● Air filter	Check	○				
	Clean			○(1)		
	Replace					○*
● Spark plug	Clean-Adjust				○	
	Replace					○
● Spark arrester (optional part)	Clean				○	
● Idle speed	Check-Adjust					○(2)
● Valve clearance	Check-Readjust					○(2)
● Combustion chamber	Clean	After every 500 Hrs.(2)				
● Fuel filter	Clean				○	
	Replace					○(2)
● Fuel tank	Clean	Every Years(2)				
● Fuel tube	Check	Every 2 years (Replace if necessary) (2)				

■ Emission-related items.

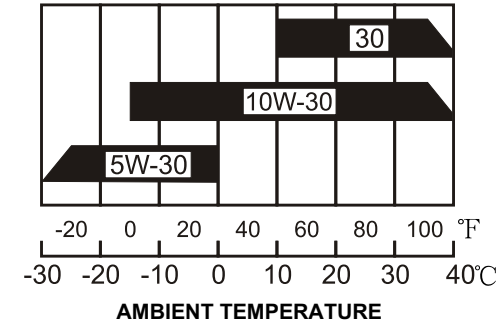
* Replace the paper air filter element only.

- (1) Service more frequently when used in dusty areas.
- (2) These items should be serviced by your servicing dealer, unless you have the proper tools and are mechanically proficient. Refer to the KIPOR shop manual for service procedures.
- (3) For commercial use, log hours of operation to determine proper maintenance intervals.

ENGINE OIL RECOMMENDATIONS

Oil is a major factor affecting performance and service life.

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.

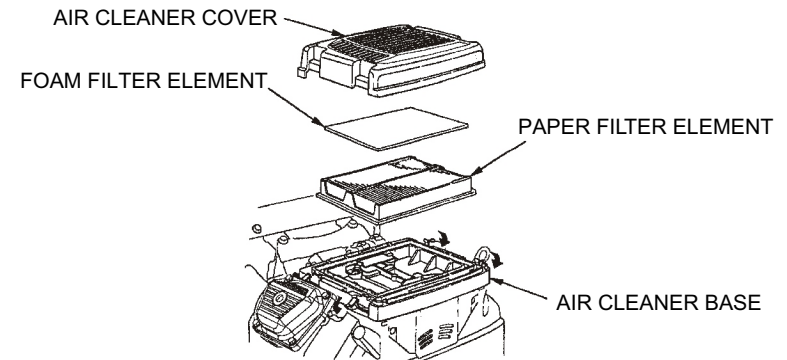


The SAE oil viscosity and service classification are in the API label on the oil container. KIPOR recommends that you use API SERVICE category SJ oil.

AIR FILTER INSPECTION

Remove the air cleaner cover and inspect the filter elements. Clean or replace dirty filter elements. Always replace damaged filter elements.

Refer to instructions that supply to the air cleaner and filter service.

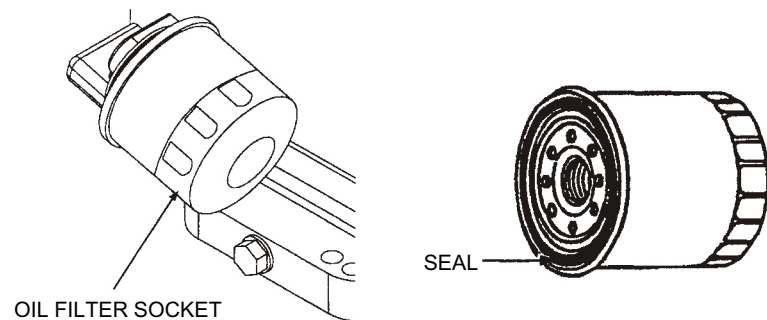


OIL FILTER CHANGE

1. Drain the engine oil, and retighten the drain bolt securely.
2. Remove the oil filter with oil filter wrench, and drain the remaining oil into a suitable container. Discard the used oil filter.

NOTICE

Use an oil filter socket, rather than an end wrench, to avoid striking and damaging the oil pressure switch.



3. Clean the filter mounting base, and coat the seal of the new oil filter with clean engine oil.

NOTICE

Use only a genuine KIPOR oil filter or a filter of equivalent quality specified for your model. Using the wrong filter, or a non-KIPOR filter which is not of equivalent quality, may cause engine damage.

4. Screw on the new oil filter by hand until the seal contacts the filter mounting base, then use an oil filter wrench to tighten the filter an additional 7/8 turn.
Oil filter tightening torque: 16 lbf-ft (22 N-m, 2.2Kgf-m)
5. Refill the crankcase with the specified amount of the recommended oil. Reinstall the oil filler cap/dipstick.
6. Start the engine, and check for leaks.
7. Stop the engine, and check the oil level. If necessary, add oil to bring the oil level to the upper limit mark on the dipstick.

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 "pining" (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 KIPOR servicing dealer.

NOTICE

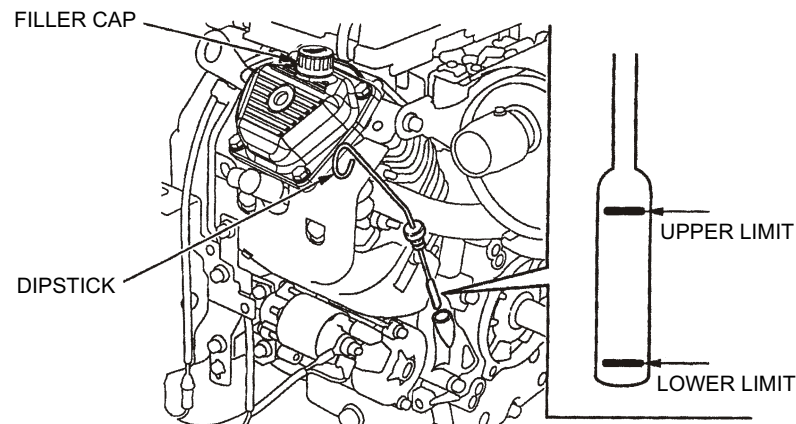
Running the engine with persistent spark knock or pinging can cause engine damage.

Running the engine with persistent spark knock or pinging is 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. Place the engine horizontally on a level surface.
2. Start the engine and let it idle for 1 for 2 minutes. Stop the engine and wait for 2 or 3 minutes.
3. Remove the dipstick and wipe it clean.
4. Insert and remove the dipstick without screwing it into the oil filler neck. Check the oil level shown on the dipstick.
5. If the oil level is near or below the lower limit mark on the dipstick, fill with the recommended oil to the upper limit mark.
6. Reinstall the oil filler cap/dipstick.



⚠ NOTICE

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

The Oil Alert system will automatically stop the engine before the oil level falls below safe limit. However, to avoid the inconvenience of an unexpected shutdown, it is still advisable to visually inspect the oil level regularly.

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, then remove the filler cap/dipstick and the drain bolt.
2. Allow the used oil to drain completely, then reinstall the drain bolt, and tighten it securely.

Please dispose of used motor oil in a manner that is compatible with the environment. We suggest you take used oil in a sealed container to your local recycling centre of 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 upper limit mark on the dipstick with the recommended oil.

Engine oil refill capacities

Without oil filter replacement: About 1.1L

With oil filter replacement: About 1.4L

⚠ NOTICE

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

The Oil Alert system will automatically stop the engine before the oil level falls below the safe limit. However, to avoid the inconvenience of an unexpected shutdown, it is still advisable to visually inspect the oil level regularly.

4. Reinstall the filler cap/dipstick securely.

