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## Processes



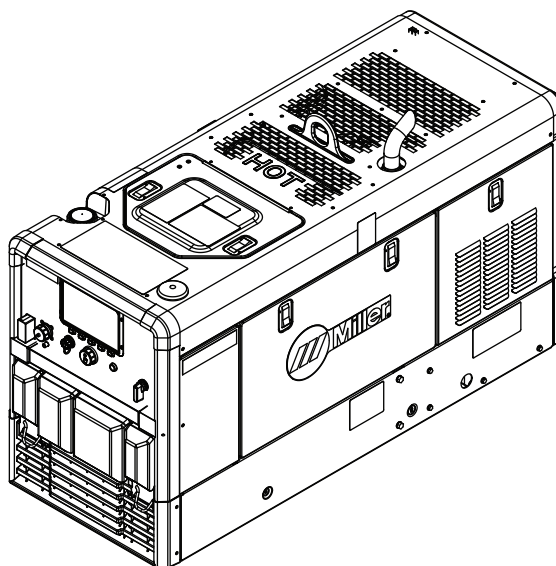
Multiprocess Welding

## Description



Engine Driven Welder/Generator

# Trailblazer<sup>®</sup> 330 Air Pak<sup>™</sup>



For product information,  
Owner's Manual translations,  
and more, visit

[www.MillerWelds.com](http://www.MillerWelds.com)

## OWNER'S MANUAL

# From Miller to You

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*Thank you and congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety Precautions. They will help you protect yourself against potential hazards on the worksite. We've made installation and operation quick and easy. With Miller, you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is, and our extensive service network is there to help fix the problem. Warranty and maintenance information for your particular model are also provided.

Miller Electric manufactures a full line of welders and welding-related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual specification sheets. **To locate your nearest distributor or service agency call**

**1-800-4-A-Miller, or visit us at [www.MillerWelds.com](http://www.MillerWelds.com) on the web.**



Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.



Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001 Quality System Standard.



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# SECTION 1 – SAFETY PRECAUTIONS – READ BEFORE USING

 Protect yourself and others from injury—read, follow, and save these important safety precautions and operating instructions.

## 1-1. Symbol Usage

 **DANGER!** – Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

 Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

**NOTICE** – Indicates statements not related to personal injury.

 Indicates special instructions.



This group of symbols means Warning! Watch Out! **ELECTRIC SHOCK**, **MOVING PARTS**, and **HOT PARTS** hazards. Consult symbols and related instructions below for necessary actions to avoid these hazards.

## 1-2. Arc Welding Hazards

 The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Principal Safety Standards. Read and follow all Safety Standards.

 Only qualified persons should install, operate, maintain, and repair this equipment. A qualified person is defined as one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project and has received safety training to recognize and avoid the hazards involved.

 During operation, keep everybody, especially children, away.



### **ELECTRIC SHOCK can kill.**

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits

are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC weld output in damp, wet, or confined spaces, or if there is a danger of falling.
- Do not store or use equipment in standing water.
- Use AC output **ONLY** if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Additional safety precautions are required when any of the following electrically hazardous conditions are present: in damp locations or while wearing wet clothing; on metal structures such as floors, gratings, or scaffolds; when in cramped positions such as sitting, kneeling, or lying; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these conditions, use the following equipment in order presented: 1) a semiautomatic DC constant voltage (wire) welder, 2) a DC manual (stick) welder, or 3) an AC welder with reduced open-circuit voltage. In most situations, use of a DC, constant voltage wire welder is recommended. And, do not work alone!

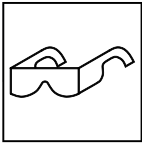
- Do not connect to any electrical distribution system normally supplied by utility power unless a proper transfer switch and grounding procedure are employed.
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install, ground, and operate this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground—check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first—double-check connections.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cord and ground conductor for damage or bare wiring—replace immediately if damaged—bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or repaired cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Do not touch electrode holders connected to two welding machines at the same time since double open-circuit voltage will be present.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal. Disconnect cable for process not in use.
- Use GFCI protection when operating auxiliary equipment. Test GFCI receptacles at high speed.



### **HOT PARTS can burn.**

- Do not touch hot parts bare handed.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to

prevent burns.



### **FLYING METAL OR DIRT can injure eyes.**

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.



### **FUMES AND GASES can be hazardous.**

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- Ventilate the work area and/or use local forced ventilation at the arc to remove welding fumes and gases. The recommended way to determine adequate ventilation is to sample for the composition and quantity of fumes and gases to which personnel are exposed.
- If ventilation is poor, wear an approved air-supplied respirator.
- Read and understand the Safety Data Sheets (SDSs) and the manufacturer's instructions for adhesives, coatings, cleaners, consumables, coolants, degreasers, fluxes, and metals.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watchperson nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.



### **BUILDUP OF GAS can injure or kill.**

- Shut off compressed gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.



### **ARC RAYS can burn eyes and skin.**

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear an approved welding helmet fitted with a proper shade of filter lenses to protect your face and eyes from arc rays and sparks when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash, glare, and sparks; warn others not to watch the arc.
- Wear body protection made from leather or flame-resistant clothing (FRC). Body protection includes oil-free clothing such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.

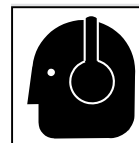


### **WELDING can cause fire or explosion.**

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns.

Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

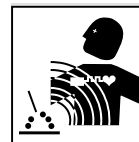
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Do not weld where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not cut or weld on tire rims or wheels. Tires can explode if heated. Repaired rims and wheels can fail. See OSHA 29 CFR 1910.177 listed in Safety Standards.
- Do not weld on containers that have held combustibles, or on closed containers such as tanks, drums, or pipes unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Do not weld where the atmosphere can contain flammable dust, gas, or liquid vapors (such as gasoline).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock, sparks, and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear body protection made from leather or flame-resistant clothing (FRC). Body protection includes oil-free clothing such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Use only correct fuses or circuit breakers. Do not oversize or bypass them.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.
- Read and understand the Safety Data Sheets (SDSs) and the manufacturer's instructions for adhesives, coatings, cleaners, consumables, coolants, degreasers, fluxes, and metals.



### **NOISE can damage hearing.**

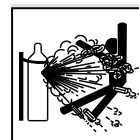
Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.



### **ELECTRIC AND MAGNETIC FIELDS (EMF) can affect Implanted Medical Devices.**

- Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations.



### **CYLINDERS can explode if damaged.**

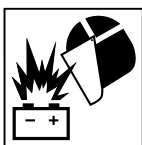
Compressed gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks, and arcs.

- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder—explosion will result.
- Use only correct compressed gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.

- Turn face away from valve outlet when opening cylinder valve. Do not stand in front of or behind the regulator when opening the valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the proper equipment, correct procedures, and sufficient number of persons to lift, move, and transport cylinders.
- Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

## 1-3. Engine Hazards



### BATTERY EXPLOSION can injure.

- Always wear a face shield, rubber gloves, and protective clothing when working on a battery.
- Stop engine before disconnecting or connecting battery cables, battery charging cables (if applicable), or servicing battery.
- Do not allow tools to cause sparks when working on a battery.
- Do not use welder to charge batteries or jump start vehicles unless the unit has a battery charging feature designed for this purpose.
- Observe correct polarity (+ and -) on batteries.
- Disconnect negative (-) cable first and connect it last.
- Keep sparks, flames, cigarettes, and other ignition sources away from batteries. Batteries produce explosive gases during normal operation and when being charged.
- Follow battery manufacturer's instructions when working on or near a battery. See Battery Service Manual (listed in Safety Standards) for additional information.



### FUEL can cause fire or explosion. ENGINE HEAT can cause fire.

- Stop engine and let it cool off before checking or adding fuel.
- Do not add fuel while smoking or if unit is near any sparks or open flames.
- Do not overfill tank — allow room for fuel to expand.
- Do not spill fuel. If fuel is spilled, clean up before starting engine.
- Dispose of rags in a fireproof container.
- Always keep nozzle in contact with tank when fueling.
- Do not locate unit on, over, or near combustible surfaces or flammables.
- Keep exhaust and exhaust pipes way from flammables.



### MOVING PARTS can injure.

- Keep away from moving parts such as fans, belts, and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Stop engine before installing or connecting unit.
- Have only qualified persons remove doors, panels, covers, or guards for maintenance and troubleshooting as necessary.
- To prevent accidental starting during servicing, disconnect negative (-) battery cable from battery.
- Keep hands, hair, loose clothing, and tools away from moving parts.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting engine.

- Before working on generator, remove spark plugs or injectors to keep engine from kicking back or starting.
- Block flywheel so that it will not turn while working on generator components.



### EXHAUST SPARKS can injure.

- Do not let engine exhaust sparks cause fire.
- Use approved engine exhaust spark arrestor in required areas — see applicable codes.



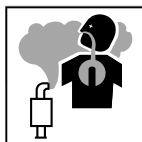
### HOT PARTS can burn.

- Do not touch hot parts bare handed.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.



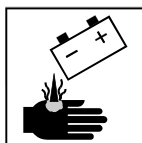
### STEAM AND HOT COOLANT can burn.

- If possible, check coolant level when engine is cold to avoid scalding.
- Always check coolant level at overflow tank, if present on unit, instead of radiator (unless told otherwise in maintenance section or engine manual).
- If the engine is warm, checking is needed, and there is no overflow tank, follow the next two statements.
- Wear safety glasses and gloves and put a rag over radiator cap.
- Turn cap slightly and let pressure escape slowly before completely removing cap.



### 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.



### BATTERY ACID can BURN SKIN and EYES.

- Do not tip battery.
- Replace damaged battery.
- Flush eyes and skin immediately with water.

## 1-4. Compressed Air Hazards



### COMPRESSED AIR EQUIPMENT can injure or kill.

- Incorrect installation or operation of this unit could result in equipment failure and personal injury. Only qualified persons should install, operate, and service this unit according to its Owner's Manual, industry standards, and national, state, and local codes.
- Do not exceed the rated output or capacity of the compressor or any equipment in the compressed air system. Design compressed air system so failure of any component will not put people or property at risk.
- Before working on compressed air system, turn off and lockout/tagout unit, release pressure, and be sure air pressure cannot be accidentally applied.
- Do not work on compressed air system with unit running unless you are a qualified person and following the manufacturer's instructions.
- Do not modify or alter compressor or manufacturer-supplied equipment. Do not disconnect, disable, or override any safety equipment in the compressed air system.
- Use only components and accessories approved by the manufacturer.
- Keep away from potential pinch points or crush points created by equipment connected to the compressed air system.
- Do not work under or around any equipment that is supported only by air pressure. Properly support equipment by mechanical means.



### HOT METAL from air arc cutting and gouging can cause fire or explosion.

- Do not cut or gouge near flammables.
- Watch for fire; keep extinguisher nearby.



### COMPRESSED AIR can injure or kill.

- Before working on compressed air system, turn off and lockout/tagout unit, release pressure, and be sure air pressure cannot be accidentally applied.
- Relieve pressure before disconnecting or connecting air lines.
- Check compressed air system components and all connections and hoses for damage, leaks, and wear before operating unit.
- Do not direct air stream toward self or others.

- Wear protective equipment such as safety glasses, hearing protection, leather gloves, heavy shirt and trousers, high shoes, and a cap when working on compressed air system.
- Use soapy water or an ultrasonic detector to search for leaks—never use bare hands. Do not use equipment if leaks are found.

- Reinstall doors, panels, covers, or guards when servicing is finished and before starting unit.
- If ANY air is injected into the skin or body seek medical help immediately.



### BREATHING COMPRESSED AIR can injure or kill.

- Do not use compressed air for breathing.
- Use only for cutting, gouging, and tools.



### TRAPPED AIR PRESSURE AND WHIPPING HOSES can injure.

- Release air pressure from tools and system before servicing, adding or changing attachments, or opening compressor oil drain or oil fill cap.



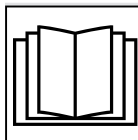
### MOVING PARTS can injure.

- Keep away from moving parts such as fans, belts and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Keep hands, hair, loose clothing, and tools away from moving parts.
- Before working on compressed air system, turn off and lockout/tagout unit, release pressure, and be sure air pressure cannot be accidentally applied.
- Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting engine.



### HOT PARTS can burn.

- Do not touch hot compressor or air system parts.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.



### READ INSTRUCTIONS.

- Read and follow all labels and the Owner's Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Use only genuine replacement parts from the manufacturer.
- Perform installation, maintenance, and service according to the Owner's Manuals, industry standards, and national, state, and local codes.

## 1-5. Additional Hazards For Installation, Operation, And Maintenance



### FIRE OR EXPLOSION hazard.

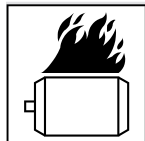
- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring—be sure power supply system is properly sized, rated, and protected to handle this unit.



### FALLING EQUIPMENT can injure.

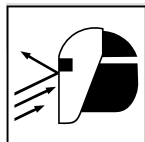
- Use lifting eye to lift unit and properly installed accessories only, NOT gas cylinders. Do not exceed maximum lift eye weight rating (see Specifications).
- Use correct procedures and equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.
- Keep equipment (cables and cords) away from moving vehicles when working from an aerial location.

- Follow the guidelines in the Applications Manual for the Revised NIOSH Lifting Equation (Publication No. 94-110) when manually lifting heavy parts or equipment.



#### **OVERHEATING can damage motors.**

- Turn off or unplug equipment before starting or stopping engine.
- Do not let low voltage and frequency caused by low engine speed damage electric motors.
- Use only equipment suitable for operation on 60 or 50/60 Hz power.



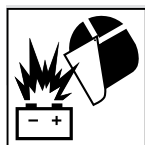
#### **FLYING SPARKS can injure.**

- Wear a face shield to protect eyes and face.
- Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.
- Sparks can cause fires—keep flammables away.



#### **MOVING PARTS can injure.**

- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.



#### **BATTERY CHARGING OUTPUT and BATTERY EXPLOSION can injure.**

Battery charging not present on all models.

- Always wear a face shield, rubber gloves, and protective clothing when working on a battery.
- Stop engine before disconnecting or connecting battery cables, battery charging cables (if applicable), or servicing battery.
- Do not allow tools to cause sparks when working on a battery.
- Do not use welder to charge batteries or jump start vehicles unless it has a battery charging feature designed for this purpose.
- Observe correct polarity (+ and -) on batteries.
- Disconnect negative (-) cable first and connect it last.
- Keep sparks, flames, cigarettes, and other ignition sources away from batteries. Batteries produce explosive gases during normal operation and when being charged.
- Follow battery manufacturer's instructions when working on or near a battery. See Battery Service Manual (listed in Safety Standards) for additional information.
- Have only qualified persons do battery charging work.
- If battery is being removed from a vehicle for charging, disconnect negative (-) cable first and connect it last. To prevent an arc, make sure all accessories are off.
- Charge lead-acid batteries only. Do not use battery charger to supply power to an extra-low-voltage electrical system or to charge dry cell batteries.
- Do not charge a frozen battery.
- Do not use damaged charging cables.
- Do not charge batteries in a closed area or where ventilation is restricted.
- Do not charge a battery that has loose terminals or one showing damage such as a cracked case or cover.
- Before charging battery, select correct charger voltage to match battery voltage.
- Set battery charging controls to the Off position before connecting to battery. Do not allow battery charging clips to touch each other.
- Keep charging cables away from vehicle hood, door, or moving parts.



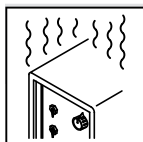
#### **HIGH PRESSURE FLUIDS can injure or kill.**

- Engine fuel system components can be under high pressure.
- Before working on fuel system, turn off engine to release pressure.
- If any fluid is injected into the skin or body seek medical help immediately.



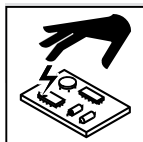
#### **WELDING WIRE can injure.**

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.



#### **OVERUSE can cause OVERHEATING.**

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



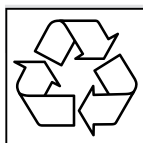
#### **STATIC (ESD) can damage PC boards.**

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.



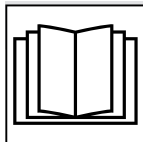
#### **TILTING OF TRAILER can injure.**

- Use tongue jack or blocks to support weight.
- Properly install welding generator onto trailer according to instructions supplied with trailer.



#### **RECYCLE.**

- Recycle or dispose of used liquids in an environmentally safe way. This is especially true for engine fluids such as drain oil and used coolant; this is also important for coolant from torch/gun cooling systems.
- Contact your local recycling office or your local distributor for information about how to dispose of parts and equipment in an environmentally safe way.



#### **READ INSTRUCTIONS.**

- Read and follow all labels and the Owner's Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Use only genuine replacement parts from the manufacturer.
- Perform installation, maintenance, and service according to the Owner's Manuals, industry standards, and national, state, and local codes.



#### **H.F. RADIATION can cause interference.**

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.

- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



#### ARC WELDING can cause interference.

as robots.

- Electromagnetic energy can interfere with sensitive electronic equipment such as microprocessors, computers, and computer-driven equipment such

- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

## 1-6. California Proposition 65 Warnings

**⚠ WARNING – This product can expose you to chemicals including lead, which are known to the state of California to cause cancer and birth defects or other reproductive harm.**

For more information, go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**For Diesel Engines:**

**⚠ WARNING – Breathing diesel engine exhaust exposes you to chemicals known to the state of California to cause cancer and birth defects or other reproductive harm.**

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information, go to [www.P65Warnings.ca.gov/diesel](http://www.P65Warnings.ca.gov/diesel).

## 1-7. Principal Safety Standards

*Safety in Welding, Cutting, and Allied Processes*, American Welding Society standard ANSI Standard Z49.1. Website: [www.aws.org](http://www.aws.org).

*Safe Practices for the Preparation of Containers and Piping for Welding and Cutting*, American Welding Society Standard AWS F4.1. Website: [www.aws.org](http://www.aws.org).

*National Electrical Code*, NFPA Standard 70 from National Fire Protection Association. Website: [www.nfpa.org](http://www.nfpa.org).

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1 from Compressed Gas Association. Website: [www.cganet.com](http://www.cganet.com).

*Safety in Welding, Cutting, and Allied Processes*, CSA Standard W117.2 from Canadian Standards Association. Website: [www.csagroup.org](http://www.csagroup.org).

*Battery Chargers*, CSA Standard C22.2 NO 107.2-01 from Canadian Standards Association. Website: [www.csagroup.org](http://www.csagroup.org).

*Safe Practice For Occupational And Educational Eye And Face Protection*, ANSI Standard Z87.1, from American National Standards Institute. Website: [safetyequipment.org](http://safetyequipment.org).

*Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, NFPA Standard 51B from National Fire Protection Association. Website: [www.nfpa.org](http://www.nfpa.org).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910.177 Subpart N, Part 1910 Subpart Q, and Part 1926, Subpart J. Website: [www.osha.gov](http://www.osha.gov).

*OSHA Important Note Regarding the ACGIH TLV, Policy Statement on the Uses of TLVs and BEIs*. Website: [www.osha.gov](http://www.osha.gov).

*Portable Generator Hazards Safety Alert* from U.S. Consumer Product Safety Commission (CPSC). Website: [www.cpsc.gov](http://www.cpsc.gov).

*Applications Manual for the Revised NIOSH Lifting Equation* from the National Institute for Occupational Safety and Health (NIOSH). Website: [www.cdc.gov/NIOSH](http://www.cdc.gov/NIOSH).

For Standards regulating hydraulic systems, contact the National Fluid Power Association. Website: [www.nfpa.com](http://www.nfpa.com).

*Battery Service Manual* from the Battery Council International. Website: [www.batterycouncil.org](http://www.batterycouncil.org).

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## 1-8. EMF Information

Electric current flowing through any conductor causes localized electric and magnetic fields (EMF). The current from arc welding (and allied processes including spot welding, gouging, plasma arc cutting, and induction heating operations) creates an EMF field around the welding circuit. EMF fields can interfere with some medical implants, e.g. pacemakers. Protective measures for persons wearing medical implants have to be taken. For example, restrict access for passers-by or conduct individual risk assessment for welders. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

1. Keep cables close together by twisting or taping them, or using a cable cover.
2. Do not place your body between welding cables. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.

4. Keep head and trunk as far away from the equipment in the welding circuit as possible.
5. Connect work clamp to workpiece as close to the weld as possible.
6. Do not work next to, sit or lean on the welding power source.
7. Do not weld whilst carrying the welding power source or wire feeder.

#### About Implanted Medical Devices:

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recommended.

# SECTION 2 – CONSIGNES DE SÉCURITÉ - LIRE AVANT UTILISATION

**⚠** Pour écarter les risques de blessure pour vous-même et pour autrui — lire, appliquer et ranger en lieu sûr ces consignes relatives aux précautions de sécurité et au mode opératoire.

## 2-1. Symboles utilisés

**⚠** **DANGER!** – Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.

**⚠** Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.

**AVIS** – Indique des déclarations pas en relation avec des blessures personnelles.

 Indique des instructions spécifiques.



Ce groupe de symboles veut dire Avertissement! Attention! DANGER DE CHOC ELECTRIQUE, PIECES EN MOUVEMENT, et PIECES CHAUDES. Reportez-vous aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout danger.

## 2-2. Dangers relatifs au soudage à l'arc

**⚠** Les symboles représentés ci-dessous sont utilisés dans ce manuel pour attirer l'attention et identifier les dangers possibles. En présence de ce symbole, prendre garde et suivre les instructions afférentes pour éviter tout risque. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les Normes de sécurité principales. Lire et suivre toutes les Normes de sécurité.

**⚠** L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées. Une personne qualifiée est définie comme celle qui, par la possession d'un diplôme reconnu, d'un certificat ou d'un statut professionnel, ou qui, par une connaissance, une formation et une expérience approfondies, a démontré avec succès sa capacité à résoudre les problèmes liés à la tâche, le travail ou le projet et a reçu une formation en sécurité afin de reconnaître et d'éviter les risques inhérents.

**⚠** Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.



### UN CHOC ÉLECTRIQUE peut tuer.

Un simple contact avec des pièces électriques peut provoquer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension dès que l'appareil est sur ON. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension à ce moment-là. En soudage semi-automatique ou automatique, le fil, le dévidoir, le logement des galets d'entraînement et les pièces métalliques en contact avec le fil de soudage sont sous tension. Des matériels mal installés ou mal mis à la terre présentent un danger.

- Ne jamais toucher les pièces électriques sous tension.
- Porter des gants et des vêtements de protection secs ne comportant pas de trous.
- S'isoler de la pièce et de la terre au moyen de tapis ou d'autres moyens isolants suffisamment grands pour empêcher le contact physique éventuel avec la pièce ou la terre.
- Ne pas utiliser de sortie de soudage CA dans des zones humides ou confinées ou s'il y a un risque de chute.
- Ne stockez pas et n'utilisez pas l'équipement dans de l'eau stagnante.
- Se servir d'une source électrique à courant électrique UNIQUEMENT si le procédé de soudage le demande.
- Si l'utilisation d'une source électrique à courant électrique s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- Des précautions de sécurité supplémentaires sont requises dans des environnements à risque comme: les endroits humides ou lorsque l'on porte des vêtements mouillés; sur des structures

métalliques au sol, grillages et échafaudages; dans des positions assises, à genoux et allongées; ou quand il y a un risque important de contact accidentel avec la pièce ou le sol. Dans ces cas utiliser les appareils suivants dans l'ordre de préférence: 1) un poste à souder DC semi-automatique de type CV (MIG/MAG), 2) un poste à souder manuel (électrode enrobée) DC, 3) un poste à souder manuel AC avec tension à vide réduite. Dans la plupart des cas, un poste courant continu de type CV est recommandé. Et, ne pas travailler seul!

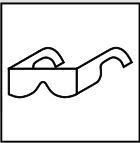
- Ne brancher aucun système de distribution électrique normalement fourni par un réseau public à moins qu'un commutateur de transfert et une procédure de mise à la terre adéquats ne soient mis en place.
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Déverrouiller l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir normes de sécurité).
- Installer et mettre à la terre correctement cet appareil conformément à son manuel d'utilisation et aux codes nationaux, provinciaux et municipaux.
- Toujours vérifier la terre du cordon d'alimentation - Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d'entrée fixer d'abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Les câbles doivent être exempts d'humidité, d'huile et de graisse; protégez-les contre les étincelles et les pièces métalliques chaudes.
- Vérifier fréquemment le cordon d'alimentation et le conducteur de mise à la terre afin de s'assurer qu'il n'est pas altéré ou dénudé -, le remplacer immédiatement s'il l'est -. Un fil dénudé peut entraîner la mort.
- Mettre l'appareil hors tension quand on ne l'utilise pas.
- Ne pas utiliser des câbles usés, endommagés, sous dimensionnés ou réparés.
- Ne pas enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, la faire directement avec un câble distinct - ne pas utiliser le connecteur de pièce ou le câble de retour.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode provenant d'une autre machine.
- Ne pas toucher des porte électrodes connectés à deux machines en même temps à cause de la présence d'une tension à vide doublée.

- N'utiliser qu'un matériel en bon état. Réparer ou remplacer sur-le-champ les pièces endommagées. Entretenir l'appareil conformément à ce manuel.
- Ne pas toucher aux portes-électrodes qui sont raccordés à deux machines à souder en même temps, car cela entraîne la présence d'une tension de circuit-ouvert double.
- Porter un harnais de sécurité quand on travaille en hauteur.
- Maintenir solidement en place tous les panneaux et capots.
- Fixer le câble de retour de façon à obtenir un bon contact métal-métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.
- Ne pas raccorder plus d'une électrode ou plus d'un câble de masse à une même borne de sortie de soudage. Débrancher le câble pour le procédé non utilisé.
- Utiliser une protection GFCI lors de l'utilisation d'appareils auxiliaires. Testez les prises GFCI à haute vitesse.



### **LES PIÈCES CHAUDES peuvent provoquer des brûlures.**

- Ne pas toucher des parties chaudes à mains nues.
- Prévoir une période de refroidissement avant de travailler à l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



### **DES PIÈCES DE METAL ou DES SALETES peuvent provoquer des blessures dans les yeux.**

- Le soudage, l'écaillage, le passage de la pièce à la brosse en fil de fer, et le meulage génèrent des étincelles et des particules métalliques volantes. Pendant la période de refroidissement des soudures, elles risquent de projeter du laitier.
- Porter des lunettes de sécurité avec écrans latéraux ou un écran facial.



### **LES FUMÉES ET LES GAZ peuvent être dangereux.**

Le soudage génère des fumées et des gaz. Leur inhalation peut être dangereux pour votre santé.

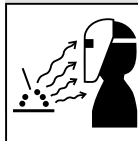
- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- À l'intérieur, ventiler la zone et/ou utiliser une ventilation forcée au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage. Pour déterminer la bonne ventilation, il est recommandé de procéder à un prélèvement pour la composition et la quantité de fumées et de gaz auxquelles est exposé le personnel.
- Si la ventilation est médiocre, porter un respirateur anti-vapeurs approuvé.
- Lire et comprendre les fiches de données de sécurité et les instructions du fabricant concernant les adhésifs, les revêtements, les nettoyants, les consommables, les produits de refroidissement, les dégraissants, les flux et les métaux.
- Travailler dans un espace fermé seulement s'il est bien ventilé ou en portant un respirateur à alimentation d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l'air et abaisser le niveau d'oxygène provoquant des blessures ou des accidents mortels. S'assurer que l'air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.

- Ne pas souder des métaux munis d'un revêtement, tels que l'acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n'ait été enlevé dans la zone de soudure, que l'endroit soit bien ventilé, et en portant un respirateur à alimentation d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.



### **LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.**

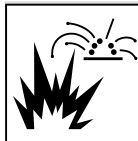
- Fermer l'alimentation du gaz comprimé en cas de non utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d'un respirateur d'adduction d'air homologué.



### **LES RAYONS DE L'ARC peuvent provoquer des brûlures dans les yeux et sur la peau.**

Le rayonnement de l'arc du procédé de soudage génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de provoquer des brûlures dans les yeux et sur la peau. Des étincelles sont projetées pendant le soudage.

- Porter un casque de soudage approuvé muni de verres filtrants appropriés pour protéger visage et yeux pendant le soudage (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des lunettes de sécurité avec écrans latéraux même sous votre casque.
- Avoir recours à des écrans protecteurs ou à des rideaux pour protéger les autres contre les rayonnements les éblouissements et les étincelles ; prévenir toute personne sur les lieux de ne pas regarder l'arc.
- Porter une protection corporelle en cuir ou des vêtements ignifuges (FRC). La protection du corps comporte des vêtements sans huile, comme des gants de cuir, une chemise solide, des pantalons sans revers, des chaussures hautes et une casquette.



### **LE SOUDAGE peut provoquer un incendie ou une explosion.**

Le soudage effectué sur des conteneurs fermés tels que des réservoirs, tambours ou des conduites peut provoquer leur éclatement. Des étincelles peuvent être projetées de l'arc de soudure. La projection d'étincelles, des pièces chaudes et des équipements chauds peut provoquer des incendies et des brûlures. Le contact accidentel de l'électrode avec des objets métalliques peut provoquer des étincelles, une explosion, un surchauffement ou un incendie. Avant de commencer le soudage, vérifier et s'assurer que l'endroit ne présente pas de danger.

- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité les recouvrir soigneusement avec des protections homologuées.
- Ne pas souder dans un endroit où des étincelles peuvent tomber sur des substances inflammables.
- Se protéger et d'autres personnes de la projection d'étincelles et de métal chaud.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- Ne pas couper ou souder des jantes ou des roues. Les pneus peuvent exploser s'ils sont chauffés. Les jantes et les roues réparées peuvent défailir. Voir OSHA 29 CFR 1910.177 énuméré dans les normes de sécurité.

- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu'ils n'aient été préparés correctement conformément à AWS F4.1 (voir les Normes de Sécurité).
- Ne pas souder là où l'air ambiant pourrait contenir des poussières, gaz ou émanations inflammables (vapeur d'essence, par exemple).
- Brancher le câble de masse sur la pièce la plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution, d'étincelles et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porte-électrode ou couper le fil à la pointe de contact.
- Porter une protection corporelle en cuir ou des vêtements ignifuges (FRC). La protection du corps comporte des vêtements sans huile, comme des gants de cuir, une chemise solide, des pantalons sans revers, des chaussures hautes et une casquette.
- Avant de souder, retirer toute substance combustible de vos poches telles qu'un allumeur au butane ou des allumettes.
- Une fois le travail achevé, assurez-vous qu'il ne reste aucune trace d'étincelles incandescentes ni de flammes.
- Utiliser exclusivement des fusibles ou coupe-circuits appropriés. Ne pas augmenter leur puissance; ne pas les ponter.
- Suivre les recommandations dans OSHA 1910.252 (a) (2) (iv) et NFPA 51B pour les travaux à chaud et avoir de la surveillance et un extincteur à proximité.
- Lire et comprendre les fiches de données de sécurité et les instructions du fabricant concernant les adhésifs, les revêtements, les nettoyants, les consommables, les produits de refroidissement, les dégraisseurs, les flux et les métaux.



### Le BRUIT peut endommager l'ouïe.

Le bruit des processus et des équipements peut affecter l'ouïe.

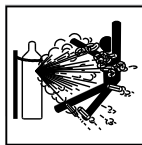
- Porter des protections approuvées pour les oreilles si le niveau sonore est trop élevé.



### Les CHAMPS ÉLECTROMAGNÉTIQUES (CEM) peuvent affecter les implants médicaux.

- Les porteurs de stimulateurs cardiaques et autres implants médicaux doivent rester à distance.

- Les porteurs d'implants médicaux doivent consulter leur médecin et le fabricant du dispositif avant de s'approcher de la zone où se déroule le soudage à l'arc, du soudage par points, du gougeage, de la découpe plasma ou une opération de chauffage par induction.

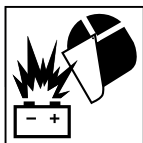


### Si des BOUTEILLES sont endommagées, elles pourront exploser.

Des bouteilles de gaz comprimé protecteur contiennent du gaz sous haute pression. Si une bouteille est endommagée, elle peut exploser. Du fait que les bouteilles de gaz font normalement partie du procédé de soudage, les manipuler avec précaution.

- Protéger les bouteilles de gaz comprimé d'une chaleur excessive, des chocs mécaniques, des dommages physiques, du laitier, des flammes ouvertes, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte-bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais placer une torche de soudage sur une bouteille à gaz.
- Une électrode de soudage ne doit jamais entrer en contact avec une bouteille.
- Ne jamais souder une bouteille pressurisée - risque d'explosion.
- Utiliser seulement des bouteilles de gaz comprimé, régulateurs, tuyaux et raccords convenables pour cette application spécifique; les maintenir ainsi que les éléments associés en bon état.
- Tourner le dos à la sortie de vanne lors de l'ouverture de la vanne de la bouteille. Ne pas se tenir devant ou derrière le régulateur lors de l'ouverture de la vanne.
- Maintenir le chapeau de protection sur la soupape, sauf en cas d'utilisation ou de branchement de la bouteille.
- Utilisez les équipements corrects, les bonnes procédures et suffisamment de personnes pour soulever, déplacer et transporter les bouteilles.
- Lire et suivre les instructions sur les bouteilles de gaz comprimé, l'équipement connexe et le dépliant P-1 de la CGA (Compressed Gas Association) mentionné dans les principales normes de sécurité.

## 2-3. Dangers existant en relation avec le moteur



### L'EXPLOSION DE LA BATTERIE peut provoquer des blessures.

- Toujours porter une protection faciale, des gants en caoutchouc et vêtements de protection lors d'une intervention sur la batterie.
- Arrêter le moteur avant de débrancher ou de brancher des câbles de batterie, des câbles de chargeur de batterie (le cas échéant) ou de batterie d'entretien.
- Éviter de provoquer des étincelles avec les outils en travaillant sur la batterie.
- Ne pas utiliser l'appareil de soudage pour charger des batteries ou faire démarrer des véhicules à l'aide de câbles de démarrage, sauf si l'appareil dispose d'une fonctionnalité de charge de batterie destinée à cet usage.
- Observer la polarité correcte (+ et -) sur les batteries.
- Débrancher le câble négatif (-) en premier lieu. Le rebrancher en dernier lieu.

- Les sources d'étincelles, flammes nues, cigarettes et autres sources d'inflammation doivent être maintenues à l'écart des batteries. Ces dernières produisent des gaz explosifs en fonctionnement normal et en cours de charge.
- Suivre les instructions du fabricant de la batterie lors d'opérations sur une batterie ou à proximité de celle-ci. Voir le manuel de service de batterie (indiqué dans Normes de sécurité) pour plus d'informations.



### LE CARBURANT MOTEUR peut provoquer un incendie ou une explosion. LA CHALEUR DU MOTEUR peut provoquer un incendie.

- Arrêter le moteur avant de vérifier le niveau de carburant ou de faire le plein.
- Ne pas faire le plein en fumant ou proche d'une source d'étincelles ou d'une flamme nue.

- Ne pas faire le plein de carburant à ras bord; prévoir de l'espace pour son expansion.
- Faire attention de ne pas renverser de carburant. Nettoyer tout carburant renversé avant de faire démarrer le moteur.
- Jeter les chiffons dans un récipient ignifuge.
- Toujours garder le pistolet en contact avec le réservoir lors du remplissage.
- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Tenir à distance les produits inflammables de l'échappement.



#### **Les PIÈCES MOBILES peuvent causer des blessures.**

- S'abstenir de toucher des parties mobiles telles que des ventilateurs, courroies et rotors.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.
- Arrêter le moteur avant d'installer ou brancher l'appareil.
- Lorsque cela est nécessaire pour des travaux d'entretien et de dépannage, faire retirer les portes, panneaux, recouvrements ou dispositifs de protection uniquement par du personnel qualifié.
- Pour empêcher tout démarrage accidentel pendant les travaux d'entretien, débrancher le câble négatif (-) de batterie de la borne.
- Ne pas approcher les mains, cheveux, vêtements lâches et outils des organes mobiles.
- Remettre en place les portes, panneaux, recouvrements ou dispositifs de protection à la fin des travaux d'entretien et avant de mettre le moteur en marche.
- Avant d'intervenir, déposer les bougies ou injecteurs pour éviter la mise en route accidentelle du moteur.
- Bloquer le volant moteur pour éviter sa rotation lors d'une intervention sur le générateur.



#### **LES ÉTINCELLES À L'ÉCHAPPEMENT peuvent provoquer un incendie.**

- Empêcher les étincelles d'échappement du moteur de provoquer un incendie.
- Utiliser uniquement un pare-étincelles approuvé - voir codes en vigueur.



#### **LES PIÈCES CHAUDES peuvent provoquer des brûlures.**

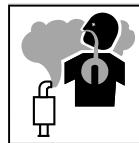
- Ne pas toucher des parties chaudes à mains nues.

- Prévoir une période de refroidissement avant de travailler à l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



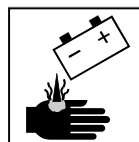
#### **LA VAPEUR ET LE LIQUIDE DE REFROIDISSEMENT CHAUD peuvent provoquer des brûlures.**

- Il est préférable de vérifier le liquide de refroidissement une fois le moteur refroidi pour éviter de se brûler.
- Toujours vérifier le niveau de liquide de refroidissement dans le vase d'expansion (si présent), et non dans le radiateur (sauf si précisé autrement dans la section maintenance du manuel du moteur).
- Si le moteur est chaud et que le liquide doit être vérifié, opérer comme suivant.
- Mettre des lunettes de sécurité et des gants, placer un torchon sur le bouchon du radiateur.
- Dévisser le bouchon légèrement et laisser la vapeur s'échapper avant d'enlever le bouchon.



#### **L'utilisation d'un groupe autonome à l'intérieur PEUT VOUS TUER EN QUELQUES MINUTES.**

- Les fumées d'un groupe autonome contiennent du monoxyde de carbone. C'est un poison invisible et inodore.
- JAMAIS utiliser dans une maison ou garage, même avec les portes et fenêtres ouvertes.
- Uniquement utiliser à l'EXTÉRIEUR, loin des portes, fenêtres et bouches d'aération.



#### **L'ACIDE DE LA BATTERIE peut provoquer des brûlures dans les YEUX ET SUR LA PEAU.**

- Ne pas renverser la batterie.
- Remplacer une batterie endommagée.
- Rincer immédiatement les yeux et la peau à l'eau.

## **2-4. Dangers liés à l'air comprimé**



#### **Un ÉQUIPEMENT PNEUMATIQUE risque de provoquer des blessures ou même la mort.**

- Une installation ou une utilisation incorrecte de cet appareil pourrait conduire à des dégâts matériels ou corporels. Seul un personnel qualifié est autorisé à installer, utiliser et entretenir cet appareil conformément à son manuel d'utilisation, aux normes industrielles et aux codes nationaux, d'état ou locaux.
- Ne pas dépasser le débit nominal ou la capacité du compresseur ou de tout équipement du circuit d'air comprimé. Concevoir le circuit d'air comprimé de telle sorte que la défaillance d'un composant ne risque pas de provoquer un accident matériel ou corporel.
- Avant d'intervenir sur le circuit d'air comprimé, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit d'air ne peut être mis sous pression par inadvertance.

- Ne pas intervenir sur le circuit d'air comprimé lorsque l'appareil fonctionne. Seul un personnel qualifié est autorisé, et appliquant les consignes du fabricant.
- Ne pas modifier ou altérer le compresseur ou les équipements fournis par le fabricant. Ne pas débrancher, désactiver ou neutraliser les équipements de sécurité du circuit d'air comprimé.
- Utiliser uniquement des composants et accessoires homologués par le fabricant.
- Se tenir à l'écart de tout point présentant un danger de pincement ou d'écrasement créé par l'équipement raccordé au circuit d'air comprimé.
- Ne pas intervenir sous ou autour d'un équipement qui n'est soutenu que par la pression pneumatique. Soutenir l'équipement de façon appropriée par un moyen mécanique.

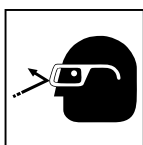


**MÉTAL CHAUD** provenant du découpage ou du gougeage à l'arc risque de provoquer un incendie ou une explosion.

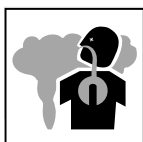
- Ne pas découper ou gouger à proximité de produits inflammables.
- Attention aux risques d'incendie: tenir un extincteur à proximité.



**L'AIR COMPRIMÉ** risque de provoquer des blessures ou même la mort.



- Avant d'intervenir sur le circuit d'air comprimé, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit d'air ne peut être mis sous pression par inadvertance.
- Détendre la pression avant de débrancher ou de brancher des canalisations d'air.
- Avant d'utiliser l'appareil, contrôler les composants du circuit d'air comprimé, les branchements et les flexibles en recherchant tout signe de détérioration, de fuite et d'usure.
- Ne pas diriger un jet d'air vers soi-même ou vers autrui.
- Pour intervenir sur un circuit d'air comprimé, porter un équipement de protection tel que des lunettes de sécurité, des gants de cuir, une chemise et un pantalon en tissu résistant, des chaussures montantes et une coiffe.
- Pour rechercher des fuites, utiliser de l'eau savonneuse ou un détecteur à ultrasons, jamais les mains nues. En cas de détection de fuite, ne pas utiliser l'équipement.
- Remettre les portes, panneaux, recouvrements ou dispositifs de protection quand l'entretien est terminé et avant de mettre en marche l'appareil.
- En cas d'injection d'air dans la peau ou le corps, demander immédiatement une assistance médicale.



**L'INHALATION D'AIR COMPRIMÉ** risque de provoquer des blessures ou même la mort.

- Ne pas inhaler d'air comprimé.
- Utiliser l'air comprimé uniquement pour découper ou gouger ainsi que pour l'outillage pneumatique.



**Une PRESSION D'AIR RÉSIDUELLE** ET DES FLEXIBLES QUI FOUETTENT risquent de provoquer des blessures.

- Détendre la pression pneumatique des outils et circuits avant d'entretenir, ajouter ou changer des accessoires et avant d'ouvrir le bouchon de vidange ou de remplissage d'huile du compresseur.



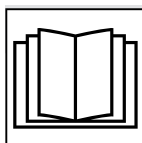
**Les PIÈCES MOBILES** peuvent causer des blessures.

- S'abstenir de toucher des parties mobiles telles que des ventilateurs, courroies et rotors.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.
- Ne pas approcher les mains, cheveux, vêtements lâches et outils des organes mobiles.
- Avant d'intervenir sur le circuit d'air comprimé, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit d'air ne peut être mis sous pression par inadvertance.
- Demander seulement à un personnel qualifié d'enlever les dispositifs de sécurité ou les recouvrements pour effectuer, s'il y a lieu, des travaux d'entretien et de dépannage.
- Remettre en place les portes, panneaux, recouvrements ou dispositifs de protection à la fin des travaux d'entretien et avant de mettre le moteur en marche.



**DES PIÈCES CHAUDES** peuvent provoquer des brûlures graves.

- Ne pas toucher de pièces chaudes du compresseur ou du circuit d'air.
- Prévoir une période de refroidissement avant d'intervenir sur l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



**LIRE LES INSTRUCTIONS.**

- Lire et appliquer les instructions sur les étiquettes et le Mode d'emploi avant l'installation, l'utilisation ou l'entretien de l'appareil. Lire les informations de sécurité au début du manuel et dans chaque section.
- N'utiliser que des pièces de remplacement provenant du fabricant.
- Effectuer l'installation, l'entretien et toute intervention selon les manuels d'utilisateurs, les normes nationales, provinciales et de l'industrie, ainsi que les codes municipaux.

## 2-5. Symboles de dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance



**Risque D'INCENDIE OU D'EXPLOSION.**

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Ne pas installer l'appareil à proximité de produits inflammables
- Ne pas surcharger l'installation électrique – s'assurer que l'alimentation est correctement dimensionnée et protégée avant de mettre l'appareil en service.



**LA CHUTE DE L'ÉQUIPEMENT** peut provoquer des blessures.

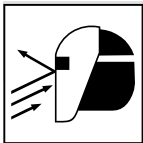
- Utiliser seulement l'anneau de levage pour soulever l'appareil et des accessoires correctement installés, non pas les bouteilles de gaz. Ne pas dépasser les capacités maximales de l'anneau de levage (voir Spécifications).
- Utilisez les procédures correctes et des équipements d'une capacité appropriée pour soulever et supporter l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.
- Tenir l'équipement (câbles et cordons) à distance des véhicules mobiles lors de toute opération en hauteur.

- Suivre les consignes du Manuel des applications pour l'équation de levage NIOSH révisée (Publication N° 94-110) lors du levage manuel de pièces ou équipements lourds.



### **LE SURCHAUFFEMENT peut endommager le moteur électrique.**

- Arrêter ou déconnecter l'équipement avant de démarrer ou d'arrêter le moteur.
- Ne pas laisser tourner le moteur trop lentement sous risque d'endommager le moteur électrique à cause d'une tension et d'une fréquence trop faibles.
- Utiliser uniquement des équipements adéquats pour un fonctionnement avec une alimentation de 50/60 ou de 60 Hz.



### **LES ÉTINCELLES PROJÉTÉES peuvent provoquer des blessures.**

- Porter un écran facial pour protéger le visage et les yeux.
- Affûter l'électrode au tungstène uniquement à la meuleuse dotée de protecteurs. Cette manœuvre est à exécuter dans un endroit sûr lorsque l'on porte l'équipement homologué de protection du visage, des mains et du corps.
- Les étincelles risquent de causer un incendie - éloigner toute substance inflammable.



### **Les PIÈCES MOBILES peuvent causer des blessures.**

- Ne pas s'approcher des organes mobiles.
- Ne pas s'approcher des points de coincement tels que des rouleaux de commande.



### **LA SORTIE DE RECHARGE et L'EXPLOSION DE LA BATTERIE peuvent provoquer des blessures.**

La recharge de batterie n'existe pas sur tous les modèles.

- Toujours porter une protection faciale, des gants en caoutchouc et vêtements de protection lors d'une intervention sur la batterie.
- Arrêter le moteur avant de débrancher ou de brancher des câbles de batterie, des câbles de chargeur de batterie (le cas échéant) ou de batterie d'entretien.
- Éviter de provoquer des étincelles avec les outils en travaillant sur la batterie.
- Ne pas utiliser l'appareil de soudage pour charger des batteries ou faire démarrer des véhicules à l'aide de câbles de démarrage, sauf si l'appareil dispose d'une fonctionnalité de charge de batterie destinée à cet usage.
- Observer la polarité correcte (+ et -) sur les batteries.
- Débrancher le câble négatif (-) en premier lieu. Le rebrancher en dernier lieu.
- Les sources d'étincelles, flammes nues, cigarettes et autres sources d'inflammation doivent être maintenues à l'écart des batteries. Ces dernières produisent des gaz explosifs en fonctionnement normal et en cours de charge.
- Suivre les instructions du fabricant de la batterie lors d'opérations sur une batterie ou à proximité de celle-ci. Voir le manuel de service de batterie (indiqué dans Normes de sécurité) pour plus d'informations.
- Les opérations de charge de batterie ne doivent être effectuées que par des personnes qualifiées.
- Pour enlever la batterie d'un véhicule pour la recharge, débrancher tout d'abord le câble négatif (-) et le rebrancher en dernier lieu. Pour éviter un arc, s'assurer que tous les accessoires sont débranchés.

- Ne charger que des batteries plomb-acide. Ne pas utiliser le chargeur de batterie pour alimenter un autre circuit électrique basse tension ou pour charger des batteries sèches.
- Ne pas charger une batterie gelée.
- Ne pas utiliser de câbles de charge endommagés.
- Ne pas charger des batteries dans un espace fermé ou en l'absence d'une ventilation.
- Ne pas charger une batterie dont les bornes sont desserrées ou présentant une détérioration comme par exemple un boîtier ou un couvercle fissuré.
- Avant de charger une batterie, sélectionner la tension de charge correspondant à la tension de la batterie.
- Régler les commandes de charge de batterie sur la position d'arrêt avant de brancher la batterie. Veiller à ce que les pinces de charge ne se touchent pas.
- Ranger les câbles de charge à distance du capot, des portes et des pièces mobiles du véhicule.



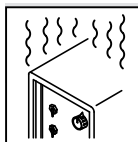
### **LES LIQUIDES PRESSURISÉS peuvent blesser ou tuer.**

- Les composants du système d'alimentation peuvent contenir du carburant sous pression élevée.
- Avant d'intervenir sur le système d'alimentation de carburant, arrêter le moteur pour dépressuriser le système.
- En cas d'injection de tout liquide sous la peau ou dans le corps, solliciter une aide médicale sur le champ.



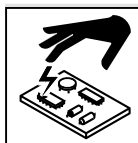
### **LES FILS DE SOUDAGE peuvent provoquer des blessures.**

- Ne pas appuyer sur la gachette avant d'en avoir reçu l'instruction.
- Ne pas diriger le pistolet vers soi, d'autres personnes ou toute pièce mécanique en engageant le fil de soudage.



### **L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.**

- Laisser l'équipement refroidir ; respecter le facteur de marche nominal.
- Réduire le courant ou le cycle opératoire avant de recommencer le soudage.
- Ne pas obstruer les passages d'air du poste.



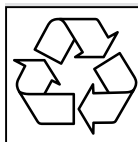
### **LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.**

- Établir la connexion avec la barrette de terre AVANT de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimés.



### **UNE REMORQUE QUI BASCULE peut provoquer des blessures.**

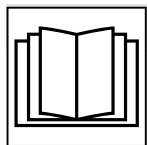
- Utiliser les supports de la remorque ou des blocs pour soutenir le poids.
- Installer convenablement le poste sur la remorque comme indiqué dans le manuel s'y rapportant.



### **RECYCLER.**

- Recycler ou éliminer les liquides usagés d'une manière respectueuse de l'environnement. Cela est particulièrement vrai pour les fluides du moteur tels que l'huile de vidange et le liquide de refroidissement usagés ; ceci est également important pour le liquide de refroidissement provenant des systèmes de refroidissement de la torche/pistolet.

- Contactez votre bureau de recyclage local ou votre distributeur local pour obtenir des informations sur la manière de mettre au rebut les pièces et l'équipement d'une manière respectueuse de l'environnement.



### LIRE LES INSTRUCTIONS.

- Lire et appliquer les instructions sur les étiquettes et le Mode d'emploi avant l'installation, l'utilisation ou l'entretien de l'appareil. Lire les informations de sécurité au début du manuel et dans chaque

section.

- N'utiliser que des pièces de remplacement provenant du fabricant.
- Effectuer l'installation, l'entretien et toute intervention selon les manuels d'utilisateurs, les normes nationales, provinciales et de l'industrie, ainsi que les codes municipaux.

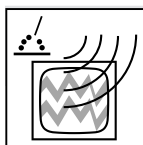


### LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- Le rayonnement haute fréquence (H.F.) peut provoquer des interférences avec les équipements de radio-navigation et de communication, les services de sécurité et les ordinateurs.

- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.

- Si le FCC signale des interférences, arrêter immédiatement l'appareil.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et un blindage pour réduire les interférences éventuelles.



### LE SOUDAGE À L'ARC risque de provoquer des interférences.

- L'énergie électromagnétique risque de provoquer des interférences pour l'équipement électronique sensible tel que les ordinateurs et l'équipement commandé par ordinateur tel que les robots.

- Veiller à ce que tout l'équipement de la zone de soudage soit compatible électromagnétiquement.
- Pour réduire la possibilité d'interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à souder à une distance de 100 mètres de tout équipement électronique sensible.
- Veiller à ce que ce poste de soudage soit posé et mis à la terre conformément à ce mode d'emploi.
- En cas d'interférences après avoir pris les mesures précédentes, il incombe à l'utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l'utilisation de câbles blindés, l'utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.

## 2-6. Proposition californienne 65 Avertissements

**AVERTISSEMENT – ce produit peut vous exposer à des produits chimiques tels que le plomb, reconnus par l'État de Californie comme cancérigènes et sources de malformations ou d'autres troubles de la reproduction.**

Pour plus d'informations, consulter [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

Pour les moteurs diesel :

**AVERTISSEMENT – les gaz d'échappement de moteurs diesel vous exposent à des produits chimiques, reconnus par l'État de Californie comme cancérigènes et sources de malformations ou d'autres troubles de la reproduction.**

- Toujours démarrer et faire tourner le moteur dans une zone bien aérée.
- Si la zone est fermée, diriger l'échappement vers l'extérieur.
- Ne pas modifier ni altérer le système d'échappement.
- Ne pas faire tourner le moteur au ralenti, sauf si nécessaire.

Pour plus d'informations, consulter [www.P65Warnings.ca.gov/diesel](http://www.P65Warnings.ca.gov/diesel).

## 2-7. Principales normes de sécurité

*Safety in Welding, Cutting, and Allied Processes*, American Welding Society standard ANSI Standard Z49.1. Website: [www.aws.org](http://www.aws.org).

*Safe Practices for the Preparation of Containers and Piping for Welding and Cutting*, American Welding Society Standard AWS F4.1. Website: [www.aws.org](http://www.aws.org).

*National Electrical Code*, NFPA Standard 70 from National Fire Protection Association. Website: [www.nfpa.org](http://www.nfpa.org).

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1 from Compressed Gas Association. Website: [www.cganet.com](http://www.cganet.com).

*Safety in Welding, Cutting, and Allied Processes*, CSA Standard W117.2 from Canadian Standards Association. Website: [www.csa-group.org](http://www.csa-group.org).

*Battery Chargers*, CSA Standard C22.2 NO 107.2-01 from Canadian Standards Association. Website: [www.csagroup.org](http://www.csagroup.org).

*Safe Practice For Occupational And Educational Eye And Face Protection*, ANSI Standard Z87.1, from American National Standards Institute. Website: [safetyequipment.org](http://safetyequipment.org).

*Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, NFPA Standard 51B from National Fire Protection Association. Website: [www.nfpa.org](http://www.nfpa.org).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910.177 Subpart N, Part 1910 Subpart Q, and Part 1926, Subpart J. Website: [www.osha.gov](http://www.osha.gov).

*OSHA Important Note Regarding the ACGIH TLV, Policy Statement on the Uses of TLVs and BEIs*. Website: [www.osha.gov](http://www.osha.gov).

*Portable Generator Hazards Safety Alert* from U.S. Consumer Product Safety Commission (CPSC). Website: [www.cpsc.gov](http://www.cpsc.gov).

*Applications Manual for the Revised NIOSH Lifting Equation* from the National Institute for Occupational Safety and Health (NIOSH). Website: [www.cdc.gov/NIOSH](http://www.cdc.gov/NIOSH).

For Standards regulating hydraulic systems, contact the National Fluid Power Association. Website: [www.nfpa.com](http://www.nfpa.com).

*Battery Service Manual* from the Battery Council International. Website: [www.batterycouncil.org](http://www.batterycouncil.org).

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## 2-8. Informations relatives aux CEM

Le courant électrique qui traverse tout conducteur génère des champs électromagnétiques (CEM) à certains endroits. Le courant issu d'un soudage à l'arc (et de procédés connexes, y compris le soudage par points, le gougeage, le découpage plasma et les opérations de chauffage par induction) crée un champ électromagnétique (CEM) autour du circuit de soudage. Les champs électromagnétiques produits peuvent causer interférence à certains implants médicaux, p. ex. les stimulateurs cardiaques. Des mesures de protection pour les porteurs d'implants médicaux doivent être prises: par exemple, des restrictions d'accès pour les passants ou une évaluation individuelle des risques pour les soudeurs. Tous les soudeurs doivent appliquer les procédures suivantes pour minimiser l'exposition aux CEM provenant du circuit de soudage:

1. Rassembler les câbles en les torsadant ou en les attachant avec du ruban adhésif ou avec une housse.
2. Ne pas se tenir au milieu des câbles de soudage. Disposer les câbles d'un côté et à distance de l'opérateur.

3. Ne pas courber et ne pas entourer les câbles autour de votre corps.
4. Maintenir la tête et le torse aussi loin que possible du matériel du circuit de soudage.
5. Connecter la pince sur la pièce aussi près que possible de la soudure.
6. Ne pas travailler à proximité d'une source de soudage, ni s'asseoir ou se pencher dessus.
7. Ne pas souder tout en portant la source de soudage ou le dévidoir.

### En ce qui concerne les implants médicaux :

Les porteurs d'implants doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de soudage par points, de gougeage, du coupage plasma ou de chauffage par induction. Si le médecin approuve, il est recommandé de suivre les procédures précédentes.

## SECTION 3 – SPECIFICATIONS

### 3-1. Serial Number And Rating Label Location

The serial number for this product is located on the front panel, and the rating card is located on the rear panel. Use rating label to determine rated output. For future reference, write serial number in space provided on back cover of this manual.

### 3-2. Weld, Power, And Engine Specifications

*This equipment will deliver rated output at an ambient air temperature up to 104°F (40°C).*

| Welding Mode | Rated Welding Output 100% Duty Cycle | Maximum Open-Circuit Voltage | Weld Output Range | Generator Power Rating                                                                                         | Fuel Capacity      | Engine                                                                                                               | Fuel Type                        |
|--------------|--------------------------------------|------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------|
| CC/DC        | 314 A, 32.5 V*<br>330 A, 31 V        | 107                          | 20 – 330 A        | <b>Peak:</b> 12kW<br><b>Continuous:</b><br>10.5 kVA/kW,<br>88/44 A,<br>120/240 V AC,<br>60 Hz,<br>Single-Phase | 11 gal (42 L) Tank | Kohler ECH-749<br>Air-Cooled,<br>Two-Cylinder,<br>Four-Cycle,<br>26.5 HP Gasoline<br>Engine w/Electronic<br>Governor | Gasoline<br>Up to 10%<br>Ethanol |
| CV/DC        | 330 A, 30.5 V*                       | 107                          | 15 – 40 V         |                                                                                                                |                    |                                                                                                                      |                                  |

\* Meets NEMA and IEC Ratings

### 3-3. Air Compressor Specifications

| Compressor Type | Air Output At Effective Working Pressure | Pressure                         | Safety Relief Valve Setting                                             | Air Compressor Oil Capacity |
|-----------------|------------------------------------------|----------------------------------|-------------------------------------------------------------------------|-----------------------------|
| Rotary Screw    | 30 cfm @ 160 psi (1100 kPa) 100%         | Range: 80–160 psi (550–1100 kPa) | Auto Shutoff: 165 psi (1275 kPa)<br>Pressure Relief: 225 psi (1550 kPa) | 2 qt (1.89 L)               |

### 3-4. Battery Charger Specifications

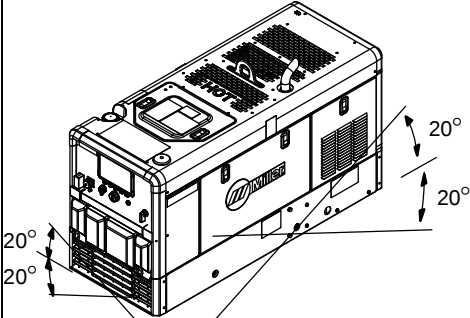
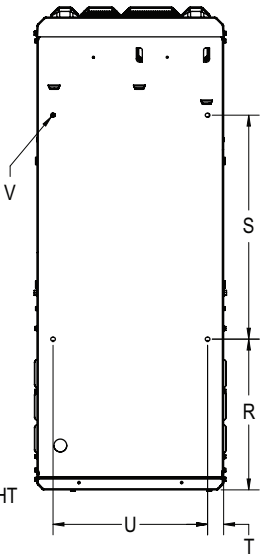
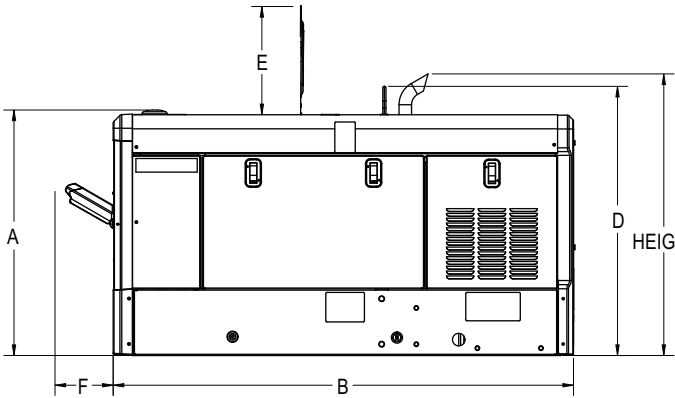
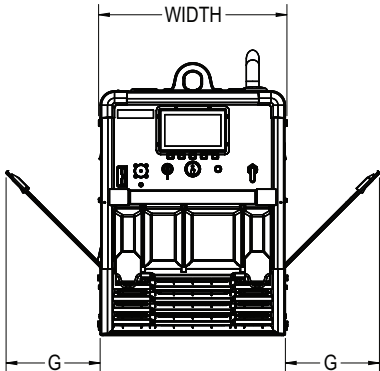
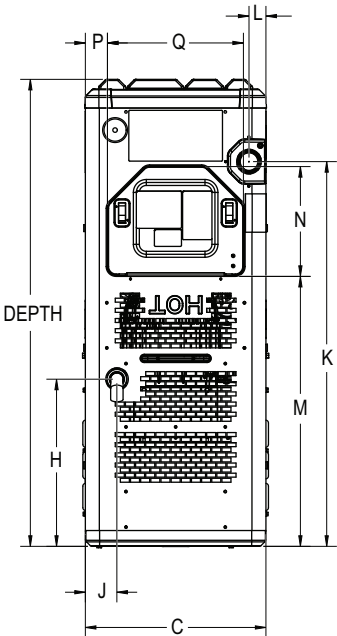
| Output         | Rated Output                                                                   | Output Range | Maximum Open-Circuit Voltage (Nominal) |
|----------------|--------------------------------------------------------------------------------|--------------|----------------------------------------|
| Battery Charge | 5 to 150 A, 12 V Charge<br>5 to 150 A, 24 V Charge                             | 12 or 24 V   | 14/28                                  |
| Jump Start     | 300 A, 12 V Jump Start for 20 Seconds<br>300 A, 24 V Jump Start for 20 Seconds |              |                                        |

### 3-5. Sound Level Table – 7 Meter (23 Ft) (Reference SAE J2101)

| Load      | 3600 RPM |
|-----------|----------|
| Idle      | 71.7 dB  |
| Weld Load | 75.3 dB  |

### 3-6. Dimensions, Weights, And Operating Angles

| Dimensions                 |                                           |
|----------------------------|-------------------------------------------|
| External Dimensions        |                                           |
| Height                     | (With Exhaust) 31 in. (787 mm)            |
| Width                      | 20.46 in. (520 mm)                        |
| Depth                      | 51.88 in. (1318 mm)                       |
| A                          | 27.02 in. (686 mm)                        |
| B                          | 50.67 in. (1287 mm)                       |
| C                          | 20 in. (508 mm)                           |
| D                          | 29.63 in. (753 mm)                        |
| E                          | (Top Door Clearance) 11.89 in. (302 mm)   |
| F                          | (Output Cover Clearance) 6.4 in. (163 mm) |
| G                          | (Side Door Clearance) 10.22 in. (260 mm)  |
| Exhaust Pipe Location      |                                           |
| H                          | 18.51 in. (470 mm)                        |
| J                          | 3.49 in. (89 mm)                          |
| Fuel Fill Location         |                                           |
| K                          | 42.61 in. (1082 mm)                       |
| L                          | 1.88 in. (48 mm)                          |
| Top Door Location          |                                           |
| M                          | 29.90 in. (759 mm)                        |
| N                          | 12.16 in. (309 mm)                        |
| P                          | 2.45 in. (62 mm)                          |
| Q                          | 15.06 in. (383 mm)                        |
| Mounting Hole Location     |                                           |
| R                          | 16.16 in. (410 mm)                        |
| S                          | 24 in. (610 mm)                           |
| T                          | 1.72 in. (44 mm)                          |
| U                          | 16.56 in. (421 mm)                        |
| V                          | Ø 0.41 in. (10.41 mm)                     |
| Weight                     |                                           |
| 590 lb (267 kg)            |                                           |
| Lifting Eye Weight Rating: |                                           |
| 1100 lb (499 kg)           |                                           |





 Do not exceed tilt angles or engine could be damaged or unit could tip.

 Do not move or operate unit where it could tip.

 Do not operate suspended from lifting eye.

### 3-7. Wireless Remote (Optional) Regulatory Approval

This device complies with Part 15 of the FCC rules. Operation is subject to the following conditions:

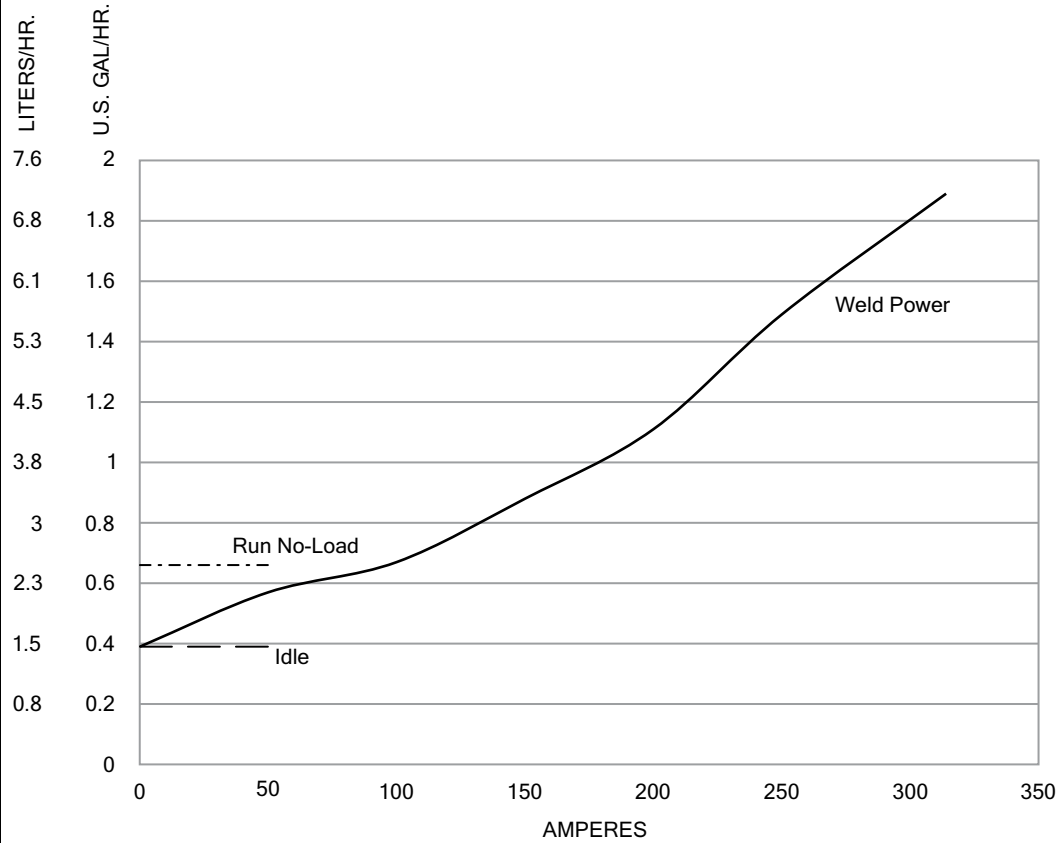
- This device may not cause harmful interference, and
- This device may accept any interference received, including interference that may cause undesired operation.

**WARNING!** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this device.

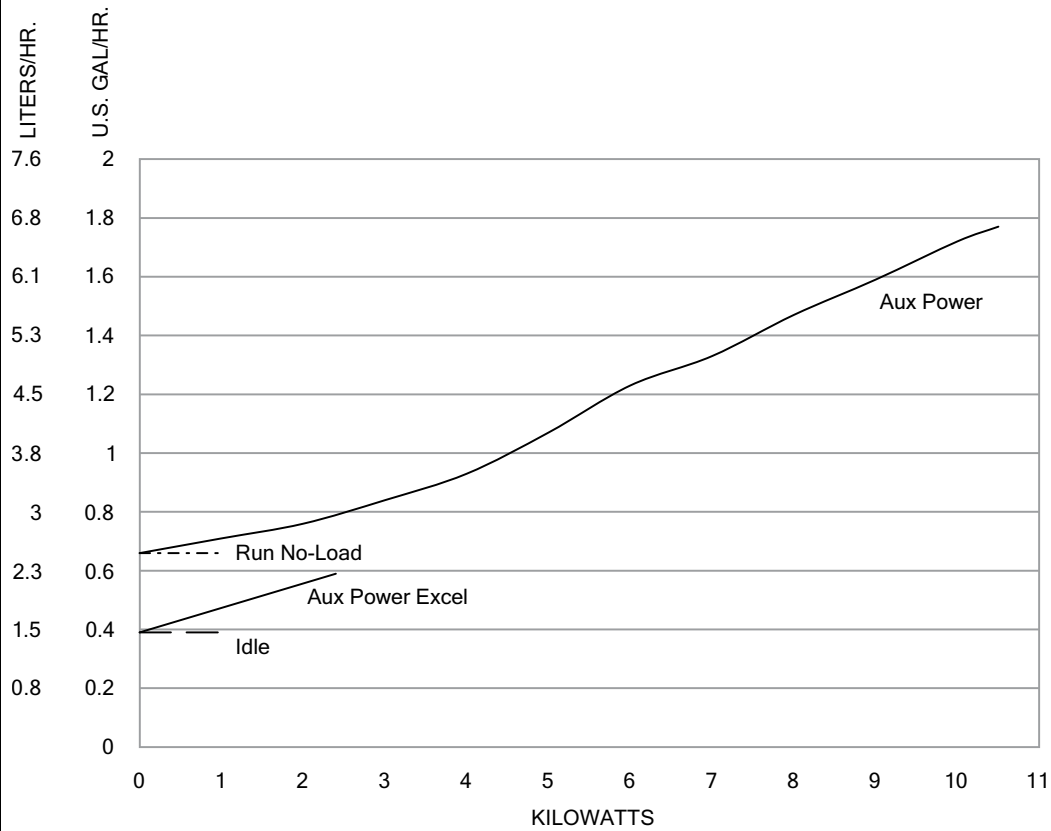
Reception of the fob and receiver signal can be affected by the weather, environment, and/or area conditions.

### 3-8. Fuel Consumption Curves

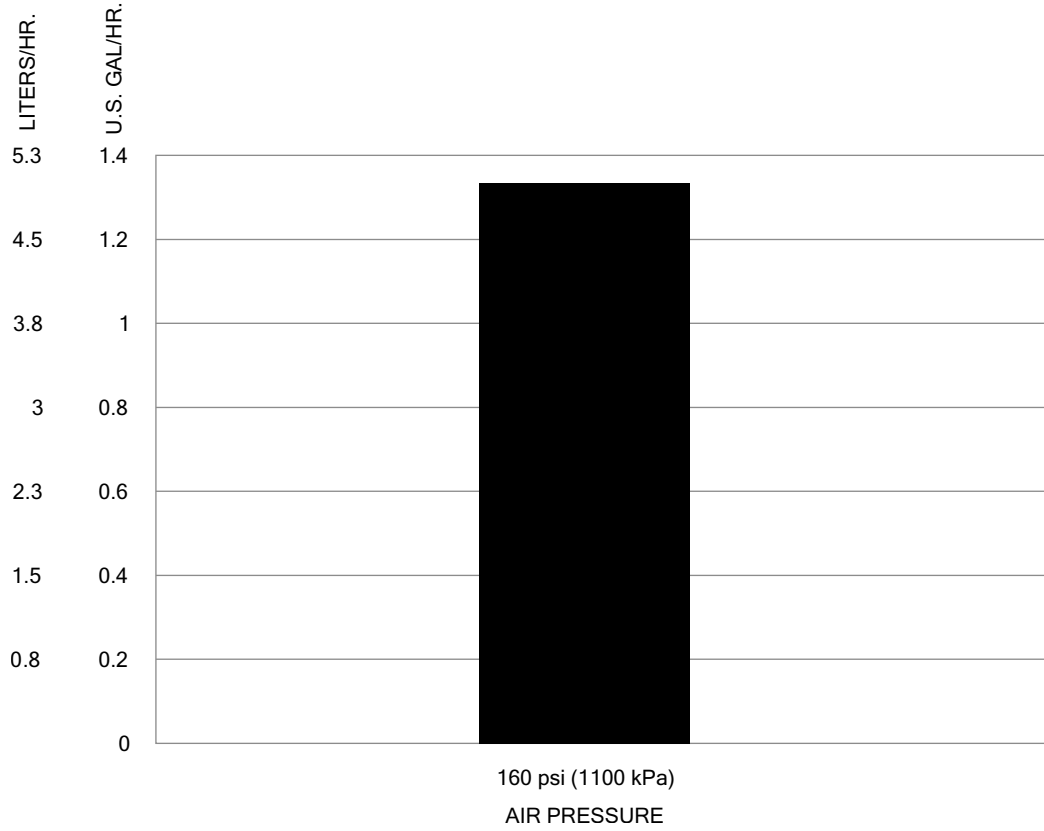
#### Welding



#### Auxiliary Power

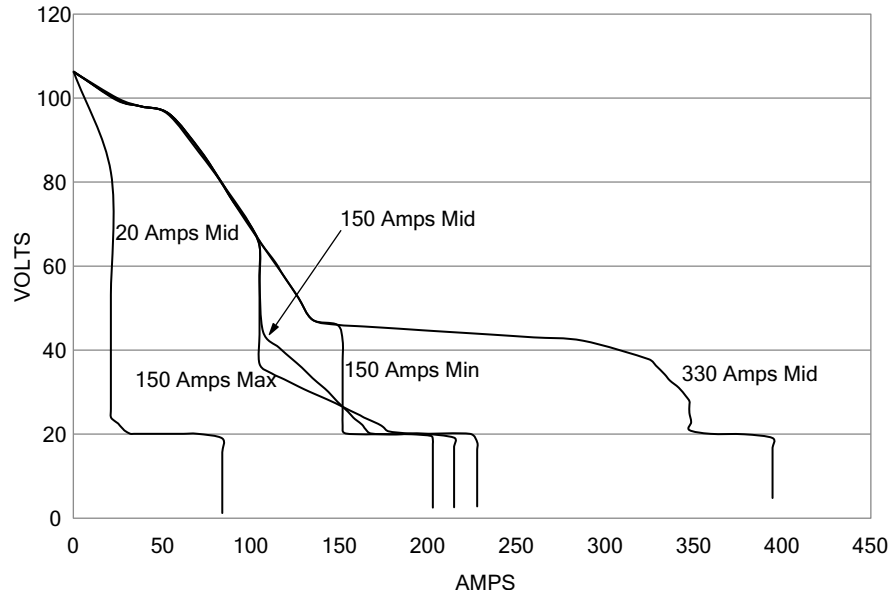


### Air Compressor



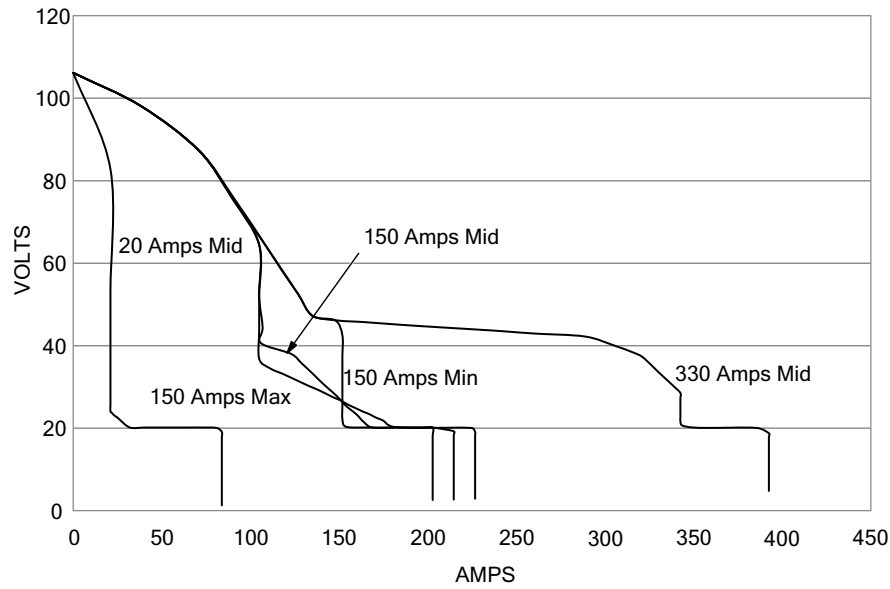
### 3-9. Stick Mode Volt-Ampere Curves

**XX10 Electrode**

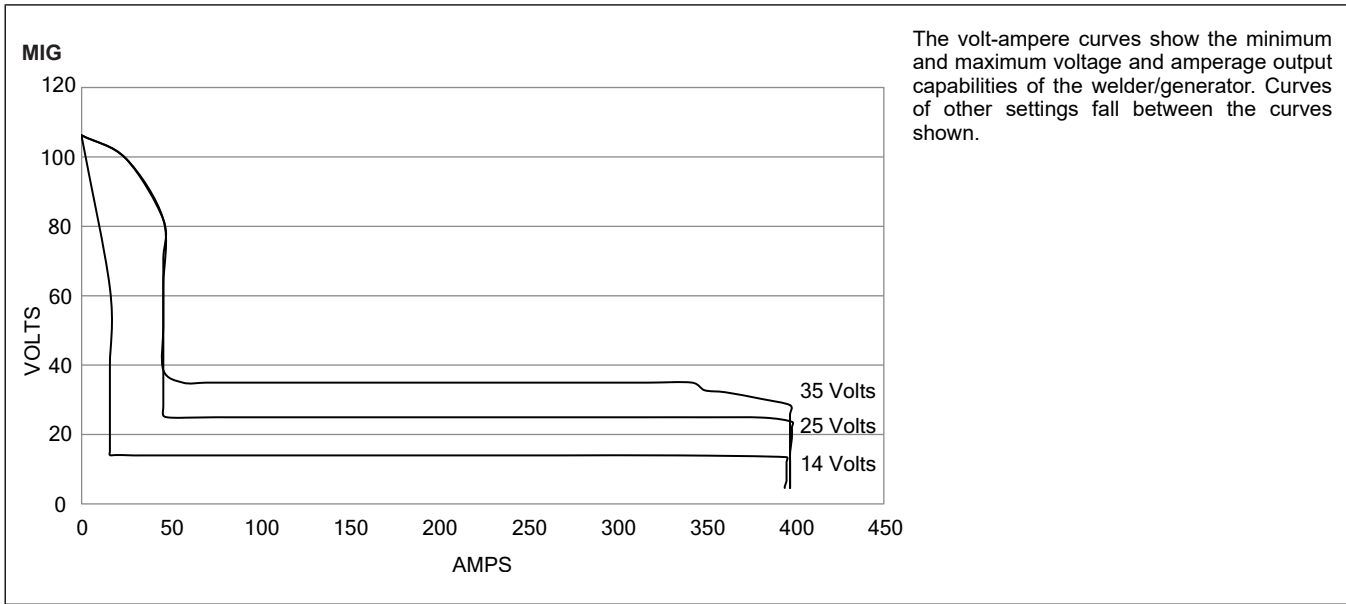


The volt-ampere curves show the minimum and maximum voltage and amperage output capabilities of the welder/generator. Curves of other settings fall between the curves shown.

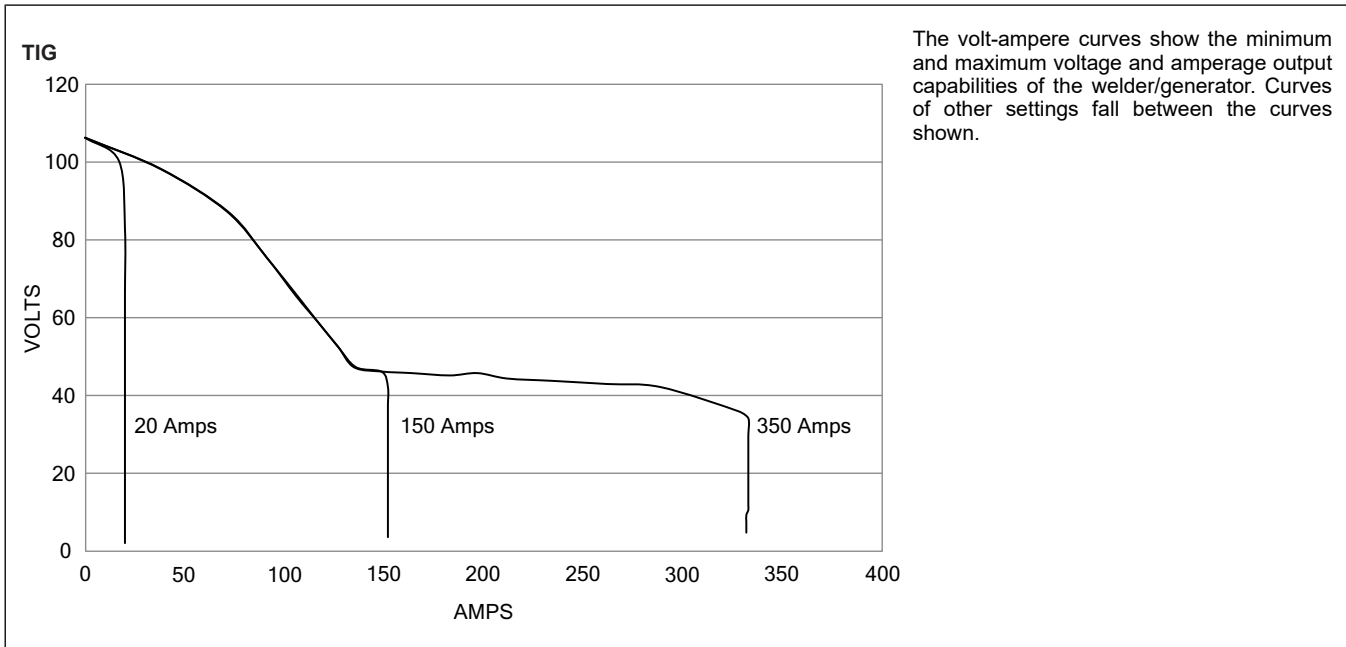
**XX18 Electrode**



### 3-10. MIG Mode Volt-Ampere Curves

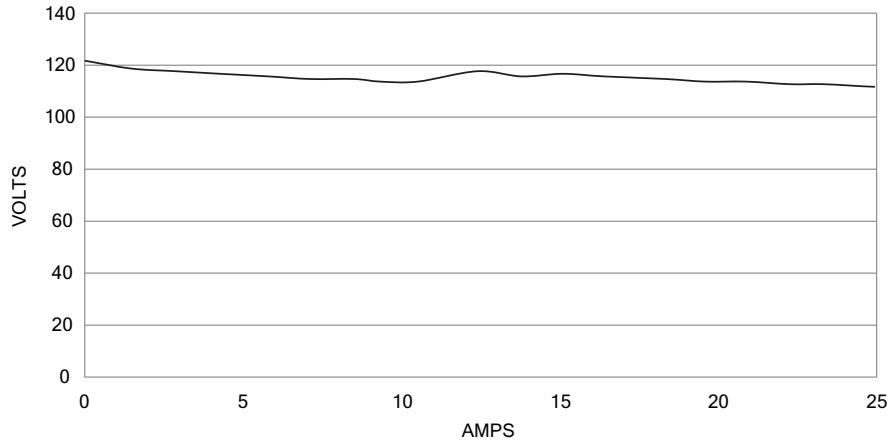


### 3-11. TIG Mode Volt-Ampere Curves



### 3-12. Generator Power Curve

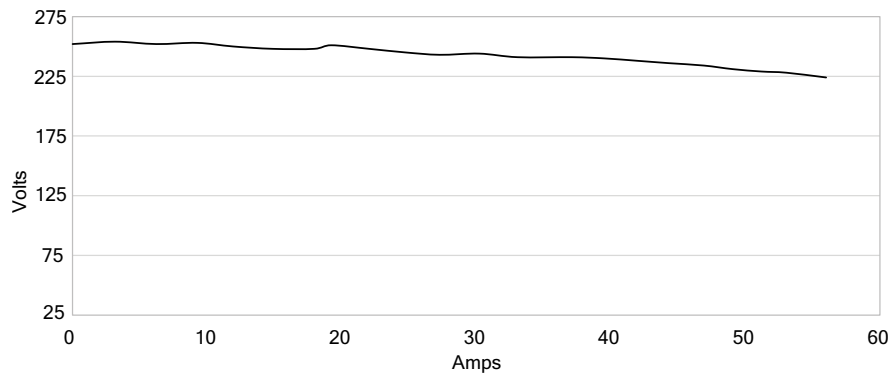
**120 Volt Excel**



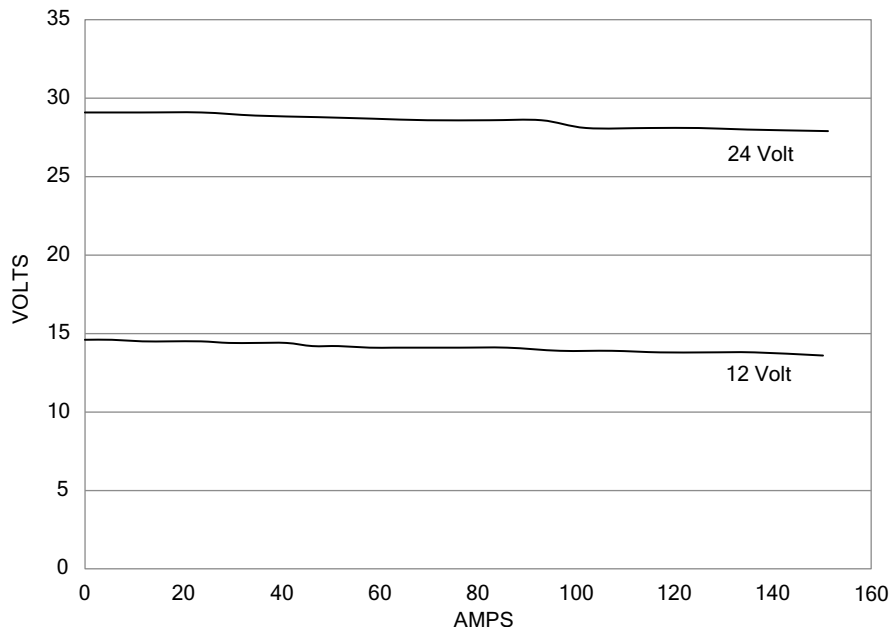
The AC generator power curve shows the generator power available in amperes at the receptacles.

Tools and motors are designed to operate within 10% of 120/240 VAC.

**240 Volt**



### 3-13. Battery Charge Curve

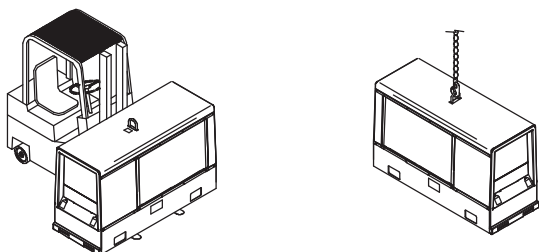


## SECTION 4 – INSTALLATION

### 4-1. Installing Welder/Generator



#### Movement

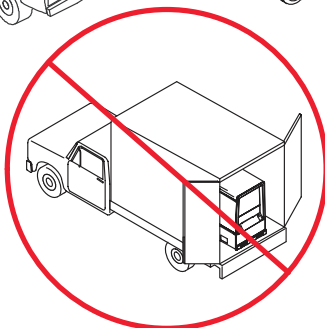
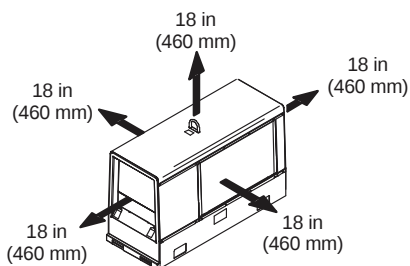
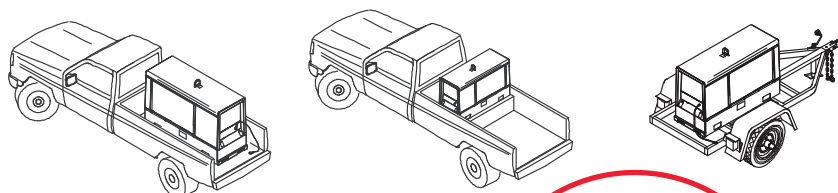


- ⚠ Do not move or operate unit where it could tip.
- ⚠ Do not lift unit from end.
- ⚠ Do not weld on base. Welding on base can cause fuel tank fire or explosion. Bolt unit down using holes provided in base.
- ⚠ Always securely fasten welding generator onto transport vehicle or trailer and comply with all DOT and other applicable codes.

**NOTICE** – Do not install unit where airflow is restricted or engine may overheat.

☞ See Specifications for lifting eye rating.

#### Location/Airflow Clearance



#### Mounting:

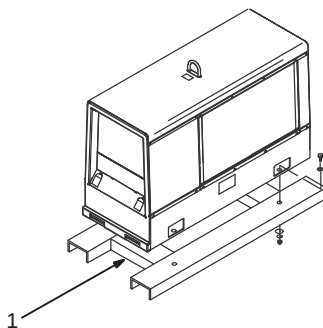
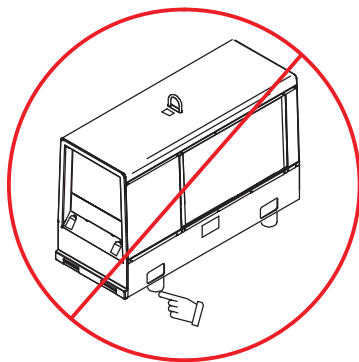
- ⚠ Do not mount unit by supporting the base only at the four mounting holes. Do not use flexible mounts. Use cross-supports to adequately support unit and prevent damage to base.

#### 1 Cross-Supports

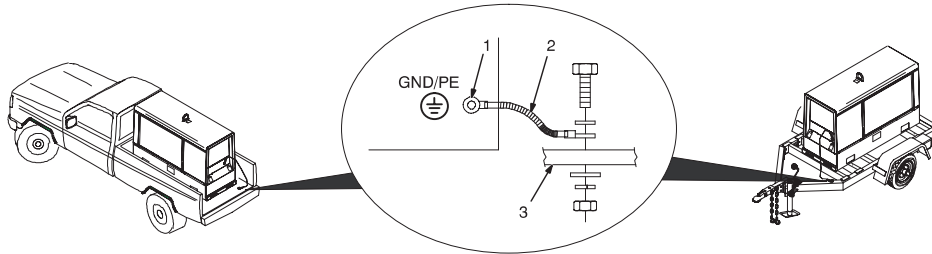
Mount unit on flat surface or use cross-supports to support base.

☞ Go to [MillerWelds.com](http://MillerWelds.com) for more information on truck installations.

#### Mounting



## 4-2. Grounding Generator to Truck or Trailer Frame



**⚠ Always ground generator frame to vehicle frame to prevent electric shock and static electricity hazards.**

**⚠ Also see AWS Safety & Health Fact Sheet No. 29, Grounding of Portable And Vehicle Mounted Welding Generators.**

**⚠ Bed liners, shipping skids, and some running gear insulate the welding generator from the vehicle frame. Always connect a ground wire from the generator equipment grounding terminal to bare metal on the vehicle frame as shown.**

1 Equipment Grounding Terminal (On Front Panel)

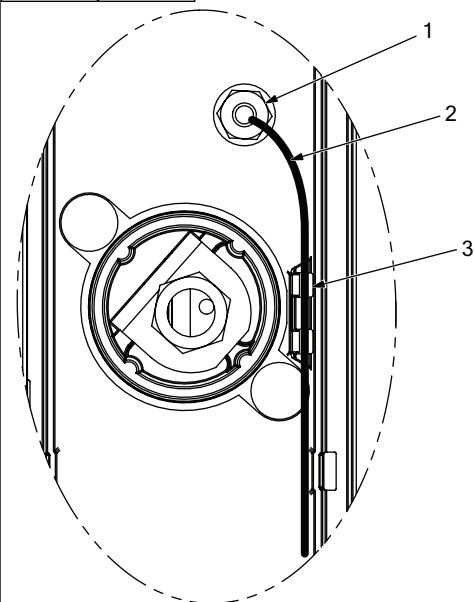
2 Grounding Cable (Not Supplied)

3 Metal Vehicle Frame

Connect cable from equipment ground terminal to metal vehicle frame. Use #8 AWG or larger insulated copper wire.

*Electrically bond generator frame to vehicle frame by metal-to-metal contact.*

## 4-3. Ground Cable Routing



*See Section 4-2 prior to routing grounding wire.*

1 Equipment Grounding Stud

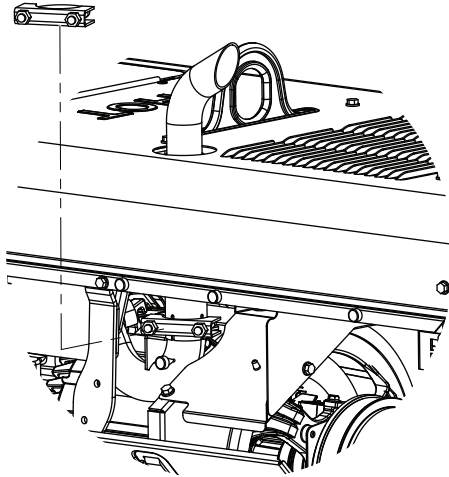
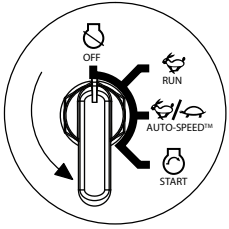
2 Grounding Cable

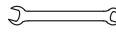
3 Grounding Cable Retention Clip

Route cable from equipment grounding terminal to metal frame through cable retention clip.

Use #8 AWG insulated copper wire.

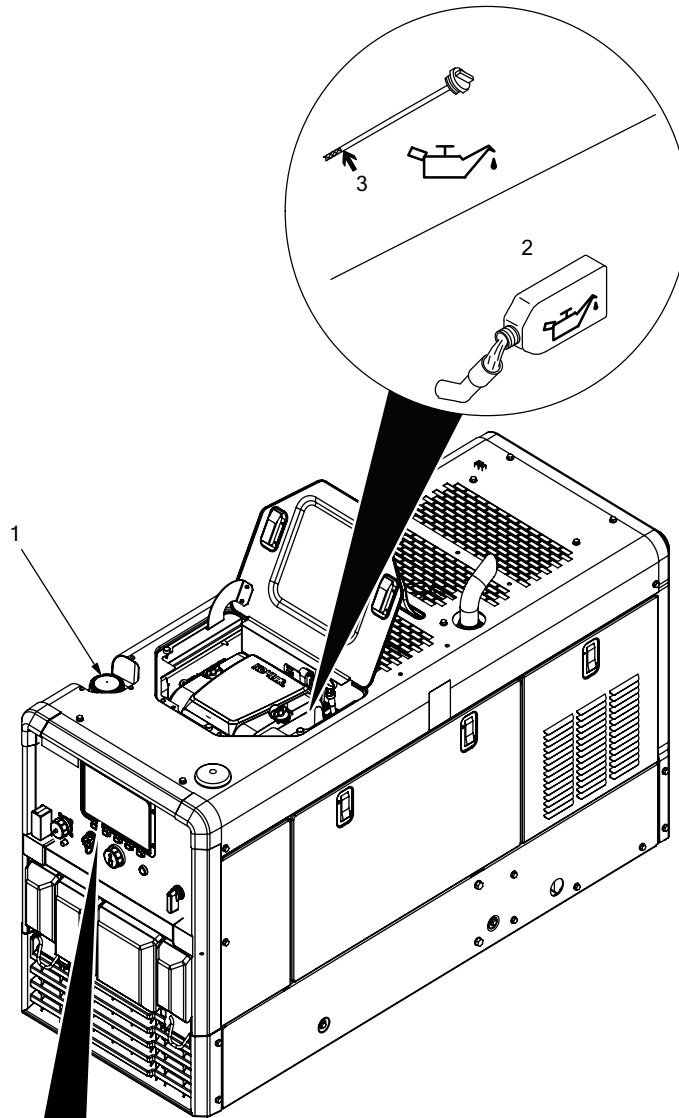
## 4-4. Installing Exhaust Pipe



 1/2 in.

-  Stop engine and let cool.
-  Engine backfire can cause severe burns or other injuries. Do not point exhaust pipe toward control panel. Keep away from exhaust outlet.
-  Do not point exhaust pipe toward LP fuel tank (if equipped). Do not point exhaust pipe towards shielding gas tank (if equipped).
-  Point exhaust pipe in desired direction but always away from front panel and direction of travel.

## 4-5. Engine Prestart Checks



Check all fluids daily. Engine must be cold and on a level surface. Unit is shipped with synthetic blend 10W-30 engine oil.

Follow run-in procedure in engine manual.

This unit has a low oil pressure shut-down switch. However, some conditions may cause engine damage before the engine shuts down. Check oil level often and do not use the oil pressure shutdown system to monitor oil level.

### Fuel

#### 1 Fuel Fill Cap

Add fresh fuel before starting engine the first time (see maintenance label for specifications). Stop fueling when fuel reaches bottom of fuel fill bowl. Do not overfill. Fuel tank has built in air expansion volume. Do not top off tank. Check fuel level on a cold engine before use each day.

To check fuel level, turn Engine Control switch to Run/Idle position. Screen indicates fuel level in tank.

### Oil

Open top service door.

#### 2 Oil Fill

#### 3 Oil Check

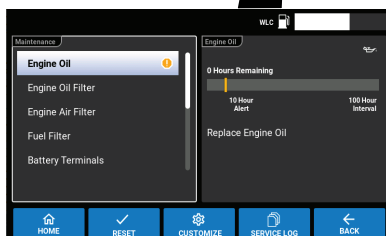
Do not exceed the "Full" mark on the oil level dipstick.

After fueling, check oil with unit on level surface. If oil is not up to full mark on dipstick, add oil (see maintenance label).

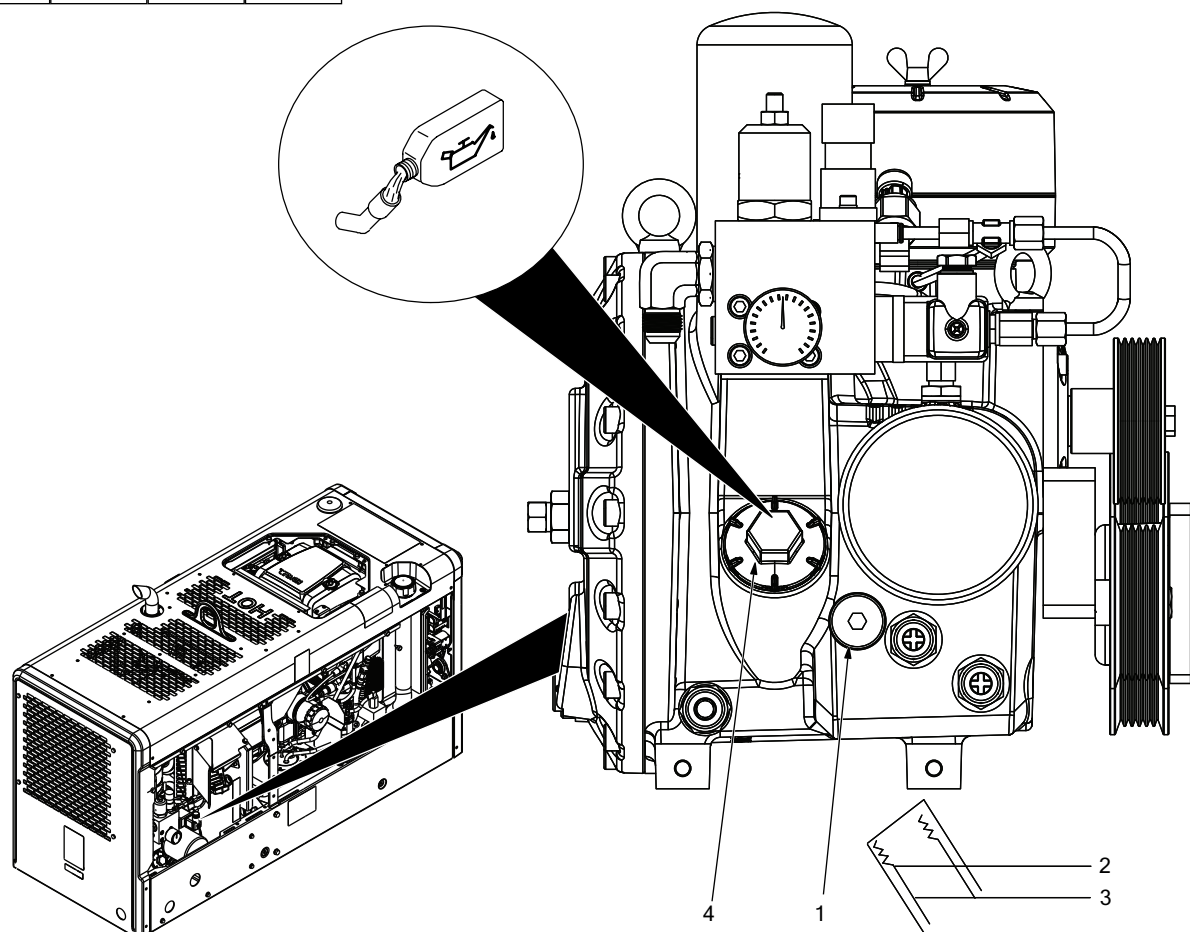
Use maintenance screen to determine hours until next recommended oil change (see Menu-Maintenance).

To improve cold weather starting:  
Keep battery in good condition.  
Store battery in warm area.  
Use correct grade oil for cold weather.

Close top service door.



## 4-6. Compressor Prestart Checks



291208

**⚠ Do not open oil fill cap until unit is off and pressure in the compressor case has been released according to Section 6-3. Do not open oil fill cap while running.**

*☞ The compressor is equipped with high oil temperature shutdown. High oil temperature can be caused by low oil or hot air recirculation.*

**NOTICE** – Do not mix oil types. Do not over-fill. Use Miller Electric compressor oil. See maintenance label in Section 11-2.

Check all fluids daily. Compressor must be cold and on a level surface. Unit is shipped with oil.

Open side service door.

- 1 Oil Level Sight Glass
- 2 High/Max
- 3 Low/Min

The unit is shipped with oil in the compressor. Oil level sight glass shows oil level.

*☞ Bottom of oil sight glass is minimum oil level. Top of oil sight glass is full.*

Minimum oil level is half way up the oil fill pipe. Maximum oil level is in threaded area of oil fill pipe.

Check level frequently. If oil needs to be added, be sure unit is off and compressor case pressure is released according to Section 6-1 before removing fill cap.

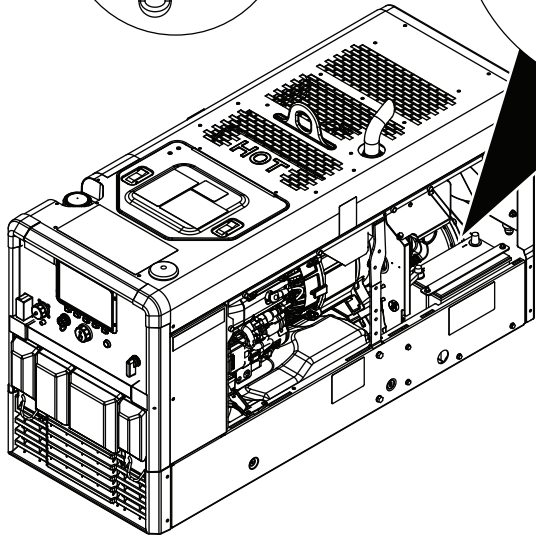
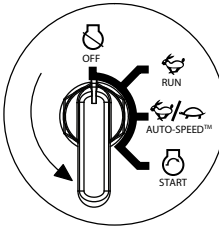
- 4 Air Compressor Oil Fill Cap

Hand tighten oil fill cap. Using excess force can damage o-ring.

Inspect compressor air cleaner element and replace if dirty (see Section 11-3).

Close side service door.

## 4-7. Connecting Or Replacing the Battery



1/2 in.

### **Connect negative (-) battery cable last.**

Battery is most easily accessed by opening right rear side panel.

- Do not allow the battery cables to touch opposing terminals. When connecting the battery cables attach the positive (+) cable to the positive (+) battery terminal first, followed by negative (-) cable to negative (-) battery terminal.
- Never start the engine when the cables are loose or poorly connected to the battery terminals.
- Never disconnect the battery while the engine is running.
- Never use a quick battery charger to start the engine.
- Do not charge battery with Engine Control switch On.
- Always disconnect the negative (-) battery cable before charging battery.
- Be sure to close and/or replace all panels after connecting battery and starting machine.

### **Replacing Battery:**

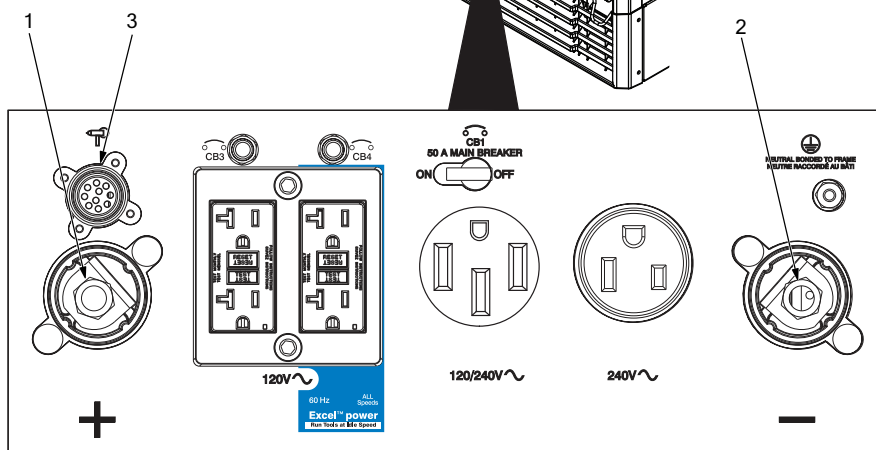
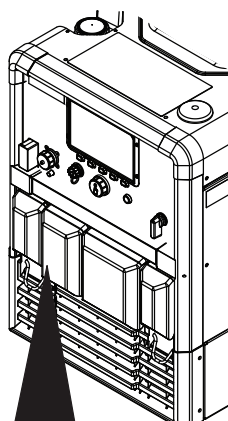
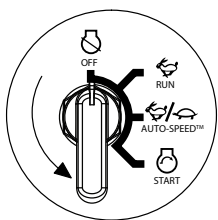
Remove right rear side panel and battery holddown.

*Be sure there are no hoses or wires pinched when installing the battery.*

*Be sure to close and/or replace all panels after connecting the battery and before starting the machine.*

| Battery Information |                  |
|---------------------|------------------|
| Nominal Voltage     | 12V              |
| BCI Group Size      | 51R              |
| Cold Crank Rating   | 450 Amperes Min. |
| Reserve Capacity    | 70 Minutes Min.  |
| Approximate Weight  | 28 lbs Wet       |

## 4-8. Weld Output Terminals



- Stop engine.
- Turn off power before connecting to weld output terminals.
- Do not use worn, damaged, undersized, or repaired cables.

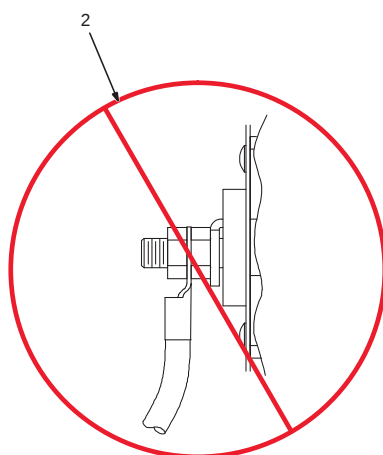
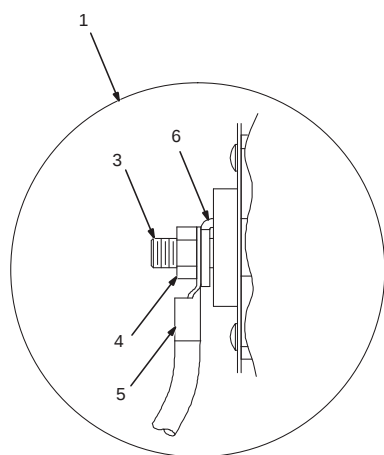
- 1 Positive Weld Output Terminal Electrode Output Terminal (Polarity Reversing Models)
- 2 Negative Weld Output Terminal Work Output Terminal (Polarity Reversing Models)
- 3 Spool gun receptacle

Connect electrode or torch cable to positive terminal for Direct Current Electrode Positive (DCEP) or the negative terminal for Direct Current Electrode Negative (DCEN).

### Polarity Reversing Models:

Electrode or torch will always be connected to electrode terminal. Polarity reversing feature will change polarity automatically when process is selected.

## 4-9. Connecting Weld Output Cables



- Stop engine.
- Failure to properly connect weld cables may cause excessive heat and start a fire, or damage your machine.

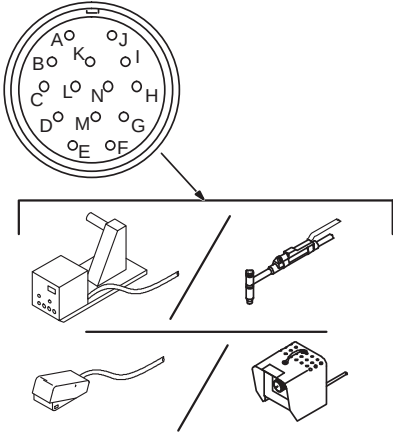
Do not place anything between weld cable terminal and copper bar. Make sure that the surfaces of the weld cable terminal and copper bar are clean.

- 1 Correct Weld Cable Connection
- 2 Incorrect Weld Cable Connection
- 3 Weld Output Terminal
- 4 Supplied Weld Output Terminal Nut
- 5 Weld Cable Terminal
- 6 Copper Bar

Remove supplied nut from weld output terminal. Slide weld cable terminal onto weld output terminal and secure with nut so that weld cable terminal is tight against copper bar.

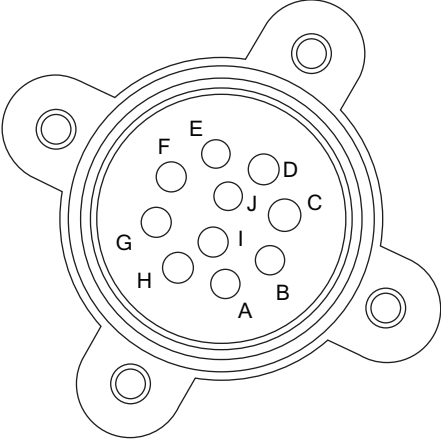
3/4 in. (19 mm)

#### 4-10. Remote Receptacle Information

|                                                                                   |                                                                                                                         |                |                                                                                                                 |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------|
|  |  <b>Remote 14</b>                      | <b>Socket*</b> | <b>Socket Information</b>                                                                                       |
|                                                                                   |  <b>24 Volts AC Output (Contactor)</b> | A              | 24 volts AC. Protected by supplementary protector CB4.                                                          |
|                                                                                   |                                                                                                                         | B              | Contact closure to A completes 24 volt AC contactor control circuit and keeps engine at Run speed in all modes. |
|                                                                                   | <b>Remote Output Control</b>                                                                                            | C              | +10 volts DC output to remote control.                                                                          |
|                                                                                   |                                                                                                                         | D              | Remote control circuit common.                                                                                  |
|                                                                                   |                                                                                                                         | E              | 0 to +10 volts DC input command signal from remote control.                                                     |
|                                                                                   | <b>A/V Amperage Voltage</b>                                                                                             | F              | Current feedback: 1 volt per 100 amperes.                                                                       |
|                                                                                   |                                                                                                                         | H              | Voltage feedback: 1 volt per 10 arc volts.                                                                      |
|                                                                                   | <b>GND</b>                                                                                                              | G              | Circuit common for 24 and 115 volts AC circuits.                                                                |
|                                                                                   |                                                                                                                         | K              | Chassis common.                                                                                                 |

\*The remaining sockets are not used.

#### 4-11. Spool Gun Receptacle Information

|                                                                                    |                |                                     |
|------------------------------------------------------------------------------------|----------------|-------------------------------------|
|  | <b>Socket*</b> | <b>Socket Information</b>           |
|                                                                                    | C              | Motor Positive (+) 0 to 24 volts DC |
|                                                                                    | B              | Motor Negative (-) 0 volts          |
|                                                                                    | D              | Spool Gun Trigger 15 volts DC       |
|                                                                                    | G              | Spool Gun Trigger 0 volts           |
|                                                                                    | E              | 10V Reference                       |
|                                                                                    | F              | WFS Potentiometer 0 to 10 volts DC  |
|                                                                                    | H              | Common                              |

\* The remaining sockets are not used.

## 4-12. Selecting Cable Sizes\*

**NOTICE** – The Total Cable Length in Weld Circuit (see table below) is the combined length of both weld cables. For example, if the power source is 100 ft (30 m) from the workpiece, the total cable length in the weld circuit is 200 ft (2 cables x 100 ft). Use the 200 ft (60 m) column to determine cable size.

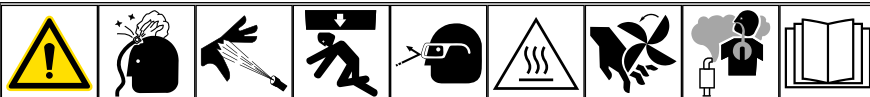
|                 | Weld Cable Size** and Total Cable (Copper) Length in Weld Circuit Not Exceeding*** |                                             |                                             |               |               |               |                |                |
|-----------------|------------------------------------------------------------------------------------|---------------------------------------------|---------------------------------------------|---------------|---------------|---------------|----------------|----------------|
|                 | 100 ft (30 m) or Less                                                              |                                             | 150 ft (45 m)                               | 200 ft (60 m) | 250 ft (70 m) | 300 ft (90 m) | 350 ft (105 m) | 400 ft (120 m) |
| Welding Amperes | 10 - 60% Duty Cycle AWG (mm <sup>2</sup> )                                         | 60 - 100% Duty Cycle AWG (mm <sup>2</sup> ) | 10 - 100% Duty Cycle AWG (mm <sup>2</sup> ) |               |               |               |                |                |
| 100             | 4 (20)                                                                             | 4 (20)                                      | 4 (20)                                      | 3 (30)        | 2 (35)        | 1 (50)        | 1/0 (60)       | 1/0 (60)       |
| 150             | 3 (30)                                                                             | 3 (30)                                      | 2 (35)                                      | 1 (50)        | 1/0 (60)      | 2/0 (70)      | 3/0 (95)       | 3/0 (95)       |
| 200             | 3 (30)                                                                             | 2 (35)                                      | 1 (50)                                      | 1/0 (60)      | 2/0 (70)      | 3/0 (95)      | 4/0 (120)      | 4/0 (120)      |
| 250             | 2 (35)                                                                             | 1 (50)                                      | 1/0 (60)                                    | 2/0 (70)      | 3/0 (95)      | 4/0 (120)     | 2x2/0 (2x70)   | 2x2/0 (2x70)   |
| 300             | 1 (50)                                                                             | 1/0 (60)                                    | 2/0 (70)                                    | 3/0 (95)      | 4/0 (120)     | 2x2/0 (2x70)  | 2x3/0 (2x95)   | 2x3/0 (2x95)   |
| 350             | 1/0 (60)                                                                           | 2/0 (70)                                    | 3/0 (95)                                    | 4/0 (120)     | 2x2/0 (2x70)  | 2x3/0 (2x95)  | 2x3/0 (2x95)   | 2x4/0 (2x120)  |
| 400             | 1/0 (60)                                                                           | 2/0 (70)                                    | 3/0 (95)                                    | 4/0 (120)     | 2x2/0 (2x70)  | 2x3/0 (2x95)  | 2x4/0 (2x120)  | 2x4/0 (2x120)  |

\* This chart is a general guideline and may not suit all applications. If cable overheats, use next size larger cable.

\*\*Weld cable size (AWG) is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere.  
( ) = mm<sup>2</sup> for metric use.

\*\*\*For distances longer than those shown in this guide, see AWS Fact Sheet No. 39, Welding Cables, available from the American Welding Society at <http://www.aws.org>.

## 4-13. Connecting To Air Compressor



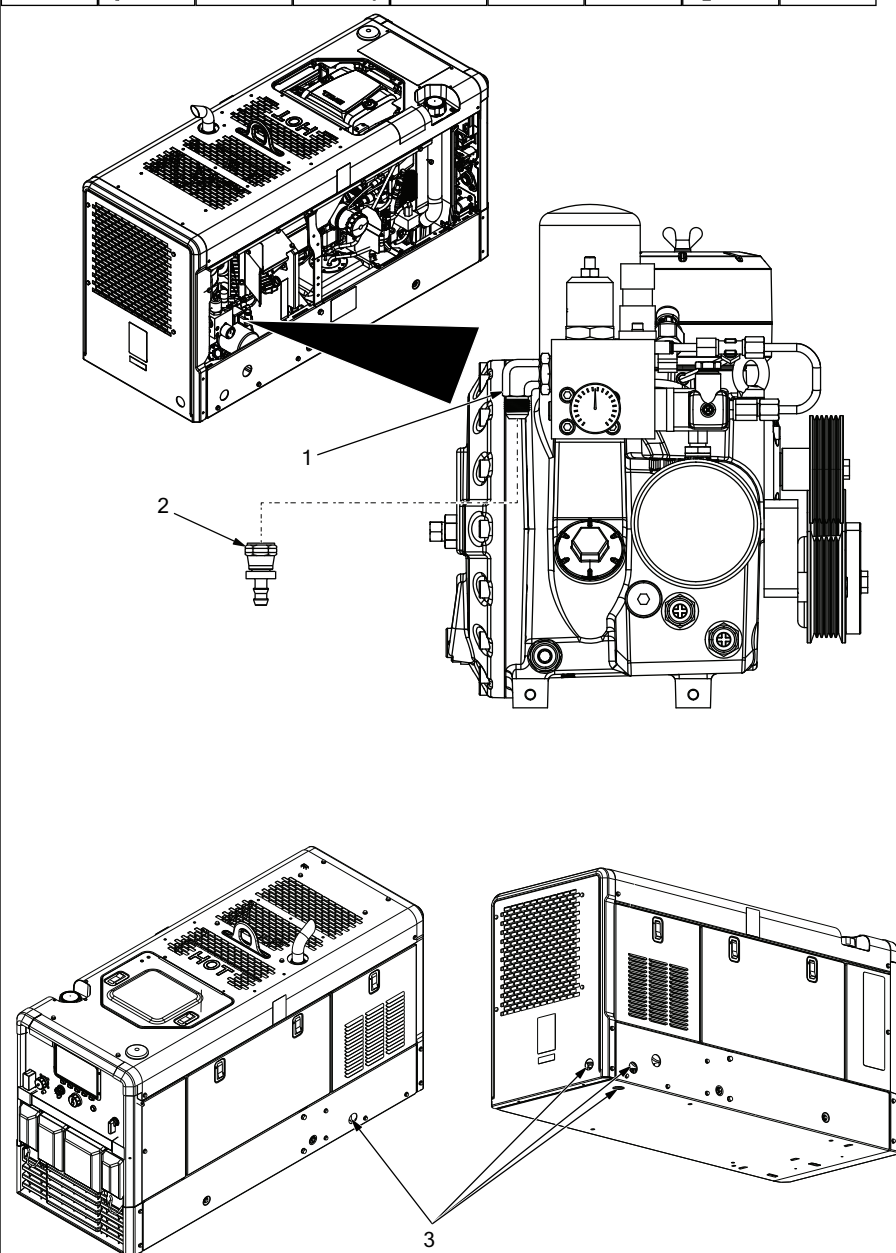
**Stop engine and release air pressure before servicing compressor.**

- 1 Air Compressor Outlet JIC 8 Male
- 2 Supplied Fitting JIC 8 Female to 1/2 in. Push On Hose Barb
- 3 Air Hose Routing Options

Supplied fitting can be used to connect a 1/2 in hose to air compressor outlet. Torque supplied fitting to 40 in lb (4.5 N·m).

Use holes in the base and rear panel to route air compressor hose (customer supplied) from compressor outlet to equipment.

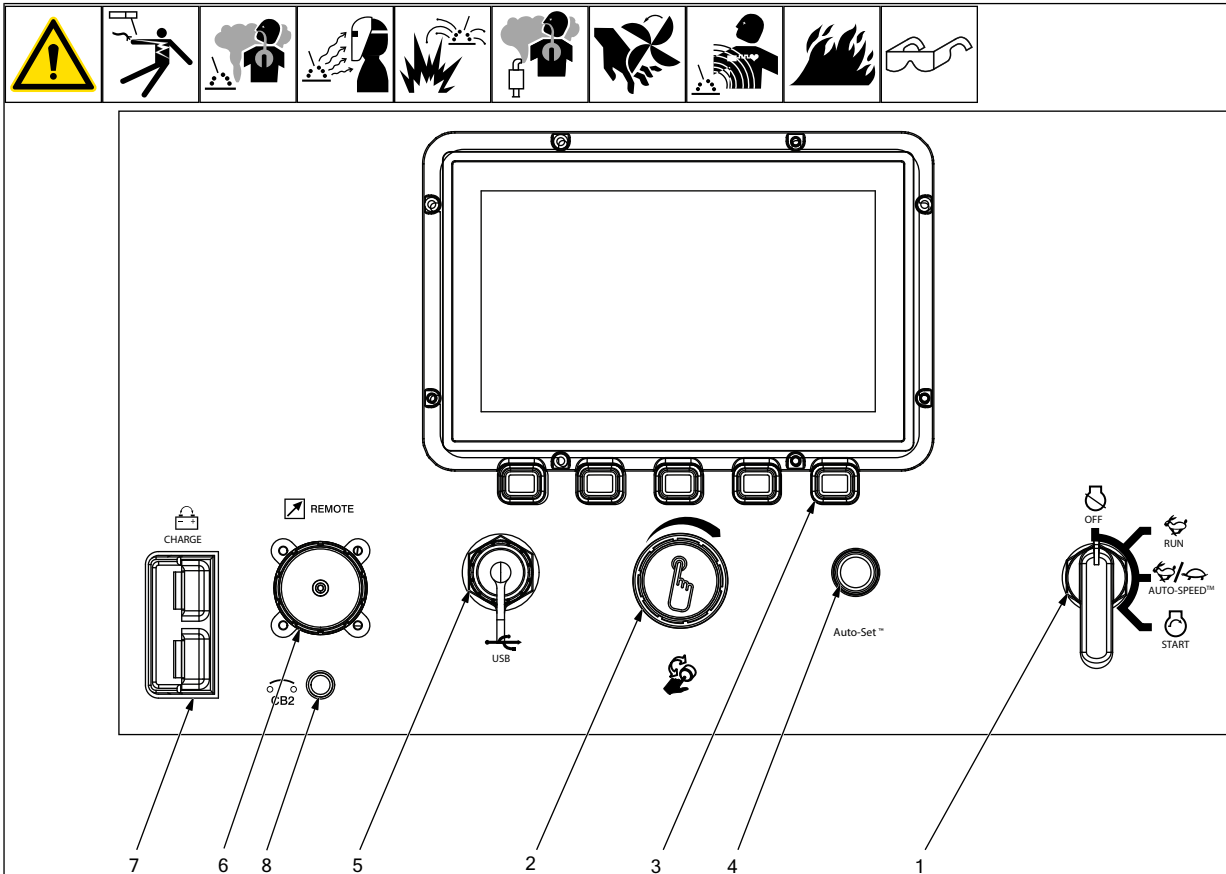
Protect hose from rubbing on sheet metal base.



804 953-A / WM Design

# SECTION 5 – OPERATION

## 5-1. Front Panel Controls



### 1 Engine Control Switch

Use switch to start engine, select speed, and stop engine. In Auto-Speed engine will fluctuate anywhere from 2400 RPM to 3600 RPM depending on required weld load. In run position unit runs at 3600 RPM<sup>1</sup>.

*Engine will run at weld/power speed when trigger is tapped on MIG equipment.*

**To Start:** Turn Engine Control switch to Start position. Release switch when engine starts.

On Wireless Interface Control equipped machines:

Turn Engine Control switch to Start position and release. The beeper will sound, and engine will start.

*If the engine does not start, let engine come to a complete stop before attempting restart.*

*During cold weather some gasoline engines encounter difficulties that are easily remedied. See Section 5-18 and Troubleshooting Tables.*

**To Stop:** Turn Engine Control switch to Off position.

### 2 Adjust Control/Select Knob

Push to select and rotate to navigate menus and adjust values.

Sets weld command and arc control.

### 3 Soft Buttons

Push to navigate screens/parameters.

### 4 Auto-Set

Push to set parameters based on pre-defined values.

### 5 USB

Use for software upgrade and collecting error codes.

*Do not use USB receptacle on welder/generator to charge electronic devices.*

### 6 14 Pin Remote Receptacle

Used to connect remote accessories.

### 7 Battery Charge Receptacle

Used to charge 12V or 24V Battery

### 8 Supplementary Protector CB2

CB2 protects 14 pin remote receptacle from overload. If the supplementary protector opens, receptacle will not work. Press button to reset supplementary protector.

1. On start up engine will go through warm up procedure where maximum speed is reduced to 3500 RPM.

## 5-2. Main Screen

The diagram shows the Main Screen interface with the following elements and callouts:

- 1** Fuel Level: Displays current fuel level.
- 2** Weld Process: Displays current weld process.
- 3** Volt Setting: Displays open circuit voltage (CC). Displays current volt setting (CV).
- 4** Amp Setting: Displays current amp setting (CC). Displays welding current (CV).
- 5** Arc Control: Displays arc control setting.
- 6** Process Selection Button: Opens process selection screen.
- 7** Weld Settings Button: Opens weld settings screen.
- 8** Battery Charge Button: Opens battery charge screen.
- 9** Air Button: Turns air compressor on and off.
- 10** Pressure Gauge: Displays current compressor pressure.
- 11** Menu Button: Opens Main Menu Screen.
- 12** ArcReach (AR): Power source is connected to an ArcReach accessory.
- 13** Weld Lead Compensation (WLC): Power Source is adjusting output to compensate for long weld cables. See Section 5-4 for setting WLC parameters.
- 14** Wireless Interface Control (WIC): Indicates if WIC is active.

The interface displays the following information:

- Process:** STICK SMAW XX18 DCEP(+)
- Voltage:** 33.0 VOLTS
- Amps:** 325 AMPS
- Arc Control:** SOFT to STIFF slider with a star icon in the middle.
- Air:** 0 PSI gauge
- Buttons:** PROCESS, WELD SETTINGS, BATTERY CHARGE, AIR, MENU

5-3. Menu Screen



Menu

System Settings

Maintenance

System Info

Productivity

Troubleshooting

HOME

BACK

1 System Settings

Select to change unit operation parameters. See Section 5-4.

2 Maintenance Menu

Select to check, change, or reset the maintenance interval schedule. See Section 10-1.

3 System Info

Select to check and update software, check and download summary file, and restore unit to factory defaults (see Section 5-19).

4 Productivity

Select to check unit usage hours.

5 Troubleshooting

Displays live unit data for troubleshooting purposes.

## 5-4. System Settings Screen

WLC

System Settings

Tank Operation

Air Pressure Set Point  
 Voltage Reduction Device  
 Weld Lead Calibration  
 Cable Length

Tank Operation

Enabled

Disabled

HOME

← BACK

To change System Settings:

- Rotate Adjust Control/Select button to select a setting.
- Press Adjust Control/Select button on desired setting.
- Rotate Adjust Control/Select button to update the setting.
- Press Adjust Control/Select button to save the setting, or press the Back button to discard setting change.
- Press Back button to return to Home screen.

| System Settings Item                       | Selectable Item Option       | Default Setting | Description                                                 |
|--------------------------------------------|------------------------------|-----------------|-------------------------------------------------------------|
| <b>Tank Operation</b>                      | Enabled / Disabled           | Enabled         | Selects the air compressor operation.                       |
| <b>Air Pressure Minimum<sup>1</sup></b>    | 90 to 165                    | 100             | Sets minimum pressure for tank operation.                   |
| <b>Air Pressure Maximum<sup>1</sup></b>    | 100 to 175                   | 120             | Sets maximum pressure for tank operation.                   |
| <b>Air Compressor Response<sup>1</sup></b> | Low / Medium / High          | High            | Sets how quickly the compressor responds to tank operation. |
| <b>Air Pressure Set Point</b>              | 100 to 175                   | 120             | Sets pressure PSI for tankless operation.                   |
| <b>Weld Lead Calibration</b>               | Enabled / Disabled           | Disabled        | Enables the Weld Lead Calibration.                          |
| <b>Cable Size<sup>2</sup></b>              | 2, 1, and 1/0 to 4/0         | 2/0             | Sets the cable size (in AWG) for Weld Lead Calibration.     |
| <b>Cable Length<sup>2</sup></b>            | 10 to 500                    | 250             | Sets the cable length (in feet) for Weld Lead Calibration.  |
| <b>Voltage Reduction Device</b>            | Enabled / Disabled           | Disabled        | Enable/Disables voltage reduction device.                   |
| <b>Screen Brightness</b>                   | 1–10                         | 10              | Sets screen brightness.                                     |
| <b>Units</b>                               | Imperial / Metric            | Imperial        | Sets how units are displayed                                |
| <b>Language</b>                            | English / Español / Français | English         | Sets what language is displayed                             |

<sup>1</sup> Only visible if Tank Operation is Enabled.

<sup>2</sup> Only visible if WLC is Enabled.

Weld Lead Calibration provides an increase in arc voltage to help offset the voltage drop based off of inputs of weld cable length and diameter.

## 5-5. Weld Lead Calibration

Refer to Section 5-4 for enabling Weld Lead Calibration (WLC)

Use of Auto-Set requires WLC or CLC to be enabled.

WLC is a method for overcoming voltage drop when using long cable runs. WLC uses estimated values for the voltage drop based on the cable size and total length of the positive and negative cables. It provides a voltage increase from the power source to achieve a voltage at the wire feeder near the display set point.

Factors that affect WLC are the age and condition of your weld cables and the amount of connections used.

## 5-6. Cable Length Compensation (For CV Process)

 Refer to Section 5-4 for enabling Cable Length Calibration (CLC)

 Use of Auto-Set requires WLC or CLC to be enabled.

CLC is a another method for overcoming voltage drop when using long cable runs and the CV process. CLC uses a test weld to measure the exact voltage drop from your weld cables. It provides a voltage increase from the power source to achieve a voltage on the electrode at the display set point.

A new test weld will be performed each time the feeder binds with the unit. This happens when the unit is first powered on and each time the cables are disconnected and reconnected. The test well will be the first weld performed after binding. The voltage may be higher than the set point on the first test weld.

CLC and WLC can each be used on their own, but to get the best results with overcoming voltage drop use the two features together. The power source will first use the data entered from WLC to apply the voltage drop offset to the first weld. This will eliminate the need for a separate test weld, as WLC will compensate for the voltage during this weld. After the first weld CLC will be used for the remaining welds. The actual voltage at the wire feeder will be even more accurate than using each of the features separately.

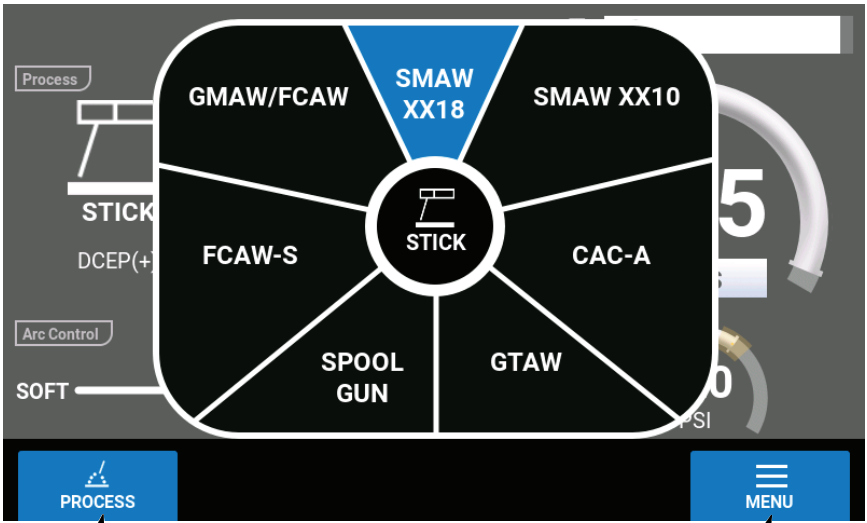
CLC will compensate for the age and condition of cables and the amount of connections used.

## 5-7. Enabling Voltage Reducing Device (VRD)

Unit can be configured for low open circuit voltage (OCV) operation by enabling Voltage Reducing Device (VRD). When VRD is enabled, a low sensing voltage (approximately 18VDC) is present between electrode and workpiece prior to electrode touching workpiece.

Feature can be turned on by accessing Settings Screen by pressing Menu button, then selecting System Settings. In System Settings Screen, select VRD, then select Enabled. When enabled, display shows 18V OCV instead of normal OCV. Feature can be used when welding in confined areas.

5-8. Process Screen



1

2

To change weld process, rotate Adjust Control/Select button to desired process and press button to select.

1 Process Button Press to open process selection screen.

2 Menu Button Press to open Menu.

| Process           | Typical Process Application                                                                                                                    | Polarity* |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| SMAW XX18 (STICK) | Constant current process. Use this process for 7018, 6013, 7024 (308, 309 316), and any other stainless-steel electrodes.                      | DCEP(+)   |
| SMAW XX10 (STICK) | Constant current process. Use this process for 6010, 7010, 8010, and 6011.                                                                     | DCEP(+)   |
| CAC-A (GOUGE)     | Gouging with or without remote amperage control. Strike an arc to start gouging.                                                               | DCEP(+)   |
| GTAW (TIG)        | Lift-Arc TIG: Touch tungsten to work and lift to start welding. Circuitry internal to welder/ generator aids arc start.                        | DCEN(-)   |
| GMAW/FCAW (GAS)   | MIG solid wire and dual shield flux core use a voltage sensing (VS) feeder that does not require a control cable back to the welder/generator. | DCEP(+)   |
| FCAW-S (NO GAS)   | Constant voltage process used with self-shielding flux core without use of shielding gas.                                                      | DCEN(-)   |
| SPOOL GUN (SPOOL) | Constant voltage process used for aluminum/FCAW-s wire types. Requires spool gun with 10 pin connection.                                       | DCEP(+)   |

\*Polarity Reversing model will default to specified polarity.

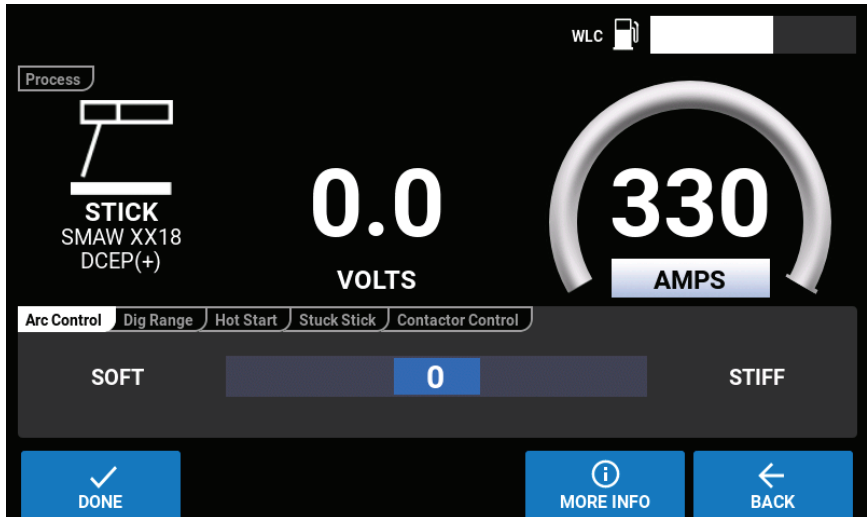
## 5-9. Weld Settings



To access the weld settings, press the Settings button.

To change a particular parameter (parameters change based on current process):

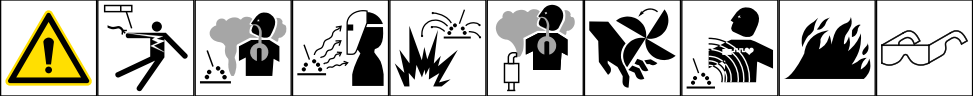
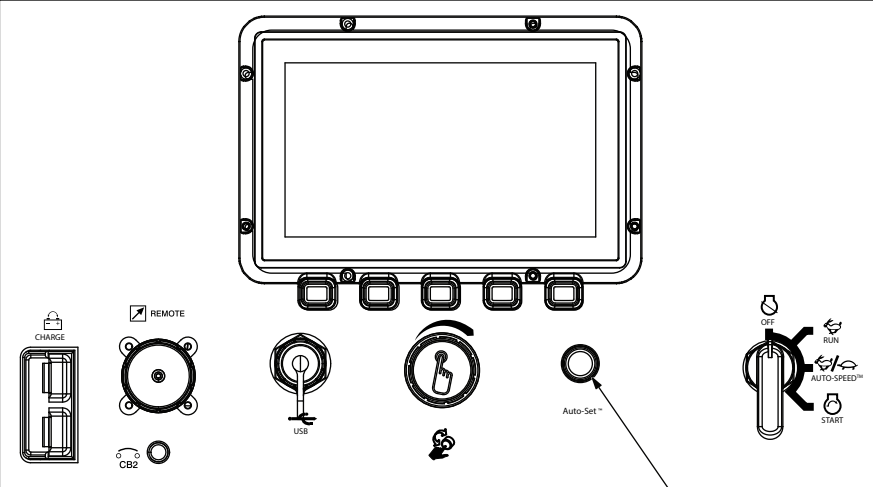
- Rotate the Adjust Control/Select knob to the specific parameter.
- Press the Adjust Control/Select knob to select.
- Rotate the Adjust Control/Select knob to change the value.
- Press the Adjust Control/Select knob to save the value, or press the back button to cancel.



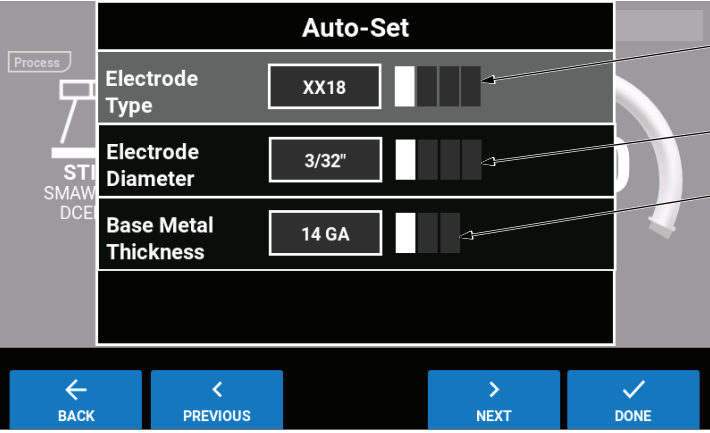
| Weld Process               | Selectable Parameter | Description                                                                                                                                                                                                                                |
|----------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SMAW XX18 and XX10 (STICK) | Arc Control          | Arc control adjusts puddle characteristics. 0 to 25 results in stiffer/faster reacting puddle. 0 to -25 results in softer, more fluid puddle.                                                                                              |
|                            | Dig Range            | Increase for less electrode sticking and more penetration/drive. Reduce for softer arc that will penetrate less.                                                                                                                           |
|                            | Hot Start            | Provides additional amperage to assist in starting electrode.<br><br>Adjust in .1 second increments to increase or decrease time it takes to transition from hot start current to preset current.                                          |
|                            | Stuck Stick          | When enabled, welding output turns off when stick electrode becomes dead shorted or stuck to the workpiece. This allows for easy removal of electrode and will eliminate overheating of flux.                                              |
| CAC-A (GOUGE)              | Arc Control          | Arc control adjusts reactivity of arc. 0 to 25 results in stiffer, faster reacting arc. 0 to -25 results in softer, slower reacting arc.                                                                                                   |
| GTAW (TIG)                 | Auto Stop            | Adjusts arc length required to terminate arc.                                                                                                                                                                                              |
|                            | Auto Crater          | Modified auto stop that terminates arc over a period of time. This reduces chance for craters, as puddle solidifies more slowly.                                                                                                           |
|                            | Pulses Per Second    | Pulsing can be used to reduce heat input/distortion and aid in welding of dissimilar thickness. 1-10 PPS produces distinct ripple pattern and to time filler addition. 100+ PPS helps focus arc, increase arc stability, and travel speed. |
|                            | Peak Time            | Increasing raises average amperage and creates more fluid puddle. Decreasing lowers average amperage and creates less fluid puddle.                                                                                                        |
|                            | Background Amps      | Increasing raises average amperage and creates more fluid puddle. Decreasing lowers average amperage and creates less fluid puddle.                                                                                                        |
| SPOOL GUN (SPOOL)          | Arc Control          | This adjusts inductance. Settings from 0 to -25 result in softer, more fluid puddle. Settings from 0 to 25 will result in stiff, fast responding arc.                                                                                      |
|                            | Run In               | The speed of the wire prior to arc initiation. A slower run in speed can help aid in arc initiation and create a softer start.                                                                                                             |
|                            | Spool Gun Selection  | Select correct spool gun being used. If wrong model is selected, wire feed speed could be inaccurate.                                                                                                                                      |
|                            | Wire Type            | Select wire type used in spool gun. Each wire type selection has process parameters optimized for that wire.                                                                                                                               |
|                            | Calibration          | Calibration ensures wire feed speed (WFS) is accurate. See Section 5-15 for spool gun calibration instruction.                                                                                                                             |
| FCAW-S (NO GAS)            | Arc Control          | This adjusts inductance. Settings from 0 to -25 result in softer, more fluid puddle. Settings from 0 to 25 will result in stiff, fast responding arc.                                                                                      |
| GMAW/FCAW (GAS)            |                      |                                                                                                                                                                                                                                            |

| Weld Process | Selectable Parameter | Description                                                                                                                                                                                                                                                                                                                      |
|--------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| All          | Contactor Control    | <p>Auto Detect – Automatically detects most remotes for contactor control. If remote is not detected, the process defaults to output on.</p> <p>Remote ON/OFF – Controls weld output with a remote connected. Use this mode for remotes that are not auto detected for contactor control.</p> <p>Output ON – Weld Output On.</p> |

## 5-10. Auto-Set Functionality™

1



1 Auto-Set Button

Press to turn Auto-Set On or Off.

2 Auto-Set Option 1

3 Auto-Set Option 2

4 Auto-Set Option 3

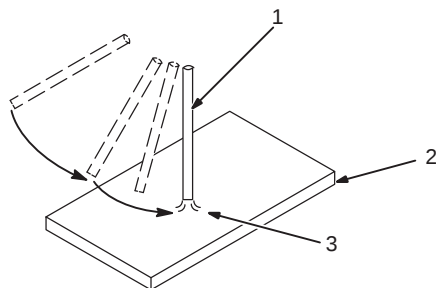
Rotating knob clockwise moves cursor left, rotating counterclockwise moves cursor right.

Press knob or NEXT button to select option and move to next selection. PREVIOUS button returns to previous option.

*To use Auto-Set with GMAW/FCAW, FCAW-S, or SPOOL GUN processes, WLC or CLC will need to be enabled. See Sections 5-5 through 5-7.*

| Process                            | Auto-Set Option 1 | Auto-Set Option 2  | Auto-Set Option 3  |
|------------------------------------|-------------------|--------------------|--------------------|
| SMAW                               | Electrode Type    | Electrode Diameter | Material Thickness |
| CAC-A                              | Rod Diameter      |                    |                    |
| GTAW                               | Tungsten Diameter | Material Thickness |                    |
| GMAW/FCAW and FCAW-S and SPOOL GUN | Wire Type         | Wire Diameter      | Material Thickness |

## 5-11. Stick Start Procedure—Scratch Start Technique



With Stick selected, start arc as follows:

- 1 Electrode
- 2 Workpiece
- 3 Arc

Drag electrode across workpiece like striking a match; lift electrode slightly after touching work. If arc goes out electrode was lifted too high. If electrode sticks to workpiece, use a quick twist to free it.

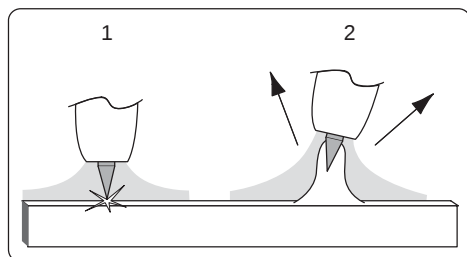
**VRD Enabled:** Normal open-circuit voltage is not present before electrode touches workpiece; only a low sensing voltage is present between electrode and workpiece. For optimal starting performance, a good clean contact must be made between the electrode and workpiece.

Miller recommends Hobart filler metals.

## 5-12. Lift-Arc™ TIG With Auto-Stop™ And Auto-Crater™



### Arc Start With Lift-Arc



### Arc Start With Lift-Arc TIG

Lift-Arc is used for the DCEN GTAW process when HF Start method is not permitted.

Select Process button and select GTAW (TIG) process.

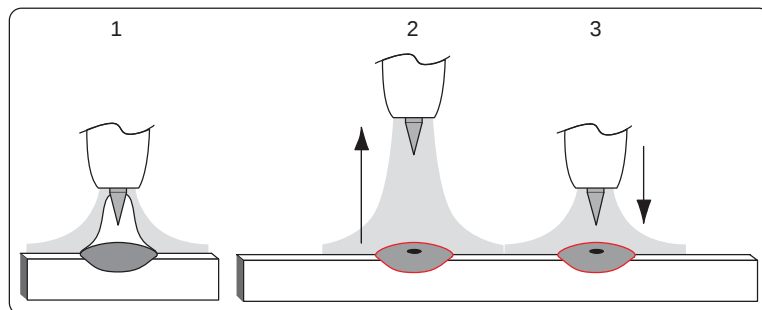
Turn gas on.

1. Touch or scratch.
2. Lift at any angle.

Touch tungsten electrode to workpiece at weld start point. Slowly lift electrode. Arc is started when electrode is lifted.

Maintain shielding gas coverage and eliminate tungsten and workpiece contamination by using Auto-Crater or Auto-Stop to end the arc.

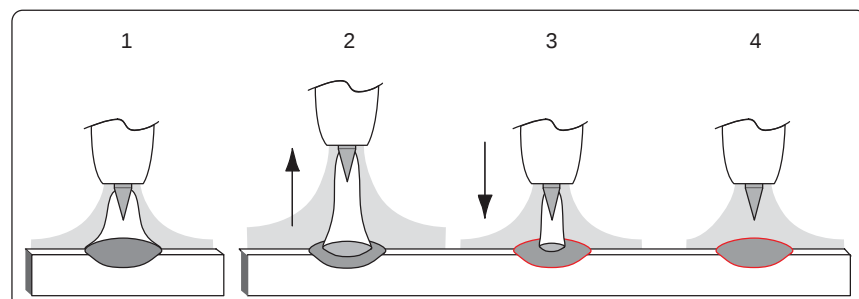
### Arc End With Auto-Stop



### Arc End With Auto-Stop

1. While welding.
2. Lift torch to start Auto-Stop. Arc stops.
3. Move torch back down to maintain gas coverage and prevent contamination.

### Arc End With Auto-Crater



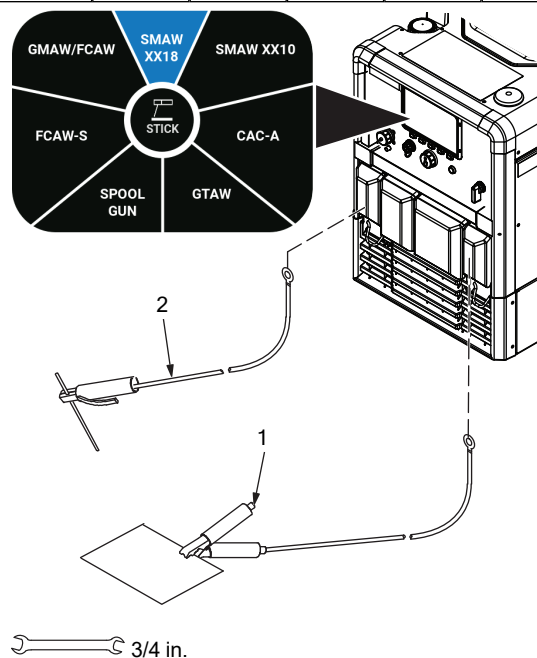
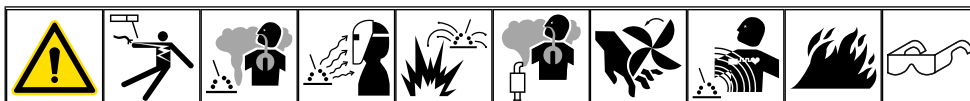
### Arc End With Auto-Crater

Remote control is not needed when using Auto-Crater.

1. While welding.
2. Lift torch slightly to start Auto-Crater end (current is reduced).
3. Lower torch. Weld current ramps down.
4. Shielding gas continues until shut off.

Miller recommends Hobart filler metals.

## 5-13. Typical Stick Welding Connections And Control Settings



### Stop engine.

This section provides general guidelines and may not suit all applications.

- 1 Work Clamp
- 2 Electrode Holder

Be sure to use the correct size weld cables (see Section 4-12).

### Typical Settings For 7018 (1/8 in.) Electrode:

Connect Work cable to Negative terminal and Electrode holder cable to Positive terminal on welding generator.

- Select **SMAW XX18** weld process
- Use Autoset to select electrode type (XX18), size (1/8 IN), and material thickness (1/8 IN – 1/2 IN).
- Adjust amperage within auto-set range as needed.

### Recommended Process Stick Electrodes:

**XX10 Process:** 6010, 7010, 8010, 6011, or any other cellulose electrodes not mentioned.

**XX18 Process:** 6013, 7018, 7024, all stainless steel electrodes, or any other low hydrogen electrodes not mentioned.

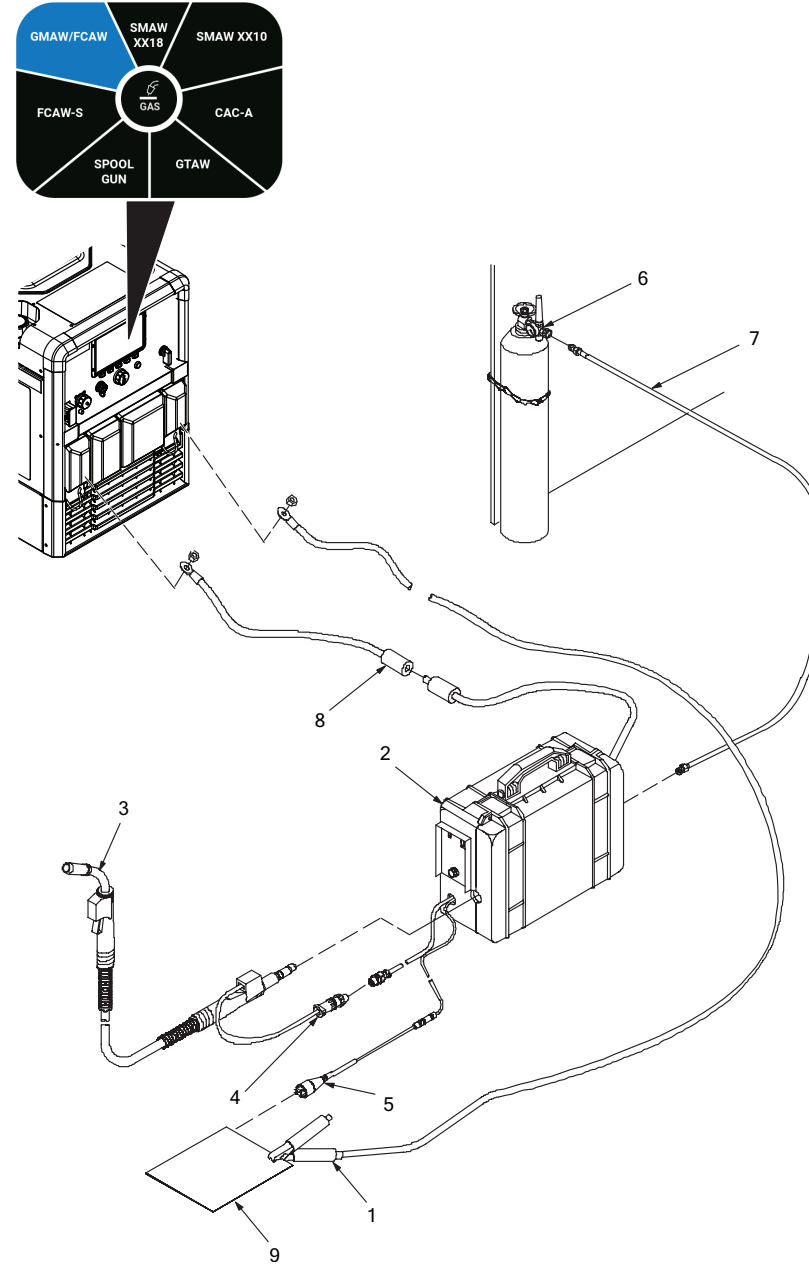
Miller recommends Hobart filler metals.

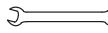
## 5-14. Typical MIG Welding Connections and Settings

### A. Solid Wire Applications



 **Stop engine.**



 3/4 in.

 This section provides general guidelines and may not suit all applications.

- 1 Work Clamp
- 2 Wire Feeder
- 3 MIG Gun
- 4 Gun Trigger Plug
- 5 Voltage Sensing Clamp
- 6 Gas Cylinder:  
75/25 Argon-Based Gas for Short Circuit Transfer; 80% Argon (Or Higher) for Spray Transfer
- 7 Gas Hose
- 8 Quick Connector
- 9 Workpiece

Connect work cable to welding generator Negative terminal. Connect cable from wire feeder to cable from welding generator Positive terminal.

 Be sure to use the correct size weld cables (see Section 4-12).

Loosen MIG gun securing knob. Insert gun end through opening in feeder and position as close as possible to drive rolls without touching. Tighten knob.

See wire feeder manual for wire threading procedure.

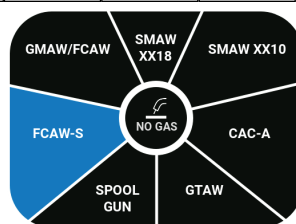
Insert gun trigger plug (item 4) into matching receptacle and tighten threaded collar.

Connect gas hose from feeder to regulator on cylinder.

**Typical Autoset settings**

- Select GMAW/FCAW weld process.
- Enable WLC in system settings and verify correct cable length/size is selected.
- Select wire type, diameter, and material thickness on auto set screen.
- Adjust voltage within auto-set range as needed.
- Set suggested wire feed speed that is displayed on UI onto wire feeder.

## B. Self-Shielded Flux Core Wire Applications



**Stop engine.**

*This section provides general guidelines and may not suit all applications.*

- 1 Work Clamp
- 2 Wire Feeder
- 3 MIG Gun
- 4 Gun Trigger Plug
- 5 Voltage Sensing Clamp
- 6 Quick Connector
- 7 Workpiece

Connect work cable to welding generator Positive terminal. Connect cable from wire feeder to cable from welding generator Negative terminal.

*Be sure to use the correct size weld cables (see Section 4-12).*

Loosen MIG gun securing knob. Insert gun end through opening in feeder and position as close as possible to drive rolls without touching. Tighten knob.

See wire feeder manual for wire threading procedure.

Insert gun trigger plug (item 4) into matching receptacle and tighten threaded collar.

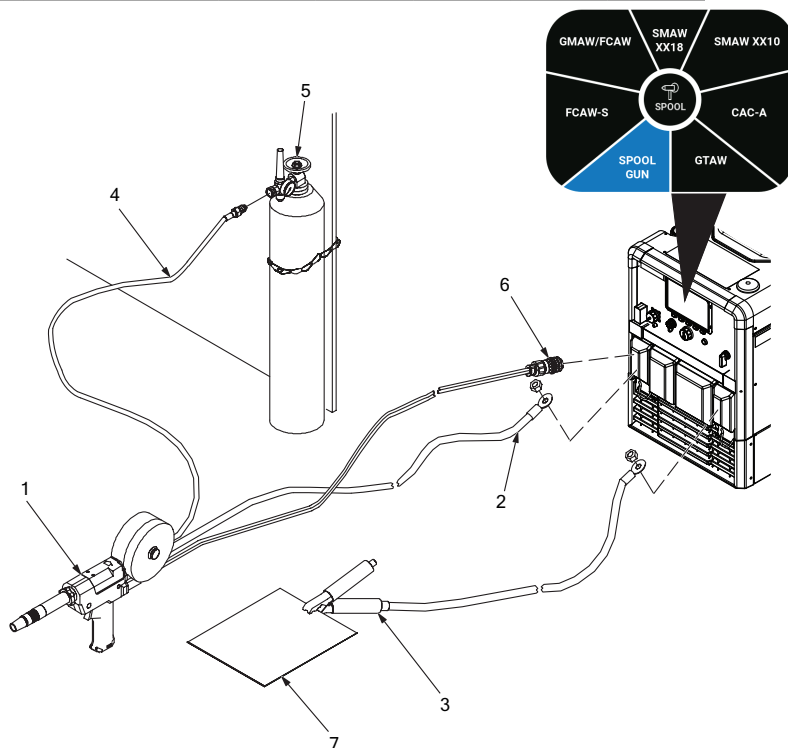
### Typical Autoset settings

- Select FCAW-S weld process.
- Enable WLC in system settings and verify correct cable length/size is selected.
- Select wire type, diameter, and material thickness on auto set screen.
- Adjust voltage within auto-set range as needed.
- Set suggested wire feed speed that is displayed on UI onto wire feeder.
- Do a test weld. To increase arc length, increase voltage. To decrease arc length reduce voltage or increase wire feed speed.

*Miller recommends Hobart filler metals.*

3/4 in.

## 5-15. Typical Spool Gun Welding Connections And Control Settings



3/4 in.

This section provides general guidelines and may not suit all applications.

- 1 Spool Gun
- 2 Weld Power Cable From Spool gun
- 3 Work Clamp
- 4 Gas Hose
- 5 Gas Cylinder With Regulator
- 6 Spool Gun Plug
- 7 Workpiece

Be sure to use the correct size weld cables (see Section 4-12).

Connect Weld power cable from spool gun to the positive terminal.

Connect work cable to welder/generator negative terminal.

Polarity Reversing Models: Work cable connects to work terminal. Spool gun connects to electrode terminal.

Insert spool gun plug into 10 pin receptacle and tighten threaded collar.

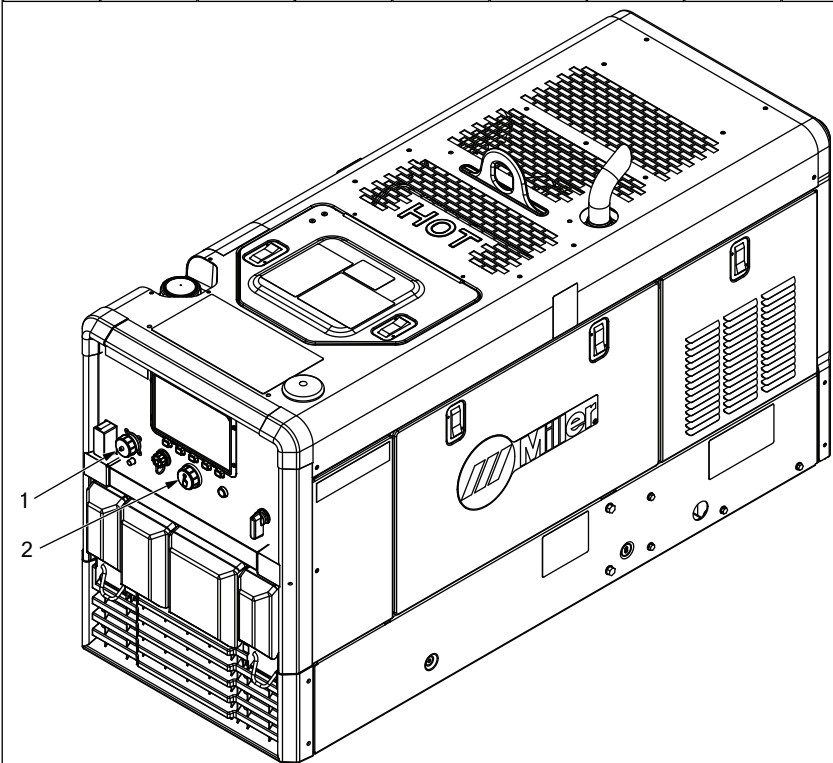
Connect gas hose from spool gun to regulator on gas cylinder.

Miller recommends Hobart filler metals.

### Calibrating Spool Gun

Calibration ensures wire feed speed (WFS) is accurate. To calibrate, select Calibration WFS on the Weld Settings screen (see Section 5-9), cut wire flush at nozzle, then trigger spool gun. Spool gun will feed 24 in. of wire through gun. Adjust offsets on User interface until run out is 24 in.. Repeat for both Calibration WFS.

# 5-16. Remote Voltage/Amperage Control



## 1 Remote Receptacle RC4

Connect optional remote voltage/amperage (V/A) control to Remote Control (RC) receptacle (see Section 4-10).

## 2 Adjust Control/Select Button

With remote control connected, weld output in Stick or TIG is determined by a combination of front panel and remote control voltage/amperage settings. In MIG, weld output is controlled through remote control only.

Connect remote V/A control to remote receptacle 14 pin remote receptacle.

Set process (Stick shown).

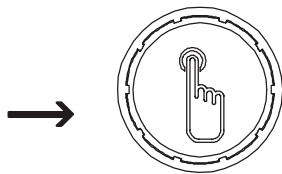
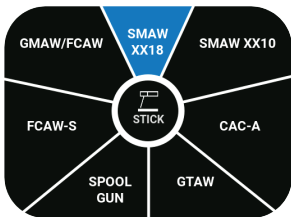
Set V/A control to 160A.

Adjust remote V/A control (stick welding only).

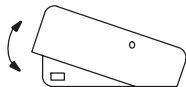
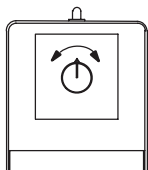
Min 30 A DC; Max 160 A DC



REMOTE



VOLTAGE  
AMPERAGE



## 5-17. Engine Auto-Speed™



### Engine Auto-Speed

When in Auto-Speed, unit will idle at 2400 RPM. Speed is determined based on load requirement.

Any auxiliary power load increases engine speed to 3600 RPM.

Air compressor load will set RPM based on tank or tankless operation and load required.

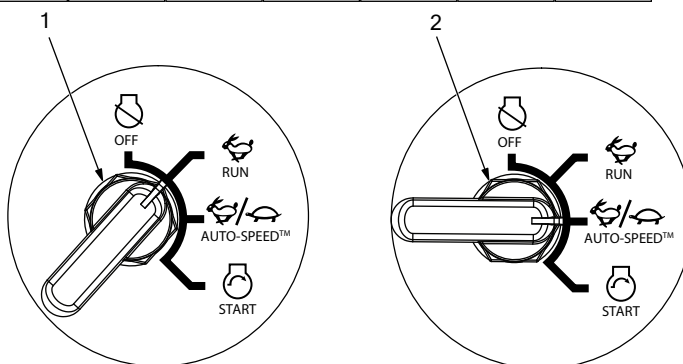
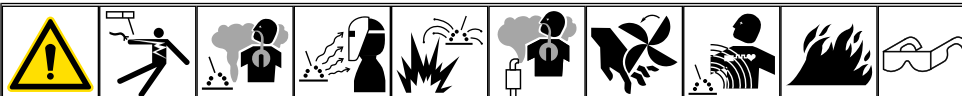
RPM for a weld load is based on preset and then adjusted based on actual load.

Battery charge will charge at idle, and increase to 3600 RPM for jump starting.

Any combination of loads will increase engine speed to 3600 RPM.

On start up engine will go through warm up procedure where maximum speed is reduced to 3500 RPM.

## 5-18. Cold Weather Engine Operation



- 1 Engine Control Switch — For cold starts and engine warm up.
- 2 Engine Control Switch — For use after engine is at operating temperature.

- Run engine only when expecting to frequently load it.

### Synthetic Oil

For temperatures below zero (0° F), synthetic oil improves engine starting.

*Do not extend the recommended oil change interval when using synthetic oil.*

In severe cold, use synthetic grade 5W-30 oil or synthetic grade 10W-30. See engine maintenance label for additional information.

## 5-19. Updating Software



### Preparing For Software Update

**Step 1.** Verify current software version installed.

**Step 2.** Press Settings button and use Adjust Control/Select button to select System Info.

The current software revision is displayed.

**Step 3.** Verify that USB thumb drive is good by inserting it into USB receptacle on bottom of remote panel. Press "Download Service File" from menu.

Status bar should read "USB Write Successful", indicating a good USB flash drive.

### Downloading Software

 Use a PC to download software. Do not use a Mac.

**Step 4.** Locate latest firmware to be loaded from [MillerWelds.com](http://MillerWelds.com)

**Step 5.** Click to download file. When the download is complete, run it.

**Step 6.** Accept software licensing agreement.

**Step 7.** Copy desired firmware to an empty USB thumb drive.

 Files must be at the top level of the USB and not zipped or inside a folder.

### Installing Software

**Step 8.** Turn Off welder/generator.

**Step 9.** Insert thumb drive into USB receptacle on front of machine.

**Step 10.** Turn Engine Control switch to Run or Run/Idle position.

 Do not start engine.

Display will change to System Info screen.

**Step 11.** Use Adjust Control/Select button to select Firmware Update.

Display will ask to confirm if you would like to update software.

**Step 12.** Confirm to update software.

 After update has started, do not power down unit or remove thumb drive until update is complete.

During download, the progress bar displays current file being updated on bottom with name of file being downloaded.

Each file being updated will progress from 0 to 100 on progress bar. Software updates may take several minutes.

Failures are indicated on status bar on top of display. Correction of failed updates depends on what type of failure occurred.

When update has completed, a prompt will read: SOFTWARE UPDATE COMPLETE

**Step 13.** Press Back button to go back to System Info screen.

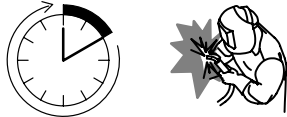
Current software revision is displayed.

**Step 14.** Verify new software revision has installed.

## 5-20. Duty Cycle And Overheating



### 100% Duty Cycle at 330 Amperes DC



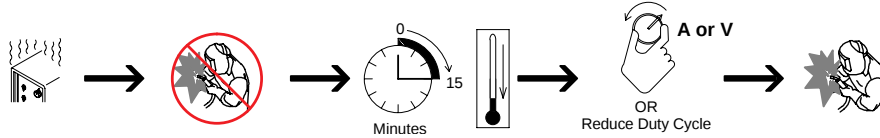
Continuous Welding

Duty cycle is the percentage of 10 minutes that unit can weld at rated load without overheating.

This unit is rated for welding at 330 amperes continuously.

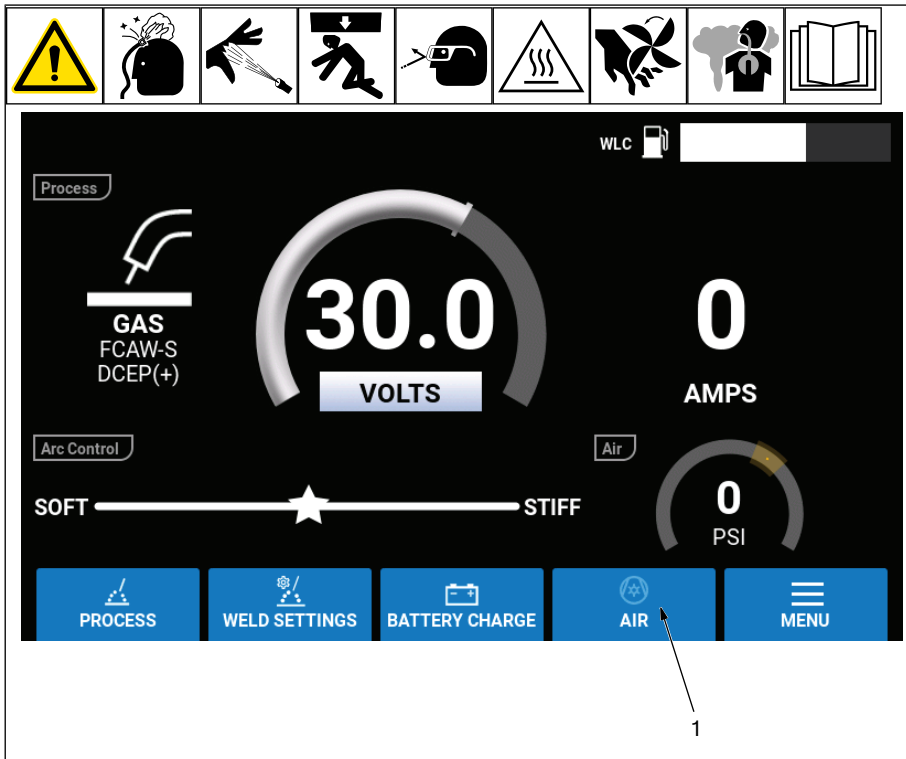
**NOTICE** – Exceeding duty cycle can damage unit and void warranty.

### Overheating



## SECTION 6 – COMPRESSOR OPERATION

### 6-1. Air Compressor Operation



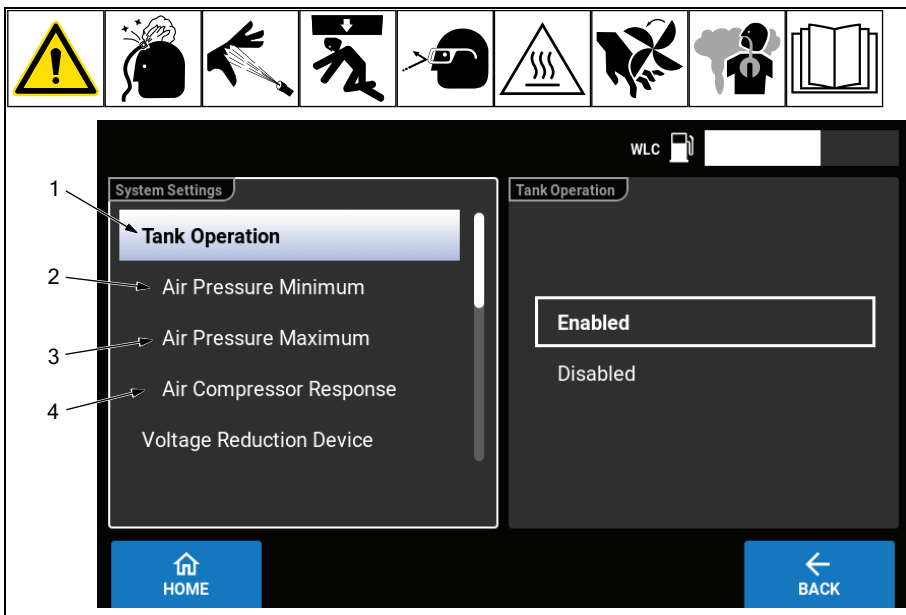
Weld output and generator power may be reduced when the air compressor is on.

1 Air Compressor Operation Button

While in the Weld screen, press the Air Compressor Operation button to toggle the compressor output. Compressor is On when Air icon is white, and Off when Air icon is blue.

Compressor clutch is always engaged when compressor is turned on. To adjust air pressure set point go to System Settings Screen (see Section 5-4).

### 6-2. Air Compressor Operation With Tank



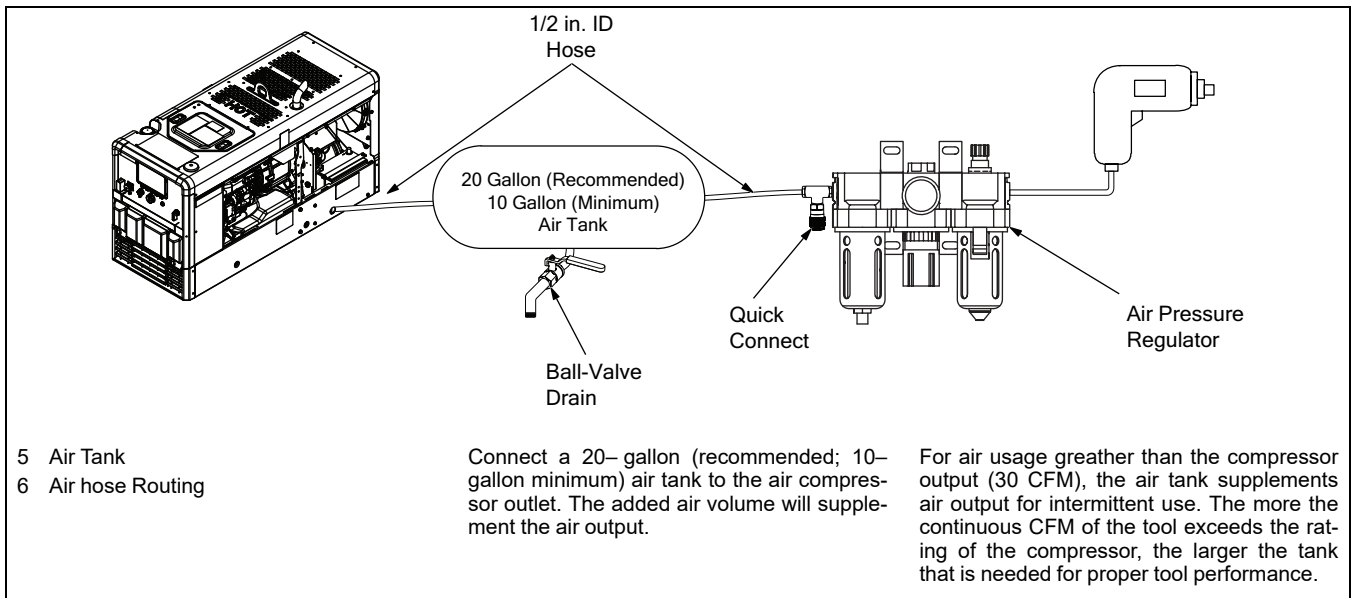
1 Tank Operation

2 Air Pressure Minimum

3 Air Pressure Maximum

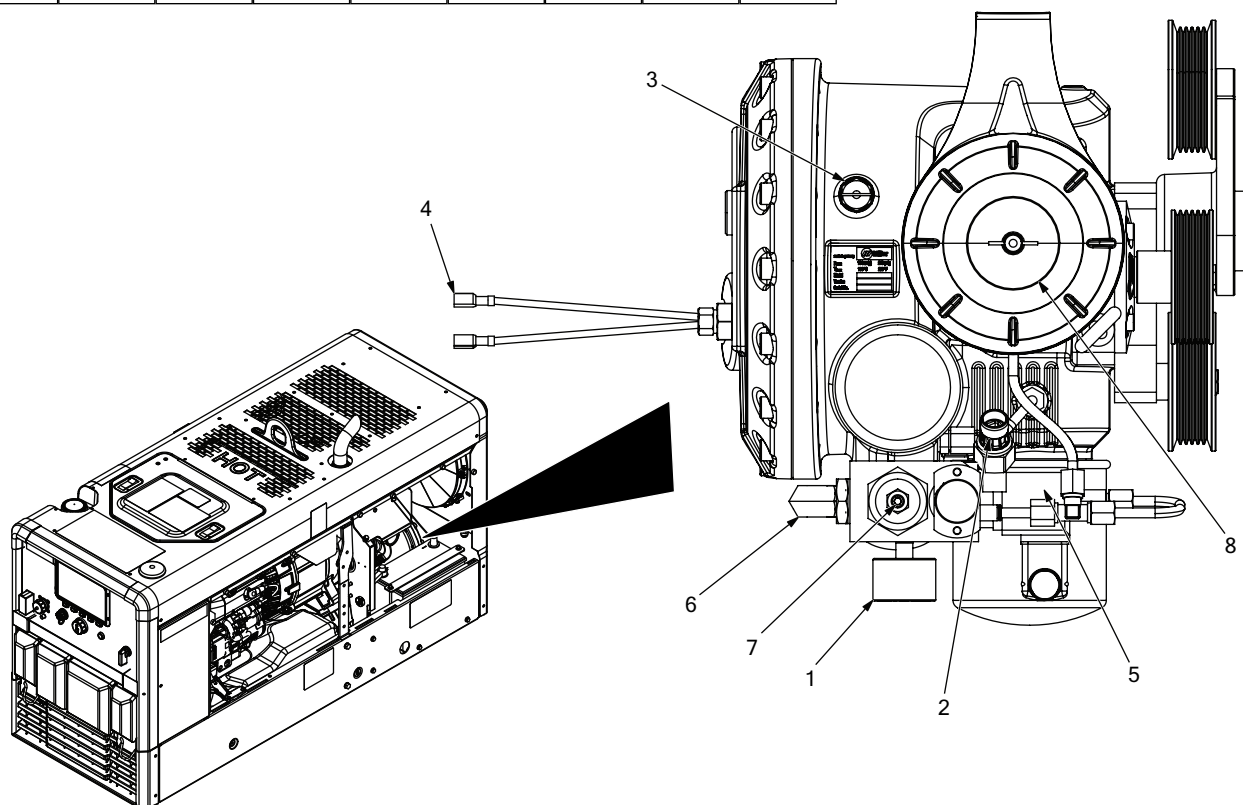
4 Air Compressor Response

When tank operation is enabled and air compressor is on, outlet air pressure is monitored. If pressure is below MIN pressure setting, compressor clutch engages and engine speed increases to meet air demand. When MAX pressure setting is reached, compressor case pressure reduces. If there is no air demand for 45 seconds, clutch disengages until outlet pressure is below MIN setting. Access System Settings menu to set MIN and MAX pressure settings (see Section 5-4). See Section 6-3 for air compressor controls.



| Air Tool                           | Average CFM | Continuous CFM |
|------------------------------------|-------------|----------------|
| 3/4 in. Impact Wrench (IR 2141)    | 10          | 40             |
| 3/4 in. Impact Wrench (Speedaire)  | 7           | 26             |
| 3/4 in. Impact Wrench (IR 231C)    | 4           | 22             |
| Needle Scaler (IR 182LNA1)         | 3           | 13             |
| 4-1/2 in. Grinder (Dayton)         | 7           | 26             |
| 1/4 in. Die Grinder (IR G1H340RG4) | 6           | 25             |
| 1/2 in. Drill (IR 7AQSTB)          | 4           | 17             |
| Air Shears (IR 7802SA)             | 4           | 21             |
| Sand Blaster                       | —           | 6              |
| Soda Blaster                       | —           | 18             |
| Button Punch/Deck Tool             | —           | 4              |
| Decking Crimp Tool                 | 4           | 15             |

## 6-3. Air Compressor Controls



**⚠ After the air compressor shuts off, the blow down cycle begins and takes several minutes. When gauge reads zero, open cap slowly to release remaining pressure.**

- 1 Air Compressor Case Pressure Gauge
- 2 Pressure Sensor

Pressure sensor measures compressor outlet pressure. A check valve in the compressor allows the outlet pressure to remain while the case pressure is reduced.

See Section 6-2 to set compressor pressure.

Over pressure activates at  $185 \pm 10$  psi ( $1276 \pm 69$  kPa), disables compressor, and displays "Air Comp Over Pressure." Power to compressor is disabled until air compressor is turned off or case pressure is reduced below 185 psi (1276 kPa).

**NOTICE** – Frequent over pressure cycling can cause clutch and belt damage.

- 3 Pressure Relief Valve

The compressor is also equipped with a mechanical safety valve (pressure relief valve) that will open if pressure reaches 225 psi (1551 kPa).

- 4 Temperature Sensor

Compressor shuts down due to over-temperature and "Air Comp Over Temp" displays. The error condition automatically resets when temperature reduces. Power to compressor is disabled until air compressor switch is turned off.

### Compressor Blow Down

- 5 Blow Down Valve

**☞ To prevent foaming or sudden release of pressure, allow 10 minutes after shutdown before opening the compressor fill cap or performing other compressor maintenance.**

To control the release of air mixed in the compressor oil (while running), the compressor goes through a blow down cycle when the compressor is turned off or the engine is stopped. The blow down valve slowly discharges the pressure in the compressor.

### Compressor Idle Down And Standby Mode

- 6 Compressor Outlet

When MAX pressure is reached, the blow-down valve is de-energized and the compressor begins reducing case pressure. If no air is used, the compressor case pressure continues to drop. After 45 seconds, the clutch disengages and the engine idles. If there is a rapid pressure drop on the outlet of the compressor, or if pressure is below MIN pressure, the clutch and compressor engage until MAX pressure is reached.

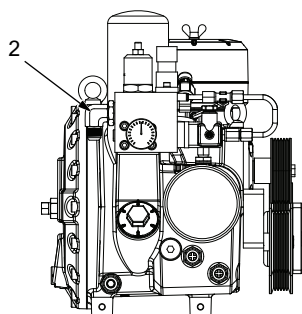
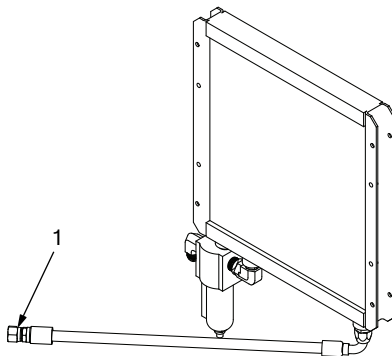
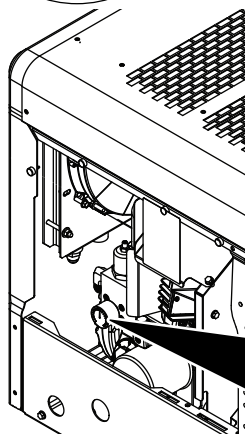
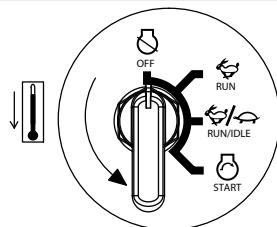
- 7 Minimum Pressure/Check Valve

Maintains 60 psi (414 kPa) minimum at compressor outlet to keep oil circulating in the system, and also includes check valve to prevent air from the user-provided air tank from flowing back into the compressor during blow-down.

- 8 Intake Control Valve

Controls the amount of air entering the compressor. As the intake control valve closes, less air is delivered by the compressor at the outlet.

## 6-4. Compressor Cold Weather Operation (Models With Air Dryer)



**NOTICE** – Air dryer must be bypassed when ambient temperature is below 32°F (0°C).

☞ Stop engine, and let cool.

☞ Disconnect battery negative (-) cable.

☞ Wait ten minutes for air pressure to release before beginning installation.

### Air Compressor Operation

- 1 Cooler Hose Fitting
- 2 Compressor Outlet Elbow Fitting

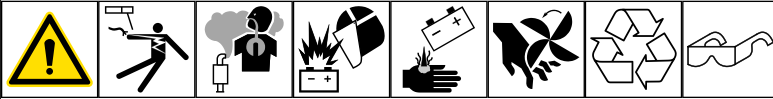
Disconnect compressor hose from separator. Disconnect cooler hose fitting from compressor outlet elbow fitting.

Connect compressor hose to compressor outlet elbow fitting.

907836 / 291208 / 296285

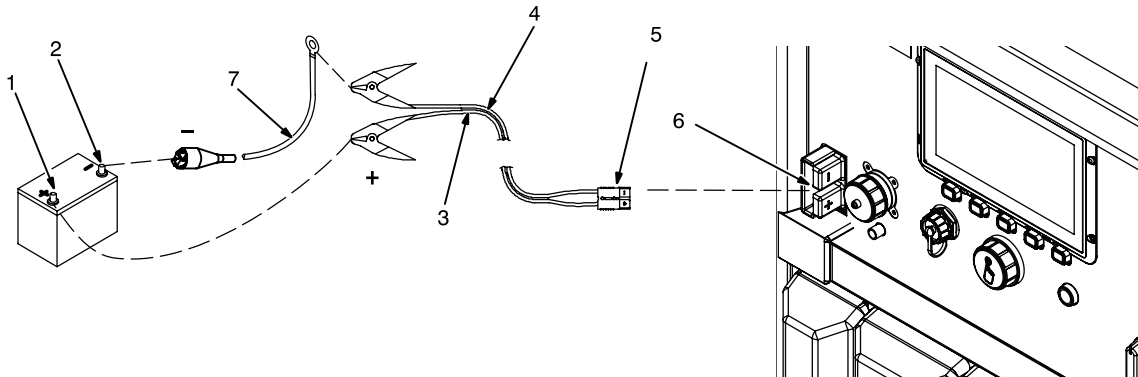
# SECTION 7 – BATTERY CHARGING

## 7-1. Battery Charging Guidelines



- ⚠ Stop welder/generator engine.
- ⚠ Before charging battery, read the Safety Precautions at the beginning of this manual.
- ⚠ Have only qualified persons do battery charging work.
- ⚠ Do not charge a defective battery, a battery with loose terminals, or one having evidence of damage such as a cracked case or cover.
- ⚠ Keep battery charging cables away from vehicle hood, door, and moving parts.
- ⚠ Do not use damaged battery charging cables.
- ⚠ Be sure charger output voltage matches battery voltage.
- ⚠ Do not jump-start/crank assist a vehicle without a battery.
- ⚠ Disconnect cables from weld terminals before charging a battery. Weld terminals are electrically live during battery charging.
- ⚠ Never disconnect jump-start/crank assist connections or cables when charging or jumping/crank assisting. Clamps are always energized when unit is in battery charge mode.
- ⚠ Never place 12V battery on 24V only setting.

## 7-2. Connecting Uninstalled Battery To Battery Charge Receptacle



- ⚠ Stop welder/generator engine. Place Air Compressor switch in the Off position.
- ⚠ Before charging battery, check polarity of battery posts. Attach a 24 in. (60 cm) AWG 6 insulated battery cable to Negative (-) battery post. Connect charger Positive (+) cable to Positive (+) post of battery. Standing as far from battery as practical and looking away from battery, connect charger Negative (-) cable to the cable connected to the Negative (-) battery post.

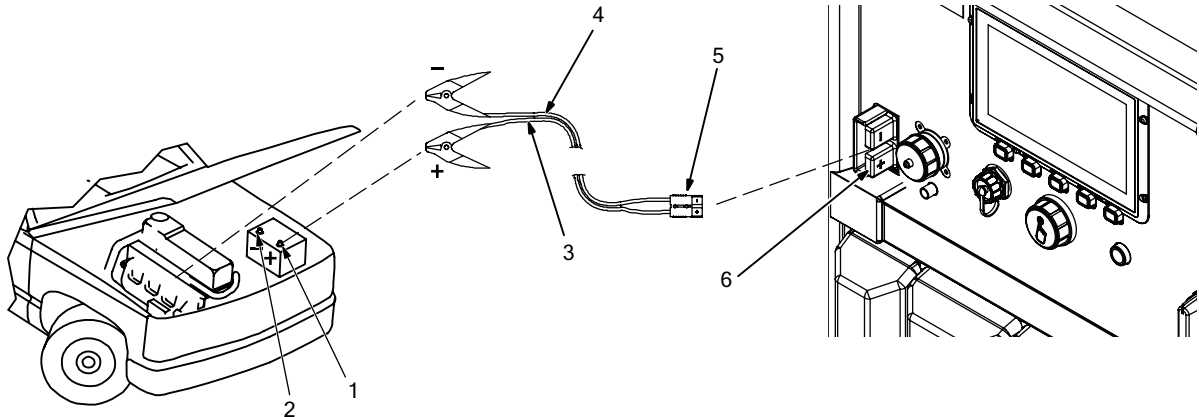
- 1 Battery Positive (+) Terminal
  - 2 Battery Negative (-) Terminal
- Obtain Battery Charge/Jumper Cable Kit 300422 or equivalent.
- 3 Red (Positive) Charging Cable
  - 4 Black (Negative) Charging Cable
  - 5 Battery Charge Plug
  - 6 Battery Charge Receptacle
  - 7 Insulated Battery Cable (Customer-Supplied)

Connect a 24 in. (60 cm) or longer insulated battery cable (AWG 6) to Negative (-) battery post. Connect red (Positive) battery charging cable to battery Positive (+) post. Connect black (Negative) battery charging cable to insulated battery cable.

Connect Battery Charge plug to Battery Charge receptacle.

👉 Battery will not charge if it is completely dead. This happens at 1 volt.

### 7-3. Connecting Installed Battery To Battery Charge Receptacle



**⚠ Stop welder/generator engine. Place Air Compressor switch in the Off position.**

**⚠ Before charging battery, check polarity of battery posts. If battery Negative (-) post is grounded to chassis (most vehicles), connect charger Positive (+) cable to Positive (+) ungrounded post of battery. Connect charger Negative (-) cable to vehicle engine block or heavy gauge metal part of frame (and away from battery). If Positive (+) post is grounded to chassis, connect charger Negative (-) cable to Negative (-) ungrounded post of battery. Connect charger Positive (+) cable to vehicle chassis or engine block (and away from battery).**

**👉 Battery will not charge if it is completely dead. This happens at 1 volt.**

- 1 Battery Positive (+) Terminal
- 2 Battery Negative (-) Terminal

Obtain Battery Charge/Jumper Cable Kit 300422 or equivalent.

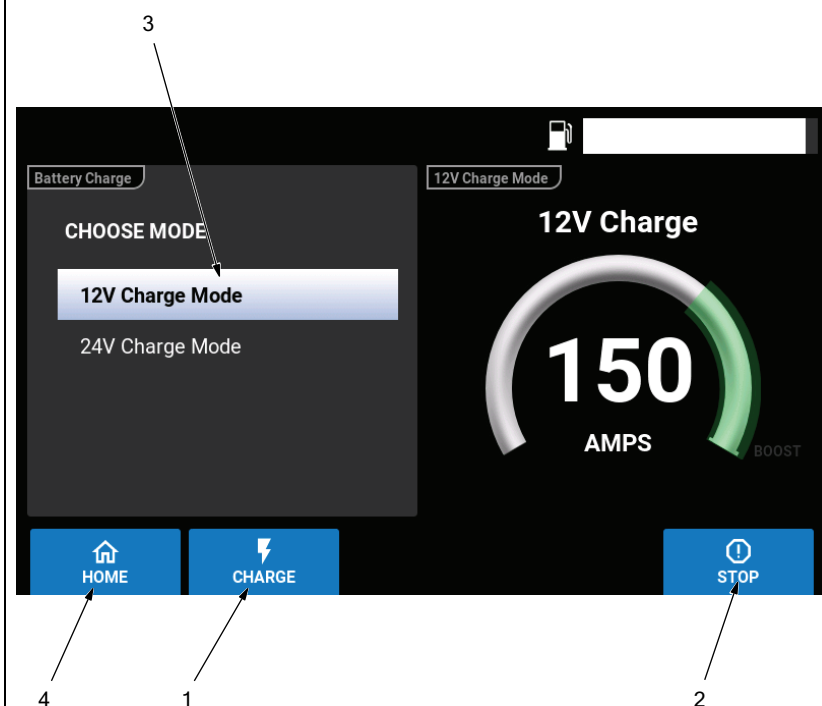
- 3 Red (Positive) Charging Cable
- 4 Black (Negative) Charging Cable
- 5 Battery Charge Plug
- 6 Battery Charge Receptacle

#### Negative Post Grounded

If battery Negative (-) post is grounded to chassis, connect red (Positive) battery charging cable to battery Positive (+) post. Connect black (Negative) battery charging cable to engine block or heavy gauge metal part of frame (and away from battery).

Connect Battery Charge plug to Battery Charge receptacle.

## 7-4. Setting Battery Charge Controls



To start charging a battery:

- Select either 12 V or 24 V with the control/select button depending on the type of battery being charged.
- Connect the battery terminals as described in Section 7-2 and 7-3.
- Push the Charge button.
- When finished charging push the Stop button.
- Disconnect the battery cables.

### 1 Charge Button

Press the Charge button to start battery charge.

### 2 Stop Button

Press the Stop button to stop battery charge.

### 3 12 V or 24 V Selection

Status bar text provides information on charge mode, charging output and charging status. Explanations of the status bar messages are provided in the table below.

### 4 Home Button

Press the Home button to go back to the Home screen.

### For batteries that do not take a charge current:

Some batteries may not take a charge current, no matter what the voltage of the battery is. Under these conditions, the unit control system will allow a battery to charge or jump start for 40 seconds. Then, if the battery still does not take a charge, the output will turn off. Reset the system to try again. The voltage on the battery must stay above 1 volt when the charging clamps are attached, or the control system will not start charging.

## A. Check Battery

|                                                                                                          |                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Batt Charge Voltage Error<br>Batt Read Open Error<br>Batt Check Open Error<br>Batt Charge Polarity Error | Codes indicate the battery will not accept a charge, battery voltage does not match charging voltage, or the system is improperly connected.<br>Check battery and connections.<br>Cycle Charge/Stop selections to restart charging. |
|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## B. Over Voltage

|                                |                                                                                                             |
|--------------------------------|-------------------------------------------------------------------------------------------------------------|
| Batt Charge Over Voltage Error | Code indicates the battery is accepting too much voltage or no current.<br>Reset clamp connection to clear. |
|--------------------------------|-------------------------------------------------------------------------------------------------------------|

## C. Jump Timeout

|                               |                                                                                                                                                                     |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Batt Jump Start Timeout Error | Code indicates the system was drawing too much current for too long of a time during an attempt to jump start.<br>Cycle Charge/Stop selections to restart charging. |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## D. Battery Bad

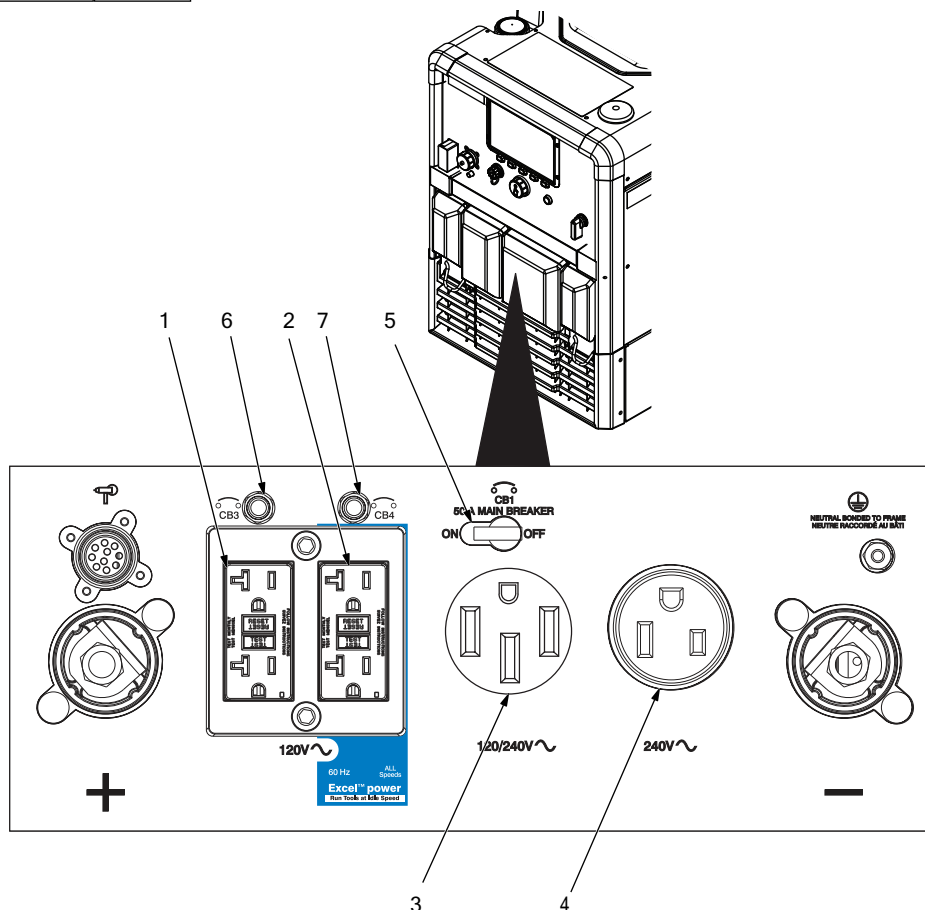
|                                                                                                                        |                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Batt Charge Check Error<br>Batt Charging Bad Battery Error<br>Batt Final Check Error<br>Batt Final Check Battery Error | The charger has determined that the battery is faulty and is unable to take a charge.<br>Replace the battery. |
|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|

## E. Charge Complete

|                         |                                                        |
|-------------------------|--------------------------------------------------------|
| Battery Charge Complete | The battery charge process has completed successfully. |
|-------------------------|--------------------------------------------------------|

## SECTION 8 – OPERATING AUXILIARY EQUIPMENT

### 8-1. Generator Power Receptacles



**⚠ Use GFCI protection when operating auxiliary equipment. If unit does not have GFCI receptacles, use GFCI-protected extension cord. Do not use GFCI receptacle to power life support equipment.**

**⚠ Unplug power cord before attempting to service accessories or tools.**

*Generator power decreases as weld current increases.*

- 1 120 V 20 A AC Duplex Receptacle (GFCI Receptacle)
- 2 120 V 20 A AC Duplex Receptacle (GFCI Receptacle)
- 3 120/240 V 50 A AC Receptacle
- 4 240 V 50 A AC Receptacle

Duplex receptacles supply 120 V 60 Hz single-phase power at weld/power speed.

Maximum output from duplex receptacles is 2.4 kVA/kW.

120/240 V receptacle supplies 60 Hz single-phase power at 3600 rpm. Maximum output is 10.5 kVA/kW.

240 V receptacle supplies 60 Hz single-phase power at 3600 RPM. Maximum output is 10.5 kVA/kW.

*Test GFCI receptacles at high engine speed only.*

**⚠ Test GFCI monthly. See Section 8-2 for GFCI information and for resetting and testing procedures.**

- 5 Supplementary Protector CB1

CB1 protects all receptacles from overload. If CB1 opens, the receptacles do not work. Place switch in On position to reset.

- 6 Supplementary Protector CB3

CB3 protects duplex receptacles from overload. If a supplementary protector opens, the receptacles do not work. Press button to reset supplementary protector.

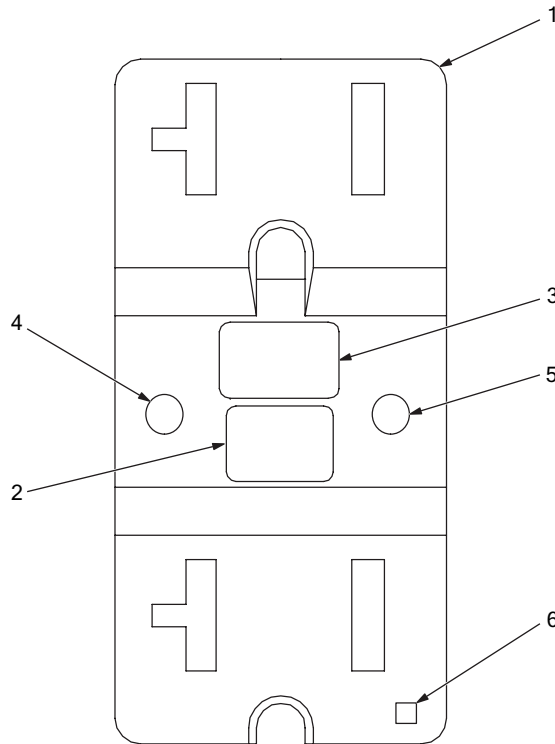
*If supplementary protector continues to open, contact Factory Authorized Service Agent.*

Combined output of all receptacles limited to 10.5 kVA/kW rating of the generator.

EXAMPLE: If 20 A is drawn from a 120 V duplex receptacle, only 34 A is available at the 120/240V receptacle:

$$(120 \text{ V} \times 20 \text{ A}) + (240 \text{ V} \times 34 \text{ A}) = 10.5 \text{ kVA/kW}$$

## 8-2. GFCI Receptacle Information, Resetting, And Testing



**⚠ Use GFCI protection when operating auxiliary equipment. If unit does not have GFCI receptacles, use GFCI-protected extension cord. Do not use GFCI receptacle to power life support equipment.**

**⚠ Unplug power cord before attempting to service accessories or tools.**

- 1 120 V 20 A AC GFCI Receptacle
- 2 GFCI Receptacle Test Button
- 3 GFCI Receptacle Reset Button
- 4 Red GFCI Indicator Light (LED)
- 5 Green GFCI Indicator Light (LED)
- 6 Alternate Location For Red And Green Indicator LEDs

*☞ Red and Green indicator lights may be combined in a single LED.*

*☞ Orientation of receptacle may be different in other applications.*

### GFCI Receptacles

GFCI receptacles protect the user from electric shock if a ground fault occurs in equipment connected to the receptacle. A ground fault occurs when electrical current takes the shortest path to ground (which could be through a person) rather than follow its intended safe path.

If a ground fault is detected, the GFCI Reset button pops out, and the circuit opens to disconnect power to the faulty equipment. A GFCI receptacle does not protect against circuit overloads, short circuits, or shocks not related to ground faults. Reset and test GFCI receptacle according to the following procedures.

A solid green LED indicates power to the GFCI. A solid red LED indicates that the GFCI has been tripped.

### Resetting/Testing GFCI Receptacle

**⚠ Test GFCI monthly.**

**⚠ If Red LED blinks, stop using GFCI receptacle and have a Factory Authorized Service Agent replace it.**

**⚠ Extension cords with bad insulation or of extended length can allow enough leakage current to trip the GFCI circuit. Reset and test as follows.**

### Resetting GFCI Receptacles

If a GFCI fault occurs, stop engine and disconnect equipment from GFCI receptacle. Check for damaged or wet tools, cords, plugs, etc. connected to the receptacle. Start engine, place engine control switch in RUN position, and press GFCI Reset button. Reconnect equipment to GFCI receptacle. If GFCI Reset button pops out again, check the equipment and repair or replace if faulty.

### Testing GFCI Receptacles

*☞ Test GFCI receptacles at high engine speed only.*

Start engine and place engine control switch in Run position. Press the GFCI Test button. The GFCI Reset button should pop out.

Press the GFCI Reset button.

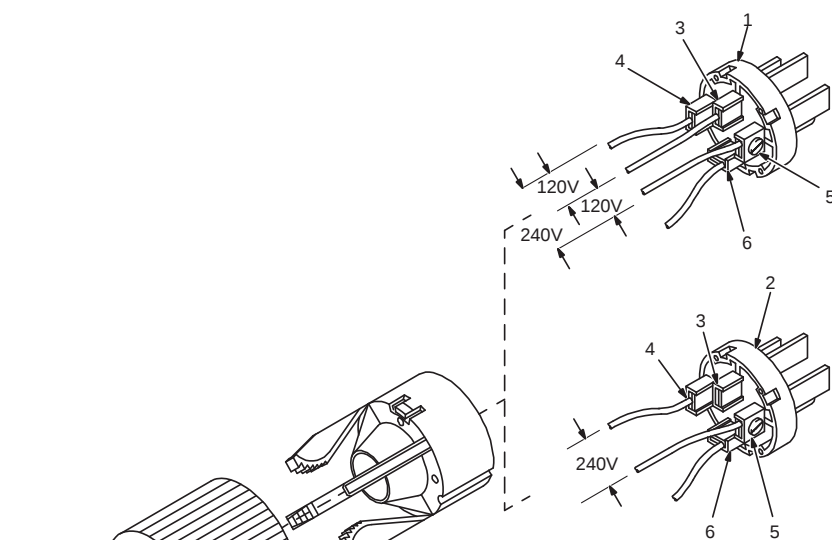
**Have a Factory Authorized Service Agent replace GFCI if any of the following occur:**

**GFCI does not trip when tested**  
**Red LED blinks**  
**GFCI does not reset.**

## 8-3. Simultaneous Weld And Power

| Weld Current in Amperes At 30 Volts DC | Total Power Available in Watts | 120 V Receptacle Amperes | 240 V Receptacle Amperes |
|----------------------------------------|--------------------------------|--------------------------|--------------------------|
| 300                                    | 1500                           | 13                       | 6                        |
| 250                                    | 3000                           | 20                       | 13                       |
| 200                                    | 4500                           | 20                       | 19                       |
| 150                                    | 6000                           | 20                       | 25                       |
| 100                                    | 7500                           | 20                       | 31                       |
| 0                                      | 10500                          | 20                       | 40                       |

## 8-4. Wiring Instructions For 240 Volt, Single-Phase Plug (NEMA 14-50P)



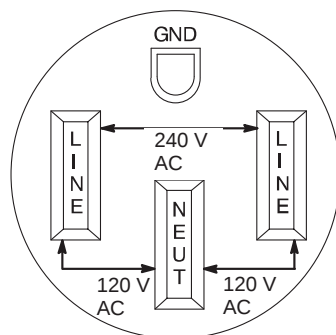
The plug can be wired for a 240 V, 2-wire load or a 120/240V, 3-wire load. See circuit diagram.

### 1 Plug Wired for 120/240 V, 3-Wire Load

When wired for 120 V loads, each duplex receptacle shares a load with one half of 240 V receptacle.

### 2 Plug Wired for 240 V, 2-Wire Load

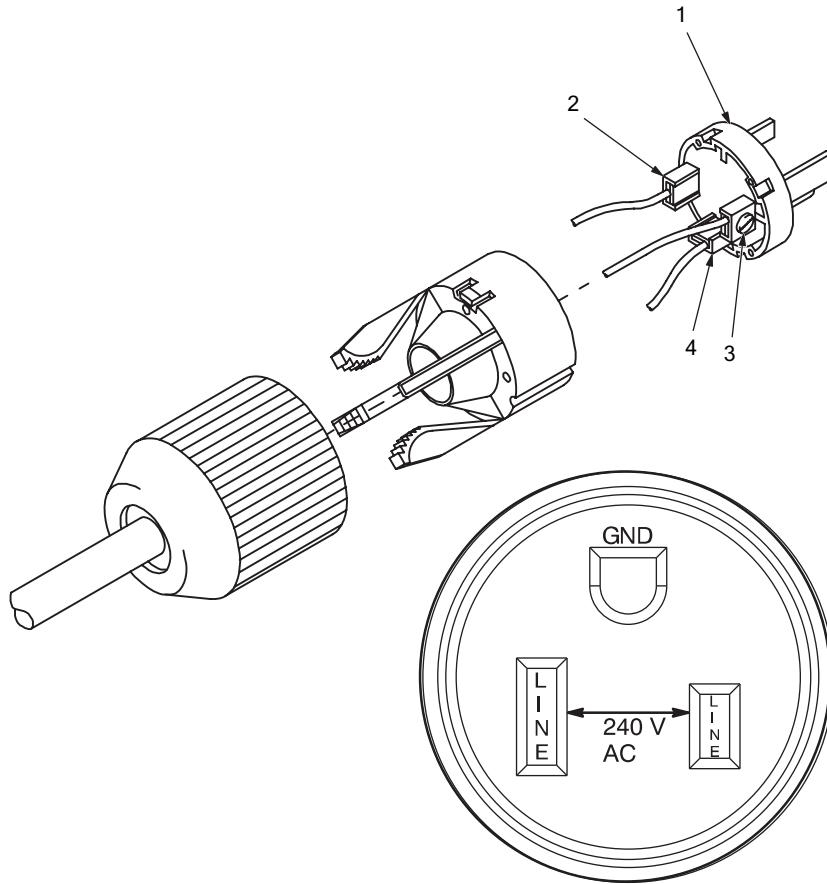
- 3 Neutral (Silver) Terminal
- 4 Load 1 (Brass) Terminal
- 5 Load 2 (Brass) Terminal
- 6 Ground (Green) Terminal



| Current Available in Amperes       |                         |
|------------------------------------|-------------------------|
| 240 V Receptacle*                  | 120 V Duplex Receptacle |
| 0                                  | 20                      |
| 5                                  | 20                      |
| 10                                 | 20                      |
| 15                                 | 20                      |
| 20                                 | 20                      |
| 25                                 | 20                      |
| 30                                 | 20                      |
| 35                                 | 18                      |
| 40                                 | 8                       |
| V x A = Watts                      |                         |
| *One 240 V load or two 120 V loads |                         |



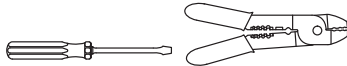
## 8-5. Wiring Instructions For 240 Volt, Single-Phase Plug (NEMA 6-50P)



The plug can be wired for a 240 V, 2-wire load.

- 1 Plug Wired for 240 V, 2-Wire Load
- 2 Load 1 (Brass) Terminal
- 3 Load 2 (Brass) Terminal
- 4 Ground (Green) Terminal

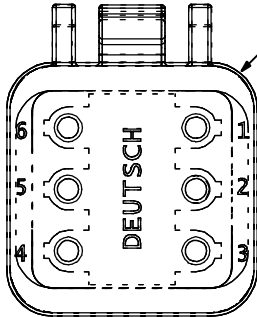
| Current Available in Amperes |                              |
|------------------------------|------------------------------|
| 240 V Receptacle             | Each 120 V Duplex Receptacle |
| 0                            | 20                           |
| 5                            | 20                           |
| 10                           | 20                           |
| 15                           | 20                           |
| 20                           | 20                           |
| 25                           | 20                           |
| 30                           | 20                           |
| 35                           | 10                           |
| 40                           | 0                            |
| V x A = Watts                |                              |

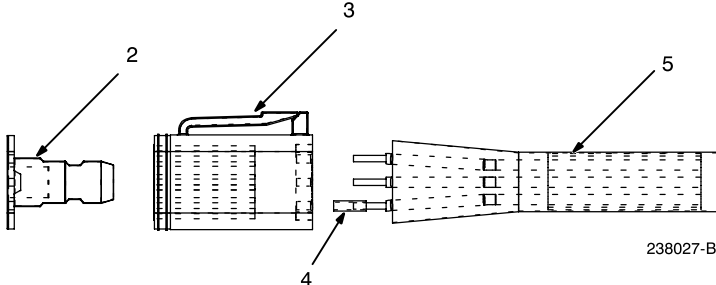


# SECTION 9 – CAN BUS CONNECTION

## 9-1. CAN-Bus Connection







1 CAN-Bus Connector

A CAN-bus connection is provided to allow read-only data communication. The data is available through the CAN-bus connector located inside right-hand access door, on the main harness. Data is transmitted when the unit is On. The CAN port is transmit only.

| Pin | Description  |
|-----|--------------|
| 1   | Ground       |
| 2   | CAN High     |
| 3   | CAN Low      |
| 4   | Cable Shield |
| 5   | +12 VDC      |
| 6   | (Open)       |

2 Wedge Lock (Supplied) (Deutsch W65-P012)

3 CAN Plug (Supplied) (Deutsch DT06-6S-P012)

4 Terminal (Not Supplied) (Deutsch 1062-16-0122)

5 Cabling (Customer Supplied)

Remove connector plug from receptacle.

Disassemble plug and remove seals as needed.

Insert insulated wires (16 or 18 AWG) using Deutsch 1062-16-0122 terminals.

Reassemble connector and reconnect to CAN BUS receptacle.

## 9-2. Trailblazer J1939 Messages

| Message                              | Notes                                                                                              | Acro-<br>nym | ID (Hex) | PGN<br>(Deci-<br>mal) | Start<br>Posi-<br>tion | Length  | SPN<br>(Deci-<br>mal) | Tx<br>Rate<br>(ms) |
|--------------------------------------|----------------------------------------------------------------------------------------------------|--------------|----------|-----------------------|------------------------|---------|-----------------------|--------------------|
| Engine Speed                         | 0 to 8031.875rpm 0.125rpm/bit 0 offset                                                             | EEC1         | 0CF004D1 | 61444                 | 4                      | 2 bytes | 190                   | 200                |
| Battery Potential (Voltage)          | 0 to 3212.75V, 0.05V/bit, 0 offset                                                                 | VEP          | 18FEF7D1 | 65271                 | 7                      | 2 bytes | 158                   | 1000               |
| Error State                          | See Table 9–2.                                                                                     | Proprietary  | 18FF78D1 | 65400                 | 3                      | 1 byte  | 516107                | 100                |
| Engine Hours                         | Actual engine hours 0 to 65535 hours 1 hour/bit 0 offset                                           | Proprietary  | 1CFF79D1 | 65401                 | 1                      | 2 bytes | 516110                | 1000               |
| Engine Oil Maintenance Hours         | Actual hours until engine oil change is required -32767 to 32767 hours 1 hour/bit 0 offset         | Proprietary  | 1CFF79D1 | 65401                 | 3                      | 2 bytes | 516111                | 1000               |
| Fuel Sender                          | Percent of fuel remaining 0 to 100                                                                 | Proprietary  | 1CFF79D1 | 65401                 | 7                      | 1 bytes | 516112                | 1000               |
| Brush Maintenance Hours              | Actual hours until generator brush change is required -32767 to 32767 hours 1 hour/bit 0 offset    | Proprietary  | 1CFF7CD1 | 65404                 | 1                      | 2 bytes | 516116                | 1000               |
| Battery Terminal Maintenance Hours   | Actual hours until battery terminal cleaning is required -32767 to 32767 hours 1 hour/bit 0 offset | Proprietary  | 1CFF7CD1 | 65404                 | 3                      | 2 bytes | 516117                | 1000               |
| Air Cleaner Maintenance Hours        | Actual hours until engine air cleaner change is required -32767 to 32767 hours 1 hour/bit 0 offset | Proprietary  | 1CFF7DD1 | 65405                 | 1                      | 2 bytes | 516118                | 1000               |
| Spark Plug Maintenance Hours         | Actual hours until spark plug change is required -32767 to 32767 hours 1 hour/bit 0 offset         | Proprietary  | 1CFF7DD1 | 65405                 | 3                      | 2 bytes | 516120                | 1000               |
| Fuel Filter Maintenance Hours        | Actual hours until engine fuel filter change is required -32767 to 32767 hours 1 hour/bit 0 offset | Proprietary  | 1CFF7DD1 | 65405                 | 7                      | 2 bytes | 516121                | 1000               |
| Air Compressor Hours                 | Actual air compressor hours 0 to 65535 hours 1 hour/bit 0 offset                                   | Proprietary  | 1CFF7AD1 | 65402                 | 1                      | 2 bytes | 516122                | 1000               |
| Air Compressor Oil Maintenance Hours | Actual hours until air compressor oil change is required -32767 to 32767 hours 1 hour/bit 0 offset | Proprietary  | 1CFF7AD1 | 65402                 | 3                      | 2 bytes | 516123                | 1000               |

**Table 9–1. J1939 Name For Address Claim**

| Field                   | Value | Notes                                            |
|-------------------------|-------|--------------------------------------------------|
| Industry Group          | 5     | Industrial-Process Control-Stationary (Gen-Sets) |
| Vehicle System Instance | 0     |                                                  |
| Vehicle System          | 0     |                                                  |
| Function                | 129   | Generator Set Controller                         |
| Function Instance       | 1     |                                                  |
| ECU Instance            | 1     |                                                  |
| MFG Code                | 402   | Simma Software                                   |
| Identity Number         | 1     |                                                  |
| Source Address          | 209   |                                                  |

**Table 9–2. Error State**

| Error                            | Value | Detection                                                                     |
|----------------------------------|-------|-------------------------------------------------------------------------------|
| NO ERROR                         | 0     |                                                                               |
| WELD BOOST CONNECTOR FAULT       | 1     | Connector RC2 not plugged in.                                                 |
| WELD BOOST VBUS HIGH FAULT       | 2     | Weld module bus voltage exceeded threshold during operation.                  |
| WELD BOOST VBUS LOW FAULT        | 3     | Weld module bus voltage below threshold while engine running.                 |
| WELD BOOST FAULT                 | 4     | Low weld module bus voltage after soft start.                                 |
| WELD BOOST CURRENT SENSOR FAULT  | 5     | Weld module current sensor not wired properly or high boost current detected. |
| WELD BOOST OVER CURRENT FAULT    | 6     | Weld module boost circuit detected over current.                              |
| WELD MODULE PRIMARY CT FAULT     | 7     | Transformer primary current exceeded threshold.                               |
| WELD MODULE CS FAULT             | 8     | Output CT not reading correctly.                                              |
| WELD MODULE PLUS 15V FAULT       | 9     | Weld module +15V fault.                                                       |
| WELD MODULE PLUS 5V FAULT        | 10    | Weld module +5V fault.                                                        |
| WELD MODULE PLUS 12V FAULT       | 11    | Weld module +12V fault.                                                       |
| WELD MODULE MINUS 15V FAULT      | 12    | Weld module -15V fault.                                                       |
| WELD MODULE CONNECTOR FAULT      | 13    | Weld module connector unplugged.                                              |
| WELD MODULE LIN BOOST FAULT      | 14    | Weld module boost LIN communication fault.                                    |
| WELD MODULE LIN INVERTER FAULT   | 15    | Weld module inverter LIN communication fault.                                 |
| WELD MODULE COMMUNICATION FAULT  | 16    | Communication has been lost with weld inverter.                               |
| WELD MODULE THERMISTOR OPEN      | 17    | Weld module thermistor fault - open.                                          |
| WELD MODULE THERMISTOR SHORTED   | 18    | Weld module thermistor fault - shorted.                                       |
| WELD MODULE THERMISTOR OVERTEMP  | 19    | Weld module thermistor fault - overtemp.                                      |
| SPOOL GUN MOTOR FAULT            | 21    | High current detected in spool gun motor circuit.                             |
| WELD MODULE DC BUS ERROR         | 26    | DC bus voltage too high or low for 10 seconds.                                |
| WELD MODULE INVERTER DC BUS HIGH | 28    | Inverter DC Bus voltage exceeding high limit.                                 |
| REMOTE DISCONNECTED FAULT        | 30    | Remote Disconnected with contactor control.                                   |
| POLARITY REVERSING FAULT         | 34    | Polarity Reversing contactor stuck in incorrect polarity.                     |
| ARC REACH COMPATIBLE FAULT       | 35    | PC1 Inverter DSP Firmware not able to run connected accessory.                |

**Table 9–3. DM1 Definitions**

| DTC                           | J1939-73 |          | SPN Name<br>SAE J1939<br>Table C1                      | Detection                                     | DTC Set Parameter                                                                 | Time to action or<br>number of error<br>detection | ECU<br>Action                                                                                                       | Recovery From<br>Error                                                        |
|-------------------------------|----------|----------|--------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
|                               | SPN      | F-<br>MI |                                                        |                                               |                                                                                   |                                                   |                                                                                                                     |                                                                               |
| ETB: Stuck                    | 5419     | 7        | Engine Throt-<br>tle Actuator<br>#1                    | Throttle performance -<br>stuck               | Movement of the<br>throttle blade is<br>restricted                                | 1.6 seconds                                       | De-<br>pend-<br>ant on<br>throttle<br>plate po-<br>sition,<br>engine<br>may start<br>and or<br>run<br>very erratic. | ECU<br>power off<br>reset (key<br>off for at<br>least 10<br>seconds)          |
| ETB: Open                     | 5419     | 5        | Engine Throt-<br>tle Actuator<br>#1                    | Throttle drive motor<br>open circuit          | Relative voltage in<br>circuit                                                    | 10.0 seconds                                      | Engine<br>will only<br>run at<br>fixed<br>low<br>speed                                                              | No longer<br>active                                                           |
| Injector cyl 1:<br>Open/Short | 651      | 31       | Engine Injec-<br>tor Cylinder<br>#01                   | Injector circuit fault,<br>cyl 1              | Electrical circuit<br>open or short                                               | 1.6 seconds                                       | Injec-<br>tion<br>function<br>for this<br>cylinder<br>is shut<br>down                                               | ECU<br>power off<br>reset (key<br>off for at<br>least 10<br>seconds)          |
| Injector cyl 2:<br>Open/Short | 652      | 31       | Engine Injec-<br>tor Cylinder<br>#02                   | Injector circuit fault,<br>cyl 2              | Electrical circuit<br>open or short                                               | 1.6 seconds                                       | Injec-<br>tion<br>function<br>for this<br>cylinder<br>is shut<br>down                                               | ECU<br>power off<br>reset (key<br>off for at<br>least 10<br>seconds)          |
| Ignition cyl 1 fault          | 1268     | 31       | Engine Igni-<br>tion Coil #1                           | Ignition coil primary<br>circuit fault, cyl 1 | Electrical circuit<br>open, short, or over-<br>current of primary<br>circuit only | 1.6 seconds                                       | Ignition<br>& Injec-<br>tion<br>function<br>for this<br>cylinder<br>is shut<br>down                                 | ECU<br>power off<br>reset (key<br>off for at<br>least 10<br>seconds)          |
| Ignition cyl 2 fault          | 1269     | 31       | Engine Igni-<br>tion Coil #2                           | Ignition coil primary<br>circuit fault, cyl 2 | Electrical circuit<br>open, short, or over-<br>current of primary<br>circuit only | 1.6 seconds                                       | Ignition<br>& Injec-<br>tion<br>function<br>for this<br>cylinder<br>is shut<br>down                                 | ECU<br>power off<br>reset (key<br>off for at<br>least 10<br>seconds)          |
| Fuel Pump: High               | 1347     | 6        | Engine Fuel<br>Pump Pres-<br>surizing As-<br>sembly #1 | Short high voltage                            | Relative voltage in<br>circuit                                                    | 3.0 seconds                                       | Poor<br>run<br>quality,<br>miss-<br>ing.                                                                            | Engine<br>must go<br>to a stall<br>state, and<br>fault no<br>longer<br>active |
| Fuel Pump: Low/<br>Open       | 1347     | 5        | Engine Fuel<br>Pump Pres-<br>surizing As-<br>sembly #1 | Short low voltage or<br>open                  | Relative voltage in<br>circuit                                                    | 3.0 seconds                                       | Engine<br>will not<br>start                                                                                         | No longer<br>active                                                           |
| Engine temp<br>High/Open      | 110      | 3        | Engine<br>Temperature                                  | Engine temp signal<br>high/open               | Voltage in ETS cir-<br>cuit is above 4.95<br>Volts                                | 12.5 seconds                                      | Typical-<br>ly no<br>noticea-<br>ble af-<br>fect.<br>May re-<br>sult in<br>poor<br>cold                             | No longer<br>active                                                           |

| DTC                                                  | J1939-73 |          | SPN Name<br>SAE J1939<br>Table C1           | Detection                                 | DTC Set Parameter                                                                                                                                                                                | Time to action or<br>number of error<br>detection | ECU<br>Action                                                                                                                                  | Recov-<br>ery From<br>Error |
|------------------------------------------------------|----------|----------|---------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
|                                                      | SPN      | F-<br>MI |                                             |                                           |                                                                                                                                                                                                  |                                                   |                                                                                                                                                |                             |
|                                                      |          |          |                                             |                                           |                                                                                                                                                                                                  |                                                   | start-<br>ing.                                                                                                                                 |                             |
| Engine temp:<br>Low/Grounded                         | 110      | 4        | Engine Temperature                          | Engine temp signal low/grounded           | Voltage in ETS circuit is below 0.15 Volts                                                                                                                                                       | 12.5 seconds                                      | Typical-<br>ly no<br>noticea-<br>ble af-<br>fect.<br>May re-<br>sult in<br>poor<br>cold start-<br>ing.                                         | No longer<br>active         |
| Air temp: High/<br>Open                              | 105      | 3        | Engine Intake<br>Manifold #1<br>Temperature | Air temp signal high/<br>open             | Voltage in IAT circuit<br>is above 4.90 Volts                                                                                                                                                    | 12.5 seconds                                      | Typical-<br>ly no<br>noticea-<br>ble affect                                                                                                    | No longer<br>active         |
| Air temp: Low/<br>Grounded                           | 105      | 4        | Engine Intake<br>Manifold #1<br>Temperature | Air temp signal low/<br>grounded          | Voltage in IAT circuit<br>is below 0.10 Volts                                                                                                                                                    | 12.5 seconds                                      | Typical-<br>ly no<br>noticea-<br>ble affect                                                                                                    | No longer<br>active         |
| Throttle Position<br>Sensor: High/<br>Shorted        | 51       | 3        | Engine Throt-<br>tle Position               | TPS signal, high/<br>shorted              | Voltage in TPS cir-<br>cuit is above 4.90<br>Volts                                                                                                                                               | 2.0 seconds                                       | No start<br>/ very<br>poor<br>run<br>quality.                                                                                                  | No longer<br>active         |
| Throttle Position<br>Sensor: Low/<br>Open            | 51       | 4        | Engine Throt-<br>tle Position               | TPS signal, low/open                      | Voltage in TPS cir-<br>cuit is below 0.25<br>Volts                                                                                                                                               | 2.0 seconds                                       | No start<br>/ very<br>poor<br>run<br>quality.                                                                                                  | No longer<br>active         |
| Crank Position<br>Sensor: Noisy                      | 636      | 2        | Engine Posi-<br>tion Sensor                 | Crank signal - noisy                      | Less than 23 teeth<br>are detected per en-<br>gine revolution.<br>Crank encoder pat-<br>tern is 23 teeth (24-<br>1).                                                                             | 12.5 seconds                                      | Erratic<br>start/<br>run.<br>Closed<br>loop<br>control<br>is deac-<br>tivated<br>when<br>fault is<br>active.                                   | No longer<br>active         |
| Crank Position<br>Sensor: No Signal                  | 636      | 8        | Engine Posi-<br>tion Sensor                 | No crank sensor<br>signal                 | Voltage drops below<br>calibrated trigger:<br>typically 2 - 3 volt<br>drop. Additional<br>MAP trigger logic is<br>available, but very<br>difficult to calibrate,<br>so typically is not<br>used. | 15.0 seconds                                      | Engine<br>will not<br>start if<br>fault is<br>actual.<br>If fault<br>is<br>falsely de-<br>tected,<br>en-<br>gine<br>starts nor-<br>mal-<br>ly. | No longer<br>active         |
| Manifold Absolute<br>Pressure: Sensor<br>signal high | 102      | 3        | Engine Intake<br>Manifold #1<br>Pressure    | MAP sensor signal,<br>high                | Voltage in MAP cir-<br>cuit is above 4.75<br>Volts                                                                                                                                               | 15.6 seconds                                      | Rich<br>running<br>condi-<br>tion                                                                                                              | No longer<br>active         |
| Manifold Absolute<br>Pressure: Sensor<br>signal low  | 102      | 4        | Engine Intake<br>Manifold #1<br>Pressure    | MAP sensor signal,<br>low/open            | Voltage in MAP cir-<br>cuit is below 0.25<br>Volts                                                                                                                                               | 15.6 seconds                                      | Lean<br>running<br>condi-<br>tion                                                                                                              | No longer<br>active         |
| Oxygen Sensor:<br>High/Open                          | 3056     | 3        | Engine Oxy-<br>gen Sensor 1<br>Monitor      | O2 (common or cyl 1)<br>signal, high/open | Voltage in O2 circuit<br>is above 998.0<br>mVolts                                                                                                                                                | 225.0 seconds                                     | Engine<br>will run<br>in open<br>loop on<br>base                                                                                               | No longer<br>active         |

| DTC                               | J1939-73 |          | SPN Name<br>SAE J1939<br>Table C1          | Detection                                     | DTC Set Parameter                                                          | Time to action or<br>number of error<br>detection | ECU<br>Action                                                                                                                                            | Recov-<br>ery From<br>Error                                          |
|-----------------------------------|----------|----------|--------------------------------------------|-----------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
|                                   | SPN      | F-<br>MI |                                            |                                               |                                                                            |                                                   |                                                                                                                                                          |                                                                      |
|                                   |          |          |                                            |                                               |                                                                            |                                                   | calibra-<br>tion                                                                                                                                         |                                                                      |
| Oxygen Sensor:<br>Low/Grounded    | 3056     | 4        | Engine Oxy-<br>gen Sensor 1<br>Monitor     | O2 (common or cyl 1)<br>signal, low/grounded  | Voltage in O2 circuit<br>is below 4.5 mVolts                               | 225.0 seconds                                     | Engine<br>will run<br>in open<br>loop on<br>base calibra-<br>tion                                                                                        | No longer<br>active                                                  |
| Oxygen Heater:<br>Low/Open        | 3056     | 5        | Engine Oxy-<br>gen Sensor 1<br>Monitor     | O2 (common or cyl 1),<br>heater, low/open     | Relative voltage in<br>circuit                                             | 15.0 seconds                                      | Long<br>term<br>offsets<br>are set<br>to 1.0<br>(nomi-<br>nal),<br>open<br>loop<br>opera-<br>tion<br>only                                                | ECU<br>power off<br>reset (key<br>off for at<br>least 10<br>seconds) |
| Oxygen Heater:<br>High/Shorted    | 3056     | 6        | Engine Oxy-<br>gen Sensor 1<br>Monitor     | O2 (common or cyl 1),<br>heater, high/shorted | Relative voltage in<br>circuit                                             | 15.0 seconds                                      | Long<br>term<br>offsets<br>are set<br>to 1.0<br>(nomi-<br>nal),<br>open<br>loop<br>opera-<br>tion<br>only                                                | ECU<br>power off<br>reset (key<br>off for at<br>least 10<br>seconds) |
| System Voltage:<br>High           | 168      | 3        | Battery Po-<br>tential / Power<br>Input #1 | Voltage, High                                 | System voltage<br>above 16.0 Volts                                         | 55.0 seconds                                      | No ef-<br>fect,<br>until a<br>compo-<br>nent<br>breaks                                                                                                   | No longer<br>active                                                  |
| System Voltage:<br>Low            | 168      | 4        | Battery Po-<br>tential / Power<br>Input #1 | Voltage, Low                                  | System voltage be-<br>low 10.0 Volts                                       | 55.0 seconds                                      | Can ef-<br>fect run<br>quality<br>as in-<br>jectors,<br>coils,<br>and fuel<br>pumps<br>per-<br>for-<br>mance<br>de-<br>pends<br>on<br>proper<br>voltage. | No longer<br>active                                                  |
| Closed Loop Fuel<br>Adaption: Max | 4237     | 0        | proprietary                                | Max fuel adaption<br>reached                  | If closed loop con-<br>trol goes above cal<br>threshold. Typically<br>1.29 | 10.0 seconds                                      | Typical-<br>ly no<br>noticea-<br>ble af-<br>fect<br>See<br>notes:                                                                                        | ECU<br>power off<br>reset (key<br>off for at<br>least 10<br>seconds) |
| Closed Loop Fuel<br>Adaption: Min | 4237     | 1        | proprietary                                | Min fuel adaption<br>reached                  | If closed loop con-<br>trol goes below cal<br>threshold. Typically<br>0.90 | 10.0 seconds                                      | Typical-<br>ly no<br>notica-<br>ble af-<br>fect<br>See<br>notes:                                                                                         | ECU<br>power off<br>reset (key<br>off for at<br>least 10<br>seconds) |

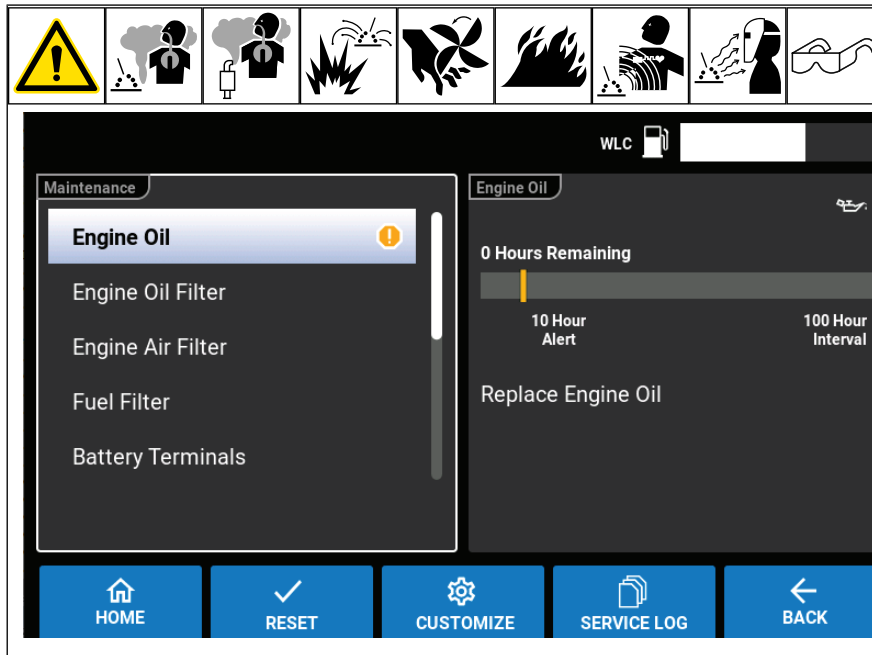
| DTC                                | J1939-73 |          | SPN Name<br>SAE J1939<br>Table C1 | Detection                                                                                              | DTC Set Parameter                                                                         | Time to action or<br>number of error<br>detection | ECU<br>Action                                                                                                                              | Recov-<br>ery From<br>Error                                                 |
|------------------------------------|----------|----------|-----------------------------------|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
|                                    | SPN      | F-<br>MI |                                   |                                                                                                        |                                                                                           |                                                   |                                                                                                                                            |                                                                             |
| Closed Loop Fuel<br>Adaption: Lean | 4237     | 31       | proprietary                       | Lean at high load/<br>open loop operation                                                              | If O2 signal falls be-<br>low about 0.1 volts<br>during open loop<br>high load operation. | 20.0 seconds                                      | Fuel<br>control<br>will add<br>injector<br>on time<br>to at-<br>tempt<br>to rem-<br>edy                                                    | O2 sen-<br>sor signal<br>maintains<br>values<br>above<br>about 0.1<br>volts |
| Engine Overheat                    | 110      | 0        | Engine<br>Temperature             | Engine overheat<br>warning. Engine oper-<br>ating at or above rec-<br>ommended tempera-<br>ture limit. | Varies slightly by<br>engine family, gen-<br>erally temp must ex-<br>ceed 165C            | 48.0 Seconds                                      | Throttle<br>opening<br>is lim-<br>ited,<br>value<br>varies<br>by en-<br>gine<br>model.<br>Ramps<br>in and<br>out of<br>the limit<br>value. | Engine<br>must go<br>below the<br>detection<br>tempera-<br>ture             |

**Table 9–4. CAN Specification**

|                        |                            |
|------------------------|----------------------------|
| Communication Protocol | SAE J1939                  |
| Format Type            | Extended Format (ID:29bit) |
| Baud Rate              | 250kbps                    |
| Sample Point           | 80%                        |
| Number of Sample       | 1                          |
| SJW                    | 2Tq                        |
| Terminal Resistor      | 120 ohms                   |

# SECTION 10 – GENERATOR/ENGINE MAINTENANCE

## 10-1. Maintenance Screen



The Maintenance screen displays hours remaining for service items and allows the user to reset service hours and change the interval (only shorter than recommended.)

Press the Home Button to go to the Home screen.

Press the Back button to go to the Menu screen.

Press the Reset Button on a maintenance item to reset the service interval.

Press the Customize button on a maintenance item to change the service interval.

Press the Service Log button to see maintenance history.

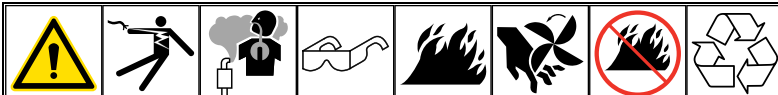
## 10-2. Routine Generator/Engine Maintenance

 Use information displayed on the LCD display to assist in scheduling maintenance (see Section 10-1).

 Engine speed is regulated by an electronic governor. Engine speed adjustments may only be performed by a Factory Authorized Service Agent.

 Follow the storage procedure in the engine owner's manual if the unit will not be used for an extended period.

 For Compressor Maintenance, see Section 11.



 **Stop engine before maintaining.**

 See Engine Manual and Maintenance Label for important start-up, service, and storage information. Service Engine more often if used in severe conditions.

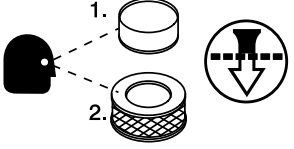
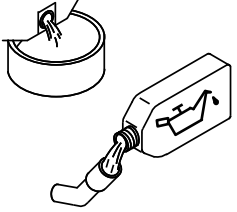
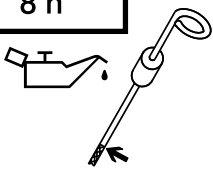
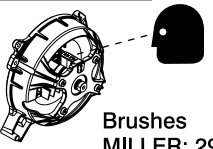
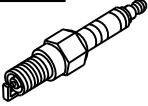
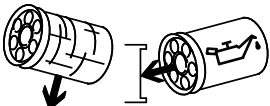
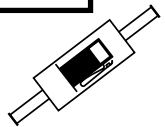
 Recycle engine fluids.

| Maintenance Schedule         |                                                                 | Every<br>8<br>Hours | Every<br>25<br>Hours | Every<br>50<br>Hours | Every<br>100<br>Hours | Every<br>200<br>Hours | Every<br>500<br>Hours | Every<br>1000<br>Hours | Reference    |
|------------------------------|-----------------------------------------------------------------|---------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------|------------------------|--------------|
| <b>Fuel and Oil</b>          | Check fuel and oil levels.<br>Clean any fuel and/or oil spills. | •                   |                      |                      |                       |                       |                       |                        | Section 4-5  |
| <b>Maintenance Screen</b>    | Check Maintenance screen for new oil change interval            | •                   |                      |                      |                       |                       |                       |                        | Section 10-1 |
| <b>Spark Arrestor Screen</b> | Check and Clean                                                 |                     | •                    |                      |                       |                       |                       |                        | Section 10-7 |
| <b>Weld Terminals</b>        | Clean                                                           |                     |                      | •                    |                       |                       |                       |                        |              |
| <b>Battery Terminals</b>     | Clean                                                           |                     |                      |                      | •                     |                       |                       |                        |              |
| <b>Cooling System</b>        | Clean                                                           |                     |                      |                      | •                     |                       |                       |                        |              |
| <b>Oil</b>                   | Change                                                          |                     |                      |                      | •                     |                       |                       |                        | Section 10-5 |
| <b>Air Cleaner Element</b>   | Check and replace if necessary                                  |                     |                      |                      | •                     |                       |                       |                        | Section 10-4 |
| <b>Labels</b>                | Replace any unreadable labels                                   |                     |                      |                      |                       | •                     |                       |                        |              |
| <b>Oil Filter</b>            | Replace                                                         |                     |                      |                      |                       | •                     |                       |                        | Section 10-5 |
| <b>Fuel Filter</b>           | Replace                                                         |                     |                      |                      |                       | •                     |                       |                        | Section 10-5 |
| <b>Weld Cables</b>           | Check cables for any signs of damage and replace if necessary.  |                     |                      |                      |                       |                       | •                     |                        |              |
| <b>Spark Plug Gap</b>        | Check and replace if necessary                                  |                     |                      |                      |                       |                       | •                     |                        | 10-3         |
| <b>Brushes*</b>              | Check brushes and replace if necessary                          |                     |                      |                      |                       |                       |                       | •                      |              |
| <b>Slip Rings*</b>           | Check slip rings for any signs of wear or damage                |                     |                      |                      |                       |                       |                       | •                      |              |
| <b>Inside Unit</b>           | Clean                                                           |                     |                      |                      |                       |                       |                       | •                      |              |

\*To be done by factory authorized service agent.

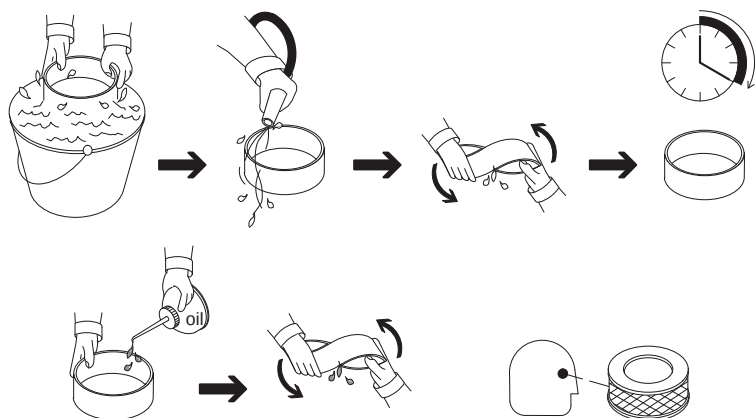
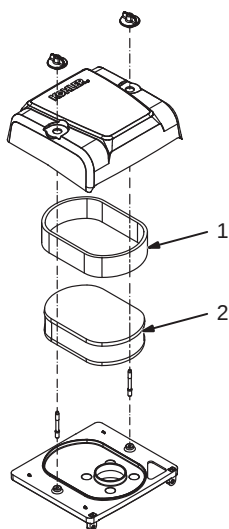
**NOTICE** – This equipment meets US EPA Evaporative Standards. Be sure fuel system replacement parts meet EPA Evaporative Standards.

## 10-3. Maintenance Label

| MACHINE<br>MAINTENANCE                                                                                                                                                                                                                                                                                                                                                                                                     | KOHLER ENGINE<br>ECH749                                                                                                                                                   |                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>12 V<br>BCI 51R<br>450 A @ 0°F (-18°C)                                                                                                                                                                                                                                                                                                | <div>100 h</div> <div>1. MILLER: 284122<br/>Kohler: 2408315-S</div>  <div>2. MILLER: 284123<br/>Kohler: 2408317-S</div>                                                     | <div>100 h</div> <div>1.7-1.9 US qt (1.6-1.8 L)<br/>Check engine<br/>dipstick.</div>                                                                                                | <div>°F</div> <div>100</div> <div>80</div> <div>60</div> <div>50</div> <div>32</div> <div>20</div> <div>0</div> <div>-20</div> <div>SAE 30</div> <div>SAE 5W-30</div> <div>10W-30</div> <div>API Class SJ or higher</div> |
| <div>8 h</div>  <div>GASOLINE<br/>11 gal (42 L)<br/>Unleaded,<br/>87 Octane min.<br/>(10% Max. Ethanol)</div>  <div>1000 h</div>  <div>Brushes<br/>MILLER: 292189</div> | <div>500 h</div>  <div>MILLER: 067007<br/>Kohler: 1213202-S<br/>Champion: RC-12YC<br/>Gap: 0.030 in. (.76 mm)<br/><i>Use only resistor spark<br/>plugs and wires.</i></div> | <div>200 h</div>  <div>MILLER: 066698<br/>Kohler: 1205001-S</div> <div>Tune-up and Filter Kit<br/>MILLER: 294669<br/>(Includes Air, Fuel, and Oil Filters, and 2 Spark Plugs)</div> | <div>200 h</div>  <div>MILLER: 283614<br/>Kohler: 2405013-S</div>                                                                      |

293897-C

## 10-4. Servicing Air Cleaner



### Stop engine.

**NOTICE** – Do not run engine without air cleaner or with dirty element. Engine damage caused by using a damaged element is not covered by the warranty.

#### 1 Precleaner

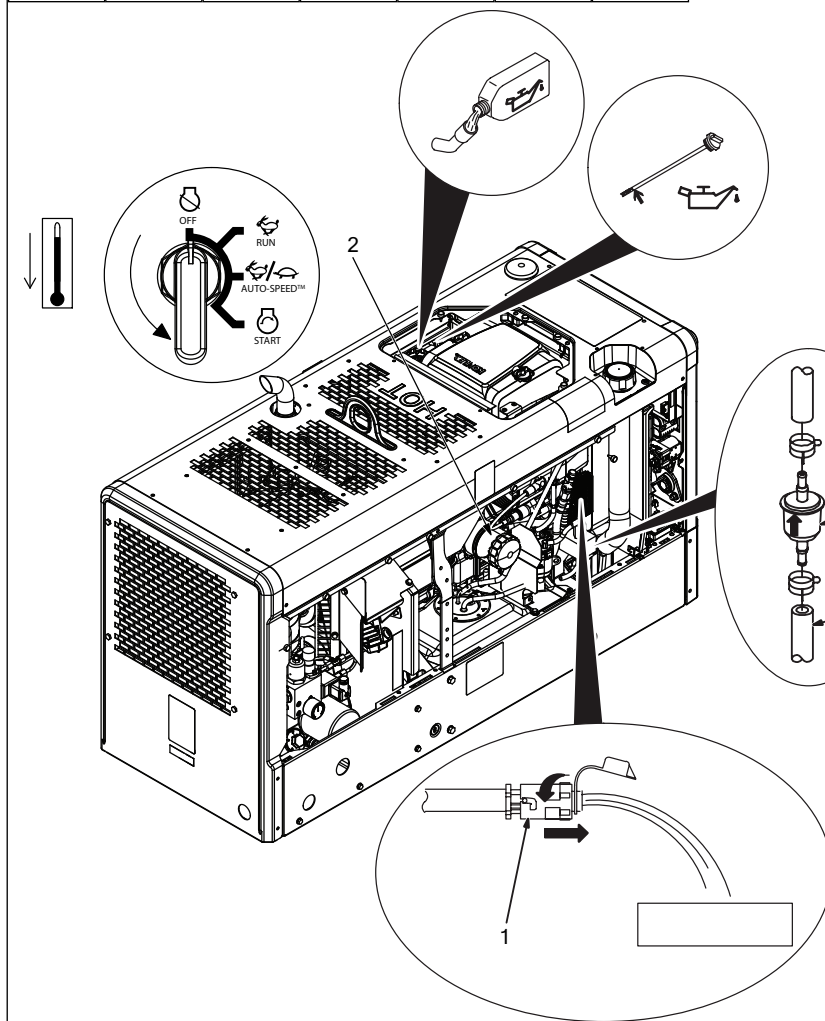
Wash precleaner with soap and water solution. Allow precleaner to air dry completely.

Spread 1 tablespoon SAE 30 oil evenly into precleaner. Squeeze out excess oil.

#### 2 Element

Replace element if damaged, dirty, or oily.

## 10-5. Changing Engine Oil, Oil Filter, And Fuel Filter



**⚠ Stop engine and let cool.**

- 1 Oil Drain Valve
- 2 Oil Filter

Change engine oil and filter according to engine owner's manual.

**NOTICE** – Close valve and valve cap before adding oil and running engine.

Fill crankcase with new oil to full mark on dipstick (see Section 10-3).

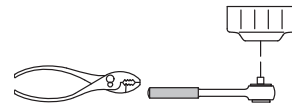
- 3 Fuel Filter
- 4 Fuel Line

Replace line if cracked or worn. Install new filter with arrow pointing in the direction of fuel flow. Wipe up any spilled fuel.

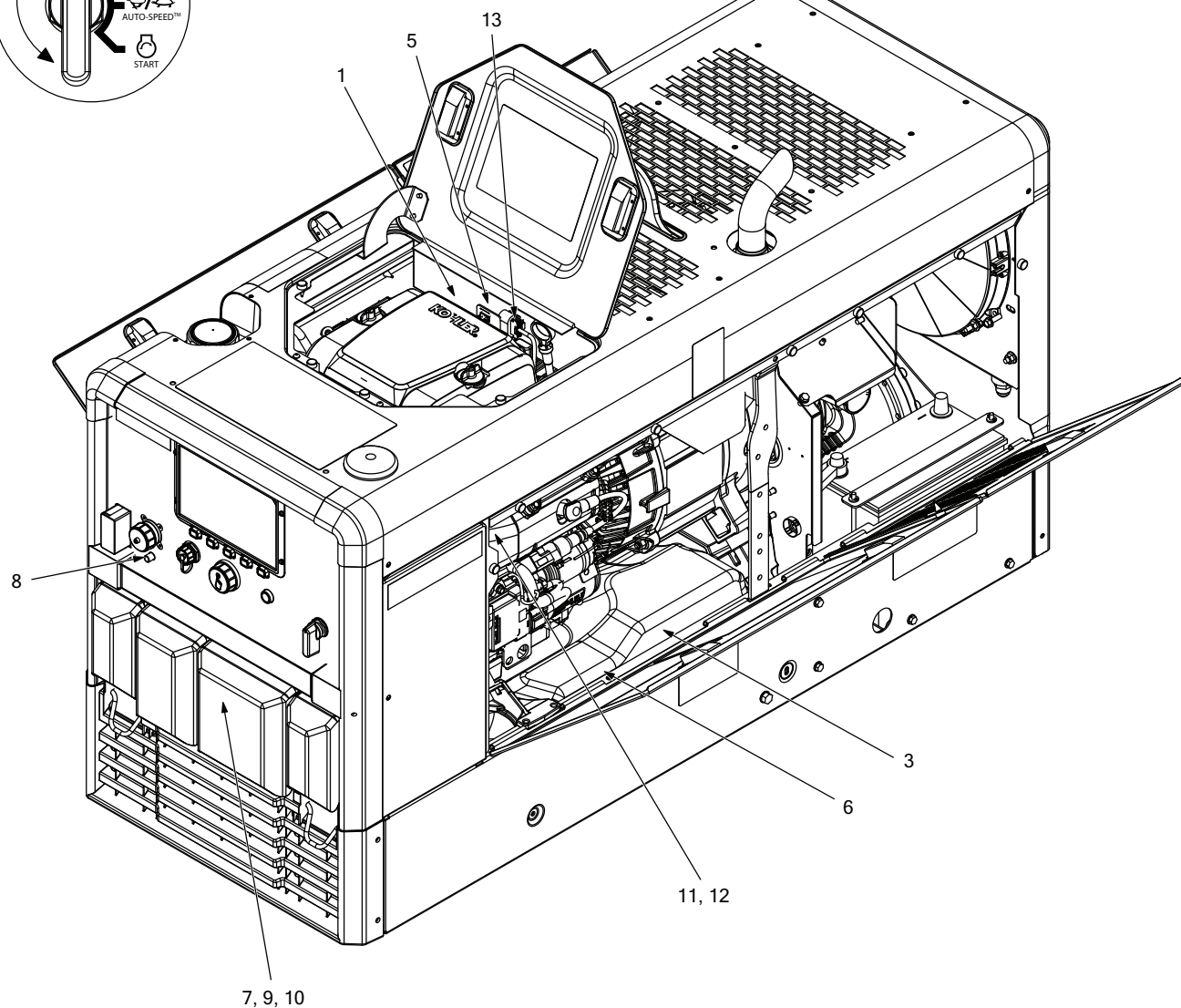
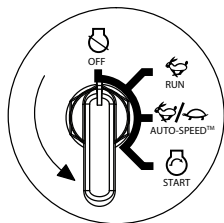
Start engine, and check for fuel leaks.

**⚠ Stop engine, tighten connections as necessary, and wipe up fuel.**

See Section 10-1 for resetting oil maintenance countdown.



## 10-6. Overload Protection



### Stop engine.

*When a circuit breaker, supplementary protector or fuse opens, it usually indicates a more serious problem exists. Contact a Factory Authorized Service Agent.*

#### 1 Fuse F1

Protects engine ECU from overload. If open, engine will not start.

#### 2 Fuse F2 (Inside Front Panel)

Protects DC circuits in machine. If open, machine will not turn on.

#### 3 Fuse F3

Protects voltage regulator from overload. If open battery will not charge.

#### 4 Fuse F4 (Inside Front Panel)

Protects battery charge circuit. If open battery charge will not work.

#### 5 Fuse F5

Protects engine ECU from overload. If open, engine will not start.

#### 6 Fuse F6

Protects CAN wiring from overload. If open, CAN connection will not work.

#### 7 Circuit Breaker CB1 (Under Cover)

Protects all receptacles from overload. If open the receptacles will not work.

#### 8 Circuit Breaker CB2

Protects 14 pin receptacle.

#### 9 Circuit Breaker CB3 (Under Cover)

Protects non Excel 120V receptacle.

#### 10 Circuit Breaker CB4 (Under Cover)

Protects Excel 120V receptacle.

#### 11 Circuit Breaker CB5 (On Engine Baffle)

Protects Excel power circuits.

#### 12 Circuit Breaker CB6 (On Engine Baffle)

Protects fan and clutch circuits. If open, air compressor will not work.

#### 13 Not Used

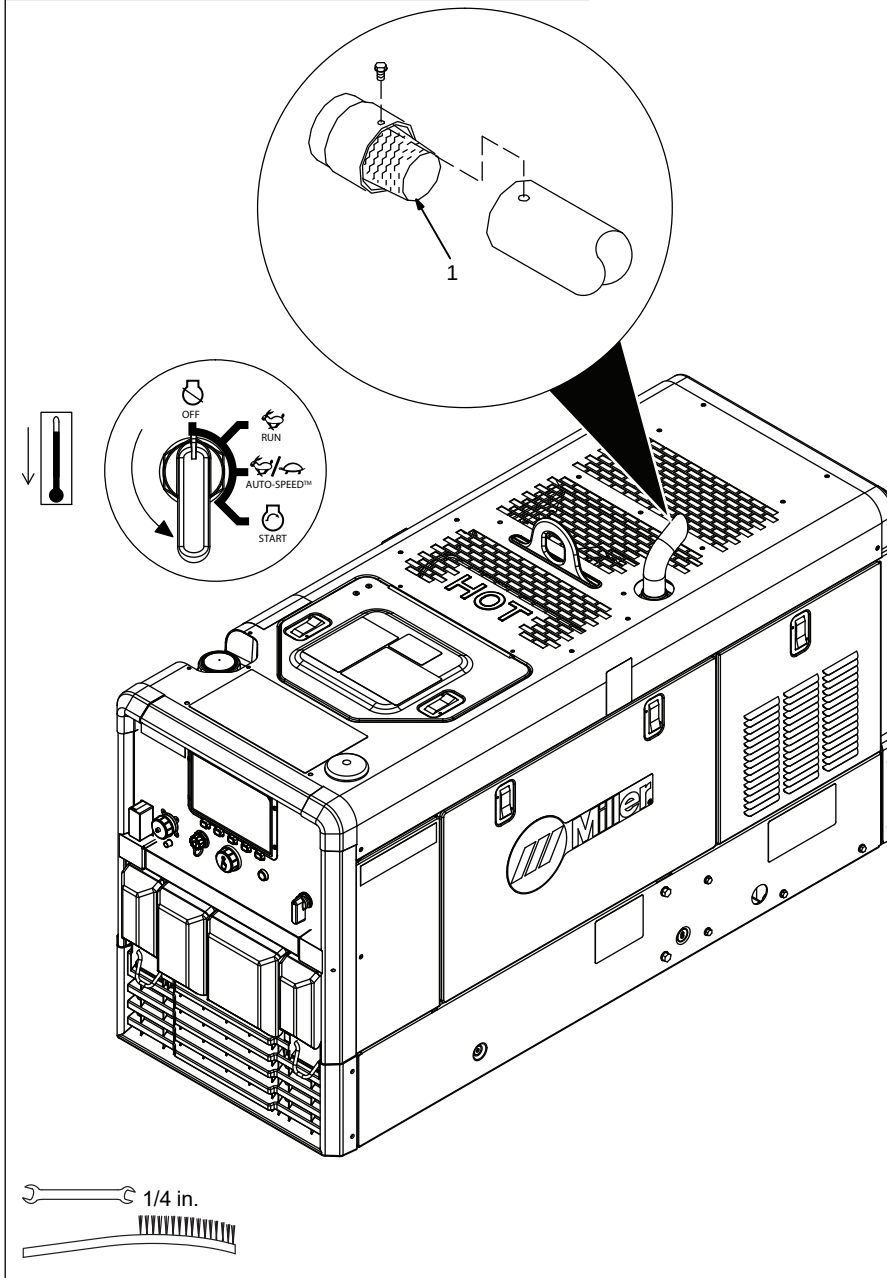
## 10-7. Servicing Optional Spark Arrestor



 **Stop engine and let cool.**

1 Spark Arrestor Screen

Clean and inspect screen. Replace spark arrestor if screen wires are broken or missing.



## 10-8. Engine Speed Adjustment

Engine speed is controlled by an electronic governor. Engine speed adjustments may be made by an Engine Factory Authorized Service Agent. Tampering with adjustments may affect engine warranty.

On startup, engine will go through warm up procedure where maximum speed is reduced to 3500 RPM.

# SECTION 11 – AIR COMPRESSOR MAINTENANCE

## 11-1. Maintenance

 Replace compressor oil and filter after the first 50 hours of operation.



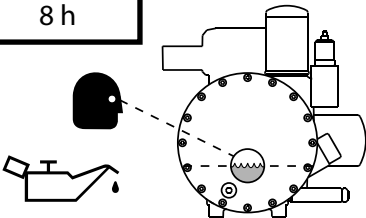
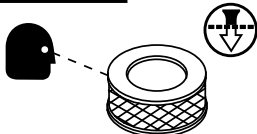
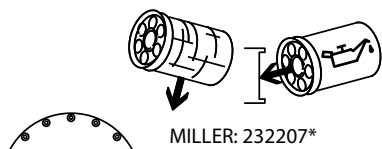
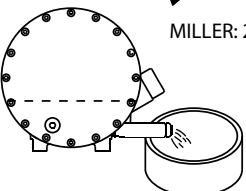
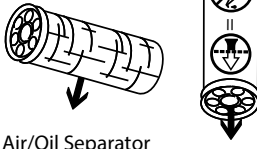
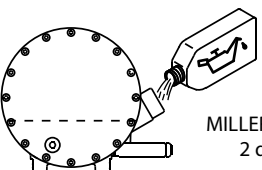
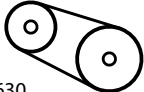
 Stop engine before maintaining.

 See compressor Maintenance Label for important start-up and service information. Service compressor more often if used in severe conditions.

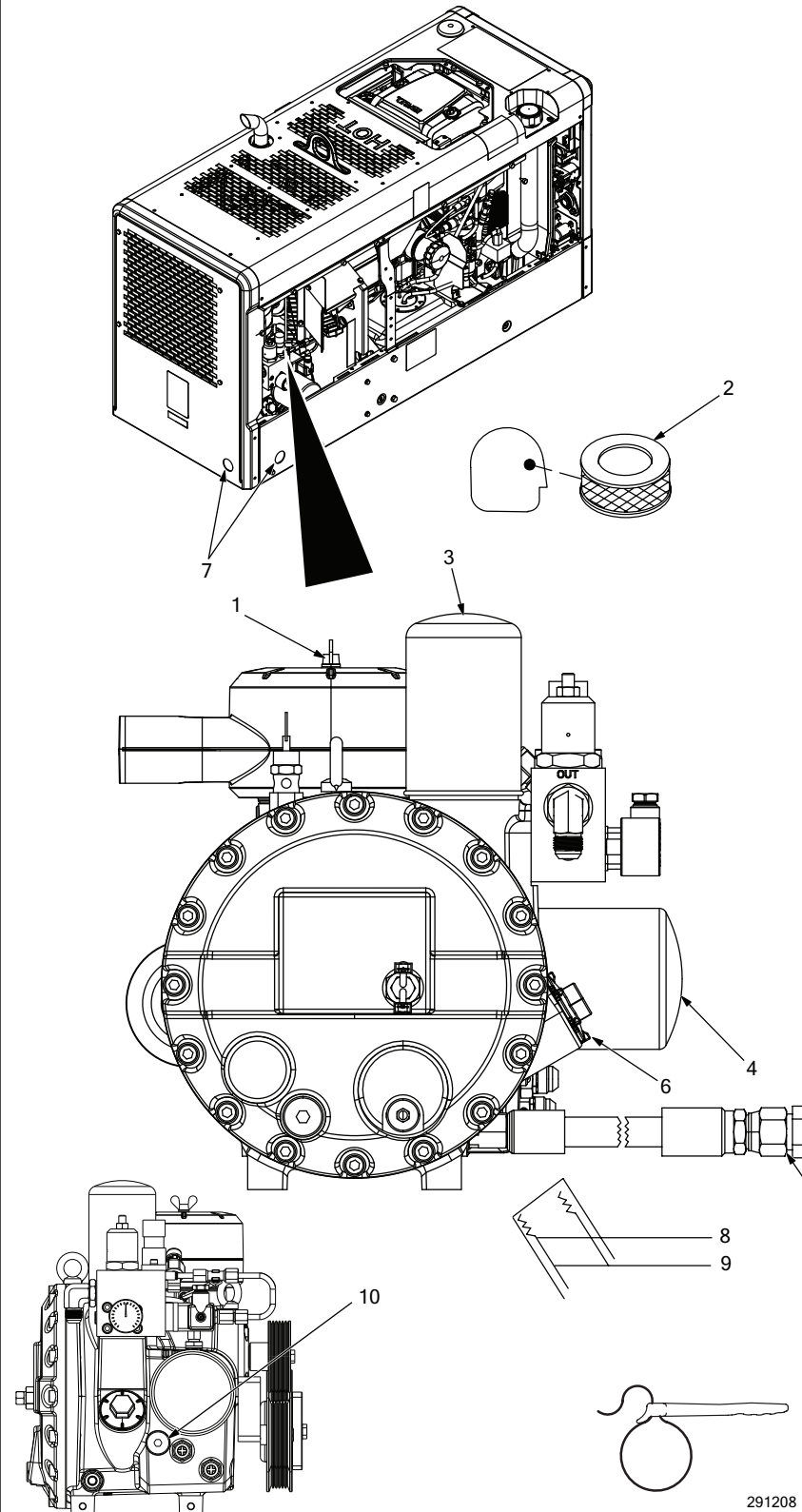
 Recycle compressor fluids.

| Maintenance Schedule      |                                                       | Every<br>8<br>Hours | Every<br>250<br>Hours | Every<br>500<br>Hours/1<br>Year | Every<br>1000<br>Hours/1<br>Year | Every<br>2000<br>Hours/2<br>Years | Reference    |
|---------------------------|-------------------------------------------------------|---------------------|-----------------------|---------------------------------|----------------------------------|-----------------------------------|--------------|
| Oil                       | Check oil level.<br>Clean any oil spills.             | •                   |                       |                                 |                                  |                                   | Section 4-5  |
| Maintenance Screen        | Check Maintenance screen for next oil change interval | •                   |                       |                                 |                                  |                                   | Section 10-1 |
| Air Cleaner               | Check and replace if necessary                        |                     | •                     |                                 |                                  |                                   | Section 11-3 |
| Oil and Oil Filter        | Change                                                |                     |                       | •                               |                                  |                                   | Section 11-3 |
| Air and Control Lines     | Check for wear and aging.                             |                     |                       | •                               |                                  |                                   |              |
| Optional Air Dryer Filter | Change                                                |                     |                       | •                               |                                  |                                   | Section 11-4 |
| Air/Oil Separator         | Change                                                |                     |                       |                                 | •                                |                                   | Section 11-3 |
| Belt                      | Check condition and tension.                          |                     |                       |                                 |                                  | •                                 |              |

11-2. Compressor Maintenance Label

| AIR COMPRESSOR |                                                                                                                       |   |
|----------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8 h            |                                      | 250 h                                                                                                                                                                |
|                |                                                                                                                       | <br>MILLER: 232208*                                                                |
| 500 h / 1 yr   | <br>MILLER: 232207*                  | 1000 h / 1 yr                                                                                                                                                        |
|                |                                      | <br>Air/Oil Separator<br>MILLER: 275648*                                           |
|                | <br>MILLER: 276620*<br>2 qt (1.9 L) | 2000 h / 2 yr                                                                                                                                                        |
|                |                                                                                                                       | <br>MILLER: 274630<br>Dayco: 6060470                                               |
|                |                                                                                                                       | * FILTER KIT 275644 contains noted filters and oil.<br>294714-A                                                                                                      |

## 11-3. Servicing Compressor Air Cleaner And Air/Oil Separator



**⚠ Stop engine.**

**⚠ Always put Engine Control Switch in the Off position before working on unit to prevent automatic starting.**

**⚠ Do not open oil fill cap until unit has been off for 10 minutes and the air compressor gauge reads zero. Do not open while running.**

**⚠ Do not run air compressor without air cleaner or with dirty element. Compressor damage caused by using a damaged element is not covered by the warranty.**

1 Compressor Air Cleaner Cover

2 Air Cleaner Element

*✍ Air cleaner element is easier to access from battery side of unit.*

Wipe off cover. Remove cover and element. Wipe dust from cover and housing with damp cloth. Inspect element and install new element if necessary. Reinstall cover.

**⚠ Do not clean element with compressed air.**

3 Air/Oil Separator

### To replace air/oil separator:

Turn filter counterclockwise. Remove filter.

Apply thin coat of oil to gasket on new filter. Install filter and turn clockwise 1/2 to 3/4 turn after gasket contact is made.

4 Air Compressor Oil Filter

5 Air Compressor Oil Drain Plug

6 Oil Fill Pipe Cap

7 Possible Drain Hose Routing Locations

### To change compressor oil and filter:

Drain compressor oil while compressor is still warm.

Remove oil drain plug to drain oil.

Remove filter by turning filter counterclockwise. Apply thin coat of oil to gasket on new filter. Install new filter and turn clockwise 1/2 to 3/4 turn after gasket contact is made.

Reinstall oil drain plug and torque to 40 ft lb.

Add recommended oil until oil level is half way up oil fill pipe (see maintenance label for oil specifications). Reinstall oil fill cap. Hand-tighten cap to prevent pressure release or oil leak.

8 High/Max

9 Low/Min

10 Sight Glass

*✍ Bottom of oil sight glass is minimum oil level. Top of oil sight glass is full.*

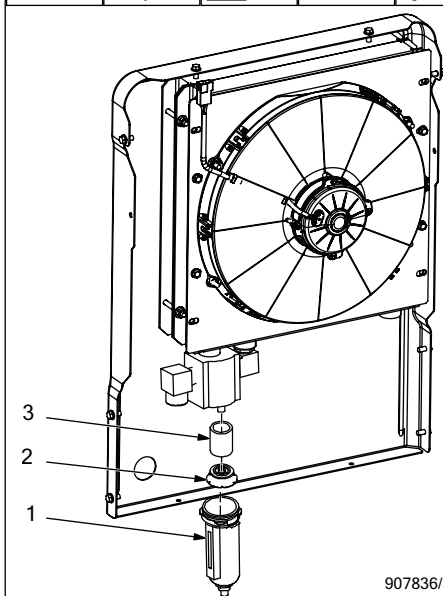
Start engine, run air compressor, and check for oil leaks.

**⚠ Stop engine.**

Check oil level and top off to fill line if necessary.

291208

## 11-4. Replacing Optional Air Dryer Filter (Separator)



907836/804054

-  Stop engine, and let cool.
-  Disconnect battery negative (-) cable.
-  Pressure may remain in air dryer system even though gauge reads 0 psi. Release pressure in air dryer system by connecting hose to outlet and waiting for pressure to bleed off.

Replace filter annually or when air dryer output is too low.

- 1 Bowl
- 2 Collar
- 3 Filter Element

To replace filter, push up and turn bowl 1/4 turn counterclockwise. Unscrew collar and remove filter.

Install new filter and reinstall collar and bowl.

# SECTION 12 – TROUBLESHOOTING

## 12-1. Front Panel Display Code Information

| LCD Message                                             | Help Code | Problem                                                                                                                 | Possible Cause                                                  | Potential Solution                          |
|---------------------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|
| Engine Oil Pressure Error - Have Unit Serviced          | ERR PF00  | Despite RPM, oil pressure switch is ON.                                                                                 | Indicates malfunction of the oil pressure switch.               | Contact a Factory Authorized Service Agent. |
| Engine Overheat Error - Let Engine Cool                 | ERR PT00  | Engine temperature is greater than or equal to 329°F (165°C).                                                           | High engine demand.                                             | Wait for unit to cool.                      |
| Engine Temp Sensor Error - Have Unit Serviced           | ERR PT01  | Voltage of oil temperature sensor is out of range.                                                                      | Indicates malfunction of the engine temp sensor.                | Contact a Factory Authorized Service Agent. |
| Engine Battery Error - Check Battery                    | ERR PB00  | ECU recognition of battery voltage is below 10 volts or above 16 volts.                                                 | Bad battery.                                                    | Check battery.                              |
| Engine Sensor Supply Error - Have Unit Serviced         | ERR PN00  | Less than 23 teeth are detected per engine revolution. Voltage drops below calibrated trigger: typically 2-3 volt drop. | Indicates malfunction of the crank position sensor.             | Contact a Factory Authorized Service Agent. |
| Engine Throttle Actuator Error - Have Unit Serviced     | ERR PE04  | Movement of the throttle blade is restricted.                                                                           | Indicates malfunction of the throttle actuator.                 | Contact a Factory Authorized Service Agent. |
| Engine Throttle Actuator Error - Have Unit Serviced     | ERR PE05  | Relative voltage in circuit.                                                                                            | Indicates malfunction of the throttle actuator.                 | Contact a Factory Authorized Service Agent. |
| Engine Fuel Injector Error - Have Unit Serviced         | ERR PE06  | Electrical circuit open or short.                                                                                       | Indicates malfunction of the fuel injector.                     | Contact a Factory Authorized Service Agent. |
| Engine Ignition Coil Error - Have Unit Serviced         | ERR PE07  | Electrical circuit open or short.                                                                                       | Indicates malfunction of the ignition coil.                     | Contact a Factory Authorized Service Agent. |
| Engine Fuel Pump Error - Have Unit Serviced             | ERR PV00  | Voltage of fuel pump circuit out of range.                                                                              | Indicates malfunction of fuel pump.                             | Contact a Factory Authorized Service Agent. |
| Engine Air Temp Sensor Error - Have Unit Serviced       | ERR PV01  | Voltage of air temperature circuit out of range.                                                                        | Indicates malfunction of air temperature sensor.                | Contact a Factory Authorized Service Agent. |
| Engine TPS Error - Have Unit Serviced                   | ERR PV02  | Voltage of TPS circuit out of range.                                                                                    | Indicates malfunction of TPS.                                   | Contact a Factory Authorized Service Agent. |
| Engine O2 Sensor Error - Have Unit Serviced             | ERR PV03  | Voltage of O2 sensor circuit out of range.                                                                              | Indicates malfunction of O2 sensor.                             | Contact a Factory Authorized Service Agent. |
| Engine Fuel Adaption Error - Have Unit Serviced         | ERR PE08  | Control above or below calibrated threshold.                                                                            | Operating out of range.                                         | Contact a Factory Authorized Service Agent. |
| Engine Lean Fuel Error - Have Unit Serviced             | ERR PE09  | Lean at high load/open loop operation.                                                                                  | Operating out of range.                                         | Contact a Factory Authorized Service Agent. |
| Engine MAP Sensor Error - Have Unit Serviced            | ERR PE10  | MAP sensor out of range.                                                                                                | Indicates malfunction of MAP sensor.                            | Contact a Factory Authorized Service Agent. |
| Engine CPS Error - Have Unit Serviced                   | ERR PE11  | CPS sensor error.                                                                                                       | Indicates malfunction of CPS sensor.                            | Contact a Factory Authorized Service Agent. |
| Engine Check Error - Have Unit Serviced                 | ERR PE02  | Check Engine Error.                                                                                                     | Indicates malfunction of the engine.                            | Contact a Factory Authorized Service Agent. |
| Boost Connector Error - Have Power Module Serviced      | ERR EE00  | Inverter Control board does not have connector RC2 plugged in.                                                          | Indicates malfunction in the primary power circuit of the unit. | Contact a Factory Authorized Service Agent. |
| Boost DC Bus Out of Range - Have Unit Serviced          | ERR EE01  | DC bus voltage too high or low for 10 sec.                                                                              | Indicates malfunction in the primary power circuit of the unit. | Contact a Factory Authorized Service Agent. |
| Boost DC Bus High Error - Have Power Module Serviced    | ERR EV00  | Inverter Control board bus voltage exceeded 480V during operation.                                                      | Indicates malfunction in the primary power circuit of the unit. | Contact a Factory Authorized Service Agent. |
| Boost DC Bus Low Error - Have Power Module Serviced     | ERR EU00  | Inverter Control board bus voltage went below 160V while engine was running.                                            | Indicates malfunction in the primary power circuit of the unit. | Contact a Factory Authorized Service Agent. |
| Boost Initial Check Error - Have Power Module Serviced  | ERR EB00  | Bus voltage detected below 360V after soft start.                                                                       | Indicates malfunction in the primary power circuit of the unit. | Contact a Factory Authorized Service Agent. |
| Boost Current Sensor Error - Have Power Module Serviced | ERR EN00  | Inverter Control board current sensor is not wired correctly or high boost current detected.                            | Indicates malfunction in the primary power circuit of the unit. | Contact a Factory Authorized Service Agent. |

| LCD Message                                                                                     | Help Code | Problem                                                                                               | Possible Cause                                                         | Potential Solution                                                                                                                                     |
|-------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Boost Over Current Error - Have Power Module Serviced                                           | ERR EG00  | Inverter Control board detected boost current over 100A.                                              | Indicates malfunction in the primary power circuit of the unit.        | Contact a Factory Authorized Service Agent.                                                                                                            |
| Inverter Primary CT Error - Have Power Module Serviced                                          | ERR HG00  | Transformer primary current exceeded trip level.                                                      | Indicates malfunction in the primary power circuit of the unit.        | Contact a Factory Authorized Service Agent.                                                                                                            |
| Inverter Current Sensor Error - Have Power Module Serviced                                      | ERR DE00  | Output Current Sensor not reading correctly.                                                          | Indicates malfunction of the output current sensor.                    | Contact a Factory Authorized Service Agent.                                                                                                            |
| Inverter Plus 15V Error - Have Power Module Serviced                                            | ERR HN00  | Inverter Control board +15V supply out of range.                                                      | Indicates malfunction of the power supplies on inverter control board. | Contact a Factory Authorized Service Agent.                                                                                                            |
| Inverter Plus 5V Error - Have Power Module Serviced                                             | ERR HN01  | Inverter Control board +5V supply out of range.                                                       | Indicates malfunction of the power supplies on inverter control board. | Contact a Factory Authorized Service Agent.                                                                                                            |
| Inverter Plus 12V Error - Check Battery Voltage                                                 | ERR HN02  | Battery voltage outside of range.                                                                     | Low battery voltage.                                                   | Charge battery.                                                                                                                                        |
| Inverter Minus 15V Error - Have Power Module Serviced                                           | ERR HN03  | Inverter Control board -15V supply out of range.                                                      | Indicates malfunction of the power supplies on inverter control board. | Contact a Factory Authorized Service Agent.                                                                                                            |
| Inverter Connector Error - Have Power Module Serviced                                           | ERR DE01  | Inverter Control board does not have inverter connector plugged in.                                   | Indicates malfunction in the primary power circuit of the unit.        | Contact a Factory Authorized Service Agent.                                                                                                            |
| Boost LIN Communication Error - Have Power Module Serviced                                      | ERR NC00  | Inverter Control board boost LIN communication fault.                                                 | Indicates malfunction of the communication systems.                    | Contact a Factory Authorized Service Agent.                                                                                                            |
| Inverter LIN Communication Error - Have Power Module Serviced                                   | ERR NC01  | Inverter Control board inverter LIN communication fault.                                              | Indicates malfunction of the communication systems.                    | Contact a Factory Authorized Service Agent.                                                                                                            |
| Inverter Thermistor Open Error - Have Power Module Serviced                                     | ERR DH00  | Inverter Control board thermistor open.                                                               | Indicates a malfunction in the thermal protection circuitry.           | Contact a Factory Authorized Service Agent.                                                                                                            |
| Inverter Thermistor Short Error - Have Power Module Serviced                                    | ERR DH01  | Inverter Control board thermistor shorted.                                                            | Indicates a malfunction in the thermal protection circuitry.           | Contact a Factory Authorized Service Agent.                                                                                                            |
| Inverter Over Temp Error - Wait For Temp To Drop                                                | ERR DH02  | Inverter Control board thermistor overtemp.                                                           | Indicates the unit has overheated.                                     | The unit has shut down to allow the fan to cool it. Operation will continue when the unit has cooled.                                                  |
| Remote Disconnected Error - Remote Disconnected With Contactor Control. Clear to Enable Output. | ERR RE00  | Lost 14 pin remote command with contactor control. Lost WIC remote connection with contactor control. | Remote disconnected.                                                   | Re-connect remote.                                                                                                                                     |
| Spool Gun Not Connected - Connect Spool Gun                                                     | ALRT WE00 | Spool gun not connected.                                                                              | Spool gun not connected.                                               | Check spool gun connection.                                                                                                                            |
| Spool Gun Motor Error - Have Power Module Serviced                                              | ERR WK00  | Spool gun motor fault.                                                                                | High Current detected in spool gun motor circuit.                      | Check spool gun connector and cable. Switch process or power cycle unit to clear error. If issue persists, contact a Factory Authorized Service Agent. |
| Polarity Reversing Error - Have Unit Serviced                                                   | ERR LL00  | Polarity Reversing contactor stuck in incorrect polarity.                                             | Stuck contactor.                                                       | Contact a Factory Authorized Service Agent.                                                                                                            |
| Inverter Control Comm Error - Have Power Module Serviced                                        | ERR NC02  | Inverter Control board communication fault between inverter and weld micro.                           | Indicates malfunction of the communication systems.                    | Contact a Factory Authorized Service Agent.                                                                                                            |
| AC Over Pressure - Reduce Tank Pressure                                                         | ALRT AV00 | Tank pressure over 185 PSI.                                                                           | Compressor pumping air past set point.                                 | Reduce pressure in tank.                                                                                                                               |
| AC Over Temp - Wait For Temp To Drop                                                            | ALRT AT00 | Air compressor oil temp over 257°F (125°C).                                                           | High air demand.                                                       | Wait for unit to cool.                                                                                                                                 |
| AC Thermistor Open Error - Have Unit Serviced                                                   | ERR AH00  | Air compressor thermistor reading above valid temperature.                                            | Thermistor not connected.                                              | Contact a Factory Authorized Service Agent.                                                                                                            |
| AC Thermistor Short Error - Have Unit Serviced                                                  | ERR AH01  | Air compressor thermistor reading below valid temperature.                                            | Thermistor shorted.                                                    | Contact a Factory Authorized Service Agent.                                                                                                            |

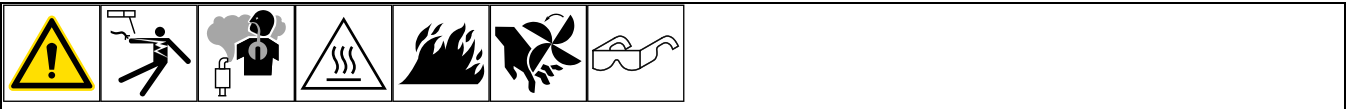
| LCD Message                                                               | Help Code | Problem                                                                                                                     | Possible Cause                                                             | Potential Solution                                                                                   |
|---------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| AC Transducer Open Error - Have Unit Serviced                             | ERR AH02  | Air compressor pressure transducer reading above valid pressure.                                                            | Transducer not connected.                                                  | Contact a Factory Authorized Service Agent                                                           |
| AC Transducer Short Error - Have Unit Serviced                            | ERR AH03  | Air compressor pressure transducer reading below valid pressure.                                                            | Transducer shorted.                                                        | Contact a Factory Authorized Service Agent.                                                          |
| Batt Charge Error - Check Charge Voltage                                  | ERR BP00  | Battery charge set to wrong voltage.                                                                                        | Incorrect battery charge voltage selected.                                 | Select charge voltage that matches battery.                                                          |
| Batt Read Open Error - Check Battery Connection                           | ERR BU00  | Battery is disconnected or reverse connected.                                                                               | Disconnected battery.                                                      | Check battery connection.                                                                            |
| Batt Check Open Error - Check Battery Connection                          | ERR BU01  | Battery is disconnected.                                                                                                    | Disconnected battery.                                                      | Check battery connection.                                                                            |
| Batt Charge Check Error - Bad Battery Replace Battery                     | ERR BE00  | Not enough voltage or no current flow during battery check.                                                                 | Bad battery.                                                               | Check battery.                                                                                       |
| Batt Jump Start Timeout Error - Jump Start Timer Expired                  | ERR BE01  | Battery charging at more than 155A for over 20 seconds.<br>Battery charge current at 0 or less current for over 40 seconds. | Boost charge timer expired.<br>Battery not drawing current, timer expired. | Check load on battery.<br>Check connection to battery.                                               |
| Batt Final Check Error - Bad Battery Replace Battery                      | ERR BE02  | Voltage has fallen below fault level after charging.                                                                        | Bad battery.                                                               | Replace battery.                                                                                     |
| Batt Final Check Battery Error - Bad Battery Replace Battery              | ERR BE03  | Too many retries on battery charge final test.                                                                              | Bad battery.                                                               | Replace battery.                                                                                     |
| Batt Charge Timer Expired Error - Wait For Process To Start Again         | ERR BX00  | Battery charging past 13.5 hours.                                                                                           | Battery charge time expired.                                               | Start battery charge process again if more time needed.                                              |
| Batt Charge Check Connection - Check Battery Connection                   | ALRT BN00 | Battery connection lost or polarity incorrect.                                                                              | Battery connection lost or connected in reverse.                           | Check battery connection.                                                                            |
| Batt Charge Over Voltage Error - Check Battery, Disconnect Clamp To Clear | ERR BV00  | 24V Battery when in 12V charge. High voltage detected while charging.                                                       | Incorrect battery charge voltage selected. Battery not taking charge.      | Disconnect clamps from battery. Select charge voltage that matches battery. Reconnect and try again. |
| Control Board Communication Error - Cycle Power                           | ERR SA01  | CAN communication timeout on control board.                                                                                 | Indicates issue with CAN communication between boards.                     | Contact a Factory Authorized Service Agent.                                                          |
| Software Invalid or Mismatch - Update Software                            | ERR SA00  | Different software versions among PC boards.                                                                                | Different software versions among PC boards.                               | Contact a Factory Authorized Service Agent.                                                          |
| Arc Reach Compatible Fault - Have Unit Serviced                           | ERR SS00  | PC1 Inverter DSP Firmware not able to run accessory                                                                         | PC1 Inverter DSP not at latest version                                     | Contact a Factory Authorized Service Agent                                                           |

## 12-2. Welding Troubleshooting



| Trouble                                                                         | Remedy                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No weld output.                                                                 | Check weld control settings.<br>Check weld connections.<br>Disconnect equipment from generator power receptacles during start-up.<br>Increase front panel and/or remote voltage/amperage control settings (see Sections 5-9 and 5-16).<br>Check and secure connections to Remote receptacle RC41 (see Sections 4-10).<br>Have Factory Authorized Service Agent check brushes, slip rings, and circuit boards PC1 PC2.                                                           |
| Low weld output.                                                                | Check control settings.<br>Increase front panel and/or remote voltage/amperage control settings (see Sections 5-9 and 5-16).<br>Check and clean air cleaner as necessary (see Section 10-4).<br>Have Factory Authorized Service Agent check engine speed, brushes, slip rings, and circuit board PC1.<br>See engine manual.                                                                                                                                                     |
| High weld output.                                                               | Check control settings.<br>Have Factory Authorized Service Agent check engine speed and circuit boards PC1 and PC2.                                                                                                                                                                                                                                                                                                                                                             |
| Weld output cannot be adjusted.                                                 | Have Factory Authorized Service Agent check circuit board PC1 and Disconnect remote..                                                                                                                                                                                                                                                                                                                                                                                           |
| Erratic weld output.                                                            | Check control settings.<br>Clean and tighten connections both inside and outside unit.<br>Check and secure lead connections to remote control.<br>Be sure connection to work piece is clean and tight.<br>Remove excessive coils from weld cables.<br>Use dry, properly stored electrodes.<br>Have Factory Authorized Service Agent check engine speed, brushes, slip rings, and circuit board PC1.<br>Check shielding gas, ensure proper shielding gas coverage while welding. |
| No remote voltage/amperage control.                                             | Check and tighten connections to Remote receptacle RC4 (see Section 4-10). Check and secure lead connections to remote control and verify remote is set to AUTO (see Section 5-9).                                                                                                                                                                                                                                                                                              |
| No front panel voltage/amperage control.                                        | Disconnect remote control from Remote receptacle RC4 if not needed for weld process (see Section 4-10) or turn Remote to OFF (see Section 5-9).                                                                                                                                                                                                                                                                                                                                 |
| No 24 volt AC power output at Remote receptacle RC4.                            | Reset supplementary protector CB2 (located below remote receptacle).                                                                                                                                                                                                                                                                                                                                                                                                            |
| Difficulty in establishing Gas Tungsten Arc Welding arc.                        | Use proper size tungsten for welding amperage.<br>Check cables and torch for cracked or deteriorated insulation or bad connections. Repair or replace necessary parts.                                                                                                                                                                                                                                                                                                          |
| Wandering arc – poor control of arc direction.                                  | Reduce gas flow rate.<br>Select proper size tungsten. Properly prepare tungsten.                                                                                                                                                                                                                                                                                                                                                                                                |
| Tungsten electrode oxidizing and not remaining bright after conclusion of weld. | Shield weld zone from drafts.<br>Increase postflow time.<br>Check and tighten all gas fittings.<br>Properly prepare tungsten.                                                                                                                                                                                                                                                                                                                                                   |

12-3. Generator Power Troubleshooting



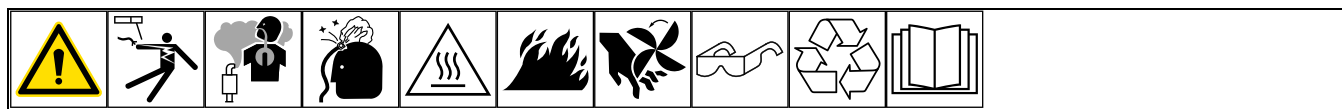
| Trouble               | Remedy                                                                                                |
|-----------------------|-------------------------------------------------------------------------------------------------------|
| No power output.      | Reset supplementary protectors CB1 and CB3 (see Section 10-6).                                        |
|                       | Have Factory Authorized Service Agent check brushes, slip rings, and circuit board PC2.               |
| Low power output.     | Check and clean air cleaner as necessary.                                                             |
|                       | Have Factory Authorized Service Agent check engine speed.                                             |
|                       | Have Factory Authorized Service Agent check circuit board PC2.                                        |
| High power output.    | Have Factory Authorized Service Agent check engine speed.                                             |
| Erratic power output. | Have Factory Authorized Service Agent check engine speed, brushes, slip rings, and circuit board PC2. |
|                       | Check receptacle wiring and connections.                                                              |

## 12-4. Engine Troubleshooting



| Trouble                                                                                                                          | Remedy                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Engine will not crank.                                                                                                           | Check supplementary protector(s) and Fuse F2 (see Section 10-6).                                                                                  |
|                                                                                                                                  | Check battery voltage.                                                                                                                            |
|                                                                                                                                  | Check battery connections and tighten if necessary.                                                                                               |
|                                                                                                                                  | Check plug PLG1 and plug PLG8 connections.                                                                                                        |
|                                                                                                                                  | Have Factory Authorized Service Agent check Engine Control switch S2.                                                                             |
| Engine does not start.                                                                                                           | Check fuel level (see Section 4-5).                                                                                                               |
|                                                                                                                                  | Check battery and replace if necessary.                                                                                                           |
|                                                                                                                                  | Check Fuse F1 and F2 (see Section 10-6).                                                                                                          |
|                                                                                                                                  | Have Factory Authorized Service Agent check fuel pump.                                                                                            |
|                                                                                                                                  | See engine manual.                                                                                                                                |
| Engine starts, but stops when Engine Control switch returns to Auto Speed position.                                              | Check oil level (see Section 4-5). Low oil pressure shutdown stops engine if oil pressure is too low.                                             |
|                                                                                                                                  | Use correct grade oil for operating temperature. (See Section 10-3).                                                                              |
|                                                                                                                                  | Have Factory Authorized Service Agent check low oil pressure shutdown switch.                                                                     |
| Battery discharges between uses.                                                                                                 | Place Engine Control switch in Off position when unit is not running.                                                                             |
|                                                                                                                                  | Clean top of battery with baking soda and water solution; rinse with clear water.                                                                 |
|                                                                                                                                  | Periodically recharge battery (approximately every 3 months).                                                                                     |
|                                                                                                                                  | Replace battery.                                                                                                                                  |
|                                                                                                                                  | Check voltage regulator according to engine manual.                                                                                               |
| Engine stops during normal operation.                                                                                            | Check fuel level (see Section 4-5).                                                                                                               |
|                                                                                                                                  | Check oil level (see Section 4-5). Low oil pressure shutdown stops engine if oil pressure is too low.                                             |
|                                                                                                                                  | Have Factory Authorized Service Agent check fuel pump                                                                                             |
|                                                                                                                                  | Have Factory Authorized Service Agent check low oil pressure shutdown switch.                                                                     |
| Engine does not return to idle speed.                                                                                            | Be sure Engine Control switch S2 is in Auto Speed position.                                                                                       |
|                                                                                                                                  | Remove all weld and generator power loads.                                                                                                        |
|                                                                                                                                  | Turn off remote device connected to Remote receptacle RC41 (see Section 4-10).                                                                    |
|                                                                                                                                  | Have Factory Authorized Service Agent check circuit board PC1 and current transformer CT1.                                                        |
| Engine does not remain at weld/power speed when power or weld load is applied with Engine Control switch in Auto Speed position. | Place Engine Control switch in the Run position for small loads that current transformer CT1 cannot detect.                                       |
| During operation in near freezing temperatures, engine starts and goes to idle but stalls after a few minutes.                   | Treat fuel with isopropyl alcohol de-icer product.                                                                                                |
|                                                                                                                                  | Place Engine Control switch in the Run position until unit has been in operation and loaded for a period of time to increase engine temperature.. |
| During operation in severe cold weather, engine starts and goes to idle but stalls after a few minutes.                          | Install engine manufacturer's kit for cold-weather operation. Contact Kohler Engines.                                                             |

## 12-5. Compressor Troubleshooting



| Trouble                                                    | Remedy                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Air compressor does not operate; no air pressure on gauge. | Place Air Compressor switch in an On position. If compressor is turned off, wait for air pressure to bleed off before turning compressor on again.                                                                                                                                            |
|                                                            | Circuit breaker CB6 is open. If CB6 continues to open, contact Factory Authorized Service Agent.                                                                                                                                                                                              |
|                                                            | Check compressor belt and tension. Be sure correct belt is used and is properly installed. Replace belt if damaged or stretched.                                                                                                                                                              |
|                                                            | Have Factory Authorized Service Agent check Air Compressor control circuit and clutch.                                                                                                                                                                                                        |
| Air compressor stops with air demand.                      | Check compressor oil level (see Section 4-6). Automatic shutdown stops compressor if compressor temperature is too high.                                                                                                                                                                      |
|                                                            | Verify adequate air flow to compressor. Check for blocked air intake. Recirculation or open covers may cause overheating. Be sure all covers, panels, and doors are in place. Operate in area with proper airflow. Automatic shutdown stops compressor if compressor temperature is too high. |
|                                                            | Have Factory Authorized Service Agent check compressor cooling fan and clean compressor cooler core. Automatic shutdown stops compressor if compressor temperature is too high.                                                                                                               |
| Air compressor stops after short period of operation.      | Check compressor oil level (see Section 4-6). Automatic shutdown stops compressor if compressor temperature is too high.                                                                                                                                                                      |
|                                                            | Circuit breaker CB6 is open. If CB6 continues to open, contact Factory Authorized Service Agent.                                                                                                                                                                                              |
|                                                            | Check fan operation. Fan should run whenever compressor is on. Have Factory Authorized Service Agent check fan circuit.                                                                                                                                                                       |
|                                                            | Clean debris from oil cooler. Automatic shutdown stops compressor if compressor temperature is too high. Recirculation or open covers may cause overheating. Be sure all covers, panels, and doors are in place. Operate in area with proper airflow.                                         |
| Low air pressure.                                          | Check for leaks in air lines and hoses, including control line.                                                                                                                                                                                                                               |
|                                                            | Reduce air demand.                                                                                                                                                                                                                                                                            |
|                                                            | Close air outlet valve.                                                                                                                                                                                                                                                                       |
|                                                            | Check for frozen lines or hoses downstream from compressor outlet. Bypass cooler/separator in freezing temperatures (see Section 6-4).                                                                                                                                                        |
|                                                            | Adjust compressor air pressure (see Section 5-4).                                                                                                                                                                                                                                             |
|                                                            | Check air compressor air cleaner (see Section 11-3).                                                                                                                                                                                                                                          |
|                                                            | Check compressor oil level (see Section 4-6).                                                                                                                                                                                                                                                 |
|                                                            | Check air/oil separator, and replace if plugged (see Section 11-3).                                                                                                                                                                                                                           |
|                                                            | Check compressor belt and tension. Be sure correct belt is used and is properly installed. Replace belt if damaged or stretched.                                                                                                                                                              |
|                                                            | Have Factory Authorized Service Agent check compressor blow down valve, and for leaks in control lines. Also check air compressor for rated output.                                                                                                                                           |
| High air pressure.                                         | Adjust compressor air pressure (see Section 5-4).                                                                                                                                                                                                                                             |
|                                                            | Verify control line is connected at inlet valve. Check for frozen control lines. If ambient temperature is cold, run unit for a period of time to thaw control lines.                                                                                                                         |
|                                                            | Have Factory Authorized Service Agent check for leaks in control lines, and also check air gauge and compressor air inlet valve.                                                                                                                                                              |
| Insufficient air delivery.                                 | Check air compressor air cleaner and oil level (see Section 11-3).                                                                                                                                                                                                                            |
|                                                            | Check air/oil separator, and replace if plugged (see Section 11-3).                                                                                                                                                                                                                           |
|                                                            | Check for frozen lines or hoses downstream from compressor outlet. Bypass cooler/separator in freezing temperatures (see Section 6-4).                                                                                                                                                        |
|                                                            | Check compressor belt and tension. Be sure correct belt is used and is properly installed. Replace belt if damaged or stretched.                                                                                                                                                              |
|                                                            | Have Factory Authorized Service Agent check output of compressor for rated output.                                                                                                                                                                                                            |
|                                                            | If operating tools that need more air output, add air reservoir tank to system (see Section 6-2).                                                                                                                                                                                             |

| Trouble                                 | Remedy                                                                                                                                                                                                                                                                                        |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oil in air from compressor              | Check compressor oil level (see Section 4-6). If oil level is too high, system becomes saturated with oil.                                                                                                                                                                                    |
|                                         | Open line (nothing connected to compressor outlet) will result in oil in air. Do not operate with open air line.                                                                                                                                                                              |
|                                         | Change compressor air/oil separator if close to replacement hours (see Section 11-3).                                                                                                                                                                                                         |
|                                         | Wrong or mixed oil results in foaming which can cause oil in air. If mixed oil is suspected, replace oil, oil filter, and air/oil separator.                                                                                                                                                  |
|                                         | Check connections of control lines.                                                                                                                                                                                                                                                           |
|                                         | Have Factory Authorized Service Agent check for plugged oil scavenge line.                                                                                                                                                                                                                    |
| Air compressor overheats.               | Check compressor oil level (see Section 4-5). Automatic shutdown stops compressor if compressor temperature is too high.                                                                                                                                                                      |
|                                         | Verify adequate air flow to compressor. Check for blocked air intake. Recirculation or open covers may cause overheating. Be sure all covers, panels, and doors are in place. Operate in area with proper airflow. Automatic shutdown stops compressor if compressor temperature is too high. |
|                                         | Verify compressor fan is running while compressor is on. Contact Factory Authorized Service Agent if fan is not operating properly.                                                                                                                                                           |
|                                         | Adjust compressor air pressure (see Section 6-3).                                                                                                                                                                                                                                             |
|                                         | Replace compressor oil filter (see Section 11-3).                                                                                                                                                                                                                                             |
|                                         | Have Factory Authorized Service Agent check cooling fan. Automatic shutdown stops compressor if compressor temperature is too high.                                                                                                                                                           |
|                                         | Have Factory Authorized Service Agent check thermal valve element, and replace if necessary.                                                                                                                                                                                                  |
| Oil in compressor air cleaner.          | Clean compressor cooler radiator.                                                                                                                                                                                                                                                             |
|                                         | Have Factory Authorized Service Agent verify compressor inlet valve is operating properly. Replace air/oil separator filter.                                                                                                                                                                  |
| Water in compressor oil.                | Operate air compressor under load to get compressor to operating temp to remove water from oil.                                                                                                                                                                                               |
|                                         | If oil appears milky, change oil, oil filter, and air/oil separator.                                                                                                                                                                                                                          |
| Moisture in compressor air.             | Install optional air cooler with separator (Part No. 300420), or desiccant dryer (Part No. 195117).                                                                                                                                                                                           |
| System retains pressure after shutdown. | Have Factory Authorized Service Agent check compressor blow down valve, and leak back from airline.                                                                                                                                                                                           |

## 12-6. Battery Charge/Jump Troubleshooting



| Trouble                                                   | Remedy                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No battery charge/jump output.                            | Verify battery is connected properly and system is set correctly on the control screen (see Section 7).                                                                                                                                                                            |
|                                                           | Have Factory Authorized service Agent check Fuse F4.                                                                                                                                                                                                                               |
|                                                           | If a code is present, check Section 7-4 for possible solution.                                                                                                                                                                                                                     |
|                                                           | Be sure battery is connected.                                                                                                                                                                                                                                                      |
|                                                           | Check battery voltage, charging may be finished.                                                                                                                                                                                                                                   |
|                                                           | Have Factory Authorized Service Agent check battery charge circuitry.                                                                                                                                                                                                              |
| Charging current turns on and off while charging battery. |  <i>This machine will not charge or jump start a completely dead battery. Some voltage must be detected from the battery that is being charged/jump started or this function will not work.</i> |
|                                                           | Clean and tighten battery connections, if necessary. Clean battery terminals and posts with baking soda solution and rinse with clear water.                                                                                                                                       |
|                                                           | Fully charged batteries, or batteries that do not take any charge may experience intermittent charging. This is normal.                                                                                                                                                            |

## SECTION 13 – PARTS LIST

### 13-1. Recommended Spare Parts

| Recommended Spare Parts |            |          |                                                          |          |
|-------------------------|------------|----------|----------------------------------------------------------|----------|
| Item No.                | Dia. Mkgs. | Part No. | Description                                              | Quantity |
|                         |            | 292189   | Brushholder Assy, Generator                              | 1        |
|                         |            | 280236   | Receptacle, Gfci 15/20a                                  | 2        |
|                         | F2         | 281760   | Fuse, Mini Blade Atm 20. Amp 32 Volt                     | 1        |
|                         | F3         | 292831   | Fuse, Auto 60a 32vdc Auto Link                           | 1        |
|                         | CB3, CB4   | 093996   | Supplementary Pro, Man Reset 1p 20a 250vac Frict         | 2        |
|                         | CB1        | 233039   | Supplementary Protector, Man Reset 2p 50a 240vac         | 1        |
|                         | CB2        | 083432   | Supplementary Pro, Man Reset 1p 10a 250vac Frict         | 1        |
|                         |            | 234477   | Holder, Fuse Blade 30 Amp Modular Pc Mtg                 | 1        |
|                         |            | 289525   | Pump, Fuel Electric 12vdc 2.5-4.5 Psi (Efi Only)         | 1        |
|                         |            | 294832   | Assy, Module Fuel Pump (Kohler: 24 393 99)               | 1        |
|                         |            | 276395   | Switch, Oil Pressure (Kohler: 25 099 27-S)               | 1        |
|                         |            | 294833   | Rectifier/Regulator(3-Phase 50amp) (Kohler: 24 403 41-S) | 1        |
|                         |            | 301742   | Kit, Screen Protector Bobcat/Trailblazer                 | 1        |

 See maintenance labels for common maintenance parts.

 A complete Parts List is available on-line at [www.MillerWelds.com](http://www.MillerWelds.com).

**NOTICE** – This equipment meets US EPA Evaporative Standards. Be sure fuel system replacement parts meet EPA Evaporative Standards.

## Notes

# SECTION 14 – DIAGRAMS

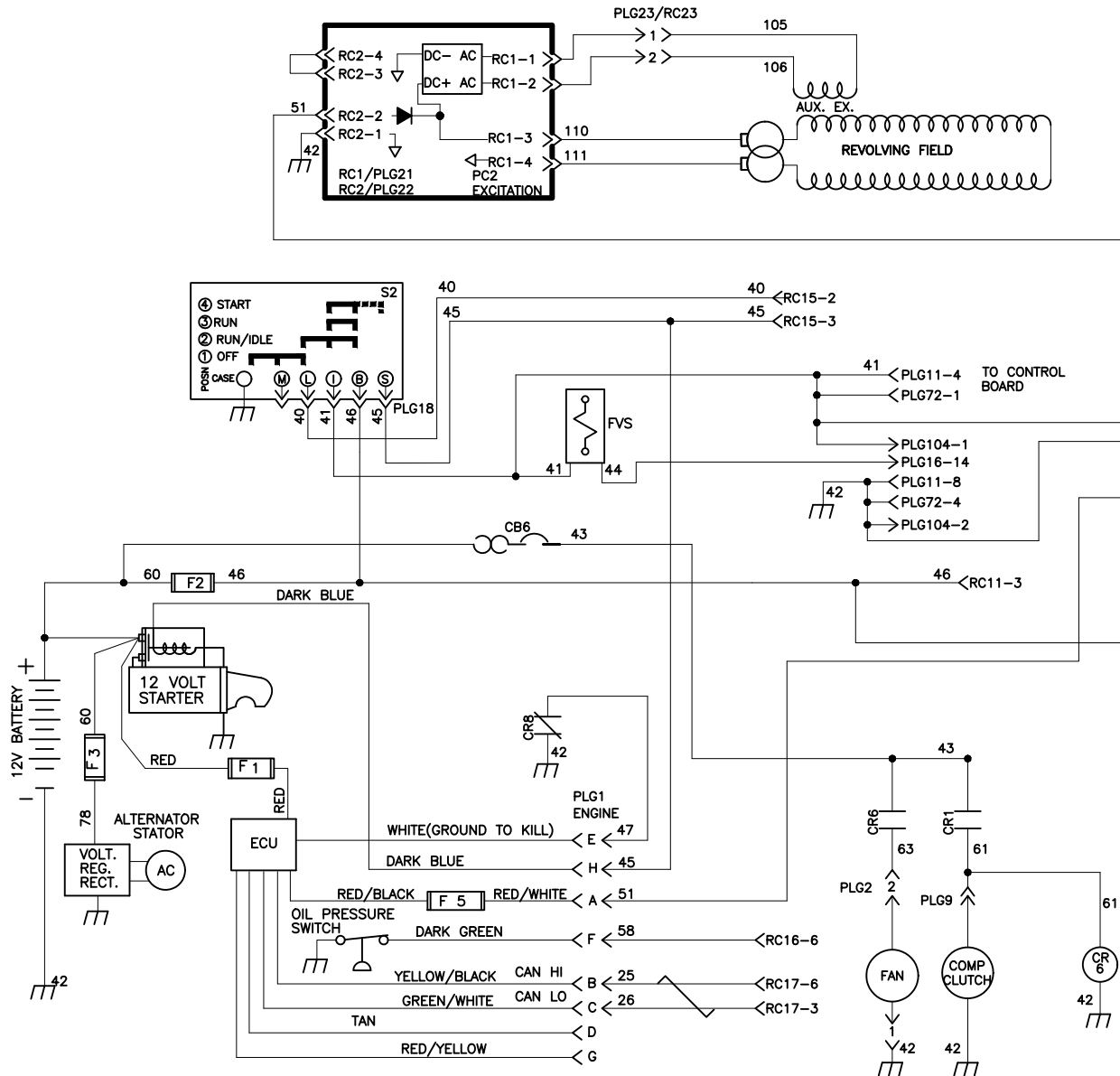
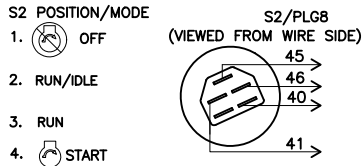


Figure 14-1. Circuit Diagram Page 1 of 2



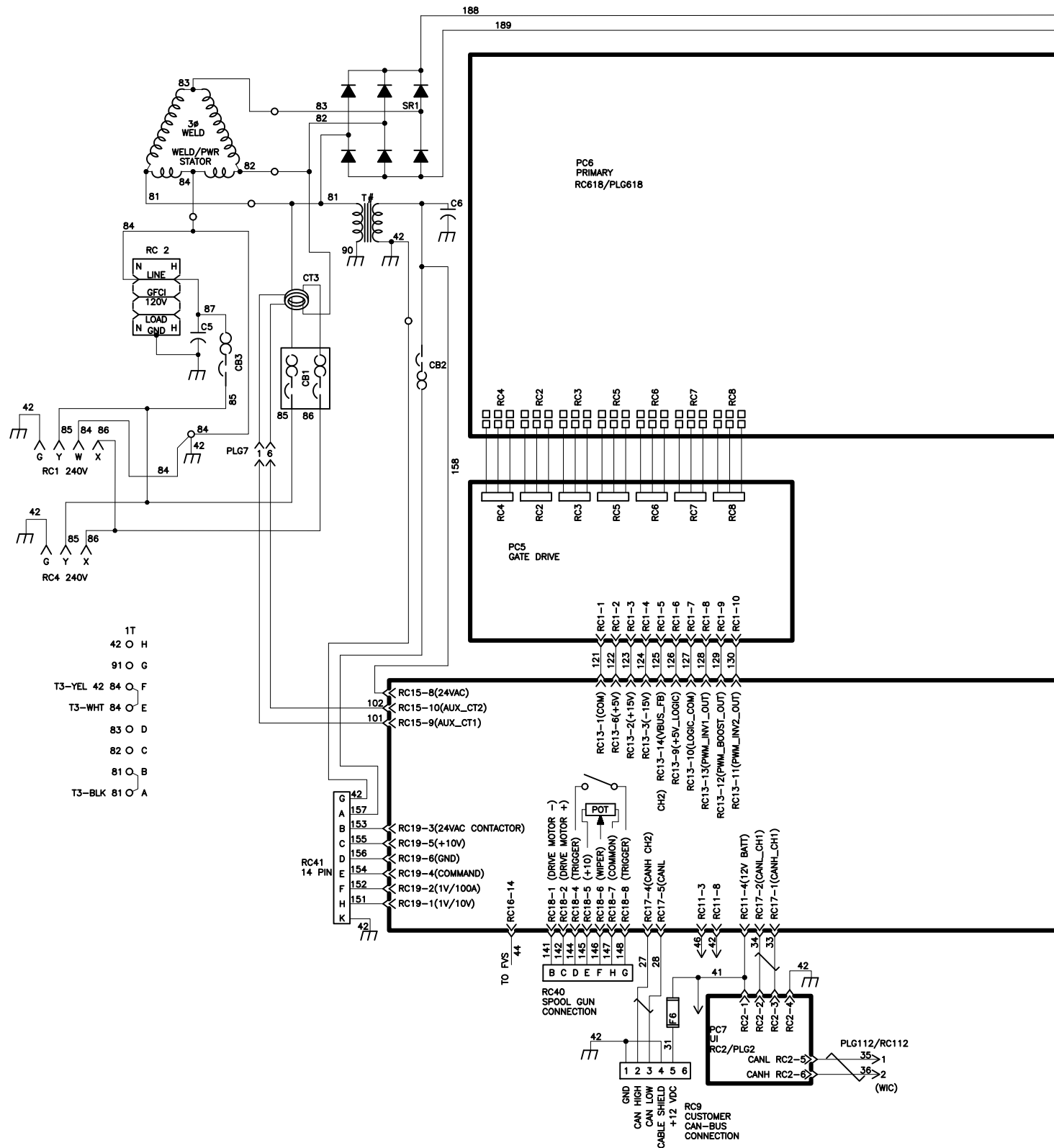
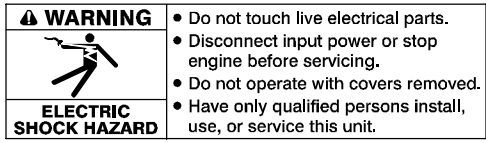
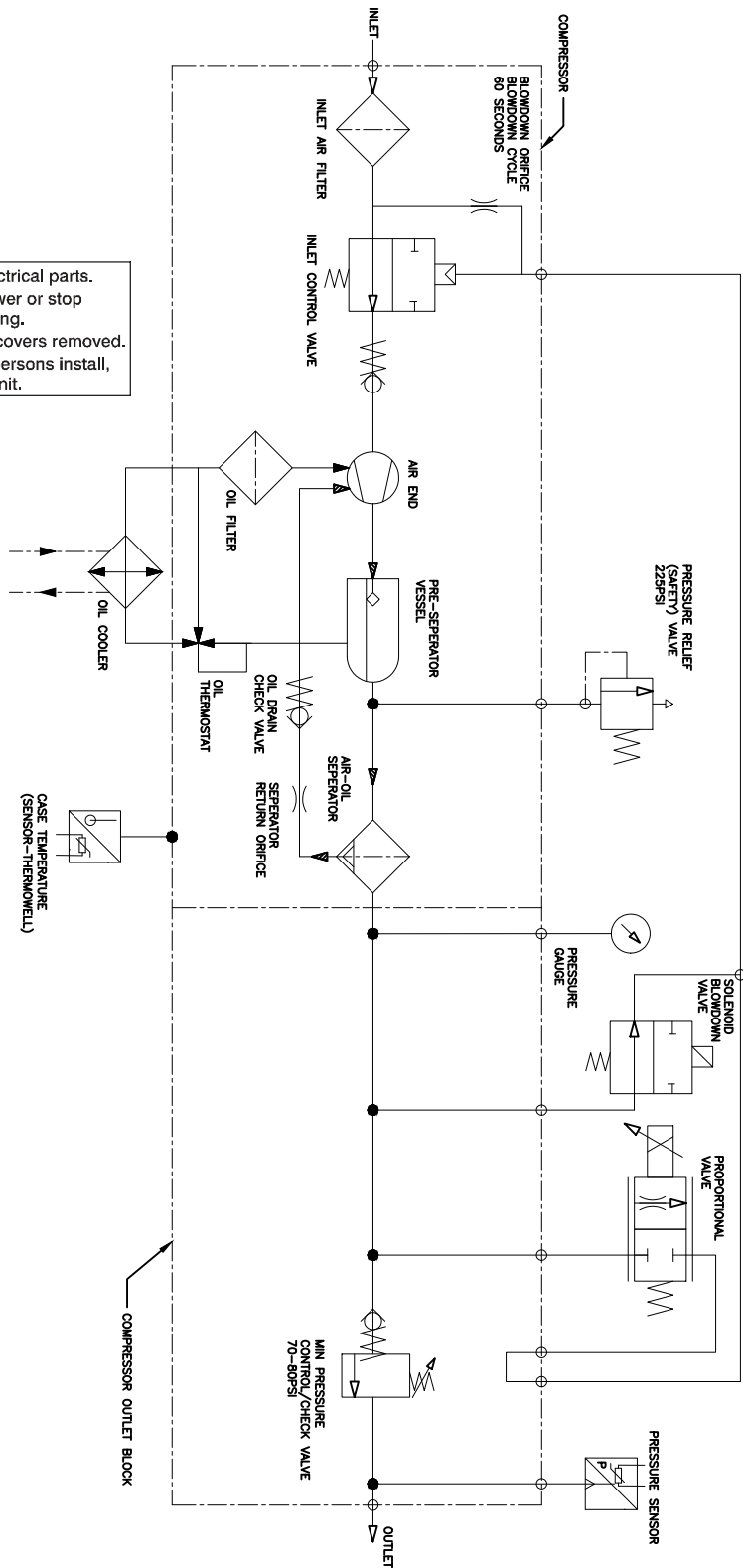


Figure 14-2. Circuit Diagram Page 2 of 2



|                                                                                   |                              |
|-----------------------------------------------------------------------------------|------------------------------|
|  | <b>WARNING</b>               |
|                                                                                   | <b>ELECTRIC SHOCK HAZARD</b> |

- Do not touch live electrical parts.
- Disconnect input power or stop engine before servicing.
- Do not operate with covers removed.
- Have only qualified persons install, use, or service this unit.



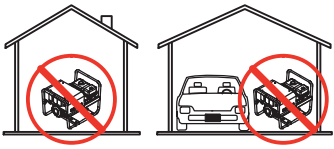
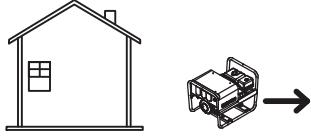
290135-A

**Figure 14-3. Air Compressor Diagram**

# SECTION 15 – DEFINITIONS

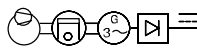
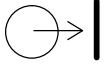
## 15-1. Additional Safety Symbol Definitions

 Some symbols are found only on CE products.

|                                                                                   |                                                                                  |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
|  | Warning! Watch Out! There are possible hazards as shown by the symbols.          |
|  | Moving parts can injure.                                                         |
|  | Never use generator inside a home or garage, even if doors and windows are open. |
|  | Only use generator outside and far away from windows, doors, and vents.          |

## 15-2. Miscellaneous Symbol Definitions

|                      |                             |
|----------------------|-----------------------------|
| <b>A</b>             | Amperage                    |
| <b>V</b>             | Voltage                     |
| <b>U<sub>0</sub></b> | Rated No-Load Voltage (OCV) |
| <b>U<sub>2</sub></b> | Load Voltage                |
| <b>I<sub>2</sub></b> | Rated Welding Current       |
| <b>X</b>             | Duty Cycle                  |
| <b>—</b>             | Negative                    |
| <b>+</b>             | Positive                    |
| <b>CC</b>            | Constant Current            |
| <b>CV</b>            | Constant Voltage            |

|                                                                                     |                                                               |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>F</b>                                                                            | Full                                                          |
| <b>E</b>                                                                            | Empty                                                         |
|  | Circulating Compressor Engine-Driven Generator with Rectifier |
|  | Direct Current (DC)                                           |
|  | Alternating Current (AC)                                      |
|  | Protective Earth (Ground)                                     |
|  | Circuit Breaker Supplementary Protector                       |
|  | Single Phase Alternator                                       |
|  | Output                                                        |
|  | Contactor On/ Electrode Hot                                   |

|                                                                                       |                                                                    |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------|
|  | Do Not Switch While Welding                                        |
|  | Remote                                                             |
|  | Read Operator's Manual                                             |
|  | Welding (General)                                                  |
|  | Shielded Metal Arc Welding (SMAW)                                  |
|  | Gas Metal Arc Welding (GMAW)                                       |
|  | Gas Tungsten Arc Welding (GTAW) / Tungsten Inert Gas (TIG) Welding |
|  | Touch Start (GTAW)                                                 |
|  | Temperature                                                        |

|                                                                                   |                              |
|-----------------------------------------------------------------------------------|------------------------------|
|  | Engine Oil                   |
|  | Fuel                         |
|  | Engine                       |
|  | Battery (Engine)             |
|  | Engine                       |
|  | Engine Start<br>(Engine RPM) |

|                                                                                   |                |
|-----------------------------------------------------------------------------------|----------------|
|  | Engine Stop    |
|  | Engine Off     |
|  | Engine Choke   |
|  | Idle (Slow)    |
|  | Run (Fast)     |
|  | Air Compressor |

|                                                                                     |              |
|-------------------------------------------------------------------------------------|--------------|
|  | Air Pressure |
|  | On           |
|  | Hertz        |
|  | Percent      |
|  | Air Filter   |
|  | Spool Gun    |

# SECTION 16 – REGULATORY AND COMPLIANCE INFORMATION

## 16-1. Software Licensing Agreement

The End User License Agreement and any third-party notices and terms and conditions pertaining to third-party software can be found at <https://www.millerwelds.com/eula> and are incorporated by reference herein.

## 16-2. Information About Default Weld Parameters And Settings

**NOTICE** – Each welding application is unique. Although certain Miller Electric products are designed to determine and default to certain typical welding parameters and settings based upon specific and relatively limited application variables input by the end user, such default settings are for reference purposes only; and final weld results can be affected by other variables and application-specific circumstances. The appropriateness of all parameters and settings should be evaluated and modified by the end user as necessary based upon application-specific requirements. The end user is solely responsible for selection and coordination of appropriate equipment, adoption or adjustment of default weld parameters and settings, and ultimate quality and durability of all resultant welds. Miller Electric expressly disclaims any and all implied warranties including any implied warranty of fitness for a particular purpose.

## 16-3. Environmental Specifications

### A. IP Rating

| IP Rating                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| IP23S                                                                                                                                                   |
| This equipment is designed for outdoor use. It may be stored, but is not intended to be used for welding outside during precipitation unless sheltered. |

### B. Temperature Specifications

| Operating Temperature Range* | Storage/Transportation Temperature Range |
|------------------------------|------------------------------------------|
| -20 to 104°F (-29 to 40°C)   | -40 to 131°F (-40 to 55°C)               |

\*Output is derated at temperatures above 104°F (40°C).

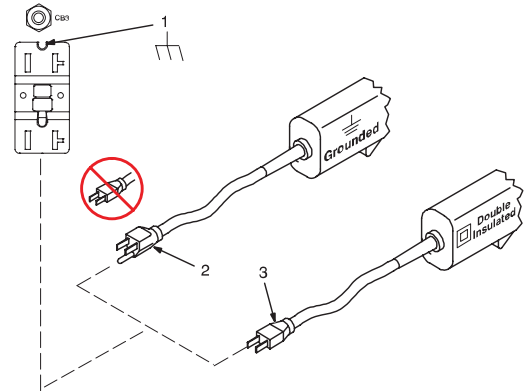
### C. Information On Electromagnetic Compatibility (EMC)

|                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  This Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There can be potential difficulties in ensuring electromagnetic compatibility in those locations, due to conducted as well as radiated disturbances. |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

# SECTION 17 – GENERATOR POWER GUIDELINES

 The views in this section are intended to be representative of all engine/hydraulic-driven welder/generators. Your unit may differ from those shown.

## 17-1. Selecting Equipment



- 1 Generator Power Receptacles – Neutral Bonded To Frame
- 2 3-Prong Plug From Case Grounded Equipment

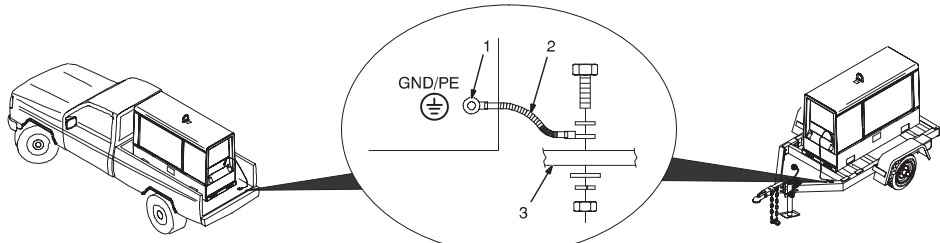
OR

- 3 2-Prong Plug From Double Insulated Equipment

 Be sure equipment has double insulated symbol and/or wording on it.

 Do not use 2-prong plug unless equipment is double insulated.

## 17-2. Grounding Generator to Truck or Trailer Frame



 Always ground generator frame to vehicle frame to prevent electric shock and static electricity hazards.

 Also see AWS Safety & Health Fact Sheet No. 29, Grounding of Portable And Vehicle Mounted Welding Generators.

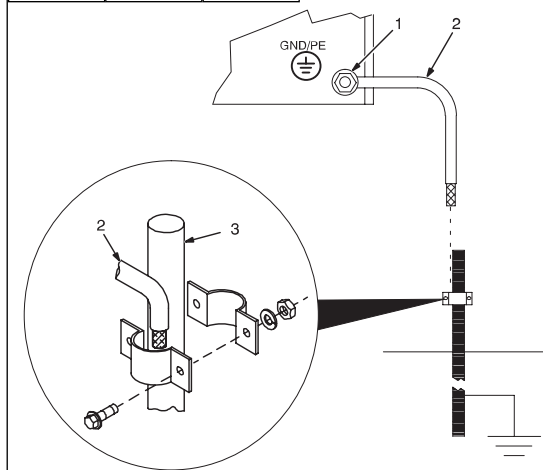
 Bed liners, shipping skids, and some running gear insulate the welding generator from the vehicle frame. Always connect a ground wire from the generator equipment grounding terminal to bare metal on the vehicle frame as shown.

- 1 Equipment Grounding Terminal (On Front Panel)
- 2 Grounding Cable (Not Supplied)
- 3 Metal Vehicle Frame

Connect cable from equipment ground terminal to metal vehicle frame. Use #8 AWG or larger insulated copper wire.

 Electrically bond generator frame to vehicle frame by metal-to-metal contact.

### 17-3. Grounding When Supplying Building Systems



1 Equipment Grounding Terminal

2 Grounding Cable

Use #8 AWG or larger insulated copper wire.

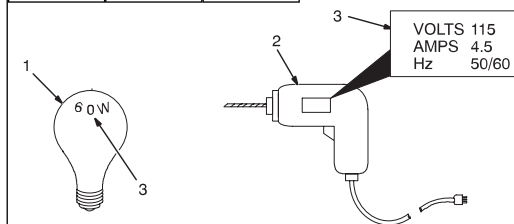
3 Ground Device

Use ground device as stated in electrical codes.

Ground generator to system earth ground if supplying power to a premises (shop, farm) wiring system.

Also see AWS Safety & Health Fact Sheet No. 29, Grounding of Portable And Vehicle Mounted Welding Generators.

### 17-4. How Much Power Does Equipment Require?



1 Resistive Load

A light bulb is a resistive load and requires a constant amount of power.

2 Non-Resistive Load

Equipment with a motor is a non-resistive load and requires approximately six times more power while starting the motor than when running (see Section 17-8).

3 Rating Data

Rating shows volts and amperes, or watts required to run equipment.

**Amperes x Volts = Watts**

**Example 1:** If a drill uses 4.5 amperes at 115 volts, calculate its running power requirement in watts.

$$4.5 \text{ A} \times 115 \text{ V} = 520 \text{ W}$$

The load applied by the drill is 520 watts.

**Example 2:** If three 200 watt flood lamps are used with the drill from Example 1, add the individual loads to calculate total load.

$$(3 \times 200\text{W}) + 520 \text{ W} = 1120 \text{ W}$$

The total load applied by the three flood lamps and drill is 1120 watts.

## 17-5. Approximate Power Requirements For Industrial Motors

| Industrial Motors             | Rating   | Starting Watts | Running Watts |
|-------------------------------|----------|----------------|---------------|
| Split Phase                   | 1/8 HP   | 800            | 300           |
|                               | 1/6 HP   | 1225           | 500           |
|                               | 1/4 HP   | 1600           | 600           |
|                               | 1/3 HP   | 2100           | 700           |
|                               | 1/2 HP   | 3175           | 875           |
| Capacitor Start-Induction Run | 1/3 HP   | 2020           | 720           |
|                               | 1/2 HP   | 3075           | 975           |
|                               | 3/4 HP   | 4500           | 1400          |
|                               | 1 HP     | 6100           | 1600          |
|                               | 1-1/2 HP | 8200           | 2200          |
|                               | 2 HP     | 10,550         | 2850          |
|                               | 3 HP     | 15,900         | 3900          |
|                               | 5 HP     | 23,300         | 6800          |
| Capacitor Start-Capacitor Run | 1-1/2 HP | 8100           | 2000          |
|                               | 5 HP     | 23,300         | 6000          |
|                               | 7-1/2 HP | 35,000         | 8000          |
|                               | 10 HP    | 46,700         | 10,700        |
| Fan Duty                      | 1/8 HP   | 1000           | 400           |
|                               | 1/6 HP   | 1400           | 550           |
|                               | 1/4 HP   | 1850           | 650           |
|                               | 1/3 HP   | 2400           | 800           |
|                               | 1/2 HP   | 3500           | 1100          |

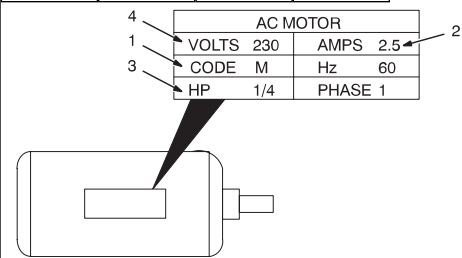
## 17-6. Approximate Power Requirements For Farm/Shop Equipment

| Farm/Shop Equipment                                                                          | Rating   | Starting Watts | Running Watts |
|----------------------------------------------------------------------------------------------|----------|----------------|---------------|
| Stock Tank De-Icer                                                                           |          | 1000           | 1000          |
| Grain Cleaner                                                                                | 1/4 HP   | 1650           | 650           |
| Portable Conveyor                                                                            | 1/2 HP   | 3400           | 1000          |
| Grain Elevator                                                                               | 3/4 HP   | 4400           | 1400          |
| Milk Cooler                                                                                  |          | 2900           | 1100          |
| Milker (Vacuum Pump)                                                                         | 2 HP     | 10,500         | 2800          |
| Farm Duty Motors Std. (e.g. Conveyors, Feed Augers, Air Compressors)                         | 1/3 HP   | 1720           | 720           |
|                                                                                              | 1/2 HP   | 2575           | 975           |
|                                                                                              | 3/4 HP   | 4500           | 1400          |
|                                                                                              | 1 HP     | 6100           | 1600          |
|                                                                                              | 1-1/2 HP | 8200           | 2200          |
|                                                                                              | 2 HP     | 10,550         | 2850          |
|                                                                                              | 3 HP     | 15,900         | 3900          |
|                                                                                              | 5 HP     | 23,300         | 6800          |
| Farm Duty Motors High Torque (e.g. Barn Cleaners, Silo Unloaders, Silo Hoists, Bunk Feeders) | 1-1/2 HP | 8100           | 2000          |
|                                                                                              | 5 HP     | 23,300         | 6000          |
|                                                                                              | 7-1/2 HP | 35,000         | 8000          |
|                                                                                              | 10 HP    | 46,700         | 10,700        |
| 3-1/2 cu. ft. Mixer                                                                          | 1/2 HP   | 3300           | 1000          |
| High Pressure 1.8 Gal/Min                                                                    | 500 PSI  | 3150           | 950           |
| Washer 2 Gal/Min                                                                             | 550 PSI  | 4500           | 1400          |
|                                                                                              | 700 PSI  | 6100           | 1600          |
| Shallow Well Pump                                                                            | 1/3 HP   | 2150           | 750           |
|                                                                                              | 1/2 HP   | 3100           | 1000          |

## 17-7. Approximate Power Requirements For Contractor Equipment

| Contractor Equipment | Rating            | Starting Watts | Running Watts |
|----------------------|-------------------|----------------|---------------|
| Hand Drill           | 1/4 in.           | 350            | 350           |
|                      | 3/8 in.           | 400            | 400           |
|                      | 1/2 in.           | 600            | 600           |
| Circular Saw         | 6-1/2 in.         | 500            | 500           |
|                      | 7-1/4 in.         | 900            | 900           |
|                      | 8-1/4 in.         | 1400           | 1400          |
| Table Saw            | 9 in.             | 4500           | 1500          |
|                      | 10 in.            | 6300           | 1800          |
| Band Saw             | 14 in.            | 2500           | 1100          |
| Bench Grinder        | 6 in.             | 1720           | 720           |
|                      | 8 in.             | 3900           | 1400          |
|                      | 10 in.            | 5200           | 1600          |
| Air Compressor       | 1/2 HP            | 3000           | 1000          |
|                      | 1 HP              | 6000           | 1500          |
|                      | 1-1/2 HP          | 8200           | 2200          |
|                      | 2 HP              | 10,500         | 2800          |
| Electric Chain Saw   | 1-1/2 HP, 12 in.  | 1100           | 1100          |
|                      | 2 HP, 14 in.      | 1100           | 1100          |
| Electric Trimmer     | Standard 9 in.    | 350            | 350           |
|                      | Heavy Duty 12 in. | 500            | 500           |
| Electric Cultivator  | 1/3 HP            | 2100           | 700           |
| Elec. Hedge Trimmer  | 18 in.            | 400            | 400           |
| Flood Lights         | HID               | 125            | 100           |
|                      | Metal Halide      | 313            | 250           |
|                      | Mercury           | 1000           |               |
|                      | Sodium            | 1400           |               |
|                      | Vapor             | 1250           | 1000          |
| Submersible Pump     | 400 GPH           | 600            | 200           |
| Centrifugal Pump     | 900 GPH           | 900            | 500           |
| Floor Polisher       | 3/4 HP, 16 in.    | 4500           | 1400          |
|                      | 1 HP, 20 in.      | 6100           | 1600          |
| High Pressure Washer | 1/2 HP            | 3150           | 950           |
|                      | 3/4 HP            | 4500           | 1400          |
|                      | 1 HP              | 6100           | 1600          |
| 55 gal Drum Mixer    | 1/4 HP            | 1900           | 700           |
| Wet & Dry Vac        | 1.7 HP            | 900            | 900           |
|                      | 2-1/2 HP          | 1300           | 1300          |

17-8. Power Required To Start Motor



- 1 Motor Start Code
- 2 Running Amperage
- 3 Motor HP
- 4 Motor Voltage

**Step 1:** Find code and use table to find kVA/HP. If code is not listed, multiply running amperage by six to find starting amperage.

**Step 2:** Find Motor HP and Volts.

**Step 3:** Determine starting amperage (see example).

Welder/generator amperage output must be at least twice the motor's running amperage.

**(kVA/HP x HP x 1000) / Volts = Starting Amperage**

Example: Calculate starting amperage required for a 230 V, 1/4 HP motor with a motor start code of M.

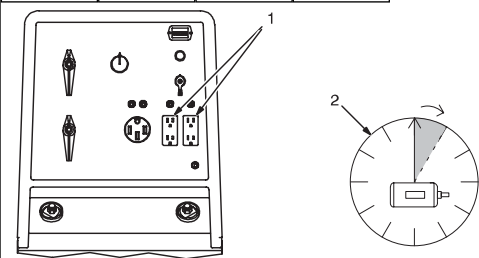
Volts = 230, HP = 1/4, kVA/HP = 11.2

$(11.2 \times 1/4 \times 1000) / 230 = 12.2A$

Starting the motor requires 12.2 amperes.

| Single-Phase Induction Motor Starting Requirements |     |     |     |     |      |      |      |      |
|----------------------------------------------------|-----|-----|-----|-----|------|------|------|------|
| Motor Start Code                                   | G   | H   | J   | K   | L    | M    | N    | P    |
| KVA/HP                                             | 6.3 | 7.1 | 8.0 | 9.0 | 10.0 | 11.2 | 12.5 | 14.0 |

17-9. How Much Power Can Generator Supply?



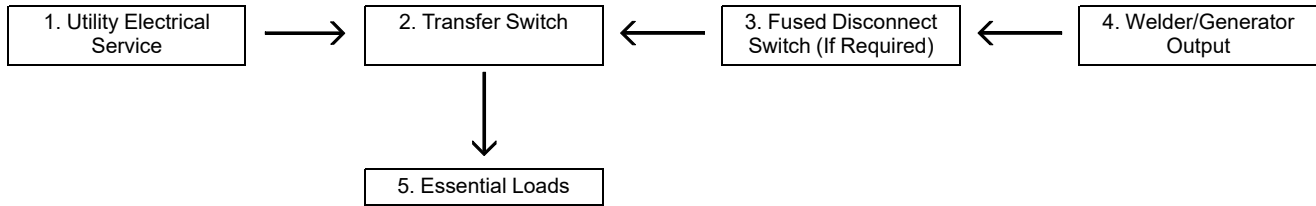
- 1 Limit Load To 90% Of Generator Output

Always start non-resistive (motor) loads in order from largest to smallest, and add resistive loads last.

- 2 5 Second Rule

If motor does not start within 5 seconds, turn off power to prevent motor damage. Motor requires more power than generator can supply.

## 17-10. Typical Connections To Standby Power



**⚠ Have only qualified persons perform these connections according to all applicable codes and safety practices.**

**⚠ Properly install, ground, and operate this equipment according to its Owner's Manual and national, state, and local codes.**

**⚠ Do not connect to any electrical distribution system normally supplied by utility power unless a proper transfer switch and grounding procedure are employed.**

*☞ Customer-supplied equipment is required if generator will supply standby power during emergencies or power outages.*

1 Utility Electrical Service

2 Transfer Switch (Double-Throw)

Switch transfers the electrical load from electric utility service to the generator. Transfer load back to electric utility when service is restored.

Install correct switch (customer-supplied). Switch rating must be same as or greater than the branch overcurrent protection.

3 Fused Disconnect Switch

Install correct switch (customer-supplied) if required by electrical code.

4 Welder/Generator Output

Generator output voltage and wiring must be consistent with regular (utility) system voltage and wiring.

Connect generator with temporary or permanent wiring suitable for the installation.

Turn off or unplug all equipment connected to generator before starting or stopping engine. When starting or stopping, the engine has low speed which causes low voltage and frequency.

5 Essential Loads

Generator output may not meet the electrical requirements of the premises. If generator does not produce enough output to meet all requirements, connect only essential loads. See Section 17-4.

## 17-11. Selecting Extension Cord (Use Shortest Cord Possible)

### A. Cord Lengths For 120 Volt Loads

|    |              |                                                                                       |           |           |          |          |          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------|-----------|-----------|----------|----------|----------|
| <b>⚠ Use GFCI protection when operating auxiliary equipment. If unit does not have GFCI receptacles, use GFCI-protected extension cord. Do not use GFCI receptacles to power life support equipment.</b>                                              |              |                                                                                       |           |           |          |          |          |
|                                                                                                                                                                                                                                                       |              | Maximum Allowable Cord Length In ft (m) for Conductor Size In AWG (mm <sup>2</sup> )* |           |           |          |          |          |
| Current (Amperes)                                                                                                                                                                                                                                     | Load (Watts) | 4 (25)                                                                                | 6 (16)    | 8 (10)    | 10 (6)   | 12 (4)   | 14 (2.5) |
| 5                                                                                                                                                                                                                                                     | 600          |                                                                                       |           | 350 (106) | 225 (68) | 137 (42) | 100 (30) |
| 7                                                                                                                                                                                                                                                     | 840          |                                                                                       | 400 (122) | 250 (76)  | 150 (46) | 100 (30) | 62 (19)  |
| 10                                                                                                                                                                                                                                                    | 1200         | 400 (122)                                                                             | 275 (84)  | 175 (53)  | 112 (34) | 62 (19)  | 50 (15)  |
| 15                                                                                                                                                                                                                                                    | 1800         | 300 (91)                                                                              | 175 (53)  | 112 (34)  | 75 (23)  | 37 (11)  | 30 (9)   |
| 20                                                                                                                                                                                                                                                    | 2400         | 225 (68)                                                                              | 137 (42)  | 87 (26)   | 50 (15)  | 30 (9)   |          |
| 25                                                                                                                                                                                                                                                    | 3000         | 175 (53)                                                                              | 112 (34)  | 62 (19)   | 37 (11)  |          |          |
| 30                                                                                                                                                                                                                                                    | 3600         | 150 (46)                                                                              | 87 (26)   | 50 (15)   | 37 (11)  |          |          |
| 35                                                                                                                                                                                                                                                    | 4200         | 125 (38)                                                                              | 75 (23)   | 50 (15)   |          |          |          |
| 40                                                                                                                                                                                                                                                    | 4800         | 112 (34)                                                                              | 62 (19)   | 37 (11)   |          |          |          |
| 45                                                                                                                                                                                                                                                    | 5400         | 100 (30)                                                                              | 62 (19)   |           |          |          |          |
| 50                                                                                                                                                                                                                                                    | 6000         | 87 (26)                                                                               | 50 (15)   |           |          |          |          |

\*Conductor size is based on maximum 2% voltage drop.

### B. Cord Lengths For 240 Volt Loads

|    |              |                                                                                       |           |           |           |          |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------|-----------|-----------|-----------|----------|----------|
| <b>⚠ Use GFCI protection when operating auxiliary equipment. If unit does not have GFCI receptacles, use GFCI-protected extension cord. Do not use GFCI receptacles to power life support equipment.</b>                                                 |              |                                                                                       |           |           |           |          |          |
|                                                                                                                                                                                                                                                          |              | Maximum Allowable Cord Length In ft (m) for Conductor Size In AWG (mm <sup>2</sup> )* |           |           |           |          |          |
| Current (Amperes)                                                                                                                                                                                                                                        | Load (Watts) | 4 (25)                                                                                | 6 (16)    | 8 (10)    | 10 (6)    | 12 (4)   | 14 (2.5) |
| 5                                                                                                                                                                                                                                                        | 1200         |                                                                                       |           | 700 (213) | 450 (137) | 225 (84) | 200 (61) |
| 7                                                                                                                                                                                                                                                        | 1680         |                                                                                       | 800 (244) | 500 (152) | 300 (91)  | 200 (61) | 125 (38) |
| 10                                                                                                                                                                                                                                                       | 2400         | 800 (244)                                                                             | 550 (168) | 350 (107) | 225 (69)  | 125 (38) | 100 (31) |
| 15                                                                                                                                                                                                                                                       | 3600         | 600 (183)                                                                             | 350 (107) | 225 (69)  | 150 (46)  | 75 (23)  | 60 (18)  |
| 20                                                                                                                                                                                                                                                       | 4800         | 450 (137)                                                                             | 275 (84)  | 175 (53)  | 100 (31)  | 60 (18)  |          |
| 25                                                                                                                                                                                                                                                       | 6000         | 350 (107)                                                                             | 225 (69)  | 125 (38)  | 75 (23)   |          |          |
| 30                                                                                                                                                                                                                                                       | 7000         | 300 (91)                                                                              | 175 (53)  | 100 (31)  | 75 (23)   |          |          |
| 35                                                                                                                                                                                                                                                       | 8400         | 250 (76)                                                                              | 150 (46)  | 100 (31)  |           |          |          |
| 40                                                                                                                                                                                                                                                       | 9600         | 225 (69)                                                                              | 125 (38)  | 75 (23)   |           |          |          |
| 45                                                                                                                                                                                                                                                       | 10,800       | 200 (61)                                                                              | 125 (38)  |           |           |          |          |
| 50                                                                                                                                                                                                                                                       | 12,000       | 175 (53)                                                                              | 100 (31)  |           |           |          |          |

\*Conductor size is based on maximum 2% voltage drop.



Effective January 1, 2025 (Equipment with a serial number preface of NF or newer)

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

**LIMITED WARRANTY** - Subject to the terms and conditions below, Miller Electric Mfg. LLC, Appleton, Wisconsin, warrants to authorized distributors that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. **THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.**

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Notifications submitted as online warranty claims must provide detailed descriptions of the fault and troubleshooting steps taken to diagnose failed parts. Warranty claims that lack the required information as defined in the Miller Service Operation Guide (SOG) may be denied by Miller.

Miller shall honor warranty claims on warranted equipment listed below in the event of a defect within the warranty coverage time periods listed below. Warranty time periods start on the delivery date of the equipment to the end-user purchaser.

**1 5 Years Parts — 3 Years Labor**

- Original Main Power Rectifiers Only to Include SCRs, Diodes, and Discrete Rectifier Modules in non-inverter products

**2 4 Years Parts (No Labor)**

- Auto-Darkening ClearLight 2.0 and 4x Helmet Lenses

**3 3 Years — Parts and Labor Unless Specified**

- Auto-Darkening Helmet Lenses (No Labor)
- Copilot Collaborative Welding Systems
- Engine Driven Welder/Generators (Including EnPak) **(NOTE: Engines are Warranted Separately by the Engine Manufacturer.)**
- Handheld Laser Power Sources
- Insight Welding Intelligence Products (Except External Sensors)
- Inverter Power Sources
- Plasma Arc Cutting Power Sources
- Process Controllers
- Semi-Automatic and Automatic Wire Feeders
- Transformer/Rectifier Power Sources

**4 2 Years — Parts and Labor**

- Auto-Darkening Weld Masks (No Labor)
- Fume Extractors - Filtair 215, Capture 5, Purifier, and Industrial Collector Series

**5 1 Year — Parts and Labor Unless Specified**

- ArcReach Heater
- AugmentedArc, LiveArc, and MobileArc Welding Systems
- Automatic Motion Devices
- Bernard BTB Air-Cooled MIG Guns (No Labor)
- CoolBelt, PAPR Blower, and PAPR Face Shield (No Labor)
- Desiccant Air Dryer System

- Field Options **(NOTE: Field options are covered for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)**

- RFCS Foot Controls (Except RFCS-RJ45)
- Fume Extractors - Filtair 130, MWX and SWX Series, Standard, Telescopic, and ZoneFlow Extraction Arms and Motor Control Box
- Handheld Laser Torches (No Labor)
- HF Units
- Induction Heating Power Sources, Coolers **(NOTE: Digital Recorders are Warranted Separately by the Manufacturer.)**
- Insight Sensors
- Laser Welding Helmets (No Labor)
- Load Banks
- MDX Series MIG Guns (No Labor)
- Motor-Driven Guns
- Positioners and Controllers
- Racks (For Housing Multiple Power Sources)
- Running Gear/Trailers
- Spoolmate Spoolguns (No Labor)
- Subarc Wire Drive Assemblies
- Supplied Air Respirator (SAR) Boxes and Panels
- TIG Torches (No Labor)
- Tregaskiss Guns (No Labor)
- Water Cooling Systems
- Wireless Remote Foot/Hand Controls and Receivers
- Work Stations/Weld Tables/Weld Booths (No Labor)
- XT Plasma Cutting Torches (No Labor)

**6 6 Months — Parts**

- 12 Volt Automotive-Style Batteries

**7 90 Days — Parts**

- Accessories (Kits)
- ArcReach Heater Quick Wrap and Air Cooled Cables
- Canvas Covers
- Induction Heating Coils and Blankets, Cables, Rolling Inductor, and Non-Electronic Controls
- M-Guns
- MIG Guns, Subarc (SAW) Torches, and External Cladding Heads
- Remote Controls and RFCS-RJ45
- Replacement Parts (No labor)

Miller's True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, relays, work station table tops and welding curtains, or parts that fail due to normal wear. (Exception: brushes and relays are covered on all engine-driven products.)**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or

misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

4. Defects caused by accident, unauthorized repair, or improper testing.

MILLER PRODUCTS ARE INTENDED FOR COMMERCIAL AND INDUSTRIAL USERS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

The exclusive remedies for warranty claims are, at Miller's option, either: (1) repair; or (2) replacement; or, if approved in writing by Miller, (3) the pre-approved cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon use). Products may not be returned without Miller's written approval. Return shipment shall be at customer's risk and expense.

The above remedies are F.O.B. Appleton, WI, or Miller's authorized service facility. Transportation and freight are the customer's responsibility. TO THE EXTENT PERMITTED BY LAW, THE REMEDIES HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES REGARDLESS OF THE LEGAL THEORY. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT) REGARDLESS OF THE LEGAL THEORY. ANY WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY, OR REPRESENTATION, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, ARE EXCLUDED AND DISCLAIMED BY MILLER.

Some US states do not allow limiting the duration of an implied warranty or the exclusion of certain damages, so the above limitations may not apply to you. This warranty provides specific legal rights, and other rights may be available depending on your state. In Canada, some provinces provide additional warranties or remedies, and to the extent the law prohibits their waiver, the limitations set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary by province.

### Warranty Questions?

**Call 1-800-4-A-MILLER for your local Miller distributor.**

Your distributor also gives you...

#### Service

You always get the fast, reliable response you need. Most replacement parts can be in your hands in 24 hours.

#### Support

Need fast answers to the tough welding questions? The expertise of the distributor and Miller is there to help you, every step of the way.

# Owner's Record

Please complete and retain with your personal records.

|               |                                                            |
|---------------|------------------------------------------------------------|
| Model Name    | Serial/Style Number                                        |
| Purchase Date | (Date which equipment was delivered to original customer.) |
| Distributor   |                                                            |
| Address       |                                                            |
| City          |                                                            |
| State         | Zip                                                        |

## For Service

**Contact a *DISTRIBUTOR* or *SERVICE AGENCY* near you.**

Always provide Model Name and Serial/Style Number.

|                               |                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Contact your Distributor for: | Welding Supplies and Consumables<br>Options and Accessories<br>Personal Protective Equipment (PPE)<br>Service and Repair Replacement Parts<br>Training (Schools, Videos, Books)<br>Welding Process Handbooks<br>To locate a Distributor or Service Agency visit<br><a href="http://www.millerwelds.com">www.millerwelds.com</a> or call 1-800-4-A-Miller |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                    |                                                                                                                                                                                      |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Contact the Delivering Carrier to: | File a claim for loss or damage during shipment.<br>For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department. |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Miller Electric Mfg. LLC

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