



OM-357 185796D

February 1998

Processes



TIG (GTAW) Welding



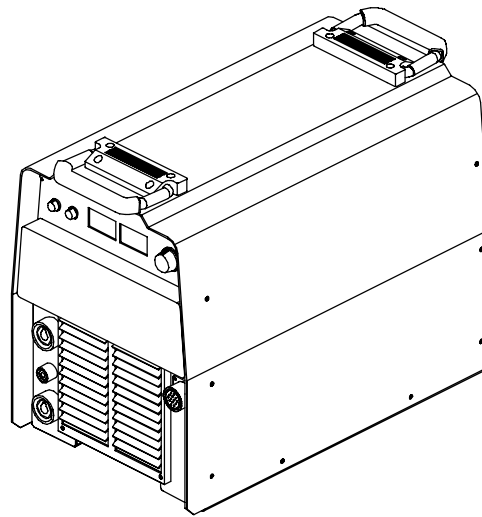
Stick (SMAW) Welding

Description



Arc Welding Power Source

Dynasty™ DX



With Auto-Link®



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OWNER'S MANUAL

From Miller to You

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

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



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

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



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 call 1-800-4-A-Miller.



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.



TRUE BLUE[®]

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Effective January 1, 1998
(Equipment with a serial number preface of "KJ" or newer)

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

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

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

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

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
 - * Intelligent
 - * Engine Driven Welding Generators
(NOTE: Engines are warranted separately by the engine manufacturer.)
3. 1 Year — Parts and Labor
 - * Motor Driven Guns (w/exception of Spoolmate 185)
 - * Process Controllers
 - * Positioners and Controllers
 - * Automatic Motion Devices
 - * Robots
 - * IHPS Power Sources
 - * Water Coolant Systems
 - * HF Units
 - * Grids
 - * Spot Welders
 - * Load Banks
 - * SDX Transformers
 - * Miller Cyclomatic Equipment
 - * Running Gear/Trailers
 - * Plasma Cutting Torches (except APT, ZIPCUT & PLAZCUT Models)
 - * Deutz Engines (outside North America)
 - * 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 and Labor
 - * MIG Guns/TIG Torches

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

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1. 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.
2. Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear.
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.

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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.

Warranty Questions?

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parts can be in your
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Need fast answers to the
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Contact your distributor.
The expertise of the
distributor and Miller is
there to help you, every
step of the way.
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.

For practical information on
welding, process applica-
tions, and Miller products,
visit our website at

www.miller-
welds.com

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

TABLE OF CONTENTS

SECTION 1 – SAFETY PRECAUTIONS	1
1-1. Symbol Usage	1
1-2. Arc Welding Hazards	1
1-3. Additional Symbols for Installation, Operation, and Maintenance	3
1-4. Principal Safety Standards	3
1-5. EMF Information	4
SECTION 1 – CONSIGNES DE SECURITE	5
1-1. Signification des symboles	5
1-2. Dangers relatifs au soudage à l'arc	5
1-3. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance	7
1-4. Principales normes de sécurité	8
1-5. Information sur les champs électromagnétiques	8
SECTION 2 – INTRODUCTION	9
2-1. Specifications	9
2-2. Duty Cycle and Overheating	9
2-3. Volt-Ampere Curves	10
2-4. Selecting a Location	11
2-5. Weld Output Terminals and Selecting Cable Sizes	12
2-6. Remote 14 Receptacle Information	12
2-7. 115 Volts AC Duplex Receptacle (Optional) and Power Switch Location	13
2-8. Electrical Service Guide	13
2-9. Connecting Input Power	14
SECTION 3 – OPERATION	15
3-1. Controls	15
3-2. AC/Balance Control	16
3-3. Meter Function	16
3-4. Output Switch Settings	16
3-5. Sequence Control	17
3-6. Lift-Arc and HF TIG Start Procedures	17
SECTION 4 – MAINTENANCE AND TROUBLESHOOTING	18
4-2. Overload Protection	18
4-3. Blowing Out Inside of Unit	18
4-4. Voltmeter/Ammeter Help Displays	19
4-5. Troubleshooting	20
SECTION 5 – ELECTRICAL DIAGRAM	22
5-1. Circuit Diagram	22
SECTION 6 – HIGH FREQUENCY	24
6-1. Welding Processes Requiring High Frequency	24
6-2. Incorrect Installation	24
6-3. Correct Installation	25
SECTION 6 – Parts List	26

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 NO TAG. 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.

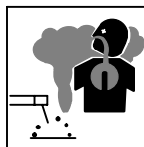
Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, 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 watchperson nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and 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.

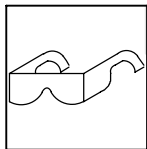
- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash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



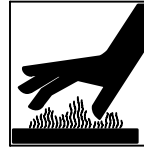
FLYING METAL can injure eyes.

- 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.



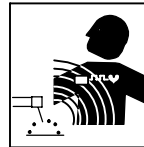
BUILDUP OF GAS can injure or kill.

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



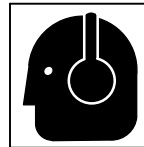
HOT PARTS can cause severe burns.

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



MAGNETIC FIELDS can affect pacemakers.

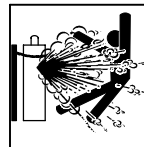
- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.



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.



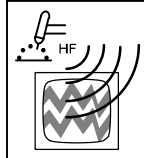
MOVING PARTS can cause injury.

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



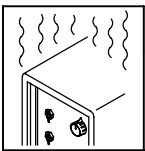
FALLING UNIT can cause injury.

- 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.



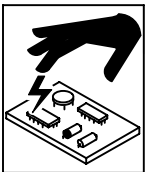
H.F. RADIATION can cause interference.

- 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.



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.



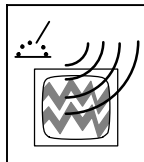
MOVING PARTS can cause injury.

- 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.



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.

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 1-5. 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.

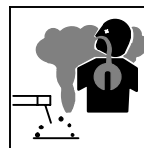
Un simple contact avec des pièces électriques peut provoquer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension dès que l'appareil est sur ON. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension à ce moment-là. En soudage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

- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- A l'intérieur, ventiler la zone et/ou utiliser un échappement au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage.
- Si la ventilation est insuffisante, utiliser un respirateur à alimentation d'air homologué.
- Lire les spécifications de sécurité des matériaux (MSDSs) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraissants.
- Travailler dans un espace fermé seulement s'il est bien ventilé ou en portant un respirateur à alimentation d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l'air et abaisser le niveau d'oxygène provoquant des blessures ou des accidents mortels. S'assurer que l'air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.
- Ne pas souder des métaux munis d'un revêtement, tels que l'acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n'ait été enlevé dans la zone de soudure, que l'endroit soit bien ventilé, et si nécessaire, en portant un respirateur à alimentation d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.



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

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

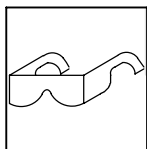
- Porter un casque de soudage muni d'un écran de filtre approprié pour protéger votre visage et vos yeux pendant le soudage ou pour regarder (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des protections approuvés pour les oreilles si le niveau sonore est trop élevé.
- Utiliser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



LE SOUDAGE peut provoquer un incendie ou une explosion.

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

- Se protéger et d'autres personnes de la projection d'étincelles et de métal chaud.
- Ne pas souder dans un endroit là où des étincelles peuvent tomber sur des substances inflammables.
- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité les recouvrir soigneusement avec des protections homologués.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu'ils n'aient été préparés correctement conformément à AWS F4.1 (voir les normes de sécurité).
- Brancher le câble sur la pièce le plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porte-électrode ou couper le fil à la pointe de contact.
- Porter des vêtements de protection dépourvus d'huile tels que des gants en cuir, une chemise en matériau lourd, des pantalons sans revers, des chaussures hautes et un couvre chef.
- Avant de souder, retirer toute substance combustible de vos poches telles qu'un allumeur au butane ou des allumettes.



DES PARTICULES VOLANTES peuvent blesser les yeux.

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



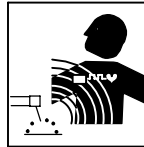
LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.

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



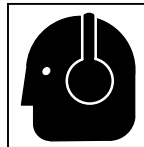
DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.

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



LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

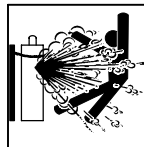
- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.



LE BRUIT peut affecter l'ouïe.

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

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



Si des BOUTEILLES sont endommagées, elles pourront exploser.

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

- Protéger les bouteilles de gaz comprimé d'une chaleur excessive, des chocs mécaniques, du laitier, des flammes ouvertes, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte-bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais placer une torche de soudage sur une bouteille à gaz.
- Une électrode de soudage ne doit jamais entrer en contact avec une bouteille.
- Ne jamais souder une bouteille pressurisée – risque d'explosion.
- Utiliser seulement des bouteilles de gaz protecteur, régulateurs, tuyaux et raccords convenables pour cette application spécifique; les maintenir ainsi que les éléments associés en bon état.
- Ne pas tenir la tête en face de la sortie en ouvrant la soupape de la bouteille.
- Maintenir le chapeau de protection sur la soupape, sauf en cas d'utilisation ou de branchement de la bouteille.
- Lire et suivre les instructions concernant les bouteilles de gaz comprimé, les équipements associés et les publications P-1 CGA énumérées dans les normes de sécurité.

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



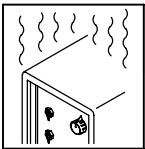
Risque D'INCENDIE OU D'EXPLOSION.

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



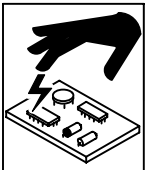
LA CHUTE DE L'APPAREIL peut blesser.

- 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.



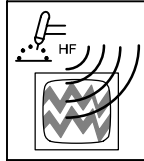
LES FILS DE SOUDAGE peuvent provoquer des blessures.

- 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.



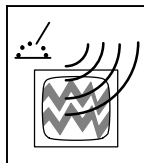
DES ORGANES MOBILES peuvent provoquer des blessures.

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



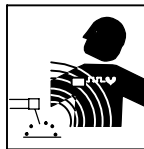
LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- 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

L'extrait suivant est tiré des conclusions générales du document intitulé *Biological Effects of Power Frequency Electric & Magnetic Fields – Background Paper, OTA-BP-E-53 (Washington DC : U.S. Government Printing Office, mai 1989)*, publié par le Office of Technology Assessment du Congrès américain : «... il existe maintenant d'abondantes données scientifiques compilées à la suite d'expériences sur la cellule ou d'études sur des animaux et des humains, qui montrent clairement que les champs électromagnétiques basse fréquence peuvent avoir des effets sur l'organisme et même y produire des transformations. Même s'il s'agit de travaux de très grande qualité, les résultats sont complexes. Cette démarche scientifique ne nous permet pas d'établir un tableau d'ensemble cohérent. Pire encore, elle ne nous permet pas de tirer des conclusions finales concernant les risques éventuels, ni d'offrir des conseils sur les mesures à prendre pour réduire sinon éliminer les risques éventuels». (Traduction libre)

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 vous.
- 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 consignes mentionnées précédemment font partie de celles destinées aux personnes ayant recours à un stimulateur cardiaque. Veuillez consulter votre médecin pour obtenir plus de détails.



SECTION 2 – INTRODUCTION

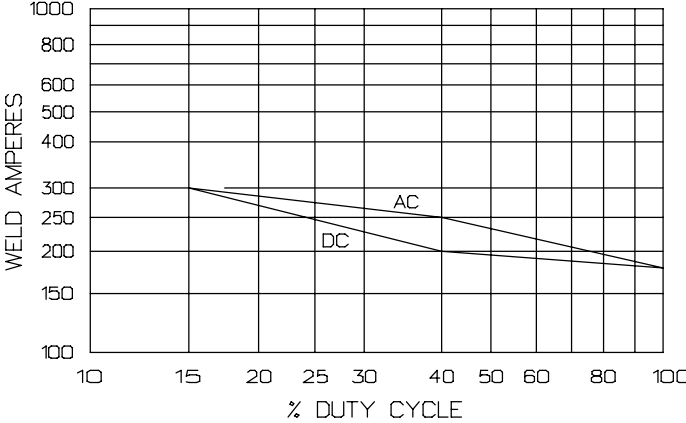
2-1. Specifications

Input Power	Rated Welding Output	Amperage Range	Maximum Open-Circuit Voltage DC	Amperes Input at Rated Load Output 60 Hz			
				230 V	460 V	KVA	KW
Three Phase	250 A @ 30 Volts AC, 40% Duty Cycle	5-300	90	26.3 *.27	17.9 *.15	14.2 *.09	10.5 *.04
	200 A @ 28 Volts DC, 40% Duty Cycle			20.5 *.27	13.4 *.15	8.4 *.09	7.6 *.04
Single Phase	250 A @ 30 Volts AC, 40% Duty Cycle	5-300	90	62.6 *.33	32.2 *.18	14.8 *.10	10.4 *.07
	200 A @ 28 Volts DC, 40% Duty Cycle			44 *.33	25.8 *.18	11.9 *.1	8.1 *.07

*While idling

2-2. Duty Cycle and Overheating

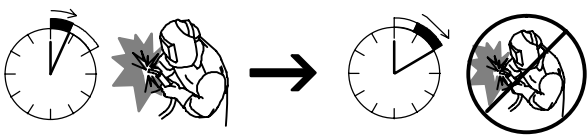


250 A @ 40% Duty Cycle For AC
200 A @ 40% Duty Cycle For DC

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

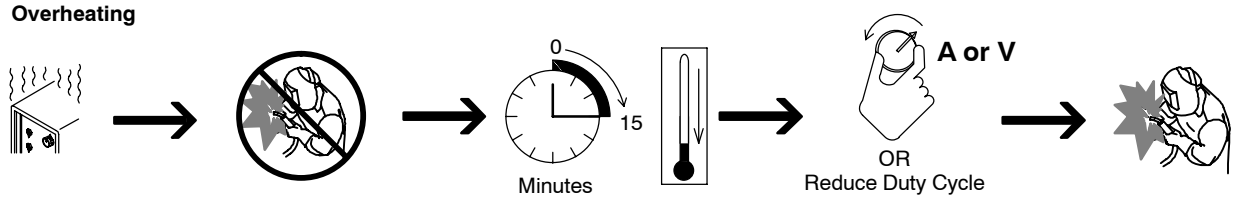
If unit overheats, output stops, a Help message is displayed (see Section 4-4), and cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or voltage, or duty cycle before welding.

▲ Exceeding duty cycle can damage unit and void warranty.



4 Minutes Welding 6 Minutes Resting

Overheating

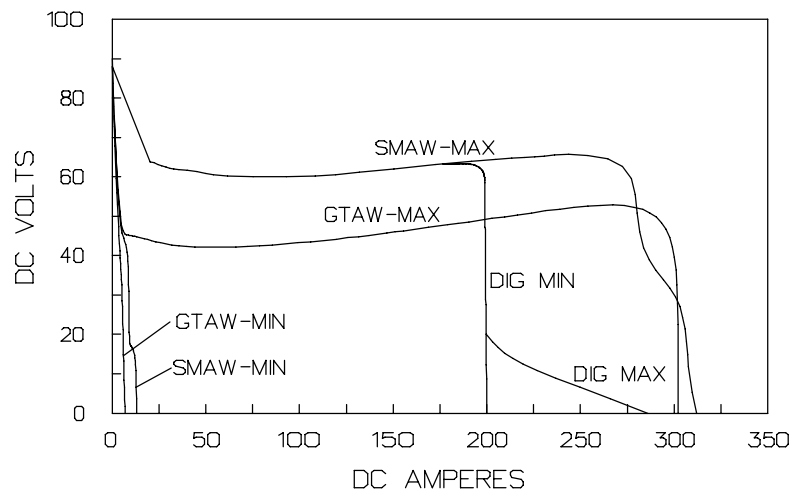
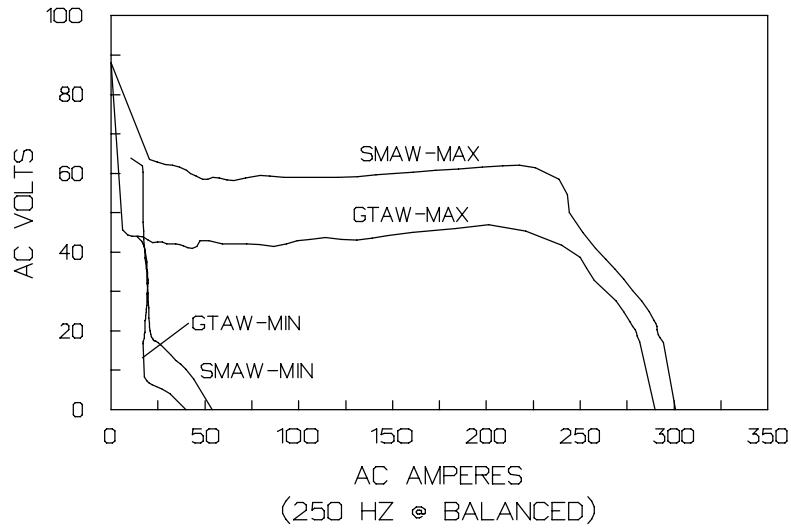


Minutes OR Reduce Duty Cycle

sduty1 5/95 / SA-185 794

2-3. Volt-Ampere Curves

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



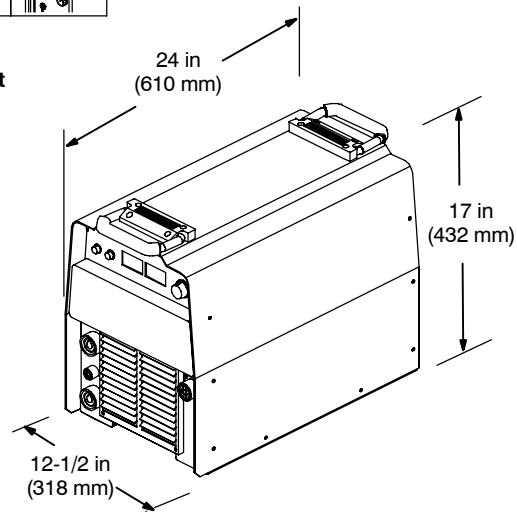
SA-185 793 / SA-186 294

2-4. Selecting a Location

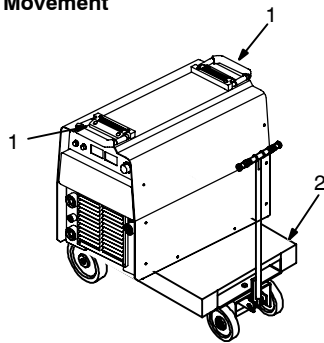


Dimensions And Weight

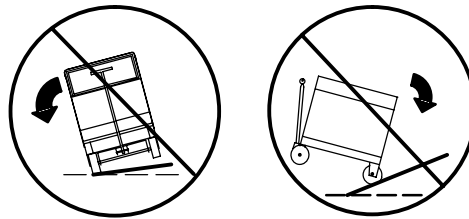
90 lb (40.7 kg)



Movement



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



1 Lifting Handles

Use handles to lift unit.

2 Hand Cart

Use cart or similar device to move unit.

3 Rating Label

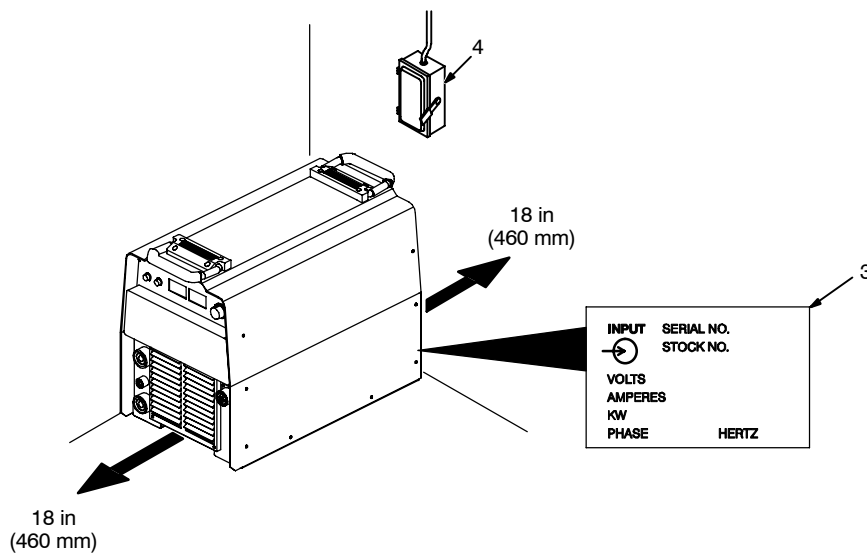
Use rating label to determine input power needs.

4 Line Disconnect Device

Locate unit near correct input power supply.

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

Location



loc_2 3/96 - ST-801 708-A

2-5. Weld Output Terminals and Selecting Cable Sizes



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					
	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

*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.

NOTE: For proper installation of gas hose, the use of a quick connect torch (such as Weldcraft QWP-17 or QWP-20), is recommended.

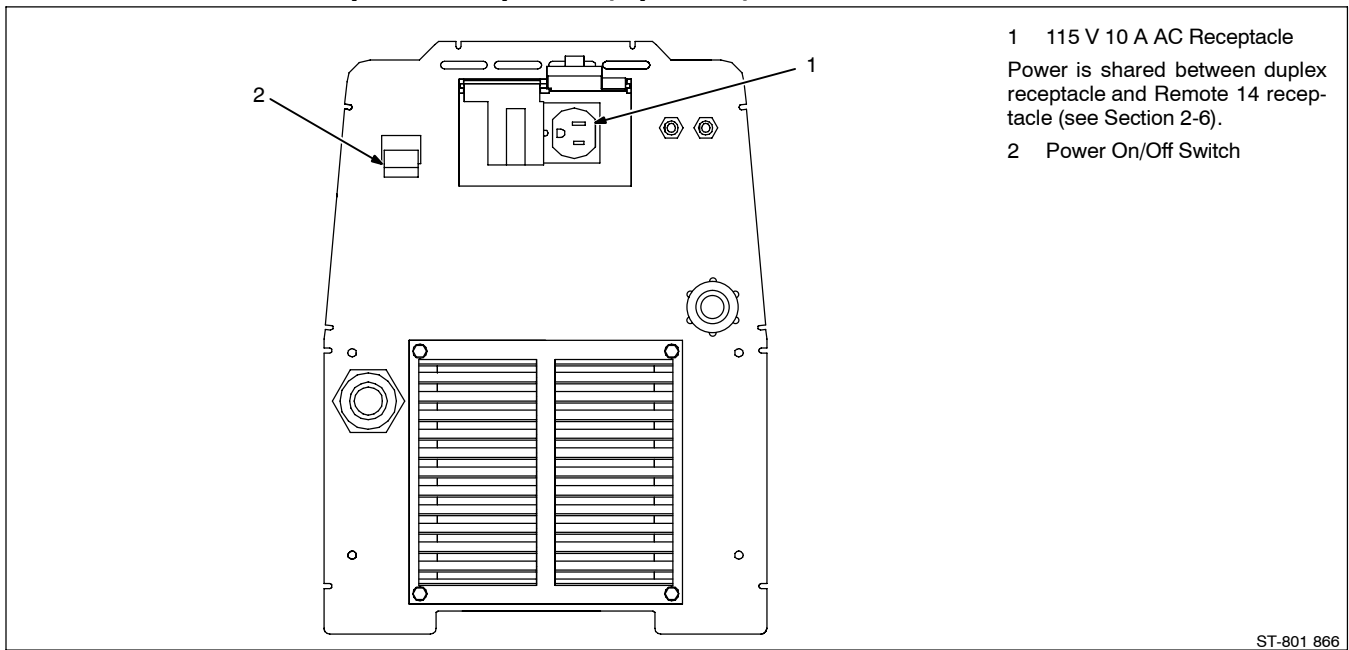
S-0007E

2-6. Remote 14 Receptacle Information

	REMOTE 14	Socket*	Socket Information
	24 VOLTS AC OUTPUT (CONTACTOR)	A	
B			Contact closure to A completes 24 volts ac contactor control circuit.
REMOTE OUTPUT CONTROL	C		Output to remote control; 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.
A/V AMPERAGE VOLTAGE	M		Remote process.
	F		Current feedback; +1 volt dc per 100 amperes.
GND	H		Voltage feedback; +1 volt dc per 10 output receptacle volts.
	G		Circuit common for 24 volts ac circuits.
	K		Chassis common.

*The remaining sockets are not used.

2-7. 115 Volts AC Duplex Receptacle (Optional) and Power Switch Location



2-8. Electrical Service Guide

NOTE

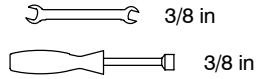
Actual input voltage cannot exceed $\pm 15\%$ of indicated required input voltage. If actual input voltage is outside of this range, no output is available.

		Three-Phase		Single-Phase	
		230	460	230	460
Input Voltage					
Input Amperes At Rated Output	AC	26.5	17.9	62.6	32.2
	DC	20.5	13.4	44	25.8
Max Recommended Standard Fuse Or Circuit Breaker Rating In Amperes		50	25	100	50
Min Input Conductor Size In AWG/Kcmil		10	14	8	10
Max Recommended Input Conductor Length In Feet (Meters)		104 (32)	165 (50)	90 (27)	241 (74)
Min Grounding Conductor Size In AWG/Kcmil		10	14	8	10
Reference: 1996 National Electrical Code (NEC).		S-0092J			

2-9. Connecting Input Power



Tools Needed:



Check input voltage available at site.

- 1 Input And Grounding Conductors
 - 2 Line Disconnect Device
- See Section 2-8.

For single-phase operation:

- 3 Black And White Input Conductor
- 4 Red Input Conductor
- 5 Insulation Sleeving
- 6 Electrical Tape

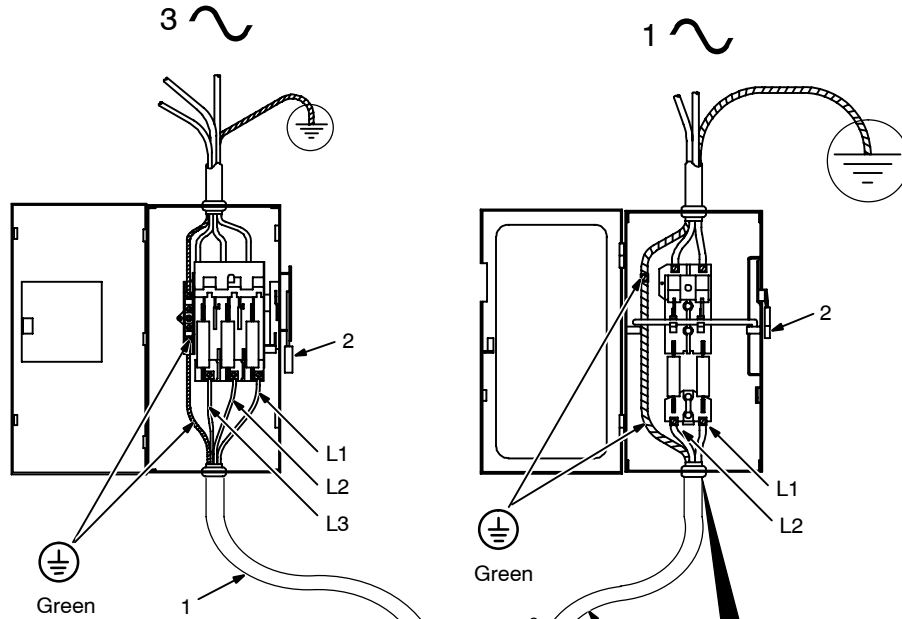
Insulate and isolate red conductor as shown.

▲ **Always connect green wire to supply grounding terminal, never to a line terminal.**

For three-phase operation:

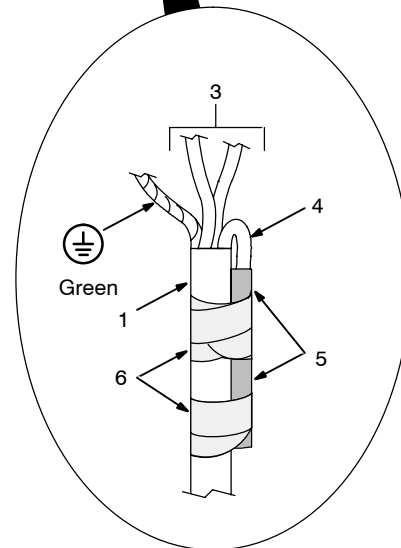
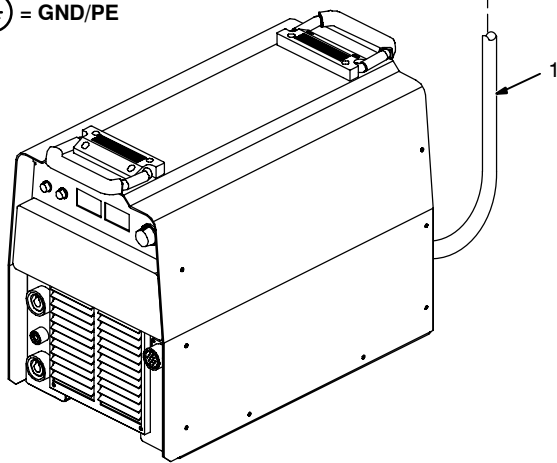
Connect black, white, and red wires (L1, L2, L3) to line terminals.

▲ **Always connect green wire to supply grounding terminal, never to a line terminal.**



▲ **Always connect grounding conductor first.**

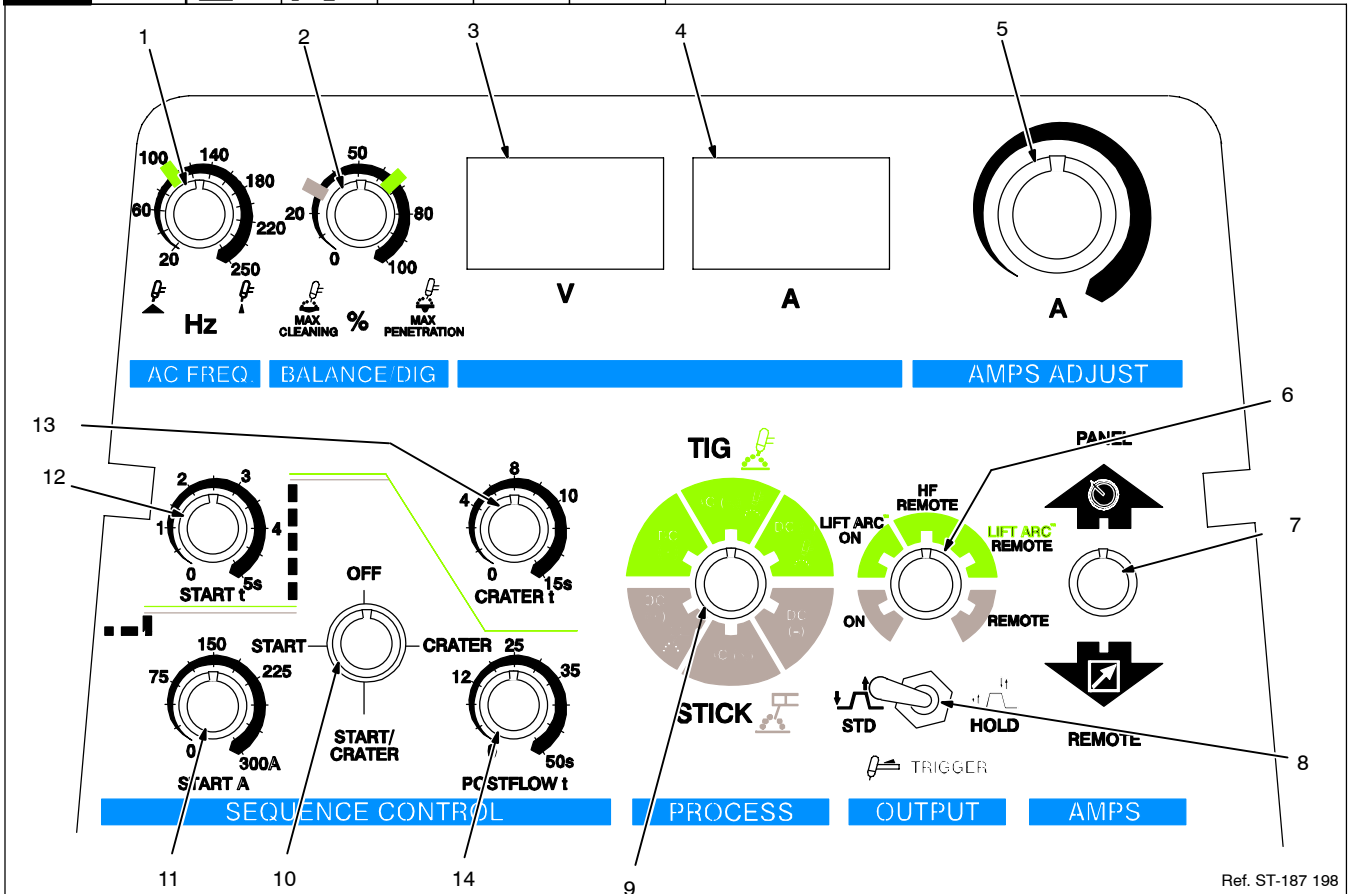
= GND/PE



input_2_3/96 - ST-801 709-A

SECTION 3 – OPERATION

3-1. Controls



Ref. ST-187 198

1 AC Frequency Control

Range is 20 to 250 hertz. For most applications, increasing frequency improves arc stability.

2 Balance/DIG Control

Control functions as a balance control for GTAW (TIG) process, and in the DIG mode for SMAW (STICK) process, depending on position of Process control.

Balance Mode:

See Section 3-2.

DIG Mode:

When set lower, short-circuit amperage at low arc voltage is the same as normal welding amperage.

When set higher, short-circuit amperage is increased at low arc voltage to help with arc starting and making overhead or vertical welds, as well as to reduce sticking while welding.

3 Voltmeter (see Section 3-3)

Voltmeter displays voltage (to the nearest 0.1 V) at the weld output terminals, but not necessarily the welding arc due to cable resistance, poor connections, etc.

4 Ammeter (see Section 3-3)

Use ammeter to preset amperage. Meter displays weld amperage output of unit when welding.

5 Amperage Adjustment Control

Turn control clockwise to increase amperage from 5 to 300 amps.

6 Output Control Switch

See Section 3-4.

7 Amperage Control Switch

For front panel control, place switch in Panel position. For remote control, make connections to remote 14 receptacle, and place switch in Remote 14 position.

8 Trigger Hold

To start weld, press and release gun trigger within three seconds after an arc has been struck. To end weld, press and release gun trigger. If gun trigger is not released within 3 seconds, unit switches to standard trigger control operation.

9 Process Control

Use control to select either of the GTAW (TIG) welding process and polarity, or the SMAW (Stick) welding process.

Selecting any GTAW (TIG) position enables the gas valve, which is disabled when SMAW (Stick) position is selected.

10 Sequence Control

See Section 3-5.

11 Start A (Amperage) Control

Use control to select a starting amperage that is different from the weld amperage.

12 Start t (Amperage Time) Control

Use control to select length of time in seconds that amperage remains at start amperage before changing to weld amperage.

For example, to select start amperage of 300 A for 3 seconds and weld amperage of 200 A: Set Start A amperage control to 300 A, set Start t time control to 3 seconds, and set front panel or remote amperage control to 200 A.

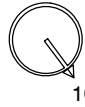

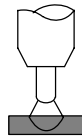
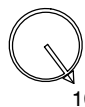
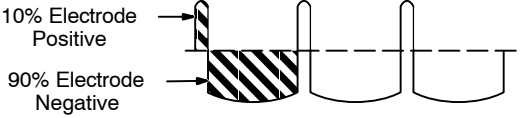
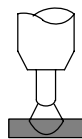

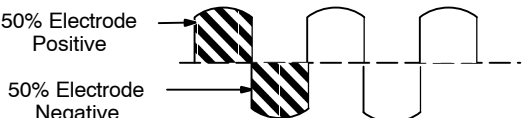
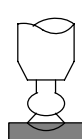
13 Crater Control

Control sets length of time in seconds to taper weld output from weld amperage setting to 0 A.

14 Postflow Control

Control sets length of time in seconds gas flows after the welding stops.

3-2. AC/Balance Control

Balance Control Waveform Examples			Balance Control: Control changes the ac output square wave. Adjust setting for deeper penetration or more cleaning action.
Max Penetration At 20 Hz 	1% Electrode Positive 99% Electrode Negative 		
Max Penetration At 250 Hz 	10% Electrode Positive 90% Electrode Negative 		
Max Cleaning At All Hz 	50% Electrode Positive 50% Electrode Negative 		

3-3. Meter Function

Mode	Meter Reading At Idle		Meter Reading While Welding	
	V	A	V	A
On	80.0 Actual Volts (OCV)	85 Preset Amps	24.5 Actual Volts	85 Actual Amps
Lift On	7.0 Actual Volts	85 Preset Amps	10.3 Actual Volts	85 Actual Amps
HF Remote	Blank	85 Preset Amps	10.3 Actual Volts	85 Actual Amps
Lift Remote	Blank	85 Preset Amps	10.3 Actual Volts	85 Actual Amps
Remote	Blank	85 Preset Amps	24.5 Actual Volts	85 Actual Amps

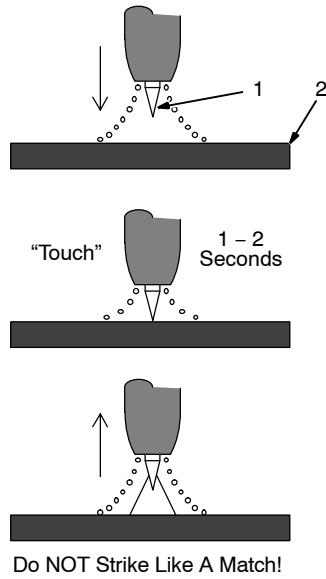
3-4. Output Switch Settings

Output Switch Setting	Process	Output On/Off Control
On	GTAW (TIG)/SMAW (Stick)	Electrode Hot
Lift On	GTAW (TIG) With Lift-Arc Start – See Section 3-6	Electrode Hot
HF Remote	GTAW (TIG) With HF Start – See Section 3-6	At Remote 14
Lift Remote	GTAW (TIG)	At Remote 14
Remote	GTAW (TIG)/SMAW (Stick)	At Remote 14

3-5. Sequence Control

Control Position	Allows These Controls To Be Functional	For The Following Processes SMAW (Stick)/GTAW (TIG)
Off		Stick
	Postflow t – 0-50 Seconds	TIG
Start	Start t (Time) – 0-15 Seconds Start A (Amperage) – 0-300 Amps	Stick/TIG
	Postflow – 0-50 Seconds	TIG
Crater	Crater t – 0-15 Seconds Postflow t – 0-50 Seconds	TIG
Start/Crater	Start t (Time) – 0-15 Seconds Start A (Amperage) – 0-300 Amps Crater t – 0-15 Seconds Postflow – 0-50 Seconds	TIG

3-6. Lift-Arc and HF TIG Start Procedures



With Output Switch in Lift On position, start arc as follows:

- 1 TIG Electrode
- 2 Workpiece

Touch tungsten electrode to workpiece at weld start point, **hold electrode to workpiece for 1-2 seconds**, and slowly lift electrode. An arc will form when electrode is lifted.

Normal open-circuit voltage is not present before tungsten electrode touches workpiece; only a low sensing voltage is present between electrode and workpiece. The solid-state output contactor does not energize until after electrode is touching workpiece. This allows electrode to touch workpiece without overheating, sticking, or getting contaminated.

With Output Switch in HF Remote position, 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.

Ref. ST-156 279

SECTION 4 – MAINTENANCE AND TROUBLESHOOTING

4-1. Routine Maintenance

			▲ Disconnect power before maintaining.
	3 Months	<p>Replace unreadable labels. </p> <p>Replace damaged gas hose. </p> <p>Clean and tighten weld terminals. </p>	
<p>Repair or replace cracked cables and cords. </p>			
	6 Months	<p>Blow out inside. During heavy service, clean monthly. </p>	

4-2. Overload Protection

1 Circuit Breaker CB1
 CB1 protects 115 volts ac portion of duplex receptacle and Remote 14 receptacle from overload.

2 Circuit Breaker CB2
 CB2 protects 24 volts ac portion of Remote 14 receptacle from overload.

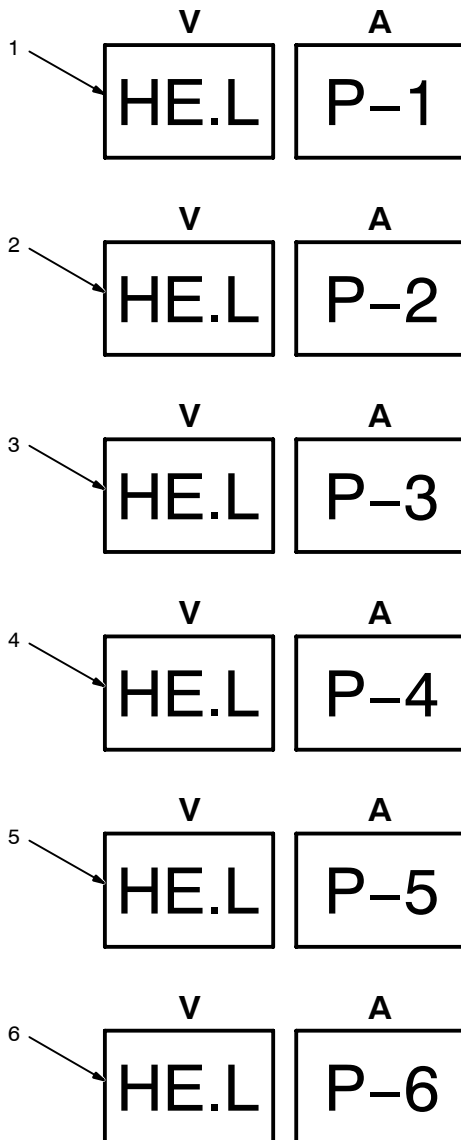
Press button to reset breaker.

ST-801 866

4-3. Blowing Out Inside of Unit

		ST-801 708-A	
<p>▲ Do not remove case when blowing out inside of unit.</p> <p>To blow out unit, direct airflow through front and back louvers as shown.</p>			

4-4. Voltmeter/Ammeter Help Displays



All directions are in reference to the front of the unit. All circuitry referred to is located inside the unit.

1 Help 1 Display

Indicates a malfunction in the primary power circuit. Contact a Factory Authorized Service Agent if this display is shown.

2 Help 2 Display

Indicates a malfunction in the thermal protection circuitry located on the left side of the unit. Contact a Factory Authorized Service Agent if this display is shown.

3 Help 3 Display

Indicates the unit has overheated. The unit has shut down to allow the fan to cool it (see Section 2-2). Operation will continue when the unit has cooled.

4 Help 4 Display

Indicates that the input voltage is too high and the unit has automatically shut down. Operation will continue when the voltage is within the operating range ($\pm 15\%$). Have an electrician check the input voltage if this display is shown.

5 Help 5 Display

Indicates that the input voltage is too low and the unit has automatically shut down. Operation will continue when the voltage is within the operating range ($\pm 15\%$). Have an electrician check the input voltage if this display is shown.

6 Help 6 Display

Indicates a malfunction in the secondary power circuit of the unit. Contact a Factory Authorized Service Agent if this display is shown.

4-5. Troubleshooting



Trouble	Remedy
No weld output; unit completely inoperative.	Place line disconnect switch in On position (see Section 2-9).
	Check and replace line fuse(s), if necessary, or reset circuit breaker (see Section 2-9).
	Check for proper input power connections (see Section 2-9).
No weld output; meter display On.	If using remote control, be sure process switch is in a position that provides output control at Remote 14 receptacle (see Section 3-1 as applicable).
	Input voltage outside acceptable range of variation (see Section 2-8).
	Check, repair, or replace remote control.
	Unit overheated. Allow unit to cool with fan On (see Section 2-2).
Erratic or improper weld output.	Use proper size and type of weld cable (see Section 2-5).
	Clean and tighten all weld connections.
No 115 volts ac output at duplex receptacle.	Reset circuit breaker CB1 (see Section 4-2).
No 24 volts ac output at Remote 14 receptacle.	Reset circuit breaker CB2 (see Section 4-2).
No high frequency.	Check fuse F1, and replace if necessary.

SECTION 5 - ELECTRICAL DIAGRAM

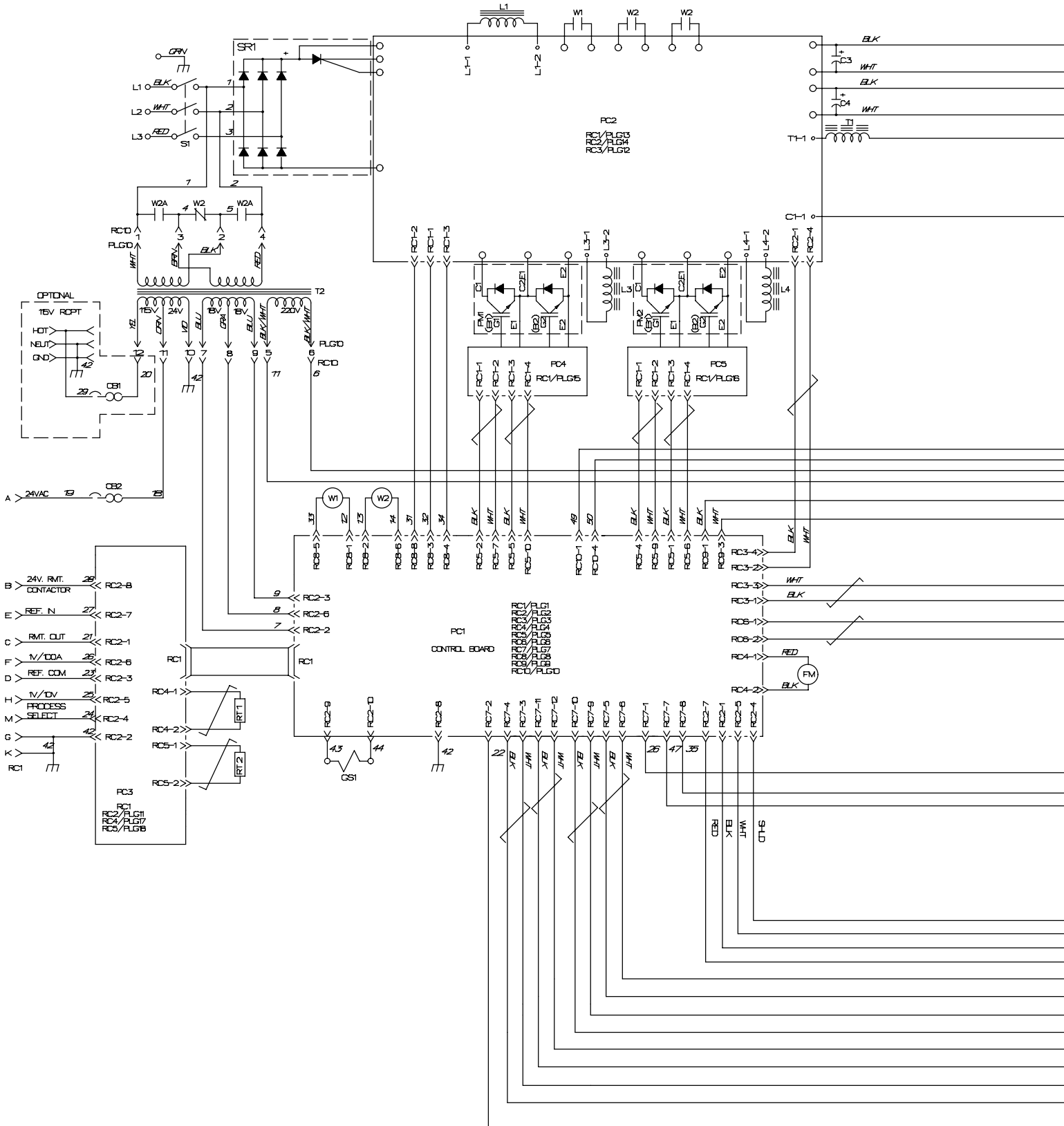
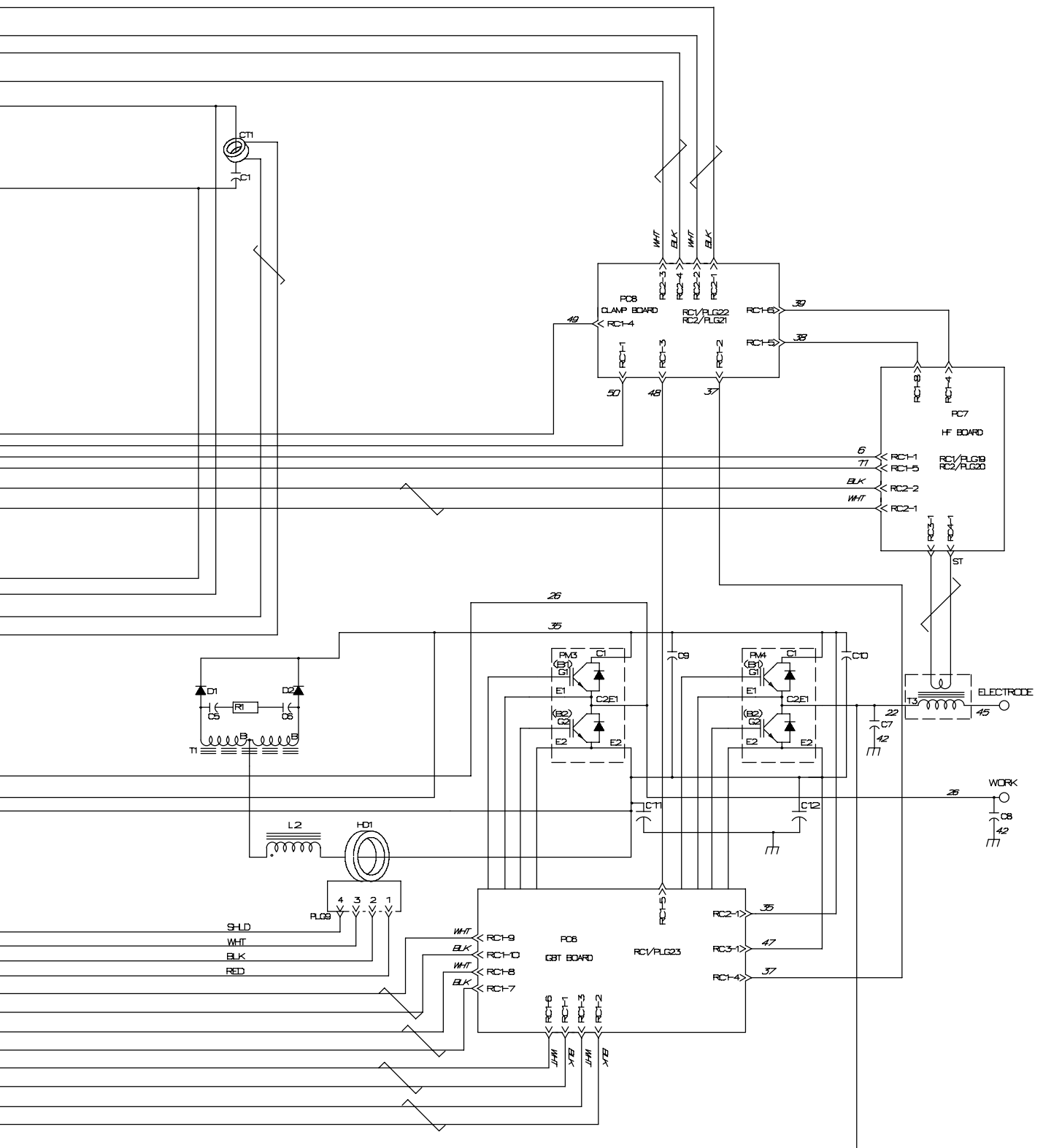


Figure 5-1. Circuit Diagram



SECTION 6 – PARTS LIST

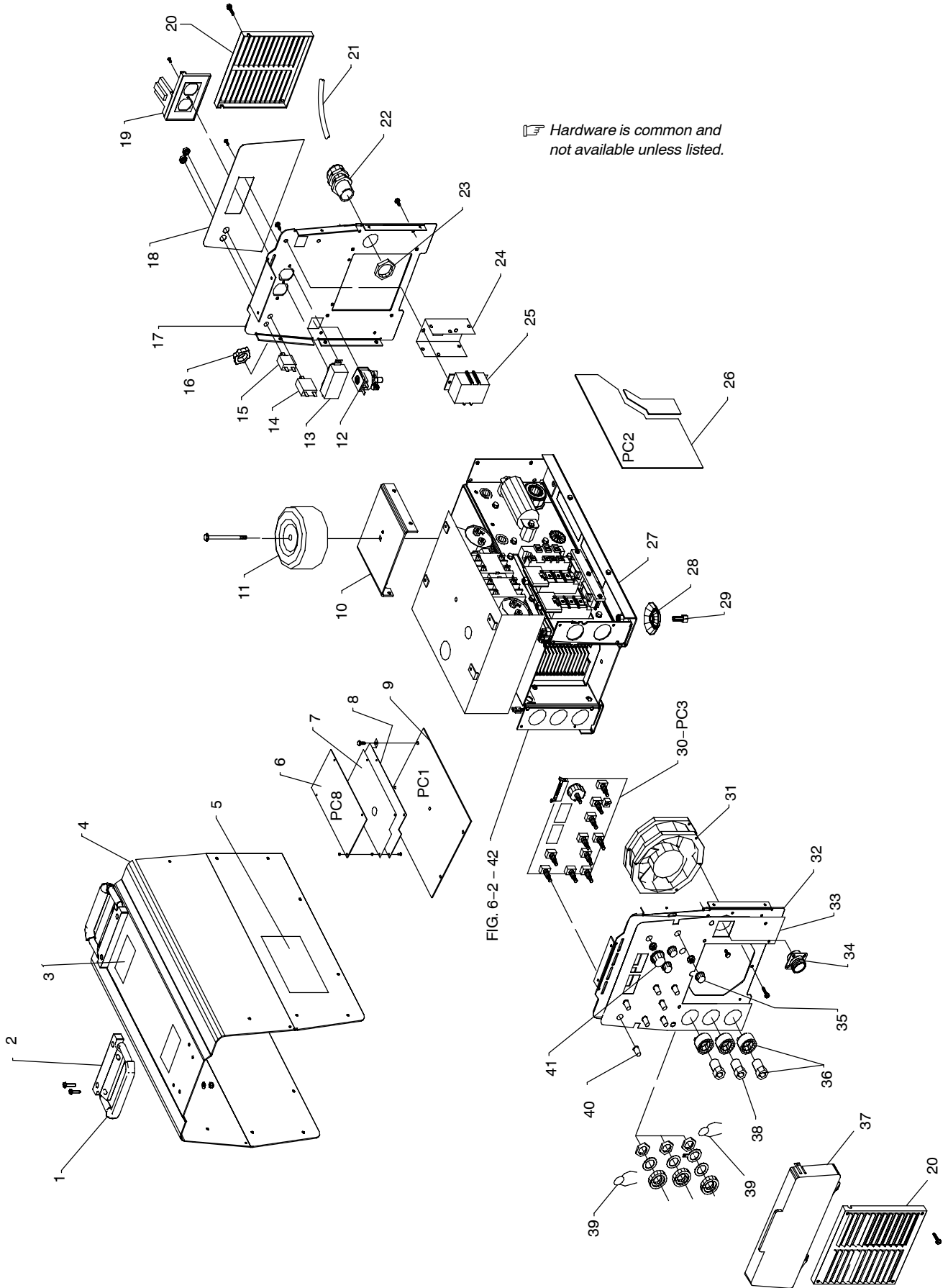


Figure 6-1.Main Assembly

ST-801 870-A

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 6-1. Main Assembly				
1		126 416	HANDLE	2
2		126 415	CLAMP, saddle	2
3		138 442	LABEL, caution falling	2
4		+175 148	WRAPPER	1
		175 256	INSULATOR, side RH & LH	2
5		134 327	LABEL, warning general precautionary	2
6	PC8	182 188	CIRCUIT CARD ASSEMBLY, clamp	1
	PLG21	183 597	PLUG, w/leads	1
	PLG22	115 093	CONNECTOR & SOCKETS	1
7		183 613	INSULATOR, PC card clamp	1
8		182 498	BRACKET, mtg PC card clamp	1
9	PC1	188 730	CIRCUIT CARD ASSEMBLY, control	1
	PLG2	115 091	CONNECTOR & SOCKETS	1
	PLG3	183 086	PLUG, w/leads	1
	PLG4	184 770	PLUG, w/leads fan	1
	PLG5,15,16	175 026	PLUG, w/leads	1
	PLG7	183 596	PLUGS, w/leads secondary gate	1
	PLG8	115 092	CONNECTOR & SOCKETS	1
	PLG9	183 595	PLUG, w/leads	1
	PLG10	115 094	CONNECTOR & SOCKETS	1
10		◆187 461	BRACKET, mtg aux transformer	1
11	T2	187 574	TRANSFORMER, control	1
11	T2	◆187 757	TRANSFORMER, control	1
	RC10	115 094	CONNECTOR & SOCKETS	1
12	GS1	133 873	VALVE, 24VDC 2way	1
13		◆604 176	RECEPTACLE, str dx grd 2P 3W 15A	1
14	CB1	◆083 432	CIRCUIT BREAKER, 1P 10A 250VAC	1
15	CB2	083 432	CIRCUIT BREAKER, 1P 10A 250VAC	1
16		605 227	NUT, .750-14 knurled	1
17		182 205	PANEL, rear	1
18			PLATE, identification rear (order by model & serial number)	1
19		◆175 282	COVER, receptacle	1
20		175 138	BOX, louver	2
21		182 561	CABLE, pwr	1
22		175 213	BUSHING, strain relief .472/.787 ID	1
23		182 445	NUT, stl locking	1
24		176 226	INSULATOR, switch power	1
25	S1	128 756	SWITCH, tgl 3PST 40A 600VAC (Power Switch)	1
26	PC2	183 620	CIRCUIT CARD, assembly	1
		176 879	SCREW, M5-.8-2	18
	PLG13	131 204	CONNECTOR & SOCKETS	1
	PLG14	183 086	PLUG, w/leads	1
		179 626	BUS BAR, interconnecting	1
27		+175 132	BASE	1
		185 835	LABEL, warning electric shock	2
28		173 693	FOOT, mtg unit	4
29		176 736	SCREW, mtg foot	4
30	PC3	187 712	CIRCUIT CARD, front panel (consisting of)	1
	DD1-6	186 914	LED	6
	R5	176 537	POTENTIOMETER, CP 1/T 2W 10K	1
	R81-86	182 771	POTENTIOMETER, CP 1/T .5W 10K	5
	R84	183 316	POTENTIOMETER, CP 1/T .5W 2.5meg	1
	SW1	173 551	SWITCH, rotary 2posn 1P 6A	1
	SW2	175 954	SWITCH, rotary 5posn 1P 6A	1
	SW3	182 772	SWITCH, rotary 6posn 1P 6A	1
	SW4	183 482	SWITCH, rotary 4posn 1P 6A	1
	SW5	125 939	SWITCH, tgl DPDT .5VA 28VDC	1
	PLG11	183 088	RECEPTACLE, w/leads & plug	1
31	FM	175 084	MOTOR, fan 24VDC 3000RPM	1

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

Figure 6-1. Main Assembly

32		186 945	PANEL, front	1
33			NAMEPLATE, (order by model and serial number)	1
34	RC1	188 186	CONNECTOR & SOCKETS	1
35		174 992	KNOB, pointer .840dia	4
36		185 703	RECEPTACLE, twist lock assembly	2
37		175 855	DOOR	1
38		187 235	RECEPTACLE, female	1
39	C7,8	186 543	CAPACITOR, cer disc .1uf 500VDC	2
40		183 332	KNOB, pointer .570	6
41		174 991	KNOB, pointer 1.250	1
42		Fig 6-2	WINDTUNNELS w/COMPONENTS	1

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

◆Optional

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

☞ Hardware is common and not available unless listed.

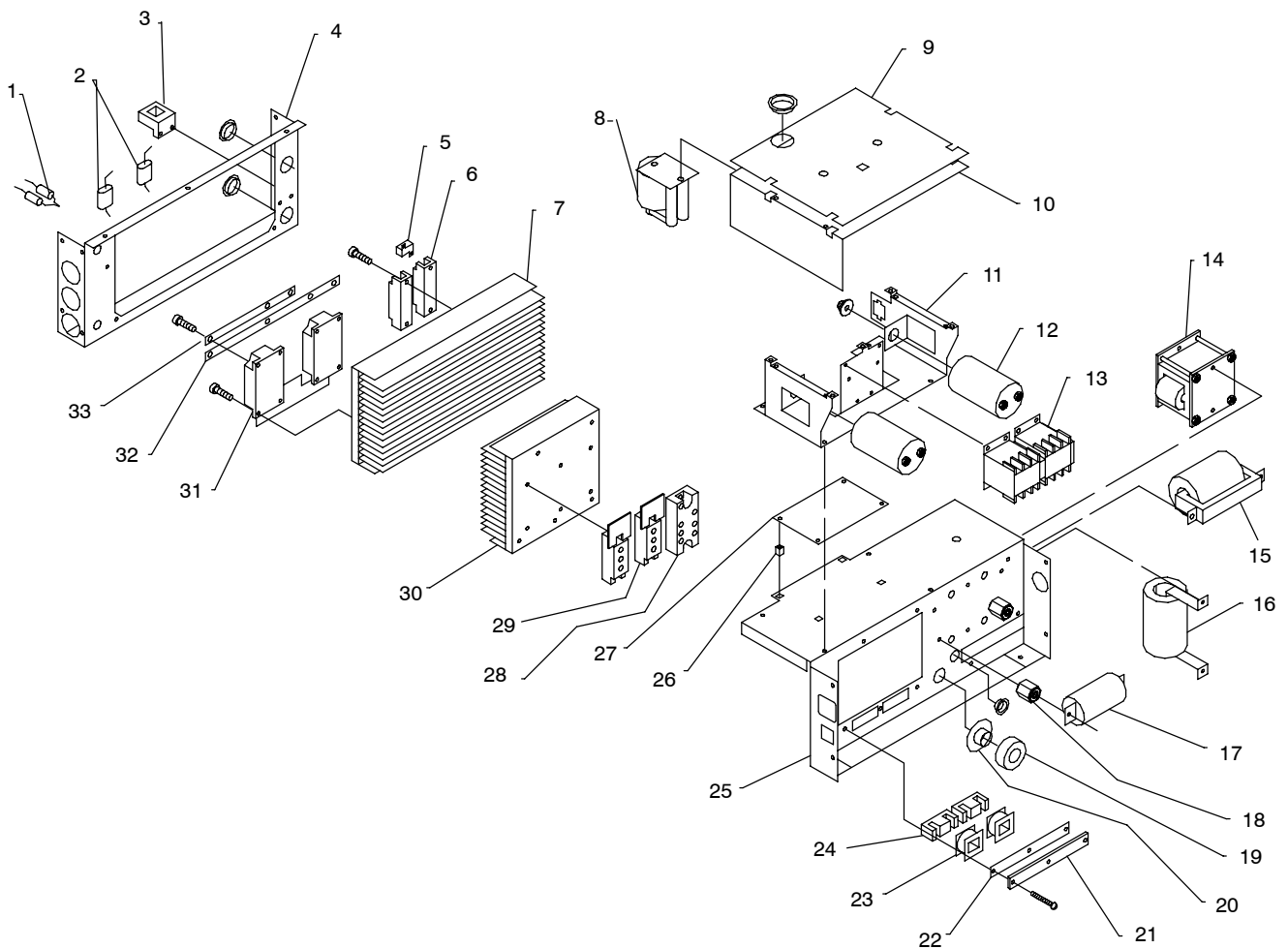


Figure 6-2. Windtunnels w/Components

ST-801 871-A

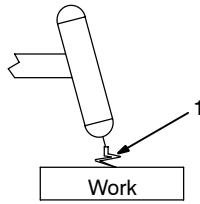
Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 6-2. Windtunnels w/Components (Fig 6-1 Item 42)				
...	1 ...	C11,12	185 424 .. CAPACITOR, filter assembly	1
...	2	C9,10	164 812 .. CAPACITOR, polyp met film 1MF 600	2
...	3	HD1	182 918 .. TRANSDUCER, current 400A	1
...	4	+182 206	.. WINDTUNNEL, LH	1
...		153 718	.. LABEL, warning exploding parts	2
...		126 026	.. LABEL, warning electric shock	2
...	5 ...	R1,C5,6	175 194 .. RESISTOR/CAPACITOR	1
...	6	D1,2	185 775 .. KIT, diode	1
...	7		182 208 .. HEAT SINK	1
...	8	T3	182 667 .. TRANSFORMER, coupling	1
...	9		183 073 .. INSULATOR, PC card HF	1
...	10		182 499 .. ENCLOSURE, HF	1
...	11		182 806 .. BRACKET, mtg contactor/capacitor/PC board	1
...	12	C3,4	174 980 .. CAPACITOR, elctlt 2700uf 420VDC	2
...	13	W1,2,2A	175 082 .. CONTACTOR, def prp 40A 7P	1
...		173 763	.. STAND-OFF, No. 10-32 x 1.418 lg	1
...	14	T1	183 014 .. TRANSFORMER, HF	1
...	15	L2	183 009 .. STABILIZER, output	1
...	16	L1	187 522 .. INDUCTOR, input	1
...	17	C1	186 549 .. CAPACITOR, polyp .27uf 1000VDC	1
...	18		025 248 .. STAND-OFF, insul .250-20 x 1.250 lg	2
...	19	CT1	175 199 .. TRANSFORMER, current	1
...	20		177 547 .. BUSHING, snap-in CT-mount	1
...	21		175 140 .. BRACKET, DI-DT	1
...	22		181 197 .. GASKET, DI-DT rubber	1
...	23	L3,4	175 482 .. COIL, DI-DT	2
...	24		109 056 .. CORE	2
...	25	+187 460	.. WINDTUNNEL, RH	1
...	26		141 690 .. GROMMET, scr No. 8/10	4
...	27	PC7	186 807 .. CIRCUIT CARD, HF (consisting of)	1
...		F1	012 633 .. FUSE, mintr gl 1A 250V	1
...		PLG19	115 092 .. CONNECTOR & SOCKETS	1
...		PLG20	183 595 .. PLUG, w/leads	1
...	28	SR1	179 629 .. KIT, diode	1
...	29	PM1,2/PC4,5	179 628 .. KIT, transistor IGBT module	1
...		RT1,2	173 632 .. THERMISTOR, NTC 30K ohm	2
...	30		173 631 .. HEAT SINK, power module	1
...	31	PM3,4/PC6	185 776 .. KIT, IGBT	1
...		PLG23	183 596 .. PLUG, w/leads	1
...	32		182 641 .. BUS BAR, diode IGBT	1
...	33		182 642 .. BUS BAR, IGBT	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.

SECTION 7 – HIGH FREQUENCY

7-1. Welding Processes Requiring High Frequency



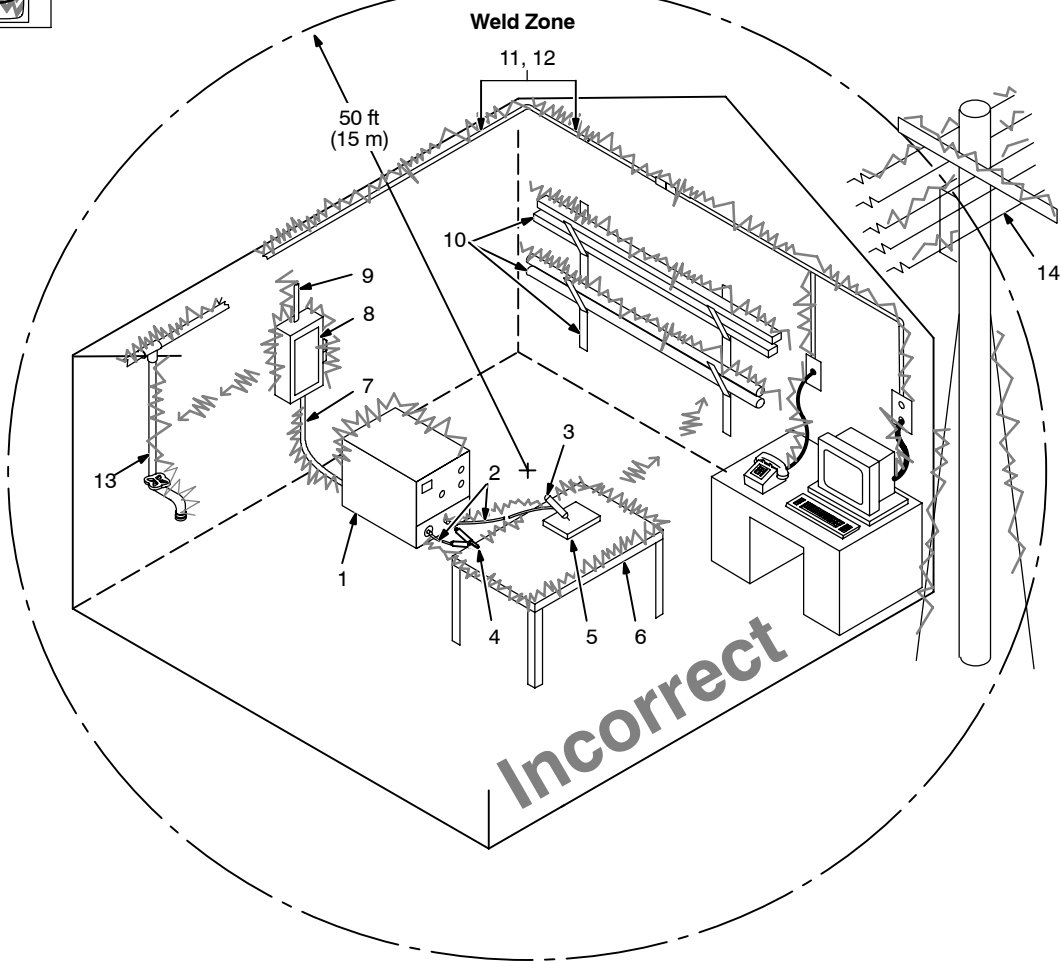
TIG

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

7-2. 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

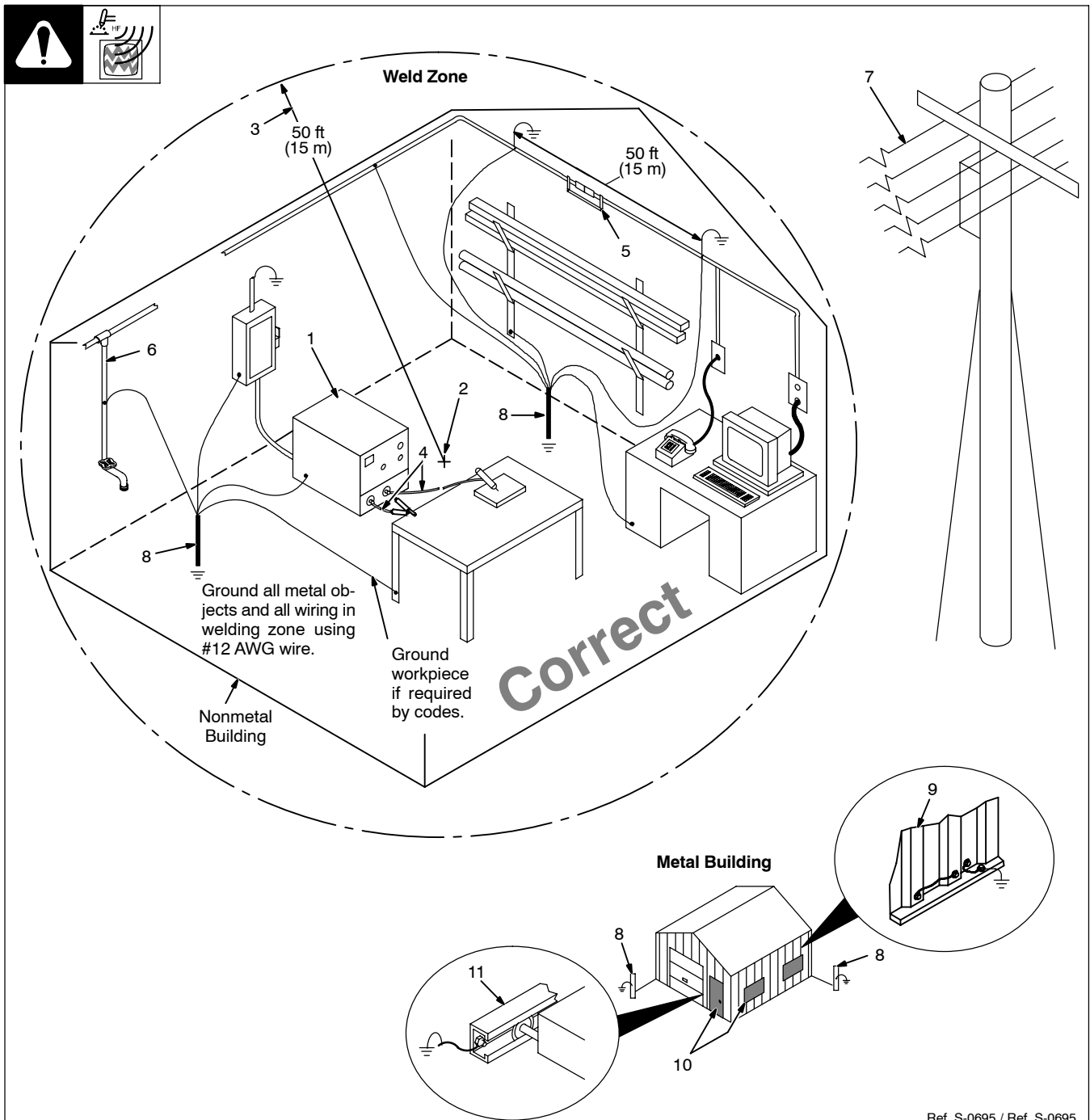
- 7 Input Power Cable
- 8 Line Disconnect Device
- 9 Input Supply Wiring

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

7-3. 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

OPTIONS AND ACCESSORIES

Control Options

PC-300 Pulsed GTAW (DC TIG) Control #042 297

Can be used with power sources that have built-in high frequency, or it can be used with an external high-frequency unit. The control has two internally switchable scales: a 0.5 – 20 pulses-per-second scale for both inverter and non-inverter type power sources, and a 10 – 300 pulses-per-second scale for inverter power sources only.

Control includes 8 ft (2.4 m) interconnecting cord and 115 VAC power cord. Front panel controls provide:

- Peak amperage adjustment
- Background amperage adjustment
- Pulses-per-second adjustment (0.5-20 pulses-per-second scale or 10-300 pulses-per-second scale)
- Percent-on-time control
- Amperage remote/panel control
- Output contactor on/off control
- Pulser on/off
- Power on/off
- Remote control receptacle (for remote hand or foot controls)

Remote Controls

RFCS-14 Foot Control #043 554

Foot current and contactor control. Includes 20 ft (6 m) cord and 14-pin plug.

RHC-14 Hand Control #129 340

Miniature hand control for remote current and contactor control. Dimensions: 4 in (102 mm) x 4 in (102 mm) x 3-1/4 in (82 mm). Includes 20 ft (6 m) cord and 14-pin plug.

RCC-14 Remote Contactor and Current Control #151 086

14-pin plug rotary-motion fingertip control fastens to TIG torch using two Velcro® straps. Includes 28 ft (8.5 m) control cord.

RMSL-14 #129 337 14-pin plug Momentary and maintained contact rocker switch for contactor control. Push forward for maintained contact and back for momentary contact. Includes 20 ft (6 m) cord.

Extension Cords for Remote Controls

#122 973 25 ft (7.6 m)
#122 974 50 ft (15.2 m)
#122 975 75 ft (22.8 m)
14-pin plug to a 14-pin socket.

Cylinder Cart #042 537

Has adjustable handles and is slanted for convenient access to power source front panel controls. Carries two 160 lb (72.6 kg) gas cylinders, or one gas cylinder and one Watermate coolant system for GTAW (TIG) welding. Can also be used with the Maxtron™ or XMT inverter power supplies. Also accommodates Radiator, Watermate™, or Coolmate™ coolant systems.

Universal Carrying Cart and Cylinder Rack #042 934

Accommodates power source, plus gas cylinder up to 56 in (142.2 cm) high measuring 6 to 9 in (15.2 to 22.8 cm) in diameter. Also provides storage for auxiliary items such as electrodes, helmets, gloves, etc. Can also be used with XMT®, Dynasty™, Econotig™, Maxstar® Series and Millermatic® 130 power sources.

Water Coolant Systems

For use with water-cooled guns. Refer to Literature Index No. AY/7.2.

Coolmate™ 3 Cooling System #043 007

Coolmate™ 4 Cooling System #042 288

Watermate™ 1A Cooling System #042 495

See Literature Index No. AY/7.2.



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



Resources Available

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:

To locate distributor nearest you call
1-800-4-A-Miller

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:

For assistance in filing or settling claims,
contact your distributor and/or equipment
manufacturer's Transportation Department.

File a claim for loss or damage during
shipment.

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