KAWASAKI

20hp FD620D

Learn Engine Safety

⚠WARNING

Improper use or maintenance by the operator can result in injury. Read this manual carefully and follow these important safety messages.
Unauthorized modifications to the engine or improper engine applications may impair the function and/or safety and affect machine life. Use only approved service parts or accessories on the engine.
Do not let anyone operate the engine without proper instruction.

Protect People

⚠WARNING

Keep people and pets out of the area where you are using the engine or equipment.
Never allow children to operate the engine or equipment.

Avoid Fires or Explosions (1)

⚠WARNING

Handle gasoline with care: it is highly flammable.
Fill the fuel tank outdoors. Do not overfill. Use approved gasoline container.
Never remove the cap of the fuel tank or add gasoline if the engine is hot or running.
Do not smoke or allow flames or sparks including the pilot light of any appliance while refueling, servicing fuel system, draining gasoline and/or adjusting carburetor.
Wipe off any spilled gasoline before starting the engine. Do not operate the engine when or where an odor of gasoline is present or other explosive condition may exist. Do not place flammable objects close to the engine.
Keep the engine free of grass, leaves, or combustible material.
Keep the engine at least 3.3 ft (1 m) away from buildings, obstructions and other burnable objects. Do not aim engine exhaust at materials that could catch fire.

Avoid Fires or Explosions (2)

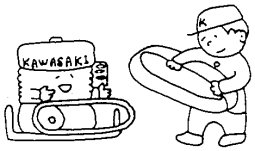
⚠WARNING

Do not operate the engine without a muffler.
Except for adjustment, do not operate the engine if the air cleaner or the cover directly over the carburetor air intake is removed.
Disconnect the battery ground cable before servicing engine.
Never store the engine or equipment with gasoline in the tank inside a building where fumes may reach an open flame or spark. Allow the engine to cool before storing in any enclosure.
Drain gasoline before transporting the engine or equipment.
If this engine is not equipped with a spark arrester and is to be used on any forest covered, bush covered, or grass covered unimproved land, a spark arrester must be added to the muffler in the areas where such a device is required by law.

For Safe Operation

⚠WARNING

To prevent injuries adequate covers and guards must be installed prior to using this engine. All potentially dangerous areas need to be protected, and all covers and guards in place, and secure prior to starting the engine.



Don't refuel the tank while engine is running or is in operation near an open flame.

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

○ *Indicates points of particular interest for more efficient and convenient operation.*

FOREWORD

We wish to thank you for choosing this Kawasaki Engine. Please read this Owner's Manual carefully, as it contains information which will be of value in obtaining maximum service from your Kawasaki Engine.

All information, illustrations and specifications in this manual are based on the latest production information available at the time of publication.

The right is reserved to make changes at any time without notice.

KAWASAKI HEAVY INDUSTRIES, LTD.

CONSUMER PRODUCTS & COMPONENTS GROUP

First Edition (1) : Jan. 1992 (M)

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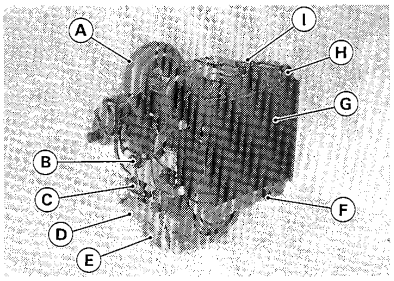
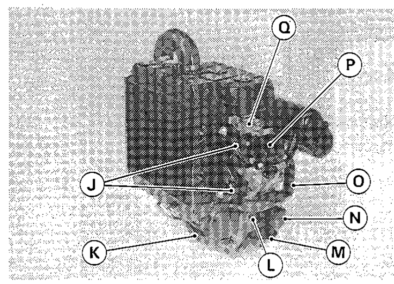
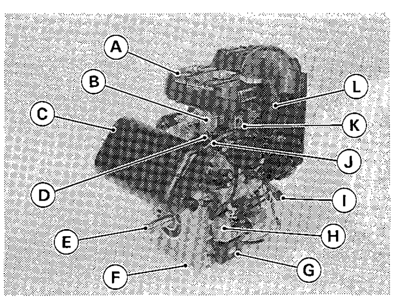


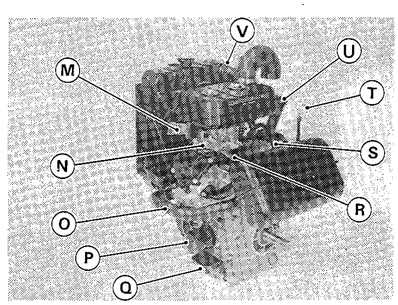


A. Air cleaner Intake Air Duct
B. Spark Plug
C. Ignition Coil
D. Electric Starter
E. Igniter
F. Radiator Drain Screw
G. Radiator Screen
H. Radiator
I. Radiator Cap
J. Radiator Brackets
K. Flywheel Cover
L. Oil Pressure Switch
M. Oil Drip Tray
N. Oil Filter
O. Radiator Hose
P. Valve-Rocker Cover
Q. Speed Control Panel

NOTE

○*An optional location fuel pump and regulator are shipped loose.*





A. Air cleaner
B. Carburetor
C. Muffler
D. Fuel Shut-off Valve
E. P.T.O. Shaft
F. Oil Drain Plug
G. Igniter
H. Electric Starter
I. Packard Connector
J. Coolant By-pass Tube
K. Oil Dip Stick
L. Radiator Hose
M. Cooling Fan
N. Speed Control Panel
O. Radiator Hose
P. Oil Filter
Q. Oil Drip Tray
R. Governor Arm
S. Coolant By-pass Tube
T. Oil Dip Stick
U. Oil Filler Cap
V. Hose Clamp

Type of engine	Liquid-cooled, Horizontal shaft, OHV, 4-stroke, 90° V-twin, Gasoline engine
Bore x Stroke	76 mm x 68 mm (2.99 in. x 2.66 in.)
Piston displacement	617 mL (37.7 cu. in)
Max. output	14.9 kw/3 600 rpm (20 HP/3 600 rpm) [SAE J1349]
Direction of rotation	Counterclockwise facing PTO shaft end
Ignition system	Battery, Full transister, Fixed timing
Spark plug	NGK BMR4A
Starting system	Shift type electric starter
Charging system	12 V – 20 amps with regulator
Carburetor	Down draft type, Fixed main jet
Fuel pump	Electro magnetic pump (In-line type)
Air cleaner	Dual stage element
Governor	All speed mechanical fly weight
Lubrication system	Pressure feed by positive displacement pump
● Oil filter	Cartridge type full flow filter
● Oil pressure switch	ON-OFF switch
Cooling System	Pressurized forced circulation type
● Radiator	3-rows with louverless corrugated fin
Dimensions (H x W x L)	624 mm x 450 mm x 555 mm (24.6 in. x 17.7 in. x 21.9 in.)
Dry weight	41.5 kg (91.5 lbs)

Preparation

Adding Engine Oil:

Check engine oil level each day before you operate the engine otherwise lack of engine oil may cause serious damage to the engine.

⚠CAUTION

Before starting the engine add oil: The engine is shipped without oil.

- Be sure the engine (equipment) is level.
- Check the oil level following the procedure described in the MAINTENANCE AND ADJUSTMENT chapter.
- If the oil level is near or below the "L" mark on the dipstick, remove the filler cap and add oil only to the "H" mark on the dipstick.
- Do not over-fill.

Filling Fuel:

Fill the fuel tank with regular grade leaded or unleaded gasoline.

⚠CAUTION

Do not use alcohol or "gasohol." This engine has not been tested and certified for use with such fuels.
Damage to the engine may result from the use of improper fuel.

⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the engine switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.
Never fill the tank so the fuel level rises into the filler neck. If the tank is overfilled, heat may cause the fuel to expand and overflow through the vents in the tank cap.
After refueling, make sure the tank cap is closed securely.
If gasoline is spilled on the fuel tank, wipe it off immediately.

- Level the engine (equipment) before fueling.
- Remove the fuel tank cap.
- Slowly pour fuel into tank through the fuel filter.
- Install the tank cap securely by turning it clockwise until seated.

NOTE

○ *Follow the equipment manufacturer's instruction.*

Filling Coolant:

- Check the coolant level each day before operating the engine. Replenish the coolant if the level is low.

⚠CAUTION

A coolant is not installed in the cooling system when shipped.

NOTE

○ *Have the first original permanent type of antifreeze replenished by your authorized KAWASAKI Engine Dealer.*

- Place the engine (equipment) on a level surface.
- Remove the radiator cap turning counterclockwise.

⚠CAUTION

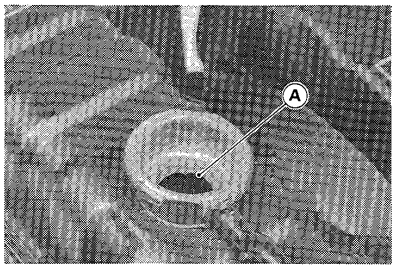
Always allow engine to cool before removing the radiator cap, then remove the cap slowly and carefully to avoid a possible fast discharge of hot coolant which could cause severe burns.

- Check the coolant level, add the coolant if the level is low.

NOTE

○ Coolant must be filled to the filler neck bottom.

- Fill the radiator up to the bottom of the filler neck with coolant (see Information for Coolant).



A. Bottom of filler neck

- Install the cap turning it clockwise until fully seated.

NOTE

○ Pour in the coolant slowly so that it can expel the air from the engine and radiator.

Correcting Electrolyte Level:

- Check battery electrolyte level each day before operating the engine .
- Electrolyte level in each cell is between the upper and lower levels.
- If necessary, add only distilled water to the battery.

⚠WARNING

DANGER EXPLOSIVE GASES

Cigarettes, flames or sparks could cause battery to explode. Always shield eyes and face from battery. Do not charge without proper instruction and training. Connect cables to the proper terminals securely. Check vent tube to avoid any crimping or obstruction to the tube.

KEEP FILLING PLUGS TIGHT AND LEVEL

POISON CAUSES SEVERE BURNS

Contains sulfuric acid. Avoid contact with skin, eyes, or clothing. In event of accident flush with water and call a physician immediately.

⚠CAUTION

Add only distilled water to the battery. Ordinary tap water is not a substitute for distilled water and shorten the life of the battery.

NOTE

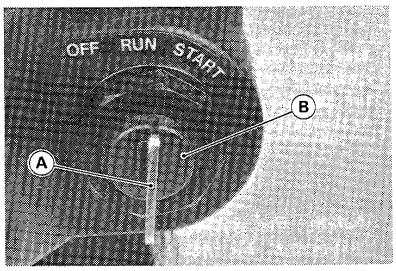
○ Follow the equipment manufacturer's instruction for more detailed battery information.

Starting

⚠WARNING

Start the engine only outdoors or in a well-ventilated place. Exhaust fumes are dangerous.

- Before starting the engine, insure all possible external loads are disconnected.
- Open the fuel valve on the equipment.
- Move throttle lever on dash to half throttle position.
- Use full choke when the engine is cold, but in hot weather or when the engine is already warm, use half-choke or leave the choke fully open.
- Insert the switch key into the engine switch.



A. Switch Key B. Engine Switch

NOTE

○ Before starting the engine, turn the switch key to the "RUN" position. Make sure the oil pressure lamp on dash comes on.

- Turn the switch key to the "START" position until the engine starts.

⚠CAUTION

Do not operate the starter continuously for more than 5 seconds or the starter will overheat and the battery power will drop temporarily. Wait 15 seconds between each operation of the starter to let it cool and the battery power recover. Never re-start the engine unless the engine completely stops.

NOTE

○ When the engine is very warm, or when the engine does not start immediately, do not keep trying to start it with the choke closed as this will cause flooding and make starting more difficult. Instead, fully open the choke and start the engine.

- After starting the engine, gradually return the choke lever to the full open position.

NOTE

○ Be aware of the followings to help start the engine under cold weather.
○ Warm the battery.
○ Use proper oil for temperatures expected.

Warming Up

- After the engine starts, let it warm up about 5 minutes. This enables the oil to circulate thoroughly in the engine, and allows the engine to be run under load safely.
- Do not accelerate the engine speed immediately after the engine starts.

⚠CAUTION

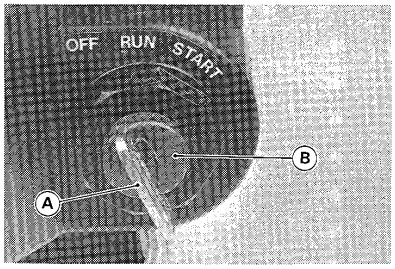
While warming up the engine, make sure the warning lamps (oil pressure, charging monitor, coolant temperature) on dash are not on. These lamps must not be illuminated during engine operation.

- After the engine is warmed up, engine speed can be controlled by the throttle lever on dash. Move the throttle lever to the desired position and leave it there, the engine will keep running at a constant speed.

Stopping

Temporary Stops:

- Declutch possible external loads from the engine.
- Move throttle lever on dash to the "IDLE" position and run the engine for a few minuites to cool.
- Turn the switch key to the "OFF" position.
- Close the fuel valve on the equipment.
- Remove the key from the engine switch to prevent unauthorized use.



A. Switch Key (OFF) **B. Engine Switch**

Long Period Stops:

- If you do not expect to use the engine again for a long period of time, close the fuel valve and let the engine run until the fuel in the carburetor is depleted, stopping it.
- Leave the fuel valve closed.
- Remove the key from the engine switch to prevent unauthorized use.

⚠CAUTION

Don't leave the engine with gasoline in the carburetor for long period. This could cause difficult starting, loss of power and other problems.

Emergency Stops:

- To stop the engine in case of emergency, immediately turn the switch key to the "OFF" position.

»»»»»»»»»»»»»»»»»»»»»»»»»»»»»» MAINTENANCE AND ADJUSTMENT ««««««««««««««««««««««««««««

Periodic Maintenance Chart

To ensure satisfactory operation over an extended period of time, any engine requires normal maintenance at regular intervals. The Periodic Maintenance Chart below shows periodic inspection and maintenance items and suitable intervals. The bullet mark (●) designates that the corresponding item should be performed at that interval.

Some adjustments require the use of special tools or other equipment. An electronic tachometer will facilitate setting idle and running speeds.

OPERATION	INTERVAL							
	Daily	Every 20 hr.	Every 25 hr.	Every 50 hr.	Every 100 hr.	Every 200 hr.	Every 300 hr.	Every 400 hr.
Check and add fuel	●							
Check and add engine oil	●							
Check and add coolant	●							
Check for fuel, oil and coolant leakage	●							
Check radiator for dust and insect	●							
Check fan belt for looseness	●							
Check for loose or lost nut and screw	●							
Check battery electrolyte level	●							
Tighten nuts and screws					●			
Clean air cleaner foam element (1)			●					
Clean air cleaner paper element (1)					●			
Change engine oil		● (first)			●			

OPERATION	INTERVAL							
	Daily	Every 20 hr.	Every 25 hr.	Every 50 hr.	Every 100 hr.	Every 200 hr.	Every 300 hr.	Every 400 hr.
Clean and re-gap spark plugs					●			
Oil filter change		● (first)				●		
Change air cleaner paper element (1)							●	
Change spark plugs							●	
Inspect radiator and hoses*						●		
Check fan belt conditions and tension*						●		
Check carburetor adjustment				●				
Check engine speeds*				●				
Check and adjust valve clearance*							●	
Check fuel lines*							●	
Valve maintenance*							●	
Clean combustion chamber*							●	
Coolant change*								●

(1) Service more frequently under dusty conditions.
* These items must be performed with the proper tools. See your authorized Kawasaki Engine Dealer for service, unless you have the proper equipment and mechanical proficiency.

Daily Check

Check all items listed daily and prior to starting the engine. If performed daily the minimal time required to do the checks will insure satisfactory operation.

If any irregularities are found during these checks, refer to the following maintenance and adjustment procedures or see your dealer for the action required to return to satisfactory operating conditions.

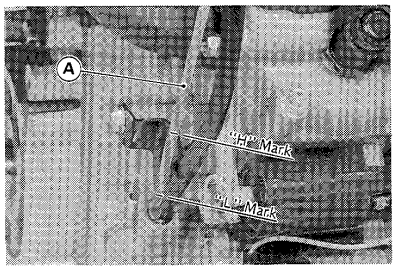
Oil Level Check

⚠CAUTION

Do not operated the engine when oil level is near or below the "L" mark on the dipstick.

Check oil level each day before you operate the engine. Be sure oil level is maintained.

- Level the engine (equipment) to ensure accurate inspection and to prevent overfilling.
- Clean area around the dipstick before removing.
- Remove the dipstick and wipe it with a clean cloth.
- Insert the dipstick into tube following the tube bend and let it's plug firmly fit into the tube, then check the oil level .
- The oil level should be between the "H" and "L" marks on the dipstick.



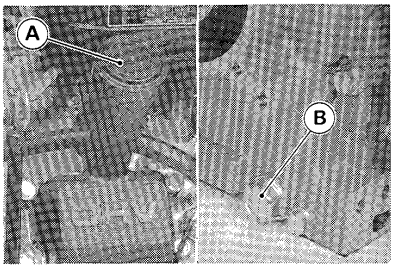
A. Dipstick

- If the oil level is near or below the "L" mark, remove the oil filler cap and add enough engine oil to bring oil level to the "H" mark.

⚠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 plug.



A. Oil Filler Cap B. Drain Plug

⚠CAUTION

Before Starting the engine for the first time, add oil: The engine is shipped dry. Preoil the engine to force all air from internal oil passages and the oil filter.

- Fill fresh engine oil to the specified level.
- Run the engine at slow speed 2 minutes.
- Stop the engine and check the oil level.
- Add oil only to the "H" mark on the dipstick.

Oil Change

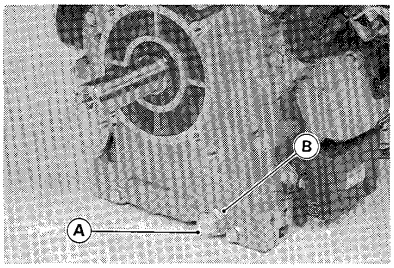
Change oil after first 20 hours of operation. Thereafter change oil every 100 hours.

- Start and warm up the engine so the oil will drain easily.
- Stop the engine.
- Put the engine (equipment) on a level surface.
- Tilt the engine.
- Place a suitable container under the engine.
- Remove the drain plug, and let the oil drain completely.

⚠WARNING

Be careful with hot oil being drained. It may be hot enough to burn you severely.

- Check the gasket at the drain plug. Replace the gasket with a new one if it is damaged.



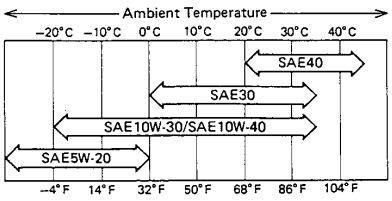
A. Drain Plug B. Gasket

- Install the drain plug with the gasket and tighten it.
- Remove the oil filler cap and refill the engine with a high quality oil of recommended viscosity in the chart.

⚠CAUTION

Use a good quality SD, SE or SF class oil. Choose the viscosity of oil for temperature expected.

- Check the oil level (see Oil Level Check).



NOTE

○ *Some increase in oil consumption may be expected when a multi grade engine oil is used. Check the oil level frequently.*

Engine Oil Capacity

Capacity	1.8 L (3.80 U.S. Pt) [When filter is not removed]
	1.5 L (3.17 U.S. Pt) [When filter is removed]

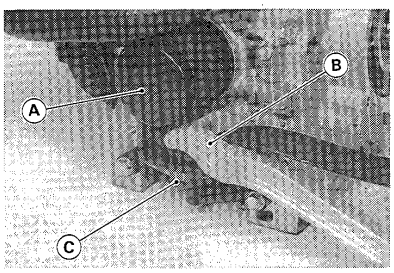
Oil Filter Change

A cartridge type full flow oil filter is used to filter contaminants from the oil before the oil is allowed to reach engine parts. The filter cannot be cleaned, change the filter at intervals specified in the Periodic Maintenance Chart.

The filter has a by-pass valve to ensure adequate engine lubrication if the filter is clogged or oil viscosity is too heavy.

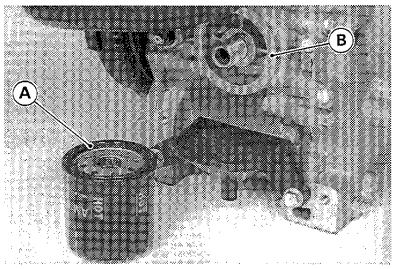
When the by-pass valve opens, oil simply by-passes the filter and lubricates engine parts.

- Change the oil filter at first 20 hours of operation. There after change the every 200 hours.
- Change engine oil (see Oil Change).
- Place a suitable container beneath the oil drip tray to receive oil from the oil filter and oil passages in the engine. Turn the filter counterclockwise to remove it.



A. Oil Filter C. Drip Tray
B. Strap Wrench

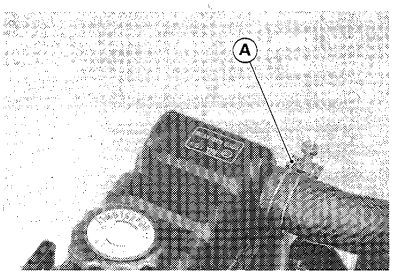
- Install new filter. Turn the filter until the seal contacts mounting surface of the engine. Then turn the filter BY HAND(S) 3/4 turn more.
- Run the engine at slow idle speed 2 minutes. Check for leaks around the engine.
- Stop the engine. Check the oil level (see Oil Level Check). Add oil only to the "H" mark on the dipstick.
- Install the filler cap and dipstick.



A. Seal B. Mounting Surface

Cooling System

This engine is equipped a highly efficient pressurized cooling system using a thermostat to maintain an optimum operating temperature. Coolant bypasses the closed thermostat when cold until operating temperature is attained. If the coolant temperature becomes too high, a thermo switch on the engine activates the coolant warning lamp to alart the operator or cooling problem. The engine must be stopped immediately with the warning light comes on.



A. Horse Clamp

Radiator Hoses:

- Check the radiator hoses for hardening, cracking, or swelling in accordance with the Periodic Maintenance Chart.
- A pressurized cooling system will blow a hose that is not installed properly. Tighten the hose clamps securely.

Radiator and Radiator Cap:

- Check for dirt and insects that may lodge in the radiator.
- Clean them out by using low pressure compressed air or a low pressure washer.

⚠CAUTION

Using high-pressure water, as from a car wash facility, could damage the radiator fins and impair the radiator's effectiveness.

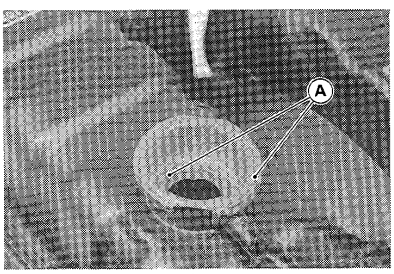
- If a radiator leak is detected, but cannot be spotted visually, have the radiator repaired by your authorized KAWASAKI Engine Dealer.
- Remove the radiator cap as follows.

- First turn the cap counterclockwise to the first stop and wait there for a few seconds.
- Push-down the cap, then turn the cap counterclockwise to the next stop.
- Lift off the cap.
- Check the filler neck of the radiator for signs of damage.

⚠WARNING

Always allow the engine to cool before removing the radiator cap. Then remove the cap slowly and carefully to avoid a possible fast discharge of hot coolant which could cause severe burns.

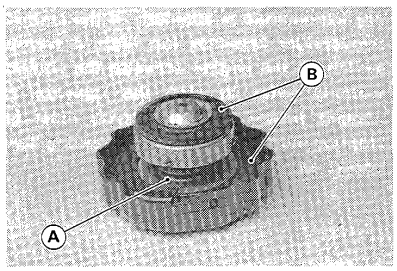
- Check the condition of the top and bottom sealing seats in the filler neck. They must be smooth and clean for the radiator cap to function properly.



A. Sealing Seats

- Check the condition of the valve spring, and the top and bottom valve seats of the radiator cap.

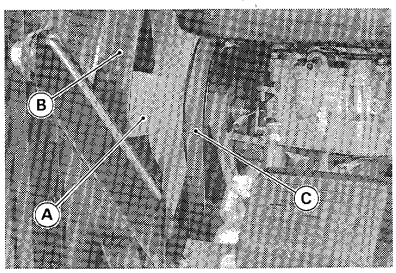
○ If any one of them shows visible damage, replace the cap.



A. Spring B. Valve Seats

Cooling Fan and Drive Belt:

- Be sure the cooling fan blades are not deformed and do not strike the cooling air duct. Deformed blades reduce the cooling system efficiency and throw the fan out of balance.



A. Fan Blades C. Fan Belt
B. Air Duct

- The fan belt should be properly tightened. A tight belt puts an extra load on the fan bearings and shortens the life of the bearings and belt.
- A loose belt allows the belt slipage and lowers the fan speed. This causes excessive belt wear and leads to cooling system overheating.
- Check the belt conditions and belt tension according with the Periodic Maintenance Chart.
- Clean the drive belt by wiping with a clean cloth. Immediately wipe off any spilled oil or grease. Do not use solvents.
- If necessary, have the drive belt replaced and adjusted by your authorized KAWASAKI Engine Dealer.

Coolant

Coolant absorbs excessive heat from the engine and transfers it to the air at the radiator. If the coolant level becomes low, the engine overheats and may suffer severe damage. Check the coolant level each day before operating the engine, and replenish coolant if the level is low. Change the coolant in accordance with the Periodic Maintenance Chart.

Information for Coolant:

To protect the cooling system (consisting of the aluminum engine and radiator) from rust and corrosion, the use of corrosion and rust inhibitor chemicals is not used, over a period of time, the cooling system accumulates rust and scale in the water jacket and radiator. This will clog up the coolant passages, and considerably reduce the efficiency of the cooling system.

⚠WARNING

Use coolant containing corrosion inhibitors made specifically for aluminum engines and radiators in accordance with the instructions of the manufacturer. Chemicals are harmful to the human body.

Soft or distilled water must be used with the antifreeze in the cooling system.

⚠CAUTION

If hard water is used in the system, it causes scale accumulation in the water passages, and considerably reduces the efficiency of the cooling system.

If the lowest ambient temperature encountered falls below the freezing point of water, use permanent antifreeze in the coolant to protect the cooling system against engine and radiator freezeup, as well as from rust and corrosion.

Use a permanent type of antifreeze (soft water and ethylene glycol plus corrosion and rust inhibitor chemicals for aluminum engines and radiators) in the cooling system. On the mixture ratio of coolant, choose the suitable one referring to the relation between freezing point and strength directed on the container.

⚠CAUTION

Permanent types of antifreeze on the market have anti-corrosion and anti-rust properties, When it is diluted excessively, it loses its anti-corrosion property. Dilute a permanent type of antifreeze in accordance with the instructions of manufacturer.

NOTE

○A permanent type of antifreeze is not installed in the cooling system when shipped. Have the first original permanent type of antifreeze replenished by your authorized KAWASAKI Engine Dealer.

Original Coolant:

Type,	Permanent type antifreeze for aluminum engine and radiator
Color,	Green
Mixed ratio,	50% solution of ethylene glycol
Freezing point,	−35°C (−31°F)
Total amount,	2.7L (0.7 U.S. gallon)

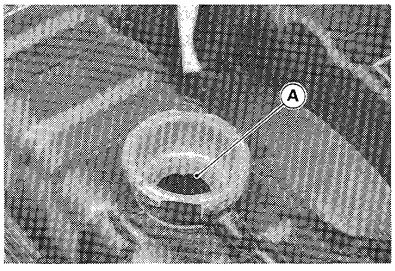
Coolant Level Inspection:

- Put the engine (equipment) on a level surface.
- Remove the radiator cap turning it counterclockwise and check the coolant level in the radiator.

⚠WARNING

Always allow the engine to cool before removing the radiator cap. Then remove the cap slowly and carefully to avoid a possible fast discharge of hot coolant which could cause severe burns.

- Coolant level must be maintained at the filler neck bottom.
- If the amount of the coolant is insufficient, fill the radiator up to the bottom of the radiator filler neck with coolant, and install the cap turning it clockwise.



A. Bottom of Filler Neck

NOTE

○In an emergency you can add water to the radiator, however you must correct the mixture ratio by the addition of antifreeze concentrate as soon as possible.

⚠CAUTION

If coolant must be added often, there is probably leakage in the system, Have the cooling system inspected by your authorized KAWASAKI Dealer.

Coolant Change:

Have the coolant changed by an authorized KAWASAKI Engine Dealer.

Air Cleaner

The FD620 utilized a patented "K-KLEEN" two stage air filtration system. The first stage incorporates a unique curveture and discharge port in the air cleaner case which allows the effects of centrifugal force to expel large particles of dirt and debris. The second stage uses a highly efficient dual element system for final filtration.

Air is filtered by a washable oiled form pre-cleaner, and a replaceable paper element for final filtration before entering the carburetor,

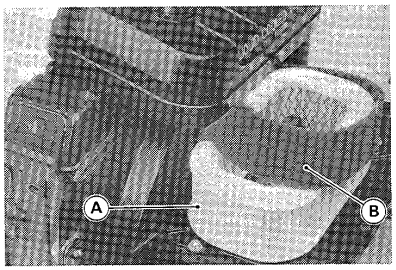
The air cleaner element must be cleaned and replaced in accordance with the Periodic Maintenance Chart, In dusty areas, the elements should be cleaned more frequently than the recommended intervals.

⚠CAUTION

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

Air Cleaner Servicing:

- Remove the wing retaining bolts, washers and air cleaner cover.
- Remove the elements and separate the foam element from the paper element.



A. Paper Element B. Foam Element

⚠CAUTION

Do not clean the elements with a solvents or compressed air.

- Wash the foam element in a detergent and water. Dry it thoroughly.
- Saturate the element with clean engine oil, squeeze out the excess oil, then wrap it in a clean rag and squeeze it as dry as possible, Be careful not to tear the element.
- Clean the paper element by tapping it gently on a flat surface to remove dust, If the element is very dirty or damaged, replace it with a new one or wash the element in a detergent and water.
- Rinse the element until a water is clear. Let the element air-dry thoroughly before install it.

⚠CAUTION

Do not oil the paper element, Do not use pressurized air to clean or dry the element.

- Check the air cleaner housing for deformation or other damage. The housing must seal well and permit only filtered air to reach the carburetor. If the housing is damaged, it must be replaced. Check that no foreign material is obstructing the air passage.
- The element installation is performed in the reverse order of removal.

Valve Clearance

Valve and valve seat wear decreases valve clearance, upsetting valve timing.

⚠CAUTION

If valve clearance is left unadjusted, the wear will eventually cause the valves to remain partly open, which lowers performance, burns the valves and valve seats, and may cause serious engine damage.

Valve clearance for each valve should be checked and adjusted in accordance with the Periodic Maintenance Chart.

Inspection and adjustment should be done by your authorized KAWASAKI Engine Dealer.

Carburetor

The carburetor performs the function of mixing fuel and air in proportions necessary for good engine performance at varying loads, In order for it to function satisfactorily, it must be properly adjusted and maintained.

Idle Mixture Screw Adjustment:

⚠CAUTION

Do not attempt to adjust idle mixture screw with air cleaner removed.

Whenever the idle speed is disturbed, check the idle mixture screw for correct setting.

- Stop the engine.
- Carefully turn the idle mixture screw all the way in until it seats lightly.

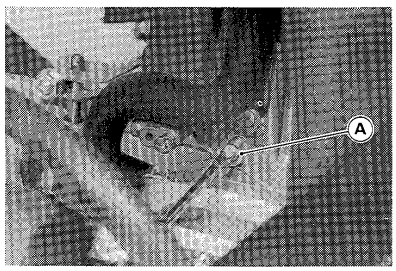
⚠CAUTION

Do not tighten the idle mixture screw or the carburetor body will be damaged and require replacement.

- Back the idle mixture screw out the specified number of turns.

Make adjustments to compensate for altitude or ambient temperature changes and to obtain smoothest engine operation as follow.

- Disconnect all possible external loads from the engine.
- Start and warm the engine completely.
- hold the throttle lever on dash in the idle position.
- Slowly turn the idle mixture screw clockwise to lean the mixture, and counterclockwise to enrichen the mixture.
- Do not vary from the standard setting more than ±¼ turn.
- Stop the engine.



A. Idle Mixture Screw

Idle Mixture Screw Setting (No. of turns out)

Standard Setting	Adjustable Range
1¾	±¼

Idle Speed Adjustment:

⚠CAUTION

Do not attempt to adjust idle speed screw with air cleaner removed.

This adjustment must be made after the idle mixture screw setting is completed.

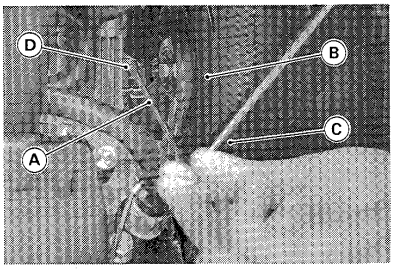
- Start and warm up the engine thoroughly.
- Hold the throttle lever on dash in the idle position (throttle lever on the carburetor in closed position).

⚠WARNING

Always keep your hands and tools clear of the moving parts.

- Be extremly careful not to touch the screw driver against running fan belt, Support the driver onto the radiator

bracket by hand. Then adjust the idle speed screw.



A. Screw Driver
B. Fan Belt
C. Radiator Bracket
D. Idle Speed Screw

- Turn the idle speed screw clockwise to raise, counterclockwise to lower the idle speed.
- Adjust the idle speed to the specification.
- Stop the engine.

Idle Speed

1 550 rpm

NOTE

○Have the idle speed adjusted by your authorized KAWASAKI Engine Dealer.

Fast Idle Speed Adjustment: (Authorized Dealer Only)

NOTE

○Fast idle speed adjustment should be made after the idle speed adjustment is performed.

⚠CAUTION

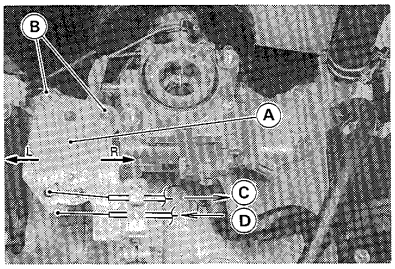
Do not adjust fast idle speed with the air cleaner removed.

- Start and warm up the engine thoroughly.

⚠WARNING

Always keep your hands clear of the moving parts.

- Move the throttle lever on dash in the fast idle position and loosen two M6 control panel mounting bolts enough to move the control panel assembly.
- Carefully move the control panel assembly left or right to obtain the specified fast idle speed.



A. Control Panel
B. M6 Mounting Bolts
C. Fast Idle
D. Open Choke
(Air cleaner is removed for clarity.)

- Tighten the M6 mounting bolts.
- Check the idle speed, and re-adjust the idle speed if necessary.

⚠CAUTION

Be sure to make the idle and fast idle speeds respectively correspond to those of the equipment.

Fast Idle Speed

3600 rpm

NOTE

○Have the fast idle speed adjusted by your authorized KAWASAKI Engine Dealer.

High Altitude Operation:

At high altitude, the standard carburetor air-fuel mixture will be excessively rich. Performance will decrease, and fuel consumption will increase. High altitude performance can be improved by installing a smaller diameter mainjet in the carburetor, If the engine is to be used in high altitude (1000 m and higher), the mainjet high altitude kits are available. See your authorized KAWASAKI Engine Dealer.

Fuel System

Accumulation of moisture or sediment in the fuel system will restrict the flow of fuel and cause carburetor malfunction. The system should be checked in accordance with the Periodic Maintenance Chart.

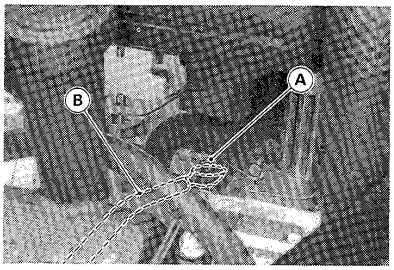
⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the Engine Switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Make sure the engine is cold before working. Wipe any fuel off the engine before starting it.

Inspection:

- Place a suitable hose under the drain screw on the carburetor.
- Run the lower end of the hose into a suitable container.
- Turn out the drain screw a few turns to drain the carburetor and check to see if water or dirt has accumulated in the carburetor.
- Tighten the drain screw.



A. Drain Screw
B. Drain Hose

NOTE

○If any water or dirt appeared during above operation, have the fuel system checked by an authorized KAWASAKI Engine Dealer.

- Check the fuel lines for hardening, cracking or swelling in accordance with the Periodic Maintenance Chart.
- Replace damaged fuel line with a new one.

Electrical System

Precautions:

There are a number of important precautions that are musts when servicing electrical systems. Learn and observe all the rules below.

- Do not reverse the battery lead connections. This will burn out the diodes in the electrical parts.
- Always check battery condition before condemning other parts of an electrical system. A fully charged battery is a must for conducting accurate electrical system tests.
- The electrical parts should never be struck sharply, as with a hammer, or allowed to fall on a hard surface. Such a shock to the parts can damage them.
- To prevent damage to electrical parts, do not disconnect the battery leads or any other electrical connections when the engine switch is on, or while the engine is running.
- Because of the large amount of current, never keep the engine switch turned to the start position when the starter motor will not turn over, or the current may burn out the starter motor windings.
- Take care not to short the leads that are directly connected to the battery positive (+) Terminal to the chassis ground.
- Troubles may involve one or in some cases all items. Never replace a defective part without determining what CAUSED the failure. If the failure was brought on by some other item or items, they too must be repaired or replaced, or the replacement part will soon fail again.
- Make sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying, etc. Poor wires and bad connections will affect electrical system operation.

Electrical System:

The electrical system is made up of a cranking system, ignition system, and charging system.

The cranking system includes a 12V battery, key switch, and shift type starting-motor with a capacity of 0.6 KW.

The ignition system is a 12V battery ignition system which includes a flywheel reluctor, pulser coil (pick up coil), igniter (ignition control unit), ignition coil, spark plug, and 12V battery.

The charging system is made up of a flywheel stator, 12V battery, and regulator to convert AC current to DC current. The stator out put is 20 amps at 3200 rpm.

NOTE

- *Electrical system parts repair requires proper tools, thorough knowledge for repair procedures, and proper training. Have the electrical parts repaired by an authorized KAWASAKI Engine Dealer.*

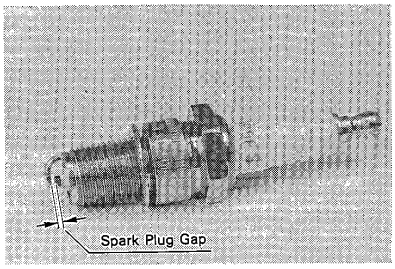
Spark Plug

The standard spark plug is shown in the table. The spark plugs should be taken our periodically in accordance with the Periodic Maintenance Chart for cleaning, inspection, and resetting of the plug gap.

⚠CAUTION

Before removing the spark plug, stop the engine and allow it to cool.

- Carefully pull the plug cap from the spark plug, and remove the spark plug.
- If the plug is oily or has carbon built up on it, clean the plug using a high flash-point solvent and a wire brush or other suitable tool.
- Measure the plug gap with a wire type thickness gauge, and adjust the gap if incorrect by bending the outer electrode.
- If the spark plug electrodes are corroded or damaged, or if the insulator is cracked, replace the spark plug. Use the standard plug or its equivalent.
- The spark plug installation is performed in the reverse order of removal.



Spark Plug

Standard Spark Plug	NGK BMR4A
Spark Plug Gap	0.6 ~ 0.7 mm (0.024 ~ 0.028 in.)
Tightening Torque	20 ~ 27 N-m (15 ~ 20 lb-ft)

Preparation for Storage

Follow the procedure below if the engine will be stored over 30 days.

- Clean the entire engine thoroughly.
- Repair worn or damaged parts. Install new parts if necessary.
- Clean the air cleaner element (see Air Cleaner Servicing).
- Drain remaining gasoline completely out of the fuel tank and fuel line, and empty the carburetor by unscrewing the drain screw at the bottom of the float chamber.

⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the engine switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Remove the spark plugs and pour approximately 15cc of engine oil into each cylinder, Turn the switch key to the "START" position for a few seconds to coat the cylinder walls with oil, and install the spark plugs.
- Spray oil on all unpainted metal surfaces to prevent rusting. Avoid getting oil on rubber parts.
- Remove the battery, and store it where it will not be exposed to direct sunlight, moisture, or freezing temperature. During storage it should be given a slow charge about once a month.
- Tie plastic bags over the exhaust pipe and inlet air duct on the air cleaner cover to prevent moisture.
- Put a dust proof cover over the engine and store it in a clean and dry area.

Removing Engine from Storage

- Check the electrolyte level in the battery. Charge the battery if necessary, and install it.
- Make sure the spark plugs are tight.
- Fill the fuel tank with fresh gasoline.
- Change the engine oil (see Oil Change).
- Check the coolant level, add the coolant if the level is low.
- Check all items for "Daily Check" listed in the "Periodic Maintenance Chart".

⚠WARNING

Start the engine only outdoors or in a well ventilated place. Exhaust fumes are dangerous.

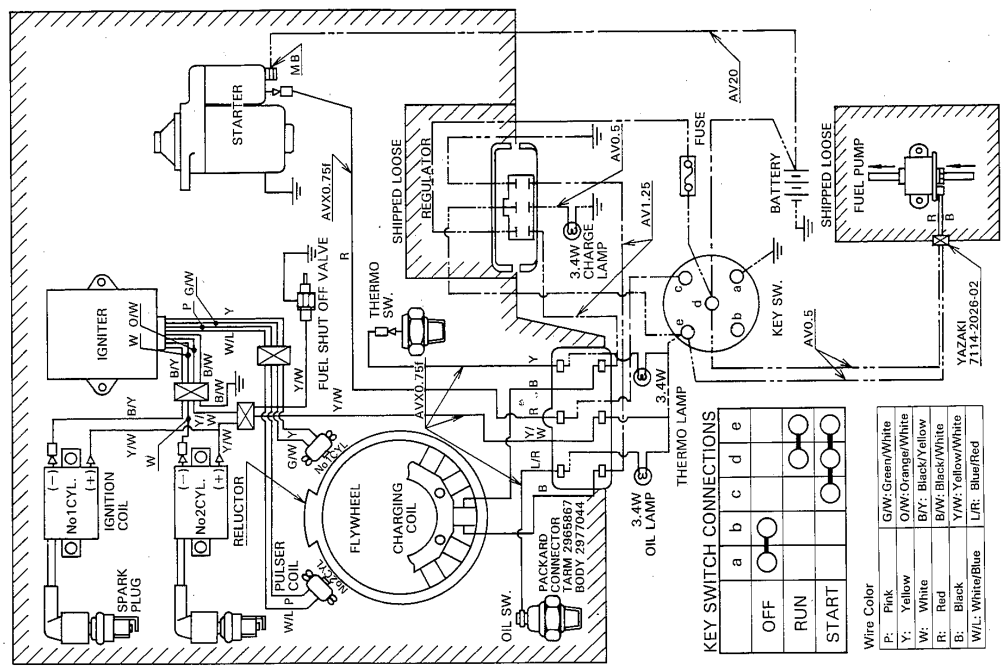
- Start the engine, let it warm up thoroughly before operating the engine.

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

Symptom		Probable Cause	Remedy
Engine won't start or output is low	Insufficient compression	Faulty piston, cylinder, piston ring, and head gasket	*
		Faulty valves	
		Loosen spark plug	Tighten properly
		Loose cylinder head bolts	
	No fuel to combustion chamber	No fuel in fuel tank	Fill fuel tank
		Fuel valve not in "OPEN" position	Open fuel valve
		Blocked fuel valve or tube	Clean
		Blocked air vent in tank cap	
		Faulty carburetor	*
	Spark plug fouled by fuel	Over-rich fuel/air mixture	Turn choke lever to "OPEN". Rotate engine with spark plug removed to discharge excess fuel. Clean spark plug.
		Clogged air clean	Clean
		Faulty carburetor	*
		Incorrect grade/type of fuel	Replace gasoline
		Water in fuel	

Symptom		Probable Cause	Remedy
	No spark or weak spark	Faulty spark plug	Replace spark plug
		Faulty ignition coil	*
		Faulty igniter	
		Faulty pulser coil	
	Cranking System	Weak or faulty battery	*Charge or replace
		Faulty starter motor	*Repair or replace
		Faulty engine switch	Replace
Low output	Engine over heats	Clogged air cleaner	Clean
		Carbon built-up in combustion chamber	*
		Too much oil in crankcase	Correct oil level
		Lack of coolant	Add coolant correct level
		Loose or slipping fan belt Clogged cooling system Poor ventilation around engine Excessive engine load	*Adjust or replace belt *Clean cooling system Select a better location Adjust loads
Engine turns erratically	Engine surge	Restricted fuel flow in fuel line	correct
		Incorrect carb. adjustment	*Adjust
	Problem in governor system	Incorrect linkage	*Correct
		faulty system's parts	*Repair or replace

A remedy marked with "*" requires special proficiency and tools. See your authorized Kawasaki Engine Dealer unless you have the proper equipment and mechanical proficiency.



NOTE : PORTION SURROUNDED BY ⁄⁄⁄⁄ SHOWS KAWASAKI PROCUREMENT PARTS.

FD620D

KAWASAKI
HEAVY INDUSTRIES, LTD.
CONSUMER PRODUCTS & COMPONENTS GROUP

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