

# GASOLINE ENGINE

## GASOLINE ENGINE

**OPERATION MANUAL(U.S.)**

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**BRIEF INTRODUCTION**

Thank you for choosing our general purpose gasoline engine.

- \* Single Cylinder, 4 stroke, Forced Air Cooled
- \* OHV
- \* TCI Ignition Method
- \* Splash Lubricated

Proper use and regular maintenance of the engine will assure it not only always in normal and reliable condition but also an extended life span. Please read this manual carefully before use, and master the correct methods and tips of operation and maintenance.

Precautions: Not following the notes and safety precautions listed below may result in personal injury or severe engine damage. Please pay close attention to the following:

**Notes:**

1. Coupling the engine with equipment should be strictly in accordance with the rated power output noted in the engine nameplate. Operating with overload, at excessive rpm, or under sustained low load and low rpm are forbidden.
2. Only use specific fuel and lube oil. Be sure to deposit and filter them fully before use. Keep oil filters clean and change lube oil regularly. Carefully check fuel pipe and joints for looseness and fuel leakage. Leaking fuel creates a potentially dangerous situation.
3. Check periodically all the bolts and nuts for looseness. A loose bolt or nut may cause serious engine trouble.
4. Clean regularly the air cleaner element and change it if necessary.
5. Clear away dirt and contaminant on the cooling fins, fan and fan cover timely to ensure the engine's normal cooling effect.

6. User should be familiar with the structure and proper operation of the engine, carry on regular maintenance and shoot troubles immediately when discover. Please do not operate if the engine is abnormal or has troubles.
7. The exhaust muffler is very hot while the engine is running or just after it has stopped. Please do not touch it by hand to avoid burning, and keep children away from the running engine.

## Safety Precautions

1. Exhaust Precautions: During the operation of engine, the exhaust gas contents carbon monoxide, colorless, odorless and extremely dangerous gas which can cause unconsciousness or death. In order to avoid accident, do not operate the engine indoors or in a poorly ventilated area, such as tunnel or cave, ect. If it must be used in such an area, exhaust gas must be led to the outside of the area and the outlet of the protective pipe must not be less than 1 m from the doors or windows. Exercise extreme care when operating the engine near people or animals.
2. Fire Prevention: Keep the engine away from flammable material and other hazardous materials (trash, rags, lubricants, explosives). Do not operate while smoking or near an open flame. Do not use around dry brush, twigs, cloth rags, or other flammable materials. Keep the engine at least 3 feet (1 meter) away from buildings or other structure.
3. Refueling Precautions: Be sure to stop engine prior to refueling. Do not overfill the fuel tank. If fuel is spilt, wipe it away carefully and wait until the fuel has dried before starting the engine.
4. Surrounding: Operate the engine on a table, level surface free of small rocks, loose gravel, etc. If the engine is tilted, it may result in fuel spillage. Do not move the engine while in operation. When the engine is transported over a long distance or on rough roads, drain out fuel from fuel tank to prevent fuel leakage.

## PREPARATION BEFORE OPERATION

### 2.1 Check lube oil level: (Refer to Figure 2-1)

When engine is stopped, unscrew the oil dipstick to check whether the lube oil is within the range of specific limit. If the oil level is below the min. oil level, fill in lube oil to reach the required height but not exceeding the max. oil level. Lube oil class SAE15W/40 is preferred.

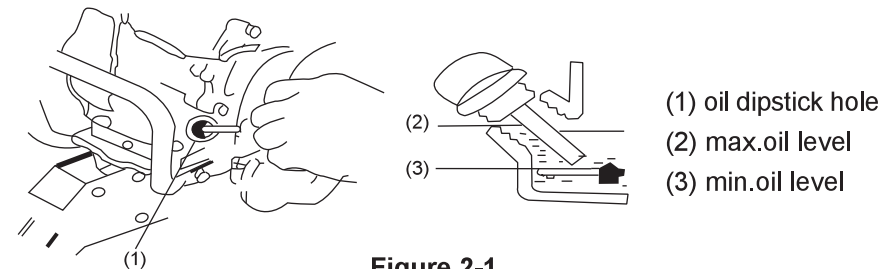


Figure 2-1

### 2.2 Check fuel oil level: (Refer to Figure 2-2)

Open the fuel tank cap to check the fuel oil level. If the fuel level is too low, fill in the gasoline through the fill-in hole till the fuel level reach the red stop plate inside the strainer. Gasoline class #90 or up is preferred. Do not mix the gasoline with lube oil. Make sure fuel oil to be clean and free of dust or any impurity.

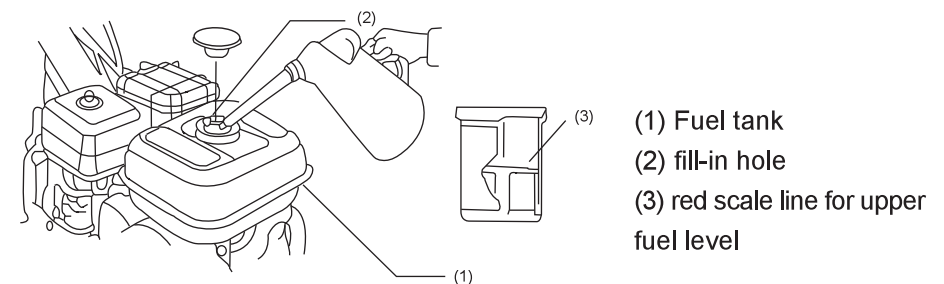


Figure 2-2

## 2.3 Check air cleaner:(Refer to Figure 2-3)

The air cleaner is dry type cleaner with two kinds of filter elements-paper and foam. When check whether the filter element is clean, remove the case of the air cleaner. If there exists any dust or dirt, clean it in gasoline or kerosene. Then make it dry. Repeat the cleaning operation for several times before reinstall it to the engine.

### 2.3.1For UP168-1 UP170 UP177 UP188

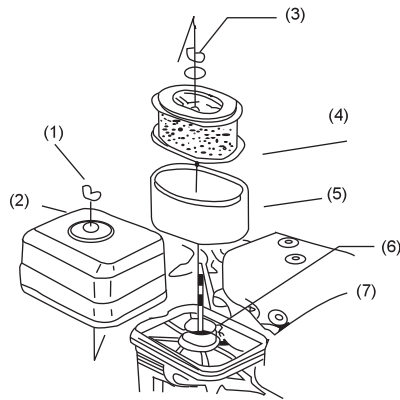
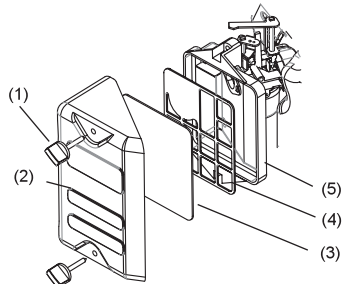


Figure 2-3

### 2.3.2For UP152 UP154 UP156



- (1) latches
- (2) air cleaner cover
- (3) filter element
- (4) gasket
- (5) cleaner base plate



Figure 2-4

## 2.4 Valve train components:(Refer to Figure 2-4)

Keep through and clean

## STARTING AND STOPING OF ENGINE

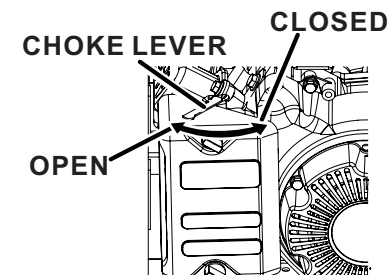
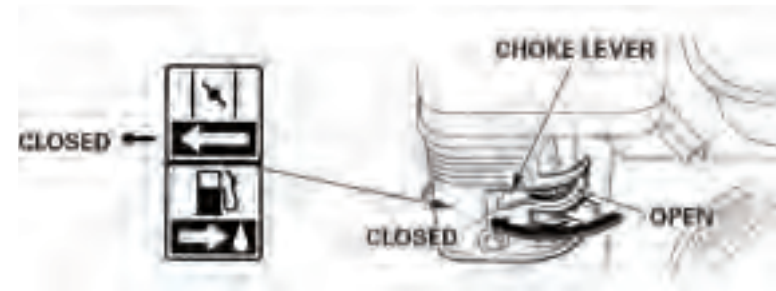
### 3.1 Start the engine

#### 3.1.1.Move the fuel valve lever to lever to de ON position

FUEL VALVE LEVER



#### 3.1.2.To start a cold engine, move the choke lever to the CLOSED position.



(only for up152 154 156)

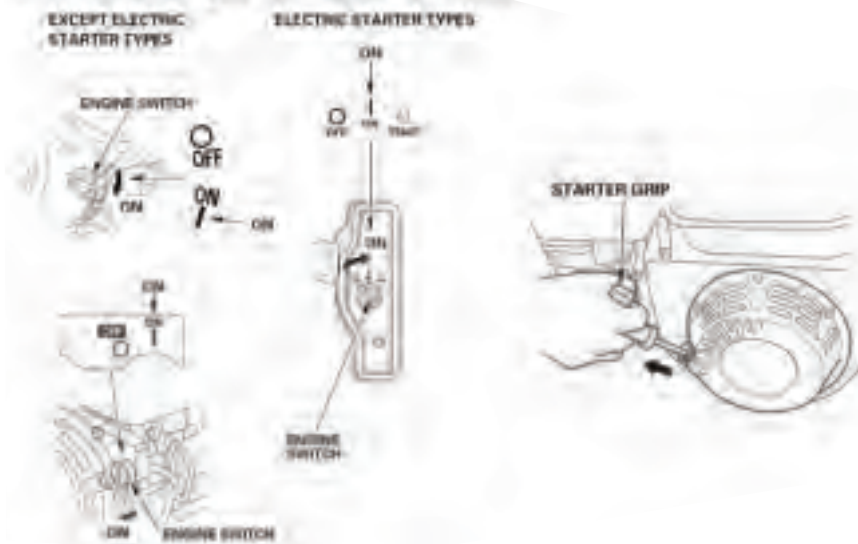
To restart a warm engine,leave the choke lever in the OPEN position.

3.1.3. Move the throttle lever away from the MIN. position, about 1/3 of the way toward the MAX. position



**THROTTLE LEVER**

3.1.4. Turn the engine switch to the ON position.



3.1.5. Operate the starter.

Recoil starter.

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

**NOTICE**

Do not allow the starter grip to snap back against the engine. Return it gently to prevent damage to the starter.

ELECTRIC STARTER (applicable types):

Turn the key to the START position, and hold it there until the engine starts. If the engine fails to start within 5 seconds, release the key, and wait at least 10 seconds before operating the starter again.

3.2 Stop the engine

To stop the engine in an emergency, simply turn the engine switch to the OFF position. Under normal conditions, use the following procedure. Refer to the instructions provided by the equipment manufacturer.

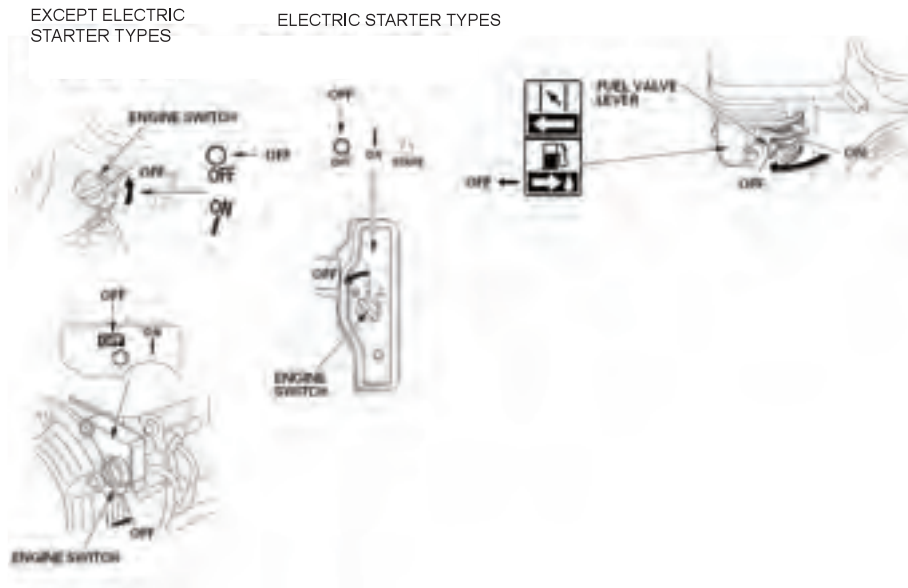
3.2.1. Move the throttle lever to the MIN. position.



3.2.2. Turn the engine switch to the OFF position.

3.2.2. Turn the engine switch to the OFF position.

3.2.3. Turn the fuel valve lever to the OFF position.



## MAINTENANCE

### 4.1 Routine Maintenance

- \* Check the filter element of the air cleaner. Remove the dirt and dust to keep it clean.
- \* Check the bolts and nuts to make sure they are fastened.
- \* Check the lube oil level according to 2.1 of Part 2.

4.2 The air cleaner should be cleaned after every 25 hours running. Follow the cleaning method mentioned in 2.3 of Part 2.

4.3 Check the spark plug after every 50 hours running. Remove its carbon deposits and adjust its gap to 0.6~0.7 mm. (Refer to Figure 4-1). Check the radiating fins and remove the dirt on them.

4.4 Replace the lube oil, unscrew the drain plug, tilt the engine slightly and let the lube oil drain out, then fill in kerosene to clean it and drain kerosene out, tighten the drain plug and fill in the fresh lube oil to the specific oil level.

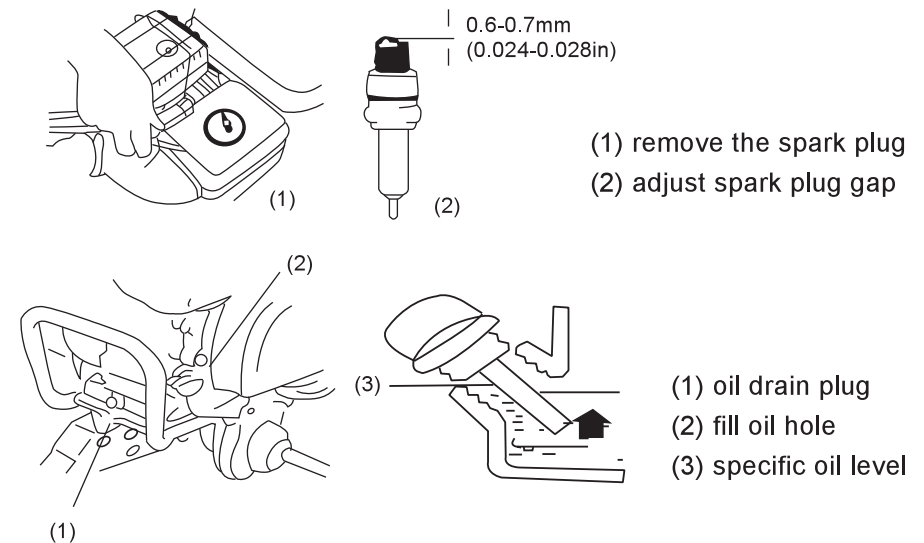


Figure 4-1

4.5 Clean the fuel tank and filter strainer after every 100 hours running. Open the fuel tank cap, take out the filter strainer and clean it with brush. Take off the fuel tank clean internal surface, remove dirt and water attached. Reinstall the fuel tank and the filter strainer, fill in fresh fuel oil till the oil level reaches the red scale line. (Refer to 2.0 of Part 2)

4.6 Check the aging condition of the oil tube after every 2 years use. Replace oil tube if there is any aging hardening or crack. Tighten the new oil tube joints and prevent any leakage.

4.6 Should the engine be stored for a long period, please do as follows: First, take off the fuel tank, drain out all the fuel and clear away the dirt/water attached on the surface of internal tank. Open the fuel cock, unscrew the drain plug at the bottom of carburetor and drain out fuel in carburetor completely. Then tighten the drain plug. Second, unscrew the drain plug at the bottom of the crankcase and drain out the lube oil in the crankcase completely. Then tighten the drain plug. Finally, clean the outer surface of the engine with clean cotton and remove dirt or dust. Then put the engine at a dry place.

**4.6 Useful data**

**Important bolts torque(N m)**

model	cylinder head bolts	crank case cover bolts	crankcase cover bolts	Fly wheel bolts
152/154/156	24	24	12	50
168	24	24	12	80
170	24	24	12	80
177	34	24	14	113
188	34	24	14	113

**4.6 tuneup specifications**

Item	specification
Spark plug gap	0.6~0.7mm (0.024~0.028in)
Valve clearance(cold)	IN:0.15±0.02mm EX:0.20±0.02mm
other specification	No other adjustments needed

**TROUBLESHOOTING**

**5.1 Low power output**

Symptom	Cause Analysis		Troubleshooting
When turning throttle greater, rising of speed responds slowly or speed is decreased or engine stops running.	Ignition system	Incorrect ignition time	Readjust ignition advance angle
	Fuel supply system	Air in fuel line or fuel line clogged	Expel air or dredge fuel line
		Main jet is not adjust properly	Readjust
		Metering jet and main jet clogged in carburetor	Clean and blow to get through
		Fuel cock is clogged up	Clean and replace damaged part
		Too much carbon fouling in combusting chamber	Clear away
		Too much carbon fouling in muffler and exhaust pipe	Clear away
		Air cleaner is clogged up	Clean air cleaner element
		Intake pipe is leaking	Repair or replace
	Poor compression	Piston or cylinder or piston ring is worn	Replace the worn
		Air leakage from the surface by which cylinder block contacting with cylinder head.	Replace cylinder gasket
		Too big or too small valve clearance	Readjust
		Valve tightness is poor	Repair

**5.2 Engine can not run smoothly**

Symptom	Cause Analysis	Troubleshooting
Engien is pinking	Piston,cylinder or piston ring is worn excessively	Replace the worn parts
	Piston pin and piston pin hole are worn excessively	Replace piston or piston pin
	Tie rod small head is worn excessively	Replace tie rod
	Roller bearing for crankshaft is worn	Replace roller bearing
Abnormal combustion	Engine is too hot	Shoot trouble
	Too much carbon fouling in combustion chamber	Clear away
	Improper gasoline class or low gasoline quality	Replace with qualified gasoline
Engine can not start because of spark lacking	There is water in floater room	Clean
	Improper spark plug electrode clearance	Adjust
	Incorrect ignition time	Readjust
	Something failed with induced coil,and so on	Check and replace damaged parts.

**5.3 Stop suddenly when running**

Symptom	Cause Analysis	Troubleshooting	
Stop suddenly when running	Fuel supply system	Fuel is used up	Refill fuel
		Carburetor is clogged	Check fuel line and dredge
		Float is leaking	Repair
		Needle valve sticks	Dismantle float bowl and shoot trouble
	Ignition system	Spark plug is struck through, or shortcircuited by carbon fouling	Replace spark plug
		Side electrode of spark plug is dropped out	Replace spark plug
		High-voltage wire is dropped out	Weld on
		Ignition coil is struck through to be short-circuited	Replace ignition coil
		Parking wire is located on engine body	Find out meeting and insulate
	Others	Cylinder is pulled damage and valve is dropped out	Repair or replace damaged parts



**5.4 Engine is excessively hot**

Symptom	Cause Analysis	Troubleshooting
Engine is excessively hot	Improper ignition time	Adjust ignition advance angle properly
	Insufficient oil supply	Refill sufficient engine oil
	Exhaust pipe is clogged	Dredge exhaust pipe
	Flow guard is leaking	Repair leakages
	Dirt or something else jams among air cooling fins	Clear away dirt or something alike
	Cooling fan is loosen and malfunction	Reinstall properly
	Tie rod deformation makes piston and cylinder bushing side wear	Replace tie rod
	Cylinder or piston or piston ring is worn resulting in air flow between cylinder and crankcase	Replace the worn parts
	Improper adjustment of engine speed	Readjust engine speed
Excessive rotational speed occurs	Readjust speed regulator	
Crankshaft main bearing is burnt out	Replace main bearing	

**NOTE:**

The engine should be operated under certain temperature range. Generally it is permitted that temperature at the flow guard outlet between 80~110\* while the temperature of the crankcase under the magneto motor around 60\*. If temperature surpasses upper limit, it is an indication that the engine is excessive hot.

**5.5 Abnormal noise occurs when engine is running**

Symptom	Cause Analysis	Troubleshooting
Noise of beating	Piston or piston ring or cylinder is worn	Replace the worn parts
	Tie rod or piston pin and piston pin hole is worn	Replace the worn parts
	Crankshaft main bearing is worn	Replace
	Piston ring is broken	Replace
	Metal-beating noise in abnormal combustion	Too much carbon fouling in combustion chamber
Too small electrodes clearance of spark plug properly		Adjust electrodes clearance
Engine is flooded with fuel		Check relating parts such as carburetor
Improper fuel class		Replace fuel
Engine is excessively hot		Shoot trouble
Others	Improper valve clearance	Readjust valve clearance properly
	Fly wheel is not connected to crankshaft tightly	Connect tightly

## **DISMANTLEMENT AND ASSEMBLY**

### **6.1 Dismantling precautions:**

- 6.1.1 Dismantle properly. Do not dismantle parts that may not be removed. Try to avoid dismantling sealing parts and moving parts such as piston and piston ring, etc.
- 6.1.2 Never dismantle parts except spark plug, carburetor and magneto motor in hot state to prevent parts from being damaged or deformed.
- 6.1.3 Take installation into consideration when dismantling
  - \*Make marks on some parts situated in special locations of the engine such as piston ring, both side of the cylinder gasket and connecting wire.
  - \*Keep parts from the same component together for convenient installation.
- 6.1.4 Remove parts should be cleaned and stored in group according to installation relationship.
- 6.1.5 When dismantling bolts, loose bolts in diagonals first and then turn them off.
- 6.1.6 Use extractors to dismantle tight parts such as bearing.
- 6.1.7 Dismantling starting bolts with opposite thread, turn loose clockwise the bolts and then apply a screw extractor.

### **6.2 Dismantling procedure:**

- 6.2.1 Drain the fuel out in the fuel tank completely.
- 6.2.2 Dismantle the spark plug and check electrodes gap.
- 6.2.3 Drain out the lube oil in the crankcase.
- 6.2.4 Dismantle the engine flow guard.
- 6.2.5 Turn loose the lock screw of the carburetor clip, remove the carburetor and its connecting parts.
- 6.2.6 Drive out the muffler lock screws, remove the muffler and its gasket.

- 6.2.7 Turn loose bolts in diagonals first, then drive them out. Remove the cylinder head and cylinder gasket.
- 6.2.8 Dismantle the starter.
- 6.2.9 Dismantle the fly wheel.
- 6.2.10 Dismantle the magneto motor.
- 6.2.11 Dismantle the crankcase cover bolts, and then dismantle the crankcase.
- 6.2.12 Dismantle the camshaft and valve tappet.
- 6.2.13 Dismantle the piston and tie rod.
- 6.2.14 Dismantle the crankshaft.
- 6.2.15 Dismantle both the intake and exhaust valves and their conveying parts.

### **6.3 Assembling precautions:**

- 6.3.1 Before installation, clean all the parts.
- 6.3.2 Before installation, make sure that all the parts are qualified. Otherwise repair or replace disqualified parts.
- 6.3.3 Oil the important assembling surfaces such as surface between cylinder bushing and piston with lube oil.
- 6.3.4 When twisting force is required in installing some bolts such as tie rod bolts and cylinder cover bolts, etc., use torque spanner to turn the bolts to specific torque.

### **6.4 Assembling procedure;**

- 6.4.1 Clean all the parts.
- 6.4.2 Install the crankshaft.
- 6.4.3 Install the valves.
- 6.4.4 Assemble the piston and tie rod in correct order, fill a little of lube oil into the cylinder, and turn tight the tie rod bolts to specific torque.
- 6.4.5 Assemble the valve tappets and camshaft, adjust the timing mark correctly and install the timing gear properly.
- 6.4.6 Assemble the cylinder gasket and cylinder head, and turn tight the cylinder head bolts to specific torque.

## PART 6

- 6.4.8 Install the fly wheel.
- 6.4.9 Install the starter.
- 6.4.10 Install the carburetor and air cleaner.
- 6.4.11 Install the muffler.
- 6.4.12 Install the engine flow guard.
- 6.4.13 Install the fuel tank and then connect fuel hose properly.
- 6.4.14 Fill the crankcase with lube oil and fill the fuel tank with specific gasoline.
- 6.4.15 Install the spark plug.
- 6.4.16 Check connecting joints for reliability and operating for smoothly;  
Check speed-adjusting parts for good conditions.
- 6.4.17 Start the engine and observe its running.

Model	UP152	UP154	UP156	UP168-1	UP170	UP177	UP188
Engine type	4-stroke, air-cooled, OHV gasoline engine						
Bore x stroke(mm)	52*37.6	54*38	56*38	68*45	70*54	77*58	88*64
Displacement capacity(cc)	79.8	87	93	163	208	270	389
Max. output(Hp)/rpm	2.1/3600	2.2/3600	2.3/3600	4.6/3600	5.6/3600	7.9/3600	11/3600
Max. torque(N.m./rpm)	4.1/3000	4.4/3000	4.7/3000	9/2500	12.5/2500	17/2500	23.5/2500
Fuel consumption(g/hp.h)	612	612	612	537	508	508	508
Ignition system	transistorized magneto ignition						
Spark plug	E6TC	E6TC	E7TC	F6TC	F6TC	F7TC	F7TC
Fuel tank capacity(L)	1.6	1.6	1.6	3.6	3.6	6	6.5
Lubrication oil	SAE 15W/40						
Lubrication oil volume(L)	0.4	0.4	0.4	0.6	0.6	1.1	1.1
Starting system	Recoil			Recoil or Electric starter			
Stop system	Ignition primary circuit ground						
Noise level at 7m(dB)	72	72	72	80	82	86	90
Gross weight(kg)	11.5	11.5	11.5	18	18	27(E:30)	33(E:37)
Dimension(mm)	397*345*367			417*368*385		542*500*507	

Note: The data mentioned above is only for reference !

## This adjunct only applicable in America

### U.S. EPA EMISSIONS CONTROL WARRANTY STATEMENT YOUR WARRANTY RIGHTS AND OBLIGATIONS

The United States Environmental Protection Agency (EPA) and UNITED POWER EQUIPMENT CO.,LTD. are pleased to explain the emissions control system warranty (ECS warranty) on your 2012 and later equipment. New equipment that use small spark-ignited must be designed, built, and equipped to meet U.S. EPA emission standards for spark ignited small off-road engines at or below 19 kilowatts. UNITED POWER will warranty the emission control system on your equipment for the period of the time listed below provided there has been no abuse, neglect, unapproved modification or improper maintenance of your equipment.

#### Manufacturer's Warranty Coverage

This ECS warranty is valid for two years, or for the same period as specified in the UNITEDPOWER limited warranty, whichever is longer. For equipment with hour meters, the warranty period is a number of hours equal to half the useful life to which the equipment is certified, or the warranty period specified above in years, whichever is less. The useful life can be found on the Emission Control Label on the engine. Where an arrantable condition exists, UNITED POWER EQUIPMENT CO.,LTD. will repair your spark ignited small off-road engine at no cost to you including diagnosis, parts and labor. Your emission control system includes parts such as carburetor, air cleaner, ignition system, muffler and catalytic converter (when present). Also included may be hoses, connectors, and other emission-related assemblies.

#### Owner's Warranty Responsibility

As the spark ignited small off-road engine owner, you are responsible for the performance of the require maintenance listed in the owner's manual. UNITED POWER EQUIPMENT CO.,LTD. recommends that you retain all receipts covering maintenance on your spark ignited small off-road engine, but UNITED POWER EQUIPMENT CO.,LTD. cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the owner of a spark ignited small off-road engine, you should however be aware that UNITED POWER EQUIPMENT CO.,LTD. may deny you warranty coverage if your spark ignited small off-road engine or part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

You are responsible for presenting your spark ignited small off-road engine to an authorized service center as soon as a problem exists. The undisputed warranty repairs should be completed in a reasonable period of time, not to exceed 30 days. For the location of an authorized service center and any questions you may have regarding your warranty rights and responsibilities, you should call our parts and technical support group toll free number below, or E-mail to us.

The emission warranty is a defects warranty and defects are judged on normal engine performance. The warranty is not related to an in-use emission test.

If you have any questions regarding your emission warranty rights and responsibilities, you should contact the UNITEDPOWER at the following address:

UNITED POWER EQUIPMENT CO.,LTD.  
1691 Mallory Lane, #157, Brentwood TN 37027  
Telephone: 800-380-5188 M-F, 8:00 AM to 5:00 PM CST.  
E-mail:info@unitedpower.cn

### **Emission Control System Warranted Parts**

Coverage under this warranty extends only to the parts listed below (the emission control system parts) to the extent that these parts were present on the engine purchased.

#### **Fuel Metering System**

Carburetor and/or internal parts  
Intake manifold

#### **Evaporative System**

Fuel tank, Fuel cap, Fuel hose, Fuel strainer, Fuel cock, Fuel hose joint

Carbon canister, canister brackets, canister purge hose joint Vapor hoses

#### **Air Induction System**

Air cleaner\*  
Intake manifold

#### **Exhaust System**

Exhaust manifold  
Catalyst

#### **Ignition System**

Ignition coil assembly  
Spark plug

#### **Crankcase Emission Control System**

Crankcase breather tube  
Oil filler cap

#### **Miscellaneous parts**

Hoses, seals, gaskets, connectors and assemblies associated with listed parts

Note: \* Covered up to the first required replacement only. See the maintenance schedule in the Owner's Manual.

### **Limitations**

The Emission Control System Warranty shall NOT cover any of the following:

(a) Repair or replacement required as the result of misuse or neglect, improper maintenance or unapproved modifications, repairs improperly performed or replacement improperly installed, use of unapproved replacement parts or accessories and modifications not recommended by UNITEDPOWER

(b) Replacement parts, other services and adjustments necessary for normal maintenance.

(c) Transportation to and from the authorized service center or retailer.

### **Limited Liability**

The liability of UNITED POWER EQUIPMENT CO.,LTD. under this Emission Control System Warranty is limited solely to the remedy of defects in materials or workmanship. This warranty does not cover inconvenience or loss of the spark ignited small off-road engine equipment or transportation of same to an authorized service center. UNITEDPOWER shall not be liable for any other expenses, loss, or damage, whether direct, incidental, consequential (except as listed) or exemplary arising in connection with the sale or use of or inability to use the spark ignited small off-road engine equipment for any other purpose.

No express Emission Control System Warranty is given by UNITED POWER EQUIPMENT CO.,LTD. with respect to the engine except as specifically set forth in this document. Any Emission Control System Warranty implied by law, including any warranty of merchantability or fitness for a particular purpose, is expressly limited to the Emission Control System Warranty terms set forth in this document.