



OM-319

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September 2000

Processes



TIG (GTAW) Welding



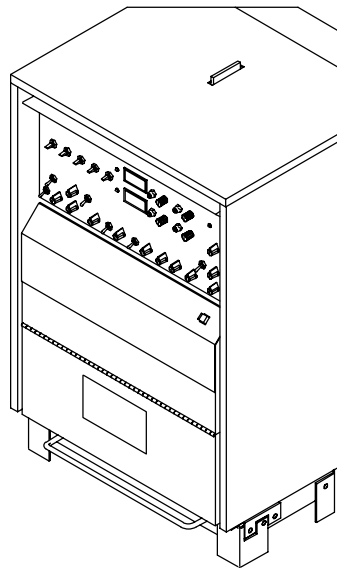
Stick (SMAW) Welding

Description



Arc Welding Power Source

Aerowave[®]



OWNER'S MANUAL



Visit our website at
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



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

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 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 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.



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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.)

The following terms are used interchangeably throughout this manual:
TIG = GTAW
Stick = SMAW

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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

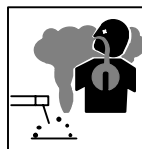
live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- 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 use work clamp or work 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.

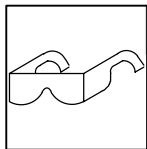
- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash 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.



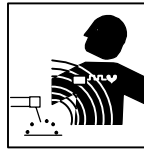
BUILDUP OF GAS can injure or kill.

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



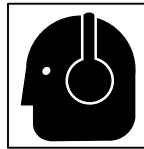
HOT PARTS can cause severe burns.

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



MAGNETIC FIELDS can affect pacemakers.

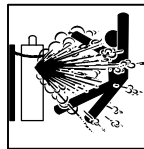
- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.



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.



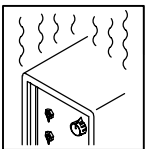
MOVING PARTS can cause injury.

- 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.



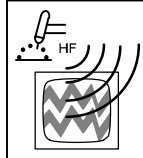
MOVING PARTS can cause injury.

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



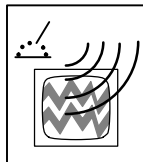
WELDING WIRE can cause injury.

- 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.

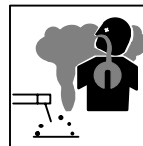
Un simple contact avec des pièces électriques peut provoquer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension dès que l'appareil est sur ON. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension à ce moment-là. En soudage 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 utiliser le connecteur de pièce ou le câble de retour.

- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode provenant d'une autre machine.
- 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 dangereux 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 dégraissateurs.
- 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 bague 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.



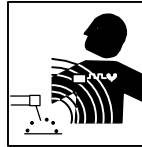
LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.

- 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.



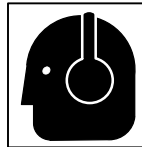
DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.

- 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.

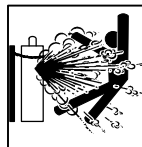
- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.



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



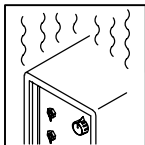
Risque D'INCENDIE OU D'EXPLOSION.

- 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.



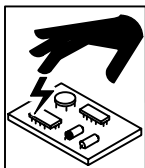
LA CHUTE DE L'APPAREIL peut blesser.

- 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.



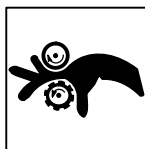
L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- 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.



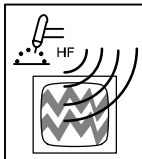
LES FILS DE SOUDAGE peuvent provoquer des blessures.

- 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.



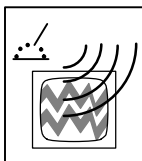
DES ORGANES MOBILES peuvent provoquer des blessures.

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



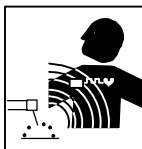
LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- 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 :

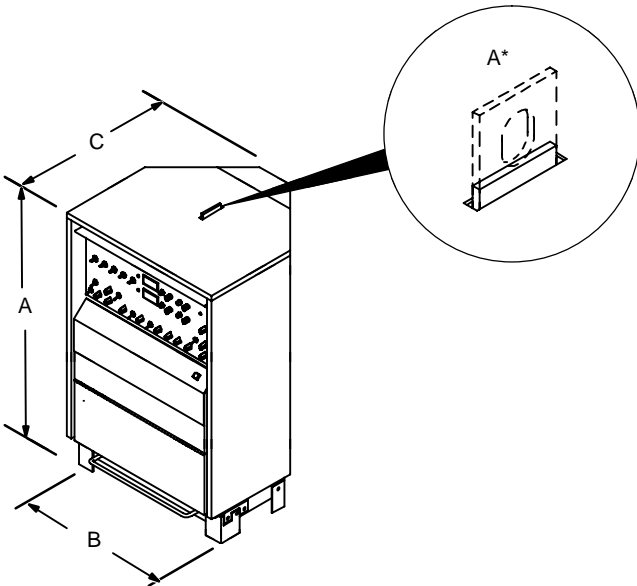
Les personnes qui portent un stimulateur cardiaque doivent avant tout consulter leur docteur. Si vous êtes déclaré apte par votre docteur, il est alors recommandé de respecter les consignes ci-dessus.

SECTION 2 – INSTALLATION

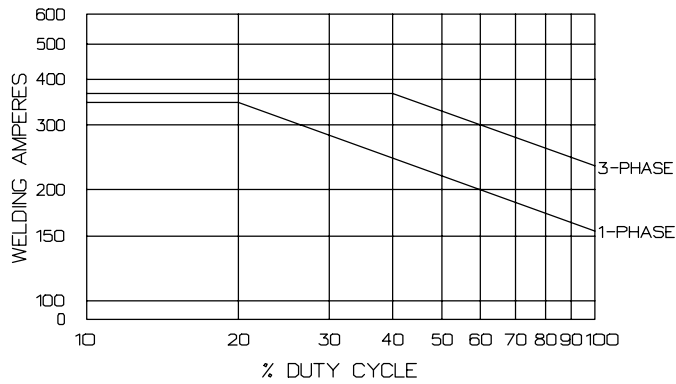
2-1. Specifications

Rated Welding Output	Amperes Input at AC Balanced Rated Load Output; 60 Hz, Single-Phase/Three-Phase				KVA	KW	Amperage Range	Max OCV
	200 V	230 V	460 V	575 V				
Three-Phase: NEMA Class I (60) – 300 Amperes, 32 Volts AC/DC, 60% Duty Cycle	42	37	18	15	14.8	14	1-375 A	90
Single-Phase: NEMA Class I (60) – 200 Amperes, 28 Volts AC/DC, 60% Duty Cycle	51	44	22	18	10.2	9		

2-2. Dimensions And Weights

 <p style="text-align: center; font-size: small;">dim_1 3/96 - ST-800 402 / ST-117 264-C</p>	Dimensions	
	A*	35-1/2 in (910 mm)
	B	24 in (615 mm)
	C	22-3/4 in (583 mm)
	*With lifting eye down	
Weight		
351 lb (159 kg)		

2-3. Duty Cycle And Overheating

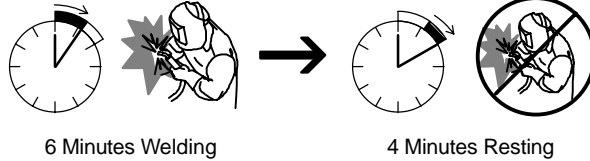


Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

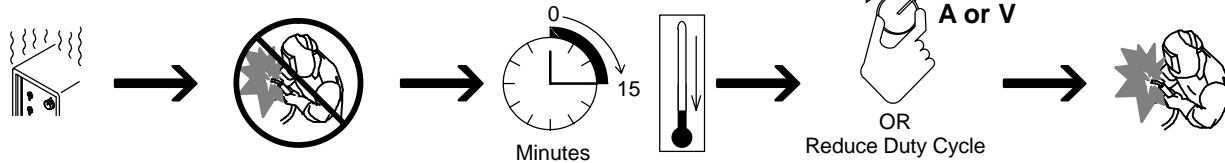
If unit overheats, thermostat(s) opens, output stops, and cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or voltage, or duty cycle before welding.

▲ Exceeding duty cycle can damage unit and void warranty.

60% Duty Cycle:
At 200 Amperes With Single-Phase Input Power
At 300 Amperes With Three-Phase Input Power



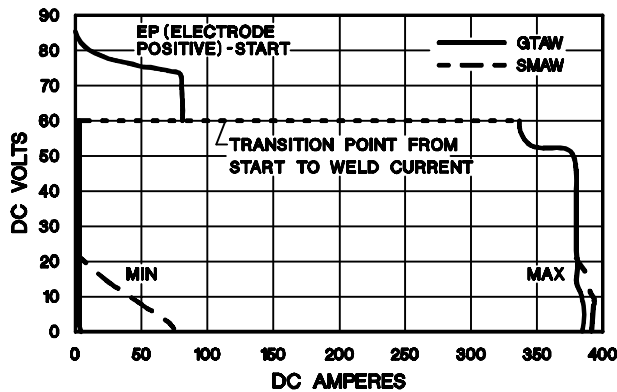
Overheating



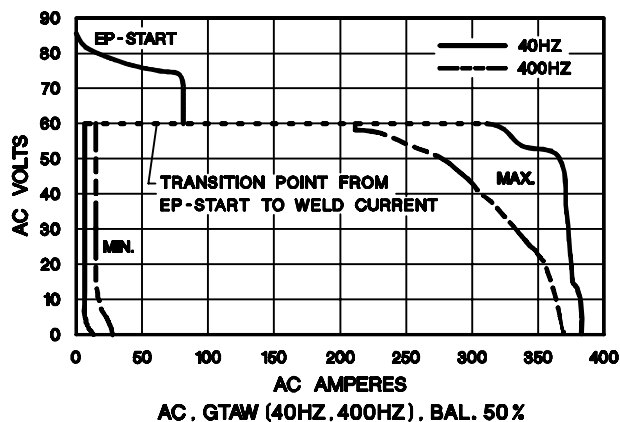
sdu1 5/95 / ST-136 510-B

2-4. Volt-Ampere Curves

A. DC Mode



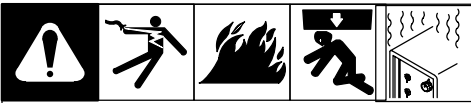
B. AC Mode



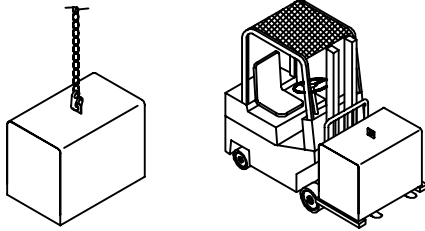
The volt-ampere curves show the minimum and maximum voltage and amperage output capabilities of the welding power source. Curves of other settings fall between the curves shown.

ssb1.1 10/91 - ST-168 007 / ST-168 006

2-5. Selecting A Location

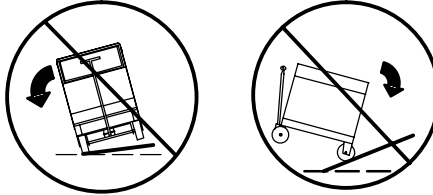


Movement



Tipping

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



1 Rating Label

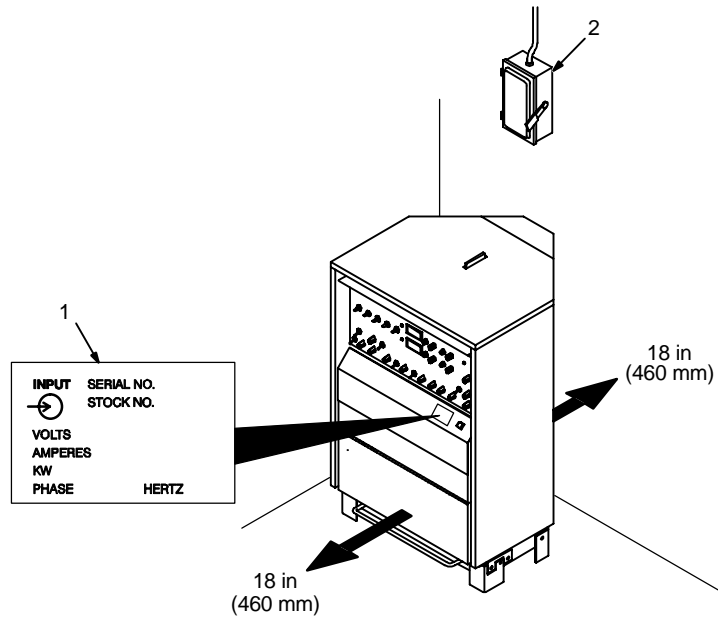
Use rating label to determine input power needs.

2 Line Disconnect Device

Locate unit near correct input power supply.

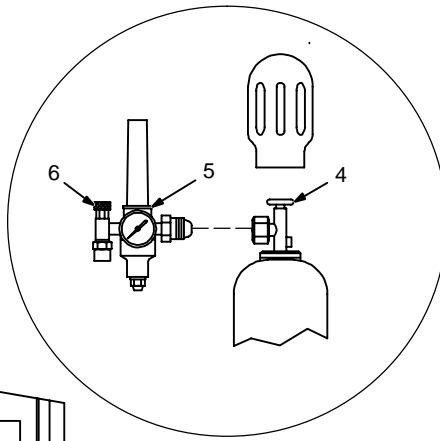
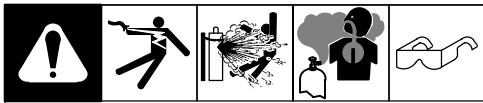
▲ Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.

Location And Airflow



loc_1 3/96 Ref. ST-800 311-B

2-6. 115 VAC Receptacle, Circuit Breaker, And Shielding Gas Connections



1 115 V 15 A AC Receptacle RC2

2 Circuit Breaker CB1

Receptacle is protected from overload by CB1.

Press button to reset breaker.

3 Gas Fittings

Fittings have 5/8-18 right-hand threads.

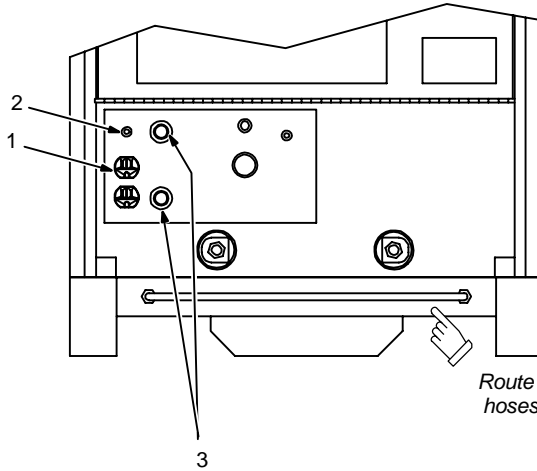
4 Cylinder Valve

Open valve slightly so gas flow blows dirt from valve. Close valve.

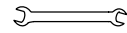
5 Regulator/Flowmeter

6 Flow Adjust

Typical flow rate is 15 cfh (cubic feet per hour).



Route Cables and hoses under bar.



5/8, 1-1/8 in


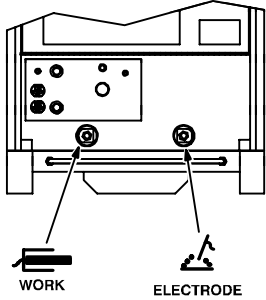
Ref. ST-800 312-A / Ref. ST-158 697-A

2-7. Weld Output Terminals And Selecting Cable Sizes



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

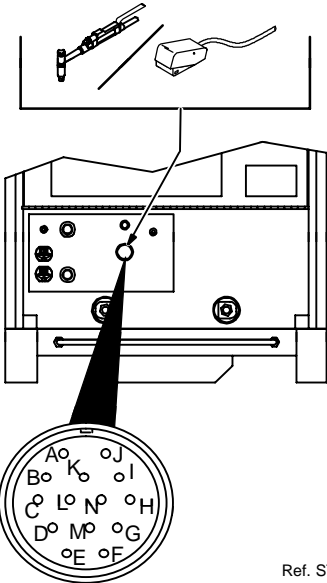

To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor. Locate welding operation 100 meters from any sensitive electronic equipment. Be sure this welding machine is installed and grounded according to this manual. If interference still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

 Weld Output Terminals	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 – 60% Duty Cycle	60 – 100% Duty Cycle	10 – 100% Duty Cycle					
 WORK ELECTRODE Ref. ST-800 312-A	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

*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 mm² equivalent weld cable sizes.

S-0007-E

2-8. Remote 14 Receptacle Information

 <p>Ref. ST-800 312-A</p>		Socket*	Information
	 OUTPUT (CONTACTOR)	A	24 volts ac.
		B	Contact closure to A completes 24 volts ac contactor control circuit.
A AMPERAGE	C	Command reference; 0 to +10 volts dc output to remote control.	
	D	Remote control circuit common.	
	E	0 to +10 volts dc input command signal from remote control.	
	K	Circuit Common.	

*The remaining sockets are not used.

2-9. Electrical Service Guide

	Single-Phase				Three-Phase				
Input Voltage	200	230	460	575	200	230	460	575	
Input Amperes At Rated Output	51	44	22	18	42	37	18	15	
Max Recommended Standard Fuse Or Circuit Breaker Rating In Amperes	80	70	35	25	60	60	30	20	
Min Input Conductor Size In AWG/Kcmil	8	8	12	14	8	10	14	14	
Max Recommended Input Conductor Length In Feet (Meters)	82 (25)	108 (33)	173 (53)	176 (54)	93 (28)	80 (24)	126 (38)	196 (60)	
Min Grounding Conductor Size In AWG/Kcmil	8	8	12	14	10	10	14	14	
Reference: 1996 National Electrical Code (NEC).								S-0092J	

2-10. Placing Jumper Links



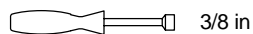
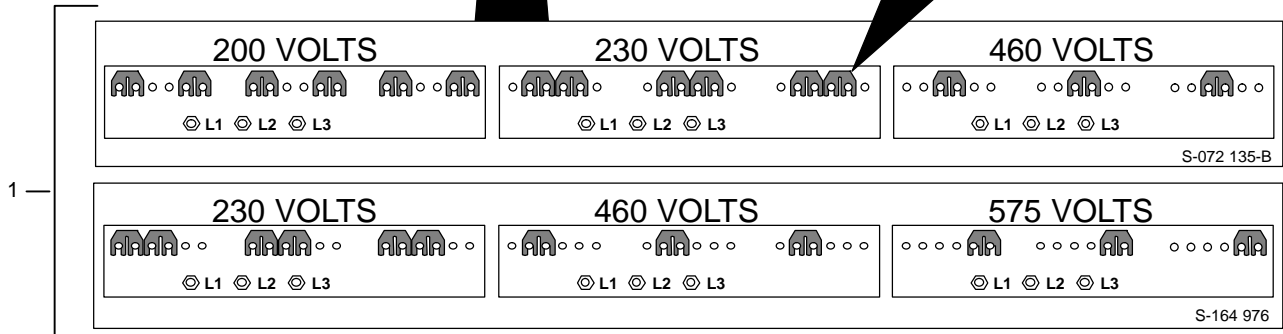
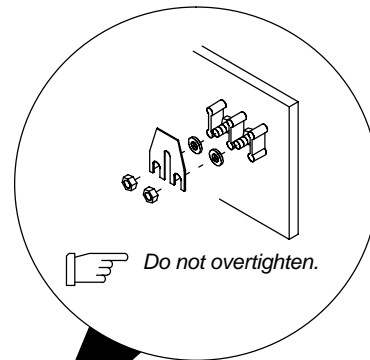
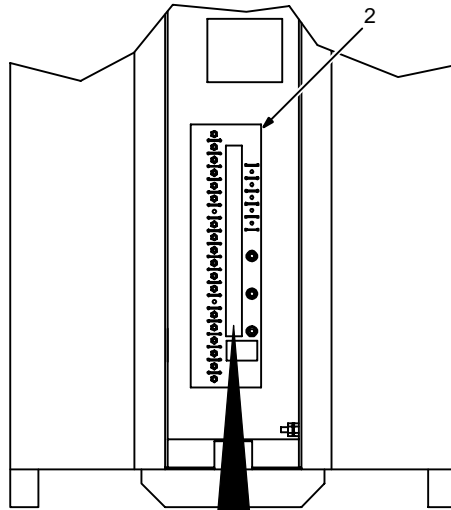
Check input voltage available at site.

1 Jumper Link Label

Move jumper links to match input voltage, and label on unit.

Proceed to Section 2-11.

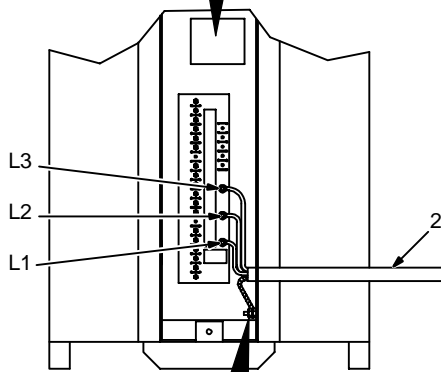
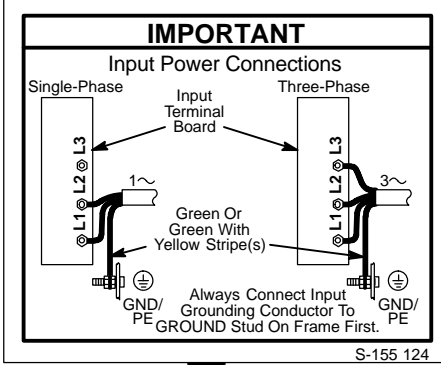
2 Primary Terminal Board



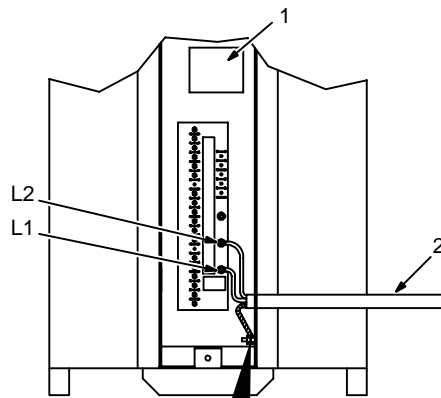
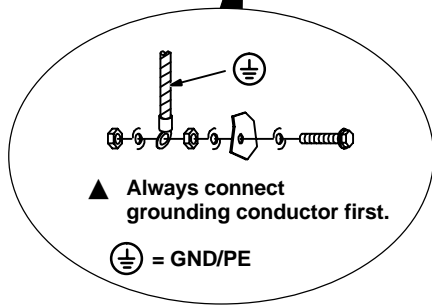
2-11. Connecting Input Power



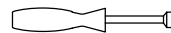
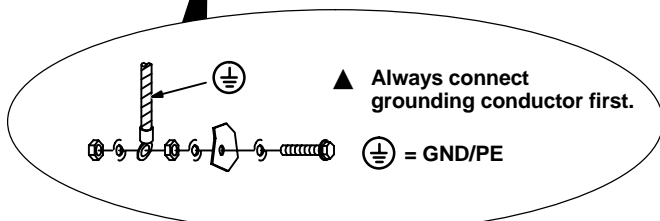
- 1 Input Power Connection Label
 - 2 Input And Grounding Conductors
 - 3 Line Disconnect Device
- See Section 2-9.
See Section 2-9.
Reinstall rear cover.



Three-Phase Connections



Single-Phase Connections



3/8, 1/2, 7/16 in

2-12. Connecting To Automation Connector Receptacle RC12



- 1 Main Control Board PC1
- 2 Automation Connector Receptacle RC12
- 3 Terminals 1-6

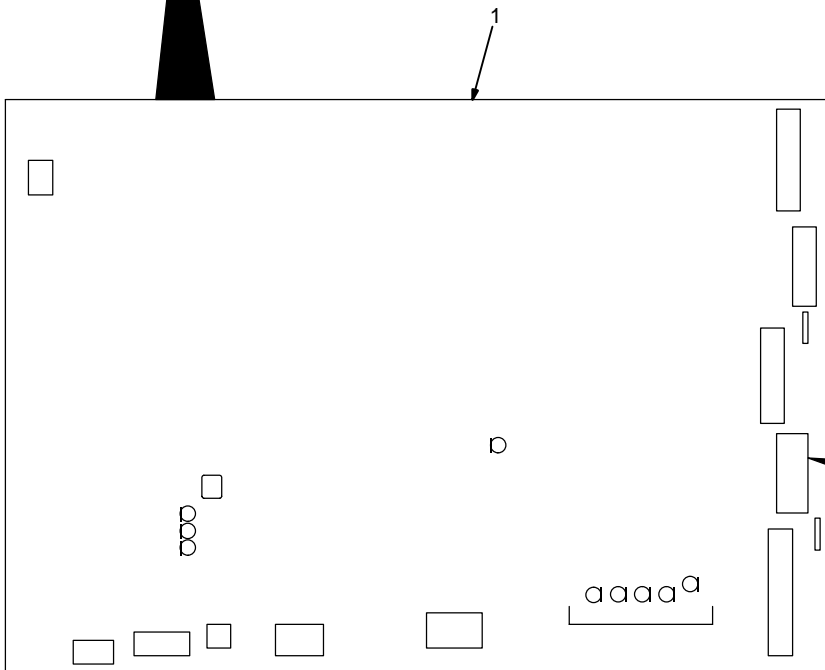
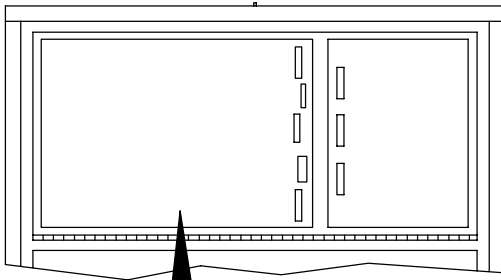
See chart for terminal functions.

- 4 Terminal Screws

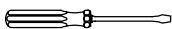
Loosen terminal screws, insert wires into terminals, tighten screws.

Terminal	Function
6	Electrode negative amplitude (0-10 volts)
5	Ground (circuit common)
4	Electrode Positive amplitude (0-10 volts)
3	Pulse train (0 or 15 volts, controls frequency and balance)
2	Gas valve (0 off - +15 volts on)
1	Output contactor (0 off - +15 volts on)

Electronic Box With Upper Front Panel Open

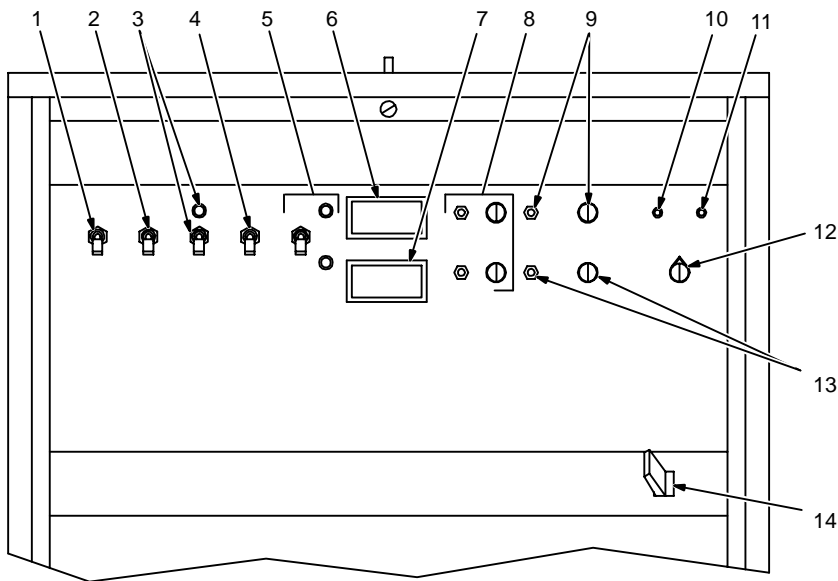


Tools Needed:



SECTION 3 – OPERATION

3-1. Controls

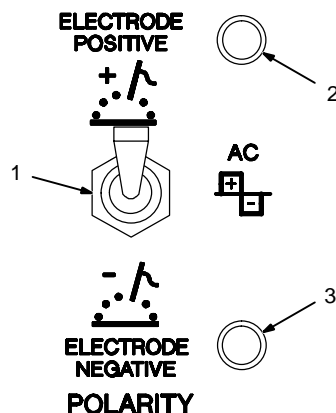


- 1 Mode Switch
(See Section 3-3)
- 2 Amperage Switch
(See Section 3-6)
- 3 Output Switch And Light
(See Section 3-5)
- 4 Start Switch
(See Section 3-11)
- 5 Polarity Switch And Lights
(See Section 3-2)
- 6 Amperage/Presets Meter
(See Section 3-4)
- 7 Voltmeter
(See Section 3-4)
- 8 Amperage Adjustment Controls (See Section 3-6)
- 9 AC Frequency Controls
(See Section 3-9)
- 10 High Temperature Shutdown Light
- 11 Over Voltage Shutdown Light
See Section 4-2)
- 12 Postflow Time Control
(See Section 3-10)
- 13 AC Balance Controls
(See Section 3-8)
- 14 Power On/Off Switch
(See Section 3-12)

▲ **Wear approved ear muffs or ear plugs if noise exposure exceeds OSHA limits.**

ST-800 312-A

3-2. Polarity Switch And Pilot Lights

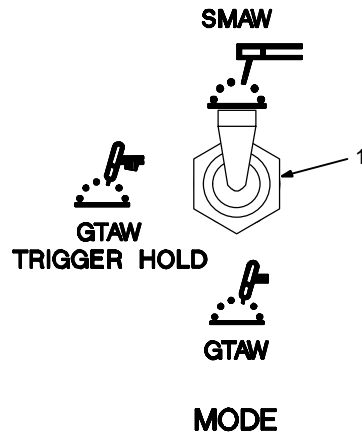


▲ **Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling. Use AC output ONLY if required for the welding process, and then use a remote output control.**

- 1 Polarity Switch
Use switch to select weld output.
- 2 Electrode Positive Pilot Light
- 3 Electrode Negative Pilot Light
Both lights go on when switch is in AC position.

Ref. ST-151 180-B

3-3. Mode Switch



1 Mode Switch

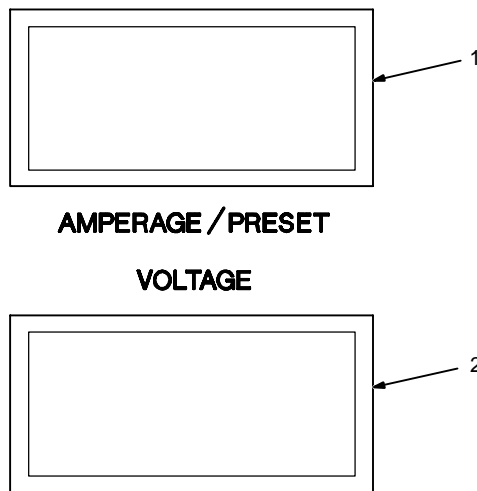
Use switch to select SMAW or either GTAW welding process.

Selecting either GTAW position enables the Start switch and gas valve; both are disabled when the SMAW position is selected.

GTAW Trigger Hold functions as follows:

Press torch switch to start arc. Switch can be released and arc remains on. Press switch to stop arc.

3-4. Amperage/Preset Meter And Voltmeter



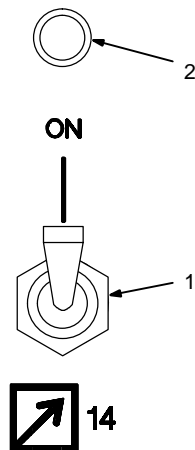
1 Amperage/Preset Meter

Use meter to preset amperage, ac frequency, and ac balance. Meter displays average weld amperage output of unit to nearest ampere when welding.

2 Voltmeter

Voltmeter displays average voltage (to the nearest 0.1 V) at the weld output terminals.

3-5. Output Switch And Pilot Light



▲ Weld output terminals are energized when switch is On and power is On. Do not touch torch or electrode and work clamp at the same time.

1 Output Switch

2 Pilot Light

Use switch to select way of controlling unit output.

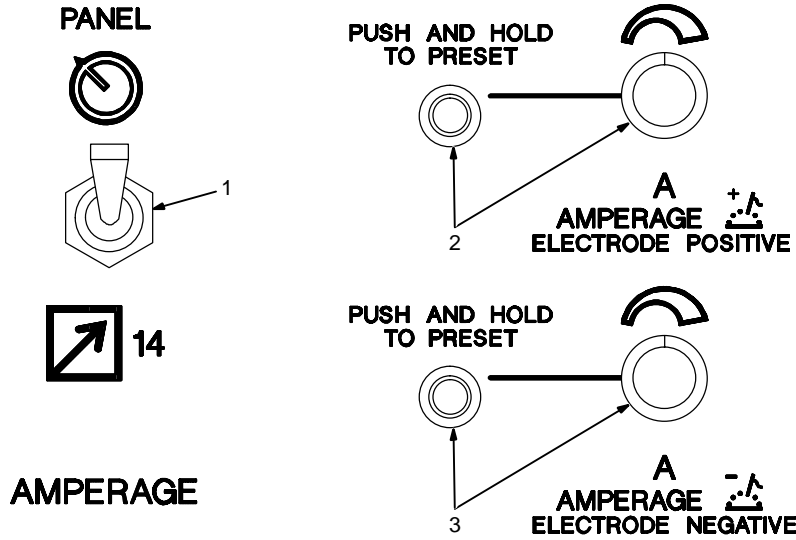
For weld output, place switch in On position.

For remote output control, place switch in Remote 14 position (see Section 2-8).

Pilot light stays on continuously in On position, but only when contactor is energized in Remote 14 position.

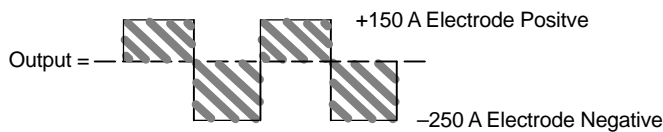
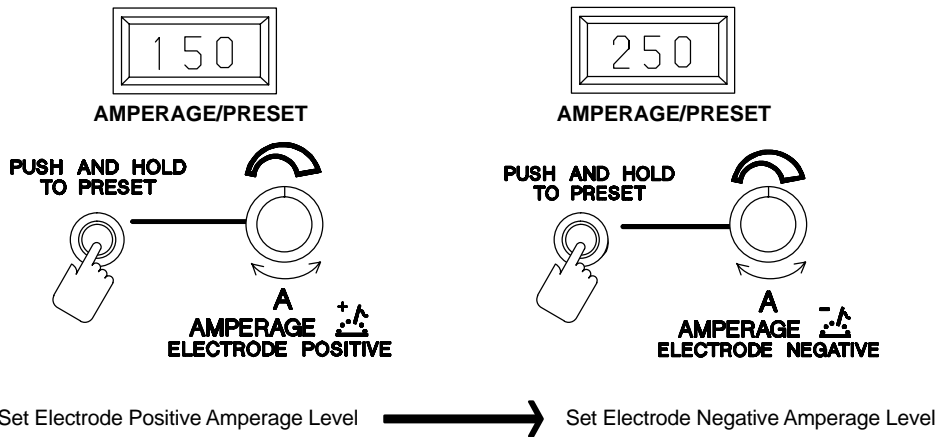
OUTPUT

3-6. Amperage Adjustment Controls



If Polarity switch is set incorrectly, the Amperage/Pre-set meter goes blank when the push-button is pressed.

Example: Setting Amperage For AC Output:



1 Amperage Control Switch
Use switch to select way of controlling amperage adjustment.

For front panel control, place switch in Panel position.

For remote control, place switch in Remote 14 position.

2 Electrode Positive Amperage Adjustment Control And Pushbutton

Set Polarity switch to AC, press pushbutton and use control and Amperage/Pre-set meter to adjust weld amperage for positive half of ac square wave.

When Polarity switch is in Electrode Positive position, pushbutton does not need to be pressed to adjust control.

3 Electrode Negative Amperage Adjustment Control And Pushbutton

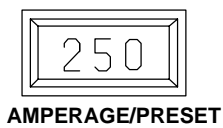
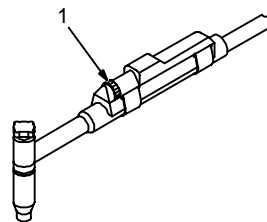
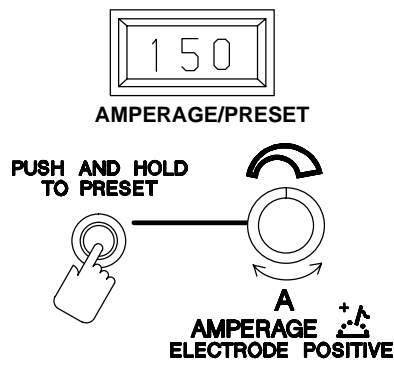
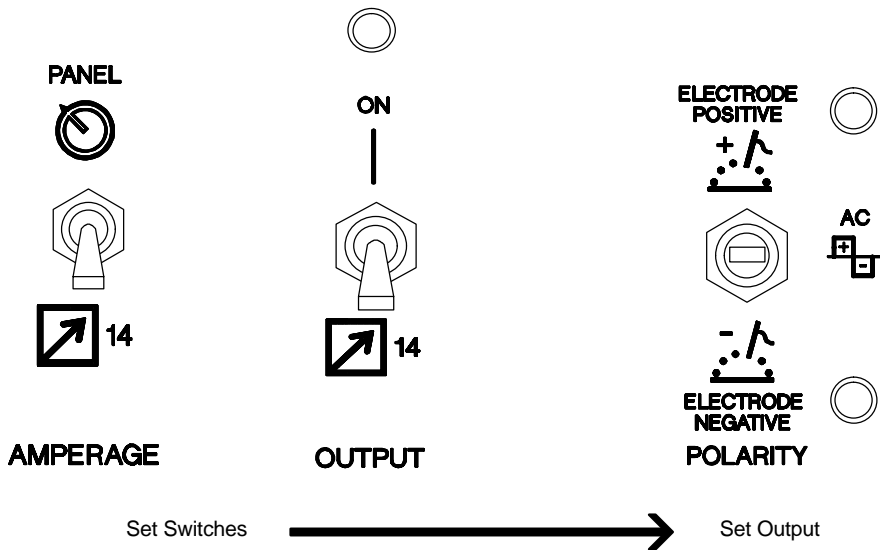
Set Polarity switch to AC, press pushbutton and use control and Amperage/Pre-set meter to adjust weld amperage for negative half of ac square wave.

When Polarity switch is in Electrode Negative position, pushbutton does not need to be pressed to adjust control.

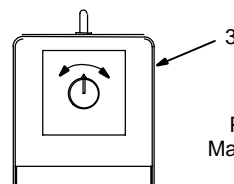
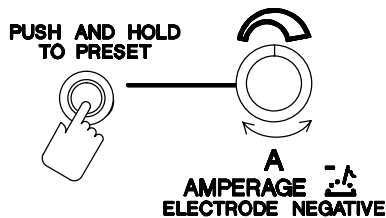
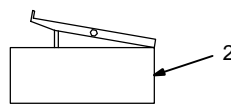
The controls require 3 turns to go from minimum to maximum, and may be adjusted while welding.

3-7. Examples Of Combination Remote Amperage Control

- 1 Fingertip Control
 - 2 Remote Foot Control
 - 3 Remote Hand Control
- See examples below.




Min=1A AC
Max=150 A EP/250 A EN

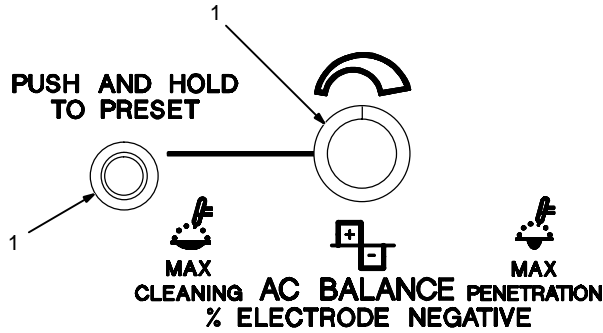


Min = 1 A AC
Percentage Of Range = 50%
Max = 75 A EP (50% of 1 to 150)/
125 A EN (50% of 1 to 250)

Set Desired Maximum Amperages → Adjust Remote Control

3-8. AC Balance Control


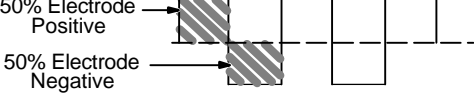
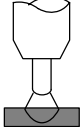

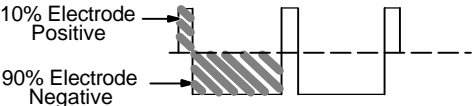
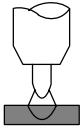

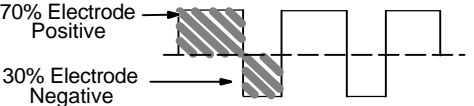
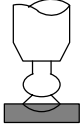
 If Polarity switch is not in AC, the Amperage/Presets meter goes blank when the pushbutton is pressed.



1 AC Balance Control And Pushbutton


Set Polarity switch to AC. Use pushbutton, control, and Amperage/Presets meter to change the ac output square wave. The control requires 3 turns to go from minimum to maximum.

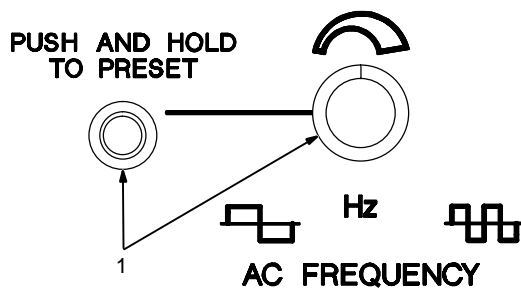
Set balance towards 30.0 to obtain more cleaning action of the workpiece, or towards 90.0 to obtain deeper penetration of the workpiece. 50.0 (balanced), provides equal penetration and cleaning action.

Balance Control Waveform Examples		
<p>Balanced</p> 	<p>50% Electrode Positive</p>  <p>50% Electrode Negative</p>	
<p>More Penetration</p> 	<p>10% Electrode Positive</p>  <p>90% Electrode Negative</p>	
<p>More Cleaning</p> 	<p>70% Electrode Positive</p>  <p>30% Electrode Negative</p>	

Ref. ST-151 180-B / S-0865

3-9. AC Frequency Controls

 If Polarity switch is not in AC, the Amperage/Presets meter goes blank when the pushbutton is pressed.

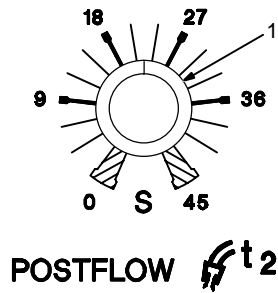


1 AC Frequency Control And Pushbutton

Set Polarity switch to AC. Press pushbutton and use control and Amperage/Presets meter to set ac frequency. Range is 40 to 400 hertz. The control requires 3 turns to go from minimum to maximum.

For most applications, increasing frequency improves arc stability.

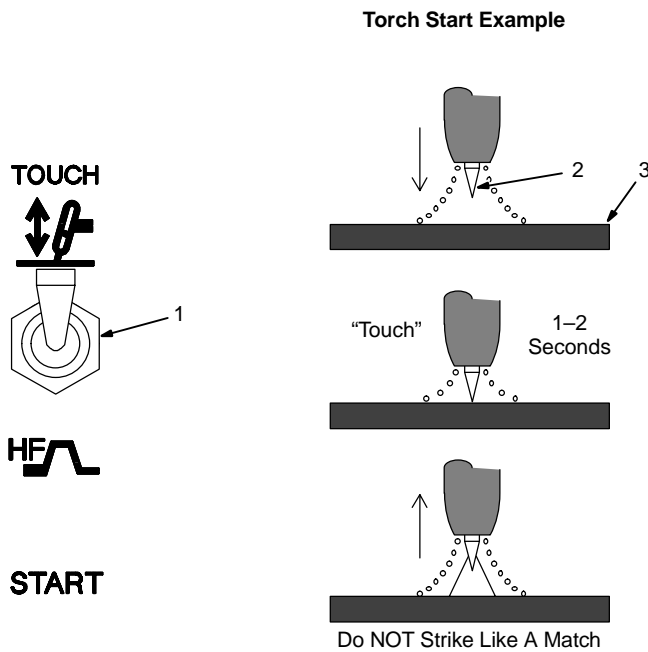
3-10. Postflow Time Control



1 Postflow Time Control

Use control to set the length of time in seconds gas flows after welding stops.

3-11. Start Switch



- 1 Start Switch
- 2 GTAW Electrode
- 3 Workpiece

With HF on, start arc as follows:

High frequency turns on to help start arc when contactor is energized. High frequency turns off when arc is started, and turns on whenever arc is broken to help restart arc.

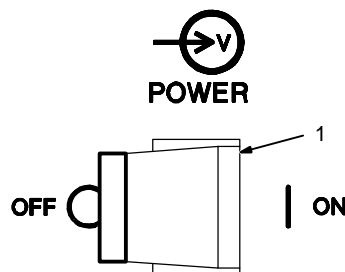
With Touch start on, set Polarity switch to AC or Electrode Negative, and start arc as follows:

Energize contactor, touch tungsten electrode to workpiece at weld start point, **hold electrode to workpiece for 1-2 seconds**, and slowly lift electrode.

Open-circuit voltage is not present before tungsten electrode touches workpiece; only a low sensing voltage is present. The output contactor energizes only after tungsten electrode is touching workpiece.

Ref. S-156 279

3-12. Power Switch

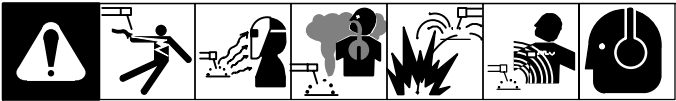


1 Power Switch

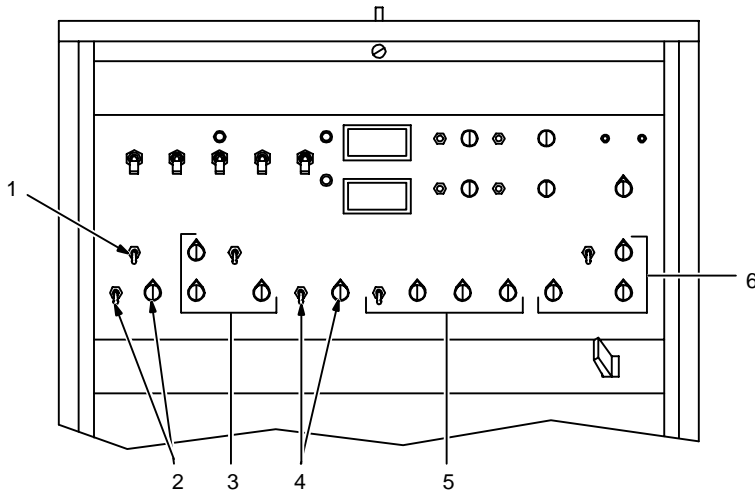
Use switch to turn unit On and Off.

Ref. ST-157 885

3-13. Optional Controls

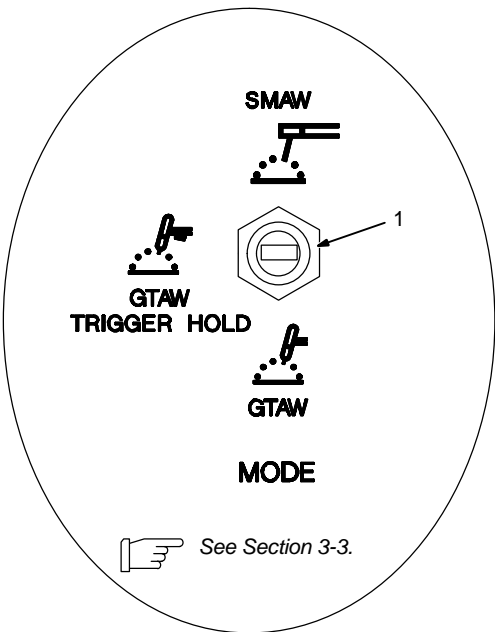


- 1 GTAW Trigger Hold Switch (See Section 3-14)
- 2 Preflow Time Controls (See Section 3-16)
- 3 Initial Sequence Controls (See Section 3-17)
- 4 Spot Time Controls (See Section 3-15)
- 5 Pulser Controls (See Section 3-18)
- 6 Final Sequence Controls (See Section 3-19)

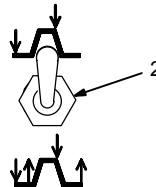


Ref. ST-800 312-A

3-14. GTAW Trigger Hold Switch (Optional)



GTAW TRIGGER HOLD



- 1 Mode Switch
Set Mode switch as shown.
- 2 GTAW Trigger Hold Switch

Up Position:

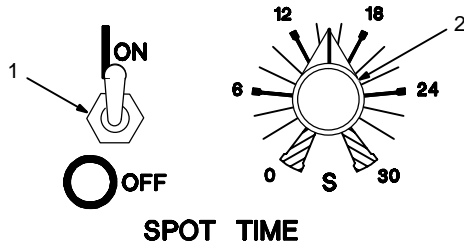
Press torch switch to start preflow and/or initial amperage. Release switch and arc stays on. Press switch again to start final slope.

Down Position:

Press torch switch to start preflow and/or initial amperage. Release switch to start initial slope and weld sequences. Press switch again to start final slope. Release switch to stop arc and start postflow.

Ref. ST-151 180-B / Ref. ST-158 132-A

3-15. Spot Time Controls (Optional)

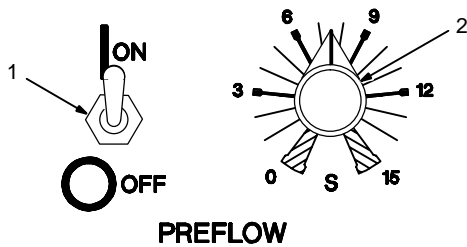


1 Spot Time Switch
 On – provides spot time;
 Off – provides no spot time
 Off – for SMAW.

2 Spot Time Control
 Use control to set time for GTAW spot welds. Spot time begins at arc initiation. If arc is broken during spot time cycle, timer stops but does not reset. When spot time has ended, weld output stops. Postflow starts when remote contactor is opened. Spot timer resets after contactor opens.

Ref. ST-158 132-A

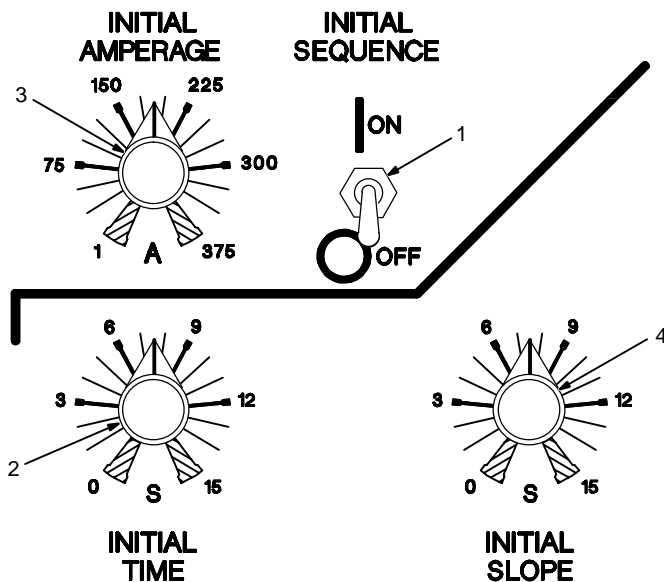
3-16. Preflow Time Controls (Optional)



1 Preflow Time Switch
 On – provides preflow time;
 Off – provides no preflow;
 Off – for SMAW.

2 Preflow Time Control
 Use control to set length of time gas flows before an arc is started.

3-17. Initial Sequence Controls (Optional)



1 Initial Sequence Switch
 On – Initial Sequence control;
 Off – No Initial Sequence control;
 Off – for SMAW.

2 Initial Time Control
 Use control to set length of time at initial amperage output before going to Amperage adjustment controls settings output.

3 Initial Amperage Control
 Use control to select amperage level for arc starting that is different than Amperage adjustment controls settings.

4 Initial Slope Time
 Use control to set time it takes amperage level to go from initial amperage level at end of initial time to weld sequence level set by Amperage adjustment controls.

3-18. Pulser Controls (Optional)

The diagram shows four pulser controls. Control 1 is a pulser switch with positions for FAST, SLOW, OFF, and PULSER. Control 2 is a Background Amperage dial with an inner scale (0-100%) and an outer scale (10-100). Control 3 is a Pulses Per Second dial with an inner scale (10-100) and an outer scale (1.6-10.0). Control 4 is a % On Time dial with an inner scale (5-95) and an outer scale (15-85).

1 Pulser Switch
 Off – no pulsing;
 Slow – pulsing, use inside scale of Pulses Per Second control;
 Fast – pulsing, use outside scale of Pulses Per Second control.
 Off – for SMAW.

2 Background Amperage Control
 Use control to select background amperage during pulsed welding. Background amperage is a percentage (0 – 100%) of peak amperage. Peak amperage is setting of the Amperage adjustment controls (see Section 3-6).

3 Pulses Per Second Control
 Use control to select frequency (number of pulses per second).

4 % On Time Control
 Use control to select pulse width, the percentage of a total pulse period that is at peak amperage.
 See Section 3-20 for an explanation of pulse waveforms.

3-19. Final Sequence Controls (Optional)

The diagram shows four final sequence controls. Control 1 is a final sequence switch with ON and OFF positions. Control 2 is a Final Amperage dial with an inner scale (0-100%) and an outer scale (10-100). Control 3 is a Final Slope dial with an inner scale (0-15) and an outer scale (3-12). Control 4 is a Final Time dial with an inner scale (0-15) and an outer scale (3-12).

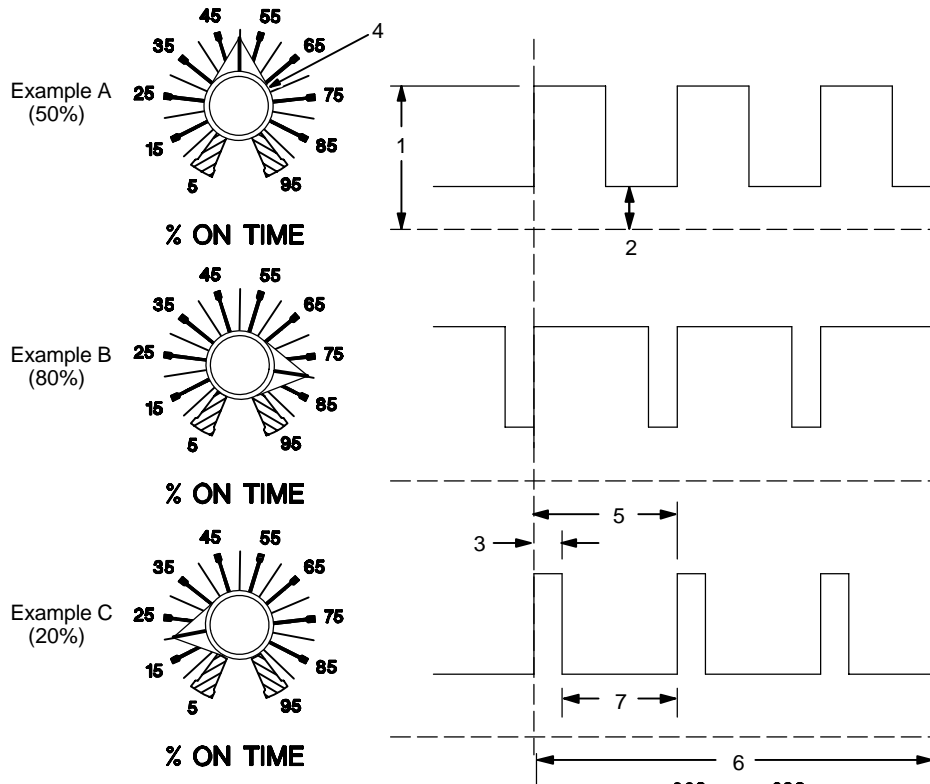
1 Final Sequence Switch
 On – Final Sequence control;
 Off – no Final Sequence control
 Off – for SMAW.

2 Final Amperage Control
 Use control to select final sequence amperage level.
 The numbers are a percentage of the Amperage adjustment control settings (see Section 3-6), and not an actual value.

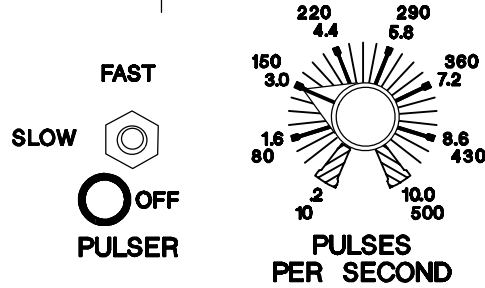
3 Final Slope Time
 Use control to set time to taper weld output from level of the Amperage adjustment controls settings to the Final Amperage level.

4 Final Time Control
 Use control to set length of time at final amperage before arc turns off.
 When using the final sequence circuit, set Postflow time control (see Section 3-10) for a longer time than the Final Time control.

3-20. Pulsed Weld Waveforms











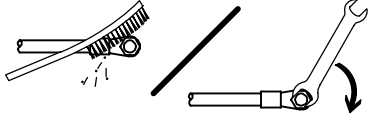
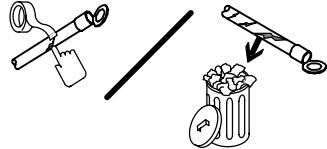
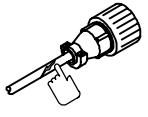
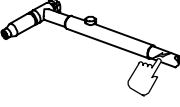

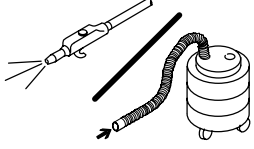
- 1 Peak Amperage
Peak amperage is the high pulse of welding current that heats the weld puddle.
- 2 Background Amperage
Background amperage is the low pulse of welding current that cools the weld puddle.
- 3 Pulse Width (Peak Amperage Period)
- 4 % On Time
The examples show three different control settings. The stiffness or wetness of the weld puddle is controlled by pulse width.
- 5 One Pulse Period
- 6 Pulses Per Second
All three examples show a control setting of three pulses per second.
- 7 Background Amperage Period



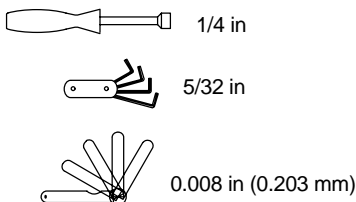
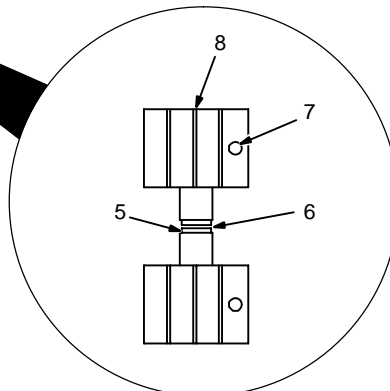
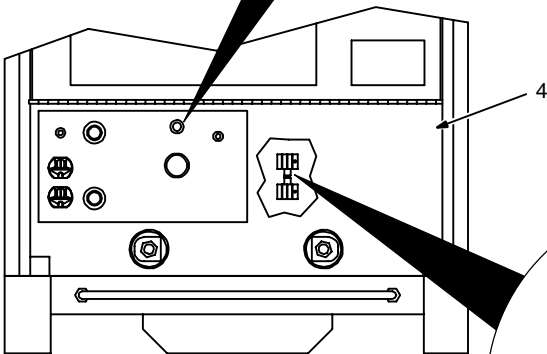
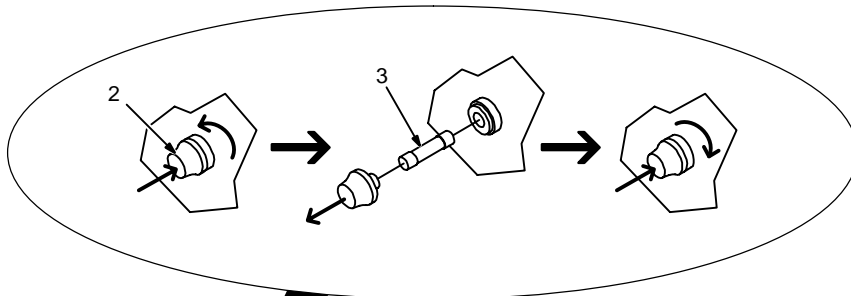
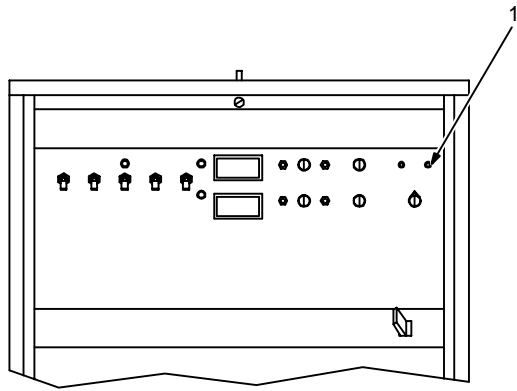
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SECTION 4 – MAINTENANCE & TROUBLESHOOTING

4-1. Routine Maintenance

				▲ Disconnect power before maintaining.	☞ Maintain more often during severe conditions.	
 3 Months						
		Replace Damaged Or Unreadable Labels		Replace Damaged Gas Hose		Clean And Tighten Weld Terminals
	→		→		Repair Or Replace Cracked Cables And Cords	
 6 Months						
				Blow Out Or Vacuum Inside		

4-2. Overload Protection And Adjusting Spark Gap



1 Over Voltage Shutdown Light
Light goes on when unit has shut down because of an output over voltage problem. This can only occur when Polarity switch is in AC position.

Check to make sure weld cables are routed as close together as possible, and that they are not too long (see Section 2-7). Momentarily turn Power switch Off and back On, and resume welding.

▲ Turn Off unit.

- 2 Fuse Holder Cover
- 3 Fuse (See Parts List)

If F1 opens, the unit shuts down. Replace F1 if open.

If fuse continues to open, contact Factory Authorized Service Agent.

▲ Turn Off unit, and disconnect input power.

Spark gap is preset at factory and normally requires no adjustment; only adjust if hard arc starting occurs.

- 4 Lower Front Panel

Remove screws and drop lower front panel. Remove cover plate to access spark gap.

- 5 Tungsten End Of Point

Do not clean or dress tungsten. Replace point if tungsten end disappears.

- 6 Spark Gap

Normal spark gap is 0.008 in (0.203 mm).

If spark gap is okay, reinstall cover plate and secure lower front panel. If adjustment is needed, continue as follows:

- 7 Adjustment Screw

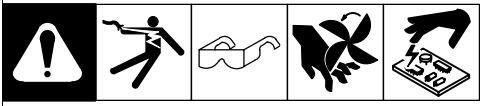
Loosen screw. Place feeler gauge of proper thickness in spark gap.

- 8 Pressure Point

Apply slight pressure at point until gauge is held firmly in gap. Tighten adjustment screw.

Reinstall cover plate and secure lower front panel.

4-3. Troubleshooting

	
Trouble	Remedy
No weld output; unit completely inoperative.	Place Power switch in On position (see Section 3-12).
	Place line disconnect switch in the On position (see Section 2-11).
	Check and replace line fuse(s) or reset circuit breaker (see Section 2-11).
	Check for proper input connections (see Section 2-11).
	Check for proper jumper link positions (see Section 2-10).
	Check fuse F1 and replace if necessary (see Section 4-2).
No weld output; fan on.	Place Output switch in On position, or place switch in Remote 14 position and connect remote contactor to Remote 14 receptacle (see Sections 3-1 and 2-8).
	Check, repair, or replace remote control.
No weld output; fan on; High Temperature light on.	Unit overheated. Allow unit to cool with fans on (see Section 2-3).
No weld output; Over Voltage light on.	Over voltage shutdown. Check weld cables, and turn Power switch Off and back On again (see Section 4-2).
Erratic or improper weld output.	Use proper size and type of weld cable (see Section 2-7).
	Clean and tighten all weld connections.
	Be sure Polarity switch is in proper position for welding process (see Section 3-2).
No control of weld output.	Place Output switch in On position, or place switch in Remote 14 position and connect remote contactor to Remote 14 receptacle (see Sections 3-1 and 2-8).
No output from duplex receptacle RC2.	Check, and reset circuit breaker CB1 if necessary (see Section 2-6).
Amperage/Preset meter goes blank when presetting Amperage, AC Balance, or AC Frequency.	Be sure Polarity switch is in AC position (see Section 3-2).
No high frequency; difficulty in establishing GTAW arc.	Check position of Start switch (see Section 3-11).
	Select proper size tungsten.
	Be sure that electrode holder cable is not close to any grounded metal.
	Check cables and torch for cracked insulation or bad connections. Repair or replace necessary parts.
	Check spark gaps and adjust if necessary (see Section 4-2).
Wandering arc – poor control of direction of arc.	Reduce gas flow rate.
	Select proper size tungsten.
	Properly prepare tungsten.
Tungsten electrode oxidizing and not remaining bright after conclusion of weld.	Shield weld zone from drafts.
	Increase postflow time (see Section 3-10).
	Check and tighten all gas fittings.
	Properly prepare tungsten.
	Replace torch parts if water has leaked into torch.

SECTION 5 – ELECTRICAL DIAGRAM

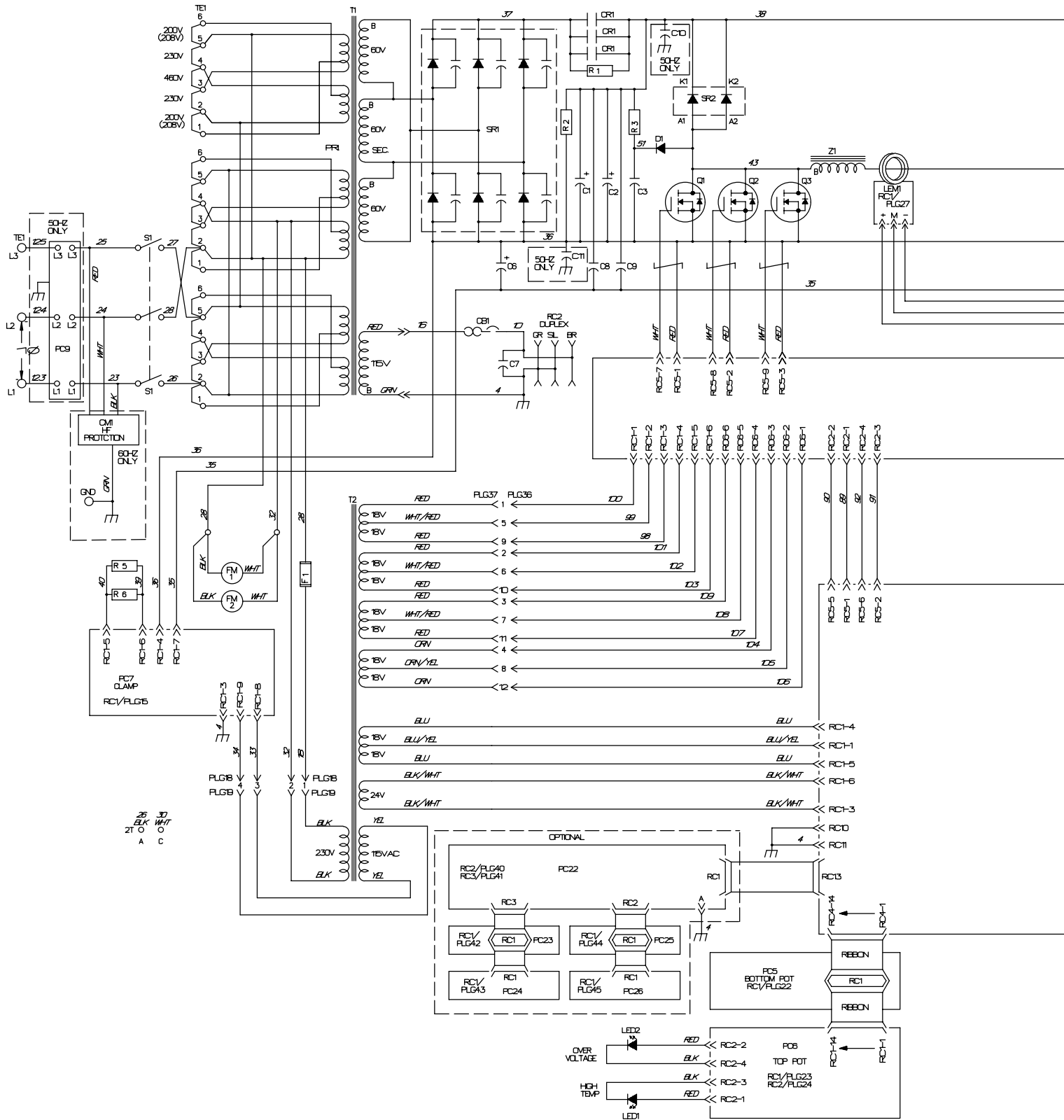
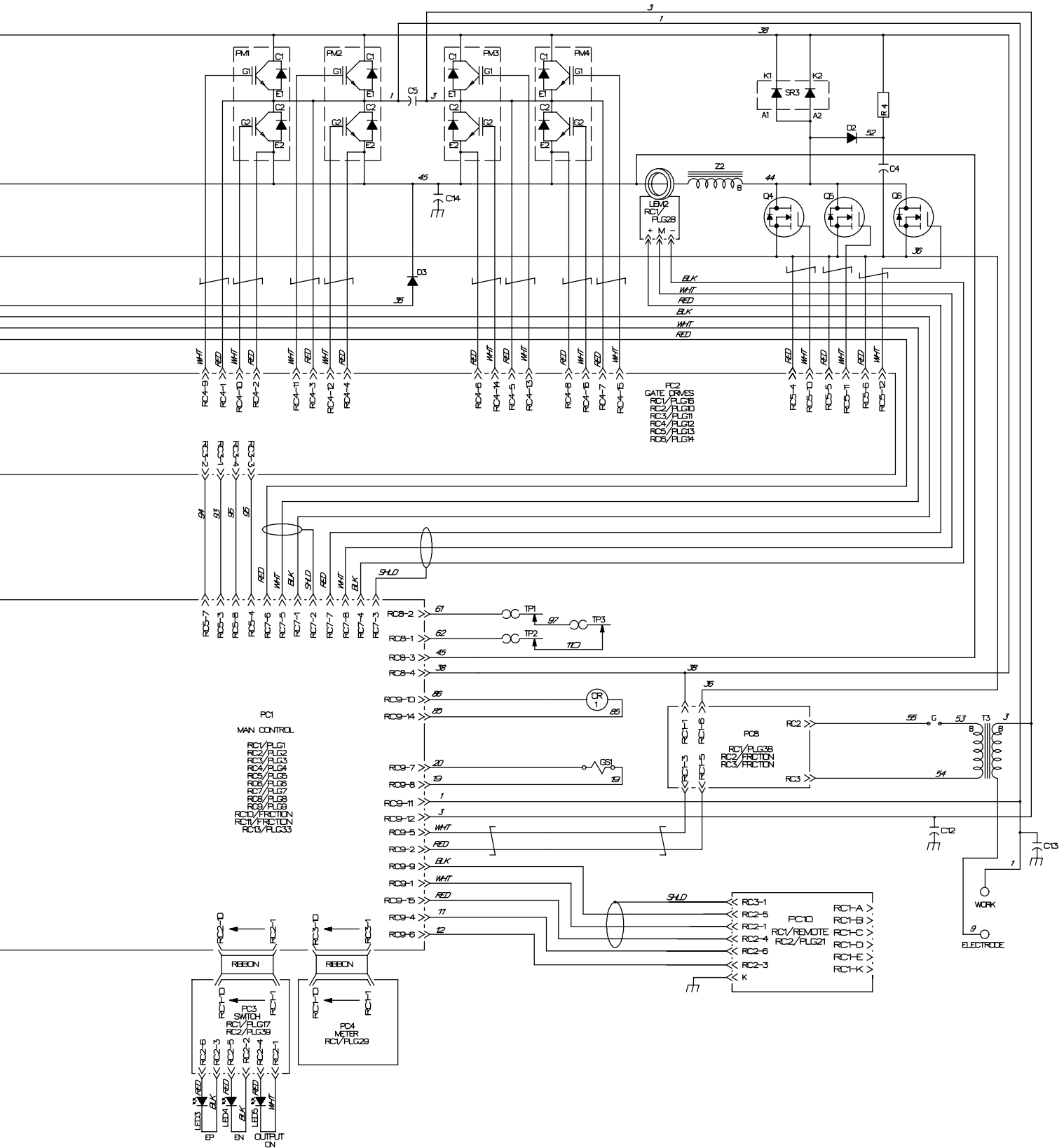



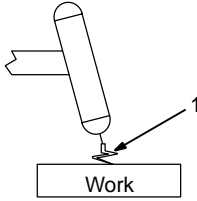
Figure 5-1. Circuit Diagram



SECTION 6 – HIGH FREQUENCY

6-1. Welding Processes Requiring High Frequency





Work


TIG

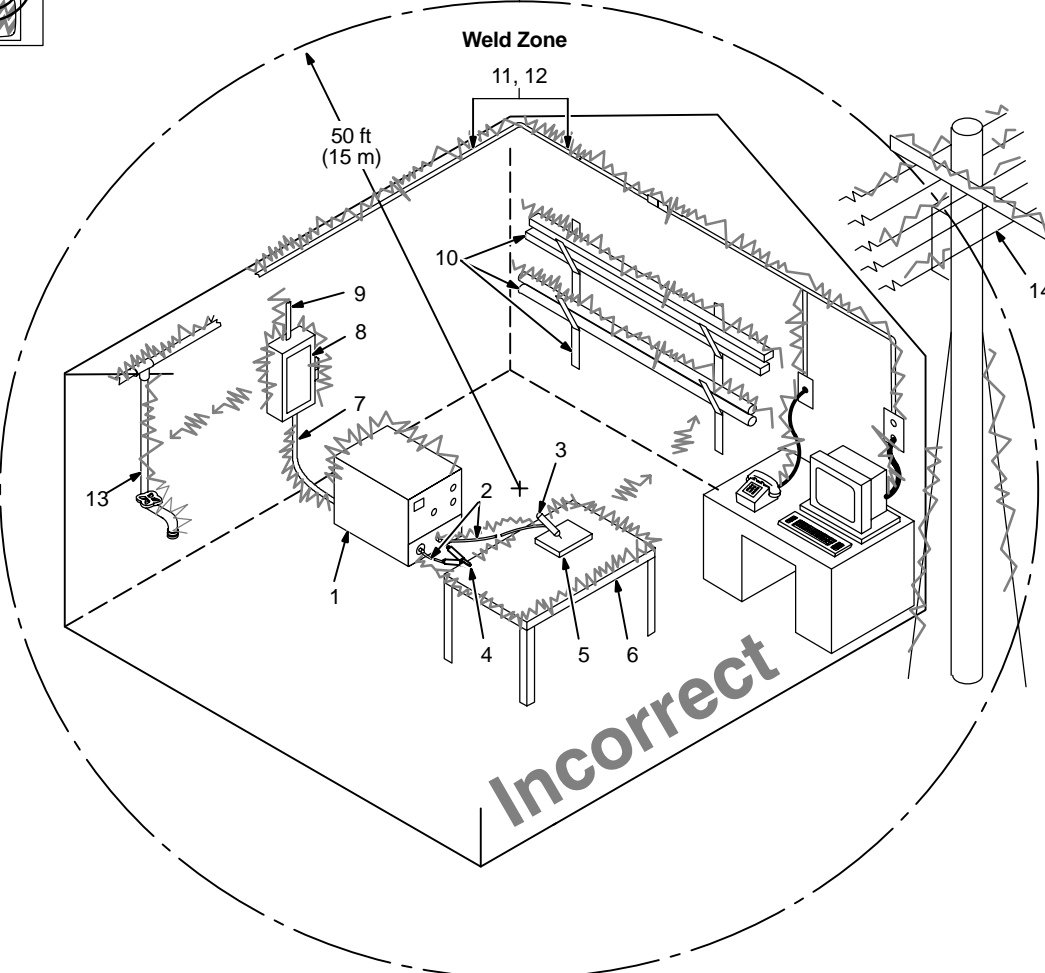
1 High-Frequency Voltage

TIG – helps arc jump air gap between torch and workpiece and/or stabilize the arc.

high_freq 12/96 – S-0693

6-2. Incorrect Installation





Sources of Direct High-Frequency Radiation

- 1 High-Frequency Source (welding power source with built-in HF or separate HF unit)
- 2 Weld Cables
- 3 Torch
- 4 Work Clamp
- 5 Workpiece
- 6 Work Table

Sources of Conduction of High Frequency

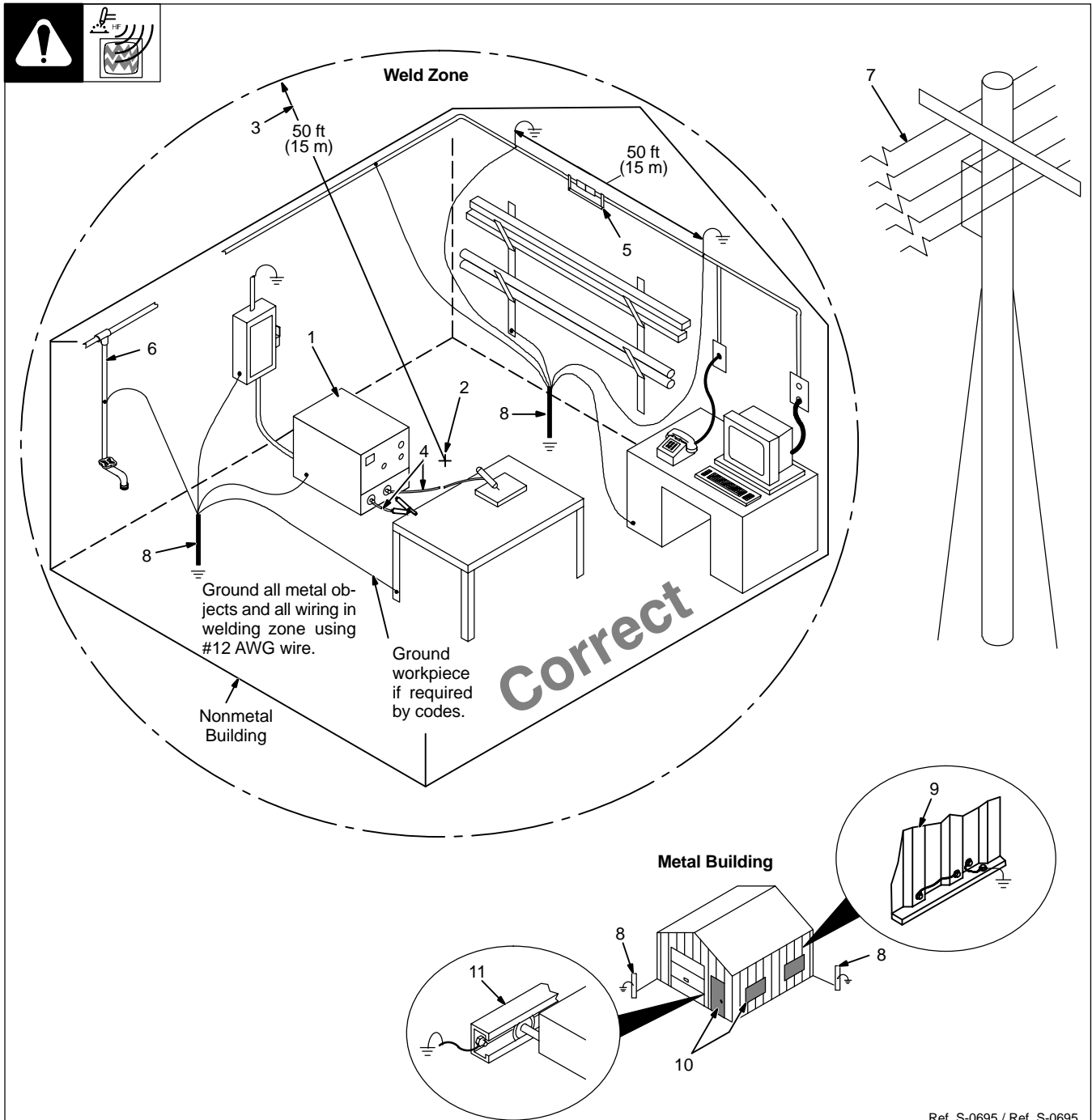
- 7 Input Power Cable
- 8 Line Disconnect Device
- 9 Input Supply Wiring

Sources of Reradiation of High Frequency

- 10 Ungrounded Metal Objects
- 11 Lighting
- 12 Wiring
- 13 Water Pipes and Fixtures
- 14 External Phone and Power Lines

S-0694

6-3. Correct Installation



- 1 High-Frequency Source (welding power source with built-in HF or separate HF unit)

Ground metal machine case, work output terminal, line disconnect device, input supply, and worktable.

- 2 Center Point of Welding Zone

Midpoint between high-frequency source and welding torch.

- 3 Welding Zone

A circle 50 ft (15 m) from center point in all directions.

- 4 Weld Output Cables

Keep cables short and close together.

- 5 Conduit Joint Bonding and Grounding

Electrically join (bond) all conduit sections using copper straps or braided wire. Ground conduit every 50 ft (15 m).

- 6 Water Pipes and Fixtures

Ground water pipes every 50 ft (15 m).

- 7 External Power or Telephone Lines

Locate high-frequency source at least 50 ft (15 m) away from power and phone lines.

- 8 Grounding Rod

Consult the National Electrical Code for specifications.

Metal Building Requirements

- 9 Metal Building Panel Bonding Methods

Bolt or weld building panels together, install copper straps or braided wire across seams, and ground frame.

- 10 Windows and Doorways

Cover all windows and doorways with grounded copper screen of not more than 1/4 in (6.4 mm) mesh.

- 11 Overhead Door Track

Ground the track.

Ref. S-0695 / Ref. S-0695

SECTION 7 – PARTS LIST

☐ Hardware is common and not available unless listed.

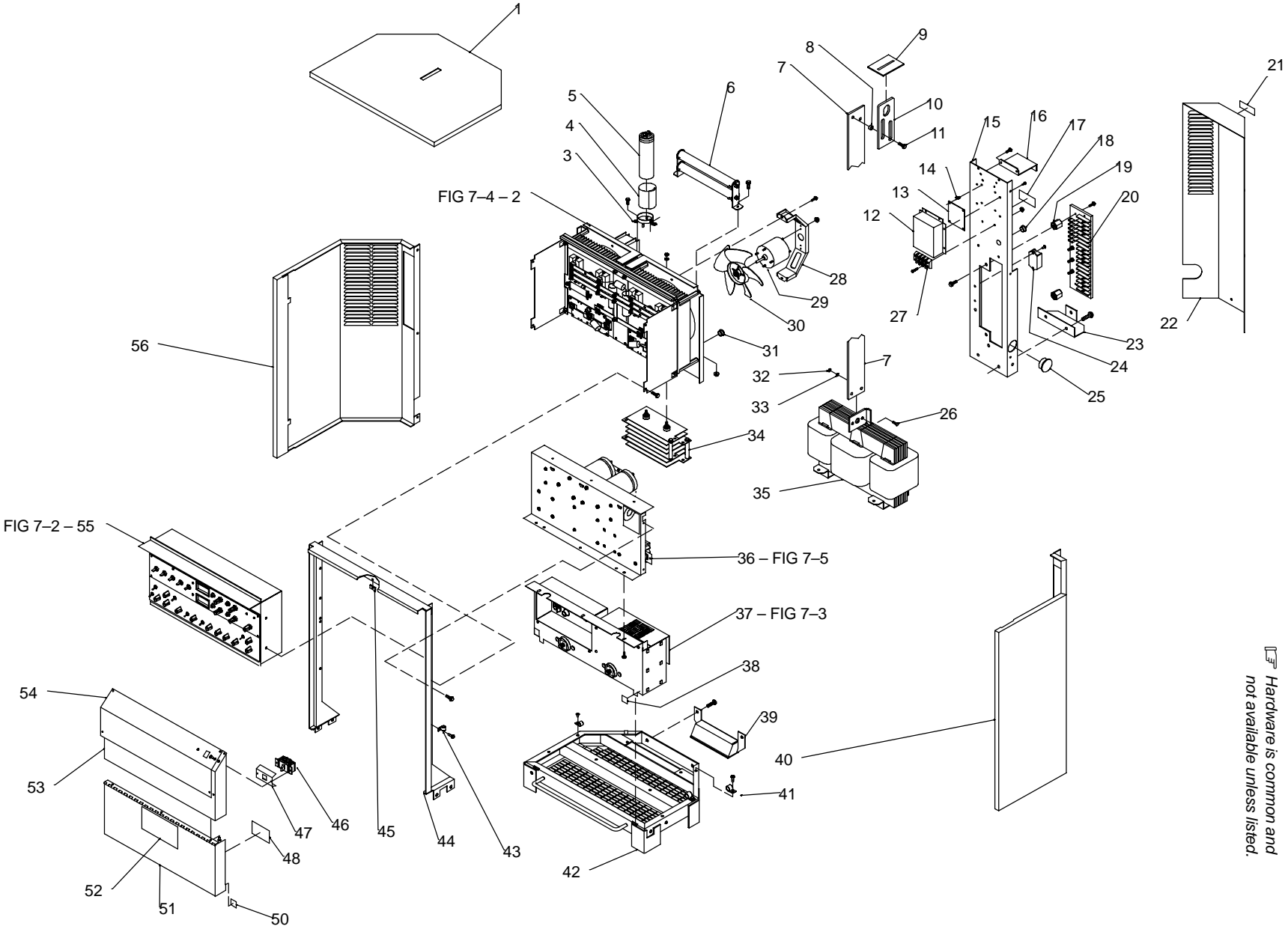


Figure 7-1. Main Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 7-1. Main Assembly				
1		182 126	COVER, top	1
2		Fig 7-4	HEAT SINK & BAFFLE ASSEMBLY	1
3		006 426	CLAMP, capacitor 2.000dia	1
4		168 976	INSULATOR, capacitor	1
5	C6	093 259	CAPACITOR, elctlt 1000uf 400VDC	1
6	R5,6	157 981	RESISTOR, WW fxd 375W 161-161 ohm dual	1
7		151 179	SUPPORT, lift eye	1
8		155 903	BUSHING, lift eye	2
9		026 627	GASKET, lift eye	1
10		155 905	LIFT EYE	1
11		086 863	SCREW, .375-16 x 1.000hexwhd	2
12	PC7	199 825	KIT, circuit card secondary inverter clamp PC7 and cover	1
	PLG15	148 439	CONNECTOR & SOCKET	1
14		110 375	STAND-OFF SUPPORT, PC card No. 6 screw	4
15		+151 158	BRACE, rear	1
16		152 582	BRACKET, mtg panel rear	1
17		126 026	LABEL, warning electric shock can kill	1
18		010 493	BUSHING, snap-in nyl .625 ID x .875mtg hole	1
19		025 248	STAND-OFF, insul .250-20 x 1.250 lg x .437thk	2
20	TE1	038 138	TERMINAL ASSEMBLY, pri 3ph triple voltage (60Hz) (Fig 7-6)	1
20	TE1	153 017	TERMINAL ASSEMBLY, pri 3ph dual voltage (50Hz) (Fig 7-6)	1
21		109 035	LABEL, warning electric shock can kill	1
22		+157 875	COVER, channel rear	1
23		144 758	BRACKET, mtg panel rear	1
24	CM1	158 197	MODULE, capacitor	1
25		148 253	BLANK, snap-in nyl 1.750mtg hole	1
26		157 320	SCREW, .375-16 x .750hexwhd	2
27	2T	038 861	BLOCK, term 20A 3P	1
28		187 807	BRACKET, mtg motor fan	2
29	FM1,2	148 808	MOTOR, fan 230V 50/60Hz 1550RPM .312dia shaft	2
30		150 783	BLADE, fan 9 in 5wg 39deg .312 bore CW	2
31		088 731	BUSHING, snap-in nyl .375 ID x .500mtg hole	1
32		601 872	NUT, .375-16 stl	2
33		602 213	WASHER, lock .380 ID stl split	2
34	SR1	142 504	RECTIFIER, si 3ph 300A 400PIV	1
35	T1	157 967	TRANSFORMER, pwr main 200/230/460 (60Hz)	1
35	T1	164 950	TRANSFORMER, pwr main 230/460/575 (60Hz)	1
35	T1	164 954	TRANSFORMER, pwr main 380/415 (50Hz)	1
	TP3	119 581	THERMOSTAT, NC	1
36		Fig 7-5	PANEL, mtg components	1
37		Fig 7-3	HF PANEL ASSEMBLY	1
38		145 784	TAPE, adh dual lock type 400 1.000 wide (order by ft)	1ft
39		144 762	FOOT, base rear	1
40		151 161	PANEL, side RH	1
41		020 279	CLAMP, stl cush .750dia x .281mtg hole	3
42		157 867	BASE	1
43		010 141	CLAMP, nyl .250 clamp dia	1
44		163 108	UPRIGHT, front	1
45		010 357	NUT, No. 12 speed x 1.000 lg stl	1
46	S1	128 756	SWITCH, tgl 3PST 40A 600VAC	1
47		146 684	INSULATOR, switch pwr	1
48		127 363	LABEL, warning electric shock can kill	1
49		+164 348	INSULATOR, output stud	1
50		145 783	TAPE, adh dual lock type 170 1.000 wide (order by ft)	1ft
51		+144 753	DOOR, HF control	1
52		134 327	LABEL, warning general precautionary	1
53		151 162	PANEL, door switch	1


Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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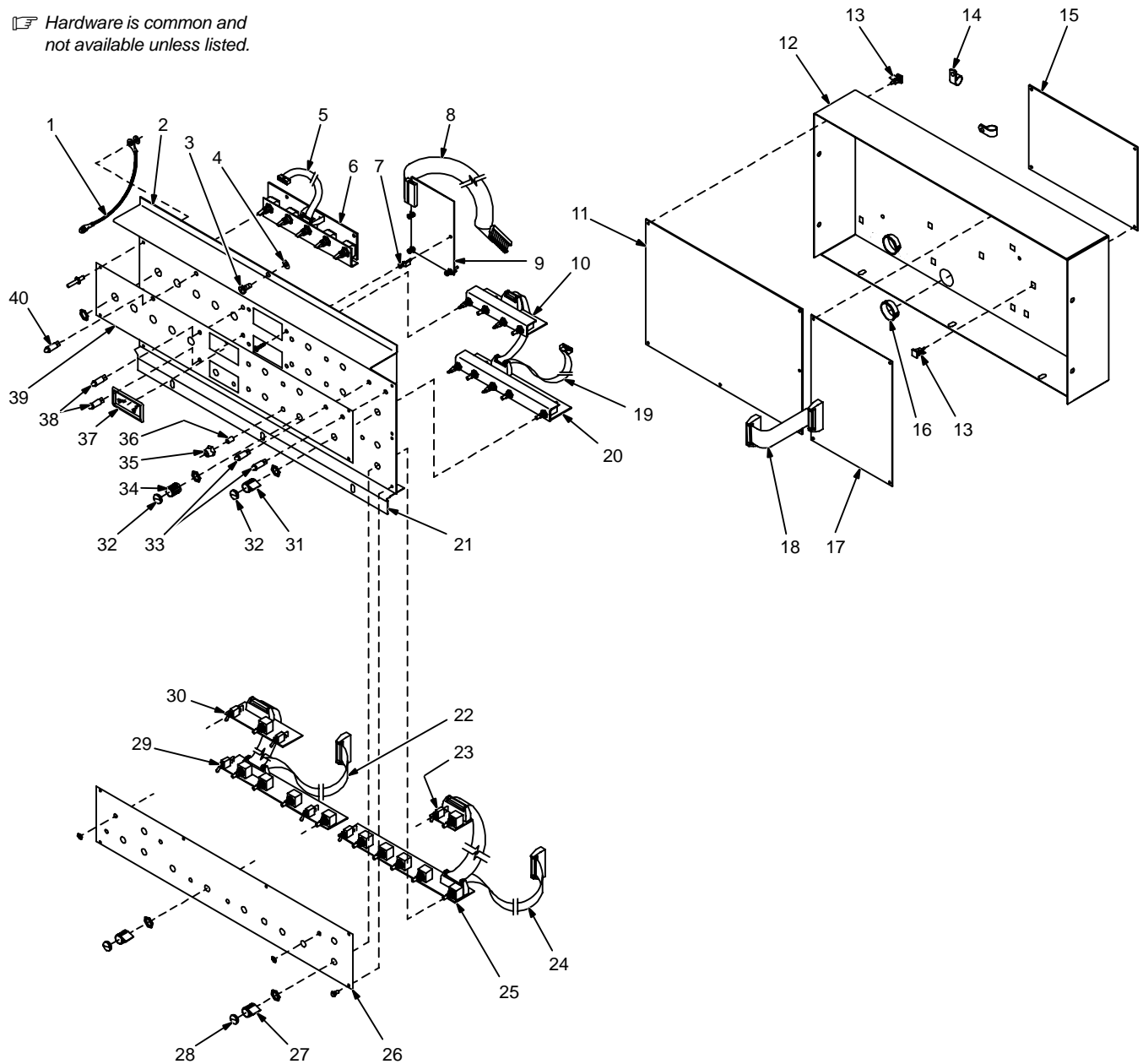
Figure 7-1. Main Assembly (Continued)

... 54	NAMEPLATE, (order by model and serial number)	1
... 55	Fig 7-2 .. MODULE, electronics box	1
... 56	151 160 .. PANEL, side LH	1

+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.



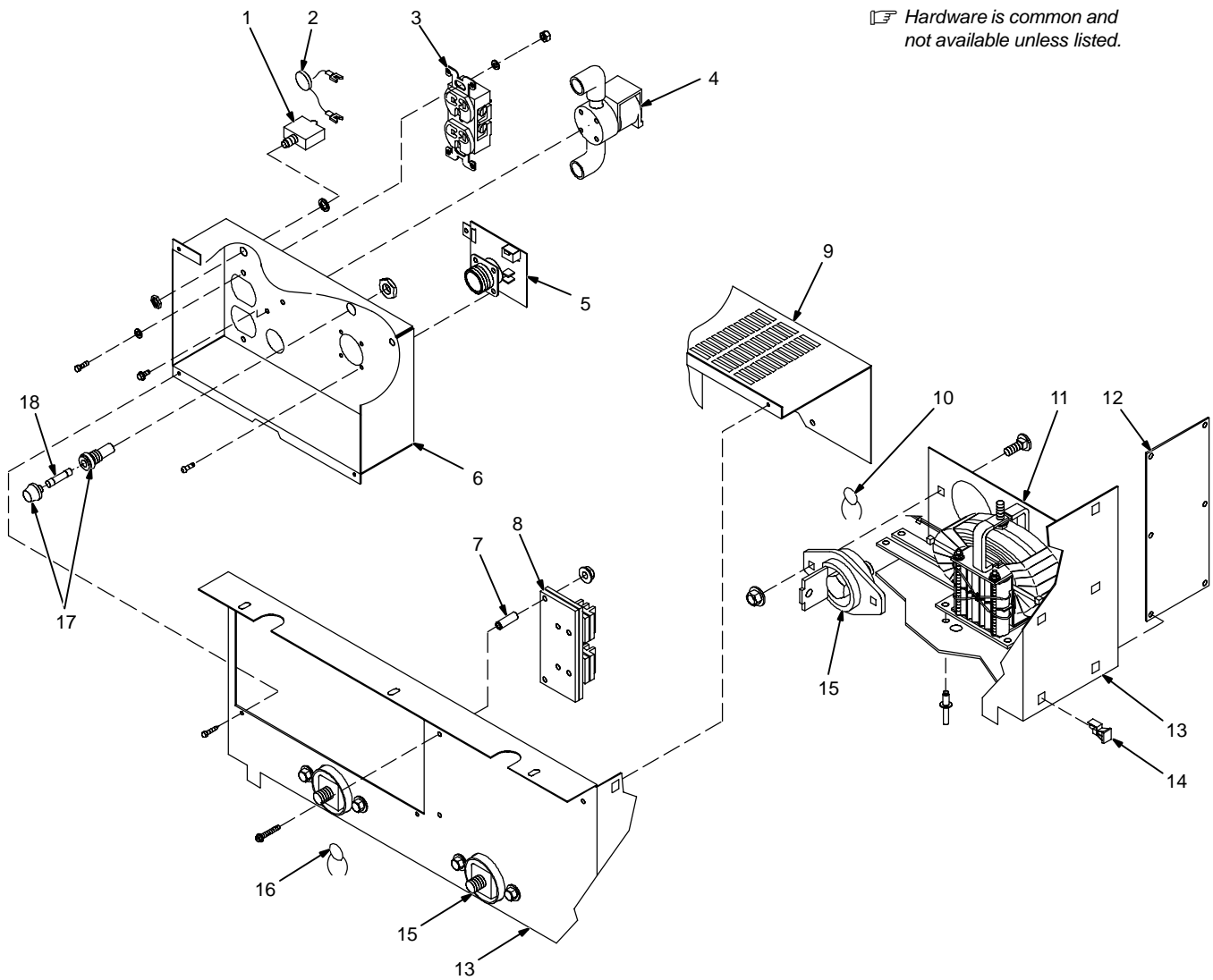
ST-800 553-A

Figure 7-2. Module, Electronics Box

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 7-2. Module, Electronics Box (Fig 7-1 Item 55)				
1		107 551	.. STRAIN RELIEF, cover	2
2		158 190	.. DOOR, electronics box	1
3		010 853	.. FASTENER, screw sltd hd No. 12	1
4		010 855	.. RETAINER, screw No. 12	1
5	PLG2,17	164 738	.. CABLE, ribbon 10posn	1
6	PC3	164 775	.. CIRCUIT CARD, switch	1
	PLG39	153 501	.. CONNECTOR & SOCKETS	1
7		110 375	.. STAND-OFF SUPPORT, PC card No. 6 screw	4
8	PLG3,29	155 511	.. CABLE, ribbon 10posn 16.000 lg	1
9	PC4	164 606	.. CIRCUIT CARD, meter	1
10	PC6	164 771	.. CIRCUIT CARD, potentiometer top	1
	PLG24	164 899	.. CONNECTOR & SOCKETS	1
11	PC1	186 073	.. CIRCUIT CARD, control	1
	PLG5	148 439	.. CONNECTOR & SOCKETS	1
	PLG7	168 847	.. CONNECTOR & SOCKETS	1
12		183 656	.. ELECTRONICS BOX	1
13		168 262	.. STAND-OFF SUPPORT, PC card .312/.375	17
14		010 146	.. CLAMP, nyl .625 clamp dia	2
15	PC2	189 399	.. CIRCUIT CARD, driver	1
	PLG10,11	164 899	.. CONNECTOR & SOCKETS	1
	PLG12	131 052	.. CONNECTOR & SOCKETS	1
	PLG13	130 203	.. CONNECTOR & SOCKETS	1
	PLG14,16	153 501	.. CONNECTOR & SOCKETS	1
16		010 494	.. BUSHING, snap-in nyl 1.000 ID x 1.125mtg hole	2
17	PC22	◆164 514	.. CIRCUIT CARD, option panel	1
18	PLG33,46	◆158 349	.. CABLE, ribbon 24posn 4.000 in	1
19	PLG4,22,23	164 739	.. CABLE, ribbon 14posn	1
20	PC5	164 767	.. CIRCUIT CARD, potentiometer bottom	1
21		158 191	.. STRIP, electronics box	1
22	PLG40,44,45	◆158 347	.. CABLE, ribbon 24posn 20.000 in	1
23	PC24	◆158 050	.. CIRCUIT CARD, switch/potentiometer	1
24	PLG41-43	◆158 348	.. CABLE, ribbon 24posn 14.000 in	1
25	PC23	◆158 047	.. CIRCUIT CARD, switch/potentiometer	1
26		158 324	.. PLATE, panel control	1
26		◆158 132	.. PLATE, sequencer	1
27		◆115 360	.. KNOB, arrow	11
28		◆115 359	.. CAP, peaked	11
29	PC25	◆158 056	.. CIRCUIT CARD, switch/potentiometer	1
30	PC26	◆158 053	.. CIRCUIT CARD, switch/potentiometer	1
31		154 339	.. KNOB, arrow	1
32		115 359	.. CAP, peaked	5
33	LED1,2	170 928	.. LED, yellow 10mA 5V	2
34		164 689	.. KNOB, plastic	4
35		153 195	.. NUT, .250-40	4
36		150 981	.. BUTTON, switch black	4
37		071 230	.. BEZEL/FILTER, black bezel/red filter 2.000 viewing	2
38	LED3,4	170 927	.. LED, green 10mA 5V	2
39		151 180	.. PLATE, ident control	1
40	LED5	170 926	.. LED, blue 45mA 3.4V	1

◆Part of 042 888 Optional Aerowave Full Feature Module.

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.




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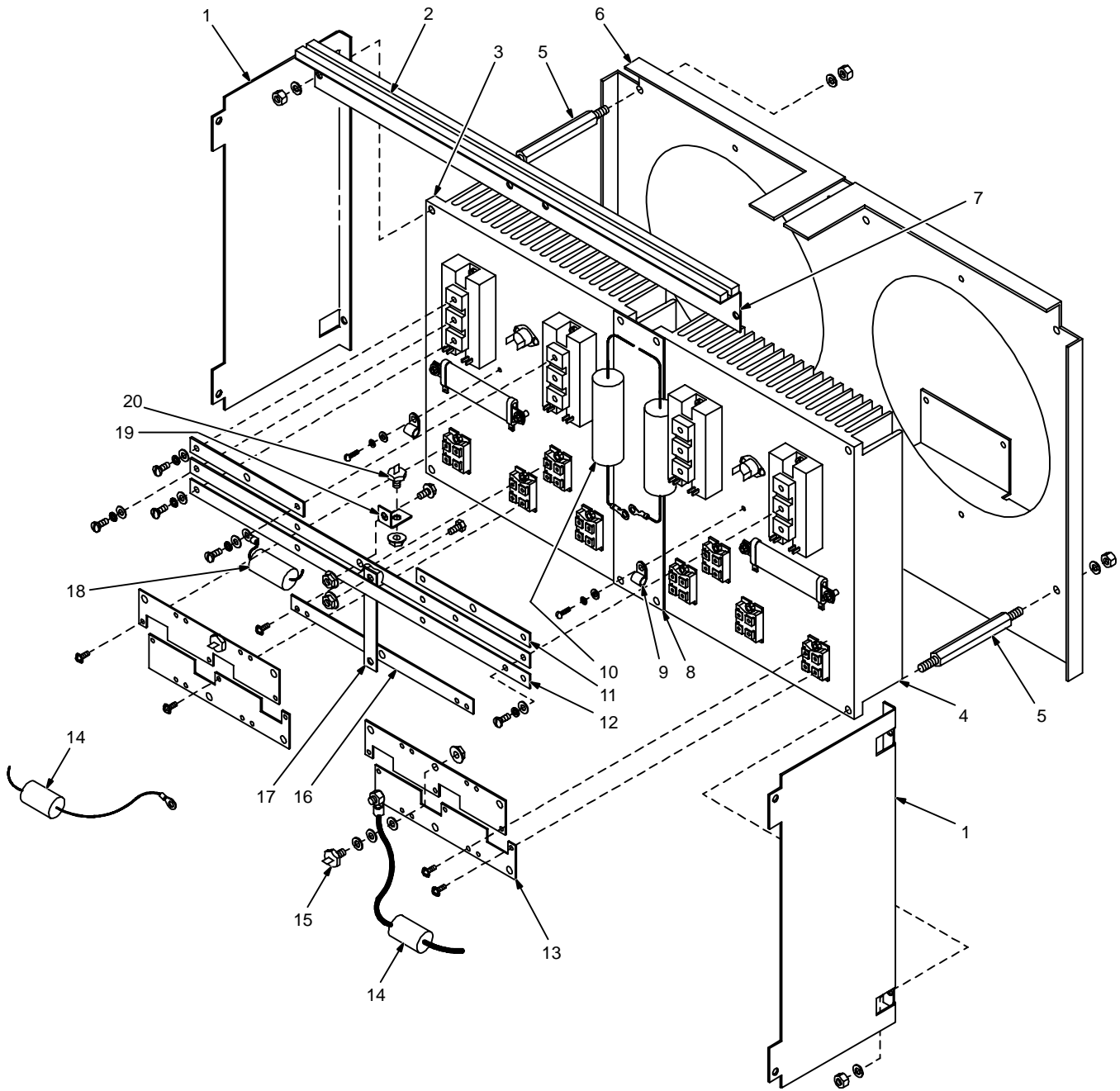
Figure 7-3. HF Panel Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 7-3. HF Panel Assembly (Fig 7-1 Item 37)				
1	CB1	093 995	CIRCUIT BREAKER, man reset 1P 15A 250VAC	1
2	C7	135 664	CAPACITOR, cer disc .01uf 500VAC	1
3	RC2	604 176	RECEPTACLE, str dx grd 2P3W 15A 125V	1
4	GS1	174 890	VALVE ASSEMBLY, 24VAC 2 way 1/4 IPS 1/8 orf	1
5	PC10,RC2	157 959	CIRCUIT CARD ASSEMBLY, connector/receptacle	1
6		185 684	PANEL, HF	1
7		103 947	TUBING, stl .312 OD x 17ga wall x .937 lg	2
8	G	181 464	SPARK GAP ASSEMBLY	2
9		151 173	COVER, HF	1
10	C12	185 640	CAPACITOR ASSEMBLY	1
11	T3	155 792	ARC STARTER, pulsed HF	1
12	PC8	158 137	CIRCUIT CARD, arc starter	1
	PLG38	153 501	CONNECTOR & SOCKETS	1
13		151 169	PANEL, front HF control box	1
14		134 201	STAND-OFF SUPPORT, PC card .312/.375	6
15		039 047	TERMINAL, pwr output red (consisting of)	3
		601 879	NUT, .500-13 x .44 high stl	1
		601 880	NUT, .500-13 x .31 high stl	1
16	C13	132 433	CAPACITOR ASSEMBLY	1
17		046 432	HOLDER, fuse mintr .250 x 1.250	1
18	F1	*012 643	FUSE, mintr gl slo-blo 1A 250V	1
	PLG30	152 249	CONNECTOR & SOCKETS	1
	PLG31	168 846	CONNECTOR & PINS	1

*Recommended Spare Parts.

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.



ST-800 683

Figure 7-4. Heat Sink & Baffle Assembly


Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 7-4. Heat Sink & Baffle Assembly (Fig 7-1 Item 2)				
1		157 879	BRACKET, mtg heat sink	2
2		603 115	WEATHERSTRIPPING, adh .125 x .375 (order by ft)	4ft
3		157 873	HEAT SINK, LH (consisting of)	1
4		157 872	HEAT SINK, RH (consisting of)	1
	PM1-4	197 470	KIT, transistor IGBT module	2
	Q1-6	185 946	KIT, transistor mosfet	3
	R3,4	155 967	RESISTOR, WW fxd 55W 10 ohm	1
	SR2,3	185 940	KIT, didoe fast recovery	1
	TP1,2	032 810	THERMOSTAT, NC	1
		151 168	HEAT SINK, mtg components	1
5		157 880	STAND-OFF, heat sink	8
6		157 871	BAFFLE, fan	1
7		168 314	BAFFLE, top heat sink	1
8		168 313	BAFFLE, center heat sink	1
9		010 142	CLAMP, nyl .312 clamp dia	2
10	C8,9	164 748	CAPACITOR, polyp film 3.5uf 600VDC	2
11		151 308	BUS BAR, transistor module 1/16 x 5/8 x 5-3/4	2
12		151 305	BUS BAR, transistor module 1/16 x 5/8 x 17-1/4	2
13		151 304	BUS BAR, transistor module	4
14	C3,4	158 214	CAPACITOR, polyp film 1.5uf 250VDC	2
15	D1,2	155 351	DIODE, ultra-fast recovery 30A 200V RP	2
16		151 307	BUS BAR, transistor module 1/16 x 5/8 x 9-1/4	1
17		164 349	BUS BAR, transistor module 1/16 x 5/8 x 4-3/8	1
18	C5	158 215	CAPACITOR, polyp film .5uf 600VDC	1
19		168 312	BUS BAR, diode	1
20	D3	144 216	DIODE, fast recovery 85A 600V	1
	PLG8	164 899	CONNECTOR & SOCKETS	1
	PLG35	168 809	CONNECTOR & PINS	1

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.

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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Figure 7-5. Panel, Mtg Components (Fig 7-1 Item 36)

1	LEM1,2	124 684	TRANSDUCER, current 300A module supply	2
	PLG27,28	130 204	CONNECTOR & SOCKETS	2
2		141 690	GROMMET, screw No. 8/10 panel hole .281sq .187 high	4
3		164 347	BRACKET, mtg LEM	2
4	T2	183 671	TRANSFORMER, control	1
	PLG1	153 501	CONNECTOR & SOCKETS	1
	PLG18	168 809	CONNECTOR & PINS	1
	PLG19	164 899	CONNECTOR & SOCKETS	1
	PLG36	168 845	CONNECTOR & PINS	1
	PLG37	168 847	CONNECTOR & SOCKETS	1
5		164 718	MOUNT, dual stud rbr .250-20 x .500 lg x .750 high x 1.000dia	4
6	Z1,2	152 599	STABILIZER	1
7		022 160	CLAMP, capacitor 3.000dia	2
		168 976	INSULATOR, capacitor	2
8	C1,2	150 801	CAPACITOR, elclt 12000uf 150VDC	2
9		151 303	BUS BAR, capacitors	2
10		155 642	SCREW, set .250-28 x 1.000 cup pt sch stl	4
11	R2	154 132	RESISTOR, WW fxd 30W 1K ohm	1
12	R1	141 424	RESISTOR, WW fxd 30W 25 ohm	1
13		157 869	PANEL, mtg components	1
14	CR1	188 009	CONTACTOR, def prp 40A 3P 24VAC	1

 Hardware is common and not available unless listed.

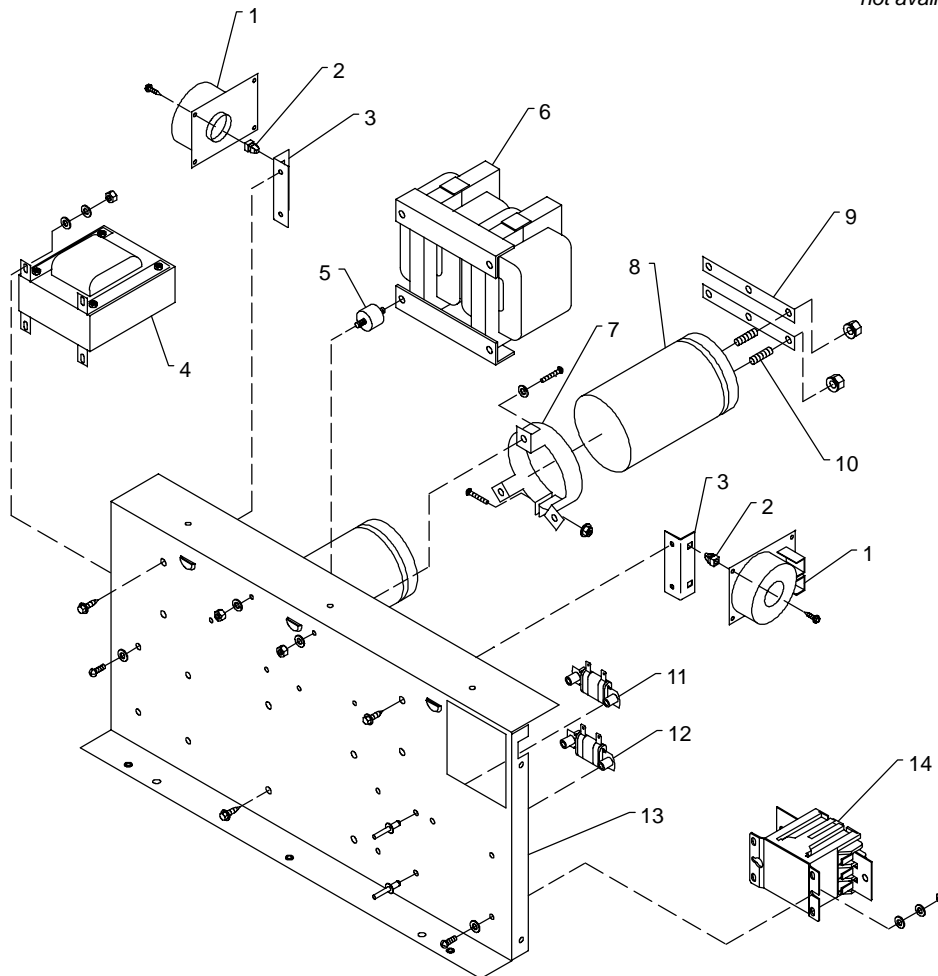


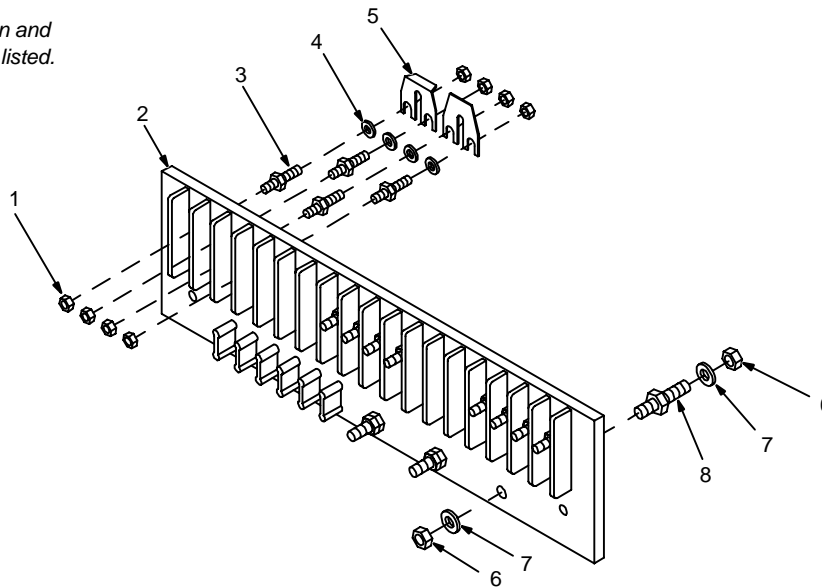
Figure 7-5. Panel, Mtg Components

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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.

Item No.	Part No.	Description	Quantity
Figure 7-6. Terminal Assembly, Primary (Fig 7-1 Item 20)			038 138 153 017
1	601 835	NUT,10-32 brs	36 24
2	038 058	TERMINAL BOARD, primary	1 1
3	038 887	STUD, pri bd brs 10-32 x 1.375	18 12
4	010 913	WASHER, flat .218 ID brs	18 12
5	038 618	LINK, jumper term bd pri	6 6
6	601 836	NUT, .250-20 brs	6 6
7	010 915	WASHER, flat .250 ID brs	6 6
8	038 888	STUD, pri bd brs .250-20 x 1.500	3 3

☞ Hardware is common and not available unless listed.



SA-138 574

Figure 7-6. Terminal Assembly, Primary

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[®]

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
 - * Intelligig
 - * 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[®] 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[®] 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 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.

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