Owner's Manual & Safety Instructions

Save This Manual Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual and the receipt in a safe and dry place for future reference. 21d

VULCAN®

OUTLAW™ 195
ENGINE DRIVEN WELDER/AC GENERATOR

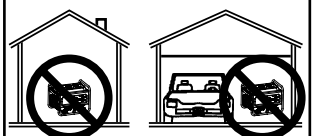
57167

Visit our website at: http://www.harborfreight.com
Email our technical support at: predator@harborfreight.com
Email our engine support at: predator@harborfreight.com

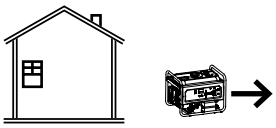
⚠ DANGER

Using a generator indoors CAN KILL YOU IN MINUTES.

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



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



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

When unpacking, make sure that the product is intact and undamaged. If any parts are missing or broken, please call 1-888-866-5797 as soon as possible.

Diagrams within this manual may not be drawn proportionally. Due to continuing improvements, actual product may differ slightly from the product described herein. Tools required for assembly and service may not be included.

⚠ WARNING

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

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Specifications

Generator	Output		120/240VAC, 60Hz 6,000 Running Watts (6,500 Max. Starting Watts)
	Battery for electric start		12V, lead acid, 18Ah
	Electrical Receptacle		Two 3-Prong, duplex NEMA #5-20 120V GFCI One 4-Prong, NEMA #L14-30 twistlock 120V/240V
Welder	Welding Current Range		20A–195A
	Rated Duty Cycles		30% @ 195A 100% @ 107A
	Maximum OCV		78V
	Weldable Materials		Iron, Steel and Steel Alloy
Engine	Displacement		420cc
	Engine Type		Horizontal Single Cylinder 4 stroke OHV
	Cooling System		Forced air cooled
	Fuel	Type	87+ octane stabilizer treated unleaded gasoline
		Capacity	5.5 Gallons
	Engine Oil	Type SAE	10W–30 above 32°F 5W–30 at 32°F or below
		Capacity	1.16 Quart
	Spark Plug	Type	Torch® F7TC
		Gap	0.028″–0.031″
	Valve Clearance	Intake	0.002″–0.004″
		Exhaust	0.004″–0.006″
	Run Time @ 50% load		6.5 hours

The emissions control system for this Engine is warranted for standards set by the U.S. Environmental Protection Agency and by the California Air Resources Board (also known as CARB). For warranty information, refer to the last pages of this manual.

WARNING SYMBOLS AND DEFINITIONS	
⚠	This is the Safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all Safety messages that follow this symbol to avoid possible injury or death.
⚠DANGER	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 CAUTION	Addresses practices not related to personal injury.

IMPORTANT SAFETY INFORMATION

⚠WARNING

Read all Safety warnings and instructions.
Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.
Save all warnings and instructions for future reference.

Engine/Generator Safety Instructions

SAVE THESE INSTRUCTIONS –
This manual contains important instructions that should be followed during installation and maintenance of the generator and any batteries.

Set up Precautions

1. This unit is to be installed so that access is restricted to only qualified service personnel who have been instructed of the reasons for the restrictions applied to the location and about any precautions that must be taken. Access shall be through the use of a special tool, or lock and key, or other means of security and shall be controlled by the authority responsible for the location.
2. Gasoline fuel and fumes are flammable, and potentially explosive. Use proper fuel storage and handling procedures. Do not store fuel or other flammable materials nearby.
3. Have multiple ABC class fire extinguishers nearby.
4. Operation of this equipment may create sparks that can start fires around dry vegetation. A spark arrestor may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.
5. Set up and use only on a flat, level, well-ventilated surface.
6. All connections and conduits from the Generator to the load must only be installed by trained and licensed electricians, and in compliance with all relevant local, state, and federal electrical codes and standards, and other regulations where applicable.
7. Connections for standby power to a building electrical system must be made by a qualified electrician. The connection must isolate the Generator power from utility power, and must comply with all applicable laws and electrical codes.
8. Wear ANSI-approved safety goggles, heavy-duty work gloves, and dust mask/respirator during set up.
9. Use only lubricants and fuel recommended in this manual.

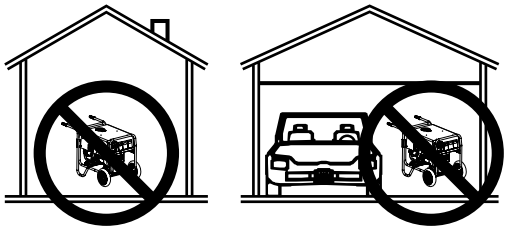
10. Improper connections to a building electrical system can allow electrical current from the Generator to backfeed into the utility lines. Such backfeed may electrocute utility company workers or others who contact the lines during a power outage, and the Generator may explode, burn, or cause fires when utility power is restored. Consult the utility company and a qualified electrician if intending to use the Generator for back up power.

11. Do not operate the Generator before grounding. The Generator must be earth-grounded in accordance with all relevant electrical codes and standards before operation.

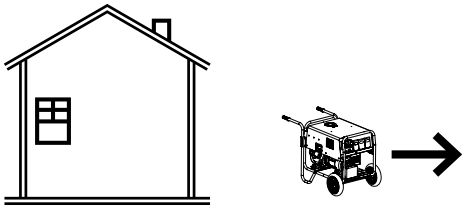
Operating Precautions

1. 

CARBON MONOXIDE HAZARD
Using a generator indoors CAN KILL YOU IN MINUTES.
Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.



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



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

2. Never use a generator indoors, including in garages, basements, crawlspaces and sheds. Opening doors and windows or using fans will NOT prevent carbon monoxide build up in the home.

3. When using generators, keep them outdoors and far away from open doors, windows, and vents to avoid toxic levels of carbon monoxide from building up indoors.

4. If you start to feel sick, dizzy, or weak while using a generator, get to fresh air right away. The carbon monoxide from generators can quickly lead to full incapacitation and death.

5. Keep children away from the equipment, especially while it is operating.

6. Keep all spectators <u>at least six feet</u> from the engine during operation.

7. Do not touch engine during use. Let engine cool down after use.

8. Never store fuel or other flammable materials near the engine.

9. Fire Hazard! Do not fill gas tank while engine is running. Do not operate if gasoline has been spilled. Clean spilled gasoline before starting engine. Do not operate near pilot light or open flame.

10. If the plugged-in product operates abnormally or unusually slow, immediately stop using the Generator as a power source. Always read and adhere to the instruction manual of the product to be powered, to make sure that it can be safely and efficiently powered by a portable generator.

11. Before connecting an appliance or power cord to the Generator: Make sure that it is in good working order. Faulty appliances or power cords can create a potential for electrical shock.

12. Do not exceed the maximum power rating of the Generator. Make sure that the total electrical rating of the all of the tools or appliances plugged into the Generator at the same time does not exceed that of the Generator. Check that the startup surge will not be beyond the limit of the Generator. Power levels between rated and maximum may be used for no more than 30 minutes.

13. Avoid substantially overloading which will trip the circuit breaker. Exceeding the time limit for maximum power operation or slightly overloading the Generator may not switch the circuit breaker or circuit protector OFF, but will shorten the service life of the Generator.

14. Do not attempt to connect or disconnect load connections while standing in water, or on wet or soggy ground.

15. Do not touch electrically energized parts of the Generator and interconnecting cables or conductors with any part of the body, or with any non-insulated conductive object.

16. Connect the Generator only to a load or electrical system (120 volt or 240 volt) that is compatible with the electrical characteristics and rated capacities of the Generator.

17. **GFCI PRECAUTIONS**
    Test Ground Fault Circuit Interrupter (GFCI) receptacles before each use as follows:
    a. Disconnect all devices from the Generator.
    b. Start the engine.
    c. Press Test button on receptacle to trip the GFCI device.
    d. The Reset button should extend, cutting off electricity to the receptacle.
    e. If above test fails, do not use receptacle until it is repaired or replaced.
    f. Press Reset button in for use.

    GFCI receptacles will not protect against electric shock if Generator is not grounded. Refer to *Grounding* on page 12.

18. Insulate all connections and disconnected wires.

19. Guard against electric shock. Prevent body contact with grounded surfaces such as pipes, radiators, ranges, and refrigerators.

20. Only use a suitable means of transport and lifting devices with sufficient weight bearing capacity when transporting the Generator.

21. Secure the Generator on transport vehicles to prevent the tool from rolling, slipping, and tilting.

22. Industrial applications must follow OSHA requirements.

23. Do not leave the Generator unattended when it is running. Turn off the Generator (and remove safety keys, if available) before leaving the work area.

24. The Generator engine can produce high noise levels. Prolonged etransport vehicles to prevent the tool from rolling, slipping, and tiltinxposure to noise levels above 85 dBA is hazardous to hearing. Always wear ear protection when operating or working around the gas engine while it is operating.

25. Wear ANSI-approved safety glasses, hearing protection, and NIOSH-approved dust mask/respirator during use.

26. People with pacemakers should consult their physician(s) before use. Electromagnetic fields in close proximity to a heart pacemaker could cause pacemaker interference or pacemaker failure. Caution is necessary when near the engine's magneto or recoil starter.

27. Use only accessories that are recommended by Harbor Freight Tools for your model. Accessories that may be suitable for one piece of equipment may become hazardous when used on another piece of equipment.

28. Do not operate in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust. Gasoline-powered engines may ignite the dust or fumes.

29. Keep grounded conductive objects, such as tools, away from exposed, live electrical parts and connections to avoid sparking or arcing. These events could ignite fumes or vapors.

30. Stay alert, watch what you are doing and use common sense when operating this piece of equipment. Do not use this piece of equipment while tired or under the influence of drugs, alcohol or medication.

31. Dress properly. Do not wear loose clothing or jewelry. Keep hair, clothing and gloves away from moving parts. Loose clothes, jewelry or long hair can be caught in moving parts.

32. Parts, especially exhaust system components, get very hot during use. Stay clear of hot parts.

33. Do not cover the Generator or its engine during operation.

34. Keep the Generator, its engine, and surrounding area clean at all times.

35. Do not smoke, or allow sparks, flames, or other sources of ignition around the equipment, especially when refuelling.

36. Use the Generator, accessories, etc., in accordance with these instructions and in the manner intended for the particular type of equipment, taking into account the working conditions and the work to be performed. Use of the equipment for operations different from those intended could result in a hazardous situation.

37. Do not operate the Generator with known leaks in the engine's fuel system.

38. When spills of fuel or oil occur, they must be cleaned up immediately. Dispose of fluids and cleaning materials as per any local, state, or federal codes and regulations. Store oil rags in a bottom-ventilated, covered, metal container.

39. Keep hands and feet away from moving parts. Do not reach over or across Generator while operating.

40. Before use, check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the Generator's operation. **If damaged, have the Generator serviced before using.** Many accidents are caused by poorly maintained equipment.

41. Use the correct generator for the application. Do not modify the generator or its engine, and do not use the generator for a purpose for which it is not intended.

Service Precautions

1. **Before service, maintenance, or cleaning:**
   a. **Unplug all devices from the Generator.**
   b. **Turn the engine switch to its "OFF" position.**
   c. **Allow the engine to completely cool.**
   d. **Then, remove the spark plug cap from the spark plug.**
2. Keep all safety guards in place and in proper working order. Safety guards include muffler, air cleaner, mechanical guards, and heat shields, among other guards.
3. Make sure the Engine Switch is in its "OFF" position before moving the Generator and before performing any service, maintenance, or cleaning procedures on the unit.
4. Keep all electrical equipment clean and dry. Replace any wiring where the insulation is cracked, cut, abraded, or otherwise degraded. Replace terminals that are worn, discolored, or corroded. Keep terminals clean and tight.
5. **Do not alter or adjust any part of the equipment or its engine that is sealed by the manufacturer or distributor. Only a qualified service technician may adjust parts that may increase or decrease governed engine speed.**
6. Wear ANSI-approved safety goggles, heavy-duty work gloves, and dust mask/respirator during service.
7. Maintain labels and nameplates on the equipment. These carry important information. If unreadable or missing, contact Harbor Freight Tools for a replacement.
8. Have the equipment serviced by a qualified repair person using only identical replacement parts. This will ensure that the safety of the equipment is maintained. Do not attempt any service or maintenance procedures not explained in this manual or any procedures that you are uncertain about your ability to perform safely or correctly.
9. Store equipment out of the reach of children.
10. Follow scheduled engine and equipment maintenance.

GFCI Protection:

This Generator is equipped with two 3-Prong, duplex 120V ground fault circuit interrupter (GFCI) receptacles. These outlets provide additional protection from the risk of electric shock. Should replacement of the receptacles become necessary, use only identical replacement parts that include GFCI protection.

Refueling:

1. Do not refill the fuel tank while the engine is running or hot.
2. Do not smoke, or allow sparks, flames, or other sources of ignition around the equipment, especially when refuelling.
3. **TO PREVENT FUEL LEAKAGE AND FIRE HAZARD, Do not overfill with fuel. Fill with fuel according to the Fuel Level information below the Specification chart for your model.**
4. Do not fill fuel tank to the top. Leave a little room for the fuel to expand as needed.
5. Refuel in a well-ventilated area only.
6. Wipe up any spilled fuel and allow excess to evaporate before starting engine. **To prevent FIRE, do not start the engine while the smell of fuel hangs in the air.**

Battery Service:

1. Servicing of batteries are to be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.
2. When replacing batteries, use the following type batteries: 12V, 18Ah sealed, lead-acid type.
3. CAUTION – Do not dispose of battery or batteries in a fire. The battery is capable of exploding.
4. CAUTION – Do not open or mutilate the battery. Released electrolyte has been known to be harmful to the skin and eyes and to be toxic.
5. CAUTION – A battery presents a risk of high short circuit current. The following precautions are to be observed when working on batteries:
   a. Remove watches, rings, or other metal objects.
   b. Use tools with insulated handles.
   c. Do not lay tools or metal parts on top of batteries.

SAVE THESE INSTRUCTIONS.

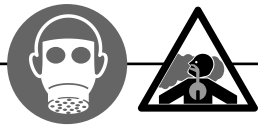
SAVE THESE INSTRUCTIONS –
This manual contains important instructions that should be followed during installation, use, and maintenance of the welder.

General Safety

PROTECT yourself and others. Read and understand this information.

1. **Before use, read and understand manufacturer's instructions, Material Safety Data Sheets (MSDS's), employer's Safety practices, and ANSI Z49.1.**
2. **Keep out of reach of children.** Keep children and bystanders away while operating.
3. **Place the welder on a stable location before use.** If it falls while plugged in, severe injury, electric shock, or fire may result.
4. **Do not overreach. Keep proper footing and balance at all times.**
5. **Stay alert, watch what you are doing and use common sense when operating a welder. Do not use a welder while you are tired or under the influence of drugs, alcohol or medication.** *A moment of inattention while operating welders may result in serious personal injury.*
6. **Avoid unintentional starting.** Make sure you are prepared to begin work before turning on the Welder.
7. **Never leave the Welder unattended while energized.** Turn power off if you have to leave.
8. **The warnings, precautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur.** It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

Fume and Gas Safety



INHALATION HAZARD:
Welding and Plasma Cutting produce toxic fumes.

1. **Exposure to welding or cutting exhaust fumes can increase the risk of developing certain cancers, such as cancer of the larynx and lung cancer.** Also, some diseases that may be linked to exposure to welding or plasma cutting exhaust fumes are:
   - Early onset of Parkinson's Disease
   - Heart disease
   - Ulcers
   - Damage to the reproductive organs
   - Inflammation of the small intestine or stomach
   - Kidney damage
   - Respiratory diseases such as emphysema, bronchitis, or pneumonia

   Use natural or forced air ventilation and wear a respirator approved by NIOSH to protect against the fumes produced to reduce the risk of developing the above illnesses.
2. **Do not use near degreasing or painting operations.**
3. **Keep head out of fumes.** Do not breathe exhaust fumes.
4. **Use enough ventilation, exhaust at arc, or both, to keep fumes and gases from breathing zone and general area.** If engineering controls are not feasible, use an approved respirator.
5. **Work in a confined area only if it is well-ventilated, or while wearing an air-supplied respirator.**
6. **Have a recognized specialist in Industrial Hygiene or Environmental Services check the operation and air quality and make recommendations for the specific welding situation.** Follow OSHA guidelines for Permissible Exposure Limits (PEL's) and the American Conference of Governmental Industrial Hygienists recommendations for Threshold Limit Values (TLV's) for fumes and gases.

Arc Ray Safety

ARC RAYS can injure eyes and burn skin.

1. **Wear ANSI-approved welding eye protection featuring at least a number 10 shade lens rating.**
2. **Wear leather leggings, fire resistant shoes or boots during use.** Do not wear pants with cuffs, shirts with open pockets, or any clothing that can catch and hold molten metal or sparks.
3. **Keep clothing free of grease, oil, solvents, or any flammable substances.** Wear dry, insulating gloves and protective clothing.
4. **Wear an approved head covering to protect the head and neck.** Use aprons, cape, sleeves, shoulder covers, and bibs designed and approved for welding and cutting procedures.
5. **Wear an approved welding jacket or long sleeves to protect forearms from radiation burns.**
6. **When welding/cutting overhead or in confined spaces, wear flame resistant ear plugs or ear muffs to keep sparks out of ears.**

Electrical Safety

ELECTRIC SHOCK can KILL.

1. **Turn off, disconnect power, and discharge Electrode to ground before setting down torch/Electrode holder and before service.**
2. **Do not touch energized electrical parts.** Wear dry, insulating gloves. Do not touch Electrode holder, Electrode, welding torch, or welding wire with bare hand. Do not wear wet or damaged gloves.
3. **Connect to grounded, GFCI-protected power supply only.**
4. **Do not use near water or damp objects.**
5. **People with pacemakers should consult their physician(s) before use.** Electromagnetic fields in close proximity to heart pacemaker could cause pacemaker interference or pacemaker failure.
6. **Do not expose welders to rain or wet conditions.** Water entering a welder will increase the risk of electric shock.
7. **Do not abuse the cord. Never use the cord for carrying, pulling or unplugging the welder. Keep cord away from heat, oil, sharp edges or moving parts.** *Damaged or entangled cords increase the risk of electric shock.*
8. **Do not use outdoors.**
9. **Insulate yourself from the workpiece and ground.** Use nonflammable, dry insulating material if possible, or use dry rubber mats, dry wood or plywood, or other dry insulating material large enough to cover your full area of contact with the work or ground.

Fire Safety

ARC AND HOT SLAG can cause fire.

1. **Clear away or protect flammable objects.** Remove or make safe all combustible materials for a radius of 35 feet (10 meters) around the work area. Use a fire resistant material to cover or block all open doorways, windows, cracks, and other openings.
2. **Keep ABC-type fire extinguisher near work area and know how to use it.**
3. **Maintain a safe working environment.** Keep the work area well lit. Make sure there is adequate surrounding workspace. Keep the work area free of obstructions, grease, oil, trash, and other debris.
4. **Do not operate welders in atmospheres containing dangerously reactive or flammable liquids, gases, vapors, or dust.** Provide adequate ventilation in work areas to prevent accumulation of such substances. *Welders create sparks which may ignite flammable substances or make reactive fumes toxic.*
5. **If working on a metal wall, ceiling, etc., prevent ignition of combustibles on the other side by moving the combustibles to a safe location.** If relocation of combustibles is not possible, designate someone to serve as a fire watch, equipped with a fire extinguisher, during the cutting process and for at least one half hour after the cutting is completed.

6. **Do not weld or cut on materials having a combustible coating or combustible internal structure, as in walls or ceilings, without an approved method for eliminating the hazard.**
7. **Do not dispose of hot slag in containers holding combustible materials.**
8. **After welding, make a thorough examination for evidence of fire.** Be aware that easily visible smoke or flame may not be present for some time after the fire has started.
9. **Do not apply heat to a container that has held an unknown substance or a combustible material whose contents, when heated, can produce flammable or explosive vapors.** Clean and purge containers before applying heat. Vent closed containers, including castings, before preheating, welding, or cutting.

Welder Use and Care

1. **Do not use the welder if the switch does not turn it on and off.** *Any welder that cannot be controlled with the switch is dangerous and must be repaired.*
2. **Disconnect the plug from the power source before making any adjustments, changing accessories, or storing welders.** *Such preventive Safety measures reduce the risk of starting the welder accidentally.*
3. **Prevent unintentional starting. Ensure the switch is in the off-position before connecting to power source or moving the welder.** *Carrying or energizing welders that have the switch on invites accidents.*
4. **Store idle welders out of the reach of children and do not allow persons unfamiliar with the welder or these instructions to operate the welder.** Welders are dangerous in the hands of untrained users.
5. **Use the welder and accessories in accordance with these instructions, taking into account the working conditions and the work to be performed.** *Use of the welder for operations different from those intended could result in a hazardous situation.*
6. **Do not use the welder for pipe thawing.**

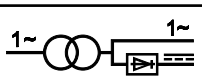
Maintenance

1. **Maintain welders. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the welder's operation. If damaged, have the welder repaired before use.** *Many accidents are caused by poorly maintained welders.*
2. **Have your welder serviced by a qualified repair person using only identical replacement parts.** *This will ensure that the Safety of the welder is maintained.*
3. **Maintain labels and nameplates on the Welder.** These carry important information. If unreadable or missing, contact Harbor Freight Tools for a replacement.
4. **Unplug before maintenance.** Unplug the Welder from its electrical outlet before any inspection, maintenance, or cleaning procedures.

SAVE THESE INSTRUCTIONS.

Symbology

RPM	Revolutions Per Minute
HP	Horsepower
	WARNING marking concerning Risk of Eye Injury. Wear ANSI-approved safety goggles with side shields.
	Read the manual before set-up and/or use.
	WARNING marking concerning Risk of Hearing Loss. Wear hearing protection.
	WARNING marking concerning Risk of Respiratory Injury. Operate Engine OUTSIDE and far away from windows, doors, and vents.
	WARNING marking concerning Risk of Fire while handling fuel. Do not smoke while handling fuel.
	WARNING marking concerning Risk of Fire. Do not refuel while operating. Keep flammable objects away from Engine.
	Workpiece Ground Cable
	Electrode Cable
	Overheat Shutdown Indicator
	Cooling Fan
	Housing Ground Point

	Single, Dual AC or DC Power
	Electrode Holder
	Single Phase AC Power Supply Frequency: 60Hz
VAC	Volts Alternating Current
A	Amperes
OCV	Open Circuit Voltage
KVA	Kilovolt Amperes (Volts / 1000 * Amperes)
AWG	American Wire Gauge
X	Duty Cycle
$\mathbf{I_2}$	Conventional Welding Current
$\mathbf{U_2}$	Conventional Load Voltage
	Electric Shock Hazard. Do not touch energized parts.
	Inhalation Hazard. Keep head out of fumes and use proper ventilation.
	Fire Hazard. Keep flammable materials away during welding. Spatter can cause accidental fires.
	Arc Ray Hazard. Wear welding helmet with properly rated filter lens.
	Pacemaker Hazard. Welding processes may interfere with pacemakers. Consult doctor before use.

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

⚠WARNING

TO PREVENT SERIOUS INJURY: Operate only with proper spark arrestor installed.

Operation of this equipment may create sparks that can start fires around dry vegetation. A spark arrestor may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.

TO PREVENT SERIOUS INJURY FROM ACCIDENTAL STARTING: Turn the Power Switch of the equipment to its "OFF" position, wait for the Engine to cool, and unplug the spark plug wire(s) before assembling or making any adjustments to the equipment.

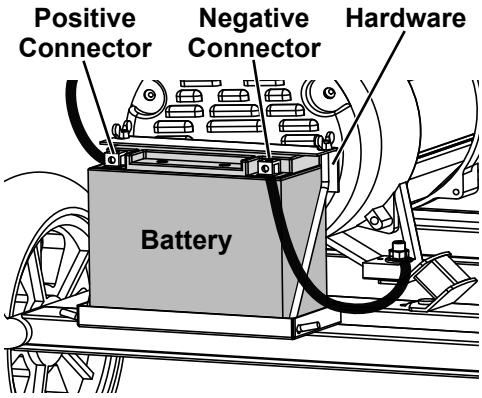
At high altitudes, the Engine's carburetor, governor, and any other parts that control the fuel-air ratio will need to be adjusted by a qualified mechanic to allow efficient high-altitude use and to prevent damage to the Engine and any other devices used with this product.

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

Battery Setup Instructions

The Welder/Generator Engine can be started using the recoil method. Installation of the included Battery is required to operate the electric start feature. Connect the Battery to the Welder/Generator Engine:

1. Place the fully charged Battery in the battery holder on the Welder/Generator.
2. Bolt in place using the hardware included with the unit.
3. Attach the positive (red) cable connector from the Engine to the positive terminal on the Battery. Connect cable securely to prevent disconnection and short circuits.
4. Attach the negative (black) cable connector to the negative battery terminal.



Grounding

The Welder/Generator must be properly grounded before use. Have the unit grounded by a qualified electrician if you are not qualified to do so.

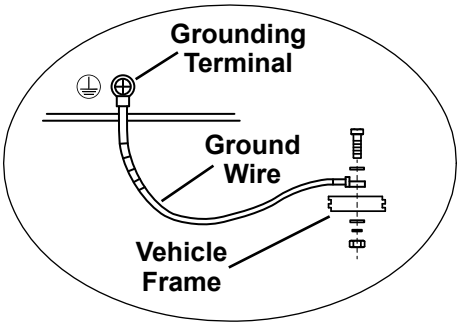
To ground the Generator, connect a #12 AWG or larger grounding wire (not included) from the Grounding Terminal on the Control Panel to a grounding rod (not included) that has been driven at least 24 inches deep into the earth. The grounding rod must be an earth-driven copper or brass rod (electrode) which can adequately ground the Generator.

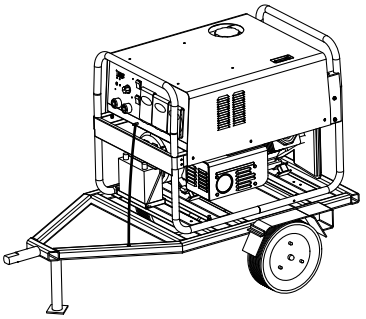
WARNING! GFCI receptacles will not protect from electric shock if Generator is not grounded.

NOTICE: This Generator is not intended to power sensitive electronic equipment without the addition of an appropriate line conditioner and surge protector (both not included). **Sensitive electronic equipment includes, but is not limited to, audio/video equipment, some television sets, computers, and printers.** Sensitive electronic equipment should be operated on approved inverter-type generators or pure sine wave generators.

Grounding to Truck or Trailer Frame

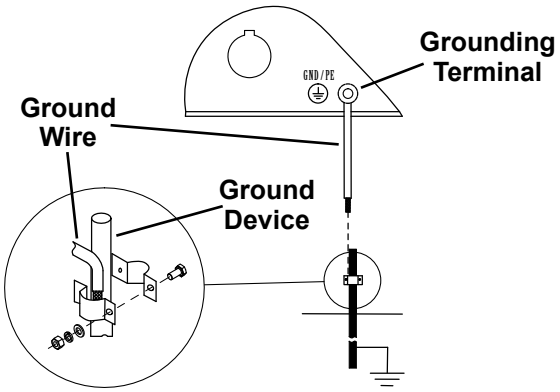
1. Ground the Welder/Generator frame to the vehicle frame to prevent electric shock and static electricity hazards.
2. Connect a ground wire (not included) from the grounding terminal on the front panel to bare metal on the vehicle frame as shown. Use #12 AWG or larger insulated copper wire.
3. Use GFCI protection when operating auxiliary equipment.





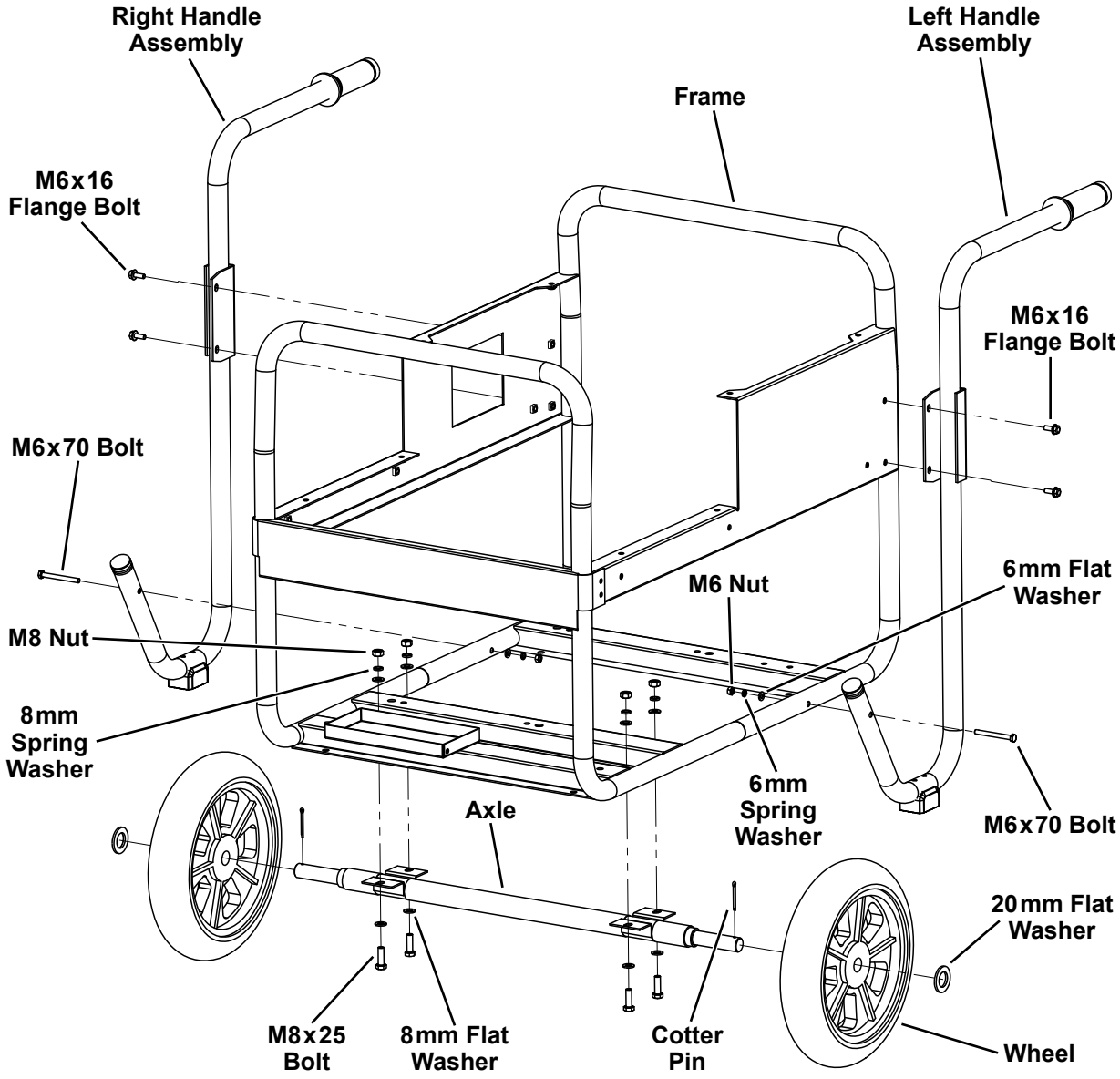
Grounding to Building Systems

1. Connections for standby power to a building electrical system must be made by a qualified electrician. The connection must isolate the Generator power from utility power, and must comply with all applicable laws and electrical codes.
2. Ground the Welder/Generator to system earth ground using #12 AWG or larger insulated copper wire (not included). Use ground device as stated in electrical codes.



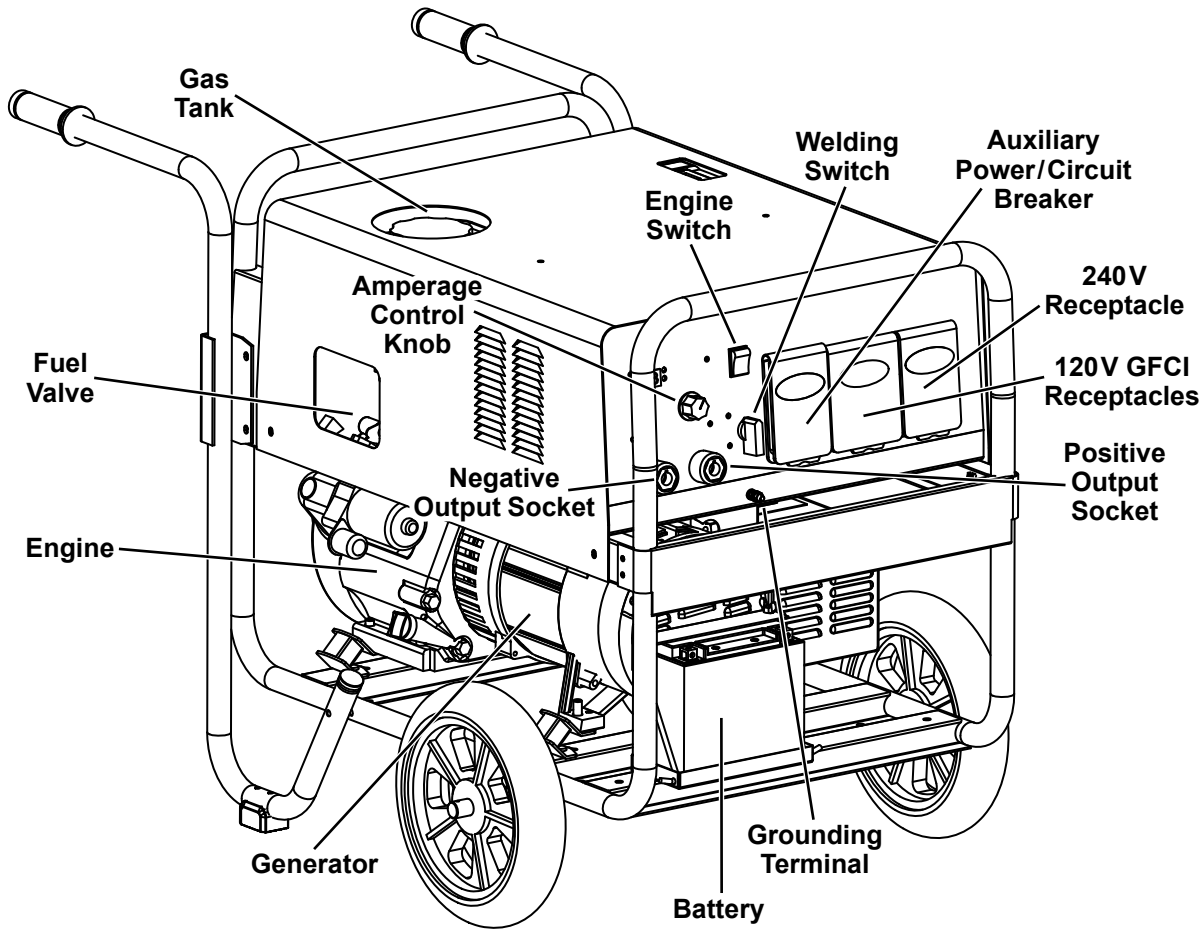
Assembly

1. With assistance, lift main Frame approximately 12 inches off the ground and place on supports. Secure the unit to prevent it from falling.
2. Align the mounting holes in the brackets on the Axle with the mounting holes in the main Frame.
3. Attach the Axle to the Frame as shown using four M8x25 Bolts, eight 8mm Flat Washers, four 8mm Spring Washers, and four M8 Nuts.
4. Slide a Wheel onto one end of the Axle followed by a 20mm Flat Washer. Secure in place with a Cotter Pin. Repeat for the other Wheel.
5. Identify the Right and Left Handle Assemblies.
6. Fasten the bracket near the top of the Right Handle Assembly to the upper right side of the Frame using two M6x16 Flange Bolts.
7. Fasten the lower end of the Right Handle Assembly to the bottom right side of the Frame using a M6x70 Bolt, 6mm Flat Washer, 6mm Spring Washer, and M6 Nut.
8. Repeat steps 6 and 7 for the Left Handle Assembly, attaching it to the left side of the Frame.
9. Tighten all hardware securely.

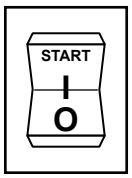


Assembly shown without Engine, Generator, Battery and Panels for clarity.

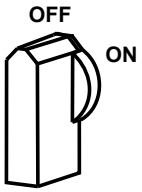
Components and Controls



The following are descriptions of the controls on the front panel.

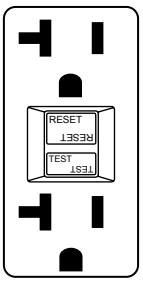


1. **Engine Switch:** Used to start and stop the Engine.



2. **Welding Power Switch:** Used to turn the welding function On and Off.

3. **AC Receptacles:** The Generator contains several AC Receptacles to power tools and equipment.



a. **3-Prong, duplex 120 volt GFCI receptacle** (NEMA #5-20)

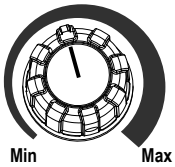
b. **4-Prong, twistlock, 240 volt receptacle** (NEMA #L14-30)

⚠WARNING! TO PREVENT SERIOUS INJURY: Connect tools and equipment only to the Receptacle (120 volt or 240 volt) that is compatible with the electrical characteristics and rated capacities of the tools and equipment being used.

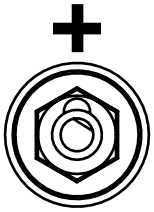
4. **Circuit Breakers:** The circuit breaker protects the Generator from overloading. The rating of the breaker and the load it protects are marked near the breaker. Should any of the Circuit Breakers trip, the Generator will stop the electricity output. If this happens, unplug all loads from the Generator. Allow the Generator to cool down. Then, press the tripped Circuit Breaker, restart the Engine, and re-attach loads.

   Auxiliary Power Switch: Used to turn auxiliary power to the 120V and 240V receptacles On and Off.

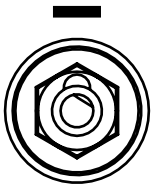
5. **Grounding Terminal:** Prior to each use, set up the ground wire (not included) connection to the Grounding Terminal to properly ground the Generator. Refer to *Grounding* on page 12 for instructions on grounding the Generator.



6. **Amperage Control Knob:** Adjusts current output from 20 to 195 Amps DC. To use Generator auxiliary power WHILE NOT WELDING, this control must be turned to the maximum setting.



7. **Positive Output Socket:** Connector for the Electrode Holder and Cable, in most cases, when STICK welding.



8. **Negative Output Socket:** Connector for the Ground Cable and Clamp, in most cases, when STICK welding.

VULCAN®

High Altitude Operation Above 3000 feet

⚠WARNING! TO PREVENT SERIOUS INJURY FROM FIRE:
Follow instructions in a well-ventilated area away from ignition sources.
If the engine is hot from use, shut the engine off and wait for it to cool before proceeding. Do not smoke.

NOTICE: Warranty void if necessary adjustments are not made for high altitude use.

At high altitudes, the engine's carburetor, governor (if so equipped), and any other parts that control the fuel-air ratio will need to be adjusted by a qualified mechanic to allow efficient high-altitude use and to prevent damage to the engine and any other devices used with this product. The fuel system on this engine may be influenced by operation at higher altitudes. Proper operation can be ensured by installing an altitude kit at altitudes higher than 3000 ft. above sea level. At elevations above 8000 ft, the engine may experience decreased performance, even with the proper main jet. Operating this engine without the proper altitude kit installed may increase the engine's emissions and decrease fuel economy and performance. The kit should be installed by a qualified mechanic.

High Altitude Kit Parts List – A

Part	Description	Qty
1a	Main Jet 3000–6000 ft.	1
2a	Main Jet 6000–8000 ft.	1
3a	Bolt Seal	1
4a	Fuel Cup Seal	1
5a	Solenoid Seal	1

High Altitude Kit Installation

1. Turn off the Engine.
2. Close the fuel valve.
3. Move the air cleaner housing aside to access the carburetor as follows:
   a. Loosen the knob and remove air cleaner cover.
   b. Remove the foam filter and deflecting plate.
   c. Remove the two nuts holding the air cleaner housing in place and move it aside.
4. Place a bowl under the fuel cup to catch any spilled fuel.
5. Remove the screws holding the solenoid in place.
6. Disconnect the solenoid and solenoid seal from the bolt.

CAUTION! Carburetor bowl may have gas in it which will leak upon removing the solenoid.

7. Unthread the bolt holding the fuel cup.
8. Remove the bolt, bolt seal, fuel cup, fuel cup seal and main jet from the body of the carburetor assembly. A carburetor screwdriver (not included) is needed to remove and install the main jet.

Note: The mixing tube is held in place by the main jet and might fall out when it is removed. If it falls out, replace it in the same orientation before replacing the main jet.

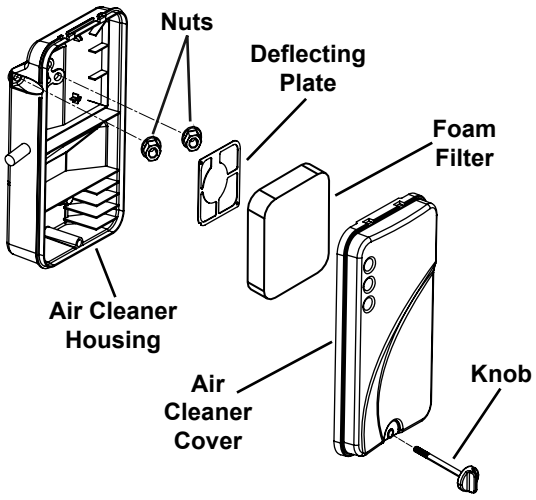
9. Replace the main jet with the replacement Main Jet needed for your altitude range (part 1a or 2a).

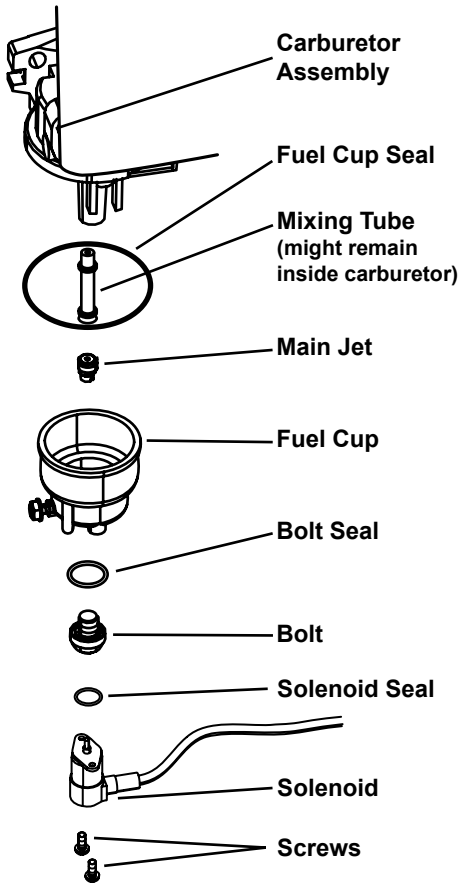
Note: The fuel cup seal, bolt seal and solenoid seal may be damaged during removal and should be replaced with the new ones from the kit.

10. Replace the Fuel Cup Seal (4a), fuel cup, Bolt Seal (3a), and bolt. Tighten in place.

NOTICE: Do not cross thread bolt when tightening. Finger tighten first and then use a wrench to make sure the bolt is properly threaded.

11. Replace the solenoid and Solenoid Seal (5a) and fasten in place with screws removed in step 5.
12. Reassemble the air cleaner and reattach all hoses to it.
13. Wipe up any spilled fuel and allow excess to evaporate before starting Engine. To prevent FIRE, do not start the Engine while the smell of fuel hangs in the air.





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

Inspect tool before use, looking for damaged, loose, and missing parts. If any problems are found, do not use tool until repaired.

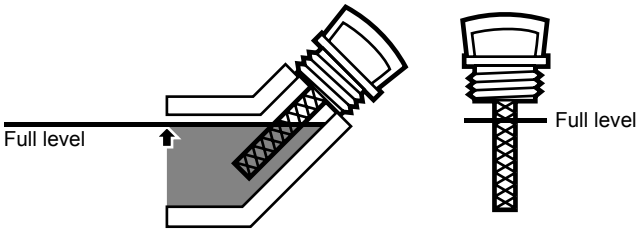
Pre-Start Checks

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

Checking and Filling Engine Oil

CAUTION! Your Warranty is VOID if the Engine's crankcase is not properly filled with oil before each use. Before each use, check the oil level. Engine will not start with low or no engine oil.

1. Make sure the Engine is stopped and is level.
2. Close the Fuel Valve.
3. Clean the top of the Dipstick and the area around it. Remove the Dipstick by threading it counterclockwise, and wipe it off with a clean lint free rag.



4. Reinsert the Dipstick without threading it in and remove it to check the oil level. The oil level should be up to the full level as shown above.
5. If the oil level is at or below the low mark add the appropriate type of oil until the oil level is at the proper level. SAE 10W-30 oil is recommended for general use. (The SAE Viscosity Grade chart on page 31 in the Service section shows other viscosities to use in different average temperatures.)
6. Thread the dipstick back in clockwise.

NOTICE: Do not run the Engine with too little oil. Engine will shut off if engine oil level is too low.

Checking and Filling Fuel

⚠WARNING! TO PREVENT SERIOUS INJURY FROM FIRE:
Fill the fuel tank in a well-ventilated area away from ignition sources. If the Engine is hot from use, shut the Engine off and wait for it to cool before adding fuel. Do not smoke.

1. Clean the Fuel Cap and the area around it.
2. Unscrew and remove the Fuel Cap.
3. If needed, fill the Fuel Tank to about 1 inch under the fill neck with 87 octane or higher unleaded gasoline that has been treated with a fuel stabilizer additive. Follow fuel stabilizer manufacturer's recommendations for use.

Note: Do not use gasoline containing more than 10% ethanol (E10). Do not use E85 ethanol.

Note: Do not use gasoline that has been stored in a metal fuel container or a dirty fuel container. It can cause particles to enter the carburetor, effecting engine performance and/or causing damage.

4. Then replace the Fuel Cap.
5. Wipe up any spilled fuel and allow excess to evaporate before starting Engine. To prevent FIRE, do not start the Engine while the smell of fuel hangs in the air.

Using the Generator

Before Starting the Engine

Before starting the Engine:

a. **Follow the Set Up Instructions to prepare the Generator.**

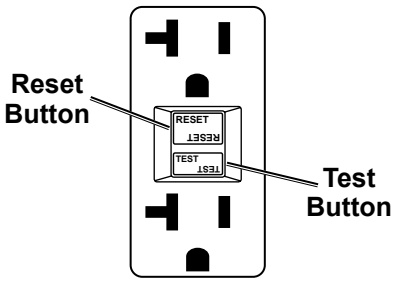
b. **Unplug all loads from the Generator.**

c. **Inspect the Generator and Engine.**

d. **Fill the Engine with the proper amount and type of both stabilizer-treated fuel and oil.**

Basic Generator Use Procedure - See following pages for specific instructions

1. Check that the Generator can handle the wattage needed to power your products.
2. Start the Engine, and allow the Engine and Generator to run and warm up for five minutes after starting with no electrical load.
3. With the Engine running, test GFCI receptacles before each use as follows:
   a. Press Test button on receptacle to trip the GFCI device.
   b. The Reset button should extend, cutting off electricity to the receptacle.
   c. If above test fails, do not use receptacle until it is repaired or replaced.
   d. Press Reset button in for use.



120 Volt GFCI Receptacle

4. Turn the Auxiliary Power Switch ON to turn on auxiliary power to the 120V and 240V receptacles.
5. Turn the Amperage Control Knob to the maximum setting to use Generator auxiliary power WHILE NOT WELDING.
6. Plug in products.
7. When finished using the Generator, turn the Auxiliary Power Switch OFF and disconnect all electrical loads.

Note: Do not allow Generator to run out of fuel with loads attached.

8. Turn off the Engine.
9. Allow the Generator and its Engine to completely cool. Then store the unit in a clean, dry, safe location out of reach of children and other unauthorized people.

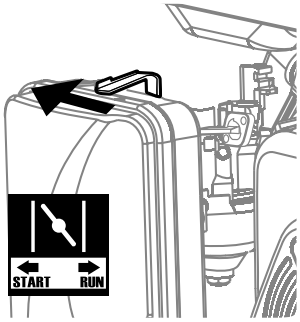
IMPORTANT: After starting the Engine, allow it to run at no load for five minutes after each start-up so that the Engine can stabilize.

10. Break-in Period:
    a. Breaking in the Engine will help to ensure proper equipment and engine operation.
    b. The operational break-in period will last about 3 hours of use. During this period:
       - Do not apply a heavy load to the equipment.
       - Do not operate the Engine at its maximum speed.
    c. The maintenance break-in period will last about 20 hours of use. After this period:
       - Change the engine oil.

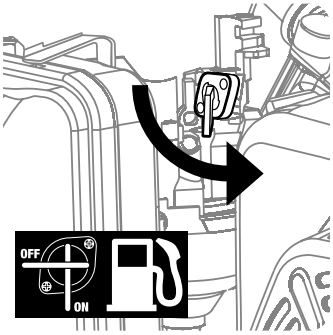
    Under normal operating conditions subsequent maintenance follows the schedule explained in the *Maintenance and Service* section.

Starting the Engine

1. To start a cold Engine, move the Choke to the START position.
   To restart a warm Engine, leave the Choke in the RUN position.

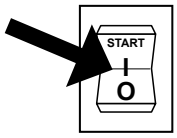


2. Open the Fuel Valve.

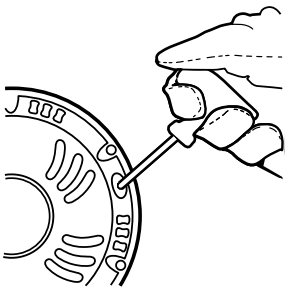


3. **For MANUAL START**

A. Turn the Engine Switch to ON.



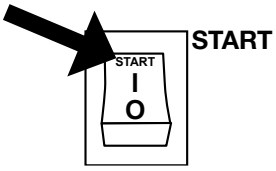
B. Grip the Starter Handle of the Engine loosely and pull it slowly several times to allow the gasoline to flow into the Engine's carburetor. Then pull the Starter Handle gently until resistance is felt. Allow Cable to retract fully and then pull it quickly. Repeat until the Engine starts.
Note: Do not let the Starter Handle snap back against the Engine. Hold it as it recoils so it doesn't hit the Engine.



Note: If Engine does not start, check engine oil level. Engine will not start with low or no engine oil.

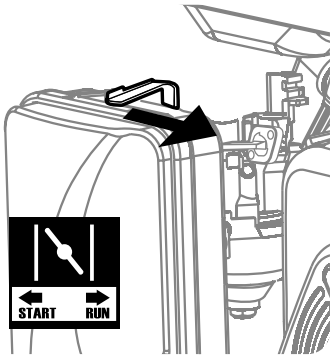
For ELECTRIC START

Turn the Engine Switch to START.



Note: To prolong starter life, use short starting cycles (5 seconds maximum). Then wait one minute before attempting to start again.

4. Allow the Engine to run for several seconds. Then, if the Choke lever is in the START position, move the Choke Lever very slowly to its RUN position.

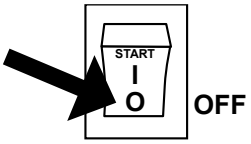


Note: Moving the Choke Lever too fast could stall the Engine.

IMPORTANT: Allow the Engine to run at no load for five minutes after each start-up so that the Engine can stabilize.

Stopping the Engine in an Emergency

1. To stop the Engine in an emergency, turn the Engine Switch OFF.

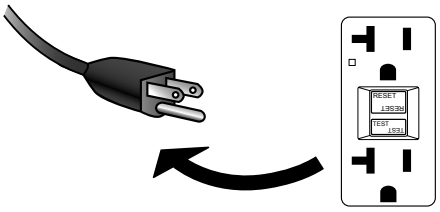


NOTICE: Generator shut-off under load may damage the Generator and attached equipment.

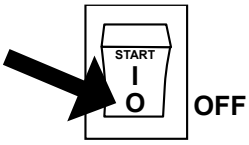
Stopping the Engine Under Normal Conditions

Stopping when using Generator

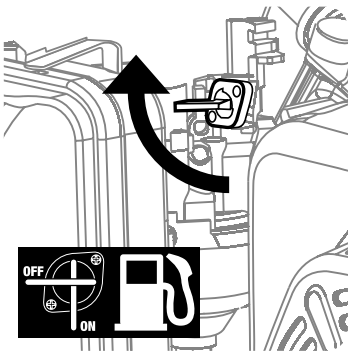
1. Before turning off the Engine, turn off all electrical loads, then unplug them.



2. Turn the Engine Switch OFF.

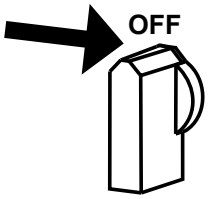


3. Close the Fuel Valve.

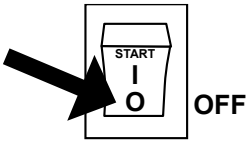


Stopping when Welding

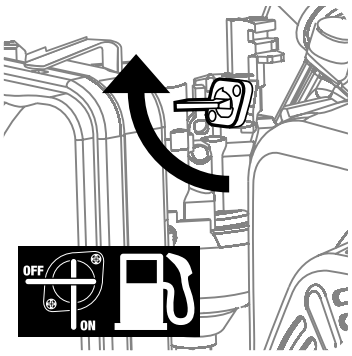
1. Turn the Welding Power Switch OFF.



2. Turn the Engine Switch OFF.

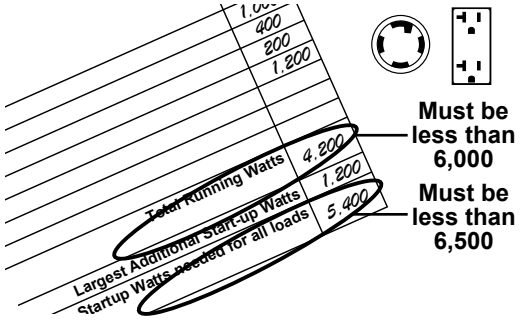


3. Close the Fuel Valve.



Connecting Electrical Loads

Familiarize yourself with the Engine controls, power panel and how to start the Engine before using the Generator. Calculate the wattage of the products you will use with the Generator and verify that the Generator can handle the total load.



⚠**WARNING!** Connect only properly wired plugs to the Generator. A plug that is spliced onto a different cord may be hazardous. Only a qualified electrician should wire a plug onto a cord.

CAUTION Never exceed the rated capacity for this Generator, as serious damage to the Generator and/or appliances, tools, and equipment could result from an overload. Starting and running wattage requirements should always be calculated when matching this Generator's wattage capacity to the appliance, tool, or equipment.

a. Connect the items that require the most wattage first.

b. Connect "inductive" load appliances, tools, and equipment next. Inductive loads are small hand tools and some small appliances.

c. Connect any lights next.

d. Voltage sensitive appliances, tools, and equipment should be the last to be connected to the Generator. Plug voltage sensitive items such as TVs, DVD players, microwaves, and cordless telephones into a UL® Listed voltage surge protector (not included). Then, connect the surge protector into the Generator.

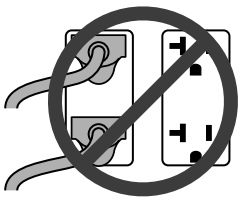
IMPORTANT! Failure to connect and operate appliances, tools, and equipment in this sequence can cause damage to the Generator, appliances, tools, and equipment and will **void** the Warranty of this Generator.

Note: If Engine speed or voltage fluctuates with a load below the Generator's running watts, move the Engine Choke Lever to the **"HALF-CHOKE"** position.

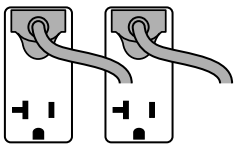
IF ANY CIRCUIT BREAKERS TRIP CHECK THE FOLLOWING:

1. Make sure that ***ALL circuit breakers*** are reset before starting the Generator again.
2. Adjust the plugs so the loads are shared across outlet circuits.

To achieve rated output from the Generator, distribute loads over outlets.



Evenly distributed over outlets:



Calculating Total Wattage of Devices Used with the Generator

Before using the Generator, check that the products you want to plug into the unit are below the rated and maximum wattage ratings of the Generator. Use the Wattage Calculation Table below, and the watts listed on your products, to help calculate multiple wattage totals.

To use the table:

1. Add up the Running Watts for all items you would like to use at any given time.
2. Make sure that this total is under the 6,000 running wattage of the Generator.
3. Find the single highest starting watts for the selected items and add to the total.
4. Make sure that this total is under the 6,500 maximum starting wattage of the Generator.
5. Plug in and turn on products from largest wattage to smallest.

Wattage Calculation Table

Equipment	Running Watts
Total Running Watts (must be less than 6,000)	
Largest Additional Start-up Watts	
Total Startup Watts needed for all loads (must be less than 6,500)	

Example

Equipment	Running Watts
Electric Water Heater (2,000 + 0)	*2,000*
Television (400 + 0)	*400*
Lawn Mower (1,200 + 1,200)	*1,200*
Hand Drill (600 + 600)	*600*
Total Running Watts (must be less than 6,000)	*4,200*
Largest Additional Start-up Watts	*1,200*
Total Startup Watts needed for all loads (must be less than 6,500)	*5,400*

A generator that is rated more than the minimum required maximum starting watts will last much longer than a generator that only supplies the exact watts needed.

To Calculate Wattage
Volts and amps can be multiplied together to get watts (volts x amps = watts).

To Calculate Additional Start-Up Watts (If They Are Not Listed)
For equipment with a motor: Use the rated watts amount as an estimate of additional Start-up Watts.

For most lights or heaters: there are no additional start-up watts.

Wattage Estimate Charts

Note: Wattages listed below are estimates for that type of equipment only. Check nameplate wattages on all loads before connecting to Generator.

EMERGENCY		
Device	**Running Watts**	**Additional Start-up Watts**
Refrigerator/Freezer	700	1500
Radio	100	0

JOB SITE		
Device	**Running Watts**	**Additional Start-up Watts**
Air Compressor - 1/2 HP	1000	1000
Table Saw - 10″	1700	1300
Belt Sander - 3″	1200	1200
Hand Drill - 1/2″	600	600
Halogen Work Light	1000	0
Recipricating Saw	900	900

RECREATION		
Device	**Running Watts**	**Additional Start-up Watts**
AM/FM Radio	100	0
Electric Grill	1700	0
Inflator Pump	50	100
CD/DVD Player	100	0
Box Fan - 20″	200	200
Coffee Maker	600	0

HOUSEHOLD		
Device	**Running Watts**	**Additional Start-up Watts**
Computer w/ Monitor	800	0
Electric Clothes Dryer	5500	500
Electric Range	2100	0
Electric Water Heater	2000	0
Light Bulb - 100 watts	100	0
Microwave - 1000 watts	1000	200
Sump Pump - 1/2 HP	1000	1100
Television	400	0
Washing Machine	1100	1100
Well Pump - 1/2 HP	1000	1000

LAWN & GARDEN		
Device	**Running Watts**	**Additional Start-up Watts**
Hedge Trimmer	400	400
Pressure Washer	1200	1200
Lawn Mower	1200	1200
Edger	1000	1000

HEATING & COOLING		
Device	**Running Watts**	**Additional Start-up Watts**
Central AC - 10,000 BTU	1500	1500
Furnace Fan - 1/2 HP	900	1400
Space Heater	1800	0
Window AC - 10,000 BTU	1200	600

Basic Welding

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

⚠WARNING

TO PREVENT SERIOUS INJURY:
Protective gear must be worn when using the Welder; minimum shade number 10 full face shield (or welding mask), ear protection, welding gloves, sleeves and apron, NIOSH-approved respirator, and fire resistant work clothes without pockets should be worn when welding.
Light from the arc can cause permanent damage to the eyes and skin.
Do not breathe arc fumes.

- Stick Welding is used to weld mild steel and stainless steel using a Stick Electrode without shielding gas.

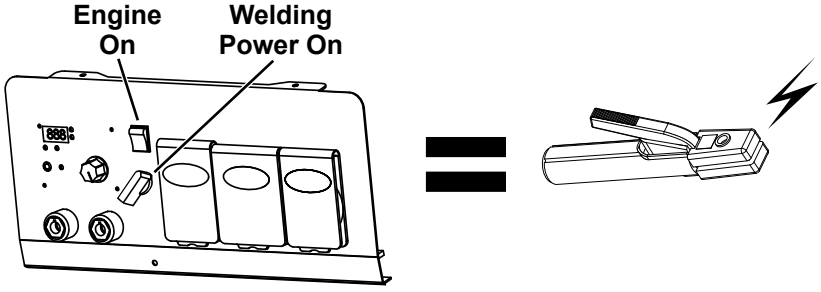
Good welding takes a degree of skill and experience. Practice a few sample welds on scrap before welding your first project. Additional practice periods are recommended whenever you weld:

- a different thickness of material
- a different type of material
- a different type of connection
- using a different process

Make practice welds on pieces of scrap to practice technique before welding anything of value.

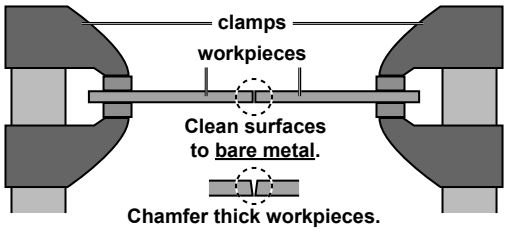
⚠WARNING

TO PREVENT SERIOUS INJURY, FIRE AND BURNS: Keep Electrode Holder clear of grounded objects whenever Engine is running and Welding Power Switch is turned on.



Practice your welding technique on scrap pieces before welding anything of value.

Setting up the Weld



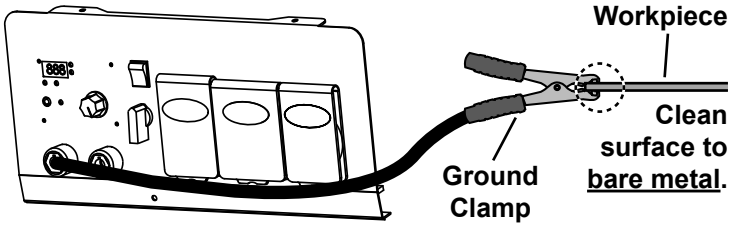
NOTE: Make practice welds on pieces of scrap the same thickness as your intended workpiece to practice technique before welding anything of value.

1. Clean the weld surfaces thoroughly with a wire brush or angle grinder; there must be no rust, paint, oil, or other materials on the weld surfaces, only bare metal.
2. Use clamps (not included) to hold the workpieces in position so that you can concentrate on proper welding technique. The distance (if any) between the two workpieces must be controlled properly to allow the weld to hold both sides securely while allowing the weld to penetrate fully into the joint. The edges of thicker workpieces may need to be chamfered (or beveled) to allow proper weld penetration.

NOTICE: When welding equipment on a vehicle, disconnect the vehicle battery power from both the positive connection and the ground before welding. This prevents damage to some vehicle electrical systems and electronics due to the high voltage and high frequency bursts common in welding.

Ground Workpiece

Attach Ground Clamp to bare metal on the workpiece near the weld area, or to metal work bench where the workpiece is clamped.



Duty Cycle (Duration of Use)

Avoid damage to the Welder by not welding for more than the prescribed duty cycle time. The Duty Cycle defines the number of minutes, within a 10 minute period, during which a given welding process can produce a particular welding current without overheating.

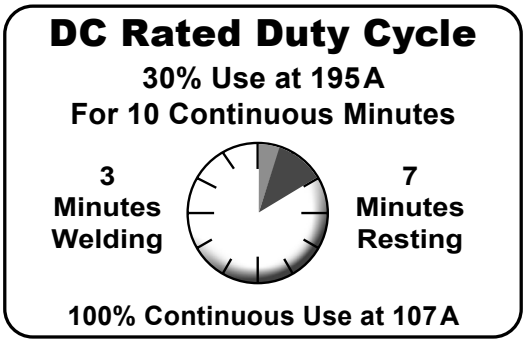
For example, a welder with a 30% duty cycle at 195 A welding current must be allowed to rest for at least 7 minutes after every 3 minutes of continuous welding.

Failure to carefully observe duty cycle limitations can easily over-stress a welder's power generation system contributing to premature welder failure.

This Welder has an internal thermal protection system to help prevent this sort of over-stress. When the Welder overheats, it automatically shuts down and the Overload Indicator lights. The Welder automatically returns to service after cooling off. Rest the Electrode Holder on an electrically non-conductive, heat-proof surface, such as a concrete slab, well clear of the ground clamp.

Allow the Welder to cool with the Power Switch on, so that the internal Fan will help cool the Welder.

When the Overload Indicator is no longer lit and the Welder can be used again, use shorter welding periods and longer rest periods to prevent needless wear.



Basic Stick Welding

⚠WARNING

TO PREVENT SERIOUS INJURY AND DEATH:
Do not weld without Grounding Clamp.
When the operator is not holding the Electrode Holder, it must be sitting on a nonconductive, nonflammable surface.

1. Place the Welder on a level surface that can bear its weight near the work area.
2. Secure the Grounding Clamp to a clean, exposed metal part of the workpiece, or to metal work bench where the workpiece is clamped.
3. To connect the Electrode Holder and Ground Clamp Cables, refer to the electrode manufacturer's package for correct polarity.

   For DC Electrode Positive:

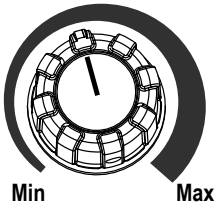
   a. Connect the Electrode Holder Cable to the Positive Output Socket (+) on the front panel of the Welder/Generator.

   b. Connect the Ground Clamp Cable to the Negative Output Socket (-) on the front panel of the Welder/Generator.

   For DC Electrode Negative:

   a. Connect the Electrode Holder Cable to the Negative Output Socket (-) on the front panel of the Welder/Generator.

   b. Connect the Ground Clamp Cable to the Positive Output Socket (+) on the front panel of theWelder/Generator.
4. Turn the Amperage Control Knob to adjust the welding current.



Set amperage according to Stick Settings Chart below.

NOTE: Settings are approximate. Adjust as necessary.

Stick Settings Chart		
Electrode Type	**Electrode Diameter**	**Amperage Range**
E6010 DC+ E6011 DC+	**3/32"**	**40–70**
	1/8"	**75–130**
	5/32"	**90–175**
	3/16"	**140–195**
E6013 DC+	**1/16"**	**25–40**
	3/32"	**40–90**
	1/8"	**75–125**
	5/32"	**105–175**
	3/16"	**150–195**
E7014 DC+	**3/32"**	**75–110**
	1/8"	**105–160**
	5/32"	**150–195**
E7018 DC+	**3/32"**	**70–110**
	1/8"	**90–160**
	5/32"	**130–195**
E7024 DC+	**3/32"**	**100–145**
	1/8"	**110–175**
	5/32"	**160–195**

The approximate current setting can be read on the digital display on the Front Panel.

WARNING! TO PREVENT SERIOUS INJURY: Protective gear must be worn when using the Welder; minimum shade number 10 full face shield (or welding mask), ear protection, welding gloves, sleeves and apron, NIOSH-approved respirator, and fire resistant work clothes without pockets should be worn when welding. Light from the arc can cause permanent damage to the eyes and skin. Do not breathe arc fumes.

> ***After practice welding on scrap,*** stop, and check your progress. Perform Strike Test, then clean and compare your weld's appearance with the diagrams and descriptions in the **Welding Tips** section starting on the next page. After making any necessary adjustments, continue to weld ***while carefully following the DUTY CYCLE guidelines as explained on page 25.***

5. Place the bare metal end of the stick electrode (sold separately) inside the jaws of the Electrode Holder.
6. Turn the Welding Power Switch to the OFF position, then start the Engine. Refer to *Starting the Engine* on page 20.
7. Set Electrode Holder down on nonconductive, nonflammable surface away from any grounded objects.
8. Turn the Welding Power Switch ON.

WARNING! TO PREVENT SERIOUS INJURY AND DEATH: When the Engine is running and the Welding Power Switch is turned ON, Welder is energized and Open Circuit Voltage is present. If the operator is not holding the Electrode Holder, it must be sitting on a nonconductive, nonflammable surface.

9. Stroke the workpiece lightly to ignite the arc. Tips for igniting the arc:
   a. Tap the surface with the Electrode.
   b. Stroke the surface with the Electrode.
   c. Strike the surface like a match with the Electrode.
10. After the arc ignites:
    a. Lift the Electrode off workpiece the same distance as the diameter of the bare metal end.
    b. Tilt Electrode back 10 to 20 degrees.
    c. Drag Electrode to the back end of the weld puddle to deposit material as needed.
11. When finished welding, lift the Electrode from the workpiece, then set Electrode Holder down on nonconductive, nonflammable surface away from any grounded objects.
12. Turn the Welding Power Switch OFF.
13. Turn the Engine Switch OFF.
14. Close the Fuel Valve.
15. To prevent accidents, after use:
    - Allow Welder/Generator to cool down.
    - Remove Ground Clamp.
    - Clean, then store Welder/Generator and its accessories indoors out of children's reach.

Welding Tips

A good way to test welding technique is to examine a weld's appearance after it has cooled and the slag has been removed. Then, better welding can be learned by adjusting your weld technique to remedy any problems found.

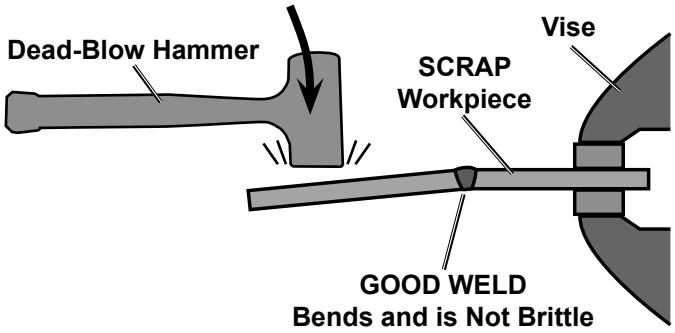
After practice welding a couple of welding beads, STOP and examine your weld using the following guidelines.

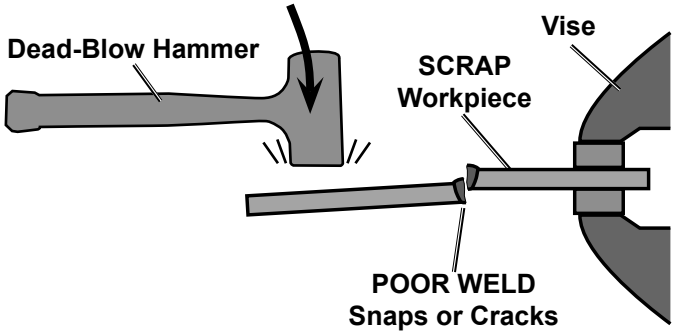
Strike Test

A test weld on a PIECE OF SCRAP can be tested by using the following procedure. WEAR ANSI-APPROVED SAFETY GOGGLES DURING THIS PROCEDURE.

CAUTION! This test WILL damage the weld it is performed on. This test is ONLY an indicator of weld technique and is not intended to test working welds.

1. After two scraps have been welded together and the weld has cooled, clamp one side in a sturdy vise.
2. Stay clear from underneath while you strike the opposite side with a heavy hammer, preferably a dead-blow hammer.
3. A **GOOD WELD** will deform but not break, as shown on top.
   A **POOR WELD** will be brittle and snap at the weld, as shown on bottom.



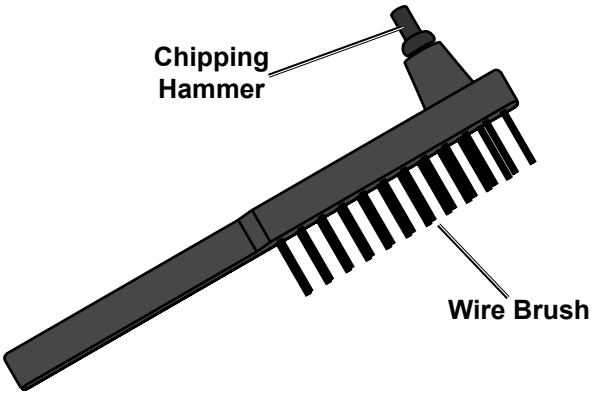


Cleaning Stick Weld

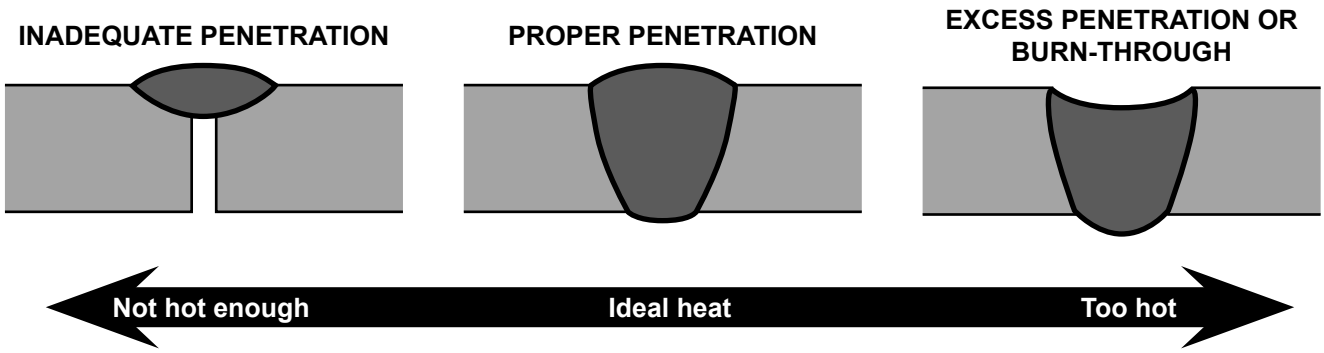
⚠WARNING

TO PREVENT SERIOUS INJURY:
Wear ANSI-approved safety goggles and protective wear when cleaning a weld.
Sparks or chips may fly when cleaning.

1. A weld from Stick welding will be covered by slag. Use a chipping hammer to knock this off. **Be careful not to damage the weld or base material.**
2. Use a wire brush to further clean the weld or use an angle grinder (sold separately) to shape the weld.



Weld Diagnosis–Workpiece Heat Control / Weld Penetration



How to increase workpiece heat and increase penetration:
(to weld THICKER workpieces properly)

a. Increase current. b. Weld more slowly.

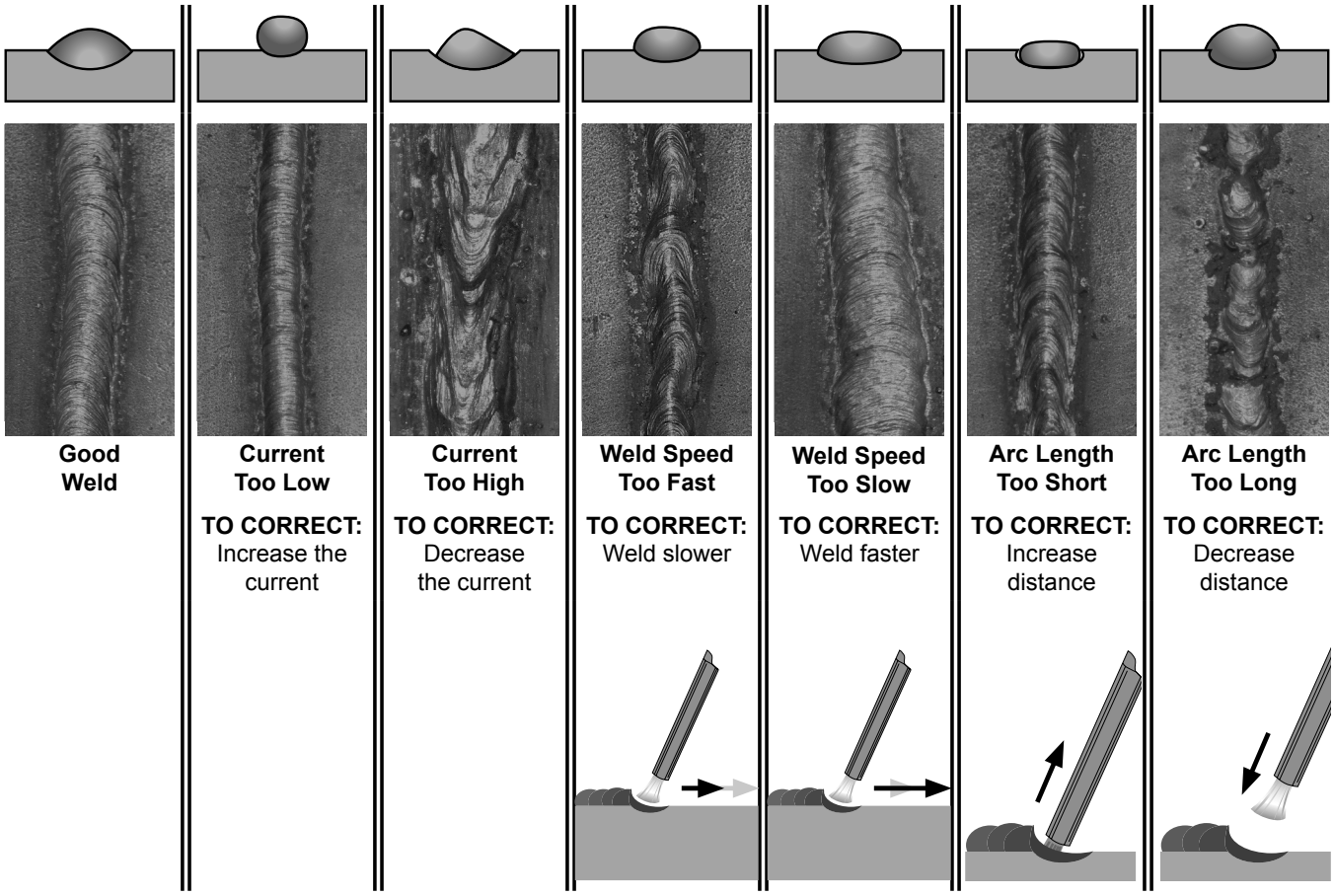
How to reduce workpiece heat and limit penetration:
(to weld THINNER workpieces properly)

a. Decrease current. b. Weld more quickly.

Weld Example Diagrams

CLEAN WELDS FIRST!

Stick welds will have a coat of slag over them until cleaned.

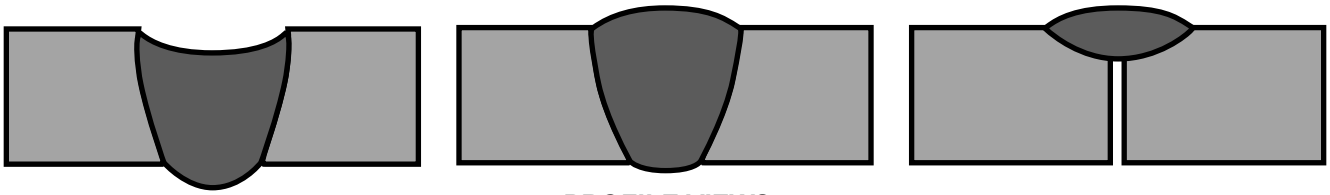


Weld Penetration (Workpiece Heat Control)

EXCESS PENETRATION OR BURN-THROUGH
Weld droops on top and underneath or falls through entirely, making a hole.

PROPER PENETRATION
Weld is visible underneath and bulges slightly on top.

INADEQUATE PENETRATION
Weld does not contact the joint fully, just on the surface.



PROFILE VIEWS

POSSIBLE CAUSES AND SOLUTIONS FOR EXCESS PENETRATION OR BURN-THROUGH

1. **Workpiece overheating:**
   Reduce current.
2. **Welding speed too slow:**
   Increase welding speed and ensure that welding speed is kept steady.

POSSIBLE CAUSES AND SOLUTIONS FOR INADEQUATE PENETRATION

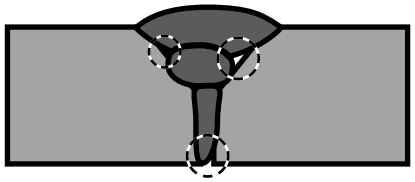
1. **Incorrect welding technique:**
   Keep arc on leading edge of weld puddle.
   Hold torch at proper angles.
2. **Insufficient weld heat:**
   Slow down so fill material has time to melt into the weld location. Increase current.
3. **Workpieces too thick/close:**
   Bevel thick workpieces, allow slight gap, and weld in several passes.
4. **Insufficient weld material:**
   Increase amount of fill material.

Weld Not Adhering Properly

Gaps present between weld and previous bead or between weld and workpiece. See areas below.

POSSIBLE CAUSES AND SOLUTIONS

PROFILE VIEW

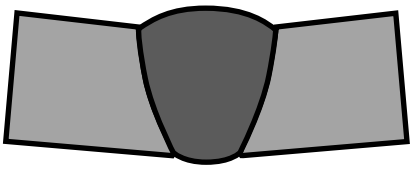


1. **Incorrect welding technique:**
   Place stringer bead at correct place in joint.
   Adjust workpiece position or weld angle to permit proper welding to bottom of piece.
   Keep arc on leading edge of weld puddle.
   Hold Electrode and fill material at proper angles.
2. **Insufficient weld heat:**
   Increase current.
3. **Dirty workpiece:**
   Clean workpiece down to bare metal.
4. **Insufficient weld material:**
   Increase amount of fill material.
5. **Distance between workpieces to large:**
   Decrease distance and increase bevel.

Bend at Joint

POSSIBLE CAUSES AND SOLUTIONS

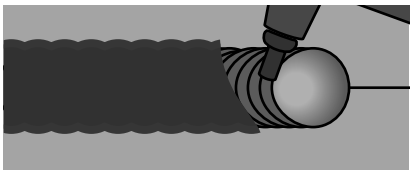
PROFILE VIEW



1. **Improper clamping:**
   Clamp workpieces securely.
   Make tack welds to hold workpieces.
2. **Excessive heat:**
   Weld a small portion and allow to cool before proceeding.
   Increase weld speed.

Coat of Slag Over Weld

TOP VIEW



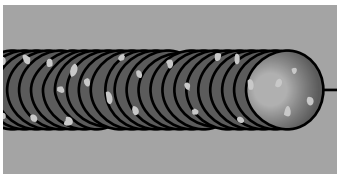
PARTIALLY CHIPPED AWAY TO SHOW WELD

Slag is a necessary part of a stick weld. It shields the weld from impurities. Clean off the slag with the Chipping Hammer and Wire Brush after welding.

Porosity — Small cavities or holes in the bead.

POSSIBLE CAUSES AND SOLUTIONS

TOP VIEW

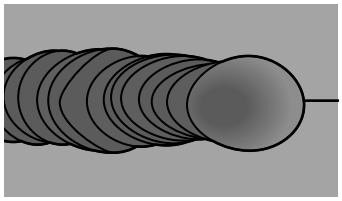


1. **Dirty workpiece or fill material:**
   Clean workpiece down to bare metal.
   Make certain that fill material and Electrode are clean and free from oil, coatings, and other residues.
2. **Inconsistent welding speed:**
   Maintain steady weld speed.

Crooked/Wavy Bead

POSSIBLE CAUSES AND SOLUTIONS

TOP VIEW

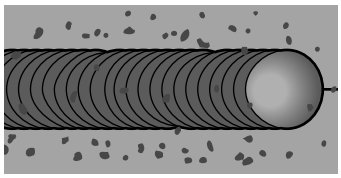


1. **Inaccurate welding:**
   Use two hands or rest hand on steady surface.
2. **Inconsistent welding speed:**
   Maintain steady weld speed.

Excessive Spatter

POSSIBLE CAUSES AND SOLUTIONS

TOP VIEW



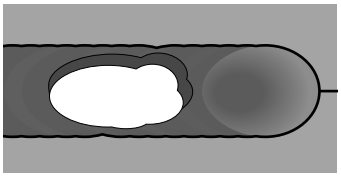
Fine spatter is normal. Spatter that is grainy and large is a problem.

Dirty workpiece or fill material:
Clean workpiece down to bare metal.
Make certain that fill material and Electrode are clean and free from oil, coatings, and other residues.

Burn-Through — Base material melts away, leaving a hole in the weld.

POSSIBLE CAUSES AND SOLUTIONS

TOP VIEW



1. **Workpiece overheating:**
   Reduce current.
2. **Welding speed too slow:**
   Increase welding speed and ensure that welding speed is kept steady.
3. **Excessive material at weld:**
   Reduce amount of fill material.

⚠WARNING

TO PREVENT SERIOUS INJURY FROM ACCIDENTAL STARTING:
Turn the Power Switch of the equipment to its "OFF" position, wait for the Engine to cool, and disconnect the spark plug cap before performing any inspection, maintenance, or cleaning procedures.

TO PREVENT SERIOUS INJURY, FIRE AND BURNS:
Turn the Welding Power Switch to its "OFF" position, rest the Electrode Holder on a heat-proof, electrically non-conductive surface, and allow all parts of the Welder to cool thoroughly before service.

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

Follow all service instructions in this manual. The Engine may fail critically if not serviced properly.

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

Cleaning, Maintenance, and Lubrication Schedule

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

Note: The following procedures are in addition to the regular checks and maintenance explained as part of the regular operation of the Engine and equipment.

Procedure	Before Each Use	Monthly or every 20 hr. of use	Every 3 mo. or 50 hr. of use	Every 6 mo. or 100 hr. of use	Yearly or every 300 hr. of use	Every 2 Years
Brush off outside of engine	✓	✓	✓	✓	✓	✓
Check engine oil level	✓	✓	✓	✓	✓	✓
Check air cleaner			✓	✓	✓	✓
Check sediment cup				✓	✓	✓
Change engine oil		✓		✓	✓	✓
Clean air filter			✓*	✓	✓	✓
Check and clean spark plug				✓	✓	✓
1. Check/adjust idle speed 2. Check/adjust valve clearance 3. Clean fuel tank, strainer and carburetor 4. Clean carbon build-up from combustion chamber					✓**	✓**
Replace fuel line if necessary						✓**

*Service more frequently when used in dusty areas.

**These items should be serviced by a qualified technician.

Checking and Filling Fuel

⚠WARNING! TO PREVENT SERIOUS INJURY FROM FIRE:
Fill the fuel tank in a well-ventilated area away from ignition sources. If the Engine is hot from use, shut the Engine off and wait for it to cool before adding fuel. Do not smoke.

1. Clean the Fuel Cap and the area around it.
2. Unscrew and remove the Fuel Cap.
3. Remove the Strainer and remove any dirt and debris. Then replace the Strainer.

Note: Do not use gasoline containing more than 10% ethanol (E10). Do not use E85 ethanol. Add fuel stabilizer to the gasoline or the Warranty is VOID.

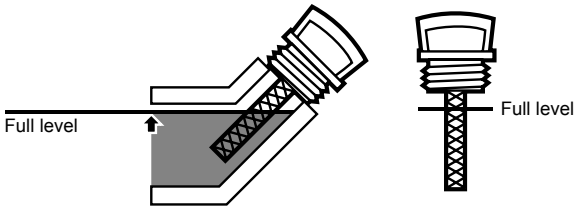
Note: Do not use gasoline that has been stored in a metal fuel container or a dirty fuel container. It can cause particles to enter the carburetor, effecting engine performance and/or causing damage.

4. If needed, fill the Fuel Tank to about 1 inch under the fill neck with 87 octane or higher unleaded gasoline that has been treated with a fuel stabilizer additive. Follow fuel stabilizer manufacturer's recommendations for use.
5. Replace the Fuel Cap.
6. Wipe up any spilled fuel and allow excess to evaporate before starting Engine. To prevent FIRE, do not start the Engine while the smell of fuel hangs in the air.

Engine Oil Change

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

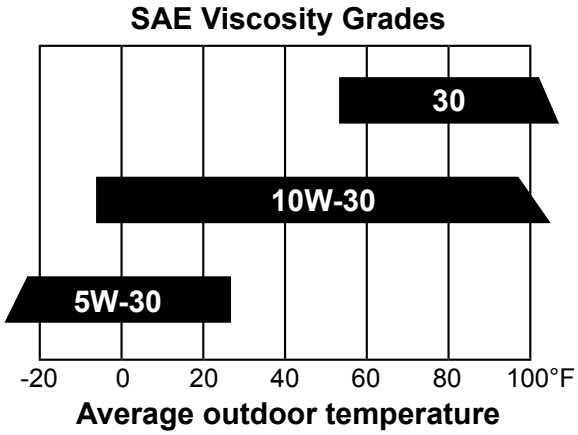
1. Make sure the Engine is stopped and is level.
2. Close the Fuel Valve.
3. Place a drain pan (not included) underneath the crankcase's drain plug.
4. Remove the drain plug and, if possible, tilt the crankcase slightly to help drain the oil out. Recycle used oil.
5. Replace the drain plug and tighten it.
6. Clean the top of the Dipstick and the area around it. Remove the Dipstick by threading it counterclockwise, and wipe it off with a clean lint free rag.



7. Add the appropriate type of oil until the oil level is at the full level. SAE 10W-30 oil is recommended for general use.

Note: Do not thread the dipstick in when checking the oil level.

The SAE Viscosity Grade chart shows other viscosities to use in different average temperatures.



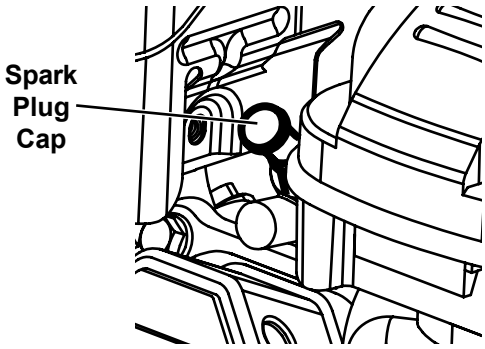
8. Thread the dipstick back in clockwise.

NOTICE! Do not run the Engine with too little oil. Engine will not start with low or no engine oil.

Air Filter Element Maintenance

1. Remove the air filter cover and the air filter elements and check for dirt. Clean as described below.
2. **Cleaning:**
   - For "paper" filter elements: To prevent injury from dust and debris, wear ANSI-approved safety goggles, NIOSH-approved dust mask/respirator, and heavy-duty work gloves. In a well-ventilated area away from bystanders, use pressurized air to blow dust out of the air filter. If this does not get the filter clean, replace it.
   - For foam filter elements: Wash the element in warm water and mild detergent several times. Rinse. Squeeze out excess water and allow it to dry completely. Soak the filter in lightweight oil briefly, then squeeze out the excess oil.
3. Install the cleaned filter. Secure the Air Cleaner Cover before use.

Spark plug Maintenance



1. Disconnect spark plug cap from end of plug. Clean out debris from around spark plug.
2. Using a spark plug wrench, remove the spark plug.
3. Inspect the spark plug:
   If the electrode is oily, clean it using a clean, dry rag. If the electrode has deposits on it, polish it using emery paper. If the white insulator is cracked or chipped, the spark plug needs to be replaced.

Recommended Spark Plug	
TORCH®	F7TC

NOTICE: Using an incorrect spark plug may damage the Engine.

4. When installing a new spark plug, adjust the plug's gap to the specification on the Specifications chart. Do not pry against the electrode, the spark plug can be damaged.
5. Install the new spark plug or the cleaned spark plug into the Engine.
   - **Gasket-style**: Finger-tighten until the gasket contacts the cylinder head, then tighten about 1/2-2/3 turn more.
   - **Non-gasket-style**: Finger-tighten until the plug contacts the cylinder head, then tighten about 1/16 turn more.

NOTICE: Tighten the spark plug properly.
If loose, the spark plug will cause the Engine to overheat.
If overtightened, the threads in the engine block will be damaged.

6. Apply dielectric spark plug boot protector (not included) to the end of the spark plug and reattach the cap securely.

Long-Term Storage

When the equipment is to remain idle for longer than 20 days, prepare the Engine for storage as follows:

1. **CLEANING**:

   Wait for Engine to cool, then clean Engine with dry cloth. **NOTICE: Do not clean using water.** The water will gradually enter the Engine and cause rust damage. Apply a thin coat of rust preventive oil to all metal parts.

2. **FUEL:**

   To protect the fuel tank during storage, fill the tank with gasoline that has been treated with a fuel stabilizer additive. Follow fuel stabilizer manufacturer's recommendations for use. Refer to *Checking and Filling Fuel* on page 33.

⚠WARNING! TO PREVENT SERIOUS INJURY FROM FIRE:
Fill tank in a well-ventilated area away from ignition sources. If the Engine is hot from use, shut the Engine off and wait for it to cool before adding fuel. Do not smoke.

3. **LUBRICATION:**
   a. Change engine oil.
   b. Clean out area around spark plug. Remove spark plug and pour one tablespoon of engine oil into cylinder through spark plug hole.
   c. Replace spark plug, but leave spark plug cap disconnected.
   d. Pull Starter Handle to distribute oil in cylinder. Stop after one or two revolutions when you feel the piston start the compression stroke (when you start to feel resistance).
4. **BATTERY:**
   Disconnect battery cables (if equipped). Recharge batteries monthly while in storage.
5. **STORAGE AREA:**
   Cover and store in a dry, level, well-ventilated area out of reach of children. Storage area should also be away from ignition sources, such as water heaters, clothes dryers, and furnaces.

NOTICE: During extended storage periods the Engine must be started every 3 months and allowed to run for 15–20 minutes or the Warranty is VOID.

6. **AFTER STORAGE:**
   Before starting the Engine during or after storage, keep in mind that untreated gasoline will deteriorate quickly. Drain the fuel tank and change to fresh fuel if untreated gasoline has been sitting for a month, if treated gasoline has been sitting beyond the fuel stabilizer's recommended time period, or if the Engine does not start.

Troubleshooting

Problem	Possible Causes	Probable Solutions
Engine will not start	FUEL RELATED:	FUEL RELATED:
	1. No fuel in tank or fuel valve closed.	1. Fill fuel tank with fresh 87+ octane stabilizer treated unleaded gasoline and open fuel valve. **Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.).**
	2. Choke not in START position; cold engine.	2. Move Choke to START position.
	3. Gasoline with more than 10% ethanol used. (E15, E20, E85, etc.)	3. Clean out ethanol rich gasoline from fuel system. Replace components damaged by ethanol. Use fresh 87+ octane stabilizer treated unleaded gasoline only. **Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.).**
	4. Low quality or deteriorated, old gasoline.	4. Use fresh 87+ octane stabilizer treated unleaded gasoline. **Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.).**
	5. Carburetor not primed.	5. Pull on Starter Handle to prime.
	6. Dirty fuel passageways.	6. Clean out passageways using fuel additive. Heavy deposits may require further cleaning.
	7. Carburetor needle stuck. Fuel can be smelled in the air.	7. **Gently** tap side of carburetor float chamber with screwdriver handle.
	8. Too much fuel in chamber. This can be caused by the carburetor needle sticking.	8. Turn Choke to RUN position. Remove spark plug and pull the start handle several times to air out the chamber. Reinstall spark plug and set Choke to START position.
	9. Clogged Fuel Filter.	9. Replace Fuel Filter.
	IGNITION (SPARK) RELATED:	IGNITION (SPARK) RELATED:
	1. Spark plug cap not connected securely.	1. Connect spark plug cap properly.
	2. Spark plug electrode wet or dirty.	2. Clean spark plug.
	3. Incorrect spark plug gap.	3. Correct spark plug gap.
	4. Spark plug cap broken.	4. Replace spark plug cap.
	5. Circuit breaker tripped (electric start models only).	5. Reset circuit breaker. Check wiring and starter motor if breaker continues to trip.
	6. Incorrect spark timing or faulty ignition system.	6. Have qualified technician diagnose/ repair ignition system.
	COMPRESSION RELATED:	COMPRESSION RELATED:
	1. Cylinder not lubricated. Problem after long storage periods.	1. Pour tablespoon of oil into spark plug hole. Crank engine a few times and try to start again.
	2. Loose or broken spark plug. (Hissing noise will occur when trying to start.)	2. Tighten spark plug. If that does not work, replace spark plug. If problem persists, may have head gasket problem, see #3.
	3. Loose cylinder head or damaged head gasket. (Hissing noise will occur when trying to start.)	3. Tighten head. If that does not remedy problem, replace head gasket.
	4. Engine valves or tappets mis-adjusted or stuck.	4. Have qualified technician diagnose/ repair ignition system.
	OIL RELATED:	OIL RELATED:
	1. Low engine oil.	1. Fill engine oil to proper level. Check engine oil before EVERY use.
	2. Engine mounted on slope, triggering low oil shutdown.	2. Operate engine on level surface. Check engine oil level.

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

Problem	Possible Causes	Probable Solutions
Engine misfires	1. Spark plug cap loose. 2. Incorrect spark plug gap or damaged spark plug. 3. Defective spark plug cap. 4. Old or low quality gasoline. 5. Incorrect compression.	1. Check cap and wire connections. 2. Re-gap or replace spark plug. 3. Replace spark plug cap. 4. Use only fresh 87+ octane stabilizer-treated unleaded gasoline. **Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.).** 5. Diagnose and repair compression. (Use **Engine will not start: COMPRESSION RELATED** section.)
Engine stops suddenly	1. Fuel tank empty or full of impure or low quality gasoline. 2. Low oil shutdown. 3. Defective fuel tank cap creating vacuum, preventing proper fuel flow. 4. Faulty magneto. 5. Disconnected or improperly connected spark plug cap.	1. Fill fuel tank with fresh 87+ octane stabilizer-treated unleaded gasoline. **Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.).** 2. Fill engine oil to proper level. Check engine oil before EVERY use. 3. Test/replace fuel tank cap. 4. Have qualified technician service magneto. 5. Secure spark plug cap.
Engine stops when under heavy load	1. Dirty air filter 2. Engine running cold.	1. Clean element. 2. Allow engine to warm up prior to operating equipment.
Engine knocks	1. Old or low quality gasoline. 2. Engine overloaded. 3. Incorrect spark timing, deposit buildup, worn engine, or other mechanical problems.	1. Fill fuel tank with fresh 87+ octane stabilizer-treated unleaded gasoline. **Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.).** 2. Do not exceed equipment's load rating. 3. Have qualified technician diagnose and service engine.
Engine backfires	1. Impure or low quality gasoline. 2. Engine too cold. 3. Intake valve stuck or overheated engine. 4. Incorrect timing.	1. Fill fuel tank with fresh 87+ octane stabilizer-treated unleaded gasoline. **Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.).** 2. Use cold weather fuel and oil additives to prevent backfiring. 3. Have qualified technician diagnose and service engine. 4. Check engine timing.
After sudden impact, engine will run, but equipment will not operate. Attached device doesn't have power	1. Shaft key or other shear pin broken by impact to disconnect engine and limit damage. Device not plugged in properly. 2. Circuit Breaker tripped. 3. GFCI activated. 4. Product needs service.	1. Have qualified technician check and replace broken shaft key or other shear pins. Turn off and unplug the device, then plug it back in again and turn on. 2. Turn off and unplug device, reset Circuit Breaker, plug in device and turn on. 3. Turn off and unplug device. Test GFCI receptacle. If functioning properly reset GFCI, plug in device and turn on. 4. Have product repaired.
Attached device begins to operate abnormally	1. Problem with device. 2. Rated load capacity exceeded.	1. Immediately unplug device. Have device repaired by a qualified technician, or replace device. 2. Lower the number of items plugged into the generator to stay within the rated capacity, or use a more powerful generator.

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

Problem	Possible Causes	Likely Solutions
No Welder Output When Switched On	1. Tripped thermal protection device. 2. Ground Clamp not attached to workpiece.	1. Reduce duration or frequency of welding periods to help reduce wear on the welder. Refer to Duty Cycle (Duration of Use) on page 25. 2. Attach Ground Clamp to workpiece.
Welder Does Not Function When Switched On	Engine not running.	Start engine.
Weak Arc Strength	Adjust current setting.	Make sure setting matches recommended setting on chart.
Welding Arc Not Stable.	1. Loose electrode cable or ground cable. 2. Damaged electrode holder or loose connection within electrode holder. 3. Adjust current setting.	1. Check to ensure that all connections are tight. 2. Have a qualified technician inspect and repair/replace as necessary. 3. Make sure setting matches recommended setting on chart.

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

PLEASE READ THE FOLLOWING CAREFULLY

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

Main Parts List

Part	Description	Qty
1	Socket Cover	1
2	Socket Cover	1
3	Welding Power Switch	1
4	Quick Connector	2
5	Electric Power Switch	1
6	Amperage Knob	1
7	Shock Absorber 1	4
8	Front Panel PCB	1
9	Shock Absorber 2	4
10	Bottom Plate	1
11	Rectifier PCB	1
12	Power Factor Correction PCB	1
13	Air Baffle	1
14	Fan	1
15	Filter PCB	1
16	Top Plate	1
17	Inverter PCB	1
18	Support Bracket	1
19	PFC Inductor	1
20	Circuit Breaker	1
21	Over-Current Protector	2
22	GFCI Socket	2
23	Socket	1
24	Insulation Sleeve	4
25	Generator Idle Controller	1

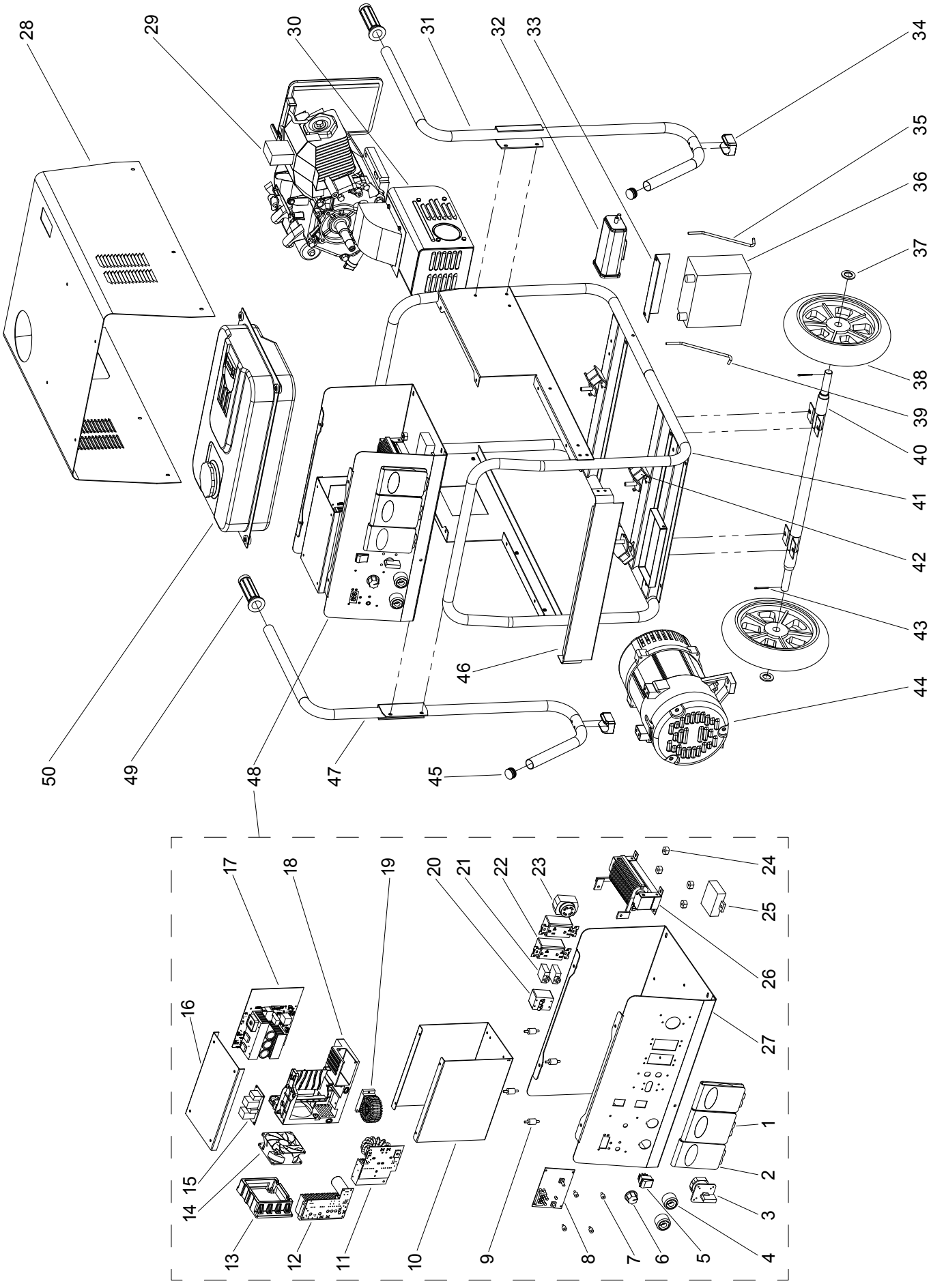
Part	Description	Qty
26	Filter Reactor	1
27	Electric Cabinet	1
28	Fuel Tank House	1
29	Engine	1
30	Muffler	1
31	Left Handle Assembly	1
32	Carbon Canister	1
33	Battery Bracket	1
34	Rubber Shock Absorber	2
35	Hook 2	1
36	Battery	1
37	Flat Washer	2
38	Wheel	2
39	Hook 1	1
40	Axle	1
41	Frame	1
42	Feet	4
43	Cotter Pin	2
44	Generator	1
45	Handle Cover	2
46	Support Plate	1
47	Right Handle Assembly	1
48	Welding Components	1
49	Rubber Handle Sleeve	2
50	Fuel Tank	1

Record Product's Serial Number Here:_____

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

Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts. Specify UPC 792363571678 when ordering parts.

Main Assembly Diagram



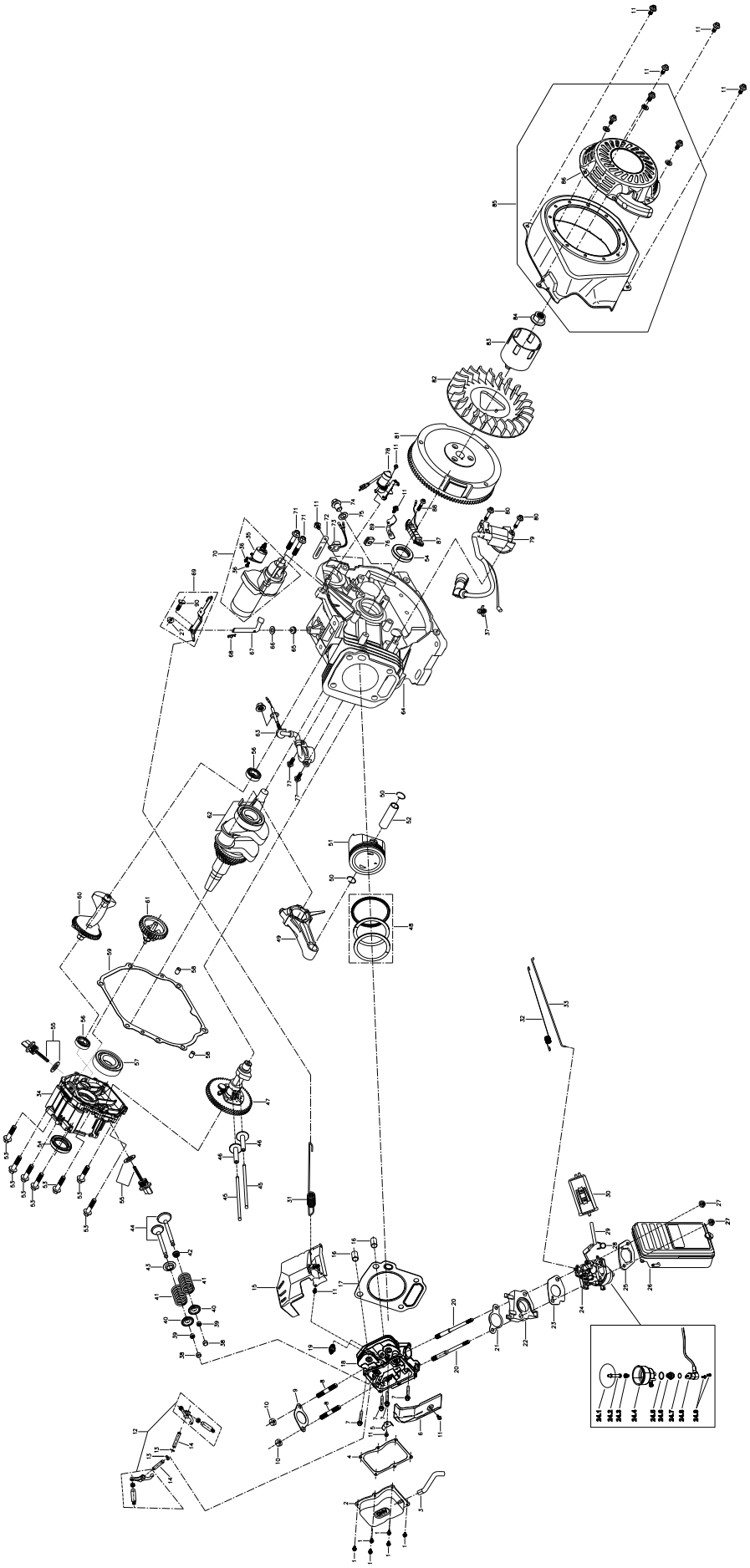
Engine Parts List

Part	Description	Qty
1A	Hex Flange Bolt	6
2A	Cylinder Head Cover Assembly	1
3A	Breather Tube	1
4A	Cylinder Head Cover Gasket	1
5A	Rocker Shaft Bumper	1
6A	Air Deflector	1
7A	Hex Flange Bolt	4
8A	Stud	2
9A	Outlet Gasket	1
10A	Nut M8	2
11A	Hex Flange Bolt	12
12A	Valve Rocker Set	1
13A	Pin Clip	2
14A	Valve Rocker Shaft	2
15A	Throttle Handle Assembly	1
16A	Pin	2
17A	Cylinder Head Gasket	1
18A	Cylinder Head	1
19A	Spark Plug	1
20A	Stud	2
21A	Carburetor Gasket	1
22A	Carburetor Heat Insulating Pad	1
23A	Carburetor Gasket	1
24A	Carburetor	1
24.1A	Fuel Cup Seal	1
24.2A	Mixing Tube	1
24.3A	Main Jet	1
24.4A	Fuel Cup	1
24.5A	Bolt Seal	1
24.6A	Bolt	1
24.7A	Solenoid Seal	1
24.8A	Solenoid	1
24.9A	Screw	2
25A	Carburetor Gasket	1
26A	Air Filter	1
27A	Hex Flange Nut	3
28A	Clip	1
29A	Oil Tube	1
30A	Carbon Canister Assembly	1
31A	Governor Spring	1
32A	Throttle Return Spring	1
33A	Throttle Rod	1
34A	Crankcase Cover	1
35A	Starter Relay	1
36A	Hex Flange Bolt	2
37A	Wire Clip	2
38A	Valve Adjustment Cap	2
39A	Valve Locker	4
40A	Valve Spring Retainer	2
41A	Inner Valve Spring	2

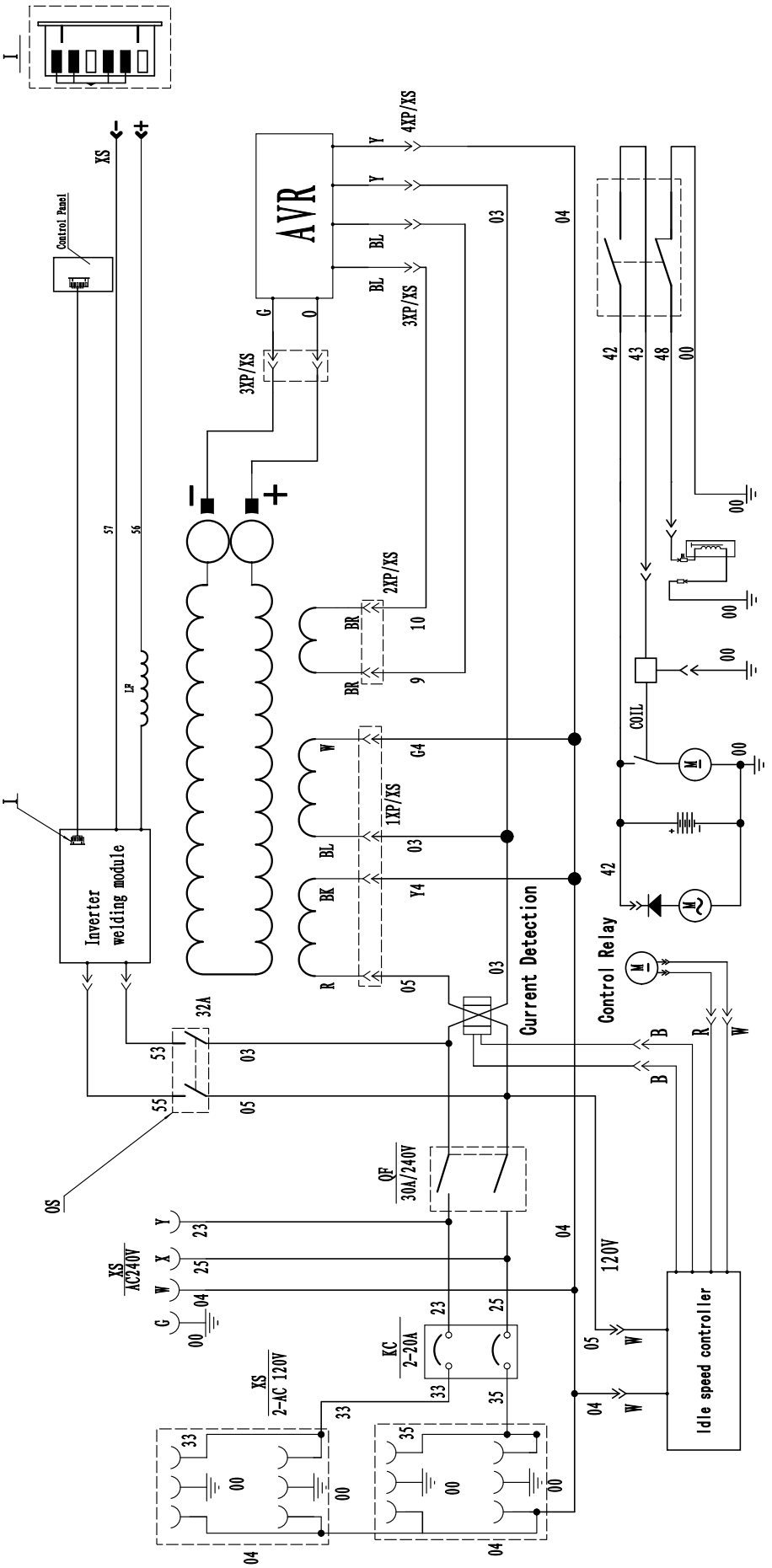
Part	Description	Qty
42A	Valve Oil Seal	1
43A	Valve Spring Seat	1
44A	Valve Kit	1
45A	Push Rod	2
46A	Valve Lifter	2
47A	Camshaft Assembly	1
48A	Piston Ring Set	1
49A	Connecting Rod	1
50A	Steel Cable Baffle Ring	2
51A	Piston	1
52A	Piston Pin	1
53A	Hex Flange Bolt	7
54A	Oil Seal	2
55A	Oil Dipstick	2
56A	Bearing	2
57A	Bearing	1
58A	Location Pin	2
59A	Crankcase Cover Gasket	1
60A	Balance Shaft	1
61A	Governor Gear Components	1
62A	Crankshaft	1
63A	Oil Level Sensor	1
64A	Crankcase Body	1
65A	Oil Seal	1
66A	Flat Washer	1
67A	Choke Arm	1
68A	Pin Clip	1
69A	Choke Bracket	1
70A	Starter Motor Components	1
71A	Hex Flange Bolt	2
72A	Cable Cleat	1
73A	Engine Oil Protector	1
74A	Oil Drain Plug	1
75A	Flat Washer	2
76A	Wire Grommet	1
77A	Hex Flange Bolt	2
78A	Solenoid Valve	1
79A	Ignition Coil Assembly	1
80A	Hex Flange Bolt	2
81A	Flywheel	1
82A	Impeller	1
83A	Starting Disc	1
84A	Hex Flange Nut	1
85A	Manual Starting Assembly	1
86A	Manual Starting Components	1
87A	Charging Current Armature	1
88A	Hex Flange Bolt	1
89A	Wire Bundle Bracket	1
90A	Square Head Set Screw	1

When ordering replacement parts from this list, the “A” suffix must be included in order to get the correct part.

Engine Assembly Diagram



Wiring Schematic



Limited 90 Day Warranty (Retail)

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

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

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

Emissions Control System Warranty

The California Air Resources Board and Harbor Freight Tools (HFT) are pleased to explain the emissions control system warranty on your 2020 Small Off-Road Engine, in addition to the Retail Warranty above. In California, new equipment that uses small off-road engines must be designed, built, and equipped to meet the State's stringent anti-smog standards. HFT must warrant that the emissions control system on your engine will be free from defects in material and workmanship for two (2) years, provided there has been no abuse, neglect, or improper maintenance of your engine.

Your emissions control system may include parts such as the carburetor or fuel-injection system, the ignition system, catalytic converter, fuel tanks, fuel lines, fuel caps, valves, canisters, vapor hoses, clamps, connectors, and other emissions-related assemblies.

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

MANUFACTURER'S WARRANTY COVERAGE

This emissions control system is warranted for two years. If any emission-related part on your engine is defective, the part will be repaired or replaced by HFT.

OWNER'S WARRANTY RESPONSIBILITIES

As the engine owner, you are responsible for the performance of the required maintenance listed in your Owner's Manual.

As the engine owner, you should however be aware that HFT may deny you warranty coverage if your engine or a part has failed due to abuse (including failure to follow the fuel use instructions contained in this manual), neglect, improper maintenance, or unapproved modifications.

You are responsible for contacting HFT as soon as the problem exists in order to obtain warranty repair or replacement, by doing either of the following: (a) contact HFT product support at 1-888-866-5797 or predator@harborfreight.com; or (b) bring the to your nearest Harbor Freight Tools retail store. The nearest Harbor Freight Tools retail store can be found on the internet at http://www.harborfreight.com. The warranty repairs or replacement should be completed in a reasonable amount of time, not to exceed 30 days. If you have a question regarding your warranty coverage, you should contact HFT product support at 1-888-866-5797 or predator@harborfreight.com.

GENERAL EMISSIONS WARRANTY COVERAGE

a) The warranty period begins on the date the engine or equipment is delivered to an ultimate purchaser. The warranty period is two years.

b) HFT warrants to the initial owner and each subsequent owner that the engine is:

1. Designed, built, and equipped so as to conform with all applicable regulations adopted by the Air Resources Board; and
2. Free from defects in materials and workmanship that causes the failure of a warranted part for a period of two years.

c) The warranty on emissions-related parts is as follows:

1. Any warranted part that is not scheduled for replacement as required maintenance in the written instructions provided, is warranted for the warranty period stated above. If any such part fails during the period of warranty coverage, it will be repaired or replaced HFT. Any such part repaired or replaced under the warranty will be warranted for the remaining warranty period.
2. Any warranted part that is scheduled only for regular inspection in the written instructions is warranted for the warranty period stated above. A statement in the written instructions to the effect of “repair or replace as necessary” does not reduce the period of warranty coverage. Any such part repaired or replaced under warranty will be warranted for the remaining warranty period.
3. Any warranted part that is scheduled for replacement as required maintenance in the written instructions will be warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part will be repaired or replaced by HFT. Any such part repaired or replaced under warranty will be warranted for the remainder of the period prior to the first scheduled replacement point for the part.
4. Repair or replacement of any warranted part under the warranty will be performed at no charge to the owner at a retail store or by HFT paying for shipping the product for repair.
5. Notwithstanding the provisions herein, warranty services or repairs will be provided at all retail stores or by contacting HFT product support at 1-888-866-5797 or predator@harborfreight.com.
6. The owner will not be charged for diagnostic labor that leads to the determination that a warranted part is in fact defective, provided that such diagnostic work is performed at a retail store.
7. HFT is liable for damages to other engine components proximately caused by a failure under warranty of any warranted part.
8. Throughout the emissions warranty period stated above, HFT will maintain a supply of warranted parts sufficient to meet the expected demand for such parts.
9. Any replacement part may be used in the performance of any warranty maintenance or repairs and will be provided without charge to the owner. Such use will not reduce the warranty obligations of HFT.
10. Add-on or modified parts that are not approved by HFT may not be used. The use of any non-exempted add-on or modified parts will be grounds for disallowing a warranty claim. HFT is not liable to warrant failures of warranted parts caused by the use of a non-exempted add-on or modified part.

d) Emission Warranty Parts List.

1. Fuel Metering System
   a. Carburetor and its internal parts (and/or pressure regulator or fuel injection system).
   b. Fuel tank.
   c. Cold start enrichment system.
   d. Air/fuel ratio feedback and control system.
2. Air Induction System
   a. Controlled hot air intake system.
   b. Intake manifold.
   c. Air filter.
3. Ignition System
   a. Spark plugs.
   b. Magneto ignition system.
   c. Spark advance/retard system.
4. Catalyst System (if so equipped)
   a. Exhaust pipe stud/exhaust manifold.
   b. Thermal reactor.
   c. Catalytic converter (if so equipped).
5. Particulate Controls
   a. Traps, filters, precipitators, and any other device used to capture particulate emissions.
6. Miscellaneous Items Used in Above Systems
   a. Vacuum, temperature and time sensitive valves and switches.
   b. Hoses, belts, connectors, and assemblies.
7. Evaporative Emission Control System
   a. Fuel tank.
   b. Fuel caps, valves, canisters, filters, vapor hoses, clamps, connectors, belts, and assemblies.

HFT provides with each product written instructions for the maintenance and use of the product by the owner.

VULCAN®

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