



OM-2230

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August 2000

### Processes



Stick (SMAW) Welding



Air Plasma Cutting  
and Gouging

Air Carbon Arc (CAC-A)  
Cutting and Gouging



Submerged (SAW) Welding

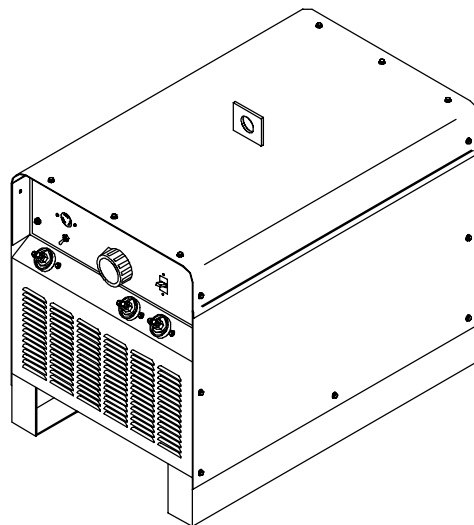
### Description



Arc Welding Power Source



# SRH-333 And SRH-444



# OWNER'S MANUAL



Visit our website at  
[www.MillerWelds.com](http://www.MillerWelds.com)

# From Miller to You

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

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



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

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

made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide which 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 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 catalog sheets. **To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at [www.MillerWelds.com](http://www.MillerWelds.com) on the web.**



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

*Miller offers a Technical Manual which provides more detailed service and parts information for your unit. To obtain a Technical Manual, contact your local distributor. Your distributor can also supply you with Welding Process Manuals such as SMAW, GTAW, GMAW, and GMAW-P.*



# TABLE OF CONTENTS

The following terms are used interchangeably throughout this manual:  
MIG = GMAW

## **WARNING**

This product, when used for welding or cutting, 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.)

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# Declaration of Conformity For European Community (CE) Products

**NOTE** 

*This information is provided for units with CE certification (see rating label on unit.)*

*Manufacturer's Name:* **Miller Electric Mfg. Co.**

*Manufacturer's Address:* 1635 W. Spencer Street  
Appleton, WI 54914 USA

*Declares that the product:* **SRH 444**

*conforms to the following Directives and Standards:*

#### **Directives**

*Electromagnetic Compatibility Directives: 89/336/EEC, 92/31/EEC*

*Low Voltage Directive: 73/23/EEC*

*Machinery Directives: 89/392/EEC, 91/368/EEC, 93/C 133/04, 93/68/EEC*

#### **Standards**

*Safety Requirements for Arc Welding Equipment Part 1: EN 60974-1: 1990*

*Arc Welding Equipment Part 1: Welding Power Sources: IEC 974-1  
(April 1995 – Draft revision)*

*Degrees of Protection provided by Enclosures (IP code): IEC 529: 1989*

*Insulation coordination for equipment within low-voltage systems:  
Part 1: Principles, requirements and tests: IEC 664-1: 1992*

*Electromagnetic compatibility (EMC) Product standard for arc welding equipment:  
EN50199: August 1995*

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# SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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## 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 1-4. 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

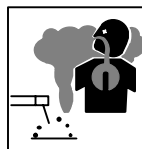
live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- 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.
- 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.
- 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 after removal of input power on inverters.

- 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 exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read 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 if necessary, 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.

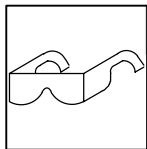
- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash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

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



### 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.



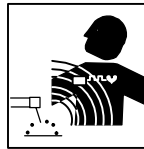
### BUILDUP OF GAS can injure or kill.

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



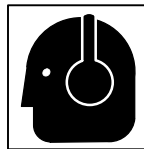
### HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on gun or torch.



### MAGNETIC FIELDS can affect pacemakers.

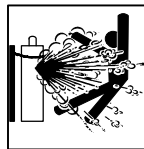
- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.



### 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, 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.
- Read and follow instructions on compressed gas cylinders, associated equipment, and 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.



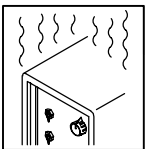
### MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.



### 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.



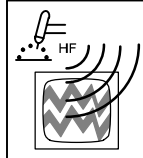
### MOVING PARTS can cause injury.

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



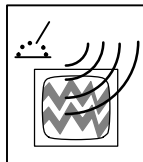
### WELDING WIRE can cause injury.

- 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.



### 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. Principal Safety Standards

*Safety in Welding and Cutting*, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

*Safety and Health Standards*, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

*Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances*, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

*National Electrical Code*, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

*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.

*Safe Practices For Occupation And Educational Eye And Face Protection*, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

*Cutting And Welding Processes*, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

## 1-5. 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 first. If cleared by your doctor, then following the above procedures is recommended.



# SECTION 1 – CONSIGNES DE SECURITE – LIRE AVANT UTILISATION

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## 1-1. Signification des symboles



Signifie Mise en garde ! Soyez vigilant ! Cette procédure présente des risques de danger ! Ceux-ci sont identifiés par des symboles adjacents aux directives.

### ▲ Identifie un message de sécurité particulier.

Signifie NOTA ; n'est pas relatif à la sécurité.



Ce groupe de symboles signifie Mise en garde ! Soyez vigilant ! Il y a des risques de danger reliés aux CHOCS ÉLECTRIQUES, aux PIÈCES EN MOUVEMENT et aux PIÈCES CHAUDES. Reportez-vous aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout danger.

## 1-2. Dangers relatifs au soudage à l'arc

▲ Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous voyez un symbole, soyez vigilant et suivez les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les normes de sécurité énumérées à la section 1-4. Veuillez lire et respecter toutes ces normes de sécurité.

▲ L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.

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



### UN CHOC ÉLECTRIQUE peut tuer.

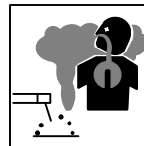
Un simple contact avec des pièces électriques peut provoquer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension dès que l'appareil est sur ON. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension à ce moment-là. En soudage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

- Ne jamais toucher les pièces électriques sous tension.
- Porter des gants et des vêtements de protection secs ne comportant pas de trous.
- S'isoler de la pièce et de la terre au moyen de tapis ou d'autres moyens isolants suffisamment grands pour empêcher le contact physique éventuel avec la pièce ou la terre.
- Ne pas 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.
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Déverrouiller l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir normes de sécurité).
- Installer et mettre à la terre correctement cet appareil conformément à son manuel d'utilisation et aux codes nationaux, provinciaux et municipaux.
- Toujours vérifier la terre du cordon d'alimentation – Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d'entrée fixer d'abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Vérifier fréquemment le cordon d'alimentation pour voir s'il n'est pas endommagé ou dénudé – remplacer le cordon immédiatement s'il est endommagé – un câble dénudé peut provoquer une électrocution.
- Mettre l'appareil hors tension quand on ne l'utilise pas.
- 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.

- 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 quand on travaille en hauteur.
- Maintenir solidement en place tous les panneaux et capots.
- Fixer le câble de retour de façon à obtenir un bon contact métal-métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.

## Il y a DU COURANT CONTINU IMPORTANT dans les convertisseurs après la suppression de l'alimentation électrique.

- 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 votre santé.

- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- A l'intérieur, ventiler la zone et/ou utiliser un échappement au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage.
- Si la ventilation est insuffisante, utiliser un respirateur à alimentation d'air homologué.
- Lire les spécifications de sécurité des matériaux (MSDSs) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraissages.
- 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 si nécessaire, 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 DE L'ARC peuvent provoquer des brûlures dans les yeux et sur la peau.

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

- Porter un casque de soudage muni d'un écran de filtre approprié pour protéger votre visage et vos yeux pendant le soudage ou pour regarder (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des protections approuvés pour les oreilles si le niveau sonore est trop élevé.
- Utiliser des écrans ou des barrières pour protéger des tiers de l'éclair et de l'éblouissement; demander aux autres personnes de ne pas regarder l'arc.
- Porter des vêtements de protection constitué dans une matière durable, résistant au feu (cuir ou laine) et une protection des pieds.



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

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

- Se protéger et d'autres personnes de la projection d'étincelles et de métal chaud.
- Ne pas souder dans un endroit là où des étincelles peuvent tomber sur des substances inflammables.
- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité les recouvrir soigneusement avec des protections homologués.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- Ne pas 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 sur la pièce le plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porte-électrode ou couper le fil à la pointe de contact.
- Porter des vêtements de protection dépourvus d'huile tels que des gants en cuir, une chemise en matériau lourd, des pantalons sans revers, des chaussures hautes et un couvre chef.
- Avant de souder, retirer toute substance combustible de vos poches telles qu'un allumeur au butane ou des allumettes.



## 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.



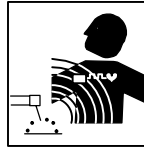
## LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.

- 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.



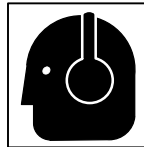
## DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.

- Ne pas toucher des parties chaudes à mains nues
- Prévoir une période de refroidissement avant d'utiliser le pistolet ou la torche.



## LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

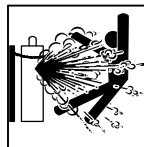
- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.



## LE BRUIT peut affecter l'ouïe.

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

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



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

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, 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.
- Ne pas tenir la tête en face de la sortie en ouvrant la soupape de la bouteille.
- Maintenir le chapeau de protection sur la soupape, sauf en cas d'utilisation ou de branchement de la bouteille.
- Lire et suivre les instructions concernant les bouteilles de gaz comprimé, les équipements associés et les publications P-1 CGA énumérées dans les normes de sécurité.

## 1-3. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance



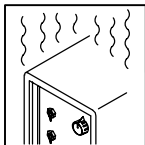
### Risque D'INCENDIE OU D'EXPLOSION.

- 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.



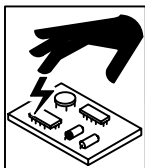
### LA CHUTE DE L'APPAREIL peut blesser.

- Utiliser l'anneau de levage uniquement pour soulever l'appareil, NON PAS les chariot, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un engin d'une capacité appropriée pour soulever 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.



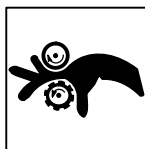
### L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- Prévoir une période de refroidissement, respecter le cycle opératoire nominal.
- Réduire le courant ou le cycle opératoire avant de recommencer le soudage.
- Ne pas obstruer les passages d'air du poste.



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

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



### 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.



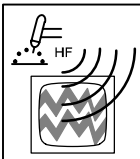
### LES FILS DE SOUDAGE peuvent provoquer des blessures.

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



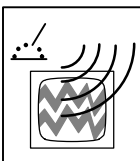
### DES ORGANES MOBILES peuvent provoquer des blessures.

- Rester à l'écart des organes mobiles comme le ventilateur.
- Maintenir fermés et fixement en place les portes, panneaux, recouvrements et dispositifs de protection.



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

- Le rayonnement haute fréquence peut provoquer des interférences avec les équipements de radio-navigation et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.
- Si le FCC signale des interférences, arrêter immédiatement l'appareil.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et un blindage pour réduire les interférences éventuelles.



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

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



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

- Porteurs de stimulateur cardiaque, restez 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.

## 1-4. Principales normes de sécurité

*Safety in Welding and Cutting*, norme ANSI Z49.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

*Safety and Health Standards*, OSHA 29 CFR 1910, du Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

*Recommended Safe Practice for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances*, norme AWS F4.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

*National Electrical Code*, NFPA Standard 70, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1, de la Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

*Règles de sécurité en soudage, coupage et procédés connexes*, norme CSA W117.2, de l'Association canadienne de normalisation, vente de normes, 178 Rexdale Boulevard, Rexdale (Ontario) Canada M9W 1R3.

*Safe Practices For Occupation And Educational Eye And Face Protection*, norme ANSI Z87.1, de l'American National Standards Institute, 1430 Broadway, New York, NY 10018.

*Cutting and Welding Processes*, norme NFPA 51B, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

## 1-5. Information sur les champs électromagnétiques

Données sur le soudage électrique et sur les effets, pour l'organisme, des champs magnétiques basse fréquence

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.

Afin de réduire les champs électromagnétiques dans l'environnement de travail, respecter les consignes suivantes :

- 1 Garder les câbles ensemble en les torsadant ou en les attachant avec du ruban adhésif.
- 2 Mettre tous les câbles du côté opposé 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 Relier la pince de masse le plus près possible de la zone de soudure.

### Consignes relatives aux stimulateurs cardiaques :

Les personnes qui portent un stimulateur cardiaque doivent avant tout consulter leur docteur. Si vous êtes déclaré apte par votre docteur, il est alors recommandé de respecter les consignes ci-dessus.

# SECTION 2 – DEFINITIONS

## 2-1. General Precautionary Label

1/96

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

- 1 Electric shock from welding electrode or wiring can kill.
- 1.1 Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves.
- 1.2 Protect yourself from electric shock by insulating yourself from work and ground.
- 1.3 Disconnect input plug or power before working on machine.
- 2 Breathing welding fumes can be hazardous to your health.
- 2.1 Keep your head out of the fumes.
- 2.2 Use forced ventilation or local exhaust to remove the fumes.
- 2.3 Use ventilating fan to remove fumes.
- 3 Welding sparks can cause explosion or fire.
- 3.1 Keep flammables away from welding. Do not weld near flammables.
- 3.2 Welding sparks can cause fires. Have a fire extinguisher nearby, and have a watchperson ready to use it.
- 3.3 Do not weld on drums or any closed containers.
- 4 Arc rays can burn eyes and injure skin.
- 4.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.
- 5 Become trained and read the instructions before working on the machine or welding.
- 6 Do not remove or paint over (cover) the label.

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## 2-2. Input Connection Label

1/96

- Warning! Watch Out! There are possible hazards as shown by the symbols.
- Electric shock from wiring can kill.
- Disconnect input plug or power before working on machine.
- Read the Owner's Manual before working on this machine.
- Consult rating label for input power requirements, and check power available at the job site – they must match.
- Read Owner's Manual and inside labels for connection points and procedures.
- Move jumper links as shown on inside label to match voltage at job site.
- Having a loop of extra length, connect grounding conductor first.
- Connect line input conductors as shown on inside label – double-check all connections, jumper link positions, and input voltage before applying power.

## 2-3. Electric Shock And Airflow Label

- Warning! Watch Out! There are possible hazards as shown by the symbols.
- Electric shock from wiring and exposed weld terminals can kill.
- Close door before turning on unit.

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## 2-4. Nameplate Safety Symbols

- Warning! Watch Out! There are possible hazards as shown by the symbols.
- Electric shock from welding electrode or wiring can kill.
- Sparks from arcing electrode can cause explosion or fire – disconnect cable for process not in use.
- Read Owner's Manual for connection procedures.
- Electric shock from wiring can kill.
- Disconnect input power before working on unit or making terminal strip connections.

Nameplate D-179 389

## 2-5. Manufacturer's Rating Labels For CE Products

		EN 60974-1			
	---	45A/12V		500A/30V	
		X	35%	60%	100%
<b>S</b>	$U_0 = 75V$	$I_2$	500A	400A	310A
		$U_2$	30V	26V	22V
	---	45A/22V		500A/40V	
		X	35%	60%	100%
<b>S</b>	$U_0 = 75V$	$I_2$	500A	400A	310A
		$U_2$	40V	36V	32V
	$U_1$	V	$I_1$	A	
	220V		103A	84A	65A
	380V		60A	48A	37A
	440V		51A	42A	33A
	50 Hz	$S_1$	39.2kVA	32kVA	24.8kVA
		IP23M			

Match label to one on unit. See Section 3-4.

200 176-B

## 2-6. Symbols And Definitions

**Note** Some symbols are found only on CE products.

<b>A</b>	Amperes		Voltage Control/Panel	<b>%</b>	Percent		Protective Earth (Ground)
	Output		Circuit Breaker		Remote	<b>I</b>	On
<b>A</b> 45-250A	A Negative (-) Weld Output Terminal (Low Range)	<b>A</b> 60-550A	B Negative (-) Weld Output Terminal (High Range)	<b>—</b>	Negative Weld Output Terminal		Input
<b>V</b>	Volts	<b>O</b>	Off	<b>S<sub>1</sub></b>	KVA	<b>===</b>	Direct Current
<b>U<sub>0</sub></b>	Rated No Load Voltage (Average)	<b>U<sub>1</sub></b>	Primary Voltage	<b>U<sub>2</sub></b>	Conventional Load Voltage		Line Connection
<b>I<sub>1</sub></b>	Primary Current	<b>I<sub>2</sub></b>	Rated Welding Current	<b>X</b>	Duty Cycle		Three-Phase Transformer Rectifier
<b>IP</b>	Degree Of Protection		Alternating Current				

# SECTION 3 – INSTALLATION

## 3-1. Specifications

Model	Rated Welding Output	Amp Range DC	Max OCV DC	IP Rating	Amperes Input at Rated Load Output, 50 or 60 Hz, Three-Phase							KVA	KW
					208 V	220 V	230 V	380 V	440 V	460 V	575 V		
300 Amp	300 A @ 32 Volts DC, 60% Duty Cycle	A (Low) 30 – 225 B (High) 40 – 375	75	23M	64 4.8*	—	58 4.3*	—	—	29 2.2*	—	23.1 1.7*	15 0.8*
400 Amp	400 A @ 36 Volts DC, 50 Or 60 Hz, 60% Duty Cycle	A (Low) 30 – 280 (45 – 250) B (High) 50 – 500 (60 – 500)	75	23M	89 5.8*	84 5.5*	80 5.3*	48 3.2*	42 2.7*	40 2.6*	32 2.1*	31.9 (32) 2.1*	19.6 (19.4) 0.8*

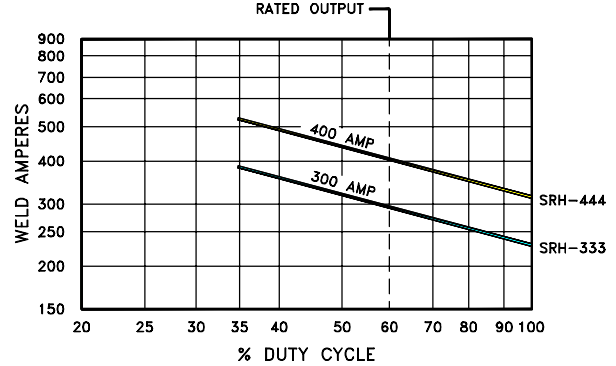
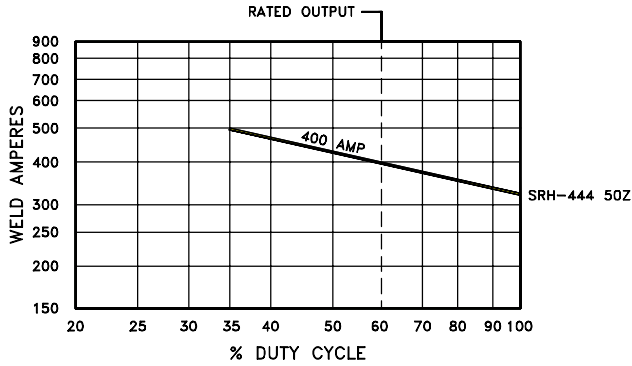
\*While idling  
( ) Indicates specification differences for CE models

## 3-2. Duty Cycle And Overheating

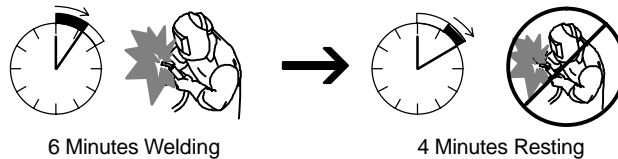


Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

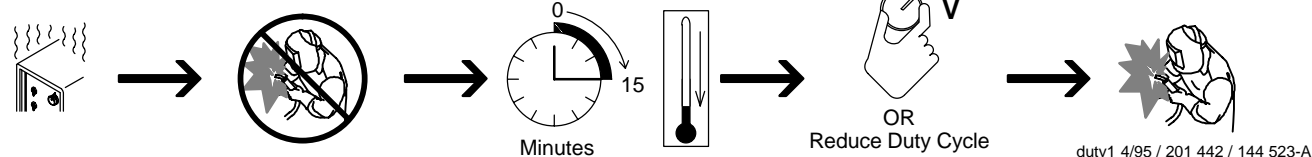
▲ Exceeding duty cycle can damage unit and void warranty.



60% Duty Cycle At 300 Amperes For 300 Ampere Models  
60% Duty Cycle At 400 Amperes For 400 Ampere Models



### Overheating

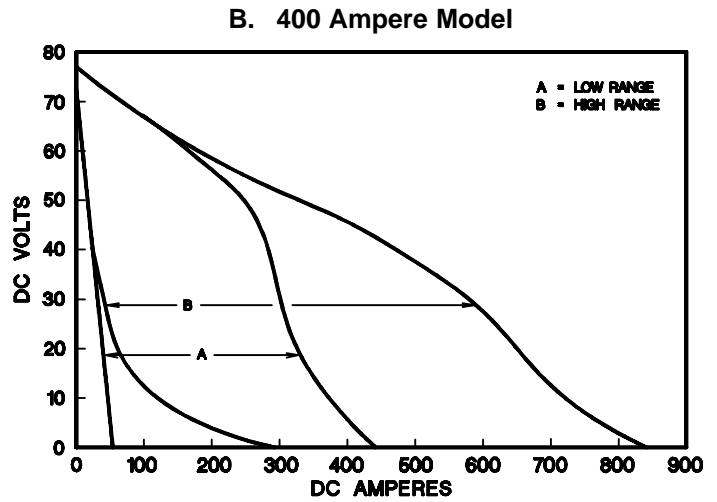
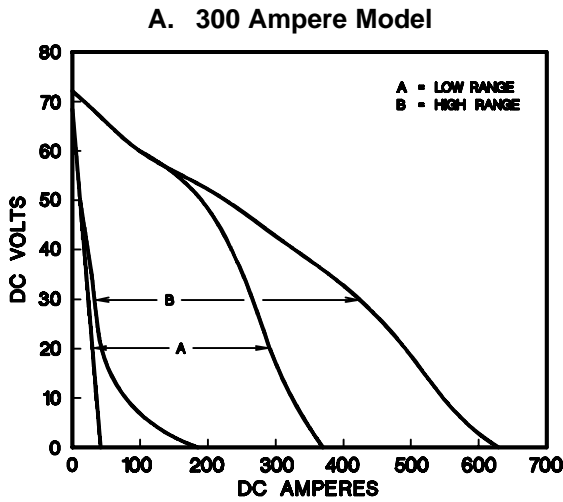


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### 3-3. Volt-Ampere Curves

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

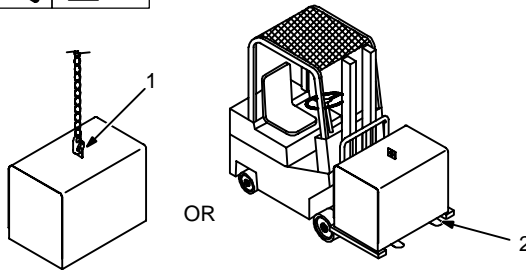


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### 3-4. Selecting A Location



#### Movement



- 1 Lifting Eye
- 2 Lifting Forks

Use lifting eye or lifting forks to move unit.

If using lifting forks, extend forks beyond opposite side of unit.

- 3 Rating Label (Non CE Models Only)

Use rating label to determine input power needs.

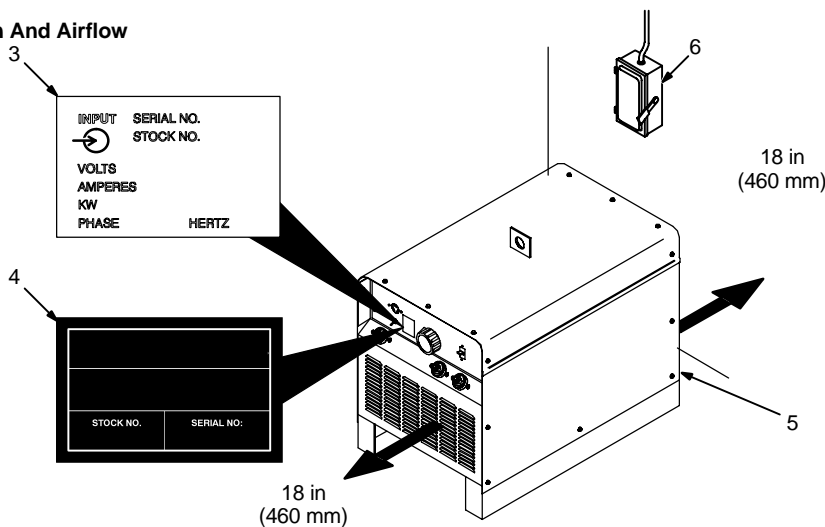
- 4 Plate Label (CE Models Only)
- 5 Rating Label (CE Models Only)

Use rating label to determine input power needs. Label located on rear access door (see Section 2-5).

- 6 Line Disconnect Device

Locate unit near correct input power supply.

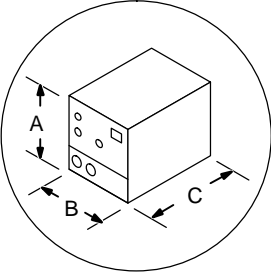
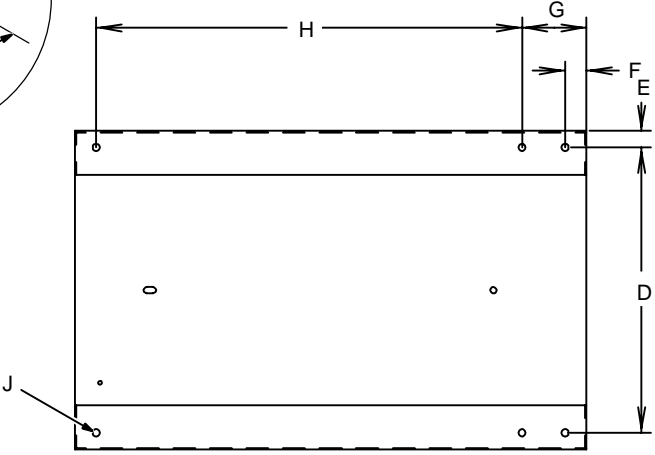
#### Location And Airflow



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

Ref. ST-800 402-A / ST-139 445-C


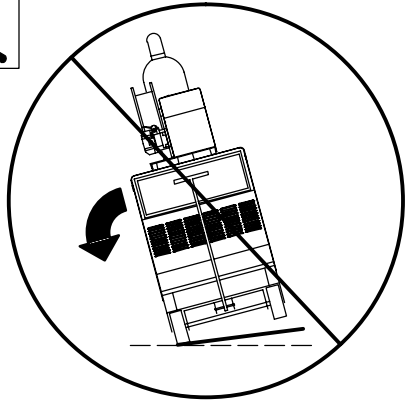
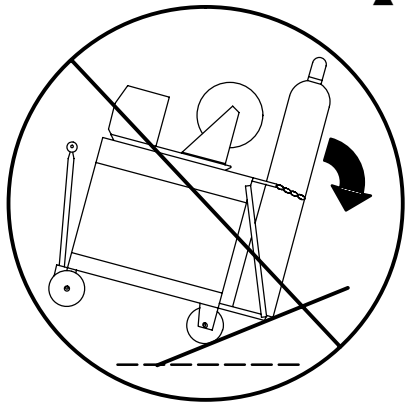
### 3-5. Dimensions And Weights

	Inches	Millimeters
A	30-1/4	768
B	22-1/2	571
C	35-3/4	908
D	20	508
E	1-1/4	32
F	1-1/2	38
G	4-1/2	114
H	29-3/4	755
J	1/2 Dia 6 Holes	13 Dia 6 Holes
<b>Weight</b>		
300 Amp	685 lb (311 Kg)	
400 Amp	755 lb (342 Kg)	

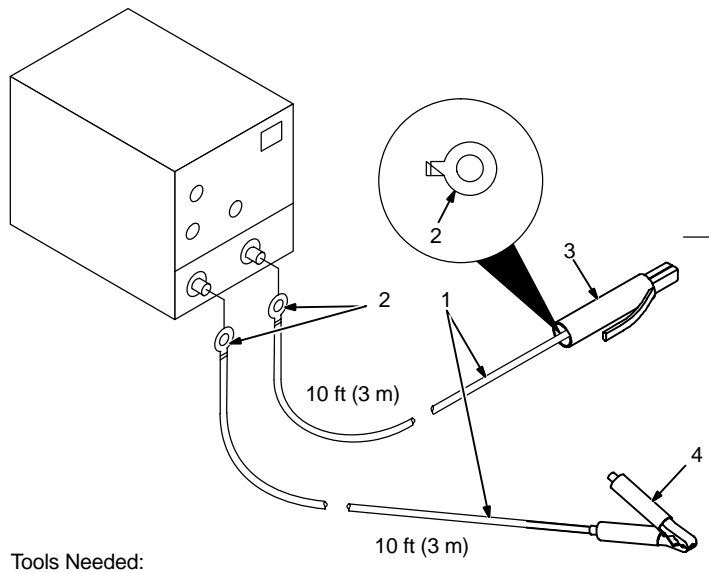
ST-800 039

### 3-6. Tipping

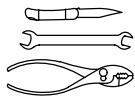




▲ Be careful when placing or moving unit over uneven surfaces.

### 3-7. Selecting And Preparing Weld Output Cables



Tools Needed:



For Example,  
Total Cable  
Length In Weld  
Circuit = 20 ft (6 m)

#### 1 Weld Output Cable

Determine total cable length in weld circuit and maximum welding amperes. See Section 3-8 to select proper cable size.

Use shortest cables possible.

Do not use damaged cables.

#### 2 Terminal Lug

Use lugs of proper amperage capacity and hole size for connecting to work clamp, electrode holder, and weld output terminals.

#### 3 Insulated Electrode Holder

Install according to manufacturer's instructions.

#### 4 Work Clamp


Install onto work cable.

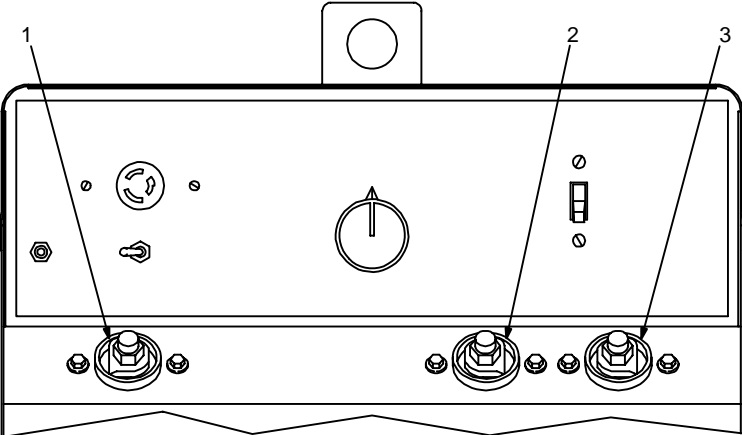
### 3-8. Weld Cable Sizes

Welding Amperes	Total Cable (Copper) Length In Weld Circuit Not Exceeding							
	100 ft (30 m) Or Less		150 ft (45 m)	200 ft (60 m)	250 ft (70 m)	300 ft (90 m)	350 ft (105 m)	400 ft (120 m)
	10 To 60% Duty Cycle	60 Thru 100% Duty Cycle	10 Thru 100% Duty Cycle					
100	4	4	4	3	2	1	1/0	1/0
150	3	3	2	1	1/0	2/0	3/0	3/0
200	3	2	1	1/0	2/0	3/0	4/0	4/0
250	2	1	1/0	2/0	3/0	4/0	2-2/0	2-2/0
300	1	1/0	2/0	3/0	4/0	2-2/0	2-3/0	2-3/0
350	1/0	2/0	3/0	4/0	2-2/0	2-3/0	2-3/0	2-4/0
400	1/0	2/0	3/0	4/0	2-2/0	2-3/0	2-4/0	2-4/0
500	2/0	3/0	4/0	2-2/0	2-3/0	2-4/0	3-3/0	3-3/0
600	3/0	4/0	2-2/0	2-3/0	2-4/0	3-3/0	3-4/0	3-4/0

\*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. Contact your distributor for the mm<sup>2</sup> equivalent weld cable sizes. S-0007-E

### 3-9. Connecting To Weld Output Terminals






- 1 Positive (+) Weld Output Terminal
- 2 A Negative (-) Weld Output Terminal (Low Range)
- 3 B Negative (-) Weld Output Terminal (High Range)


For DC Electrode Positive (DCEP), connect work cable to negative (-) terminal that supplies desired amperage range. Connect electrode holder cable to positive (+) terminal.

For DC Electrode Negative (DCEN), reverse cable connections.



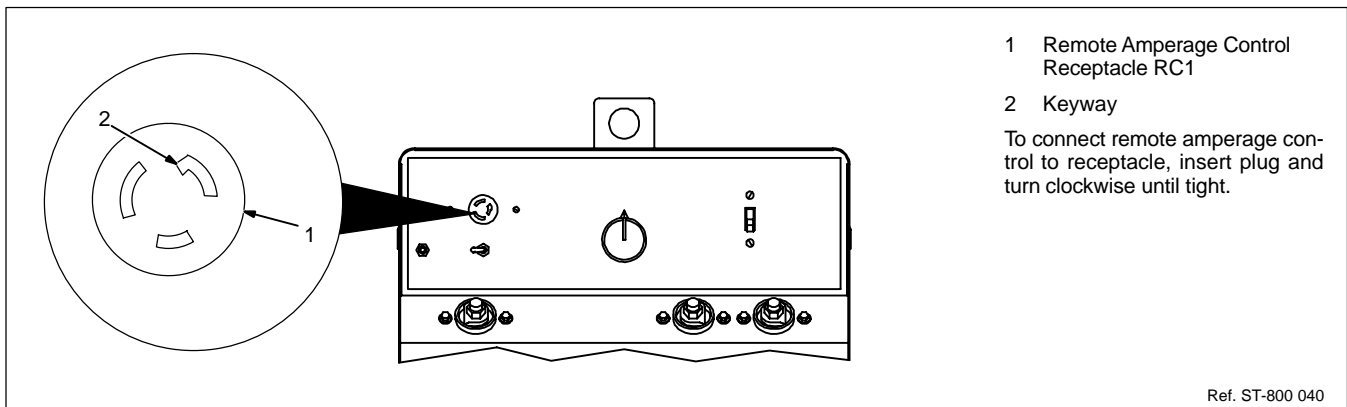
**Use ONLY one negative weld output terminal at a time.**

Tools Needed:

 3/4 in

Ref. ST-800 040

### 3-10. Remote Amperage Control Receptacle



### 3-11. Electrical Service Guide

60 Hertz Models	300 Amp Model			400 Amp Model			
Input Voltage	208	230	460	208	230	460	575
Input Amperes At Rated Output	64	58	29	89	80	40	32
Max Recommended Standard Fuse Rating In Amperes <sup>1</sup>							
Time-Delay <sup>2</sup>	80	70	35	110	100	50	40
Normal Operating <sup>3</sup>	100	90	45	125	125	60	50
Min Input Conductor Size In AWG/Kcmil	8	8	10	4	6	8	10
Max Recommended Input Conductor Length In Feet (Meters)	101 (31)	124 (38)	332 (101)	171 (52)	142 (43)	375 (114)	395 (120)
Min Grounding Conductor Size In AWG/Kcmil	8	8	10	6	6	10	10

Reference: 1999 National Electrical Code (NEC)

1 Consult factory for circuit breaker applications.

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).

50 Hertz Models	400 Amp Model		
Input Voltage	220	380	440
Input Amperes At Rated Output	84	48	42
Max Recommended Standard Fuse Rating In Amperes <sup>1</sup>			
Time-Delay <sup>2</sup>	100	60	50
Normal Operating <sup>3</sup>	125	70	60
Min Input Conductor Size In AWG/Kcmil	4	8	8
Max Recommended Input Conductor Length In Feet (Meters)	193 (59)	258 (79)	346 (105)
Min Grounding Conductor Size In AWG/Kcmil	6	8	10

Reference: 1999 National Electrical Code (NEC)

1 Consult factory for circuit breaker applications.

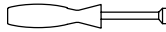
2 "Time-Delay" fuses are UL class "RK5" .

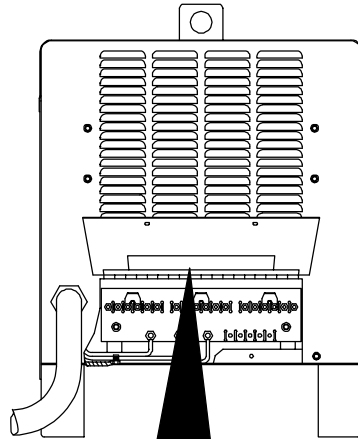
3 "Normal Operating" (general purpose – no intentional delay) fuses are UL class "K5" (up to and including 60 amp), and UL class "H" ( 65 amp and above).

### 3-12. Connecting Input Power



#### A. Placing Jumper Links

Tools Needed:  
 3/8 in



Jumper links allow operation on different input voltages and are factory set for the highest input voltage.

Check input voltage available at site.

Open rear panel access door to check jumper links.

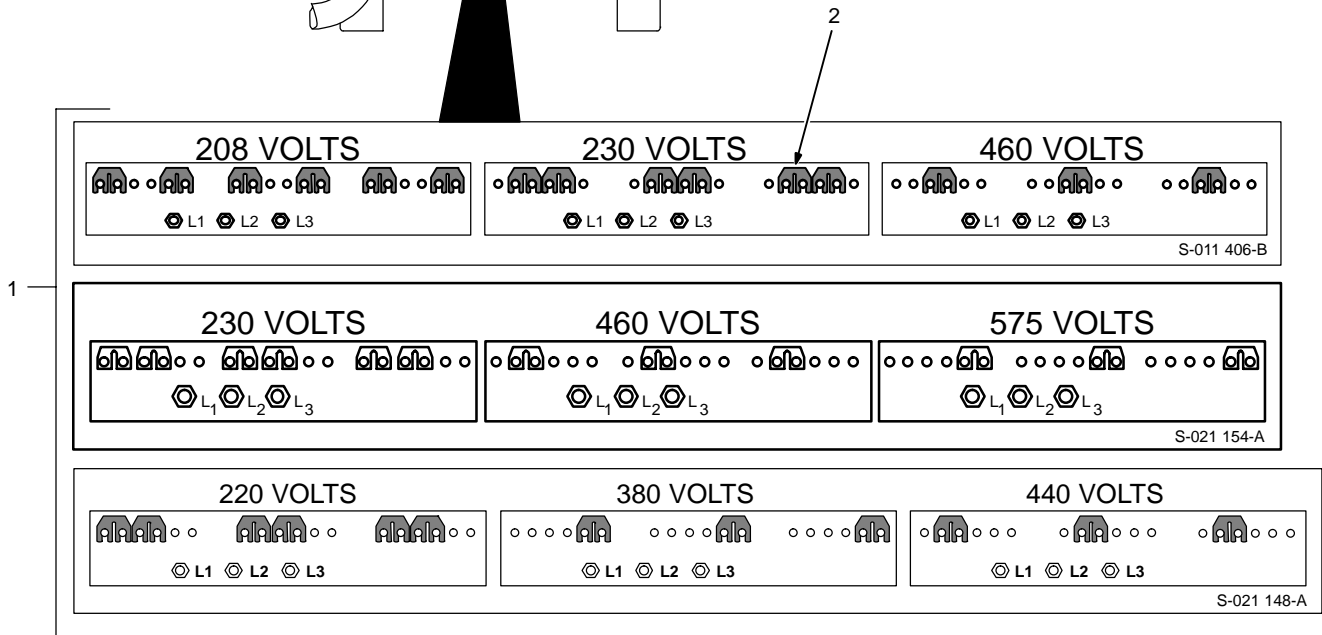
1 Input Voltage Label – Only One Is On Unit

Look at jumper links and compare link position with unit label.

2 Input Voltage Jumper Links

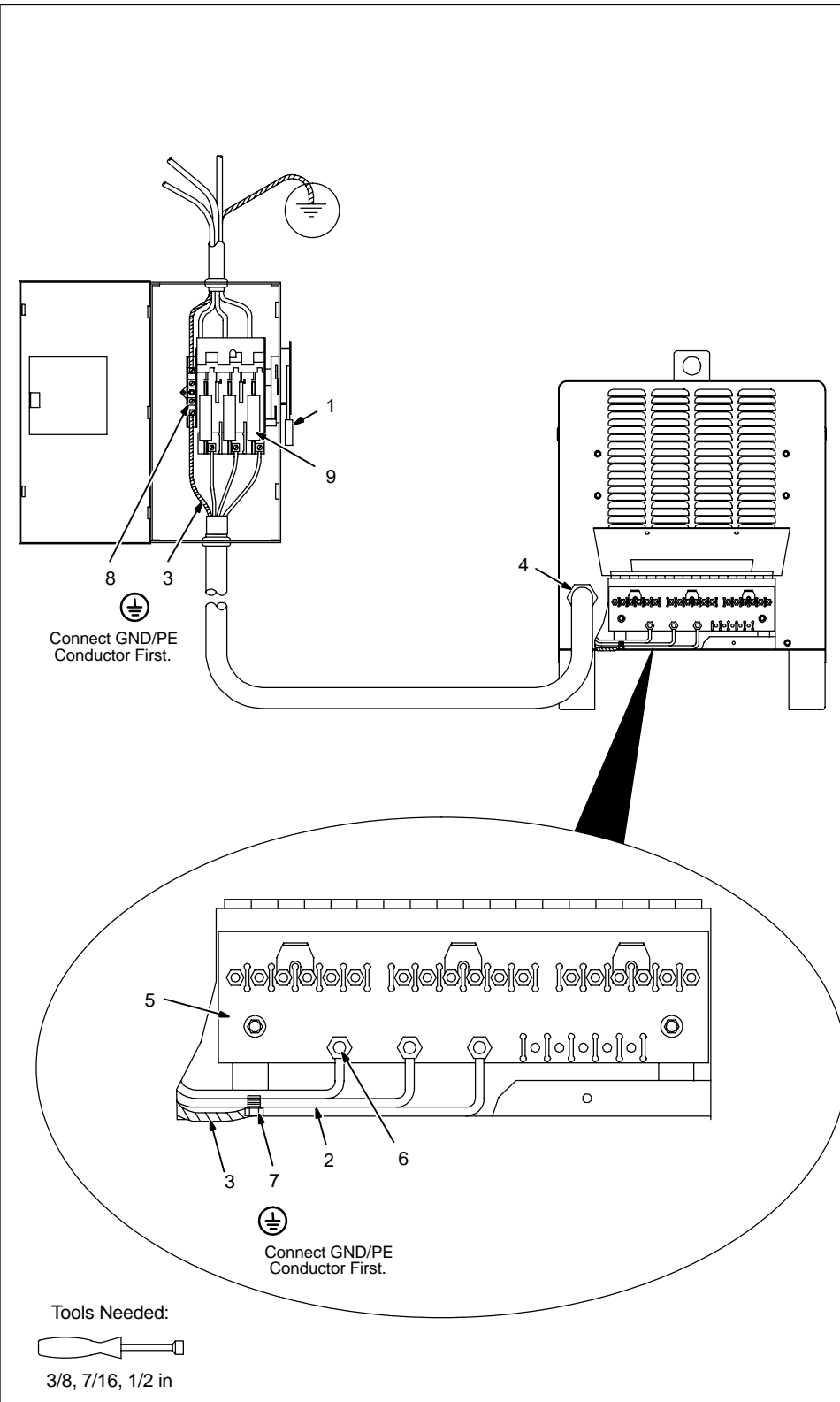
Move links to match input voltage. For example, use 230 volts position when 230 volts input power is available.

Close door or go on to 3-12B.



ssb5.1 2/92 – Ref. ST-800 042

## B. Connecting Input Power



Have only qualified persons make this installation.

Open rear panel access door.

- 1 Line Disconnect Device Of Proper Rating
- 2 Input Conductors
- 3 Grounding Conductor

Select size and length using 3-11. Conductor rating must comply with national, state, and local electrical codes. Use lugs of proper amperage capacity and correct hole size.

- 4 Strain Relief Connector

Insert conductors through strain relief.

- 5 Input Terminal Board

- 6 Line Terminals

- 7 Welding Power Source Ground Terminal

Connect grounding conductor to ground terminal first. Then connect input conductors to line terminals.

- 8 Disconnect Device Ground Terminal

Install and connect grounding conductor and input conductors in conduit or equivalent to deenergized line disconnect device.

Connect grounding conductor first, then line input conductors.

Be sure grounding conductor goes to an earth ground.

Close rear panel door.

- 9 Overcurrent Protection

Select type and size using 3-11. Install into deenergized line disconnect device (fused disconnect switch shown).

ssb2.4 1/94 – ST-800 042-A

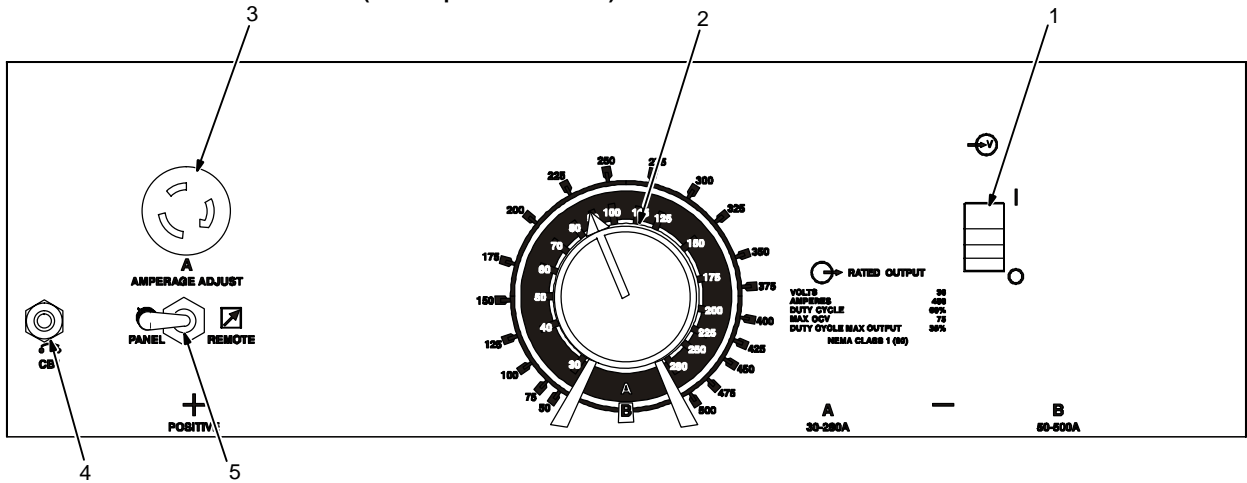
# SECTION 4 – OPERATION

## 4-1. Controls



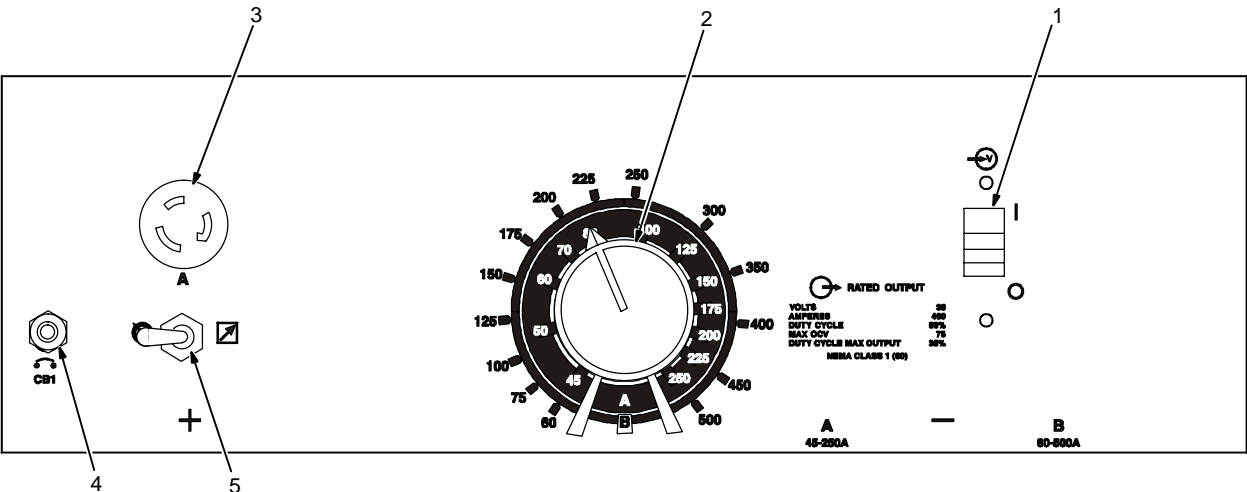
- 1 Power Switch
- 2 Amperage Adjustment Control (see Section 4-2)
- 3 Remote Amperage Control Receptacle (See Section 3-10)
- 4 Circuit Breaker CB1 (See Section 5-2)
- 5 Remote Amperage Switch (See Section 4-3)

(400 Ampere 60Hz Model)



122 035-B

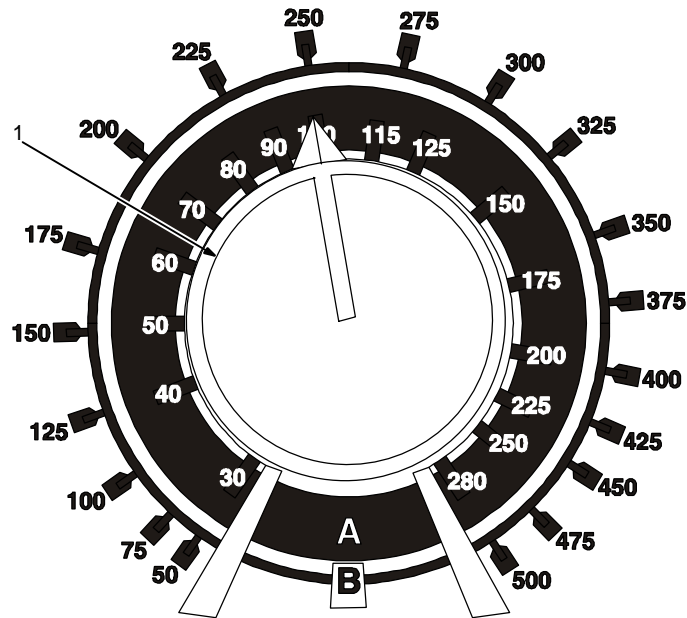
(400 Ampere 50Hz Model)



122 043



## 4-2. Amperage Adjustment Control



(400 Amp 60 Hz Model Shown)

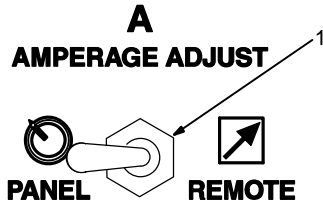
### 1 Amperage Adjustment Control

Use control to adjust amperage within range for Negative Weld Output terminal (see Section 3-9).

Use A (inner) scale for low amperage range and B (outer) scale for high amperage range.

Ref. 122 035-B

### 4-3. Remote Amperage Switch



Example: Combination Remote Amperage Control – 400 Ampere Non CE Model Shown

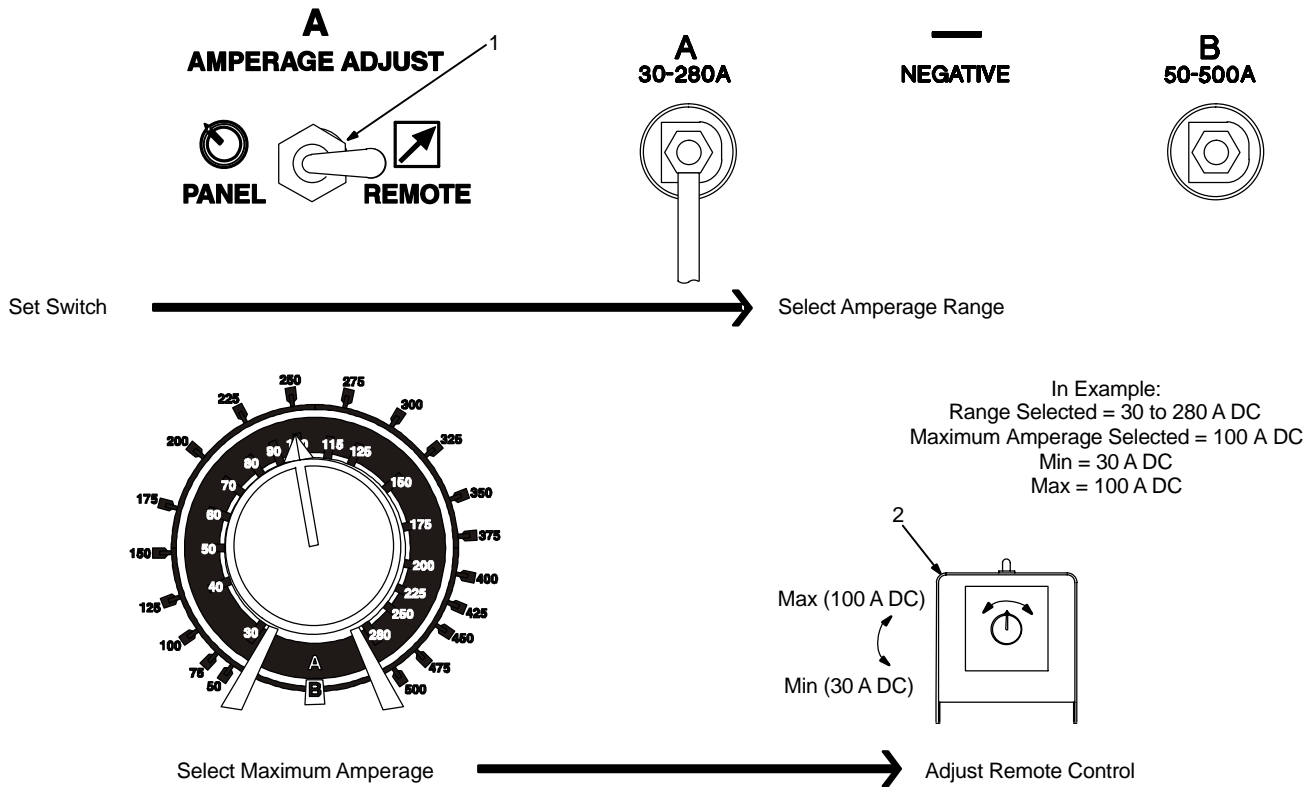
▲ Arcing can damage switch. Do not change Remote Amperage switch position while power is on. Arcing inside switch can damage contacts, causing switch to fail.

- 1 Remote Amperage Switch
- 2 Remote Amperage Control

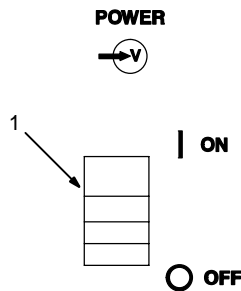
Use switch to select way of controlling amperage adjustment.

For front panel control, place switch in the Panel position.

For remote control, place switch in the Remote position and connect remote amperage control to remote amperage control receptacle (see Section 3-10). See example below.



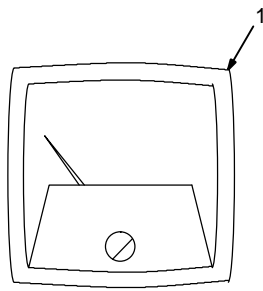
### 4-4. Power Switch



- 1 Power Switch

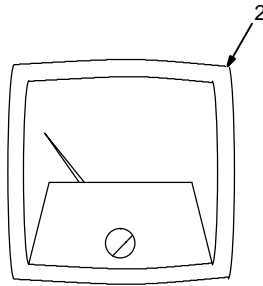
Use switch to turn unit t On and Off.

## 4-5. Ammeter And Voltmeter (Optional)



### 1 Voltmeter

Voltmeter displays voltage at the weld output terminals, but not necessarily the welding arc due to cable resistance, poor connections, etc.



### 2 Ammeter

Ammeter displays weld amperage output of unit.



# SECTION 5 – MAINTENANCE & TROUBLESHOOTING

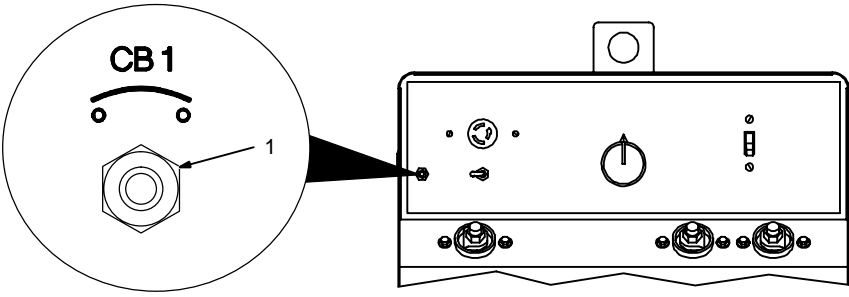
## 5-1. Routine Maintenance

			<b>▲ Disconnect power before maintaining.</b>
--	--	--	---

	<b>3 Months</b>	<p>Replace unreadable labels.</p>	<p>Repair or replace cracked weld cable.</p>	<p>Clean and tighten weld terminals.</p>
	<b>6 Months</b>	<p>Blow out or vacuum inside. During heavy service, clean monthly</p> <p>Or</p>		<p>Sealed Bearings – No Oil Needed</p>

## 5-2. Overload Protection



1 Circuit Breaker CB1

CB1 protects the welding power source control circuit from overload. If CB1 opens, weld output drops to the minimum of the range selected.

Press button to reset circuit breaker.


Ref. ST-800 040

## 5-3. Troubleshooting Table



Trouble	Remedy
No weld output; unit completely inoperative.	Place line disconnect switch in On position (see Section 3-12B).
	Check and replace line fuse(s), if necessary, or reset circuit breaker (see Section 3-12B).
	Check for proper input power connections (see Section 3-12B).
	Check for proper jumper link position (see Section 3-12A).
No weld output.	Clean and tighten all weld connections (see Section 5-1).
Unit provides only low or minimum weld output.	Check for proper line voltage.
	Check for open line fuse(s), and replace if necessary. Check and replace circuit breakers (see Section 3-12B).
	Clean and tighten all weld connections (see Section 5-1).
	Place Remote Amperage switch in correct position (see Section 4-3).
	Select correct size weld cables (see Section 3-8).
Low weld amperage; Amperage Adjustment does not control amperage.	Reset circuit breaker CB1, if necessary (see Section 5-2).
Maximum weld output.	Have Factory Authorized Service Agent check Amperage Adjustment control.
Erratic or improper weld output.	Check for proper input power connections.
	Clean and tighten all weld connections (see Section 5-1).
	Use proper size and type electrodes.
Excessive line current or line fuse(s) open repeatedly.	Check for proper input power connections (see Section 3-12B).
	Check for proper jumper link position (see Section 3-12A).
Fan not operating and/or over heating.	Check for and remove anything blocking fan movement.
	Replace fan motor, if necessary.



	<b>WARNING</b>
	<ul style="list-style-type: none"> <li>Do not touch live electrical parts.</li> <li>Disconnect input power or stop engine before servicing.</li> <li>Do not operate with covers removed.</li> <li>Have only qualified persons install, use, or service this unit.</li> </ul>
<b>ELECTRIC SHOCK HAZARD</b>	

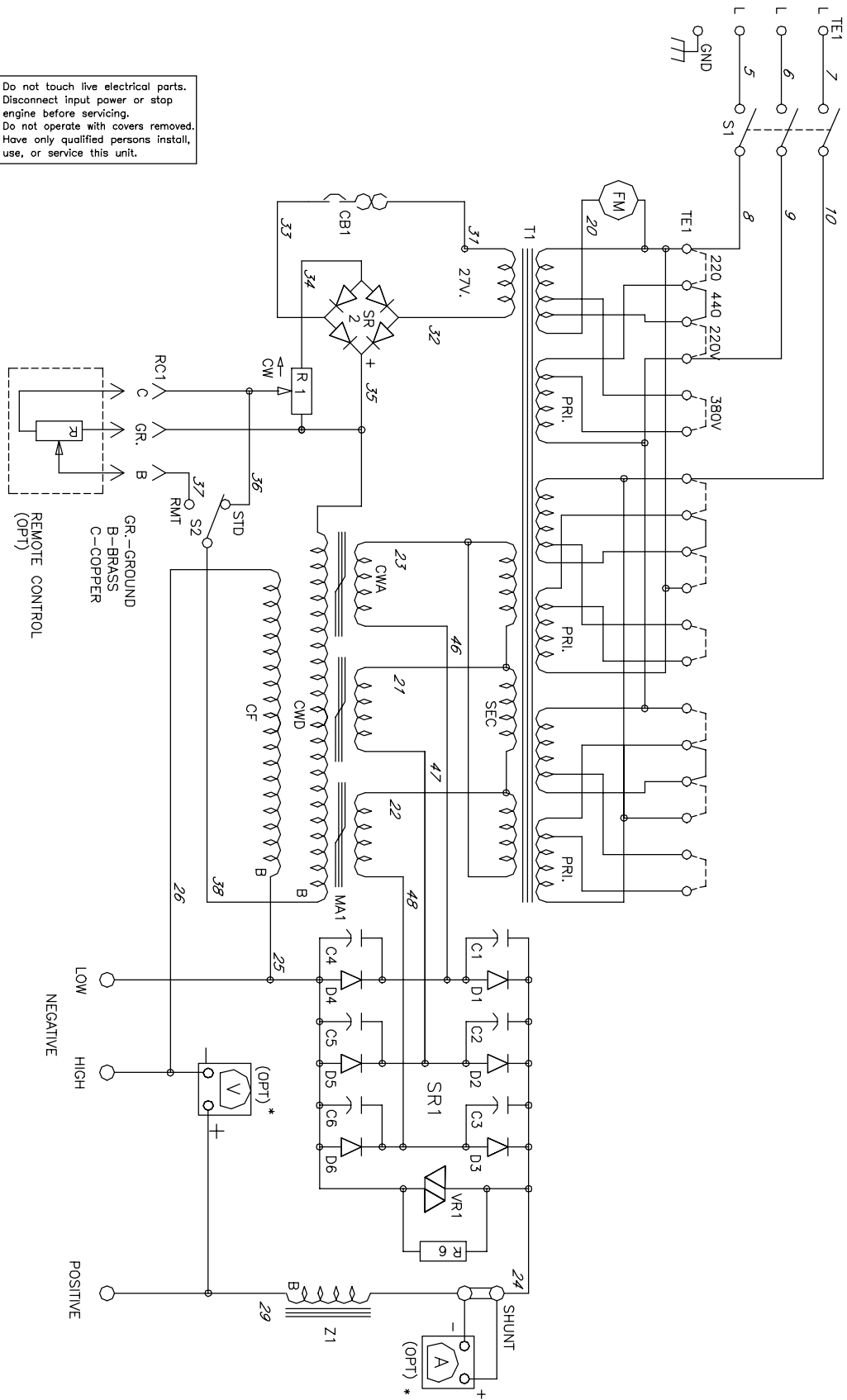



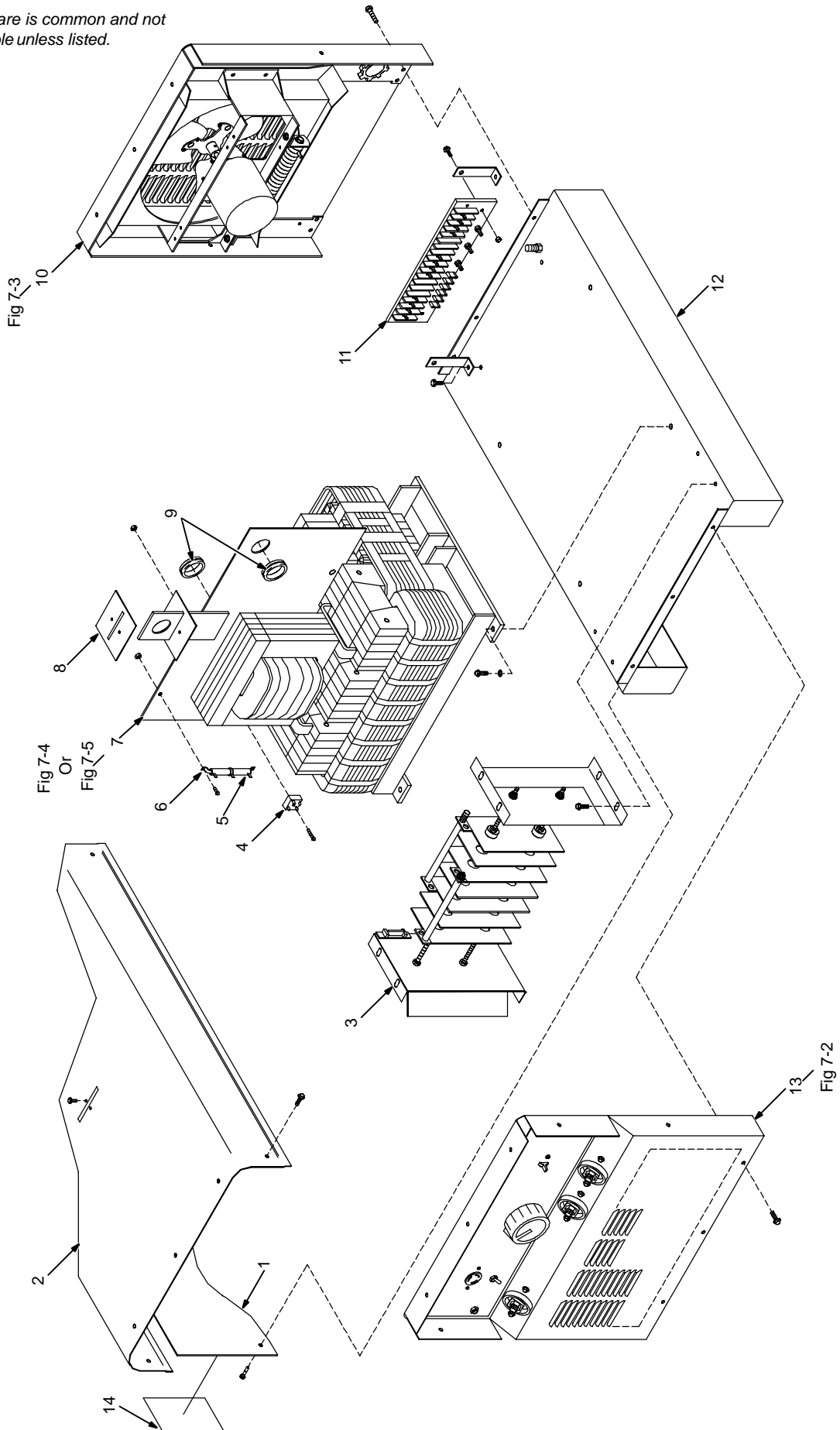
Figure 6-2. Circuit Diagram (50 Hz Models)

SC-086 018-D



# SECTION 7 – PARTS LIST

 Hardware is common and not available unless listed.





**Figure 7-1 Main Assembly (60 Hz Models Shown)**

Item No.	Dia. Mkgs.	Part No.	Description	Quantity		
				300 Amp	400 Amp 60Hz	400 Amp 50Hz
<b>Figure 7-1 Main Assembly</b>						
... 1		006 016	.. PANEL, side	2	2	2
... 2		006 890	.. COVER, top	1	1	1
... 3	SR1	199 309	.. RECTIFIER, si diode	1		
... 3	SR1	199 311	.. RECTIFIER, si diode		1	1
... 4	SR2	035 704	.. RECTIFIER, integ 40A 800V	1	1	1
... 5	R2	071 054	.. RESISTOR, WW adj 50W 2 ohm	1	1	
... 6		605 741	.. CLIP, mtg resistor .312 ID core	2	2	
... 7	MA1,T1	Fig 7-4, 7-5	.. TRANSFORMER & AMPLIFIER, power main	1	1	1
... 8		026 627	.. GASKET, lifting eye	1	1	1
... 9		+116 888	.. GROMMET, rbr 1.500 ID x 1.750mtg hole	2	2	2
... 10		Fig 7-3	.. PANEL, rear w/components	1	1	1
... 11	TE1	038 138	.. TERMINAL, pri term assy, pri 3ph 3v (consisting of)	1	1	1
		038 618	.. Jumper, link	6	6	6
... 12		199 308	.. BASE	1	1	1
... 13		Fig 7-2	.. PANEL, front w/components	1	1	1
... 14		134 464	.. LABEL, general precautionary (60 Hz)	2	2	2
... 14		176 254	.. LABEL, general precautionary (50 Hz)	2	2	2

**Parts For Optional Equipment**

		040 075	.. METER KIT, (consisting of)	1	1	1
	A	191 833	.. METER, amp dc 50MV 0-600 scale	1	1	1
	V	191 834	.. METER, volt dc 0-100 scale	1	1	1

+One grommet (center) is included with the Amplifier, Transformer, Stabilizer Assembly.

\*Recommended Spare Parts.


BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.

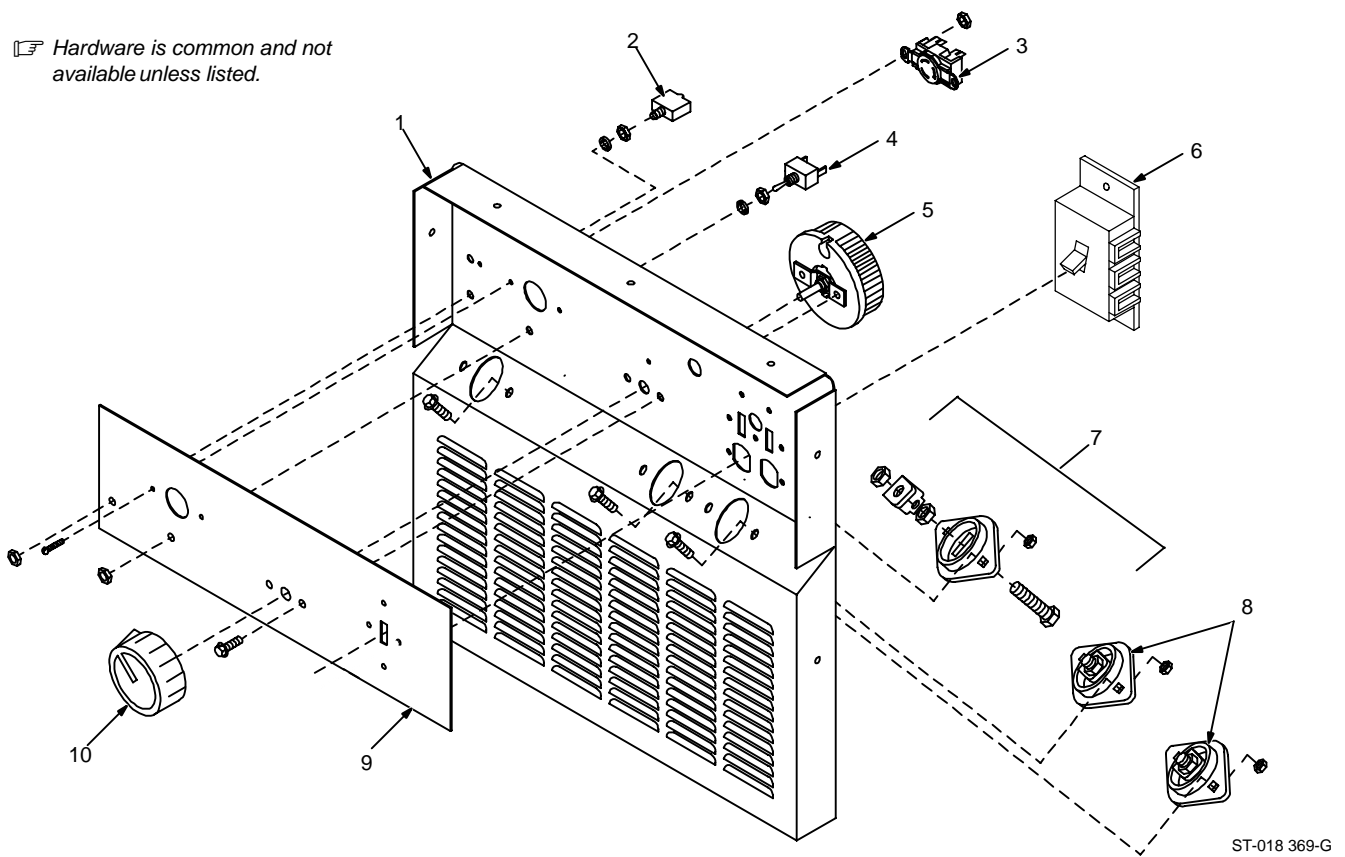
Item No.	Dia. Mkgs.	Part No.	Description
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**Figure 7-2 Panel, Front w/Components (Fig 7-1 Item 13)**

1		+017 287	PANEL, front	1
2	CB1	083 432	CIRCUIT BREAKER, man reset 10A 250VDC	1
3	RC1	039 607	RECEPTACLE, twlk 3P3W 20A 250V	1
		605 797	PLUG, twlk 3P3W 20A 125V Arrow Hart 6312	
4	S2	011 609	SWITCH, tgl SPDT 15A 125VAC	1
5	R1	030 653	RHEOSTAT, WW 150W 15 ohm	1
6	S1	045 835	SWITCH, tgl 3PST 60A 600VAC screw term	1
7		181 245	TERMINAL, pwr output red	1
8		181 246	TERMINAL, pwr output black	2
9		+	NAMEPLATE, (order by model and serial number)	1
10		097 926	KNOB, pointer	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.  
**BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.**

 Hardware is common and not available unless listed.




**Figure 7-2 Panel, Front w/Components**

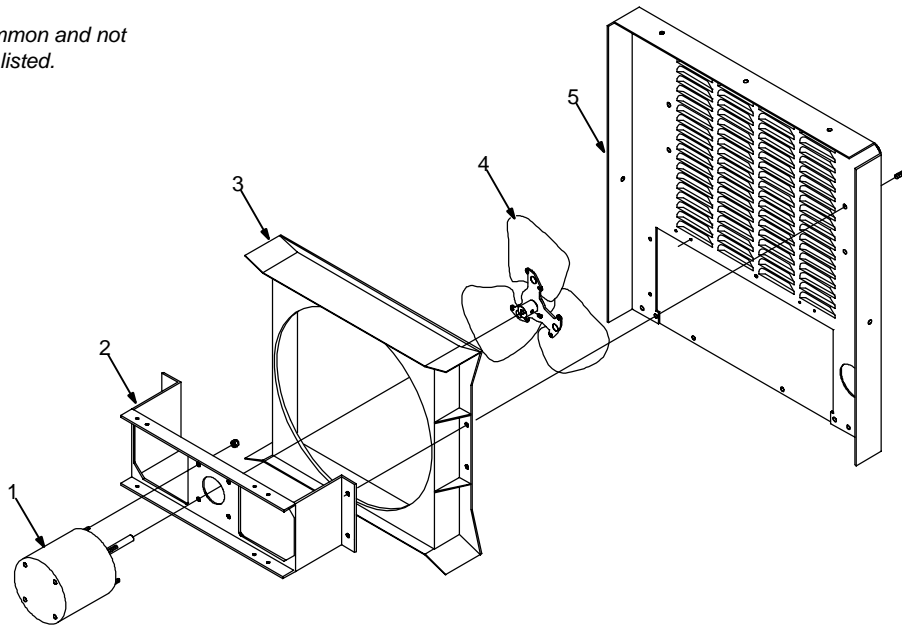
ST-018 369-G

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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**Figure 7-3 Panel, Rear w/Components (Fig 7-1 Item 10)**

... 1	FM	116 190	.. MOTOR, 1/12HP 230V 1550RPM 50/60Hz 1.5A	1
... 2		124 274	.. BRACKET, mtg fan motor	1
... 3		173 283	.. CHAMBER, plenum 14 in	1
... 4		180 165	.. BLADE, fan 14 in 3wg 28deg .375 bore CCW	1
... 5		+018 144	.. PANEL, rear	1
.....		168 384	.. LABEL, warning electric shock input connections (60 Hz models)	1
.....		179 290	.. LABEL, warning electric shock input connections (50 Hz models)	1

 Hardware is common and not available unless listed.



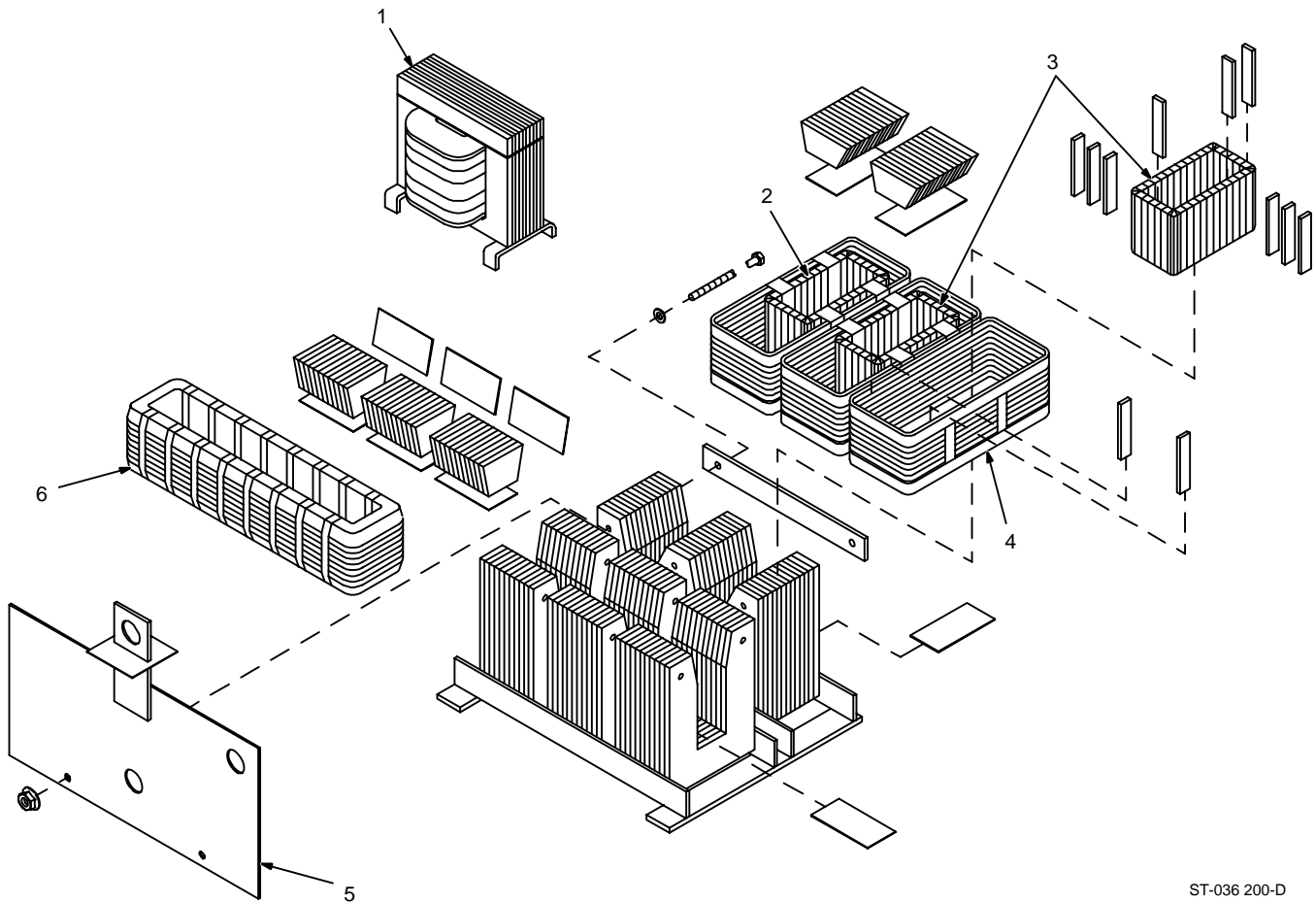
ST-018 370-D

**Figure 7-3 Panel, Rear w/Components**

+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.**

**Replace Coils At Factory Or Authorized Service Stations/Service Distributors**

Item No.	Dia. Mkgs.	Part No.	Description	Quantity	
				300 Amp	400 Amp
<b>Figure 7-4. Transformer &amp; Amplifier, Power Main (60 Hz) (Fig 7-1 Item 7) (Listed below as Amplifier)</b>					
.....	MA1,T1	093 896	.. AMPLIFIER, 208/230/460 (consisting of)	1	
1	Z	036 126	.. STABILIZER	1	
2	PR1	093 524	.. COIL, pri LH 208/230/460	1	
3	PR1	093 523	.. COIL, pri center & RH 208/230/460	2	
4	SEC	071 009	.. COIL, sec	3	
5		018 873	.. BAFFLE, air	1	
6	CWD	033 652	.. COIL, control dc	1	
.....	MA1,T1	093 929	.. AMPLIFIER 208/230/460 (consisting of)	1	
.....	MA1,T1	093 930	.. AMPLIFIER 230/460/575 (consisting of)	1	
1	Z	036 127	.. STABILIZER	1	
2	PR1	093 583	.. COIL, pri LH 208/230/460	1	
2	PR1	093 585	.. COIL, pri LH 230/460/575	1	
3	PR1	093 584	.. COIL, pri center & RH 208/230/460	2	
3	PR1	093 586	.. COIL, pri center & RH 230/460/575	2	
4	SEC	033 801	.. COIL, sec	3	
5		018 873	.. BAFFLE, air	1	
6	CWD	033 262	.. COIL, control dc	1	



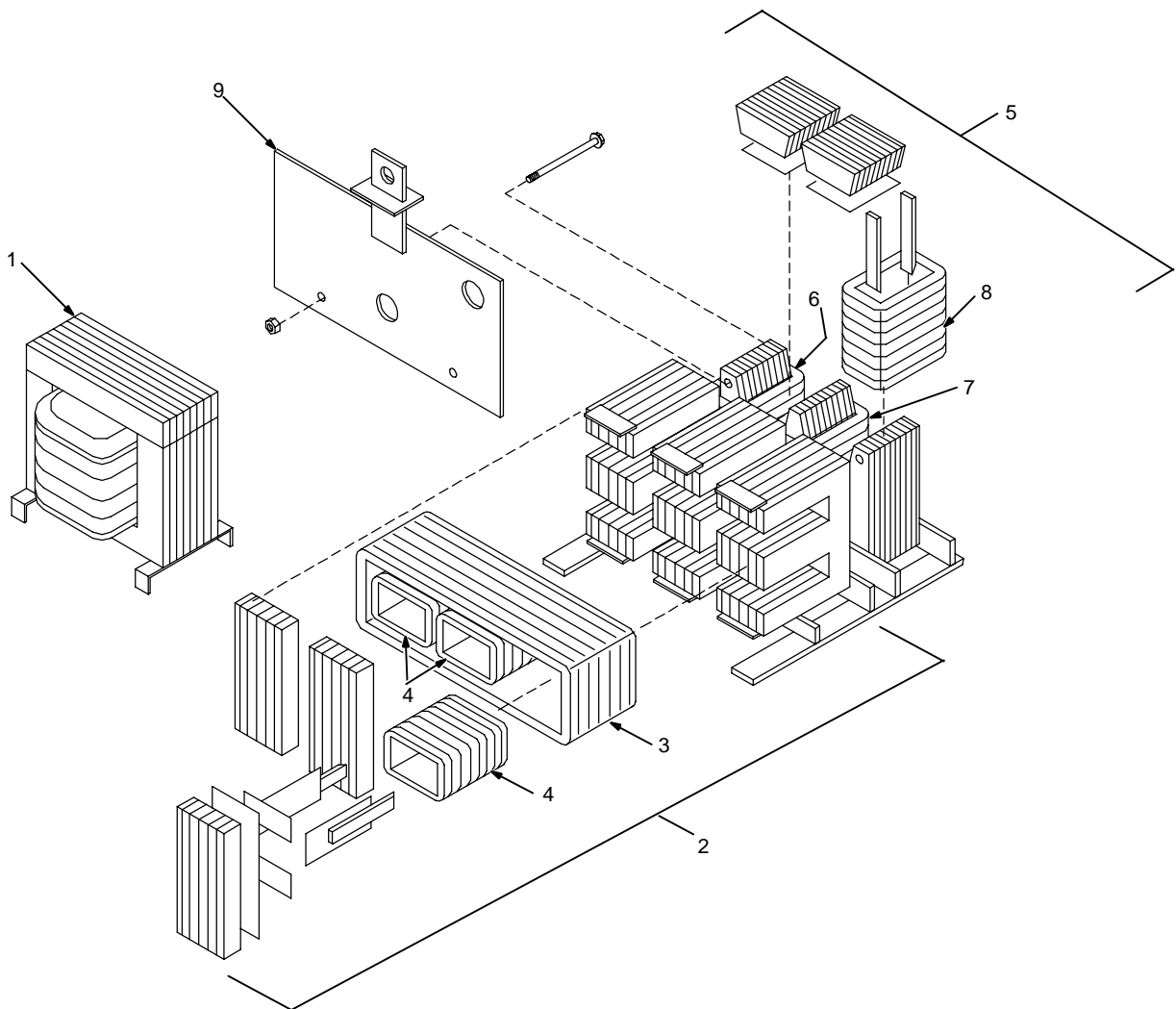
ST-036 200-D

**Figure 7-4 Transformer & Amplifier, Power Main (60 Hz)**

BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.

**Replace Coils At Factory Or Authorized Service Stations/Service Distributors**

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
				50 Hz Models
<b>Figure 7-5. Transformer &amp; Amplifier, Power Main 50 Hz</b> <b>(Fig 7-1 Item 7) (Listed below as Amplifier)</b>				
.....		093 931 ..	TRANSFORMER AND AMPLIFIER, (consisting of) .....	1
1	Z	052 995	STABILIZER .....	1
2	MA1	052 204	AMPLIFIER, magnetic (consisting of) .....	1
3		033 691	COIL, control dc .....	1
4		033 690	COIL, control ac .....	3
5	T1	093 932	TRANSFORMER, power main (consisting of) .....	1
6		093 587	COIL, pri/sec LH .....	1
7		093 588	COIL, pri/sec center .....	1
8		093 589	COIL, pri/sec RH .....	1
9		018 873	BAFFLE, air .....	1



ST-802 611

**Figure 7-5 Transformer & Amplifier, Power Main (50 Hz)**

BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.



# TRUE BLUE<sup>®</sup>

## WARRANTY

Effective January 1, 2000

(Equipment with a serial number preface of "LA" or newer)

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

### 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.

**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.

1. 5 Years Parts – 3 Years Labor
  - \* Original main power rectifiers
  - \* Inverters (input and output rectifiers only)
2. 3 Years — Parts and Labor
  - \* Transformer/Rectifier Power Sources
  - \* Plasma Arc Cutting Power Sources
  - \* Semi-Automatic and Automatic Wire Feeders
  - \* Inverter Power Supplies
  - \* Intelligit
  - \* Engine Driven Welding Generators  
**(NOTE: Engines are warranted separately by the engine manufacturer.)**
3. 1 Year — Parts and Labor
  - \* DS-2 Wire Feeder
  - \* Motor Driven Guns (w/exception of Spoolmate 185 & Spoolmate 250)
  - \* Process Controllers
  - \* Positioners and Controllers
  - \* Automatic Motion Devices
  - \* RFCS Foot Controls
  - \* Induction Heating Power Sources
  - \* Water Coolant Systems
  - \* HF Units
  - \* Grids
  - \* Maxstar 140
  - \* Spot Welders
  - \* Load Banks
  - \* Miller Cyclomatic Equipment
  - \* 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.)**
4. 6 Months — Batteries
5. 90 Days — Parts
  - \* MIG Guns/TIG Torches
  - \* Induction Heating Coils and Blankets

- \* APT, ZIPCUT & PLAZCUT Model Plasma Cutting Torches
- \* Remote Controls
- \* Accessory Kits
- \* Replacement Parts (No labor)
- \* Spoolmate 185 & Spoolmate 250
- \* Canvas Covers

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

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear.**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

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.





# 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

**Call 1-800-4-A-Miller or see our website at [www.MillerWelds.com](http://www.MillerWelds.com) to locate 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

Contact the Delivering Carrier for:

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.

### Miller Electric Mfg. Co.

An Illinois Tool Works Company  
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Appleton, WI 54914 USA

### International Headquarters—USA

USA Phone: 920-735-4505 Auto-Attended  
USA & Canada FAX: 920-735-4134  
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[www.MillerWelds.com](http://www.MillerWelds.com)



**Miller**  
*The Power of Blue.*