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2023-07

Processes



Stick (SMAW) Welding



MIG (GMAW) Welding



Flux Cored (FCAW) Welding



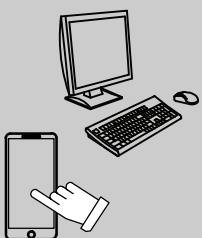
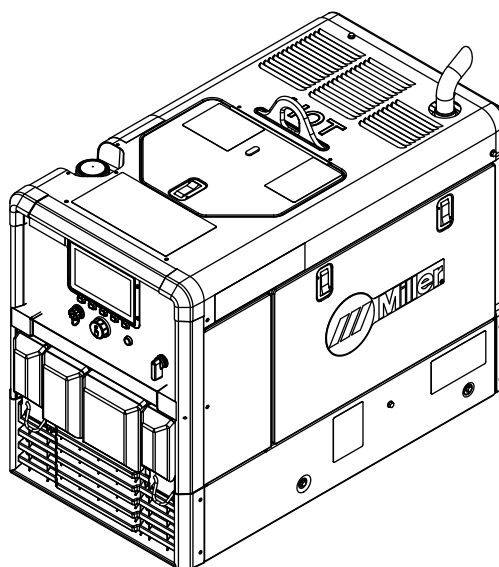
TIG (GTAW) Welding

Description



Engine Driven Welder/Generator

Bobcat™ 265



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

www.MillerWelds.com

OWNER'S MANUAL

From Miller to You

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 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.



**ISO 9001
Quality**

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 cir-

cuits 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.
- 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.

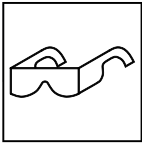
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install, ground, and operate this equipment according to its Owner's Manual and national, state, and local codes.
- Always 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.

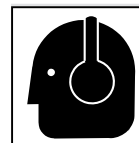


WELDING can cause fire or explosion.

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.

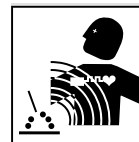
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Do not weld where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that welding sparks and hot materials 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.

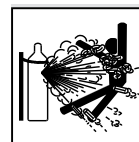
Noise from some processes or equipment can damage hearing.

- 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.

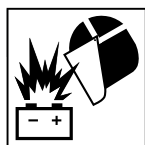
Compressed gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- 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.



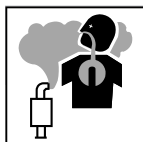
HOT PARTS can burn.

- 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.



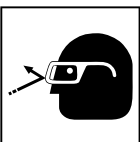
HOT METAL from air arc cutting and gouging can cause fire or explosion.

- 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.



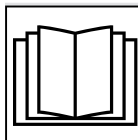
MOVING PARTS can injure.

- 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.

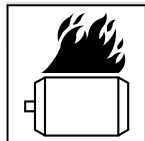
- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring—be sure power supply system is properly sized, rated, and protected to handle this unit.



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.

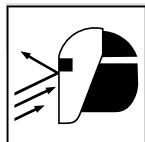
- Follow the guidelines in the Applications Manual for the Revised NIOSH Lifting Equation (Publication No. 94-110) when manually lifting heavy parts or equipment.



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.

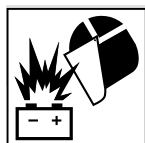
- Wear a face shield to protect eyes and face.
- Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.

- 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.



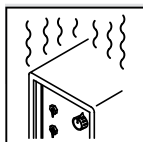
HIGH PRESSURE FLUIDS can injure or kill.

- 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.



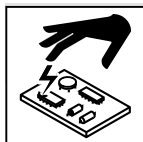
WELDING WIRE can injure.

- 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.



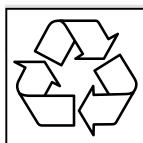
STATIC (ESD) can damage PC boards.

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



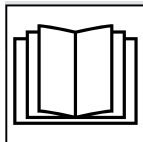
TILTING OF TRAILER can injure.

- 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.

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.

1-7. Principal Safety Standards

Safety in Welding, Cutting, and Allied Processes, American Welding Society standard ANSI Standard Z49.1. Website: <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: <http://www.aws.org>.

National Electrical Code, NFPA Standard 70 from National Fire Protection Association. Website: www.nfpa.org.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1 from Compressed Gas Association. Website: www.cganet.com.

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2 from Canadian Standards Association. Website: www.csagroup.org.

Battery Chargers, CSA Standard C22.2 NO 107.2-01 from Canadian Standards Association. Website: www.csagroup.org.

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute. Website: www.ansi.org.

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B from National Fire Protection Association. Website: 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.

OSHA Important Note Regarding the ACGIH TLV, Policy Statement on the Uses of TLVs and BEIs. Website: www.osha.gov.

Portable Generator Hazards Safety Alert from U.S. Consumer Product Safety Commission (CPSC). Website: 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.

For Standards regulating hydraulic systems, contact the National Fluid Power Association. Website: www.nfpa.com.

Battery Service Manual from the Battery Council International. Website: 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.

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 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.
- 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

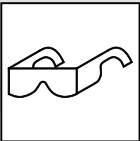
- Ne brancher aucun système de distribution électrique normalement fourni par un réseau public à moins qu'un commutateur de transfert et une procédure de mise à la terre adéquats ne soient mis en place.
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou 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, le 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'écaillement, 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.

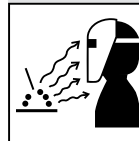
- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- À l'intérieur, ventiler la zone et/ou utiliser une ventilation forcée au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage. Pour déterminer la bonne ventilation, il est recommandé de procéder à un prélèvement pour la composition 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.

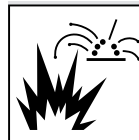
- Fermer l'alimentation du gaz comprimé en cas de non utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d'un respirateur d'adduction d'air homologué.



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 approprié 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.

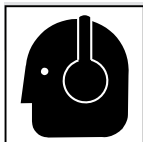


LE SOUDAGE peut provoquer un incendie ou une explosion.

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 homologués.
- 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 défaillir. 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 le 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 dégelier 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 nettoyeurs, 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.

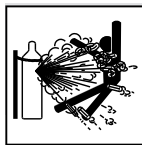
- Porter des protections approuvées pour les oreilles si le niveau sonore est trop élevé.



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 du soudage à l'arc, du soudage par points, du gougeage, de la découpe plasma ou une opération de chauffage par induction.

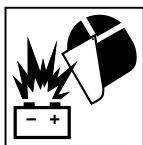


Si des BOUTEILLES sont endommagées, elles pourront exploser.

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.



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

- 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.
- 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 delaborne.
- 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.



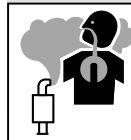
LES PIÈCES CHAUDES peuvent provoquer des brûlures.

- Ne pas toucher des parties chaudes à mains nues.
- Prévoir une période de refroidissement avant de travailler à l'équipement.



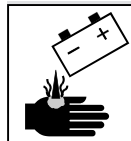
LA VAPEUR ET LE LIQUIDE DE REFROIDISSEMENT CHAUD peuvent provoquer des brûlures.

- 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 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.

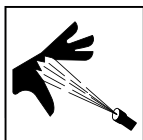
- Une installation ou une utilisation incorrecte de cet appareil pourrait conduire à des dégâts matériels ou corporels. Seul un personnel qualifié est autorisé à installer, utiliser et entretenir cet appareil conformément à son manuel d'utilisation, aux normes industrielles et aux codes nationaux, d'état 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.



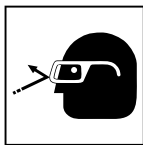
MÉTAL CHAUD provenant du découpage ou du gougeage à l'arc risque de provoquer un incendie ou une explosion.

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

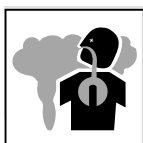


L'AIR COMPRIMÉ risque de provoquer des blessures ou même la mort.

- 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.



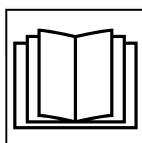
Les PIÈCES MOBILES peuvent causer des blessures.

- 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



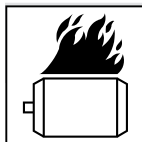
Risque D'INCENDIE OU D'EXPLOSION.

- 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.

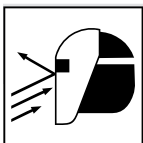
- Utiliser seulement l'anneau de levage pour soulever l'appareil et des accessoires correctement installés, non pas les bouteilles de gaz. Ne pas dépasser les capacités maximales de l'anneau de levage (voir Spécifications).



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.



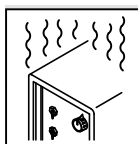
LES LIQUIDES PRESSURISÉS peuvent blesser ou tuer.

- 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.



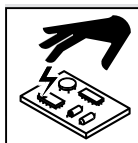
LES FILS DE SOUDAGE peuvent provoquer des blessures.

- 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.



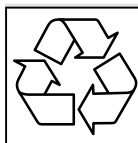
LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- 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.



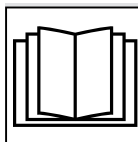
UNE REMORQUE QUI BASCULE peut provoquer des blessures.

- 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/du 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.

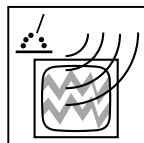
- Lire et appliquer les instructions sur les étiquettes et le Mode d'emploi avant l'installation, l'utilisation ou l'entretien de l'appareil. Lire les informations de sécurité au début du manuel et dans chaque section.
- N'utiliser que des pièces de remplacement provenant du fabricant.

- 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 cancérogènes et sources de malformations ou d'autres troubles de la reproduction.

Pour plus d'informations, consulter 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 cancérogènes 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.

2-7. Principales normes de sécurité

Safety in Welding, Cutting, and Allied Processes, American Welding Society standard ANSI Standard Z49.1. Website: <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: <http://www.aws.org>.

National Electrical Code, NFPA Standard 70 from National Fire Protection Association. Website: www.nfpa.org.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1 from Compressed Gas Association. Website: www.cganet.com.

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2 from Canadian Standards Association. Website: www.csa-group.org.

Battery Chargers, CSA Standard C22.2 NO 107.2-01 from Canadian Standards Association. Website: www.csagroup.org.

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute. Website: www.ansi.org.

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B from National Fire Protection Association. Website: 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.

OSHA Important Note Regarding the ACGIH TLV, Policy Statement on the Uses of TLVs and BEIs. Website: www.osha.gov.

Portable Generator Hazards Safety Alert from U.S. Consumer Product Safety Commission (CPSC). Website: 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.

For Standards regulating hydraulic systems, contact the National Fluid Power Association. Website: www.nfpa.com.

Battery Service Manual from the Battery Council International. Website: 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.

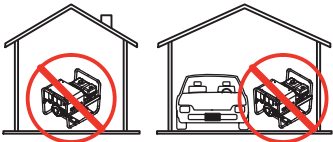
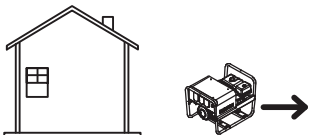
En ce qui concerne les implants médicaux :

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 – DEFINITIONS

3-1. Additional Safety Symbol Definitions

Some symbols are found only on CE products.

	Warning! Watch Out! There are possible hazards as shown by the symbols.
	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.

3-2. Miscellaneous Symbol Definitions

A	Amperage		Alternating Current (AC)		Run (Fast)
V	Voltage		Protective Earth (Ground)		Engine
s	Seconds		Output		Air Filter
U₀	Rated No-Load Voltage (OCV)		Work Connection		Battery (Engine)
U₂	Conventional Load Voltage		Engine Temperature		Fuel
I₂	Rated Welding Current		Circuit Breaker Supplementary Protector		Engine Oil
h	Hours		Clock		Check Valve Clearance
X	Duty Cycle		Engine Choke		Call for Maintenance
—	Negative		Engine Start		Read Operator's Manual
+	Positive		Engine Stop		Engine-Driven Generator with Rectifier
==	Direct Current (DC)		Idle (Slow)		Do Not Switch While Welding

	Shielded Metal Arc Welding (SMAW)
	Gas Metal Arc Welding (GMAW)
	Flux Cored Arc Welding (FCAW)
	Gas Tungsten Arc Welding (GTAW) / Tungsten Inert Gas (TIG) Welding
	Welding

	Single Phase Alternator
Hz	Hertz
	Single Phase
	USB
	Push Button

	Press Or Turn Button
	Spool Gun
	Battery Charge

SECTION 4 – SPECIFICATIONS

4-1. Serial Number And Rating Label Location

The serial number for this product is located on the front. The rating information for this product is located on the back. Use rating label to determine input power requirements and/or rated output. For future reference, write serial number in space provided on back cover of this manual.

4-2. 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.

4-3. 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.

4-4. Weld, Power, And Carbureted 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 at 40° C	Weld Output Range	Maximum Open-Circuit Voltage
CC/DC	244A, 29.8V* 260A, 28V	20 – 265A	94.5V
CV/DC	260A, 27V* 260A, 28V	14 – 30V	

Generator Power Rating	Fuel Capacity	Engine	Operating Angle	Fuel Type
Peak: 11 kVA/kW Continuous: 9.5 kVA/kW Single-Phase, 40A, 240VAC, 20A, 120VAC, 60 Hz, Single Phase	11 gal (42 L) Tank	Kohler CH730 Air-Cooled, Two-Cylinder, Four-Cycle, 23.5 HP Gasoline Engine	20°	Gasoline Up to 10% Ethanol
	N/A	Kohler CH730 LP Air-Cooled, Two-Cylinder, Four-Cycle, 21.5 HP LP Engine		Liquefied Petroleum Gas

*Meets NEMA and IEC Ratings

Derate outputs up to five percent when using LP fuel.

4-5. 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

Engine	Operating Temperature Range*	Storage/Transportation Temperature Range
Kohler CH730	–20 to 104°F (–29 to 40°C)	–40 to 131°F (–40 to 55°C)
Kohler CH730 LP	–10 to 104°F (–12 to 40°C)	

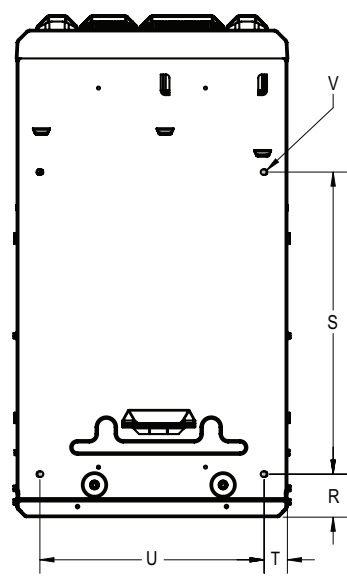
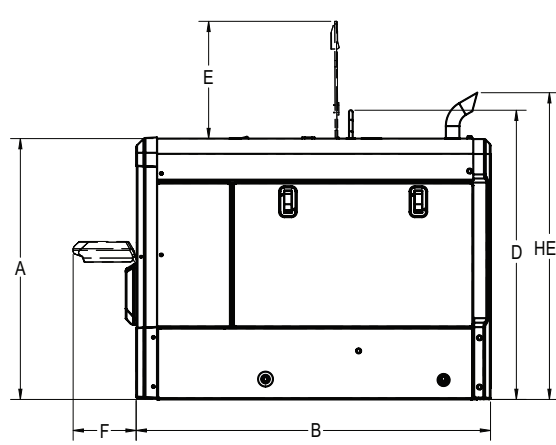
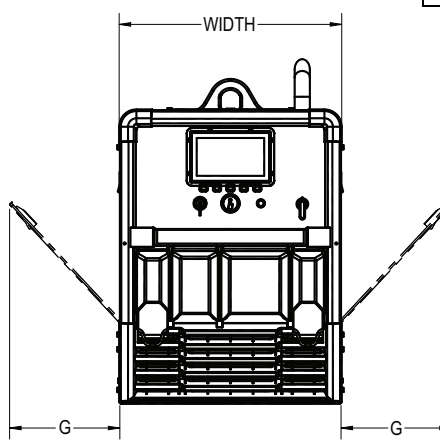
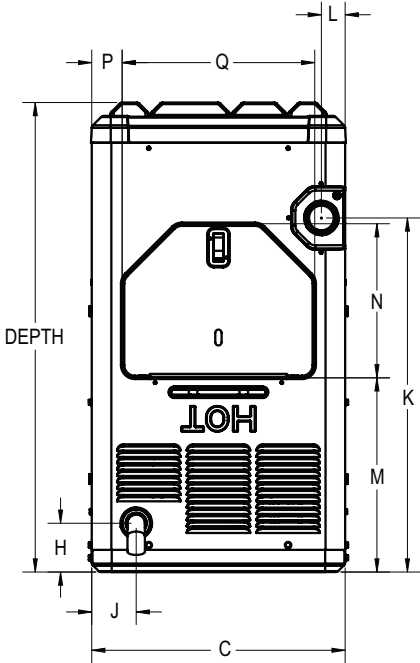
*Output is derated at temperatures above 104°F (40°C).

4-6. Battery Charge Specifications (Models With Battery Charge Option)

Output	Rated Output	Output Range	Maximum Open Circuit Voltage (Nominal)
Battery Charge	150 A	12 or 24 V	14/28
Jump Start	300 A for 20 seconds		

4-7. Base Unit Dimensions, Weights, And Operating Angles

Dimensions	
External Dimensions	
Height	(With Exhaust) 31.16 in. (791 mm)
Width	20.13 in. (511 mm)
Depth	37.06 in. (941 mm)
A	26.5 in. (673 mm)
B	36 in. (914 mm)
C	20 in. (508 mm)
D	29.38 in. (746 mm)
E	(Top Door Clearance) 11.91 in. (303 mm)
F	(Output Cover Clearance) 6.4 in. (163 mm)
G	(Side Door Clearance) 9.97 in. (253 mm)
Exhaust Pipe Location	
H	3.85 in. (98 mm)
J	3.51 in. (89 mm)
Fuel Fill Location	
K	27.95 in. (710 mm)
L	1.88 in. (48 mm)
Top Door Location	
M	15.33 in. (389 mm)
N	12.16 in. (309 mm)
P	2.4 in. (61 mm)
Q	15.2 in. (386 mm)
Mounting Hole Location	
R	3.18 in. (81 mm)
S	22.31 in. (567 mm)
T	1.72 in. (44 mm)
U	16.56 in. (421 mm)
V	0.406 in. (10.31 mm)
Weight	
385 lb (175 kg)	
Lifting Eye Weight Rating: 1100 lb (499 kg)	



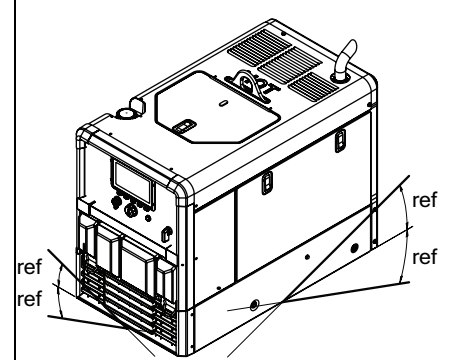


⚠ Do not exceed tilt angles or engine could be damaged or unit could tip.

⚠ Do not move or operate unit where it could tip.

⚠ Do not operate suspended from lifting eye.

☞ See Section 4-4 for specific operating angles.



4-8. Wireless Remote Regulatory Approval

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

1. This device may not cause harmful interference, and
2. 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.

4-9. Duty Cycle And Overheating



100% Duty Cycle at 260 Amperes DC



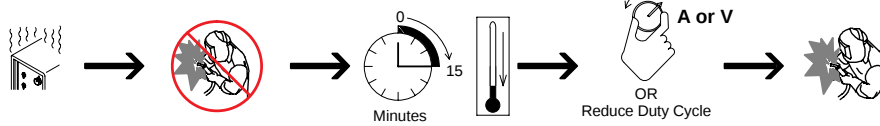
Continuous Welding

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

☞ This unit is rated for welding at 260 amperes continuously.

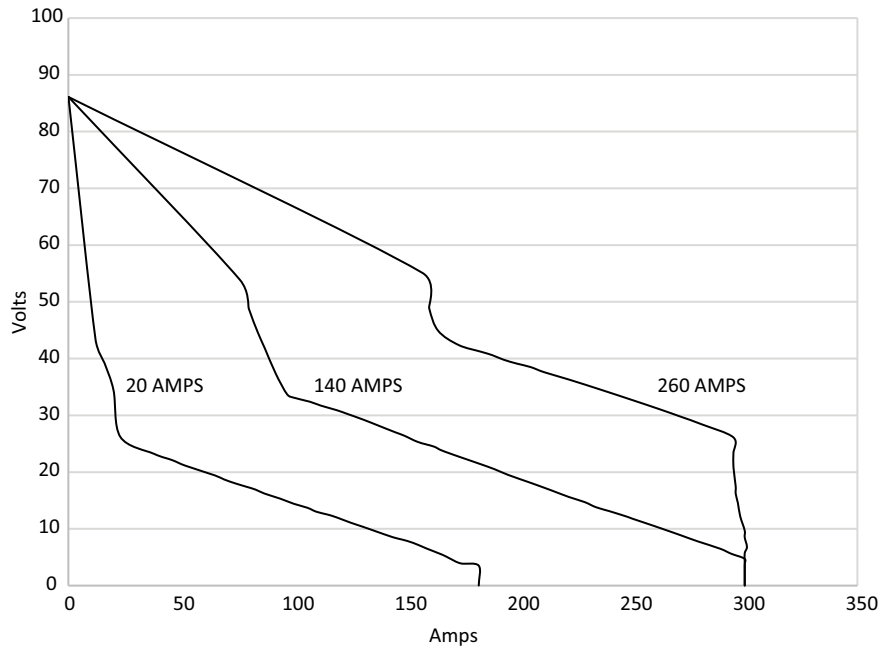
NOTICE – Exceeding duty cycle can damage unit and void warranty.

Overheating



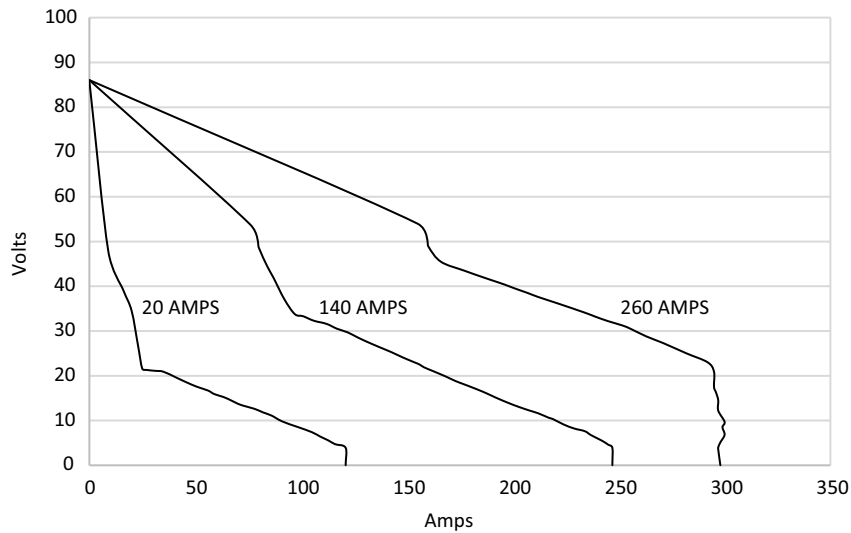
4-10. Volt-Ampere Curves

STICK XX10 Electrode

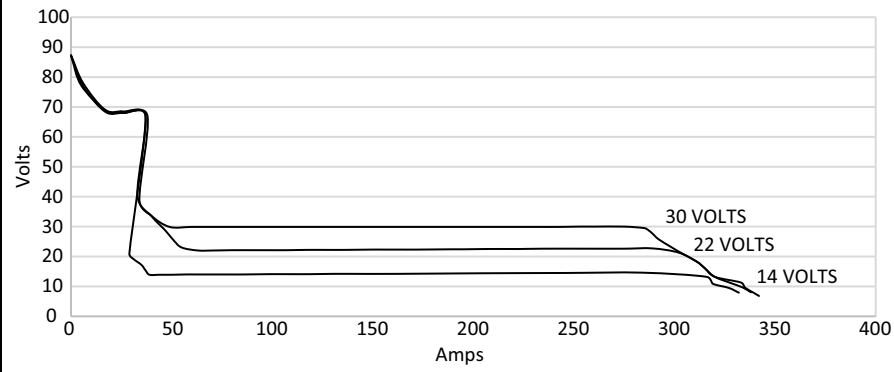


The volt-ampere curve shows the minimum and maximum voltage and amperage output capabilities of the welding generator. Curves of all other settings fall between the curves shown.

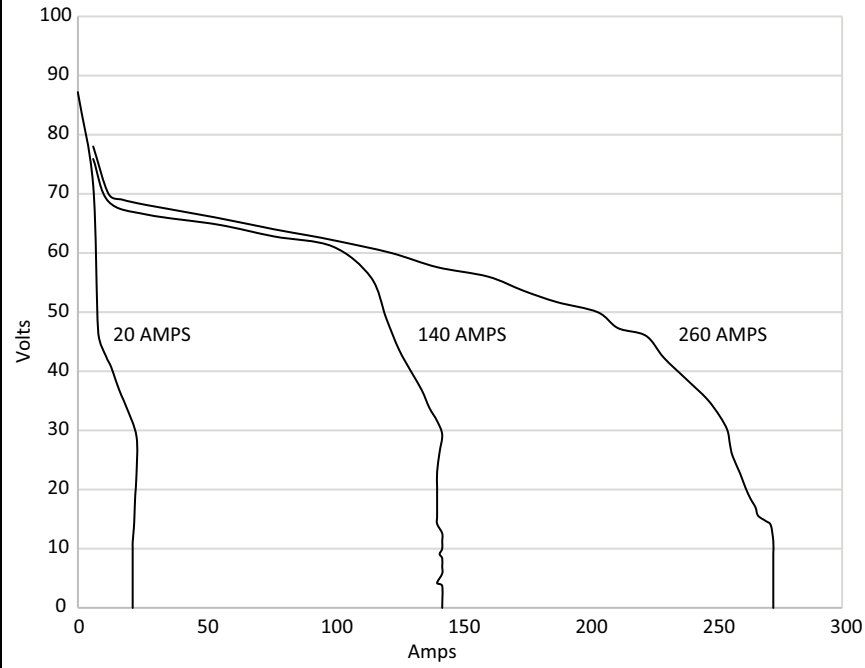
STICK XX18 Electrode



MIG



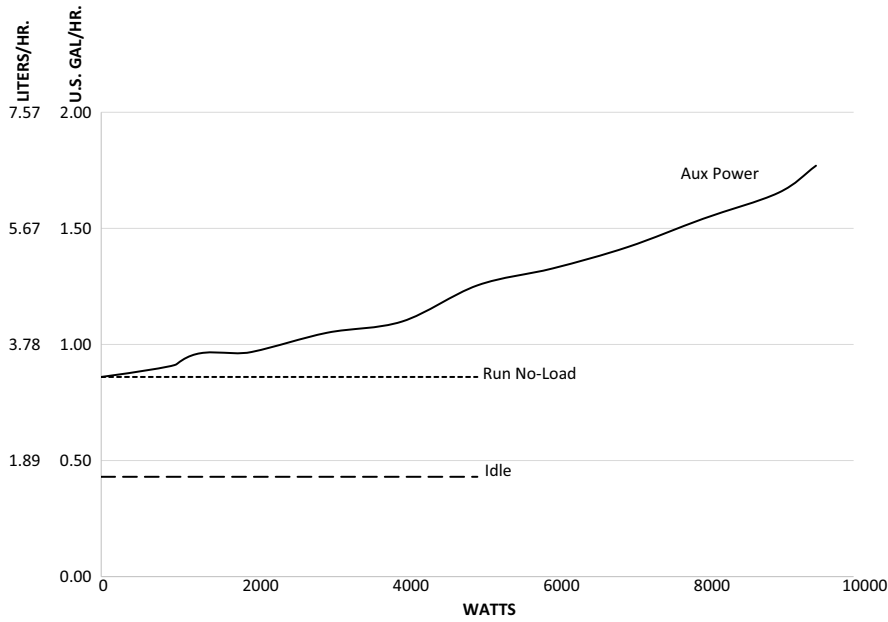
TIG



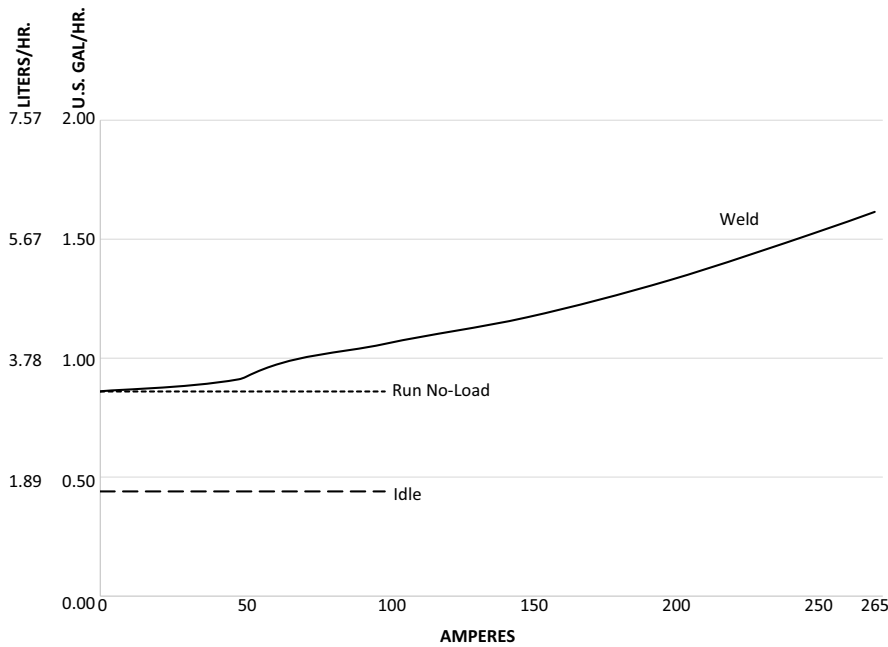
4-11. Fuel Consumption

Auxiliary Fuel Consumption

The curves show typical fuel use under auxiliary and weld loads.

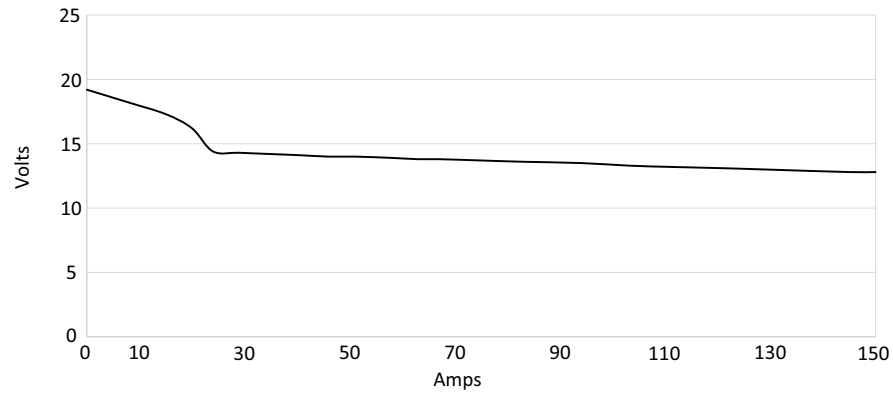


Weld Fuel Consumption

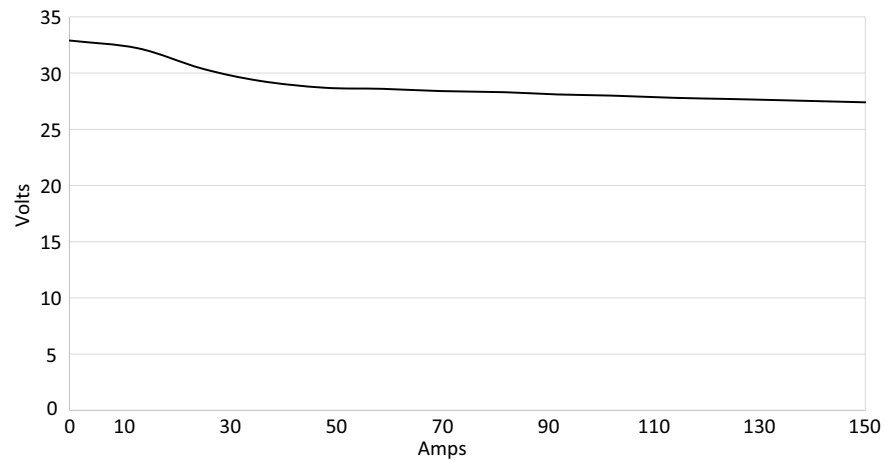


4-12. Battery Charge Curve (Models With Battery Charge Option)

12 Volt Battery Charge



24 Volt Battery Charge

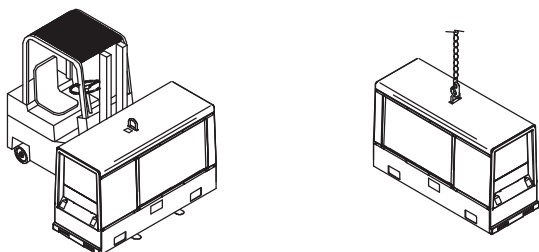


SECTION 5 – INSTALLATION

5-1. Installing Welder/Generator



Movement

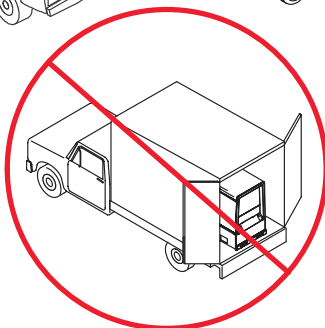
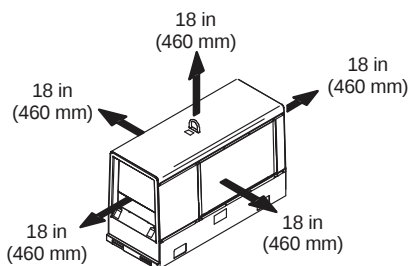
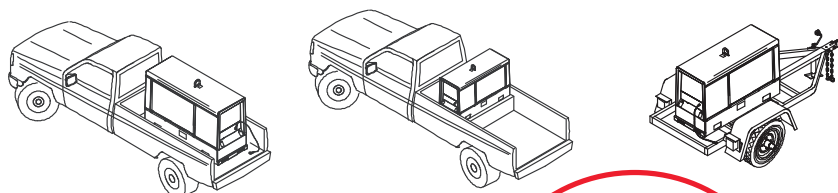


- ⚠ Do not move or operate unit where it could tip.
- ⚠ Do not lift unit from end.
- ⚠ Do not weld on base. Welding on base can cause fuel tank fire or explosion. Bolt unit down using holes provided in base.
- ⚠ Always securely fasten welding generator onto transport vehicle or trailer and comply with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

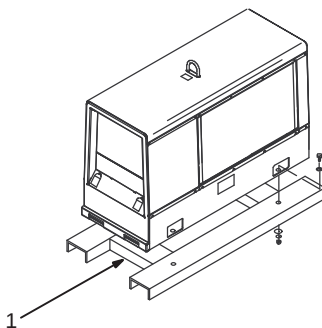
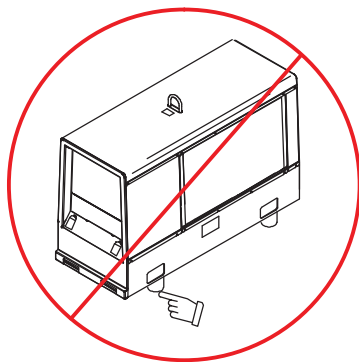
- ⚠ Do not mount unit by supporting the base only at the four mounting holes. Do not use flexible mounts. Use cross-supports to adequately support unit and prevent damage to base.

1 Cross-Supports

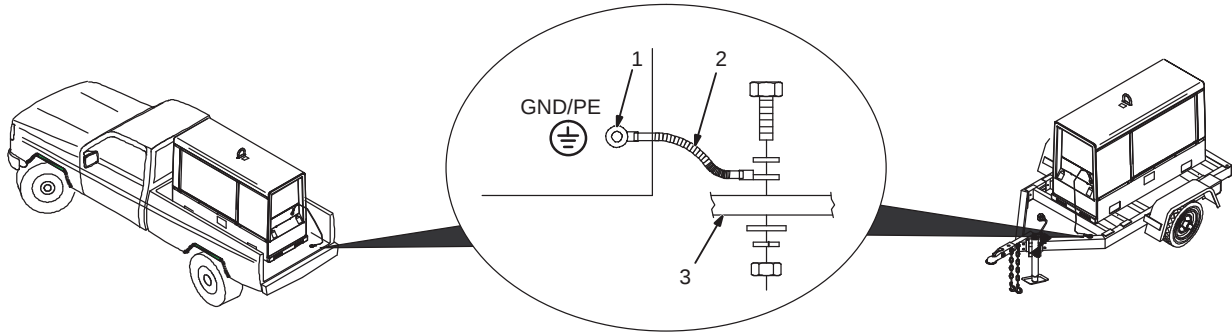
Mount unit on flat surface or use cross-supports to support base.

☞ Go to MillerWelds.com for more information on truck installations.

Mounting



5-2. 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)

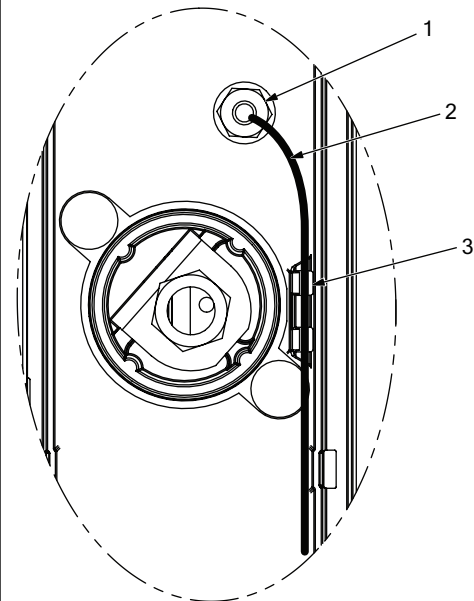
2 Grounding Cable (Not Supplied)

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.

5-3. Ground Cable Routing



See Section 5-2 prior to routing grounding wire.

1 Equipment Grounding Stud

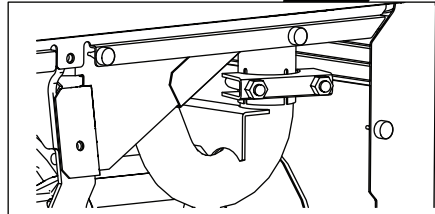
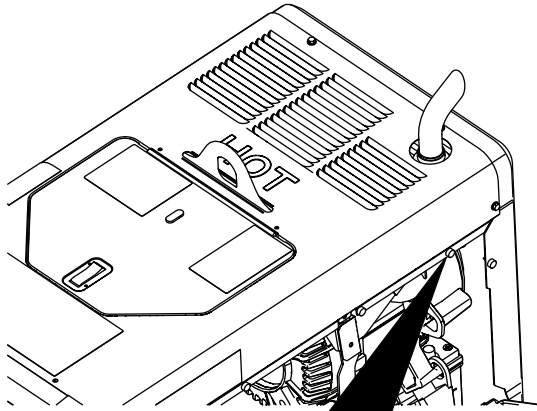
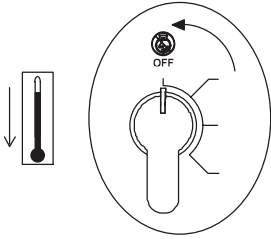
2 Grounding Cable

3 Grounding Cable Retention Clip

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

Use #8 AWG insulated copper wire.

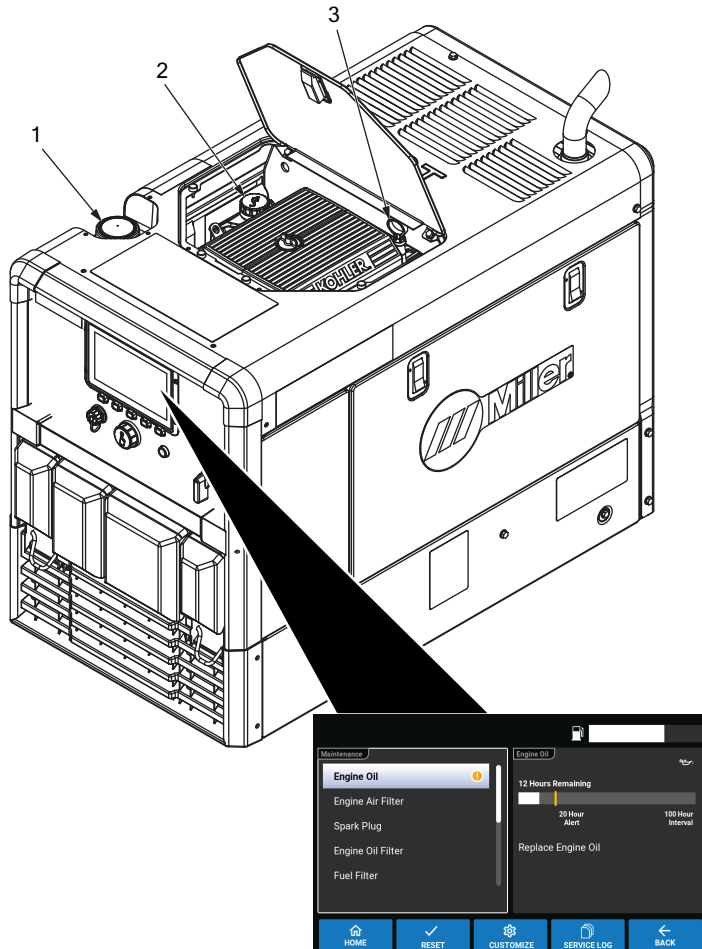
5-4. Installing Exhaust Pipe



 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.

5-5. 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. Fuel/hourmeter 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. The fuel pump may operate erratically if crankcase is overfilled.

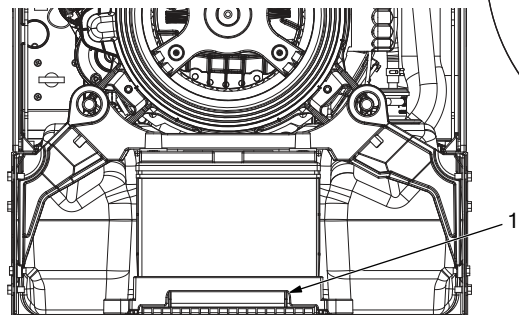
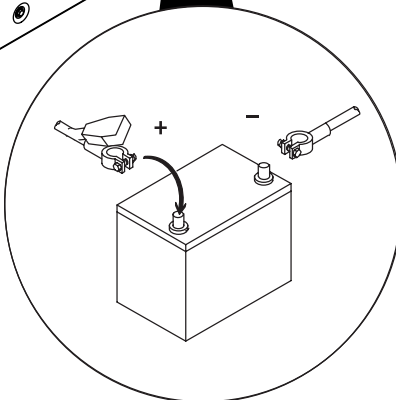
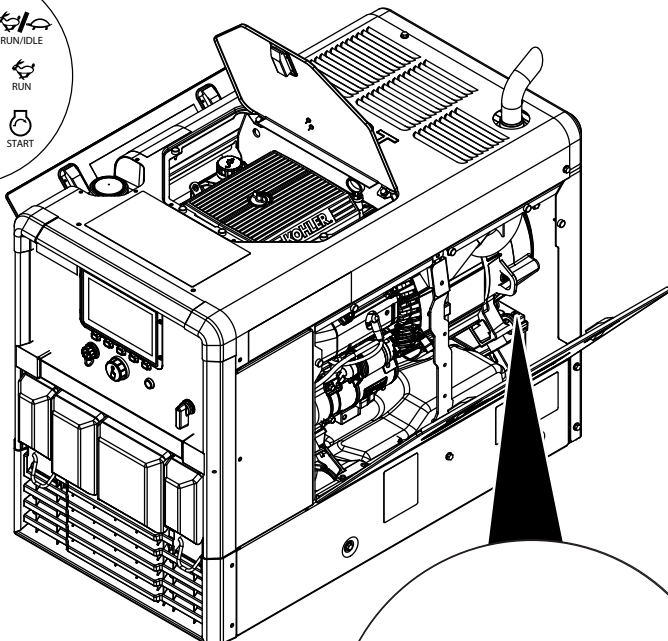
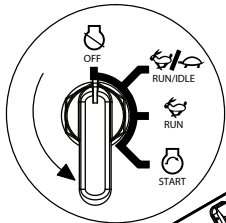
After fueling, check oil with unit on level surface. If oil is not up to full mark on dipstick, add oil (see maintenance label).

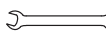
Use maintenance screen to determine hours until next recommended oil change (see Front Panel Controls).

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.

5-6. Connecting Or Replacing The Battery



 3/8, 1/2 in.

Connect negative (-) battery cable last.

Battery is most easily accessed through the side door. Connect battery, negative cable last. Close access door.

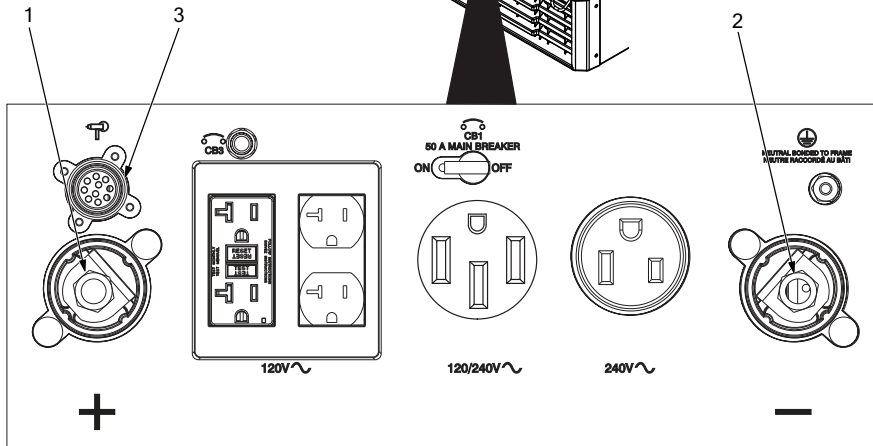
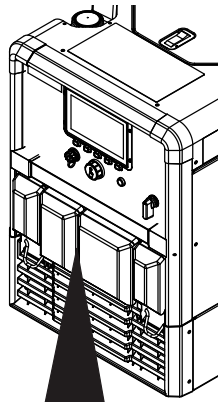
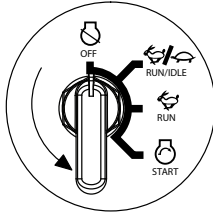
- Do not allow the battery cables to touch opposing terminals. When connecting the battery cables attach the positive (+) cable to the positive (+) battery terminal first, followed by negative (-) cable to negative (-) battery terminal.
- Never start the engine when the cables are loose or poorly connected 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.

1 Battery Holddown

To change battery, remove rear panel and battery holddown.

Be sure battery cables and fuel tank vent hose are not pinched when installing battery and replacing rear panel.

5-7. Weld Output Terminals



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

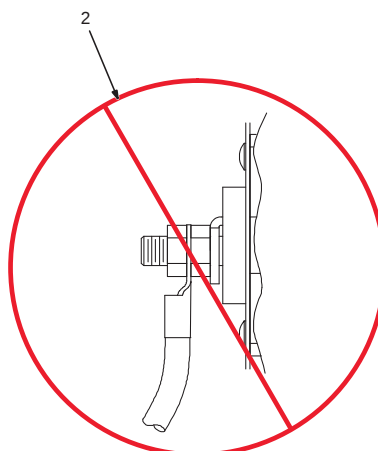
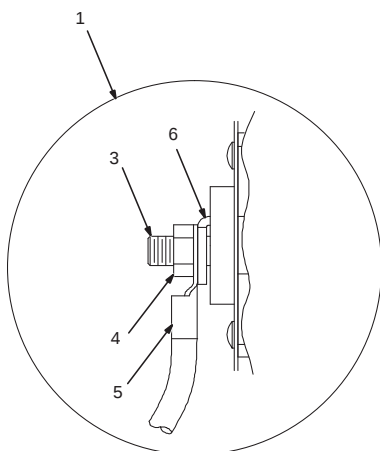
- 1 Positive Weld Output Terminal
- 2 Negative Weld Output Terminal
- 3 Spool gun receptacle

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

Navigate to the weld process menu if equipped with LCD interface (see section 6-1).

See Sections 6-6 thru 6-8 for typical process connections and control settings.

5-8. Connecting Weld Output Cables



3/4 in. (19 mm)

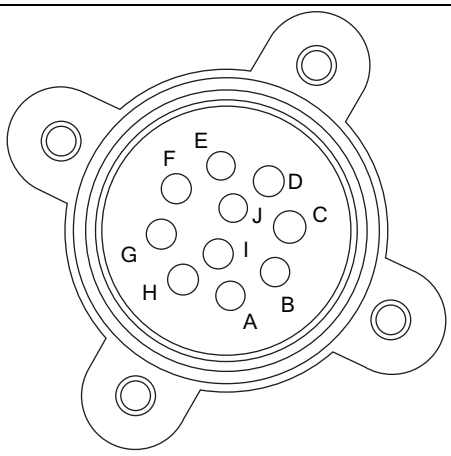
- Stop engine.**
- Failure to properly connect weld cables may cause excessive heat and start a fire, or damage your machine.**

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.

5-9. Spool Gun Receptacle Information

	Socket*	Socket Information
	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.	

5-10. 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 ²)	60 - 100% Duty Cycle AWG (mm ²)	10 - 100% Duty Cycle AWG (mm ²)					
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)

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

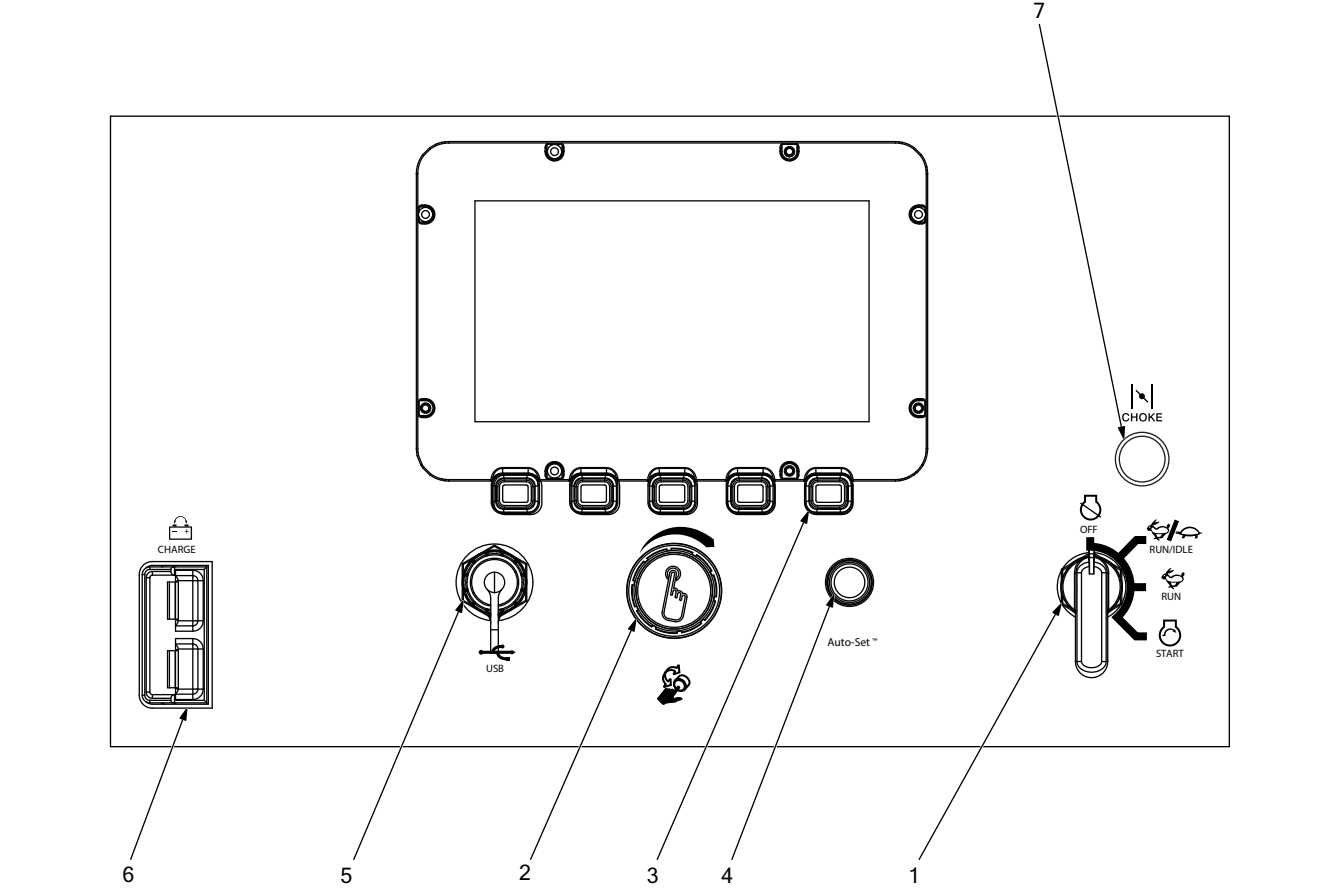
**Weld cable size (AWG) is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere.
() = mm² for metric use.

***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>.

SECTION 6 – OPERATION

6-1. LCD Front Panel Controls





1 Engine Control Switch

Use switch to start engine, select speed, and stop engine. In Run/Idle position, engine runs at idle speed at no load, and weld/power speed under load. In Run position, engine runs at weld/power speed.

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

To Start: pull out choke (if equipped) and turn Engine Control switch to Start position. Release switch when engine starts. Slowly push in choke (if equipped).

☞ 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 6-11 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.

3 Soft Buttons

Push to navigate screens/parameters.

4 Auto-Set

Push to set parameters based on pre-defined values.

5 USB Port

Use for software upgrade and collecting error codes.

6 Battery Charge (Models with battery charge option, see Section 7-2)

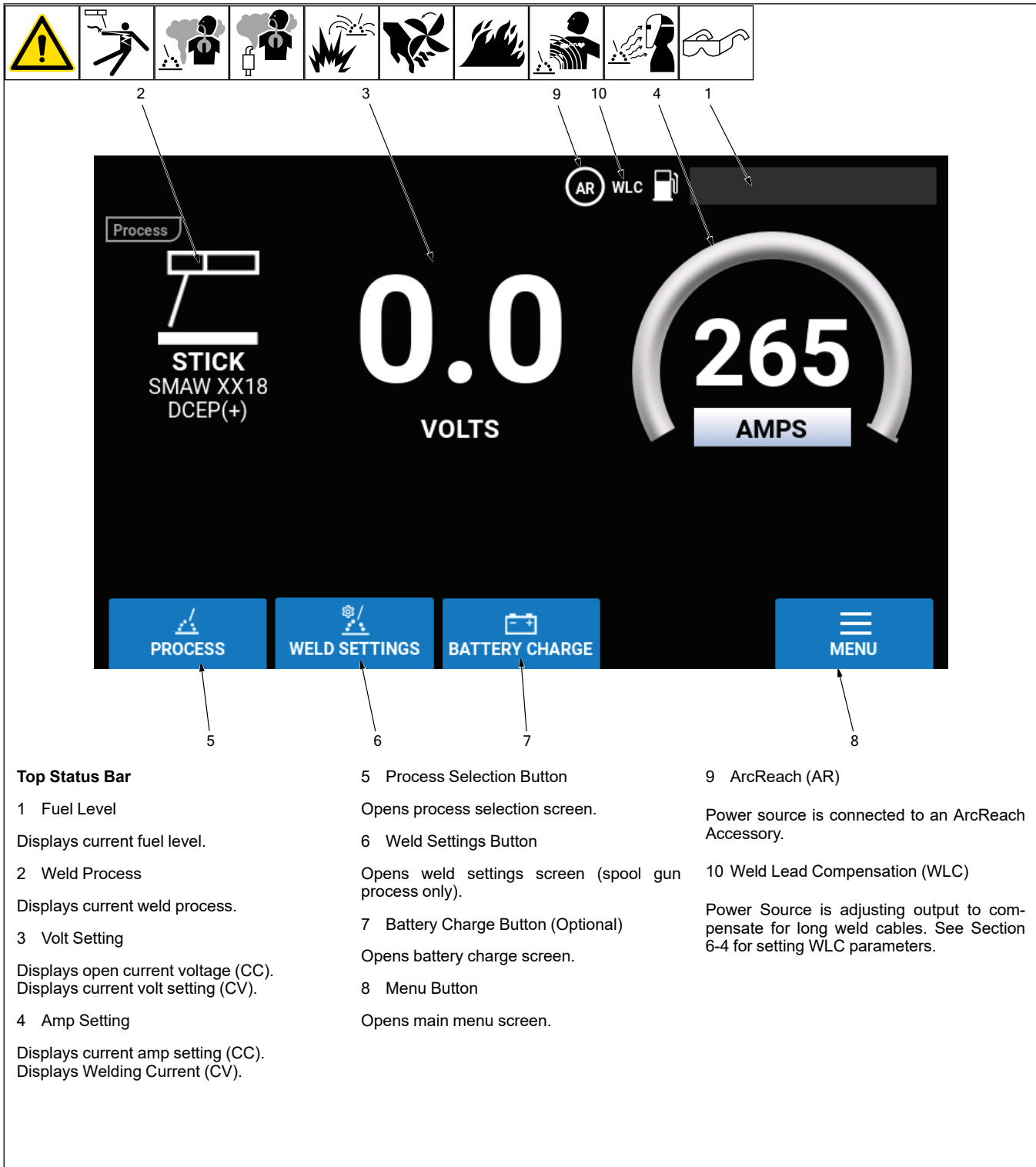
Used to charge 12V or 24V Battery

7 Choke (Kohler LP engine option only)

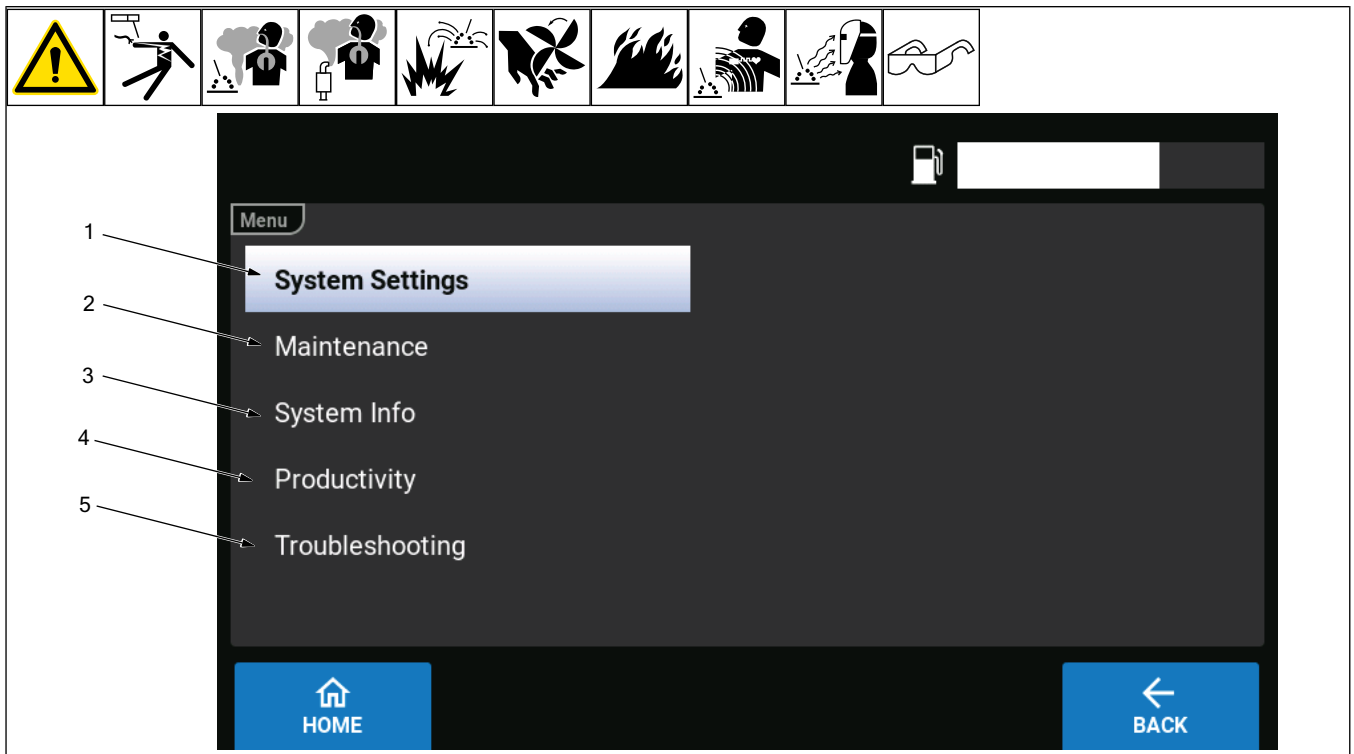
Use to control fuel flow during cold engine starts.

☞ See Sections 6-6 thru 6-8 for typical process connections and control settings.

6-2. Main Screen



6-3. Menu Screen



The screenshot shows a menu screen with a dark background. At the top, there is a row of ten safety icons: a warning triangle, a person using a tool, a person with a gas cylinder, a person with a flame, a person with a spark, a person with a flame, a person with a flame, a person with a flame, a person with a flame, and a person with a flame. Below the icons is a 'Menu' header. The menu items are listed vertically: System Settings, Maintenance, System Info, Productivity, and Troubleshooting. At the bottom, there are two buttons: 'HOME' and 'BACK'.

1 System Settings Select to change unit operation parameters. See Section 6-4.	3 System Info Select to check and update software, check and download summary file, and restore unit to factory defaults (see Section 6-13).	4 Productivity Select to check unit usage hours.
2 Maintenance Menu Select to check, change, or reset the maintenance interval schedule. See Section 10-1.		5 Troubleshooting Displays live unit data for troubleshooting purposes.

6-4. System Settings Screen












WLC


System Settings

Weld Lead Calibration

Cable Length

Cable Size

Screen Brightness

Weld Lead Calibration

Enabled

Disabled


HOME


BACK

To change System Settings:

- Rotate Adjust Control/Select knob to select a setting.
- Press Adjust Control/Select knob on desired setting.
- Rotate Adjust Control/Select knob to update the setting.
- Press Adjust Control/Select knob 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 Options	Description
Screen Brightness	1 to 10	Sets Screen Brightness.
Weld Lead Calibration	Enable / Disable	Enable/disable Weld Lead Compensation.
Cable Length	10 to 500 ft	Enter cable length of total weld circuit in feet
Cable Size	#4 to 4/0 AWG	Enter cable gauge size.

6-5. Auto-Set Screen

The screenshot displays the Miller Auto-Set screen. At the top, a row of nine safety icons is shown. The main display area features a large '0.0 VOLTS' reading and a '70 AMPS' reading. A green bracket labeled '4' indicates the recommended setting range for the selected welding parameters. A blue star labeled '5' indicates the recommended setting. Below the main display, three buttons are visible: 'Electrode Type' (XX18), 'Electrode Diameter' (3/32"), and 'Material Thickness' (14 GA). Each button has a left and right arrow. A 'PROCESS' button is on the left, and a 'MENU' button is on the right. A 'WLC' icon is in the top right corner.

1 Electrode Type Button
Press to select through electrodes.

2 Electrode Diameter Button
Press to select electrode diameter.

3 Material Thickness Button
Press to select material thickness range.

4 Auto-Set Indicator
Represents recommended setting range for selected welding parameters.

5 Auto-Set Star
Star appears and text turns blue when recommended setting is selected.

Options change depending on weld process selected.

6-6. Typical Stick Welding Connections And Control Settings

Stop engine.

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

Consult the amperage selection tables in section 14-2 for general guidance

- 1 Work Clamp
- 2 Electrode Holder

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

Be sure to use the correct size weld cables (see Section 5-10).

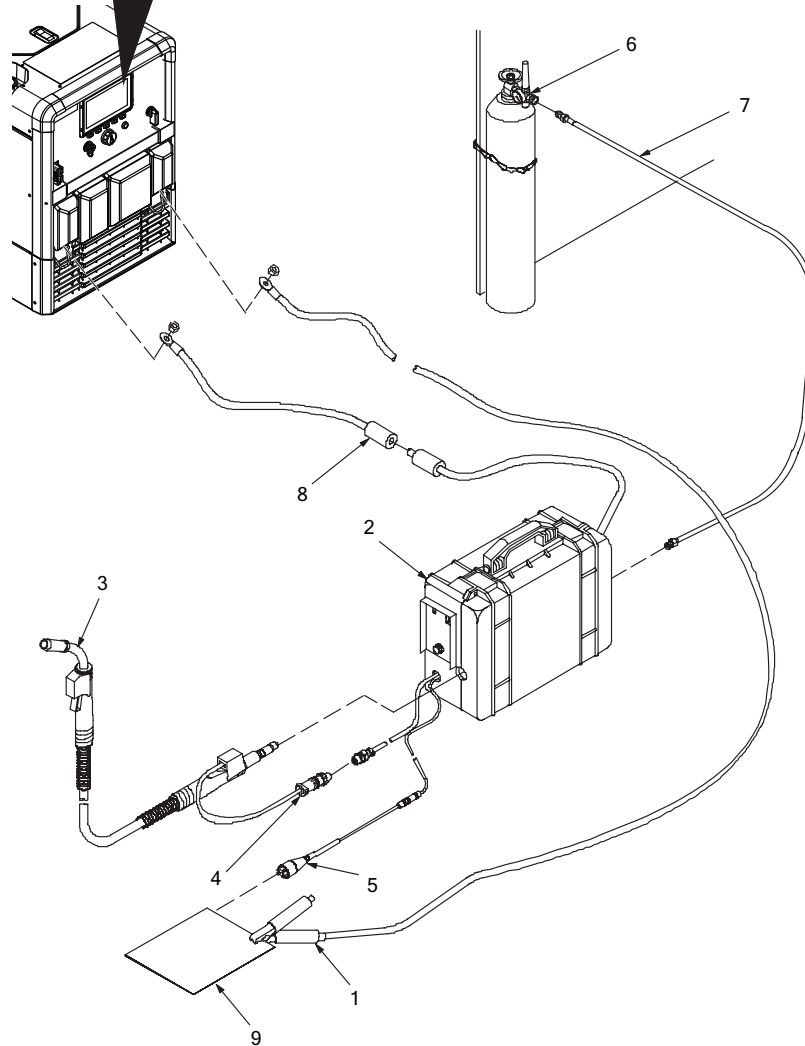
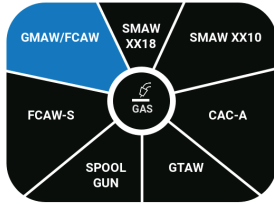
Typical Settings For 7018 (1/8 in.) Electrode:

- 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.

Miller recommends Hobart filler metals.

6-7. Typical MIG Welding Connections and Settings

A. Solid Wire Applications



3/4 in.

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 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 5-10).

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.

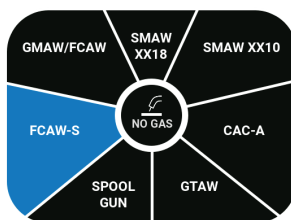
Insert gun trigger plug (item 4) into matching receptacle and tighten threaded collar.

Connect gas hose from feeder to regulator on cylinder.

Typical Autoset settings

- Select GMAW/FCAW weld process.
- Select wire type, diameter, and material thickness on auto set screen.
- Adjust voltage within auto-set range as needed.
- Set wire feed speed between 100–300 IPM for Short Circuit Transfer and 300–400 IPM for Spray Transfer.

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 5-10).

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.

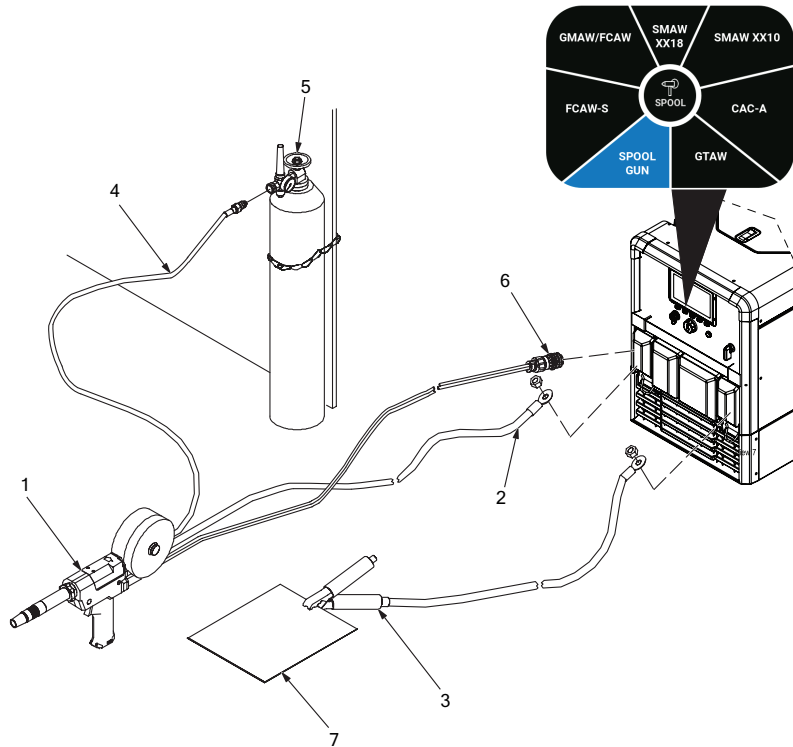
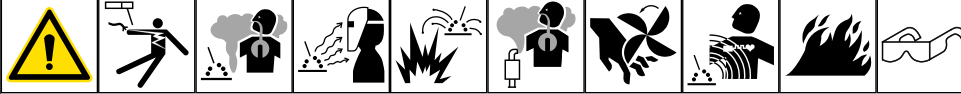
Typical Autoset settings

- Select GMAW/FCAW weld process.
- Select wire type, diameter, and material thickness on auto set screen.
- Adjust voltage within auto-set range as needed.
- Set wire feed speed between 105–195 IPM for Short Circuit Transfer and 300–400 IPM for Spray Transfer.
- Do a test weld. To increase arc length, increase voltage. To shorten arc length reduce voltage or increase wire feed speed.

Miller recommends Hobart filler metals.

3/4 in.

6-8. Typical MIG Connections And Settings Using Weld Control And Spool Gun



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 Argon Cylinder
- 6 Spool Gun Plug
- 7 Workpiece

Be sure to use the correct size weld cables (see Section 5-10).

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

Connect the work cable to the Negative terminal.

Connect work cable to welder/generator Work terminal.

Insert spool gun plug into receptacle and tighten threaded collar.

Connect gas hose from spool gun to regulator on Argon bottle.

Typical Settings For 4043 (.035) Aluminum On 1/8 in. Material:

- Select SPOOL GUN weld process.
- Adjust voltage between 22V and 26V as needed.
- Set wire feed speed between 300-400 IPM.
- Increase/decrease voltage setting to increase/decrease arc length.

Miller recommends Hobart filler metals.

6-9. Using Wireless Remote (If Equipped)



⚠ Place Engine Control switch in Off position when welder/generator is not in use to prevent unexpected starting.

⚠ Check that all doors, panels, covers, and guards are closed and securely in place before starting.

1 Fob Button

2 Communication LED

3 Cranking LED

4 Running LED

Place welder/generator in a location where remote signal is not blocked during operation. If signal is weak, shorten distance between fob and unit.

If welder/generator is out of range of the fob, the Communication LED will blink rapidly after completing the starting or shut off sequence.

Starting Sequence Feedback

Engine Control switch must be in Run or Run/Idle position for remote starting.

Communication LED will turn off after three seconds to signal that you can release the button to start the machine.

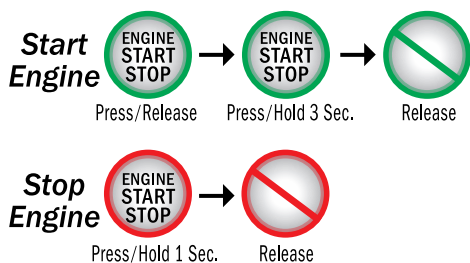
If the Cranking LED blinks red and the fob beeps twice, the transmit was successful and the startup sequence begins. The alarm on the welder/generator chimes for up to 10 seconds while cranking.

When the engine starts, the Running LED illuminates green for two seconds, and the fob beeps twice. If the engine does not start after 20 seconds, the Running LED illuminates red for two seconds and the fob emits one long beep.

Shut Off Sequence Feedback

When the engine has stopped, the Running LED illuminates red for two seconds, and the fob beeps four times.

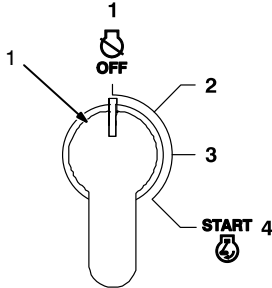
Start/Stop Sequence



LED Indicators

- Start/Stop Communication
- Engine Cranking
- Engine Start Successful
- Engine Start Failed/
Engine Stopped

6-10. Pairing Wireless Remote



- 1 Engine Control Switch
- 2 Fob Button

Start with Engine Control switch in Position 1 (Off).

Turn switch to Position 2 for three seconds.

Turn switch to Position 3 for three seconds.

Turn switch to Position 2 for three seconds.

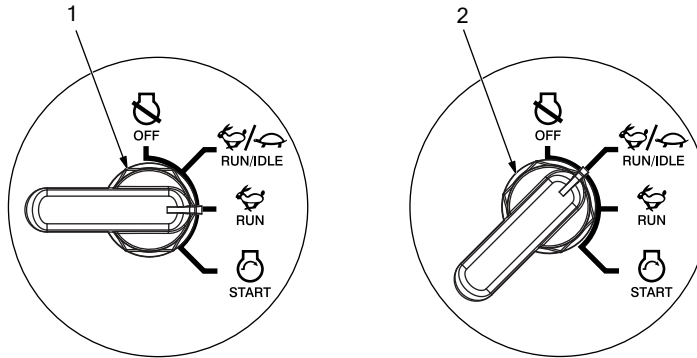
Turn switch to Position 3 for three seconds. The welder/generator alarm emits a short chime to indicate that the welder/generator is in remote pairing mode.

Press and release Fob button. The welder/generator alarm chimes once to indicate that the remote has been paired.

After seven seconds, the welder/generator alarm chimes twice to indicate that the welder/generator is no longer in remote pairing mode.

The maximum number of fobs that can be paired with one welder/generator is four.

6-11. Cold Weather Engine Operation



- 1 Run Position – For cold starts and engine warm up
- 2 Run/Idle Position – For use after engine is at operating temperature

Carburetor Icing

Carburetor icing causes the unit to drop below the normal idle speed and then stall. This condition occurs when the temperature is near freezing and the relative humidity is high. Ice forms on the throttle plate and inner bore of the carburetor. The engine typically restarts without problems but soon stalls again.

- Treat gasoline with a fuel de-icer product (isopropyl alcohol).
- Place the Engine Control switch in the Run position.
- Run engine only when expecting to frequently load it.

Breather Icing

Oil breather/pulse line icing occurs in severe cold (continuously below 0°F). Moisture accumulates in the oil from piston ring blow-by if the engine is extensively idled. This may cause vacuum line freezing, oil breather tube freezing or ice in the carburetor. All of these cause operating problems. Due to ice in the lines, the engine may not restart until it is warmed to above freezing.

- Load engine and reduce idle times to prevent engine shutdowns.
- Use an electric fuel pump to avoid pulse line freezing.
- Install engine cold-weather kit.

Kohler (1-800-544-2444) offers a kit for cold weather operation. The user can install this kit. The kit pulls heated air from the muffler surface into the carburetor and shut the cold

air off. This increases engine temperature during operation in both idle and high speed.

When the ambient temperatures become warmer (above 45°F) the air flow will have to be returned to normal.

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.

6-12. Associating ArcReach® Devices (ArcReach Models Only)



⚠ Stop engine.

NOTICE – Do not exceed machine duty cycle.

Associating ArcReach Device To Engine Driven Welder/Generator

Make connections between welder/generator and ArcReach device. See Owner's Manual for ArcReach device for typical connection diagrams.

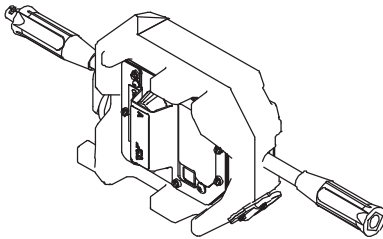
The welder/generator has the ability to associate automatically with an ArcReach device at power up. The Process/Contactor switch must be set to an Output ON mode to associate with an ArcReach device.

See the ArcReach device Owner's Manual to associate the device to the welder/generator.

When the association process is complete, the In Use light will be illuminated. Depending on the capabilities of the ArcReach device, the Process/Contactor switch, Adjust Control/Select button, and Arc Control adjustment may be overridden.

The following ArcReach accessories are compatible with this welder/generator:

ArcReach Stick/TIG Remote For Stick Or TIG Welding

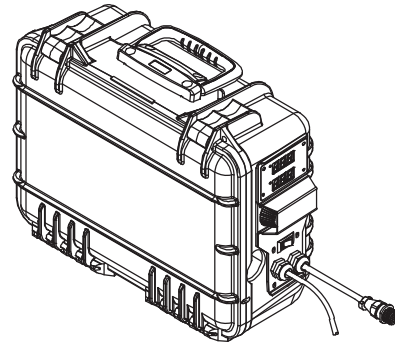


When welder/generator is associated with Stick/TIG Remote:

SMAW processes: Amperage, Electrode Type, and Arc Control settings are adjusted on the remote.

GTAW and CAC-A processes: Amperage settings are adjusted on the remote.

ArcReach SuitCase Feeders For MIG Or FCAW Welding



When welder/generator is associated with SuitCase ArcReach feeder, voltage and wire feed settings are adjusted on the feeder.

6-13. 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

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

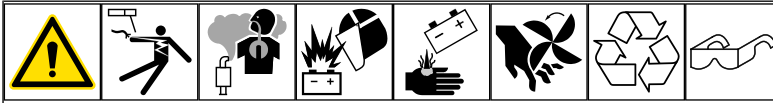
Step 13. Press Back button to go back to System Info screen.

Current software revision is displayed.

Step 14. Verify new software revision has installed.

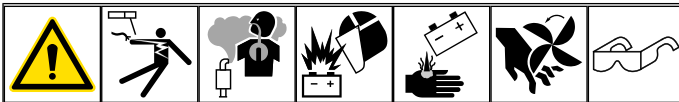
SECTION 7 – BATTERY CHARGING (MODELS WITH BATTERY CHARGE OPTION)

7-1. Battery Charging Guidelines

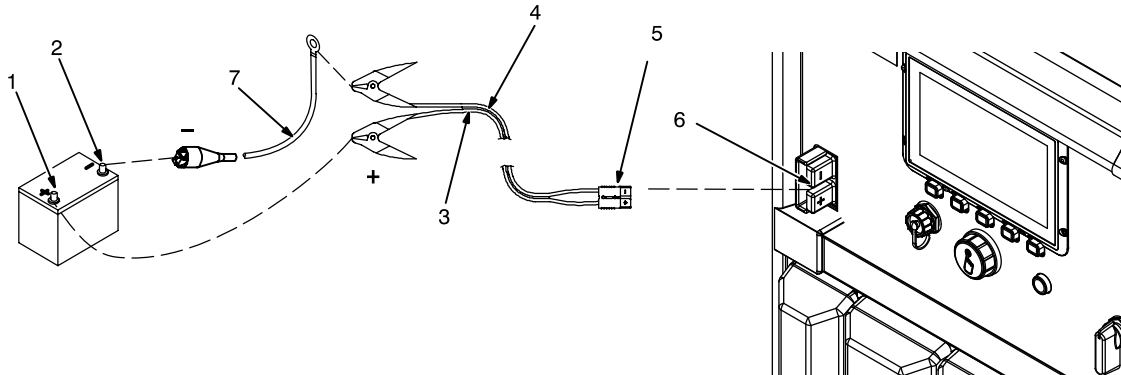


- ⚠ Stop welder/generator engine.
- ⚠ Before charging battery, read the Safety Precautions at the beginning of this manual.
- ⚠ Have only qualified persons do battery charging work.
- ⚠ Do not charge a defective battery, a battery with loose terminals, or one having evidence of damage such as a cracked 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

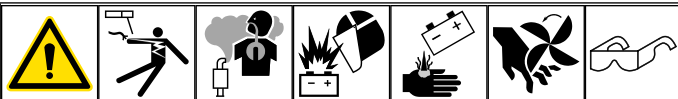


Battery located outside of vehicle

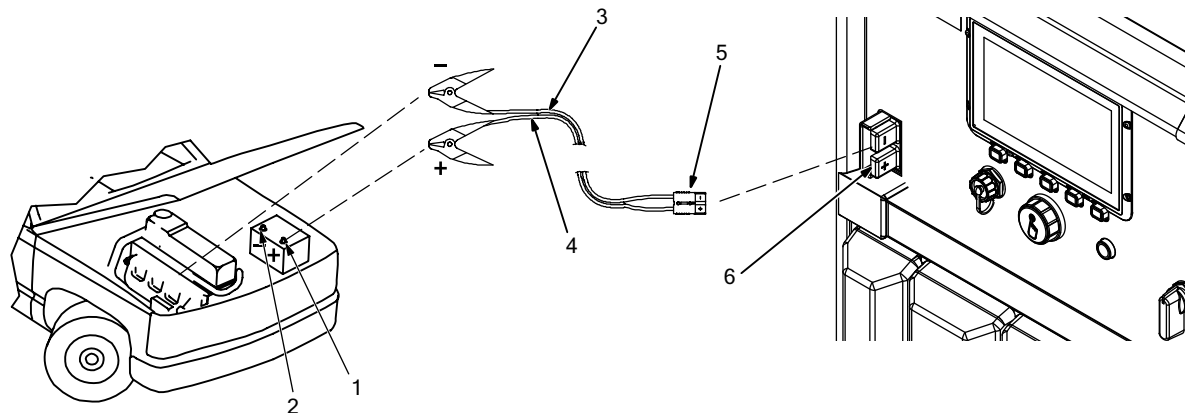


- ⚠ Stop engine.
- ⚠ Before charging battery, check polarity of battery posts. Attach a 24 in. (60 cm) AWG 6 insulated battery cable to Negative (-) battery post. Connect charger Positive (+) cable to Positive post of battery. Standing as far from battery as practical and looking away from battery, connect charger Negative (-) cable to the cable connected to the Negative (-) battery post.
- 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)
- 1 Battery Positive (+) Terminal
- 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.
- NOTICE** – Always connect cables to battery first, then to Battery Charge receptacle.

7-3. Connecting Installed Battery To Battery Charge Receptacle



Battery located in vehicle (Negative post grounded to chassis)



⚠ Stop engine.

⚠ 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).

NOTICE – For equipment with sensitive electronics, such as a vehicle with an on-board computer, disconnect battery from vehicle or equipment before charging battery.

NOTICE – Never leave machine unattended when charging a battery.

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

Obtain Battery Charge/Jumper Cable Kit 300422 or equivalent.

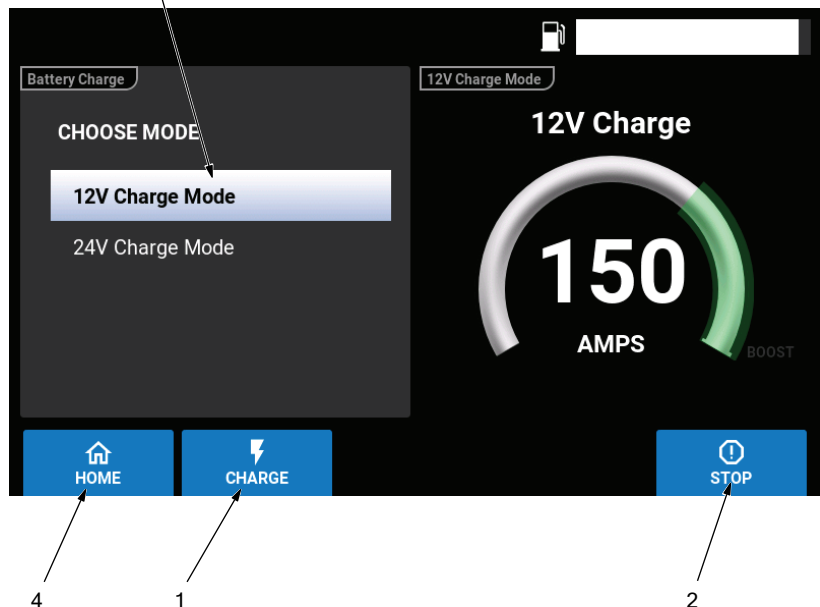
- 3 Red (Positive) Charging Cable
- 4 Black (Negative) Charging Cable
- 5 Battery Charge Plug
- 6 Battery Charge Receptacle

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 2 volts when the charging clamps are attached, or the control system will not start charging.

A. Check Battery

Batt Charge—Check Connection	Code indicates the battery will not accept a charge, battery voltage does not match charging voltage, or the system is improperly connected. Check battery and connections. Cycle Charge/Weld switch to restart charging.
------------------------------	---

B. Jump Timeout

Batt Charge Timer Expired—Wait	Code indicates the system was drawing too much current for too long of a time during an attempt to jump start. Charge automatically restarts after cool down time.
--------------------------------	--

C. Battery Bad

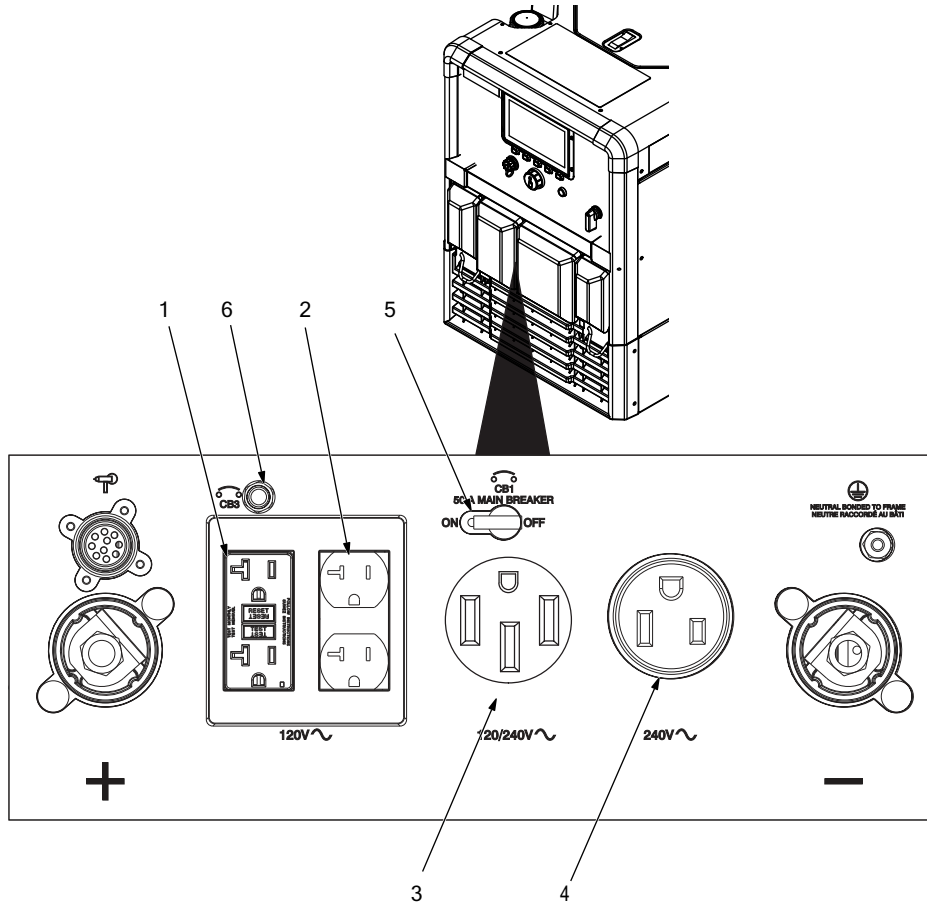
Batt Charge—Bad Battery	The charger has determined that the battery is faulty and is unable to take a charge. Replace the battery.
-------------------------	---

D. 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, protects both duplex receptacles)
- 2 120 V 20 A AC Duplex Receptacle (Non-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 240 V 60 Hz single-phase power at weld/power speed. Maximum output is 9.5 kVA/kW.

240 V receptacle supplies 240 V 60 Hz single-phase power at weld/power speed. Maximum output is 9.5 kVA/kW.

⚠ 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.

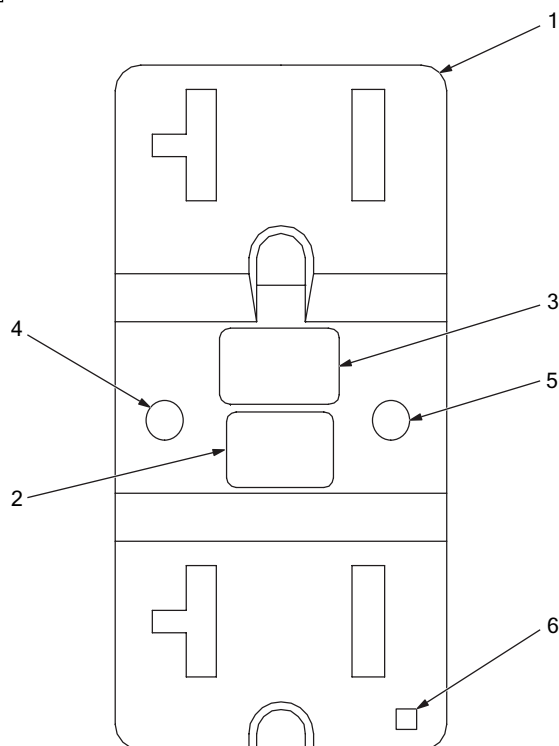
☞ Press button to reset supplementary protector. If supplementary protector continues to open, contact Factory Authorized Service Agent.

Combined output of all receptacles limited to 9.5 kVA/kW rating of the generator.

EXAMPLE: If 20 A is drawn from a 120 V duplex receptacle, only 29 A is available at the 120/240V receptacle:

$$(120 \text{ V} \times 20 \text{ A}) + (240 \text{ V} \times 29 \text{ A}) = 9.5 \text{ kVA/kW}$$

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

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.

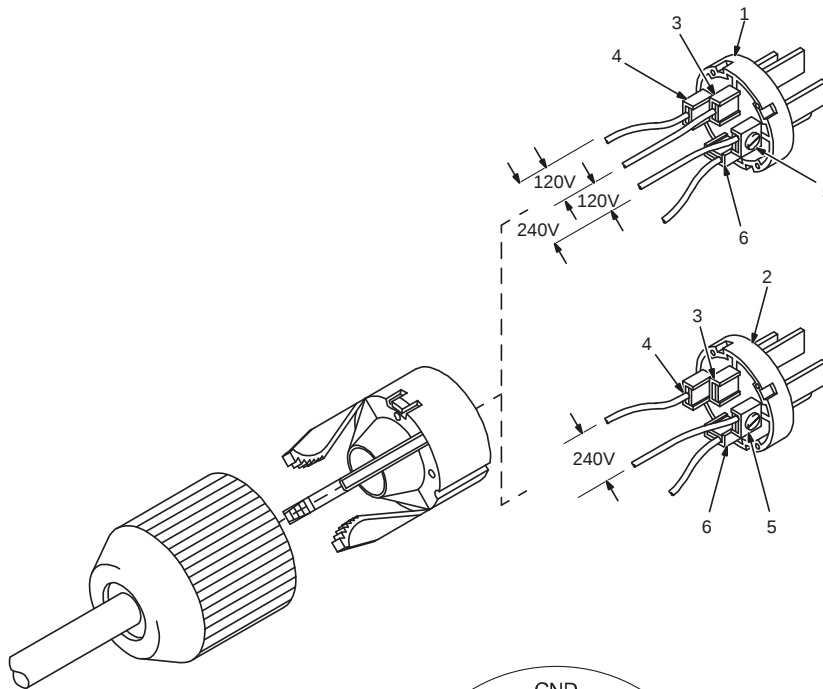
Have a Factory Authorized Service Agent replace GFCI if any of the following occur:

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

8-3. Simultaneous Weld And Power

Weld Current in Amperes	Total Power in Watts	120 V Full kVA (4 Wire) Receptacle Amperes	240 V Full kVA Receptacle Amperes
260	1600	13	6
180	4600	38	19
125	6300	53	26
90	7300	61	30
0	9500	79	39

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, both duplex receptacle share a load with one half of 240 V receptacle.

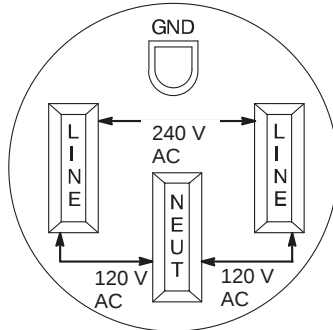
2 Plug Wired for 240 V, 2-Wire Load

3 Neutral (Silver) Terminal

4 Load 1 (Brass) Terminal

5 Load 2 (Brass) Terminal

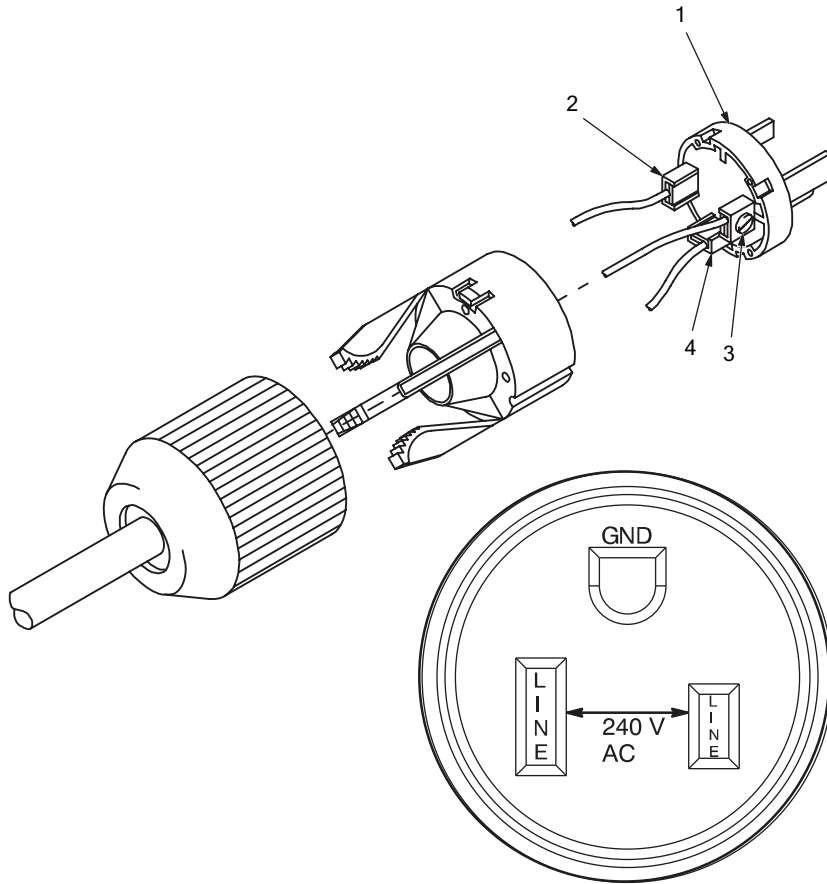
6 Ground (Green) Terminal



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



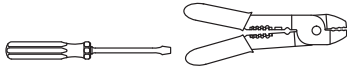
8-5. Wiring Instructions For 240 Volt, Single-Phase Plug (NEMA 6-50P)



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

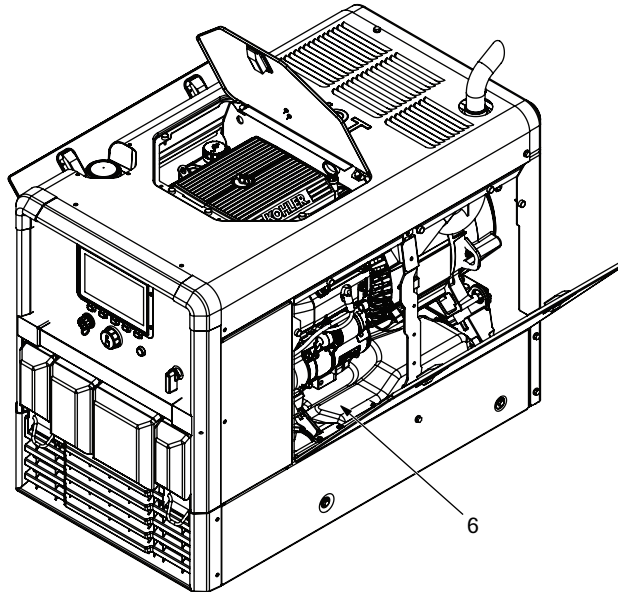
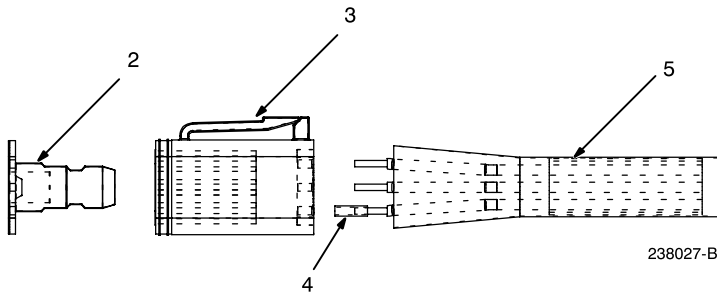
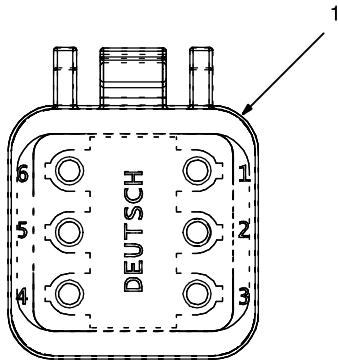
- 1 Plug Wired for 240 V, 2-Wire Load
- 2 Load 1 (Brass) Terminal
- 3 Load 2 (Brass) Terminal
- 4 Ground (Green) Terminal

Current Available in Amperes	
240 V Receptacle*	Each 120 V Duplex Receptacle
0	20
5	20
10	20
15	20
20	20
25	15
30	10
35	5
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. Data is available through CAN-bus connector located on main power harness accessible from side door of unit. Data is transmitted when the unit is On. 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)

6 CAN BUS Receptacle

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. J1939 Messages

Message	Notes	Acro- nym	ID (Hex)	PGN (Deci- mal)	Start Posi- tion	Length	SPN (Deci- mal)	Tx Rate (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 2 for values	propri- etary	18FF78D1	65400	3	1 byte	516107	100
Engine Hours	Actual engine hours 0 to 65535 hours 1 hour/bit 0 offset	propri- etary	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	propri- etary	1CFF79D1	65401	3	2 bytes	516111	1000
Fuel Sender	Percent of fuel remaining 0 to 100	propri- etary	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	propri- etary	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	propri- etary	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	propri- etary	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	propri- etary	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	propri- etary	1CFF7DD1	65405	7	2 bytes	516121	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. Fault Code Values

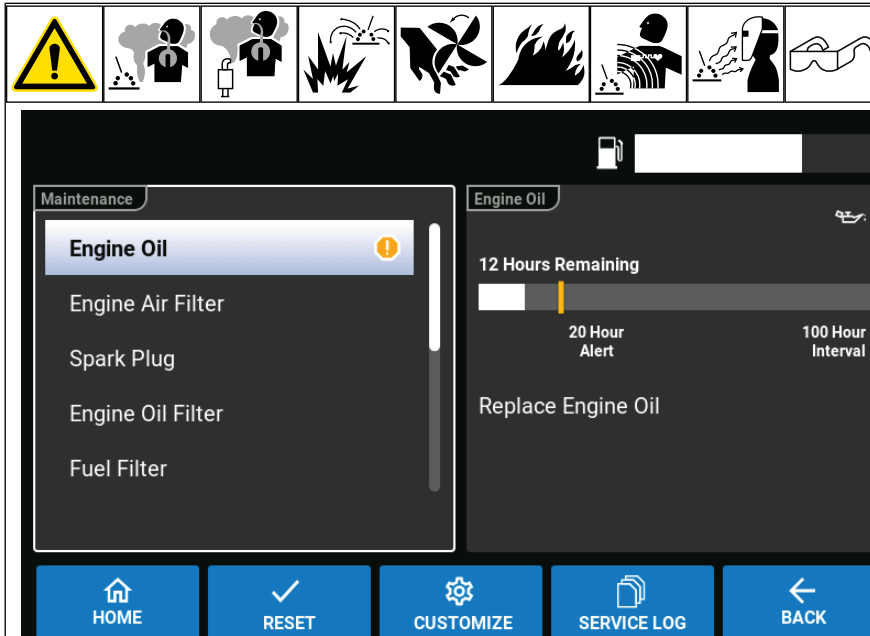
Fault	Help Code	Value
NO FAULT	—	0
Inverter +15V Error	ERR PE07	9
Inverter +5V Error	ERR PV00	10
Inverter +12V Error	ERR PU00	11
Inverter -15V Error	ERR PV01	12
Control Board Communication Error	ERR PV02	16
Inverter Thermistor Error	ERR DH04	27
Inverter Bus Voltage High Error	ERR HV00	28
Inverter Bus Voltage Low Error	ERR HU00	29
Inverter Field Bus Voltage High Error	ERR HV01	33

Table 9–3. 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 – MAINTENANCE AND TROUBLESHOOTING

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 Home button to go to the Home screen.

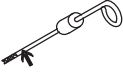
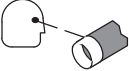
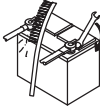
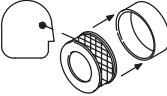
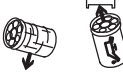
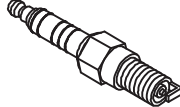
Press Back button to go to the Menu screen.

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

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

Press Service Log button to see maintenance history.

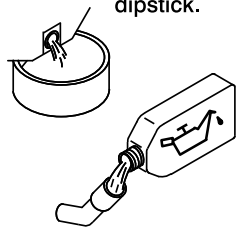
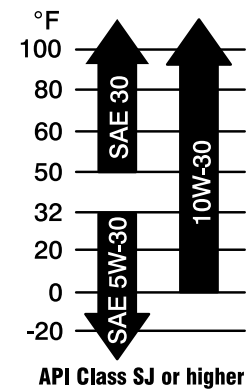
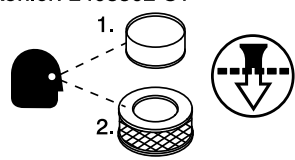
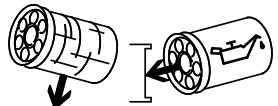
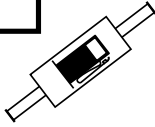
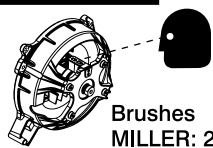
10-2. Routine Maintenance

					
 Stop engine before maintaining.  See <i>Engine Manual and Maintenance Label</i> for important start-up, service, and storage information. Service engine more often if used in severe conditions.  Recycle engine fluids.					
	✓ = Check	☆ = Replace	○ = Clean		Reference
Every 8 Hours	 ✓ Fuel Level	 ✓ Oil Level	 ○ Oil, Fuel Spills		Section 5-5
Every 20 Hours	 ✓○ Spark Arrestor Screen				
Every 25 Hours	 ○ Air Cleaner Wrapper				Section 10-4
Every 50 Hours	 ○ Weld Terminals				
Every 100 Hours	 ○ Battery Terminals	 ○ Cooling System	 ☆ Oil	 ✓☆ Air Cleaner Element	Engine Manual, Sections 10-4 and 10-6
Every 200 Hours	 ☆ Unreadable Labels	 ✓ Spark Plug Gap	 ☆ Oil Filter	 ☆ Fuel Filter	Engine Manual, Section 10-6
Every 500 Hours	 ✓☆ Weld Cables	 ✓ Slip Rings* ✓☆ Brushes*	 ☆ Spark Plug		Engine Manual

*To be done by factory authorized service agent.

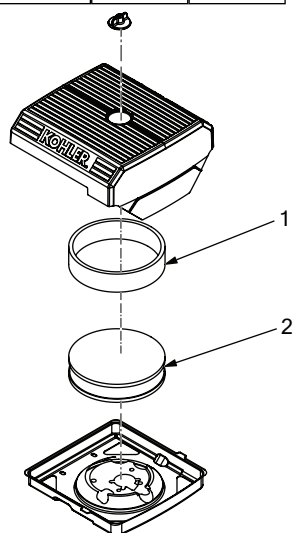
NOTICE – This equipment meets US EPA Evaporative Standards. Be sure fuel system replacement parts meet EPA Evaporative standards.

10-3. Maintenance Label

MACHINE MAINTENANCE		KOHLER ENGINES CH730 / ECH730 / CH730 LP	
 12 V BCI 26 400 CCA	100 h 1. CH730/ECH730 MILLER: 230017 Kohler: 2408305-S 1. CH730 LP MILLER: 067273 Kohler: 2408302-S1	100 h 1.8 qt (1.7 L) Check engine dipstick. 	
8 h  GASOLINE 11 gal (42 L) Unleaded, 87 Octane min. (10% Max. Ethanol)	2. CH730/ECH730 MILLER: 230016 Kohler: 2408303-S 2. CH730 LP MILLER: 067272 Kohler: 4708303-S 	200 h  MILLER: 066698 Kohler: 1205001-S	200 h  CH730/ECH730 MILLER: 283614 Kohler: 2405013-S
1000 h  Brushes MILLER: 292189	500 h MILLER: 067007 Kohler: 1213202-S Champion: RC-12YC Gap: 0.030 in. (.76 mm) Use only resistor spark plugs and wires.	Tune-up and Filter Kit CH730/ECH730 (Gas): MILLER: 284083 CH730 (LP): MILLER: 252838 (Includes Air, Fuel, and Oil Filters, and 2 Spark Plugs)	
500 h	CH730 LP	LIQUID WITHDRAWAL SYSTEM ONLY	
	LOCK-OFF ASSEMBLY FUEL FILTER MILLER: 252837 Kohler: 2405004-S		LPG REGULATOR Drain residue from secondary chamber.
		1500 h	CH730 LP LPG REGULATOR Complete disassembly, cleaning, and resetting.

293385-E

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.

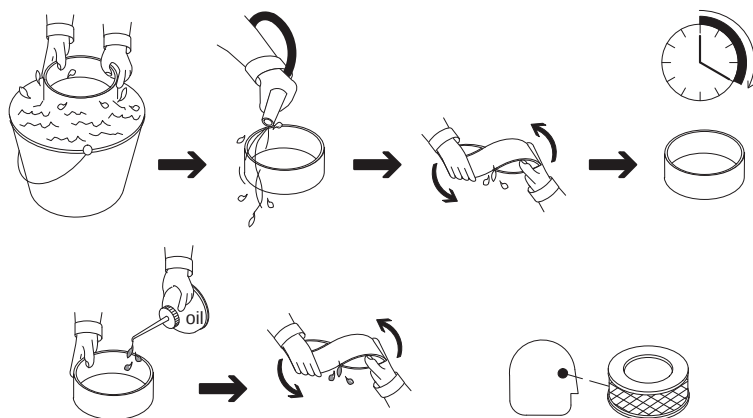
1 Precleaner

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

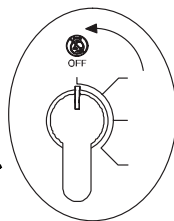
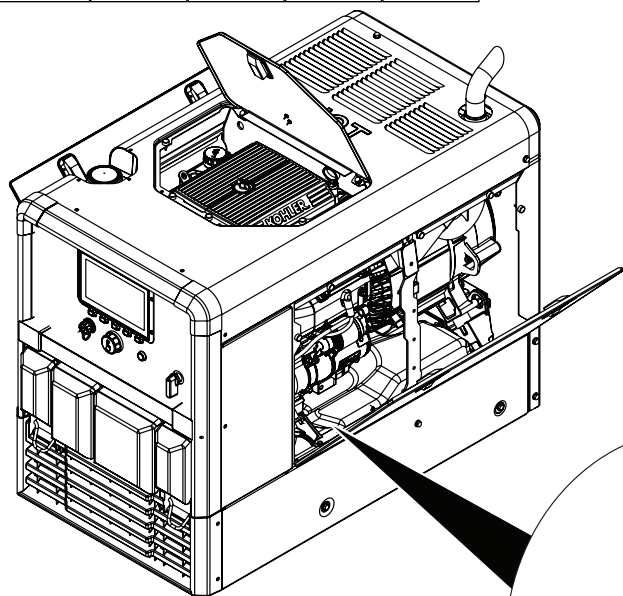
Spread 1 tablespoon SAE 30 oil evenly into precleaner. Squeeze out excess oil.

2 Element

Replace element if damaged, dirty, or oily.



10-5. Overload Protection



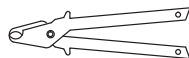
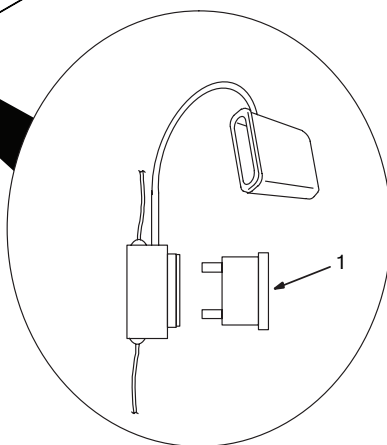
 **Stop engine. Disconnect negative (-) battery cable.**

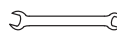
1 Fuse F6

F6 protects the engine wiring system from overload. If F6 opens, engine will not crank.

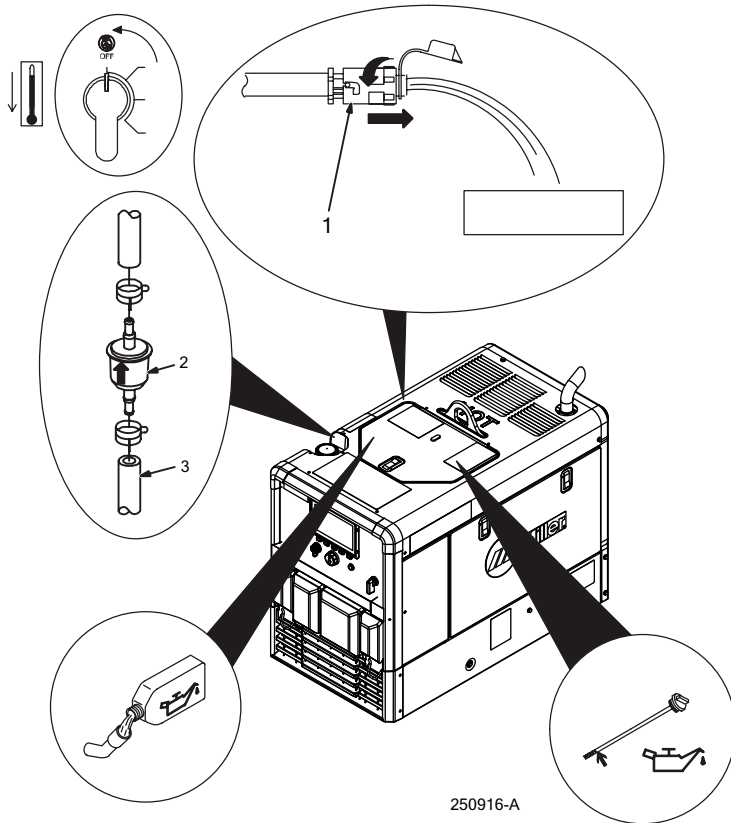
Replace any open fuses. Reinstall cover before operating.

 *If a fuse opens, it usually indicates a more serious problem exists. Contact a Factory Authorized Service Agent.*



 3/8 in.

10-6. Changing Engine Oil, Oil Filter, And Fuel Filter



Stop engine and let cool.

1 Oil Drain Valve

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).

2 Fuel Filter

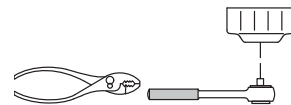
3 Fuel Line

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

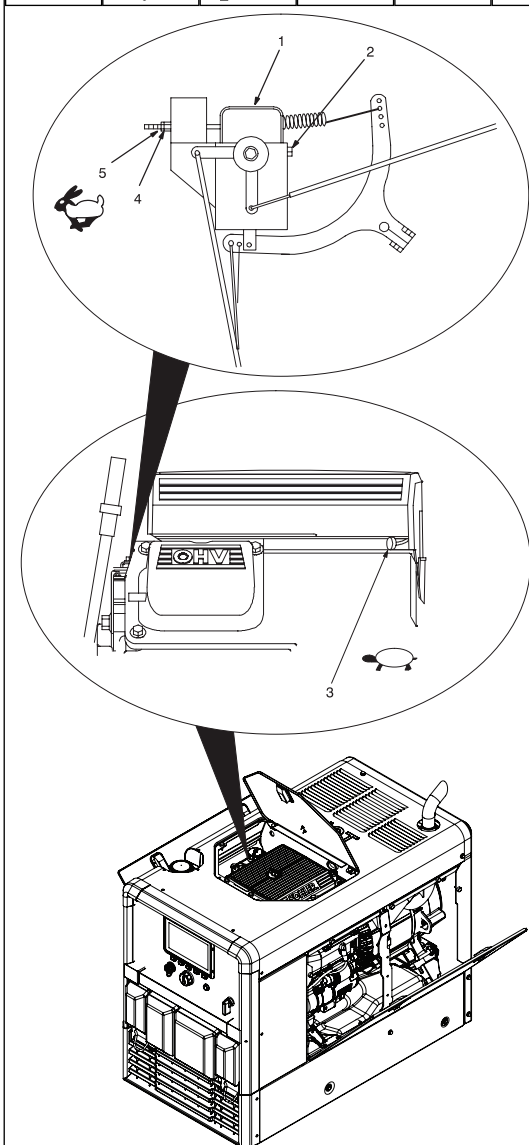
Start engine, and check for fuel leaks.

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

See Section 10-1 to reset oil and oil filter maintenance countdown.



10-7. Adjusting Engine Speed



1/4, 3/8 in.

After tuning engine, check engine speeds with troubleshooting screen or a tachometer (see table). If necessary, adjust speeds as follows:

Start engine and run until warm.

Open top and side access doors.

Idle Speed Adjustment

Move Engine Control switch to Run/Idle position.

- 1 Throttle Solenoid
- 2 Mounting Screws
- 3 Remote Idle Speed Screw

Loosen mounting screw. Adjust solenoid position so engine runs at idle speed. Tighten mounting screw. Be sure solenoid linkage works smoothly.

Turn idle speed screw for fine adjustments.

Weld/Power Speed Adjustment

Move Engine Control switch to Run position.

- 4 Weld/Power Speed Adjustment Nut
- 5 Lock Nut

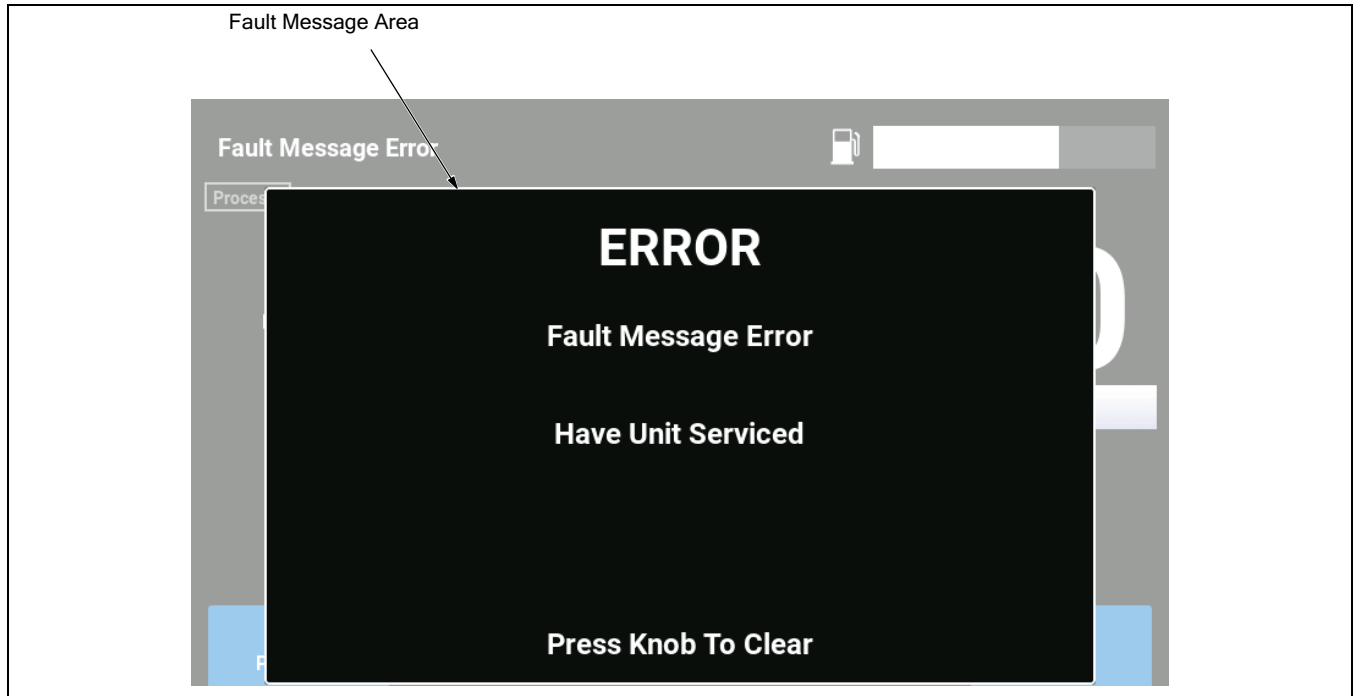
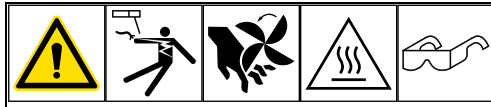
Loosen lock nut. Turn adjustment nut until engine runs at weld/power speed. Tighten lock nut.

Stop engine.

Close side and top access doors.

	2300–2400 rpm (38.3–40.0 Hz)
	3675–3750 rpm (61.3–62.5 Hz)

10-8. Fault Displays



LCD Message	Help Code	Problem	Possible Cause	Potential Solution
Inverter +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 +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 +12V Error - Check Battery	ALRT HN02	Battery voltage outside of range.	Low battery voltage.	Charge battery.
Inverter -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 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.
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.	Power supply issue on inverter control board.	Contact a Factory Authorized Service Agent.
Inverter Thermistor Error - Have Power Module Serviced	ERR DH04	Inverter Control board thermistor open or shorted.	Indicates a malfunction in the thermal protection circuitry.	Contact a Factory Authorized Service Agent.
Inverter Bus Voltage High Error - Have Power Module Serviced	ERR HV00	High DC bus voltage.	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
Inverter Bus Voltage Low Error - Have Power Module Serviced	ERR HU00	Low DC bus voltage.	Indicates malfunction in the primary power circuit of the unit.	Contact a Factory Authorized Service Agent.
Inverter Output Diode Shorted Error - Have Power Module Serviced	ERR HE05	Shorted output diode.	Indicates malfunction in the secondary power circuit of the unit.	Contact a Factory Authorized Service Agent.
Inverter Control Comm Error - Have Power Module Serviced	ERR NC03	Lost UART communication between ARM & DSP.	Indicates malfunction in the primary power circuit of the unit.	Contact a Factory Authorized Service Agent.
Inverter Field Bus Voltage High Error - Have Power Module Serviced	ERR HV01	High DC bus voltage.	Indicates malfunction in the primary power circuit of the unit.	Contact a Factory Authorized Service Agent.
Batt Charge Wrong Voltage - Change Voltage	ALRT BP00	Battery charge set to wrong voltage.	Incorrect battery charge voltage selected.	Select charge voltage that matches battery.
Batt Charge - Check Connection	ALRT BU00	Battery is disconnected or reverse connected.	Disconnected battery.	Check battery connection.
Batt Charge - Check Connection	ALRT BU01	Battery is disconnected.	Disconnected battery.	Check battery connection.
Batt Charge - Check Connection	ALRT BE00	Not enough voltage or no current flow during battery check.	Bad battery.	Check battery.
Batt Charge Charging - Bad Battery	ALRT BE01	Charging amps too high.	Bad battery.	Replace battery.
Batt Charge Final - Bad Battery	ALRT BE02	Voltage has fallen below fault level after charging.	Bad battery.	Check battery.
Batt Charge Final - Bad Battery	ALRT BE03	Too many retries on battery charge final test.	Bad battery.	Replace battery.
Batt Charge Timer Expired - Wait	ALRT BX00	Battery charging past 13.5 hours.	Battery charge time expired.	No action required.
BATT CHARGE POLARITY - Check Connection	ALRT BN00	Battery reverse connected.	Battery connected in reverse.	Check battery connection.
BATT CHARGE - Change to 24V Charge	ALRT BV00	24V Battery when in 12V charge.	Incorrect battery charge voltage selected.	Select charge voltage that matches battery.
Control Board Communication Error - Have Unit Serviced	ERR SA01	CAN communication timeout on control board.	Indicates issue with CAN communication between boards.	Contact a Factory Authorized Service Agent.
Software Version Mismatch Error - Update Software	ALRT SA00	Different software versions among PC boards.	Different software versions among PC boards.	Contact a Factory Authorized Service Agent.

10-9. Troubleshooting



A. Welding Troubleshooting

Trouble	Remedy
Low or no weld output; generator power output okay at AC receptacles.	Check control settings.
	Check weld connections.
	Have Factory Authorized Service Agent check brushes and slip rings.
No weld output or generator power output at AC receptacles.	Be sure all equipment is disconnected from receptacles when starting unit.
	Check plug PLG5 and RC4 connection.
	Have Factory Authorized Service Agent check brushes and slip rings.
Low weld output.	Check control settings.
	Check engine speed, and adjust if necessary (see Section 10-7).
	Service air cleaner according to engine manual.
	Have Factory Authorized Service Agent check brushes and slip rings.
High weld output.	Check control settings.
	Check engine speed, and adjust if necessary (see Section 10-7).
Erratic weld output.	Check control settings.
	Tighten and clean connections to electrode and workpiece.
	Use dry, properly-stored electrodes for Stick and TIG welding.
	Remove excessive coils from weld cables.
	Clean and tighten connections both inside and outside welding generator.
	Check engine speed, and adjust if necessary (see Section 10-7).
	Have Factory Authorized Service Agent check brushes and slip rings.

B. Generator Power Troubleshooting

Trouble	Remedy
No or low generator power output at AC receptacles; weld output okay.	Reset supplementary protector(s) (see Section 8-1).
	Press optional GFCI receptacle Reset button (see Section 8-1).
	Check plug RC4 connection.
	Have Factory Authorized Service Agent check brushes and slip rings.
No generator power or weld output.	Be sure all equipment is disconnected from receptacles when starting unit.
	Check plug RC4 connection.
	Have Factory Authorized Service Agent check brushes and slip rings.
Low power output at AC receptacles.	Check engine speed, and adjust if necessary (see Section 10-7).
	Have Factory Authorized Service Agent check brushes and slip rings.
High power output at AC receptacles.	Check engine speed, and adjust if necessary (see Section 10-7).

Trouble	Remedy
Erratic power output at AC receptacles.	Check fuel level.
	Check engine speed, and adjust if necessary (see Section 10-7).
	Check receptacle wiring and connections.
	Have Factory Authorized Service Agent check brushes and slip rings.

C. Engine Troubleshooting

Trouble	Remedy
Engine will not crank.	Check fuse F6, and replace if open (see Section 10-5).
	Check battery voltage.
	Check battery connections and tighten if necessary.
	Check plug PLG5 and plug PLG8 connections.
	Have Factory Authorized Service Agent check Engine Control switch S2.
Engine will not start.	Check fuel level.
	Check battery voltage.
	Check battery connections and tighten if necessary.
	Check oil level (see Section 5-5).
	Check low oil pressure shutdown switch.
	Have Factory Authorized Service Agent check fuel shutoff solenoid FS1 (carbureted engine only).
	Verify e-choke is operating. If not, contact engine service center.
Engine starts but stops when Engine Control switch returns to Run position.	Check oil level.
	Check and refill crankcase with proper viscosity oil for operating temperature, if necessary.
	Check low oil pressure shutdown switch.
Engine stopped during normal operation.	Check fuel level.
	Replace fuel filter(s) (see Section 10-6).
	Check oil level (see Section 5-5).
	Check low oil pressure shutdown switch.
	Periodically recharge battery (approximately every 3 months).
	Replace battery.
	Check voltage regulator and connections according to engine manual.
	Have Factory Authorized Service Agent check fuel shutoff solenoid FS1 (carbureted engine only).
Battery discharges between uses.	Clean battery, terminals, and posts with baking soda and water solution; rinse with clear water.
	Periodically recharge battery (approximately every 3 months).
	Replace battery.
	Check voltage regulator and connections according to engine manual.
Engine idles but does not come up to weld speed.	Have Factory Authorized Service Agent check fuel gauge/hourmeter/idle control, and current transformer CT1.
Unstable or sluggish engine speeds.	Readjust throttle linkage if necessary. Check throttle solenoid TS1 for smooth operation.
	Check oil level. Oil level should not exceed Full mark on dipstick. Fuel pump will operate erratically if crankcase is overfilled.
	Tune-up engine according to engine manual.
Engine does not return to idle speed.	Remove weld and generator power loads.
	Check throttle linkage for smooth, non-binding operation.
	Have Factory Authorized Service Agent check idle module, current transformer CT1, Engine Control switch S2, and throttle solenoid TS1.
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.
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.

D. Wireless Remote Troubleshooting

Trouble	Remedy
Fob Communication LED (1st LED) blinks rapidly after start or stop sequence button presses.	Check that the Engine Control switch is set to Run or Run/Idle
	Remove obstructions between fob and unit.
	Reduce distance between fob and unit.
	Replace both CR2025 coin cell batteries in fob.
	Call factory authorized service agent.
Fob Communication LED (1st LED) does not turn on when the button is pressed.	Replace both CR2025 coin cell batteries in fob.
	Call factory authorized service agent.
Failed start sequence, the Fob Running LED (3rd LED) is red for two seconds and the fob emits one long beep.	Wait 15 seconds after previous remote stop sequence.
	Reduce obstructions between fob and unit.
	Reduce distance between fob and unit.
	Check wireless remote operation section for start sequence (see Section 6-9).
	Check that the unit can start with the Engine Control Switch manually. If it does not start manually, look in the Engine Troubleshooting section.
	Call factory authorized service agent.
Unit unexpectedly shuts off	Check that the fob button was not accidentally pressed.
	Check unit fuel level.
	Call factory authorized service agent.
Unit does not shut off with the stop sequence	Remove obstructions between fob and unit.
	Reduce distance between fob and unit.
	Replace both CR2025 coin cell batteries in fob.
	Check wireless remote operation section for stop sequence (see Section 6-9).
	Call factory authorized service agent.

E. Battery Charge Troubleshooting (Models with battery charge option)

Trouble	Remedy
No battery charge/jump start output	Check battery connections.
	Check polarity.
	Check battery charge screen is set to 12V or 24V to match battery being charged.
	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.	Clean and tighten battery connections. If necessary, clean battery, terminals, and posts with baking soda and water solution; rinse with clear water.
	Check condition of battery.

SECTION 11 – PARTS LIST

11-1. Recommended Spare Parts

Recommended Spare Parts			
Dia. Mkgs.	Part No.	Description	Quantity
	283588	Electric Fuel Pump (High Altitude)	1
	280236	Receptacle, GFCI 15/20A	1
F6	215621	Fuse, 30 Amp Ato Type (Kohler CH730)	1
	276379	Switch, Oil Pressure (Kohler CH730)	1
	292928	Regulator, Voltage (Kohler CH730)	1
	190248	Pump, Fuel Pulse (Kohler CH730)	1

 See Section 10-3 for common maintenance parts.

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

SECTION 12 – ELECTRICAL DIAGRAMS

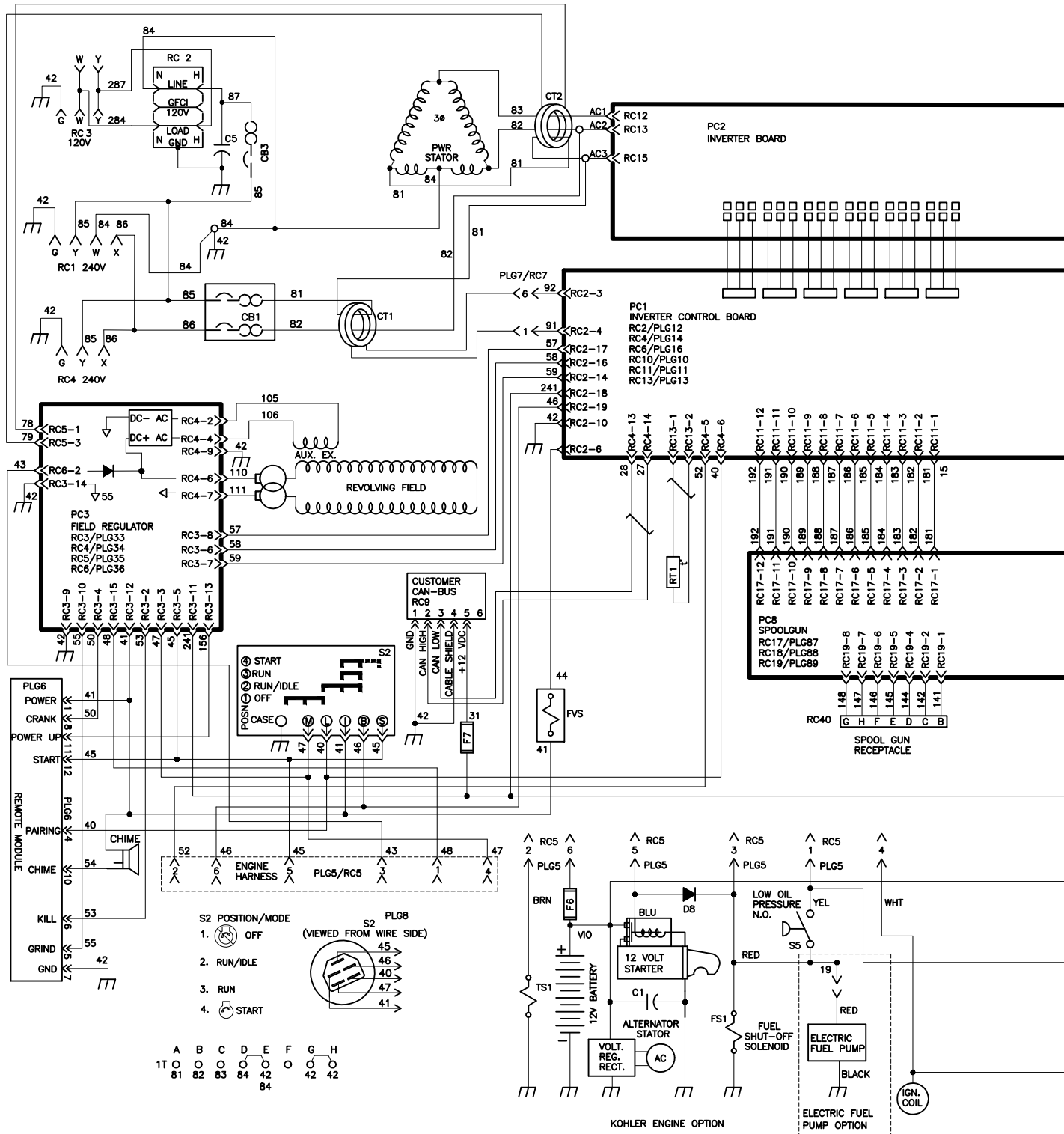
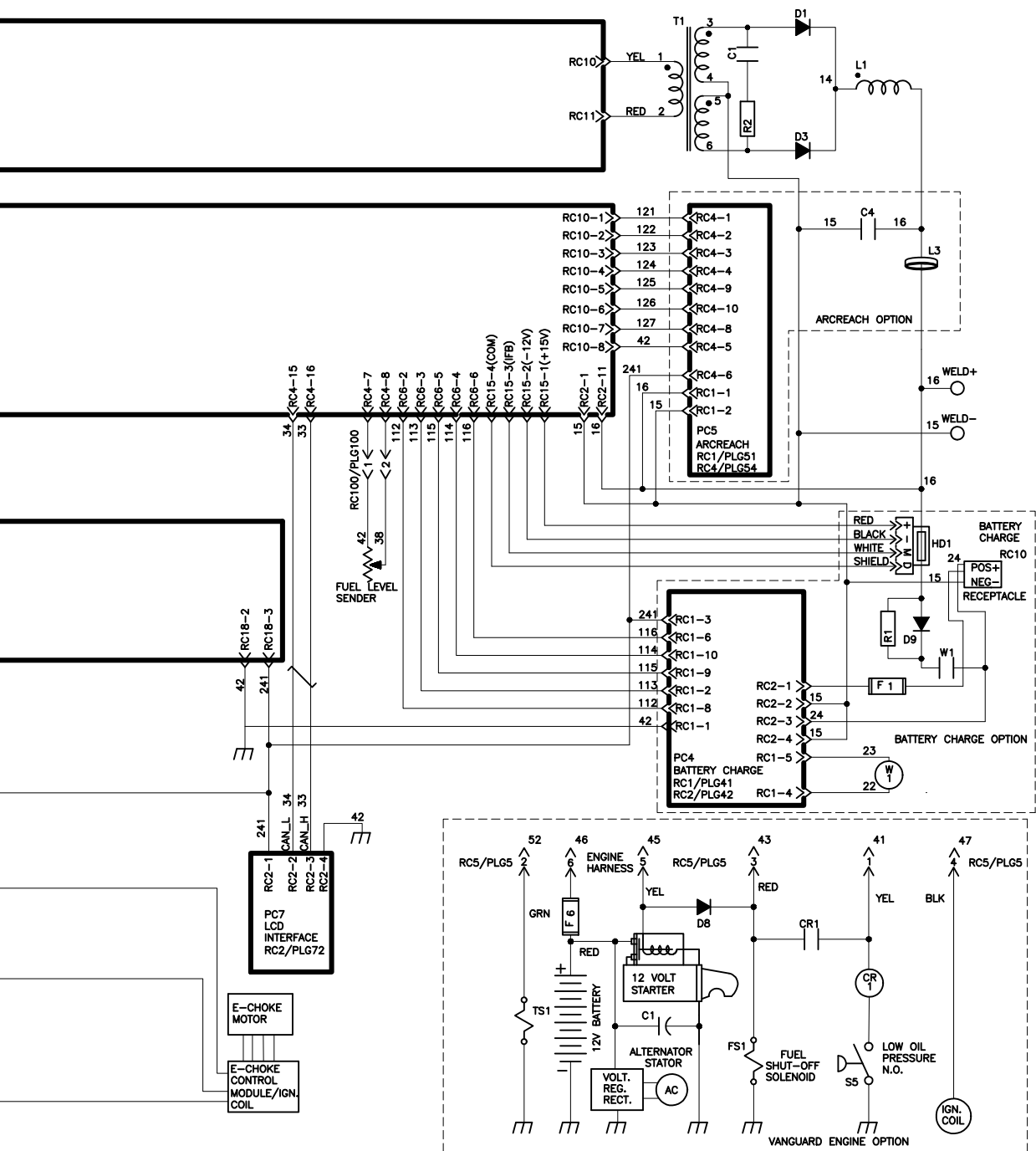
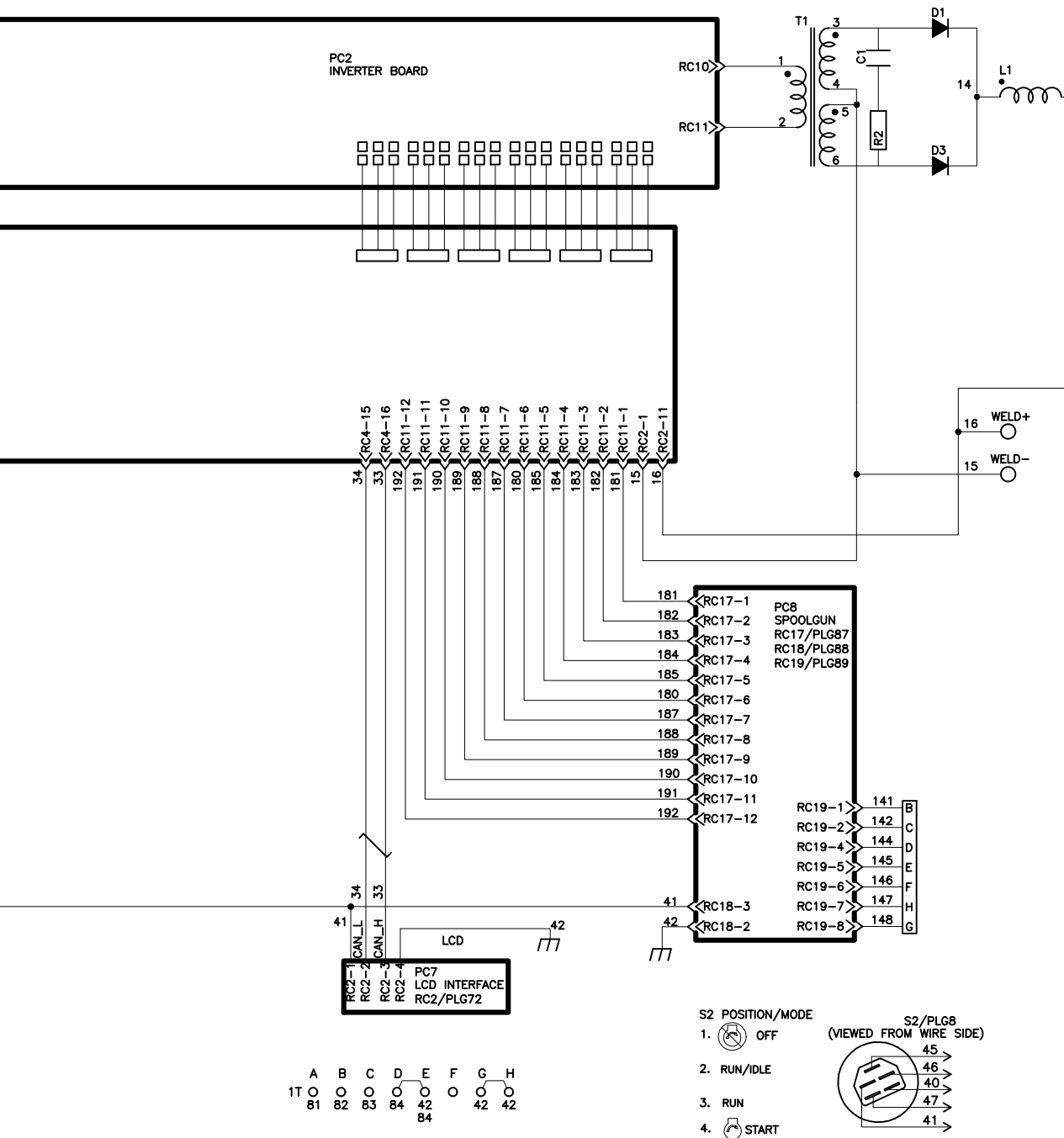


Figure 12-1. Circuit Diagram For Gasoline Welder/Generator





	⚠ WARNING	- 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.
	ELECTRIC SHOCK HAZARD	

SECTION 13 – GENERATOR POWER GUIDELINES

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

13-1. 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.

13-2. Grounding When Supplying Building Systems

1 Equipment Grounding Terminal

2 Grounding Cable

Use #8 AWG or larger insulated copper wire.

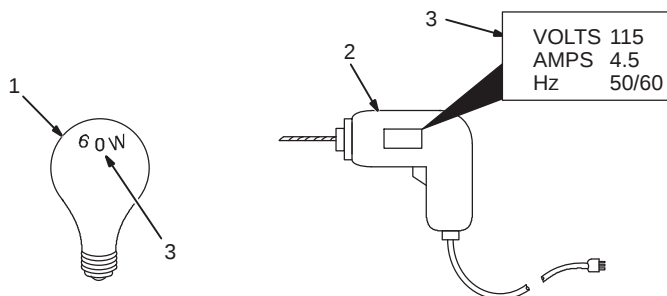
3 Ground Device

 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.

13-3. 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 13-7).

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.

13-4. 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

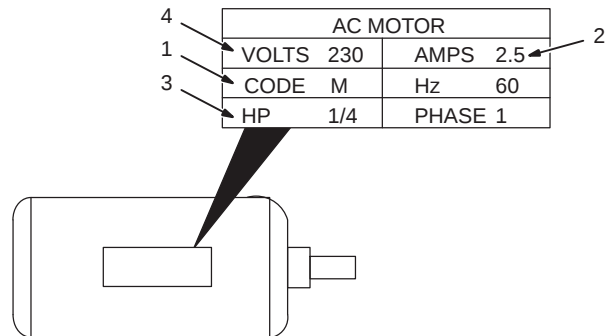
13-5. Approximate Power Requirements For Farm/Shop Equipment

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
Farm Duty Motors High Torque (e.g. Barn Cleaners, Silo Unloaders, Silo Hoists, Bunk Feeders)	5 HP	23,300	6800
	1-1/2 HP	8100	2000
	5 HP	23,300	6000
	7-1/2 HP	35,000	8000
3-1/2 cu. ft. Mixer	10 HP	46,700	10,700
High Pressure 1.8 Gal/Min	1/2 HP	3300	1000
Washer 2 Gal/Min	500 PSI	3150	950
	550 PSI	4500	1400
Shallow Well Pump	700 PSI	6100	1600
	1/3 HP	2150	750
	1/2 HP	3100	1000

13-6. 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

13-7. 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.

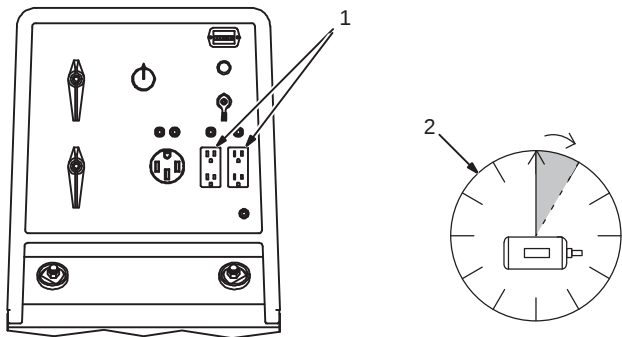
Volts = 230, HP = 1/4, kVA/HP = 11.2

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

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

13-8. How Much Power Can Generator Supply?



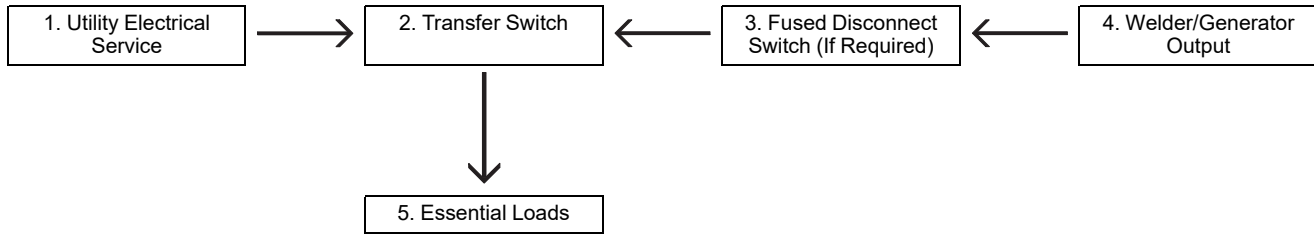
- 1 Limit Load To 90% Of Generator Output

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.

13-9. 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 13-3.

13-10. Selecting Extension Cord (Use Shortest Cord Possible)

A. Cord Lengths For 120 Volt Loads



⚠ 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.

		Maximum Allowable Cord Length In ft (m) for Conductor Size In AWG (mm²)*					
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



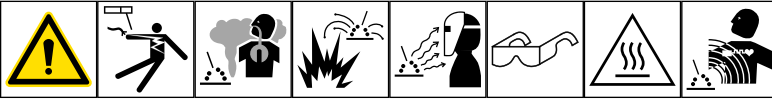
⚠ Use GFCI protection when operating auxiliary equipment. If unit does not have GFCI receptacles, use GFCI-protected extension cord. Do not use GFCI receptacles to power life support equipment.

Current (Amperes)	Load (Watts)	Maximum Allowable Cord Length In ft (m) for Conductor Size In AWG (mm ²)*					
		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)				

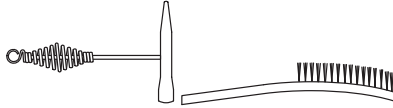
*Conductor size is based on maximum 2% voltage drop.

SECTION 14 – STICK WELDING (SMAW) GUIDELINES

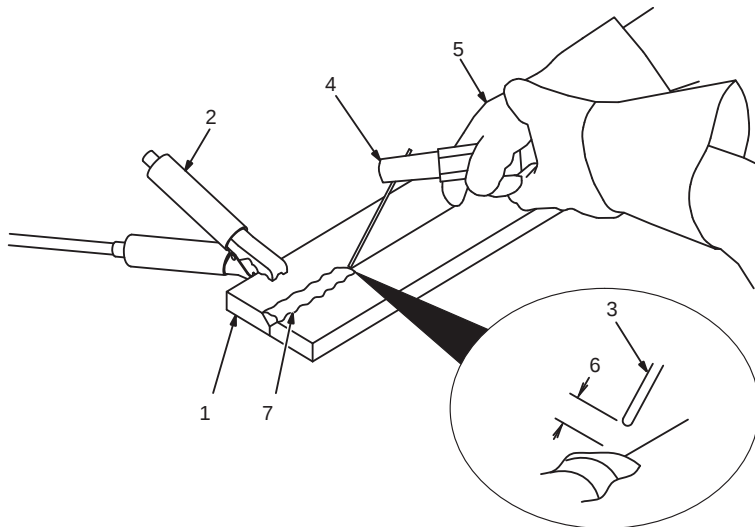
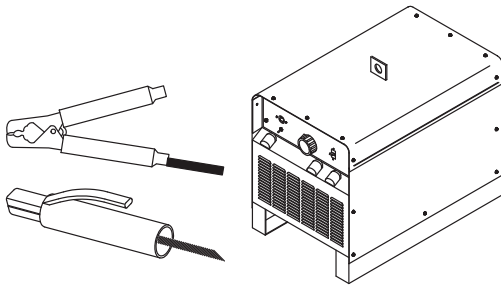
14-1. Stick Welding Procedure



Tools Needed:



Equipment Needed:



Weld current starts when electrode touches workpiece.

Weld current can damage electronic parts in vehicles. Disconnect both battery cables before welding on a vehicle. Place work clamp as close to the weld as possible.

Always wear appropriate personal protective clothing.

1 Workpiece

Make sure workpiece is clean before welding.

2 Work Clamp

Place as close to the weld as possible.

3 Electrode

Before striking an arc, insert an electrode in the electrode holder. A small diameter electrode requires less current than a large one. Follow recommendations of the electrode manufacturer when setting weld amperage (see Section 14-2).

4 Insulated Electrode Holder

5 Electrode Holder Position

6 Arc Length

Arc length is the distance from the electrode to the workpiece. A short arc with correct amperage will give a sharp, crackling sound. Correct arc length is related to electrode diameter. Examine the weld bead to determine if the arc length is correct.

Arc length for 1/16 and 3/32 in. diameter electrodes should be about 1/16 in. (1.6 mm); arc length for 1/8 and 5/32 in. electrodes should be about 1/8 in. (3 mm).

7 Slag

Use a chipping hammer and wire brush to remove slag. Remove slag and check weld bead before making another weld pass.

14-2. Electrode And Amperage Selection Chart

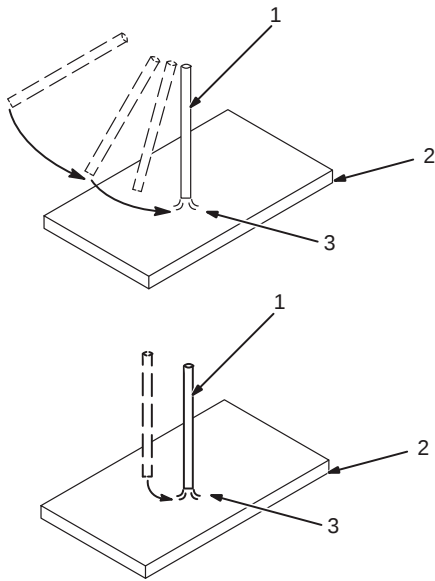
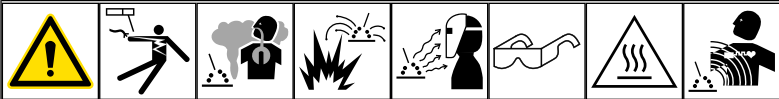


ELECTRODE	DIAMETER	AMPERAGE RANGE									
		50	100	150	200	250	300	350	400	450	
6010 & 6011	3/32										
	1/8										
	5/32										
	3/16										
	7/32										
6013	1/4										
	1/16										
	5/64										
	3/32										
	1/8										
	5/32										
	3/16										
	7/32										
7014	1/4										
	3/32										
	1/8										
	5/32										
	3/16										
	7/32										
	1/4										
	3/32										
7018	1/8										
	5/32										
	3/16										
	7/32										
	1/4										
7024	3/32										
	1/8										
	5/32										
	3/16										
	7/32										
Ni-Cr	1/4										
	3/32										
	1/8										
	5/32										
308L	3/16										
	3/32										
	1/8										
	5/32										

ELECTRODE	DC*	AC	POSITION	PENETRATION	USAGE
6010	EP		ALL	DEEP	MIN. PREP, ROUGH HIGH SPATTER
6011	EP	✓	ALL	DEEP	
6013	EP,EN	✓	ALL	LOW	GENERAL
7014	EP,EN	✓	ALL	MED	SMOOTH, EASY, FAST
7018	EP	✓	ALL	MED	LOW HYDROGEN, STRONG
7024	EP,EN	✓	FLAT HORIZ*	LOW	SMOOTH, EASY, FASTER
NI-CL	EP	✓	ALL	LOW	CAST IRON
308L	EP	✓	ALL	LOW	STAINLESS

*EP = ELECTRODE POSITIVE (REVERSE POLARITY)
EN = ELECTRODE NEGATIVE (STRAIGHT POLARITY)

14-3. Striking An Arc



Weld current starts when electrode touches workpiece.

- 1 Electrode
- 2 Workpiece
- 3 Arc

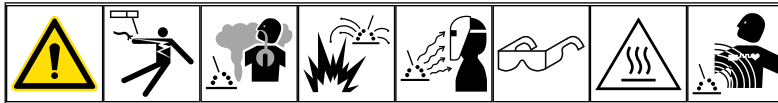
Scratch Technique

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.

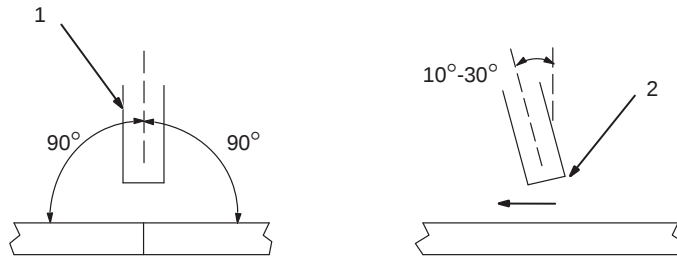
Tapping Technique

Bring electrode straight down to workpiece; then lift slightly to start arc. If arc goes out, electrode was lifted too high. If electrode sticks to workpiece, use a quick twist to free it.

14-4. Positioning Electrode Holder



Groove Welds



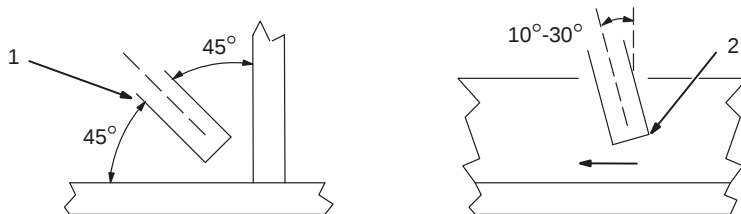
- 1 End View Of Work Angle
- 2 Side View Of Electrode Angle

After learning to start and hold an arc, practice running beads of weld metal on flat plates using a full electrode.

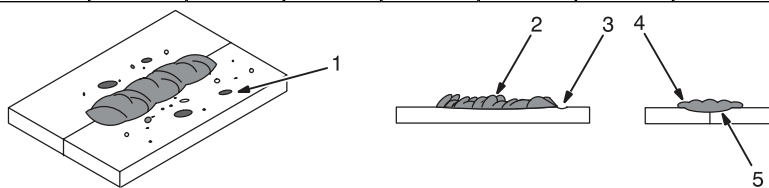
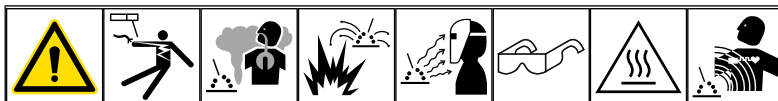
Hold the electrode nearly perpendicular to the work, although tilting it ahead (in the direction of travel) will be helpful.

To produce the best results, hold a short arc, travel at a uniform speed, and feed the electrode downward at a constant rate as it melts.

Fillet Welds

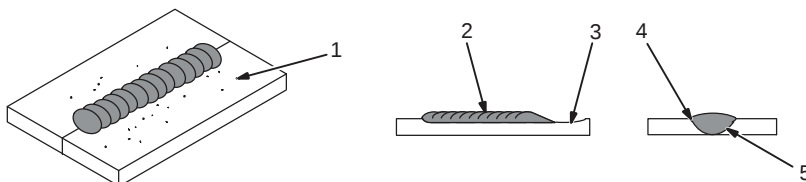
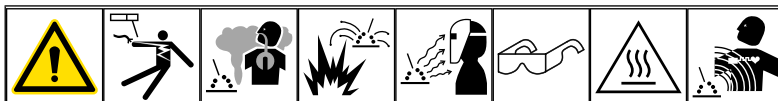


14-5. Poor Weld Bead Characteristics



- 1 Large Spatter Deposits
- 2 Rough, Uneven Bead
- 3 Slight Crater During Welding
- 4 Bad Overlap
- 5 Poor Penetration

14-6. Good Weld Bead Characteristics

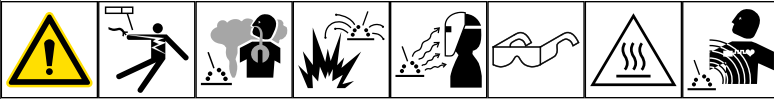


- 1 Fine Spatter
- 2 Uniform Bead
- 3 Moderate Crater During Welding

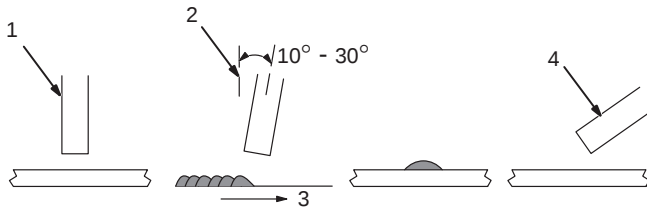
Weld a new bead or layer for each 1/8 in. (3.2 mm) thickness in metals being welded.

- 4 No Overlap
- 5 Good Penetration into Base Metal

14-7. Conditions That Affect Weld Bead Shape



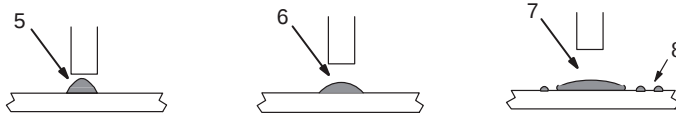
Electrode Angle



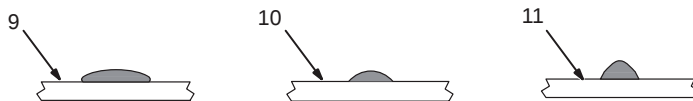
☞ Weld bead shape is affected by electrode angle, arc length, travel speed, and thickness of base metal.

- 1 Angle Too Small
- 2 Correct Angle
- 3 Drag
- 4 Angle Too Large
- 5 Too Short
- 6 Normal
- 7 Too Long
- 8 Spatter
- 9 Slow
- 10 Normal
- 11 Fast

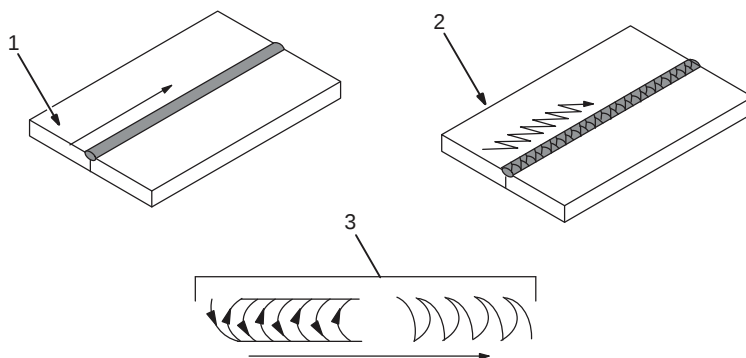
Arc Length



Travel Speed



14-8. Electrode Movement During Welding

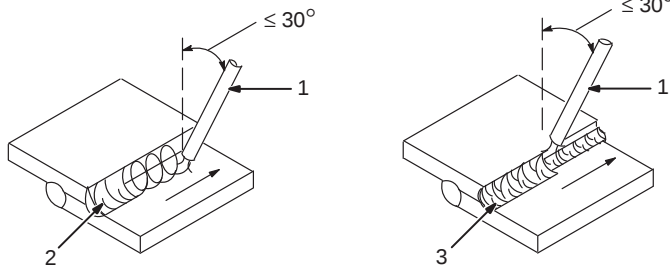
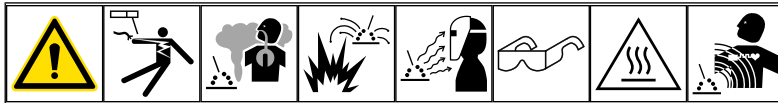


☞ Normally, a single stringer bead is satisfactory for most narrow groove weld joints; however, for wide groove weld joints or bridging across gaps, a weave bead or multiple stringer beads works better.

- 1 Stringer Bead - Steady Movement Along Seam
- 2 Weave Bead - Side To Side Movement Along Seam
- 3 Weave Patterns

Use weave patterns to cover a wide area in one pass of the electrode. Do not let weave width exceed 2-1/2 times diameter of electrode.

14-9. Welding Lap Joints



1 Electrode

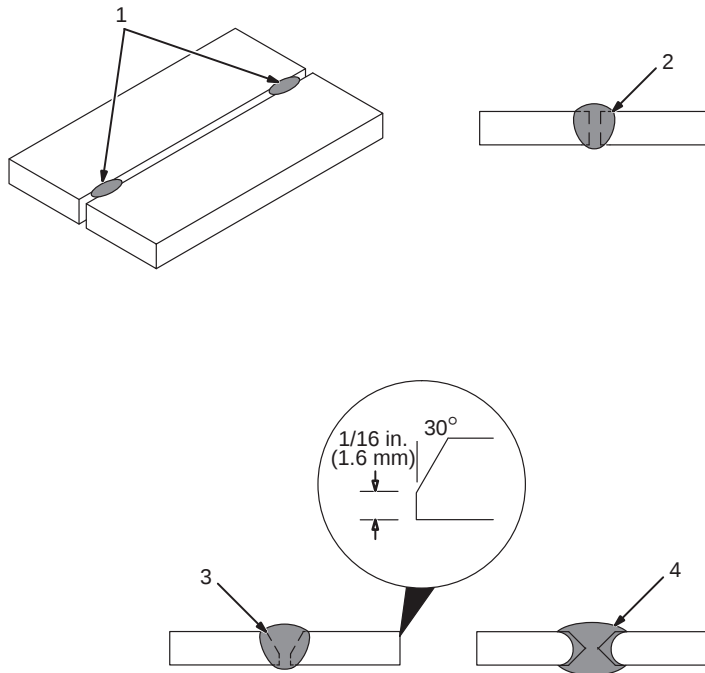
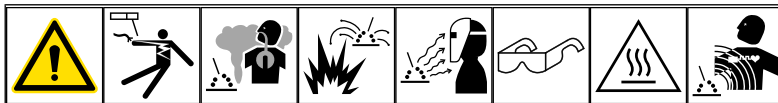
2 Single-Layer Fillet Weld

Move electrode in circular motion.

3 Multi-Layer Fillet Weld

Weld a second layer when a heavier fillet is needed. Remove slag before making another weld pass. Weld both sides of joint for maximum strength.

14-10. Welding Groove (Butt) Joints



1 Tack Welds

Prevent butt joint distortion by tack welding the materials in position before final weld.

Workpiece distortion occurs when heat is applied locally to a joint. One side of a metal plate will curl up toward the weld. Distortion will also cause the edges of a butt joint to pull together ahead of the electrode as the weld cools.

2 Square Groove Weld

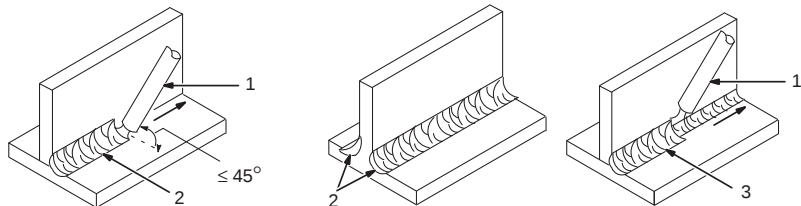
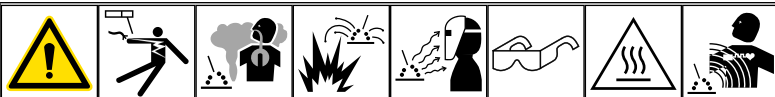
3 Single V-Groove Weld

4 Double V-Groove Weld

Materials up to 3/16 in. (5 mm) thick can often be welded without special preparation using the square groove weld. However, when welding thicker materials it may be necessary to prepare the edges (V-groove) of butt joints to ensure good welds.

The single or double V-groove weld is good for materials 3/16 - 3/4 in. (5-19 mm) thick. Generally, the single V-groove is used on materials up to 3/4 in. (19 mm) thick and when, regardless of thickness, you can weld from one side only. Create a 30 degree bevel with oxyacetylene or plasma cutting equipment. Remove scale from material after cutting. A grinder can also be used to prepare bevels.

14-11. Welding T-Joints



- 1 Electrode
- 2 Fillet Weld

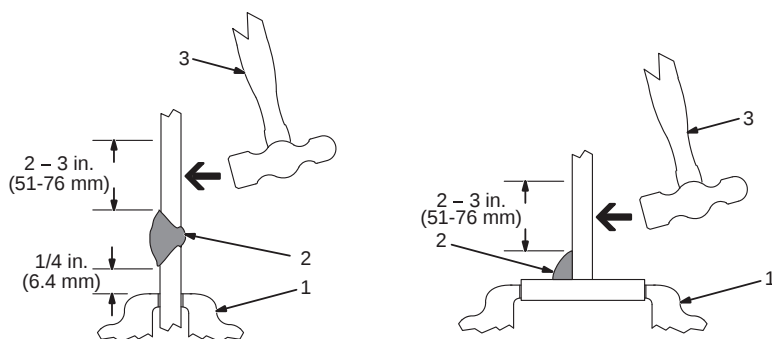
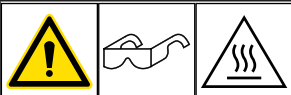
Keep arc short and move at definite rate of speed. Hold electrode as shown to provide fusion into the corner. Square edge of the weld surface.

For maximum strength weld both sides of upright section.

3 Multi-Layer Deposits

Weld a second layer when a heavier fillet is needed. Use any of the weaving patterns shown in Section 14-8. Remove slag before making another weld pass.

14-12. Weld Test



- 1 Vise
- 2 Weld Joint
- 3 Hammer

Strike the weld joint in the direction shown. A good weld bends over but does not break.

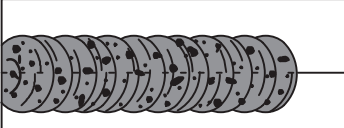
If the weld breaks, examine it to determine the cause.

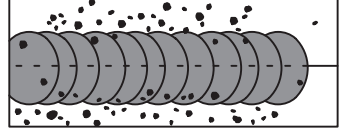
If the weld is porous (many holes), the arc length was probably too long.

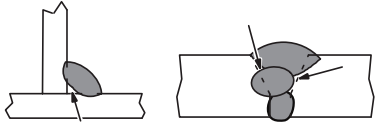
If the weld contains bits of slag, the arc may have been too long or the electrode was moved incorrectly which allowed molten slag to be trapped in the weld. This may happen on a V-groove joint made in several layers and calls for additional cleaning between layers.

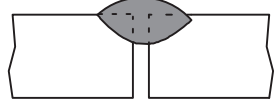
If the original beveled surface is visible the material was not fully melted which is often caused by insufficient heat or too fast a travel speed.

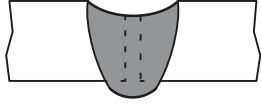
14-13. Troubleshooting

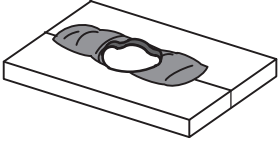
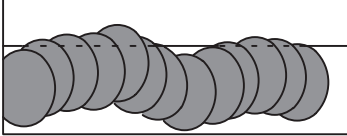
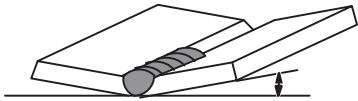
	Porosity - small cavities or holes resulting from gas pockets in weld metal.
Possible Causes	Corrective Actions
Arc length too long.	Reduce arc length.
Damp electrode.	Use dry electrode.
Workpiece dirty.	Remove all grease, oil, moisture, rust, paint, coatings, slag, and dirt from work surface before welding.

	Excessive Spatter - scattering of molten metal particles that cool to solid form near weld bead.
Possible Causes	Corrective Actions
Amperage too high for electrode.	Decrease amperage or select larger electrode.
Arc length too long or voltage too high.	Reduce arc length or voltage.

	Incomplete Fusion - failure of weld metal to fuse completely with base metal or a preceding weld bead.
Possible Causes	Corrective Actions
Insufficient heat input.	Increase amperage. Select larger electrode and increase amperage.
Improper welding technique.	Place stringer bead in proper location(s) at joint during welding.
	Adjust work angle or widen groove to access bottom during welding.
	Momentarily hold arc on groove side walls when using weaving technique.
Workpiece dirty.	Keep arc on leading edge of weld puddle. Remove all grease, oil, moisture, rust, paint, coatings, slag, and dirt from work surface before welding.

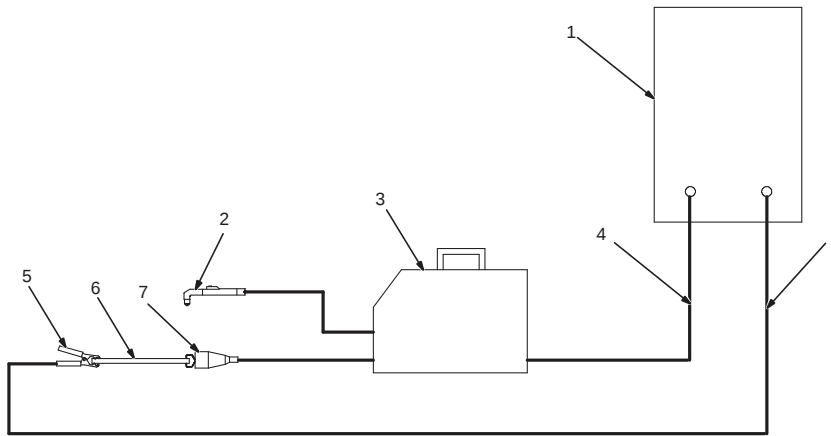
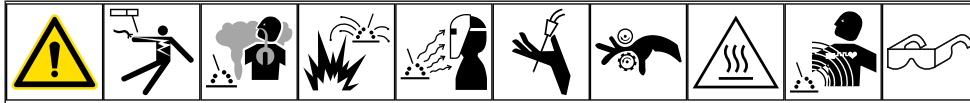
	Lack Of Penetration - shallow fusion between weld metal and base metal.
Possible Causes	Corrective Actions
Improper joint preparation.	Material too thick. Joint preparation and design must provide access to bottom of groove.
Improper weld technique.	Keep arc on leading edge of weld puddle.
Insufficient heat input.	Increase amperage. Select larger electrode and increase amperage.
	Reduce travel speed.

	Excessive Penetration - weld metal melting through base metal and hanging underneath weld.
Possible Causes	Corrective Actions
Excessive heat input.	Select lower amperage. Use smaller electrode.
	Increase and/or maintain steady travel speed.

	Burn-Through - weld metal melting completely through base metal resulting in holes where no metal remains.
Possible Causes	Corrective Actions
Excessive heat input.	Select lower amperage. Use smaller electrode.
	Increase and/or maintain steady travel speed.
	Waviness Of Bead - weld metal that is not parallel and does not cover joint formed by base metal.
Possible Causes	Corrective Actions
Unsteady hand.	Use two hands. Practice technique.
	Distortion - contraction of weld metal during welding that forces base metal to move. Illustration: Base metal moves in the direction of the weld bead.
Possible Causes	Corrective Actions
Excessive heat input.	Use restraint (clamp) to hold base metal in position.
	Make tack welds along joint before starting welding operation.
	Select lower amperage for electrode.
	Increase travel speed.
	Weld in small segments and allow cooling between welds.

SECTION 15 – GMAW WELDING (MIG) GUIDELINES WHEN USING A VOLTAGE-SENSING FEEDER

15-1. Typical GMAW (MIG) Process Connections Using A Voltage-Sensing Wire Feeder



Weld current can damage electronic parts in vehicles. Disconnect both battery cables before welding on a vehicle. Place work clamp as close to the weld as possible.

Voltage sensing wire feeders are used with constant current (CC) or constant voltage (CV) power sources (14 pin receptacle not required).

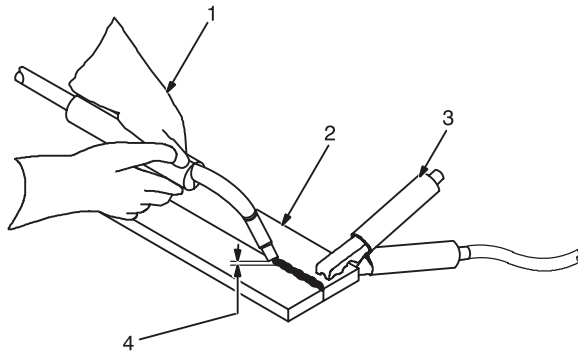
If using a CC or CV welding power source without a weld output contactor, use optional secondary contactor.



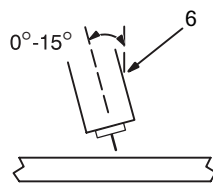
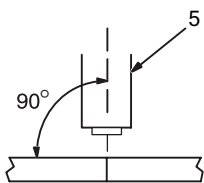
For GMAW, use optional gas valve.

- 1 Constant Current (CC) or Constant Voltage (CV) Welding Power Source
- 2 Gun
- 3 Voltage-Sensing Wire Feeder
- 4 Electrode Lead
- 5 Work Clamp
- 6 Workpiece
- 7 Voltage Sensing Clamp
- 8 Work Lead

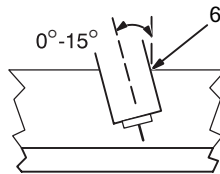
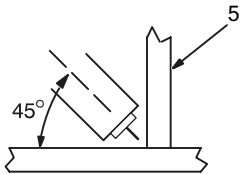
15-2. Holding And Positioning Welding Gun



Groove Welds



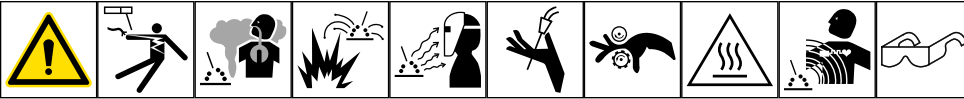
Fillet Welds



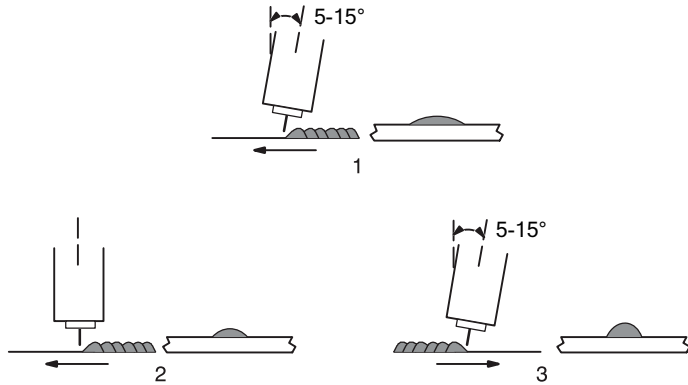
☞ Welding wire is energized when gun trigger is pressed. Before lowering helmet and pressing trigger, be sure wire is no more than 1/2 in. (13 mm) past end of nozzle, and tip of wire is positioned correctly on seam.

- 1 Hold Gun and Control Gun Trigger
- 2 Workpiece
- 3 Work Clamp
- 4 Electrode Extension (Stickout) 1/4 to 1/2 in. (6 to 13 mm)
- 5 Cradle Gun and Rest Hand on Workpiece
- 6 End View Of Work Angle
- 7 Side View Of Gun Angle

15-3. Conditions That Affect Weld Bead Shape



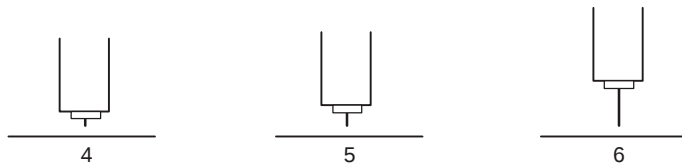
Gun Angles and Weld Bead Profiles



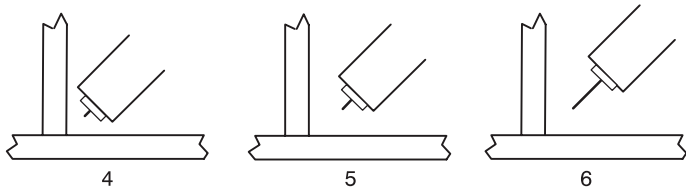
Weld bead shape depends on gun angle, direction of travel, contact to work distance (stickout), travel speed, thickness of base metal, wire feed speed (weld current), and voltage.

- 1 Push
- 2 Perpendicular
- 3 Drag
- 4 Short
- 5 Normal
- 6 Long
- 7 Slow
- 8 Normal
- 9 Fast

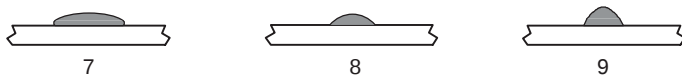
Contact Tip To Work Distance (Stickout)



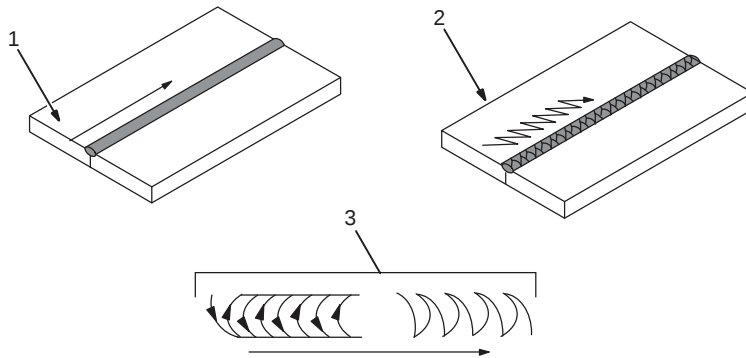
Fillet Weld Contact Tip To Work Distance (Stickout)



Travel Speed



15-4. Gun Movement During Welding

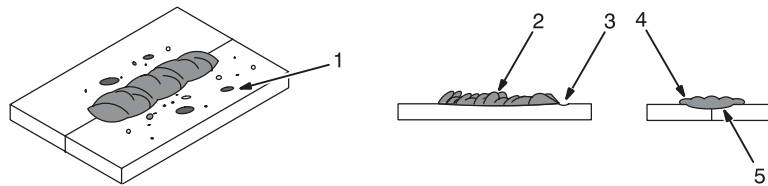


☞ Normally, a single stringer bead is satisfactory for most narrow groove weld joints; however, for wide groove weld joints or bridging across gaps, a weave bead or multiple stringer beads works better.

- 1 Stringer Bead - Steady Forward Movement Along Weld Joint
- 2 Weave Bead - Side To Side Movement Along Weld Joint
- 3 Weave Patterns

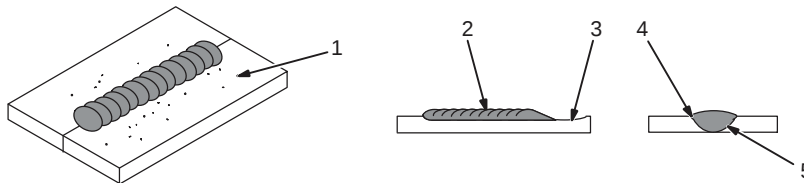
Use weave patterns to cover a wide area in one pass of the electrode.

15-5. Poor Weld Bead Characteristics



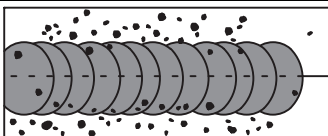
- 1 Large Spatter Deposits
- 2 Rough, Uneven Bead
- 3 Large Crater At End of Weld
- 4 Overlap Present
- 5 Little To No Penetration

15-6. Good Weld Bead Characteristics



- 1 Little To No Micro Spatter
- 2 Uniform Bead
- 3 Little To No Crater At End Of Weld
- 4 No Overlap
- 5 Adequate Penetration Into Base Metal

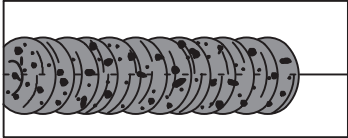
15-7. Troubleshooting – Excessive Spatter



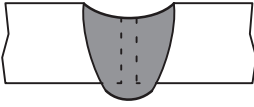
Excessive Spatter - scattering of molten metal particles that cool to solid form near weld bead.

Possible Causes	Corrective Actions
Wire feed speed too high.	Select lower wire feed speed.
Voltage too high.	Select lower voltage range.
Electrode extension (stickout) too long.	Use shorter electrode extension (stickout).
Workpiece dirty.	Remove all grease, oil, moisture, rust, paint, undercoating, and dirt from work surface before welding.
Insufficient shielding gas at welding arc.	Increase flow of shielding gas at regulator/flowmeter and/or prevent drafts near welding arc.
Dirty welding wire.	Use clean, dry welding wire.
	Eliminate pickup of oil or lubricant on welding wire from feeder or liner.

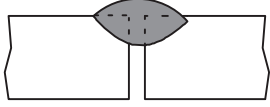
15-8. Troubleshooting – Porosity

	Porosity - small cavities or holes resulting from gas pockets in weld metal.
Possible Causes	Corrective Actions
Insufficient shielding gas at welding arc.	Increase flow of shielding gas at regulator/flowmeter and/or prevent drafts near welding arc.
	Remove spatter from gun nozzle.
	Check gas hoses for leaks.
	Ensure proper contact tip to work distance.
	Hold gun near bead at end of weld until molten metal solidifies.
Wrong gas.	Use welding grade shielding gas; change to different gas.
Dirty wire.	Use clean, dry wire.
	Eliminate pick up of oil or lubricant on wire from feeder or liner.
Workpiece dirty.	Remove all grease, oil, moisture, rust, paint, coatings, and dirt from work surface before welding.
	Use a more highly deoxidizing wire (contact supplier).
Excessive contact tip to work distance	Ensure proper contact tip to work distance

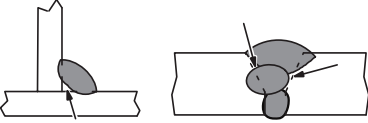
15-9. Troubleshooting – Excessive Penetration

	Excessive Penetration - weld metal melting through base metal.
Possible Causes	Corrective Actions
Excessive heat input.	Select lower voltage and reduce wire feed speed.
	Increase travel speed.

15-10. Troubleshooting – Lack Of Penetration

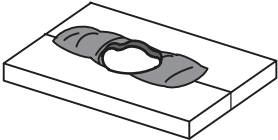
	Lack Of Penetration - shallow fusion between weld metal and base metal.
Possible Causes	Corrective Actions
Improper joint preparation.	Material too thick. Joint preparation and design must provide access to bottom of groove while maintaining proper welding wire extension and arc characteristics.
Improper weld technique.	Maintain normal gun angle of 0 to 15 degrees to achieve maximum penetration.
	Keep arc on leading edge of weld puddle.
	Be sure welding wire extends not more than 1/2 in (13 mm) beyond nozzle.
Insufficient heat input.	Select higher wire feed speed and/or select higher voltage range.
	Reduce travel speed.

15-11. Troubleshooting – Incomplete Fusion

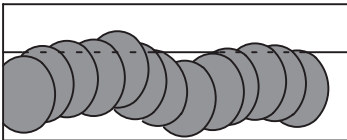
	Incomplete Fusion - failure of weld metal to fuse completely with base metal or a preceding weld bead.
Possible Causes	Corrective Actions
Workpiece dirty.	Remove all grease, oil, moisture, rust, paint, undercoating, and dirt from work surface before welding.
Insufficient heat input.	Select higher voltage and/or adjust wire feed speed.
Improper welding technique.	Place bead in proper location(s) in joint during welding.
	Pause on groove side walls when using weaving technique.
	Keep wire on leading edge of weld puddle.

	Maintain proper work and travel angles.
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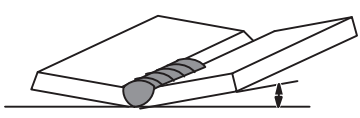
15-12. Troubleshooting – Burn-Through

	Burn-Through - a hole caused by excessive penetration.
Possible Causes	Corrective Actions
Excessive heat input.	Select lower voltage and reduce wire feed speed.
	Increase and/or maintain steady travel speed.

15-13. Troubleshooting – Waviness Of Bead

	Waviness Of Bead - weld metal that is not parallel and does not cover joint formed by base metal.
Possible Causes	Corrective Actions
Excessive contact tip to work distance.	Ensure proper contact tip to work distance.
Unsteady hand.	Support hand on solid surface or use two hands.

15-14. Troubleshooting – Distortion

	Distortion - contraction of weld metal during welding that forces base metal to move. Illustration: Base metal moves in the direction of the weld bead.
Possible Causes	Corrective Actions
Excessive heat input.	Use restraint (clamp) to hold base metal in position.
	Make tack welds along joint before starting welding operation.
	Select lower voltage range and/or reduce wire feed speed.
	Increase travel speed.
	Weld in small segments and allow cooling between welds.

15-15. Common MIG Shielding Gases

This is a general chart for common gases and where they are used. Many different combinations (mixtures) of shielding gases have been developed over the years. The most commonly used shielding gases are listed in the following table.

Gas	Application								
	Spray Arc Steel	Short Cir-cuiting Steel	GMAW-P Steel	Spray Arc Stainless Steel	Short Cir-cuiting Stainless Steel	GMAW-P Stainless Steel	Spray Arc Aluminum	Short Cir-cuiting Aluminum	GMAW-P Aluminum
Argon							All Positions	All Positions	All Positions
Argon + 2% O ₂	Flat & Horizontal Fillet		All Positions	Flat & Horizontal Fillet					
Argon + 2% CO ₂				Flat & Horizontal Fillet	All Positions	All Positions			
Argon + 5% CO ₂	Flat & Horizontal Fillet		All Positions						
Argon + 10% CO ₂	Flat & Horizontal Fillet	All Positions	All Positions						
Argon + 25% CO ₂		All Positions							
CO ₂		All Positions							
Helium							All Positions*		
Argon + Helium							All Positions*		
90% HE + 7-1/2% AR + 2-1/2% CO ₂					All Positions				
65% AR + 33% HE + 2% CO ₂						All Positions			

* Heavy Thicknesses

15-16. Troubleshooting Guide For Semiautomatic Welding Equipment

Problem	Probable Cause	Remedy
Wire feed motor operates, but wire does not feed.	Too little pressure on drive rolls.	Increase pressure setting on drive rolls.
	Incorrect drive rolls.	Check size stamped on drive rolls, replace to match wire size and type if necessary.
	Spool hub tension too high.	Decrease brake pressure on wire spool.
	Restriction in the gun and/or assembly.	Check and replace cable, gun, and contact tip if damaged. Check size of contact tip and cable liner, replace if necessary.
Wire curling up in front of the wire feed rolls (bird nesting).	Too much pressure on drive rolls.	Decrease spool hub tension.
	Incorrect liner or gun contact tip size.	Check size of contact tip and check liner length and diameter, replace if necessary.
	Gun end not inserted into drive housing properly.	Loosen gun securing bolt in drive housing and push gun end into housing just enough so it does not touch drive rolls.
	Dirty or damaged (kinked) liner.	Replace liner.
Wire feeds, but no gas flows (GMAW).	Gas cylinder empty.	Replace empty gas cylinder.
	Gas nozzle plugged.	Clean or replace gas nozzle.
	Gas cylinder valve not open or flowmeter not adjusted.	Open gas valve at cylinder and adjust flow rate.
	Restriction in gas line.	Check gas hose between flowmeter and wire feeder, and gas hose in gun and cable assembly.
	Loose or broken wires to gas solenoid.	Have Factory Authorized Service Agent repair wiring.
	Gas solenoid valve not operating.	Have Factory Authorized Service Agent replace gas solenoid valve.
	Incorrect primary voltage connected to welding power source.	Check primary voltage and relink welding power source for correct voltage.
Welding arc not stable.	Wire slipping in drive rolls.	Adjust pressure setting on drive rolls. Replace worn drive rolls if necessary.
	Wrong size gun liner.	Match liner to wire size and type.
	Incorrect voltage setting for selected wire feed speed on welding power source.	Readjust welding parameters.
	Loose connections at the gun weld cable or work cable.	Check and tighten all connections.
	Gun in poor shape or loose connection inside gun.	Repair or replace gun as necessary.
	Wrong size contact tip or worn out contact tip.	Match contact tip to wire size and type. Replace contact tip as necessary.



Effective January 1, 2023 (Equipment with a serial number preface of ND 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. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed. 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, or 12 months after the equipment is shipped to a US or Canada distributor, or 18 months after the equipment is shipped to an international distributor, whichever occurs first.

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 Helmet Lenses

3 3 Years — Parts and Labor Unless Specified

- Auto-Darkening Helmet Lenses (No Labor)
- Engine Driven Welder/Generators (Including EnPak) **(NOTE: Engines are Warranted Separately by the Engine Manufacturer.)**
- 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, 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, ZoneFlow Extraction Arms and Motor Control Box
- HF Units
- ICE/XT Plasma Cutting Torches (No Labor)
- Induction Heating Power Sources, Coolers **(NOTE: Digital Recorders are Warranted Separately by the Manufacturer.)**
- Insight Sensors
- Load Banks
- Motor-Driven Guns (except Spoolmate Spoolguns)
- Positioners and Controllers
- Racks (For Housing Multiple Power Sources)
- Running Gear/Trailers
- 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 (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, and Non-Electronic Controls
- MDX Series MIG Guns
- M-Guns
- MIG Guns, Subarc (SAW) Torches, and External Cladding Heads
- Remote Controls and RFCS-RJ45
- Replacement Parts (No labor)
- Spoolmate Spoolguns

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, GUARANTEE 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 Options and Accessories Personal Protective Equipment (PPE) Service and Repair Replacement Parts Training (Schools, Videos, Books) Welding Process Handbooks To locate a Distributor or Service Agency visit www.millerwelds.com or call 1-800-4-A-Miller
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Contact the Delivering Carrier to:	File a claim for loss or damage during shipment. For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.
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