

OPERATION MANUAL



MODEL GAW180HE/HE1/HEA PORTABLE WELDER-GENERATOR (HONDA GX340K1EDE2/GX340RT2EDE2 GASOLINE ENGINES)

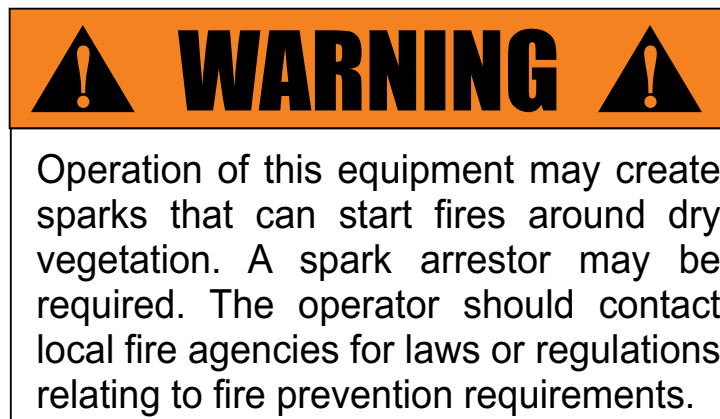
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THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

PROPOSITION 65/START FIRES WARNING



**GAW180HE Series
60 Hz Welder-Generator**

Proposition 65/Start Fires Warning..... 2
Nameplate/Safety Information 4
Safety Information 5-12
Specifications (Welder-Generator) 13
Specifications (Engine)..... 14
Dimensions..... 15
Installation 16-17
General Information..... 18
Welding Polarity and Duty Cycle 19
Welding Terms 20
Components Generator 21-22
Inspection/Setup..... 23-25
Operation..... 26-28
Preparation for Long Term Storage 29
Maintenance 30-34
Welder/Generator Wiring Diagram 35
Troubleshooting (Welder/Generator)..... 36-37
Troubleshooting (Engine) 38-39

NOTICE
Specifications and part numbers are subject to change without notice.

NAMEPLATE/SAFETY INFORMATION

NAMEPLATE AND SAFETY LABELS

Safety labels are attached to the generator as shown in Figure 1. Keep these safety labels clean at all times. When the safety labels become worn or damaged, contact your nearest dealer or the Multiquip Parts Dept.

NOTICE

For safety label part numbers, reference the parts section of this manual.

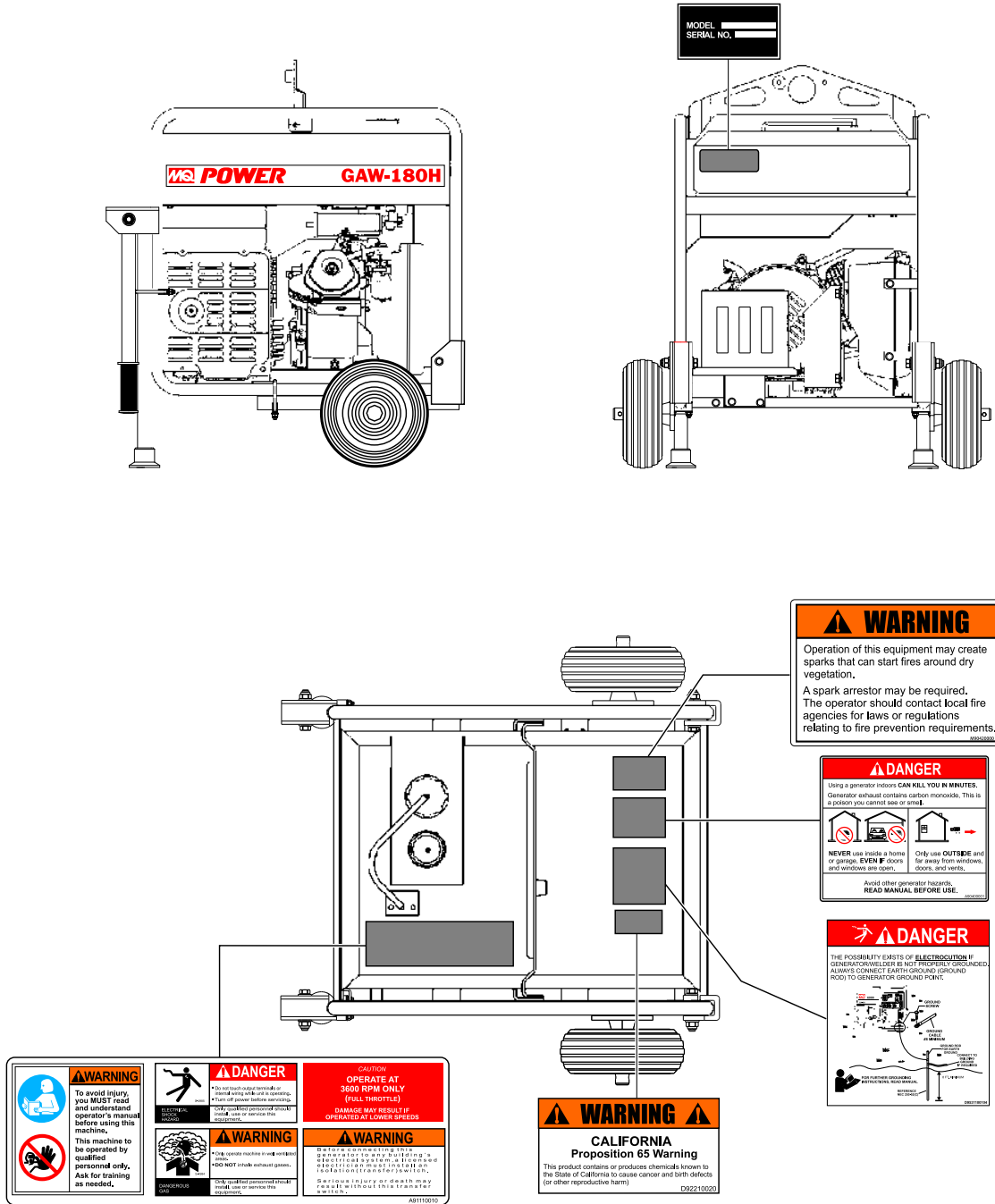


Figure 1. Nameplate and Safety Decals

SAFETY INFORMATION

DO NOT operate or service the equipment before reading the entire manual. Safety precautions should be followed at all times when operating this equipment. Failure to read and understand the safety messages and operating instructions could result in injury to yourself and others.



SAFETY MESSAGES

The four safety messages shown below will inform you about potential hazards that could injure you or others. The safety messages specifically address the level of exposure to the operator and are preceded by one of four words: **DANGER**, **WARNING**, **CAUTION** or **NOTICE**.

SAFETY SYMBOLS

DANGER
Indicates a hazardous situation which, if not avoided, WILL result in DEATH or SERIOUS INJURY .
WARNING
Indicates a hazardous situation which, if not avoided, COULD result in DEATH or SERIOUS INJURY .
CAUTION
Indicates a hazardous situation which, if not avoided, COULD result in MINOR or MODERATE INJURY .
NOTICE
Addresses practices not related to personal injury.

Potential hazards associated with the operation of this equipment will be referenced with hazard symbols which may appear throughout this manual in conjunction with safety messages.

Symbol	Safety Hazard
	Lethal Exhaust Gas Hazards
	Explosive Fuel Hazards
	Burn Hazards
	Welding Hazards
	EMF Hazards
	Pacemaker Hazards
	Implant Hazards
	Flying Sparks Hazards
	Fire Hazards
	Electric Shock Hazards

SAFETY INFORMATION

GENERAL SAFETY

CAUTION

- **NEVER** operate this equipment without proper protective clothing, shatterproof glasses, respiratory protection, hearing protection, steel-toed boots and other protective devices required by the job or city and state regulations.



- **NEVER** operate this equipment when not feeling well due to fatigue, illness or when under medication.

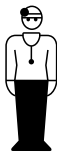


- **NEVER** operate this equipment under the influence of drugs or alcohol.



NOTICE


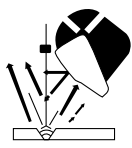

- This equipment should only be operated by trained and qualified personnel 18 years of age and older.
- Whenever necessary, replace nameplate, operation and safety decals when they become difficult read.
- Manufacturer does not assume responsibility for any accident due to equipment modifications. Unauthorized equipment modification will void all warranties.
- **NEVER** use accessories or attachments that are not recommended by Multiquip for this equipment. Damage to the equipment and/or injury to user may result.
- **ALWAYS** know the location of the nearest **fire extinguisher**.
- **ALWAYS** know the location of the nearest **first aid kit**.
- **ALWAYS** know the location of the nearest phone or **keep a phone on the job site**. Also, know the phone numbers of the nearest **ambulance, doctor and fire department**. This information will be invaluable in the case of an emergency.



SAFETY INFORMATION


WELDER SAFETY

DANGER

- **NEVER** install or operate the welder-generator in an explosive atmosphere or near combustible materials. An explosion or fire could result causing severe **bodily harm or even death.** 
- Flying sparks can cause injury. Wear a face shield to protect eyes and face. 
- Remove all flammables within 35 ft (10.7 m) of welding arc. If this is not possible, tightly cover them with approved covers.
- Do not weld where flying sparks can strike flammable material.
- Hot metal from air arc cutting and gouging can cause fire or explosion. **DO NOT** cut or gouge near flammables. 
- Welding on closed containers, like tanks, drums or pipes, can cause them to blow up. **DO NOT** weld on closed containers unless they are properly prepared according to AWS F4.1 (see *Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping* from American Welding Society Standards). Check and be sure area is safe before doing any welding.
- Protect yourself and others from flying sparks and hot metal. Wear oil-free protective garments like leather gloves, heavy shirt, cuffless trousers, high shoes and a cap.
- Be alert that welding sparks and hot materials from welding can go through small cracks and openings to adjacent areas.
- Be aware that welding on a ceiling, floor, bulkhead or partition can cause fire on hidden side.
- Connect welding cable to the work as close to welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock, sparks and fire hazards.
- **DO NOT** use welder-generator to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.




- **DO NOT** touch output terminals during operation. Contact with output terminals during operation can cause **electrocution, electrical shock or burn.**
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers and flames.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.

WARNING


- Keep your head out of the fumes. Use enough ventilation or exhaust at the arc, or both, to keep the fumes and gases from your breathing zone and the general area. In a large room or outdoors, natural ventilation may be adequate if you keep your head out of the fumes.
- **DO NOT** get too close to the arc. Use corrective lenses if necessary to stay a reasonable distance away from the arc.
- Use natural drafts or fans to keep the fumes away from your face.
- Welding wire can cause injury. Do not press gun trigger until instructed to do so. Do not point gun toward any part of the body, other people or any metal when threading welding wire. 
- Have only qualified people remove doors, panels, covers or guards for maintenance and troubleshooting if necessary.
- Reinstall doors, panels, covers or guards when servicing is finished and before starting engine.
- **NEVER** disconnect any **emergency or safety devices.** These devices are intended for operator safety. Disconnection of these devices can cause severe injury, bodily harm or even death. Disconnection of any of these devices will void all warranties.

SAFETY INFORMATION

CAUTION

- Electric current flowing through any conductor causes localized Electro Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines. 
- Wearers of **pacemakers** and other implanted medical devices should keep away from welding equipment when in use. 
- Implanted medical device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting or induction heating operations. 
- Exposure to EMF fields in welding may have other health effects which are now not known.
- All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:
 - Route the electrode and work cables together. Secure them with tape when possible.
 - **NEVER** coil the electrode lead around your body.
 - **DO NOT** place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.
 - Connect the work cable to the workpiece as close as possible to the area being welded.
 - **DO NOT** work next to the welder-generator.

NOTICE

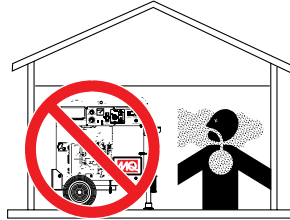
- Electromagnetic energy can interfere with sensitive electronic equipment such as microprocessors, computers and computer-driven equipment such as robots. Be sure all equipment in the welding area is electromagnetically compatible. 
- To reduce possible interference, keep weld cables as short as possible, close together and down low, such as on the floor. Locate welding operation 100 meters from any sensitive electronic equipment. Be sure welder-generator is installed and grounded according to this manual.
- If interference still occurs, the operator must take extra measures, like moving the welder-generator, using shielded cables, using line filters or shielding the work area.
- **NEVER** lubricate components or attempt service on a running machine.
- Overheating can damage equipment. Turn off or unplug equipment before starting or stopping engine. Low voltage and frequency caused by low engine speed can damage electric devices. Ensure engine speed is correct during operation.
- Overloading shortens the life of the welder-generator. Use the machine with appropriate AC and DC current and appropriate duty cycle.
- **ALWAYS** ensure welder-generator is on level ground before use.
- **ALWAYS** keep the welder-generator in proper running condition.
- Fix damage to welder-generator and replace any broken parts immediately.
- **ALWAYS** store welder-generator properly when it is not being used. Equipment should be stored in a clean, dry location out of the reach of children and unauthorized personnel.

SAFETY INFORMATION

ENGINE SAFETY

DANGER

- The engine fuel exhaust gases contain poisonous carbon monoxide. This gas is colorless and odorless, and can cause death if inhaled.
- The engine of this equipment requires an adequate free flow of cooling air. **NEVER** operate this equipment in any enclosed or narrow area where free flow of the air is restricted. If the air flow is restricted it will cause injury to people and property and serious damage to the equipment or engine.



WARNING

- **NEVER** operate the engine with heat shields or guards removed.
- **DO NOT** remove the engine oil drain plug while the engine is hot. Hot oil will gush out of the engine crankcase and severely scald any persons in the general area of the generator.

CAUTION

- **NEVER** touch the hot exhaust manifold, muffler or cylinder. Allow these parts to cool before servicing equipment.



NOTICE

- **NEVER** run engine without an air filter or with a dirty air filter. Severe engine damage may occur. Service air filter frequently to prevent engine malfunction.
- **NEVER** tamper with the factory settings of the engine or engine governor. Damage to the engine or equipment can result if operating in speed ranges above the maximum allowable.
- State Health Safety Codes and Public Resources Codes specify that in certain locations, spark arresters must be used on internal combustion engines that use hydrocarbon fuels. A spark arrester is a device designed to prevent accidental discharge of sparks or flames from the engine exhaust. Spark arresters are qualified

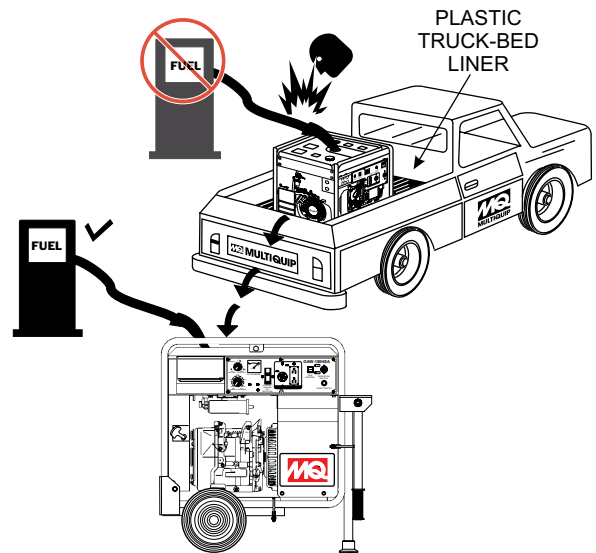


and rated by the United States Forest Service for this purpose. In order to comply with local laws regarding spark arresters, consult the engine distributor or the local Health and Safety Administrator.

FUEL SAFETY

DANGER

- **DO NOT** add fuel to equipment if it is placed inside truck bed with plastic liner. Possibility exists of explosion or fire due to static electricity.



- **DO NOT** start the engine near spilled fuel or combustible fluids. Gasoline fuel is extremely flammable and its vapors can cause an explosion if ignited.
- **ALWAYS** refuel in a well-ventilated area, away from sparks and open flames.
- **ALWAYS** use extreme caution when working with **flammable** liquids.
- **DO NOT** fill the fuel tank while the engine is running or hot.
- **DO NOT** overfill tank, since spilled fuel could ignite if it comes into contact with hot engine parts or sparks from the ignition system.
- Store fuel in appropriate containers, in well-ventilated areas and away from sparks and flames.

SAFETY INFORMATION

- **NEVER** use fuel as a cleaning agent.
- **DO NOT** smoke around or near the equipment. Fire or explosion could result from fuel vapors or if fuel is spilled on a hot engine



ELECTRICAL SAFETY

DANGER

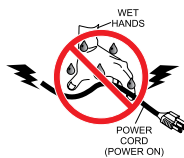
- Turn welder-generator and all circuit breakers **OFF** before performing maintenance on the generator or making contact with output receptacles.
- **NEVER** insert any objects into the output receptacles during operation. This is extremely dangerous. The possibility exists of **electrical shock, electrocution or death.**
- Backfeed to a utility system can cause **electrocution** and/or property damage. **NEVER** connect the welder-generator to a building's electrical system without a transfer switch or other approved device. All installations should be performed by a **licensed electrician** in accordance with all applicable laws and electrical codes. Failure to do so could result in electrical shock or burn, causing **serious injury or even death.**



Power Cord/Cable Safety

DANGER

- **NEVER** let power cords or cables **lay in water.**
- **NEVER stand in water** while AC or DC power from the generator is being transferred to a load.
- **NEVER** grab or touch a live power cord or cable with wet hands. The possibility exists of **electrical shock, electrocution or death.**
- **NEVER** use **damaged** or **worn** cables or cords when connecting equipment to generator. Inspect for cuts in the insulation.
- Make sure power cables are securely connected to the generator's output receptacles. Incorrect connections may cause electrical shock and damage to the generator.



NOTICE

- **ALWAYS** make certain that proper power or extension cord has been selected for the job. See Cable Selection Chart in this manual.

Grounding Safety

DANGER

- These welder-generators are equipped with a grounding terminal at the base of the pipe frame. Electrical grounding requirements can differ by State, Province, District, Municipality, and unique application settings.
- For portable and vehicle-mounted welder-generators, Multiquip recognizes the guidance provided in NEC Handbook Article 250.34 Parts A and B, and 29 CFR 1926.404 (f) (3) (i). If a more definitive earth-to-ground safeguard is required, please consult a qualified electrician and reference appropriate National Electrical Code (NEC) guidelines in establishing an exterior grounding point
- **NEVER** use gas piping as an electrical ground.

BATTERY SAFETY

DANGER

- **DO NOT** drop the battery. There is a possibility that the battery will explode.
- **DO NOT** expose the battery to open flames, sparks, cigarettes, etc. The battery contains combustible gases and liquids. If these gases and liquids come into contact with a flame or spark, an explosion could occur.
- **DO NOT** charge battery if frozen. Battery can explode. When frozen, warm the battery to at least 61°F (16°C)



WARNING

- **ALWAYS** wear safety glasses when handling the battery to avoid eye irritation. The battery contains acids that can cause injury to the eyes and skin.
- Use well-insulated gloves when picking up the battery.
- **ALWAYS** keep the battery charged. If the battery is not charged, combustible gas will build up.



SAFETY INFORMATION

- **ALWAYS** recharge the battery in a well-ventilated environment to avoid the risk of a dangerous concentration of combustible gasses..
- If the battery liquid (dilute sulfuric acid) comes into contact with **clothing or skin**, rinse skin or clothing immediately with plenty of water.
- If the battery liquid (dilute sulfuric acid) comes into contact with **eyes**, rinse eyes immediately with plenty of water and contact the nearest doctor or hospital to seek medical attention.

⚠ CAUTION

- **ALWAYS** disconnect the **NEGATIVE battery terminal** before performing service on the generator.
- **ALWAYS** keep battery cables in good working condition. Repair or replace all worn cables.

TRANSPORTING SAFETY

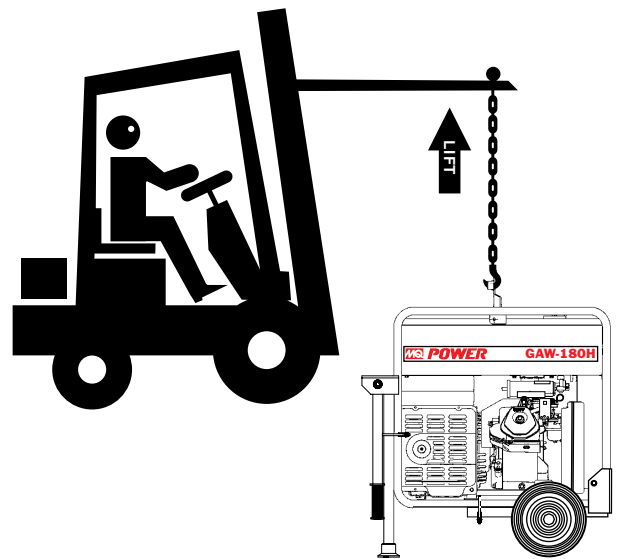
⚠ CAUTION

- **NEVER** allow any person or animal to stand underneath the equipment while lifting.

NOTICE

- Before lifting, make sure that the equipment parts (lifting bail) is not damaged and screws are not loose or missing.

- **ALWAYS** make sure crane or lifting device has been properly secured to the lifting bail (hook) of the equipment.
- **ALWAYS** shutdown engine before transporting.
- **NEVER** lift the equipment while the engine is running.
- Tighten fuel tank cap securely and close fuel cock to prevent fuel from spilling.
- Use adequate lifting cable (wire or rope) of sufficient strength.
- Use one point suspension hook and lift straight upwards.



- **DO NOT** lift machine to unnecessary heights.
- **ALWAYS** tie down equipment during transport by securing the equipment with rope.

SAFETY INFORMATION

ENVIRONMENTAL SAFETY/DECOMMISSIONING

NOTICE

Decommissioning is a controlled process used to safely retire a piece of equipment that is no longer serviceable. If the equipment poses an unacceptable and unrepairable safety risk due to wear or damage or is no longer cost effective to maintain (beyond life-cycle reliability) and is to be decommissioned (demolition and dismantlement), be sure to follow rules below.

- **DO NOT** pour waste or oil directly onto the ground, down a drain or into any water source.
- Contact your country's Department of Public Works or recycling agency in your area and arrange for proper disposal of any electrical components, waste or oil associated with this equipment.
- When the life cycle of this equipment is over, remove battery (if equipped) and bring to appropriate facility for lead reclamation. Use safety precautions when handling batteries that contain sulfuric acid.
- When the life cycle of this equipment is over, it is recommended that the unit frame and all other metal parts be sent to a recycling center.



Metal recycling involves the collection of metal from discarded products and its transformation into raw materials to use in manufacturing a new product.

Recyclers and manufacturers alike promote the process of recycling metal. Using a metal recycling center promotes energy cost savings.

EMISSIONS INFORMATION

NOTICE

The gasoline engine used in this equipment has been designed to reduce harmful levels of carbon monoxide (CO), hydrocarbons (HC) and nitrogen oxides (NOx) contained in gasoline exhaust emissions.

This engine has been certified to meet US EPA Evaporative emissions requirements in the installed configuration.

Attempting to modify or make adjustments to the engine emission system by unauthorized personnel without proper training could damage the equipment or create an unsafe condition.

Additionally, modifying the fuel system may adversely affect evaporative emissions, resulting in fines or other penalties.

Emission Control Label

The emission control label is an integral part of the emission system and is strictly controlled by regulation(s).

The label must remain with the engine for its entire life.

If a replacement emission label is needed, please contact your authorized Honda Engine Distributor.

SPECIFICATIONS (WELDER-GENERATOR)

Table 1. Specifications (Welder-Generator)			
DC ARC Welder	Model	GAW180HE	GAW180HEA
	Rated Output	4.56 kW	
	Max Current	180 amps	
	Rated Current	170 amps	
	Rated Voltage	26.8	
	Duty Cycle	50%	
	Current Range	30 ~ 180 amps	
	Applicable Electrode Size	3/32 ~ 5/32"	
	Welding Applications	SMAW, FCAW, GMAW, GTAW and ACAC	
60 Hz Generator	Rated Output	3.0 kW	
	Rated Voltage	120V	
	Rated Current	25 amps	
	Phase	Single Phase (3 wire)	
	Frequency	60 Hz	
	Power Factor	1	
Dimensions (L x W x H)		27.6 x 25.6 X 22 in. (701 X 650 X 559 mm)	28 x 22 X 26 in. (711 X 559 X 755 mm)
Dry Net Weight		236 lbs. (107 kg.)	
Weight With Fuel		265 lbs. (120 kg.)	
Battery		12 volts, 26 Amp hours, 260 amps cold cranking ability : 7-1/2" (L) X 5"(W) X 7-1/4"(H)	

NOTICE

In keeping with Multiquip's policy of constantly improving its products, the specifications quoted herein are subject to change without prior notice..

SPECIFICATIONS (ENGINE)

Table 2. Specifications (Engine)				
Engine	Model	HONDA GX340K1EDN2	HONDA GX340RT2EDE2	
	Type	Air-cooled 4 stroke, Single Cylinder, OHV, Horizontal Shaft Gasoline Engine		
	Bore X Stroke	2.90 in. X 2.30 in. (73 mm x 58 mm.)	3.46 in. X 2.52 in. (88 mm x 64 mm.)	
	Displacement	23.70 cu-in (389 cm ³)		
	Max Output	9.5 H.P./3600 R.P.M.	10.7 H.P./3600 R.P.M	
	Rated Output	7.8 H.P./3600 R.P.M.	8.4 H.P./3600 R.P.M.	
	Fuel	Unleaded Gasoline 86 Octane or Higher		
	Fuel Capacity	3.7 gal. (14 liters)		
	Lube Oil Capacity	1.16 quarts (1.1 liters)		
	Oil Alert System	Yes		
	Speed Control Method	Centrifugal Fly-weight Type		
	Starting Method	Electric Start ~ Recoil Start		
	Dimensions (L x W x H)	15.0 x 17.7 X 17.4 in. (380 X 450 X 443 mm)	16 x 19.1 X 17.7 in. (407 X 485 X 449 mm)	
Dry Net Weight	68.4 lbs. (31 kg.)	69 lbs. (31.5 kg.)		

Effects of Altitude and Heat

The maximum output of the engines listed above are applicable to supplying electrical power for continuous service at ambient conditions in accordance with SAE Test cord J607. The above ambient conditions are at standard sea level, with a barometric reading of 29.92 inches and a temperature of 60° F (15.5° C).

Generally, the engine's output power will decrease 3-1/2% for each 1000 feet (305 meters) of altitude above sea level, and 1% for each 10° F (-12.2° C) above the standard temperature of 60° F (15.5° C).

DIMENSIONS

NOTICE

UWKB Wheel Kit is optional. Contact MQ inside sales to order.

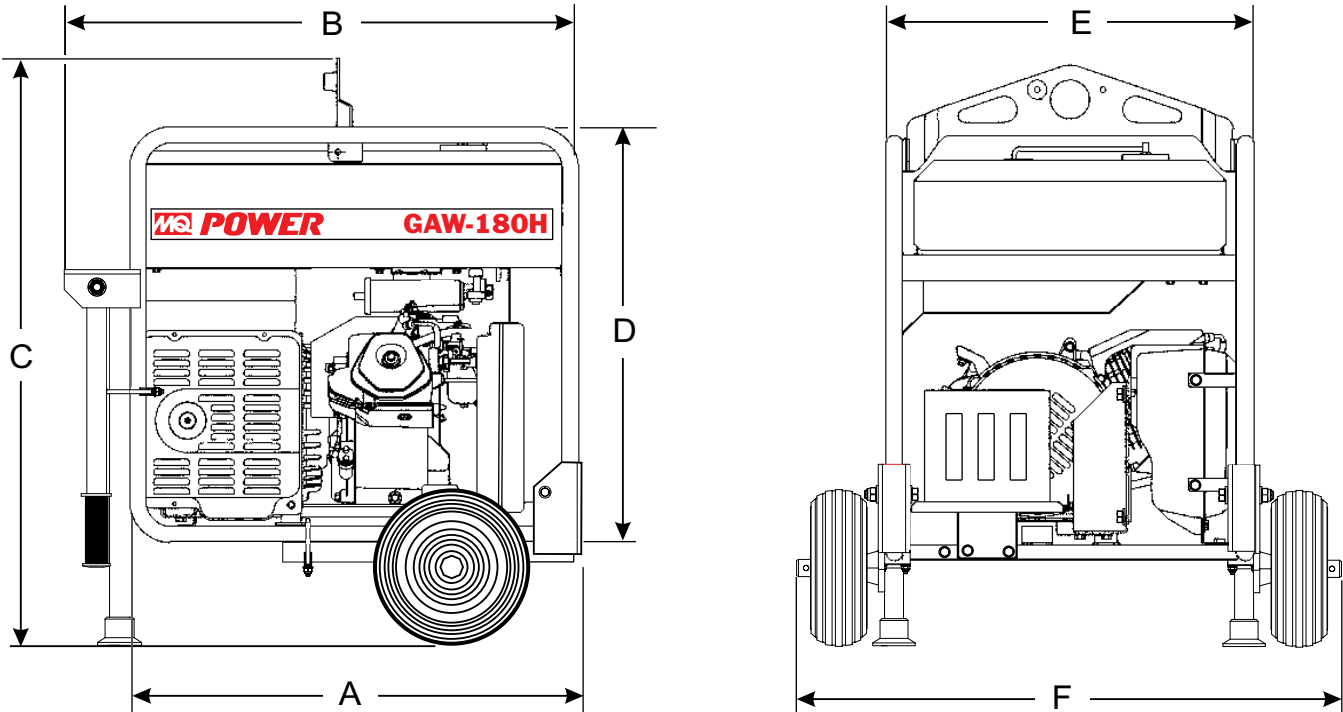


Figure 2. Dimensions

Table 3. Generator Dimensions		
REFERENCE LETTER	DESCRIPTION	DIMENSIONS: IN. (MM)
A	LENGTH (FRAME)	27.55 (700)
B ¹	LENGTH (W/HANDLE)	30.55 (776)
C	HEIGHT (FRAME ONLY)	23.62 (600) HE 25.60 (650) HE1/HEA
D	HEIGHT (LIFTING BALE)	27.95 (710) HE 29.92 (760) HE1/HEA
E ¹	HEIGHT (FRAME/WHEELS)	28.62 (725) HE 30.60 (777) HE1/HEA
F	WIDTH (FRAME)	22.0 (560)
G ¹	WIDTH (WHEELS)	31.5 (800)
¹ Approximate value.		

CONNECTING THE GROUND

The ground point on the welder-generator should always be used to connect the generator to a suitable ground. The ground cable should be #8 size wire (aluminum) minimum. If copper wire is used, #10 size wire minimum should be used.

At the generator, connect the terminal of the ground cable between the lock washer and the bolt (Figure 3) and tighten the bolt fully. Connect the other end of the ground cable to a suitable earth ground (ground rod).

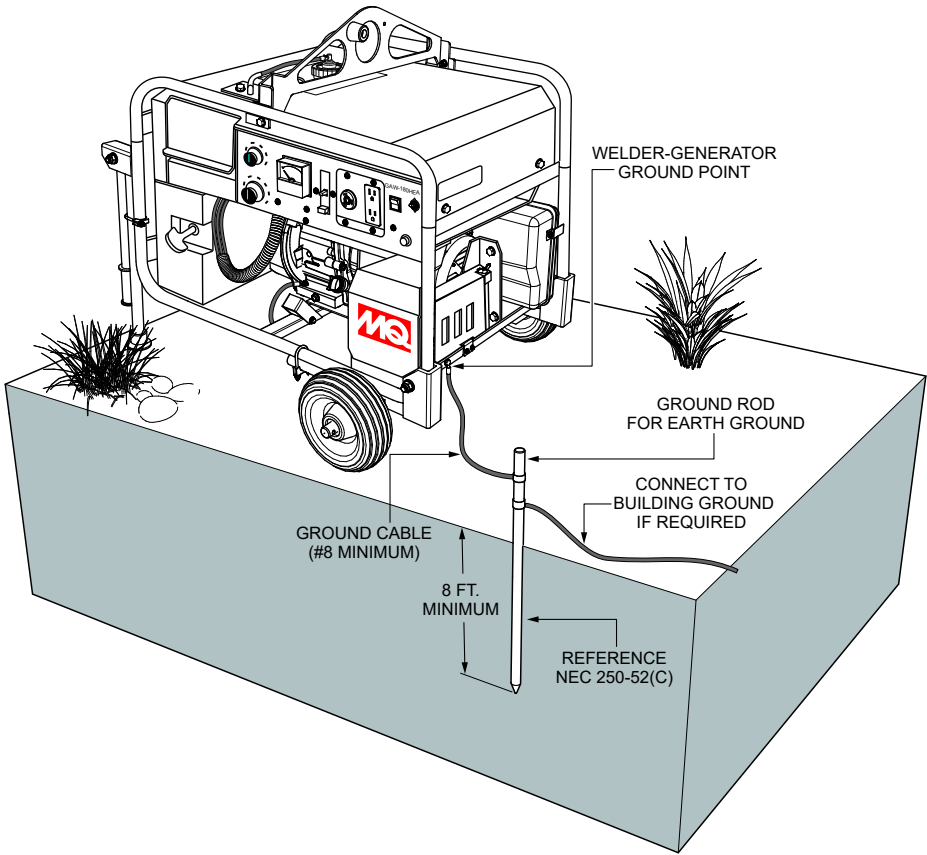



Figure 3. Welder-Generator Grounding


OUTDOOR INSTALLATION

If possible install the generator in a area that is free of debris, bystanders, and overhead obstructions. Make sure the generator is on secure level ground so that it cannot slide or shift around.

The installation site must be relatively free from moisture and dust. All electrical equipment should be protected from excessive moisture. Failure to do will result in deterioration of the insulation and will result in short circuits and grounding.

Foreign materials such as dust, sand, lint and abrasive materials have a tendency to cause excessive wear to engine and alternator parts.

 **WARNING**


 Pay close attention to ventilation when operating the generator inside tunnels and caves. The engine exhaust contains noxious elements. Engine exhaust must be routed to a ventilated area


INDOOR INSTALLATION

Exhaust gases from gas engines are extremely poisonous. Whenever an engine is installed indoors the exhaust fumes must be vented to the outside. The engine should be installed at least two feet from any outside wall. Using an exhaust pipe which is too long or too small can cause excessive back pressure which will cause the engine to heat excessively and possibly burn the valves.

PLACEMENT

The generator should always be placed on a flat level surface when it is running. **DO NOT** place the generator on slopes, the possibility exists that the generator could slide.

 **DANGER**

 Electric shock can occur when vibrators are used. Pay close attention to handling when operating vibrators and always use rubber boots and gloves to insulate the body from a short circuit.

GENERATOR GROUNDING

To guard against electrical shock and possible damage to the equipment, it is important to provide a good **EARTH** ground.

Article 250 (Grounding) of the National Electrical Code (NEC) provides guide lines for proper grounding and specifies that the cable ground shall be connected to the grounding system of the building as close to the point of cable entry as practical.

NEC articles 250-64(b) and 250-66 set the following grounding requirements:

1. Use one of the following wire types to connect the generator to earth ground.
 - a. Copper - 10 AWG (5.3 mm²) or larger.
 - b. Aluminum - 8 AWG (8.4 mm²) or larger.
2. When grounding the generator (Figure 3) connect the ground cable between the lock washer and the nut on the generator and tighten the nut fully. Connect the other end of the ground cable to earth ground.
3. NEC article 250-52(c) specifies that the earth ground rod should be buried a minimum of 8 ft. into the ground.

NOTICE

When connecting the generator to any buildings electrical system **ALWAYS** consult with a licensed electrician.

DANGER

Before connecting this generator to any building's electrical system, a licensed electrician must install an isolation (transfer) switch.

Serious injury or death may result without this transfer switch.

GENERAL INFORMATION

GAW180HE/HEA FAMILARIZATION

Your welder-generator has been thoroughly inspected and accepted prior to shipment from the factory. However, be sure to check for damaged parts or components, or loose nuts and bolts, which could have become dislodged in transit.

This welder-generator has been designed as a portable lightweight power source for 60 Hz (single-phase) vibrators, lighting facilities, power tools, submersible pumps and other industrial and construction machinery.

The welder-generator is powered by a Honda GX340 air-cooled gasoline engine. The alternator, a brushless revolving-field type, is permanently aligned to the engine through rigid coupling.

The welder-generator is mounted on rubber vibration isolators that have a steel base backplate which is attached to the protective steel pipe carrying frame. The protective carrying frame is made of steel tubing and fully wraps around the generator to protect against damage.

These portable generators are supplied with a electrical control panel. The control panel includes items as listed below.

CONTROL PANEL

- GFCI, Duplex Receptacle, NEMA 5-20R (120V, 20 Amp)
- Twist-Lock Receptacle, NEMA L5-30R (125V, 20 Amp)
- Main Circuit Breaker, 2-pole, 25 Amp
- Idle Control Switch
- Operation Switch
- Start Switch
- Hourmeter
- AC Voltmeter
- Current Regulator
- ARC Force Regulator
- DC Welding Output Terminal Lugs
- Canister
- Ground Terminal

This unit is equipped with protection shutdown devices to protect the welder-generator in the event of an equipment malfunction. Reference Table 4 for a basic understanding of the protection devices and their effect on the welder-generator when activated.

If a malfunction has been detected by a protection device, simply shutdown the welder-generator and correct the problem before restarting the unit.

Protection Device	Engine Shutdown	AC Circuit Breaker GFCI Trip	Control Unit Output Stop
Low Oil Level	YES	NO	NO
AC Power Overcurrent	NO	YES	YES
Electrical Ground Fault	NO	YES	NO
Control Unit (AC) High Temp. ¹	NO	NO	YES
Control Unit (AC) High Temp. ²	NO	NO	YES

¹Stop engine for at least 20 seconds before restarting.

²Output will resume as temperature falls to normal operating level.

WELDING POLARITY AND DUTY CYCLE

WELDING POLARITY

Polarity indicates the direction of the current flow in that circuit. Since DC current moves in only one direction, polarity is important because the flow of current must be changed depending on the application.

By changing the polarity, the greatest amount of heat can be concentrated where it is most needed. With straight polarity (electrode negative) more heat is directed to the workplace. When using reverse polarity (electrode positive), more of the heat generated is directed to the electrode. Reference Figure 4 below.

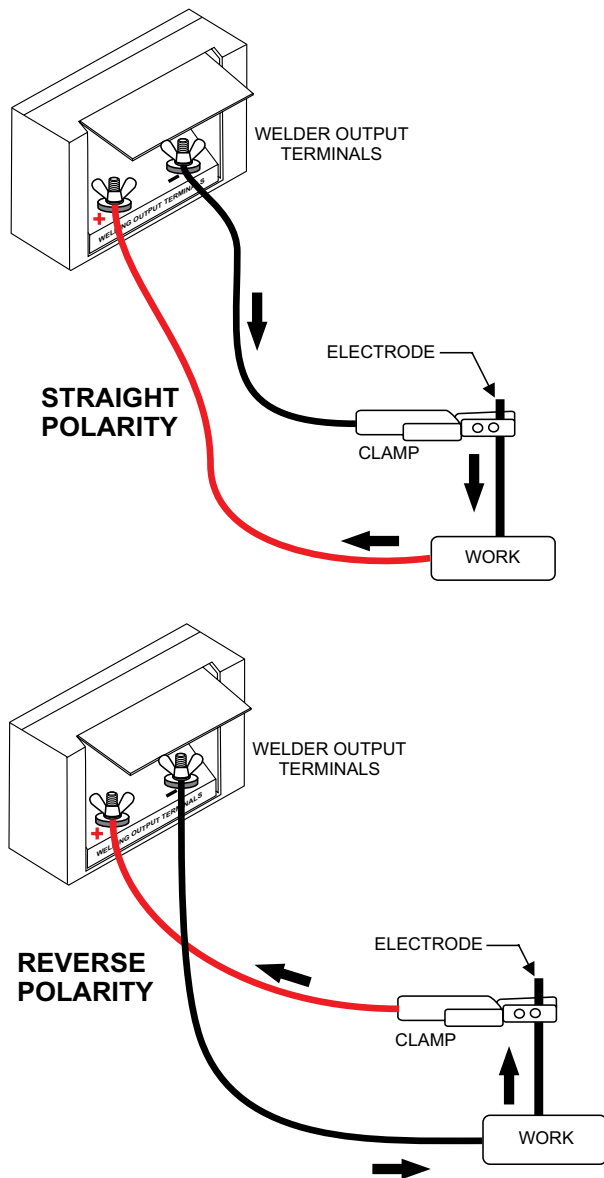


Figure 4. Welding Polarities

DUTY CYCLE

NOTICE

The **American Welding Society** sets all regulations and procedures for the welding industry. All welders are subject to the same regulations.

Duty cycle is based on a 10-minute welding period. Exceeding the duty cycle will have an affect on the welding process. The amperage will start dropping off and the welding process will not have the proper amperage required to proceed. If the duty cycle is exceeded, damage can occur to the welding machine.

The 10-minute duty cycle period means 100% welding. If the duty cycle is 60%, then you can only weld for six minutes and the machine must cool down for four minutes (Reference Table 5 below).

Table 5. 10-Minute Duty Cycle

Duty Cycle %	Welding ON Time (Min)	Cool Down Time (Min.)	Welding Current (Amps)
100	Continuous	N/A	120 or Less
85	8.5	1.5	130
70	7	3	140
60	6	4	150
55	5.5	4.5	160
50 ¹	5	5	170
40	4	6	180

¹The GAW180HE/HEA welders have a 50% duty cycle @ 170 amps.

DEFINITIONS OF WELDING TERMS

1. **Weld** — The unification of metallic parts by heating and allowing the metals to flow together or by hammering or compressing with or without previous heating.
2. **Straight Polarity** — A term for direct current electrode negative.
3. **Reverse Polarity** — A term for direct current electrode positive.
4. **Manual Welding** — A welding operation performed and controlled completely by hand.
5. **AC or Alternating Current** — AC is the kind of electricity, which reverses its direction periodically. For 60 cycle current, the current goes in one direction and then in the other direction 60 times in the same second, so that the current changes its direction 120 times in one second.
6. **DC or Direct Current** — DC is the kind of electricity, which only flows in one direction. The flow of electricity is from the power source to the application. In welding, an arc welding process wherein the power supply is at the arc is direct current.
7. **ARC Force** — An adjustment that allows the operator to fine tune the arc characteristics according to job requirements.
8. **ARC Length** — The distance from the end of the electrode to the point where the arc makes contact with the work surface.
9. **ARC Voltage** — The voltage across the welding arc.
10. **ARC Blow** — The deflection of an electric arc from its normal path because of magnetic forces.
11. **Base Metal (Material)** — The metal (material) to be welded, brazed, soldered, or cut.
12. **E-Mode** — The Improves fuel efficiency by allowing the operator to weld with engine at idle speed at up to 160 amps. Reduces operating costs and noise levels.
13. **Covered Electrode** — A composite fill metal electrode consisting of a core of a bare electrode or metal-cored electrode to which a covering sufficient to provide a slag layer on the weld metal has been applied.

The covering may contain materials providing such functions as shielding from the atmosphere, deoxidization, and arc stabilization and can serve as a source of metallic additions to the weld.

14. **Fillet Weld** — A weld of triangular cross section joining two surfaces approximately at right angles to each other in a lap joint, T-joint or corner joint.
15. **Tack Weld** — A weld made to hold parts of a weldment for proper alignment until the final welds are made.
16. **Shade Number** — This number pertains to the lightness or darkness of the lens in the welding helmet. Lens number range from 2 to 14 where 2 would be the lightest lens and 14 would be the darkest lens.
17. **CC or Constant Current** — In this mode the amperage or current stays constant, but the direct current voltage will change depending on the arc length. This mode is applied to SMAW, FCAW and GTAW processes.
18. **CV or Constant Voltage** — In this mode the direct current voltage stays constant, but direct current amperage will change slightly. This mode is applied to GMAW, FCAW and GTAW.
19. **Parallel Connection** — Simply connect the positive terminals together, then connect the negative terminals together. Make sure that the machines are located as close together as possible.

Welding cables should be sized appropriately to handle the additional amperage. Rheostats must be set at the same amperage or as close as possible. (Note: Unlike competitive models, no parallel box is needed with Multiquip Power machines.)

WELDING PROCESSES

- SMAW – Shielded-Metal Arc Welding
- FCAW – Flux-Cored Arc Welding
- GMAW – Gas-Metal Arc Welding
- GTAW – Gas-Tungsten Arc Welding
- ACAC – Air Carbon Arc Cutting

COMPONENTS GENERATOR

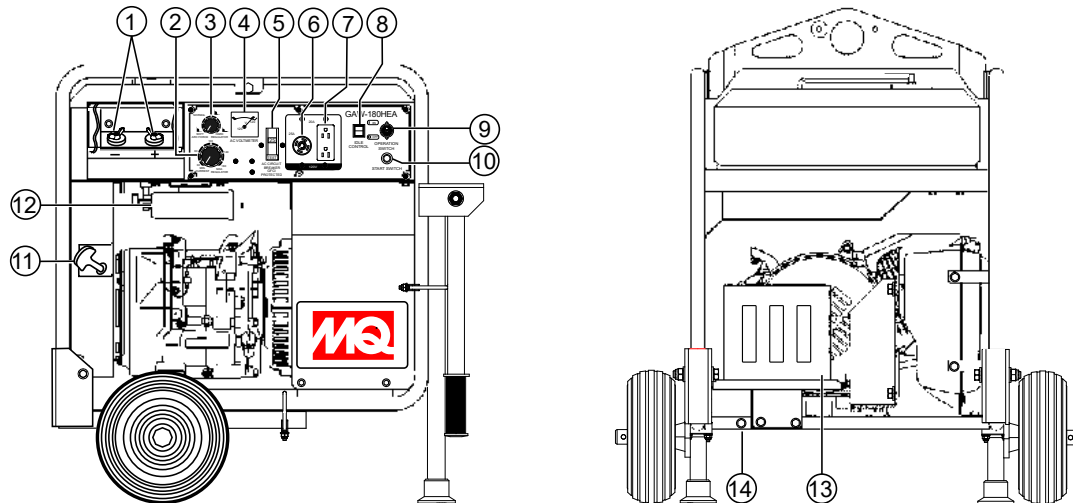


Figure 5. Welder-Generator Components

- 1. DC Welding Output Terminals** — Connect DC welding cables to these terminals. Note the polarity marked on the welder-generator. Select the appropriate polarities according to the application as specified in Table 9.
- 2. Current Regulator Adjustment Control** — Place this knob in the desired setting when welding is required. Current range is from 30 to 180 amps. t
- 3. ARC Force Regulator Adjustment Control** — An adjustment that allows the operator to fine tune the arc characteristics according to job requirements. This control allows the user to adjust the arc from a soft smooth arc to a more aggressive digging arc.
- 4. AC-Voltmeter** — This voltmeter indicates (with a mark) the rated 60 Hz (single-phase) output voltage. In addition the voltmeter can also be used as a diagnostic tool. If the voltmeter indicator (needle) is below the rated voltage, engine problems may exist (low/high RPM's). To prevent damage to the generator or power tools turn the generator OFF and consult your authorized Multiquip service dealer.
- 5. Main Breaker** — This 2-pole, 25 amp circuit breaker protects the welder-generator from short circuiting or overloading. When starting the generator always have the circuit breaker placed in the "OFF" position.
- 6. 120V Output Receptacle** — NEMA L5-30R twist-lock receptacle will provide 120V, 25 amps, 60 Hz.
- 7. GFCI Duplex Receptacles** — NEMA 5-20R, GFCI receptacle will provide 120V@ 20 amps.
- 8. Idle Control Switch** — The welder-generator is provided with an automatic idle control device for noise suppression and reduced fuel consumption.

The automatic idle control automatically engages under a no-load condition. With the automatic idle control switched "ON", the engine revolutions will automatically drop to about 2600 rpm (low-speed operation) within 3 seconds after the load stops. When the operation is resumed, the engine speed is automatically increased to about 3600 rpm (high-speed operation) as soon as the load is connected.
- 9. Operation Switch** — Place switch in the "ON" position (up) for normal operation. To turn-off the welder-generator, place the operation switch in the "OFF" position (down).
- 10. Start Switch** — Press this pushbutton switch to start the welder-generator.
- 11. Recoil Starter (pull rope)** — Manual-starting method. Pull the starter grip until resistance is felt, then pull briskly and smoothly.
- 12. Charcoal Canister** — A container filled with activated charcoal that traps gasoline vapors emitted by the fuel system. Installed on GAWHE1/HEA only.
- 13. Battery** — This unit is equipped with a 12 VDC battery. Replace with only recommended type battery.
- 14. Ground** — This ground connection point should be connect to a good earth ground (ground rod).

COMPONENTS GENERATOR (CONTINUED)

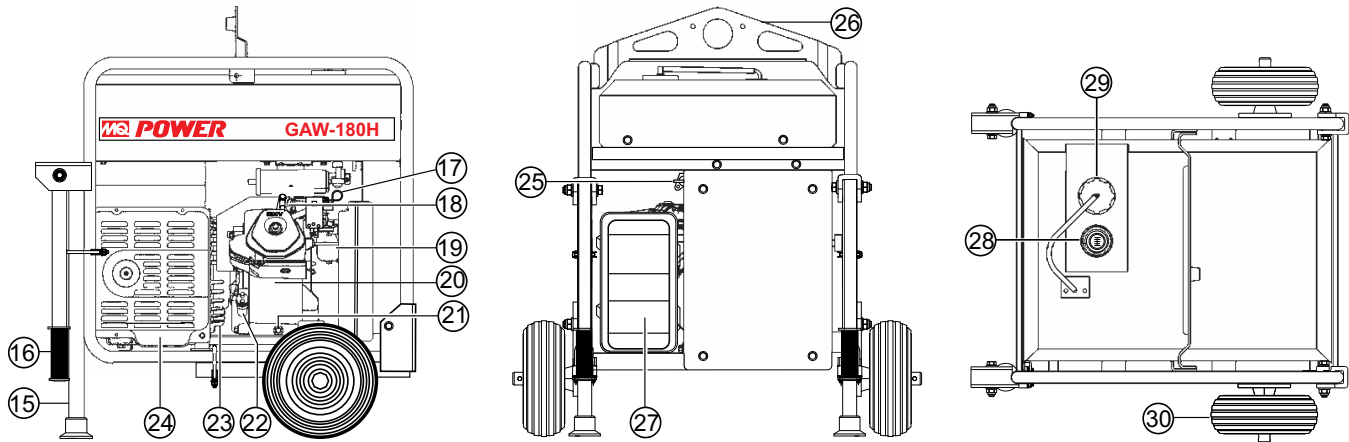


Figure 6. Welder-Generator Components (Continued)

15. **Support Stand (Option)** — Supports the welder-generator, part of the UWKB Wheel Kit Assembly.
16. **Transport Handles (Option)** — Lift up on each handle when transporting of the welder-generator is required. Part of the UWKB Wheel Kit Assembly.
17. **Choke Lever** — Used for starting the engine. Close the choke lever when starting a cold engine or in cold weather conditions. The choke enriches the fuel mixture. Open the choke lever if starting a warm engine or in warm weather conditions.
18. **Spark Plug** — Provides spark to the ignition system. Set spark plug gap to 0.6 - 0.7 mm (0.028 - 0.031 inch). Clean spark plug once a week.
19. **Carburetor Cup** — Inspect the fuel cup weekly for water and dirt. Clean as referenced in the maintenance section of this manual.
20. **Engine** — This welder generator uses a HONDA GX340 air-cooled, 4-stroke, single cylinder, overhead camshaft gasoline engine. Engine uses unleaded gasoline. For more detailed specifications reference Table 2.
21. **Engine Oil Drain Plug** — Remove this drain plug when draining of the oil from the engine crankcase is required. Fill with recommended type oil as listed in See Table 7.
22. **Engine Oil Filler Cap** — Remove this cap/dipstick when the adding of engine oil is required. See Table 7 for recommended type engine oil.
23. **Generator Housing** — Contains the rotor, rectifier field coil assembly, armature, bearings and other components that make up generator assembly.
24. **Muffler/Heat Shield** — Used to reduce noise and emissions. **NEVER** touch this heat shield when the generator/welder is in use. Always allow time for engine to cool before servicing.
25. **Fuel Cock Lever** — Turn this lever downward (**ON**) to start the flow of fuel into the carburetor. Turn upward to stop (**OFF**) the flow of fuel.
26. **Lifting Bail Eye** — Attach a rope or chain to this lifting eye when lifting of the welder-generator is required. Never stand underneath the welder-generator while it is being lifted. Place lifting eye in down position when not in use.
27. **Air Cleaner** — Prevents dirt and other debris from entering the fuel system. Remove wing-nut on top of air filter cannister to gain access to filter element. **NEVER** run the engine without an air cleaner.
28. **Fuel Gauge** — This gauge is located on top of the fuel tank. Read this gauge to determine when fuel is low.
29. **Fuel Tank Cap** — Remove this cap to add unleaded gasoline to the fuel tank. Replenish with clean unleaded gasoline. Make sure cap is tightened securely. **DO NOT** over fill. Fuel tank capacity is 3.7 gallons (14 liters).
30. **Foam-Filled Tires** — Provided for ease of transport. Replace with only recommended tires.

GENERAL INSPECTION PRIOR TO OPERATION

Ground Power Tools

When using power tools or electrical equipment requiring AC power from the generator, make sure power tool cord has a ground pin or is double insulated as shown in Figure 7.

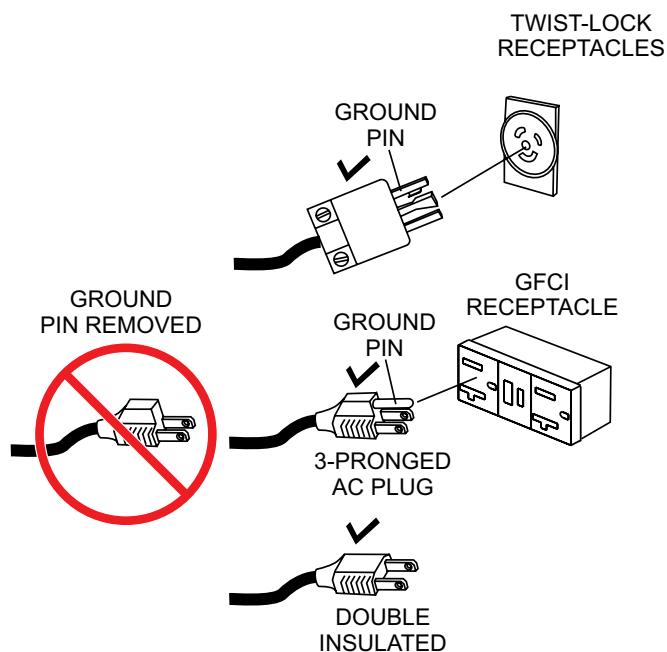


Figure 7. Ground Pin

NOTICE

Double-insulated power tools and small appliances have specially insulated housings that eliminate the need for a ground pin. These types of double-insulated power cords are designed so that no part of the device will be electrically live even if the internal insulation fails.

Extension Cable

When electric power is to be provided to various tools or loads at some distance from the generator, extension cords are normally used. Cables should be sized to allow for distance in length and amperage so that the voltage drop between the generator and point of use (load) is held to a minimum. Use the cable selection chart (Table 6) as a guide for selecting proper cable size.

⚠ DANGER

NEVER use power tools or equipment that do not have a ground capability, the possibility exists of electrocution, electrical shock or burn, which can cause severe bodily harm or even **DEATH!**

Table 6. Cable Selection (60 Hz, Single Phase Operation)

Current In Amperes	Load In Watts		Maximum Allowable Cable Length			
	120 Volts	240 Volts	#10 Wire	#12 Wire	#14 Wire	#16 Wire
2.5	300	600	1000 ft.	600 ft.	375 ft.	250 ft.
5	600	1200	500 ft.	300 ft.	200 ft.	125 ft.
7.5	900	1800	350 ft.	200 ft.	125 ft.	100 ft.
10	1200	2400	250 ft.	150 ft.	100 ft.	
15	1800	3600	150 ft.	100 ft.	65 ft.	
20	2400	4800	125 ft.	75 ft.	50 ft.	

CAUTION: Equipment damage can result from low voltage.

INSPECTION/SETUP

BEFORE STARTING

NOTICE

ALWAYS place the AC circuit breaker in the **OFF** position prior to starting the engine.

1. Read safety instructions at the beginning of manual.
2. Clean the welder-generator, removing dirt and dust, particularly the engine cooling air inlet, carburetor and air cleaner.
3. Check the air filter for dirt and dust. If air filter is dirty, replace air filter with a new one as required.
4. Check carburetor for external dirt and dust. Clean with dry compressed air.
5. Check fastening nuts and bolts for tightness.

Engine Oil Check

1. To check the engine oil level, place the welder-generator on secure level ground with the engine stopped.
2. Remove the filler dipstick from the engine oil filler hole (Figure 8) and wipe clean.

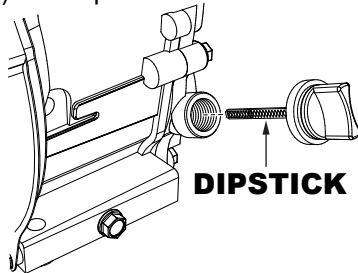


Figure 8. Engine Oil Dipstick Removal

3. Insert and remove the dipstick without screwing it into the filler neck. Check the oil level shown on the dipstick.
4. If the oil level is low (Figure 9), fill to the edge of the oil filler hole with the recommended oil type (Table 7). Maximum oil capacity is 1.16 quarts (1.1 liters).

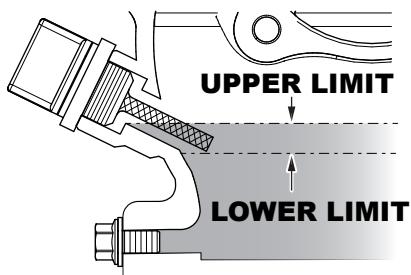


Figure 9. Engine Oil Dipstick(Oil Level)

Table 7. Oil Type

Season	Temperature	Oil Type
Summer	25°C or Higher	SAE 10W-30
Spring/Fall	25°C~10°C	SAE 10W-30/20
Winter	0°C or Lower	SAE 10W-10

Fuel Check

1. Close the fuel cock before filling the fuel tank.
2. Remove the fuel cap located on top of fuel tank.
3. Read the fuel gauge located on top of the fuel tank (Figure 10) to determine if the fuel level is low. If fuel is low, replenish with clean unleaded fuel.

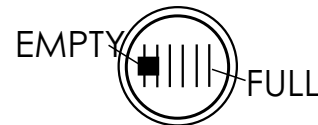


Figure 10. Fuel Gauge

4. When refueling, be sure to use a strainer for filtration. **DO NOT** top-off fuel. **DO NOT** fill the tank beyond capacity. Wipe up any spilled fuel **immediately!**

BATTERY SETUP

CAUTION

Use all safety precautions specified by the battery manufacturer when working with the battery. See Safety Information section of this manual for more details on battery safety.

1. Place the battery into the battery cradle and secured with mounting hardware.
2. **ALWAYS** be sure the battery cables are properly connected to the battery terminals (Figure 11). The **red** cable is connected to the positive terminal of the battery, and the **black** cable is connected to the negative terminal of the battery.

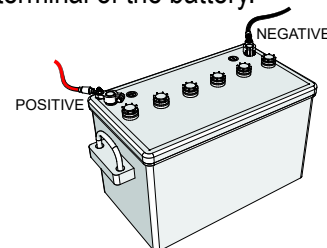


Figure 11. Battery Connections

WELDING CABLE AND POLARITIES

- Lift the output terminal protective cover (Figure 12) on the welder-generator to gain access to the welding output terminals.

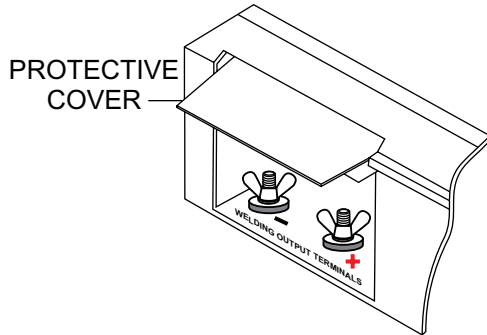


Figure 12. Protective Cover

- Next, remove the wing nuts and flat washers that are attached to the output terminals.
- Place welder cables onto output terminals (post). Select appropriate polarity depending on application. Reference Table 8 and Table 9.

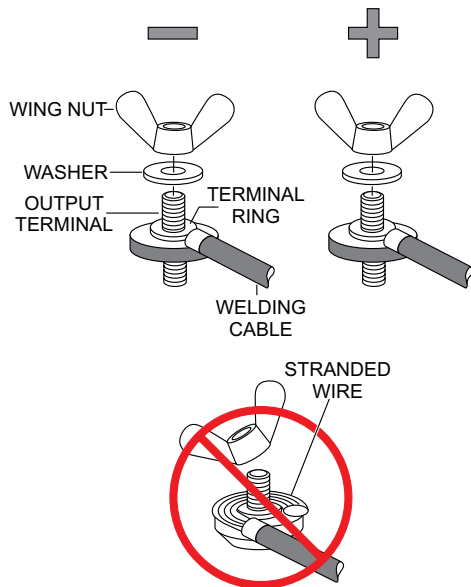


Figure 13. Welding Cable Attachment

NOTICE

ALWAYS attach a terminal ring on the end of the welding cables. **NEVER** attach stranded or exposed wires to the output terminals. This condition could cause arcing which could start a fire.

- Reinstall wing nuts and washers back onto output terminals. Tighten wing nuts securely to prevent arcing.

NOTICE

NEVER allow the terminal ends of the welding cables to come in contact with each other or the frame of the welder-generator. The possibility exists of creating sparks which could ignite a fire causing damage to the equipment and bodily harm.

Table 8. Polarities and Applications

Polarity	Welding Method	Typical Applications
Straight Polarity	(+)...grounding (base metal)	Arc welding for steel material of general structures, and for thick plates Arc welding for copper alloy
	(-)...welding holder	
Reverse Polarity	(+)...welding holder	Build-up welding Air gouging Arc welding of thin plates Arc welding of stainless steel
	(-)...grounding (base metal)	

WELDING CABLE SELECTION

The welding cable should be larger in size as it becomes longer or its current becomes higher. Prepare a cable with suitable size by referring to the table below.

Calculations for Table 9 are based on a voltage drop of 4 volts maximum.

Weld Current (A)	Length (ft/m)					
	50 (15)	100 (30)	150 (46)	200 (61)	250 (76)	300 (91)
50	#5	#5	#5	#5	#5	#4
100	#5	#5	#4	#3	#2	#1
150	#5	#4	#2	#1	#1/0	#2/0
180	#5	#3	#1	#1/0	#2/0	#3/0

Reference Table 10 for applicable electrode size.

Table 10. Applicable Electrode Size

Welding Current (A)	30~180
Applicable Electrode	3/32"~5/32"

OPERATION

This section is intended to assist the operator with the initial start-up of the portable welder-generator. It is extremely important that this section be read carefully before attempting to use the generator in the field.

Before Starting the Engine

1. Be sure to disconnect all electrical loads from the welder-generator prior to starting the engine.
2. **NEVER** start the engine with the AC circuit breaker in the **ON** position. Always place AC circuit breaker (Figure 14) in the **OFF** position before starting.

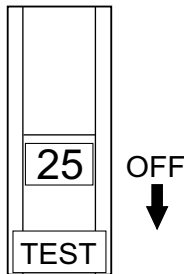


Figure 14. AC Circuit Breaker (OFF)

Starting the Engine (Electric Start)

1. Place the engine fuel valve lever (Figure 15) in the **ON** position.

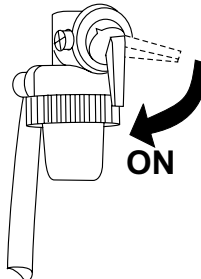


Figure 15. Engine Fuel Valve Lever (ON)

2. Place the choke lever (Figure 16) in the **CLOSED** position if starting a cold engine.

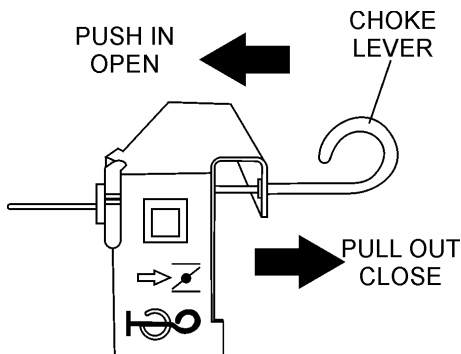


Figure 16. Choke Lever

3. Place the choke lever (Figure 16) in the **OPEN** position if starting a warm engine or the temperature is warm.
4. Place the generator's operation switch (Figure 17) in the **ON** position.

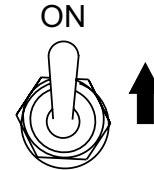


Figure 17. Operation Switch (ON)

5. Next, press the generator's pushbutton start switch (Figure 18) and listen for the engine to start. If starting the welder-generator using the recoil start method, proceed to step 11.



Figure 18. Start Switch

6. If the engine has started, slowly return the choke lever (Figure 16) to the **OPEN** position. If the engine has not started repeat steps 1 through 6.
7. Before the generator is placed into operation, run the engine for 3-5 minutes. Check for abnormal smells, fuel leaks, and noises that would associate with loose components.
8. Place idle control switch (Figure 19) in the **OFF** position. This will allow the engine speed to run at about 3600 RPM's (**high speed**).

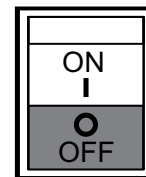


Figure 19. Idle Control Switch (OFF)

NOTICE

Placing the idle control switch in the **OFF** position (Figure 19) allows the engine to operate at a maximum speed of about 3600 RPM's.

When the idle control switch is placed in the up position **ON position (Figure 20)**, the generator will run at idle speed (2600 RPM's) until a load is applied, at that time the engine speed will increase to 3600 RPM's as long as a load is being applied.

When the load is not in use, the engine speed will drop back to the idle mode after about 3 seconds.

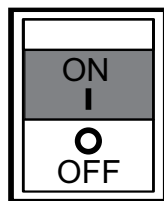


Figure 20. Idle Control Switch (ON)

9. Place AC circuit breaker (Figure 21) in the **ON** position .

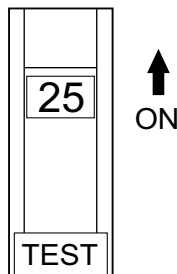


Figure 21. AC Circuit Breaker (ON)

10. Read voltmeter on front panel of generator (Figure 22) and verify that 120 VAC is displayed. Using an external voltmeter as shown in Figure 22, verify that 120 VAC is present at the 120V twist-lock and GFCI duplex receptacles.

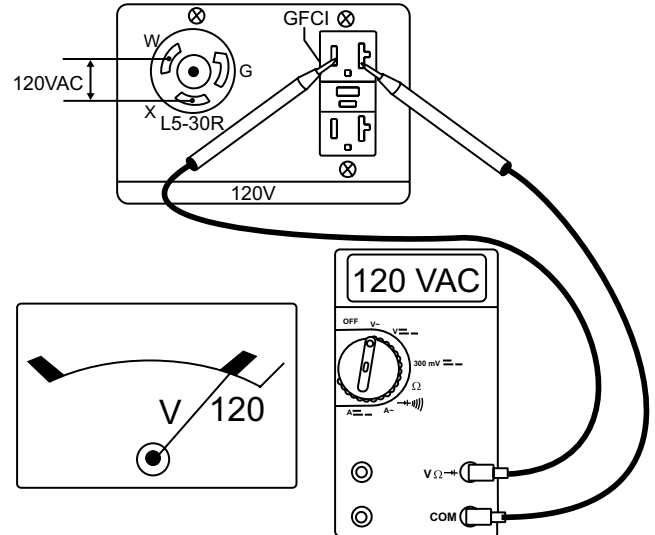


Figure 22. 120V Twist-Lock/GFCI Receptacles

11. If starting your welder-generator by the **recoil start method** (no battery), grasp the starter grip (Figure 23) and slowly pull it out. The resistance becomes the hardest at a certain position, corresponding to the compression point. Pull the starter grip briskly and smoothly for starting.

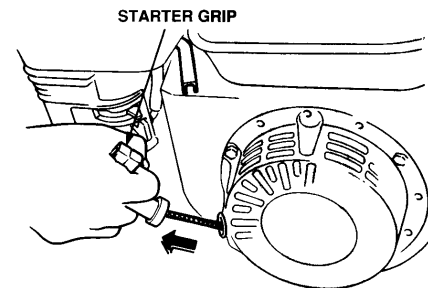


Figure 23. Starter Grip

NOTICE

DO NOT pull the starter rope all the way to the end.

DO NOT release the starter rope after pulling. Allow it to rewind as soon as possible..

12. Continue using the welder-generator referencing steps 6 through 10.

WELDING OPERATION

Adjust the arc force and current regulator control knobs (Figure 24) to their respective positions depending on the characteristics of the job requirements.

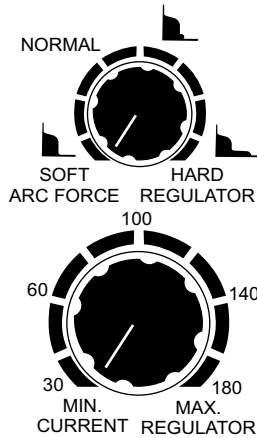


Figure 24. Arc Force And Current Regulator Control Knob

NOTICE

When **high quality welding** is required **DO NOT** use convenience receptacles simultaneously.

Both welder-generator models are equipped with a single phase AC power source in addition to the DC welding power source.

The AC power source and DC welding power source can be used simultaneously. Reference Table 11 for the simultaneous use of AC and DC power.

NOTICE

DO NOT allow welder-generator overloading when AC and DC power are used simultaneously.

Table 11. AC Power Capacity Allowable For Simultaneous Use

Electrode Size (Amps)	AC Power Capacity
(0)	3.0 kW
3/32" (50A)	2.0 kW
1/8" (80A)	1.4 kW
1/8" (120A)	1.0 kW
5/32" (150A)	0.5 kW

Stopping the Engine (Normal Shutdown)

1. Place AC circuit breaker (Figure 25) in the **OFF** position

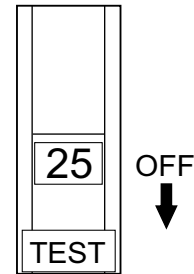


Figure 25. AC Circuit Breaker (OFF)

2. Place idle control switch (Figure 26) in the **OFF** position

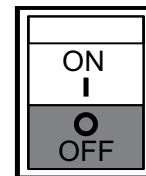


Figure 26. Idle Control Switch (OFF)

3. Let engine run at idle with no load for 2-3 minutes.
4. To shut-down the engine, place the generator's operation switch (Figure 27) in the **OFF** position).



Figure 27. Operation Switch (OFF)

5. Place engine fuel valve lever (Figure 28) in the **OFF** position.

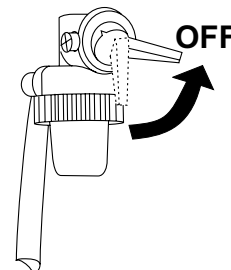


Figure 28. Engine Fuel Valve Lever (OFF)

6. Remove all loads and cables from the welder-generator.

PREPARATION FOR LONG TERM STORAGE

Generator Storage

For storage of the generating set for over 30 days, the following is required:

- Drain the fuel tank completely, or add STA-BIL to the fuel.
- Run the engine until the gasoline in the carburetor is completely consumed.
- Completely drain the oil from the crankcase and refill with fresh oil.
- Remove the spark plug, pour 2 or 3 cc of SAE 30 oil into the cylinder and crank slowly to distribute the oil.
- Slowly rotate the engine a few times with the starter rope and install a new plug.
- Pull out the starter rope slowly and stop at the compression point.
- Clean all external parts of the generating set with a cloth.
- Cover the generating set and store in a clean, dry place

MAINTENANCE

Use Table 12 as a general maintenance guideline when servicing your engine. For more detail engine maintenance information, refer to the engine owner's manual supplied with your engine.

Table 12. Engine Maintenance Schedule							
DESCRIPTION (3)	OPERATION	BEFORE	FIRST MONTH OR 10 HRS.	EVERY 3 MONTHS OR 25 HRS.	EVERY 6 MONTHS OR 50 HRS.	EVERY YEAR OR 100 HRS.	EVERY 2 YEARS OR 200 HRS.
Engine Oil	CHECK	X					
	CHANGE		X		X	X	X
Air Cleaner	CHECK	X	X				
	CHANGE			X (1)			
Charcoal Canister (4)	REPLACE						
All Nuts & Bolts	RETIGHTEN IF NECESSARY	X					
Spark Plug	CHANGE				X		
	REPLACE						X
Cooling Fins	CHECK				X		
Spark Arrester	CLEAN					X	
Fuel Tank	CLEAN					X	
Fuel Strainer	CHECK				X	X	
Idle Speed	CHECK-ADJUST					X (2)	
Valve Clearance	CHECK-ADJUST			X		X	X (2)
Fuel lines	CHECK	Every 2 years, replace if necessary (2)					

(1) Service more frequently when used in **DUSTY** areas.

(2) These items should be serviced by your service dealer, unless you have the proper tools and are mechanically proficient. Refer to the HONDA Shop Manual for service procedures.

(3) For commercial use, log hours of operation to determine proper maintenance intervals.

(4) Charcoal canister is maintenance free (non-servicable). Replace only if damaged.

MAINTENANCE

Perform the scheduled maintenance procedures as defined by Table 12 on the previous page.

Daily

Thoroughly remove dirt and oil from the engine and control area. Clean or replace the air cleaner elements as necessary. Check and retighten all fasteners as necessary.

Wiring

Inspect the entire generator for bad or worn electrical wiring or connections. If any wiring or connections are exposed (insulation missing) replace wiring immediately.

Piping and Hose Connection

Inspect all piping, oil hose, and fuel hose connections for wear and tightness. Tighten all hose clamps and check fuel or leaks. If any hose (fuel or oil) lines are defective replace them immediately.

Fuel Strainer

1. Thoroughly clean the area around the fuel cap.
2. Remove the fuel cap from the fuel tank.
3. Next, remove, inspect and clean the fuel strainer (Figure 29) with solvent.

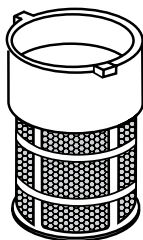


Figure 29. Fuel Strainer

Spark Plug

1. Remove and clean the spark plug (Figure 30), then adjust the spark gap to 0.024~0.028 inch (0.6~0.7 mm). This unit has electronic ignition, which requires no adjustments.

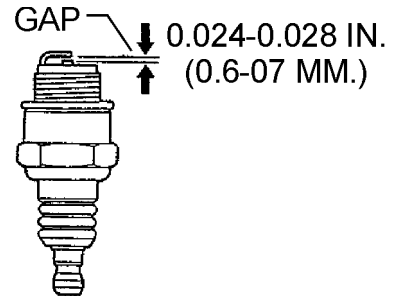


Figure 30. Spark Plug Gap

ENGINE OIL

2. Drain the engine oil when the oil is warm as shown in (Figure 31).
3. Remove the oil drain bolt and sealing washer and allow the oil to drain into a suitable container.
4. Replace engine oil with recommended type oil as listed in Table 7. For engine oil capacity, see Table 2 (engine specifications). **DO NOT** overfill.
5. Install drain bolt with sealing washer and tighten securely.

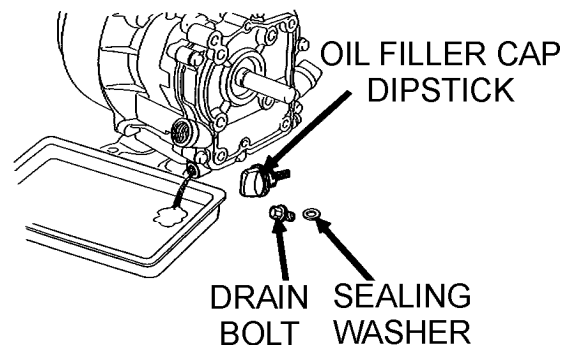


Figure 31. Draining Engine Oil

! DANGER



DO NOT use gasoline as a cleaning solvent, the possibility exists of fire or explosion which can cause damage to the equipment and severe bodily harm or even **DEATH!**

ENGINE AIR CLEANER

1. Remove the air cleaner cover (Figure 32) and foam filter element as shown in .
2. Clean foam element in warm, soapy water or nonflammable solvent. Rinse and dry thoroughly. Dip the element in clean engine oil and completely squeeze out the excess oil from the element before installing.

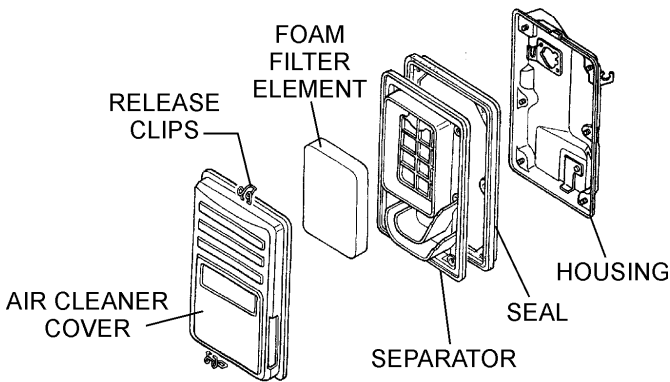


Figure 32. Engine Air Cleaner

3. Clean foam element (Figure 33) in warm, soapy water or non-flammable solvent. Rinse and dry thoroughly.
4. Next, dip the element in clean engine oil and completely squeeze out the excess oil from the element before installing.

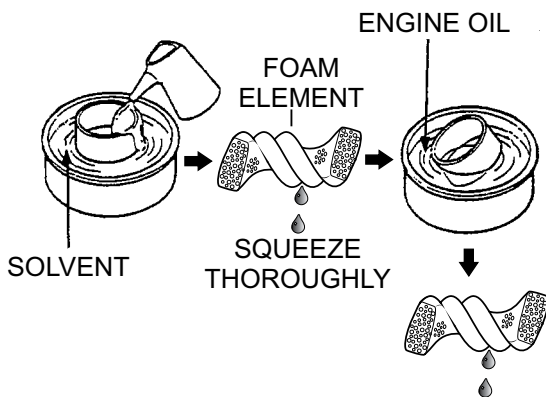


Figure 33. Cleaning Foam Element

SPARK ARRESTER CLEANING

Clean the spark arrester every 6 months or 100 hours.

1. Remove the muffler protector retaining bolts (Figure 34), then remove muffler protector.
2. Next, remove tapping screw that secures spark arrester to muffler, then remove spark arrester.

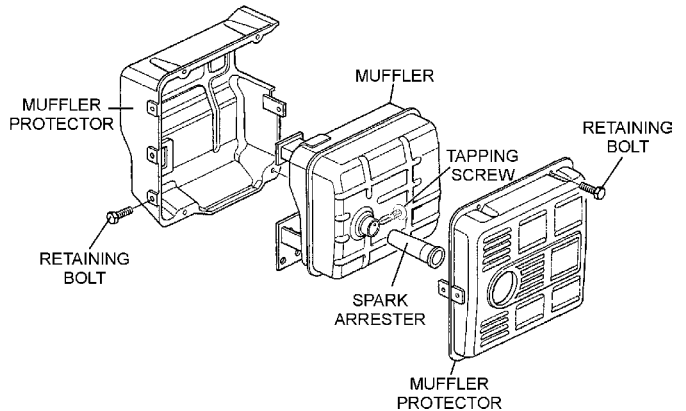


Figure 34. Spark Arrester Removal

3. Carefully remove carbon deposits from the spark arrester screen (Figure 35) with a wire brush.

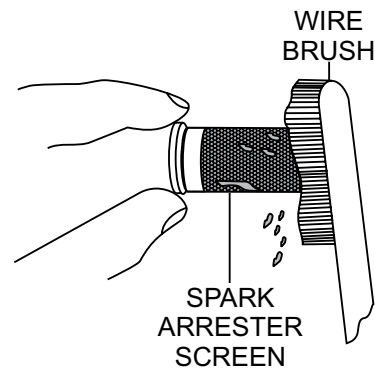


Figure 35. Cleaning The Spark Arrester

4. If the spark arrester is damaged and has breaks or holes, replace with a new one.
5. Reinstall the spark arrester and muffler protector in reverse order of disassembly.

BATTERY

This unit is of negative ground. **DO NOT** connect in reverse. Always maintain battery fluid level between the specified marks. Battery life will be shortened, if the fluid levels are not properly maintained. Add only distilled water when replenishment is necessary.

Check to see whether the battery cables are loose. Poor contact may result in poor starting or malfunctions. Always keep the terminals firmly tightened. Coating the terminals with an approved battery terminal treatment compound will help prevent corrosion. Replace battery with only recommended type battery.

The battery is sufficiently charged if the specific gravity of the battery fluid is 1.28 (at 68° F). If the specific gravity should fall to 1.245 or lower, it indicates that the battery is dead and needs to be recharged or replaced.

Before charging the battery with an external electric source, be sure to disconnect the battery cables.

BATTERY CABLE INSTALLATION

NOTICE

Inadequate battery cable connections may cause poor starting of the generator, and create other malfunctions.

ALWAYS be sure the battery cables are properly connected to the battery terminals (Figure 36). The **red** cable is connected to the positive terminal of the battery, and the **black** cable is connected to the negative terminal of the battery.

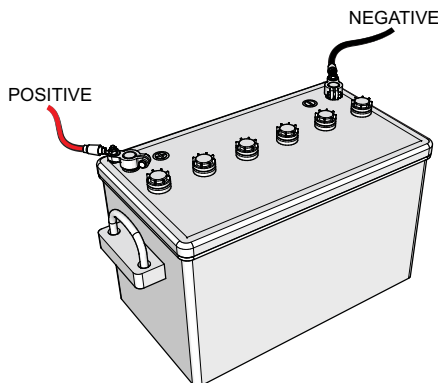


Figure 36. Battery Connections

NOTICE

ALWAYS disconnect the negative terminal first and reconnect negative terminal last.

When connecting battery do the following:

1. **NEVER** use worn or damaged battery cables. Replace defective battery cables immediately.
2. Place a small amount of battery terminal treatment compound around both battery terminals. This will ensure a good connection and will help prevent corrosion around the battery terminals.

NOTICE

If the battery cables are connected incorrectly, electrical damage to the generator will occur. Pay close attention to the polarity markings on the battery when connecting the battery cables.

POLARITY

The polarity of the battery is extremely important. When an inverted circuit connection takes place, the circuit will be in short circuit instantaneously resulting in possible damage to the control box electronics and starter.

When connecting the battery cables to the battery terminals be sure to check the polarity.

TESTING THE GFCI CIRCUIT BREAKER

1. Start the generator as outlined in the start up procedure in this manual.
2. Place idle control switch (Figure 37) in the **OFF** position. This will allow the engine speed to run at about 3600 RPM's (*high speed*).

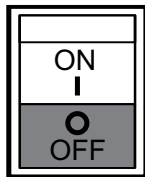


Figure 37. Idle Control Switch ON (GFCI Test)

3. Place the AC circuit breaker (Figure 38) in the **ON** position.

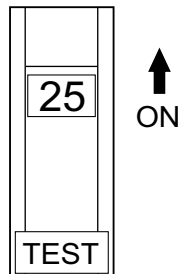


Figure 38. AC Circuit Breaker ON (GFCI Test)

4. Press the **test button** (Figure 39) on the AC circuit breaker and verify that the circuit breaker lever moves (*click*) from the **ON** position to the **center** trip position. This indicates that that the GFCI breaker is working correctly and ground faults will be detected.

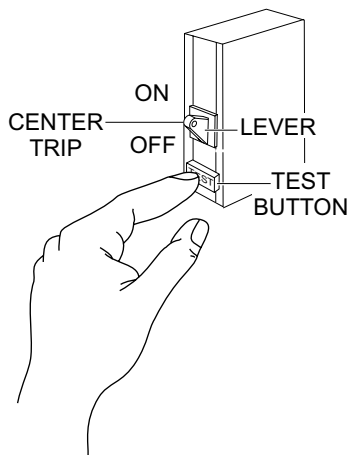


Figure 39. GFCI Breaker (Test)

5. Use an external voltmeter as shown in Figure 40, and verify that no voltage (zero) is present at the 120V twist-lock and GFCI duplex receptacles.

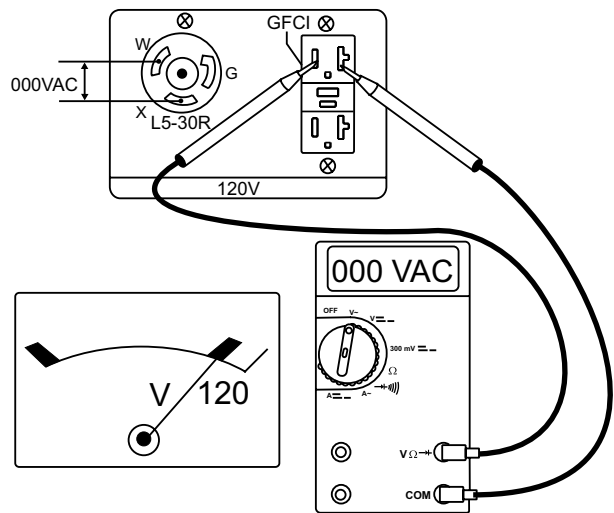


Figure 40. 120V Twist-Lock/GFCI Receptacles (GFCI Test)

NOTICE

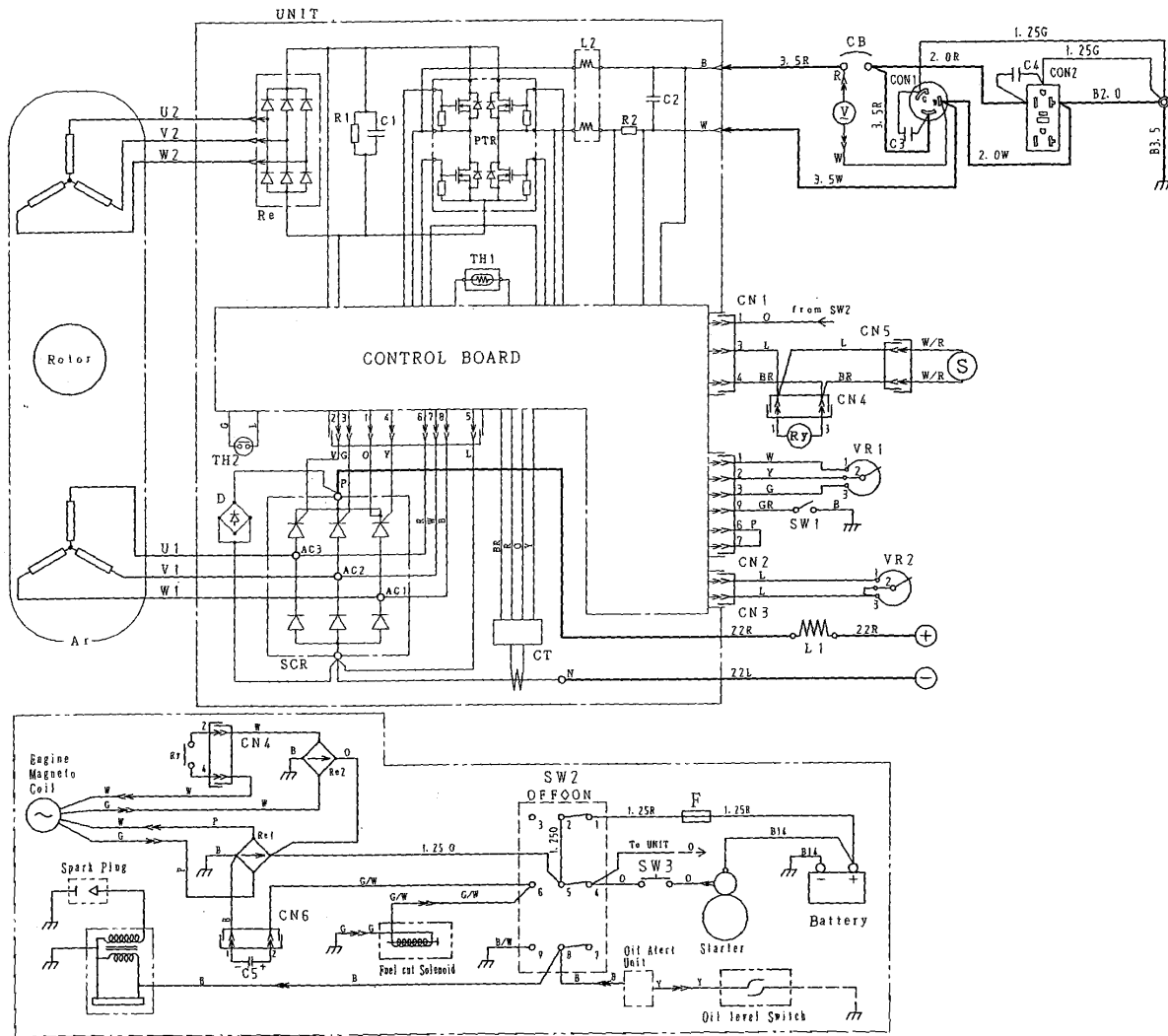
The AC voltmeter on the control panel will still indicate 120 VAC since it is not connected to the load side of the breaker.

6. Reset AC circuit breaker by placing lever to the **OFF** position then to the **ON** position.

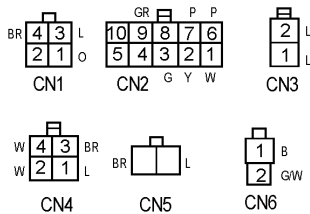
NOTICE

The GFCI circuit breaker should be tested at least once a month. **NEVER** perform the GFCI circuit breaker test with the engine running at low speed (idle control switch ON), damage to the GFCI may occur.

WELDER/GENERATOR WIRING DIAGRAM



COLOR CODE	
WIRE COLOR	WIRE COLOR
B BLACK	R RED
L BLUE	W WHITE
BR BROWN	Y YELLOW
G GREEN	LB LIGHT BLUE
GR GRAY	LG LIGHT GREEN
V VIOLET	O ORANGE
P PINK	



CONNECTOR ARRANGEMENT
(VIEW FROM INSERTING WIRE SIDE)

SYMBOL	DESIGNATION
Ar	ARMATURE WINDING
ROTOR	ROTOR ASSEMBLY
CB	CIRCUIT BREAKER 25A
Ex W2	EXCITATION WINDING
CON 1	RECEPTACLE L5-30R 30A 125V/250V
CON 2	RECEPTACLE 5-20R 20A, 125V
V	AC VOLTMETER 120/240V
C3, C4	SURGE FILTER
SW1	IDLE CONTROL SWITCH
VR1	CURRENT REGULATOR
VR2	ARC FORCE REGULATOR
L1	DC REACTOR
⊕ ⊖	WELDING OUTPUT TERMINALS
SW2	OPERATION SWITCH
SW3	STARTER SWITCH
RE 1~2	RECTIFIER
S	IDLE CONTROL SOLENOID
Ry	RELAY
C5	CAPACITOR
F	FUSE

TROUBLESHOOTING (WELDER/GENERATOR)

Troubleshooting (Welder/Generator)		
Symptom	Possible Problem	Solution
No Arcing	Loose or disconnected wires?	Check wire connections.
	Defective generator?	Check or replace generator.
	Defective control unit?	Check or replace control unit
	Defective current regulator?	Check or replace current regulator.
	Defective output terminals	Replace output terminals.
Current or ARC force regulator not working properly	Loose or disconnected wires?	Check wire connections.
	Defective control unit?	Replace control unit.
	Defective current or ARC force regulator?	Replace current or ARC force regulator.
No AC voltage output.	Loose or disconnected wires?	Check wire connections.
	Defective generator?	Check or replace generator.
	Defective control unit?	Replace control unit.
	Defective circuit breaker?	Replace circuit breaker.
Overheating	Overload?	Reduce load.
	Poor ventilation?	Check air space around welder-generator. Make sure there is at least 3.0 ft./1 meter clearance on all sides of the welder-generator.
	Stator winding malfunction?	Check or replace stator.
	Leakage breaker malfunction?	Check or replace CB1.
Low voltage	Engine speed too low?	Raise engine speed to rated RPM.
Low voltage, 3650 RPM (unloaded), 2600 RPM (idle)	AC voltmeter not working?	Replace AC voltmeter.
	Control box internal wiring malfunction?	Check control box wiring.
	Rotor winding malfunction?	Check or replace rotor.
	Stator winding malfunction?	Check or replace stator.
	Leakage breaker malfunction?	Check or replace CB1.

TROUBLESHOOTING WELDER/GENERATOR)

Troubleshooting (Welder/Generator)-continued		
Symptom	Possible Problem	Solution
Voltage output too high.	Engine speed too high?	Lower engine speed to rated RPM.
Voltage output too high. Engine speed normal 3650 RPM (unloaded), 2500 RPM (idle)	Control box internal wiring malfunction	Check control box wiring.
Circuit breaker will not turn on "NO LOAD"	Defective circuit breaker?	Replace circuit breaker.
	Loose connection?	Inspect connections.
Circuit breaker will turn on "LOADED" but trips immediately.	Overload Condition?	Reduce load or replace breaker.
	Load circuit is shorted?	Check load circuit for short.
	Loose connection?	Inspect connections.
Does not accelerate from low to high "NO LOAD"	Stuck solenoid?	Check solenoid.
	Bad Idle control switch?	Check or replace idle control switch.
Does not accelerate from low to high "LOAD ACTIVE"	Idle control switch malfunction?	Check or replace idle control switch.
	Idle control device malfunction?	Check or replace idle control device.
	Control box internal wiring defective?	Check control box wiring.
Does not decelerate but has "VOLTAGE OUTPUT".	Control box wiring malfunction?	Check control box wiring, replace any defective components.
	Defective solenoid?	Check or replace solenoid.
	Idle control device malfunction?	Check or replace idle control device.

TROUBLESHOOTING (ENGINE)

Troubleshooting (Engine)		
Symptom	Possible Problem	Solution
Difficult to start, fuel is available, but no spark at spark plug.	Spark plug bridging?	Check gap, insulation or replace spark plug.
	Carbon deposit on spark plug?	Clean or replace spark plug.
	Short circuit due to deficient spark plug insulation?	Check spark plug insulation, replace if worn.
	Improper spark plug gap?	Set to proper gap.
	Spark plug is red?	Check transistor ignition unit.
	Spark plug is bluish white?	If insufficient compression, repair or replace engine. If injected air leaking, correct leak. If carburetor jets clogged, clean carburetor.
	No spark present at tip of spark plug?	Check if transistor ignition unit is broken, and replace defective unit. Check if voltage cord cracked or broken and replace. Check if spark plug is fouled and replace.
	No oil?	Add oil as required.
Difficult to start, fuel is available, and spark is present at the spark plug.	Oil pressure alarm lamp blinks upon starting? (if applicable)	Check automatic shutdown circuit, oil sensor. (if applicable)
	ON/OFF switch is shorted?	Check switch wiring, replace switch.
	Ignition coil defective?	Replace ignition coil.
	Improper spark gap, points dirty?	Set correct spark gap and clean points.
	Condenser insulation worn or short circuiting?	Replace condenser.
Difficult to start, fuel is available, spark is present and compression is normal.	Spark plug wire broken or short circuiting?	Replace defective spark plug wiring.
	Wrong fuel type?	Flush fuel system, replace with correct type of fuel.
	Water or dust in fuel system?	Flush fuel system.
	Air cleaner dirty?	Clean or replace air cleaner.
Difficult to start, fuel is available, spark is present and compression is low.	Choke open?	Close choke.
	Suction/exhaust valve stuck or protruded?	Reseat valves.
	Piston ring and/or cylinder worn?	Replace piston rings and/or piston.
	Cylinder head and/or spark plug not tightened properly?	Torque cylinder head bolts and spark plug.
No fuel present at carburetor.	Head gasket and/or spark plug gasket damaged?	Replace head and spark plug gaskets.
	No fuel in fuel tank?	Fill with correct type of fuel.
	Fuel cock does not open properly?	Apply lubricant to loosen fuel cock lever, replace if necessary.
	Fuel filter/lines clogged?	Replace fuel filter.
	Fuel tank cap breather hole clogged?	Clean or replace fuel tank cap.
Air in fuel line?	Bleed fuel line.	

TROUBLESHOOTING (ENGINE)

Troubleshooting (Engine) - continued		
Symptom	Possible Problem	Solution
Weak in power, compression is proper and does not misfire.	Air cleaner dirty?	Clean or replace air cleaner.
	Improper level in carburetor?	Check float adjustment, rebuild carburetor.
	Defective spark plug?	Clean or replace spark plug.
	Improper spark plug?	Set to proper gap.
Weak in power, compression is proper but misfires.	Water in fuel system?	Flush fuel system and replace with correct type of fuel.
	Dirty spark plug?	Clean or replace spark plug.
	Ignition coil defective?	Replace ignition coil.
Engine overheats.	Wrong type of fuel?	Replace with correct type of fuel.
	Cooling fins dirty?	Clean cooling fins.
	Intake air restricted?	Clear intake of dirt and debris. Replace air cleaner elements as necessary.
	Oil level too low or too high?	Adjust oil to proper level.
Rotational speed fluctuates.	Governor adjusted incorrectly?	Adjust governor.
	Governor spring defective?	Replace governor spring.
	Fuel flow restricted?	Check entire fuel system for leaks or clogs.
Recoil starter malfunctions. (if applicable)	Recoil mechanism clogged with dust and dirt?	Clean recoil assembly with soap and water.
	Spiral spring loose?	Replace spiral spring.
Starter malfunctions.	Loose, damaged wiring?	Ensure tight, clean connections on battery and starter.
	Battery insufficiently charged?	Recharge or replace battery.
	Starter damaged or internally shorted?	Replace starter.
Burns too much fuel.	Over-accumulation of exhaust products?	Check and clean valves. Check muffler and replace if necessary.
	Wrong spark plug?	Replace spark plug with manufacturer's suggested type.
Exhaust color is continuously white.	Lubricating oil is wrong viscosity?	Replace lubricating oil with correct viscosity.
	Worn rings?	Replace rings.
Exhaust color is continuously black.	Air cleaner clogged?	Clean or replace air cleaner.
	Choke valve set to incorrect position?	Adjust choke valve to correct position.
	Carburetor defective, seal on carburetor broken?	Replace carburetor or seal.
	Poor carburetor adjustment, engine runs too rich?	Adjust carburetor.
Will not start, no power with key ON. (if applicable)	ON/OFF device not activated ON?	Turn on ON/OFF device.
	Battery disconnected or discharged?	Check cable connections. Charge or replace battery.
	Ignition switch/wiring defective?	Replace ignition switch. Check wiring.

OPERATION MANUAL

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL
NUMBER ON HAND WHEN CALLING

UNITED STATES

Multiquip Inc.

(310) 537- 3700
6141 Katella Avenue Suite 200
Cypress, CA 90630
E-MAIL: mq@multiquip.com
WEBSITE: www.multiquip.com

CANADA

Multiquip

(450) 625-2244
4110 Industriel Boul.
Laval, Quebec, Canada H7L 6V3
E-MAIL: infocanada@multiquip.com

UNITED KINGDOM

Multiquip (UK) Limited Head Office

0161 339 2223
Unit 2, Northpoint Industrial Estate, Globe Lane,
Dukinfield, Cheshire SK16 4UJ
E-MAIL: sales@multiquip.co.uk

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by
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