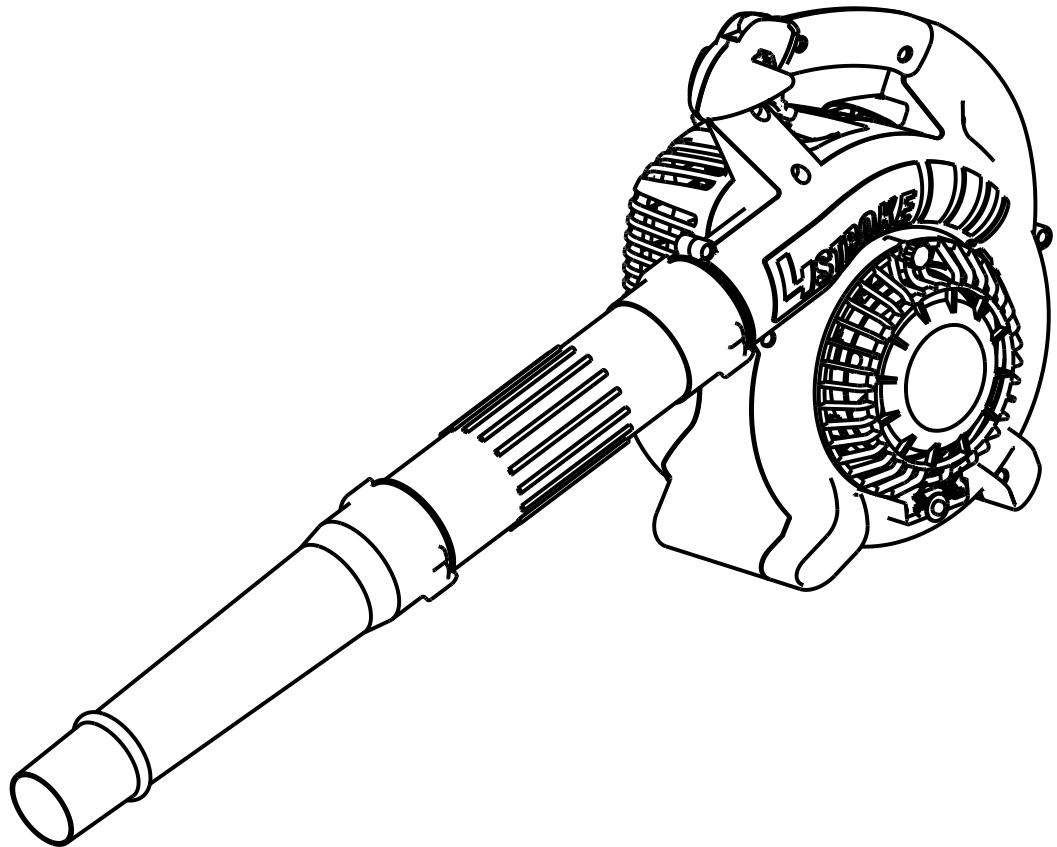


BLOWER

BHX2500



INSTRUCTION MANUAL

Important:

Read this instruction manual carefully before putting the Blower into operation and strictly observe the safety regulations! Preserve instruction manual carefully!

Thank you very much for selecting the MAKITA blower. We are pleased to be able to offer you the MAKITA blower which is the result of a long development programme and many years of knowledge and experience.

The blower models BHX2500 combines the advantages of state-of-the-art technology with ergonomic design. They are of light weight, handy, compact and represent professional equipment for a great variety of applications.

Please read, understand and follow this booklet which refers in detail to the various points that will demonstrate its outstanding performance. This will assist you to safely obtain the best possible results from your MAKITA Blower.



Table of Contents

	Page
Symbols	2
Safety instructions	3-5
Specification	6
Designation of parts	7
Assembly instructions	8
Before start of operation	9-10
Operation	11-12
Adjustment of idling	12
Operation method	13
Inspection and maintenance	14-16
Storage	16
Troubleshooting	18

SYMBOLS

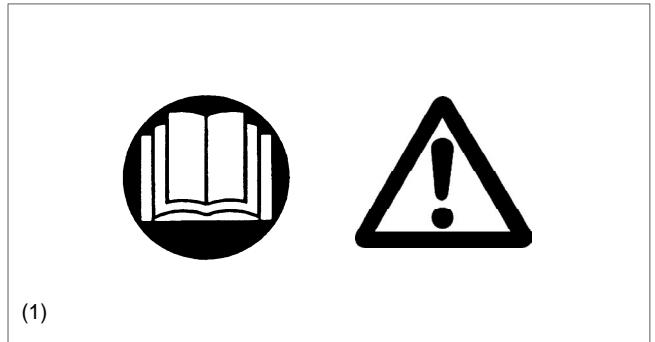
It is very important to understand the following symbols when reading this instructions manual.

	WARNING/DANGER		Fuel (Gasoline)
	Read, Understand and Follow Instruction Manual		Engine-manual Start
	Forbidden		Emergency Stop
	No Smoking		First Aid
	No Open Flame		Recycling
	Protective Gloves must be Worn		ON/START
	Keep the Area of Operation Clear of All Persons and Pets		OFF/STOP
	Wear Eye and Ear Protection		

SAFETY INSTRUCTIONS

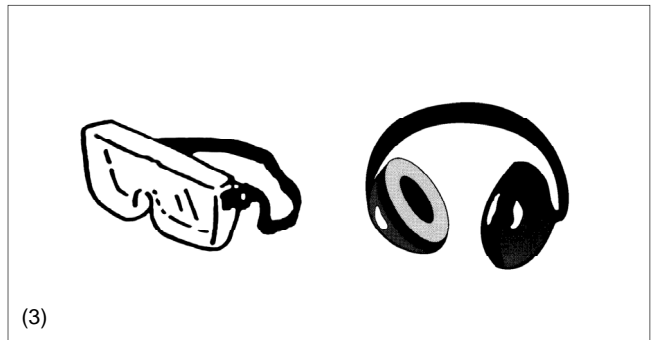
General Instructions

- To ensure correct and safe operation, the user must read, understand and follow this instruction manual to assure familiarity with the handling of the blower (1). Users insufficiently informed will risk danger to themselves as well as others due to improper handling.
- It is recommended only to loan the blower to people who have proven to be experienced with blowers.
- Always hand over the instruction manual.
- First-time users should ask the dealer for basic instructions to familiarize oneself with the handling of a blower.
- Children and young persons aged under 18 years must not be allowed to operate the blower. Persons over the age of 16 years may however use the tool for the purpose of being trained only while under the direct supervision of a qualified trainer.
- Use blowers with the utmost care and attention.
- Operate the blower only if you are in good physical condition.
- Perform all work conscientiously and carefully. The user has to accept responsibility for others.
- Never use the blower while under the influence of alcohol or drugs (2).
- Do not use the unit when you are tired.
- Save these instructions for future referral.



Personal Protective Equipment

- The clothing worn should be functional and appropriate, i. e. It should be tight-fitting but not cause a hinderance. Do not wear jewelry, clothing or long hair which could be drawn into the air intake.
- In order to avoid head-, eye-, hand- or foot injuries as well as to protect your hearing the following protective equipment and protective clothing must be used during operation of the blower.



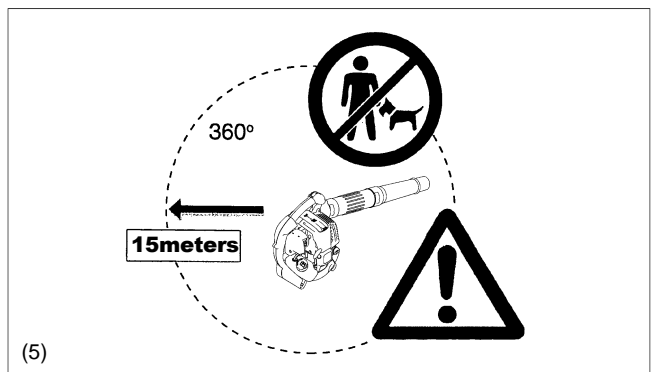
Pay particular attention to the following regulations

- Clothing must be sturdy and snug-fitting, but allow complete freedom of movement. Avoid loose-fitting jackets, flared or cuffed pants, scarfs, unconfined long hair or anything that could be drawn into the air intake. Wear overalls or long pants to protect your legs. Do not wear shorts. (4)
- Blower noise may damage your hearing. Wear sound barriers (ear plugs or ear muffers) to protect your hearing. Continual and regular users should have their hearing checked regularly. (3)
- Use of gloves when working with the blower is recommended. Good footing is most important. Wear sturdy shoes with nonslip soles. (4)
- Proper eye protection is a must. Even though the discharge is directed away from the operator, ricochets and bouncebacks can occur during blower operation. (3)
- Never operate a blower unless wearing goggles or properly fitted safety glasses with adequate top and side protection which comply with ANSI Z 87. 1 (or your applicable national standard).



Starting up the blower

- Please make sure that there are no children or other people within a working range of 15 meters (5), also pay attention to any animals in the working vicinity. Never use the blower in urban areas.
- Before operating, always check that the blower is safe for operation:
Check the security of the throttle lever. The throttle lever should be checked for smooth and easy action. Check for proper functioning of the throttle lever lock. Check for clean and dry handles and test the function of the I-O switch. Keep handles free of oil and fuel.

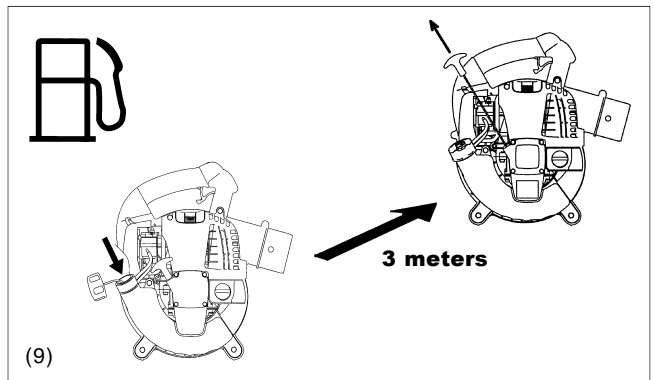
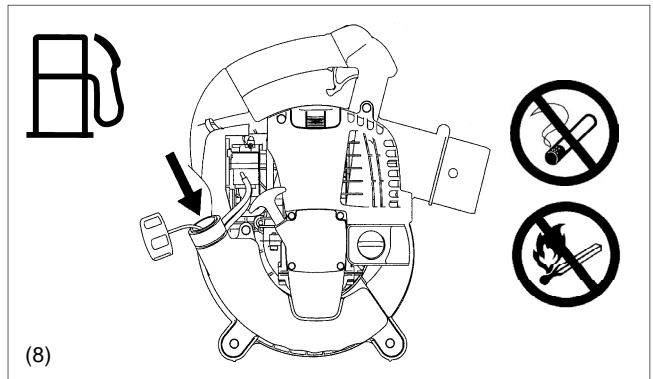
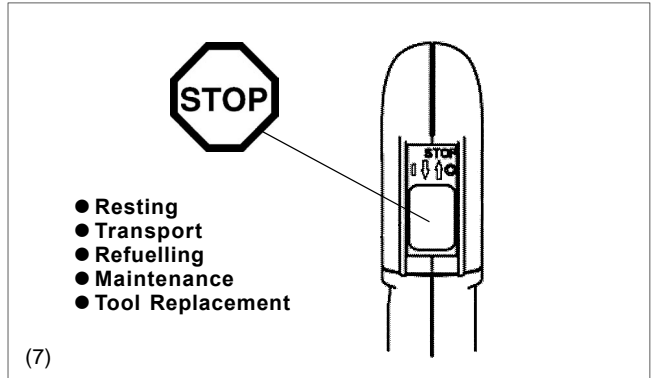
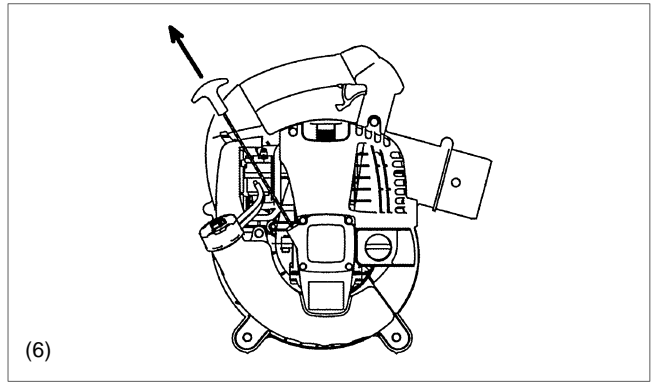


Start the Blower only in accordance with the instructions. Do not use any other methods for starting the engine (6) !

- Use the blower and the tools supplied only for applications specified.
- Start the blower engine only after the entire tool has been assembled. Operation of the tool is permitted only after all the appropriate accessories are attached.
- The engine is to be switched off immediately if there are any engine problems.
- When working with the blower, always wrap your fingers tightly around the handle, keeping the control handle cradled between your thumb and forefinger. Keep your hand in this position to have your machine under control at all times. Make sure your control handle (and grip for vacuum attachment) are in good condition and free of moisture, pitch, oil or grease. Always ensure a safe, well-balanced footing.
- Operate the blower in such a manner as to avoid inhalation of the exhaust gases. Never run the engine in enclosed rooms (risk of suffocation and gas poisoning). Carbon monoxide is an odorless gas. Always ensure there is adequate ventilation.
- Switch off the engine when resting and when leaving the blower unattended. Place it in a safe location prevent danger to others, setting fire to combustible materials, or damage to the machine.
- Never lay the hot blower onto dry grass or onto any combustible materials.
- All protective parts and guards supplied with the machine must be used during operation.
- Never operate the engine with a faulty exhaust muffler.
- Shut off the engine during transport (7).
- Position the blower safely during car or truck transportation to avoid fuel leakage.
- When transporting the blower, ensure that the fuel tank is completely empty.

Refuelling

- Shut off the engine during refuelling (7), keep well away from open flame (8) and do not smoke.
- Avoid skin contact with petroleum products. Do not inhale fuel vapor. Always wear protective gloves during refuelling. Change and clean protective clothing at regular intervals.
- Take care not to spill either fuel or oil in order to prevent soil contamination (environmental protection). Clean the blower immediately after fuel has been spilt. Allow wet cloths to dry before disposing in properly, covered container to prevent spontaneous combustion.
- Avoid any fuel contact with your clothing. Change your clothing immediately if fuel has been spilled on it (fire hazard).
- Inspect the fuel cap at regular intervals making sure that it stays securely fastened.
- Carefully tighten the locking screw of the fuel tank. Change locations to start the engine (at least 3 meters away from the place of refuelling) (9).
- Never refuel in closed rooms. Fuel vapors accumulate at ground level (risk of explosions)
- Only transport and store fuel in approved containers. Make sure stored fuel is not accessible to children.
- Do not attempt to refuel a hot or a running engine.



Method of operation

- Use the blower only in good light and visibility. During cold seasons beware of slippery or wet areas, ice and snow (risk of slipping). Always ensure a safe footing.
- Never work on unstable surfaces or steep terrain.
- To reduce the risk of personal injury, do not direct air blast towards bystanders, since the high pressure of the air flow could injure eyes and could blow small objects at great speed.
- Never insert any foreign object into the air intake of the machine or into the nozzle of the blower. It will damage the fan wheel and may cause serious injury to the operator or bystanders as a result of the object or broken parts being thrown out at high speed.
- Pay attention to the direction of the wind, i.e., do not work against the wind.
- To reduce the risk of stumbling and loss of control, do not walk backward while operating the machine.
- Always shut off the engine before cleaning or servicing the unit or replacing parts.



(10)

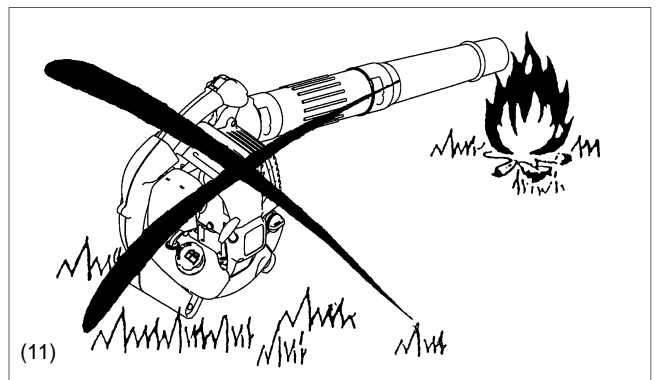
Maintenance instructions

- Be kind to the environment. Operate the blower with as little noise and pollution as possible. In particular check the correct adjustment of the carburetor.
- Clean the blower at regular intervals and check that all screws and nuts are securely tightened.
- Never service or store the blower in the vicinity of open flames, sparks, etc. (11).
- Always store the blower in a well-ventilated locked room and with an emptied fuel tank.

Observe and follow all relevant accident prevention instructions issued by the trade associations and by insurance companies. Do not perform any modifications to the blower as this will risk your safety.

The performance of maintenance or repair work by the user is limited to those activities as described in this instruction manual. All other work is to be done by Authorized Service Agents.

Use only genuine spare parts and accessories supplied by MAKITA. Use of non-approved accessories and tools means increased risk of accidents and injuries. MAKITA will not accept any liability for accidents or damage caused by the use of any non-approved attachment or accessories.



(11)

First Aid

In case of accident make sure that a well-stocked first-aid kit is available in the vicinity of the operations. Immediately replace any item taken from the first aid kit.

When asking for help, please give the following information:

- Place of accident
- What happened
- Number of injured persons
- Extent of injuries
- Your name



(12)

Packaging

The MAKITA blower is delivered in a protective cardboard box to prevent shipping damage. Cardboard is a basic raw material and is therefore consequently reusable or suitable for recycling (waste paper recycling).



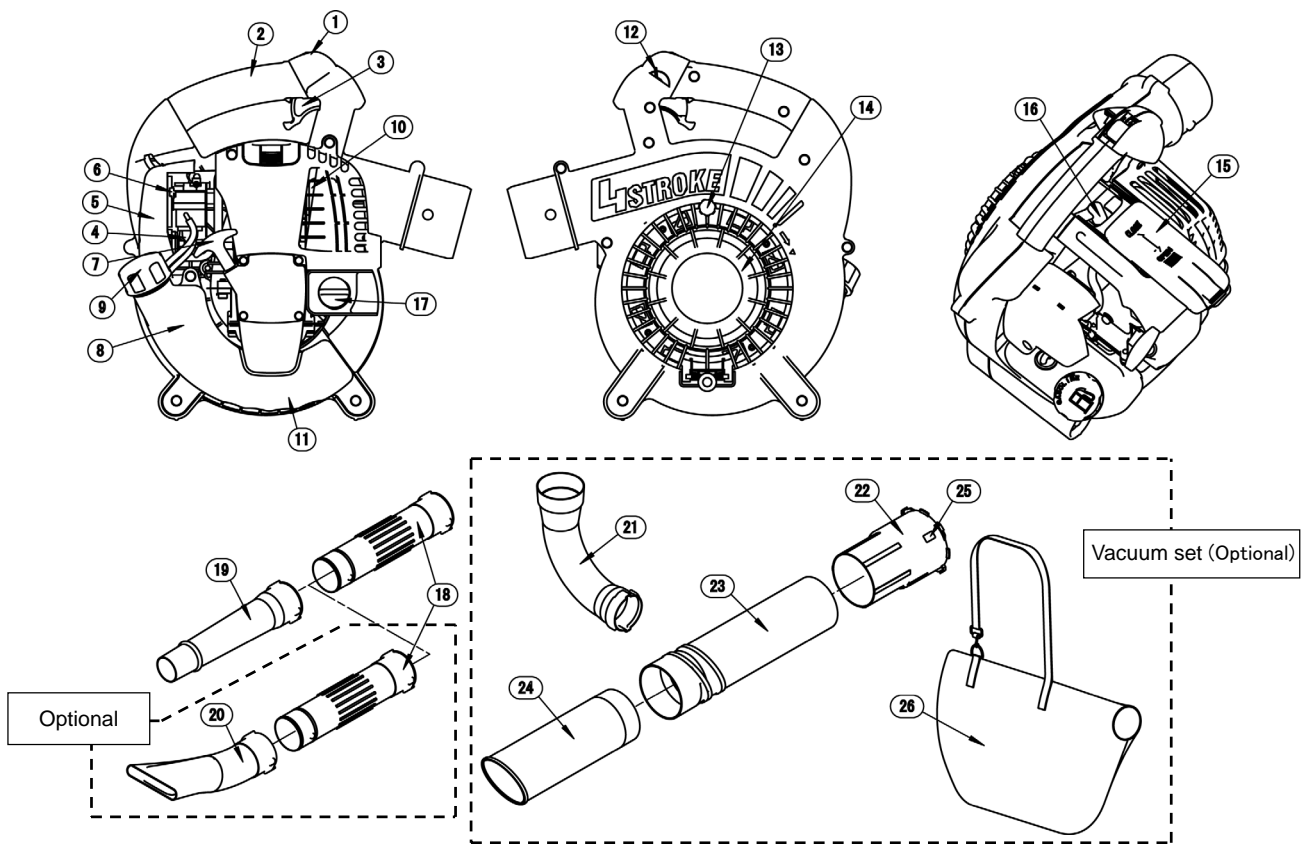
SPECIFICATION

Model		BHX2500
Mass (without blower pipe)	(kg)	4.5 (9.9 lbs)
Dimension (without blower pipe L x W x H)	(mm)	350 × 231 × 368 (13.8 × 9.1 × 14.5 in)
Max. engine speed	(/min)	7,800
Idling speed	(/min)	3,500
Engine displacement	(mL)	24.5 (1.49 cu.in)
Fuel		Automobile gasoline
Fuel tank capacity	(L)	0.52 (17.6 fl.oz)
Engine oil		SAE 10W-30 oil of API Classification, Class SF or higher (4-stroke engine for automobile)
Engine oil volume	(L)	0.08 (2.7 fl.oz)
Carburetor (Diaphragm-carburetor)		WALBRO WYL
Ignition system		Solid state ignition
Spark plug		NGK CMR6A
Electrode gap	(mm)	0.7 - 0.8 (0.028-0.031 in)

Notes:

1. Use the oil and spark plug specified by MAKITA.
2. This specification is subject to change without prior notice.

DESIGNATION OF PARTS



DESIGNATION OF PARTS	DESIGNATION OF PARTS	DESIGNATION OF PARTS	DESIGNATION OF PARTS
1. Stop switch	8. Fuel Tank	15. Plug Cover	22. Vacuum Pipe A
2. Main Handle	9. Fuel Tank Cap	16. Spark Plug	23. Vacuum Pipe B
3. Trigger Lever	10. Muffler	17. Oil Cap	24. Vacuum Pipe C
4. Primer Pump	11. Assist Handle	18. Blower Tube	25. Arrow Mark
5. Air Cleaner Cover	12. Cruise Control Lever	19. Blower Nozzle A	26. Dust Bag
6. Choke Lever	13. Screw	20. Blower Nozzle B	
7. Starter Handle	14. Protector	21. Elbow	

ASSEMBLY INSTRUCTIONS

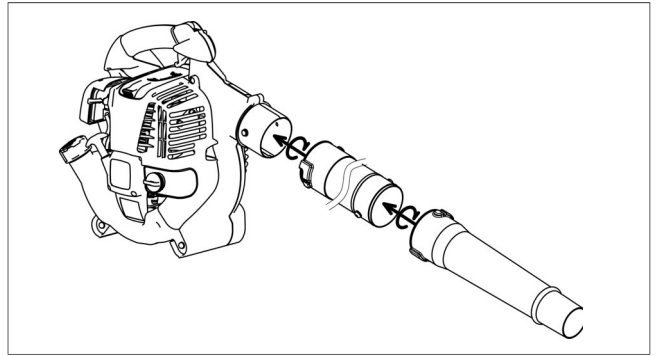


CAUTION : Before performing any work on the blower, always switch off the motor and pull the spark plug connectors off the spark plug. Always wear protective gloves!

CAUTION : Start the blower only after having assembled it completely.

1. ASSEMBLY OF BLOWER PIPES

- 1) Align grooves in the blower pipe with pegs on the blower housing and slide the pipe onto housing.
- 2) Turn the blower pipe clockwise to lock it into place.



2. ASSEMBLY OF VACUUM ATTACHMENT

- 1) Installing Vacuum pipe (nozzle)
 - (1) Loosen the screw ① and open the protector ②.

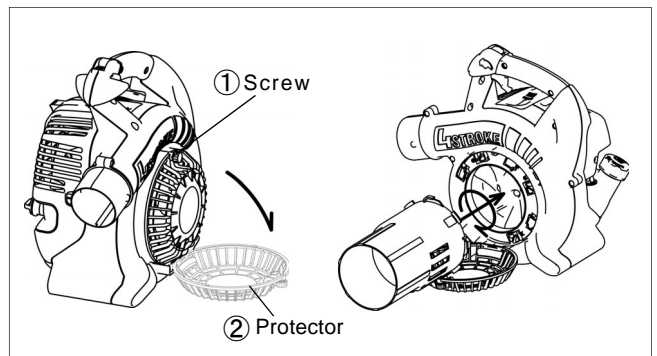


WARNING!

When using this machine as a blower, be sure to confirm that the screw ① is not loosened at each time of startup. If the screw is loosened, retighten it.

It is dangerous to operate the machine with the screw ① loosened. The operator's finger or clothing may be caught in the impeller, which will result in a serious accident.

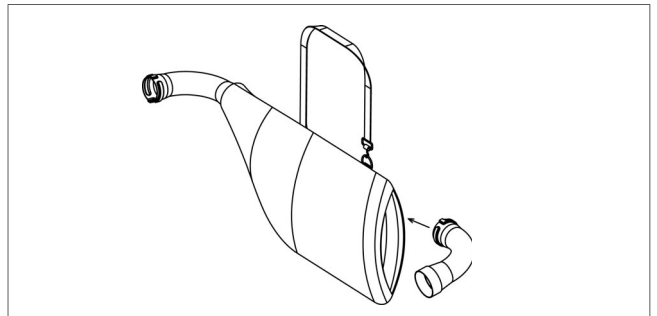
- (2) Align the ◀ indicated on the vacuum pipe with the "●" indicated on the blower. Then insert the vacuum pipe into the blower.
- (3) Turn the vacuum pipe until the ▶ is aligned with the "▼" indicated on the blower to lock the vacuum pipe.



WARNING!

Always hold the mounting end of the vacuum pipe when attaching/detaching the vacuum pipe.

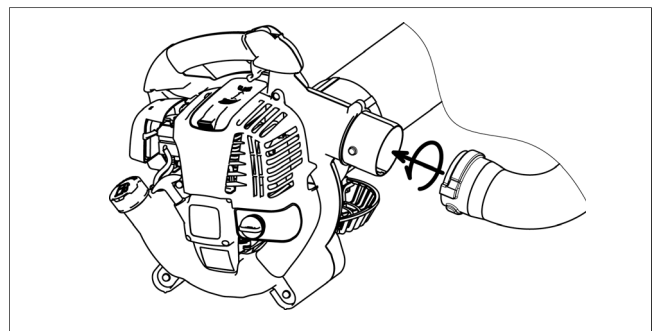
- 2) Installing Elbow and Dust Bag
 - (1) Open the fastener of the dust bag.
 - (2) Insert the elbow into the dust bag and take it out through the bag's entry.
- (3) Install the elbow on the blower.



WARNING!

Do not attempt to pick up large wood chips, metals, glass, stones, liquids, lighted cigarettes, fire works or the like.

Always mount the protector/vacuum pipe in the right way before operation. Operation without the protector/vacuum pipe is dangerous, the impeller may catch the operator's fingers or clothes and it can result in serious injury.



BEFORE START OF OPERATION

1. Inspection and Refill of Engine Oil

(1) Perform the following procedure, with the engine cooled down.

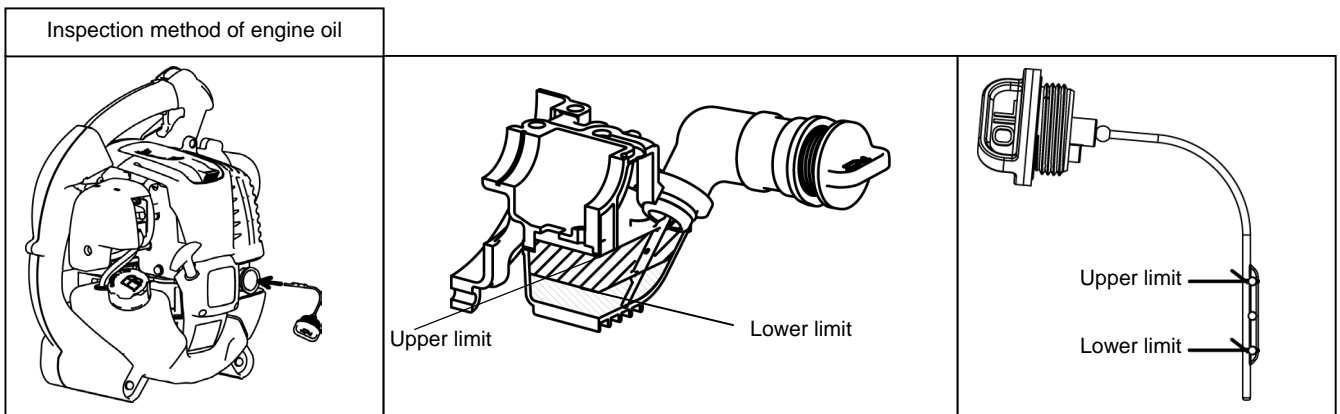
- **Inspection:** Please inspect whether it makes the machine horizontal, removes the oil cap, there is a oil to inside the range of the upper limit lower limit mark of gauge. When it is insufficient, (especially, when it has not reached to the lower limit level), please refill new oil.
- **Refill:** Verticality (under the suction port cover) please do the machine, remove the oil cap. When oil is supplied from the oil pipe port and oil level comes to the shelf inside the oil pipe, please stop oil supply.

(2) For reference, the oil refill time is about 10 h (refill frequency: 10 times).

(3) If the oil changes in color or mixes with dirt, replace it with new one. (For the interval and method of replacement, refer to P. 14)

Recommended oil: SAE 10W-30 oil of API Classification, Class SF or higher (4-stroke engine for automobile)

Oil volume: Approx. 0.08 L (2.7 fl.oz)

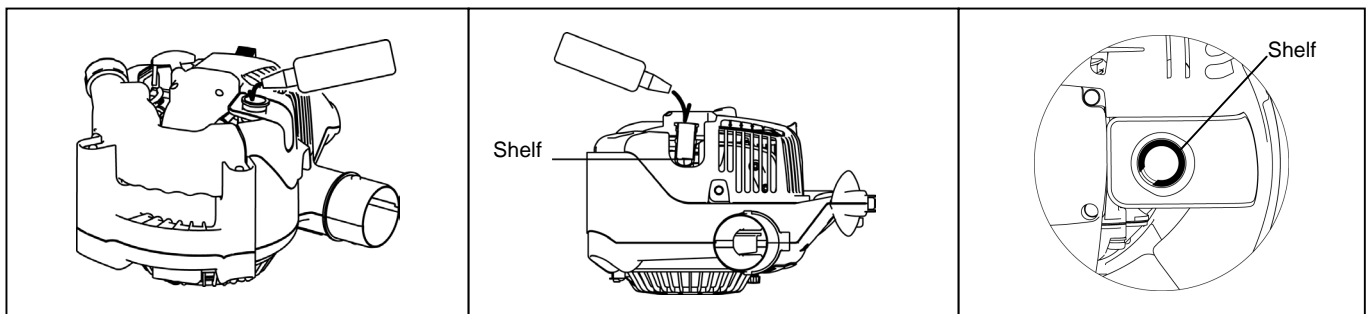


NOTE

- If the engine is not kept upright, oil may go into around the engine, and may be refilled excessively.
- If the oil is filled above the limit, the oil may be contaminated or may catch fire with white smoke.

Point 1 in Replacement of Oil “Oil Gauge”

- Remove dust or dirt near the oil refill port, and detach the oil gauge.
- Keep the detached oil gauge free of sand or dust. Otherwise, any sand or dust adhering to the oil gauge may cause irregular oil circulation or wear on the engine parts, which will result in troubles.
- As an example to keep the oil gauge clean, it is recommended to insert the oil gauge on its knob side into the engine cover.



Point 2 in Replacement of Oil: “If oil spills out”

- It becomes cause of the oil soiling. Be sure to wipe out spilt oil before start of operation.

2. Fuel supply



- When supplying the fuel, be sure to observe the following instructions to prevent ignition or fire:
 - Fuel supply must be made in a place free of fire. Never bring the fire (smoking, etc.) near to the place of fuel supply.
 - Stop the engine and allow the engine to cool down before fuel supply.
 - Open the fuel tank cap full of fuel slowly. The fuel may sprout out under internal pressure.
 - Take care not to spill the fuel. Any spilled fuel must be wiped clean.
 - Carry out fuel supply in a well-ventilated place.
- Handle the fuel with care.
 - Fuel sticking to the skin or entering an eye may cause allergies or irritation. When any physical abnormality is detected, consult the medical specialist immediately.

STORAGE PERIOD OF FUEL

Fuel should be used up within a period of 4 weeks, even if it is kept in a special container in a well-ventilated shade. If a special container is not used or if the container is not covered, fuel may deteriorate in one day.

Storage of machine and refill tank

- Keep the machine and tank at a cool place free from direct sunshine.
- Never keep the fuel in the cabin or trunk.

FUEL

The engine is a four-stroke engine. Be sure to use an automobile gasoline (regular gasoline or premium gasoline).

Points for Fuel

- Never use a gasoline mixture which contains engine oil. Otherwise, it will cause excessive carbon accumulation or mechanical troubles.
- Use of deteriorated oil will cause irregular startup.

When refueling the fuel, be sure to stop the engine and confirm that the engine cools down.

REFUELING METHOD

- Loosen the tank cap a little so that there will be no difference in atmospheric pressure.
- Detach the tank cap, and refuel, discharging air by tilting the fuel tank so that the refuel port will be oriented upward. (Never refill fuel full to the oil refill port.)
- After refueling, securely tighten the tank cap.
- If there is any flaw or damage on the tank cap, replace it.
- The tank cap is consumable, and therefore should be renewed every two to three years.

OPERATION



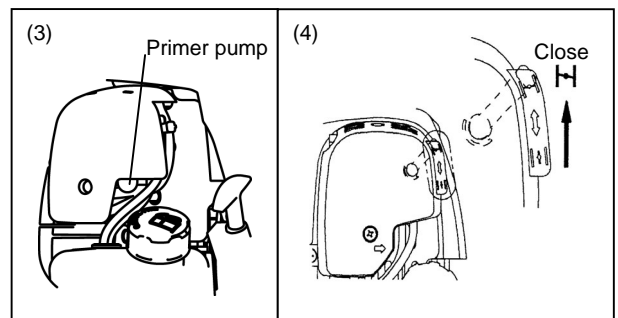
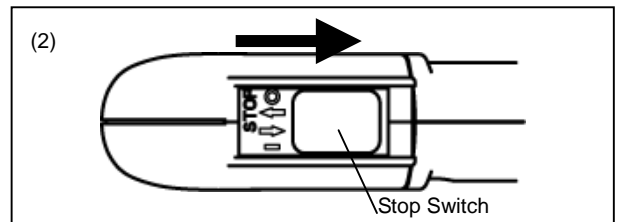
1. Starting

WARNING

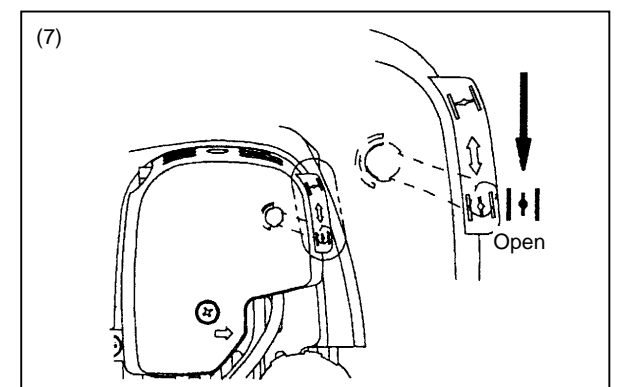
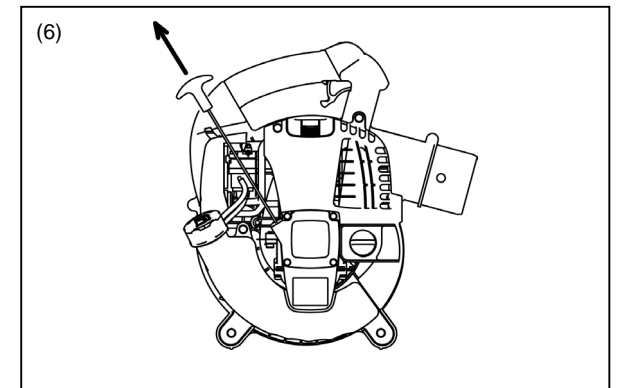
- Never attempt engine start in a place where the fuel has been supplied. When starting the engine, keep a distance of at least 3 m.
 - Otherwise, it will may cause ignition or fire.
- Exhaust gas from the engine has toxic consequences. Do not operate the engine in a poorly-ventilated place, such as in a tunnel, building, etc.
 - Operating the engine in the poorly-ventilated place may cause poisoning by exhaust gas.
- In case of detection of any abnormality in sound, odor, vibration after start, stop the engine immediately and carry out inspection.
 - If the engine is operated without attending such abnormality, an accident may occur.
- Confirm that the engine stops when the stop switch is set to "O" position.

1) When the engine is cold, or when the fuel it refueled

- (1) Set this machine on a flat space.
- (2) Set the stop switch to "I" position.
- (3) Continue to push the primer pump until fuel enters into the primer pump.
 - In general, fuel enters into the carburetor by 7 to 10 pushes.
 - If the primer pump is pushed excessively, an excess of gasoline returns to the fuel tank.
- (4) Lifting the choke lever of the air cleaner right side, close the choke lever.



- (5) Hold the main handle with a left hand to prevent the engine from moving, settle down to take the stable position.
- (6) Pull out slowly the starter handle till a certain resistance is felt. Return the starter handle backward once from this position, then pull it out with force.
 - Never pull the rope to the full.
 - Once the start knob is pulled, never release your hand immediately. Hold the start knob until it returns to its original point.
- (7) When the engine starts, open the choke lever.
 - Open the choke lever progressively while checking the engine operation. Be sure to open the choke lever to the full in the end.
 - In cold or when the engine is cooled down, never open the choke lever suddenly. Otherwise, the engine may stop.
- (8) Continue warm-up operation for 2 to 3 minutes.
- (9) Rotation of the engine speed stabilizes and when from low speed making at high speed rotation, if reaches the point where it accelerates smoothly, it is completion of warming-up.



NOTE

- The engine may be damaged if the choke lever is moved further beyond the "CLOSE" position.
- If the engine stops with an explosion sound or if the engine started, but stopped before operation of the choke lever, return this lever to the "OPEN" position and pull the starter handle several times to start the engine again.
- If the operator keeps pulling the starter handle several times with the choke lever left in the "CLOSE" position, the engine may be difficult to start because of over-suction of the fuel.
- In case of over-suction of the fuel, remove the spark plug and pull the handle several times rapidly to discharge any excess fuel. Dry the spark plug electrode.
- When the throttle valve does not return to a position in contact with the idling adjusting screw even if the throttle lever is set to the low speed, correct the control cable catching state to ensure proper return of the valve.

2) When the engine is warm

- (1) Place the engine on a flat ground.
- (2) Press the primary pump several times.
- (3) Confirm that the choke lever is open.
- (4) Hold the main handle with a left hand to prevent the engine from moving, settle down to take the stable position.
- (5) Pull out slowly the starter handle till a certain resistance is felt. Return the starter handle backward once from this position, then pull it out with force.
- (6) When the engine is difficult to start, open the throttle valve by about 1/3.

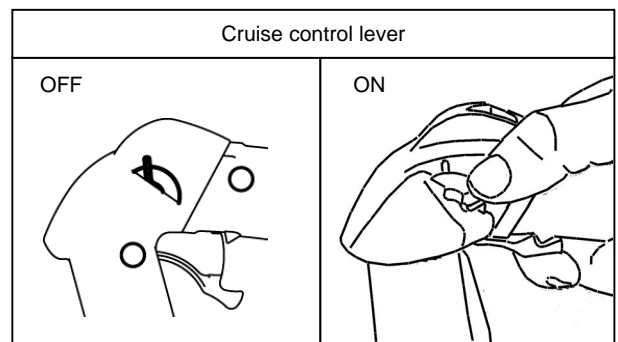
2. Stopping

1) When the cruise control lever is OFF

Release the trigger lever to reduce the engine speed, and set the stop switch to the "O" position.

2) When the cruise control lever is ON

Set the cruise control lever to the OFF position, reduce the engine speed, and set the stop switch to the "O" position.



ADJUSTMENT OF IDLING



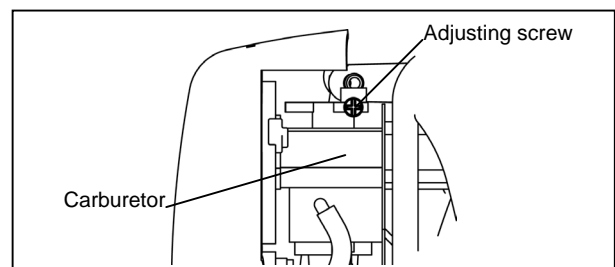
DANGER

The carburetor is the adjustment being completed at the time of factory shipment. Please do not adjust other than idling adjusting. When adjustment becomes necessary, please consult your dealership or an authorized service agent.

Checkup of low-speed rotation

Set the low-speed rotation to 3500 (/min).

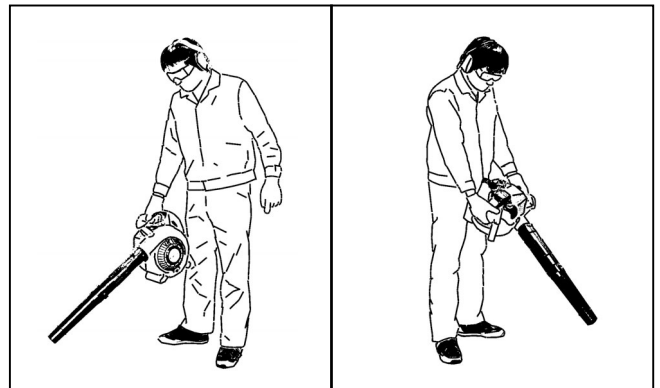
- If it is necessary to change the rotation speed, regulate the adjusting screw, with Phillips screwdriver.
- Turn the adjusting screw to the right, and the engine rotation will increase. Turn the adjusting screw to the left, and the engine rotation will drop.



OPERATION METHOD

1. Blower operation

- Hold the machine firmly during operation.
- Direct the nozzle end toward the object to be dusted and pull the trigger lever.
- The trigger lever can be fixed in an arbitrary position with the cruise control lever.
- Maintain the trigger lever at a position where the engine speed appropriate for the operation is obtained and set the cruise control lever to the "ON" position.
- To adjust the engine speed, set the cruise control lever to the "OFF" position once, adjust the engine speed with the trigger lever again, then set and fix the cruise control lever to the "ON" position.
- Operation of the trigger lever with the cruise control lever in the "ON" position may cause failure.
- The lower portion of the fuel tank acts as an assist handle, which enables operation with both hands. In this case, be sure to hold the assist handle with a right hand.



2. Dust Collection Operation

WARNING

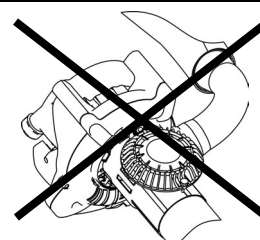
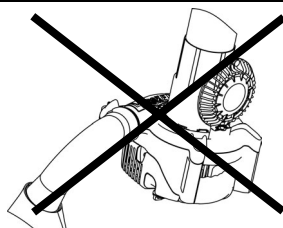
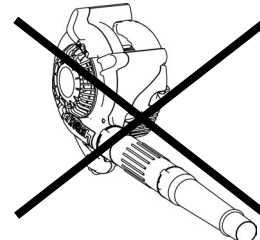
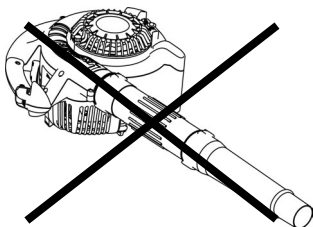
- Do not allow kerosene, gasoline, or lighted cigarette to be sucked into the machine.
 - Otherwise, fire may occur.
- Do not allow foreign materials, such as large wood chips, metals, glass, pebbles, etc., to be sucked into the machine.
 - Otherwise, failure may occur.
- Overfilling of the dust bag with dust may cause its overflow toward the engine side. Empty the bag in a proper timing.
 - Otherwise, the fire may occur.

- Carry the dust bag belt on the shoulder and adjust the belt length to ensure easy operation.
- Confirm that the dust bag is not twisted and pull the trigger lever to start dust collection.
- When the dust bag is filled with dust, remove the dust bag from the machine and open the fastener to empty the bag.



NOTE

If this machine is operated with the protector oriented upwards or the main handle downwards, there may appear white smoke, oil contamination or oil leakage.





DANGER

- Before inspection and maintenance, stop the engine and allow it to cool. Remove also the spark plug and plug cap.
 - If inspection or maintenance is attempted immediately after engine stop or with the plug cap left attached, the operator may suffer burn or an accident due to careless startup.
- After inspection and maintenance, be sure to confirm that all parts are assembled. Then, proceed to operation.

1. Replacement of engine oil

Deteriorated engine oil will shorten the life of the sliding and rotating parts to a great extent. Be sure to check the period and quantity of replacement.

DANGER

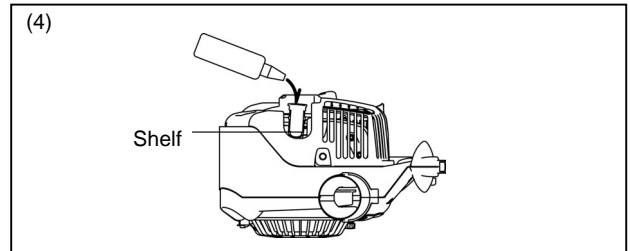
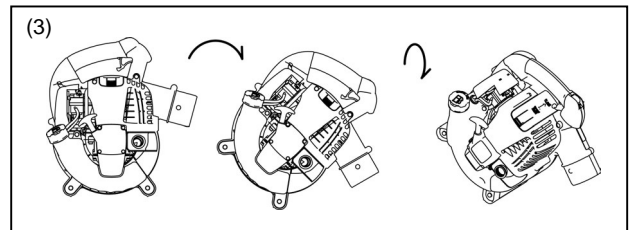
- In general, the engine main unit and engine oil still remain hot just after the engine is stopped. In replacement of oil, confirm that the engine main unit and engine oil are sufficiently cooled down. Otherwise, there may remain a risk of scald. In addition just after of the engine stopping because oil does not finish to return in the oil case, becomes cause of the oil inserting too much.
- If the oil filled above the limit, it may be contaminated or may catch fire with white smoke.

Interval of replacement: Initially, every 20 operating hours, and subsequently every 50 operating hours

Recommended oil: SAE10W-30 oil of API Classification SF Class or higher (4-stroke engine oil for automobile)

In replacement, perform the following procedure.

- (1) Confirm that the tank cap is tightened securely.
- (2) Detach the oil cap.
 - Keep the oil gauge free from dust or dirt.
- (3) The machine it can tilt to the blower port side, drain oil.
 - Drain oil in a container.
- (4) Please make the machine vertical (under the protector), refill oil to the shelf inside the oil pipe.
- (5) After refill, securely tighten the oil gauge. Insufficient tightening of the oil gauge will lead to oil leakage.



Points in replacement of engine oil

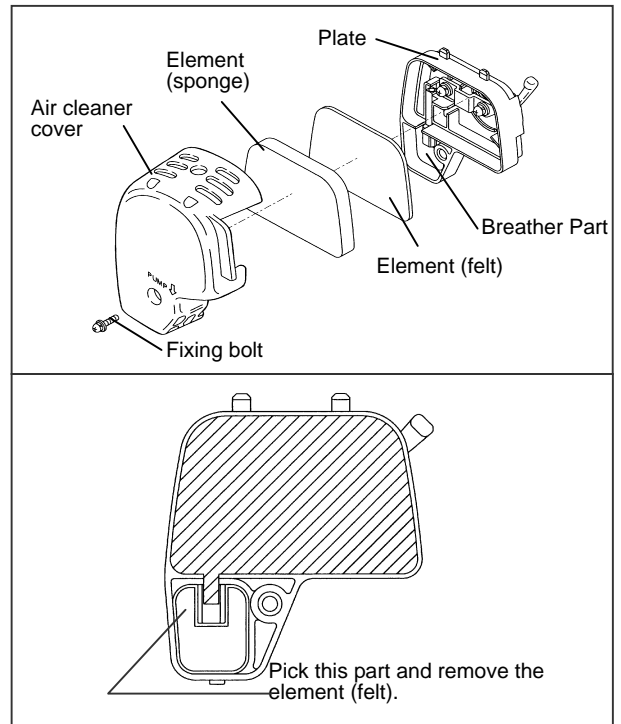
- Never discard replaced engine oil in garbage, earth or sewage ditch. Disposal of oil is regulated by law. In disposal, always follow the relevant laws and regulations. For any points remaining unknown, contact Authorized Service Agent.
- Oil will deteriorate even when it is kept unused. Perform inspection and replacement at regular intervals (replace with new oil every 6 months).

2. Cleaning of air cleaner

WARNING : INFLAMMABLES STRICTLY PROHIBITED

Interval of Cleaning and Inspection: Daily (every 10 operating hours)

- (1) Remove the air cleaner cover-fixing bolts.
- (2) Pull the cover lower side and detach the air cleaner cover.
- (3) Turn the choke lever to the full close side, and keep the carburetor off from dust or dirt.
- (4) If oil adheres to the element (sponge), squeeze it firmly.
- (5) For heavy contamination:
 - 1) Remove the element (sponge), immerse it in warm water or in water-diluted neutral detergent, and dry it completely.
 - 2) Clean the element (felt) with gasoline, and dry it completely.
- (6) Before attaching the element, be sure to dry it completely. Insufficient drying of the element may lead to difficult startup.
- (7) Wipe out with waste cloth, oil adhering around the air cleaner cover and plate breather.
- (8) Immediately after cleaning is finished, attach the air cleaner cover and tighten it with fixing bolts. (In remounting, first place the upper claw, and then the lower claw.)



DANGER

- Clean the element several times a day, if excessive dust adheres to it.
- If operation continues with the element remaining not cleared of oil, oil in the air cleaner may fall outside, resulting in oil contamination.

3. Checking the spark plug

- (1) Opening/closing the plug cover

When opening the cover, apply fingers to the main handle and plug cover projection as shown in the figure right. Push up the projection and slide the cover in the "OPEN" direction. When closing the cover, slide the cover in the "CLOSE" direction till the click under the plug cover projection rides over the engine cover. Finally, push in the projection.

- (2) Removing the spark plug

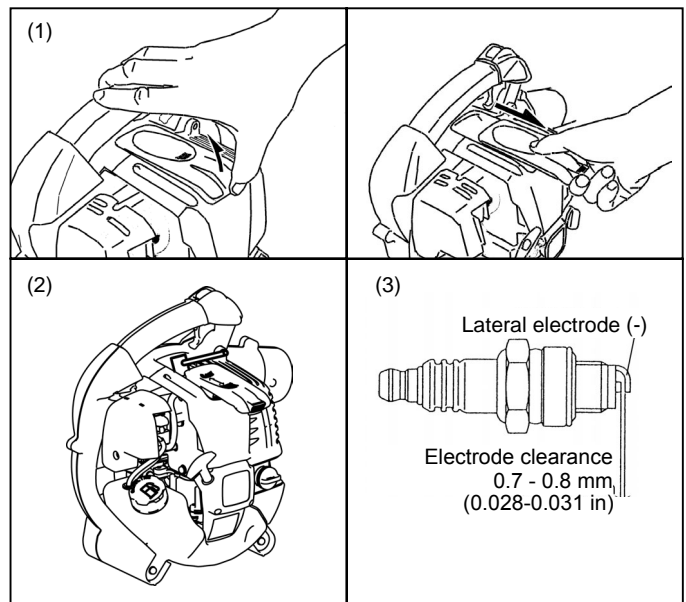
Use an attached box wrench to remove or install the spark plug.

- (3) Checking the spark plug

The clearance between two electrodes of spark plug (see the figure left) is 0.7 to 0.8 mm. Adjust to the correct clearance when it is too wide or too narrow. Clean thoroughly or replace the spark plug if it has accumulated carbon or contaminated.

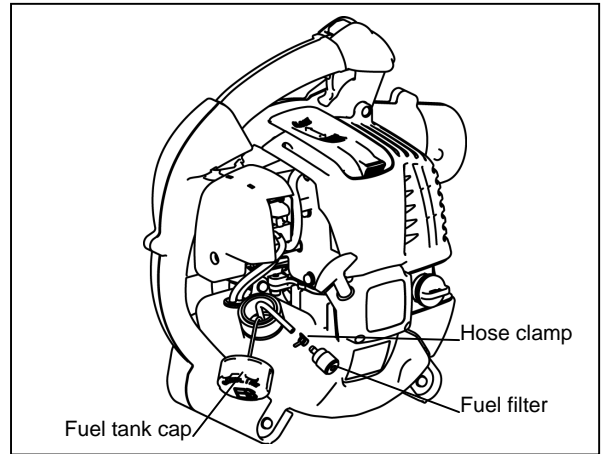
- (4) Replacing the spark plug

For replacement, use NGK-CMR6A.



4. Cleaning the fuel filter

- Clogged oil filter may cause difficulty of startup or failure of engine speed increase.
 - Check the fuel filter regularly as follows:
- (1) Remove the fuel tank cap, drain the fuel to empty the tank. Check the tank inside for any foreign materials. If any, wipe clean such materials.
 - (2) Pull out the fuel filter with wire through the oil filling port.
 - (3) If the fuel filter surface is contaminated, clean it with gasoline. Foul gasoline must be disposed of according to the method specified by each local authority. Excessively foul filter must be replaced.
 - (4) Reset the fuel filter in the fuel tank and tighten firmly the fuel tank cap. For replacement, contact your dealership or an authorized service agent.



5. Inspection of bolts, nuts and screws

- Retighten loose bolts, nuts, etc.
- Check for fuel and oil leakage.
- Replace damaged parts with new ones for safety operation.

6. Cleaning of parts

- Keep the engine always clean.
- Keep the cylinder fins free of dust or dirt. Dust or dirt adhering to the fins will cause seizure.

7. Replacement of gaskets and packings

In reassembling after the engine is dismantled, be sure to replace the gaskets and packings with new ones.

Any maintenance of adjustment work that is not included and described in this manual is only to be performed by Authorized Service Agents.

STORAGE

WARNING

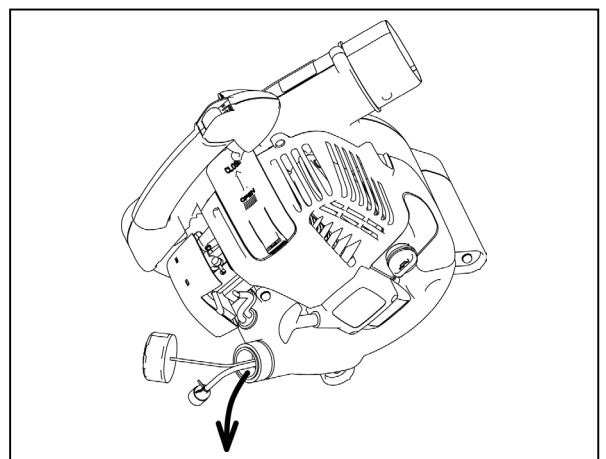
- When draining the fuel, be sure to stop the engine and confirm that the engine cools down.
 - Just after stopping the engine, it may still hot with possibility of burns, inflammability and fire.

DANGER

- When the machine is kept out of operation for a long time, drain up all fuel from the fuel tank and carburetor, and keep it at a dry and clean place.

Drain up fuel from the fuel tank and carburetor according to the following procedure:

- (1) Remove the fuel tank cap, and drain fuel completely. If there is any foreign matter remaining in the fuel tank, remove it completely.
- (2) Pull out the fuel filter from the refill port using a wire.
- (3) Push the primer pump until fuel is drained from there, and drain fuel coming into the fuel tank.
- (4) Reset the filter to the fuel tank, and securely tighten the fuel tank cap.
- (5) Then, continue to operate the engine until it stops.
- (6) Remove the spark plug, and drip several drops of engine oil through the spark plug hole.
- (7) Gently pull the starter handle so that engine oil will spread over the engine, and attach the spark plug.
- (8) During storage, in order for the machine to become uprighting, please keep.
- (9) Keep the drained fuel in a special container in a well-ventilated shade.



Fault location

Fault	System	Observation	Cause
Engine not starting or with difficulty	Ignition system	Ignition spark O.K.	Fault in fuel supply or compression system, mechanical defect
		No ignition spark	STOP-switch operated, wiring fault or short circuit, spark plug or connector defective, ignition module faulty
	Fuel supply	Fuel tank filled	Incorrect choke position, carburetor defective, fuel supply line bent or blocked, fuel dirty.
	Compression	No compression when pulled over	Cylinder bottom gasket defective, crankshaft seals damaged, cylinder or piston rings defective or improper sealing of spark plug
Warm start problems	Mechanical fault	Starter not engaging	Broken starter spring, broken parts inside of the engine
Engine starts but dies	Fuel supply	Tank filled ignition spark existing	Carburetor contaminated, have it cleaned
		Tank filled	Incorrect idling adjustment, carburetor contaminated Fuel tank vent defective, fuel supply line interrupted, cable or STOP-switch faulty
Insufficient performance	Several systems may simultaneously be affected	Engine idling poor	Air filter contaminated, carburetor contaminated, muffler clogged, exhaust duct in the cylinder clogged

Item	Operating time	Before operation	After lubrication	Daily (10h)	30h	50h	200h	Shutdown /rest	Corres-ponding P
Engine oil	Inspect/clean	○							10
	Replace					○ ^{*1}			15
Tightening parts (bolt, nut)	Inspect	○							17
Fuel tank	Clean/inspect	○							—
	Drain fuel							○ ^{*3}	17
Throttle lever	Check function		○						
Stop switch	Check function		○						13
Low-speed rotation	Inspect/adjust			○					13
Air cleaner	Clean			○					16
Ignition plug	Inspect			○					16
Cooling air duct	Clean/inspect			○					17
Fuel pipe	Inspect			○					17
	Replace						◎ ^{*2}		—
Fuel filter	Clean/replace					○			17
Clearance between air intake valve and air discharge valve	Adjust						◎ ^{*2}		—
Oil tube	Inspect						◎ ^{*2}		
Engine overhaul							◎ ^{*2}		—
Carburetor	Drain fuel							○ ^{*3}	17

*1 Perform initial replacement after 20h operation.

*2 For the 200 operating hour inspection, request Authorized Service Agent or a machine shop.

*3 After emptying the fuel tank, continue to run the engine and drain fuel in the carburetor.

TROUBLESHOOTING

Before making a request for repairs, check a trouble for yourself. If any abnormality is found, control your machine according to the description of this manual. Never tamper or dismount any part contrary to the description. For repairs, contact Authorized Service Agent or local dealership.

State of abnormality	Probable cause (malfunction)	Remedy
Engine does not start	Failure to operate primer pump	Push 7 to 10 times.
	Low pulling speed of starter rope	Pull strongly.
	Lack of fuel	Feed fuel.
	Clogged fuel filter	Clean
	Broken fuel tube	Straighten fuel tube
	Deteriorated fuel	Deteriorated fuel makes starting more difficult. Replace with new one. (Recommended replacement: 1 month)
	Excessive suction of fuel	Set throttle lever from medium speed to high speed, and pull starter handle until engine starts. If engine will not start still, remove spark plug, make electrode dry, and reassemble them as they originally are. Then, start as specified.
	Detached plug cap	Attach securely
	Contaminated spark plug	Clean
	Abnormal clearance of spark plug	Adjust clearance
	Other abnormality of spark plug	Replace
	Abnormal carburetor	Make request for inspection and maintenance.
	Starter rope cannot be pulled	Make request for inspection and maintenance
	Abnormal drive system	Make request for inspection and maintenance
Engine stops soon Engine speed does not increase	Insufficient warm-up	Perform warm-up operation
	Choke lever is set to "CLOSE" although engine is warmed up	Set to "CLOSE"
	Clogged fuel filter	Clean
	Contaminated or clogged air cleaner	Clean
	Abnormal carburetor	Make request for inspection and maintenance
	Abnormal drive system	Make request for inspection and maintenance
	Detached throttle wire	Attach securely
	Abnormal drive system	Make request for inspection and maintenance
Engine does not stop. ↓ Run engine at idling, and set choke lever to CLOSE.	Detached connector	Attach securely
	Abnormal electric system	Make request for inspection and maintenance.

When the engine does not start after warm-up operation:

If there is no abnormality found for the check items, open the throttle by about 1/3 and start the engine.

EMISSION COMPLIANCE PERIOD

For handheld engine : The Emissions

Compliance Period referred to on the Emissions

Compliance label indicates the number of operating hours for which the engine has been shown to meet Federal emission requirements.

Category C=50 hours, B=125 hours, and A=300 hours.

AIR INDEX

An Air Index Information hang tag was supplied to this engine in accordance with the emission regulations of the California Air Resources Board.

The bar graph on the hang tag shows the emissions performance of this engine. The bar graph can be used to compare the emissions performance with other available engine. The lower the Air Index, the less pollution.

The following durability description is to provide you with information relating to the emission durability period of the engine.

<u>Descriptive Term</u>		<u>Applicable to Emissions Durability Period</u>
Moderate	-	50hours (0-65 cc)
Intermediate	-	125hours (0-65cc)
Extended	-	300hours (0-65cc)

Notice : The Air Index Information hang tag must remain on the engine or on the equipment until it is sold to the ultimate purchaser. Remove the hang tag before operating the engine.

CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board and Makita U.S.A., Inc. are pleased to explain the emission control system warranty on your 2000 and later Small Off-Road engine (herein "engine"). In California, the engine must be designed, built and equipped to meet the State's stringent anti-smog standards Makita U.S.A., Inc. must warrant the emission control system on your engine for the periods of time described below, provided there has been no abuse, neglect or improper maintenance of your engine. Your emission control system includes parts such as the carburetor and the ignition system. Also included may be hoses, connectors and other emission-related assemblies. Where a warrantable condition exists, Makita U.S.A., Inc. will repair your engine at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE:

The 2000 and later engines are warranted for two (2) years. If any emission-related part on your engine is defective, the part will be repaired or replaced by Makita U.S.A., Inc.

OWNER'S WARRANTY RESPONSIBILITIES:

- As the engine owner, you are responsible for the performance of the required maintenance listed in your Owner's Manual. Makita U.S.A., Inc. recommends that you retain all receipts covering maintenance on your engine, but Makita U.S.A., Inc. cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.
- As the engine owner, you should however be aware that Makita U.S.A., Inc. may deny you warranty coverage if your engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
- You are responsible for presenting your engine manufactured by Makita U.S.A., Inc. to a dealer, distributor or warranty station authorized by Makita Factory Service Center which is the U.S. importer and/or OEM of the Small Off-Road/engine as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact Makita Factory Service Center nearest you.

Makita Factory Service Center

Address	Phone NO.
14930 Northam Street La Mirada, CA 90638-5753	(714) 522-8088
41850 Christy Street Fremont, CA 94538-5107	(510) 657-9881
1421N. Clovis Ave., Ste. 112 Fresno, CA 93727	(209) 252-5166
4554 Roseville Rd., Ste E North Highlands, CA 95660	(916) 331-6211
392 S. Arrowhead Ave., #A-1 San Bernardino, CA 92408	(909) 885-1289
7674 Clairemont Mesa Blvd. San Diego, CA 92111	(619) 278-4471
333 Littlefield Ave. S. San Francisco, CA 64080	(415) 875-1002
1714 E McFadden Ave., Unit M Santa Ana, CA 92705	(714) 667-5066
16735 Saticoy St., Ste. 105 Van Nuys, CA 91406	(818) 782-2440

LIMITED WARRANTY on Emission Control Systems
- California Only -

Makita U.S.A., Inc., a distributor of Small Off-Road Engine in the U.S. warrant to the owner of the 2000 and later engine that the engine (1) has been designed, built and equipped so as to conform at the time of manufacture with the applicable regulations of the California Air Resources Board, and (2) is free from defects in materials and workmanship which cause it to fail to conform with those regulations as may be applicable in the terms and conditions stated below;

A. WARRANTY COMMENCEMENT DATE

The warranty period begins on the date the engine is delivered to a first retail purchaser.

B. LENGTH OF COVERAGE

Makita U.S.A., Inc. warrants to a first retail purchaser and each subsequent purchaser that the engine is free from defects in materials and workmanship which cause the failure of a warranted emission-related part for a period of two (2) years after the date of delivery to the first retail purchaser.

C. WHAT IS COVERED:

1. REPAIR OR REPLACEMENT PARTS

Repairs and replacement of any warranted part will be performed at no charge to you by an authorized dealer, distributor or a warranty station. You may contact Makita Factory Service Center which is the U.S. importer/OEM of the Small Off-Road /engine manufactured by Makita U.S.A., Inc. to get the nearest appropriate location where your warranty repairs are performed.

2. WARRANTY PERIOD

This warranty continues for a period of two (2) years and shall apply only to the repair, replacement or adjustment of the component parts which are not scheduled for replacement as required maintenance. Further component parts or which are scheduled only for regular inspection to the effect of "repair or replace as necessary" shall be warranted for the warranty period. Any warranted part which is scheduled for replacement as required maintenance shall be warranted for the period of time up to the first scheduled replacement point for that part.

3. DIAGNOSIS

You shall not be charged for diagnostic labor, which leads to the determination that a warranted part is defective, if the diagnostic work is performed at an authorized dealer, distributor or warranty station.

4. CONSEQUENTIAL DAMAGES

If a warranted part failed causing damages to other engine components, consult a warranty station.

D. WHAT IS NOT COVERED

1. This limited warranty does not cover any part which malfunctions, fails or is damaged due to failure to follow the maintenance and operating instructions set forth in the 2000 and later Owner's Manual including:

- (1) improper or inadequate maintenance of any warranted parts
- (2) improper installation, adjustment or repair of the engine or of any warranted part unless performed by an authorized dealer
- (3) failure to follow recommendations on fuel use contained in the 2000 and later Owner's Manual
- (4) repairs performed outside of the authorized warranty service facility
- (5) use of parts, which are not authorized by Makita U.S.A., Inc..

2. Add-on or modified parts

This warranty does not cover any part which malfunctions, fails or is damaged due to alterations by changing, adding to or removing parts from the engine.

3. Expenses incurred by processing warranty claims

Makita Factory Service Center, any authorized dealer, distributors and warranty station shall not be liable for any loss of use of the engine, for any alternative usage, for any damage to goods, loss of time or inconvenience.

E. HOW TO FILE A CLAIM

All repairs qualifying under this Limited Warranty must be performed by a dealer who sold you the engine or distributors or warranty stations authorized by Makita Factory Service Center. In the event that any emission-related part is found to be defective during the warranty period, you shall notify Makita Factory Service Center and you will be given the appropriate warranty service facilities where the warranty repair is performed.

F. WHERE TO GET WARRANTY SERVICE

It is recommended that warranty service be performed by the authorized dealer, who sold you the engine, although warranty service will be performed by any authorized dealers, distributors and warranty stations anywhere in the United States. When warranty repair is needed, the engine must be brought to an authorized dealer, distributorship or warranty station's place of business during normal business hours. In all cases, a reasonable time, not to exceed 30 days, must be allowed for the warranty repair to be completed after the engine is received by the authorized dealer, distributor or service station.

G. MAINTENANCE, REPLACEMENT AND REPAIR OF EMISSION-RELATED PARTS

Only warranted engine replacement parts approved by Makita U.S.A., Inc. should be used in the performance of any warranty maintenance or repairs on emission-related parts. If other than authorized parts are used for maintenance, replacement or repair of components affecting emission control, you should assure yourself that such parts are warranted by their manufacturer to be equivalent to authorized parts in performance and durability. Makita U.S.A., Inc., however, assumes no liability under this warranty with respect to parts other than authorized parts. The use of non-authorized replacement parts does not invalidate the warranty on other components unless the non-authorized parts cause damage to warranted parts.

H. PARTS COVERED UNDER THE CALIFORNIA EMISSION WARRANTY

- 1) Fuel Metering system
 - (i) Carburetor and internal parts
 - (ii) Air cleaner plate (including choke system)
 - (iii) Air cleaner cover
 - (iv) Air cleaner element
 - (v) Fuel Filter
- 2) Ignition System
 - (i) Spark plug
 - (ii) Flywheel magneto
 - (iii) Ignition coil
- 3) Miscellaneous Item Used in Above Systems
 - (i) Hoses and sealing gaskets, bolts, connectors, and assemblies.

I. MAINTENANCE STATEMENTS

It is your responsibility to have all scheduled inspection and maintenance service performed at the times recommended in the 2000 and later Owner's Manual and to retain proof that inspection and maintenance service are performed at the times when recommended. Makita U.S.A., Inc. will not deny a warranty claim solely because you have no record of maintenance; however, Makita U.S.A., Inc. may deny a warranty claim if your failure to perform required maintenance resulted in the failure of warranted part. The proof, which you maintain, should be given to each subsequent owner of the engine. You are responsible for performing the scheduled maintenance described below based on the procedures specified in the 2000 and later Owner's Manual. The scheduled maintenance below is based on the normal engine-operating schedule.

PROCEDURE	INTERVAL
1) Clean engine and check bolts and nuts. Retighten if necessary.	:Every 8 hours (daily)
2) Check and refill engine oil (4stroke)	:Every 8 hours (refill daily up to upper limit)
3) Change engine oil (4stroke)	:Initial 20 hours and every 50 hours afterward
4) Check clogging of cooling air passage and cylinder fins. Remove and clean if necessary.	:Every 8 hours (daily)
5) Clean air cleaner.	:Every 8 hours (daily)
6) Check spark plug. Clean and adjust if necessary.	:Every 8 hours (daily)
7) Check muffler exhaust outlet (or port). Clean if necessary.	:Every 50 hours (monthly)
8) Check fuel filter. If clogged, replace with new one.	:Every 50 hours (monthly)
9) Adjust valve clearance, if applicable (4stroke).	:Every 200 hours (yearly)
10) Replace fuel lines.	:Every 200 hours (yearly)
11) Overhaul engine.	:Every 200 hours (yearly)
12) Replace packings and gaskets and gaskets with new ones.	:Every reassembling

REPAIR AND REPLACEMENT OF EMISSION-RELATED PARTS

It is recommended that only engine replacement parts which have been authorized and approved by Makita U.S.A., Inc. should be used in the performance of any warranty maintenance or repairs of emission-related parts. These replacement parts will be provided at no charge if the part is still under warranty.

HOW TO FILE A WARRANTY CLAIM AND WHERE TO GET WARRANTY SERVICES

Contact the nearest Makita Factory Service Center Manager to determine the appropriate location where the required warranty services are to be performed. A list of the Factory Service Center locations and phone numbers are provided below for your convenience.

14930 Northam Street
La Mirada, CA 90638-5753
(714) 522-8088

41850 Christy Street
Fremont, CA 94538-5107
(510) 657-9881

1421N. Clovis Ave., Ste. 112
Fresno, CA 93727
(209) 252-5166

4554 Roseville Rd., Ste E
North Highlands, CA 95660
(916)331-6211

392 S. Arrowhead Ave., #A-1
San Bernardino, CA 92408
(909)885-1289

7674 Clairemont Mesa Blvd.
San Diego, CA 92111
(619) 278-4471

333 Littlefield Ave.
S. San Francisco, CA 94080
T. (415)875-1002

1714 E McFadden Ave., Unit M
Santa Ana, CA 92705
(714) 667-5066

16735 Saticoy St., Ste. 105
Van Nuys, CA 91406
(818) 782-2440

FEDERAL EMISSION COMPONENT DEFECT WARRANTY

EMISSION COMPONENT DEFECT WARRANTY COVERAGE - This emission warranty is applicable in all States, except the State of California

Makita U.S.A., Inc., La Mirada, California, (herein "MAKITA") warrant to the initial retail purchaser and each subsequent owner, that this utility equipment engine (herein "engine") was designed, built, and equipped to conform at the time of initial sale to all applicable regulations of the U.S. Environmental Protection Agency (EPA), and that the engine is free of defects in materials and workmanship which would cause this engine to fail to conform with EPA regulations during its warranty period.

For the components listed under PARTS COVERED, Makita Factory Service Center or service center authorized by Makita will, at no cost to you, make the necessary diagnosis, repair, or replacement necessary to ensure that the engine complies with applicable U.S. EPA regulations.

EMISSION COMPONENT DEFECT WARRANTY PERIOD

The warranty period for this engine begins on the date of sale to the initial purchaser and continues for a period of 2 years.

PARTS COVERED

Listed below are the parts covered by the Emission Component Defect Warranty. Some of the parts listed below may require scheduled maintenance and are warranted up to the first scheduled replacement point for that part.

- 1) Fuel Metering System
 - (i) Carburetor and internal parts
 - (ii) Fuel filter, if applicable
 - (iii) Throttle stopper, if applicable
 - (iv) Choke System, if applicable
- 2) Air Induction System
 - (i) Air cleaner plate
 - (ii) Air cleaner case
 - (iii) Air cleaner element
- 3) Ignition System
 - (i) Spark plug
 - (ii) Flywheel Magneto
 - (iii) Ignition Coil
- 4) Miscellaneous Items Used in Above Systems
 - (i) Fuel hoses, clamps and sealing gaskets

OBTAINING WARRANTY SERVICE

To obtain warranty service, take your engine to the nearest MAKITA Factory Service Center or Service Center authorized by MAKITA. Bring your sales receipts indicating date of purchase for this engine. The dealer or service center authorized by MAKITA will perform the necessary repairs or adjustments within a reasonable amount of time and furnish you with a copy of the repair order. All parts and accessories replaced under this warranty become the property of MAKITA.

WHAT IS NOT COVERED

- * Conditions resulting from tampering, misuse, improper adjustment (unless they were made by the dealer or service center authorized by MAKITA during a warranty repair), alteration, accident, failure to use the recommended fuel and oil, or not performing required maintenance services.
- * The replacement parts used for required maintenance services.
- * Consequential damages such as loss of time, inconvenience, loss of use of the engine of equipment, etc.
- * Diagnosis and inspection charges that do not result in warranty-eligible service being performed.
- * Any non-authorized replacement part, or malfunction of authorized parts due to use of non-authorized parts.

OWNER'S WARRANTY RESPONSIBILITIES

As the engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual, MAKITA recommends that you retain all receipts covering maintenance on your engine, but MAKITA can not deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the engine owner, you should however be aware that the MAKITA may deny your warranty coverage if your engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

You are responsible for presenting your engine to the nearest MAKITA Factory Service Center or service center authorized by MAKITA when a problem exists.

If you have any questions regarding your warranty rights and responsibilities, you should contact the Makita Warranty Service Department at 1-800-4-MAKITA for the information.

THINGS YOU SHOULD KNOW ABOUT THE EMISSION CONTROL SYSTEM WARRANTY

MAINTENANCE AND REPAIRS

You are responsible for the proper use and maintenance of the engine. You should keep all receipts and maintenance records covering the performance of regular maintenance in the event questions arise. These receipts and maintenance records should be transferred to each subsequent owner of the engine. MAKITA reserves the rights to deny warranty coverage if the engine has not been properly maintained. Warranty claims will not be denied, however, solely because of the lack of required maintenance or failure to keep maintenance records.

MAINTENANCE, REPLACEMENT OR REPAIR OF EMISSION CONTROL DEVICES AND SYSTEMS MAY BE PERFORMED BY ANY REPAIR ESTABLISHMENT OR INDIVIDUAL; HOWEVER, WARRANTY REPAIRS MUST BE PERFORMED BY MAKITA FACTORY SERVICE CENTER OR SERVICE CENTER AUTHORIZED BY Makita. THE USE OF PARTS THAT ARE NOT EQUIVALENT IN PERFORMANCE AND DURABILITY TO AUTHORIZED PARTS MAY IMPAIR THE EFFECTIVENESS OF THE EMISSION CONTROL SYSTEM AND MAY HAVE A BEARING ON THE OUTCOME OF WARRANTY CLAIM.

If other than the parts authorized by MAKITA are used for maintenance replacements or for the repair of components affecting emission control, you should assure yourself that such parts are warranted by their manufacturer to be equivalent to the parts authorized by MAKITA in their performance and durability.

HOW TO MAKE A CLAIM

All repairs qualifying under this limited warranty must be performed by Makita Factory Service Center or service center authorized by MAKITA. In the event that any emission-related part is found to be defective during the warranty period, you shall notify Makita Warranty Service Department at 1-800-4-MAKITA and you will be given the appropriate warranty service facilities where the warranty repair can be performed.

MEMO



WARNING: The Engine Exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

Makita Corporation

3-11-8, Sumiyoshi-cho,
Anjo, Aichi 446-8502, Japan