

CHICAGO

Electric[®]Generators

DIESEL GENERATOR

Model 98391

SET UP, OPERATING, AND SERVICING INSTRUCTIONS



⚠ DANGER

Using an engine indoors **CAN KILL YOU IN MINUTES.**

Engine exhaust contains carbon monoxide. This is a poison you cannot see or smell.



NEVER use inside a home or garage, **EVEN IF** doors and windows are open.

Only use **OUTSIDE** and far away from windows, doors, and vents.

Distributed exclusively by Harbor Freight Tools[®].

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**Read this material before using this product.
Failure to do so can result in serious injury.
SAVE THIS MANUAL.**

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

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SAVE THIS MANUAL

Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual and the receipt in a safe and dry place for future reference.

IMPORTANT SAFETY INFORMATION

In this manual, on the labeling, and all other information provided with this product:



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

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

WARNING

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

CAUTION

CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

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

CAUTION

CAUTION, without the safety alert symbol, is used to address practices not related to personal injury.



WARNING! Read all instructions. Failure to follow all instructions listed below may result in fire, serious injury and/or DEATH.

The warnings and precautions discussed in this 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.

SAVE THESE INSTRUCTIONS

SET UP PRECAUTIONS

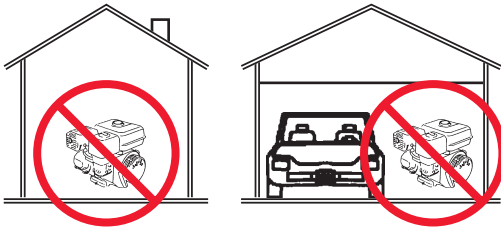
1. Diesel fuel and fumes are flammable, and potentially explosive. Use proper fuel storage and handling procedures. Do not store fuel or other flammable materials nearby.
2. Have multiple ABC class fire extinguishers nearby.
3. Operation of this equipment may create sparks that can start fires around dry vegetation. A spark arrestor may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.
4. Set up and use only on a flat, level, well-ventilated surface.

5. Wear ANSI-approved safety goggles, heavy-duty work gloves, and dust mask/respirator during set up.
6. Use only oil and fuel recommended in the "Specifications" section of this manual.
5. People with pacemakers should consult their physician(s) before use. Electromagnetic fields in close proximity to a heart pacemaker could cause pacemaker interference or pacemaker failure. Caution is necessary when near the engine's magneto or recoil starter.

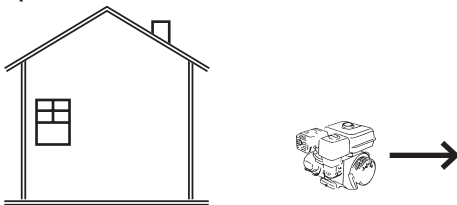
OPERATING PRECAUTIONS

1.  **CARBON MONOXIDE HAZARD**
Using an engine indoors CAN KILL YOU IN MINUTES.

Engine exhaust contains carbon monoxide. This is a poison you cannot see or smell.



NEVER use inside a home or garage, **EVEN IF** doors and windows are open.



Only use **OUTSIDE** and far away from windows, doors, and vents.

2. Keep children away from the equipment, especially while it is operating.
3. Do not leave the equipment unattended when it is running. Turn off the equipment (and remove safety keys, if available) before leaving the work area.
4. Wear ANSI-approved safety goggles and hearing protection during use.
6. Use only accessories that are recommended by Harbor Freight Tools for your model. Accessories that may be suitable for one piece of equipment may become hazardous when used on another piece of equipment.
7. Do not operate in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust. Diesel-powered engines may ignite the dust or fumes.
8. Stay alert, watch what you are doing and use common sense when operating this piece of equipment. Do not use this piece of equipment while tired or under the influence of drugs, alcohol or medication.
9. Do not overreach. Keep proper footing and balance at all times. This enables better control of the equipment in unexpected situations.
10. Dress properly. Do not wear loose clothing or jewelry. Keep hair, clothing and gloves away from moving parts. Loose clothes, jewelry or long hair can be caught in moving parts.
11. Parts, especially exhaust system components, get very hot during use. Stay clear of hot parts.
12. Do not cover the engine or equipment during operation.

13. Keep the equipment, engine, and surrounding area clean at all times.
14. Use the equipment, accessories, etc., in accordance with these instructions and in the manner intended for the particular type of equipment, taking into account the working conditions and the work to be performed. Use of the equipment for operations different from those intended could result in a hazardous situation.
15. Do not operate the equipment with known leaks in the engine's fuel system.
16. This product contains or, when used, produces a chemical known to the State of California to cause cancer and birth defects or other reproductive harm. (California Health & Safety Code § 25249.5, *et seq.*)
17. When spills of fuel or oil occur, they must be cleaned up immediately. Dispose of fluids and cleaning materials as per any local, state, or federal codes and regulations. Store oil rags in a bottom-ventilated, covered, metal container.
18. Keep hands and feet away from moving parts. Do not reach over or across equipment while operating.
19. Before use, check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the equipment's operation. **If damaged, have the equipment serviced before using.** Many accidents are caused by poorly maintained equipment.
20. Use the correct equipment for the application. Do not modify the equipment and do not use the equipment for a purpose for which it is not intended.
21. Wash hands with soap and water after handling diesel fuel or lubricating oil.

SERVICE PRECAUTIONS

1. **Before service, maintenance, or cleaning:**
 - a. **Turn the engine switch to its "OFF" position.**
 - b. **Allow the engine to completely cool.**
2. Keep all safety guards in place and in proper working order. Safety guards include mechanical guards, and heat shields, among other guards.
3. **Do not alter or adjust any part of the equipment or its engine that is sealed by the manufacturer or distributor. Only a qualified service technician may adjust parts that may increase or decrease governed engine speed.**
4. Wear ANSI-approved safety goggles, heavy-duty work gloves, and dust mask/respirator during service.
5. All connections from the Generator to the load must be installed by a licensed electrician in compliance with local, state, and federal laws.
6. The generator must be grounded in accordance with applicable electrical codes and standards before operation.
7. Insulate all connections and disconnected wires.

8. Do not connect or disconnect load connections while standing in water or on wet ground.
9. Do not overload the generator. Overloading can cause fires in the electrical cords, in addition to generator and appliance damage.
10. Connect the generator only to a load or electrical system (120 volt or 240 volt) that is compatible with the electrical characteristics and rated capacities of the generator.
11. Set up the generator outdoors in a well-ventilated, dry area, away from building air intakes. The generator should be protected from direct exposure to rain and snow. Do not set up the generator on a conductive surface such as a metal deck.
12. Do not connect generator directly into a home's electrical lines. Do not plug a generator into an outlet in the home. Connecting a generator directly to a utility power supply can 'back feed' along the power lines and kill or injure utility workers working on the lines.
13. Do not charge vehicle batteries with this Generator.
14. Maintain labels and nameplates on the equipment. These carry important information. If unreadable or missing, contact Harbor Freight Tools for a replacement.
15. Have the equipment serviced by a qualified repair person using only identical replacement parts. This will ensure that the safety of the equipment is maintained. Do not attempt any service or maintenance procedures not explained in this manual or any procedures that you are uncertain about your ability to perform safely or correctly.
16. Store equipment out of the reach of children.
17. Follow scheduled engine and equipment maintenance.
18. Refueling Precautions:
 - a. Do not smoke, or allow sparks, flames, or other sources of ignition around the equipment, especially when refuelling.
 - b. Do not refill the fuel tank while the engine is running or hot.
 - c. Do not fill fuel tank to the top. Leave a little room for fuel expansion.
 - d. Refuel in a well-ventilated area only.



SAVE THESE INSTRUCTIONS.

BASIC SPECIFICATIONS

Fuel	Type	#2 Diesel Fuel
	Capacity	4.2 Gallons
Engine Oil	Type	SAE 5W40
	Capacity	1-3/4 qts.
Rated Wattage		5,000 Watts
Maximum Wattage		6,000 Watts
Run Time @ 75% Load		8.5 Hours with full tank
Sound Level		75 dB @ 23'

Note: Additional specifications found in the TECHNICAL ENGINE SPECIFICATIONS chart in this manual.

At high altitudes, the engine's carburetor, governor, and any other parts that control the fuel-air ratio will need to be adjusted by a qualified mechanic to allow efficient high-altitude use and to prevent damage to the engine and any other devices used with this product.

UNPACKING

When unpacking, check to make sure that the item is intact and undamaged. If any parts are missing or broken, please call Harbor Freight Tools at the number shown on the cover of this manual as soon as possible.

SET UP INSTRUCTIONS



Read the **ENTIRE IMPORTANT SAFETY INFORMATION** section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

⚠️ WARNING

TO PREVENT SERIOUS INJURY

FROM ACCIDENTAL STARTING:
Turn the Power Switch of the equipment to its "OFF" position, wait for the engine to cool before assembling or making any adjustments to the equipment.

⚠️ WARNING

TO PREVENT SERIOUS INJURY:

Operate only with proper spark arrestor installed.

Operation of this equipment may create sparks that can start fires around dry vegetation.

A spark arrestor may be required.

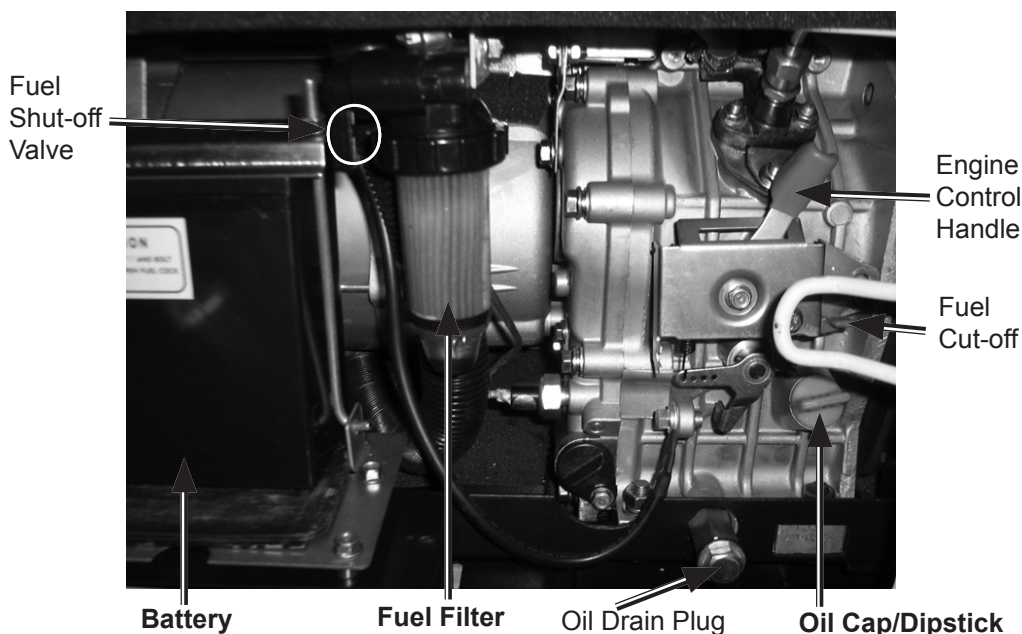
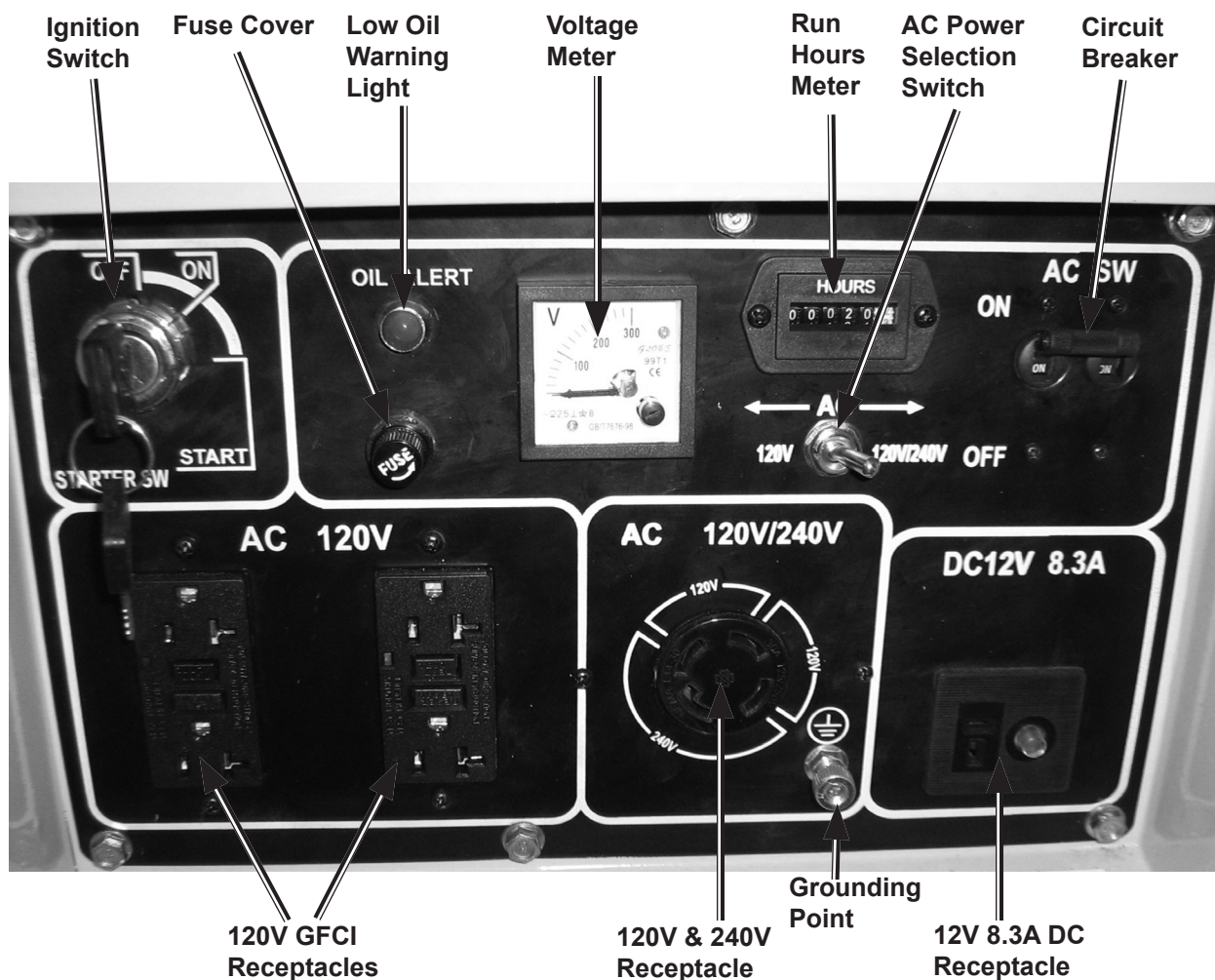
The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.

Note: For additional information regarding the parts listed in the following pages, refer to the Assembly Diagram near the end of this manual.

Location

1. The Generator must be installed outdoors where ventilation is readily available.
2. Install the Generator so that the air inlets and outlets are not blocked by obstructions such as bushes, trees, or snow drifts. Locating it in the path of heavy winds or snowdrifts may require the placement of a barrier for protection. The air inlet should face the prevailing wind direction.

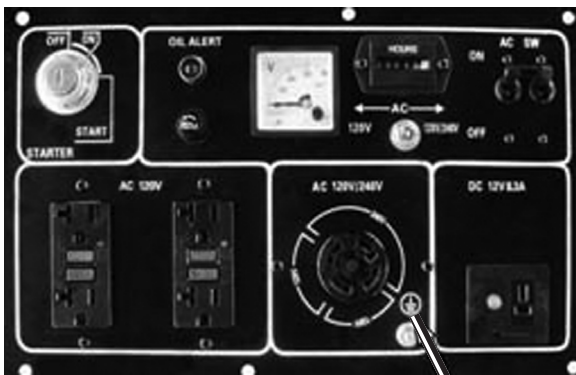
CONTROLS



3. Install the Generator on a concrete slab or other area where water can not reach it.
4. Generator placement should allow four feet of access on all sides for maintenance.
5. Place the Generator as close as possible to the electrical tools and equipment being powered to reduce the length of extension cords.

Grounding

1. Connect a #12 AWG grounding wire (not included) from the Grounding Point on the Generator to a grounding rod (not included) that has been driven at least 24 inches into the ground. The grounding rod must be a copper or brass rod which can adequately ground the Generator. Only a trained and licensed electrician should perform this procedure.



Grounding Point

2. Electrical and other permits may be required for the installation of emergency power systems. Investigate local building and electrical codes before installing this unit. Installation must be completed by a licensed contractor.

OPERATING INSTRUCTIONS



Read the **ENTIRE IMPORTANT SAFETY INFORMATION** section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

Starting the Engine



Inspect engine and equipment looking for damaged, loose, leaking and missing parts before set up and starting. If any problems are found, do not use equipment until fixed properly.

Checking and Filling Engine Oil

CAUTION! Your Warranty is VOID if the engine's crankcase is not properly filled with oil before each use. Before each use, check the oil level. Do not run the engine with low or no engine oil. Running the engine with no or low engine oil WILL permanently damage the engine.

1. Open the front panel; remove the dipstick and wipe it off with a clean rag.
2. Reinsert the dipstick completely and remove it to check the oil level. The oil level should be between the high and low marks on the dipstick.
3. If the oil level is below the low mark on the dipstick add the appropriate type of oil until the oil level is between the high and the low marks.

Oil type:

SAE 5W-40

4. Replace the Oil Dipstick.

5. Wipe off any spilled oil.

CAUTION! Do not run the engine with too little or too much oil. The engine will be permanently damaged.

Checking and Filling Fuel

1. Check the fuel level on the built-in fuel gauge.



⚠️ WARNING! TO PREVENT SERIOUS INJURY FROM FIRE:

- Fill the fuel tank in a well-ventilated area away from ignition sources. Do not smoke.
2. To fill the Fuel Tank, first wipe off the Fuel Tank Cap and the surrounding area.
 3. Unscrew, and remove the Fuel Tank Cap.
 4. Fill the Fuel Tank to about 1 inch under the fill neck of the tank with #2 diesel.
 5. Then replace the Fuel Tank Cap.

Bleed the fuel line

This is a two man operation. Place rags under the bleeding points to catch flow of fuel.

1. The fuel system should be bled to remove possible trapped air from the system before first use and after each fuel filter, fuel tank flushing, or general service of the diesel generator. Note: Place rags at the bleeding points to capture spilled fuel.
2. Turn the fuel valve to the off position. Top off fuel tank with fresh diesel fuel. Slide the hose clamp away from the fuel pump end. Loosen the hose at the pump to allow fuel to bleed

out. Turn the fuel valve to its open position. Depress the decompression lever and while holding it down crank the engine for a few seconds at a time. Fuel and trapped air will emerge from the line and as soon as just fuel flows without traces of air, push the fuel line back onto the intake of the pump and stop cranking the engine. Reattach the hose clamp. **Note:** Never crank the engine more than ten seconds at a time. Allow at least one minute prior to further cranking.

3. Using two wrenches, hold the injector with one and back off the steel feed line nut with the other wrench. Repeat the above mentioned flushing cycle to bleed the air from the injector. Wipe all spilled fuel from the engine and components. Note: Do not close the fuel valve with the engine running. This may only be done for the intention of shutting the engine off should the fuel shut-off system fail.

Connect the Battery

1. The Generator ships with the negative battery cable disconnected. Before the generator can be started the covering on the battery cable must be removed and the cable must be secured to the negative ground terminal on the battery. Recheck battery's positive terminal connection for tightness.

How to Shut Engine Off

A diesel engine is not operated like a gasoline engine. When operating a diesel engine, one should be aware of various options of how to shut the engine off.

1. Turn the ignition key to the off position.
2. Push down on the fuel shut off lever to release the Control Handle (13).
3. Turn the fuel valve to its "OFF" position.

Start Procedure

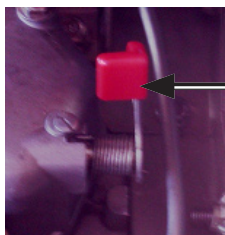


Before starting the engine:

- a. **Follow the Set Up Instructions to prepare the equipment.**
- b. **Inspect the equipment and engine.**
- c. **Fill the engine with the proper amount and type of fuel and oil.**
- d. **Read the Equipment Operation section that follows.**

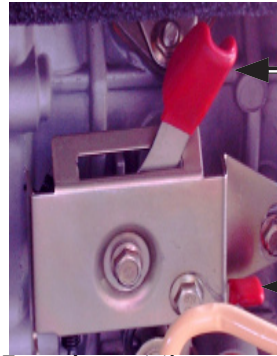
To start the engine:

1. Unplug all loads from the Generator before starting to prevent permanent damage to any appliances or tools.
2. Depress the Decompression Handle (16) all the way (Cold starting only).



Decompression Handle

3. Open the front panel and turn the fuel shut-off valve to its "OPEN" position.
4. Rotate the Control Handle (13) to the right until release button on the Right hand side of the Handle Bracket (12) pops up and locks in place.



Control Handle

Release Button

5. Insert the engine key into the ignition and turn it to "START" position for up to 10 seconds. Note: To prolong starter life, use short starting cycles (10 seconds maximum). If the engine does not start, wait one minute before attempting to start again.

Break-in Period

1. Breaking-in the engine will help to ensure proper equipment and engine operation, and will extend the engine's lifespan. The warranty is void if the engine is not broken in properly. The first 20 hours of operation is the break-in period.
2. During the first 3 hours of use:
 - Do not apply a heavy load to the equipment.
3. After the first 20 hours of use:
 - Change the engine oil.

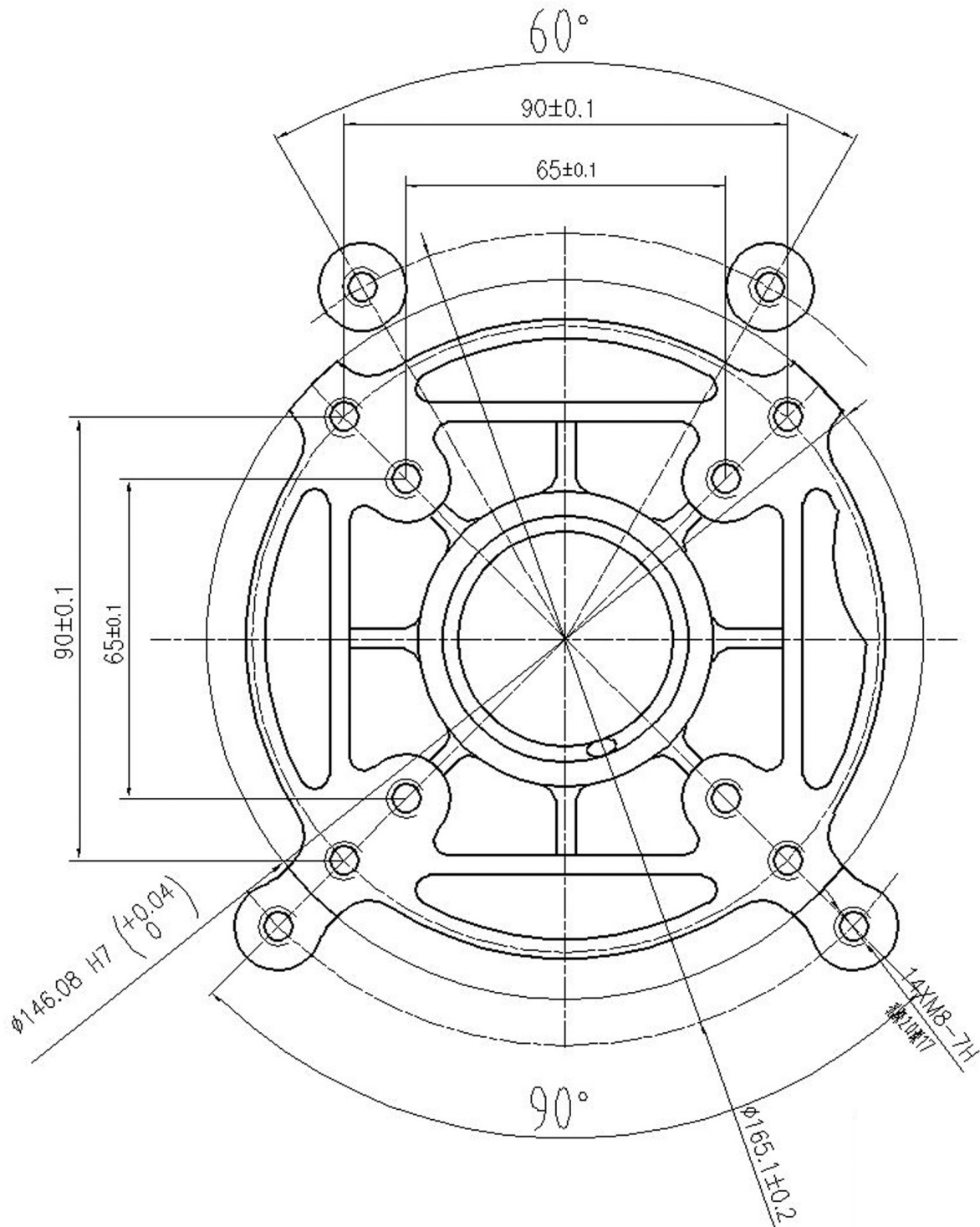
Under normal operating conditions subsequent maintenance follows the schedule explained in the MAINTENANCE AND SERVICING section.

Equipment Operation

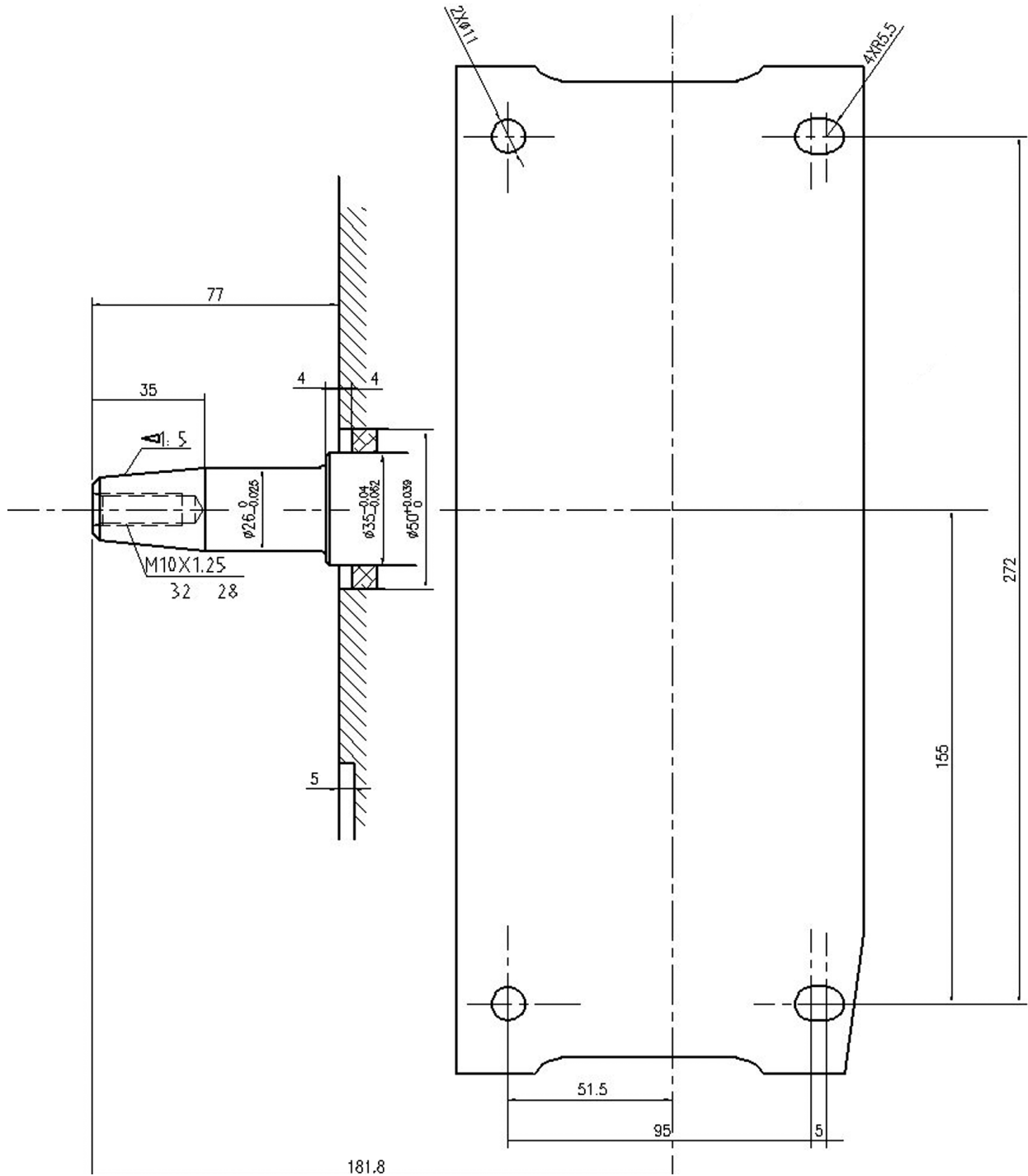
To Power Tools and Equipment:

1. Move the AC Power Selection Switch left to select 120V AC to power 120V tools or equipment or to the right to power 240V AC tools and equipment.
2. Prior to powering tools and equipment, make sure the Generator's rated wattage capacity (5000 W) is adequate to supply all electrical loads that the unit will power. If powering exceeds the Generator's capacity, it may be necessary to group one or more of the tools and/or equipment for connection to a separate Generator.
3. Start the Generator with no loads attached. Once the Generator warms up, with the equipment or tools turned off, connect the Power Cords of the AC tools and equipment into the AC Outlets. Only connect 120V AC tools to the 120V AC Outlets. Only connect 240V AC NEMA L14-30 type plug tools the 240V AC Outlet. **Do not use this Generator to charge DC vehicle batteries.** The Generator has a Circuit Protector to protect the unit in case of an overload. If an overload occurs, the Circuit Breaker will switch to its "OFF" position and cause the Generator to shut down. The Pilot Light will shut off to show that the Circuit Protector has been tripped. Disconnect all devices and press the Circuit Breaker back up to reset the Generator.
4. When finished using the Generator turn the tools off and unplug them. Allow the Generator to run for several minutes with no devices connected to allow the temperature to stabilize. Turn the Power Switch to its "OFF" position. Turn the Fuel Valve to the "OFF" position.
5. To prevent accidents remove the key and disconnect negative battery terminal after use. Wait for the engine to cool, clean external parts with clean cloth, then store the equipment out of children's reach according to the Storage instructions in this manual. If the Generator is not going to be used again soon, drain the diesel fuel.

Mounting Hole Pattern



Shaft Size/Type



TECHNICAL SPECIFICATIONS

Engine Type	Four Stroke Single Cylinder OHV Diesel, 10HP	
Bore x Stroke	86x72 mm	
Compression Ratio	19±:1	
Displacement	418 cc	
Rotation viewed from PTO (power takeoff - the output shaft)	Counterclockwise	
Fuel	Type	#2 Diesel Fuel
	Capacity	4.2 Gallons
Engine Oil	Type	5W-40
	Capacity	1-3/4 qts
Valve Clearance (COLD)	Intake	0.10~0.15 mm
	Exhaust	0.10~0.15 mm
Speed	Idle	1,100 RPM
	Maximum	3,600 RPM

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 last pages of this manual.

SERVICING

⚠️ WARNING TO PREVENT SERIOUS INJURY

FROM ACCIDENTAL STARTING:
Turn the Power Switch of the equipment to its "OFF" position, wait for the engine to cool before performing any inspection, maintenance, or cleaning procedures.

⚠️ WARNING TO PREVENT
SERIOUS INJURY
FROM EQUIPMENT FAILURE:
Do not use damaged equipment. If abnormal noise, vibration, or excess smoking occurs, have the problem corrected before further use.

Maintenance Procedures



Many maintenance procedures, including those not detailed in this manual, will need to be performed by a qualified technician for safety. If you have any doubts about your ability to safely service the equipment or engine, have a qualified technician service the equipment instead.

Note: Warranty is void if proper maintenance and servicing procedures are not followed.

Engine Oil Change

⚠️ CAUTION! Oil is very hot during operation and can cause burns. Wait for engine to cool before changing oil.

1. Place a drain pan (not included) underneath the crankcase's drain plug.
2. Remove the drain plug and empty oil. Recycle used oil.
3. Inspect drain plug gasket for damage or tears. Replace gasket if damaged. Replace the drain plug and tighten it.
4. Refill the oil to the proper level following the instructions under the Starting the Engine section.

Air Filter Element Maintenance

1. Routine maintenance to the air cleaner helps maintain proper airflow to the engine. Service the air cleaner according to the following steps every 250 or 500 hours, or more often when using the generator in a dusty area.
2. Wipe off the air cleaner cover.
3. Remove the air cleaner maintenance panel by unscrewing the bolts with 10-mm wrench.
4. Remove the wing nut from the bolt holding the air cleaner cover. Remove the air cleaner cover.
5. Take out the used air cleaner element. Replace with a new element.
6. Reinstall the air cleaner cover, tighten the wing nut, then screw back the air cleaner maintenance panel.

Fuel Filter Replacement



⚠ WARNING! TO PREVENT SERIOUS INJURY FROM FIRE:

Replace the fuel filter in a well-ventilated area away from ignition sources. Do not smoke.

1. Wait for engine to cool completely before proceeding.
2. Wear protective gear including, ANSI-approved safety goggles.
3. Turn the fuel valve to the “off” position.
4. Unscrew the bolt holding the fuel filter to the frame using a 13 mm wrench. Pull the fuel valve/filter assembly out of the enclosure. Place a bucket under the assembly to catch the fuel.
5. Remove the fuel filter cup, and the filter element.
6. Clean the cup of all sediment using a rag or brush.
7. Replace the fuel filter element
8. Reinstall the fuel filter element, fill the cup with fresh and clean diesel fuel and assemble per stps 5 and 4 above.
9. Open the fuel valve until the filter is filled.
10. Remove the hose clamp and slightly remove fuel outlet hose to purge out any trapped air in the line. Re-attach the hose and clamp.
11. Remove four screws and Injector Inspection Cover (49) from top of Sound Shield Panel (41). Place a clean rag under the injector inlet and using two wrenches loosen input line nut by one turn. Tap starter to force fuel out of injector line. When air bubbles stop, re-tighten the input line nut.

Cleaning, Maintenance, and Lubrication Schedule

Note: This maintenance schedule is intended solely as a general guide. If performance decreases or if equipment operates unusually, check systems immediately. The maintenance needs of each piece of equipment will differ depending on factors such as duty cycle, temperature, air quality, fuel quality, and other factors.

Note: These procedures are in addition to the regular checks and maintenance explained as part of the regular operation of the engine and equipment.

After Initial 20 Operation Hour Period:

- a. Change engine oil.

Every 50 Operation Hours:

- a. Replace fuel filter.

Every 100 Operation Hours:

- a. Change engine oil (or with frequent use; every three months).

Note: All maintenance procedures scheduled for 25, 50, and 100 operation hours should be performed at least yearly.

Every 250 Operation Hours:

- a. Clean fuel tank.
- b. Clean carbon build-up from combustion chamber.
- c. Replace the air filter.

Every 500 Operation Hours:

- a. Clean fuel tank and fuel filter.

Storage

1. Wait for engine to cool, then clean engine with clean cloth.
2. When the equipment is to remain idle for longer than 20 days, prepare the engine for storage as follows:
 - a. Wait for engine to cool.
 - b. Disconnect battery.
 - c. Drain fuel tank.
 - d. Change engine oil.
3. Cover and store in a dry, well-ventilated area out of reach of children.

Diesel Fuel and Microbes

1. Microbes can grow in Diesel fuel and can, over time, interfere with the Generator's performance. When performance begins to suffer and the engine begins to produce black smoke, a high-quality biocide must be added to the fuel to kill the microbes. If left untreated the microbes will eventually clog the fuel lines and ruin the equipment. The biocide must continue to be added to the fuel until the microbes are completely destroyed and the fuel runs pure again.

Troubleshooting

Problem	Possible Causes	Probable Solutions
Engine will not start	<p>FUEL RELATED:</p> <ol style="list-style-type: none"> 1. No fuel in tank or fuel valve closed. 2. Air trapped in fuel line/Filter. 3. Low quality or deteriorated, old diesel. 4. Not enough oil in crankcase. 5. Dirty fuel passageways blocking fuel flow. 6. Low oil sensor failure. 7. Generator is not on level surface. 8. Load connected. 9. Air filter dirty. 10. Battery dead. 	<p>FUEL RELATED: *</p> <ol style="list-style-type: none"> 1. Open fuel valve and fill fuel tank. 2. Bleed fuel line. 3. Use only fresh #2 diesel fuel. 4. Add or replace oil. 5. Clean out passageways using diesel fuel additive or biocide. Heavy deposits may require further cleaning. 6. Add oil, disconnect low oil sensor, start engine and allow to run for several minutes before reconnecting the sensor. 7. Move the generator to a level surface to prevent low oil shutdown from triggering. 8. Disconnect load. 9. Change air filter. 10. Replace battery.
Black smoke from exhaust	<ol style="list-style-type: none"> 1. Generator overloaded. 2. Oil in cylinder. 3. Contaminated diesel fuel. 4. Fuel injection malfunction. 5. Clogged air filter. 6. Improper setting for specific altitude. 	<ol style="list-style-type: none"> 1. Reduce load. 2. Check oil level and drain excess from crankcase. 3. Treat engine with biocide. 4. Have the Generator serviced by a qualified mechanic. 5. Replace air filter. 6. Have a qualified technician inspect/ reset the engine fuel system.
White smoke from exhaust	<ol style="list-style-type: none"> 1. Water in fuel. 	<ol style="list-style-type: none"> 1. Empty and clean fuel tank, fuel lines and filter.
Generator runs but does not support all loads.	<ol style="list-style-type: none"> 1. Device connected is faulty. 2. Engine overloaded. 	<ol style="list-style-type: none"> 1. Check devices for problems. 2. Turn off and unplug devices, shut Generator off for several minutes, restart generator, connect fewer loads.

*** Every time fuel system is serviced, replace the fuel filter.**



Follow all safety precautions whenever diagnosing or servicing the equipment or engine.

Troubleshooting

Problem	Possible Causes	Probable Solutions
Engine backfires	<ol style="list-style-type: none">1. Impure or low quality diesel fuel.2. Engine too cold.3. Engine not properly adjusted for high altitude operation.4. Intake valve stuck, incorrect timing, clogged carburetor, or overheated engine.	<ol style="list-style-type: none">1. Fill fuel tank with fresh #2 diesel fuel.2. Use cold weather fuel and oil additives to prevent backfiring.3. Qualified technician must adjust engine at altitudes greater than 5,000 feet above sea level.4. Have qualified technician diagnose and service engine.
AC output, but no DC output	<ol style="list-style-type: none">1. Fuse burnt out.	<ol style="list-style-type: none">1. Replace Fuse.

*** Every time fuel system is serviced, replace the fuel filter.**



Follow all safety precautions whenever diagnosing or servicing the equipment or engine.

PLEASE READ THE FOLLOWING CAREFULLY

THE MANUFACTURER AND/OR DISTRIBUTOR HAS PROVIDED THE PARTS LIST AND ASSEMBLY DIAGRAM 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.

MAIN ASSEMBLY PARTS LIST

Part	Description	Qty
1	Upper Muffler	1
2	Lower Muffler	1
3	Muffler Gasket	2
4	Muffler Connection Pipe	1
5	Muffler Inner Cover	1
6	Muffler Engine Shield	1
7	Left Engine Shield	1
8	Engine Mount	1
9	Muffler Pipe Support	1
10	Cable Guard	1
11	Terminal Block	1
12	Rear Air Duct Cover	1
13	End Bell Bolts	4
14	End Bell	1
15	Rotor Bolt	1
16	Stator Assembly	1
17	Rotor Assembly	1
18	Crankcase Cover	1
19	Air Cleaner Air Duct	1
20	Air Cleaner Gasket	1
21	Diesel Engine	1
22	Bottom Frame	1
23	Foot Mount	4
24	Chassis	1
25	High Pressure Hose Clamp	1
26	Engine Front Wind Shield	1
27	Nuts	2

MAIN ASSEMBLY PARTS LIST

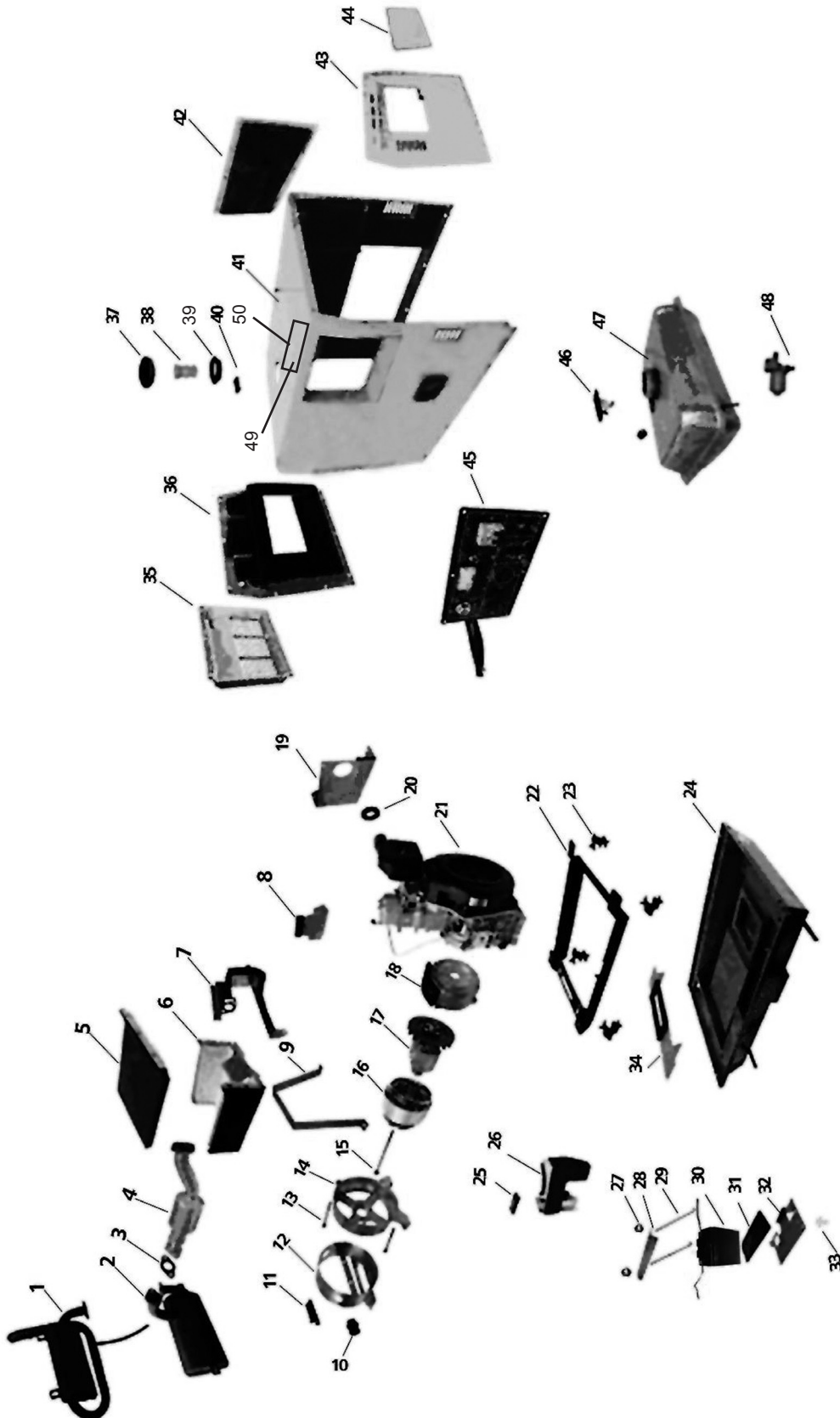
Part	Description	Qty
28	Battery Clamp	1
29	Battery Clamping Bar	2
30	Battery	1
31	Battery Cushion	1
32	Battery Support Plate	1
33	Battery Support Bolt	4
34	Alternator Shield	1
35	Muffler Cover Panel	1
36	Left Cover Panel	1
37	Fuel Tank Cover	1
38	Fuel Strainer	1
39	Fuel Tank Gasket	1
40	Fuel Gauge Window	1
41	Sound Shield Panel	1
42	Rear Panel	1
43	Right Panel	1
44	Air Cleaner Cover Plate	1
45	Electric Panel	1
46	Fuel Gauge	1
47	Fuel Tank	1
48	Fuel Valve Assembly	1
49	Injector & Decompressor Access Door	1
50	Securing Flex Screws M10x25	4

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.

MAIN ASSEMBLY DIAGRAM



Note: Wheels and Handles not shown.

CYLINDER BLOCK ASSEMBLY PARTS LIST

Part	Description	Qty
1A	Drain Plug	1
2A	Drain Plug Gasket	1
3A	Oil Seal 35x50x10	1
4A	Cylinder Block	1
5A	Fuel Controller	1
6A	O-ring 24x24	2
7A	Oil Depth Gauge	2
8A	Needle Bearing	2
9A	Short Stud Plate	1
10A	Long Stud Plate	2
11A	Fuel Injection Pump Gasket	1
12A	Seal Gasket	1
13A	Seal Plate	1
14A	Nut M6	3
15A	Retainer	1
16A	Washer 8	1
17A	Bolt M8x12	1
18A	Needle Bearing	1
19A	Short Cylinder Head Stud	2
20A	Cylinder Head Washer	4
21A	Short Cylinder Head Nut	2

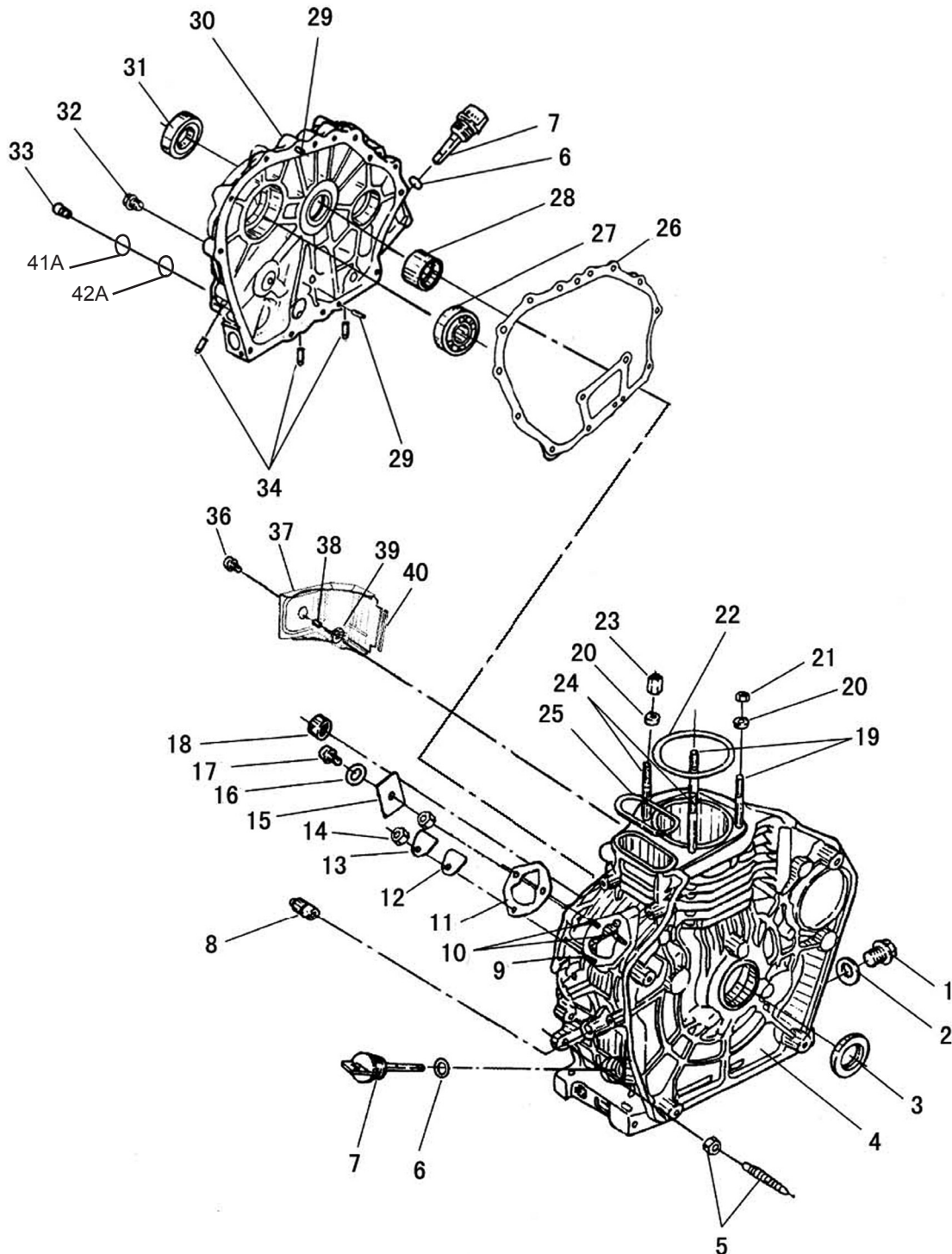
CYLINDER BLOCK ASSEMBLY PARTS LIST

Part	Description	Qty
22A	Cylinder Head Gasket	1
23A	Long Cylinder Head Nut	2
24A	Long Cylinder Head Stud	2
25A	Ring	1
26A	Crank Case Gasket	1
27A	Ball Bearing	1
28A	Main Bearing	1
29A	Pin 8x12	2
30A	Crank Case Cover	1
31A	Oil Seal	1
32A	Bolt M8x34	16
33A	Plug	1
34A	Plunger	3
36A	Bolt M6x14	1
37A	Air Shroud	1
38A	Air Shroud Collar	1
39A	Shock Absorber	1
40A	Shock Absorber Seat	1
41A	Flat Washer 8mm	16
42A	Spring Washer 8mm	16

Note: Use the suffix "A" when ordering parts for this assembly.

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

CYLINDER BLOCK ASSEMBLY DIAGRAM



Note: Use the suffix "A" when ordering parts for this assembly.

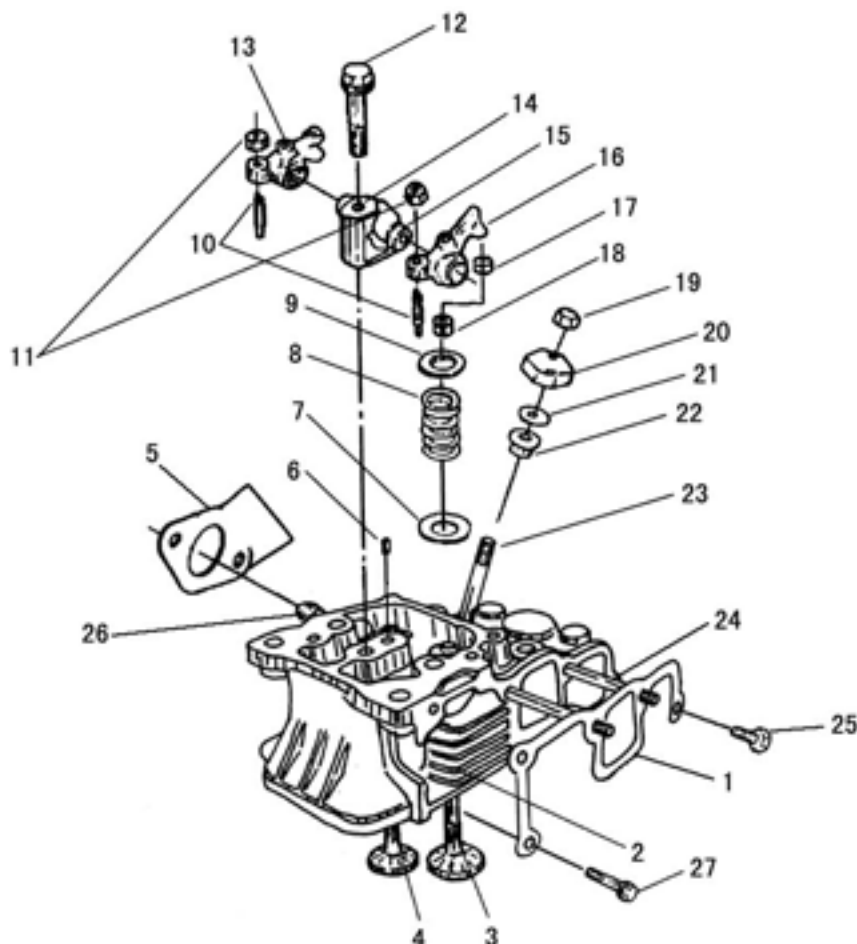
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

CYLINDER HEAD ASSEMBLY PARTS LIST & DIAGRAM

Part	Description	Qty
1B	Air Intake Gasket	1
2B	Cylinder Head	1
3B	Intake Valve	1
4B	Exhaust Valve	1
5B	Silencer	1
6B	Pin 4x8	1
7B	Valve Spring Washer	2
8B	Valve Spring	2
9B	Spring Retainer	2
10B	Valve Screw	2
11B	Nut M6	2
12B	Rocker Arm Bolt	1
13B	Exhaust Valve Rocker Arm	1
14B	Rocker Arm Support	1

CYLINDER HEAD ASSEMBLY PARTS LIST & DIAGRAM

Part	Description	Qty
15B	Rocker Arm Shaft	1
16B	Intake Valve Rocker Arm	1
17B	Valve Adjusting Plate	2
18B	Cotter	4
19B	Nut M6	2
20B	Nozzle Retainer	1
21B	Spacer Washer	1
22B	Spacer	1
23B	Stud M6x50	2
24B	Stud M6x75	2
25B	Bolt M6x22	2
26B	Stud M8x20	2
27B	Bolt M6x28	1



Note: Use the suffix “B” when ordering parts for this assembly.

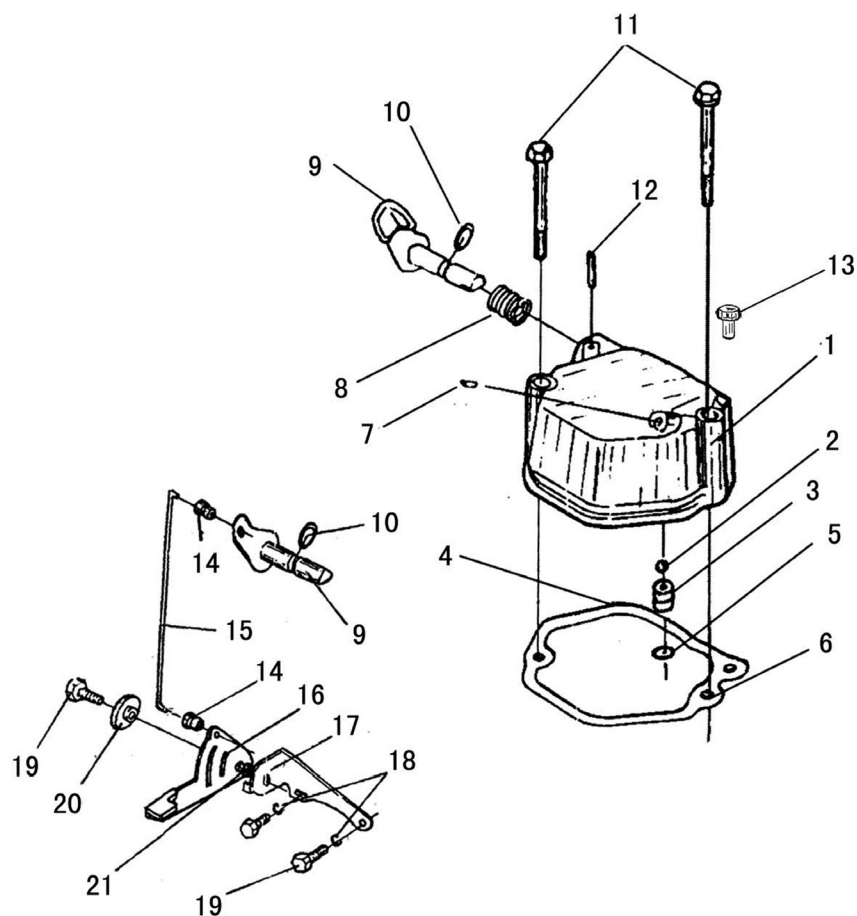
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

CYLINDER HEAD BONNET PARTS LIST & DIAGRAM

Part	Description	Qty
1C	Valve Cover	1
2C	Ball	1
3C	Breather	1
4C	Pin	1
5C	O-ring 12x1.9	1
6C	Cover Gasket	1
7C	Plunger	1
8C	Decompression Spring	1
9C	Decompression Shaft	1
10C	O-ring 10x1.9	1
11C	Bolt M6x70	2

CYLINDER HEAD BONNET PARTS LIST & DIAGRAM

Part	Description	Qty
12C	Pin 3x16	1
13C	Plunger	2
14C	Decompression Wire Collar	1
15C	Decompression Wire	1
16C	Decompression Handle	1
17C	Decompression Handle Support	2
18C	Washer 6	2
19C	Bolt M6x15	3
20C	Decompression Handle Bushing	2
21C	Nut M6	1



Note: Use the suffix "C" when ordering parts for this assembly.

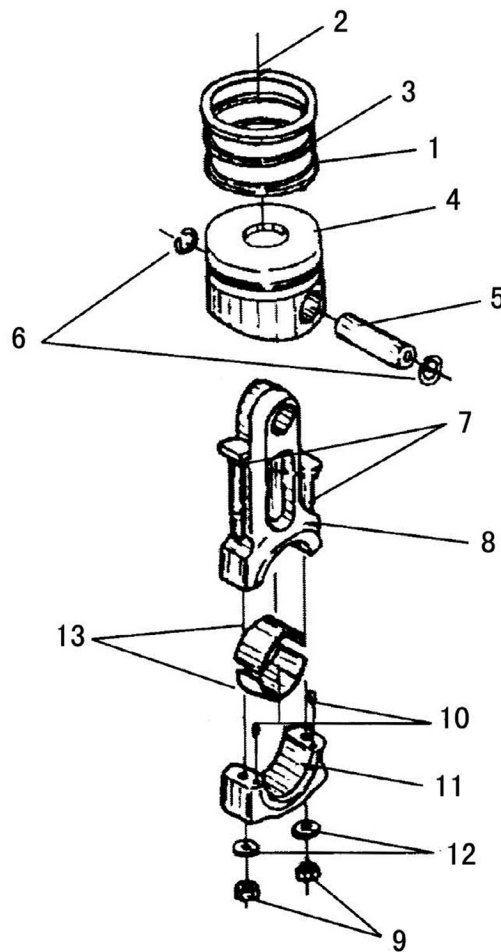
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

PISTON & CONNECTING ROD PARTS LIST & DIAGRAM

Part	Description	Qty
1D	Oil Ring	1
2D	First Compression Ring	1
3D	Second Compression Ring	1
4D	Piston	1
5D	Piston Pin	1
6D	Washer 23	1
7D	Rod Bolt	2

PISTON & CONNECTING ROD PARTS LIST & DIAGRAM

Part	Description	Qty
8D	Connecting Rod Body	1
9D	Rod Nut	2
10D	Pin 3x10	2
11D	Connecting Rod	1
12D	Rod Bolt Washer	2
13D	Crank Pin Bearing	2



Note: Use the suffix “D” when ordering parts for this assembly.

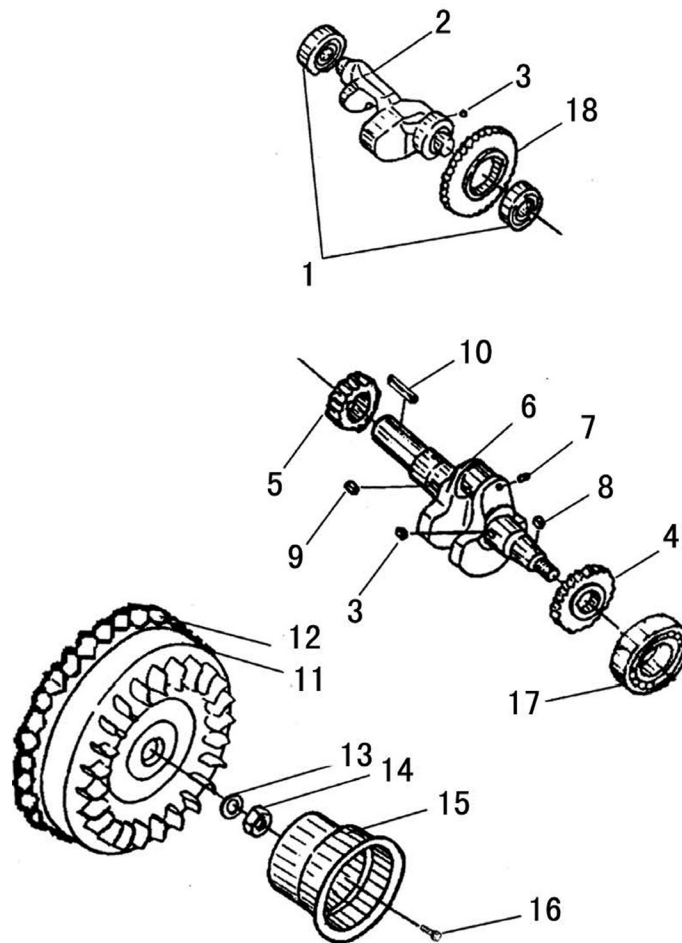
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

CRANK SHAFT & FLYWHEEL PARTS LIST & DIAGRAM

Part	Description	Qty
1E	Ball Bearing	2
2E	Balancer Shaft	1
3E	Key 5x7	2
4E	Balancer Gear	1
5E	Crank Shaft Timing Gear	1
6E	Crank Shaft	1
7E	Plug 6	1
8E	Key 5x12	1
9E	Key 5x14	1

CRANK SHAFT & FLYWHEEL PARTS LIST & DIAGRAM

Part	Description	Qty
10E	Key 6x50	1
11E	Flywheel	1
12E	Flywheel Gear	1
13E	Flywheel Washer	1
14E	Flywheel Nut	1
15E	Starter Pulley	1
16E	Bolt M6x12	4
17E	Ball Bearing	1
18E	Balancer Gear	1



Note: Use the suffix “E” when ordering parts for this assembly.

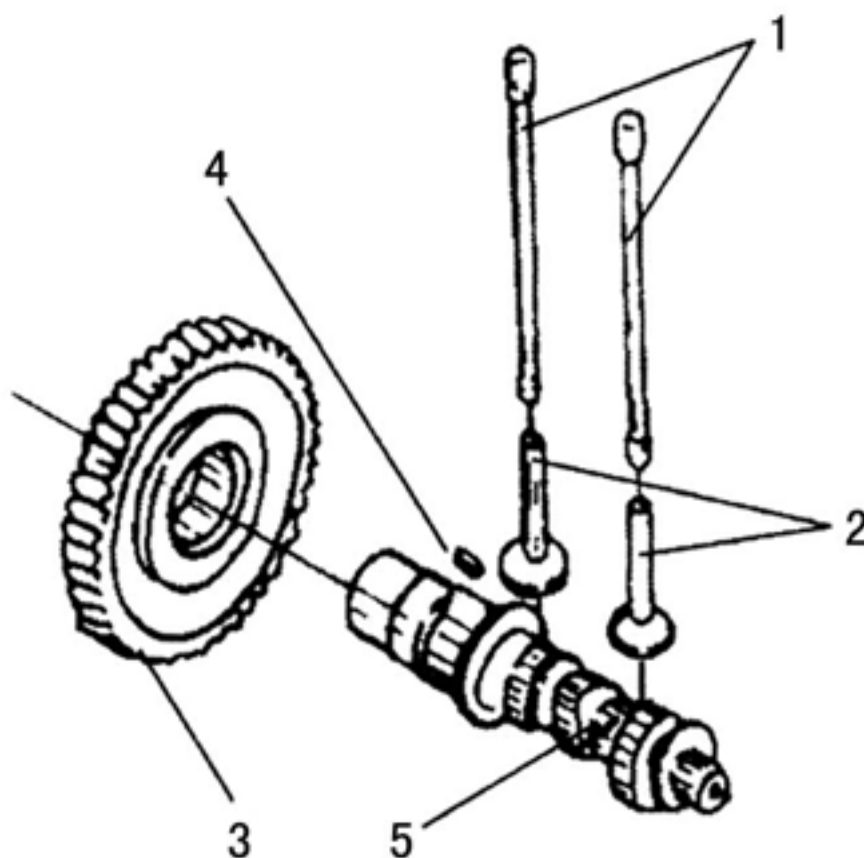
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

CAMSHAFT ASSEMBLY PARTS LIST & DIAGRAM

Part	Description	Qty
1G	Push Rods	2
2G	Valve Tappet	2
3G	Camshaft Timing Gear	1

CAMSHAFT ASSEMBLY PARTS LIST & DIAGRAM

Part	Description	Qty
4G	Key 5x14	1
5G	Camshaft	1



Note: Use the suffix “G” when ordering parts for this assembly.

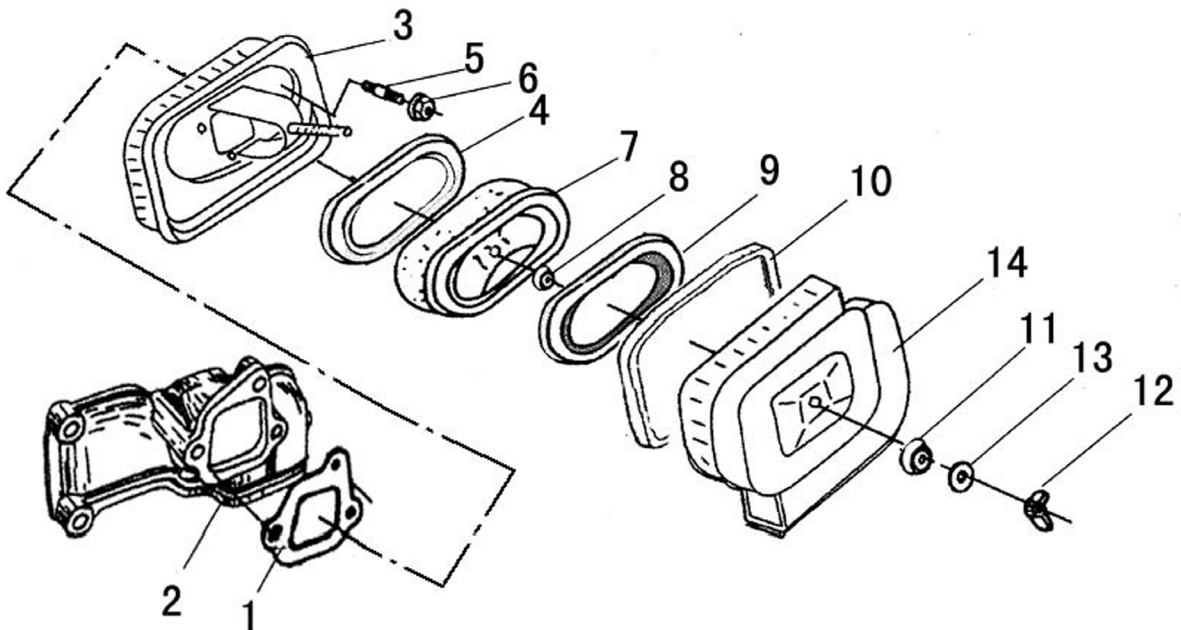
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

AIR CLEANER ASSEMBLY PARTS LIST & DIAGRAM

Part	Description	Qty
1H	Air Cleaner Gasket	1
2H	Intake Manifold	1
3H	Air Cleaner Bottom Case	1
4H	Shock Absorber Washer B	1
5H	Air Cleaner Element Bolt	1
6H	Nut M6	3
7H	Air Cleaner Element	1

AIR CLEANER ASSEMBLY PARTS LIST & DIAGRAM

Part	Description	Qty
8H	Element Shock Absorber	1
9H	Shock Absorber Washer A	1
10H	Ring	1
11H	Air Cleaner Shock Absorber	1
12H	Nut M8	1
13H	Washer 8	1
14H	Air Cleaner Cover	1



Note: Use the suffix "H" when ordering parts for this assembly.

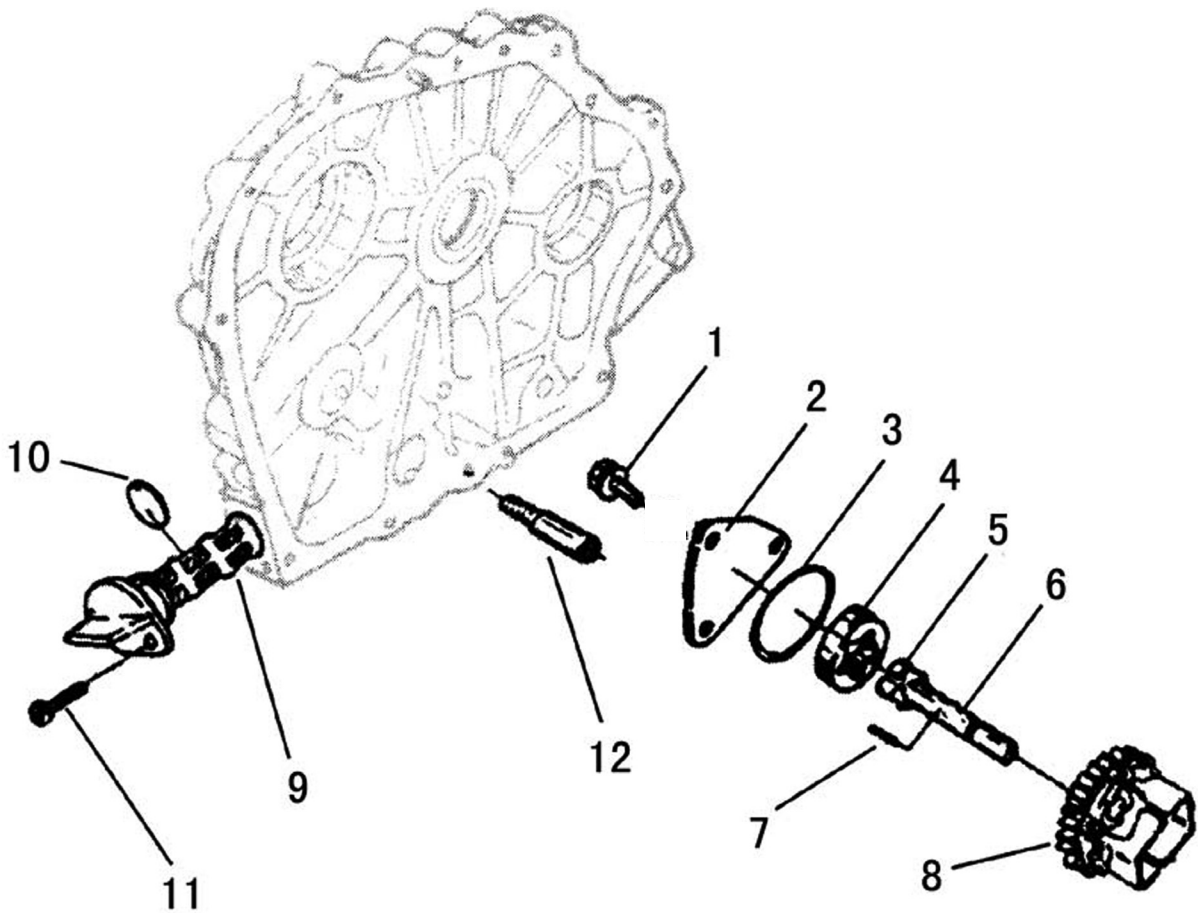
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

OIL SYSTEM PARTS LIST & DIAGRAM

Part	Description	Qty
1J	Bolt M6x8	3
2J	Oil Pump Cover	1
3J	O-ring	1
4J	Outer Rotator	1
5J	Inner Rotator	1
6J	Oil Pump Shaft	1

OIL SYSTEM PARTS LIST & DIAGRAM

Part	Description	Qty
7J	Pin 3x16	1
8J	Oil Pump Gear	1
9J	Oil Filter	1
10J	O-ring	1
11J	Bolt M6x14	1
12J	Intake Pipe	1



Note: Use the suffix “J” when ordering parts for this assembly.

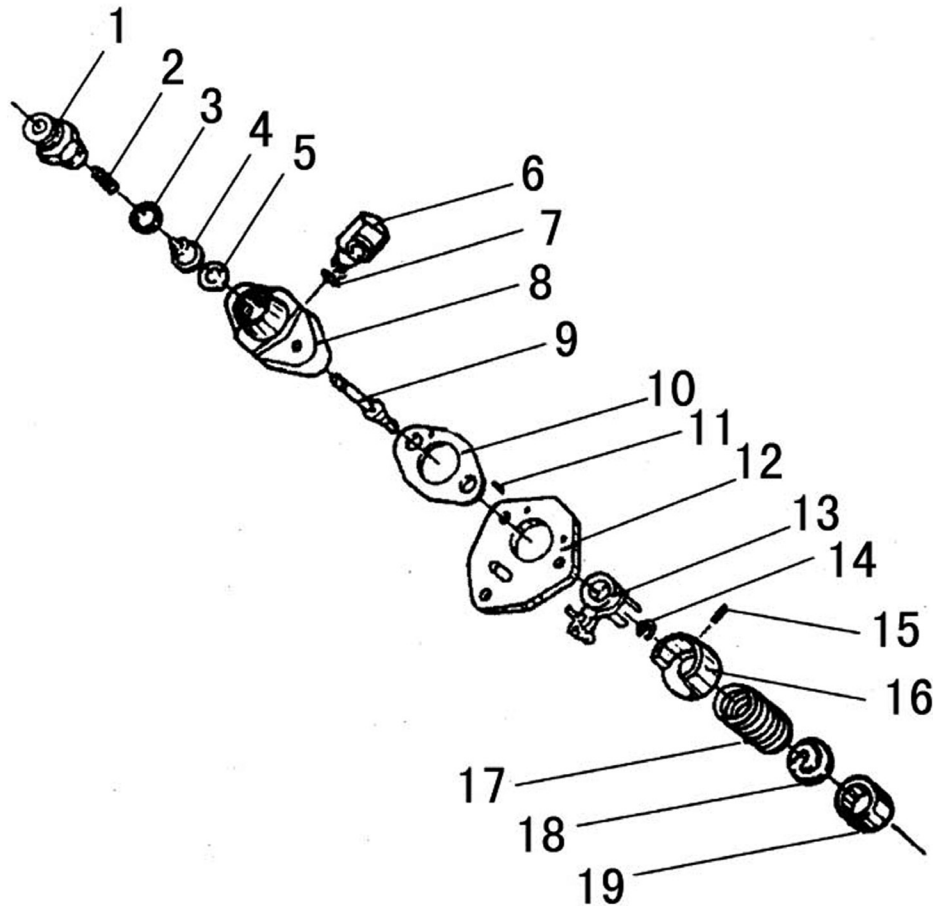
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

FUEL INJECTION PUMP PARTS LIST & DIAGRAM

Part	Description	Qty
1K	Delivery Holder	1
2K	Delivery Spring	1
3K	Delivery Gasket	1
4K	Delivery Valve	1
5K	Delivery Seat	1
6K	Solenoid Pilot Valve	1
7K	O-ring	1
8K	Pump Body	1
9K	Plunger	1
10K	Shim Set	1

FUEL INJECTION PUMP PARTS LIST & DIAGRAM

Part	Description	Qty
11K	Pin 2x6	2
12K	Packing	1
13K	Control Lever	1
14K	Snap Ring	1
15K	Pin 3x8	1
16K	Spring Seat	2
17K	Pump Spring	1
18K	Spring Seat	1
19K	Tappet	



Note: Use the suffix "K" when ordering parts for this assembly.

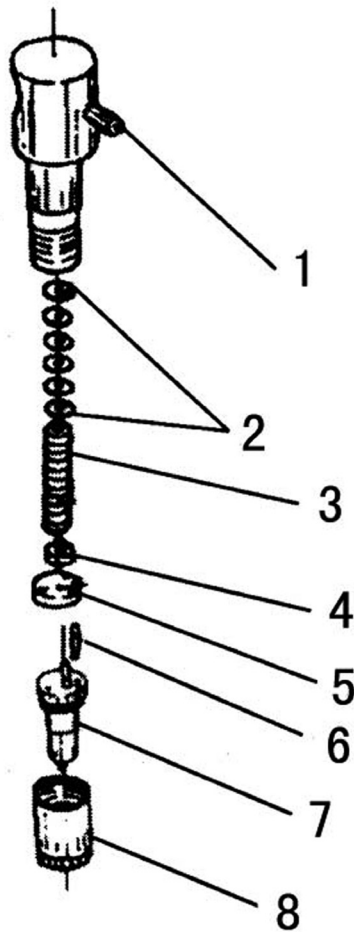
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

FUEL NOZZLE PARTS LIST & DIAGRAM

Part	Description	Qty
1M	Nozzle Holder	1
2M	Shim Set	1
3M	Nozzle Holder Spring	1
4M	Spring Retainer	1

FUEL NOZZLE PARTS LIST & DIAGRAM

Part	Description	Qty
5M	Stop Plate	1
6M	Pin	2
7M	Nozzle Valve	1
8M	Nozzle Case Nut	1



Note: Use the suffix “M” when ordering parts for this assembly.

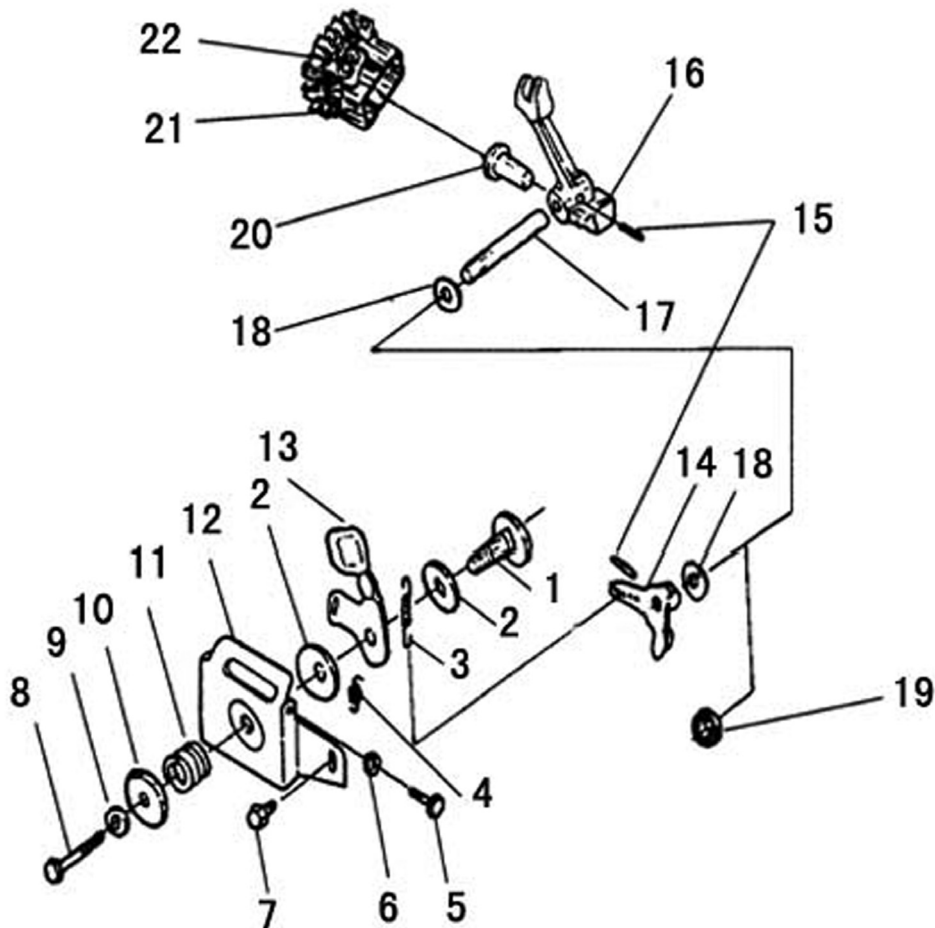
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

GOVERNOR & CONTROL SYSTEM PARTS LIST & DIAGRAM

Part	Description	Qty
1N	Control Handle Shaft	1
2N	Governor Handle Shaft	2
3N	Governor Spring	1
4N	Return Spring	1
5N	High Speed Limit Screw	1
6N	Nut M6	1
7N	Bolt M6x14	1
8N	Bolt M6x20	1
9N	Nut M10x1.25	1
10N	Cover	1
11N	Spring	1

GOVERNOR & CONTROL SYSTEM PARTS LIST & DIAGRAM

Part	Description	Qty
12N	Handle Bracket	1
13N	Control Handle	1
14N	Bracket	1
15N	Pin 3x22	2
16N	Lever Fork	1
17N	Lever Shaft	1
18N	Washer	3
19N	Seal	1
20N	Tappet	1
21N	Fly Block	2
22N	Fly Block Pin	2

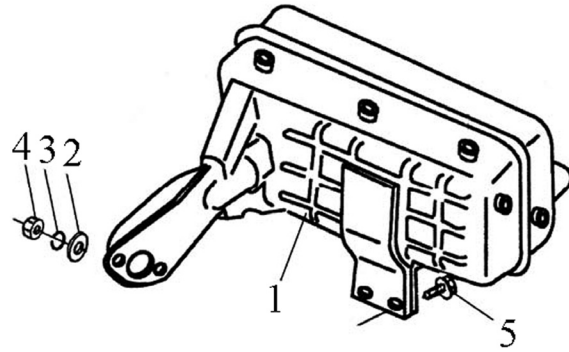


Note: Use the suffix "N" when ordering parts for this assembly.

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

MUFFLER PARTS LIST & DIAGRAM

Part	Description	Qty
1R	Muffler	1
2R	Washer 8	2
3R	Washer 8	2
4R	Nut M8	2
5R	Bolt M8x12	2



Note: Use the suffix “R” when ordering parts for this assembly.

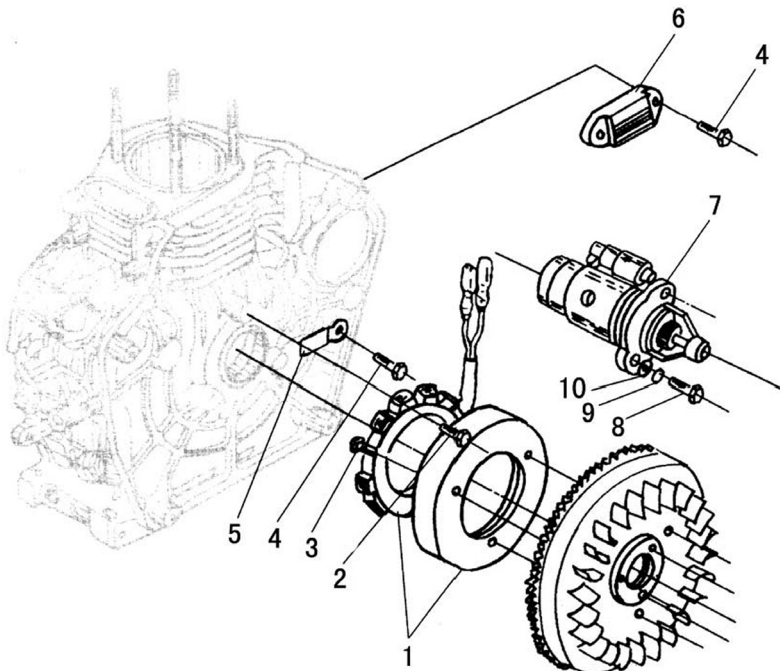
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

STARTING MOTOR PARTS LIST & DIAGRAM

Part	Description	Qty
1T	Alternator	1
2T	Bolt M6x30	3
3T	Screw M6x12	3
4T	Bolt M8x12	1
5T	Clamp	1

STARTING MOTOR PARTS LIST & DIAGRAM

Part	Description	Qty
6T	Regulator	1
7T	Starting Motor	1
8T	Bolt M10x35	2
9T	Washer 10	2
10T		



Note: Use the suffix “T” when ordering parts for this assembly.

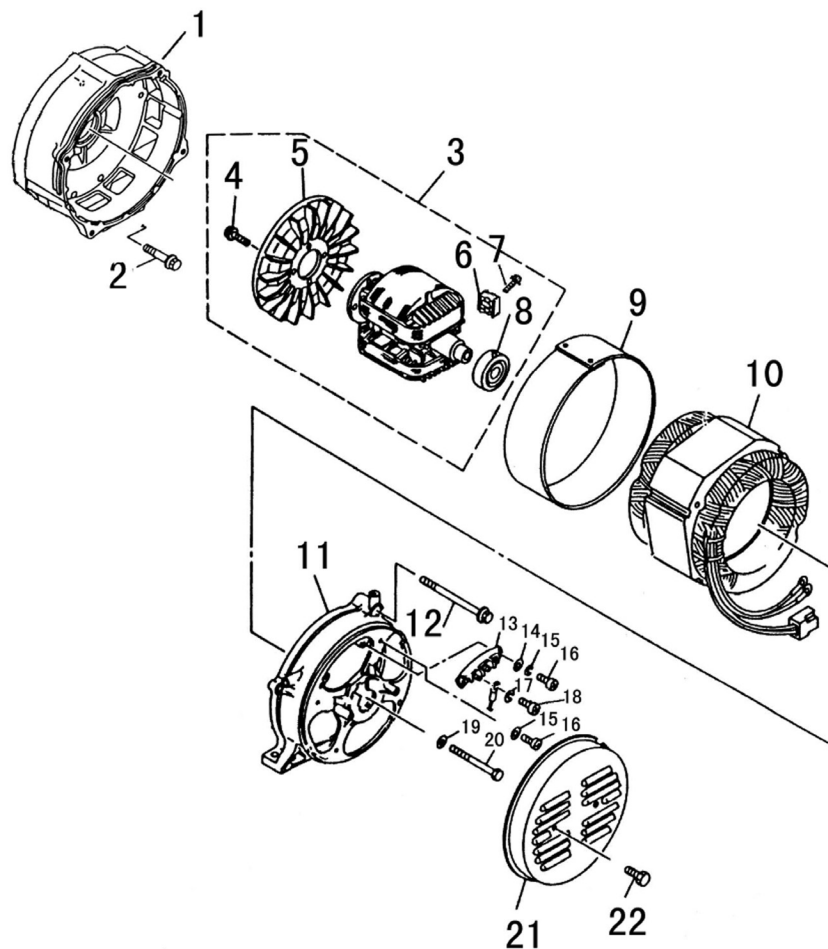
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

GENERATOR PARTS LIST & DIAGRAM

Part	Description	Qty
1U	Front Cover	1
2U	Flange Bolt M8x30	4
3U	Rotor Assembly	1
4U	Bolt M6x16	4
5U	Fan Blade	1
6U	Rectifier	1
7U	Bolt M5x20	1
8U	Bearing	1
9U	Stator Cover	1
10U	Stator Assembly	1
11U	Rear Cover	1

GENERATOR PARTS LIST & DIAGRAM

Part	Description	Qty
12U	Flange Bolt M8x125	4
13U	Plate	1
14U	Flat Washer	2
15U	Spring Washer	2
16U	Bolt M6x16	2
17U	Washer	8
18U	Bolt M6x16	4
19U	Washer	1
20U	Bolt M10x250x1.25	1
21U	End Cover	1
22U	Bolt M6x10	2



Note: Use the suffix "U" when ordering parts for this assembly.

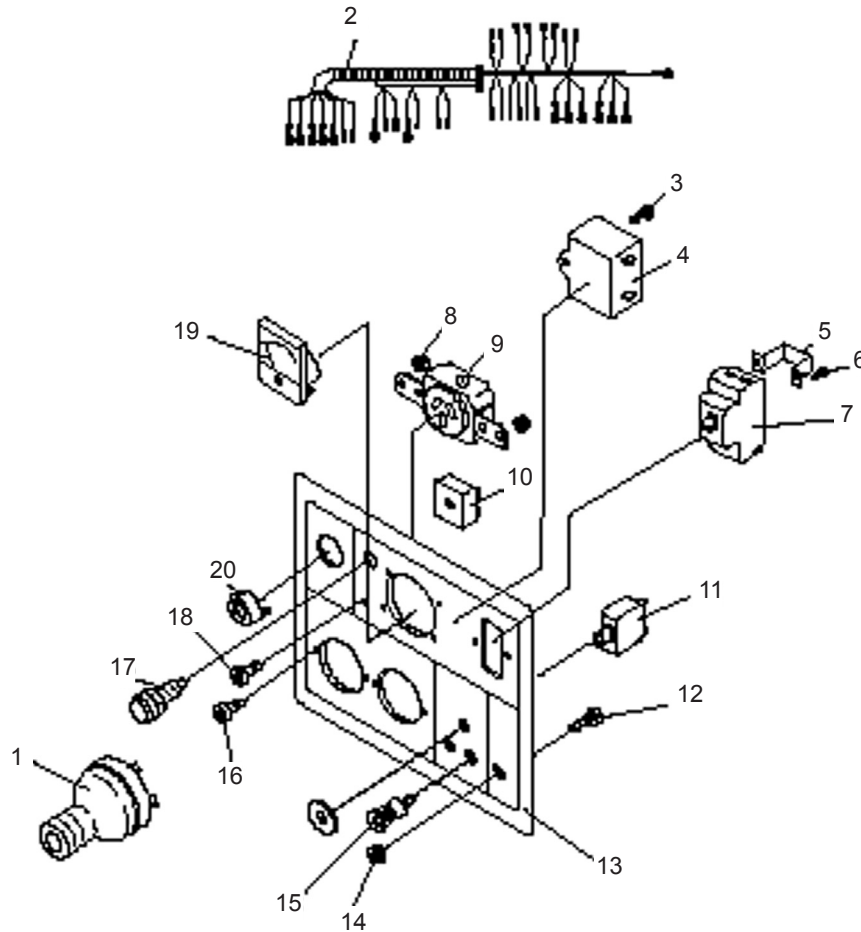
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

CONTROL PANEL PARTS LIST & DIAGRAM

Part	Description	Qty
1W	AC Plug	2
2W	Wiring Harness Assembly	1
3W	Screw M4x10	2
4W	Capacitor 20uf/450V	1
5W	Clasp	1
6W	Screw M4x10	2
7W	AC Circuit Breaker	1
8W	Nut M4	4
9W	AC Socket	2
10W	Rectifier	1

CONTROL PANEL PARTS LIST & DIAGRAM

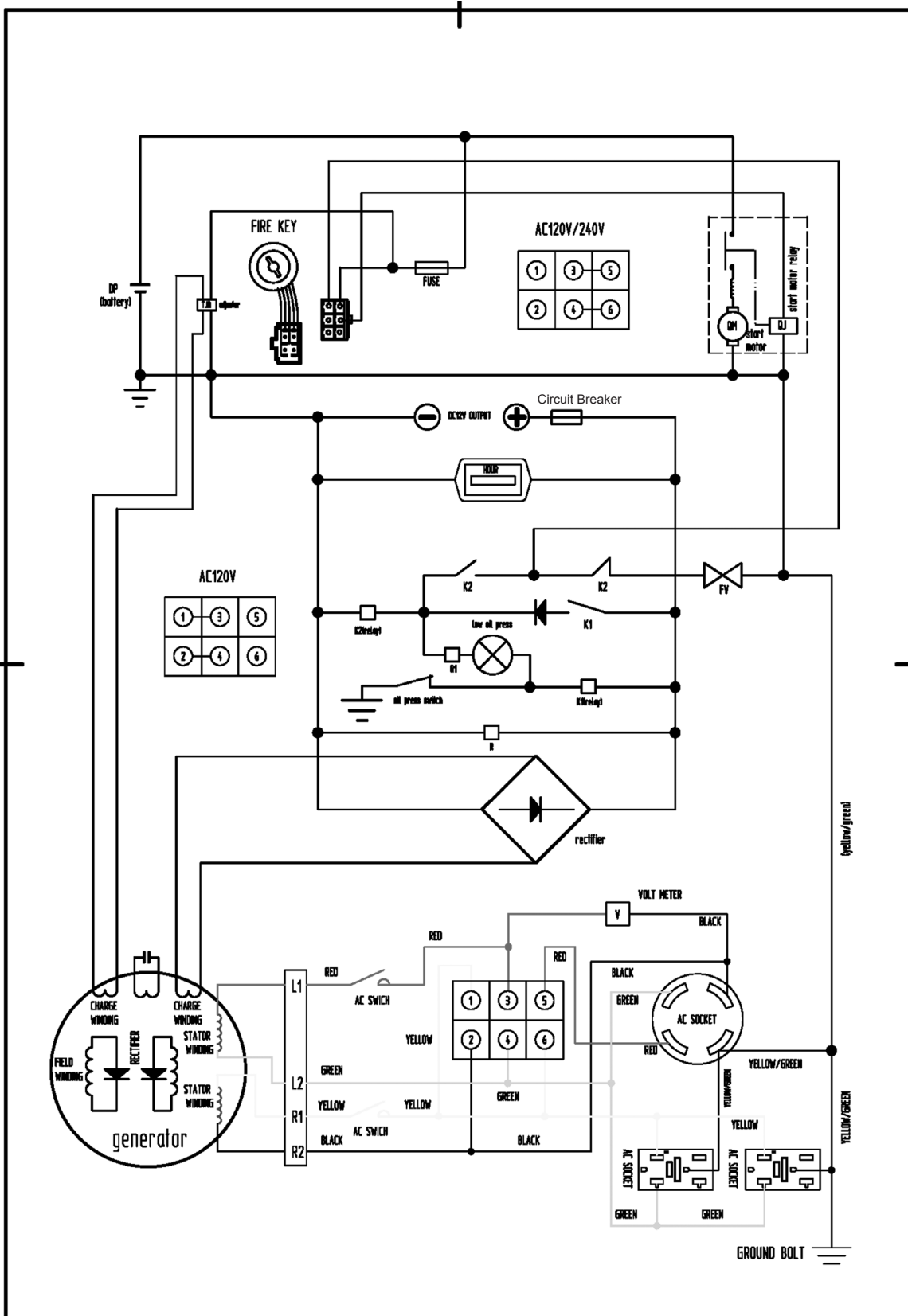
Part	Description	Qty
11W	DC Circuit Breaker	1
12W	Bolt M4x20	2
13W	Faceplate	1
14W	Nut M6	2
15W	Terminal	2
16W	Screw M5x20	4
17W	Oil Warning Light	1
18W	Screw M5x20	1
19W	Voltmeter	1
20W	Engine Switch	1



Note: Use the suffix “W” when ordering parts for this assembly.

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

WIRING DIAGRAM



LIMITED 1 YEAR / 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 for a period of ninety days from date of purchase that the engine/motor, the belts (if so equipped), and the blades (if so equipped) are free of defects in materials and workmanship. Harbor Freight Tools also warrants to the original purchaser, for a period of one year from date of purchase, that all other parts and components of the product are free from defects in materials and workmanship (90 days if used by a professional contractor or if used as rental equipment). This warranty does not apply to damage due directly or indirectly, to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, 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.

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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.

1. 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.

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