KIPOR®

KIPOR POWER

OPERATION MANUAL

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

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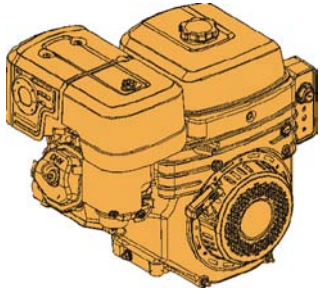


GASOLINE ENGINE

GK170
GK205
GK205S
GK280A
GK400
GK400S

Version 1, Printing date 25/11/2009

Preface

Your safety and the safety of others are very important. Using the engine safely is an important responsibility.

To help you make informed decisions about safety, we have provided operating 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 Labelson the engine

■ Safety messagespreceded 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 SERIOUS HURT if you don't follow instructions.
⚠ WARNING	You CAN be KILLED or SERIOUS HURT if you don't follow instructions
⚠ CAUTION	You CAN be HURT if you don't follow instructions.

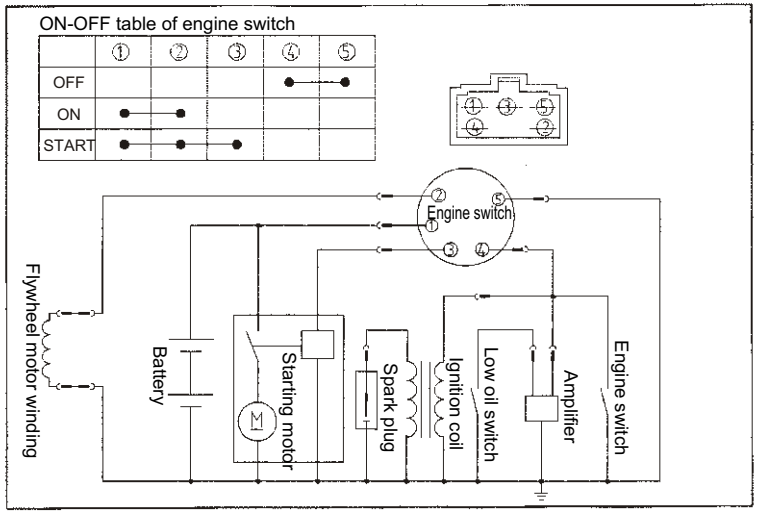
■ Safety Headings: such as IMPORTANT SAFETY INFORMATION.

■ Safety Sections: such as ENGINE SAFETY.

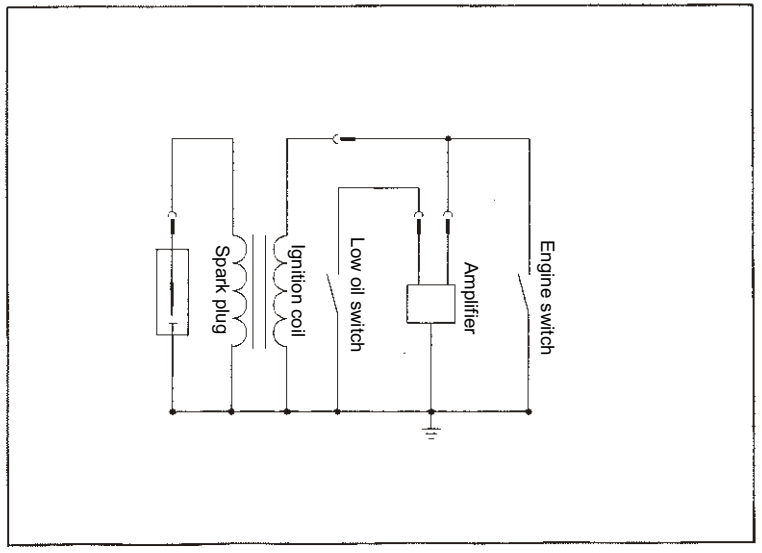
■ Instructions: how to use this engine correctly and safety.

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

Wiring diagram-1 (electric starter)



Wiring diagram-2 (recoil starter)



8.3 Specifications

GK170/GK205/GK205S

	GK170	GK205	GK205S
Overall dimension L × W × H (mm)	305×355×345		
Net weight (kg)	16.5		
Engine type	Single cylinder, air-cooled, 4-stroke, OHV		
Displacement (cm^3)	168.3	201.9	194.4
Bore × Stroke (mm)	69×45	69×54	69×52
Max. output [kW/(r/min)]	3.3/3600	4/3600	4/1800
Fuel consumption g/(kW • h)	395		
Ignition system	TCI		
PTO shaft rotation	Counterclockwise		

GK280A/GK400/GK400S

	GK280A	GK400	GK400S
Overall dimension L × W × H (mm)	380×345×416	453 × 380 × 447 (electric starter: 499 × 380 × 447)	
Net weight (kg)	25	33 (electric starter: 36)	
Engine type	Single cylinder, air-cooled, 4-stroke, OHV		
Displacement (cm^3)	277	398.1	373.2
Bore × Stroke (mm)	78×58	89×64	89×60
Max. output [kW/(r/min)]	5.5/3600	7.7/3600	7.7/1800
Fuel consumption g/(kW • h)	374		
Ignition system	TCI		
PTO shaft rotation	Counterclockwise		

GK170/GK205/GK205S/GK280A/GK400/GK400S gap

Item	Specifications	Adjustment
Spark plug gap	0.7-0.8mm	
Valve clearance	IN:0.10 ± 0.02mm (cold) EX:0.15 × 0.02mm (cold)	See your authorized dealer
Other specifications	No other adjustment needed	

CONTENTS

8. TECHNICAL INFORMATION

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_____

8.1 Battery connections for electric starter

Use a 12-volt battery with an ampere-hour rating of at lease 18Ah.

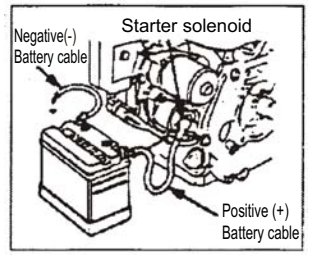
Be careful not to connect the battery in reverse polarity, as this will short circuit the battery charging system. Always connect the positive (+) battery cable, so your tools cannot cause a short circuit if they touch a grounded part while tightening the positive (+) battery cable end.

⚠ 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 batter 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 wire ends with grease.

8.2 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 1800 meters, have you servicing dealer perform this carburetor modification.

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

7. UNEXPECTED INFORMATION

Engine Will Not Start	Possible Cause.	Correction
1. QAE2 electric starting: Check battery and fuse.	Battery discharged.	Recharge battery:
	Fuse burnt out.	Replace fuse.
2. Check control positions.	Fuel valve OFF.	Move lever to ON.
	Choke OPEN.	Move lever to CLOSED
	Engine switch OFF.	Unless engine is warm.
3. Check fuel	Out of fuel.	Turn engine switch to ON.
	Bad fuel: engine stored without treating or draining gasoline. Or refueled with bad gasoline.	Refuel Drain fuel tank and carburetor. Refuel with fresh gasoline.
4. Remove and inspect spark plug.	Spark plug faulty, fouled, or improperly gapped.	Clean, gap, or replace spark plug.
	Spark plug wet with fuel (flooded engine)	Dry and reinstall spark plug. Start engine with throttle lever in FAST position.
5. Take engine to an authorized servicing dealer, or refer to shop manual.	Fuel cleaner clogged, carburetor malfunction, ignition malfunction, valves stuck, etc.	Replace or repair faulty components as necessary.

Engine lacks power	Possible Cause	Correction
1. Check air cleaner.	Cleaner element(s) clogged.	Clean or replace cleaner element(s)
2. Check fuel.	Bad fuel; engine stored without; did not add stabilizer or add the worst of the oil.	Drain fuel tank and carburetor. Refuel with fresh gasoline.
3. Take engine to an authorized servicing dealer, or refer to shop manual.	Fuel filter clogged, carburetor malfunction, ignition malfunction, valves stuck, etc.	Replace or repair faulty components as necessary

1. ENGINE SAFETY

1.1 Important safety information

Most accidents with engine 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 responsibility:

Our 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 the 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 hazards:

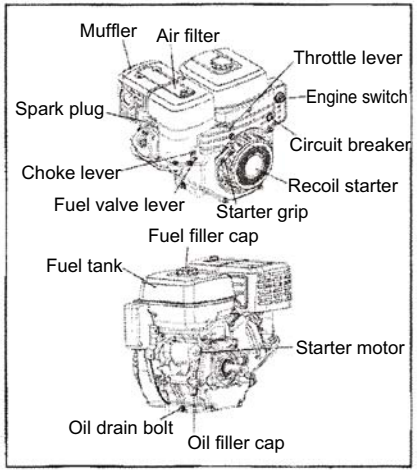
Exhaust gas contains poisonous carbon monoxide. Avoid inhalation of exhaust gas. Never run the engine in closed garage or confined area.

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.

2. CONTROLS AND FEATURES

2.1 Component & Control locations



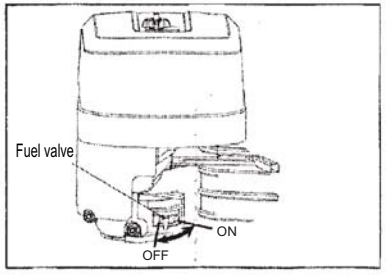
2.2 Controls

2.2.1 Fuel valve:

The fuel valve opens and closes the connection between the fuel tank and the carburetor.

The fuel valve level must be in ON position for the engine to run.

When the engine is not in use, leave the fuel valve level in the OFF position to prevent carburetor flooding and to reduce the possibility of fuel 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 plastic sheet 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.

6.6 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.

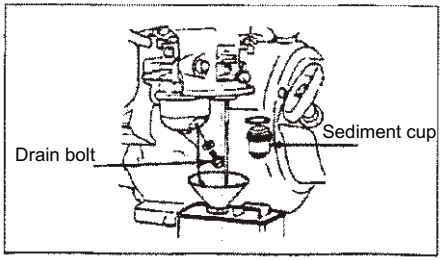
If you keep a container of gasoline for refueling, be sure that it contains only fresh gasoline. Gasoline oxidizes and deteriorates over time, causing hard starting.

If the cylinder was coated with oil during storage preparation, the engine may smoke briefly at start up. This is normal.

6.7 Transport

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.



3. After all the fuel has drained into the carburetor, reinstall the drain bolt and sediment cup. Tighten them securely.

6.4 Engine oil

1. Change the engine oil
2. Remove the spark plug
3. Pour a tablespoon of clean engine oil into the cylinder
4. Pull the starter rope for several times to distribute the oil in the cylinder
5. Reinstall the spark plug
6. Pull the starter rope slowly until resistance is felt. This will close the valves so moisture can not enter the engine cylinder. Return the starter rope gently.

6.5 Storage precautions

If your engine will be stored with gasoline in the fuel or 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 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 area 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 OFF position to reduce the possibility of fuel leakage.

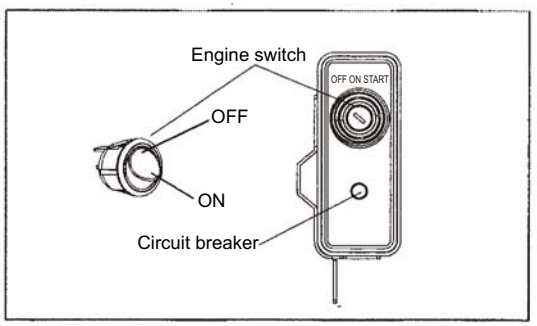
Place the engine on the level ground. Tilting can cause fuel or oil leakage.

2.2.2 Engine switch

The engine switch enables and disables the ignition system.

Turn the engine switch to ON position to run the engine.

Turn the engine switch to OFF position to stop the engine.



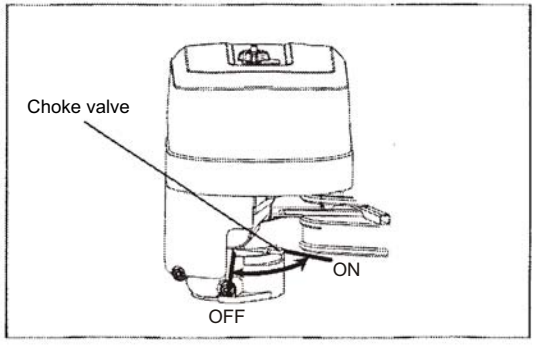
2.2.3 Choke lever

The choke lever opens or closes the choke valve in the carburetor.

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

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

Some engine applies the remotely-mounted choke control instead of the engine-mounted choke lever.

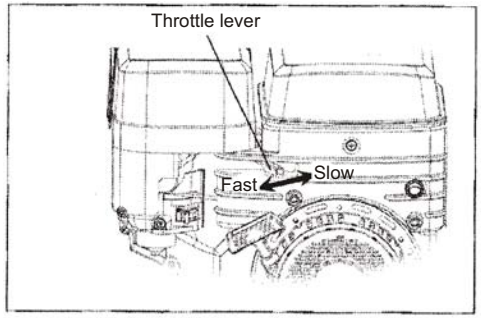


2.2.4 Throttle lever

The throttle lever controls engine speed.

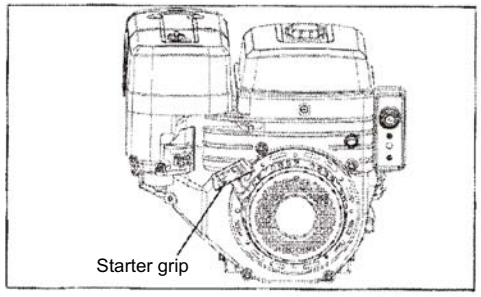
Move the throttle lever to regulate the engine speed.

Some engine applies the remotely-mounted throttle control instead of the engine-mounted throttle lever.



2.2.5 Recoil starter grip

Pulling the starter grip operates the recoil starter to crank the engine.



2.3 Features

2.3.1 Oil alert system

The oil alert system is designed to prevent engine damage caused by insufficient oil in the crankcase. Before the oil lever falls below a safe limit, the oil alert system will automatically stop the engine (the engine switch will remain in ON position).

If the engine stops and fails to restart, check the engine oil lever.

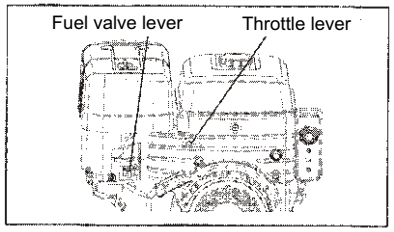
The Distributor's Limited Warranty does not cover fuel system damage or engine performance problems resulting from neglected storage preparation.

You can extend the 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.

6.2 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 move the throttle lever to OFF position.



6.3 Draining the fuel tank and carburetor

1. Place an approved gasoline container below the carburetor, and use a funnel to avoid spilling fuel.
2. Remove the carburetor drain bolt and sediment cup, then move the throttle lever to ON position.

⚠ NOTICE

- Gasoline is highly flammable and explosive.
- You can be burned or seriously injured when handling fuel.
- Keep heat, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

6. HELPFUL TIPS & SUGGESTIONS

6.1 Store the engine

6.1.1 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 easier to start when you use it again.

6.1.2 Cleaning

If the engine has bee 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 cleaner, and water that passes through the air cleaner or muffler can enter into 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.

6.1.3 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 or carburetor without causing functional problems will vary with such factors as gasoline blend, your storage temperature, and whether the fuel tank is partially or completely filled. The air in a partially filled tank promotes fuel deterioration. Very warm storage temperature accelerates 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.

3. PRE-CHECKS BEFORE RUNNING THE ENGINE

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 problems you find, or have your servicing dealer correct it.

⚠ WARNING

■ Improperly maintaining this engine, or failing to correct the problem before operation, could cause a malfunction in which you could be seriously injured.

■ Always perform a pre-operation inspection before each operation, and correct the problems.

■ Before beginning your pre-operation check, 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 will automatically stop the engine before the oil level falls below the 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.

4. RUNNING THE ENGINE

4.1 Safe operating precautions

Before operating the engine for the first time, please review the important safety information and the chapter “Pre-checks before running the engine”.

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

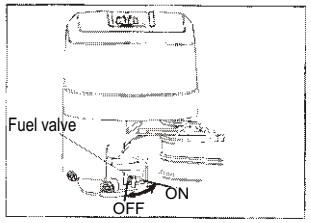
⚠ WARNING

■ Carbon monoxide is toxic. Breathing it can cause unconsciousness or even kill you.

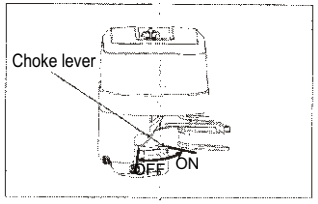
■ Avoid any areas or actions that expose you to carbon monoxide.

4.2 Starting the engine

4.2.1 Turn the fuel valve lever to ON position.



4.2.2 To start a cold engine, turn the choke lever to the OFF position. To restart a warm engine, leave the choke lever in the ON position.

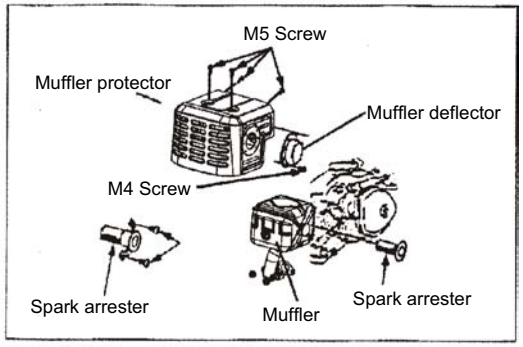


Some engine applies the remotely-mounted choke control instead of the engine-mounted choke lever.

1. Remove the two M8 nuts and muffler from the cylinder.

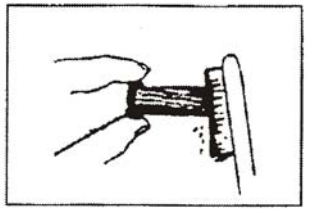
2. Remove the four M5 screw and one M6 screw from the muffler protector, and remove the muffler protector.

3. Remove the M4 screw from the spark arrester, and remove the spark arrester.



4. Use a brush to remove the carbon deposits from the spark arrester screen. Be careful to avoid damaging the screen.

The spark arrester must be free of breaks and holes. Replace the spark arrester if it is damaged.



5. Install the spark arrester, muffler protector and muffler in the reverse order of disassembly.

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

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

If reinstalling the used spark plug, tighten 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 cover.

7. Reinstall the spark plug cup.

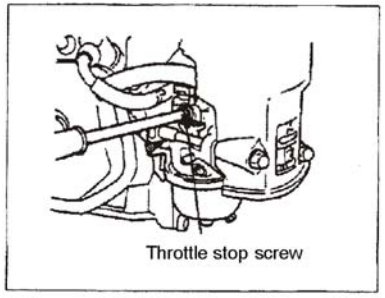
5.12 Idle adjustment

1. Start the engine outdoors, and allow it to warm up to operating temperature.

2. Move the throttle lever to the slowest position.

3. Adjust the throttle stop screw to obtain the standard idle speed.

Standard idle speed: 1440±140 r/min



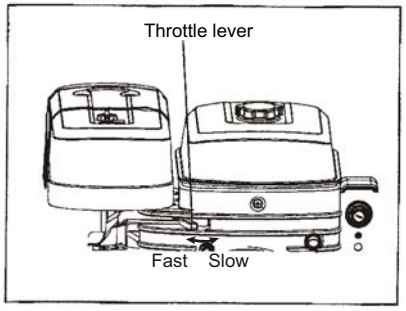
5.13 Service spark arrester (optional parts)

Your engine is not factory-equipped with a spark arrester. In some area, it is illegal to operate an engine without a spark arrester. Check local laws and regulations. A spark arrester is available from authorized serving dealers.

The spark arrester must be serviced every 100 hours to keep it functioning as designed.

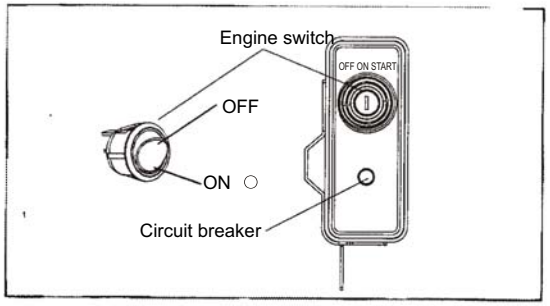
If the engine has been running, the muffler will be very hot. Allow the muffler to cool before servicing the spark arrester.

4.2.3 Turn the throttle lever away from SLOW position, about 1/3 of the way towards the FAST position.



Some engine applies the remotely-mounted throttle control instead of the engine-mounted throttle lever.

4.2.4 Turn the engine switch to the ON position.



4.2.5 Operate the starter:

Recoil starter (all engine types):

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

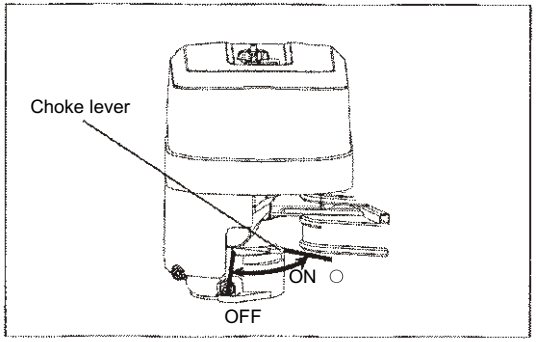
Electric starter:

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.

⚠ NOTIC

■ 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.

4.2.6 To start the engine, gradually move the choke lever to the ON position as the engine warms up.



4.3 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 procedures:

1. Turn the throttle lever to SLOW position.

Some engine applies the remotely-mounted throttle control instead of the engine-mounted throttle lever.

2. Turn the engine switch to OFF position.
3. Turn the fuel valve lever to OFF position.

4.4 Set the engine speed

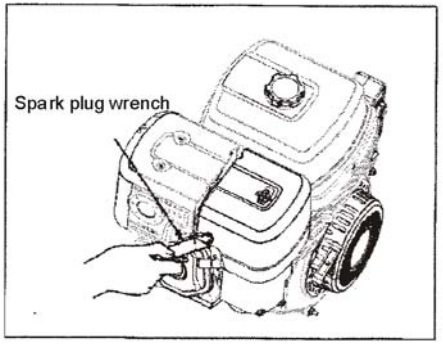
Position the throttle lever for the desired engine speed. Some engine applies the remotely-mounted throttle control instead of engine-mounted throttle lever. For engine speed recommendations, refer to the instructions provided with the equipment powered by this engine.

5.11 Service spark plug

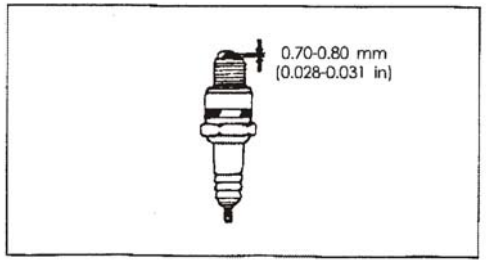
⚠ NOTICE

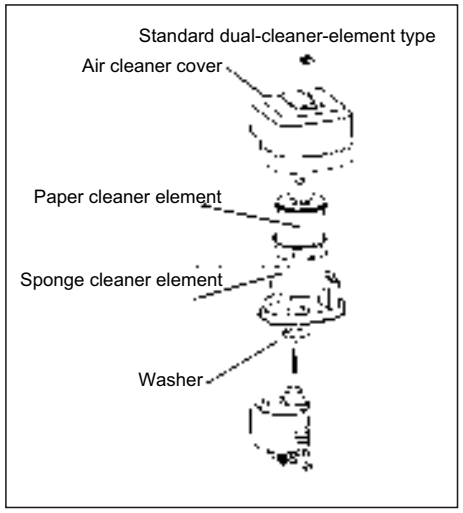
■ Incorrect spark plug will cause engine damage

1. Disconnect the spark plug cap, and clean off any dirt from around the spark plug area.
2. Remove the spark plug with a 13/16-inch spark plug wrench.



3. Inspect the spark plug. Replace it if the electrodes are worn or if the insulator is cracked. 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 0.70-0.80mm. correct the gap, if necessary, be carefully bending the side electrode.





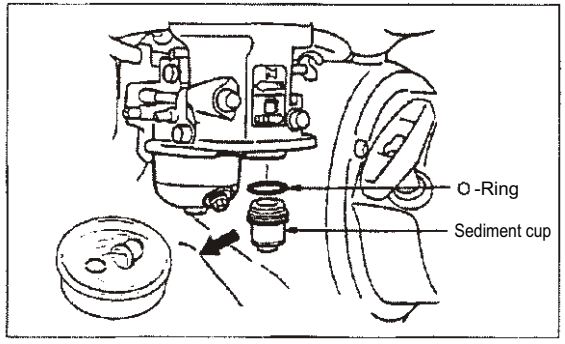
5.10 Clean the sediment cup

1. Move the fuel valve to OFF position, then remove the fuel sediment cup and O-ring.

2. Wash the sediment cup and O-ring in nonflammable solvent, and dry them thoroughly.

3. Place the O-ring in the fuel valve, and install the sediment cup. Tighten the sediment cup securely.

4. Move the fuel valve to ON position, and check for leaks.



5. SERVICE THE ENGINE

5.1 Importance of service

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

⚠ WARNING

■ Improperly maintaining this engine, or failure to correct a problem before operation, can cause a malfunction in which you would 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 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 unusual wet or dusty conditions, consult your servicing dealer for recommendations applicable to your individual needs and use.

5.2 Service safety information

Some of the most important safety precautions follow. However, we can not 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 precautions and procedures in the owner's manual.

5.2.1 Safety precautions

Make sure the engine is off before you begin any maintenance or repairs. This eliminates 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.

1. Read the instructions before you begin, and make sure you have the tools and skills required.

2. 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.

5.3 Service schedule

Item / Regular service period(3)			Each use	First month or 20 hrs	Every 3 months or 50 hrs	Every 6 months or 100 hrs	Every year or 300 hrs
●	Engine oil	Check level	○				
		Replace		○		○	
●	Air filter	Check	○				
		Clean			○(1)		
		Replace					○*
●	Sediment cup	Clean				○	
●	Spark plug	Clean - adjust				○	
		Replace					○
●	Spark arrester	Clean				○	
●	Idle speed	Clean - adjust					○(2)
●	Valve clearance	Clean - adjust					○(2)
●	Fuel tank	Clean					○(2)
●	Fuel line	Check					

Remarks: “●” Emission-related items.

“*” Replace the paper air filter element only

Standard dual-filter-element type: every year or 300 hours.

(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 shop manual for service procedures.

(3) For commercial use, log hours of operation to determine proper maintenance intervals.

5.9 Service the air filter

A dirty cleaner will restrict air flow to carburetor, reducing the engine performance. If you operate the engine in very dusty areas, clean the air cleaner more often than specified in the Maintenance Schedule.

⚠ NOTICE

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

5.9.1 Dual-element type:

1. Remove the tighten nut from the air cleaner cover and remove the cover.
2. Remove the wing nut from the air cleaner and remove the c.
3. Remove the sponge cleaner element from the paper cleaner.
4. Inspect both air cleaner element, and replace them if they are damaged. Always replace the paper cleaner element at the scheduled interval.
5. Clean the air cleaner element if they are to be reused.

Paper air cleaner element: Tap the element several times on a hard surface to remove dirt, or blow compressed air (not exceeding 207kPa) through the element from the inside. Never try to brush off dirt, brushing will force dirt into the fibers.

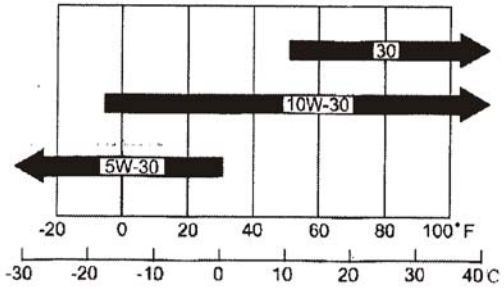
Sponge cleaner element: Clean in warm soapy water, and allow to dry thoroughly. Or clean in nonflammable solvent and allow to dry. Dip the element in clean engine oil, then squeeze out all excess oil. The engine will smoke when starter if too much oil is left in the sponge.

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 air duct that leads to the carburetor.
7. Place the sponge cleaner element over the paper element, and reinstall the assembled air cleaner. Be sure that the gasket is in place beneath the air cleaner. Tighten the air cleaner wing nut securely.
8. Install the air cleaner cover and tighten the cover tighten nut securely.

5.7 Engine oil specifications

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

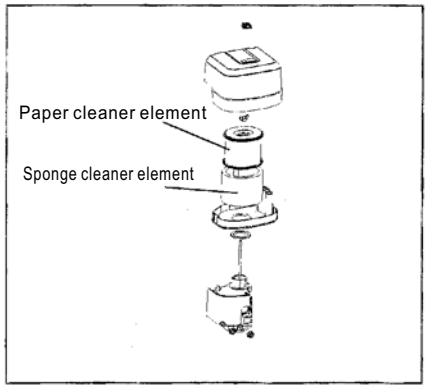
SAE 10W-30 is recommended for general use. Other viscosities shown in the chart may be used when the average temperature in your area is within the recommended range.



The SAE oil viscosity and service classification are in the API label on the oil container. We recommend that you use API SF or SG oil.

5.8 Check the air filter

Remove the air filter cover and check and air filter. Clean or replace the dirty cleaner elements. Always replace the damaged cleaner filter. If the cleaner element is damaged, replace it immediately.



5.4 Refueling

Fuel tank capacity:

GK170, GK205: 3.6L GK280A: 6L GK400: 6.5L

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

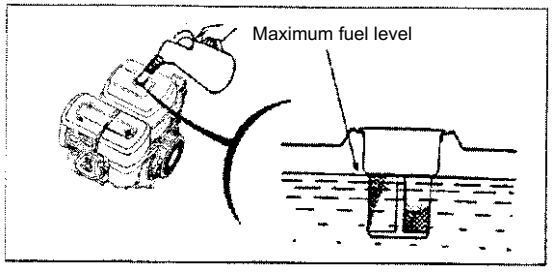
⚠ WARNING

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

■ Stop the engine and keep heats, 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.

⚠ NOTICE

■ 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 90 or higher.

These engines are certified to operate on unleaded gasoline. Unleaded gasoline produces fewer 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.

⚠ 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.

5.5 Check engine oil level

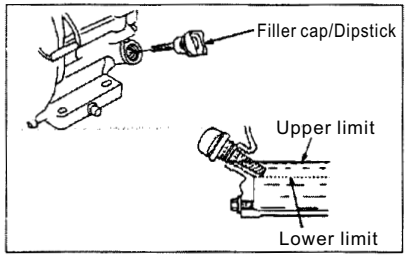
Check the engine oil level with the engine stopped and in a level position.

1. Remove the dipstick and wipe it clean.

2. Insert the dipstick without screwing it into the filter 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 dipstick securely.



⚠ 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 safe limits. However, to avoid the inconvenience of an unexpected shutdown, always check the engine oil level before startup.

5.6 Replace the engine oil

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

1. Place a suitable container below the engine to catch the used oil, then remove the dipstick and the drain plug.

2. Allow the used oil to drain completely, then reinstall the drain plug, and tighten it securely.

3. Please dispose the used oil in a manner that is compatible with the environment. We suggest you take the 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.

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

Engine oil capacity: GK170, GK205: 0.6L GK280A、GK400：1.1L

⚠ 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 safe limits. However, to avoid the inconvenience of an unexpected shutdown, always check the engine oil level regularly.

5. Screw in the dipstick securely