

Kawasaki

ENGINES

OWNER'S MANUAL

2-STROKE AIR-COOLED GASOLINE ENGINE

TJ23E
TJ27E
TJ35E
TJ45E
TJ53E

P/N 99976-2152-04

2. FUEL AND OIL RECOMMENDATIONS:

WARNING

Gasoline is extremely flammable and can be explosive under certain conditions, creating the potential for serious burns. Turn the ignition switch to "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 completely to the top. If the tank is filled completely to the top, when the gasoline tank becomes full, 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. Machine oil is a poisonous substance. Be careful not to contact the machine oil to eyes and mouth.

NOTICE

Running on gasoline only will cause the engine to seize. Use gasoline-oil mixture.

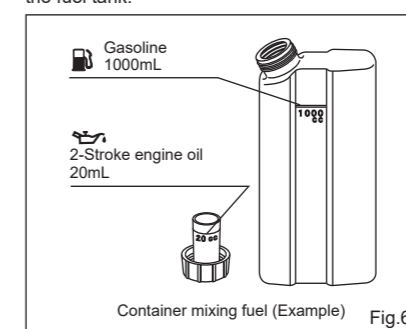
Kawasaki 2-stroke engine requires a gasoline-oil mixture.

Gasoline and engine oil mixing ratio:

50:1
(Gasoline 50, 2-stroke engine Oil 1)

(Refer to Fig.6)

Pour the 2-stroke engine oil and the gasoline into an appropriate container with the ratio shown above, and shake it thoroughly to avoid the separation of them. And then, pour it into the fuel tank.



Fuel Type and Octane Rating

Use clean, fresh unleaded gasoline with ethanol volume content not more than 10% and an octane rating equal to or higher than that shown in the table.

Fuel Type	Unleaded Gasoline
Ethanol Content	E10 or less
Minimum Octane Rating	Research Octane Number (RON) 91

Table 1

NOTICE

Do not use any fuel that contains more ethanol or other oxygenates than specified for E10 fuel* in this engine. Damage to the engine and fuel system, or engine starting and/or performance problems may result from the use of improper fuel.

* E10 means fuel containing up to 10% ethanol as specified by European directive.

NOTE

- Do not use gasoline that has been stored longer than two months.
- To ensure proper starting at low ambient temperatures, fresh winter grade fuel must be used.
- If "knocking or pinging" occurs, use a different brand of gasoline or higher octane rating.

Recommended Engine Oil
High quality 2-stroke engine oil
JASO – FC class or higher
ISO – EGC class or higher

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

WARNING

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

NOTICE

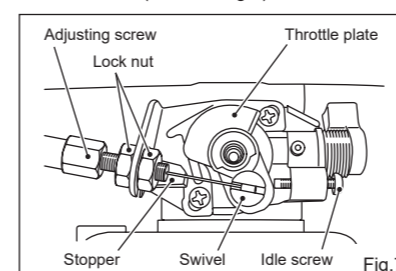
NOTICE is used to address practices not related to personal injury.

NOTE

NOTE indicates information that may help or guide you in the operation or service of the engine.

1

3. ADJUSTMENT OF THROTTLE CABLE: (Refer to Fig.7)



- When setting the engine to equipments (bush cutter, Etc.), adjust the throttle cable in the following procedures.

- Remove the air cleaner cap. Loosen the lock nut.
- Turn the adjusting screw. Be sure that the idle screw touches throttle plate at the swivel and the play of the throttle cable is around 2 mm.
- Squeeze the throttle lever. Be sure that throttle plate touches the stopper.
- Tighten the lock nut.

4. STARTING:

Fuel

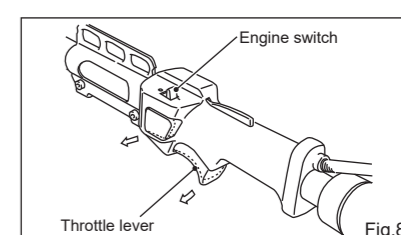
- Level the engine before fueling.
- Open the fuel tank cap and fill the fuel tank with 50 : 1 gas/oil pre-mixed fuel.
- Pour slowly to avoid "spill back" and allow air to escape from the fuel tank.
- Close the tank cap securely by turning it clockwise as far as it will go.

WARNING

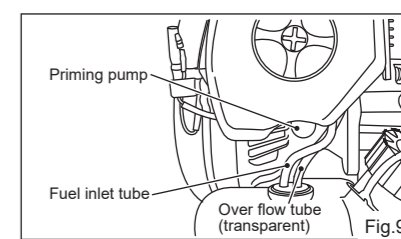
Never fill the tank so the fuel level rises into the filler neck. If the tank is overfilled, heat may cause the fuel to expand and overflow through the vents in the tank cap. After refueling, make sure the fuel tank cap is closed securely. If gasoline is spilled on the fuel tank, wipe it off immediately.

DANGER

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



- Turn the engine switch on the engine or the equipment to the "I" (starting) position. (Refer to Fig.8)
- Move the throttle lever on the equipment to the fully CLOSED (engine idle speed) position. (Refer to Fig.8)



- Slowly push the priming pump several times until the fuel comes out of the overflow tube. (Refer to Fig.9)

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

DANGER

DO NOT disassemble or replace the engine. Be sure to perform everyday's maintenance to this engine according to the explanation of this "instruction for use". All other maintenance and repairs should be done by your equipment dealer. Exhaust gas contains carbon monoxide, a colorless, odorless poisonous gas. Inhaling carbon monoxide can cause serious brain injury or death.

DO NOT run the engine in enclosed areas. Operate only in a well-ventilated area. Gasoline is extremely flammable and can be explosive under certain conditions, creating the potential for serious burns. When refueling, servicing fuel system, draining gasoline and/or adjusting the carburetor:

Stop engine and allow it to cool before refueling.

DO NOT smoke. Make sure the area is well-ventilated and free from any source of flame or sparks, including the pilot light of any appliance.

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.

Engines can become extremely hot during normal operation. To prevent fire hazard: Keep the engine at least 1 m (3.3 ft) away from buildings, obstructions and other flammable 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, brush covered or grass 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.

WARNING

DO NOT remove the silencer. The noise of the engine over a long period of time possibility hurts your hearing ability. Or it will cause to safe driving of the machine. Noise also cause to others within the limits.

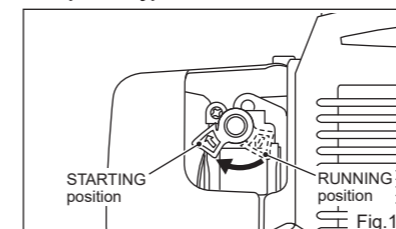
Read warning labels which are on the engine and understand them. If any label is missing, damaged, or worn, get a replacement from your equipment dealer and install it in the correct position.

2

NOTE

- This engine is designed so that overflowed fuel due to pushing a priming pump is to be returned to the fuel tank.
- There is no fear of flooding the engine, so push the priming pump enough times to get the engine started.

Lift up lever type

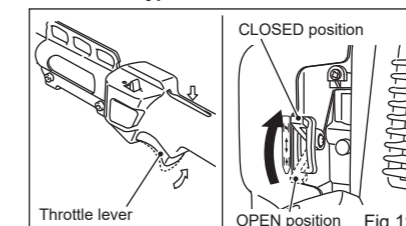


- Turn the lift up lever clockwise to switch to the "STARTING" position. (Refer to Fig.10)

NOTE

- If the throttle lever is squeezed or locked at half position, the engine won't start. Be sure the throttle lever is in the fully CLOSED position.

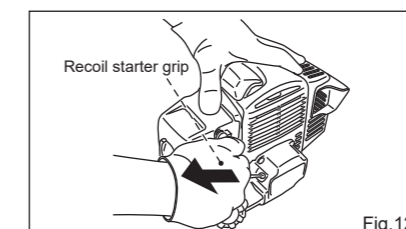
Choke lever type



- Move the throttle lever to the half position. (Refer to Fig.11)
- Move the choke lever to the "CLOSED" position. (Refer to Fig.11)

NOTE

- When the engine is already warm up, no lift up lever or choke lever required.

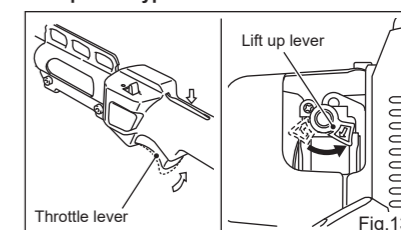


- Pull the recoil starter grip slowly to engage the starter, then give a short, quick pull. (Refer to Fig.12)

WARNING

Releasing the starting rope suddenly may allow the rope to whip around and cause injury and/or damage the recoil starting mechanism. When starting the engine, firmly grasp the recoil starter grip; do not grasp the starter rope itself. Always control the rope as it rewinds into the housing.

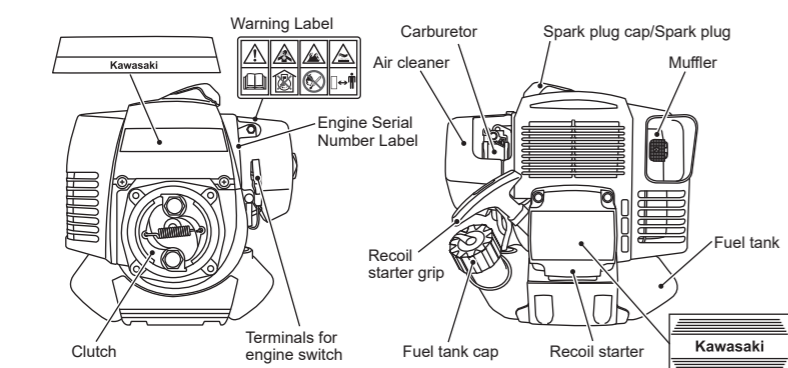
Lift up lever type



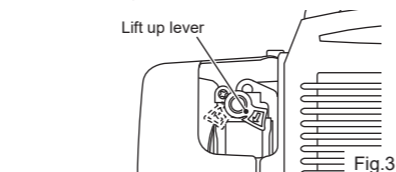
- Once squeeze the throttle lever to switch the lift up lever to the "RUNNING" (engine idle speed) position, and then release the throttle lever back to fully "CLOSED" (engine idle speed) position. (Refer to Fig.13)

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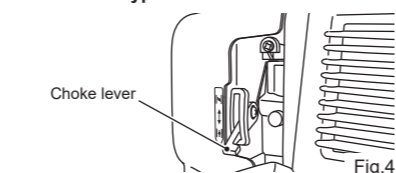
1. LOCATION OF PARTS: (Refer to Fig.1 to Fig.5)



Lift up lever type



Choke lever type



Warning Label

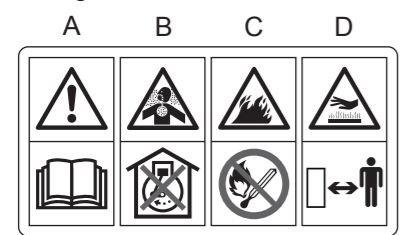


Fig.2

- A: The Owner's manual contains important information on safe operation. Read it before operating engine.
B: Exhaust gas contains carbon monoxide, an odorless and deadly poison. Do not run engine in an enclosed area.
C: Gasoline is extremely flammable and explosive. No open flames or other source of ignition.
D: Engines can be extremely hot during normal operation. Keep away from hot parts of the engine.

Engine Serial Number Label

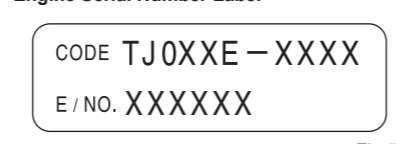
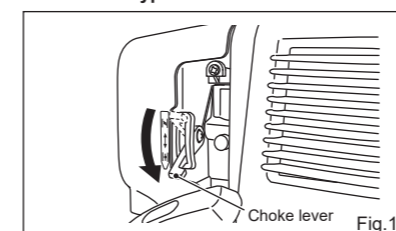


Fig.5

Engine Serial Number:
The engine serial number 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.

Choke lever type



- After starting, move the choke lever to the "OPEN" position gradually. (Refer to Fig.14)
- If the engine fires only briefly and stops, move the choke lever to the "OPEN" position. (Refer to Fig.14)
- Repeat the recoil start until the engine starts.

After starting, run the engine at the idling speed for a few minutes. (See Warming up)

NOTE

- Should the engine fail to start, do not try the recoil start many times with the lift up lever to the "STARTING" position or the choke lever to the "CLOSED" position. This will cause the fuel to flood into the cylinder and make starting even more difficult. In this case, set the lift up lever to the "RUNNING" position or the choke lever to the "OPEN" position. And then, repeat the starting.
- After starting, vary the engine speed a few times, by operating the throttle lever to draw out the remaining air in the carburetor.

5. WARMING UP:

- After starting the engine, run the engine at the idling speed (throttle lever position is fully CLOSED) for a few minutes.

NOTICE

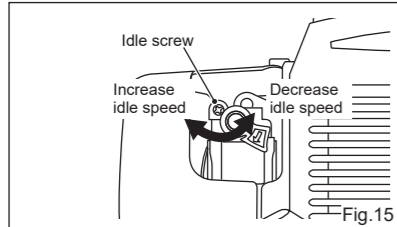
Allow sufficient warm-up time to prevent engine damage and run the engine smoothly. The engine should be run at idle speed for a few minutes to allow it to warm up before applying a load. This will allow oil to reach engine parts, and allow piston clearance to reach design specifications.

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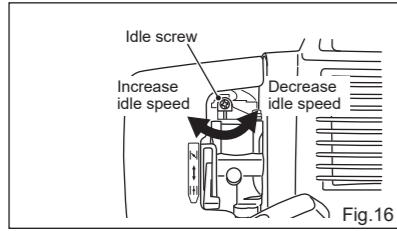
3

6. ADJUSTING: (Refer to Fig.15 and Fig.16)

Lift up lever type



Choke lever type



Idling Speed

- If the cutting blade move when the engine is running at the idle speed, turn the idle screw counterclockwise to decrease the engine idle speed.
- If the engine does not run the idle speed, it may be changed too low, turn the idle screw clockwise to increase the engine idle speed. The stable idle speed is shown below.

	TJ23E	TJ27E	TJ35E	TJ45E	TJ53E
Stable idle speed r/min (rpm)	3000	3000	3000	2800	2800

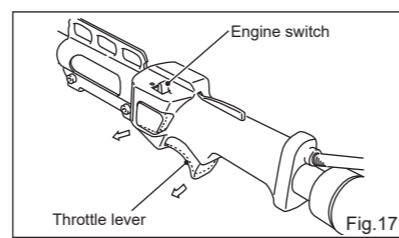
Fuel Adjustment

The carburetor has been adjusted to the optimum fuel supply at the factory. Don't reset the carburetor setting.

NOTE

- If adjustment is needed, it should be performed by your equipment dealer.

7. STOPPING: (Refer to Fig.17)



- Move the throttle lever on the equipment to the fully CLOSED (engine idle speed) position, and the engine running at idle speed.
- Turn the engine switch to the "O" (stopping) position.

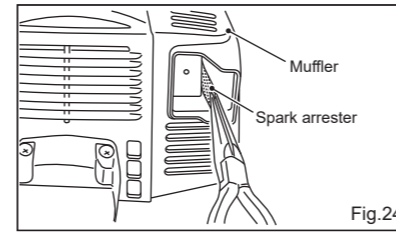
NOTICE

Suddenly stopping engine from high-speed operation can cause engine damage. Reduce engine speed to idle speed for one minute before shutting engine off after high-speed, full-load operation.

Emergency stop

- Turn the engine switch to the "O" (stopping) position.

9. STORAGE: (Refer to Fig.25)

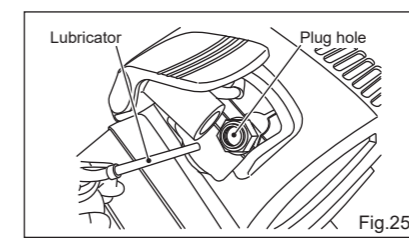


Spark Arrester Service (Refer to Fig.24)

- Every 50 hours of operation
- Remove the spark arrester from the exhaust hole of muffer
- Clean deposits from the spark arrester screen by brushing it.
- Install the spark arrester.

Carbon Removal of Engine Internal Parts

Every 50 hours of operation These items must be performed with proper tools. See your equipment dealer.



- Engine 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.
- Clean the engine.
- Remove all the fuel from the tank and run the engine at idling to use up the fuel in the carburetor.
- Remove the spark plug, pour in 0.5 mL of new 2-stroke engine oil through the plug hole, pull the recoil starter grip several times, and reinstall the spark plug.
- Slowly pull the recoil starter grip until resistance is felt.
- Store the engine in a clean and dry place.

WARNING

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

8. MAINTENANCE :

WARNING

Prevent accidental starting during engine service by removing the spark plug caps.

Periodic Maintenance Chart

Table 3

Maintenance	Interval				
	Daily	First 20 hours	Every 20 hours	Every 50 hours	Every 100 hours
Check and replenish fuel	●				
Check for fuel leakage	●				
Check bolts, nuts and screws for looseness and loss	●				
Clean fuel filter			●		
★ Clean air cleaner element (foam and paper)			●		
Tighten bolts, nuts and screws		●		●	
Clean spark plug and adjust electrode gap				●	
★ Remove dust and dirt from cylinder fins				●	
◆ Remove carbon deposits on piston head and inside cylinder				●	
◆ Remove carbon deposits in the exhaust pipe of muffer				●	
Clean screen of spark arrester				●	
◆ Check the sliding portion of crankshaft, connecting rod etc.					●
Fuel tube	It is recommended to replace every 3 years.				

NOTE

- The service intervals indicated are to be used as a guide. Service to be performed more frequently as necessary by operating condition.
- When damage or defect occurs in checked parts, replace with a new one.
- ◆: Service should be performed by an equipment dealer.
- ★: Service more frequently under dusty conditions.

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10. TROUBLESHOOTING GUIDE :

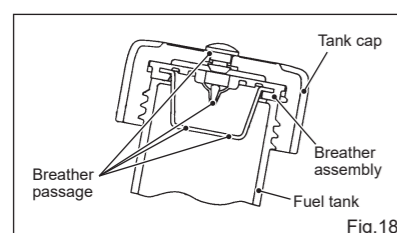
If the engine malfunctions, carefully examine the symptoms and the operating conditions, and use the table below as a guide to troubleshooting.

Table 4

Symptom	Probable Cause	Remedy	
Engine won't start or output is low	Insufficient compression	Faulty piston, cylinder and piston ring	◆
		Loose spark plug	Tighten properly
		Loose cylinder bolts	
	No fuel to combustion chamber	No fuel in fuel tank	Fill fuel tank
		Blocked fuel filter or tube	Clean
		Blocked air vent in tank cap	
	Spark plug fouled by fuel	Faulty carburetor	◆
		Over-rich fuel/air mixture	Turn lift up lever to "RUNNING" position. Move the choke lever to "OPEN" position. Pull recoil starter grip with spark plug removed to discharge excess fuel. Clean spark plug.
		Clogged air cleaner	Clean
		Faulty carburetor	◆
Incorrect grade/type of fuel		Change fuel	
Water in fuel			
No spark or weak spark		Faulty spark plug	Replace spark plug
Faulty ignition coil	◆		
Low output	Engine overheats	Turn engine switch to "I" (starting) position	
	Clogged air cleaner	Clean	
	Recoil starter or cooling air path clogged with dirt		
	Carbon built-up in combustion chamber	◆	
	Poor ventilation around engine	Select a better location	

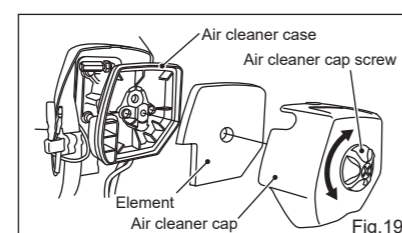
- ◆: Service should be performed by an equipment dealer.

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Fuel Tank Cap Service (Refer to Fig.18)

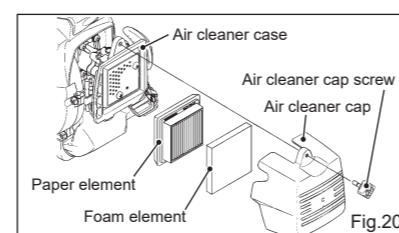
A breather passage is incorporated in the tank cap. If the breather passage is clogged, the fuel will not flow into the carburetor, causing problems with starting or running the engine. At the same time, make sure that the base of the breather assembly is fitted firmly into the groove inside the tank cap as shown.



Air Cleaner Service

Foam Element Type (Refer to Fig.19)

- Clean the air cleaner element every 20 hours.
- Remove the air cleaner cap from the air cleaner case by removing the air cleaner cap screw.
- Remove the element from the air cleaner case.
- Wash the element in detergent and water, and dry it thoroughly.
- Reinstall the element in the air cleaner case and reinstall the air cleaner, and tighten the screw.



Paper Element Type (Refer to Fig.20)

- Clean the foam and paper elements every 20 hours.
- Remove the air cleaner cap from the air cleaner case by removing the air cleaner cap screw.
- Remove the foam element from the air cleaner case.
- Wash the element in detergent and water, and dry it thoroughly.
- Remove the paper element from the air cleaner case.
- Clean the paper element by tapping gently to remove dust. If very dirty, replace the paper element with a new one.
- Reinstall the paper element in the air cleaner case and foam element in the air cleaner cap.
- Reinstall the air cleaner cap, and tighten the screw.

NOTE

- When installing the air cleaner cap, insert the tabs of the air cleaner case in the slots of the air cleaner cap. (Refer to Fig.21)

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11. ENVIRONMENTAL PROTECTION :

To help preserve the environment, properly discard used batteries, oils and fluids, or other engine components that you might dispose of in the future. Consult your equipment dealer or local environmental waste agency for their proper disposal procedure. This also applies to disposal of the entire engine at the end of its life.

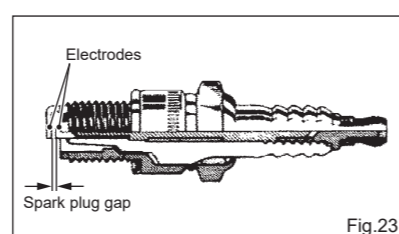
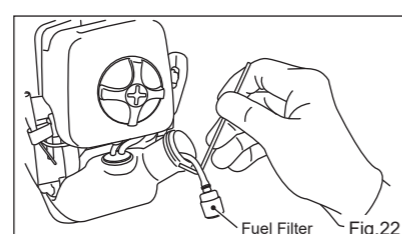
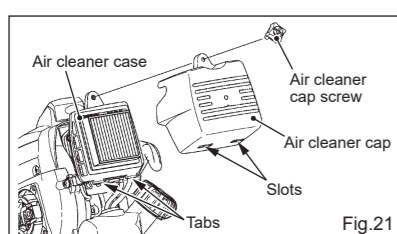
12. SPECIFICATIONS :

Table 5

Model name	TJ23E	TJ27E	TJ35E	TJ45E	TJ53E
Type	Forced air-cooled, 2-stroke piston valve, gasoline engine.				
Displacement	mL 23.3	26.3	34.4	45.4	53.2
Ignition System	Flywheel magneto with CDI (Capacitive Discharge Ignition)				
Spark Plug name	NGK : BPMR7A			NGK : BPMR8Y	
Air Cleaner	Dry type				
Cooling System	Forced Air Cooled				
Starter	Recoil Starter				
Fuel	Mixture of gasoline and oil Gasoline : RON91				
Oil	High quality 2-stroke engine oil JASO - FC class or higher ISO - EGC class or higher				
Mixing Ratio	Gasoline : 2-stroke oil = 50 : 1				
L x W x H	mm 171x246x221	171x247x221	182x260x238	188x262x260	202x289x274
Tank Capacity	L 0.5	0.5	0.7	0.9	1.1

The above specifications are subject to change without notice due to improvements in design and performance during production.

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Fuel Filter Service (Refer to Fig.22)

- Every 20 hours of operation
- Pull the fuel filter out from the fuel tank.
- Clean the fuel filter in a bath of high flash-point solvent.
- Dry the fuel filter and reinstall it into the fuel tank.

NOTE

- If a fuel still does not flow well after the cleaning, replace the fuel filter with new one.

WARNING

Many solvents are highly flammable and may cause serious burns. 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. Clean only in a well-ventilated area away from sources of sparks or flame, including any appliances with a pilot light.

Spark Plug Service (Refer to Fig.23)

- Every 50 hours of operation
- Take the spark plug cap with fingers, and pull it up.
- Remove the spark plug by using a suitable plug wrench.
- Clean the electrodes by scraping or with a wire brush to remove carbon deposits and wetness.
- 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 it if necessary. The gap must be between 0.6 and 0.7mm. To change the gap, bend only side-electrode, using a spark plug tool.
- Install and tighten the spark plug to 14N·m.
- Fit the spark plug cap on the spark plug securely.
- Pull up the spark plug cap lightly to make sure of the installation of the spark plug cap.

Recommended spark plug:
TJ23E/TJ27E/TJ35E/TJ45E ... NGK BPMR7A
TJ53E ... NGK BPMR8Y

NOTICE

Improper element cleaning can result in engine damage. Do not use compressed air to clean or dry element. Always clean element with an approved high flash point-solvent only. Never use gasoline. Do not wash paper element. Do not oil paper element. Do not operate engine with air filter parts removed.

NOTE

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

Location:
1-1 Kawasaki-cho Akashi, Hyogo Prefecture, Japan

Contact:
Concerning maintenance or supply parts, please contact equipment manufacturer. Contact address and phone number are in the manual of the equipment.

Kawasaki
— ENGINES —
KAWASAKI MOTORS, LTD.

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