

Item # GEN4000DF-STW
4000 SURGE WATTS / 3500 RUNNING WATTS
DUAL FUEL LPG LIQUID PROPANE & GASOLINE
PORTABLE HIT WELDING
GENERATOR + WELDER INSTRUCTION MANUAL



READ ALL INSTRUCTIONS AND WARNINGS BEFORE USING THIS PRODUCT.

This manual provides important information on proper operation & maintenance. Every effort has been made to ensure the accuracy of this manual. These instructions are not meant to cover every possible condition and situation that may occur. We reserve the right to change this product at any time without prior notice.

**IF THERE IS ANY QUESTION ABOUT A CONDITION BEING SAFE OR UNSAFE,
DO NOT OPERATE THIS PRODUCT!**

QUESTIONS? PROBLEMS? CALL US FIRST!

If you experience a problem, have questions or need parts for this product, call Customer Service at **1-866-460-9436, Monday-Friday, 8 AM - 4 PM Central Time**. A copy of the sales receipt is required.

FOR CONSUMER USE ONLY – NOT FOR PROFESSIONAL USE.
KEEP THIS MANUAL, SALES RECEIPT & APPLICABLE WARRANTY FOR FUTURE REFERENCE.

Item # GEN4000DF-STW 4000 Surge Watts / 3500 Running Watts

This unit is a Dual Fuel LPG or Gasoline Fuel powered generator plus Stick/TIG welder.

FEATURES:

- 4000 Surge Output / 3500 Running Watts*
- 7 HP Engine, 4 Stroke
- Displacement (CC): 212cc
- AVR Automatic Voltage Regulation
- Low Oil Shut Off
- UL Listed Electrical Components
- Engine Shut Off Switch
- Circuit Breaker & Power Outlets
- Spark Plug Model F7RTC
- 1-12V DC Outlet
- 4-120V Outlets
- 1-120V RV Outlet
- 85A Welding Machine
- 3.2 Gallons Max Capacity Gasoline Fuel Tank
- Complies with EPA emissions
- Decibel Rating < 69 db
- Mobility Kit: Not Available
- Run time =9 hrs @ 50% load Gasoline
- Run time =12 hrs @ 50% load LPG with 20 Gallon tank
- Fuel type - Liquid Propane Gas (also commonly referred to as LP, LPG and Propane) Or Unleaded Gasoline Only 87 rating or higher (This portable generator is not for use with gasoline/ ethanol blends with over 15% ethanol. Do not use E85 fuel.)
- High Altitude Use: This generator is not recommended for high altitude use above 3,000 feet.
- If you are using a generator above sea level, the generator may not function properly because of air flow getting through the mixer.
- Propane Tank Not Included
- If you want to use a propane tank larger than 20 lbs, call Customer Service for details at 866-460-9436.



* SURGE WATTS / RUNNING WATTS MAY BE REDUCED BY 10% WHEN USING PROPANE FUEL VS USING GASOLINE.

AC Output

Rated Voltage (V)	120
Rated Watts (W)	3500
Rated Frequency (Hz)	60
Phase	Single

DC Output

Voltage (V)	12
Circuit Breaker Amperage (A)	8

Welding Machine

Max No load Voltage (V)	72
Current Range (A)	10-85
Duty Cycle	25%
Usable electrodes (mm)	1.6-2.5

Engine

Engine Type	4-stroke single cylinder with forced air cooling system
Ignition System	Non-contact transistor (T.C.I.)
Starting System	Recoil

TABLE OF CONTENTS

RECOGNIZE SAFETY SYMBOLS, WORDS AND LABELS.....	4
PACKAGE CONTENTS	
PACKAGE CONTENTS	10
COMPONENTS	11
PREPARING THE GENERATOR FOR USE	12
Using This Generator For The First Time.....	12
Step 1 – Add Oil	12
Step 2 – Connect Fuel.....	13
Step 3 – Ground The Generator.....	14
Subsequent Use Of This Generator.....	14
Step 1 – Verify Oil Level	14
Step 3 – Ground The Generator.....	15
STARTING THE GENERATOR.....	15
USING THE GENERATOR.....	16
AC Usage.....	16
DC Usage.....	18
STOPPING THE GENERATOR.....	18
MAINTENANCE/CARE	18
Recommended Maintenance Schedule	19
Cleaning The Generator.....	19
Checking The Oil Level	19
Changing/Adding Oil	19
Air Filter Maintenance	20
Spark Plug Maintenance	21
Spark Arrester.....	21
Changing Fuel Line.....	21
Fuel Tank Usage And Maintenance Instructions.....	22
STORAGE/TRANSPORT PROCEDURES	22
TROUBLESHOOTING	23
SPECIFICATIONS	25
PARTS DIAGRAM	26
WIRE DIAGRAM	32
EMISSION CONTROL SYSTEM WARRANTY.....	33
WELDER USAGE	35

RECOGNIZE SAFETY SYMBOLS, WORDS AND LABELS

What You Need to Know About Safety Instructions

Warning and Important Safety Instructions appearing in this manual are not meant to cover all possible conditions and situations that may occur. Common sense, caution and care must be exercised when operating or cleaning tools and equipment.

Always contact your dealer, distributor, service agent or manufacturer about problems or conditions you do not understand.



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 an imminently hazardous situation which, if not avoided, will result in death or serious injury.



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



CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

2 YEAR LIMITED EMISSION-RELATED WARRANTY

THIS ENGINE MEETS U.S. EPA EMISSION STANDARDS UNDER 40 CFR 1054.625. The emission-related limited warranty is valid for two (2) years. Keep the purchase receipt and mail in the product registration card for proof of purchase. Buffalo Corp limits emission-related warranty repairs to authorized service centers for owners located within 100 miles of an authorized service center. For owners located more than 100 miles from an authorized service center, Buffalo Corp will, in its sole discretion, either pay for shipping costs to and from an authorized service center, provide for a service technician to come to the owner to make the warranty repair, or pay for the repair to be made at a local non-authorized service center. The provisions of this paragraph apply only for the contiguous states, excluding the states with high-altitude areas identified in 40 CFR part 1068, Appendix III.

To exercise this warranty, DO NOT RETURN TO RETAILER. Instead, call Customer Service toll free at 1-866-460-9436 (email address info@buffalotools.com) and you will be instructed on where to take the engine for warranty service. Take the generator and proof of purchase (your receipt) to the repair facility recommended by the Customer Service Representative. The warranty does not extend to generators damaged or affected by fuel contamination, accidents, neglect, misuse, unauthorized alterations, use in an application for which the product was not designed and any other modifications or abuse.

1 YEAR LIMITED WARRANTY (30 Day Limited Warranty for Commercial and Rental Purpose)

Generators are warranted to be free from defects in materials and workmanship for a period of 1 YEAR from date of original purchase. Buffalo Corp. is not liable for any indirect, incidental or consequential damages from the sale or use of this product. Any implied warranties are limited to 1 YEAR as stated, or as otherwise stated, in this written limited warranty. Some states do not allow the exclusion or limitation of incidental or consequential damages. Some states do not allow limitation on the length of an implied warranty. Buffalo Corp will repair or replace, at its discretion, any part that is proven to be defective in materials or workmanship under normal use during the 1 YEAR warranty period. Warranty repairs or replacements will be made without charge for parts or labor. Parts replaced during warranty repairs will be considered as part of the original product and will have the same warranty period as the original product. This warranty gives you specific legal rights, and you may have other rights that vary state to state

Legal Requirements:

Federal and/or State Occupational Safety and Health Administration (OSHA) regulations, local codes, and/or ordinances may apply to the intended use of this generator. Consult a qualified electrician, electrical inspector, and/or the local agency having jurisdiction. Some areas require generators to be registered with local utility companies. Additional regulations may apply if this generator will be used at a construction site.

Notice Regarding Emissions:

Engines certified to comply with U.S. EPA emission regulations for SORE (Small Off Road Equipment) are certified to operate on regular unleaded gasoline and may include the following emission control systems: Three-Way Catalyst (TWC) (if equipped), and Engine Modifications (EM).

IMPORTANT SAFETY INSTRUCTIONS – SAVE THESE INSTRUCTIONS

STOP!

Before using this generator and if you have any questions regarding the hazard and safety notices listed in this manual and/or on this generator, call 1-866-460-9436, Monday - Friday, 8 AM - 4 PM Central Time.

DANGER

Carbon Monoxide Gas: When in operation, the exhaust from this generator contains poisonous carbon monoxide gas. Carbon monoxide gas is both odorless and colorless AND may be present even if you do not see or smell gas. Breathing this poison gas can lead to headaches, dizziness, drowsiness, loss of consciousness and eventually death.

- Use this generator ONLY outdoors in non-confined areas.
- Keep at least several feet of clearance on all sides to allow proper ventilation for this generator.

WARNING

Propane (LPG): This generator may emit highly flammable and explosive vapors, which can cause severe burns or even death. A nearby open flame can lead to an explosion even if not directly in contact the fuel.

- Do not operate this generator near open flame.
- Always operate this generator on a firm, level surface.

This fuel is highly flammable and explosive. Handling fuel can result in serious injury or burns.

- Before starting the generator, inspect your LPG tank valve for damage or leaks, attach only approved tanks that have been properly filled by an approved station. DO NOT light or smoke cigarettes.
- Replace the hose at the first sign of a leak or if age-cracking becomes apparent.
- Always handle propane fuel and generator outdoors.
- Before transporting, turn the fuel valve to the "off" position and disconnect the spark plug.

DANGER

Powerful Voltage: This generator produces powerful voltage, which can result in electrocution.

- ALWAYS ground this generator before using it. (See "Ground the Generator" section in this manual).
- Only electrical devices should be plugged into this generator, either directly or with an extension cord. NEVER connect a building electrical system to this generator without a qualified electrician. **Doing so voids your warranty.** Such connections must isolate generator power from utility power and comply with local electrical laws and codes. Failure to comply can create a back feed into utility lines creating an electrocution hazard, which may result in serious injury or death to utility workers. Such a back feed may cause this generator to explode, burn and create fires when utility power is restored.
- Do not use this generator in wet conditions (rain, snow, active sprinkler system, wet hands, etc.). Always keep this generator dry and operate it with dry hands.
- Do not touch bare wires or outlets (receptacles).
- Do not allow children or non-qualified persons to operate this generator.

DANGER

High Temperatures: This generator produces heat when in operation. Temperatures near the exhaust can exceed 150 Degrees Fahrenheit (65 Degrees Celsius).

- Do not touch hot surfaces. Observe all warning placards on this generator denoting hot surfaces.
- Allow this generator to cool for several minutes after use before touching the engine, muffler or other areas that are hot during operation and before storing indoors.
- Hot exhaust may ignite some materials. Keep flammable materials away from this generator.
- Keep at least several feet of clearance on all sides of this generator during operation. Do not enclose this generator in any structure.

WARNING

Usage: Avoid the use of extension cords if possible. If you choose to use them, be sure they are sized adequately to handle the flow of electricity. An undersized cord can overheat, short out and cause a fire.

⚠ CAUTION

Usage: Misuse of this generator can damage it or shorten its life.

- Use this generator only for its intended purpose.
- Operate this generator only on a dry, level surface.
- Allow this generator to run for several minutes before connecting any electrical devices.
- Promptly turn off any malfunctioning devices and disconnect them.
- Do not operate an excessive number of electrical devices in excess of the wattage capacity of this generator.
- Do not turn on electrical devices until *after* they are connected to this generator.
- Turn off all connected electrical devices before stopping this generator.

⚠ DANGER

Flammable liquid gas under pressure. Can form explosive mixtures with air. May cause frostbite. **In Case Of Inhalation:** Persons suffering from lack of oxygen should be removed to fresh air. If victim is not breathing, administer artificial respiration. If breathing is difficult, administer oxygen. Obtain prompt medical attention. **In Case Of Eye Contact:** Contact with liquid or cold vapor can cause freezing of tissue. Gently flush eyes with lukewarm water. Obtain medical attention immediately. **In Case Of Skin Contact:** Contact with liquid or cold vapor can cause frostbite. Immediately warm affected area with lukewarm water not to exceed 105°F (40°C). **Fire And Explosion Hazards:** Propane is easily ignited. It is heavier than air, therefore, it may collect in low areas or travel along the ground where an ignition source may be present. Pressure in a container can build up due to heat, and it may rupture if pressure relief devices should fail to function. **Storage:** Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling or being knocked over. Protect cylinders from physical damage; do not drag, roll, slide or drop. Use a suitable hand truck for cylinder movement. Post "No Smoking or Open Flames" signs in the storage areas. There should be no sources of ignition. All electrical equipment should be explosion proof in the storage and use areas. Storage areas must meet national electric codes for class 1 hazardous areas.

⚠ DANGER

Propane smells like rotten eggs, a skunk's spray, or a dead animal. IF YOU SMELL GAS- NO FLAMES OR SPARKS! Immediately put out all smoking materials and other open flames. Do not operate lights, appliances, telephones, or cell phones. - Flames or sparks from these sources can trigger an explosion or a fire.

WHAT IS CARBON MONOXIDE (CO)?

You can't taste or smell CO, but it is a very dangerous gas. High levels of CO can come from appliances that are not operating correctly, or from a venting system or chimney that becomes blocked. CO CAN BE DEADLY! High levels of CO can make you dizzy or sick. In extreme cases, CO can cause brain damage or death.

Symptoms of CO poisoning include: headache, dizziness, fatigue, shortness of breath, and nausea.

IF YOU SUSPECT CO IS PRESENT, ACT IMMEDIATELY!

1. If you or a family member shows physical symptoms of CO poisoning, get everyone out of the building and call 911 or your local fire department.
2. If it is safe to do so, open windows to allow entry of fresh air, and turn off any appliances you suspect may be releasing CO.
3. If no one has symptoms, but you suspect that CO is present, call your propane retailer or a qualified service technician to check CO levels and your propane equipment.

⚠ WARNING

Usage: Consult a physician(s) before using this generator if using a pacemaker. Electromagnetic fields in close proximity to a heart pacemaker could cause a pacemaker to malfunction or fail. Caution is necessary when near the engine's recoil starter.

⚠ CAUTION

Usage: Prolonged exposure to high noise levels can be hazardous to hearing. Always wear ANSI-approved hearing protection when operating or working around the generator when it is running.

CAUTION

Usage: This generator is not intended to power sensitive electronic equipment such as TVs, DVD players, stereos, desktop computers or laptop computers without the use of an appropriate line conditioner and/or surge protector (both not included). Sensitive electronic equipment should be operated on approved inverter type generators or pure sine wave generators. For additional information consult the devices operation manual or call customer service at 1-866-460-9436 Monday - Friday, 8 AM - 4 PM Central Time.

⚠ WARNING

Usage: Welding is dangerous, and may cause damage to you and others, so take good protection when welding. For details, please refer to the operator safety guidelines in conformity with the accident prevention requirements of the manufacturer.

⚠ DANGER

Professional training is needed before operating the machine.

- Wear protective flame-resistant gloves.
- Clothing shall provide sufficient coverage and be made of suitable materials to minimize skin burns caused by sparks, spatter or radiation. Covering all parts of the body is recommended to protect against ultraviolet and infrared ray flash burn.
- Wear protective eyewear and face mask.



Electric shock—may lead to serious injury or even death.

- Install earth device according to the application criteria.
- Make sure that you are insulated from the ground and work-piece.
- Make sure that your working position is safe.
- Cut off power before maintenance or repair.



Smoke & gas—may be harmful to health.

- Keep the head away from smoke and gas to avoid inhalation of exhaust gas from welding.
- Keep the working environment in good ventilation with exhaust or ventilation equipment when welding.



Arc radiation—may damage eyes or burn skin.

- Wear suitable welding masks and protective clothing to protect your eyes and body.
- Use suitable masks or screens to protect spectators from harm.



Improper operation may cause fire or explosion.

- Welding sparks may result in a fire, make sure no combustible materials are nearby.
- Have a fire extinguisher nearby, and have a trained person to use it.
- Airtight container welding is forbidden
- Do not use these machines for pipe thawing.



Hot workpiece may cause severe scalding.

- Do not contact hot workpiece with bare hands.
- Cooling is needed during continuous use of the welding torch.



Magnetic fields affect cardiac pacemaker.

- Pacemaker users should be away from the welding spot before medical consultation.



Moving parts may lead to personal injury.

- Keep yourself away from moving parts such as fan.
- All doors, panels, covers and other protective devices should be closed during operation.



Seek professional help when encountering machine failure.

Contact customer service with questions.



⚠ WARNING

EXHAUST CONTAINS POISONOUS CARBON MONOXIDE GAS THAT CAN BUILD UP TO DANGEROUS LEVELS IN CLOSED AREAS. BREATHING CARBON MONOXIDE CAN CAUSE UNCONSCIOUSNESS OR DEATH. Never run the generator in a closed or even partly closed area where people may be present.

⚠ WARNING

THE GENERATOR IS A POTENTIAL SOURCE OF ELECTRICAL SHOCK IF NOT KEPT DRY. Do not expose the generator to moisture, rain or snow. Do not operate the generator with wet hands. READ OWNER'S MANUAL CAREFULLY BEFORE OPERATION.

⚠ DANGER

IMPROPER CONNECTIONS TO A BUILDING CAN ALLOW ELECTRICAL CURRENT TO BACKFEED INTO UTILITY LINES, CREATING AN ELECTROCUTION HAZARD. Connections to a building must isolate generator power from utility power and comply with all applicable laws and electrical codes.

⚠ WARNING

THIS GENERATOR PRODUCES HEAT WHEN RUNNING. TEMPERATURES NEAR EXHAUST CAN EXCEED 150°F. (65° C) DO NOT TOUCH HOT SURFACES. PAY ATTENTION TO WARNING LABELS ON THE GENERATOR DENOTING HOT PARTS OF THE MACHINE. ALLOW GENERATOR TO COOL AFTER USE BEFORE TOUCHING ENGINE OR AREAS WHICH HEAT DURING USE.

⚠ WARNING

GASOLINE IS HIGHLY FLAMMABLE AND EXPLOSIVE. YOU COULD BE BURNED OR SERIOUSLY INJURED IF THE GASOLINE IS IGNITED. Before refueling, stop the engine and keep heat, sparks and flame away. Handle fuel only outdoors. Do not fill the fuel tank above the upper limit line. Wipe up spills immediately.

In addition to the previously described safety information, familiarize yourself with all safety and hazard notices on this generator.

⚠ DANGER POISONOUS GAS

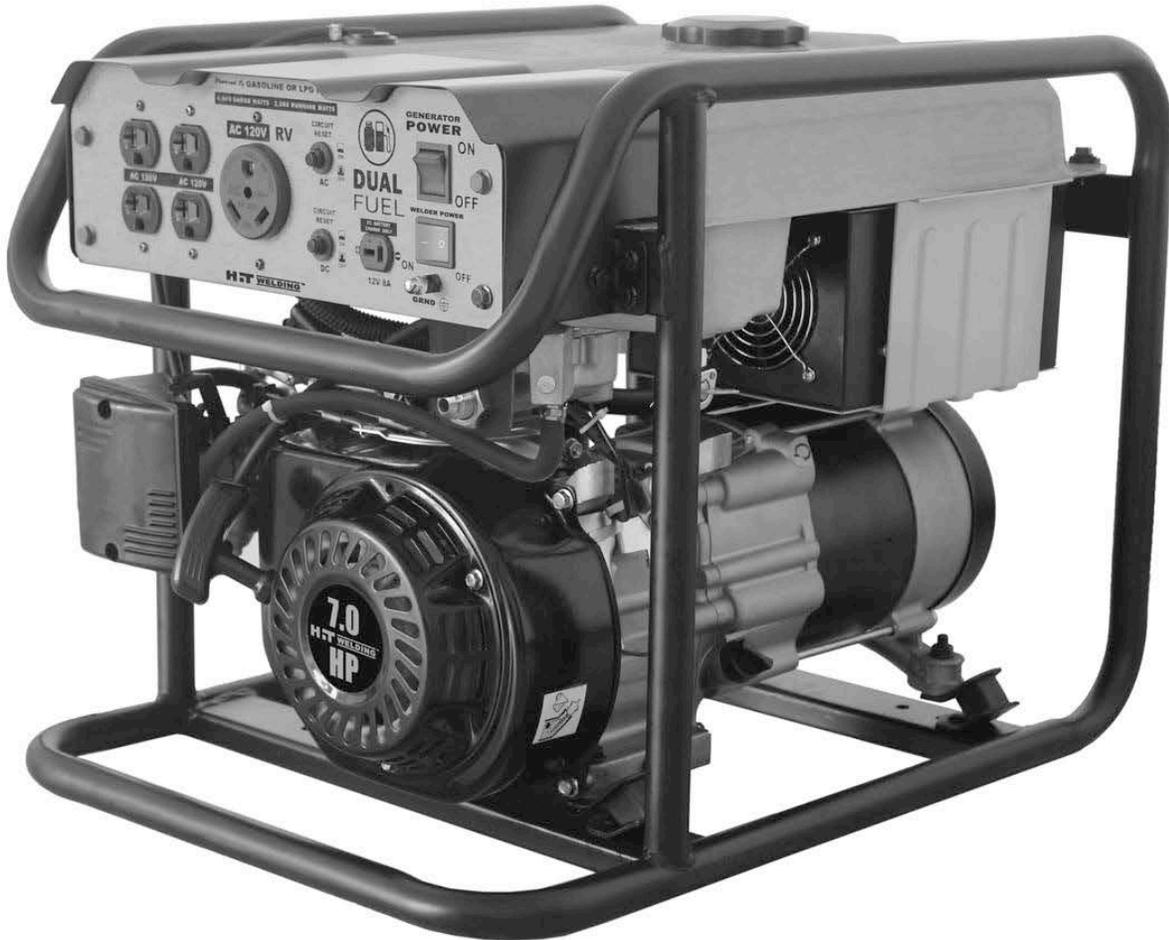
Generator exhaust contains toxic carbon monoxide gas. Breathing exhaust can cause loss of consciousness and shortness of breath. NEVER operate generator in poorly ventilated areas.

⚠ WARNING

Risk of electric shock. Do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

⚠ WARNING! RISK OF ELECTRIC SHOCK

This generator produces high voltage. Always ground properly before use. Do not connect to any building electrical system. Never use in rainy or wet conditions. Never touch bare wires or receptacles. Never allow children or non-qualified person to operate.



⚠ WARNING

Propane smells like rotten eggs, a skunk's spray, or a dead animal. IF YOU SMELL GAS- NO FLAMES OR SPARKS! Immediately put out all smoking materials and other open flames. Do not operate lights, appliances, telephones, or cell phones. Flames or sparks from these sources can trigger an explosion or a fire.

⚠ 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.

Avoid other generator hazards. READ MANUAL BEFORE USE.

⚠ CAUTION! HOT EXHAUST

🚫 DO NOT TOUCH

⚠ CAUTION! HIGH TEMPERATURE DO NOT TOUCH

PACKAGE CONTENTS

The following items are supplied with this Model GEN4000DF-STW Dual Fuel Generator + Welder. Verify that all items are included.

STOP!

If there are missing items, call 1-866-460-9436, Monday - Friday, 8 AM - 4 PM Central Time for customer service.

Item List:	
	Set of 2 DC connector wires for charging 12 Volt automotive-type batteries
	Spark plug wrench
	5.9 Ft. Regulator Hose Kit (YOU MUST USE THE SUPPLIED REGULATOR FOR SAFE OPERATION)
	Electrode holder and Earth clamp
	Face mask
	Brush & Hammer

ATTENTION

The Air-Fuel Mixer is not adjustable. Tampering with the governor can damage your generator and electrical devices, and will void your warranty.

WARNING

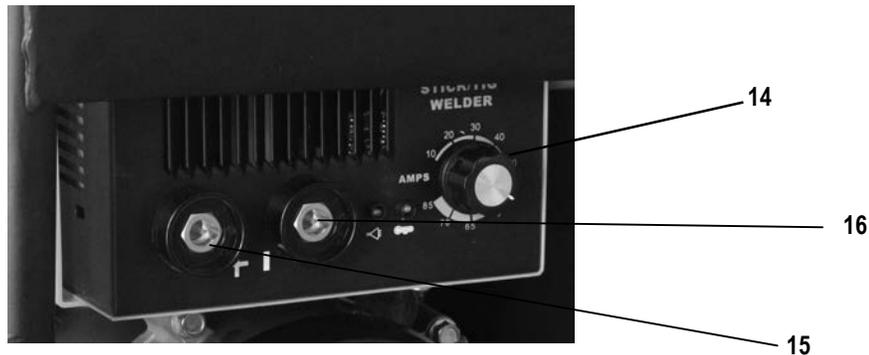
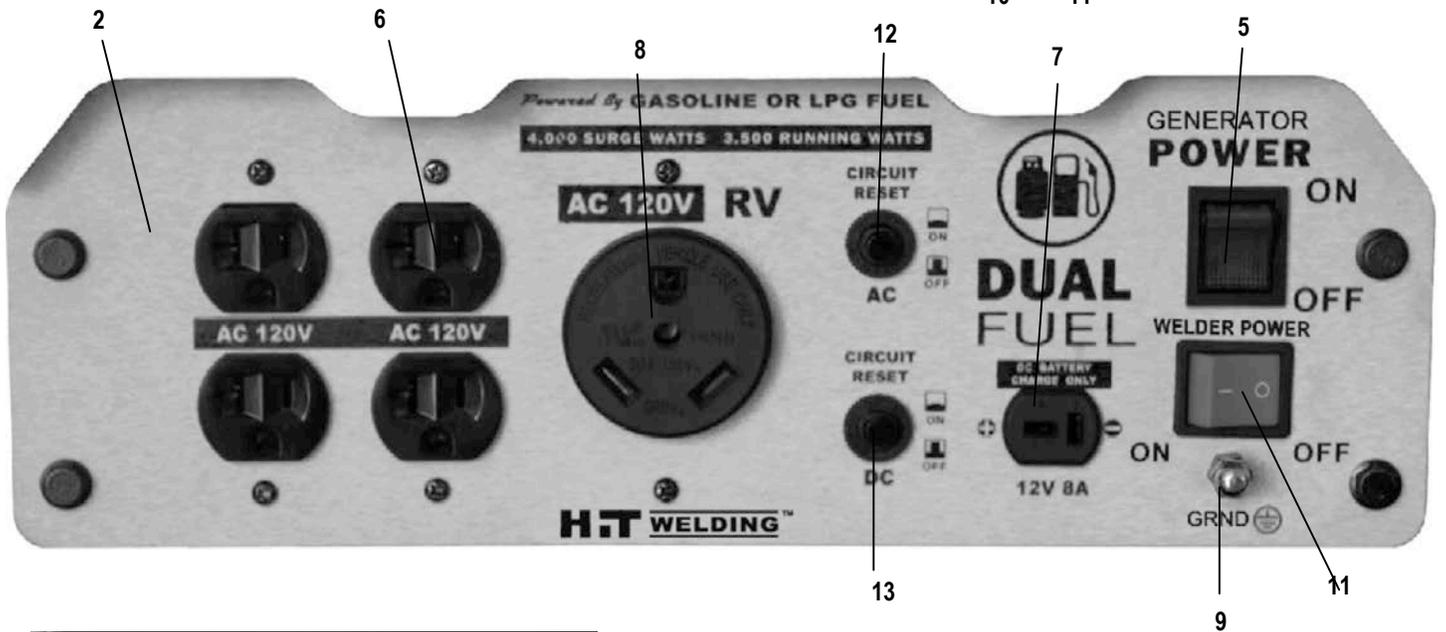
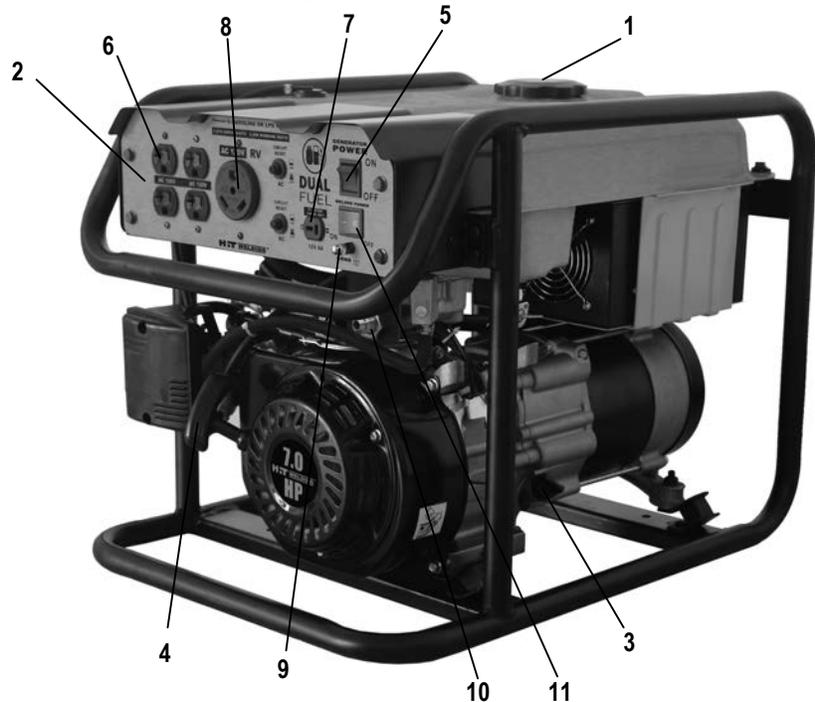
To prevent electrical shock from faulty appliances, the generator should be grounded. Connect a length of heavy wire between the ground terminal and the ground source.

Consult with a qualified electrician to ensure compliance with local electrical codes.

GENERATOR COMPONENTS

Observe the locations and functions of the various components and controls of this generator.

- 1) Fuel Tank Cap
- 2) Control Panel
- 3) Oil Access
- 4) Recoil Starter
- 5) Engine Switch
- 6) 120 Volt AC Outlet
- 7) 12 Volt DC Outlet
- 8) 120 Volt RV Outlet
- 9) Grounding Terminal
- 10) LP gas inlet
- 11) Welder Switch
- 12) AC Circuit Protector
- 13) DC Circuit Protector
- 14) Stick/TIG Welding Current Knob
- 15) "+" Output Terminal
- 16) "-" Output Terminal



PREPARING THE GENERATOR FOR USE

Using this Generator for the First-Time

STOP!

CAUTION

The following section describes the required steps for preparing this generator for the first use. Failure to correctly perform these steps can damage this generator and/or shorten its life. If still unsure about how to perform any of these steps after reading this section, call 1-866-460-9436 Monday - Friday, 8 AM - 4 PM Central Time for customer service.

If this generator is being used for the first time, the following few steps are required to prepare it for operation:

Step 1 - Add Oil

This generator requires engine oil to function. Engine oil is a major factor affecting engine performance and service life. When new from the package, this generator contains no oil in the engine crankcase. Add the correct quantity of oil before operating this generator for the first time. When replenishing oil for subsequent use of this generator, always determine that this generator has the correct quantity of oil.

Model GEN4000DF-STW Oil Capacity	18.5 ounces
Model GEN4000DF-STW Oil Type Recommended	High Detergent Motor Oil, SAE10W-30

To add oil:

1. Confirm that this generator is on a level surface.
2. Unscrew the oil filler/dipstick cap from the engine as illustrated in Figure 1.
3. Using a funnel, add high detergent motor oil to fill the engine crankcase to the correct quantity. SAE10W-30 oil is recommended for general, all-temperature use. **When the engine crankcase is full, the oil level should reach all the way up to the threads** as illustrated in Figure 2.
4. Replace the oil filler/dipstick cap.

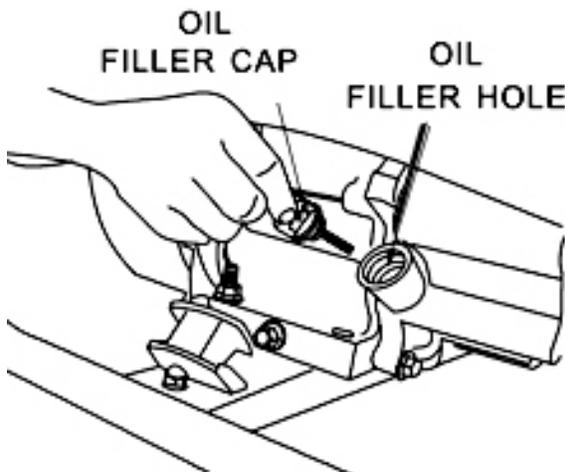


Figure 1 - Unscrew the Oil Cap



Figure 2 - Add Oil To TOP Of Threads

Step 2 – Connect Fuel

⚠ WARNING

Sulfur, water, dust, etc. are harmful for engine. If the gas supply source (LPG) contains these harmful elements, user must use filter to remove sulfur, water etc. and clean gas. Otherwise, the engine service lifetime will be shortened.

Choose either LPG or Gasoline fuel. If using LPG, first connect the regulator that was included with the generator to Propane Fuel Tank, then connect the other end to the Gas Inlet. (Fig A) Make sure the LPG cylinder is vertical and securely positioned

If using gasoline fuel, add Unleaded gasoline only with an octane rating of 87 or higher.
Maximum Capacity: 3.2 Gallons

Pre-Operation Check List

Step 1 Check that the gas supply source is in good condition. Check that the gas inlet connection is tightly fixed and not leaking.

Step 2 CHOKE VALVE GRIP is at CHOKE (CLOSE) position. The generator may be hard to start if CHOKE VALVE GRIP is at RUN (OPEN) position.

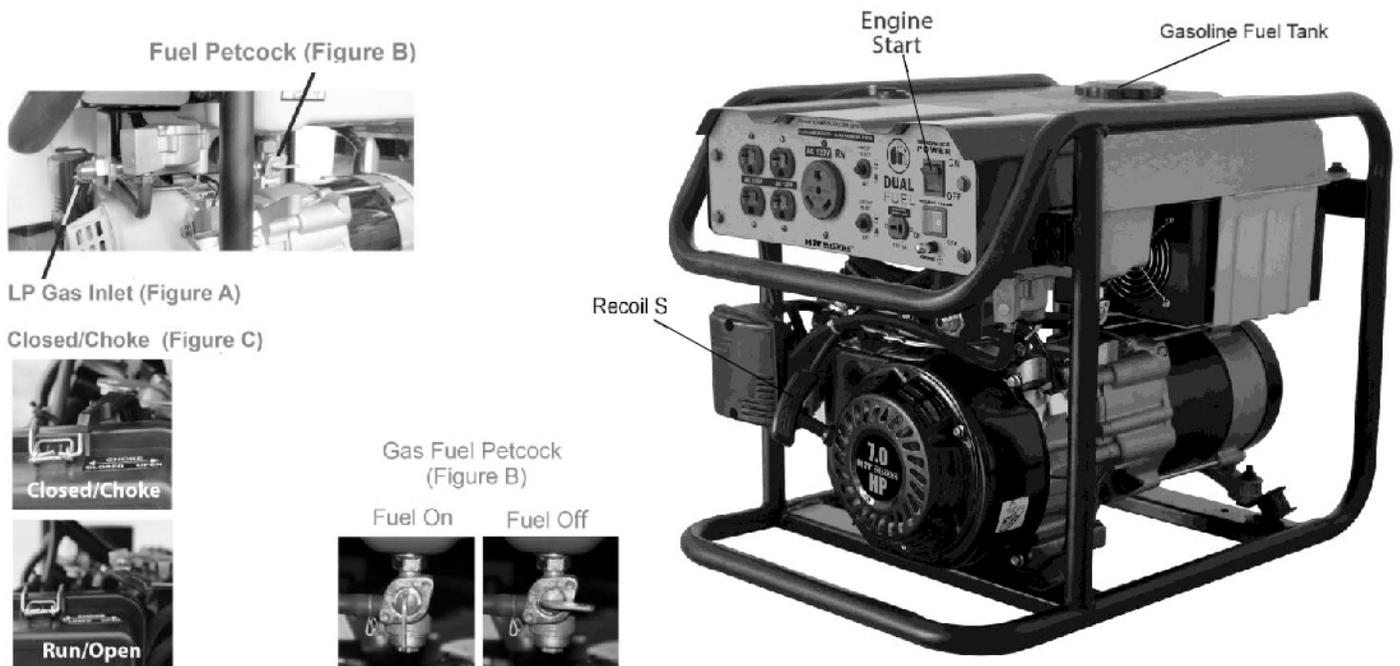
Step 3 Check if engine oil is full.

Step 4 Make sure GROUND TERMINAL is properly grounded.

Step 5 AC OUTPUT no load connected.

Disconnect all electrical loads from the generator set before starting the engine. The generator may be hard to start if a load is connected.

Step 6 DC OUTPUT no load connected.



Step 3 - Ground the Generator

WARNING

Failure to properly ground this generator can result in electrocution.

Ground this generator by tightening the grounding nut against a grounding wire as illustrated in Figure 3. A No. 12 AWG (American Wire Gauge) stranded copper wire is generally an acceptable grounding wire. The other end of this grounding wire should be connected to a copper or brass grounding rod that is driven into the earth.

Grounding codes can vary by location. Contact a local electrician for information on grounding regulations for your area.



Figure 3 - Attaching the Grounding Wire to this Generator

Subsequent Use of this Generator

For subsequent uses of this generator after the first use, certain steps still must be completed to prepare it for operation.

IMPORTANT: Be familiar with the procedures described in the previous section titled “Using the Generator for the First Time” of this manual. If not, review this section now.

Step 1 - Verify Oil Level

Even though this generator is equipped with an automatic shutoff to protect it from damage due to low oil, it is important to check the oil level in the engine crankcase before each use to ensure that there is sufficient quantity.

1. Verify that this generator is on a level surface.
2. Unscrew the oil filler/dipstick cap from the engine.
3. With a dry cloth, wipe the oil off of the dipstick that is located on the inside of the cap.
4. Fully insert the dipstick without screwing the filler/dipstick cap and then remove again. There should be oil on the dipstick. If there is no oil on the dipstick, or oil is visible only at the very end of the dipstick, add oil until the engine crankcase is filled. (See “Changing/Adding Oil” in the “Maintenance/Care” section of this manual).
5. Confirm that the oil filler/dipstick cap is properly screwed in place when finished verifying the oil level.

Model GEN4000DF-STW Oil Capacity	18.5 ounces
Model GEN4000DF-STW Oil Type Recommended	High Detergent Motor Oil, SAE10W-30

Step 3 - Ground the Generator

WARNING

Failure to properly ground this generator can result in electrocution.

Ground this generator by tightening the grounding nut against a grounding wire as previously illustrated in Figure 3. A generally acceptable grounding wire is a No. 12 AWG (American Wire Gauge) stranded copper wire. The other end of this grounding wire should be connected to a copper or brass grounding rod that is driven into the earth. Grounding codes can vary by location. Contact a local electrician for information on grounding regulations for your area.

STARTING THE GENERATOR

STOP!

Before starting this generator, confirm that all the steps in the section titled, "Preparing the Generator for Use," of this manual have been correctly completed. If unsure about how to perform any of these steps, call 1-866-460-9436, Monday - Friday, 8 AM - 4 PM Central Time for customer service.

CAUTION

Disconnect all electrical loads from this generator before attempting to start.

- Step 1 If using Propane LPG fuel, connect propane tank using included regulator hose and open fuel supply on the LP tank.
If using gasoline, make sure unleaded gasoline fuel has been added to the tank and turn fuel petcock to ON.
- Step 2 Turn ENGINE SWITCH at ON position.
- Step 3 Move Choke Lever to CHOKE position.
- Step 4 Pull the STARTER GRIP slowly until resistance is felt and then pull rapidly. After the engine started, return the STARTER GRIP gently to prevent damage to the starter or housing. DO NOT allow the starter grip to snap back. Return it slowly by hand.
- Step 6 Turn the CHOKE LEVER to RUN position.

Choke Rod

The choke is used to provide an enriched fuel mixture when starting a cold engine. It can be opened and closed by operating the choke rod manually. Pull the rod out toward CLOSED to enrich the mixture for cold starting

USING THE GENERATOR

After the engine has been running for several minutes, electrical devices may be connected to this generator.

AC Usage

Electrical devices running on AC current may be connected according to their wattage requirements. The rated (running) and surge wattage:

Model GEN4000DF-STW Rated (Running) Wattage	3500
Model GEN4000DF-STW Surge Wattage	4000

The *rated (running) wattage* corresponds to the maximum wattage a generator can output on a continuous basis.

The *surge wattage* corresponds to the maximum amount of power a generator can output for a short time. Many electrical devices, such as a refrigerator, require short bursts of extra power for starting and stopping fan motors, etc., in addition to their listed rated wattage. Motorized devices typically require more than their rated wattage for startup. The surge wattage ability of a generator allows for this extra power requirement.

The total running wattage requirement of the electrical devices connected to a generator should not exceed the rated wattage of the generator itself. To calculate the total wattage requirement of the electrical devices to be connected, look up the rated (running) wattage of each device and add these numbers together to find the total wattage that all of the devices together will draw from the generator. If the total wattage of the selected devices exceeds the rated wattage of the generator, DO NOT connect all of the devices. Select a combination of the electrical devices that will have a total wattage less than or equal to the rated wattage for the generator, i.e., no more than 3500 for this generator.

⚠ CAUTION

This generator can run at its surge wattage capacity for only a short time. Connect electrical devices requiring a rated (running) wattage equal to or less than the rated wattage of this generator. Never connect devices requiring a rated wattage equal to the surge wattage of a generator.

A device's rated (running) wattage should be listed somewhere on the device itself and/or in its manual. If the wattage specification for a device is not available, the wattage can be calculated by multiplying the Voltage requirement (120 or 240) by the Amperage drawn.

Watts = Volts x Amperes

Or, the wattage required by a device can be estimated by using the following chart (see Figure 7). The chart provides only estimates and it is better to know the exact wattage of each electrical device to be powered by this generator.

Electrical Device	Rated (Running) Watts	Additional Surge Watts
air compressor (1 HP)	1500	3000
air compressor (1 - 1/2 HP)	2500	2500
airless sprayer (1/3 HP)	600	1200
box fan	300	600
clock radio AM/FM	300	0
coffee maker	1500	0
computer w/17 inch monitor	800	0
deep freezer	500	500
electric drill (1/2 HP)	1000	1000
DVD/CD player or VCR	100	0
furnace fan blower (1/2 HP)	800	1300
garage door opener (1/2 HP)	480	520
hot plate	2500	0
light bulb (75 watt)	75	0
microwave oven (1000 watt)	1000	0
quartz halogen work light	1000	0
refrigerator/freezer (18 Cu. Ft.)	800	1600
saw - circular (7 1/4 inch)	1500	1500
saw - miter (10 inch)	1800	1800
saw - reciprocating	960	1040
security system	180	0
electric stove - single element	1500	0
sump pump	800	1200
television (27 inch color)	500	0
electric water heater (40 gallon)	4000	0
window air conditioner (10000 BTU)	1200	1800
window fan	300	600

Figure 7 - Estimated wattage requirements for common electrical devices.

Connect electrical devices to this generator according to the following procedure:

1. Allow the engine to run for several minutes after it has been started.
2. Confirm that the electrical device is switched off prior to plugging it into this generator.

CAUTION

Connect only electrical devices that are in good working order. Faulty devices or power cords present the risk of electrical shock. Immediately turn off and disconnect any device that commences to operate abnormally, sluggish or abruptly stops. Determine if the problem was the device or the rated load capacity of this generator has been exceeded.

NOTE: Plug appliances into the correct outlet. Connect standard 120 Volt, single phase, 60 Hz loads to the 120 Volt outlet. See Figure 8 for an illustration of these outlets.

CAUTION

Even though this Portable Generator has an overall rated wattage of 3500, do not attempt to draw more than 20 AMPS from any set of Two receptacles of the 120 Volt outlets. Draws higher than 20 Amps will damage this generator and void the warranty.

3. Make sure AC Reset button is pressed in.
4. Turn on the connected electrical devices beginning with the device with the highest rated wattage requirement and then each additional device with the next lower rated wattage requirement.

CAUTION

Do not connect 50Hz or 3-phase loads to this generator.



Figure 8 - Outlets available on this generator, from left to right: 4 each 120V AC, 120V AC RV and 12V DC.

SOME NOTES ABOUT POWER CORDS

Long or thin cords can require more wattage from a generator to power an electrical device. Figure 9 shows the recommended cords according to the power requirement of the electrical device. When using cords that exceed these specifications, allow for the electrical device to have a slightly higher rated wattage requirement.

Device Requirements			Max. Cord Length (ft) by Wire Gauge				
Amps	Watts (120V)	Watts (240V)	#8 wire	#10 wire	#12 wire	#14 wire	#16 wire
2.5	300	600	NR	1000	600	375	250
5	600	1200	NR	500	300	200	125
7.5	900	1800	NR	350	200	125	100
10	1200	2400	NR	250	150	100	50
15	1800	3600	NR	150	100	65	NR
20	2400	4800	175	125	75	50	NR
25	3000	6000	150	100	60	NR	NR
30	3600	7200	125	65	NR	NR	NR
40	4800	9600	90	NR	NR	NR	NR

NR = Not Recommended.

Figure 9 - Maximum Extension Cord Lengths by Power Requirement

DC Usage

⚠ CAUTION

The DC outlet is only for recharging 12 Volt automotive-type batteries. Do not connect any other device to this outlet.

⚠ CAUTION

Use this generator only for recharging 12 Volt batteries. NEVER attempt to jumpstart a car with this generator.

⚠ DANGER

Failing to use the correct procedure can cause a battery to explode, seriously injuring anyone nearby. Keep heat, sparks, flame and smoking materials away from the battery.

To connect 12 Volt batteries to the DC outlet:

1. Connect the red charging wire to the positive terminal of the battery and the black charging wire to the negative terminal of the battery.
2. Connect the plug end of the wire to the 12V DC outlet on this generator.
3. Start this generator.
4. When disconnecting, always disconnect the wires from this generator first to avoid a spark.

⚠ DANGER

Storage batteries emit highly explosive hydrogen gas when charged.

Batteries also contain acid, which can cause severe chemical burns.

- Do not allow open flames or cigarettes nearby for several minutes after charging a battery.
- Always wear protective goggles and rubber gloves when charging a battery.
 - If battery acid gets on the skin, flush with water.
 - If battery acid gets in the eyes, flush with water and immediately call a physician.
 - If battery acid is swallowed, drink large quantities of milk and immediately call a physician.

STOPPING THE GENERATOR

To stop this generator:

1. Turn off all connected electrical devices and then unplug them.
2. Allow this generator to run for several more minutes with no electrical devices connected to help stabilize the temperature of this generator.
3. Turn off the engine switch.
4. If using Propane, turn the propane tank fuel valve to the "off" position.

⚠ WARNING

Allow this generator to cool down before touching areas that become hot during operation.

MAINTENANCE/CARE

Proper routine maintenance of this generator is essential for safe, economical, and trouble-free operation. It will help prolong the life of this generator as well as help reduce air pollution. Perform maintenance checks and procedures according to the schedule in Figure 10.

STOP!

If you have questions about maintenance procedures described in this manual, call 1-866-460-9436 , Monday - Friday, 8 AM - 4 PM Central Time.

⚠ CAUTION

Never perform maintenance procedures while this generator is running. Allow this generator to cool before commencing any maintenance procedures. Keep heat, sparks and flame away.

⚠ WARNING

Improper maintenance and/or failure to correct any problems prior to operating this generator can cause a malfunction which could cause death or serious injury. Always follow the inspection and maintenance recommendations and schedules in this manual.

Recommended Maintenance Schedule

		Each Use	Every Month or Each 20 Hrs	Every 3 Months or Each 50 Hrs	Every 6 Months or Each 100 Hrs	Every Year or Each 300 Hrs
Engine Oil	Check Level	X				
	Replace		X (First Use)		X	
Air Filter	Check	X				
	Clean			X		
Fuel Filler Cap	Clean				X	
Spark Plug	Check/Clean				X	
	Clean					X

Figure 10 - Recommended maintenance schedule

Cleaning the Generator

Always try to use this generator in a cool dry place. If this generator becomes dirty, the exterior can be cleaned with a damp cloth, soft brush, vacuum and/or pressurized air.

Never clean this generator with a bucket of water and/or a hose as water can get inside and cause a short circuit or corrosion.

Never use gasoline to clean parts of this generator.

Checking the Oil Level

Even though this generator is equipped with an automatic shutoff to protect it from damage due to low oil, it is important to check the oil level in the engine crankcase before each use to ensure that there is a sufficient quantity.

To check the oil level:

1. Verify that this generator is shut down and on a level surface.
2. Unscrew the oil filler/dipstick cap from the engine as illustrated in Figure 11.
3. With a dry cloth, wipe the oil off of the dipstick that is located on the inside of the cap.
4. Insert the dipstick as if replacing the cap and then remove again. There should be oil on the dipstick. If there is no oil on the dipstick, or oil is visible only at the very end of the dipstick, add oil until the engine crankcase is filled (see "Changing/Adding Oil" in this section of this manual).
5. Confirm that the oil filler/dipstick cap is properly in place when finished verifying the oil level.

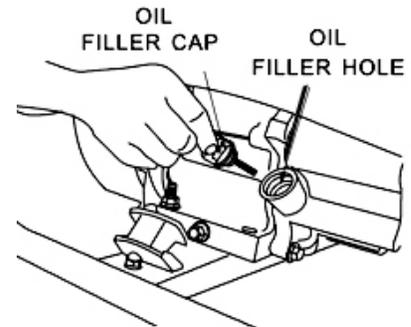


Figure 11 - Checking the Oil

Changing/Adding Oil

The oil level in this generator should be checked before each use. (See Figure 10.) When the oil level is low, add oil until the level is sufficient to operate this generator.

To drain the oil from this generator:

The oil should be changed after the first 20 hours of operation. The oil should then be changed every 6 months, or for every 100 hours of use time, or when it has become contaminated with water and/or dirt.

1. Place a bucket underneath this generator to catch oil as it drains.
2. Using a 12 mm hex wrench, unscrew the oil drain plug located on the crankcase underneath the oil filler/dipstick cap as illustrated in Figure 12.
3. Allow all the oil to drain from this generator.
4. Replace the oil drain plug and tighten with a 12 mm wrench.

NOTE: Never dispose of used motor oil in the trash, down a drain or on the ground. Put oil in a sealed container and contact your local recycling center or auto garage to arrange oil disposal.

To add oil to the engine crankcase:

1. Confirm that this generator is on a level surface.
2. Unscrew the oil filler/dipstick cap from the engine as illustrated in Figure 11 above.
3. Using a funnel, add high detergent motor oil to fill the engine crankcase to the correct quantity. SAE10W-30 oil is recommended for general use.

When the engine crankcase is full, the oil level should reach the top of the oil filling opening as shown in Figure 13.

Model GEN400DF-STW Oil Capacity	18.5 ounces
Model GEN400DF-STW Oil Type Recommended	High Detergent Motor Oil, SAE10W-30

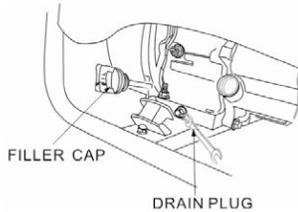


Figure 12 - Draining Oil



Figure 13 - Adding Oil

Air Filter Maintenance

Occasionally verify that the air filter is free of excessive dirt. The air filter will require more frequent cleaning when operating this generator in extremely dusty areas.

1. Unhinge the clasps at the top and bottom of the air filter cover as shown in Figure 14.
2. Remove the sponge-like elements from the casing.
3. Wipe the dirt from inside the empty air filter casing.
4. Wash the sponge-like elements in household detergent and warm water. **Do not use gasoline or a flammable solvent.**
5. Allow the sponge-like elements to dry thoroughly.
6. Soak the dry sponge-like elements in engine oil. Squeeze out any excess oil. The engine will smoke during initial startup if too much oil is left in the air filter.
7. Replace the sponge-like elements in the air filter casing (the fine element first) and replace the cover.

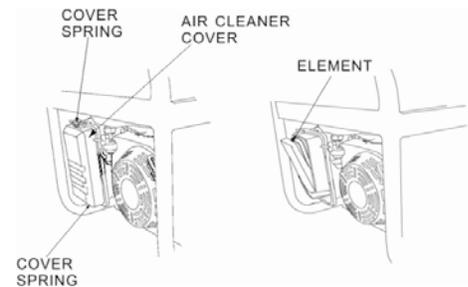


Figure 14 - Removing the Air Filter Casing.

Spark Plug Maintenance

The spark plug is essential for proper engine operation. The spark plug should be intact, free of deposits, and properly gapped. A bad or incorrectly installed spark plug can cause engine damage. To inspect the spark plug:

1. Remove the spark plug by pulling on the spark plug cap.
2. Unscrew the spark plug from this generator by using the included spark plug wrench.
3. Visually inspect the spark plug. If it is cracked and/or chipped, discard and install a new spark plug. A F7RTC spark plug, such as NGK BPR7ES is recommended.
4. Measure the spark plug electrode gap with a gauge. The gap should be 0.020-0.028 inch. (Figure17.)
5. If re-using the spark plug, use a wire brush to clean any dirt from around the spark plug base and then re-gap the spark plug.
6. Screw the spark plug back into place on this generator by using the included spark plug wrench.
7. Replace the spark plug cap.

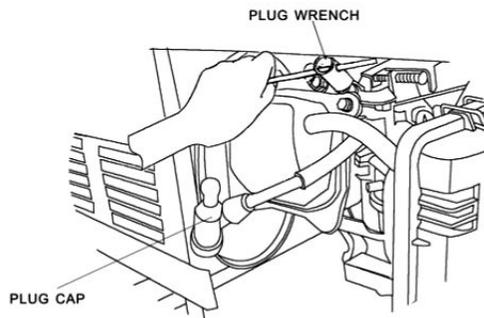


Figure 16 - Locating the Spark Plug

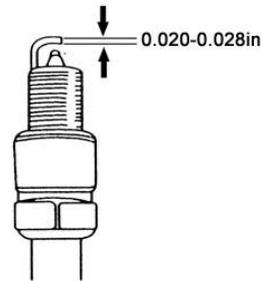


Figure 17 – Spark Plug Gap

Spark Arrester

1. Allow the engine to cool completely before servicing the spark arrester.
2. Remove the screws holding the cover plate which retains the end of the spark arrester to the muffler.
3. Remove the spark arrester screen.
4. Carefully remove the carbon deposits from the spark arrester screen with a wire brush.
5. Replace the spark arrester if it is damaged.
6. Position the spark arrester in the muffler and attach with the screws.

Changing Fuel Line

Fuel line installation instruction (include the carburetor and fuel tank, etc.)

1. Connect clamp ($\Phi 7.5$) to the fuel hose.
2. Slide fuel hose onto connection until it touches the bottom.
3. Then secure with clamp.

Fuel Tank Usage And Maintenance Instructions

- 1, Please pay attention to the cleanliness of the fuel tank inside when you add the fuel into the fuel tank at the first time, and use a small amount of diesel oil (kerosene) to flush fuel tank inside, after flushed fuel tank inside, and then start filling the fuel.
- 2, Please pay attention to the sundries will be went into the fuel tank inside when you are filling the fuel; and the fuel quality will affect the performance and safety of the equipment.
- 3, Please note that the tank should be kept at least a certain amount of space for the expansion of fuel. The rated capacity should be controlled in the fuel tank of the maximum liquid capacity of 95%.
- 4, Fuel tank pipeline must not use the materials which can cause pipeline blockage due to dissolution.
- 5, The fuel tank should be regularly discharged residues; After discharging residues, the fuel tank can be used again.
- 6, Please pay attention to fire safety when you are using the fuel tank.
- 7, The fuel tank should avoid exposure, and should be placed far away from the fire source, no smoking in the vicinity of the fuel tank, no spark or flame, volatile fuel will cause an explosion.
- 8, The fuel tank should be regularly checked if the rubber sealing has being aged or not, if you find the components are damaged, please immediately stop using, and replace it.

STORAGE/TRANSPORT PROCEDURES



Never place any type of storage cover on this generator while it is still hot.

When transporting or storing this generator for extended time:

- Allow generator to fully cool before moving it. A hot engine and exhaust system can burn you and ignite some materials.
- Turn the fuel valve to the “off” position.
- Disconnect the spark plug. (See Figure 16, Locating the spark plug.)
- Do not obstruct any ventilation openings.
- Do not drop or strike this generator while moving it.
- Store this generator in a cool dry area, free of excessive dust.

To store this generator for extended time if you have used gasoline: Drain the gasoline from the carburetor AND fuel tank.

To drain gasoline from this generator:

1. Turn the fuel valve to the “off” position and let the engine run until it stops.
2. Place a receptacle underneath this generator to catch gasoline as it drains
3. Unscrew the drain bolt of the carburetor.
4. Empty the fuel in the carburetor.
5. Unplug the fuel hose from the carburetor.
6. Turn the fuel valve to the “on” position. Empty the fuel in the tank.
7. Turn the fuel valve to the “off” position and replug the fuel hose to the carburetor.
8. Tighten the drain bolt of the carburetor.
9. Store the drained gasoline in a suitable place.

TROUBLESHOOTING

IMPORTANT: If trouble persists, call our customer help line at 1-866-460-9436, Monday - Friday, 8 AM - 4 PM Central Time.

Symptom	Cause	Solution
Engine will not start.	Fuel valve is turned to "closed."	Turn fuel valve to "open."
	Choke is open.	Close the choke.
	Propane Tank is out of fuel.	Replace propane fuel tank.
	Spark plug is dirty.	Clean spark plug.
	Generator is not on level surface.	Move generator to a level surface to prevent triggering the low oil shutdown.
	Oil is low.	Add or replace oil.
	Generator runs but does not support all connected electrical devices.	Generator is overloaded.
Short in one of the connected devices.		Disconnect any faulty or short-circuited electrical loads.
Air filter is dirty.		Clean or replace air filter.
	Loose wiring harness connection	Turn off generator, then check wiring behind control panel and at the end of generator for loose connection. If wires are loose, tighten the screws and/or nuts. Be certain the plug in connectors are pushed together all the way.
Engine runs but there is no electrical output.	Reset button(s) is (are) "off."	Push reset button(s) to "on."
	Loose wiring harness connection	Turn off generator, then check wiring behind control panel and at the end of generator for loose connection. If wires are loose, tighten the screws and/or nuts. Be certain the plug in connectors are pushed together all the way.
	Bad connecting wires/cables.	Try a different extension cord.
	Bad electrical device connected to generator.	Disconnect device, try connecting another device.
	Carbon Brushes are worn down	Turn off generator, then look at the brush holder at the end of the generator to determine if the brushes are still against the copper bands on the end of the rotor. If they are worn down, replace the 2 wires the same way they came off.
	AVR shorted out or burned out	Turn off the generator, then remove the 2 screws at the end of the generator. Look for the burn spots on the back side of the AVR. If there is burn spots, replace the AVR.

Welder Troubleshooting:

WARNING

The following operation requires sufficient professional knowledge on electric aspect and comprehensive safety knowledge. Make sure the input cable of the machine is cut off from the electricity utility before uncovering the welding machine.

Malfunction	Cause and Solution
Turn on the machine, the power LED is off, the fan doesn't work, and no welding output.	<ol style="list-style-type: none">(1) Check if the power switch is closed.(2) No input power.
Turn on the machine, the fan works, but the output current is unstable and can't be controlled by potentiometer when welding.	<ol style="list-style-type: none">(1) The current potentiometer fails. Replace it.(2) Check if any loose contact exists inside the machine. If any, reconnect.
Turn on the machine, the power LED is on, the fan works, but no welding output.	<ol style="list-style-type: none">(1) Check if any loose contact exists inside the machine.(2) Open circuit or loose contact occurs at the joint of output terminal.(3) The overheating LED is on.<ol style="list-style-type: none">a) The machine is under over-heating protection status. It can recover automatically after the welding machine is cooled.b) Check if the thermal switch is ok. Replace it if damaged.
The electrode holder becomes very hot.	The rated current of the electrode holder is smaller than its actual working current. Replace it with a bigger rated current.
Excessive spatter in MMA welding.	The output polarity connection is incorrect. Exchange the polarity.

SPECIFICATIONS

Generator

Type	Brush, Revolving Magnetic Field, Self Exciting, 2-Pole, Single Phase
------	--

AC Output

Rated Wattage (W)	3500
Surge Wattage (W)	4000
Rated Voltage (V)	120
Rated Amperage	20A+20A+20A+20A at 120 V 30 A at 120 RV
Rated Frequency (Hz)	60
Phase	Single

DC Output

Voltage (V)	12
Circuit Breaker Amperage (A)	8

Engine

Approvals	EPA
Engine Model (HP)	7
Engine Type	4-stroke single cylinder with forced air cooling system.
Ignition System	Non-contact transistor (T.C.I.)
Starting System	Recoil
Continuous Operating Hours	Run time = 9 hrs @ 50% load Gasoline fuel
Continuous Operating Hours	Run time = 12 hrs @ 50% load per 20 lbs of LPG fuel
Oil Capacity (SAE10W-30)	18.5 ounces

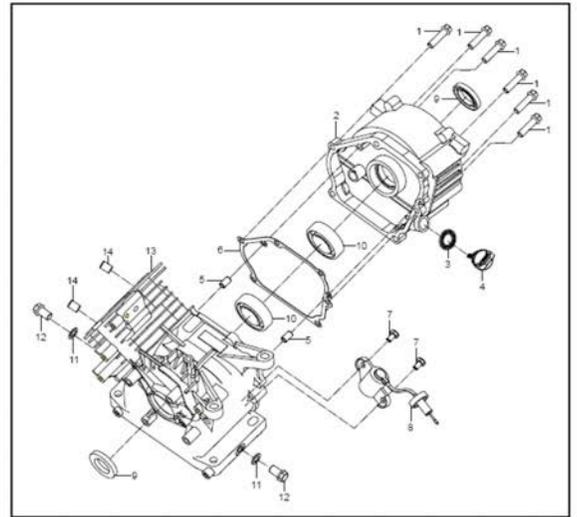
Welder

Power Voltage(V)	120
Power Frequency(Hz)	60
Max Input Power(KVA)	3
Efficiency(%)	85
Max No load voltage(V)	72
Current range(A)	10-85
Duty cycle	25%

PARTS DIAGRAM

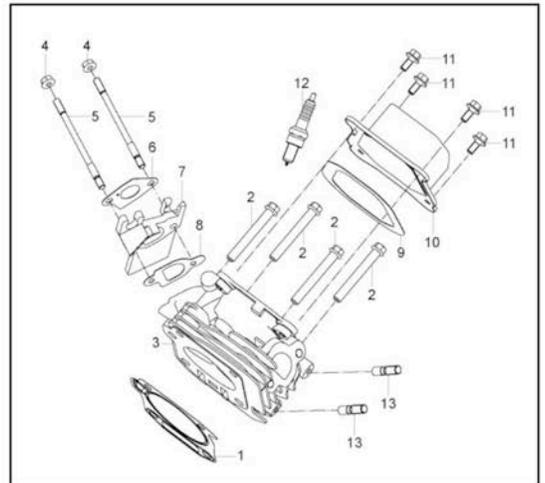
CRANKCASE ASSEMBLY

NO.	PART NO.	DESCRIPTION	QTY
1	GB/T16674.1-2004	Bolt M8x30	6
2	QJ168QDJ.01-01B	Cover, Crankcase	1
3	JF142F.8-5	Oil Seal, Dipstick	1
4	QJ168QDJ .01-04	Dipstick	1
5	157.3-8	Guide Dowel $\phi 8 \times 14$	2
6	QJ168QDJ .01-02	Gasket, Crankcase	1
7	GB/T16674.1-2004	Bolt M6x12	2
8	QJ168FJH-3.01.02	Oil level sensor components	1
9	QJ168QDJ.01.01	Oil Seal $\phi 25 \times \phi 41.25 \times 6$	2
10	GB/T276-2013	Bearing 6205/P53	2
11	QJ166QDK.01-07B	Washer, Drain Plug	2
12	QJ166QDK.01-06	Drain Plug	2
13	JF170FLH.01.01	Crankcase Body	1
14	157.4-6	Guide Dowel $\phi 10 \times 14$	2



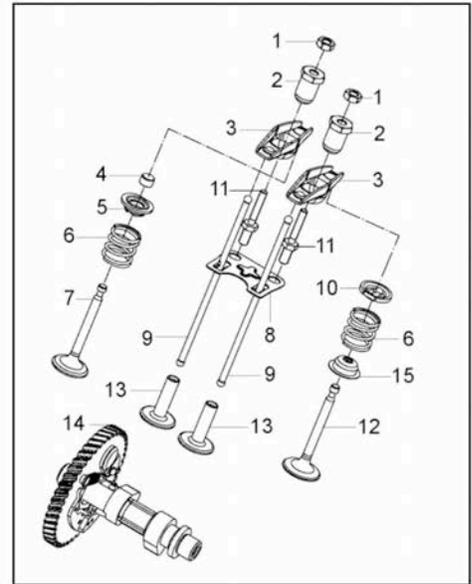
CYLINDER HEAD

NO.	PART NO.	DESCRIPTION	QTY
1	JF170FLH.02-01	Gasket, Cylinder Head	1
2	GB/T16674.1-2004	Bolt, Cylinder Head M8x60	4
3	QJ168QDL.02.01C	Cylinder Head Assembly	1
4	GB/T6177.1-2000	Nut M6	2
5	JF152FFH.02-06	Double End Stud	2
6	QJ168QDJ.02-05	Gasket, Intake 1	1
7	QJ168QDJ.02-02	Spacer, Heat Insulating	1
8	QJ168QDJ.02-04	Gasket, Intake 2	1
9	QJ168QDJ.02-06	Gasket, Cylinder Head Cover	1
10	QJ168QDJ.02.03B	Cylinder Head Cover	1
11	GB/T5789-1986	Bolt M6x14	4
12	QJ1E50FMG.1.2	Spark Plug	1
13	QJ168QDJ.02-07	Double End Stud	2



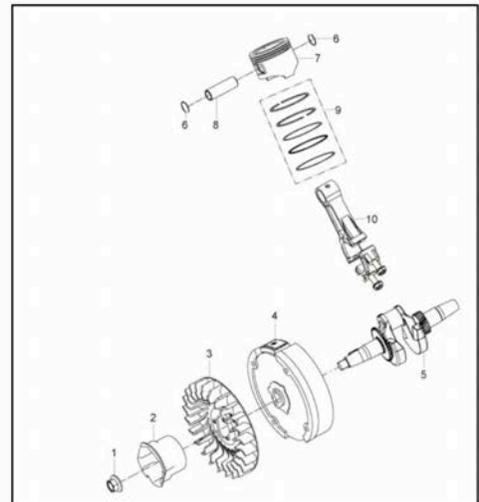
VALVE ASSEMBLY

NO.	PART NO.	DESCRIPTION	QTY
1	QJ166QDK.03-11	Nut, Valve Clearance Adjustment	2
2	QJ182QDP.03-07	Button head, Arm	2
3	QJ168QDJ.03-09	Arm	2
4	QJ168QDJ.03-02	Cap, Exhaust Rod	1
5	QJ168QDJ.03-10	Upper Retainer, Exhaust Valve Spring	1
6	QJ168QDJ.03-07	Spring, Valve	2
7	QJ168QDJ.03-05C	Valve, Exhaust	1
8	QJ168QDJ.03.04	Guide Plate, Connecting Stud	1
9	QJ168QDJ.03.02	Rod, Connecting	2
10	QJ168QDJ.03-08	Upper Retainer, Intake Valve Spring	1
11	QJ182QDP.03-04	Adjusting Stud, Valve Clearance	2
12	QJ168QDJ.03-06C	Valve, Intake	1
13	QJ168QDL.03-01	Stud, Connecting	2
14	QJ168QDL .03.01B	Camshaft	1
15	QJ1P64.02.01	Seal, Valve Stem	1



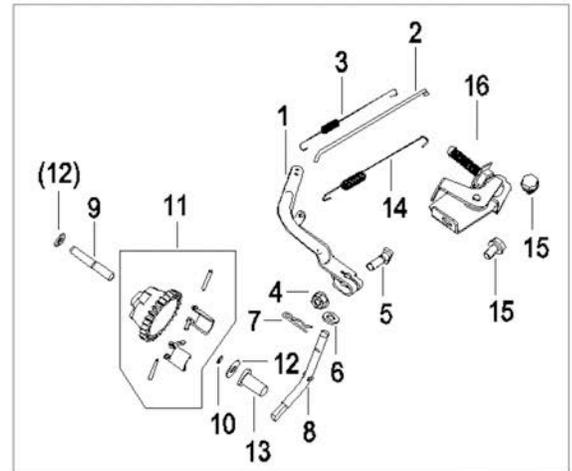
CRANKSHAFT ASSEMBLY

NO.	PART NO.	DESCRIPTION	QTY
1	GB/T6177.2-2000	Nut, M14*1.5	1
2	QJ168QDJ.04-10B	Start-Up Ratchet Gear	1
3	QJ168QDJ.04-11	Fan Wheel	1
4	QJ168QDJ.04.03	Fly Wheel	1
5	JF170FLH.04.02H	Crankshaft	1
6	QJ168QDJ.04-05	Clip, Piston Pin	2
7	JF170FLH.04-01B	Piston	1
8	QJ168QDJ.04-04	Pin, Piston	1
9	JF170FLH.04.01B	Piston Ring Assembly	1
10	QJ168QDJ.04.02	Connecting Rod Assembly	1



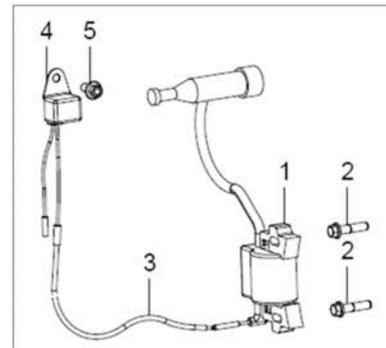
CENTRIFUGAL ADJUSTMENT (GOVERNOR)

NO.	PART NO.	DESCRIPTION	QTY
1	QJ168QDJ.05-01	Arm	1
2	QJ168QDJ.05-07	Rod, Tension	1
3	QJ168QDJ.05-06	Spring 2, Tension	1
4	GB/T6177.1-2000	Nut M6	1
5	QJ182QDP.06-03	Bolt, Square	1
6	QJ168QDJ.05-09	Spacer 2	1
7	QJ182QDP.06-02	Hair Pin	1
8	QJ168QDJ.05-03	Governor Crank	1
9	QJ168QDJ.05-04	Pin	1
10	QJ166QDK.01-02	Circlip	1
11	QJ168QDJ.05.02	Centrifugal Timing Implement	1
12	QJ168QDJ.05-08	Spacer 3	1
13	QJ168QDJ.05-02	Cover, Push Rod	1
14	QJ168QDJ-2.02-01	Spring 1, Tension	1
15	GB/T5789-1986	Bolt M6 X 10	2
16	QJ168QDJ-2.02.01B	RPM Adjust Mechanism	1



IGNITION SYSTEM

NO.	PART NO.	DESCRIPTION	QTY
1	QJ168QDJ.11.03B	Ignition Coil	1
2	GB/T5789-1986	Bolt M6x25	2
3	QJ168QDJ.11.02	Connecting Wire Assy.	1
4	QJ182QDP.01.05	Electronic Switch	1
5	GB/T5789-1986	Bolt M6X10	1



CARBURETOR

NO.	PART NO.	DESCRIPTION	QTY
1	JF170FLH-2.09.01F	Carburetor & Regulator Assy.	1
2	JF168FJH-15.05-08	Clamp, $\phi 8$	2
3	JF168FJH.10.03-03	Clamp, $\phi 8.5$	1
4	QJ168QDJ.10.03-01	Hose, Fuel $\phi 4.5 \times \phi 8.5$	1

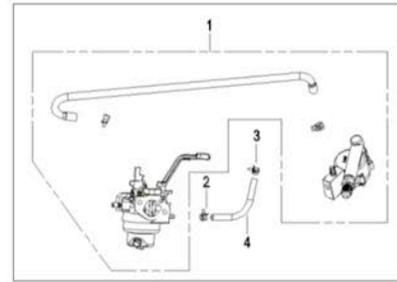
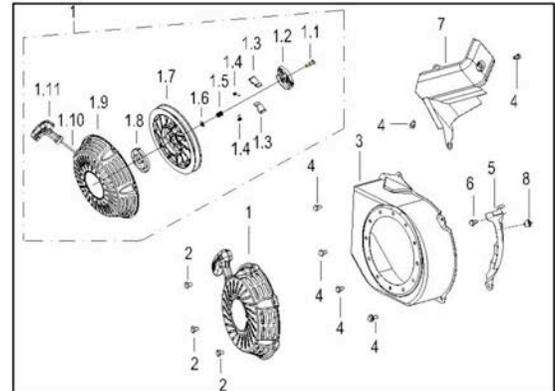


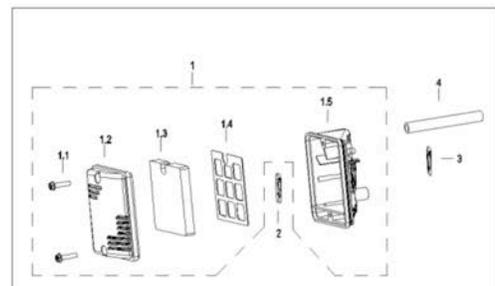
PLATE VENTILATION HOOD COMPONENTS

NO.	PART NO.	DESCRIPTION	QTY
1	JF168FJH-M.06.01D	Starter Assembly	1
1.1	JF168FLH-M.06.01-06	Screw	1
1.2	JF168FLH-M.06.01-08	Guide Pan	1
1.3	JF168FLH-M.06.01-07	Ratchet	2
1.4	JF168FLH-M.06.01-05	Return Spring	2
1.5	JF168FLH-M.06.01-04	Spring	1
1.6	JF168FLH-M.06.01-03	Gasket	1
1.7	JF168FLH-M.06.01-02	Spool	1
1.8	JF168FLH-M.06.01-01	Wind Spring	1
1.9	JF168FLH-M.06.01.01	Starter Cover	1
1.10	QJ168QDJ.06-08B	Starter Rope	1
1.11	JF168FJH.06.01.02C	Handle, Recoil Starter	1
2	GB/T5789-1986	Bolt M6x8	3
3	QJ168QDJ.06.02.02B	Engine Side Cover Assy.	1
4	GB/T5789-1986	Bolt M6x10	6
5	QJ168QDJ.06.02.01	Shield 1	1
6	GB/T5789-1986	Bolt M6x20	1
7	QJ168QDJ.06.02-01	Shield 2	1
8	QJ168QDJ.06.02.01-03	Stem	1



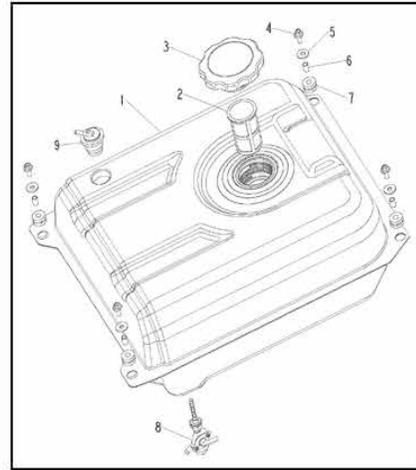
AIR CLEANER

NO.	PART NO.	DESCRIPTION	QTY
1	JF170FLH-2.07.01B	Air Filter Assembly	1
1.1	GB/T29.2-2013	Bolt M5 x 22	2
1.2	JF170FLH-2.07.01B-01	Air Filter Cover	1
1.3	JF170FLH-2.07.01B-02	Filter Element	1
1.4	JF170FLH-2.07.01B-03	Filter Element Mounting Base	1
1.5	JF170FLH-2.07.01B-04	Air Filter Case	1
2	QJ168QDJ.07.03C	Spacer	1
3	JF170FLH.07-01	Spacer	1
4	QJ168FJH-3.05-01	Breather Tube	1



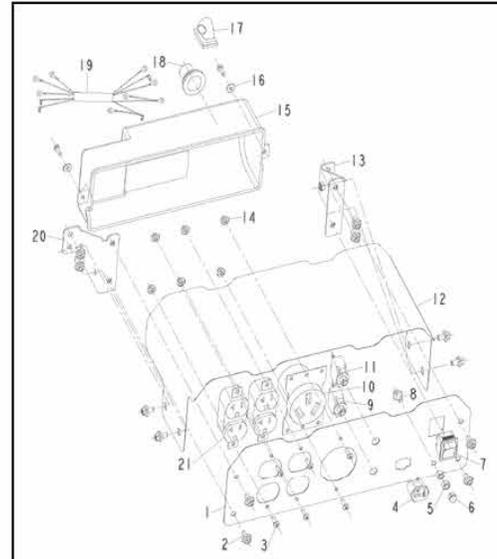
GAS TANK ASSEMBLY

NO.	PART NO.	DESCRIPTION	QTY
1	GEN4000DF-STW.01.01	Fuel Tank Comp	1
2	QJ2600.01-04A	Filtering Net	1
3	QJ2600.01.05	Gas Cap	1
4	GB/T5789-1986	Bolt M6 x20	4
5	GB/T96.2-2002	Washer ϕ 6	4
6	QJ2600.01-02	Spacer	4
7	QJ2600.01-01	Mounting Grommet	4
8	QJ2600.01.02	Fuel Petcock	1
9	QJ2900.08.02A	Oil spill valve	1



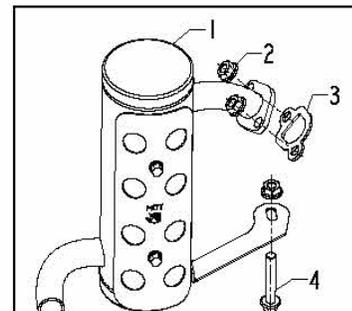
PANEL

NO.	PART NO.	DESCRIPTION	QTY
1	GEN4000DF-STW.02-01	Panel	1
2	GB/T5789-1986	Bolt M6x10	4
3	GB/T818-2000	Screw M4x12	8
4	QJ1500.02.06	T- Socket	1
5	GB/T6170-2000	Nut M6	2
6	GB/T923-1988	Nut M6	1
7	QJ1200.02.04	Engine Switch	1
8	GB/T5789-1986	Bolt M6x16	1
9	QJ6500.02.06	DC Protector 8A	1
10	KE4500E.02.03B	RV-socket	1
11	QJ2900.01.04	AC Protector 20A	1
12	GEN4000DF-SS.02-02	Panel Cover	1
13	GEN4000DF-SS.02.03	Right Bracket	1
14	GB/T6177.1-2000	Nut M4	6
15	GEN4000DF-SS.02-03	Bottom Shell	1
16	GB/T95-2002	Washer ϕ 4	1
17	QJ1200.02-02A	Jacket	1
18	QJ6000.02-02	Sheath	1
19	GEN4000DF-SS.02.01	Cable	1
20	GEN4000DF-SS.02.02	Left Bracket	1
21	QJ3200.01.04	Socket of USA Standard	2



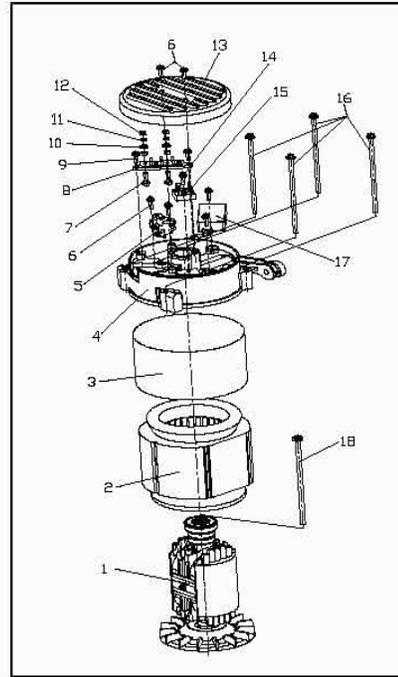
MUFFLER

NO	PART NO.	DESCRIPTION	QTY
1	QJ3500.05.01	Muffler (CARB)	1
2	GB/T6177.1-2000	NUT M8	3
3	QJ2500.05-01	Muffler Gasket	1
4	GB/T5789-1986	BOLT M8x35	1



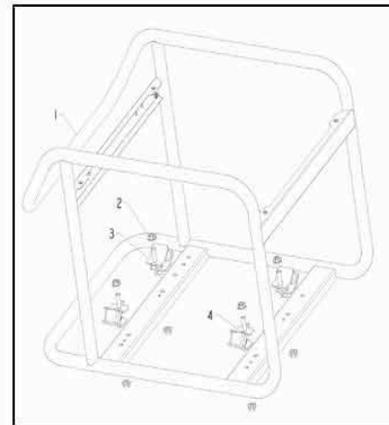
GENERATOR

NO	PART NO	DESCRIPTION	QTY
1	QJ3200.03.02	Rotor Assy.	1
2	QJ3200.03.01	Stator Assy.	1
3	QJ3200.01-01A	Alternator Cover	1
4	QJ2500.03-01	Motor Casing (End Cap)	1
5	QJ2300.03.03	Brush Module	1
6	GB/T5789-1986	Bolt M5x8	3
7	GB/T5781-2000	Bolt M5x20	2
8	QJ6000.03-03	Connecting Block	1
9	GB/T5789-1986	Bolt M5x12	4
10	GB/T6170 -2000	Spring Washer ϕ 5	4
11	GB/T93-1987	Plate Washer ϕ 5	4
12	GB/T6170 -2000	Nut M5	4
13	QJ2500.03-02	Right Side Cover	1
14	GB/T5789-1986	Bolt M5x17	2
15	QJ2500.03-04	Rectifier KB2506	1
16	GB/T5789-1986	Bolt M6x150	4
17	QJ2300.03.04	AVR	1
18	GB/T5789-1986	Bolt M8x230	1



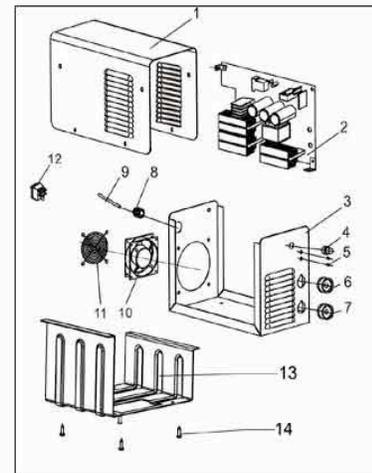
FRAME

NO.	PART NO.	DESCRIPTION	QTY
1	GEN4000DF-SS.06.01	Frame Welding Components	1
2	GB/T6177.1-2000	Nut M8	8
3	QJ2600.08.02	Left & Right Shockproof Mounting Feet	2
4	QJ2500.06.03	Right Shockproof Mounting Feet	2

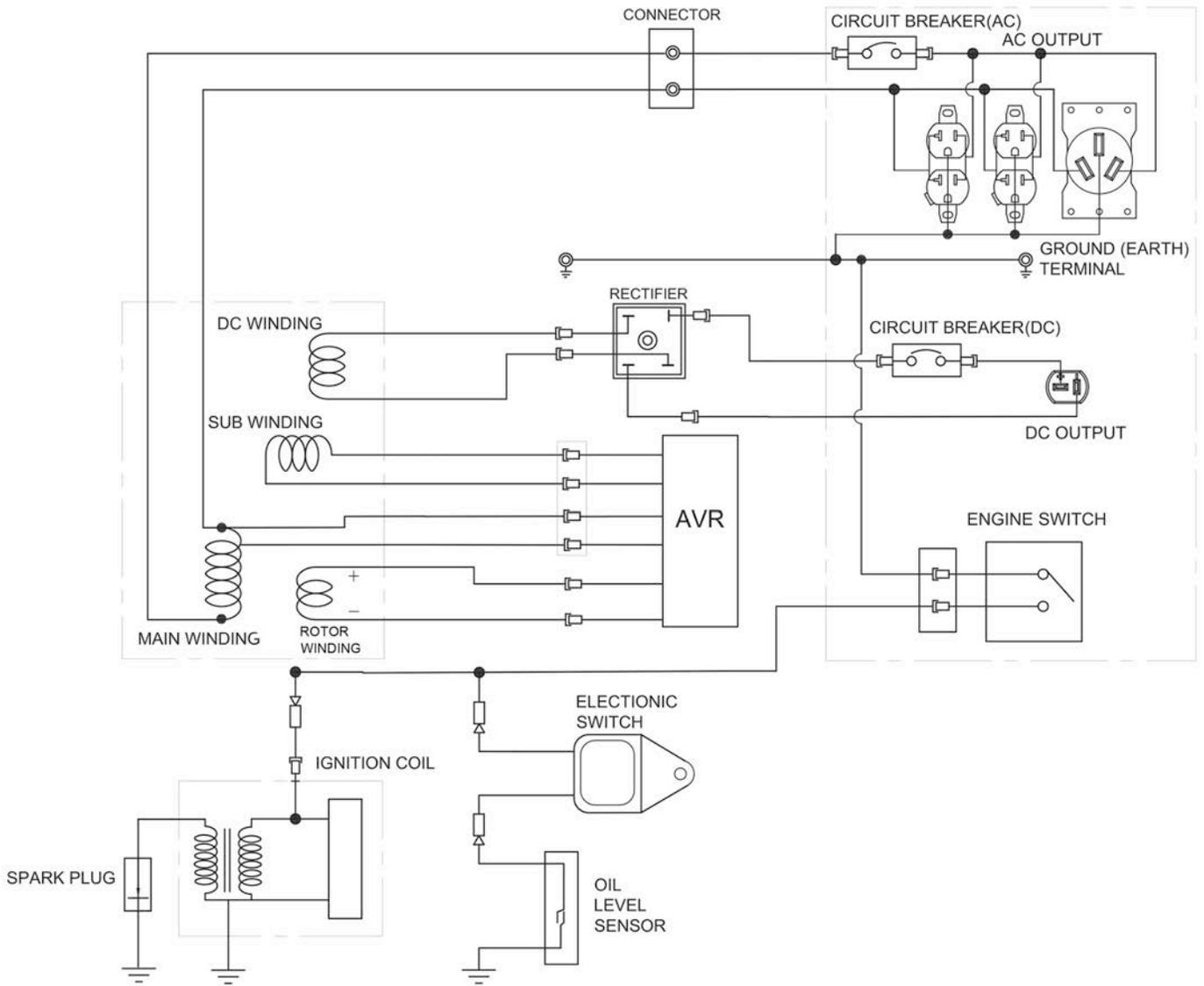


WELDING MACHINE

NO	PART NO.	DESCRIPTION	QTY
1	HIT145-1	Cover	1
2	HIT145-2	PCB	1
3	HIT145-3	Bottom Panel	1
4	HIT145-4	Welding Current Knob	1
5	HIT145-5	LED light	2
6	HIT145-6	Fast Connector	1
7	HIT145-7	Fast Connector	1
8	HIT145-8	Water Joint	1
9	HIT145-8	Input Cable	1
10	HIT145-10	Fan	1
11	HIT145-11	Fun Net	1
12	HIT145-12	Welder Switch	1
13	GEN4000DF-STW.09-01	Mounted Plate	1
14	GB/T818-2000	Screw M4x16	4



WIRING DIAGRAM



EMISSION CONTROL SYSTEM WARRANTY BUFFALO CORPORATION

Your Warranty Rights and Obligations

The California Air Resources Board, U.S. EPA and Buffalo Corp are pleased to explain the Emission Control System Warranty on your 2018 model year outdoor power equipment engine.

California

In California, new spark-ignited small off-stringent anti-smog standards.

Other States, U.S. Territories

In other areas of the United States, your engine must be designed, built and equipped to meet the U.S. EPA emission standards for spark-ignited engines at or below 19 kilowatts.

All of the United States

Buffalo Corp must warrant the emission control system on your power equipment engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your power equipment engine. Where a warrantable condition exists, Buffalo Corp will repair your power equipment engine at no cost to you including diagnosis, parts and labor.

Your emission control system may include parts such as: carburetors or fuel injection system, ignition system, catalytic converters, fuel tanks, valves, filters, clamps, connectors, and other associated components. Also, included may be hoses, belts, connectors, sensors, and other emission-related assemblies.

Manufacturer's Warranty Coverage

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

Owner's Warranty Responsibility

As the power equipment engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. Buffalo Corp recommends that you retain all receipts covering maintenance on your power equipment engine, but Buffalo Corp cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance. As the power equipment engine owner, you should however be aware that Buffalo Corp may deny your warranty coverage if your power equipment engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications. You are responsible for presenting your power equipment engine to distribution center or service center authorized by Buffalo Corp as soon as the problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days. If you have any questions regarding your warranty rights and responsibilities, you should contact a customer service representative at 1-866-460-9436 or email info@buffalotools.com

DEFECTS Warranty Coverage

Adopted by the Air Resources Board, Buffalo Corp warrants to the ultimate purchaser and each subsequent purchaser that the small off-road engine (SORE) (1) has been designed, built and equipped so as to conform with all applicable regulation; and (2) is free from defects in materials and workmanship that cause the failure of a warranted part to conform with those regulations as may be applicable to the terms and conditions stated below. (a) The warranty period begins on the date the engines is delivered to an ultimate purchaser or first placed into service. The warranty period is two years. (b) Subject to certain conditions and exclusions as stated below, the warranty on emissions related parts is as follows:

- (1) Any warranted part that is not scheduled for replacement as required maintenance in your Owner's Manual is warranted for the warranty period stated above. If the part fails during the period of warranty coverage, the part will be repaired or replaced by Buffalo Corp according to Subsection (4) below. Any such part repaired or replaced under warranty will be warranted for the remainder of the period.
- (2) Any warranty part that is scheduled only for regular inspection in your period stated above. 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 your Owners Manual is warranted for the period of time before the first

scheduled replacement date for that part. If the part fails before the first scheduled replacement, the part will be repaired or replaced by Buffalo Corp. according to the Subject (4) below. 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 provisions herein must be performed at a warranty station at no charge to the owner.

(5) Notwithstanding the provisions herein, warranty services or repair will be provided at all of our distribution centers that are franchised to service the subject engines.

(6) The engine owner must 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 warranty station.

(7) Buffalo Corp. is liable for damages to other engine components proximately caused by a failure under warranty of any warranted part.

(8) Throughout the engine warranty period stated above, Buffalo Corp. 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 must be provided without charge to the owner. Such use will not reduce the warranty obligations of Buffalo Corp.

(10) Add-on or modified parts that are not exempted by the Air Resources Board may not be used. The use of any non-exempted add-on or modified parts by the ultimate purchaser will be grounds for disallowing a warranty claims. Buffalo Corp will not be liable to warrant failures of warranted parts caused by the use of a non-exempted add-on or modified part.

(11) The manufacturer issuing the warranty shall provide any documents that describe that manufacturer's warranty procedures or policies within five working days of request by the Air Resources Board.

EMISSION WARRANTY PARTS LIST

(1) Fuel Metering System:

(a) Gasoline carburetor assembly and its internal components

(b) Carburetor gaskets

(c) Fuel line

(d) Clamps

(e) Fuel tank

(f) Fuel line fittings

(g) pressure regulator (if equipped)

(h) Mixer assembly and its internal components (if equipped)

(2) Air induction system including: (a) Intake pipe/manifold

(b) Air cleaner

(3) Ignition system including: (a) Spark plug (b) Ignition coil

(4) Catalytic muffler assembly including: (a) Muffler gasket (b) Exhaust manifold (c) Catalytic converter if available

(5) Crankcase breather assembly including (a) Breather connection tube

(6) Fuel tank evaporative emissions control system including:

(a) Purge valves (b) Carbon canister (c) canister Mounting Brackets (d) Fuel Cap (e) Fuel Tank

(7) Miscellaneous items used in above systems including: (a) Switches (b) Hoses, belts connectors, and assemblies

(8) Air injection system (a) Pulse valve

WELDER USAGE

The Stick Welder is a DC only inverter stick welder with a smooth stick welding performance. It is intended for use for welding steel, stainless steel, cast iron and hard surfacing using electrodes from 1/16 inch to 3/32 inch. This unit can also perform lift start DC TIG welding on steel and stainless steel materials with the optional TIG Torch. (Argon shielding gas along with a regulator, gas hose, and TIG filler rod would also be required for TIG welding.) The removable quick connect weld cables allow for easy connection, tear down, and polarity changes. It is designed to weld mild steel and alloys with electrodes up to 3/32" on materials up to 1/8" thick.

Stick welding gives the operator the flexibility to use this welder for mobile applications, including outdoor applications. Stick electrodes contain a flux, making welding easy and does not require the use of a separate shielding gas which can be blown away by the wind in outdoor applications. Since this welder does not use shielding gas, the operator will not require to have or maintain shielding gas bottles, a regulator or gas hose. TIG welding does require the use of Argon shielding gas. The shielding gas replaces the flux that is used in TIG welding, providing a more controlled and cosmetic weld. However, TIG welding is limited to areas inside or where wind can be controlled, preventing the shielding gas from blowing away.

Use on a 20 amp 115V AC circuit without the use of an extension cord. If an extension cord is necessary for your application, use the appropriate size and length of extension cord to handle 20 amps the entire length of the extension. Talk with a qualified electrician for cord size recommendations.

WELDER TECHNICAL SPECIFICATIONS

Item	Description
Power Supply	120V, 25.7A, 60 HZ, Single Phase
No-Load Voltage	72 Volts DC
Output Range	10 - 85 Amp DC
Duty Cycle	25% @ 85A
Suggested Electrode	E6011, E6013, E7018, Stainless Steel
Electrode Diameter	1/16 in, 5/64 in, 3/32 in

Inverter Power Will Maintain Fluctuations In Input Power For Better Welding And Dependable Output
Welds Carbon Steel/Stainless Steel
Thermal Overload Protection & Arc Force
Over/Low Voltage Protection, Anti-Sticking, & Hot Start
Welds Up To 1/8" With 1/16 in., 5/64 in. or 3/32 in. Electrodes
10 - 85 AMP Welding Range
Input Voltage: 120V - 60 Hz
Rated Duty Cycle: 25% @ 85A

WELDER IMPORTANT SAFETY CONSIDERATIONS

1.1 Your Welding Environment

- Keep the environment you will be welding in free from flammable materials.
- Always keep a fire extinguisher accessible to your welding environment.
- Always have a qualified person install and operate this equipment.
- Make sure the area is clean, dry and ventilated. Do not operate the welder in humid, wet or poorly ventilated areas.
- Always have your welder maintained by a qualified technician in accordance with local, state and national codes.
- Always be aware of your work environment. Be sure to keep other people, especially children, away from you while welding.
- Keep harmful arc rays shielded from the view of others.

1.2 Your Welder's Condition

- Check ground cable, power cord and welding cable to be sure the insulation is not damaged. Always replace or repair damaged components before using the welder.
- Check all components to ensure they are clean and in good operating condition before use.

1.3 Use of Your Welder

▲ CAUTION

Do not operate the welder if the output cable, electrode, torch, wire is wet. Do not immerse them in water. These components and the welder must be completely dry before use.

- Follow the instructions in this manual.
- Keep welder in the off position when not in use.
- Connect ground lead as close to the area being welded as possible to ensure a good ground.
- Do not allow any body part to come in contact with the welding wire if you are in contact with the material being welded, ground or electrode from another welder.
- Do not weld if you are in an awkward position. Always have a secure stance while welding to prevent accidents. Wear a safety harness if working above ground.
- Do not drape cables over or around your body.
- Wear a full coverage helmet with appropriate shade (see ANSI Z87.1 safety standard) and safety glasses while welding.
- Wear proper gloves and protective clothing to prevent your skin from being exposed to hot metals, UV and IR rays.
- Do not overuse or overheat your welder. Allow proper cooling time between duty cycles.
- Keep hands and fingers away from moving parts and stay away from the drive rolls.
- Do not point torch at any body part of yourself or anyone else.
- Always use this welder in the rated duty cycle to prevent excessive heat and failure.

1.4 Specific Areas of Danger, Caution or Warning



Electrical Shock

▲ WARNING

Electric arc welders can produce a shock that can cause injury or death. Touching electrically live parts can cause fatal shocks and severe burns. While welding, all metal components connected to the wire are electrically hot. Poor ground connections are a hazard, so secure the ground lead before welding.

- Wear dry protective apparel: coat, shirt, gloves and insulated footwear.
- Insulate yourself from the work piece. Avoid contacting the work piece or ground.
- Do not attempt to repair or maintain the welder while the power is on.
- Inspect all cables and cords for any exposed wire and replace immediately if found.
- Use only recommended replacement cables and cords.
- Always attach ground clamp to the work piece or work table as close to the weld area as possible.
- Do not touch the welding wire and the ground or grounded work piece at the same time.
- Do not use a welder to thaw frozen pipes.

Fumes and Gases

▲ WARNING

- Fumes emitted from the welding process displace clean air and can result in injury or death.
- Do not breathe in fumes emitted by the welding process. Make sure your breathing air is clean and safe.
- Work only in a well-ventilated area or use a ventilation device to remove welding fumes from the environment where you will be working.
- Do not weld on coated materials (galvanized, cadmium plated or containing zinc, mercury or barium). They will emit harmful fumes that are dangerous to breathe. If necessary use a ventilator, respirator with air supply or remove the coating from the material in the weld area.
- The fumes emitted from some metals when heated are extremely toxic. Refer to the material safety data sheet for the manufacturer's instructions.
- Do not weld near materials that will emit toxic fumes when heated. Vapors from cleaners, sprays and degreasers can be highly toxic when heated.

UV and IR Arc Rays

▲ WARNING

The welding arc produces ultraviolet (UV) and infrared (IR) rays that can cause injury to your eyes and skin. Do not look at the welding arc without proper eye protection.

- Always use a helmet that covers your full face from the neck to top of head and to the back of each ear.
- Use a lens that meets ANSI standards and safety glasses.
- Cover all bare skin areas exposed to the arc with protective clothing and shoes. Flame-retardant cloth or leather shirts, coats, pants or coveralls are available for protection.
- Use screens or other barriers to protect other people from the arc rays emitted from your welding.
- Warn people in your welding area when you are going to strike an arc so they can protect themselves.

Fire Hazards

▲ WARNING

Do not weld on containers or pipes that contain or have had flammable, gaseous or liquid combustibles in them. Welding creates sparks and heat that can ignite flammable and

explosive materials.

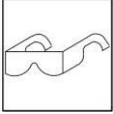
- Do not operate any electric arc welder in areas where flammable or explosive materials are present.
- Remove all flammable materials within 35 feet of the welding arc. If removal is not possible, tightly cover them with fireproof covers.
- Take precautions to ensure that flying sparks do not cause fires or explosions in hidden areas, cracks or areas you cannot see.
- Keep a fire extinguisher close in the case of fire.
- Wear garments that are oil-free with no pockets or cuffs that will collect sparks.
- Do not have on your person any items that are combustible, such as lighters or matches.
- Keep work lead connected as close to the weld area as possible to prevent any unknown, unintended paths of electrical current from causing electrical shock and fire hazards.
- To prevent any unintended arcs, cut wire back to ¼" stick out after welding.

Hot Materials

▲ CAUTION

Welded materials are hot and can cause severe burns if handled improperly.

- Do not touch welded materials with bare hands.
- Do not touch MIG gun nozzle after welding until it has had time to cool down.



Sparks/Flying Debris

⚠ CAUTION

Welding creates hot sparks that can cause injury. Chipping slag off welds creates flying debris.

- Wear protective apparel at all times: ANSI-approved safety glasses or shield, welder's hat and ear plugs to keep sparks out of ears and hair.



Electromagnetic Field

⚠ CAUTION

-Electromagnetic fields can interfere with various electrical and electronic devices such as pacemakers.

- Consult your doctor before using any electric arc welder or cutting device
- Keep people with pacemakers away from your welding area when welding.
- Do not wrap cable around your body while welding.
- Wrap welding holder and ground cable together whenever possible.
- Keep welding holder and ground cables on the same side of your body.

Shielding Gas Cylinders Can Explode

⚠ WARNING

High pressure cylinders can explode if damaged, so treat them carefully.

- Never expose cylinders to high heat, sparks, open flames, mechanical shocks or arcs.
- Do not touch cylinder with welding holder.
- Do not weld on the cylinder
- Keep cylinders away from welding or electrical circuits.
- Use the proper regulators, gas hose and fittings for the specific application.
- Do not look into the valve when opening it.
- Use protective cylinder cap whenever possible

1.5 Proper Care, Maintenance and Repair

⚠ DANGER

- Always have power disconnected when working on internal components.
- Do not touch or handle PC board without being properly grounded with a wrist strap. Put PC board in static proof bag to move or ship.
- Do not put hands or fingers near moving parts such as drive rolls of fan

USE AND CARE

Do not modify the welder in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment. There are specific applications for which the welder was designed.

Always check of damaged or worn out parts before using the welder. Broken parts will affect the operation. Replace or repair damaged or worn parts immediately.

Store idle welder. When not in use, store it in a secure place out of the reach of children. Inspect it for good working condition prior to storage and before re-use.

The Power Indicator Light is on when the machine is turned on.

Thermal Protection Indicator Light

When the thermal overload indicator is on, it indicates the machine has exceeded the allowable internal temperature. The machine automatically turns off welding output but the fan will remain on to cool down the internal components. When the internal temperature had decreased, the machine will automatically turn welding output back on.

Current Adjustment

Current adjustment is on the front panel of the machine. It has infinite current output adjustment from 10 to 85 Amps.

Positive Output Connector

This is the connector for the electrode holder and cable, most often, when STICK welding. When this machine is used for TIG welding, this connector is for the grounding cable.

Negative Output Connector

This is the connector for the ground cable and clamp, most often, when STICK welding. When this machine is used for TIG welding, this connector is for the TIG torch.

Ground Cable and Clamp

The ground cable and clamp are attached to the work piece to complete the circuit allowing the flow of current needed to weld.

Welding Cable and Electrode Holder

One end of the cable is connected to the output connectors of the welder. The electrode is held in the electrode holder for welding.

Power Cord

The power cord connects the welder to the 120V volt power supply. Plug the 15 amp plug into a 115V/20Amp receptacle to supply power to the welder.

1. **INSTALLATION OF OPTIONAL TIG TORCH** (Call Customer Service for Optional TIG Torch purchase)

- 1.1 Remove the ground cable and the electrode holder from the weld output connections. Install the ground cable to the Positive (+) weld output connection.
- 1.2 Secure the ground clamp to the work piece
- 1.3 Connect a regulator to a bottle of ARGON gas. Then connect the gas connection from the TIG torch to the regulator.
- 1.4 Connect the TIG torch weld cable to the Negative (-) weld output connection.
- 1.5 Set desired amperage on the amperage control knob on the front panel of the welder.
- 1.6 Turn on the input power switch on the welder.

▲ CAUTION

Be aware that the TIG torch will be electrically HOT when the Input Power Switch on the welder is turned on.

- 1.7 Turn on the regulator on the bottle of shielding gas and adjust the regulator to approximately 20 CFH. Then open the shielding gas valve on the torch to start the flow of shielding gas.

▲ WARNING

EXPOSURE TO A WELDING ARC IS EXTREMELY HARMFUL TO THE EYES AND SKIN!

Prolonged exposure to the welding arc can cause blindness and burns. Never strike an arc or begin welding until you are adequately protected. Wear flame-proof welding gloves, a heavy long sleeved shirt, trousers without cuffs, high topped shoes, and an ANSI approved welding helmet.

- 1.8 Touch the tungsten that is installed in the TIG torch to the work piece, then quickly pull away approximately 1/4" to create an arc.

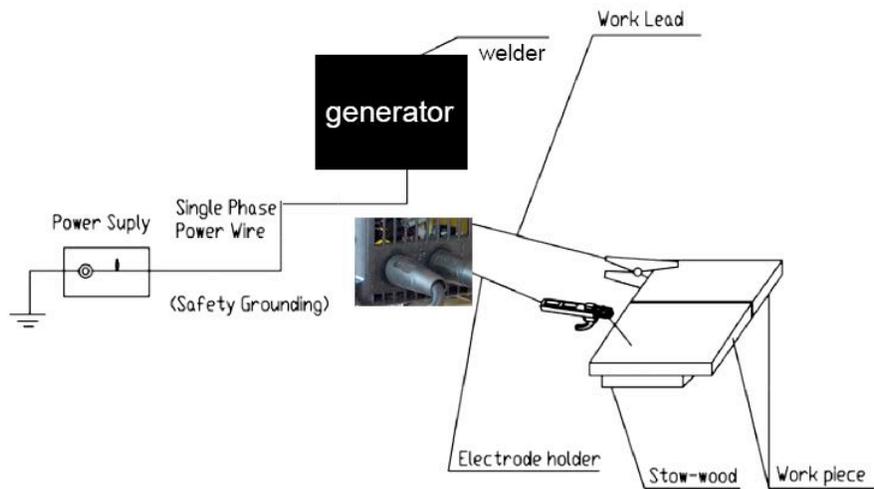
OPERATION

⚠ WARNING

High voltage danger from power source! Consult a qualified electrician for proper installation of receptacle at the power source. This welder must be grounded while in use to protect the operator from electrical shock. If you are not sure if your outlet is properly grounded, have it checked by a qualified electrician. Do not cut off the grounding prong or alter the plug in any way and do not use any adapter between the welder's power cord and the power source receptacle. Make sure the POWER switch is OFF then connect your welder's power cord to a properly grounded 120 VAC, 60 HZ, single phase, 20 amp power source.

1. TURN ON POWER

Turn on Generator and allow to run for several minutes. Then turn on Welder power. Insert electrode holders.

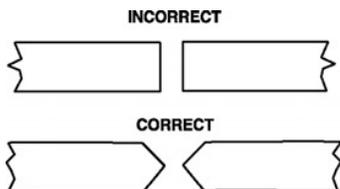


1.1 Welding positions

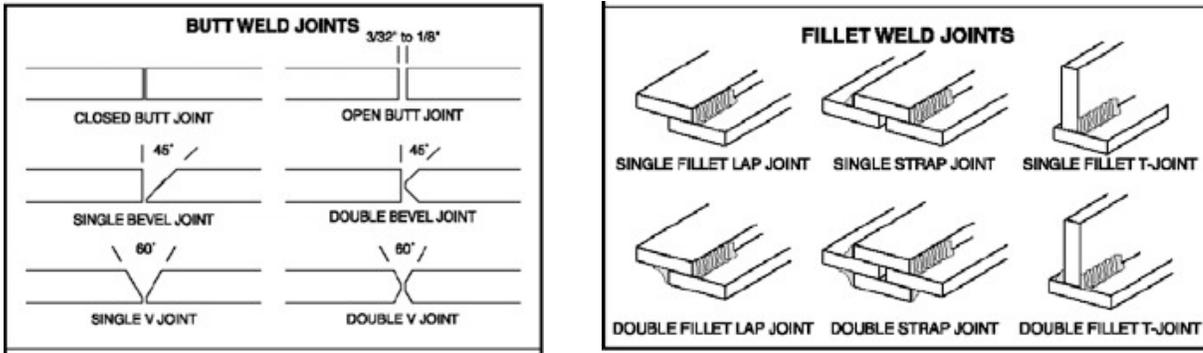
There are two basic positions, for welding: Flat and Horizontal. Flat welding is generally easier, faster, and allows for better penetration. If possible, the work piece should be positioned so that the bead will run on a flat surface.

1.2 Preparing the Joint

Before welding, the surface of work piece needs to be free of dirt, rust, scale, oil or paint or it will create brittle and porous welds. If the base metal pieces to be joined are thick or heavy, it may be necessary to bevel the edges with a metal grinder, the correct bevel should be around 60 degree. See following picture:



Based on different welding position, there are different welding joint, see following image:



2. GROUND CLAMP CONNECTION

Clear any dirt, rust, scale, oil or paint on the ground clamp. Make certain you have a good solid ground connection. A poor connection at the ground clamp will waste power and heat. Make sure the ground clamp touches the metal.

3. ELECTRODE

The welding electrode is a rod coated with a layer of flux. When welding, electrical current flows between the electrode (rod) and the grounded metal work piece. The intense heat of the arc between the rod and the grounded metal melts the electrode and the flux. For best performance on this unit, we suggest the use of 6013 electrodes.

4. SELECTING THE PROPER ELECTRODE

There is no golden rule that determine the exact rod or heat setting required for every situation. The type and thickness of metal and the position of the work piece determine the electrode type and the amount of heat needed in the welding process. Heavier and thicker metals required more amperage. It is best to practice your welds on scrap metal which matches the metal you intend to work with to determine correct heat setting and electrode choice. See the following helpful trouble shooting tips to determine if you are using a correct electrode.

7.1. When proper rod is used:

- 7.1.a. The bead will lay smoothly over the work without ragged edges
- 7.1.b. The base metal puddle will be as deep as the bead that rises above it
- 7.1.c. The welding operation will make a crackling sound similar to the sound of eggs frying

7.2. When a rod too small is used;

- 7.2. a. The bead will be high and irregular
- 7.2. b. The arc will be difficult to maintain

7.3. When the rod is too large

- 7.3. a. The arc will burn through light metals
- 7.3. b. The bead will undercut the work
- 7.3. c. The bead will be flat and porous
- 7.3. d. Rod may be freeze or stick to work piece

Note: Rate of travel over the work also affects the weld. To ensure proper penetration and enough deposit of rod, the arc must be moved slowly and evenly along the weld seam.

5. SETTING THE AMPERAGE CONTROL

The welder has an infinite current control. It is capable of welding with electrodes up to 3/32" diameter. There is no golden rule that determines the exact amperage required for every situation. It is best to practice your welds on scrap metal which matches the metals you intend to work with to determine correct setting for your job. The electrode type and the thickness of the work piece metal determine the amount of heat needed in the welding process. Heavier and thicker metals require more voltage (amperage), whereas lighter and thinner metals require less voltage (amperage). Consult the welding electrode packaging for recommended welding amperage range.

6. WELDING TECHNIQUES

The best way to teach yourself how to weld is with short periods of practice at regular intervals. All practice welds should be done on scrap metal that can be discarded. Do not attempt to make any repairs on valuable equipment until you have satisfied yourself that your practice welds are of good appearance and free of slag or gas inclusions.

6.1 Holding the electrode

The best way to grip the electrode holder is the way that feels most comfortable to you. Position the Electrode to the work piece when striking the initial arc it may be necessary to hold the electrode perpendicular to the work piece. Once the arc is started the angle of the electrode in relation to the work piece should be between 10 and 30 degrees. This will allow for good penetration, with minimal spatter.

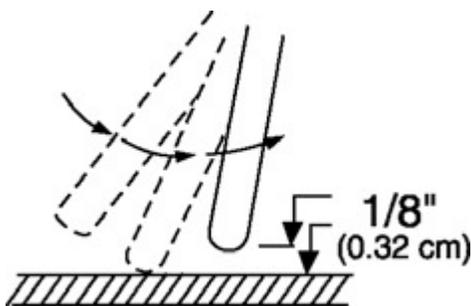
6.2 Striking the arc

⚠ WARNING

EXPOSURE TO A WELDING ARC IS EXTREMELY HARMFUL TO THE EYES AND SKIN!

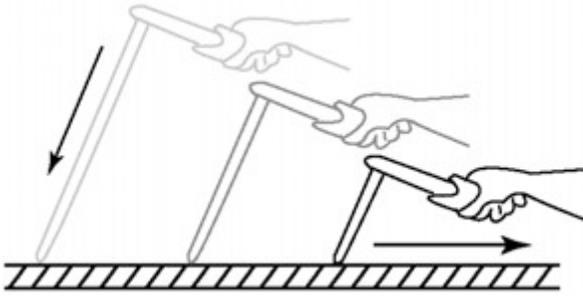
Prolonged exposure to the welding arc can cause blindness and burns. Never strike an arc or begin welding until you are adequately protected. Wear flame-proof welding gloves, a heavy long sleeved shirt, trousers without cuffs, high topped shoes, and an ANSI approved welding helmet.

Scratch the work piece with the end of electrode to start arc and then raise it quickly about 1/8 inch gap between the rod and the work piece, see following picture:



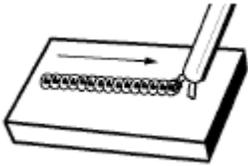
It is important that the gap be maintained during the welding process and it should be neither too wide or too narrow. If too narrow, the rod will stick to the work piece. If too wide, the arc will be extinguished. It needs much practice to maintain the gap. The beginners may usually get sticker or arc extinguishing. When the rod is stuck to the work piece, gently rock it back and forth to make them separate. If not, a short circuit will occur and it will break the welder.

A good arc is accompanied by a crisp, cracking sound. The sound is similar to that made by eggs frying. To lay a weld bead, only 2 movements are required; downward (as the electrode is consumed) and in the direction the weld is to be laid, as in following figure:

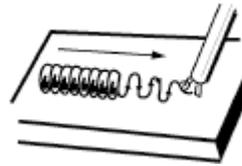


6.3 Types of weld bead

The following paragraphs discuss the most commonly used arc welding beads. The stringer bead is formed by traveling with the electrode in a straight line while keeping the electrode centered over the weld joint.



Stringer Bead



Weave Bead

The weave bead is used when you want to deposit metal over a wider space than would be possible with a stringer bead. It is made by weaving from side to side while moving with the electrode. It is best to hesitate momentarily at each side before weaving back the other way.

9.4 Welding position

Flat position It is easiest of the welding positions and is most commonly used. It is best if you can weld in the flat position if at all possible as good results are easier to achieve.



Flat Position

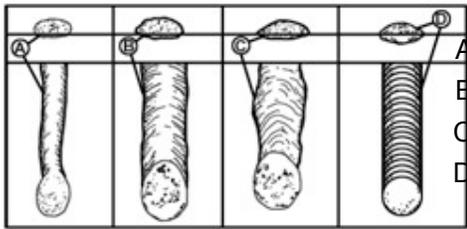


Horizontal Position

The horizontal position it is performed very much the same as the flat weld except that the angle is different such that the electrode, and therefore the arc force, is directed more toward the metal above the weld joint. This more direct angle helps prevent the weld puddle from running downward while still allowing slow enough travel speed to achieve good penetration. A good starting point for your electrode angle is about 30 degrees DOWN from being perpendicular to the work piece.

9.5 Judge the good weld bead

When the trick of establishing and holding an arc has been learned, the next step is learning how to run a good bead. The first attempts in practice will probably fall short of acceptable weld beads. Too long of an arc will be held or the travel speed will vary from slow to fast (see following)



- A. Weld speed is too fast.
- B. Weld speed is too slow.
- C. Arc is too long.
- D. Ideal weld.

A solid weld bead requires that the electrode be moved slowly and steadily along the weld seam. Moving the electrode rapidly or erratically will prevent proper fusion or create a lumpy, uneven bead.

▲ WARNING

ELECTRIC SHOCK CAN KILL! To prevent ELECTRIC SHOCK, do not perform any welding while standing, kneeling, or lying directly on the grounded workpiece.

9.6 Finish the bead

As the coating on the outside of the electrode burns off, it forms an envelope of protective gases around the weld. This prevents air from reaching the molten metal and creating an undesirable chemical reaction. The burning coating, however, forms slag. The slag formation appears as an accumulation of dirty metal scale on the finished weld. Slag should be removed by using a chipping hammer.

▲ WARNING

PEENING THE SLAG FROM A WELD JOINT CAUSES SMALL CHIPS OF METAL TO FLY THROUGH THE AIR!

Metallic chips flying through the air can cause eye injury or injury to other parts of the head, hands or exposed portions of the body. Wear goggles or safety glasses with side shields and protect the hands and other exposed parts of the body with protective garments, or if possible, work with a shield between the body and the work piece.

The intense heat produced at the arc sets up strains in the metal joined by welding. Peening the weld not only removes the scale left behind in the welding but relieves the internal strains developed by the heating and cooling process.

MAINTENANCE

- **Maintain your welder.** Keep the welder in good repair by adopting a program of conscientious repair and maintenance. Have necessary repairs made by qualified service personnel.
- Periodically clean dust, dirt, grease, etc. from your welder.
- Every six months, or as necessary, remove the cover panel from the welder and air-blow any dust and dirt that may have accumulated inside the welder.
- Replace power cord, ground cable, ground clamp, or electrode assembly when damaged.

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Unit Does Not Power Up	Unit Is Not Plugged In	Plug In Unit
	Input Power Circuit Breaker Not On	Reset Input Power Circuit Breaker
	The Main Power Switch Is Not Working	Replace Main Power Switch
Can Not Create An Arc	Work Piece is Painted Or Rusty	Remove All Paint And Rust
	Ground Clamp Is Connected Where There Is Paint Or Rust	Remove All Paint And Rust So Ground Clamp Is Connected To Bare Metal
	Ground Clamp Is Not Electrically Connected To The Work Piece	Make Certain The Ground Clamp Is Connected To The Work Piece
	Amperage Too Low for Electrode	Consult the electrode packaging for correct amperage settings.
Overload Indicator Is On	The internal temperature is too high.	Leave power on and let the fan cool the unit. Output will continue when the unit has cooled.
Electrode Holder or ground cable getting hot. Output Connections Getting Hot.	Weld Cable Connections Loose	Check to make certain weld cables are tight.
	Weld Cable Connections have corroded.	Clean weld connections and reinstall.
Poor Welding Performance, excessive spatter	Damp Electrode	Use fresh and dry electrodes.
Electrode Sticks	The electrode is kept in contact with the work piece for too long while striking an arc.	This will take practice. Keep trying.
Welding Bead Is Too Thin	The welding travel speed is too fast	Reduce the welding travel speed. Maybe incorporate a slight weave over the joint.
Welding Bead Is Too Thick	The welding travel speed is too slow	Increase the welding travel speed.