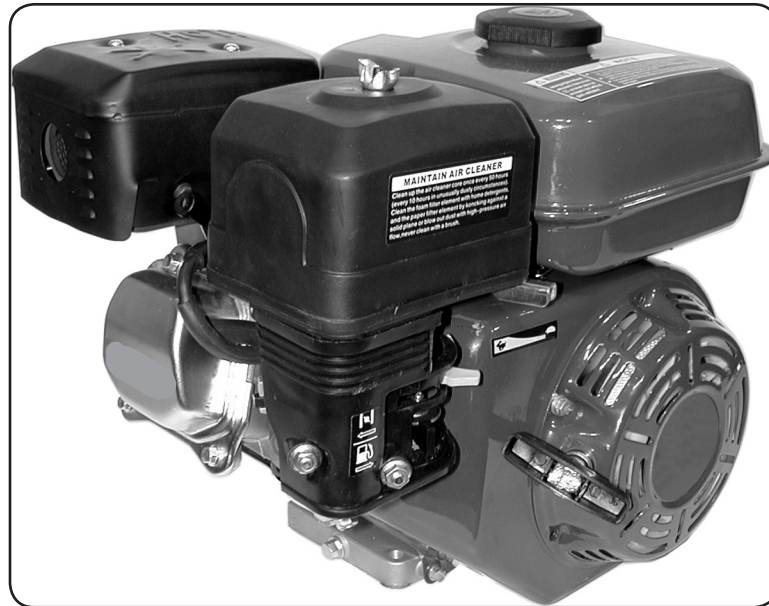


# CENTRAL MACHINERY®

## GAS ENGINE - 6.5 HP

**Model 96549**

### ASSEMBLY AND OPERATION INSTRUCTIONS



Due to continuing improvements, actual product may differ slightly from the product described herein.



3491 Mission Oaks Blvd., Camarillo, CA 93011

Visit our website at: <http://www.harborfreight.com>

**TO PREVENT SERIOUS INJURY, READ AND UNDERSTAND  
ALL WARNINGS AND INSTRUCTIONS BEFORE USE.**

Copyright© 2007 by Harbor Freight Tools®. All rights reserved. No portion of this manual or any artwork contained herein may be reproduced in any shape or form without the express written consent of Harbor Freight Tools.

**For technical questions or replacement parts, please call 1-800-444-3353.**

# Contents

<b>SPECIFICATIONS</b> .....	<b>3</b>
Save This Manual.....	3
<b>SAFETY WARNINGS AND PRECAUTIONS</b> .....	<b>3</b>
<b>UNPACKING</b> .....	<b>5</b>
<b>MOUNTING</b> .....	<b>6</b>
<b>OPERATION</b> .....	<b>6</b>
Controls and Indicators .....	6
Pre-Operation Checks.....	7
<b>TROUBLESHOOTING</b> .....	<b>9</b>
General/Basic Troubleshooting .....	9
Engine Difficult to Start .....	9
Low Engine Power .....	10
Engine not Running Smoothly.....	10
Engine Excessively Hot.....	11
Abnormal Engine Noise .....	11
<b>MAINTENANCE</b> .....	<b>12</b>
Scheduled Maintenance.....	12
Cleaning Air Filter.....	12
Cleaning and Replacing Spark Plug .....	12
Changing Oil .....	13
Cleaning the Deposit Cup .....	13
Torque Value for Major Engine Bolts .....	14
Transporting the Engine .....	14
Storing the Engine .....	14
<b>PARTS LISTS AND ASSEMBLY DIAGRAMS</b> .....	<b>16</b>
Crankcase .....	16
Crankcase Cover.....	17
Cylinder Head and Cover .....	18
Crankshaft, Piston, and Connecting Rod .....	19
Camshaft and Rocker Valve .....	20
Carburetor .....	21
Fuel Tank.....	22
Air Cleaner .....	23
Muffler .....	24
Recoil Starter .....	25
Regulator Control .....	26
Flywheel.....	27
Ignition Coil .....	28
Wiring Diagram .....	29
<b>WARRANTY</b> .....	<b>29</b>
Emission Control System Warranty.....	30

## SPECIFICATIONS

Power Output	6.5 HP OHV Gas Engine, EPA approved
Displacement / Stroke	196 cc; 4-stroke
Ignition Type	Electronic ignition (T.C.I.)
Cooling System	Forced air cooling
Idling Carburetor Adjust	1700 +/- 150 RPM
Valve clearance	Cold engine – Intake: 0.15 +/- 0.02mm; Exhaust: 0.20 +/- 0.02 mm
Maximum Power Output	4.8 KW @ 3600 RPM
Maximum Torque	11-N.M./2500-RPM
Distributor Timing	Intake valve opening: BTDC10°; Intake valve closing: ABDC20°
Bore and Stroke	68 x 54 mm
Spark Plug Type	BP6ES, BPR6ES (NGK), or NHSPLD F6RTCUI; 0.7~0.8 mm gap
Gasoline Type	Unleaded
Gasoline Tank Capacity	0.95 gallon (3.6 liters)
Drive Shaft Type	Horizontal, 3/4" straight, (3/16") keyed shaft with ball bearings. Direction: counterclockwise (facing shaft); Length: 2-1/4"; Central thread: 5/16"-24
Start Type	Recoil
Speed	3600 RPM
Oil Capacity and Type	0.528 quart (0.5 liters); SAE 10W30 (in freezing weather use 5W30)
Engine Shaft Mounting	Square pattern, 4 holes; 8.0-1.25 mm threads x 3-5/8" Bolt Circle
Base Mounting Pattern	3" x 6-3/8"
Weight	33.8 lbs.
Overall Dimensions	12-3/4" L x 14" W x 10-1/4" H
Recommended Applications	To drive: pump, sprayer, tiller, chipper, shredder, log splitter
Features	Low oil shutdown, automatic Longer engine life with bearing supported shaft Meets EPA certification (2007) Fuel shutoff valve

The Emission Control System for this generator's engine is warranted for standards set by the U.S. Environmental Protection Agency. For warranty information, refer to the back two pages of this manual.

### Save This Manual

You will need the manual for the safety warnings and precautions, assembly instructions, operating and maintenance procedures, parts list and diagram. Keep your invoice with this manual. Write the invoice number on the inside of the front cover. Keep the manual and invoice in a safe and dry place for future reference.


## SAFETY WARNINGS AND PRECAUTIONS

**WARNING:** When using this Engine, basic safety precautions should always be followed to reduce the risk of personal injury and damage to equipment.

**Read all instructions before using this tool!**

- 1. Keep work area clean.** Dark and cluttered areas invite injuries.

2. **Observe work area conditions.** Do not use the Engine in damp or wet locations. Do not expose to rain. Keep work area well lit. Do not use powered tools in the presence of flammable gases or liquids.
3. **Keep children away.** Children must never be allowed in the work area. Do not let them handle machines, tools, or extension cords.
4. **Store idle equipment.** When not in use, the Engine must be stored in a dry location to inhibit rust. Always lock up tools and keep out of reach of children.
5. **Dress properly.** Do not wear loose clothing or jewelry as they can be caught in moving parts. Wear restrictive hair covering to contain long hair.
6. **Use the right tool for the job.** Do not attempt to force the Engine to do the work of a larger industrial tool. There are certain applications for which this equipment was designed. It will do the job better and more safely at the rate for which it was intended. Do not modify the Engine for a purpose for which it was not intended.
7. **Use eye and ear protection.** Always wear ANSI-approved impact safety goggles and ear plugs when working with the Engine.
8. **Do not overreach.** Keep proper footing and balance at all times. Do not reach over or across running machines.
9. **Maintain this equipment with care.** Keep the Engine clean for better and safer performance. Follow instructions for lubricating and changing accessories.
10. **Remove adjusting keys and wrenches.** Remove keys and adjusting wrenches from the Engine before starting.
11. **Avoid unintentional starting.** Be sure the power switch and gas valve are in the Off position when not in use.
12. **Check for damaged parts.** Check for alignment and binding of moving parts; any broken parts or mounting fixtures; and any other condition that may affect proper operation. Any part that is damaged should be properly repaired or replaced by a qualified technician. Do not use the Engine if the switch does not turn On and Off properly.
13. **Do not operate the Engine while tired or under the influence of drugs, alcohol, or medication.** Read warning labels if taking prescription medicine to determine if your judgment or reflexes are impaired while taking drugs. If there is any doubt, do not operate the equipment.
14. **Maintenance.** For your safety, service and maintenance should be performed regularly by a qualified technician.
15. **People with pacemakers should consult their physician(s) before use.** Electro-magnetic fields in close proximity to heart pacemaker could cause pacemaker interference or pacemaker failure. Caution is necessary when near coil, spark plug cables, or distributor of running engine. Engine should be off during distributor adjustment.

16.  **Fire Hazard!** Do not fill gas tank when the Engine is running. Do not operate if gasoline has been spilled. Clean spilled gasoline before starting the Engine. Do not operate near a pilot light or open flame.
17. **Operate the Engine in well-ventilated areas only.** Carbon Monoxide is produced during operation and is deadly in a closed environment. Early signs of Carbon Monoxide poisoning resemble the flu, with headaches, dizziness, or nausea. If you develop these symptoms, there may be inadequate ventilation in the work area or the engine may not be working properly. Get fresh air immediately.
18. **Avoid burns from the Engine.** Certain parts of the Engine become very hot during use. Do not touch the Engine until it cools down.
19. **Install this product on a appropriate surface.** Locate on a flat, level, and solid surface that is capable of supporting the weight of the engine and the machinery that it is powering.
20. **Do not operate the Engine with the safety guards removed.** While the engine is running, do not attempt to reach around the safety guards for maintenance or any other reason.
21. **If the Engine is installed indoors, exhaust fumes must be piped out of the building using leak-free, heat-resistant piping.** Pipes and silencer should not use any flammable materials, nor should they be installed near the same. Engine exhaust fumes should be within legal limits.
22. **Engine fuel and fumes are flammable, and potentially explosive. Do not smoke, or allow sparks, flames or other sources of ignition around the engine, fuel tanks, or batteries.** Use proper fuel storage and handling procedures. Always have multiple ABC class fire extinguishers nearby.
23. **Never store fuel or other flammable materials near the Engine.**
24. **Keep hands, arms, long hair, loose clothing, and jewelry away from pulleys, belts, and other moving parts.** Be aware that when engine parts are moving fast they cannot be seen clearly.
25. **The Engine can produce high noise levels.** Prolonged exposure to noise levels above 85 dBA is hazardous to hearing. Always wear ANSI-approved hearing protection when operating or working around the Engine when it is running.

**Warning:** The warnings, cautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

---

## MOUNTING

---

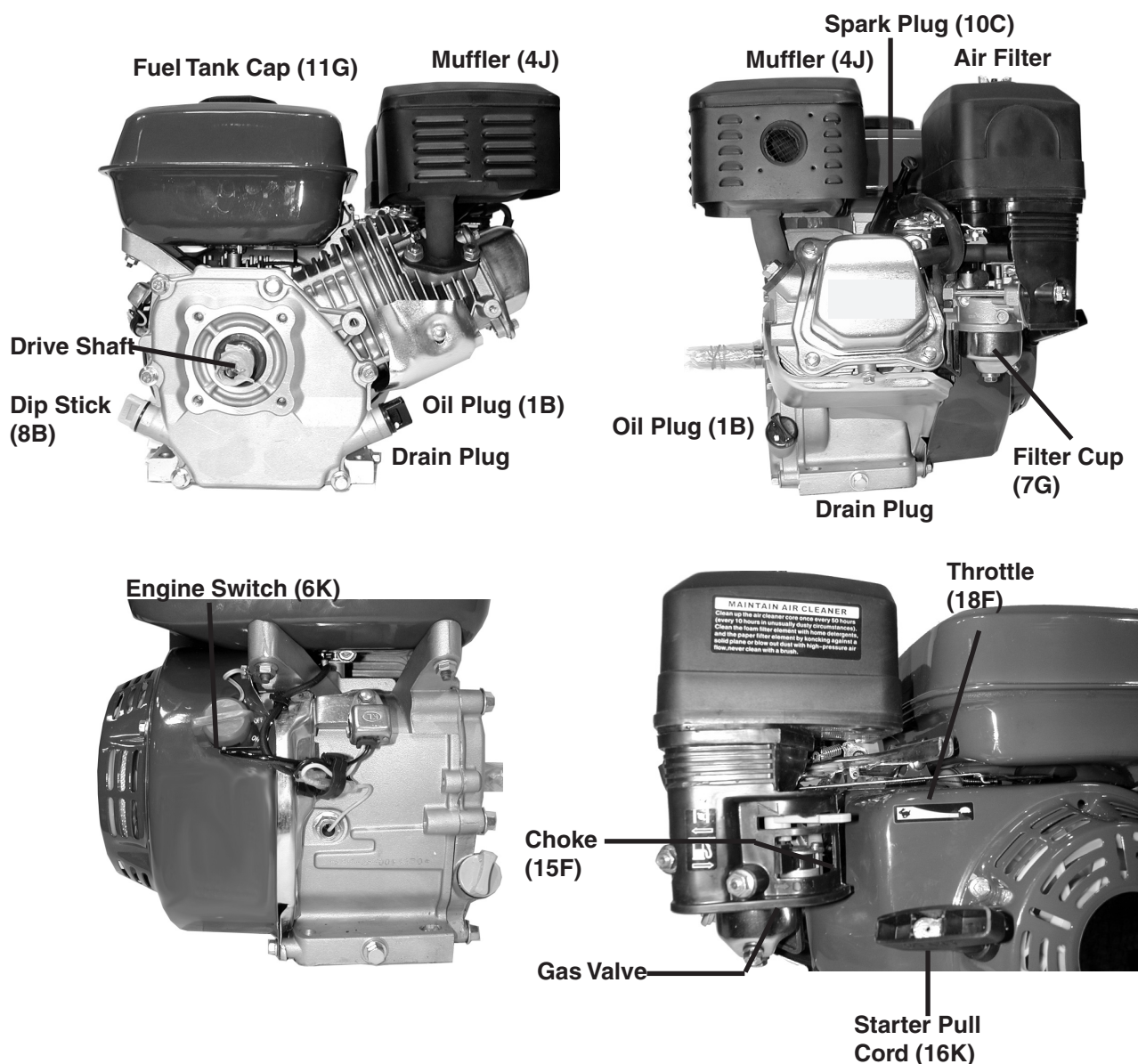
1. Mount the Engine using the four mounting holes at the base (hardware not supplied). Select a flat, level location able to withstand the weight, vibration, and the load device connected to the Engine. If installed indoors, proper exhaust ventilation tubing **must** be installed. If installed outdoors, a weatherproof housing is recommended.
2. Install the Engine load.  
The Engine load must be perfectly aligned with the Engine drive shaft to prevent undue wear on the shaft and bearings. A qualified technician should perform this operation.

---

## OPERATION

---

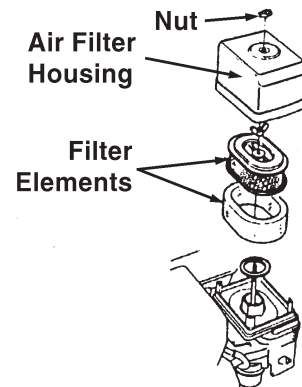
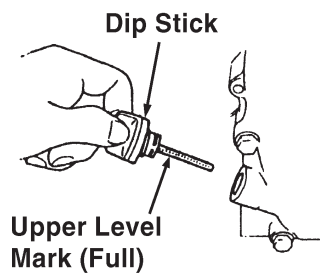
### Controls and Indicators



## Pre-Operation Checks

**Caution:** Failure to add oil to the Engine before use will damage the Engine and void the factory warranty. Engine oil is the key factor in engine performance. Do not use Engine oil with additives. Do not use two-stroke gasoline-oil. Using these products will shorten Engine life. See Specifications on page 2 for recommended oil type.

1. Check that all mounting nuts and bolts are tight.
2. Check oil level (See illustration below, left.) If needed, add oil. Unscrew the oil Dip Stick (8B) and wipe clean. Insert the Dip Stick back into the hole without screwing it in. Remove it again and check the oil level. Full is indicated by oil on the Upper Level mark. Use a siphon to avoid spilling the oil. Carefully screw the plastic Dip Stick back into the metal Engine crankcase to avoid stripping the plastic threads on the Dip Stick.



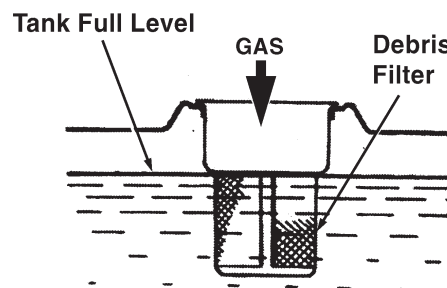
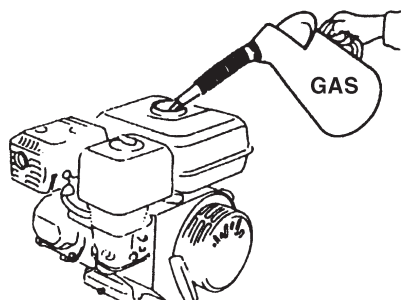
3. Check Air Filter. (See illustration above, right.) Unscrew Air Filter Wing Nut (1H) and remove the Air Filter Cover (2H) and Filter Elements. If dirty or dusty, clean (refer to the Maintenance Section).

**Caution:** To avoid damaging the Engine, never run it without the Air Filter Assembly (11H) attached.

4. Remove the fuel Filter Cup (7G), clean and replace it before filling. Fill the Fuel Tank (11G), outdoors, with up to 0.95 of a gallon of unleaded gasoline containing at least 86 octane. Do not top-off tank. Replace Fuel Cap (10G). Clean up any spilled gas with a dry cloth.





**Fire Hazard!** Do not fill Gas Tank when the Engine is running, or near a pilot light or open flame. Do not smoke. Do not operate if gasoline has been spilled. Clean spilled gasoline before starting the engine.



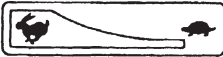
## **Starting the Engine**

During this procedure, it may be helpful to refer to the photos of the Engine Controls on page 6.

1. Push the Gas Valve to the open (right) position. 


2. Close the Choke (15F) by pulling it to the left. 

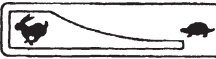
**Note:** If the Engine is already hot, it is not necessary to close the Choke.

3. Push the Throttle Lever (18F) to the slow (right) position , then move it back slightly.

4. Turn the Engine Switch (6K) to the On position.

5. Gently pull the Pull Cord Handle (16K) until it engages. Then pull it hard and all the way out. Slowly guide the Pull Cord back into the starter. The Engine should start. Try again if it does not start. Refer to the Troubleshooting section if problems persist. Let the engine run for five minutes to warm up.

6. Push the Choke to the right 

7. Push the Throttle Lever to the fast position (left). 

## **Stopping the Engine**

1. Push the Throttle Lever to the slow (right) position.

2. Turn the Engine Switch to the Off position.

3. Push the Gas Valve to the closed (left) position.



# TROUBLESHOOTING

## General/Basic Troubleshooting

Symptom	Probable Cause	Possible Remedy
Engine will not start.	<ol style="list-style-type: none"> <li>1. On/Off Switch in Off position.</li> <li>2. Gas Valve in closed position.</li> <li>3. Choke set to open position.</li> <li>4. Gas Tank empty.</li> <li>5. Spark plug dirty.</li> <li>6. Technical problem.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn to On position.</li> <li>2. Push to open position.</li> <li>3. Set to closed position.</li> <li>4. Fill Gas Tank.</li> <li>5. Remove spark plug and clean.</li> <li>6. Service by qualified mechanic.</li> </ol>
Engine runs rough, pinging noises.	<ol style="list-style-type: none"> <li>1. Gasoline wrong type.</li> <li>2. Gasoline has water.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace with 89 octane gas.</li> <li>2. Empty tank and replace gas.</li> </ol>
Engine stops by itself, but has gas.	<ol style="list-style-type: none"> <li>1. Low oil level auto shut off.</li> <li>2. Technical problem.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check oil level; Add if needed.</li> <li>2. Service by qualified mechanic.</li> </ol>
Engine does not reach full speed.	<ol style="list-style-type: none"> <li>1. Choke closed.</li> <li>2. Air filters clogged.</li> <li>3. Technical problem.</li> </ol>	<ol style="list-style-type: none"> <li>1. Open Choke.</li> <li>2. Clean air filter elements.</li> <li>3. Service by qualified mechanic.</li> </ol>

## Engine Difficult to Start

Symptom	Probable Cause	Possible Remedy
Engine difficult to start –Cylinder compression OK –Spark OK	Fuel supply blocked: <ol style="list-style-type: none"> <li>1. Air vent in Gas Cap clogged.</li> <li>2. Gas Valve plugged up</li> <li>3. Main jet clogged or misadjusted</li> <li>4. Needle valve improperly closed or start hole is clogged</li> <li>5. Floater in fuel tank is damaged or sticking</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean Gas Cap air vent</li> <li>2. Unclog Gas Valve</li> <li>3. Clean and/or readjust</li> <li>4. Take apart needle valve and repair, clean, and blow out</li> <li>5. Repair floater</li> </ol>
Engine difficult to start –Cylinder compression OK –Spark OK –Gas supply OK	Fuel system problem: <ol style="list-style-type: none"> <li>1. Gas dirty, has water, or is old</li> <li>2. Engine cylinder flooded</li> <li>3. Gas wrong type</li> </ol>	<ol style="list-style-type: none"> <li>1. Drain gas and replace</li> <li>2. Drain extra gas, dry spark plug electrodes</li> <li>3. Drain gas and replace</li> </ol>
Engine difficult to start –Cylinder Compression OK –Gas supply OK –Ignition coil spark OK	<ol style="list-style-type: none"> <li>1. Spark plug has carbon buildup or dirt on and around electrodes</li> <li>2. Electrodes are burned</li> <li>3. Improper spark gap</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove spark plug and clean</li> <li>2. Replace spark plug</li> <li>3. Adjust spark plug electrodes</li> </ol>
Engine difficult to start –Gas supply OK –Ignition system OK	<ol style="list-style-type: none"> <li>1. Piston ring worn</li> <li>2. Piston ring is sticking</li> <li>3. Piston ring broken</li> <li>4. Spark plug loose or without a gasket</li> <li>5. Air leakage between cylinder block and cylinder</li> <li>6. Air leakage in valve</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace piston rings</li> <li>2. Clean out carbon fouling</li> <li>3. Replace piston ring</li> <li>4. Tighten with a gasket</li> <li>5. Check cylinder gasket and bolts</li> <li>6. Check valve clearance and thickness, repair if required</li> </ol>

## Low Engine Power

Symptom	Probable Cause	Possible Remedy
When pressing Throttle for higher speed, engine responds slowly; speed is decreased; or engine stops.	Incorrect Ignition timing.	Re-adjust ignition advance angle.
	Fuel supply problem: 1. Fuel line is clogged or has air 2. Main jet not adjusted properly 3. Carburetor needle valve hole and main jet clogged 4. Gas valve clogged 5. Carbon buildup in combustion chamber. 6. Air filter is clogged. 7. Intake pipe leaking.	1. Clean line. Bleed line of air. 2. Readjust jet. 3. Clean needle valve hole and main jet 4. Clean or replace gas valve. 5. Clean combustion chamber. 6. Clean filter elements. 7. Repair or replace.
	Low compression: 1. Piston, piston ring, or cylinder worn. 2. Air leakage from surface where cylinder block contacts cylinder head. 3. Valve clearance incorrect. 4. Valve tightness poor.	1. Replace damaged part. 2. Replace cylinder gaskets. 3. Adjust valve. 4. Repair or replace valve.

## Engine not Running Smoothly

Symptom	Probable Cause	Possible Remedy
Engine pinging.	1. Piston, ring, or cylinder worn. 2. Piston pin and pin hole are worn excessively. 3. Tie rod small head is worn. 4. Main crankshaft roller bearing worn.	1. Replace worn part. 2. Replace piston and/or pin. 3. Replace tie rod. 4. Replace roller bearing.
Abnormal combustion.	1. Engine too hot. 2. Carbon fouling in combustion chamber. 3. Wrong gasoline type.	1. Troubleshoot overheating (see page 11). 2. Clean chamber. 3. Drain gas from system and replace with correct type.
Spark plug not firing correctly	1. Water in carburetor float chamber. 2. Spark plug electrode gap wrong. 3. Incorrect ignition timing. 4. Ignition coil malfunction.	1. Clean Carburetor. 2. Adjust spark plug gap. 3. Re-adjust. 4. Repair or replace coil.
Engine stops suddenly.	1. Gas tank empty. 2. Carburetor clogged 3. Floater is leaking. 4. Needle valve sticks. 5. Spark plug dirty or damaged. 6. Spark plug connector wire damaged or disconnected. 7. Low oil auto-shutdown. 8. Ignition coil damaged. 9. Cylinder or valve damaged.	1. Fill gas tank. 2. Clean carburetor and check fuel line. 3. Repair or replace. 4. Disassemble floater chamber and clean. 5. Replace spark plug. 6. Check and repair spark plug wire. 7. Fill with oil. 8. Repair or replace. 9. Disassemble, check, and repair.

## Engine Excessively Hot

<b>Symptom</b>	<b>Probable Cause</b>	<b>Possible Remedy</b>
Engine runs excessively hot.	<ol style="list-style-type: none"> <li>1. Ignition timing off.</li> <li>2. Engine oil low.</li> <li>3. Exhaust pipe or muffler clogged.</li> <li>4. Flow guard is leaking.</li> <li>5. Cooling fan loose, damaged, or clogged.</li> <li>6. Cylinder, piston, or piston ring is worn resulting in air flow between cylinder and crankcase.</li> <li>7. Engine speed maximum set too high.</li> <li>8. Crankshaft main bearing burnt.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust ignition advance angle.</li> <li>2. Fill with oil.</li> <li>3. Clean out exhaust pipe and muffler.</li> <li>4. Repair leakage.</li> <li>5. Clean, repair, or replace fan.</li> <li>6. Replace damaged parts.</li> <li>7. Re-adjust engine speed governor.</li> <li>8. Replace main bearing.</li> </ol>

## Abnormal Engine Noise

<b>Symptom</b>	<b>Probable Cause</b>	<b>Possible Remedy</b>
Noise of piston banging, or other metal-on-metal	<ol style="list-style-type: none"> <li>1. Piston, piston ring, or cylinder worn.</li> <li>2. Tie rod, piston pin and hole worn.</li> <li>3. Crankshaft main bearing worn.</li> <li>4. Piston ring broken.</li> <li>5. Carbon deposits in combustion chamber.</li> <li>6. Spark plug gap too small.</li> <li>7. Using wrong gasoline.</li> <li>8. Engine running too hot.</li> <li>9. Incorrect valve clearance.</li> <li>10. Flywheel not tightly connected to crankshaft.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace worn parts.</li> <li>2. Replace worn parts.</li> <li>3. Replace main bearing.</li> <li>4. Replace piston ring.</li> <li>5. Clean combustion chamber.</li> <li>6. Adjust electrode clearance.</li> <li>7. Empty gas tank and refill with proper gasoline.</li> <li>8. See Troubleshooting Excessively Hot Engine.</li> <li>9. Readjust valve clearance.</li> <li>10. Retighten flywheel.</li> </ol>

# MAINTENANCE

Before performing maintenance procedures, it may be helpful to locate the items to be serviced in the photos on page 5. Many Engine maintenance, adjustments, and repairs must be completed by a qualified, small engine mechanic.

## Scheduled Maintenance

Frequency Item	Each Use	First month or 20 hours	Each 50 hours	Every 6 months or 100 hours.	Each year or 300 hours.
Engine oil	Check	Replace		Replace	
Air Filter	Check		Clean	Clean	Replace
Spark Plug				Clean & Adjust	Replace
Spark Eliminator				Clean	
Idling					Check & Adjust*
Valve Clearance					Check & Adjust**
Fuel Tank & Filter					Clean
Fuel Line					Check
Deposit Cup				Clean	

\* Proper Idle: 1700 ± 150 RPM

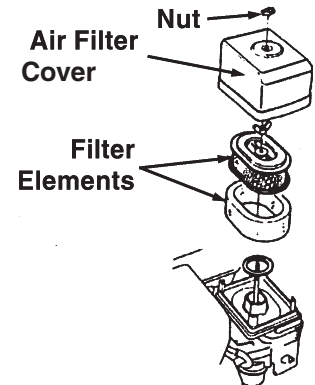
\*\* Valve Clearance (cold engine)

Intake:  
Exhaust:

0.15 ± 0.02mm  
0.20 ± 0.02mm

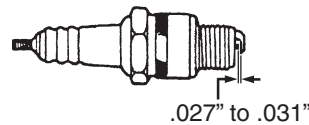
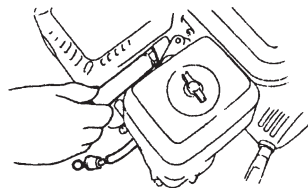
## Cleaning Air Filter

Using compressed air, blow the dust from both elements and the Filter Base on the Engine. If the Filter Elements cannot be cleaned, wash the foam element with mild soap and water, and dry. Purchase a new paper Filter Element if necessary. Reinstall Filter Elements, Air Filter Housing, and Nut.



## Cleaning and Replacing Spark Plug

- Remove the Spark Plug (10C) with a socket wrench (not supplied).  
Wait for the Engine to cool to avoid burning hands.



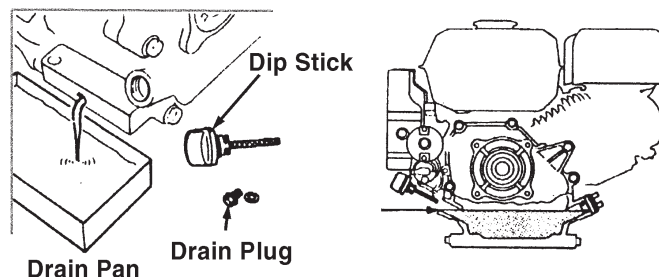
- Clean Spark Plug with a steel brush. If the insulator is damaged, replace Spark Plug.

**Caution:** Using other than the recommended Spark Plug replacement type can damage the Engine (see Specifications on page 2).

3. Measure the Spark Plug electrode gap with a feeler gauge (not supplied). It should be between 0.7 to 0.8 mm. If adjustment is necessary, bend the side electrode carefully, then re-measure. If Spark Plug Gasket is damaged, replace it.
4. Replace Spark Plug by hand for the first few turns, then tighten with the socket wrench completely. A Spark Plug with a new Gasket requires 1/2 more turns to tighten than the used Gasket which requires 1/8 to 1/4 turns to tighten.

### Changing Oil

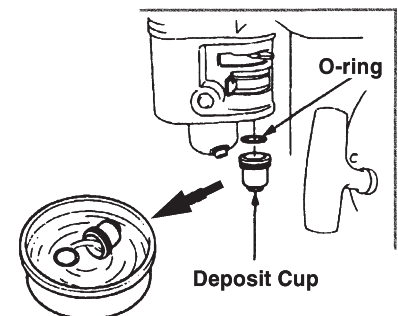
1. Run the Engine for five minutes to warm up the oil, then shut off the Engine.
2. Place a drain pan under the Drain Plug.
3. Remove the Dip Stick and unscrew the Drain Plug.



4. Allow all the oil to drain out into the pan. Pour the used oil into a container with a lid. Deliver used oil to a recycling center. Do not dump oil into the earth or storm drain. Dispose of oil properly.
5. Replace Drain Plug and securely tighten.
6. Add 1/2 quart of 10W30 motor oil through a funnel (not included) into the Dip Stick fill hole. Fill until the oil reaches the Upper Level line of the fill hole.
7. Replace the Dip Stick carefully.

### Cleaning the Deposit Cup

1. Push the Gas Valve to the closed (left) position.
2. Using a wrench (not supplied), loosen and remove the Bolt under the Deposit Cup. Place a pan below the Deposit Cup to catch any remaining gasoline.
3. Remove the Deposit Cup and O-ring, and wash them in cleaning solvent.
4. Reinstall the Deposit Cup.
5. Push the Gas Valve to the open (right) position and check for gas leaks from the Deposit Cup. Reinstall the Deposit Cup and tighten hardware.



## Torque Value for Major Engine Bolts

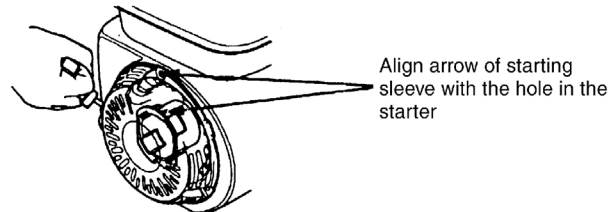
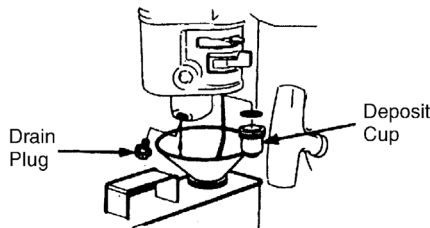
Item	Torque Value (ft-lb)
Cylinder Head Bolts	18
Flywheel Bolt	52~59
Crankcase Cover Bolts	18
Connecting Rod	9

## Transporting the Engine

1. Press the Gas Valve to the left (closed) position.
2. Wait until the engine is cool before lifting and moving.
3. Keep the Engine level while carrying with another person.

## Storing the Engine

1. Replace the Engine oil with new oil before storing as described on page 13.
2. Remove the Spark Plug as described on page 12. Add a spoonful of new Engine oil through the Spark Plug mounting hole, into the cylinder. Rotate the driveshaft to distribute the oil evenly. Replace the Spark Plug. Wipe up any spilled oil.



3. With a gas can and funnel (neither included) underneath the Deposit Cup, unscrew the Drain Plug of the Deposit Cup and drain all the gasoline from the Gas Tank. The Gas Valve must be open. When drained, replace the Drain Plug. See illustration above, left.
4. Pull the Starter Pull Cord slowly, and when it engages keep pulling until the arrow on the starting sleeve aligns with the hole of the starter. See illustration above, right. This ensures that the inlet and outlet valves are closed, preventing a buildup of moisture and rust within the engine.
5. Cover the Engine with a waterproof cover.

## **PLEASE READ THE FOLLOWING CAREFULLY**

THE MANUFACTURER AND/OR DISTRIBUTOR HAS PROVIDED THESE PARTS LISTS AND ASSEMBLY DIAGRAMS IN THIS MANUAL AS A REFERENCE TOOL ONLY. NEITHER THE MANUFACTURER OR DISTRIBUTOR MAKES ANY REPRESENTATION OR WARRANTY OF ANY KIND TO THE BUYER THAT HE OR SHE IS QUALIFIED TO MAKE ANY REPAIRS TO THE PRODUCT, OR THAT HE OR SHE IS QUALIFIED TO REPLACE ANY PARTS OF THE PRODUCT. IN FACT, THE MANUFACTURER AND/OR DISTRIBUTOR EXPRESSLY STATES THAT ALL REPAIRS AND PARTS REPLACEMENTS SHOULD BE UNDERTAKEN BY CERTIFIED AND LICENSED TECHNICIANS, AND NOT BY THE BUYER. THE BUYER ASSUMES ALL RISK AND LIABILITY ARISING OUT OF HIS OR HER REPAIRS TO THE ORIGINAL PRODUCT OR REPLACEMENT PARTS THERETO, OR ARISING OUT OF HIS OR HER INSTALLATION OF REPLACEMENT PARTS THERETO.

## **ORDERING PARTS**

When ordering parts from the following Parts Lists and Diagrams be sure to indicate which Parts List you are ordering from by including the alpha digit (A-N) of the Parts List and the name of the engine subsystem, as well as the Part Number. Including this information will assure that the correct part is received. Not all parts are available for order, some are just listed to show an accurate representation of the mechanical aspects of the Engine.

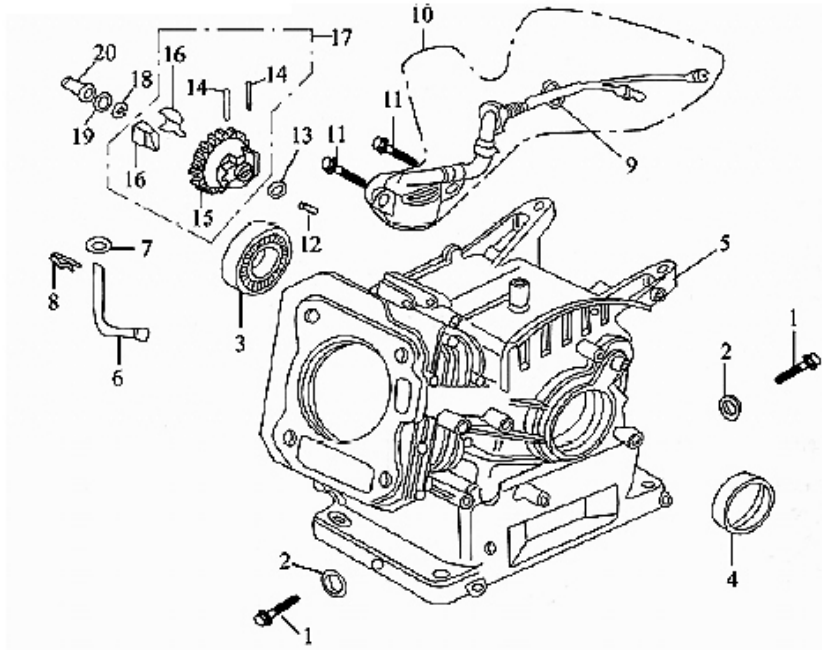
**Record** Product's Serial Number Here: \_\_\_\_\_ .

**Note:** If product has no serial number, record month and year of purchase instead.

**Note:** Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

# PARTS LISTS AND ASSEMBLY DIAGRAMS

## Crankcase Assembly Diagram



**Note:** When ordering parts from this list, specify: **Parts List A**, CRANKCASE ASSEMBLY and the ITEM No.

## Crankcase Parts List

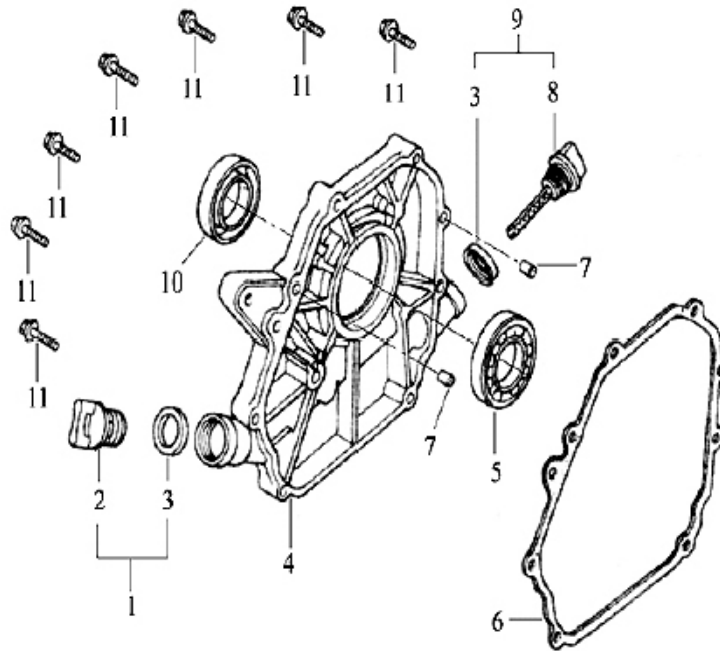
Part	Description	Qty
1A	Drain Plug	2
2A	Washer	2
3A	Bearing, 6205	1
4A	Seal, Oil, Crankshaft	1
5A	Crankcase	1
6A	Sway Bar, Regulator	1
7A	Washer	2
8A	Pin, Split	1
9A	Nut, M10	1
10A	Sensor, Oil	1

Part	Description	Qty
11A	Bolt, M6x14	2
12A	Regulating Shaft	1
13A	Washer, Drive Gear	1
14A	Pin	2
15A	Drive Gear, Regulator	1
16A	Fly Block	2
17A	Drive Gear Assembly Regulator	1
18A	Snap Ring	1
19A	Washer	2
20A	Sliding Sleeve	1

**Note:** Some parts on this Parts List and the Parts Lists that follow are listed and shown for illustration purposes only and are not available individually as replacement parts.



## Crankcase Cover Assembly Diagram



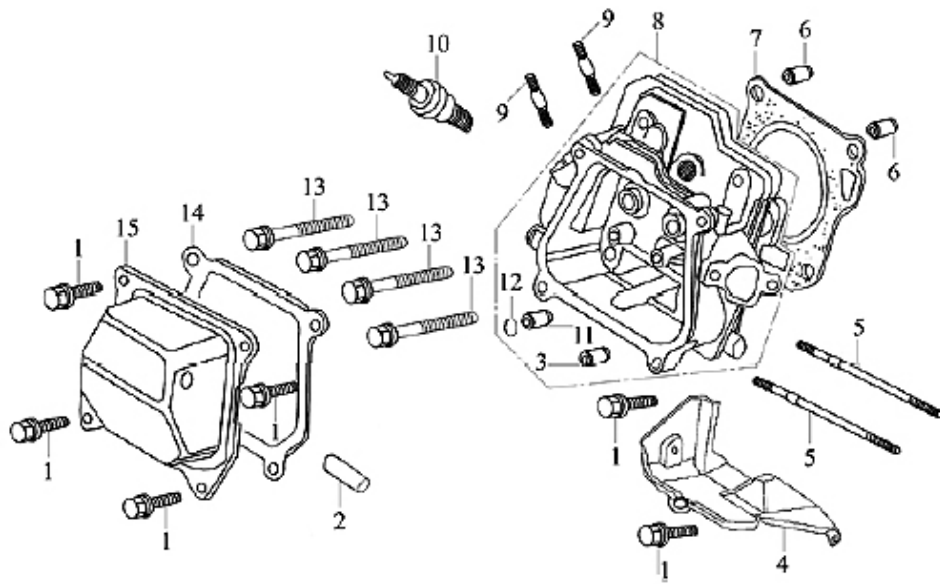
**Note:** When ordering parts from this list, specify: **Parts List B, CRANKCASE COVER ASSEMBLY** and the ITEM No.

### Crank Case Cover Parts List

Part	Description	Qty
1B	Oil Plug with Seal	1
2B	Oil Plug	1
3B	Seal	2
4B	Crankcase Cover	1
5B	Bearing, 6250	1
6B	Gasket, Crankcase	1

Part	Description	Qty
7B	Pin, Set	2
8B	Dipstick	1
9B	Dipstick with seal	1
10B	Oil Seal, Crankshaft	1
11B	Bolt, M8x32	7

## Cylinder Head and Cover Assembly Diagram



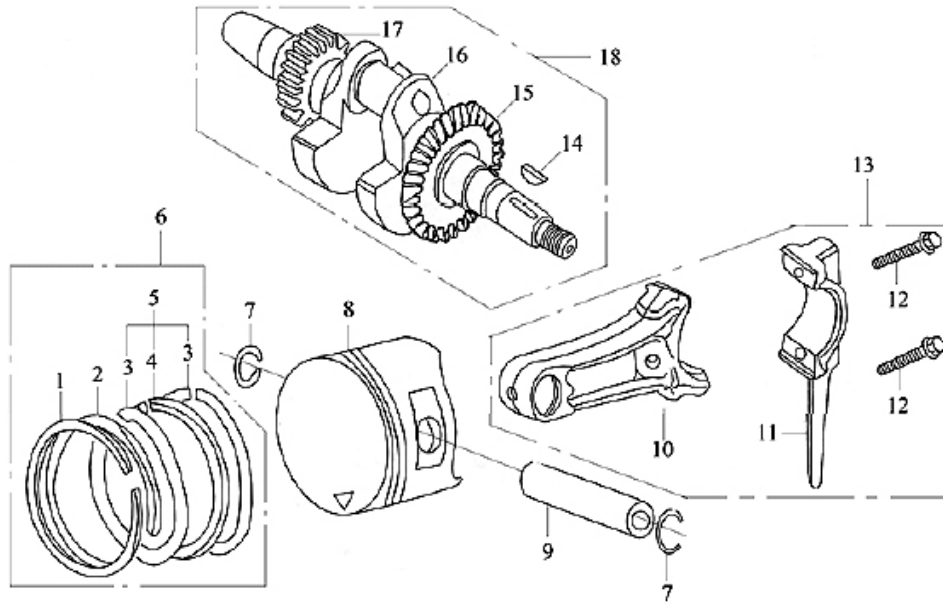
**Note:** When ordering parts from this list, specify: **Parts List C**, CYLINDER HEAD AND COVER ASSEMBLY and the ITEM No.

### Cylinder Head and Cover Parts List

Part	Description	Qty
1C	Bolt, M6x12	6
2C	Air duct	1
3C	Intake Valve Guide	1
4C	Lead Wind Cover	1
5C	Stud, M6x109	2
6C	Pin, Set 10x16	2
7C	Gasket, Cylinder Head	1
8C	Cylinder Head Assembly	1

Part	Description	Qty
9C	Stud, M8x34	2
10C	Spark Plug, F6TC	1
11C	Exhaust Valve Guide	1
12C	Circle Clip	1
13C	Bolt	4
14C	Gasket, Cylinder Head Cover	1
15C	Cylinder Head Cover Assembly	1

## Crankshaft, Piston, and Connecting Rod Assembly Diagram



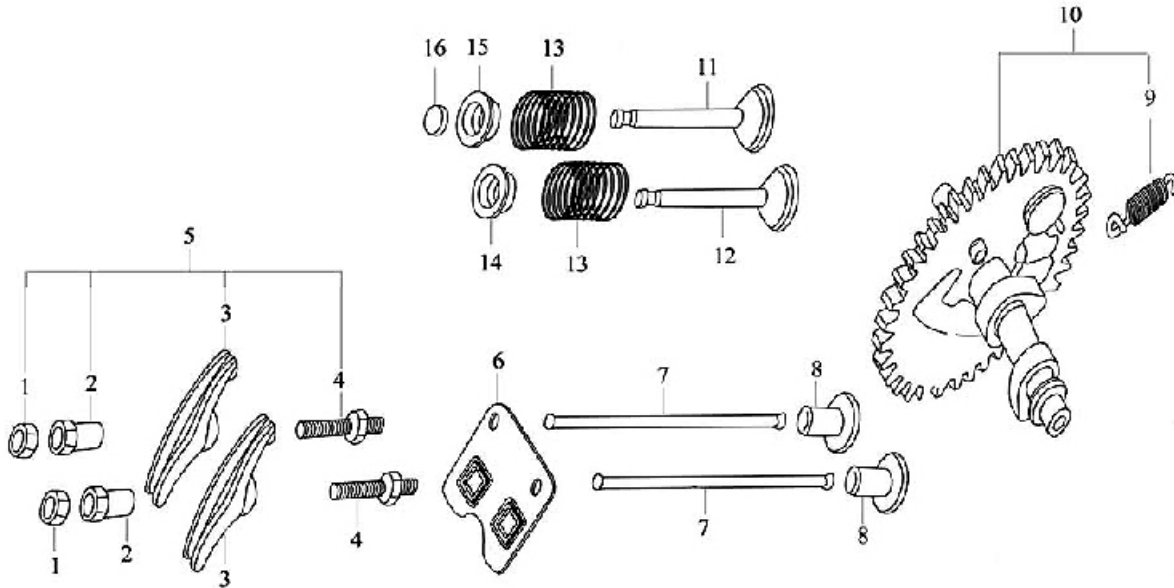
**Note:** When ordering parts from this list, specify: **Parts List D, CRANKSHAFT, PISTON, AND CONNECTING ROD ASSEMBLY** and the ITEM No.

### Crankshaft, Piston, and Connecting Rod Parts List

Part	Description	Qty
1D	Piston Ring (I)	1
2D	Piston Ring (II)	1
3D	Side Rail	2
4D	Expander	1
5D	Scraper Ring Set	1
6D	Piston Ring Assembly	1
7D	Piston Pin Circle Clip	2
8D	Piston	1
9D	Piston Pin	1

Part	Description	Qty
10D	Connecting Rod	1
11D	Connecting Rod Cover	1
12D	Bolt	2
13D	Connecting Rod Assembly	1
14D	Woodruff Key	1
15D	Drive Gear	1
16D	Crankshaft	1
17D	Timing Drive Gear	1
18D	Crankshaft Assembly	1

## Camshaft and Rocker Valve Assembly Diagram



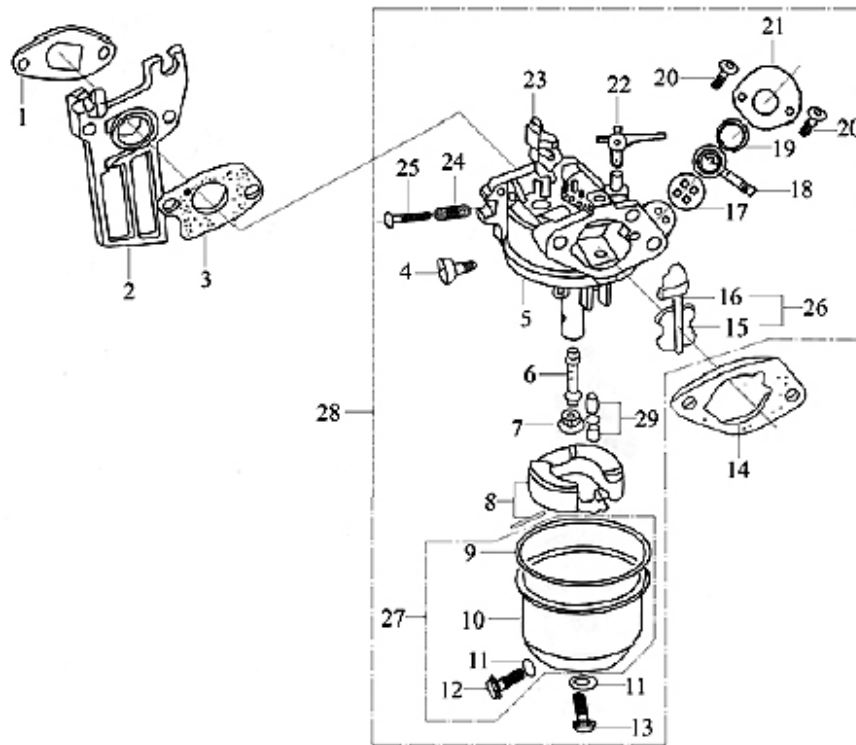
**Note:** When ordering parts from this list, specify: **Parts List E, CAMSHAFT AND ROCKER VALVE ASSEMBLY** and the ITEM No.

### Camshaft and Rocker Valve Parts List

Part	Description	Qty
1E	Lock Nut	2
2E	Sleeve	2
3E	Valve, Rocker	2
4E	Bolt, Adjusting, Valve Gap	2
5E	Valve, Rocker, Assembly	2
6E	Pusher Guide	1
7E	Pusher	2
8E	Tappet	2

Part	Description	Qty
9E	Spring, Extension	1
10E	Camshaft Assembly	1
11E	Valve, Exhaust	1
12E	Valve, Intake	1
13E	Spring, Valve	2
14E	Spring Seat, Intake Valve	1
15E	Spring Seat, Exhaust Valve	1
16E	Cap	1

## Carburetor Assembly Diagram



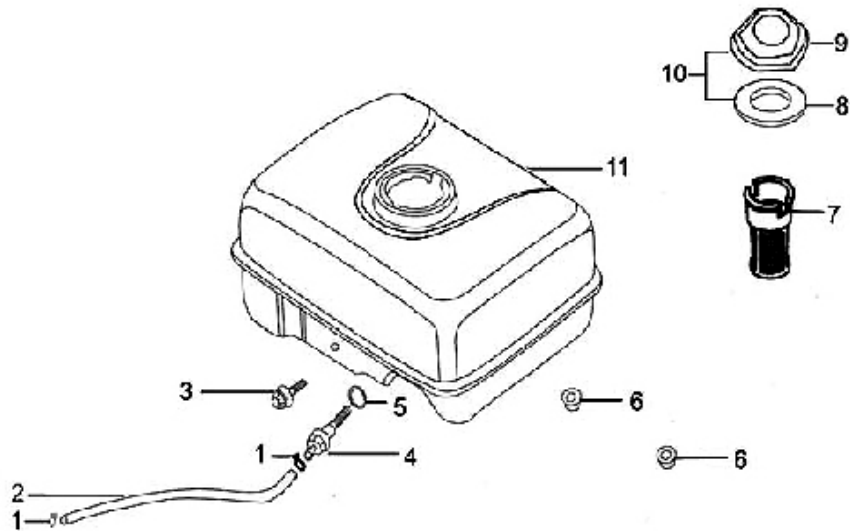
**Note:** When ordering parts from this list, specify: **Parts List F, CARBURETOR ASSEMBLY** and the ITEM No.

### Carburetor Parts List

Part	Description	Qty
1F	Inlet Gasket	1
2F	Connecting Block	1
3F	Carburetor Gasket	1
4F	Screw, Idle Adjustment	1
5F	Chamber Bode, Mixture	1
6F	Nozzle, Main	1
7F	Jet, Main	1
8F	Float	1
9F	Float Chamber Gasket	1
10F	Float Chamber	1
11F	Washer	2
12F	Float Chamber Drain Screw	1
13F	Screw	1
14F	Air Cleaner Gasket	1
15F	Choke	1

Part	Description	Qty
16F	Choke Stem	1
17F	Washer, Air-proof	1
18F	Throttle Lever	1
19F	Washer	1
20F	Screw, M4	2
21F	Cover	1
22F	Choke Switch	1
23F	Throttle Unit	1
24F	Spring, Mixture Adjustment Screw	1
25F	Screw, Mixture Adjustment	1
26F	Choke Unit	1
27F	Float Chamber	1
28F	Carburetor Assembly	1
29F	Float Needle	1

## Fuel Tank Assembly Diagram

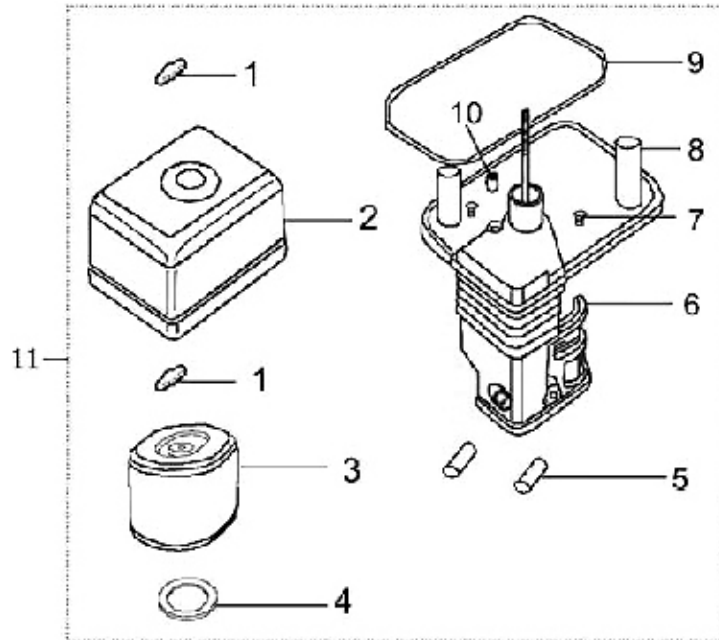


**Note:** When ordering parts from this list, specify: **Parts List G**, FUEL TANK ASSEMBLY and the ITEM No.

### Fuel Tank Parts List

Part	Description	Qty
1G	Pipe Clamp	2
2G	Pipe, Outlet	1
3G	Bolt, M6x22	1
4G	Connector	1
5G	Packing Ring	1
6G	Nut, M6	2
7G	Filter Cup	1
8G	Packing Ring	1
9G	Fuel Filler Cap	1
10G	Fuel Filler Cap with Packing Ring	1
11G	Fuel Tank	1

## Air Cleaner Assembly Diagram

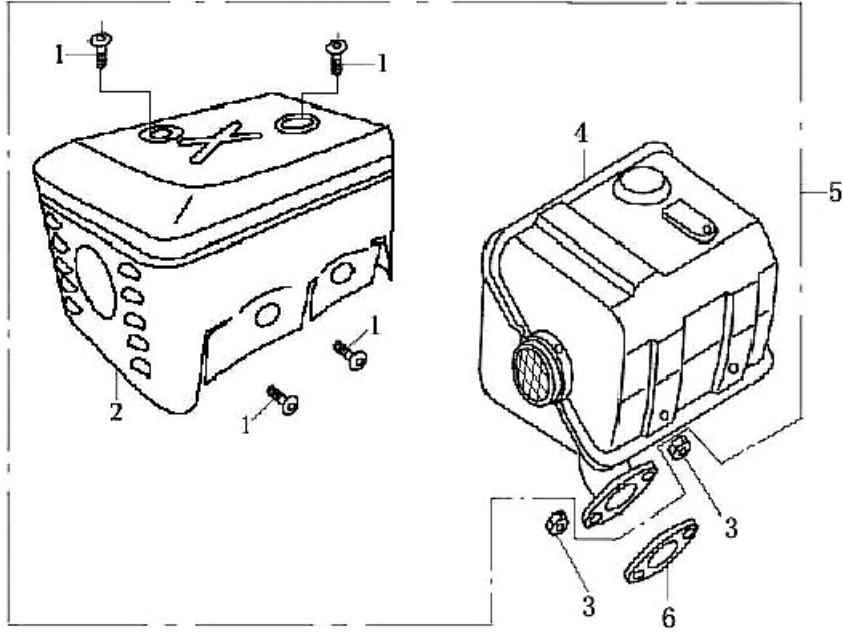


**Note:** When ordering parts from this list, specify: **Parts List H, AIR CLEANER ASSEMBLY** and the ITEM No.

### Air Cleaner Parts List

Part	Description	Qty
1H	Wing Nut	2
2H	Air Cleaner Cover	1
3H	Filter Element	1
4H	Washer	1
5H	Sleeve A	2
6H	Air Cleaner Housing	1
7H	Screw, M5x12	2
8H	Air Cleaner Base	1
9H	Gasket	1
10H	Sleeve B	1
11H	Air Cleaner Assembly	1

## Muffler Assembly Diagram



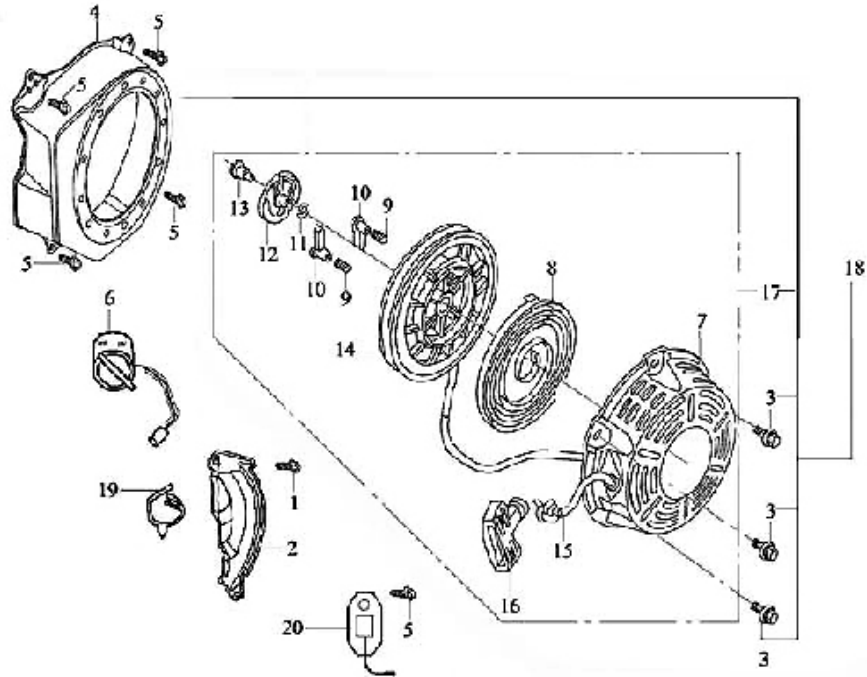
**Note:** When ordering parts from this list, specify: **Parts List J, MUFFLER ASSEMBLY** and the ITEM No.

### Muffler Parts List

Part	Description	Qty
1J	Screw, M5x8	4
2J	Muffler Hood	1
3J	Nut, M8	2
4J	Muffler	1
5J	Exhaust Muffler	1
6J	Exhaust Gasket	1



## Recoil Starter Assembly Diagram



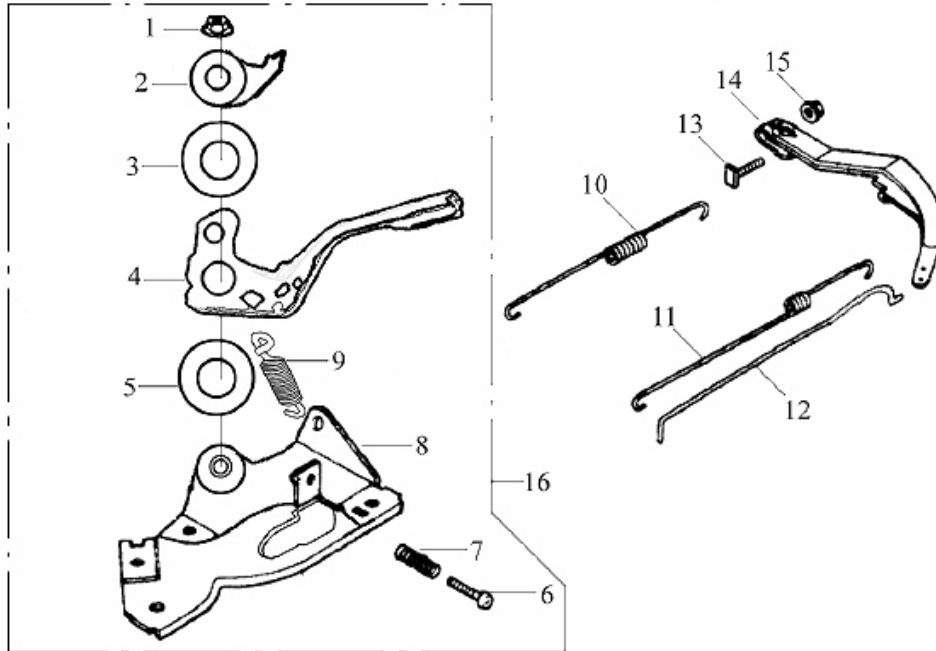
**Note:** When ordering parts from this list, specify: **Parts List K**, RECOIL STARTER ASSEMBLY and the ITEM No.

### Recoil Starter Parts List

Part	Description	Qty
1K	Bolt, M6x22	1
2K	Crankcase Side Plate Assy	1
3K	Bolt, M6x18	3
4K	Fan Hood Assy.	1
5K	Bolt, M6x12	5
6K	Engine Switch	1
7K	Casing	1
8K	Spring, Spiral	1
9K	Spring, Ratchet	2
10K	Ratchet	2

Part	Description	Qty
11K	Spring, Friction	1
12K	Spring Lid	1
13K	Screw, Set	1
14K	Starter Wheel	1
15K	Rope, Starter	1
16K	Pull Cord Handle	1
17K	Recoil Starter	1
18K	Recoil Starter Assembly	1
19K	Clip, Plastic	1
20K	Diode	1

## Regulator Control Assembly Diagram



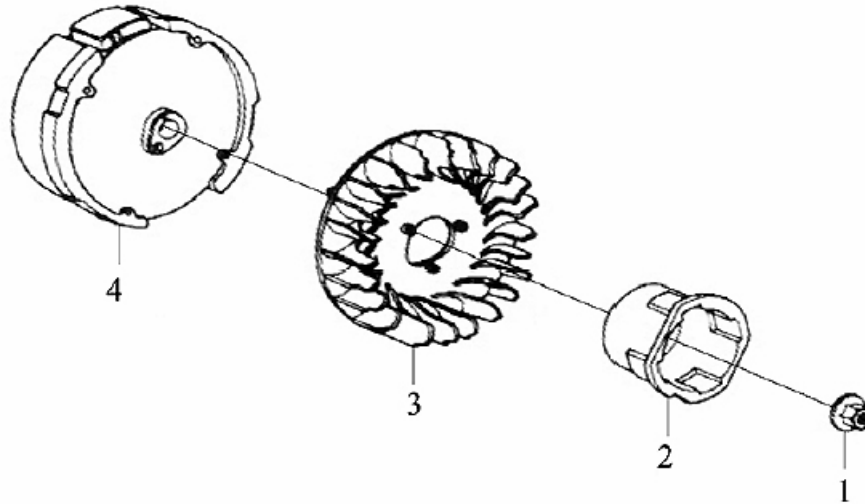
**Note:** When ordering parts from this list, specify: **Parts List L, REGULATOR CONTROL ASSEMBLY** and the ITEM No.

### Regulator Control Parts List

Part	Description	Qty
1L	Nut, M6	1
2L	Panel, Setting	1
3L	Spring Patch	1
4L	Hand Grip	1
5L	Washer	1
6L	Bolt, M5x25	1
7L	Spring, Regulating	1
8L	Support Panel Assembly	1

Part	Description	Qty
9L	Spring	1
10L	Spring, Back	1
11L	Spring, Fine Regulating	1
12L	Rod, Pull	1
13L	Bolt, Lock	1
14L	Arm, Regulating	1
15L	Nut, M6	1
16L	Regulating Frame Assembly	1

## Flywheel Assembly Diagram

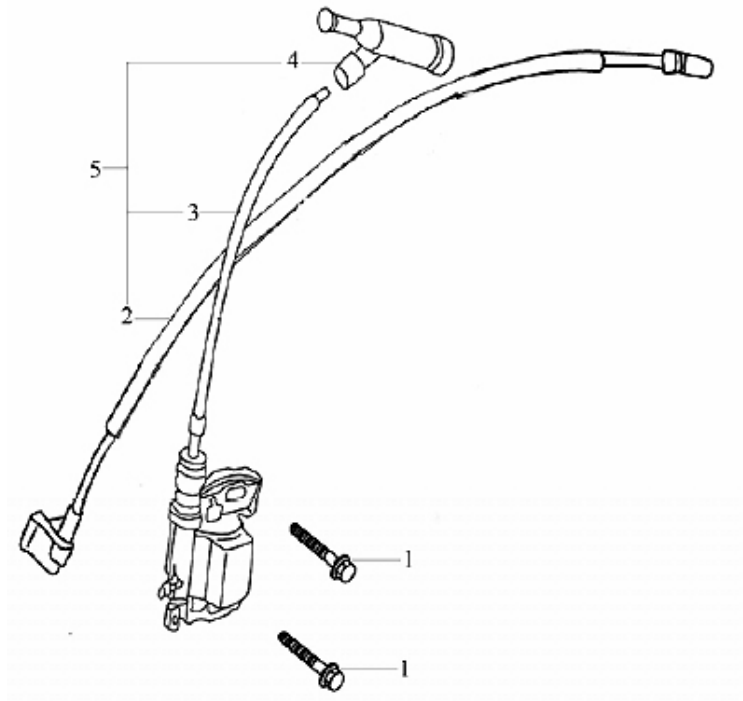


**Note:** When ordering parts from this list, specify: **Parts List M, FLYWHEEL ASSEMBLY** and the ITEM No.

### Flywheel Parts List

Part	Description	Qty
1M	Nut, M14x1.5	1
2M	Starting Flange	1
3M	Flywheel Fan	1
4M	Flywheel	1

## Ignition Coil Assembly Diagram

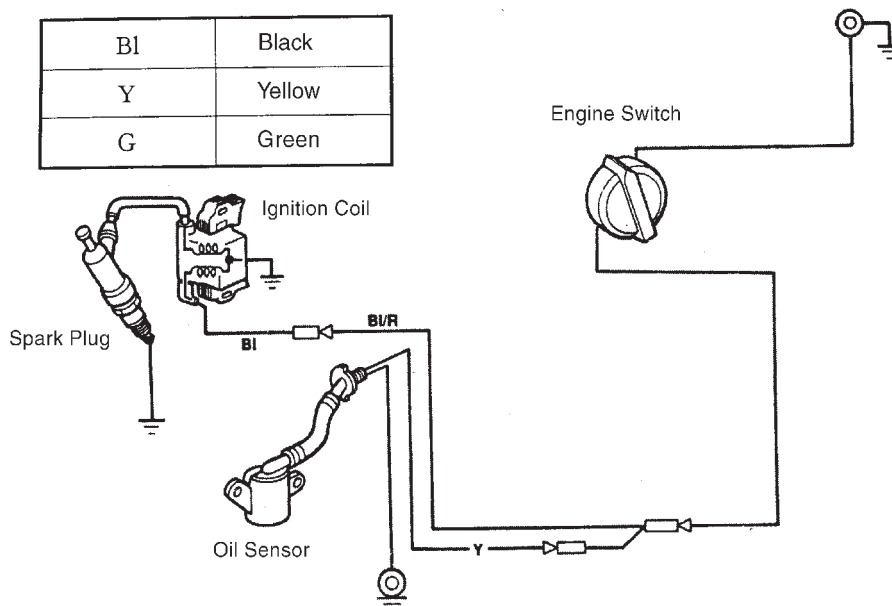


**Note:** When ordering parts from this list, specify: **Parts List N**, IGNITION COIL ASSEMBLY and the ITEM No.

### Ignition Coil Parts List

Part	Description	Qty
1N	Screw, M6x22	2
2N	Engine Stop Cable	1
3N	Ignition Coil	1
4N	Spark Plug Cap	1
5N	Ignition Coil Assembly	1

## Wiring Diagram



## **LIMITED 90 DAY WARRANTY**

Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that this product is free from defects in materials and workmanship for the period of 90 days from the date of purchase. This warranty does not apply to damage due directly or indirectly, to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, criminal activity, improper installation, normal wear and tear, or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

**3491 Mission Oaks Blvd. • PO Box 6009 • Camarillo, CA 93011 • (800) 444-3353**

---

# EMISSION CONTROL SYSTEM WARRANTY

---

## United States Emission Control Defects Warranty Statement

The United States Environmental Protection Agency (herein EPA) and Harbor Freight Tools (herein HFT) are pleased to explain the emission control system warranty on your 1997 and later Small Off-Road Engine (herein engine). Within the United States, new off-road, spark-ignition engines certified for model year 1997 and later, must be designed, built and equipped to meet the stringent anti-smog standards set forth by the EPA. HFT 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 may include parts such as the carburetor or fuel-injection system, and the ignition system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, HFT will repair your engine at no cost to you including diagnosis, parts and labor.

## Manufacturer's Warranty Coverage

The 1997 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 HFT.

## Harbor Freight Tools Emission Control Defects Warranty Coverage

Engines are warranted for a period of two (2) years relative to emission control parts defects, subject to the provisions set forth below. If any emission related part on your engine is defective, the part will be repaired or replaced by HFT.

### **Owner's Warranty Responsibilities**

- As the engine owner, you are responsible for the performance of the required maintenance listed in your Owner's Manual. HFT recommends that you retain all receipts covering maintenance on your engine, but HFT 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 HFT 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 shipping your engine to a HFT warranty station as soon as a problem exists. Contact the HFT Customer Service department at the number below to make shipping arrangements. 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 the Harbor Freight Tools Customer Service Department at 1-800-444-3353.

## Harbor Freight Tools Emission Control Defects Warranty Provisions

### **1. Length of Coverage**

HFT warrants to a first retail purchaser and each subsequent purchaser that the engine is free from defects in materials and workmanship that cause the failure of warranted parts for a period of two (2) years after the date of delivery to the first retail purchaser.

### **2. No Charge Repair or Replacement**

Repair or replacement of any warranted part will be performed at no charge to the owner if the work is performed through a warranty station authorized by HFT. For emissions warranty service, contact the HFT Customer Service Department at 1-800-444-3353.

### **3. Consequential Damages Coverage**

Coverage under this warranty shall also extend to the failure of any engine components caused by the failure of any warranted part while it is still covered under this warranty.

### **4. Coverage Exclusions**

Warranty claims shall be filed in accordance with the provisions of the HFT warranty policy explained in the box at the top of the previous page. HFT 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. Warranty coverage shall also be excluded for any part which fails, malfunctions, or is damaged due to failure to follow the maintenance and operating instructions set forth in the Owner's Manual including, but not limited to:

- a) Use of parts which are not authorized by HFT
- b) Improper installation, adjustment or repair of the engine or of any warranted part unless performed by an authorized warranty center
- c) Failure to follow recommendations on fuel use contained in the Owner's Manual
- d) Improper or inadequate maintenance of any warranted parts
- e) Repairs performed outside of the authorized warranty service dealers
- f) Alterations by changing, adding to or removing parts from the engine.

### **5. Service and Maintenance**

Component parts which are not scheduled for replacement as required maintenance or are scheduled only for regular inspection to the effect of "repair or replace as necessary" are warranted for the warranty period. Any warranted part which is scheduled for replacement as required maintenance is warranted for the period of time up to the first scheduled replacement point for that part. Any replacement part, provided it is equivalent in durability and performance, may be used in performance of maintenance or repairs. The owner is responsible for commissioning a qualified technician/mechanic to perform all required maintenance, as outlined in the Inspection, Cleaning, and Maintenance section in this manual.

## **6. Warranted Parts**

### **1) Fuel Metering System**

- i) Carburetor and its internal parts.
- ii) Fuel pump (if so equipped).
- iii) Cold start enrichment system.

### **2) Air Induction System**

- i) Intake pipe/manifold.
- ii) Air cleaner.

### **3) Ignition System**

- i) Spark plug.
- ii) Magneto ignition system.

### **4) Catalyst System (if so equipped)**

- i) Exhaust pipe stud.
- ii) Muffler.
- iii) Catalytic converter (if so equipped).

### **5) Miscellaneous Items Used in Above Systems**

- i) Vacuum, temperature and time sensitive valves and switches.
- ii) Hoses, belts, connectors, and assemblies.

## Free Manuals Download Website

<http://myh66.com>

<http://usermanuals.us>

<http://www.somanuals.com>

<http://www.4manuals.cc>

<http://www.manual-lib.com>

<http://www.404manual.com>

<http://www.luxmanual.com>

<http://aubethermostatmanual.com>

Golf course search by state

<http://golfingnear.com>

Email search by domain

<http://emailbydomain.com>

Auto manuals search

<http://auto.somanuals.com>

TV manuals search

<http://tv.somanuals.com>