

SAFETY AWARENESS

Whenever you see the symbols shown below, heed their instructions! Always follow safe operating and maintenance practices.

WARNING

This warning symbol identifies special instructions or procedures which, if not correctly followed, could result in personal injury, or loss of life.

CAUTION

This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to, or destruction of equipment.

NOTE

- *This note symbol indicates points of particular interest for more efficient and convenient operation.*

READ THIS FIRST

For your safety, read this Owner's Manual and understand it thoroughly before operating this ENGINE.

WARNING

DO NOT run the engine in a closed area. Exhaust gas contains carbon monoxide, an odorless and deadly poison.

Gasoline is extremely flammable and can be explosive under certain condition.

Stop engine and allow the engine to cool before refueling.

DO NOT smoke. Make sure area is well ventilated and free from any source of flame or sparks including the pilot light of any appliance while refueling, servicing fuel system, draining gasoline and/or adjusting fuel system.

DO NOT fill the tank so the fuel level rises into the filler neck or level surface of level gauge. If the tank is overfilled, heat may cause the fuel to expand and overflow through the vents in the tank cap.

Wipe off any spilled gasoline immediately.

To prevent fire hazard:

Keep the engine at least 1 m (3.3 ft) away from buildings, obstructions and other burnable objects.

DO NOT place flammable objects close to the engine.

DO NOT expose combustible materials to the engine exhaust.

DO NOT use the engine on any forest covered, bush covered or glass covered unimproved land unless spark arrester is installed on the muffler.

To avoid getting an electric shock, DO NOT touch spark plugs, plug caps or spark plug leads during engine running.

To avoid a serious burn, DO NOT touch a hot engine or muffler. The engine becomes hot during operation. Before you service or remove parts, stop engine and allow the engine to cool.

DO NOT place hands or feet near moving or rotating parts. Place a protective cover over pulley, V belt or coupling.

DO NOT run engine at excessive speeds. This may result in injury.

Always remove the spark plug caps from spark plugs when servicing the engine to prevent accidental starting.

Read warning labels which are on the engine and understand them. If any label is missing, damaged, or worn get a replacement from your Kawasaki dealer and install it in the correct position.

EMISSION CONTROL INFORMATION

Fuel Information

THIS ENGINE IS CERTIFIED TO OPERATE ON UNLEADED REGULAR GRADE GASOLINE ONLY. A minimum of 87 octane of the antiknock index is recommended. The antiknock index is posted on service station pumps in the U.S.A.

Emission Control Information

To protect the environment in which we all live, Kawasaki has incorporated an exhaust emission control system in compliance with applicable regulations of the United States Environmental Protection Agency and the California Air Resources Board. Also, depending on when your engine was produced, it may have an assigned emissions durability period. *See below for the engine emissions durability period that may apply to your engine.

Exhaust Emission Control System

The exhaust emission control system applied to this engine consists of a carburetor and an ignition system having optimum ignition timing characteristics. The carburetor has been calibrated to provide lean air/fuel mixture characteristics and optimum fuel economy with a suitable air cleaner and exhaust system.

A sealed-type crankcase emission control system is also used to eliminate blow-by gasses. The blow-by gasses are led to a breather chamber through the crankcase and from there to the air cleaner.

Engine Emissions Compliance Period

California

Engines Greater Than or Equal To 225 cc

Model Year – 2008 and later

Durability Period – 1 000 hours

All Other States

Engines Greater Than or Equal To 225 cc

Model Year – 2011 and later

Durability Period – 1 000 hours (Category A)

*** If your engine has an assigned emissions durability period it will be located on the certification label attached to the engine (IMPORTANT ENGINE INFORMATION).**

High Altitude Performance Adjustment Information

To improve the EMISSIONS CONTROL PERFORMANCE of engines operated above 1,000 meters (3 300 feet) , Kawasaki recommends the following Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) approved modifications.

However, the models with DFI (Digital Fuel Injection system) does not require high altitude performance adjustment.

NOTE

○ *When properly performed, these specified modifications only are not considered to be emissions system “tampering” and engine performance is generally unchanged as a result.*

Maintenance and Warranty

Proper maintenance is necessary to ensure that your engine will continue to have low emission levels. This Owner’s Manual contains those maintenance recommendations for your engine. Those items identified by the Periodic Maintenance Chart are necessary to ensure compliance with the applicable standards.

As the owner of the engine, you have the responsibility to make sure that the recommended maintenance is carried out according to the instructions in this Owner’s Manual at your own expense.

The Kawasaki Limited Emission Control System Warranty requires that you return your engine to an authorized Kawasaki dealer for remedy under warranty. Please read the warranty carefully, and keep it valid by complying with the owner’s obligations it contains.

Tampering with Emission Control System Prohibited

Federal law and California State law prohibit the following acts or the causing thereof: (1) the removal or rendering inoperative by any person other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new engine for the purposes of emission control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the engine after such device or element of design has been removed or rendered inoperative by any person.

Among those acts presumed to constitute tampering are the acts listed below:
Do not tamper with the original emission related parts:

- Carburetor or DFI system, and their internal parts
- Spark Plug
- Magneto or electronic ignition system
- Fuel filter element
- Air cleaner element
- Crankcase
- Cylinder heads
- Breather chamber and internal parts
- Intake pipe and tube
- Muffler or any internal portion of the muffler

FOREWORD

We wish to thank you for purchasing this Kawasaki engine.

Please read this Owner's Manual carefully before starting your new engine so that you will be thoroughly familiar with the proper operation of your engine's control, its features, capabilities and limitations.

Also read the manual of the equipment to which this engine is attached.

To ensure a long, trouble-free life for your engine, give it the proper care and maintenance described in this manual. Always keep this manual at your fingertip so that you can refer to it whenever you need information. This manual should be considered a permanent part of the engine and should remain with the engine when it is sold.

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This publication includes the latest information available at the time of printing. However, there may be minor differences between the actual product and illustrations and text in this manual.

All products are subject to change without prior notice or obligation.

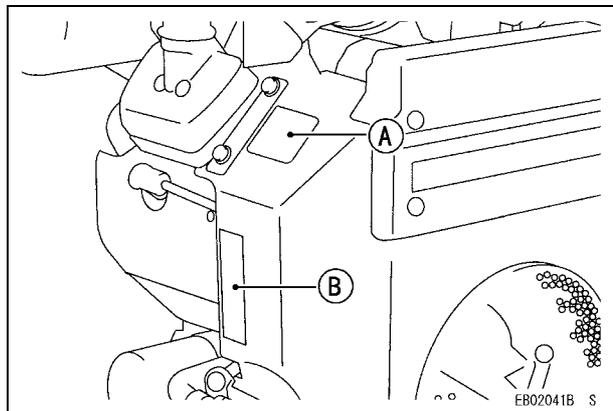
KAWASAKI HEAVY INDUSTRIES, LTD.
Motorcycle & Engine Company

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GENERAL INFORMATION

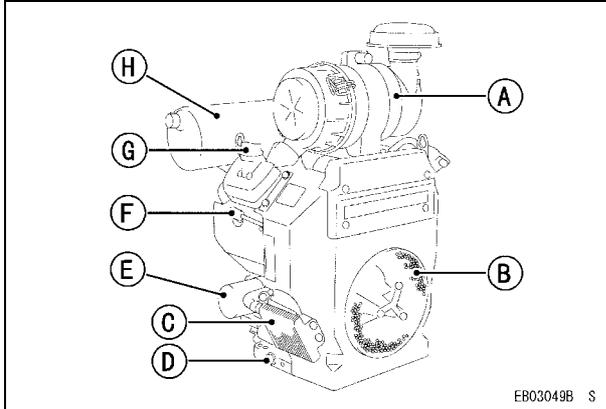
Location of Safety Related Labels



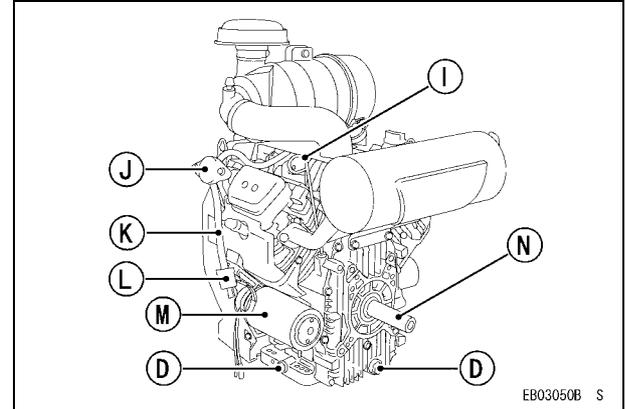
- A. Warning Label
- B. Maintenance Label



Location of Parts



- A. Air Cleaner**
- B. Air Intake Screen**
- C. Oil Cooler**
- D. Oil Drain Plugs**
- E. Oil Filter**
- F. Spark Plugs/Spark Plug Caps**
- G. Oil Filter Cap**
- H. Muffler**



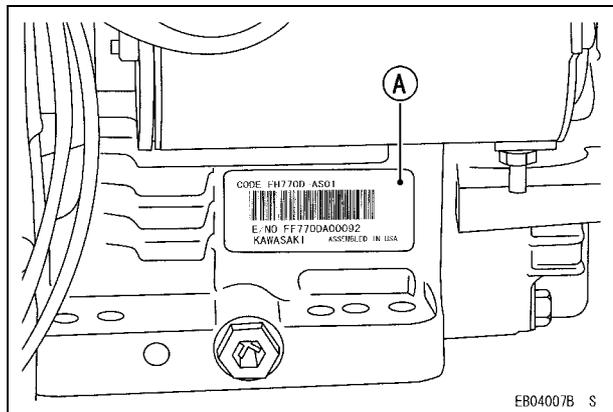
- I. Oil Gauge**
- J. Fuel Pump**
- K. Fuel Tube**
- L. Fuel Filter**
- M. Electric Starter**
- N. P.T.O Shaft**

10 GENERAL INFORMATION

Engine Serial Number

The engine serial number (A) is the only means of identifying your particular engine from others of the same model type.

This engine serial number is needed by your dealer when ordering parts.



A. Engine Serial Number Label

Tune-up Specifications

| ITEM | Specifications |
|------------------------------|--|
| Ignition Timing | Unadjustable |
| Spark Plugs: Gap | BPR4ES 0.75 mm (0.030 in.) |
| Low Idle Speed (Governor) | 1 550 r/min (rpm) |
| High Idle Speed | 3 600 r/min (rpm) |
| Valve Clearance | IN 0.10 ~ 0.15 mm (0.004 ~ 0.006 in.) EX 0.10 ~ 0.15 mm (0.004 ~ 0.006 in.) |
| Other Specifications | No other adjustment needed |

NOTE

○ *High and low idle speeds may vary depending on the equipment on which the engine is used. Refer to the equipment specification.*

Engine Oil Capacity

Engine Oil Capacity

| | |
|--------|---|
| FH770D | 1.4 L (1.5 US-qt) [when oil filter is not removed] |
| | 1.6 L (1.7 US-qt) [when oil filter is removed] |

FUEL AND OIL RECOMMENDATIONS

Fuel

Use only clean, fresh, unleaded regular grade gasoline.

| |
|----------------|
| CAUTION |
|----------------|

| |
|--------------------------------------|
| Do not mix oil with gasoline. |
|--------------------------------------|

Octane Rating

The octane rating of a gasoline is a measure of its resistance to “knocking”. Using a minimum of 87 octane by the antiknock index is recommended. The antiknock index is posted on service station pumps in the U.S.A.

Antiknock Index: (RON + MON)/2

RON = Research Octane Number

MON = Motor Octane Number

NOTE

○ If “knocking or pinging” occurs, use a different brand of gasoline or higher octane rating.

Oxygenated Fuel

Oxygenates (either ethanol or MTBE) are added to the gasoline. If you use the oxygenated fuel be sure it is unleaded and meets the minimum octane rating requirement.

The following are the EPA approved percentages of fuel oxygenates.

ETHANOL: (Ethyl or Grain Alcohol)

You may use gasoline containing up to 10% ethanol by volume.

MTBE: (Methyl Tertiary Butyl Ether)

You may use gasoline containing up to 15% MTBE by volume.

METHANOL: (Methyl or Wood Alcohol) 5% by volume

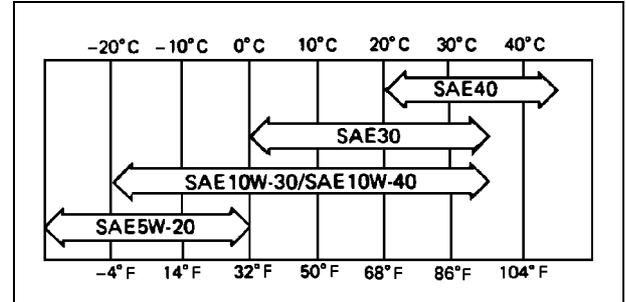
You may use gasoline containing up to 5% methanol by volume, as long as it also contains cosolvents and corrosion inhibitors to protect the fuel system. Gasoline containing more than 5% methanol by volume may cause starting and/or performance problems. It may also damage metal, rubber, and plastic parts of your fuel system.

Engine Oil

The following engine oils are recommended.
 API Service Classification : SG, SH, SJ or SL

Oil Viscosity

Choose the viscosity according to the temperature as follows:



Using multi grade oils (5W-20, 10W30, and 10W40) will increase oil consumption. Check oil level more frequently when using them.

PREPARATION

Fuel

 WARNING

Gasoline is extremely flammable and can be explosive under certain conditions

Before refueling, turn the engine switch to “OFF” position. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks, including any appliances with a pilot lamp.

Never fill tank so that fuel level rises into the filler neck. If tank is overfilled, heat may cause fuel to expand and overflow through vents in tank cap.

After refueling make sure tank cap is securely closed.

If gasoline is spilled, wipe it up immediately.

Engine Oil

Check the engine oil daily before starting the engine otherwise shortage of the engine oil may cause serious damage to the engine such as seizure.

- Place the engine on level surface. Clean area around the oil gauge before removing it.
- Remove the oil gauge (A) and wipe it with clean cloth.
- Insert the oil gauge into oil gauge hole (B) and let its plug firmly fit into the oil gauge hole, then check the oil level.
- The oil level should be between the “H (H)” and “L” (L) marks on the oil gauge.
- ★ If the oil level is near or below the “L” mark, remove the oil filler cap (C) and add enough engine oil to bring oil level to the “H” mark.
- Install the oil gauge (A) and tighten the oil filler cap (C).

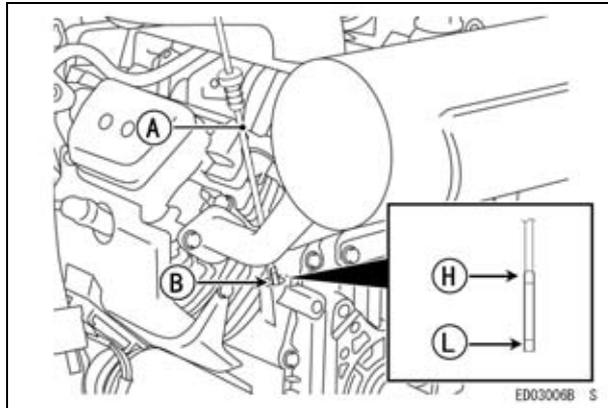
CAUTION

Do not fill above the “H” mark. Excess oil will cause a smoking condition, and may cause the engine to overheat.

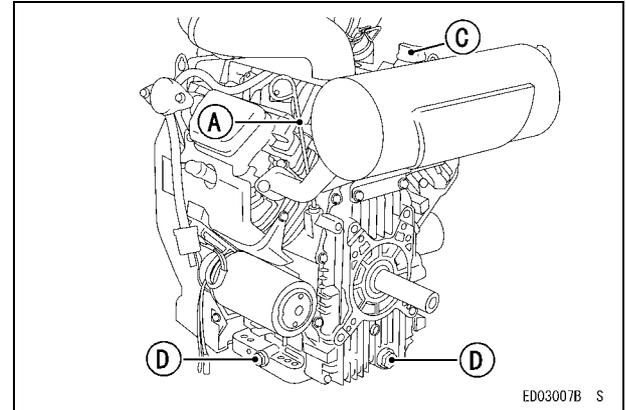
- ★ If the oil level is too high, remove the excess oil by loosening the drain plugs (D).

Engine Oil Capacity

| | |
|--------|---|
| FH770D | 1.4 L (1.5 US-qt) [when oil filter is not removed] |
| | 1.6 L (1.7 US-qt) [when oil filter is removed] |



A. Oil Gauge
B. Oil Gauge Hole



C. Oil Filler Cap
D. Oil Drain Plugs

STARTING

Start Engine

⚠ WARNING

Exhaust gases contain carbon monoxide, a colorless, odorless, poisonous gas. Do not operate the unit in enclosed areas. Provide adequate ventilation at all times.

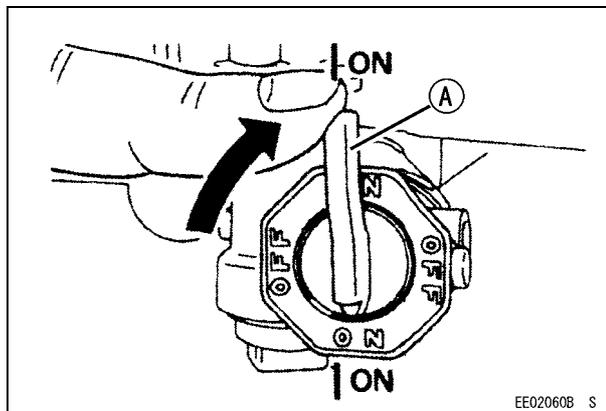
⚠ WARNING

Engine exhaust may ignite combustible materials and cause a fire. Keep the area around the exhaust outlet clear. Locate the unit so that the exhaust outlet points toward an open area and is located at least one meter (3.3 feet) from any obstructions.

NOTE

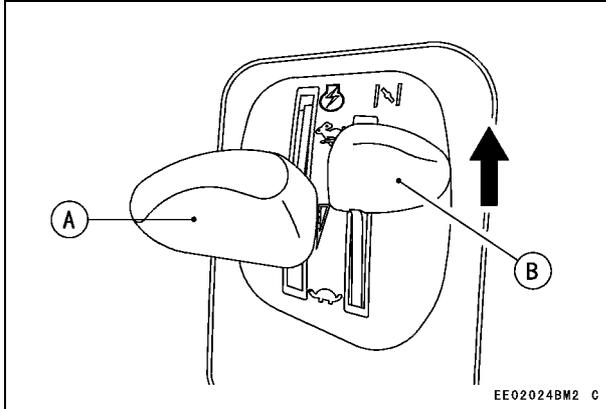
- Be aware of the following in order to start the engine easily in cold weather.
- Use proper oil for temperature expected (See “FUEL AND OIL RECOMMENDATIONS” chapter).
- Use fresh gasoline.

- Protect the engine or the equipment from direct exposure to weather when not in operation.
- Before starting the engine, insure all possible external loads are disconnected.
- Turn the fuel tap lever (A) on the equipment to “ON” (Open) position.



A. Fuel Tap Lever

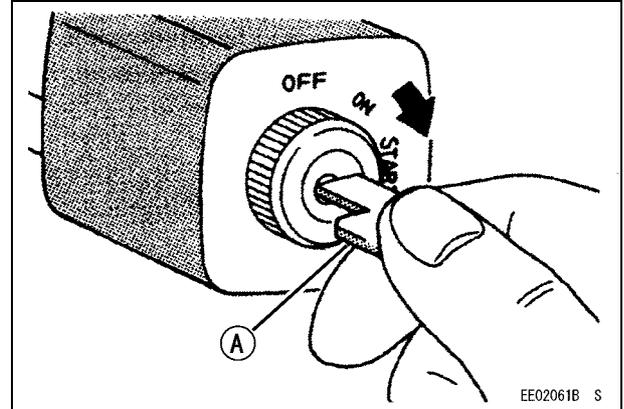
- Move the throttle lever (A) on the equipment to its halfway position (between “🌀” (FAST) and “🌀” (SLOW) position).
- Turn the choke lever (B) on the equipment to “🌀” (Close) position.



- A. Throttle Lever
- B. Choke Lever

NOTE

- Use full choke when the engine is cold, but in hot weather or when the engine is already warm, use halfchoke or leave the choke fully open.
- Put the switch key (A) into the engine switch.
- Turn the switch key to the START position on the equipment. Usually engine will start within 3 seconds.



CAUTION

Do not run the electric starter continuously for more than 5 seconds, otherwise the battery may discharge quickly. If the engine does not start right away, wait 15 seconds and try again.

CAUTION

Whenever you start engine, make sure warning light is not illuminated after engine starts. If warning light comes on, stop engine immediately and check oil level. And the warning light must not be illuminated during engine operation (if equipped).

OPERATING

Warming Up

CAUTION

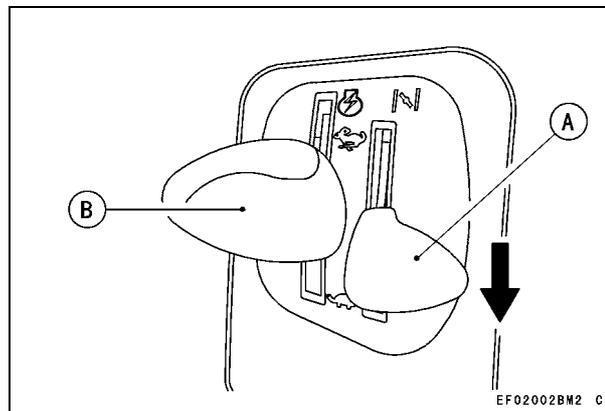
Allow engine to warm up sufficiently (3 to 5 minutes at idle) before applying a load. This will allow oil to reach all engine parts, and allow piston clearance to reach design specifications.

CAUTION

While warming up the engine, make sure the warning lights (oil pressure, charging monitor, and coolant temperature and/or self-diagnosis light) on the dash are not on. These lights must not be illuminated during engine operation.

After the engine starts, gradually return the choke lever (A) to the “ ” (fully open) position.

To warm up the engine, run it for 3 to 5 minutes with the throttle lever (B) in the same position (halfway) before putting the equipment under load. Then, move the throttle lever to its “ ” (FAST) position.



A. Choke Lever
B. Throttle Lever

Engine Inclination

This engine will operate continuously at angles up to 25° in any direction.

Refer to the operating instructions of the equipment this engine powers. Because of equipment design or application, there may be more stringent restrictions regarding the angle of operation.

CAUTION

Do not operate this engine continuously at angles exceeding 25° in any direction. Engine damage could result from insufficient lubrication.

STOPPING

Stopping the Engine

CAUTION

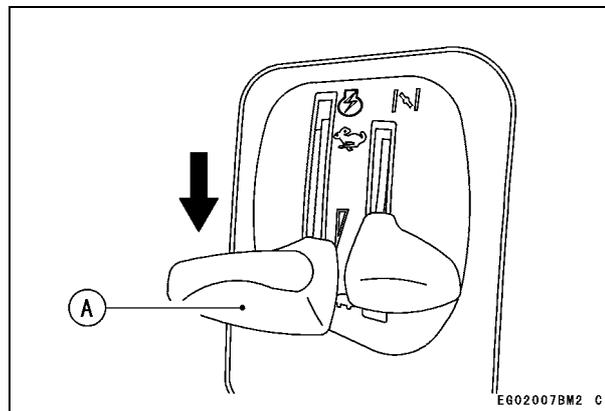
Engine damage can occur from run-on or after-burning if engine is stopped suddenly from high speed loaded operation. Reduce engine speed to idle for one minute before shutting engine off.

WARNING

Always remove Engine Key from switch when leaving equipment unattended or when equipment is not in use.

Ordinary Stop

- Move throttle lever (A) to “” (SLOW) position.
- Lower the engine speed to an idle. Keep running at idle for about one minute.



A. Throttle Lever

- Turn the switch key to “OFF” position.
- Turn the fuel tap lever on the equipment to “OFF” position.

Emergency Stop

- Immediately turn the engine switch or the switch key to “OFF” position.
- Turn the fuel tap lever on the equipment to “OFF” position.

ADJUSTMENT

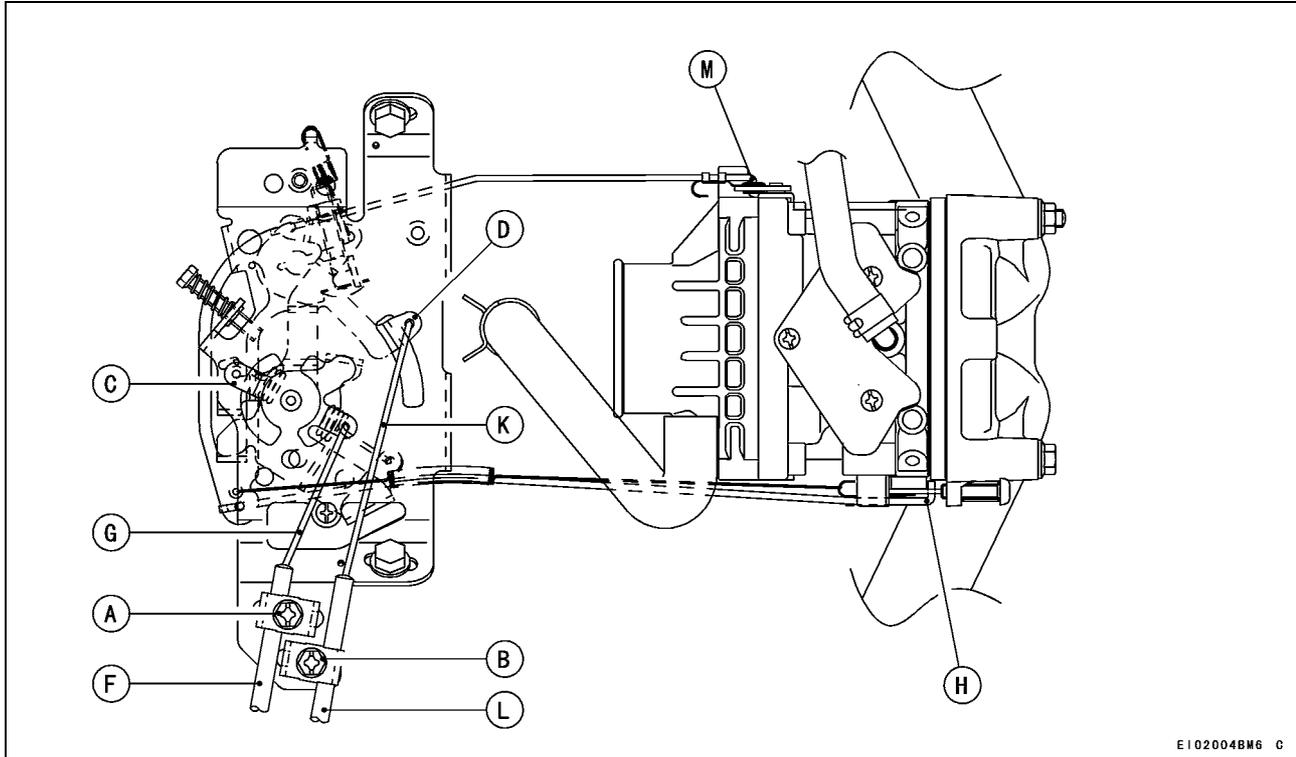
Throttle Cable Installation, Adjustment

- Link the throttle cable (G) to the speed control lever (C) and loosely clamp the throttle cable outer housing (F) with the cable clamp bolt (A).
- Move the throttle lever to “FAST” position.
- Pull up the outer housing (F) of the throttle cable until the inner wire (G) has almost no slack, and tighten the cable clamp bolt (A).
- Move the throttle lever to “SLOW” position. Make sure that the carburetor throttle valve (H) is moved smoothly.

Choke Cable Installation, Adjustment

- Link the choke cable (K) to the choke control lever (D), and loosely clamp the choke cable outer housing (L) with the cable clamp bolt (B).
- Move the equipment choke control to “OPEN” position. Make sure that the carburetor choke valve (M) is fully opened.
- Pull up the outer housing (L) of the choke cable until the inner wire (K) has almost no slack, and tighten the cable clamp bolt (B).
- Move the equipment choke control to “CHOKE” position. Make sure that the carburetor choke valve (M) is completely closed.
- Make sure that the choke valve turns from fully closed position to fully opened position when actuating the equipment choke control.

22 ADJUSTMENT



Engine Speed Adjustment

NOTE

- *Do not tamper with the governor setting or the carburetor setting to increase the engine speed. Every carburetor is adjusted at the factory and a cap or stop plate was installed on each mixture screw.*

- *If adjustment is needed, it must be performed by your authorized Kawasaki dealer.*

MAINTENANCE

Maintenance, replacement, or repair of the emission control devices and systems may be performed by any nonroad engine repair establishment or individual.

Periodic Maintenance Chart

WARNING

Always remove the spark plug caps from spark plugs when servicing the engine to prevent accidental starting.

NOTE

○ *The service intervals indicated are to be used as a guide. Service should be performed more frequently as determined by operating conditions.*

◆ : Service more frequently under dusty conditions.

K : Have an authorized Kawasaki dealer perform these service.

MAINTENANCE 25

| MAINTENANCE | INTERVAL | | | | | | | | |
|---|----------|----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------|
| | Daily | First 8 hr. | Every 25 hr. | Every 50 hr. | Every 100 hr. | Every 200 hr. | Every 250 hr. | Every 300 hr. | Every 500 hr. |
| Check and add engine oil. | ● | | | | | | | | |
| Check for loose or lost nuts and screws. | ● | | | | | | | | |
| Check for fuel and oil leakage. | ● | | | | | | | | |
| Check battery electrolyte level. | ● | | | | | | | | |
| ◆ Check or clean air intake screen. | ● | | | | | | | | |
| ◆ Check and clean dust and dirt oil cooler fins. | | | | | ● | | | | |
| ◆ Clean dust and dirt from cylinder K and cylinder head fins. | | | | | ● | | | | |
| Tighten nuts and screws. | | | | | ● | | | | |
| Change engine oil. | | ● | | | ● | | | | |
| Clean and regap spark plugs. | | | | | ● | | | | |
| Change oil filter. | | | | | | ● | | | |
| ◆ Replace air cleaner primary element. | | | | | | | ● | | |
| ◆ Check air cleaner secondary element | | | | | | | ● | | |
| K Clean combustion chamber. | | | | | | | | ● | |
| K Check and adjust valve clearance. | | | | | | | | ● | |

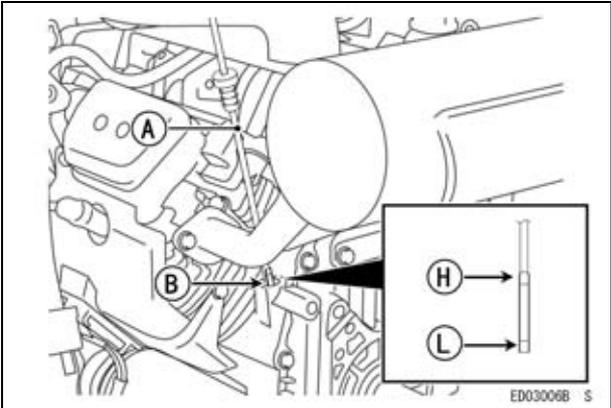
Oil Level Check

Check oil level daily and before each time of operation. Be sure oil level is maintained. See “PREPARATION” chapter.

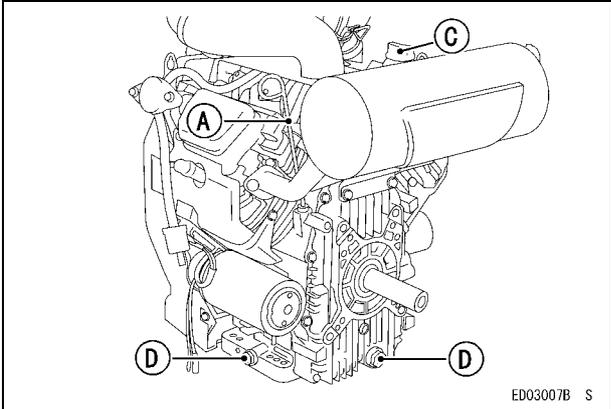
★ If the oil level is too high, remove the excess oil by loosening the drain plugs (D).

Engine Oil Capacity

| | |
|--------|---|
| FH770D | 1.4 L (1.5 US-qt) [when oil filter is not removed] |
| | 1.6 L (1.7 US-qt) [when oil filter is removed] |



A. Oil Gauge
B. Oil Gauge Hole



C. Oil Filter Cap
D. Oil Drain Plugs

28 MAINTENANCE

Oil Change

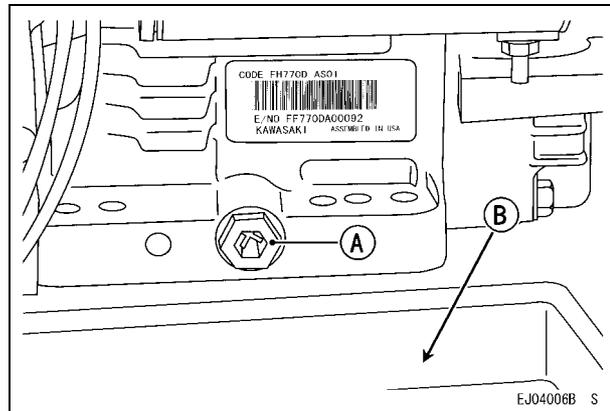
Change oil after first 8 hours of operation. Thereafter change oil every 100 hours.

- Run the engine to warm oil.
- Be sure the engine (equipment) is level.
- Stop the engine.
- Remove the oil drain plugs (A) and drain the oil into suitable container while engine is warm.

WARNING

Hot engine oil can cause severe burns. Allow engine temperature to drop from hot to warm level before draining and handling oil.

- Install the oil drain plugs.
- Remove oil gauge and refill with fresh oil (See “FUEL AND OIL RECOMMENDATIONS” chapter).
- Check the oil level (See “PREPARATION” chapter for oil level check).



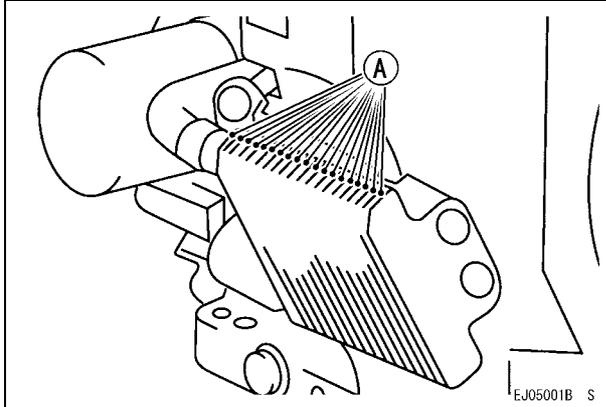
- A. Oil Drain Plug
- B. Suitable Container

WARNING

Engine oil is a toxic substance. Dispose of used oil properly. Contact your local authorities for approved disposal methods or possible recycling.

Oil Cooler Service

- Check and clean oil cooler every 100 hours.
- Clean dirt off the outside fins with a brush or with compressed air.



A. Oil Cooler Fins

Oil Filter Change

- Change the oil filter every 200 hours of operation.

⚠ WARNING

Hot engine oil can cause severe burns. Allow engine temperature to drop from hot to warm level before attempting to remove oil filter.

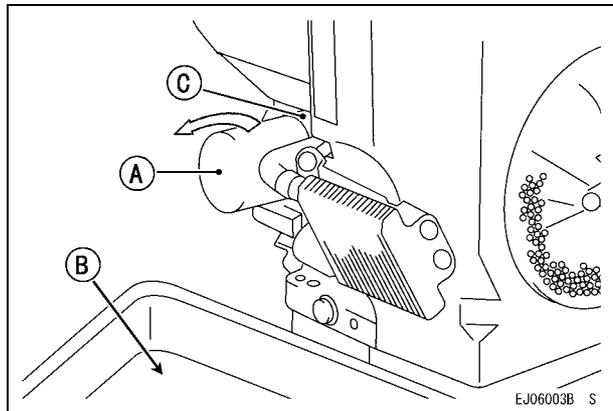
- Drain engine oil into a suitable container (B).

CAUTION

Before removing the oil filter, place suitable pan under filter connection.

- Rotate the oil filter (A) counterclockwise to remove it.
- Coat a film of clean engine oil on seal of new filter.
- Install new filter rotating it clockwise until seal contacts mounting surface (C). Then rotate filter 3/4 turn more by hand.
- Supply engine oil as specified.
- Run the engine for about 3 minutes, stop engine, and check oil leakage around the filter.
- Add oil to compensate for oil level drop due to oil filter capacity (See “PREPARATION” chapter for oil level check).

30 MAINTENANCE



- A. Oil Filter
- B. Suitable Container
- C. Mounting Surface

WARNING

Engine oil is a toxic substance. Dispose of used oil properly. Contact your local authorities for approved disposal methods or possible recycling.

Air Cleaner Service

This air cleaner elements are not recommended to be cleaned, and each air cleaner element should be replaced with the new one at the maintenance time as shown in the maintenance chart.

CAUTION

To prevent excessive engine wear, do not run the engine with the air cleaner removed.

CAUTION

Do not wash air cleaner elements.
Do not oil air cleaner elements.
Do not use pressurized air to clean air cleaner elements.

NOTE

- *Operating in dusty condition may require more frequent maintenance than above.*

Primary Element

Replace the primary element every 250 hrs.

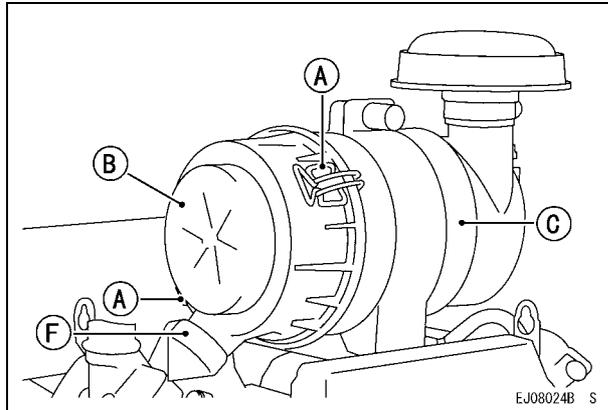
Secondary Element

- Replace the secondary element with the new one if dirty when primary elements is checked.
- Replace the primary element every 500 hrs.

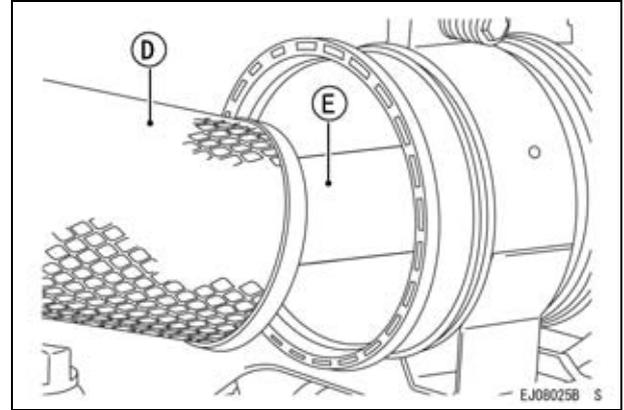
Cap (Dust Ejector Valve)

Push open the cap on the case of the air cleaner body to expel dust and/or water accumulated inside.

- Unfasten the two retaining clamps (A) and remove the case (B) from the air cleaner body (C).
- Remove the primary element (D) and the secondary element (E) from the air cleaner body by pulling out them.



- A. Retaining Clamps**
- B. Case**
- C. Air Cleaner Body**
- F. Cap (Dust Ejector Valve)**



- D. Primary Element**
- E. Secondary Element**

- Install the new air cleaner elements into the air cleaner body.
- Reinstall the case with the cap (F) is down and securely fasten the two retaining clamps.

32 MAINTENANCE

Fuel Filter and Fuel Pump Service

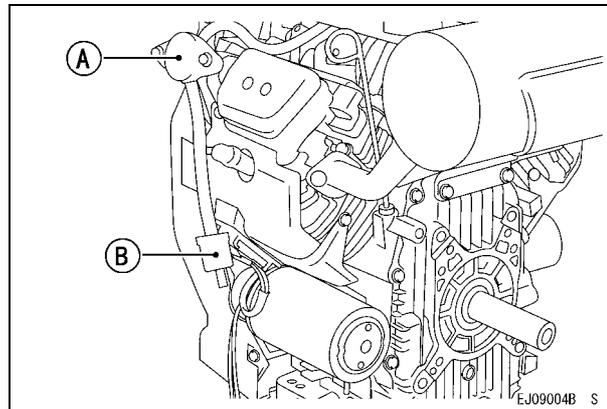
WARNING

Improper use of solvents can result in fire or an explosion.

Do not use gasoline or low flash-point solvents to clean the fuel filter and/or the fuel pump.

Clean only in a well ventilated area away from sources of sparks or flame, including any appliances with a pilot lamp.

- The fuel filter (B) can not be disassembled. If the fuel filter gets clogged, replace it with a new one.
- The fuel pump (A) can not be disassembled. If the fuel pump fails, replace it with a new one.



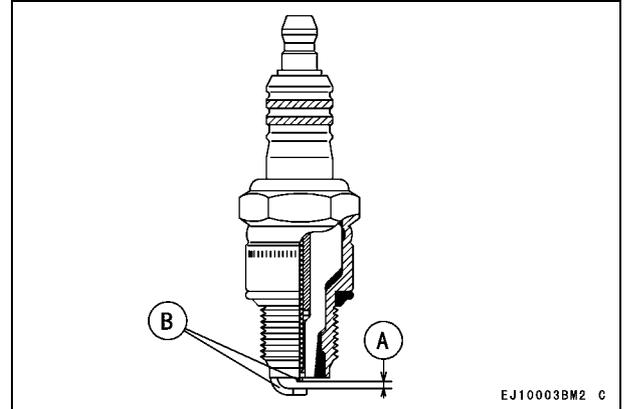
Spark Plug Service

WARNING

Hot engine components can cause severe burns.
Stop engine and allow it to cool before checking spark plugs.

Clean or replace the spark plugs and reset spark plug gap (A) every 100 hours of operation.

- Disconnect the spark plug caps from the spark plugs and remove the spark plugs
- Clean the electrodes (B) by scraping with a wire brush to remove carbon deposits.
- Inspect for cracked porcelain or other wear and damage. Replace the spark plug with a new one if necessary.
- Check the spark plug gap and reset if necessary. The gap must be 0.75 mm (0.030 in.). To change the gap, bend only the side-electrode, using a spark plug tool.
- Install and tighten the spark plugs to 22 N·m (2.2 kg·m, 16 ft·lb).
- Fit the spark plug caps on the spark plugs securely.
- Pull up the spark plug caps lightly to make sure of the installation of the spark plug caps.



A. Spark Plug Gap
B. Electrodes

RECOMMENDED SPARK PLUG
NGKBPR4ES

34 MAINTENANCE

Cooling System Cleaning

⚠ WARNING

Always remove the spark plug cap from spark plug when servicing the engine to prevent accidental starting.

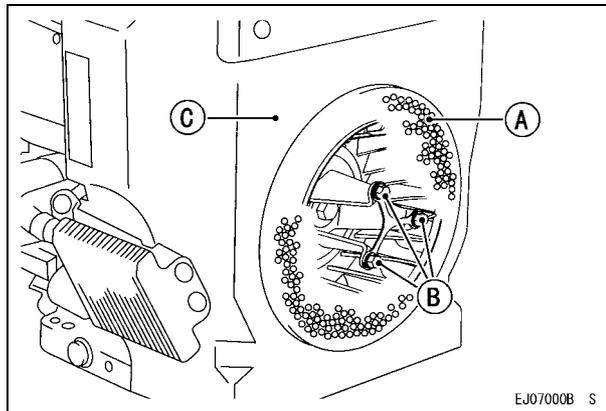
- Before each use, check that the air-intake (rotary) screen (A) is free from grass and debris and clean by removing bolts (B) and air intake screen with spacer if necessary.
- Check and clean at Kawasaki dealer every 100 hours of operation, for the cooling fins and engine shroud (C) to remove grass, chaff or dirt clogging the cooling system and causing overheating.

CAUTION

Do not run engine before all cooling system parts are reinstalled to keep cooling and carburetion as intended.

[Bolts Size, Tightening Torque]

| Bolts | Size | Length | Tightening-torque |
|-------|------|--------|------------------------------|
| B | M6 | 12 mm | 5.9 N·m (0.6 kg·m, 52 in·lb) |



- A. Air Intake Screen**
- B. Bolts**
- C. Engine Shroud**

STORAGE

Fuel System Draining

Engines to be stored over 30 days should be completely drained of fuel to prevent gum deposits forming on essential carburetor parts, fuel filter and fuel tank.

WARNING

Gasoline is extremely flammable and can be explosive under certain conditions.

Drain fuel before storing the equipment for extended periods.

Drain fuel in a well-ventilated area away from any source of flame or sparks, including any appliances with a pilot lamp. Store fuel in an approved container in safe location.

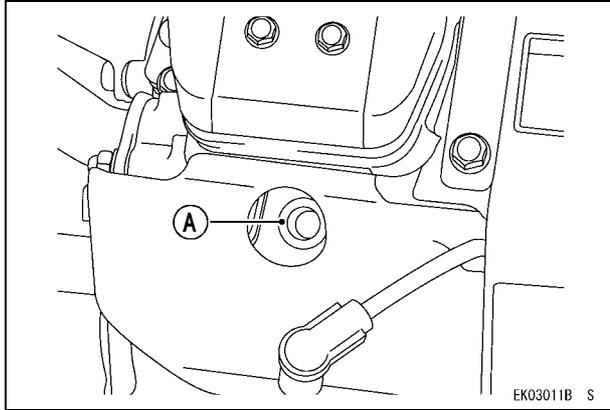
- Clean every part of the engine.
- Be sure that the engine switch or switch key is positioned at “OFF”.
- Turn the fuel tap lever on the equipment to “OFF” (Close) position and remove the sediment bowl.

- Put a pan under the fuel tap to receive the drained fuel, and turn the fuel tap lever to “ON” (Open) position to drain the fuel from fuel tank completely.
- Install the sediment bowl and open the fuel valve.
- To remove the fuel from the carburetor, run the engine to use up the fuel in the carburetor.
- Remove the spark plugs and pour approx. 1 ~ 2 mL (0.06 ~ 0.1 cu. in.) of engine oil through the spark plug holes and then screw the spark plugs in after turning the engine a few times. Slowly turn the engine until you feel compression and then leave it there. This blocks the air inside the cylinder and prevents rust inside the engine.
- Wipe the body with oily cloth.
- Change engine oil for next use after period of storage (refer to “Oil Change” section in “MAINTENANCE” chapter).

WARNING

Gasoline is a toxic substance. Dispose of gasoline properly. Contact your local authorities for approved disposal methods.

36 STORAGE



A. Spark Plug Hole

TROUBLESHOOTING GUIDE

If the engine malfunctions, carefully examine the symptoms and the operating conditions, and use the table below as a guide to troubleshooting.

38 TROUBLESHOOTING GUIDE

| Symptom | | Probably Cause | Remedy |
|-------------------------------------|-------------------------------|---|---|
| Engine won't start or output is low | Insufficient compression | Faulty pistons, cylinders, piston rings, and head gaskets | K |
| | | Faulty valves | |
| | | Loose spark plugs | Tighten properly |
| | | Loose cylinder head bolts | |
| | No fuel to combustion chamber | No fuel in fuel tank | Fill fuel tank |
| | | Fuel tap lever not in "ON" position | Turn fuel tap lever to "ON" position. |
| | | Blocked fuel filter or tube | Change fuel filter or fuel tube |
| | | Blocked air vent in tank cap | Clean fuel tank cap |
| | | Faulty carburetor | K |
| | Spark plugs fouled by fuel | Over-rich fuel/air mixture | Open choke valve of carburetor. Rotate engine with spark plugs removed to discharge excess fuel. Clean spark plugs. |
| | | Clogged air cleaner elements | Change air cleaner elements |
| | | Faulty carburetor | K |
| | | Incorrect grade/type of fuel | |
| | | Water in fuel | |
| | No spark or weak spark | Faulty spark plugs | Replace spark plugs |
| | | Faulty ignition coil | K |
| | | Engine switch left in "OFF" position | Turn engine switch to "ON" position |

| Symptom | | Probably Cause | Remedy |
|------------|-----------------------------|---|-----------------------------|
| Low output | Engine overheats | Clogged air cleaner | Change air cleaner elements |
| | | Air-intake screen or cooling air path clogged with dirt | Clean |
| | | Insufficient engine oil | Replenish or change oil |
| | | Carbon build-up in combustion chamber | K |
| | | Poor ventilation around engine | Select a better location |
| | Engine speed won't increase | Faulty governor | K |

K : Have an authorized Kawasaki dealer perform these service.

ENVIRONMENTAL PROTECTION

To protect our environment, properly discard used batteries, engine oil, gasoline, coolant, or other components that you might dispose of in the future.

Consult your authorized Kawasaki dealer or local environmental waste agency for their proper disposal procedure.

SPECIFICATIONS

| | FH770D |
|-----------------------|---|
| Type of engine | Air- cooled, 4-stroke OHV, V-twin cylinder, gasoline engine |
| Bore × Stroke | 80 × 76 mm (3.15 × 2.99 in.) |
| Displacement | 764 mL (46.6 cu.in) |
| Ignition System | Solid-state ignition |
| Direction of rotation | Counterclockwise facing the PTO Shaft |
| Starting system | Electric starter |
| Dry weight : kg (lbs) | 46.4 (102.3) |

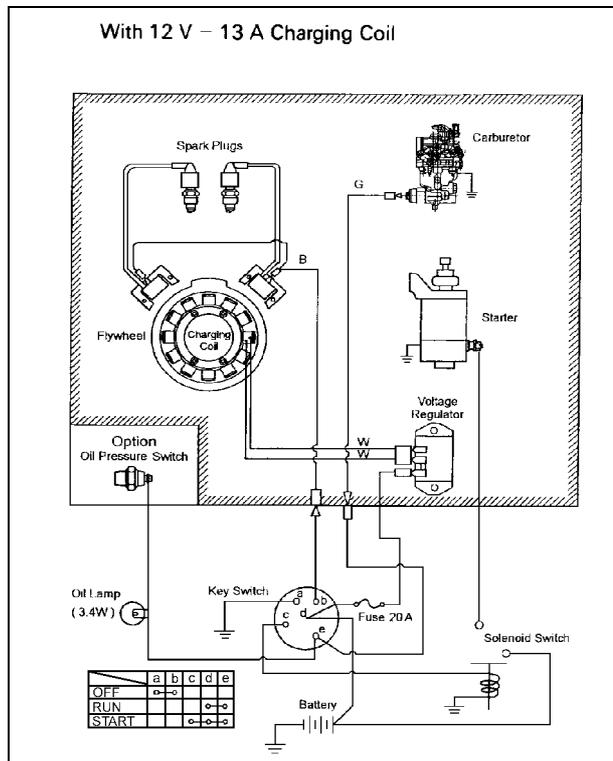
NOTE

○ Specifications subject to change without notice.

○ Dry weight excludes that of fuel tank and muffler.

WIRING DIAGRAM

Wiring Diagram



NOTE

○ Portion Surrounded by hatching Shows Kawasaki Procurement Parts.

WARNING

For electrical safety, always remove cable from negative (-) side of battery before attempting any repair or maintenance.

Battery Capacity Recommended

| Model | Battery Capacity |
|--------------|--------------------|
| Lawn Mower | 12 V 200 CCA Class |
| Snow Thrower | 12 V 280 CCA Class |