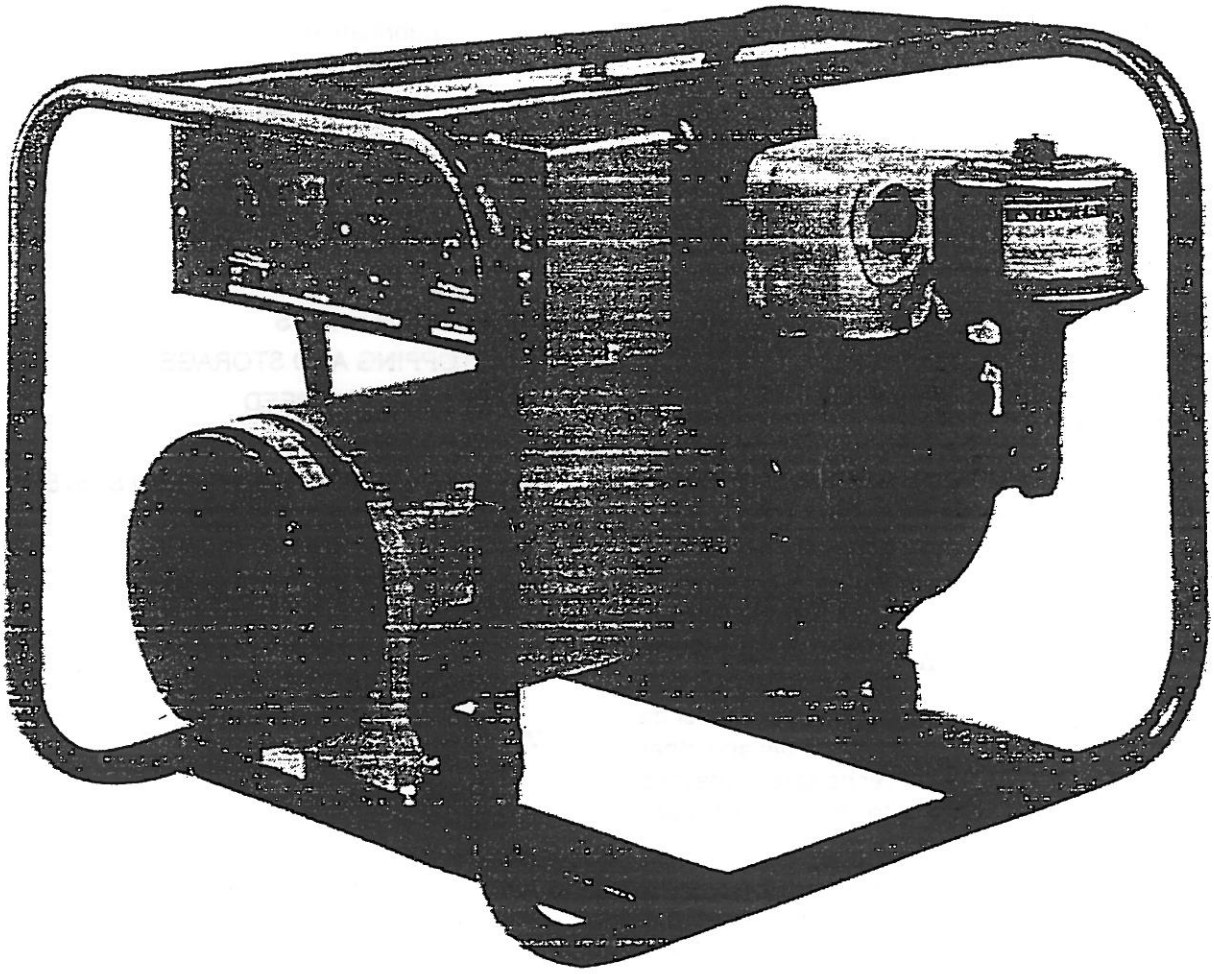
WINCO®

OWNERS MANUAL

HD3200
HD4500
HD6000

HD3200H
HD4500E
HD6000E



Model HD4500 Shown

READ AND UNDERSTAND ALL INSTRUCTIONS IN THIS MANUAL BEFORE STARTING AND OPERATING THE GENERATOR SET.

USING THIS MANUAL

Congratulations on your choice of a WINCO generator set. You have selected a high-quality, precision engineered generator set that is designed and tested to give you years of satisfactory service.

To get the best performance from your new engine generator set, it is important that you carefully read and follow the instructions in this manual.

Should you experience a problem please see "Things To Check" near the end of this manual. The warranty in the back of this manual describes what you can expect from WINCO should you need service assistance in the future.

PROPER USE AND INSTALLATION

You must be sure your new generator set is:

- Properly serviced before it is started
- Operated in a well ventilated area
- Located so exhaust gases are dispersed safely
- Wired by a qualified electrician
- Operated only for its designed purposes
- Used only by operators who understand its operation
- Properly maintained

COPY MODEL AND SERIAL NUMBER HERE

No other WINCO generator has the same serial number as yours. It is important that you record the number and other vital information here, if you should ever need to contact us on this unit it will help us to respond to your needs faster.

MODEL . . . . . _____

SERIAL NUMBER . . . . . _____

DATE PURCHASED . . . . . _____

DEALER . . . . . _____

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GUIDE TO PRODUCT SAFETY

This engine generator set has been designed and manufactured to provide safe, reliable performance. Poor maintenance, improper, or careless use can result in potential deadly hazards; from electrical shock, exhaust gas asphyxiation, or fire. Please read all safety instructions carefully before installation or use. Keep these instructions handy for future reference. Take special note and follow all warnings on the unit labels and in the manuals.

CAUTION	CAUTION: Possible Damage to Equipment. CAUTION notes indicate any condition or practice, which if not strictly observed or remedied, could result in damage or destruction of the equipment.

WARNING: Personal Danger. WARNING notes indicate any condition or practice, which if not strictly observed, could result in personal injury or possible loss of life.

1. ELECTRIC SHOCK - The output voltage present in this equipment can cause a fatal electric shock. This equipment must be operated by a responsible person.
   a. Do not allow anyone to operate the generator without proper instruction.
   b. Take precautions to guard against electric shock.
   c. Avoid contact with live terminals or receptacles.
   d. Use extreme care if operating this unit in rain or snow.
   e. Use only three-prong grounded receptacles and extension cords.
   f. Be sure the unit is properly grounded to an external ground rod driven into the earth.
2. FIRE HAZARD - Gasoline and other fuels always present a hazard of possible explosion and/or fire.
   a. Do not refuel when the engine is running or hot. Allow the engine to cool at least two minutes before refueling.
   b. Keep fuel containers out of the reach of children.
   c. Do not smoke or use an open flame near the generator set or the fuel tank.
   d. Keep a fire extinguisher nearby and know how to use it properly. Fire extinguishers that are rated ABC by the NFPA are appropriate.
   e. Store fuel only in an approved container, and only in a well- ventilated area.
3. DEADLY EXHAUST GAS - Exhaust fumes from any gasoline engine contain carbon monoxide, an invisible, odorless, and deadly gas that must be mixed and dispersed with fresh air.
   a. Operate only in well ventilated areas.
   b. Never operate indoors.
   c. Never operate the unit in a way that allows exhaust gases to seep back into closed rooms (i.e. through windows, walls or floors).
4. NOISE HAZARD - Excessive noise is not only tiring, but continual exposure can lead to loss of hearing.
   a. Use hearing protection equipment when working around this equipment for long periods of time.
   b. Keep your neighbors in mind when permanently installing this equipment.
5. CLEANLINESS - Keep the generator and surrounding area clean.
   a. Remove all grease, ice, snow, or other materials that may create slippery conditions around the unit.
   b. Remove any rags or other material that could create potential fire hazards.
   c. Make sure to wipe up any gas or oil spills before starting the unit.
   d. Never allow leaves or other flammable material to build up around the engine exhaust area.
6. SERVICING EQUIPMENT - All service, including the installation or replacement of service parts, should be performed only by a qualified technician.
   a. Use only factory approved repair parts.
   b. Do not work on this equipment when you are fatigued.
   c. Never remove the protective guards, covers, or receptacle panels while the engine is running.
   d. Use extreme caution when working on electrical components. High output voltages from this equipment can cause injury or death.
   e. When servicing this unit always avoid hot mufflers, exhaust manifolds, and engine parts. These parts can cause severe burns instantly.
   f. Installing and wiring a home-standby generator is not a "do it yourself" project. Consult a qualified, licensed electrician or contractor. The installation must comply with all national, state, and local codes.

SPECIFICATIONS

Performance & Technical Data

Model Number	*HD3200	*HD3200H	*HD4500	*HD4500E	*HD6000	*HD6000L
Electrical Specifications						
Maximum Power Rating	3200 watts	2800 watts	4500 watts	4500 watts	6000 watts	6000 watts
Continuous Power Rating	2800 watts	2400 watts	4000 watts	4000 watts	5500 watts	5500 watts
A.C. Output Voltage	120 volts	120 volts	120/240 volts	120/240 volts	120/240 volts	120/240 volts
Continuous Current Rating	23.3 amps	20 amps	33.3/16.7 amps	33.3/16.7 amps	45.8/22.9 amps	45.8/22.9 amps
Motor Starting Ability (1)	1 hp	1/2 hp	1-1/2 hp	1-1/2 hp	3 hp	3 hp
120 volt Full Power ™			33.3 amps	33.3 amps	45.8 amps	45.8 amps
Generator Type (2)	RFL	RFL	RFL	RFL	RFB	RFB
Engine Data						
Make/Model	KAW/FA210	Honda GX160	B&S/I.C.	B&S/I.C.	B&S/I.C.	B&S/I.C.
Displacement/Type (3)	207 cc	160 cc /OHV	319 cc	319 cc	400 cc	400 cc
Rated Power (3600 rpm)	5 hp	5.5 hp	8 hp	8 hp	11 hp	11 hp
Low Oil Shutdown	Standard	Standard	Standard	Standard	Standard	Standard
Starting System	Recoil	Recoil	Recoil	Recoil/Electric	Recoil	Recoil/Electric
Stop System	Switch	Switch	Switch	Switch	Switch	Switch
Fuel Tank Capacity	3/4 gallon	1 gallon	1-1/2 gallons	1-1/2 gallons	1-1/2 gallons	1-1/2 gallons
Oil Capacity	0.67 pints	1.38 pints	2.25 pints	2.25 pints	3.0 pints	3.0 pints
Running Time - Full Load	1.2 hours	2.2 hours	1.8 hours	1.8 hours	1.4 hours	1.4 hours
Running Time - Half Load	1.7 hours	3.1 hours	2.5 hours	2.5 hours	2.0 hours	2.0 hours
120 volt Receptacles						
Straight Blade (NEMA 5-15R)	4-15 amp	4-15 amp	2-15 amp	2-15 amp	2-15 amp	2-15 amp
Straight Blade (NEMA 5-20R) GFCI			2-15 amp	2-15 amp	2-15 amp	2-15 amp
Straight Blade (NEMA 5-50R)			1-50 amp	1-50 amp	1-50 amp	1-50 amp
240 volt Receptacles						
Twist-Lock (NEMA L6-20R)			1-20 amp	1-20 amp		
Twist-Lock (NEMA L6-30R)					1-30 amp	1-30 amp
Size & Weight						
Dimensions (LxWxH)	24x16x16 in.	24x16x16 in.	27x20x20 in.	27x20x20 in.	29x21x20 in.	29x21x20 in.
Shipping Weight	98 lbs.	98 lbs.	174 lbs.	186 lbs.	218 lbs.	230 lbs.
Warranty Information (4)						
Generator/Engine	2 year/1 year	2 year/2 year	2 year/2 year	2 year/2 year	2 year/2 year	2 year/2 year

*CSA models also available.

The owner must provide the proper fuel and 10W-30 oil. See the engine manual for more specific information. The owner must also provide the battery for electric start units.

NOTES: (1) Code G. capacitor start motor. (2) RFB stands for Rotating Field Brush design, RFL stands for Rotating Field Brushless design (capacitor excitation), all manufactured by WINCO. (3) OHV stands for Overhead Valve. (4) Consult factory or authorized dealer for complete details. WINCO Inc. continually improves its products and reserves the right to change designs, materials, and/or specifications without notice.

INTENDED USES

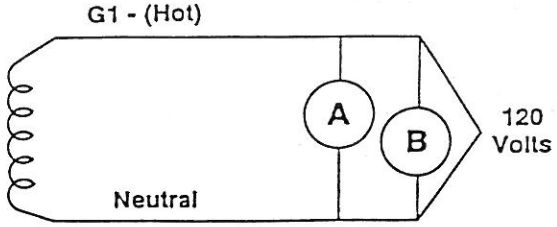
1. These generator sets have been designed primarily for portable use. The receptacles that are located in the control panel allow you to plug in your loads (portable appliances and tools). Models HD4500, HD4500E, HD6000, and HD6000E are designed with full power capabilities. See Unit Capabilities for more detailed information about full power capabilities.
2. These units require large quantities of fresh air to cool the engine and the generator. Fresh air is drawn from both the engine end and the generator end and is exhausted at the center of the unit. For safety, long life, and satisfactory performance, these units should never be run in small compartments without positive fresh air flow.

RESTRICTED USES

1. DO NOT remove the generator from the cradle assembly. Removing the generator from the cradle assembly may cause excessive vibration and damage to the generator set.
2. DO NOT install and operate these portable generators in small compartments. (i.e. generator compartment of vehicles, motor homes, or travel trailers). These compartments restrict the free flow of fresh air required to cool the generator set and may cause the unit to overheat. Overheating will damage both the engine and the generator. Small compartments can also develop hot spots where there is very little air flow and may cause a fire.
3. DO NOT attempt to operate this unit at 50 hertz (cycles per second). These units are designed and governed to operate at 60 hertz only. Special units are available for 50 hertz operation.

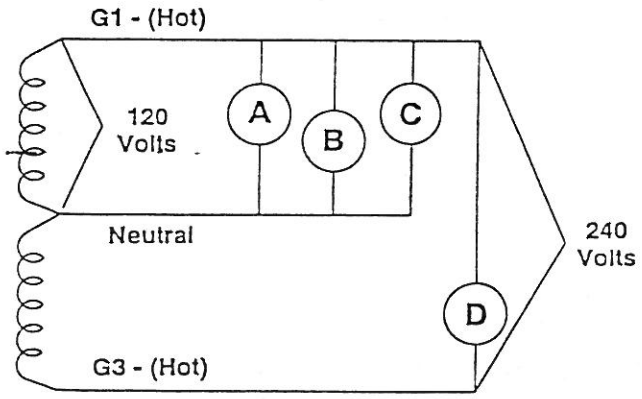
UNITS CAPABILITIES

1. **Generator Connections** - The 3200 Schematic shows a typical 3200 watt generator. Receptacles A and B are the two 120 volt duplex receptacles. Full output is available at each receptacle, but individual receptacles are rated at only 15 amps each. These generators produce 120 volt, 60 hertz, AC (alternating current).



3200 Schematic

The 4500 watt and the 6000 watt generators are equipped with a patented Full Power feature that uses extra heavy wire in the windings. The Full Power Schematic shows a typical 4500 or 6000 watt generator. Receptacles A and B are the two 120 volt duplex receptacles. Receptacle C is the 50 amp 120 volt receptacle. Receptacle D is the 240 volt receptacle. The full output is available at any of the receptacles, but the duplex receptacles are rated at only 15 amps per each. These generators produce 120 and 240 volt, 60 hertz, AC (alternating current).



Full Power Schematic

A Full Power generator can safely carry an entire full capacity load on a single 120 volt circuit. This eliminates the need to split and balance the 120 volt load to avoid damaging the generator. The entire output of this generator can be taken from a single 120 volt circuit, a single 240 volt circuit, or a combination of 120/240 volts circuits as long as the total load does not overload the engine or exceed the units rated output (see Specifications). Although the unit is protected by circuit breakers, damage caused by overloading constitutes abuse and will not be warranted.

The following chart shows the output capabilities of the 4500 and 6000 watt generators.

Generator Model	Amps @ 120 Volts (Receptacle ID) (A&B)	(C)	240 Volts (D)
HD4500	30.0	33.3	16.7
HD4500E	30.0	33.3	16.7
HD6000	30.0	45.8	22.9
HD6000E	30.0	45.8	22.9

Check the appliance or tool nameplates to make sure that the current and voltage ratings are compatible with the generator. If a circuit breaker trips, make sure that the associated load is not excessive before resetting the circuit breaker.

2. **Starting Electric Motors** - Electric motors require much more current (amps) to start than they do to run.

Some motors, particularly low cost Split-Phase (SP) motors are very hard to start and have a start current that is 5 to 7 times as much as the run current. Capacitor (Cap) motors are easier to start and have a start current that is 2 to 4 times as much as the run current. Repulsion-Induction (RI) motors are the easiest to start and usually have a start current that is 1.5 to 2.5 times as much as the run current.

In general, the run current for all types of fractional horsepower motors is about the same. The chart below shows the approximate current required to start and run various types and sizes of 120 volt 60 hertz electric motors under average load conditions.

Motor Rating (hp)	Run Current (amps)	Start Current (amps)		
		SP	Cap	RI
1/6	3.2	16 TO 22	6 TO 13	5 TO 8
1/4	4.5	22 TO 32	9 TO 18	7 TO 12
1/3	5.2	26 TO 35	10 TO 21	8 TO 17
1/2	7.2	NOT MADE	14 TO 29	11 TO 18
1	13.0	NOT MADE	26 TO 52	20 TO 33

The figures given above are for an average load such as a blower or fan. If the electric motor is connected to a hard starting load such as an air compressor, it will require more start current. If the motor is connected to a light load, or to no load such as a power saw, it will require less start current. The exact requirement will also vary with the brand and design of the motor.

For 240 volt motors, the start and run currents are half as much as those shown for the 120 volt motors of the same size. Some dual voltage 120/240 volt motors are difficult to start on 240 volts when driven by generator sets and can be started more easily when wired to operate on 120 volts. This is particularly true of "capacitor start-induction run" motors.

Sometimes a 240 volt motor that cannot be started on the 240 volt circuit of a 120/240 volt generator can be started on a 120 volt circuit and then quickly switched to the 240 volt circuit after it is started. This can be done in applications where the motor is manually controlled and is started under "no load" conditions.

A self-excited generator does not respond to severe overloading like a transformer connected to a power line does.

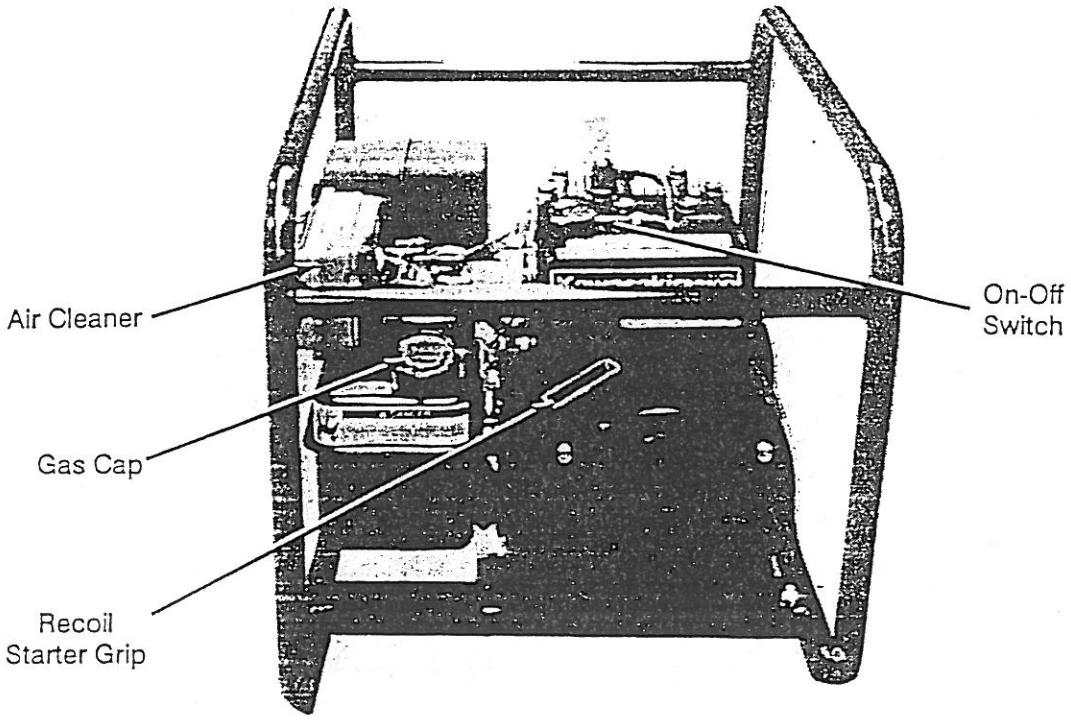
For example, suppose that a 240 volt 5 H.P. "capacitor start-induction run" motor is connected to a small transformer that is not able to supply enough power to bring the motor up to operating speed. The transformer would be severely overloaded and probably would burn out in a short time. The motor might also be damaged.

When this motor is connected to a self-excited 4000 watt generator, the generator's output voltage drops to practically zero. Thus, there is virtually no load on the generator or the engine, and no harm is done. The motor may revolve a few times when it is first turned on, and then stop.

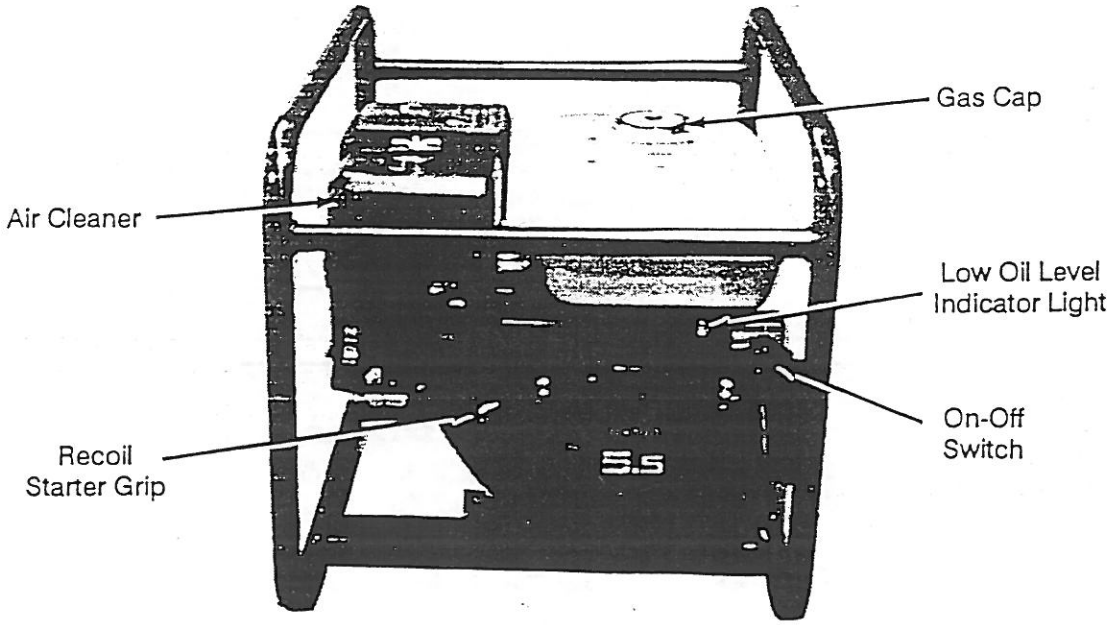
On the other hand, suppose an electric motor that requires just a little more output than the generator can produce is connected to the generator. The motor will run but will not reach a running speed that is high enough to de-energize the starting winding. The generator output voltage may drop from 120 volts to 70 or 80 volts. RUNNING THE GENERATOR UNDER THESE CONDITIONS MAY DAMAGE THE GENERATOR AND THE ELECTRIC MOTOR.

Because the heavy surge of current needed to start a motor is required for only an instant, the generator will not be damaged if it can bring the motor up to speed within a few seconds. If you are having trouble starting a motor, turn all the other electrical loads off and, if possible, reduce the load on the electrical motor.

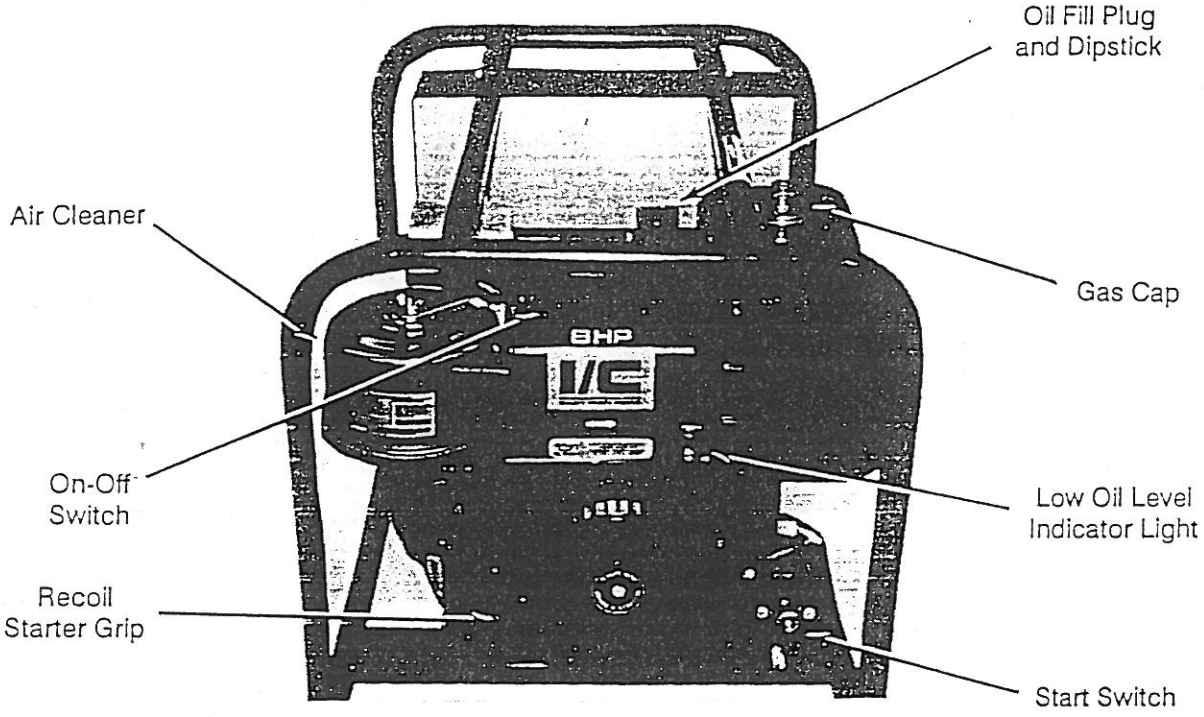
Trying to start a larger motor or a higher code (i.e. J or K) motor may result in damage to both the generator and the electric motor, especially 120 volt motors.



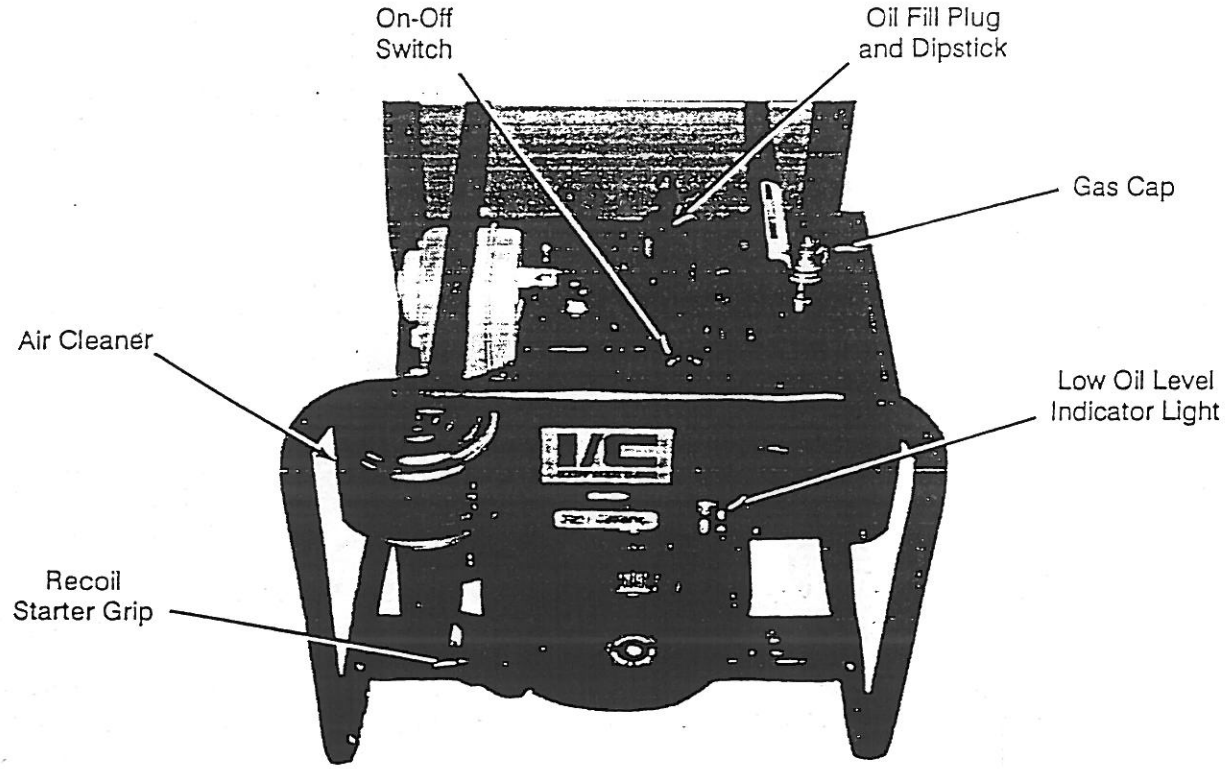
HD3200 Component Location



HD3200H Component Location



HD4500E Component Location



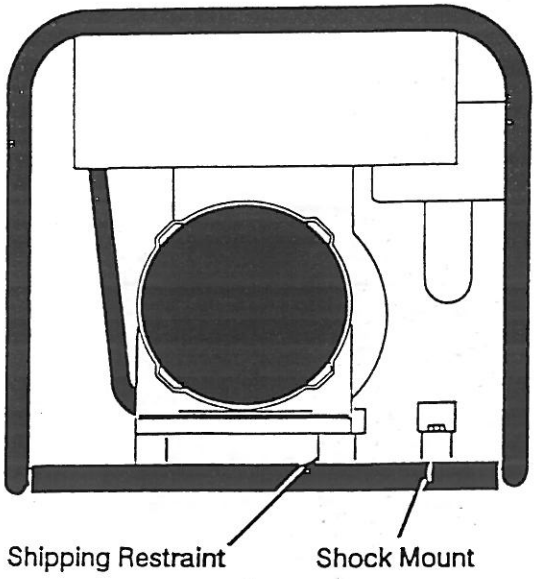
HD6000 Component Location

UNPACKING

When you unpack your new GENERATOR SET be sure to remove all the information sheets and manuals from the carton. Also make sure that any accessories (such as a battery rack) ordered with the generator have also been received.

CAUTION	EQUIPMENT DAMAGE: THIS UNIT HAS BEEN SHIPPED WITHOUT OIL. Failure to maintain the engine oil at the proper level will result in serious engine damage.

1. This generator set was in good condition when it was shipped. Inspect the generator set as soon as it arrives. If anything is damaged, notify the transportation company immediately; request proper procedures for filing a "concealed damage" claim. Title to the equipment and responsibility for filing claim rests with you when a generator is sent F.O.B. shipping point. Only you the customer, can legally file a claim.
2. Before preparing your new generator set for operation, take a few minutes to check and make sure that the unit you have received is the correct model. Check the Specifications page in this manual to make sure that this unit meets your job requirements.
3. After removing the generator set from the carton, locate the shipping restraint and remove it. On HD6000 and HD6000E units, the shipping restraint must be replaced with the shock mount and hardware that are attached to the frame. Tags are attached to the shipping restraints and the shock mounts to help you locate them. The illustration shows the location of these components on the HD6000 and HD 6000E units.



Shipping Restraint and Shock Mount Location

UNIT PREPARATION

The performance of your generator set was fully tested before it was shipped from our factory. The generator was load tested to its full capacity, and the voltage and frequency were carefully checked and adjusted.

1. **Lubrication** - Before starting the engine, fill the crankcase to the proper level with a good quality oil. The recommended grade and quantity of oil required is listed in both the engine operators manual and in the Specifications section of this manual.

   The importance of using the correct oil, and keeping the crankcase full cannot be overemphasized. Engine failures resulting from inadequate or improper lubricant are considered abuse and are not covered by Winco or the engine manufacturer's warranty.

2. **Gasoline** - Always use a good grade of unleaded gasoline. Leaded gasoline may be used if unleaded is not available. Gasoline containing alcohol, such as gasohol is not recommended. However if gasoline with alcohol is used, it must not contain more than 10 percent ethanol and must be removed from the engine during storage. DO NOT use gasoline containing methanol. Always make sure that the fuel is clean and free of all impurities.

FIRE DANGER
Gasoline and its fumes are VERY explosive when proper precautions are not taken.

Never use gasoline that has been stored for an extended period of time because it loses its volatile properties and only the varnish residue remains. This varnish like substance will clog the carburetor and will not burn properly. The use of a fuel additive, such as STA-BIL, or an equivalent, will minimize the formation of fuel gum deposits. If a unit has been out of operation for an extended period of time, drain the old fuel from the fuel tank and the carburetor. Fill the fuel tank with fresh fuel before attempting to start the engine.

3. **Battery Installation and Care** - All electric start engine generator sets are shipped with a battery rack kit that the customer must install. This kit contains installation instructions. After installing the battery rack, file the instruction sheet in the back of this manual for future reference.

   You will need to purchase and install a battery to operate the electric start system. Units equipped with a recoil or rope start will operate satisfactorily without a battery. A twelve volt, group U1, battery rated at 190 CCA or larger is recommended for this electric start generator set. Follow the battery manufacturers recommendations for servicing and charging prior to use. Connect the battery to the electric start systems using the cables provided.

   For your safety always connect the positive battery cable to the positive battery terminal (bat +) first. Then connect the negative battery cable to the negative battery terminal (bat -). Make sure all connections are clean and tight. When disconnecting the battery, disconnect the negative battery cable first. This engine produces enough direct current to keep the battery charged under normal operating conditions, but it is not designed to be used as a battery charger.

CAUTION

EQUIPMENT DAMAGE: Thes electric start systems are NEGATIVE GROUND. Use extreme caution when connecting the battery. Make sure to connect the NEGATIVE battery terminal to GROUND.

PERSONAL DANGER: Lead acid batteries produce explosive hydrogen gas when charging. Keep sparks, flames, and burning cigarettes away from the battery. Ventilate the area when charging or using the battery in an enclosed space. Lead acid batteries contain sulfuric acid, which causes severe burns. If acid contacts eyes, skin or clothing, flush well with water. For contact with eyes, get immediate medical attention.

BASIC OPERATION

INITIAL START UP

Use the following checklist to make sure that the generator set has been prepared properly and is ready to start.

On All Units

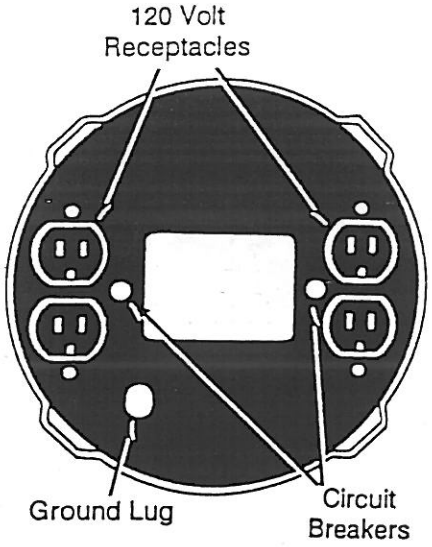
1. Check the engine oil. Fill as required with the correct grade and quantity of oil.
2. Check the fuel level. Fill as required with clean fresh fuel.
3. Check the shipping restraint. Make sure that the shipping restraint has been removed (and replaced with the shock mount on HD6000 and HD6000E).
4. Visually check the unit for loose parts.

On Electric Start Units

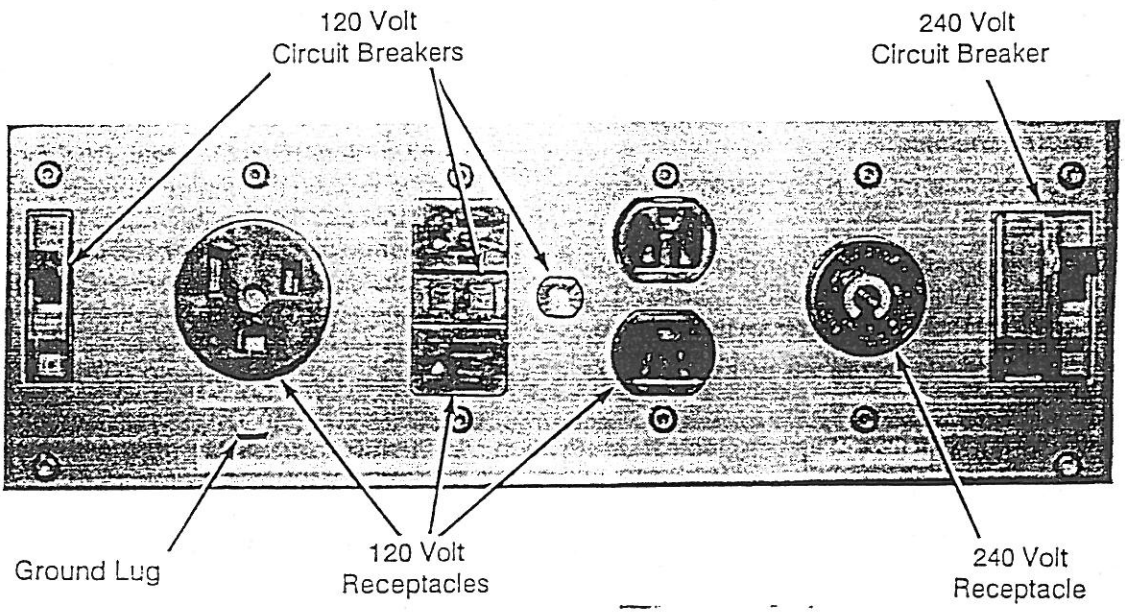
5. Check the battery connections. Make sure that they are clean and tight.
6. Check to make sure that the battery has the proper voltage and amperage hour ratings.
7. Check to make sure that the battery is fully charged.

CONTROL PANELS

Before starting your new generator set, refer to the following illustrations and familiarize yourself with the components on the control panel.



HD3200 and HD3200H Control Panel



HD4500 and HD 6000 Control Panel

STARTING THE UNIT

The throttle control on these generators is preset and locked to operate at 3600 RPM (nominal). The no load speed is set at 3690 RPM. Only a trained service technician should be allowed to adjust this speed setting. See the Operating Speed section for additional information.

NOTICE	ENGINE START LOCKOUT: This unit will not start if the oil is low. The engine oil level must be up to the FULL mark or the engine will not start.

1. **Manual Starting** - Refer to the engine manual for additional starting, operating, and stopping instructions.
   a. Turn on the fuel supply.
   b. If the engine is cold, place the choke in the full ON position. A warm engine does not need to be choked as much as a cold engine.
   c. Slowly pull the recoil starter grip until you feel the starter engage the engine. After the starter engages the engine, pull the starter grip firmly and rapidly to overcome compression, prevent kickback and start the engine. Repeat this if the engine does not start.
   d. After the engine starts, open the choke gradually.
   e. The engine should promptly come up to the normal operating speed.

CAUTION	EQUIPMENT DAMAGE: Do not leave the choke 'ON' when the engine is running. A warm engine does not need to be choked as much as a cold engine. Avoid choking the engine too much.

2. **Electric Starting** - If the engine is cold and stiff or if the battery is not fully charged, turn the engine over a few times by hand and pull the engine through the compression stroke before pressing the start switch. This allows the starter to gain momentum before the heavy load of the compression stroke occurs, reduces the load on the battery, and improves the unit's ability to start under such adverse conditions. Keep the battery fully charged, especially in cold weather.
   a. Turn on the fuel supply.
   b. If the engine is cold, place the choke in the full ON position. A warm engine does not need to be choked as much as a cold engine.
   c. Press the start switch until the engine starts, but do not operate the starter for more than 15 seconds. The starter will last longer if you operate the starter for a maximum of 15 seconds and then allow it to cool for a minute before you try to start the unit again.
   d. After the engine starts, open the choke gradually.
   e. The engine should promptly come up to the normal operating speed.

STARTING HINTS

1. Cold Weather
   a. Be sure to use the proper grade of oil for the temperature expected.
   b. A warm battery has much more cranking power than a cold battery.
   c. Use fresh winter grade fuel. Winter grade gasoline is blended to improve cold weather starting. Do not use gasoline that is left over from the summer.
   d. A slightly richer fuel mixture will usually improve cold starting.
2. Hot Weather
   a. Be sure to use the proper grade of oil for the temperature expected.
   b. Use only summer grade gasoline. Using gasoline that is left over from the winter may cause the unit to vapor lock.
   c. Do not over-choke the unit.

STOPPING AND STORAGE

1. Press the stop switch.
2. Close the fuel shut-off valve. Always shut the fuel off whenever the engine is stopped to prevent fuel from leaking out of the carburetor.
3. Before extended storage (over 30 days) certain precautions must be taken to make sure that the fuel does not deteriorate and clog the fuel system.

   NOTE: The use of a fuel additive, such as STA-BIL, or an equivalent, will minimize the formation of fuel gum deposits during storage. Such an additive may be added to the gasoline in the fuel tank of the engine, or to gasoline in a storage container.
   a. Remove the fuel from the fuel tank.
   b. Start the engine and allow it to run until all the fuel in the carburetor and the fuel lines has been used up and the engine stops.
   c. While the engine is warm drain the oil and refill the engine with fresh oil.
   d. Remove the spark plug, pour approximately 1/2 ounce (15cc) of engine oil into the cylinder and turn the engine over slowly to distribute oil. Replace spark plug.
   e. Clean dirt and debris from the cylinder, cylinder head fins, blower housing, rotating screen, and muffler areas.
   f. Store the unit in a clean and dry place.

OPERATING SPEED

The generator set must run at the correct speed in orde. produce electricity at the proper voltage and frequency.

1. All engines have a tendency to slow down under a load. The load on the engine increases as the electrical load increases. The voltage produced by the generator decreases as the electrical load increases. These two factors cause generator sets to produce slightly lower voltages when loaded to full capacity than when running with no load. The slight variation in speed also affects the frequency of the output current. This frequency variation has no appreciable effect on the operation of motors, lights, and most appliances. However, electronic equipment and clocks will be affected if the correct RPM is not maintained. See the LOAD vs. OUTPUT chart.

   Although individual units and models may vary slightly, the normal voltage and frequency of the generator sets described in this book are approximately as follows under varying loads:

LOAD vs. OUTPUT

Load Applied	Speed (RPM)	Frequency (Hertz)	Voltage @ 120V Recpt.	Voltage @ 240V Recpt.
None	3720	62.0	129V	258V
Half	3600	60.0	120V	240V
Full	3540	59.0	115V	230V

2. The speed of the engine was carefully adjusted at the factory to make the generator produce the proper output voltage and frequency. For normal use, the speed setting should not be changed. If the generator is being run continuously with a very light load, it may be beneficial to lower the operating speed slightly. Whenever making any speed adjustments, check the unit with a voltmeter or tachometer to make sure that the speed is not too high or too low.

   The engine must run at the specified speed at all times. Low voltage may damage the generator and any load connecting to it. High voltage, caused by running the engine at excessively high speeds, may significantly shorten the life of any appliances being used.
3. The output voltage and frequency should be checked periodically to make sure that the generator set is operating properly. Check the voltage with a portable voltmeter. The frequency can be checked with an electric clock that has a sweep second hand. Plug this clock into the generator and compare its time to a wrist watch or a stop watch. The clock should be correct to within ±2 seconds per minute.

CONNECTING LOADS

Connecting The Load - Allow the engine to warm up for two or three minutes before connecting any loads. This allows the engine to reach its normal operating temperature and allows the oil to circulate throughout the engine. A short warm-up period helps the engine work more efficiently when the load is applied and helps reduce engine wear.

CAUTION	EQUIPMENT OVERLOAD: The load must not exceed the ratings shown on the generator nameplate. Overloading may cause damage to the generator and/or the loads.

a. Do not overload the generator or the receptacles. The generator and the receptacles can be damaged if they are overloaded. The generator is a limited source of electrical power and has a specific rating. The total load connected to the generator must not exceed the rated output of the generator. The receptacles located on the control panel also have specific ratings. Do not overload a receptacle by connecting a load that exceeds the rating of that receptacle. Know the receptacle and generator ratings, they are listed in the Specifications.

b. Connect the loads to the receptacles on the control panel. The loads should be applied gradually. If a large motor is being started or multiple motors are being started, they should be started individually and the largest should be started first.

c. Most electrical tools and appliances will have their voltage and amperage requirements on their individual nameplates. When in doubt consult the manufacturer or a local electrician. The amperage rating on electric motor nameplates can be misleading, see Starting Electric Motors.

d. These generator sets are inherently self regulated by the engine speed. The engine's governor automatically adjusts the engine speed to the load. The generator will not be harmed if it runs without a load.

2. **Grounding-All units must be grounded.** Drive a 3/4 in. or 1 in. copper pipe (or rod) into the ground near the generator set. The pipe must penetrate moist earth. Connect an approved ground clamp to the pipe. Run a no. 10 AWG wire from the ground clamp to the generator ground lug or to the negative battery terminal. Do not connect the generator ground to a water pipe or to a ground used by a radio system.

3. The generator sets covered in this manual were designed for portable use. DO NOT install or operate this generator indoors. The unit should be stored in a warm dry location. If this generator is used during a power outage, move the unit outdoors to a flat dry location such as a driveway or sidewalk.

4. Most homes today are wired for 60 to 100 amp entrance service, much greater than the capacity of these generators. Do not attempt to power a home with this portable generator. This generator set is designed to power individual appliances or emergency lighting.

LOW OIL LEVEL SHUTDOWN SYSTEM

These generator sets are equipped with a Low Oil Level Shutdown System. A sensor located in the engine crankcase senses the engine oil level. The system automatically stops the engine if the oil level gets too low. However, the system shuts the unit down well before the oil level gets low enough to damage the engine. This feature is designed to prevent costly repairs and downtime.

The engine will not start if the oil level is low. Some of these units also have an indicator light mounted on the engine near the recoil starter. This light blinks on and off while you are trying to start the unit if the oil level is low. To get the engine started, you must add enough oil to bring the oil level up to the full mark.

Do not use the Low Oil Level Shutdown System if the unit is subject to shock, bumping, or severe angles of operation (in excess of 15 degrees). This is especially true if an unexpected **shutdown would cause a safety hazard** or serious inconvenience for the operator. To disable the Low Oil Level Shutdown System, remove the wire that is attached to the sensor mounted on the engine crankcase. The wire should then be insulated with a connector or tape.

ENGINE CARE

If major engine service or repair is required, contact an authorized engine service center. The manufacturers of these engines have established excellent world-wide engine service organizations. Engine service is likely available from a nearby authorized dealer or distributor. Check the yellow pages of your local telephone directory under "Engines-Gasoline" for the closest engine repair center or ask the dealer from whom you purchased the generator set.

1. **Oil Changes** - Change the oil after the first five hours of operation and every 50 hours thereafter, under normal operating conditions. Change the oil after every 25 hours of operation if the engine is operated under heavy load or in high ambient temperatures.
   a. Run the engine until it is warm.
   b. Remove the oil drain plug from the crankcase and drain the oil.
   c. Replace the oil drain plug.
   d. Remove the oil filler plug and fill the crankcase with new oil. Refer to the table in the engine manual for the proper grade of oil based on the ambient temperature in your area.
   e. Replace filler plug.
2. **Checking the Oil Level** - The oil level must always be checked before the engine is started. Make sure to remove any dirt or debris from around the oil fill plug before removing it. When the oil fill plug is removed, the oil should be high enough to almost run out of the crankcase. FILL TO POINT OF OVERFLOWING. On units with the extended oil filler, the oil should be at the "FULL" mark on the dipstick.

   If the engine generator should fail to start and run, check to be sure that the low oil shutdown system has not been activated by a low oil level.
3. **Servicing Dual Element Air Cleaners** - Clean and oil the foam pre-cleaner after every 25 hours of operation, or every three months, whichever occurs first. Service the air cleaner more often in dusty conditions.
   a. Remove the knob and cover.
   b. Remove the foam pre-cleaner by sliding it off the paper cartridge.
   c. Wash the foam pre-cleaner in kerosene or liquid detergent and water.
   d. Wrap the foam pre-cleaner in a cloth and squeeze it dry.
   e. Saturate the foam pre-cleaner with engine oil. Squeeze it to remove the excess oil.
   f. Place the foam pre-cleaner back over the paper cartridge.
   g. Replace the cover and screw the knob down tight. Replace the cartridge in the Dual Element Air Cleaner yearly or every 100 hours. Service more often if necessary.
4. **Spark Plug** - Check the spark plug after every 100 hours of operation. If the spark plug is dirty or shows signs of wear, replace it.

GENERATOR CARE

Proper care and maintenance of the generator is necessary to insure a long trouble free life.

1. **Periodic Generator Operation** - The generator should be operated every three or four weeks to keep it in good condition. The generator should be operated long enough to completely warm the unit up and to dry out any moisture that has accumulated in the windings. If this moisture is allowed to accumulate it can cause corrosion in the windings and on the slip rings. Frequent operation of the generator set also insures that it is operating properly in case it is needed in an emergency.
2. **Generator Maintenance** - Any major generator service including the installation or replacement of parts should be performed only by a qualified electrical service technician. USE ONLY FACTORY APPROVED REPAIR PARTS.
   a. Bearings - The bearings used in these generators are heavy duty double sealed ball bearings. They require no maintenance or lubrication.
   b. Receptacles - Quality receptacles are used in this generator. If a receptacle should become cracked or otherwise damaged, replace it. Using damaged or cracked receptacles can be dangerous, for the operator and for the equipment.

CLEANING THE UNIT

Remove dirt and debris with a cloth or a brush. DO NOT use high pressure spray to clean the engine or the generator. High pressure spray can contaminate the fuel system and damage the generator components.

1. Keep the air inlet screens on the engine and the generator free of any dirt or debris to insure proper cooling. At least once a year you should remove the blower housing from the engine and clean the dirt and debris out of the engine cooling fins and flywheel. Do this more often if necessary. Failure to keep these areas clean may cause the unit to overheat and permanent damage the unit.

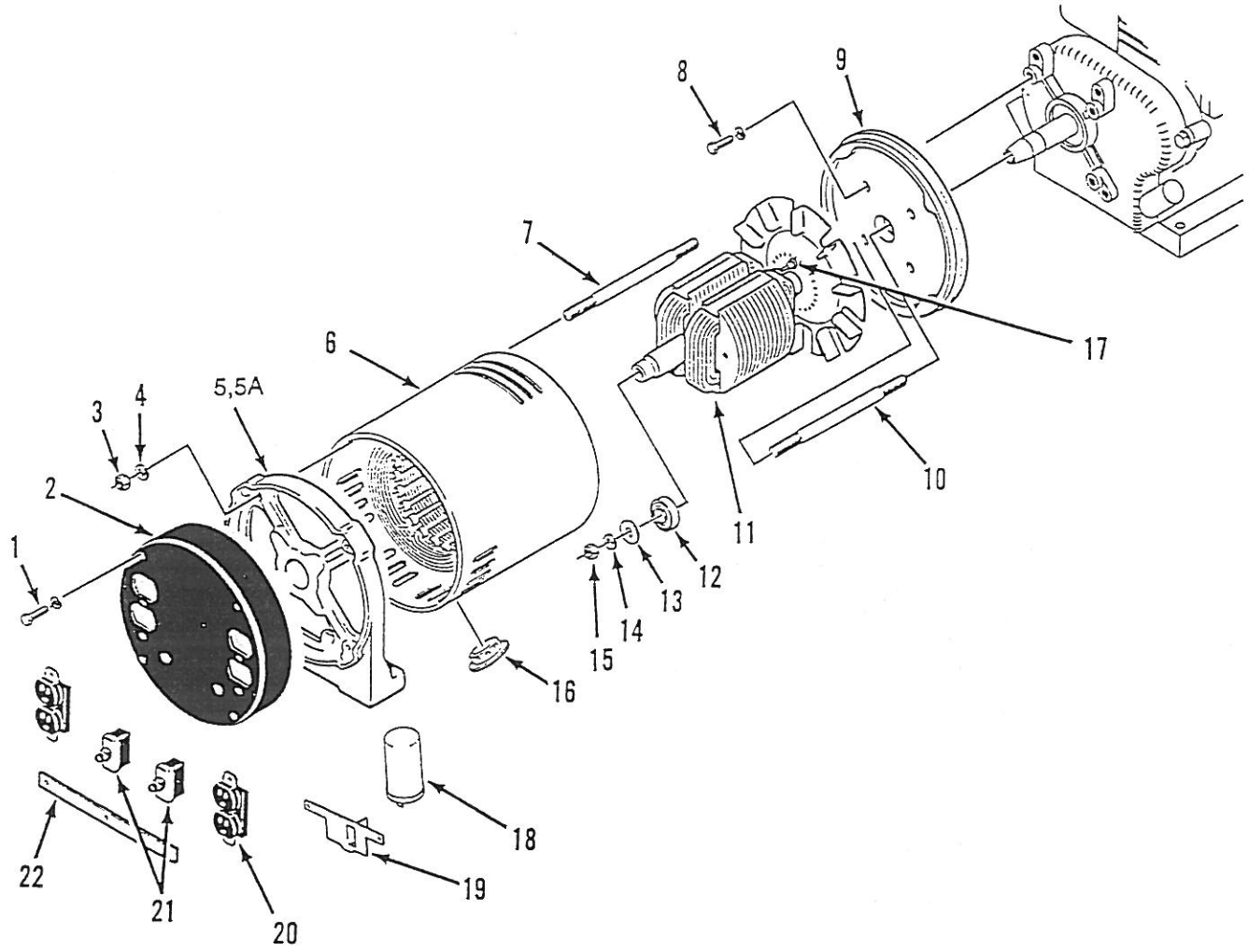
2. Periodically clean the area around the muffler. Remove all grass, dirt, and combustible debris to prevent a fire.
3. Remove the spark arrester (if so equipped) every 50 hours. Clean and inspect the spark arrester and replace it if it is damaged.

THINGS TO CHECK

Sometimes problems can be easily solved by checking a few basic things. Check the items below before you call or take your unit to a service center. It could save you time and money.

Problem	Possible Causes
Won't Start	*Low oil level
	*Fouled spark plug
	*Out of fuel
	*Fuel turned off
	*Dead battery
	*Defective start switch
Voltage too low	*Engine speed too low
	*Generator overload
	*Defective rectifier
	*Defective stator
	*Defective rotor (field)
Circuit breaker trips	*Defective load
	*Defective receptacle
Voltage too high	*Engine speed too high
Generator overheating	*Overloaded
	*Insufficient ventilation
No output voltage	*Short in load (disconnect)
	*Broken or loose wire
	*Defective receptacle
	*No residual magnetism (in generator)
	*Defective stator
	*Defective rotor (field)
	*Shorted capacitor
	*Defective rectifier
Battery not re-charging	*Defective charging circuit on engine

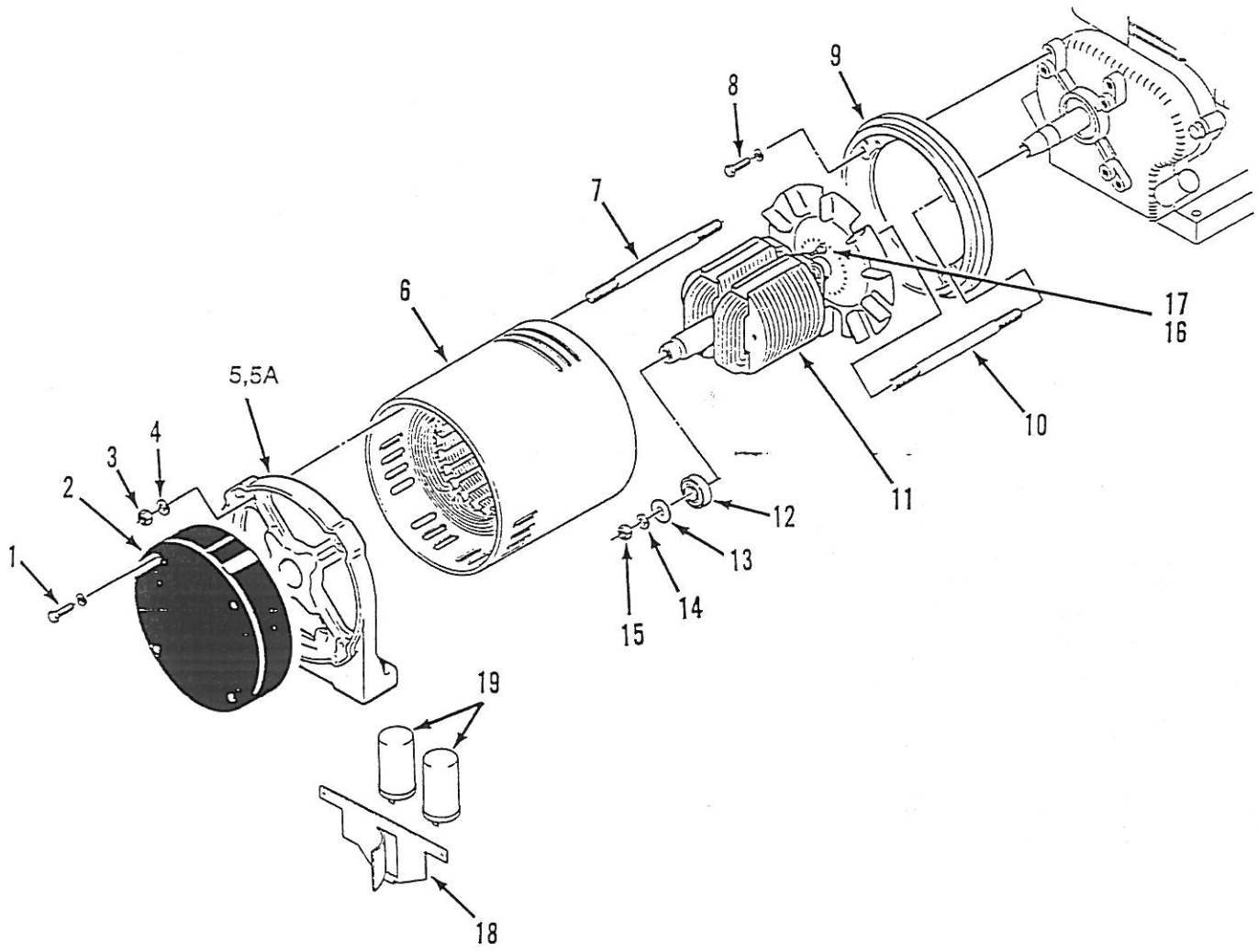
GENERATOR GROUP
HD3200 & HD3200H



GENERATOR GROUP

REF	PART NO.	DESCRIPTION	REQ
1	15013-000	SCREW - mtg cover	4
	21975-000	LOCKWASHER	4
2	15087-000	COVER ASSY - end (inc 18 thru 22)	1
	15050-000	COVER - end, bare	1
3	15192-000	NUT - mtg bracket & generator	4
4	479-000	LOCKWASHER	4
5	15156-000	BRACKET - bearing	1
5a	15122-000	RING - tolerance	1
6	15093-000	STATOR ASSEMBLY	1
7	15009-004	STUD - bracket	4
8	55576-000	SCREW - mtg bracket	4
	480-000	LOCKWASHER	4
9	15053-001	BRACKET - engine	1
10	23197-007	STUD - mtg rotor	1
11	15045-003	ROTOR ASSEMBLY	1
12	55223-000	BEARING	1
13	23558-000	FLATWASHER	1
14	480-001	LOCKWASHER	1
15	15193-000	NUT - mtg rotor	1
16	15102-001	PLUG - hole	1
17	15047-001	DIODE - E4P9	1
18	15051-000	CAPACITOR	2
19	15088-000	STRAP - capacitor	1
20	24749-000	RECEPTACLE 15A 125V	2
21	64230-000	BREAKER - circuit 15A	2
22	64045-004	STRAP - mounting	1

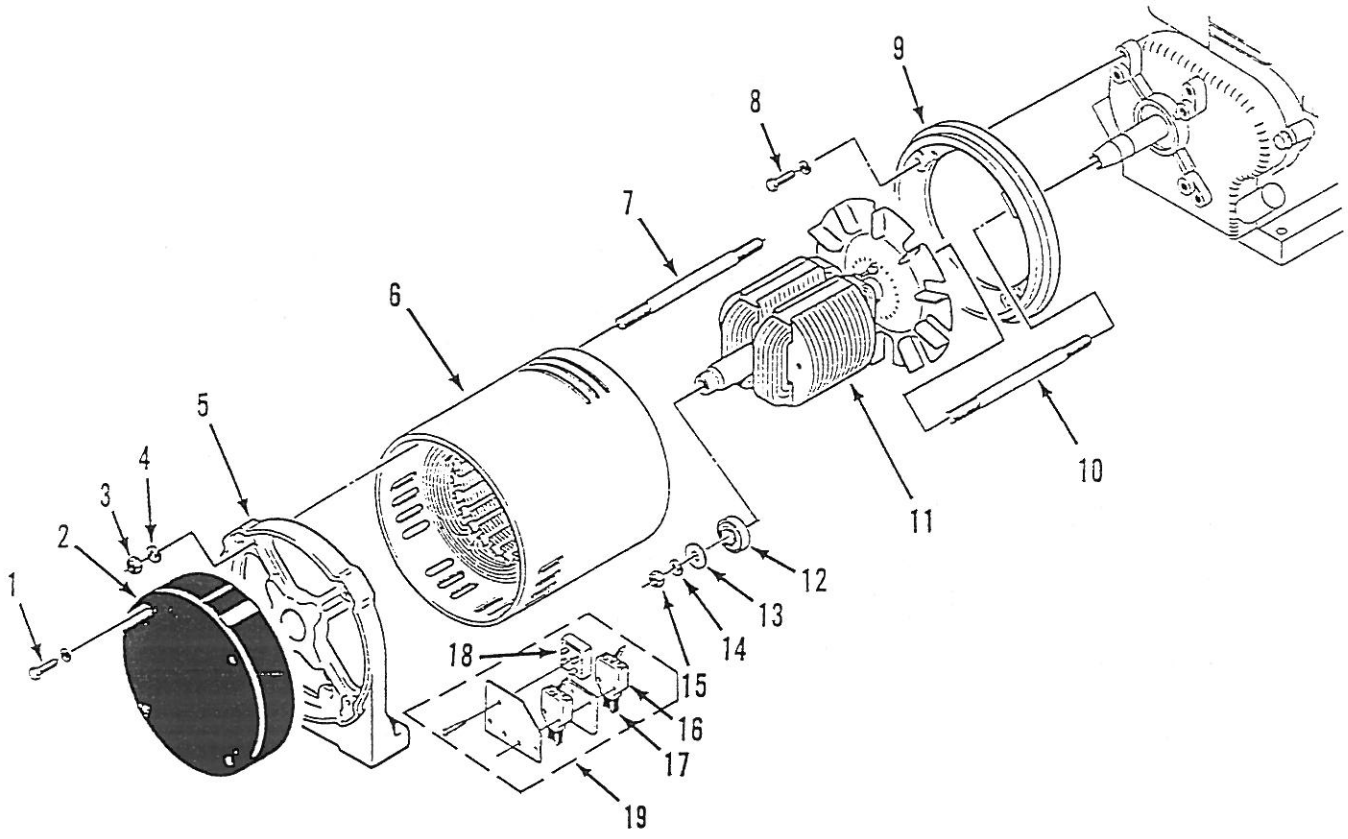
GENERATOR GROUP
HD4500 & HD4500E



GENERATOR GROUP

REF	PART NO.	DESCRIPTION	REQ	REF	PART NO.	DESCRIPTION	REQ
1	15013-000	SCREW - mtg cover	4	9	15008-001	BRACKET - engine	1
	21975-000	LOCKWASHER	4	10	23197-009	STUD - mtg rotor	1
2	15106-000	COVER - end	1	11	15045-005	ROTOR ASSEMBLY	1
3	15192-000	NUT - mtg bracket & generator	4	12	55223-000	BEARING	1
4	479-000	LOCKWASHER	4	13	23558-000	FLATWASHER	1
5	15156-001	BRACKET - bearing	1	14	480-001	LOCKWASHER	1
5a	15122-000	RING - tolerance	1	15	15193-000	NUT - mtg rotor	1
6	15091-005	STATOR ASSEMBLY	1	16	15047-001	DIODE - E4P9	1
7	15068-008	STUD - bracket	4	17	15047-002	DIODE - E4P9R	1
8	91658-003	SCREW - mtg bracket	4	18	15088-000	STRAP - capacitor	1
	481-000	LOCKWASHER	4	19	15051-000	CAPACITOR	2

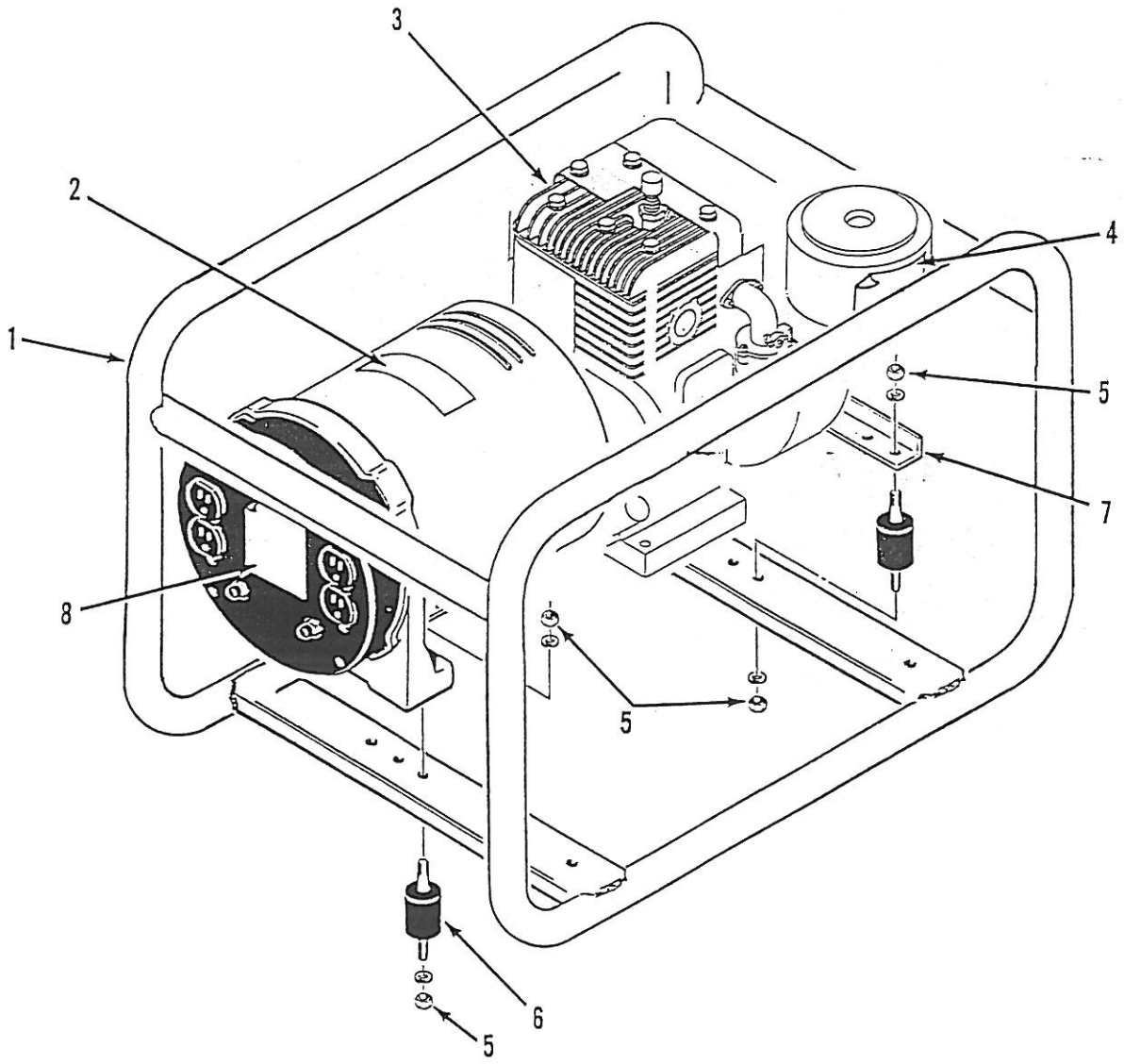
GENERATOR GROUP
HD6000 & HD6000E



GENERATOR GROUP

REF	PART NO.	DESCRIPTION	REQ	REF	PART NO.	DESCRIPTION	REQ
1	15013-001	SCREW - mtg cover	4	9	15008-001	BRACKET - engine	1
	21975-000	LOCKWASHER	4	10	23197-026	STUD - mtg rotor	1
2	15085-000	COVER - end	1	11	15522-002	ROTOR ASSEMBLY	1
3	15192-000	NUT - mtg bracket & generator	4	12	50215-000	BEARING	1
				13	23558-000	FLATWASHER	1
4	479-000	LOCKWASHER	4	14	480-001	LOCKWASHER	1
5	15156-002	BRACKET - bearing	1	15	15193-000	NUT - mtg rotor	1
5a	15122-003	RING - tolerance	1	16	59690-000	HOLDER - brush	2
6	15528-000	GENERATOR - complete	1	17	23607-000	BRUSH	1
7	15068-009	STUD - bracket	4	18	53976-000	RECTIFIER	1
8	91658-003	SCREW - mtg bracket	4	19	15523-000	BRUSH ASSEMBLY	1
	481-000	LOCKWASHER	4				

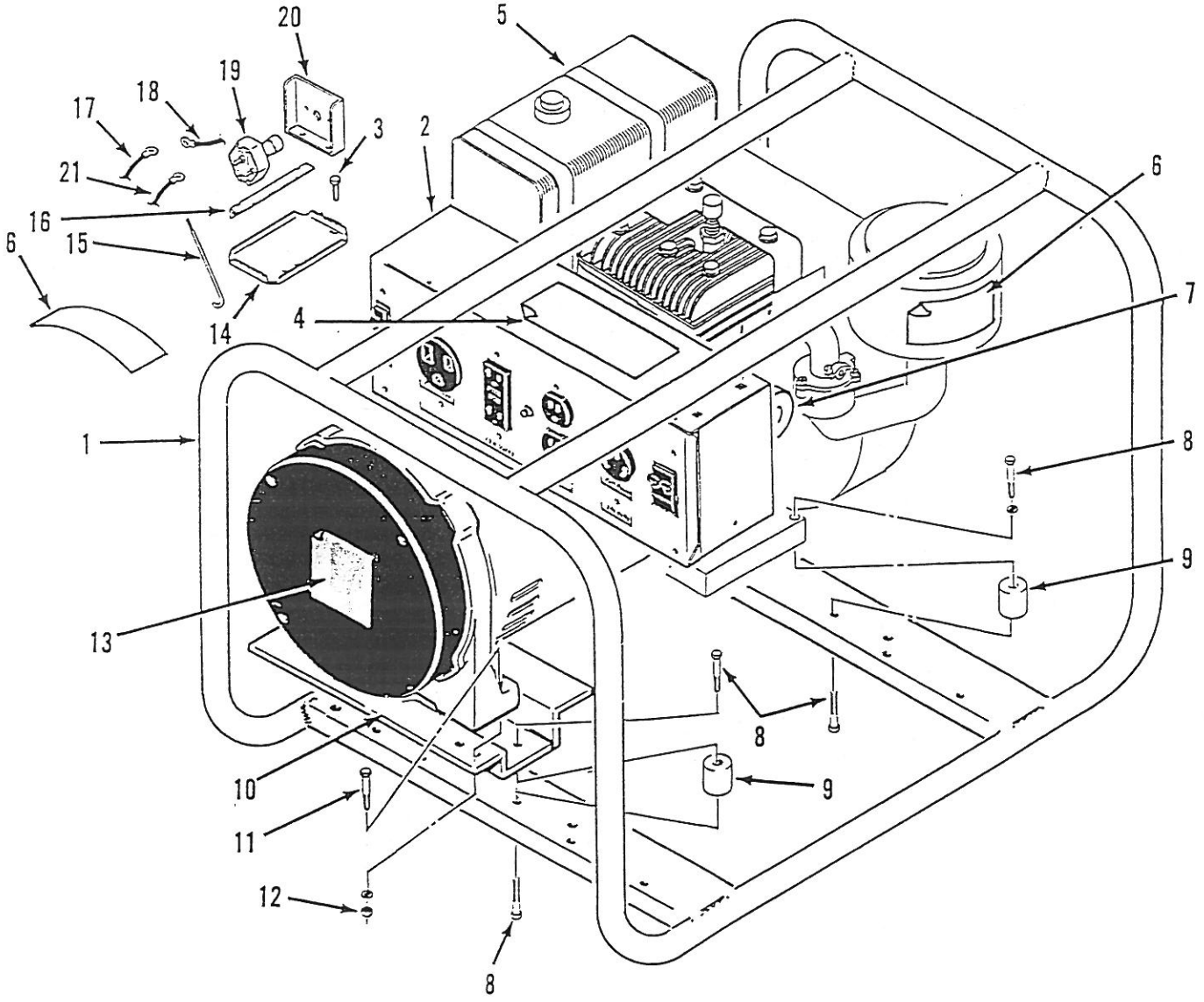
GENERATOR & ENGINE MOUNTING
HD3200 & HD3200H



GENERATOR & ENGINE MOUNTING

REF	PART NO.	DESCRIPTION	REQ	REF	PART NO.	DESCRIPTION	REQ
1	15072-000	CRADLE ASSEMBLY	1	4	15209-000	DECAL SET	1
2	15209-000	DECAL SET	1	5	638-000	NUT	8
3	63955-000	ENGINE ASSEMBLY			479-000	LOCKWASHER	8
		Kawasaki	1	6	71605-003	MOUNT - shock	4
	15250-000	ENGINE ASSEMBLY		7	62832-000	PLATE - adapter	1
		Honda	1	8	63966-000	DECAL - ID	1

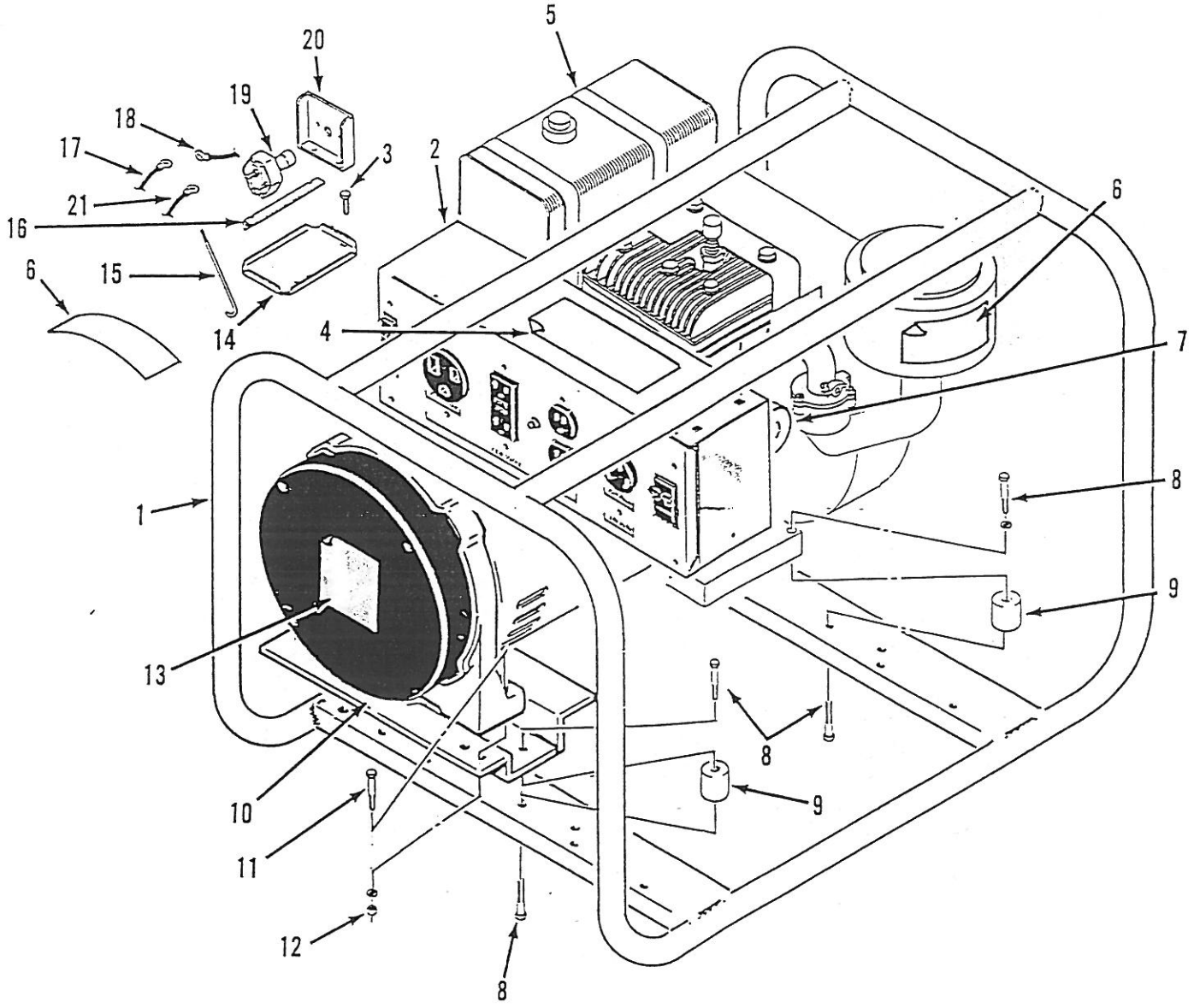
GENERATOR & ENGINE MOUNTING
HD4500 & HD4500E



GENERATOR & ENGINE MOUNTING

REF	PART NO.	DESCRIPTION	REQ	REF	PART NO.	DESCRIPTION	REQ
1	15351-001	CRADLE ASSEMBLY	1	10	15084-000	PLATE - adapter	1
2	15625-001	CONTROL BOX ASSEMBLY	1	11	580-000	SCREW - mtg plate	2
3	94375-003	SCREW - mtg control box	4		480-000	LOCKWASHER	2
4	64214-038	DECAL - ID	1	12	458-000	NUT	2
5	15552-000	ENGINE HD4500	1	13	63966-000	NAMEPLATE	1
	15627-000	ENGINE HD4500E	1	14	15064-000	TRAY - battery	1
6	15209-000	DECAL SET	1	15	64240-000	ROD - hold down	2
7	64159-000	SPARK ARRESTOR	1	16	64167-000	ANGLE - hold down	1
8	468-000	SCREW - 1-1/2 lg	1	17	15063-002	CABLE - battery, negative	1
	477-000	SCREW - 5/8 lg	5	18	15063-003	CABLE - battery, positive	1
	480-000	LOCKWASHER	6	19	2210-000	SWITCH - starter	1
9	64062-000	MOUNT - shock	4	20	15689-000	BRACKET - switch	1
				21	56378-025	CABLE - starter	1

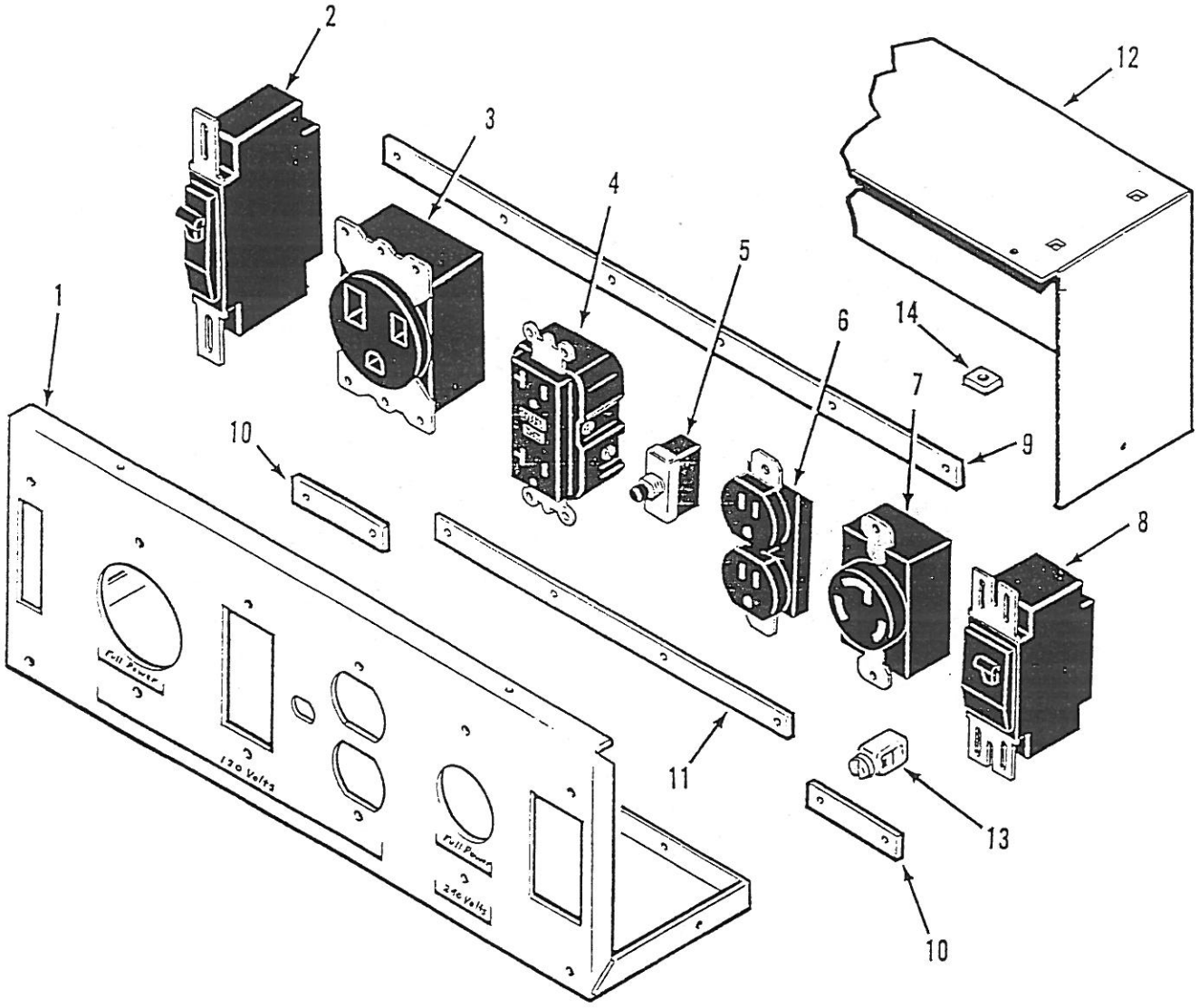
GENERATOR & ENGINE MOUNTING
HD6000 & HD6000E



GENERATOR & ENGINE MOUNTING

REF	PART NO.	DESCRIPTION	REQ	REF	PART NO.	DESCRIPTION	REQ
1	15629-000	CRADLE ASSEMBLY	1	10	15084-000	PLATE - adapter	1
2	15625-002	CONTROL BOX ASSEMBLY	1	11	580-000	SCREW - mtg plate	2
3	94375-003	SCREW - mtg control box	4		480-000	LOCKWASHER	2
4	64214-038	DECAL - ID	1	12	458-000	NUT	2
5	15631-000	ENGINE HD6000	1	13	63966-000	NAMEPLATE	1
	15632-000	ENGINE HD6000E	1	14	15186-000	TRAY - battery	1
6	15209-000	DECAL SET	1	15	64240-000	ROD - hold down	2
7	64159-001	SPARK ARRESTOR	1	16	64167-000	ANGLE - hold down	1
8	441-000	SCREW - 2 lg	1	17	15063-002	CABLE - battery, negative	1
	468-000	SCREW - 1-1/2 lg	1	18	15063-003	CABLE - battery, positive	1
	477-000	SCREW - 5/8 lg	5	19	2210-000	SWITCH - starter	1
	480-000	LOCKWASHER	6	20	15689-000	BRACKET - switch	1
9	64062-000	MOUNT - shock	4	21	56378-025	CABLE - starter	1

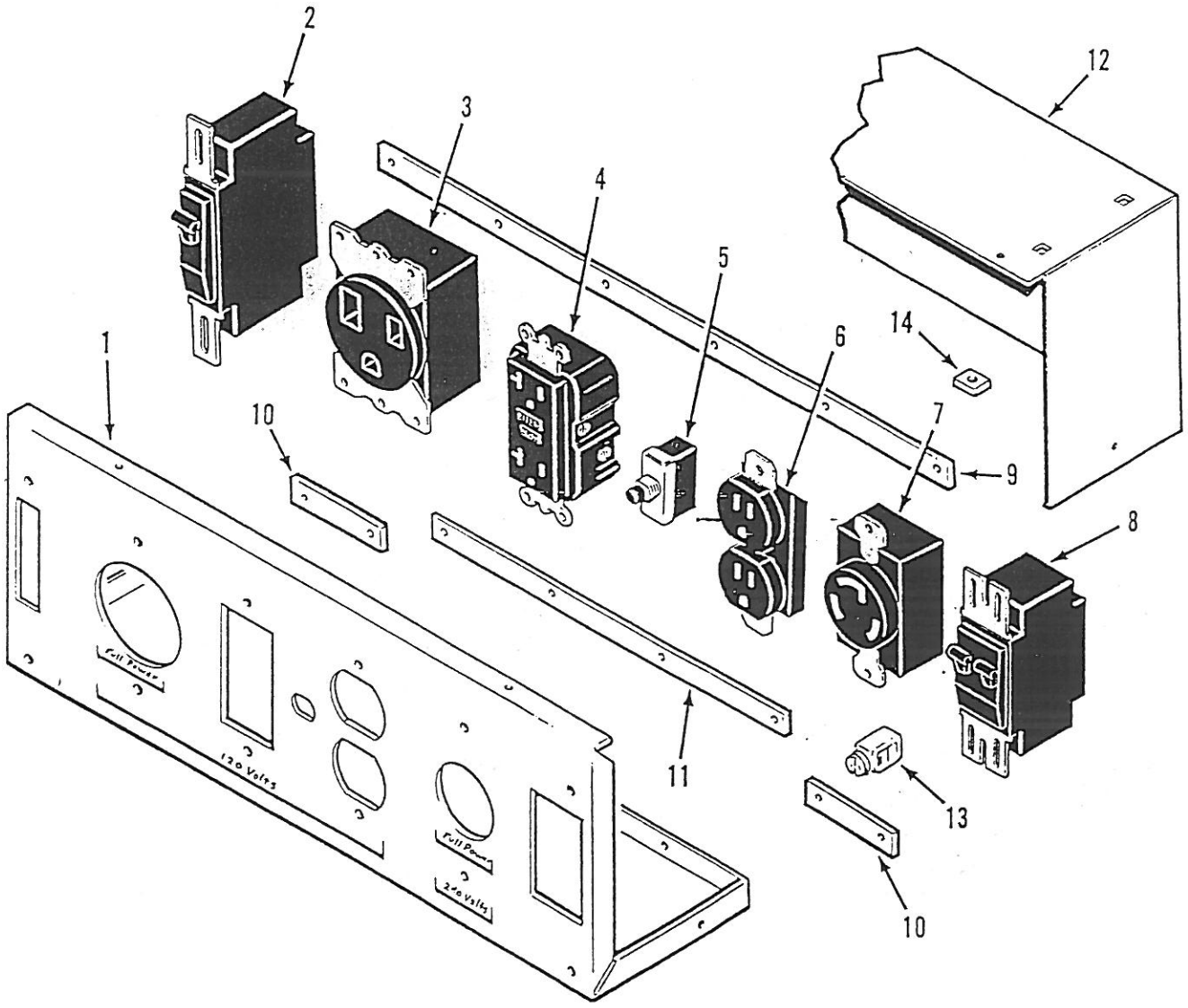
CONTROL BOX ASSEMBLY
HD4500 & HD4500E



CONTROL BOX ASSEMBLY

REF	PART NO.	DESCRIPTION	REQ
	15625-001	BOX ASSEMBLY - control	1
1	15624-000	PANEL - control	1
2	91977-008	BREAKER - circuit 35A 125V	1
3	54545-000	RECEPTACLE - power, 50A 125V	1
4	15147-002	RECEPTACLE - power, GFI, 15A 125V	1
5	91286-000	BREAKER - circuit, 15A	1
6	24749-000	RECEPTACLE - power, 15A 125V	1
7	56281-000	RECEPTACLE - power, 20A 250V	1
8	57030-001	BREAKER - circuit, 20A 250V	1
9	64045-007	STRAP - mounting	2
10	64045-003	STRAP - mounting	2
11	64045-001	STRAP - mounting	2
	21698-001	SCREW - mtg strap	11
12	15355-000	COVER - box	1
	21698-000	SCREW - mtg cover	6
13	64211-000	LUG - ground	1
	6402-001	SCREW - mtg lug	1
	21976-000	LOCKWASHER	1
14	92495-000	NUT - retainer	4

CONTROL BOX ASSEMBLY
HD6000 & HD6000E



CONTROL BOX ASSEMBLY

REF	PART NO.	DESCRIPTION	REQ
	15625-002	BOX ASSEMBLY - control	1
1	15624-000	PANEL - control	1
2	91977-006	BREAKER - circuit 45A 125V	1
3	54545-000	RECEPTACLE - power, 50A 125V	1
4	15147-002	RECEPTACLE - power, GFI, 15A 125V	1
5	91286-000	BREAKER - circuit, 15A	1
6	24749-000	RECEPTACLE - power, 15A 125V	1
7	57324-000	RECEPTACLE - power, 30A 250V	1
8	57030-009	BREAKER - circuit, 25A 250V	1
9	64045-007	STRAP - mounting	2
10	64045-003	STRAP - mounting	2
11	64045-001	STRAP - mounting	2
	21698-001	SCREW - mtg strap	11
12	15355-002	COVER - box	1
	21698-000	SCREW - mtg cover	6
13	64211-000	LUG - ground	1
	6402-001	SCREW - mtg lug	1
	21976-000	LOCKWASHER	1
14	92495-000	NUT - retainer	4

WINCO, Inc.
24 Month Limited Warranty

WINCO, Incorporated warrants to the original purchaser for 24 months that goods manufactured or supplied by it will be free from defects in workmanship and material, provided such goods are installed, operated and maintained in accordance with Winco written instructions.

WINCO's sole liability, and Purchaser's sole remedy for a failure under this warranty, shall be limited to the repair of the product. At WINCO's option, material found to be defective in material or workmanship under normal use and service will be repaired or replaced. For warranty service, return the product within 24 months from the date of purchase, transportation charges prepaid, to your nearest WINCO Authorized Service Center or to WINCO, Inc. at Le Center Minnesota.

THERE IS NO OTHER EXPRESS WARRANTY.

To the extent permitted by law, any and all warranties, including those of merchantability and fitness for a particular purpose, are limited to 24 months from date of purchase. In no event is WINCO liable for incidental or consequential damages.

Note: Some states do not allow limitation on the duration of implied warranty and some states do no allow the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply in every instance. This warranty gives you specific legal rights which may vary from state to state.

WINCO reserves the right to change or improve its products without incurring any obligations to make such changes or improvement on products purchased previously.

EXCLUSIONS:

WINCO does not warrant engines, batteries, or other component parts that are warranted by their respective manufacturers.

WINCO does not warrant modifications or alterations which were not made by the WINCO, Inc.

WINCO does not warrant products which have been subjected to misuse and/or negligence or have been involved in an accident.

This warranty does not include travel time, mileage, or labor for removal or reinstallation of WINCO product from its application.

WINCO®
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