



OM-216 967L

2006-08

**Processes**



MIG (GMAW) Welding

Pulsed MIG (GMAW-P)

Flux Cored (FCAW) Welding



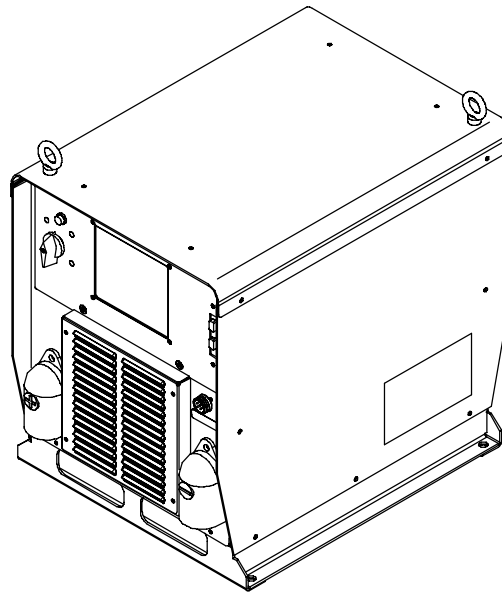
Automatic Welding

**Description**



Automatic Welding Interface And  
Arc Welding Power Source

# Access<sup>TM</sup> 300



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## OWNER'S MANUAL

File: Advanced Manufacturing Systems



# From Miller to You

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

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

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

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite.

We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide the exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.



Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001:2000 Quality System Standard.

Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual specification sheets. **To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at [www.MillerWelds.com](http://www.MillerWelds.com) on the web.**



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



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# SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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▲ **Warning: Protect yourself and others from injury — read and follow these precautions.**

## 1-1. Symbol Usage



Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ **Marks a special safety message.**

☞ Means "Note"; not safety related.



This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the 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 Safety Standards listed in Section 1-5. Read and follow all Safety Standards.**

▲ **Only qualified persons should install, operate, maintain, and repair this unit.**

▲ **During operation, keep everybody, especially children, away.**



### ELECTRIC SHOCK can kill.

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

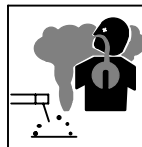
live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, 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!
- 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 and ground 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.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.

- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced 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.
- Do not touch electrode holders connected to two welding machines at the same time since double open-circuit voltage will be present.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- 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.

### SIGNIFICANT DC VOLTAGE exists in inverter-type welding power sources after removal of input power.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.



### 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.
- If inside, ventilate the area and/or use local forced ventilation at the arc to remove welding fumes and gases.
- If ventilation is poor, wear an approved air-supplied respirator.
- Read and understand the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person 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.



### 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.

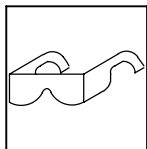
- Wear an approved welding helmet fitted with a proper shade of filter lenses to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash, glare and sparks; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather, heavy cotton, or wool) and foot protection.



### 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 weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- 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 oil-free protective garments 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.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.



### FLYING METAL 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.



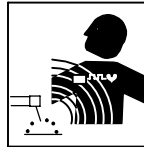
### BUILDUP OF GAS can injure or kill.

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



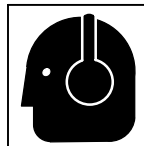
### HOT PARTS can cause severe burns.

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



### MAGNETIC FIELDS can affect pacemakers.

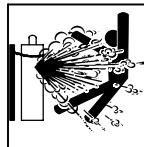
- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.



### NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.



### CYLINDERS can explode if damaged.

Shielding 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 shielding 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.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the right equipment, correct procedures, and sufficient number of persons to lift and move 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. Additional Symbols 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 UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use 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.



### 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.



### MOVING PARTS can cause injury.

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



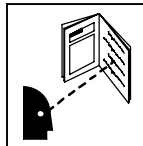
### WELDING WIRE can cause injury.

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



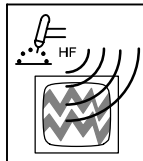
### MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Have only qualified persons remove doors, panels, covers, or guards for maintenance as necessary.
- Reinstall doors, panels, covers, or guards when maintenance is finished and before re-connecting input power.



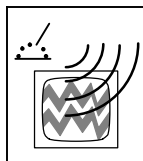
### READ INSTRUCTIONS.

- Read Owner's Manual before using or servicing unit.
- Use only genuine Miller/Hobart replacement parts.



### 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.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure 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.

## 1-4. California Proposition 65 Warnings

- ▲ Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)
- ▲ Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

### For Gasoline Engines:

- ▲ Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

### For Diesel Engines:

- ▲ Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

## 1-5. Principal Safety Standards

*Safety in Welding, Cutting, and Allied Processes*, ANSI Standard Z49.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

*Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping*, American Welding Society Standard AWS F4.1 from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

*National Electrical Code*, NFPA Standard 70, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269-9101 (phone: 617-770-3000, website: www.nfpa.org).

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1, from Compressed Gas Association, 1735 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102 (phone: 703-412-0900, website: www.cganet.com).

*Code for Safety in Welding and Cutting*, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale

Boulevard, Rexdale, Ontario, Canada M9W 1R3 (phone: 800-463-6727 or in Toronto 416-747-4044, website: www.csa-international.org).

*Practice For Occupational And Educational Eye And Face Protection*, ANSI Standard Z87.1, from American National Standards Institute, 11 West 42nd Street, New York, NY 10036-8002 (phone: 212-642-4900, website: www.ansi.org).

*Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, NFPA Standard 51B, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269-9101 (phone: 617-770-3000, website: www.nfpa.org).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250 (there are 10 Regional Offices—phone for Region 5, Chicago, is 312-353-2220, website: www.osha.gov).

## 1-6. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: "The body of evidence, in the committee's judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard." However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

### **About Pacemakers:**

Pacemaker wearers consult your doctor before welding or going near welding operations. If cleared by your doctor, then following the above procedures is recommended.



# SECTION 2 – CONSIGNES DE SÉCURITÉ – LIRE AVANT UTILISATION

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▲ **Avertissement : se protéger et protéger les autres contre le risque de blessure — lire et respecter ces consignes.**

## 2-1. Symboles utilisés



Symbole graphique d'avertissement ! Attention ! Cette procédure comporte des risques possibles ! Les dangers éventuels sont représentés par les symboles graphiques joints.



Ce groupe de symboles signifie Avertissement ! Attention ! Risques d'ÉLECTROCUTION, ORGANES MOBILES et PARTIES CHAUDES. Consulter les symboles et les instructions afférentes ci-dessous concernant les mesures à prendre pour supprimer les dangers.

▲ **Indique un message de sécurité particulier**

☞ Signifie NOTE ; n'est pas relatif à la sécurité.

## 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 l'un de ces symboles, prendre garde et suivre les instructions afférentes pour éviter tout risque. Les instructions en matière de sécurité indiquées ci-dessous ne constituent qu'un sommaire des instructions de sécurité plus complètes fournies dans les normes de sécurité énumérées dans la Section 2-5. Lire et observer toutes les normes de sécurité.**

▲ **Seul un personnel qualifié est autorisé à installer, faire fonctionner, entretenir et réparer cet appareil.**

▲ **Pendant le fonctionnement, maintenir à distance toutes les personnes, notamment les enfants de l'appareil.**



**UNE DÉCHARGE ÉLECTRIQUE peut entraîner la mort.**

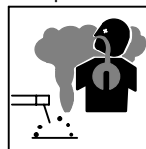
Le contact d'organes électriques sous tension peut provoquer des accidents mortels ou des brûlures graves. Le circuit de l'électrode et de la pièce est sous tension lorsque le courant est délivré à la sortie. Le circuit d'alimentation et les circuits internes de la machine sont également sous tension lorsque l'alimentation est sur Marche. Dans le mode de soudage avec du fil, le fil, le dérouleur, le bloc de commande du rouleau et toutes les parties métalliques en contact avec le fil sont sous tension électrique. Un équipement installé ou mis à la terre de manière incorrecte ou impropre constitue un danger.

- Ne pas toucher aux pièces électriques sous tension.
- Porter des gants isolants et des vêtements de protection secs et sans trous.
- S'isoler de la pièce à couper et du sol en utilisant des housses ou des tapis assez grands afin d'éviter tout contact physique avec la pièce à couper ou le sol.
- Ne pas se servir de source électrique à courant électrique dans les zones humides, dans les endroits confinés ou là où on risque de tomber.
- 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.
- D'autres consignes de sécurité sont nécessaires dans les conditions suivantes : risques électriques dans un environnement humide ou si l'on porte des vêtements mouillés ; sur des structures métalliques telles que sols, grilles ou échafaudages ; en position coincée comme assise, à genoux ou couchée ; ou s'il y a un risque élevé de contact inévitable ou accidentel avec la pièce à souder ou le sol. Dans ces conditions, utiliser les équipements suivants, dans l'ordre indiqué : 1) un poste à souder DC à tension constante (à fil), 2) un poste à souder DC manuel (électrode) ou 3) un poste à souder AC à tension à vide réduite. Dans la plupart des situations, l'utilisation d'un poste à souder DC à fil à tension constante est recommandée. En outre, ne pas travailler seul !
- 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 le poste correctement et le mettre à la terre convenablement selon les consignes du manuel de l'opérateur et les normes nationales, provinciales et locales.
- 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.

- Vérifier fréquemment le cordon d'alimentation afin de s'assurer qu'il n'est pas altéré ou à nu, le remplacer immédiatement s'il l'est. Un fil à nu peut entraîner la mort.
- L'équipement doit être hors tension lorsqu'il n'est pas utilisé.
- Ne pas utiliser des câbles usés, endommagés, de grosseur insuffisante ou mal épissés.
- 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 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. Entretien l'appareil conformément à ce manuel.
- Porter un harnais de sécurité si l'on doit travailler au-dessus du sol.
- S'assurer que tous les panneaux et couvercles sont correctement en place.
- 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.

**Il reste une TENSION DC NON NÉGLIGEABLE dans les sources de soudage onduleur quand on a coupé l'alimentation.**

- Arrêter les convertisseurs, débrancher le courant électrique et décharger les condensateurs d'alimentation selon les instructions indiquées dans la partie Entretien avant de toucher les pièces.



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

Le soudage génère des fumées et des gaz. Leur inhalation peut être dangereuse pour la santé.

- Ne pas mettre sa tête au-dessus des vapeurs. Ne pas respirer ces vapeurs.
- 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.
- Si la ventilation est médiocre, porter un respirateur anti-vapeurs approuvé.
- Lire et comprendre les spécifications de sécurité des matériaux (MSDS) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyeurs et les dégraisseurs.
- 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 RAYONS D'ARC peuvent entraîner des brûlures aux yeux et à la peau.

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

Des étincelles sont projetées pendant le soudage.

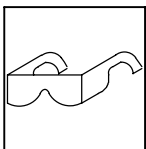
- Porter un casque de soudage approuvé muni de verres filtrants appropriés pour protéger visage et yeux pendant le soudage (voir ANSI Z49.1 et Z87.1 énumérés dans les normes de sécurité).
- Porter des lunettes de sécurité avec écrans latéraux même sous votre casque.
- Avoir recours à des écrans protecteurs 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 des vêtements confectionnés avec des matières résistantes et ignifuges (cuir, coton lourd ou laine) et des bottes de protection.



### 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 peuvent provoquer des incendies et des brûlures. Le contact accidentel de l'électrode avec des objets métalliques peut provoquer des étincelles, une explosion, une surchauffe ou un incendie. Avant de commencer le soudage, vérifier et s'assurer que l'endroit ne présente pas de danger.

- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité, les recouvrir soigneusement avec des protections homologuées.
- Ne pas souder dans un endroit où des étincelles peuvent tomber sur des substances inflammables.
- Se protéger, ainsi que toute autre personne travaillant sur les lieux, contre les étincelles et le 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.
- Afin d'éliminer tout risque de feu, être vigilant et garder toujours un extincteur à la portée de main.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- 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).
- Brancher le câble de masse sur la pièce la plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution, d'étincelles et d'incendie.
- Ne pas utiliser le poste de soudage pour 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 des vêtements de protection exempts d'huile tels que des gants en cuir, une veste résistante, des pantalons sans revers, des bottes et un casque.
- Avant de souder, retirer toute substance combustible de ses poches telles qu'un allumeur au butane ou des allumettes.
- Suivre les consignes de OSHA 1910.252 (a) (2) (iv) et de NFPA 51B pour travaux de soudage et prévoir un détecteur d'incendie et un extincteur à proximité.



### DES PARTICULES VOLANTES peuvent blesser les yeux.

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



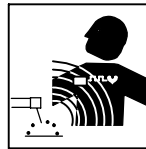
### LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.

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



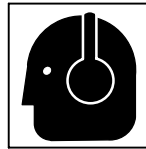
### DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.

- Ne pas toucher des parties chaudes à mains nues.
- Prévoir une période de refroidissement avant d'utiliser le pistolet ou la torche.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



### LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

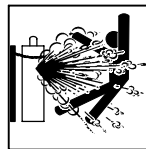
- Porteurs de stimulateur cardiaque, rester à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.



### 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 BOUTEILLES peuvent exploser si elles sont endommagées.

Des bouteilles de gaz 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.

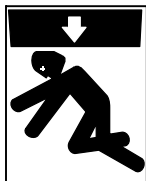
- Protéger les bouteilles de gaz comprimé d'une chaleur excessive, des chocs mécaniques, des dommages physiques, du laitier, des flammes ouvertes, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte-bouteilles pour les empêcher de tomber 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 protecteur, régulateurs, tuyaux et raccords convenables pour cette application spécifique ; les maintenir ainsi que les éléments associés en bon état.
- Détourner votre visage du détendeur-régulateur lorsque vous ouvrez la soupape de la bouteille.
- Le couvercle du détendeur doit toujours être en place, sauf lorsque la bouteille est utilisée ou qu'elle est reliée pour usage ultérieur.
- Utiliser les équipements corrects, les bonnes procédures et suffisamment de personnes pour soulever et déplacer 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 supplémentaires en relation avec l'installation, le fonctionnement et la maintenance



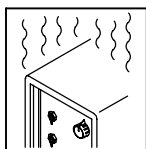
### Risque D'INCENDIE OU D'EXPLOSION.

- 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.



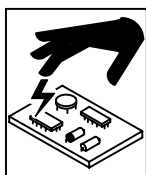
### LA CHUTE DE L'APPAREIL peut blesser.

- Utiliser l'anneau de levage uniquement pour soulever l'appareil, NON PAS les chariots, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un équipement de levage de capacité suffisante pour lever l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.



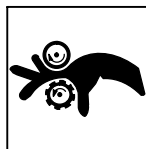
### L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- Prévoir une période de refroidissement ; respecter le cycle opératoire nominal.
- Réduire le courant ou le facteur de marche avant de poursuivre 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 PC.



### DES ORGANES MOBILES peuvent provoquer des blessures.

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



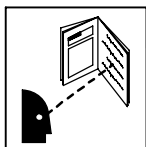
### LES FILS DE SOUDAGE peuvent provoquer des blessures.

- Ne pas appuyer sur la gâchette 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.



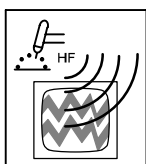
### DES ORGANES MOBILES peuvent provoquer des blessures.

- S'abstenir de toucher des organes mobiles tels que des ventilateurs.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.
- Seules des personnes qualifiées sont autorisées à enlever les portes, panneaux, recouvrements ou dispositifs de protection pour l'entretien.
- Remettre les portes, panneaux, recouvrements ou dispositifs de protection quand l'entretien est terminé et avant de rebrancher l'alimentation électrique.



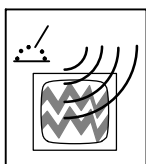
### LIRE LES INSTRUCTIONS.

- Lire le manuel d'utilisation avant d'utiliser ou d'intervenir sur l'appareil.
- Utiliser uniquement des pièces de rechange Miller/Hobart.



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

- Le rayonnement haute fréquence (HF) 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 peut gêner le fonctionnement d'appareils électroniques comme des ordinateurs et des 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.

## 2-4. Proposition californienne 65 Avertissements

▲ Les équipements de soudage et de coupage produisent des fumées et des gaz qui contiennent des produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des malformations congénitales et, dans certains cas, des cancers. (Code de santé et de sécurité de Californie, chapitre 25249.5 et suivants)

▲ Les batteries, les bornes et autres accessoires contiennent du plomb et des composés à base de plomb, produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des cancers et des malformations congénitales ou autres problèmes de procréation. Se laver les mains après manipulation.

Pour les moteurs à essence :

▲ Les gaz d'échappement des moteurs contiennent des produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des cancers et des malformations congénitales ou autres problèmes de procréation.

Pour les moteurs diesel :

▲ Les gaz d'échappement des moteurs diesel et certains de leurs composants sont reconnus par l'État de Californie comme provoquant des cancers et des malformations congénitales ou autres problèmes de procréation.

## 2-5. Principales normes de sécurité

*Safety in Welding, Cutting, and Allied Processes*, ANSI Standard Z49.1, de Global Engineering Documents (téléphone : 1-877-413-5184, site Internet : [www.global.ihs.com](http://www.global.ihs.com)).

*Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping*, American Welding Society Standard AWS F4.1 de Global Engineering Documents (téléphone : 1-877-413-5184, site Internet : [www.global.ihs.com](http://www.global.ihs.com)).

*National Electrical Code*, NFPA Standard 70, de National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269-9101 (téléphone : 617-770-3000, site Internet : [www.nfpa.org](http://www.nfpa.org)).

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1, de Compressed Gas Association, 1735 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102 (téléphone : 703-412-0900, site Internet : [www.cganet.com](http://www.cganet.com)).

*Code for Safety in Welding and Cutting*, CSA Standard W117.2, de Canadian Standards Association, Standards Sales, 178 Rexdale

Boulevard, Rexdale, Ontario, Canada M9W 1R3 (téléphone : 800-463-6727 ou à Toronto 416-747-4044, site Internet : [www.csa-international.org](http://www.csa-international.org)).

*Practice For Occupational And Educational Eye And Face Protection*, ANSI Standard Z87.1, de American National Standards Institute, 11 West 42nd Street, New York, NY 10036-8002 (téléphone : 212-642-4900, site Internet : [www.ansi.org](http://www.ansi.org)).

*Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, NFPA Standard 51B, de National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269-9101 (téléphone : 617-770-3000, site Internet : [www.nfpa.org](http://www.nfpa.org)).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, de U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250 (il y a 10 bureaux régionaux—le téléphone de la région 5, Chicago, est 312-353-2220, site Internet : [www.osha.gov](http://www.osha.gov)).

## 2-6. Information EMF

Considérations sur le soudage et les effets de basse fréquence et des champs magnétiques et électriques.

Le courant de soudage, pendant son passage dans les câbles de soudage, causera des champs électromagnétiques. Il y a eu et il y a encore un certain souci à propos de tels champs. Cependant, après avoir examiné plus de 500 études qui ont été faites pendant une période de recherche de 17 ans, un comité spécial ruban bleu du National Research Council a conclu : « L'accumulation de preuves, suivant le jugement du comité, n'a pas démontré que l'exposition aux champs magnétiques et champs électriques à haute fréquence représente un risque à la santé humaine ». Toutefois, des études sont toujours en cours et les preuves continuent à être examinées. En attendant que les conclusions finales de la recherche soient établies, il vous serait souhaitable de réduire votre exposition aux champs électromagnétiques pendant le soudage ou le coupage.

Pour réduire les champs magnétiques sur le poste de travail, appliquer les procédures suivantes :

1. Maintenir les câbles ensemble en les tordant ou en les enveloppant.
2. Disposer les câbles d'un côté et à distance de l'opérateur.
3. Ne pas courber pas et ne pas entourer pas les câbles autour de votre corps.
4. Garder le poste de soudage et les câbles le plus loin possible de vous.
5. Connecter la pince sur la pièce aussi près que possible de la soudeuse.

### En ce qui concerne les stimulateurs cardiaques

Les porteurs de stimulateur cardiaque doivent consulter leur médecin avant de souder ou d'approcher des opérations de soudage. Si le médecin approuve, il est recommandé de suivre les procédures précédentes.

# SECTION 3 – INSTALLATION

## NOTE

Appearance of actual unit may vary from unit shown in manual.

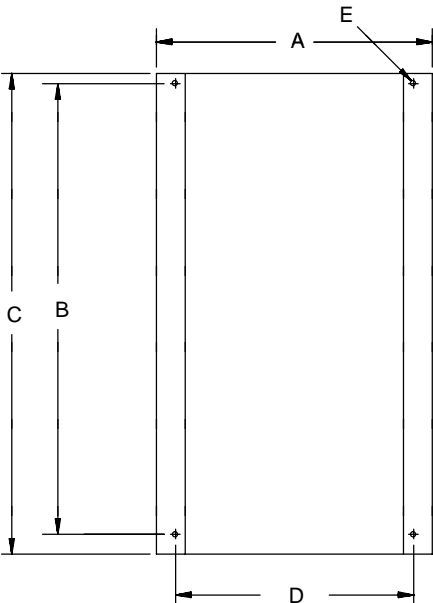
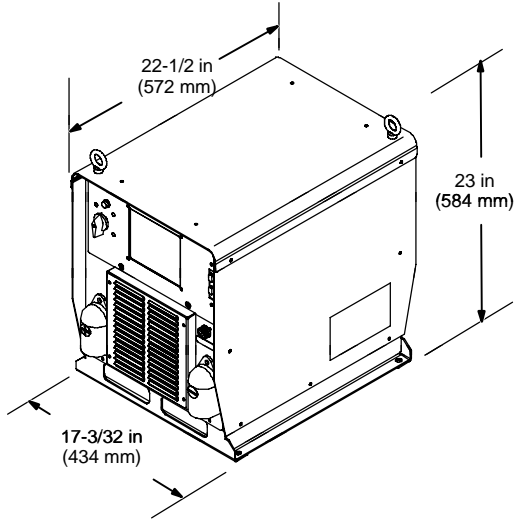
### 3-1. Specifications

Input Power	Rated Welding Output	Voltage Range	Wire Feed Speed Range**	Wire Diameter Range	Max Open Circuit Voltage DC	Amperes Input At Rated Load Output 60 Hz, Single-Phase/Three-Phase					Input kVA	Input KW
						208 V	230 V	400V	460 V	575 V		
Single Phase	175 A @ 27 V DC, 100% Duty Cycle	10-44	Standard: 50-1400 ipm (1.3-35.6 mpm)	.030-.062 in (0.8-1.6 mm)	80	30.0 (0-1A*)	27.2 (0-1A*)	15.0 (0-1A*)	12.8 (0-1A*)	10.2 (0-1A*)	6.3 (0.2*)	5.8 (0.04*)
Three Phase	225 A @ 29 V DC, 100% Duty Cycle					23.0	20.8	11.8	10.2	8.1	8.3 (0.2*)	7.9 (0.04*)

\*While idling; Input amperage fluctuates while idling and is always less than one Ampere. Use one Ampere for power efficiency calculations.

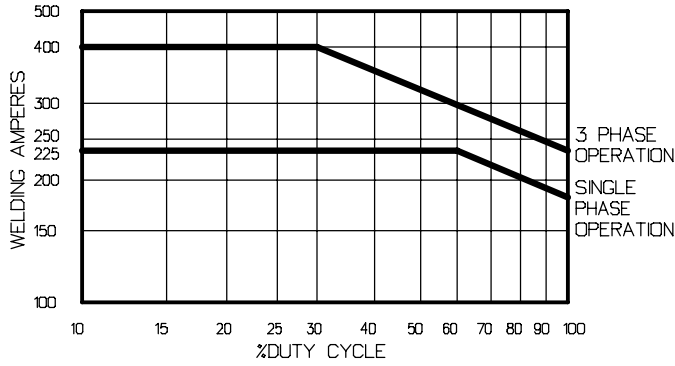
\*\*Wire feed speed ranges are for GMAW welding. While pulse welding, wire feed speed ranges may be more limited.

### 3-2. Dimensions And Weight

Hole Layout Dimensions			
A	17-3/32 in (434 mm)		
B	17-3/8 in (441 mm)		
C	19-3/32 in (485 mm)		
D	16-3/32 in (409 mm)		
E	1/2 in (13 mm)		
Weight			
112 lb (51 kg) Net 134 lb (61 kg) Ship			

803 667-A

### 3-3. Duty Cycle And Overheating

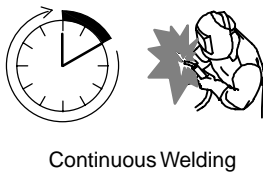


Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

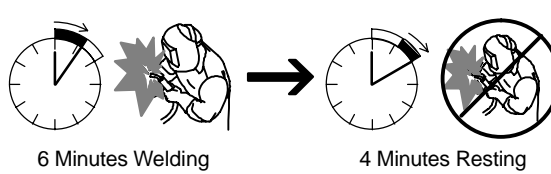
If unit overheats, thermostat(s) opens, output stops, and cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or duty cycle before welding.

**▲ Exceeding duty cycle can damage unit and void warranty.**

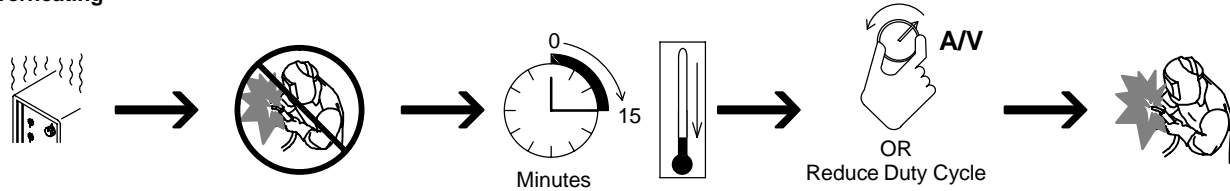
100% Duty Cycle At 225 Amperes



60% Duty Cycle At 300 Amperes

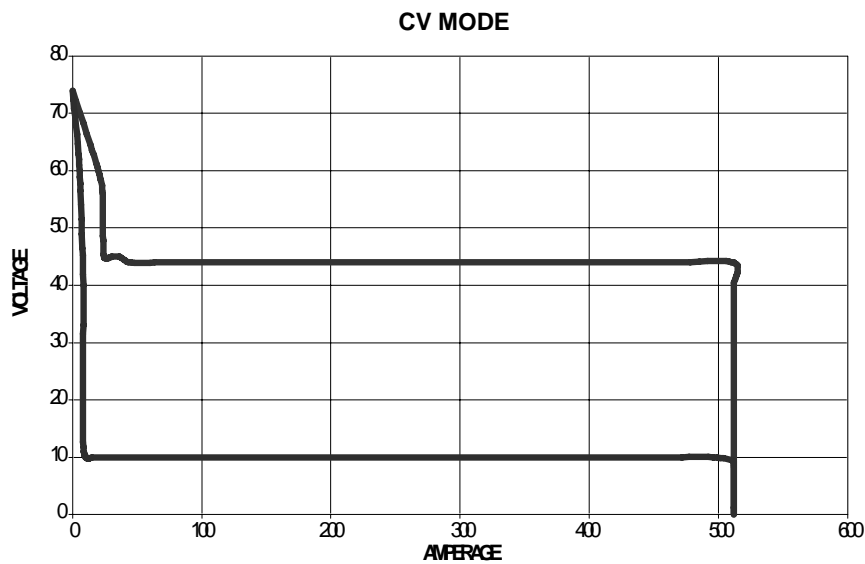


#### Overheating



duty1 4/95 - 178 651

### 3-4. Volt-Ampere Curves



Volt-ampere curves show minimum and maximum voltage and amperage output capabilities of unit. Curves of other settings fall between curves shown.

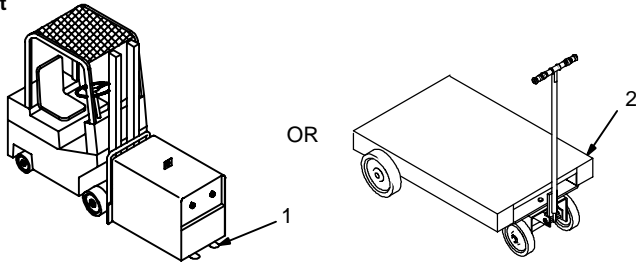
*This volt-ampere curve represents the dynamic output of the unit with a static load.*

va\_curve1 4/95

### 3-5. Selecting A Location

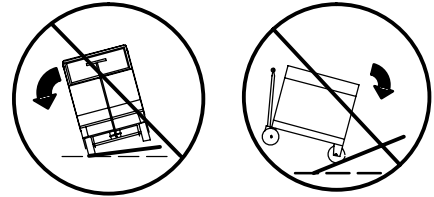


#### Movement



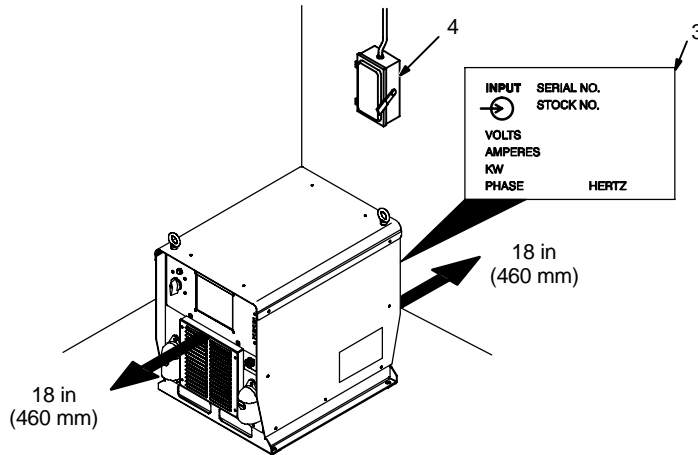
#### Tipping

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



#### Location

▲ Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.

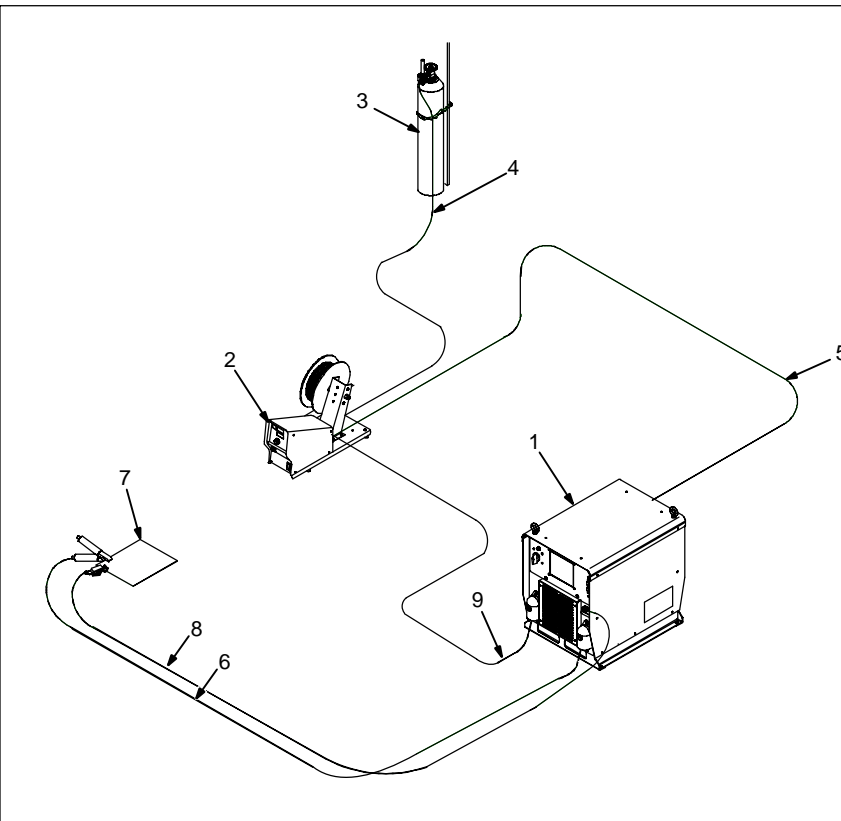


▲ Do not stack units. Beware of tipping.

- 1 Lifting Forks  
Use lifting forks to move unit. Extend forks beyond opposite side of unit.
- 2 Hand Cart  
Use cart or similar device to move unit.
- 3 Rating Label  
Use rating label to determine input power needs.
- 4 Line Disconnect Device  
Locate unit near correct input power supply.

loc\_2 3/96 -803 667-A

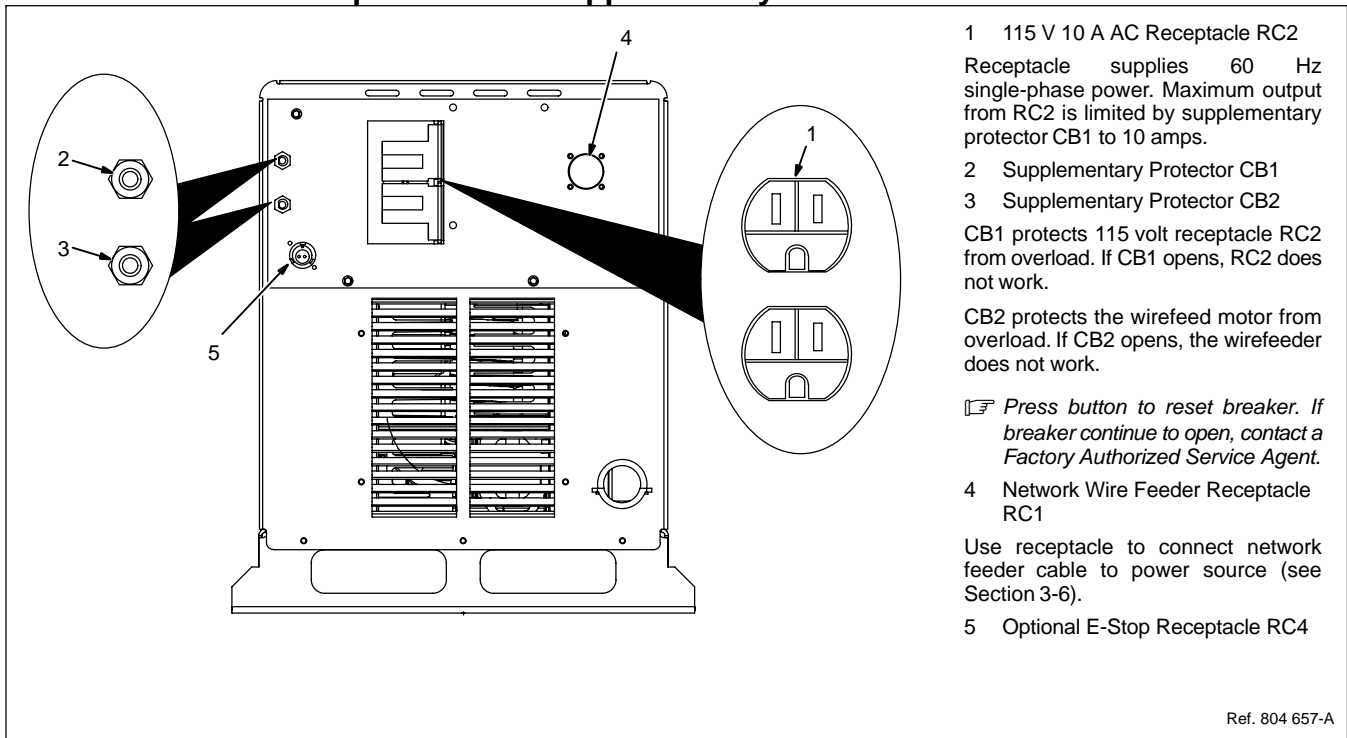
### 3-6. Connection Diagram



- 1 Welding Power Source
  - 2 Wire Feeder
  - 3 Gas Cylinder
  - 4 Gas Hose
  - 5 Network Feeder Cable
  - 6 Negative (-) Weld Cable
  - 7 Workpiece
  - 8 Voltage Sensing Lead  
Recommended for Accu-pulse and RMD (optional).
  - 9 Positive (+) Weld Cable
- ☞ Positive (+) voltage sensing lead is contained in the motor cable.

803 667-A / Ref. 801 915-A

### 3-7. Rear Panel Receptacles And Supplementary Protectors

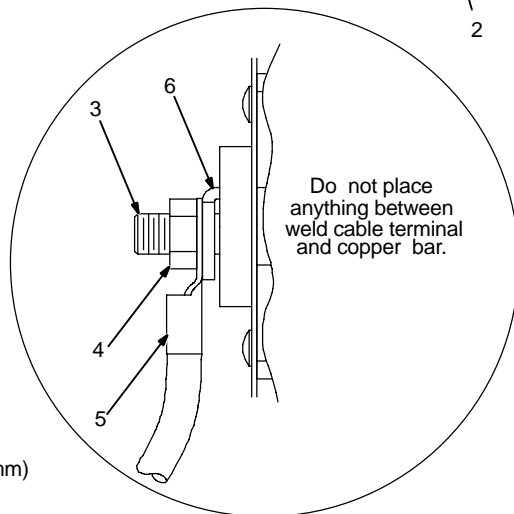
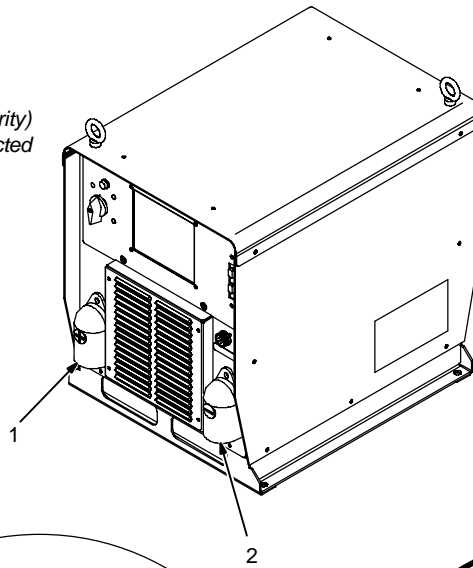




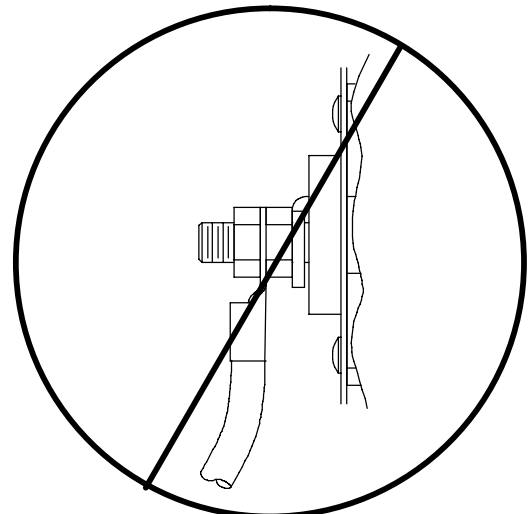
### 3-8. Connecting To Weld Terminals



☞ If using an electrode negative (straight polarity) process, the volt sense lead must be connected to the work.

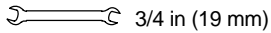


Correct Installation



Incorrect Installation

Tools Needed:



803 667-A / 803 778-A

▲ Turn off power before connecting to weld output terminals.

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

Determine total cable length in weld circuit (both positive and negative cables combined) and maximum welding amperes. See Section 4-1 to select proper cable size.

- 1 Positive (+) Weld Output Terminal
- 2 Negative (-) Weld Output Terminal


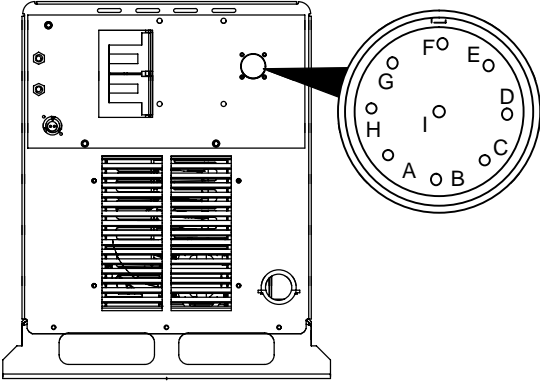
Connect positive weld cable to Positive (+) weld terminal and negative (-) cable to Negative weld terminal.

- 3 Weld Output Terminal
- 4 Supplied Weld Output Terminal Nut
- 5 Weld Cable Terminal

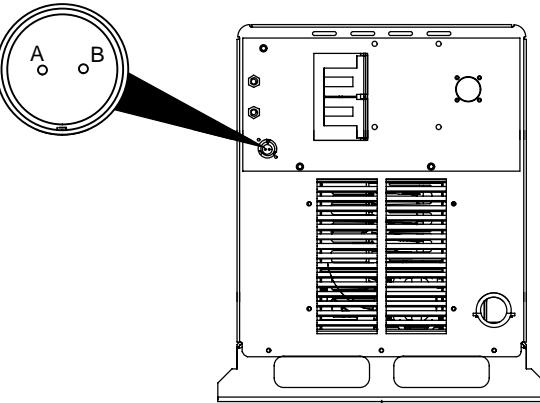
- 6 Copper Bar

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. **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.**

### 3-9. Network Wire Feeder Receptacle Functions

 REMOTE 9	Pin*	Pin Information
 <p style="text-align: right;">Ref. 804 657-A</p>	A	Not used.
	B	Shield.
	C	Volt sense.
	D	Can low.
	E	Can high.
	F	+24 volts dc common.
	G	+ 24 volts dc
	H	Motor voltage +40 volts dc common
	I	Motor voltage +40 volts dc
*The remaining pins are not used.		

### 3-10. Optional E-Stop Receptacle Functions

 <p style="text-align: right;">Ref. 804 657-A</p>	Socket	Socket Information
	A	A short to socket B allows unit to weld.
	B	A short to socket A allows unit to weld.

### 3-11. Electrical Service Guide

	Single Phase 50/60 Hz				
<b>Input Voltage</b>	208	230	400	460	575
<b>Input Amperes At Rated Output</b>	30	27	15	13	10
<b>Max Recommended Standard Fuse Rating In Amperes</b>					
<b>Circuit Breaker <sup>1</sup>, Time-Delay <sup>2</sup></b>	35	30	15	15	10
<b>Normal Operating <sup>3</sup></b>	45	40	25	20	15
<b>Min Input Conductor Size In AWG <sup>4</sup></b>	8	10	12	14	14
<b>Max Recommended Input Conductor Length In Feet (Meters)</b>	138 (42)	111 (34)	203 (62)	174 (53)	272 (83)
<b>Min Grounding Conductor Size In AWG <sup>4</sup></b>	10	10	12	14	14

Reference: 2005 National Electrical Code (NEC) (including article 630)

1 Choose a circuit breaker with time-current curves comparable to a Time Delay Fuse.

2 "Time-Delay" fuses are UL class "RK5" .

3 "Normal Operating" (general purpose - no intentional delay) fuses are UL class "K5" (up to and including 60 amp), and UL class "H" ( 65 amp and above).

4 Conductor data in this section specifies conductor size (excluding flexible cord or cable) between the panelboard and the equipment per NEC Table 310.16. If a flexible cord or cable is used, minimum conductor size may increase. See NEC Table 400.5(A) for flexible cord and cable requirements.

**▲ Caution: Failure to follow these fuse and circuit breaker recommendations could create an electric shock or fire hazard. These recommendations are for a dedicated branch circuit that applies to the rated output and duty cycle of the welding power source.**

	Three Phase 50/60 Hz				
<b>Input Voltage</b>	208	230	400	460	575
<b>Input Amperes At Rated Output</b>	23	21	12	10	8
<b>Max Recommended Standard Fuse Rating In Amperes</b>					
<b>Circuit Breaker <sup>1</sup>, Time-Delay <sup>2</sup></b>	25	25	15	10	10
<b>Normal Operating <sup>3</sup></b>	35	30	15	15	10
<b>Min Input Conductor Size In AWG <sup>4</sup></b>	10	10	14	14	14
<b>Max Recommended Input Conductor Length In Feet (Meters)</b>	134 (41)	164 (50)	194 (59)	256 (78)	400 (122)
<b>Min Grounding Conductor Size In AWG <sup>4</sup></b>	10	10	14	14	14

Reference: 2005 National Electrical Code (NEC) (including article 630)

1 Choose a circuit breaker with time-current curves comparable to a Time Delay Fuse.


2 "Time-Delay" fuses are UL class "RK5" .

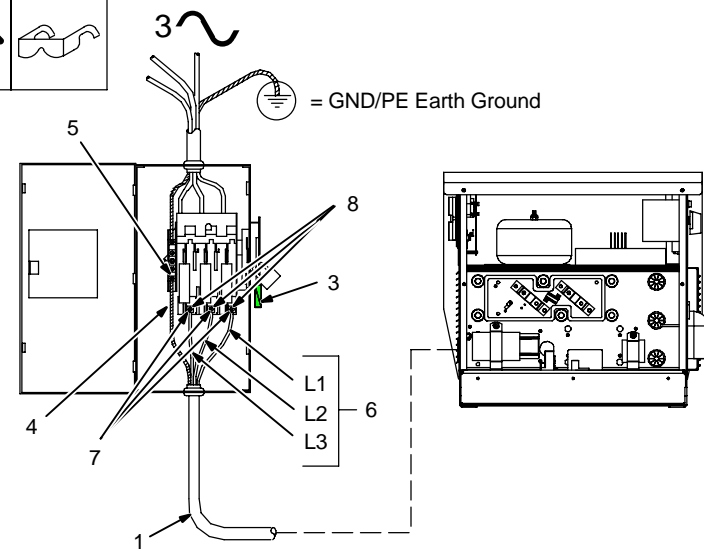
3 "Normal Operating" (general purpose - no intentional delay) fuses are UL class "K5" (up to and including 60 amp), and UL class "H" ( 65 amp and above).

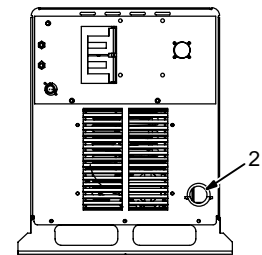
4 Conductor data in this section specifies conductor size (excluding flexible cord or cable) between the panelboard and the equipment per NEC Table 310.16. If a flexible cord or cable is used, minimum conductor size may increase. See NEC Table 400.5(A) for flexible cord and cable requirements.

**▲ Caution: Failure to follow these fuse and circuit breaker recommendations could create an electric shock or fire hazard. These recommendations are for a dedicated branch circuit that applies to the rated output and duty cycle of the welding power source.**

## 3-12. Connecting 3-Phase Input Power







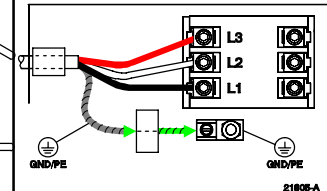
**WARNING**

**ELECTRIC SHOCK** can kill; **SIGNIFICANT DC VOLTAGE** exists after removal of input power.


- Always wait 5 minutes after power is turned off before working on unit.
- Check input capacitor voltage, and be sure it is near 0 before touching any parts.

Read Owner's Manual.

**Three-Phase Input Connection**



Tools Needed:



Route input power cable through tubing inside unit.

Route ground conductor through current transducer to ground terminal.

Ref. 144 221 / Ref. 070 399-F / 804 657-A / 218 005-A

- ▲ Turn Off welding power source, and check voltage on input capacitors according to Section 8-1 before proceeding.
- ▲ Installation must meet all National and Local Codes - have only qualified persons make this installation.
- ▲ Disconnect and lockout/tagout input power before connecting input conductors from unit.
- ▲ Make input power connections to the welding power source first.
- ▲ Always connect green or green/yellow conductor to supply grounding terminal first, and never to a line terminal.

☞ The Auto-Line circuitry in this unit automatically links the power source to the primary voltage being applied. Check input voltage available at site. This unit can be connected to any input power between 208 and 575 VAC without relinking the power source.

- 1 Input Power Conductors (Customer Supplied Cord)

Select size and length of conductors using Section 3-11. Conductors must comply with national, state, and local electrical codes. If applicable, use lugs of proper amperage capacity and correct hole size.

### Welding Power Source Input Power Connections

#### 2 Strain Relief

Install strain relief of proper size for unit and input conductors. Route conductors (cord) through strain relief and tighten screws.

- Use large strain relief for input conductor size 8 and larger.
- Use small strain relief with reducing washers for input conductor size 10.

Connect input conductors as shown in illustration.

Route green or green/yellow grounding conductor through current transducer and connect to welding power source grounding terminal first. Then connect input conductors L1, L2, and L3 to welding power source line terminals.

Reinstall side panel onto welding power source.

### Disconnect Device Input Power Connections

- 3 Disconnect Device (switch shown in the OFF position)
- 4 Green Or Green/Yellow Grounding Conductor
- 5 Disconnect Device Grounding Terminal
- 6 Input Conductors (L1, L2 And L3)
- 7 Disconnect Device Line Terminals

Connect green or green/yellow grounding conductor to disconnect device grounding terminal first.

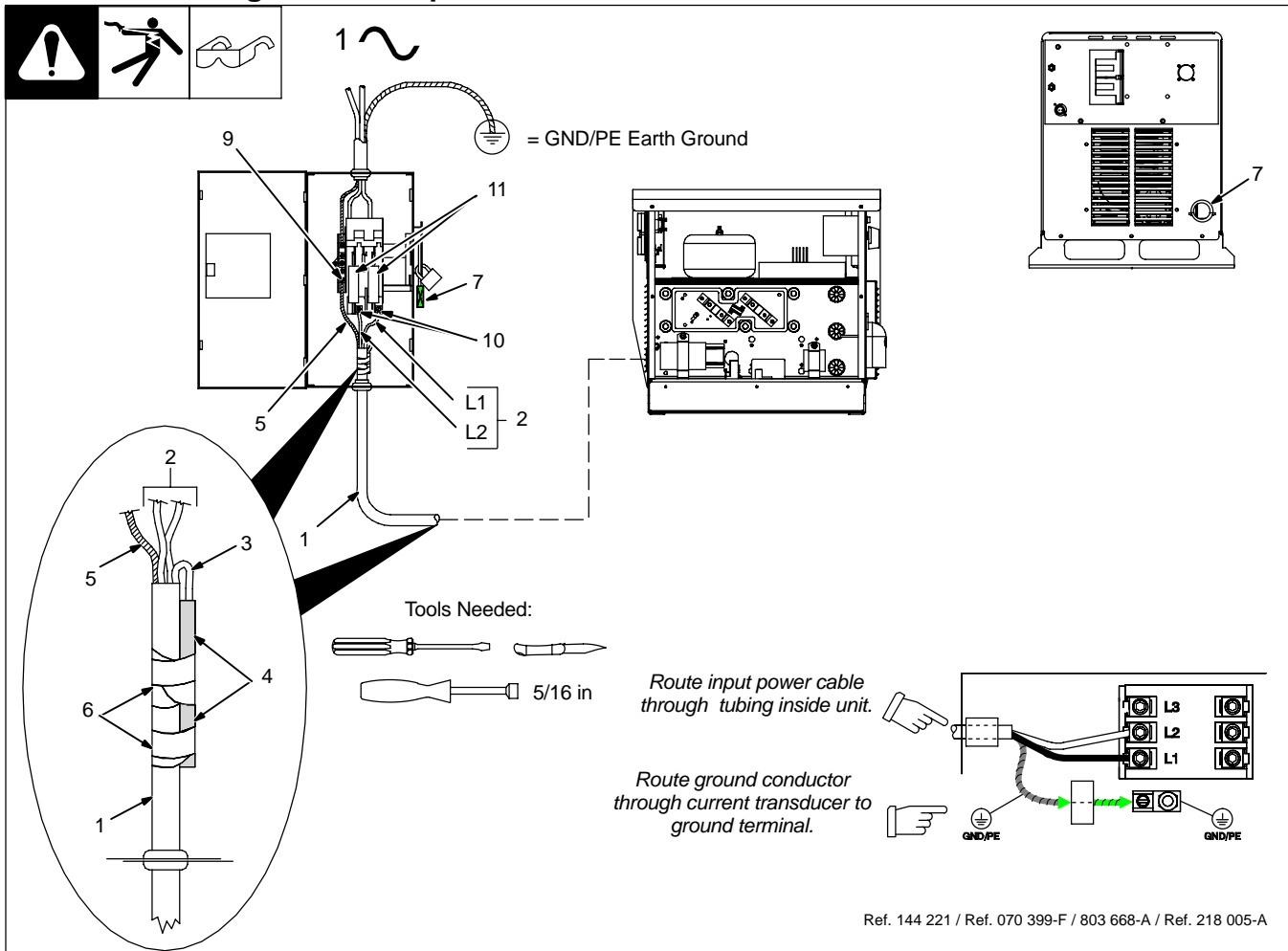
Connect input conductors L1, L2, and L3 to disconnect device line terminals.

#### 8 Over-Current Protection

Select type and size of over-current protection using Section 3-11 (fused disconnect switch shown).

Close and secure door on disconnect device. Remove lockout/tagout device, and place switch in the On position.

### 3-13. Connecting 1-Phase Input Power



Ref. 144 221 / Ref. 070 399-F / 803 668-A / Ref. 218 005-A

▲ Turn Off welding power source, and check voltage on input capacitors according to Section 8-1 before proceeding.

▲ Installation must meet all National and Local Codes - have only qualified persons make this installation.

▲ Disconnect and lockout/tagout input power before connecting input conductors form unit.

▲ Make input power connections to the welding power source first.

▲ Always connect green or green/yellow conductor to supply grounding terminal first, and never to a line terminal.

☞ The Auto-Line circuitry in this unit automatically links the power source to the primary voltage being applied. Check input voltage available at site. This unit can be connected to any input power between 208 and 575 VAC without relinking the power source.

1 Input Power Conductors (Customer Supplied Cord)

Select size and length of conductors using Section 3-11. Conductors must comply with

national, state, and local electrical codes. If applicable, use lugs of proper amperage capacity and correct hole size.

#### Three Conductor Power Cord Preparation

2 Black And White Input Conductors (L1 And L2)

3 Red Input Conductor

4 Insulation Sleeve

5 Green Or Green/Yellow Grounding Conductor

6 Electrical Tape

Insulate and isolate red conductor as shown.

#### Welding Power Source Input Power Connections

7 Strain Relief

Install strain relief of proper size for unit and input conductors. Route conductors (cord) through strain relief and tighten screws.

- Use large strain relief for input conductor size 8 and larger.

- Use small strain relief with reducing washers for input conductor size 10.

Connect input conductors as shown in illustration.

Route green or green/yellow grounding conductor through current transducer and connect to welding power source grounding terminal first. Then connect input conductors L1 and L2 to welding power source line terminals.

Reinstall side panel onto welding power source.

#### Disconnect Device Input Power Connections

8 Disconnect Device (switch shown in OFF position)

9 Disconnect Device (Supply) Grounding Terminal

Connect green or green/yellow grounding conductor (see Item 5) to disconnect device grounding terminal first.

10 Disconnect Device Line Terminals

Connect input conductors L1 and L2 to disconnect device line terminals.



11 Overcurrent Protection

Select type and size of overcurrent protection using Section 3-11 (fused disconnect switch shown).



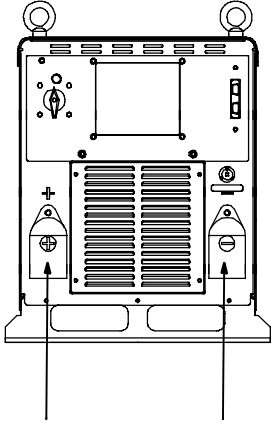
Close and secure door on line disconnect device.

# SECTION 4 – RECOMMENDED SETUP PROCEDURES

## 4-1. Selecting Weld Cable Sizes\*

  **▲ ARC WELDING can cause Electromagnetic Interference.**

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.

 <b>Weld Output Terminals</b> ▲ Turn off power before connecting to weld output terminals. ▲ Do not use worn, damaged, undersized, or poorly spliced cables.	 <b>Welding Amperes**</b>	<b>Weld Cable Size*** and Total Cable (Copper) Length in Weld Circuit Not Exceeding****</b>								
				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)
		10 – 60% Duty Cycle	60 – 100% Duty Cycle	10 – 100% Duty Cycle						
 Positive +      Negative - 803 669-A	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)	2 ea. 2/0 (2x70)	2 ea. 2/0 (2x70)	
	300	1 (50)	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 3/0 (2x95)	
	350	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 3/0 (2x95)	2 ea. 4/0 (2x120)	
	400	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 4/0 (2x120)	2 ea. 4/0 (2x120)	
	500	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 4/0 (2x120)	3 ea. 3/0 (3x95)	3 ea. 3/0 (3x95)	
	600	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 4/0 (2x120)	3 ea. 3/0 (3x95)	3 ea. 4/0 (3x120)	3 ea. 4/0 (3x120)	
	700	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 4/0 (2x120)	3 ea. 3/0 (3x95)	3 ea. 4/0 (3x120)	3 ea. 4/0 (3x120)	4 ea. 4/0 (4x120)	
800	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 4/0 (2x120)	3 ea. 4/0 (3x120)	3 ea. 4/0 (3x120)	4 ea. 4/0 (4x120)	4 ea. 4/0 (4x120)		

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

\*\*Cable should be sized for Peak Amperage (Apk) for pulse welding applications.

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

S-0007-E

\*\*\*\*For distances longer than those shown in this guide, call a factory applications representative at 920-735-4505.

### NOTE

*In pulse welding applications using inverter power sources, peak currents can result in extreme voltage drops producing poor welding characteristics with undersized cables. A recommendation for weld cable size is a minimum of 2/0 for 300 ampere welding power sources and 4/0 for 450 ampere welding power sources when total cable length is less than 100 ft (30m).*

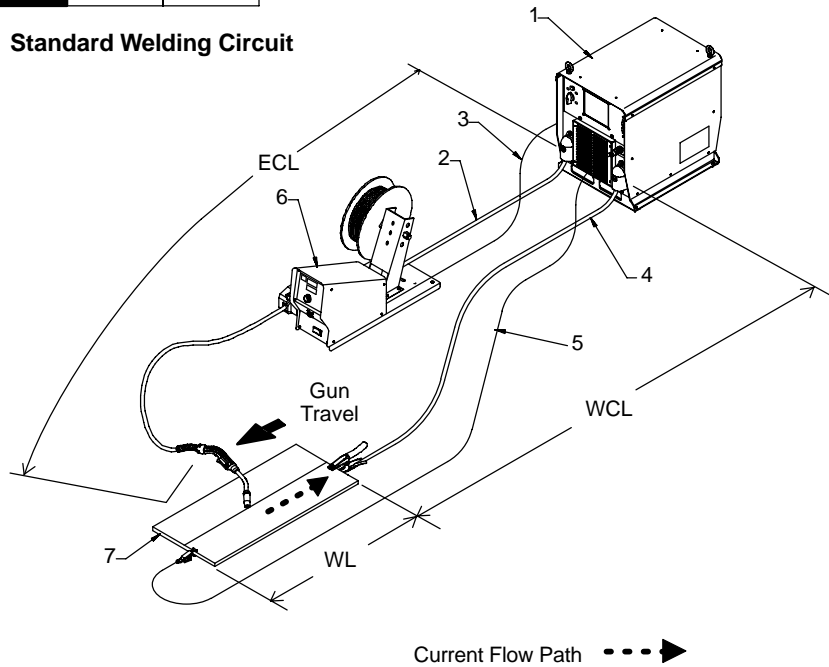
## 4-2. Welding Circuit

### NOTE

Minimizing the welding circuit loop can prevent extreme voltage drops that produce poor welding characteristics.



**Standard Welding Circuit**



- 1 Welding Power Source
- 2 Electrode Cable
- 3 Feeder Cable
- 4 Work Cable
- 5 Voltage Sensing Lead
- 6 Wire Feeder
- 7 Workpiece

In pulse welding applications using inverter power sources, cable resistance can result in less than satisfactory performance. In most cases, a welding circuit length of 50 ft (15 m) or less will provide satisfactory performance with a standard welding circuit connection.

The length of a welding circuit is determined as follows:

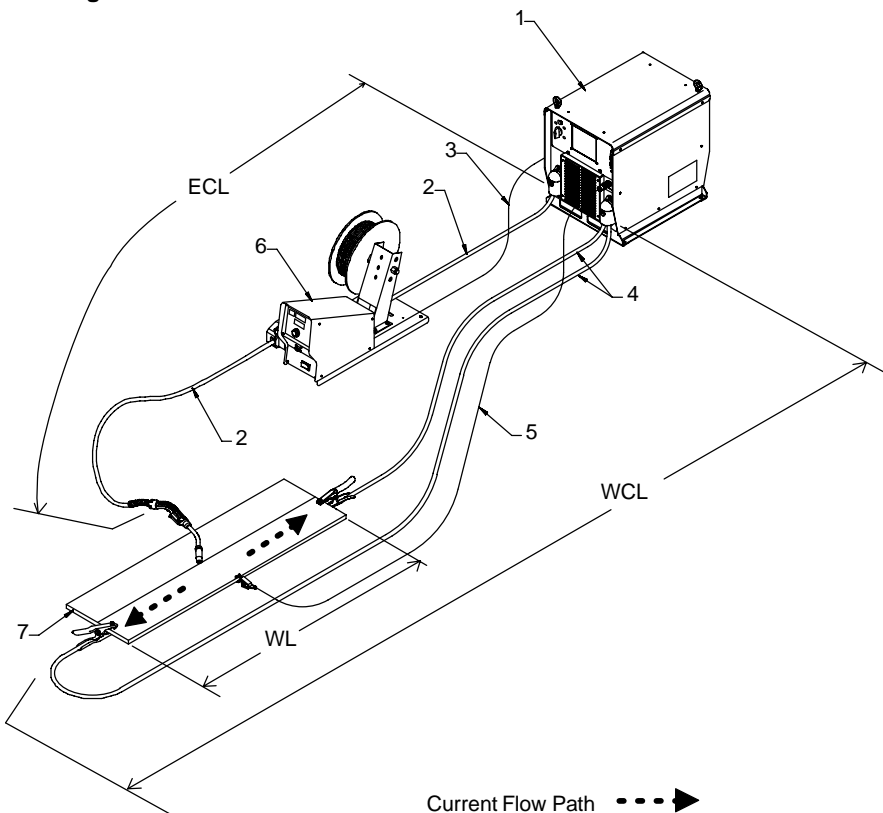
Welding Circuit = Electrode Cable Length (ECL) + Work Cable Length (WCL) + Workpiece Length (WL)

See Section 4-1 for weld cable size.

Variations in welding processes and welding circuit resistance can affect apparent voltage at the welding arc. Voltage sensing can improve welding performance by providing accurate feedback to the welding power source.

It is important to connect the voltage sensing lead as near to the weld as possible, but not in the return current path.

**Large Weld Structure**

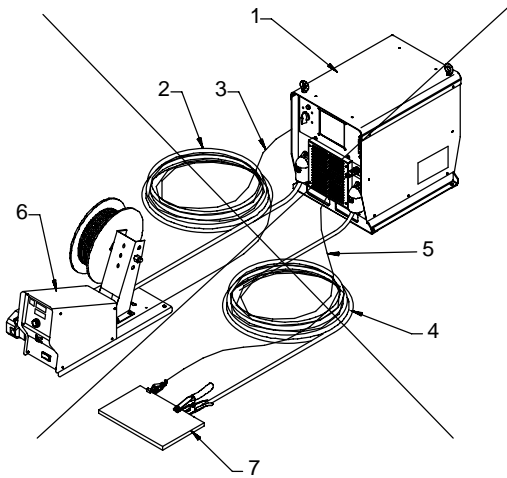


804 525-A

### 4-3. Arranging Welding Cables To Reduce Welding Circuit Inductance



**Bad**

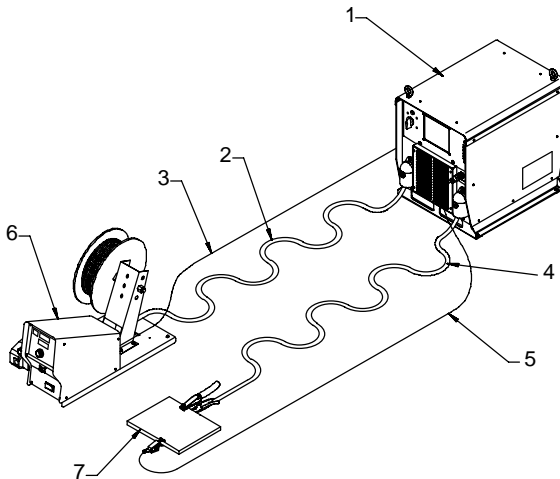


- 1 Welding Power Source
- 2 Electrode Cable
- 3 Feeder Cable
- 4 Work Cable
- 5 Voltage Sensing Lead
- 6 Wire Feeder
- 7 Workpiece

The method used to arrange cables has a significant affect on welding properties. As an example, Accupulse and RMD welding processes can produce high welding circuit inductance depending on cable length and arrangement. This can result in limited current rise during droplet transfer into the welding puddle.

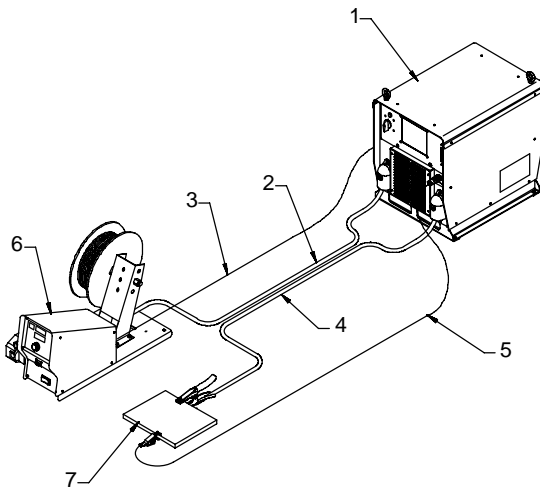
The electrode sense lead is contained in the feeder control cable and automatically becomes enabled for all semi-automatic processes. The work sense lead connects to the Axxcess welding power source 4-pin connector located above the negative output terminal. This work sense lead automatically compensates for work cable voltage drop when connected to the welding power source.

**Better**



**Do not coil excess cables.** Use cables that are the appropriate length for the application. Whenever using long weld cables [longer than 50 ft (15 m)] try to arrange positive and negative weld cables together to reduce the magnetic field surrounding the cables. Avoid coupling the feeder and work sense leads with the weld cables.

**Best**

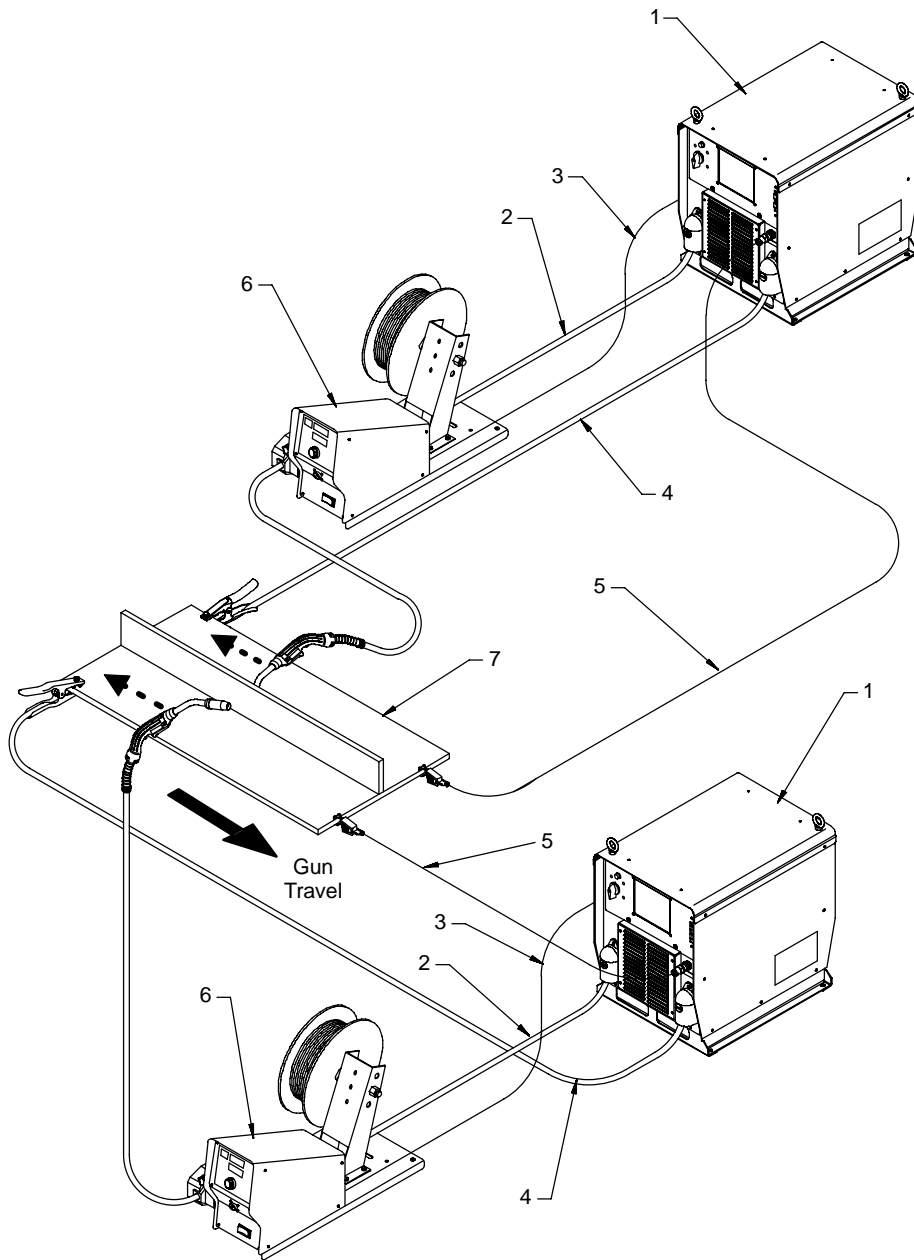




# NOTE

Welding on a single workpiece using multiple welding power sources can cause arc blow and arc impedance to develop or intensify.

## 4-4. Using Multiple Welding Power Sources



- 1 Welding Power Source
- 2 Electrode Cable
- 3 Feeder Cable
- 4 Work Cable
- 5 Voltage Sensing Lead
- 6 Wire Feeder
- 7 Workpiece

Each welding power source should have a separate work cable connection to the workpiece. Do not stack or join work cables together at the workpiece. This is very important for pulse welding applications.

It is important to connect the voltage sensing lead as near to the weld as possible, but not in the return current path.

Connect voltage sensing lead at the end of the weld joint.

The direction of the welding path should be away from the work cable connections.

Connect work clamp at the beginning of the weld joint.

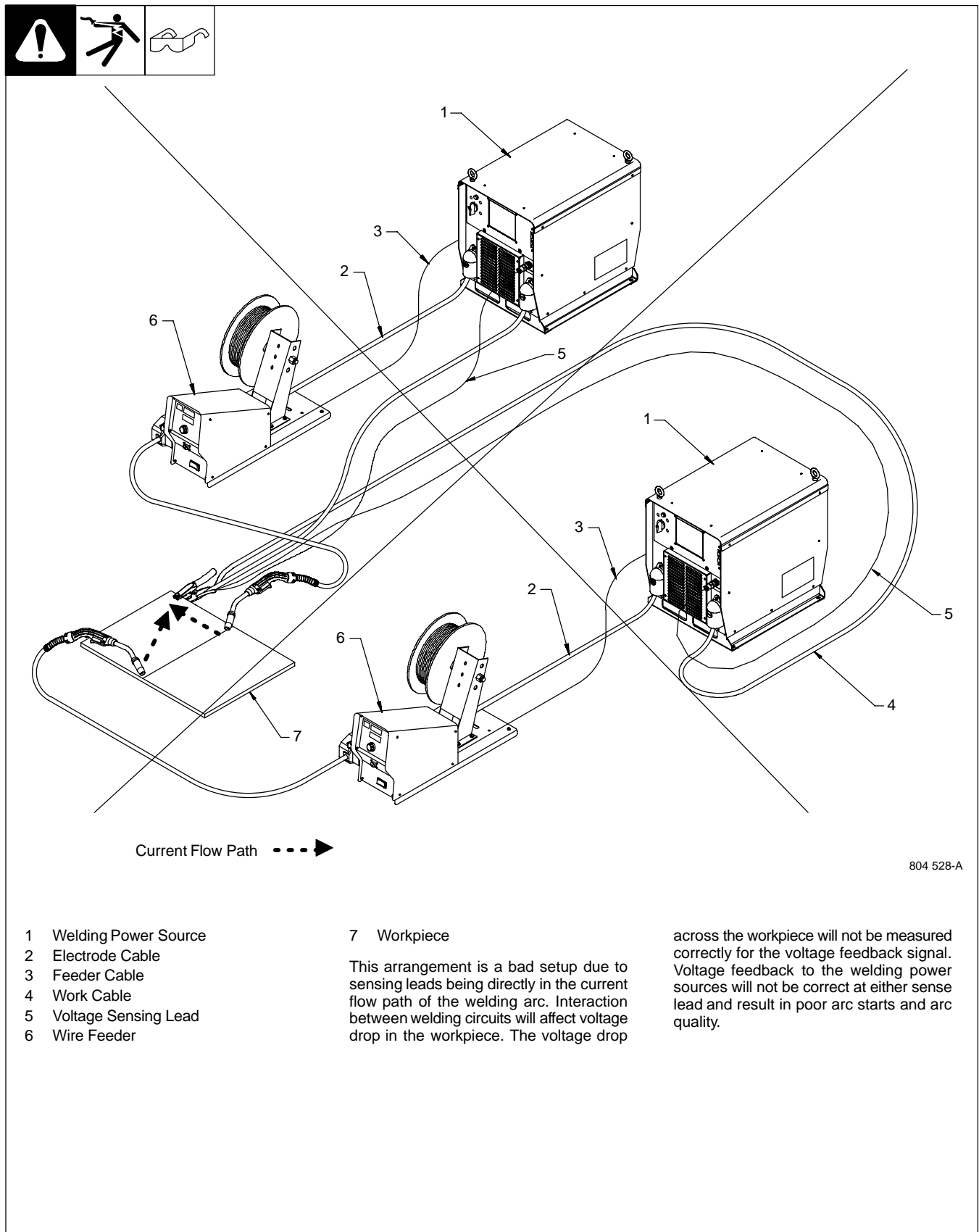
Each welding gun should have its own source of shielding gas. Use a separate shielding gas regulator and shielding gas connection for each welding gun.

Arc blow is the deflection of a welding arc from its normal path due to magnetic forces. It will adversely affect the appearance of a weld, cause excessive spatter, and impair the quality of a weld. Arc blow occurs primarily during the welding of steel or ferromagnetic metals. Weld current will take the path of least resistance, but not always the most direct path through the workpiece to the work lead connection. The most intense magnet force will be around the arc due to a difference in resistance for the magnetic path in the base metal. The work clamp connection is important and should be placed at the starting point of a weld. It is recommended to have as short of an arc as possible so that there is less of an arc for the magnetic forces to control. Conditions affecting the magnetic force acting on the arc vary so widely that the reference here is only about cabling connections and arc preferences.

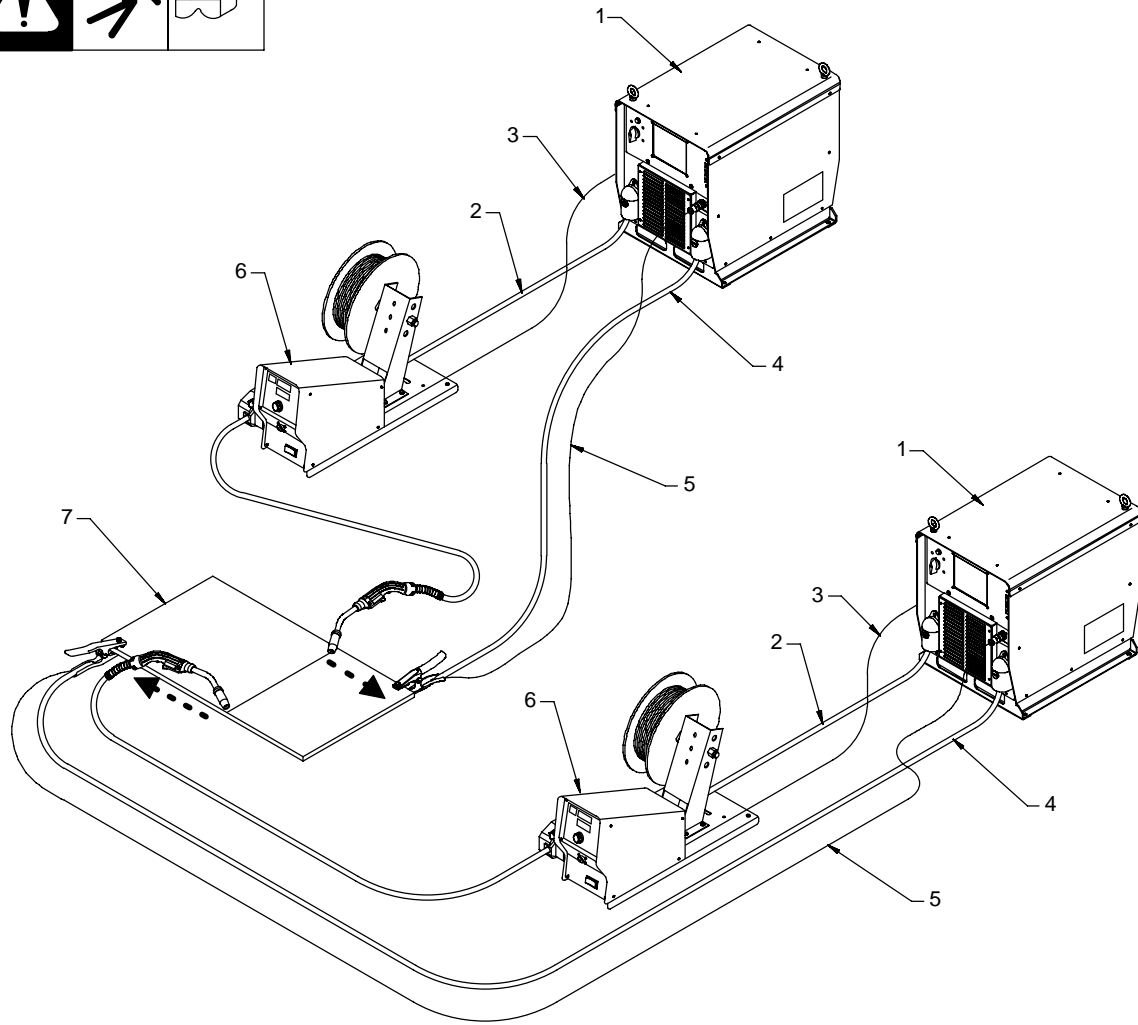
Current Flow Path 

## 4-5. Voltage Sensing Lead And Work Cable Connections For Multiple Welding Arcs

### A. Bad Setup



## B. Better Setup



Current Flow Path - - - ➔

804 529-A

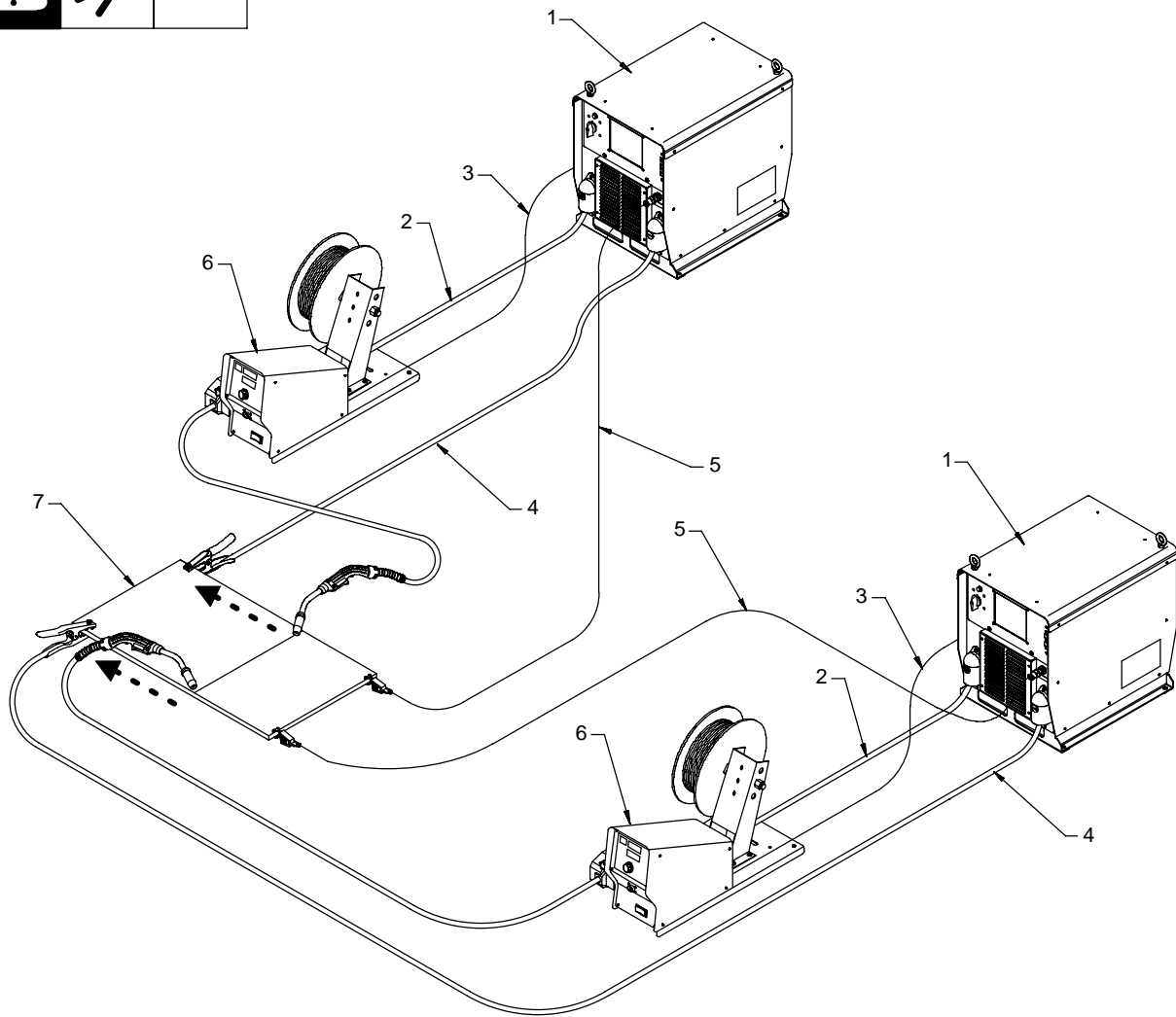
- 1 Welding Power Source
- 2 Electrode Cable
- 3 Feeder Cable
- 4 Work Cable
- 5 Voltage Sensing Lead

- 6 Wire Feeder
- 7 Workpiece

This arrangement is a better setup for supporting separate voltage feedback to

the welding power sources. The most accurate voltage sensing may not be achieved due to voltage drops in the workpiece. This may require compensation in the welding parameters.

### C. Best Setup



Current Flow Path - - - - ->

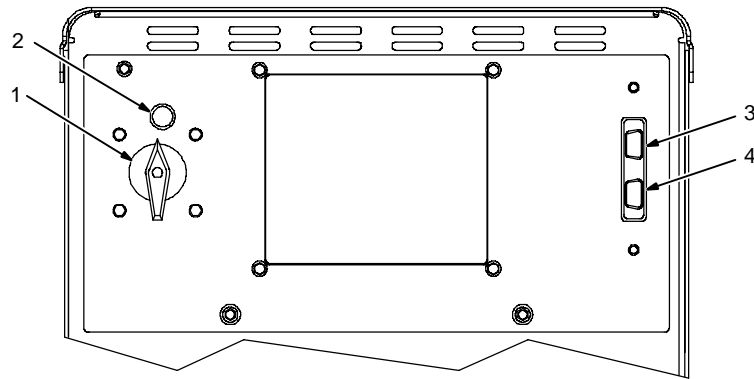
804 530-A

- |   |                      |   |                      |
|---|----------------------|---|----------------------|
| 1 | Welding Power Source | 5 | Voltage Sensing Lead |
| 2 | Electrode Cable      | 6 | Wire Feeder          |
| 3 | Feeder Cable         | 7 | Workpiece            |
| 4 | Work Cable           |   |                      |

This arrangement is the best setup for proper voltage sensing at the workpiece. Voltage feedback to the welding power sources will more accurate and result in reliable arc starts and better arc quality.

# SECTION 5 – OPERATION

## 5-1. Front Panel Switches



Ref. 803 669-A

1 Power Switch  
Turns unit On or Off.

2 Pilot Light  
Light indicates status of welding power source, on when unit is on and off when unit is off.

3 PDA Port  
4 PC Port

## 5-2. Options

### A. E-Stop Option

The E-Stop option comes with a 2-pin amphenol receptacle, matching plug, and 30 ft (9 m) of high density molded cord to allow connecting the welding power source into an E-Stop circuit. An integrator will need to supply a closure for the non E-Stop condition.

When the E-Stop input connection changes its state from closed to open, the welding power source goes into an E-Stop mode where all welding outputs shutdown immediately. Once the input connection returns to a closed state, the unit will start a reset routine and be ready for operation when it completes the reset operation.

### B. DeviceNet Option

The DeviceNet option provides hardware and software that allows the welding power source to be connected into a DeviceNet network.

Contact factory for option details.

### C. RMD Option

RMD (Regulated Metal Deposition) is a precisely controlled short-circuit transfer welding process. Some of the benefits provided by the RMD process are the ability to weld thin gauge material and use larger diameter welding wire on thin gauge material, improved gap filling, reduction of spatter, less heat input into the workpiece, and less distortion.

The RMD process is a software option that is loaded into the welding power source.

Contact factory for option details.

# SECTION 6 – MAINTENANCE

## 6-1. Routine Maintenance

		<b>▲ Disconnect power before maintaining.</b>		<i>Maintain more often during severe conditions.</i>		
		✓ = Check      ◇ = Change      ● = Clean      ☆ = Replace * To be done by Factory Authorized Service Agent				Reference
Every 3 Months	☆ Unreadable Labels	● Weld Terminals	☆ Damaged Gas Hose	✓ ☆ Weld Cables		
	✓ ☆ Cords	✓ ☆ Gun Cables				
Every 6 Months	● Drive Rolls	● Inside Unit				

## 6-2. Blowing Out Inside Of Unit

			<b>▲ Do not remove case when blowing out inside of unit.</b> To blow out unit, direct airflow through front and back louvers as shown.
--	--	--	---

803 667-A

# SECTION 7 – SAFETY PRECAUTIONS FOR SERVICING

▲ **Warning: Protect yourself and others from injury — read and follow these precautions.**

## 7-1. Symbol Usage

OM-211 434M - 2006-05, safety\_stm 3/06



Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ **Marks a special safety message.**

☞ Means "Note"; not safety related.



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

## 7-2. Servicing 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.**

▲ **Only qualified persons should service, test, maintain, and repair this unit.**

▲ **During servicing, keep everybody, especially children, away.**



### ELECTRIC SHOCK can kill.

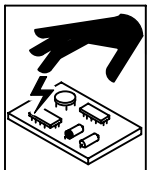
- Do not touch live electrical parts.
- Turn Off welding power source and wire feeder and disconnect and lockout input power using

line disconnect switch, circuit breakers, or by removing plug from receptacle, or stop engine before servicing unless the procedure specifically requires an energized unit.

- Insulate yourself from ground by standing or working on dry insulating mats big enough to prevent contact with the ground.
- Do not leave live unit unattended.
- If this procedure requires an energized unit, have only personnel familiar with and following standard safety practices do the job.
- When testing a live unit, use the one-hand method. Do not put both hands inside unit. Keep one hand free.
- Disconnect input power conductors from deenergized supply line BEFORE moving a welding power source.

### SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Troubleshooting Section before touching any parts.



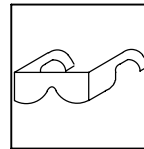
### STATIC (ESD) can damage PC boards.

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



### FIRE OR EXPLOSION hazard.

- Do not place unit on, over, or near combustible surfaces.
- Do not service unit near flammables.



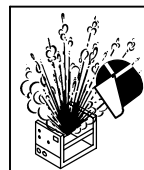
### FLYING METAL or DIRT can injure eyes.

- Wear safety glasses with side shields or face shield during servicing.
- Be careful not to short metal tools, parts, or wires together during testing and servicing.



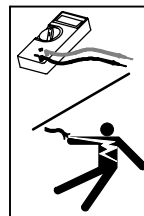
### HOT PARTS can cause severe burns.

- 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.



### EXPLODING PARTS can cause injury.

- Failed parts can explode or cause other parts to explode when power is applied to inverters.
- Always wear a face shield and long sleeves when servicing inverters.



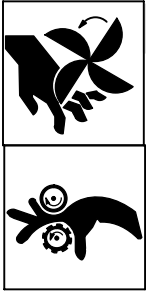
### SHOCK HAZARD from testing.

- Turn Off welding power source and wire feeder or stop engine before making or changing meter lead connections.
- Use at least one meter lead that has a self-retaining spring clip such as an alligator clip.
- Read instructions for test equipment.



### FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use 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.



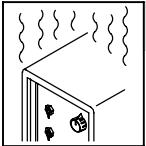
### **MOVING PARTS can cause injury.**

- Keep away from moving parts such as fans.
- Keep away from pinch points such as drive rolls.
- Have only qualified persons remove doors, panels, covers, or guards for maintenance as necessary.
- Keep hands, hair, loose clothing, and tools away from moving parts.
- Reinstall doors, panels, covers, or guards when maintenance is finished and before re-connecting input power.



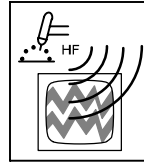
### **MAGNETIC FIELDS can affect pacemakers.**

- Pacemaker wearers keep away from servicing areas until consulting your doctor.



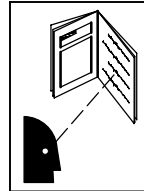
### **OVERUSE can cause OVERHEATING.**

- 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.



### **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 install, test, and service H.F. producing units.
- 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.



### **READ INSTRUCTIONS.**

- Use Testing Booklet (Part No. 150 853) when servicing this unit.
- Consult the Owner's Manual for welding safety precautions.
- Use only genuine replacement parts from the manufacturer.

## **7-3. California Proposition 65 Warnings**

- ▲ **Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)**
- ▲ **Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.**

#### **For Gasoline Engines:**

- ▲ **Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.**

#### **For Diesel Engines:**

- ▲ **Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.**

## **7-4. EMF Information**

### **Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields**

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: "The body of evidence, in the committee's judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard." However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

#### **About Pacemakers:**

Pacemaker wearers consult your doctor before welding or going near welding operations. If cleared by your doctor, then following the above procedures is recommended.



# SECTION 8 – TROUBLESHOOTING

## 8-1. Removing Cover and Measuring Input Capacitor Voltage



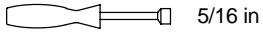
▲ 900 Volts dc can be present on the capacitor bus and significant DC voltage can remain on capacitors after unit is Off. Always check the voltage on inverter assembly as shown to be sure the input capacitors have discharged before working on unit.

Turn Off welding power source, and disconnect input power.

Remove cover

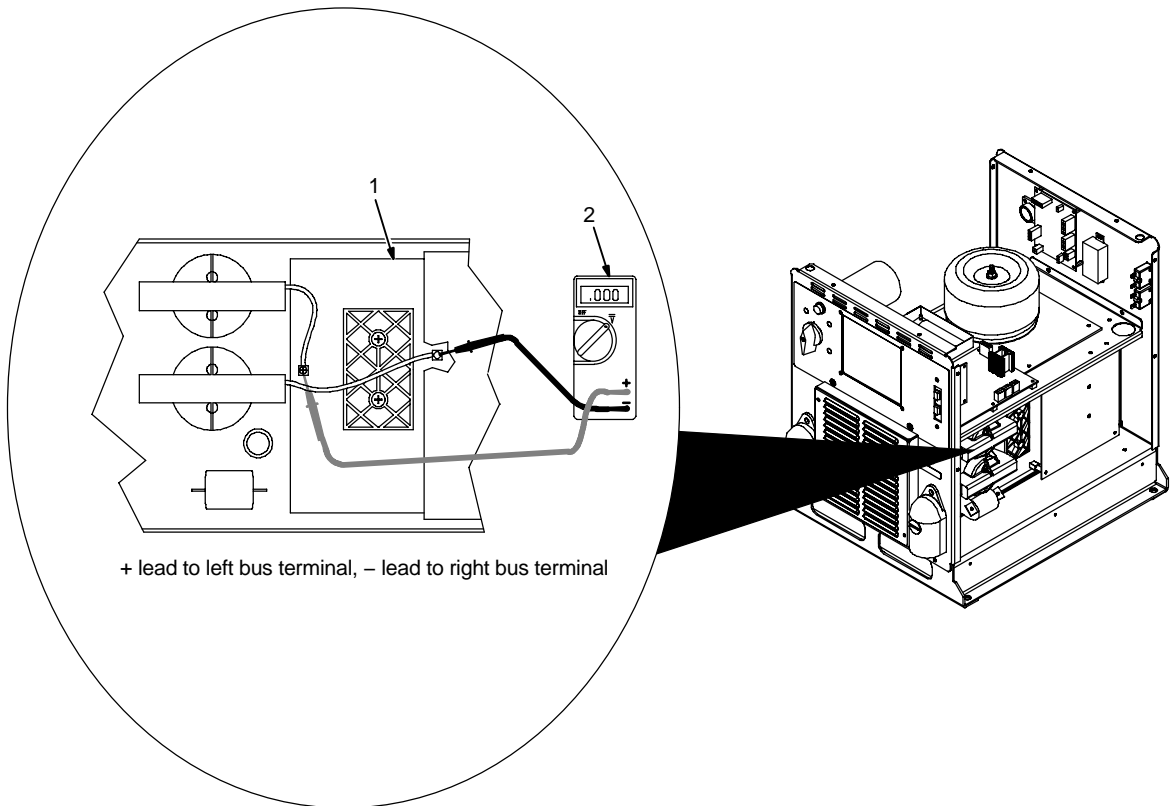
- 1 Interconnect Board PC2
- 2 Voltmeter

Tools Needed:



Measure the dc voltage across the + bus terminal and – bus terminal on PC2 as shown until voltage drops to near 0 (zero) volts. Measure input capacitor voltage on inverter assembly before proceeding.

Proceed with job inside unit. Reinstall cover when finished.



## 8-2. Weld Process Board PC4 Diagnostic LED's

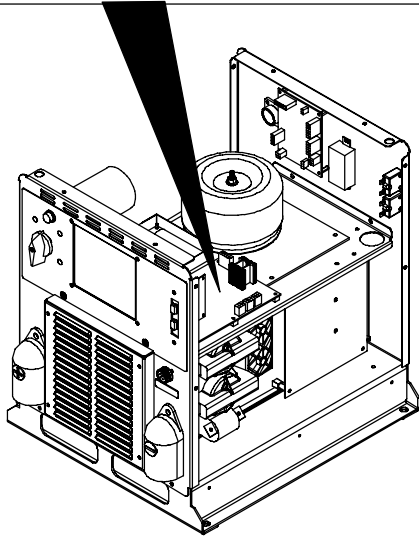
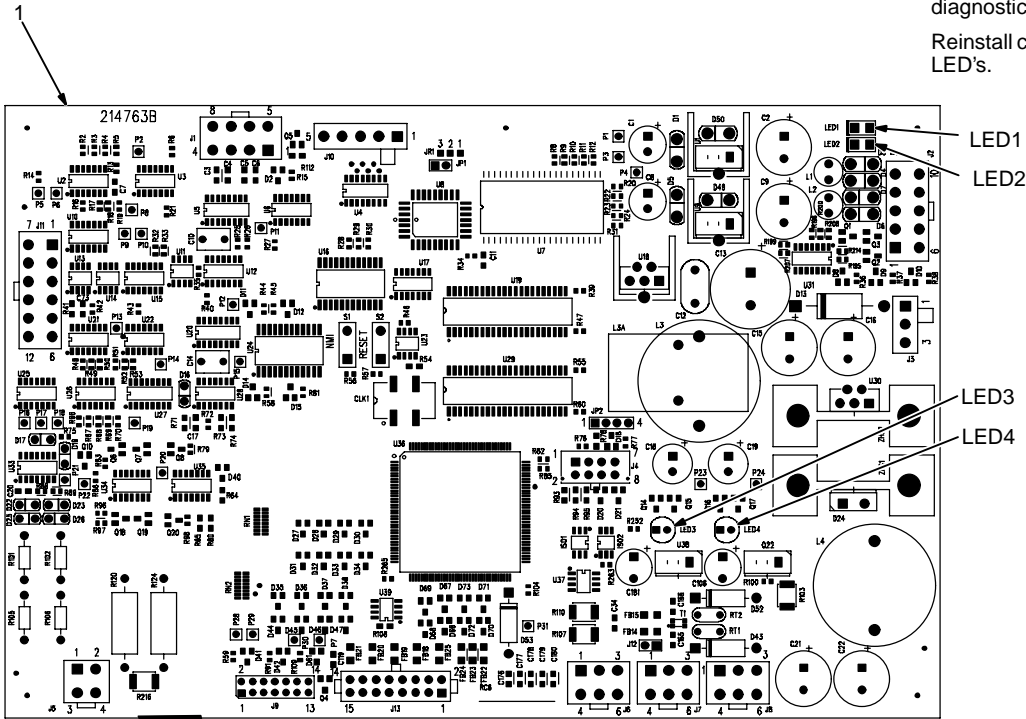


### 1 Weld Process Board PC4

Diagnostic LED's are visible inside unit, located on PC4 mounted on the top tray.

Refer to Section 8-3 for information on diagnostic LED's.

Reinstall cover after checking diagnostic LED's.



216 956-A / Ref. 803 670-A

## 8-3. Diagnostic LED's On Process Board PC4

LED	Status	Diagnosis
1	On	Indicates -25 volts dc is present on process board PC4
	Off	Indicates -25 volts dc is not present on process board PC4
2	On	Indicates +25 volts dc is present on process board PC4
	Off	Indicates +25 volts dc is not present on process board PC4
3,4	On	See Network Status Table in Section 8-4
	Off	See Network Status Table in Section 8-4

## 8-4. Network And Module Status LED's

### A. Network Status LED's

The following is a network status LED:

LED4 on the PCM circuit board.

Status	Diagnosis
Off	The circuit board is not on-line with the network or there is no power applied to the circuit board.
Green	The circuit board is operating normally and the on-line connection is made with the network.
Flashing Green	The circuit board is waiting for an on-line connection to be made with the network.
Red	The circuit board has encountered a communication link failure with the network. Check DeviceNet cable connections. Replace circuit board if necessary.


### B. Module Status LED's

The following is a module status LED:

LED3 on the PCM circuit board.

Status	Diagnosis
Off	There is no power applied to the circuit board or the board software is not executing its functions.
Green	The circuit board is operating normally.
Flashing Red	The circuit board has encountered a recoverable fault. Wait or cycle power to clear fault.
Red	The circuit board has encountered an unrecoverable fault.

## 8-5. Troubleshooting

			
Trouble		Remedy	
No weld output; completely inoperative	Place line disconnect in On position (see Section 3-12 or 3-13).		
	Check and replace line fuse(s), if necessary, or reset circuit breaker (see Section 3-12 or 3-13).		
	Check for proper input power connections (see Section 3-12 or 3-13).		
No weld output; meter display on with no error displayed.	Check to see if the contactor indicator light is lit when contactor line is asserted on.		
Erratic or improper weld output with no errors displayed.	Use proper size and type of weld cable (see Section 4-1).		
	Clean and tighten all weld connections.		
No 115 volts AC at the duplex receptacle.	Reset supplementary protector CB1.		
Wire does not feed.	Check supplementary protector CB2 and reset if necessary.		
	Check motor control cable connections.		
Wire feeds erratically.	Readjust hub tension.		
	Readjust drive roll pressure.		
	Clean or replace dirty or worn drive rolls.		
	Remove weld spatter around the nozzle opening.		
	Replace contact tip or liner. See gun Owner's Manual.		
Wire feeds as soon as power is supplied.	Check motor control cable connections.		
	Check gun trigger. See gun Owner's Manual.		
Wire stubbing on low end using a constant current power source.	Increase output setting of the power source.		
	Check voltage sense lead connection, clean and tighten if necessary.		
Gas does not flow or does not stop flowing; wire feeds.	Check gas valve and flow meter.		
Wire burns back to gun contact tip when using electrode negative (straight polarity) process.	Check to be sure that volt sense lead is connected to the work.		



# SECTION 9 – ELECTRICAL DIAGRAMS

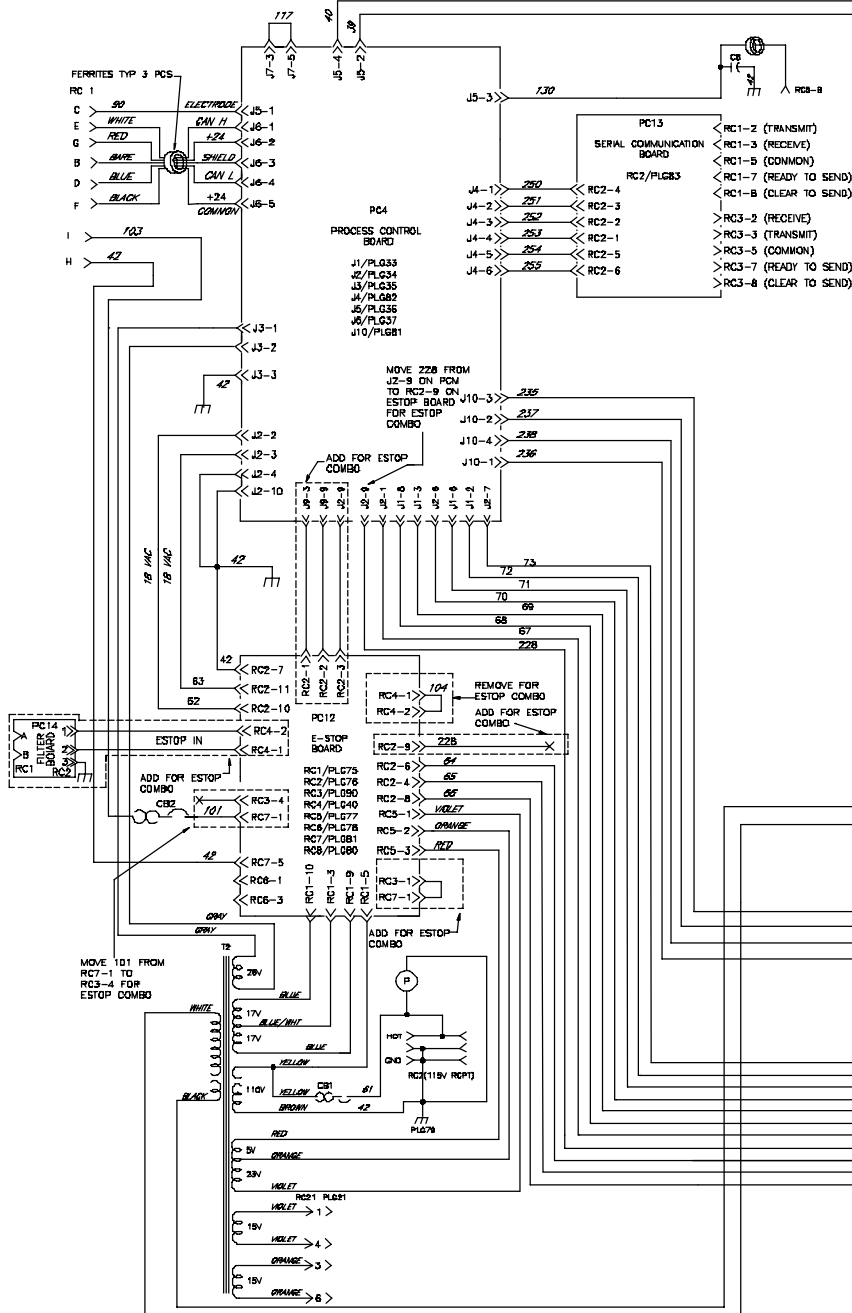
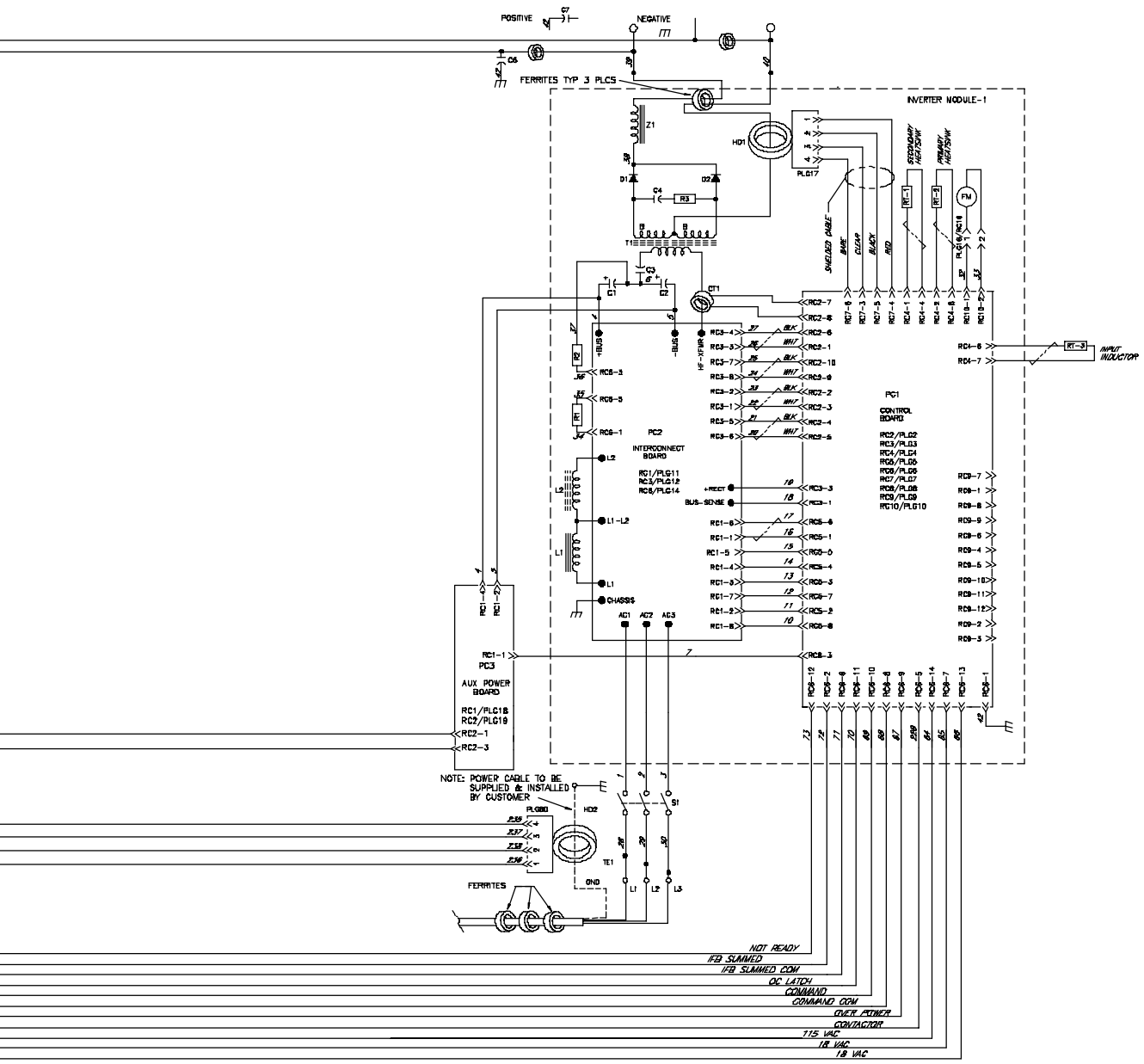


Figure 9-1. Circuit Diagram For Welding Power Source


**⚠ 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 10 – PARTS LIST

 Hardware is common and not available unless listed.

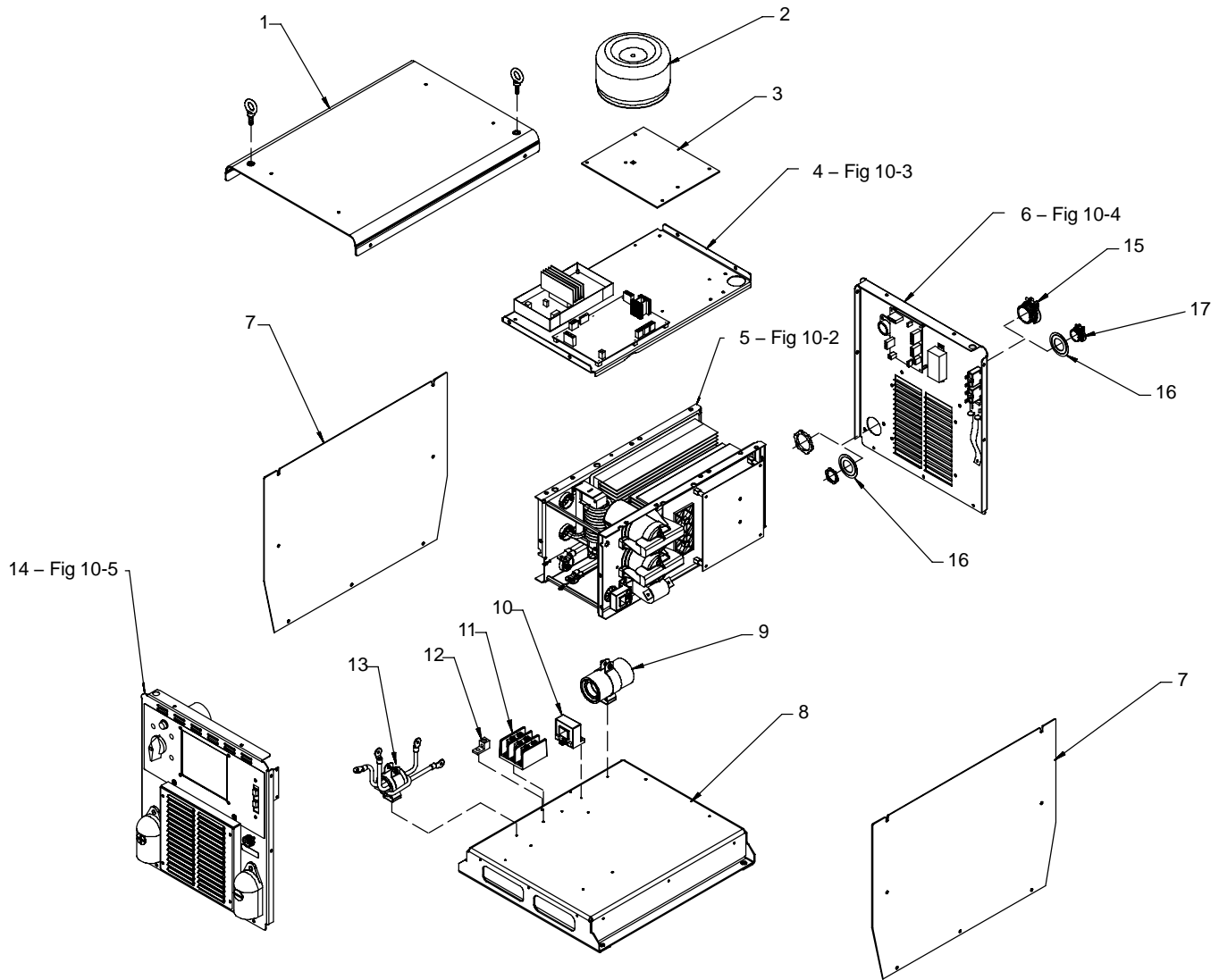


Figure 10-1. Main Assembly

804 659-A



Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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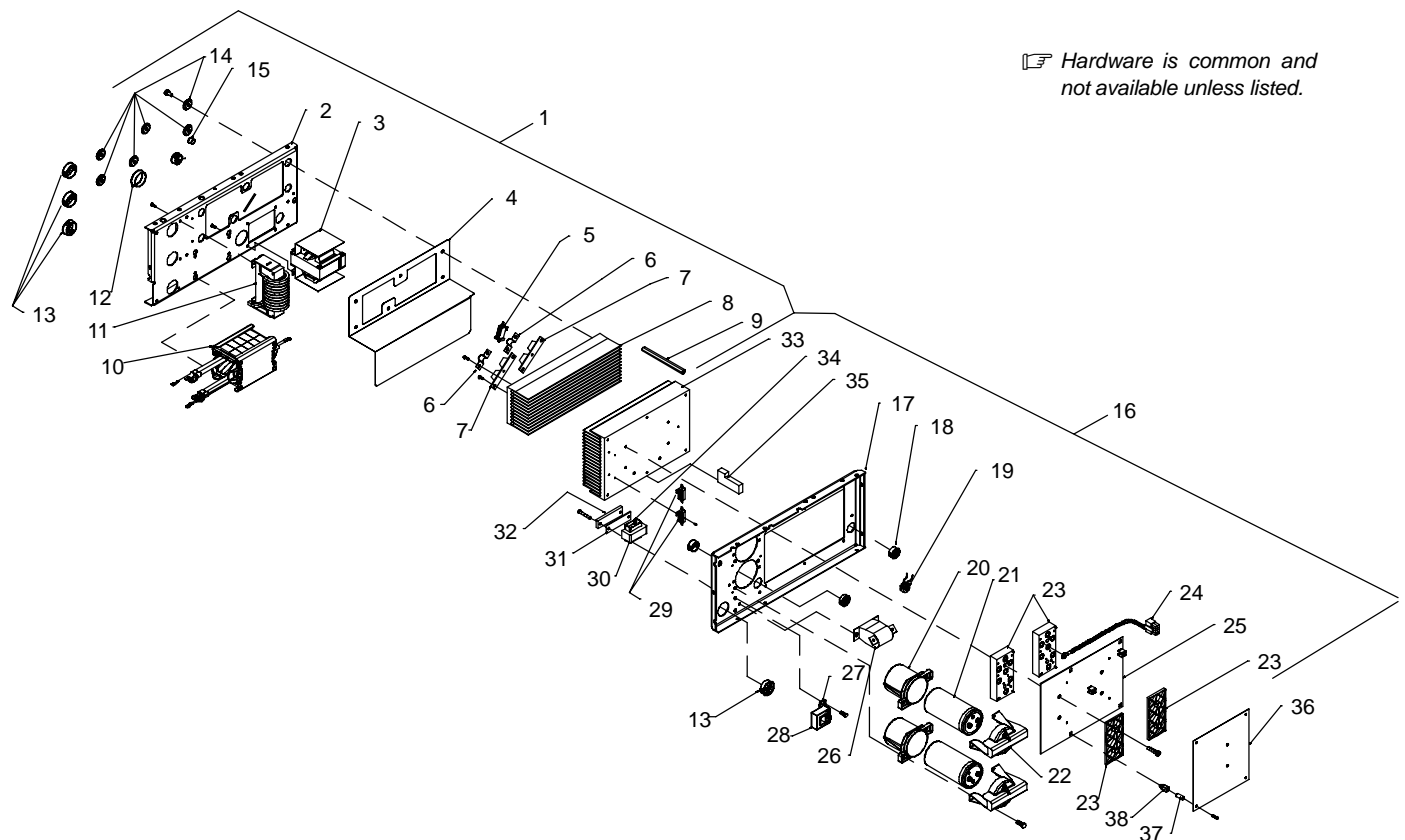
**Figure 10-1. Main Assembly**

...	1	...	210492	...	Cover, Top	...	1
...	2	T2	212543	...	Xfmr, Control Toroidal 665 VAC Pri 1900 VA 60 Hz	...	1
...	3		210481	...	Plate, Mtg Toroid Xfmr	...	1
...	4		Fig 10-3	...	Top Tray Assembly	...	1
...	5	IM-1	214597	...	Windtunnel, LH w/Components (Fig 10-2)	...	1
...		IM-1	222958	...	Windtunnel, RH w/Components (Fig 10-2)	...	1
...	6		Fig 10-4	...	Rear Panel Assembly	...	1
...	7		227792	...	Panel, Side W/Insulator	...	2
...	8		210482	...	Base	...	1
...	9		213386	...	Assembly, Filter (Primary)	...	1
...	10	HD2	182918	...	Transducer, Current 400A Module Supply V +/- 15V	...	1
...	11		198951	...	Block, Terminal 3 Pole	...	1
...	12		148025	...	Lug, Univ W/SCR 600V 2/0-6 Wire .266 Stud	...	1
...	13		213372	...	Filter Assy, Secondary	...	1
...	14		Fig 10-5	...	Front Panel Assembly	...	1
...			227855	...	Kit, Connectors W/Washer For Power Cables (Includes)	...	1
...	15		010467	...	Connector, Clamp Cable 1.250	...	1
...	16		225840	...	Washer, Reducer 1.25 in - 0.75 in	...	2
...	17		010916	...	Connector, Clamp Cable 0.750	...	1

\*Recommended Spare Parts.

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**



**Figure 10-2. Windtunnel Assembly LH And RH**

802 955-A

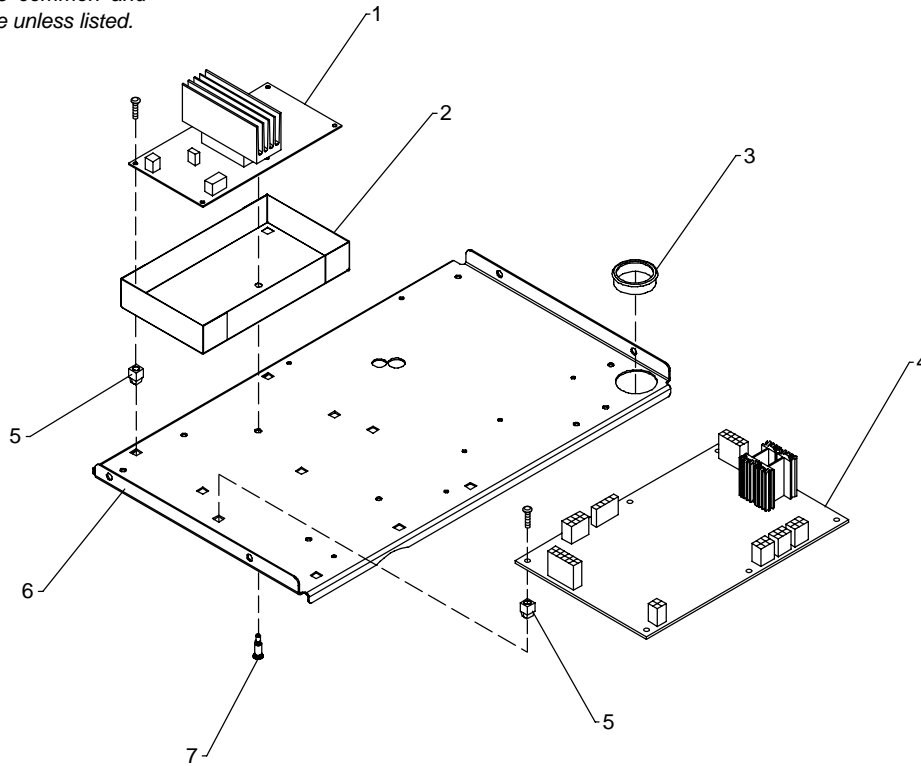
Item No.	Dia. Mkgs.	Part No.	Description	Quantity
<b>Figure 10-2. Windtunnel Assembly LH And RH (Fig 10-1 Item 6)</b>				
1		214597	Windtunnel, LH w/Components (including)	1
2		196351	Windtunnel, LH	1
3	L1	213940	Inductor, Input	1
4		214519	Insulator, Heat Sink Rectifier	1
5	R3, C4	196518	Resistor/Capacitor	1
6		199840	Bus Bar, Diode	2
7	D1, D2	201531	Kit, Diode Power Module	2
8		196347	Heat Sink, Rectifier	1
9		196349	Spacer, Windtunnel	3
10	T1	203408	Xfmr, HF Litz/Litz	1
11	Z1	220496	Output Inductor Assy	1
12		170647	Bushing, Snap-in Nyl 1.312 Id X 1.500 Mtg Hole	2
13		179276	Bushing, Snap-in Nyl 1.000 Id X 1.375 Mtg Hole Cent	4
14		196355	Insulator, Screw	6
15		010546	Bushing, Snap-in Nyl .375 Id X .500 Mtg Hole	1
16		222958	Windtunnel, RH w/Components (including)	1
17		196332	Windtunnel, RH	1
18		153403	Bushing, Snap-in Nyl .750 Id X 1.000 Mtg Hole Cent	2
19		196259	Plugs, w/Leads & Current Xfmr (including)	1
		115092	Housing, Plug & Skts	1
		115091	Housing, Plug & Skts	1
	CT1	196231	Xfmr, Current Sensing 200/1	1
20		201695	Clamp, Capacitor (Bottom)	2
21	C1, C2	226081	Capacitor, Elctlt 2400 Uf 500 Vdc Can 2.50 Dia	2
22		210507	Clamp, Capacitor (Top) Machined	2
23		217625	Kit, Input/Pre-regulator And Inverter Module	2
24	RT1, RT2	214015	Thermistor, NTC 30K Ohm @ 25 Deg C 7&18in Lead	1
25	PC2	222661	Circuit Card Assy, Power Interconnect	1
26	C3	196143	Capacitor, Polyp Met Film 16. Uf 400 VAC 10%	1
27		196378	Bracket, Mtg Current Xfmr	1
28	HD1	182918	Transducer, Current 400A Module Supply V +/- 15v	1
		196384	Cable, Transducer 20in	1
29	R1, R2	196343	Resistors, W/Leads & Plug	1
		196840	Insulator, Resistors/Interface Board	1
30		109056	Core, Ferrite E 2.164 Lg X 1.094 High X .826 Wide	1
31		196514	Gasket, Inductor Mounting	2
32		196512	Bracket, Inductor Mounting	2
33		196330	Heat Sink, Power Module	1
34	L2	196345	Coil, Inductor (Pre-regulator)	1
35		196588	Baffle, Foam Rubber (Lower)	1
		196365	Plugs, w/Leads (Fan)	1
		199136	Plugs, w/Leads (PC2 To PC1)	1
36	PC1	216192	Circuit Card Assy, Control (Inverter 400A)	1
37		204846	Insulator, Screw	4
38		083147	Grommet, Scr No 8/10 Panel Hole .312 Sq .500 High	4

\*Recommended Spare Parts.

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

☞ Hardware is common and not available unless listed.



803 422-B

**Figure 10-3. Top Tray Assembly**

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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**Figure 10-3. Top Tray Assembly (Fig 10-1 Item 4)**

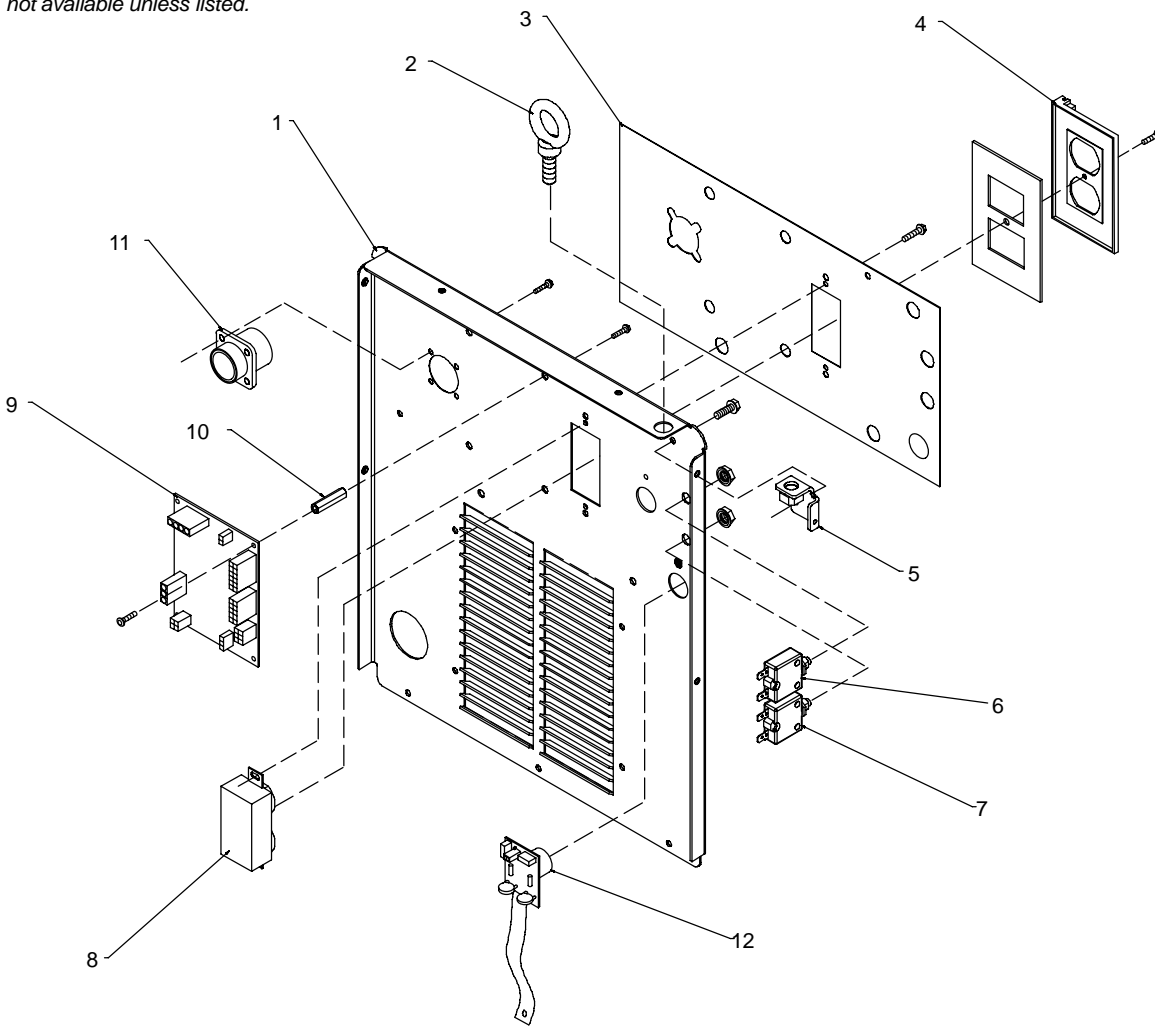
...	1	PC3	221606	Circuit Card Assy, Aux Power	1
...	2		223439	Insulator, circuit card (Aux Power)	1
...	3		170647	Bushing, Snap-in Nyl 1.312 Id X 1.500 Mtg Hole	1
...	4	PC4	221277	Process Control Module	1
...	5		083147	Grommet, SCR No 8/10 Panel Hole .312 Sq .500 High	8
...	6		210491	Panel, Mtg Components Top	1
...	7		198122	Stand-Off Support, PC Card .250 w/Post&Lock .500	1

\*Recommended Spare Parts.

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

☞ Hardware is common and not available unless listed.



804 660-A

**Figure 10-4. Rear Panel Assembly**

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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**Figure 10-4. Rear Panel Assembly (Fig 10-1 Item 8)**

...	1	210478	Panel, Rear	1
...	2	210358	Eye Bolt	1
...	3	210503	Nameplate, Rear	1
...	4	217297	Cover, Receptacle Weatherproof Duplex Rcpt	1
...	5	210483	Bracket, lift eye	1
...	6	CB1	083432 Supplementary Protector, Man Reset 1P 10A 250VAC Frict	1
...	7	CB2	093995 Supplementary Protector, Man Reset 1P 15A 250VAC Frict	1
...	8	RC2	196814 Receptacle, w/Leads (115V Duplex)	1
...	9	PC12	209676 Circuit Card Assy, E-Stop	1
...	10	115440	Stand-off, no 6-32 x .687 lg .250 hex al fem	4
...	11	212764	Plug Assy, Rear	1
...	12	◆300007	E-Stop Connector	1

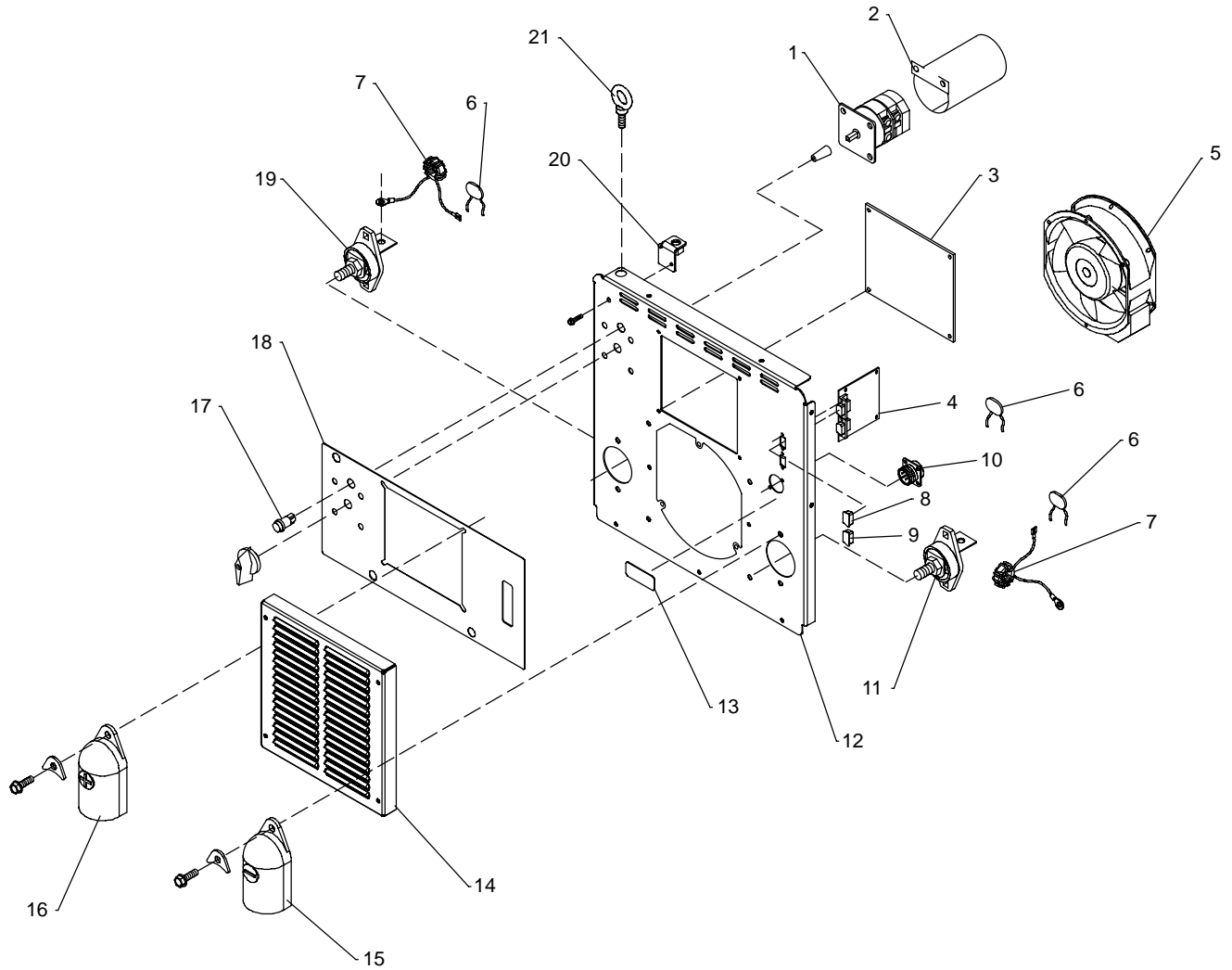
\*Recommended Spare Parts.

◆OPTIONAL

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

☐ Hardware is common and not available unless listed.



**Figure 10-5. Front Panel Assembly**

803 673-A

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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**Figure 10-5. Front Panel Assembly (Fig 10-1 Item 14)**

...	1	S1	207456	Switch, Rotary 2 Posn 1P 40A 600VAC PNLMTG 90Deg	1
...	2		207895	Insulator,Switch Power	1
...	3		211475	Plate, front panel	1
...	4	PC13	208071	Circuit Card Assy,ISO/COMM	1
...	5	FM	196313	Fan, Muffin 115V 50/60 Hz 3000 Rpm 6.378 Mtg Holes	1
...	6	C6, C7, C8	206878	Capacitor Assy	3
...	7		213102	Choke, Common Mode w/Leads	2
...	8		216965	Cover, Connector D-sub 9 skt Female w/Chain	1
...	9		216966	Cover, Connector D-sub 9 pin Male w/Chain	1
...	10	RC5	214664	Receptacle, Common Mode Choke	1
...	11		210866	Terminal, Pwr Output Black	1
...	12		210476	Panel, Front	1
...	13		215467	Label, Volt Sense	1

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
----------	------------	----------	-------------	----------

**Figure 10-5. Front Panel Assembly (Continued)**

... 14		207979	Box, Louver	1
... 15		180732	Boot, Negative Output Stud	1
... 16		179848	Boot, Positive Output Stud	1
... 17	PL1	163562	Light, ind white lens	1
... 18		212777	Nameplate, Front	1
... 19		210865	Terminal, Pwr Output Red	1
... 20		210483	Bracket, lift eye	1
... 21		210358	Bolt, eye shld thd stem .500-13 X 1.500	1

\*Recommended Spare Parts.

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

# TRUE BLUE<sup>®</sup>

## WARRANTY

Effective January 1, 2006

(Equipment with a serial number preface of "LG" 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. Co., Appleton, Wisconsin, warrants to its original retail purchaser 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.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to a North American distributor or eighteen months after the equipment is sent to an International distributor.

- 5 Years Parts — 3 Years Labor
  - \* Original main power rectifiers
- 3 Years — Parts and Labor
  - \* Transformer/Rectifier Power Sources
  - \* Plasma Arc Cutting Power Sources
  - \* Process Controllers
  - \* Semi-Automatic and Automatic Wire Feeders
  - \* Inverter Power Sources (Unless Otherwise Stated)
  - \* Water Coolant Systems (Integrated)
  - \* Intelligig
  - \* Engine Driven Welding Generators  
**(NOTE: Engines are warranted separately by the engine manufacturer.)**
- 1 Year — Parts and Labor Unless Specified
  - \* Motor Driven Guns (w/exception of Spoolmate Spoolguns)
  - \* Positioners and Controllers
  - \* Automatic Motion Devices
  - \* RFCS Foot Controls
  - \* Induction Heating Power Sources, Coolers, and Electronic Controls/Recorders
  - \* Water Coolant Systems (Non-Integrated)
  - \* Flowgauge and Flowmeter Regulators (No Labor)
  - \* HF Units
  - \* Grids
  - \* Spot Welders
  - \* Load Banks
  - \* Arc Stud Power Sources & Arc Stud Guns
  - \* Racks
  - \* Running Gear/Trailers
  - \* Plasma Cutting Torches (except APT & SAF Models)
  - \* Field Options  
(NOTE: Field options are covered under True Blue<sup>®</sup> for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
  - \* Bernard-Branded Mig Guns (No Labor)
  - \* Weldcraft-Branded TIG Torches (No Labor)
  - \* Subarc Wire Drive Assemblies
- 6 Months — Batteries
- 90 Days — Parts
  - \* MIG Guns/TIG Torches and Subarc (SAW) Guns

- \* Induction Heating Coils and Blankets, Cables, and Non-Electronic Controls
- \* APT & SAF Model Plasma Cutting Torches
- \* Remote Controls
- \* Accessory (Kits)
- \* Replacement Parts (No labor)
- \* Spoolmate Spoolguns
- \* Canvas Covers

Miller's True Blue<sup>®</sup> Limited Warranty shall not apply to:

- Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear. (Exception: brushes, slip rings, and relays are covered on Bobcat, Trailblazer, and Legend models.)**
- 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.
- 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.

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

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable 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 actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.

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### 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?  
Contact your distributor.  
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 Safety Equipment

Service and Repair

Replacement Parts

Training (Schools, Videos, Books)

Technical Manuals (Servicing Information and Parts)

Circuit Diagrams

Welding Process Handbooks

To locate a Distributor or Service Agency visit [www.millerwelds.com](http://www.millerwelds.com) or call 1-800-4-A-Miller

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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