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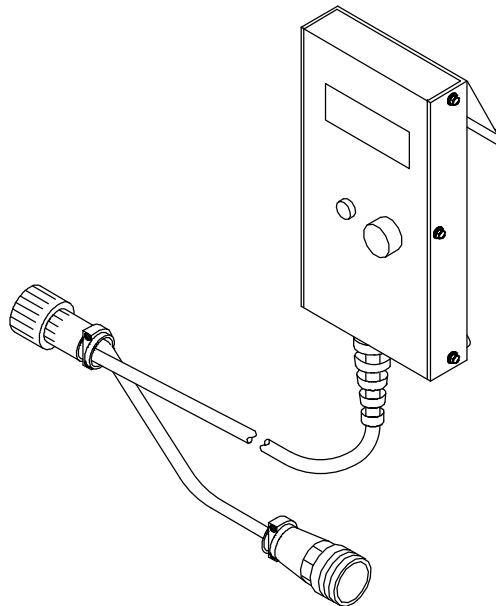


Pulsed MIG (GMAW-P)

Description

Synergic Control

Optima™



Visit our website at
www.MillerWelds.com

OWNER'S MANUAL

From Miller to You

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

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

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

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

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



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

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



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



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SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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 Protect yourself and others from injury — read, follow, and save these important safety precautions and operating instructions.

1-1. Symbol Usage



DANGER! – Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

NOTICE – Indicates statements not related to personal injury.

1-2. Arc Welding Hazards



The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-5. Read and follow all Safety Standards.



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



During operation, keep everybody, especially children, away.



ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.

- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Additional safety precautions are required when any of the following electrically hazardous conditions are present: in damp locations or while wearing wet clothing; on metal structures such as floors, gratings, or scaffolds; when in cramped positions such as sitting, kneeling, or lying; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these conditions, use the following equipment in order presented: 1) a semiautomatic DC constant voltage (wire) welder, 2) a DC manual (stick) welder, or 3) an AC welder with reduced open-circuit voltage. In most situations, use of a DC, constant voltage wire welder is recommended. And, do not work alone!
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install, ground, and operate this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in

 Indicates special instructions.



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

disconnect box or that cord plug is connected to a properly grounded receptacle outlet.

- When making input connections, attach proper grounding conductor first – double-check connections.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cord and ground conductor for damage or bare wiring – replace immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or repaired cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Do not touch electrode holders connected to two welding machines at the same time since double open-circuit voltage will be present.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal. Disconnect cable for process not in use.
- Use GFCI protection when operating auxiliary equipment in damp or wet locations.

SIGNIFICANT DC VOLTAGE exists in inverter welding power sources AFTER removal of input power.

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



HOT PARTS can burn.

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



FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use local forced ventilation at the arc to remove welding fumes and gases. The recommended way to determine adequate ventilation is to sample for the composition and quantity of fumes and gases to which personnel are exposed.
- If ventilation is poor, wear an approved air-supplied respirator.
- Read and understand the Safety Data Sheets (SDSs) and the manufacturer's instructions for adhesives, coatings, cleaners, consumables, coolants, degreasers, fluxes, and metals.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.



ARC RAYS can burn eyes and skin.

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

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

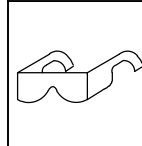


WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Do not weld where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on containers that have held combustibles, or on closed containers such as tanks, drums, or pipes unless they are properly prepared according to AWS F4.1 and AWS A6.0 (see Safety Standards).
- Do not weld where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock, sparks, and fire hazards.
- Do not use welder to thaw frozen pipes.

- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear body protection made from durable, flame-resistant material (leather, heavy cotton, wool). Body protection includes oil-free clothing such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Use only correct fuses or circuit breakers. Do not oversize or bypass them.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.
- Read and understand the Safety Data Sheets (SDSs) and the manufacturer's instructions for adhesives, coatings, cleaners, consumables, coolants, degreasers, fluxes, and metals.



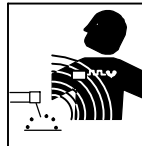
FLYING METAL or DIRT can injure eyes.

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.



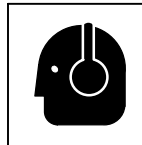
BUILDUP OF GAS can injure or kill.

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



ELECTRIC AND MAGNETIC FIELDS (EMF) can affect Implanted Medical Devices.

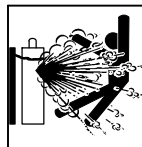
- Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations.



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.

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

- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only correct compressed gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve. Do not stand in front of or behind the regulator when opening the valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the right equipment, correct procedures, and sufficient number of persons to lift and move cylinders.
- Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

1-3. Additional Symbols For Installation, Operation, And Maintenance



FIRE OR EXPLOSION hazard.

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



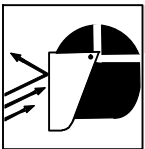
FALLING EQUIPMENT can injure.

- 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.
- Keep equipment (cables and cords) away from moving vehicles when working from an aerial location.
- Follow the guidelines in the Applications Manual for the Revised NIOSH Lifting Equation (Publication No. 94–110) when manually lifting heavy parts or equipment.



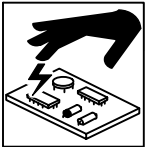
OVERUSE can cause OVERHEATING

- 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.



FLYING SPARKS can injure.

- Wear a face shield to protect eyes and face.
- Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.
- Sparks can cause fires — keep flammables away.



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 injure.

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



WELDING WIRE can injure.

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



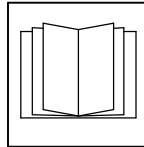
BATTERY EXPLOSION can injure.

- Do not use welder to charge batteries or jump start vehicles unless it has a battery charging feature designed for this purpose.



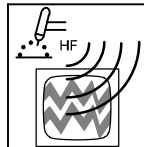
MOVING PARTS can injure.

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



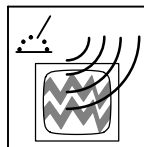
READ INSTRUCTIONS.

- Read and follow all labels and the Owner's Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Use only genuine replacement parts from the manufacturer.
- Perform maintenance and service according to the Owner's Manuals, industry standards, and national, state, and local codes.



H.F. RADIATION can cause interference.


- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.




ARC WELDING can cause interference.

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

1-4. California Proposition 65 Warnings

 **Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)**

 **This product contains chemicals, including lead, known to the state of California to cause cancer, birth defects, or other reproductive harm. *Wash hands after use.***

1-5. Principal Safety Standards

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1, is available as a free download from the American Welding Society at <http://www.aws.org> or purchased from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

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

Safe Practices for Welding and Cutting Containers that have Held Combustibles, American Welding Society Standard AWS A6.0, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org and www.sparky.org).

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151 (phone: 703-788-2700, website: www.cganet.com).

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 5060

Spectrum Way, Suite 100, Ontario, Canada L4W 5NS (phone: 800-463-6727, website: www.csa-international.org).

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 25 West 43rd Street, New York, NY 10036 (phone: 212-642-4900, website: www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (phone: 1-866-512-1800) (there are 10 OSHA Regional Offices—phone for Region 5, Chicago, is 312-353-2220, website: www.osha.gov).

Applications Manual for the Revised NIOSH Lifting Equation, The National Institute for Occupational Safety and Health (NIOSH), 1600 Clifton Rd, Atlanta, GA 30333 (phone: 1-800-232-4636, website: www.cdc.gov/NIOSH).

1-6. EMF Information

Electric current flowing through any conductor causes localized electric and magnetic fields (EMF). The current from arc welding (and allied processes including spot welding, gouging, plasma arc cutting, and induction heating operations) creates an EMF field around the welding circuit. EMF fields may interfere with some medical implants, e.g. pacemakers. Protective measures for persons wearing medical implants have to be taken. For example, restrict access for passers-by or conduct individual risk assessment for welders. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

1. Keep cables close together by twisting or taping them, or using a cable cover.
2. Do not place your body between welding cables. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.

4. Keep head and trunk as far away from the equipment in the welding circuit as possible.
5. Connect work clamp to workpiece as close to the weld as possible.
6. Do not work next to, sit or lean on the welding power source.
7. Do not weld whilst carrying the welding power source or wire feeder.

About Implanted Medical Devices:

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recommended.

SECTION 2 – CONSIGNES DE SÉCURITÉ – LIRE AVANT UTILISATION

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⚠ Pour écarter les risques de blessure pour vous-même et pour autrui — lire, appliquer et ranger en lieu sûr ces consignes relatives aux précautions de sécurité et au mode opératoire.

2-1. Symboles utilisés



DANGER! – Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.



Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.

NOTE – Indique des déclarations pas en relation avec des blessures personnelles.

 Indique des instructions spécifiques.



Ce groupe de symboles veut dire Avertissement! Attention! DANGER DE CHOC ÉLECTRIQUE, PIÈCES EN MOUVEMENT, et PIÈCES CHAUDES. Consulter les symboles et les instructions ci-dessous y afférant pour les actions nécessaires afin d'éviter le danger.

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



Les symboles représentés ci-dessous sont utilisés dans ce manuel pour attirer l'attention et identifier les dangers possibles. En présence de l'un de ces symboles, prendre garde et suivre les instructions afférentes pour éviter tout risque. Les instructions en matière de sécurité indiquées ci-dessous ne constituent qu'un sommaire des instructions de sécurité plus complètes fournies dans les normes de sécurité énumérées dans la Section 2-5. Lire et observer toutes les normes de sécurité.



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



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



UNE DÉCHARGE ÉLECTRIQUE peut entraîner la mort.

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

- Ne pas toucher aux pièces électriques sous tension.
- Porter des gants isolants et des vêtements de protection secs et sans trous.
- S'isoler de la pièce à couper et du sol en utilisant des housses ou des tapis assez grands afin d'éviter tout contact physique avec la pièce à couper ou le sol.
- Ne pas se servir de source électrique à courant électrique dans les zones humides, dans les endroits confinés ou là où on risque de tomber.
- Se servir d'une source électrique à courant électrique UNIQUEMENT si le procédé de soudage le demande.
- Si l'utilisation d'une source électrique à courant électrique s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- D'autres consignes de sécurité sont nécessaires dans les conditions suivantes : risques électriques dans un environnement humide ou si l'on porte des vêtements mouillés ; sur des structures métalliques telles que sols, grilles ou échafaudages ; en position coincée comme assise, à genoux ou couchée ; ou s'il y a un risque élevé de contact inévitable ou accidentel avec la pièce à souder ou

le sol. Dans ces conditions, utiliser les équipements suivants, dans l'ordre indiqué : 1) un poste à souder DC à tension constante (à fil), 2) un poste à souder DC manuel (électrode) ou 3) un poste à souder AC à tension à vide réduite. Dans la plupart des situations, l'utilisation d'un poste à souder DC à fil à tension constante est recommandée. En outre, ne pas travailler seul !

- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Déverrouiller l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir normes de sécurité).
- Installez, mettez à la terre et utilisez correctement cet équipement conformément à son Manuel d'Utilisation et aux réglementations nationales, gouvernementales et locales.
- Toujours vérifier la terre du cordon d'alimentation. Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d'entrée, fixer d'abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Les câbles doivent être exempts d'humidité, d'huile et de graisse; protégez-les contre les étincelles et les pièces métalliques chaudes.
- Vérifier fréquemment le cordon d'alimentation et le conducteur de mise à la terre afin de s'assurer qu'il n'est pas altéré ou dénudé –, le remplacer immédiatement s'il l'est –. Un fil dénudé peut entraîner la mort.
- L'équipement doit être hors tension lorsqu'il n'est pas utilisé.
- Ne pas utiliser des câbles usés, endommagés, de grosseur insuffisante ou mal épissés.
- Ne pas enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode provenant d'une autre machine.
- Ne pas toucher des porte électrodes connectés à deux machines en même temps à cause de la présence d'une tension à vide doublée.
- N'utiliser qu'un matériel en bon état. Réparer ou remplacer sur-le-champ les pièces endommagées. Entretenir l'appareil conformément à ce manuel.
- Porter un harnais de sécurité si l'on doit travailler au-dessus du sol.
- S'assurer que tous les panneaux et couvercles sont correctement en place.
- Fixer le câble de retour de façon à obtenir un bon contact métal-métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.

- Ne pas raccorder plus d'une électrode ou plus d'un câble de masse à une même borne de sortie de soudage. Débrancher le câble pour le procédé non utilisé.
- Utiliser une protection différentielle lors de l'utilisation d'un équipement auxiliaire dans des endroits humides ou mouillés.

Il reste une TENSION DC NON NÉGLIGEABLE dans les sources de soudage onduleur UNE FOIS l'alimentation coupée.

- 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 PIÈCES CHAUDES peuvent provoquer des brûlures.

- Ne pas toucher à mains nues les parties chaudes.
- Prévoir une période de refroidissement avant de travailler à l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



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.
- À l'intérieur, ventiler la zone et/ou utiliser une ventilation forcée au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage. Pour déterminer la bonne ventilation, il est recommandé de procéder à un prélèvement pour la composition et la quantité de fumées et de gaz auxquels est exposé le personnel.
- Si la ventilation est médiocre, porter un respirateur anti-vapeurs approuvé.
- Lire et comprendre les fiches de données de sécurité et les instructions du fabricant concernant les adhésifs, les revêtements, les nettoyeurs, les consommables, les produits de refroidissement, les dégraisseurs, les flux et les métaux.
- Travailler dans un espace fermé seulement s'il est bien ventilé ou en portant un respirateur à alimentation d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l'air et abaisser le niveau d'oxygène provoquant des blessures ou des accidents mortels. S'assurer que l'air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.
- Ne pas souder des métaux munis d'un revêtement, tels que l'acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n'ait été enlevé dans la zone de soudure, que l'endroit soit bien ventilé, et en portant un respirateur à alimentation d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.

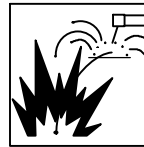


LES RAYONS DE L'ARC peuvent provoquer des brûlures dans les yeux et sur la peau.

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

- Porter un casque de soudage approuvé muni de verres filtrants appropriés pour protéger visage et yeux 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 lunettes de sécurité avec écrans latéraux même sous votre casque.

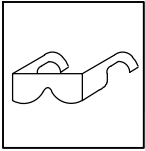
- Avoir recours à des écrans protecteurs ou à des rideaux pour protéger les autres contre les rayonnements les éblouissements et les étincelles ; prévenir toute personne sur les lieux de ne pas regarder l'arc.
- Porter un équipement de protection pour le corps fait d'un matériau résistant et ignifuge (cuir, coton robuste, laine). La protection du corps comporte des vêtements sans huile comme par ex. des gants de cuir, une chemise solide, des pantalons sans revers, des chaussures hautes et une casquette.



LE SOUDAGE peut provoquer un incendie ou une explosion.

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

- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité les recouvrir soigneusement avec des protections homologués.
- Ne pas souder dans un endroit là où des étincelles peuvent tomber sur des substances inflammables.
- Se protéger et d'autres personnes de la projection d'étincelles et de métal chaud.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- Ne pas 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 et AWS A6.0 (voir les Normes de Sécurité).
- Ne soudez pas si l'air ambiant est chargé de particules, gaz, ou vapeurs inflammables (vapeur d'essence, par exemple).
- Brancher le câble de masse sur la pièce la plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution, d'étincelles et d'incendie.
- Ne pas utiliser le poste de soudage pour 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 un équipement de protection pour le corps fait d'un matériau résistant et ignifuge (cuir, coton robuste, laine). La protection du corps comporte des vêtements sans huile comme par ex. des gants de cuir, une chemise solide, des pantalons sans revers, des chaussures hautes et une casquette.
- Avant de souder, retirer toute substance combustible de vos poches telles qu'un allumeur au butane ou des allumettes.
- Une fois le travail achevé, assurez-vous qu'il ne reste aucune trace d'étincelles incandescentes ni de flammes.
- Utiliser exclusivement des fusibles ou coupe-circuits appropriés. Ne pas augmenter leur puissance; ne pas les ponter.
- Une fois le travail achevé, assurez-vous qu'il ne reste aucune trace d'étincelles incandescentes ni de flammes.
- Utiliser exclusivement des fusibles ou coupe-circuits appropriés. Ne pas augmenter leur puissance; ne pas les ponter.
- Suivre les recommandations dans OSHA 1910.252(a)(2)(iv) et NFPA 51B pour les travaux à chaud et avoir de la surveillance et un extincteur à proximité.
- Lire et comprendre les fiches de données de sécurité et les instructions du fabricant concernant les adhésifs, les revêtements, les nettoyeurs, les consommables, les produits de refroidissement, les dégraisseurs, les flux et les métaux.



DES PIÈCES DE METAL ou DES SALETES peuvent provoquer des blessures dans 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 comprimé en cas de non utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d'un respirateur d'adduction d'air homologué.



Les CHAMPS ÉLECTROMAGNÉTIQUES (CEM) peuvent affecter les implants médicaux.

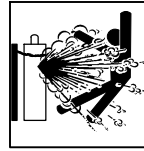
- Les porteurs de stimulateurs cardiaques et autres implants médicaux doivent rester à distance.
- Les porteurs d'implants médicaux doivent consulter leur médecin et le fabricant du dispositif avant de s'approcher de la zone où se déroule du soudage à l'arc, du soudage par points, du gougeage, de la découpe plasma ou une opération de chauffage par induction.



LE BRUIT peut endommager l'ouïe.

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

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



LES BOUTEILLES peuvent exploser si elles sont endommagées.

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

- Protéger les bouteilles de gaz comprimé d'une chaleur excessive, des chocs mécaniques, des dommages physiques, du laitier, des flammes ouvertes, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte-bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais placer une torche de soudage sur une bouteille à gaz.
- Une électrode de soudage ne doit jamais entrer en contact avec une bouteille.
- Ne jamais souder une bouteille pressurisée – risque d'explosion.
- Utiliser seulement des bouteilles de gaz comprimé, régulateurs, tuyaux et raccords convenables pour cette application spécifique; les maintenir ainsi que les éléments associés en bon état.
- Tourner le dos à la sortie de vanne lors de l'ouverture de la vanne de la bouteille. Ne pas se tenir devant ou derrière le régulateur lors de l'ouverture de la vanne.
- Le couvercle du détendeur doit toujours être en place, sauf lorsque la bouteille est utilisée ou qu'elle est reliée pour usage ultérieur.
- Utiliser les équipements corrects, les bonnes procédures et suffisamment de personnes pour soulever et déplacer les bouteilles.
- Lire et suivre les instructions sur les bouteilles de gaz comprimé, l'équipement connexe et le dépliant P-1 de la CGA (Compressed Gas Association) mentionné dans les principales normes de sécurité.

2-3. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance



Risque D'INCENDIE OU D'EXPLOSION.

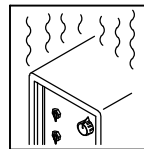
- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Ne pas installer l'appareil à proximité de produits inflammables.
- Ne pas surcharger l'installation électrique – s'assurer que l'alimentation est correctement dimensionnée et protégée avant de mettre l'appareil en service.



LA CHUTE DE L'ÉQUIPEMENT peut provoquer des blessures.

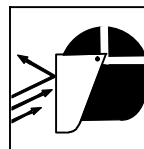
- Utiliser l'anneau de levage uniquement pour soulever l'appareil, NON PAS les chariots, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un équipement de levage de capacité suffisante pour lever l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.
- Tenir l'équipement (câbles et cordons) à distance des véhicules mobiles lors de toute opération en hauteur.

- Suivre les consignes du Manuel des applications pour l'équation de levage NIOSH révisée (Publication N°94-110) lors du levage manuel de pièces ou équipements lourds.



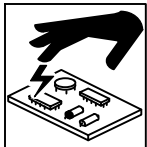
L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

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



LES ÉTINCELLES PROJETÉES peuvent provoquer des blessures.

- Porter un écran facial pour protéger le visage et les yeux.
- Affûter l'électrode au tungstène uniquement à la meuleuse dotée de protecteurs. Cette manœuvre est à exécuter dans un endroit sûr lorsque l'on porte l'équipement homologué de protection du visage, des mains et du corps.
- Les étincelles risquent de causer un incendie – éloigner toute substance inflammable.



LES 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.



Les PIÈCES MOBILES peuvent causer des blessures.

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



LES FILS DE SOUDAGE peuvent provoquer des blessures.

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



L'EXPLOSION DE LA BATTERIE peut provoquer des blessures.

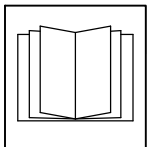
- Ne pas utiliser l'appareil de soudage pour charger des batteries ou faire démarrer des véhicules à l'aide de câbles de démarrage, sauf si l'appareil dispose d'une fonctionnalité de charge de batterie destinée à cet usage.



Les PIÈCES MOBILES peuvent causer des blessures.

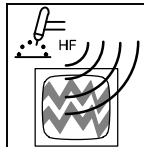
- S'abstenir de toucher des organes mobiles tels que des ventilateurs.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.

- Lorsque cela est nécessaire pour des travaux d'entretien et de dépannage, faire retirer les portes, panneaux, recouvrements ou dispositifs de protection uniquement par du personnel qualifié.
- Remettre les portes, panneaux, recouvrements ou dispositifs de protection quand l'entretien est terminé et avant de rebrancher l'alimentation électrique.



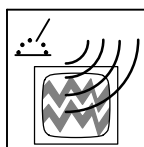
LIRE LES INSTRUCTIONS.

- Lire et appliquer les instructions sur les étiquettes et le Mode d'emploi avant l'installation, l'utilisation ou l'entretien de l'appareil. Lire les informations de sécurité au début du manuel et dans chaque section.
- N'utiliser que les pièces de rechange recommandées par le constructeur.
- Effectuer l'entretien en respectant les manuels d'utilisation, les normes industrielles et les codes nationaux, d'état et locaux.



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

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



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

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

2-4. Proposition californienne 65 Avertissements

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

⚠ Ce produit contient des produits chimiques, notamment du plomb, dont l'État de Californie reconnaît qu'ils provoquent des cancers, des malformations congénitales ou d'autres problèmes de procréation. *Se laver les mains après utilisation.*

2-5. Principales normes de sécurité

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1, is available as a free download from the American Welding Society at <http://www.aws.org> or purchased from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

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

Safe Practices for Welding and Cutting Containers that have Held Combustibles, American Welding Society Standard AWS A6.0, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org and www.sparky.org).

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151 (phone: 703-788-2700, website: www.cganet.com).

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 5060

Spectrum Way, Suite 100, Ontario, Canada L4W 5NS (phone: 800-463-6727, website: www.csa-international.org).

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 25 West 43rd Street, New York, NY 10036 (phone: 212-642-4900, website: www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (phone: 1-866-512-1800) (there are 10 OSHA Regional Offices—phone for Region 5, Chicago, is 312-353-2220, website: www.osha.gov).

Applications Manual for the Revised NIOSH Lifting Equation, The National Institute for Occupational Safety and Health (NIOSH), 1600 Clifton Rd, Atlanta, GA 30333 (phone: 1-800-232-4636, website: www.cdc.gov/NIOSH).

2-6. Informations relatives aux CEM

Le courant électrique qui traverse tout conducteur génère des champs électromagnétiques (CEM) à certains endroits. Le courant issu d'un soudage à l'arc (et de procédés connexes, y compris le soudage par points, le gougeage, le découpage plasma et les opérations de chauffage par induction) crée un champ électromagnétique (CEM) autour du circuit de soudage. Les CEM peuvent créer des interférences avec certains implants médicaux comme des stimulateurs cardiaques. Des mesures de protection pour les porteurs d'implants médicaux doivent être prises: Limiter par exemple tout accès aux passants ou procéder à une évaluation des risques individuels pour les soudeurs. Tous les soudeurs doivent appliquer les procédures suivantes pour minimiser l'exposition aux CEM provenant du circuit de soudage:

1. Rassembler les câbles en les torsadant ou en les attachant avec du ruban adhésif ou avec une housse.
2. Ne pas se tenir au milieu des câbles de soudage. Disposer les câbles d'un côté et à distance de l'opérateur.

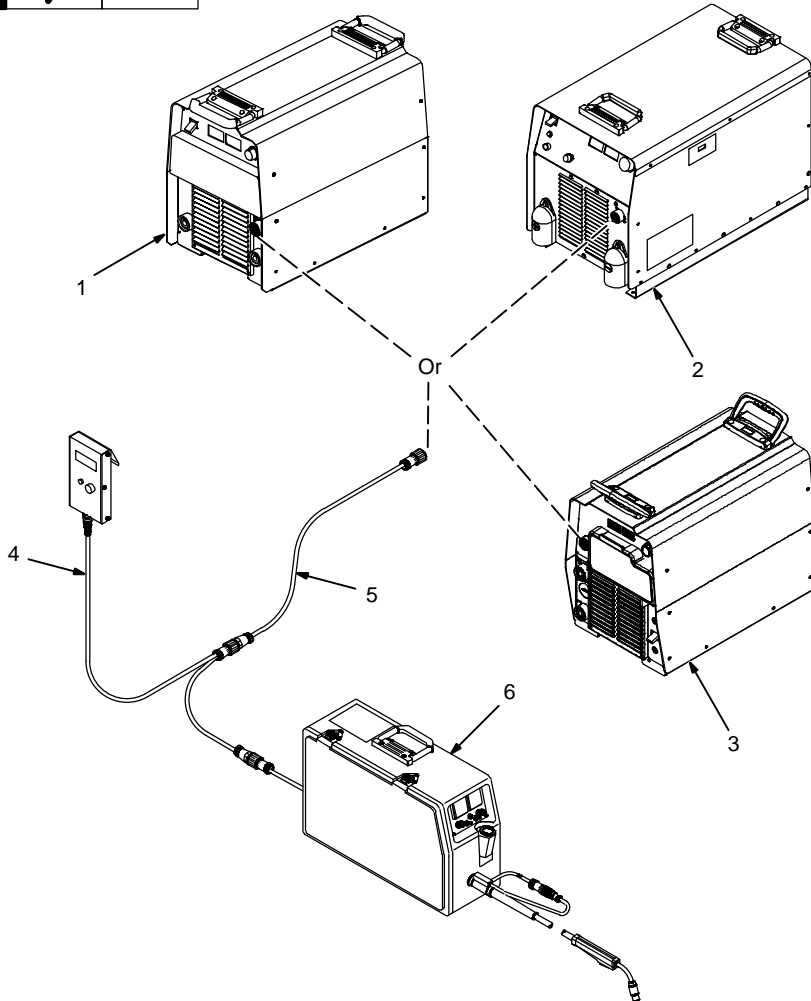
3. Ne pas courber et ne pas entourer les câbles autour de votre corps.
4. Maintenir la tête et le torse aussi loin que possible du matériel du circuit de soudage.
5. Connecter la pince sur la pièce aussi près que possible de la soudure.
6. Ne pas travailler à proximité d'une source de soudage, ni s'asseoir ou se pencher dessus.
7. Ne pas souder tout en portant la source de soudage ou le dévidoir.

En ce qui concerne les implants médicaux :

Les porteurs d'implants doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de soudage par points, de gougeage, du coupage plasma ou de chauffage par induction. Si le médecin approuve, il est recommandé de suivre les procédures précédentes.

SECTION 3 – INSTALLATION

3-1. Connecting To Welding Power Source



- 1 304 Model Welding Power Sources
- 2 456 Model Welding Power Sources
- 3 XMT 350 Model Welding Power Sources
- 4 Remote 14 Cord On Control Unit
- 5 14-Pin Extension Cord (Customer-Supplied)

Use one of these MILLER extension cords:

043 690 – 25 ft (7.6 m)

043 691 – 50 ft (15.2 m)

Make sure total cord length does not exceed 200 ft (61 m).

- 6 Wire Feeder

Connect control as shown if you want control to be close to feeder.

If you want control to be close to welding power source, connect control to welding power source, and connect extension cord between control cord and feeder.

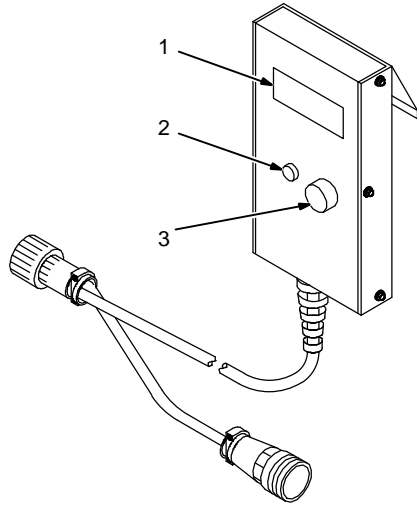
Set applicable welding power source controls as explained in Section 3-2.

ST-801 316-A / Ref. ST-801 192 / ST-801 718 / Ref. 803 691-A

3-2. Welding Power Source Settings

Welding Power Source Model	Mode Switch Setting	Voltage/Amperage Control Switch Setting	Inductance/Dig or Inductance Control Setting
XMT 304 CC/CV	Pulsed MIG	Remote	This control is not functional with welding power source in Pulsed MIG mode. Adjust as normal when welding power source is used in MIG mode.
Invision 304P	No Mode switch - setting automatically done by control unit.	No V/A Control switch - setting automatically done by control unit.	Same as above
XMT 456 CC/CV	Pulsed MIG	Remote	Same as above
Phoenix 456 CC/CV	Pulsed MIG	Remote	Same as above
Invision 456P	No Mode switch - setting automatically done by control unit.	No V/A Control switch - setting automatically done by control unit.	Same as above
XMT 350 CC/CV	Pulsed MIG	No V/A Control switch - setting automatically done by control unit.	Same as above

3-3. Overview And Controls



Overview

The control unit provides three modes of operation:

CV Mig – control functions as a remote voltage control.

Manual MIG Pulsar – control functions as a discrete pulsed MIG CC control.

Synergic Pulsar – programs that use factory-entered values are used to control process.

Setup screens (see Section 3-5) allow the type of welding power source in use to be defined, programs or modes to be made inaccessible (locked out) to the operator, and the language used in the displays (English, French, etc.) to be defined.

Controls

1 Display

2 Parameter Select Push Button

Press button to move > on display. The parameter indicated by > is selected.

3 Parameter Adjust Knob

Turn knob to change selected parameter. Knob turns in either direction.

When top line of display is selected, turning knob accesses pre-written pulse programs, Manual MIG Pulsar mode, or CV MIG mode.

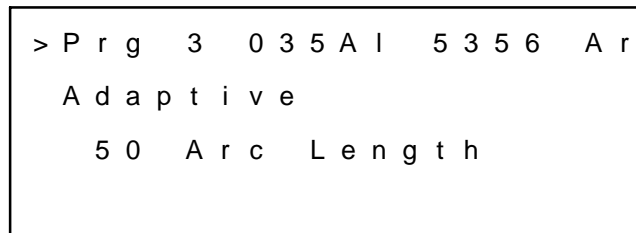
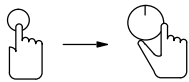
See example at left.

Example

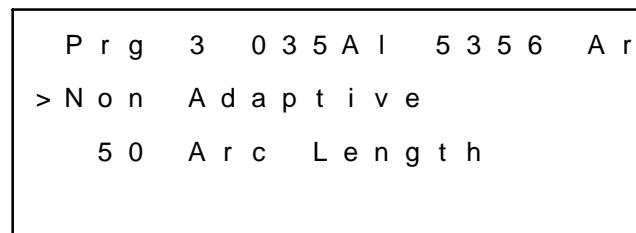
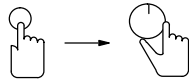
To select Program 3, set to Non Adaptive, and set Arc Length to 36, proceed as follows:

304 model power source shown.

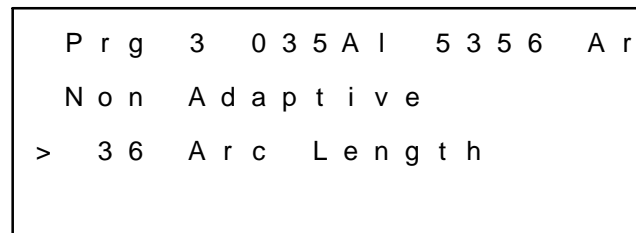
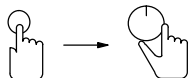
Select top line by pressing push button until > is on top line, and turn knob until Program 3 appears.



Press push button to select second line, and turn knob so Non Adaptive appears.



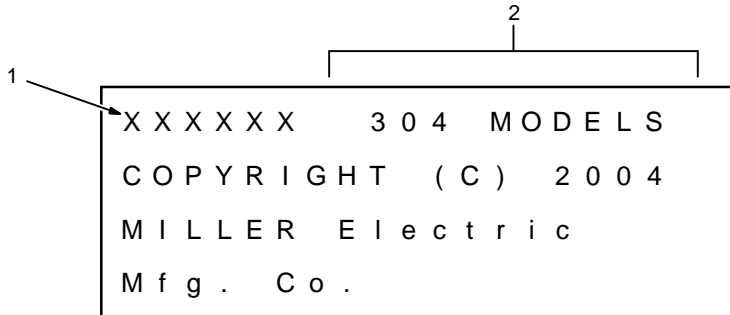
Select third line, and turn knob to set arc length to 36.



3-4. Initial Display, Manual MIG Pulser Mode, And CV Mig Mode



☞ 304 model power source shown.



- 1 Software Number
- 2 Defined Welding Power Source Type

When power is applied, initial display with software number and welding power source type appears momentarily, and then last program to be viewed before control was shut down appears.

If welding power source type does not match welding power source in use, change according to Section 3-5.

3 Manual MIG Pulser Mode

The control unit functions as a discrete pulsed MIG CC control in this mode.

Select top line of display, and turn knob until Manual MIG Pulser is displayed.

Select Amps Peak line, and use knob to set peak amperage from 100–400 amps, but always at least 1 amp more than background amperage. (100 - 425 amps for 350 models). (100 - 600 amps for 456 models).

Select Amps Background line, and use knob to set background amperage (min: 10 amps; max: 300 amps, but always at least 1 amp less than peak setting).

Select PPS Frequency line, and use knob to set pulse frequency (20 - 300 pulses per second, but max setting may be less depending on Pulse Width setting).

Select ms Pulse Width line, and use knob to set pulse width (1 - 5 ms, but max setting may be less depending on Frequency setting).

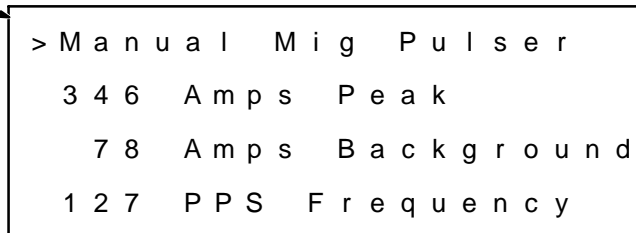
Select Amps Start line, and use knob to set starting amperage from (150 - 530 amps). (150 - 563 amps for 350 models). (150 - 800 amps for 456 models). This amperage value is used at the start of the weld or when an arc is restarted.

4 CV Mig Mode

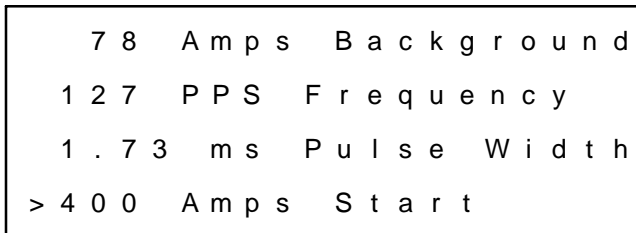
The control unit functions as a remote voltage control in this mode. The welding power source Inductance/Dig control is active in this mode (see Section 3-2).

Select top line of display, and turn knob until CV MIG is displayed. Select Volts line, and use knob to set arc voltage from min to max of welding power source voltage. (10 - 35 volts for 304 and 350 models). (10 - 38 volts for 456 models).

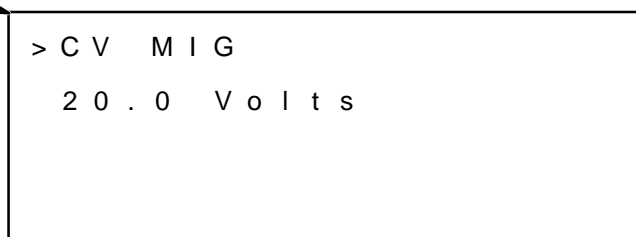
3
With > on top line, turn knob until Manual Mig Pulser appears.



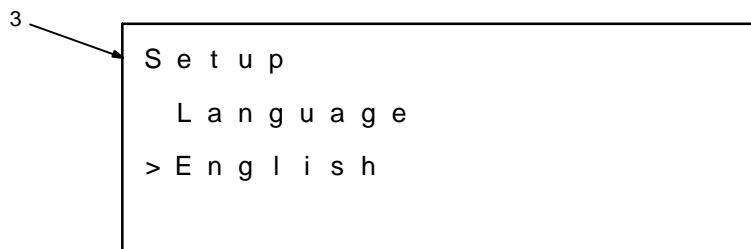
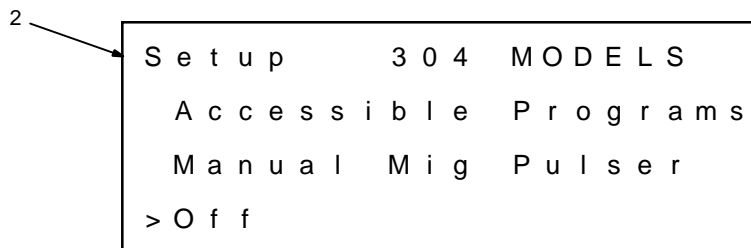
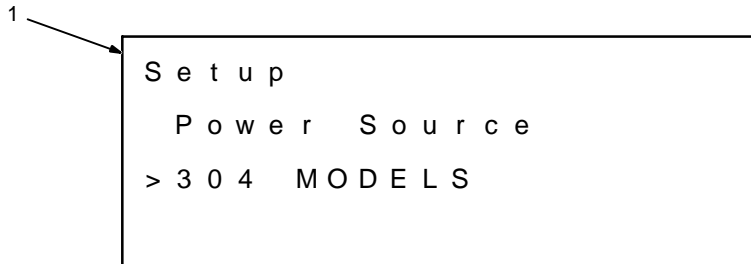
Display scrolls to show lines 5 and 6.



4
With > on top line, turn knob until CV MIG appears.




3-5. Setup Screens



To access Setup screens: turn welding power source Off, press and hold Select push button, turn unit On, and hold push button down until initial screen leaves.

To exit Setup screens, turn welding power source Off and then On again. Parameters that are displayed when the Setup screens are exited are active.

1 Welding Power Source Screen

 Unit originally shipped with 304 models selected.

Select third line of display, and turn knob until desired welding power source type is displayed.

Choices are:

- 304 Models
- 350 Models
- 456 Models

2 Accessible Programs Screen

Select second line of display, and turn knob until Accessible Programs is displayed. Select third line of display and turn knob to access each program and the CV MIG mode and the Manual MIG Pulser mode as desired. Select the fourth line and turn knob to define each option On (accessible) or Off (not accessible).

Programs and modes that are defined Off are not shown when the operator scrolls through the displays in normal operation.

3 Language Screen

Select second line of display, and turn knob until Language is displayed. Select third line of display and turn knob until desired language is shown. The choices are English, French, Italian, and Spanish.

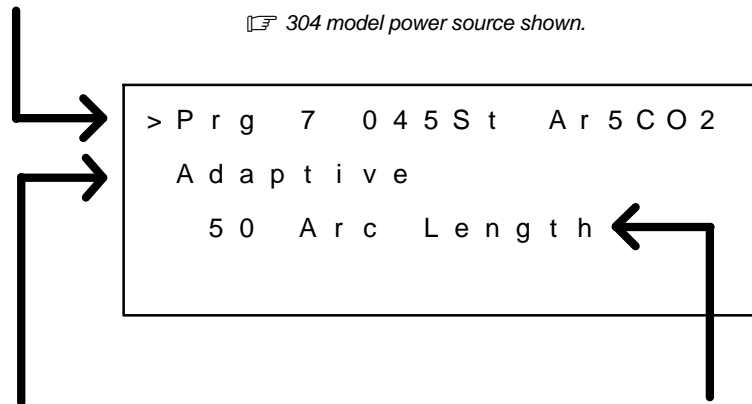
3-6. Choosing Pulse Programs And Setting Parameters



Choosing Pulse Program:

Pulse programs are pre-written and cannot be changed by the user. See Sections 4 and 6 for program parameters.

Choose program depending on the type and size of wire, and type of shielding gas used. For example, the program shown below is for .045 steel wire using 95Ar – 5CO₂ gas.



Choosing Adaptive Or Non Adaptive:

Adaptive: Pulse frequency is automatically regulated to maintain a constant arc length, regardless of changes in wire stickout.

Non Adaptive: Constant pulse frequency is maintained, regardless of the arc length.

Choose mode which best applies to your application.

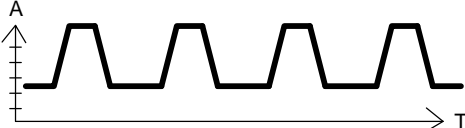
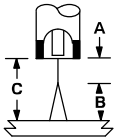
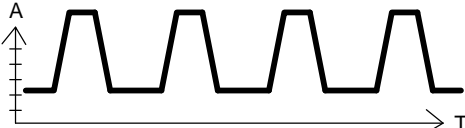
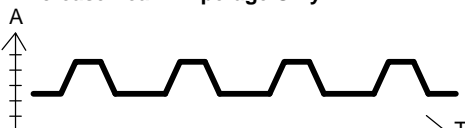
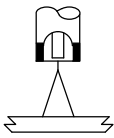
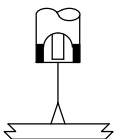



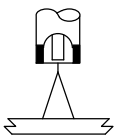
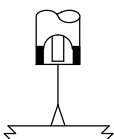


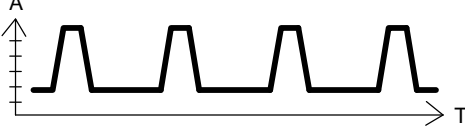
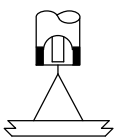
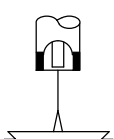

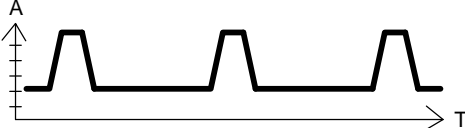
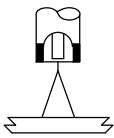
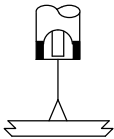
Setting Arc Length:

Each pulsed weld program contains a different range of arc length values. Numbers (0 – 100) are for reference only.

Adjustment normally needed if wire feed speed or type of weld joint is changed.

Set arc length that best applies to your application.

3-7. How Manual Pulsed MIG Waveform Components Affect Arc and Burn-off Rate

	Changes to Arc	Comments
 <p>Reference Waveform</p>		<p>A Electrode extension (stickout) B Arc length C Contact tube-to-work distance should be 3/8 in. to 3/4 in. Recommended gun angle is 10 to 20 degrees from vertical.</p>
 <p>Increase Peak Amperage Only</p>  <p>Decrease Peak Amperage Only</p>	 	<p>Increasing peak amperage only: Increases burn-off rate, which directly affects arc length Increases average amperage slightly Increase heat input slightly</p> <p> Note: A good fine tuning parameter for arc length.</p> <p>Assuming a constant pulse width (peak time), peak amperage should be high enough to achieve a spray transfer. Too low of a peak current often results in a globular transfer. High peak amperages result in smaller droplets, and a more forceful or driving arc.</p>
 <p>Increase Background Amperage Only</p>  <p>Decrease Background Amperage Only</p>	 	<p>Increasing background amperage only: Increases arc length Increases average amperage Increases heat input and penetration Increases puddle fluidity</p> <p> This current level is largely responsible for arc stabilization, and must be high enough to maintain the arc between peak current pulses.</p>
 <p>Increase Pulse Width (Time) Only</p>  <p>Decrease Pulse Width (Time) Only</p>	 	<p>Increasing pulse width (time) only: Increases arc length Increases heat input and penetration Increases arc cone width Increase average amperage</p>
 <p>Increase Pulses Per Second Only</p>  <p>Decrease Pulses Per Second Only</p>	 	<p>Increasing pulses per second only: Increase arc length Increases average amperage Increases heat input</p> <p>Note: A good fine tuning parameter for arc length. Typically this variable is adjusted to control the Burn off rate of the wire as it is fed into the arc.</p>

SECTION 4 – PROGRAMS FOR 304 MODEL WELDING POWER SOURCES

☞ Section 4-1 provides basic information on each of the programs in the unit's memory for the 304 Model welding power sources. See Section 4-2 for more detailed information on each of the programs.

☞ Synergic Information: The manufacturer makes no warranties, express or implied, that welds made using the synergic parameters of this equipment will meet the requirements of the application.

The synergic parameters contained in this equipment are intended only to be a general guideline. The choice and use of any synergic setting must be tested as to its suitability for the application.

4-1. Overview Of Programs

Program #	Wire Type	Wire Size	Shielding Gas	IPM: Min	IPM: Max
1	Nickel	.035 in.	75Ar/25He	80	780
2	5356AL	.047 in.	Argon	165	730
3	5356AL	.035 in.	Argon	200	875
4	4043AL	.047 in.	Argon	110	730
5	4043AL	.035 in.	Argon	160	875
6	Steel	.045 in.	98Ar/2CO ₂	80	550
7	Steel	.045 in.	95Ar/5CO ₂	80	550
8	Steel	.035 in.	98Ar/2CO ₂	100	780
9	Steel	.035 in.	95Ar/5CO ₂	100	780
10	Stainless	.045 in.	98Ar/2CO ₂	90	620
11	Stainless	.045 in.	95Ar/5CO ₂	100	600
12	Stainless	.035 in.	98Ar/2CO ₂	100	780
13	Stainless	.035 in.	95Ar/5CO ₂	100	780
14	Silicon Bronze	.035 in.	Argon	120	780
15	Metal Core	.052 in.	Argon/CO ₂	60	450
16	Metal Core	.045 in.	Argon/CO ₂	100	550
Manual MIG Pulsar					
CV MIG					

4-2. Programs For 304 Model Welding Power Sources

Program 1 -- .035 Nickel -- 75 Argon / 25 Helium (For 304 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
80	0	221	14	40	1.90	458
141	10	268	36	60	2.10	505
212	20	294	58	84	2.40	529
283	30	327	73	96	2.50	529
354	40	337	89	114	2.65	529
425	50	346	105	124	2.72	529
496	60	368	111	139	2.84	529
567	70	382	122	149	2.90	529
638	80	395	138	170	3.00	529
709	90	400	152	182	3.16	529
780	100	400	169	167	3.55	529

Program 2 --- .047 Aluminum 5356 --- Argon (For 304 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
165	0	294	42	59	1.40	529
222	10	304	61	69	1.50	529
279	20	320	81	75	1.65	529
336	30	335	89	96	1.80	529
393	40	348	100	107	2.00	529
450	50	362	120	116	2.20	529
507	60	374	134	129	2.30	529
564	70	384	155	140	2.45	529
621	80	393	167	156	2.60	529
678	90	400	189	166	2.70	529
730	100	400	230	222	2.93	529

Program 3 --- .035 Aluminum 5356 --- Argon (For 304 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
200	0	272	31	51	1.30	484
268	10	272	43	71	1.30	510
336	20	277	54	90	1.35	529
404	30	288	67	99	1.41	529
472	40	298	78	104	1.53	529
540	50	313	86	106	1.66	529
608	60	323	103	111	1.75	529
676	70	330	117	121	1.85	529
744	80	354	134	139	2.00	529
812	90	374	149	150	2.20	529
875	100	389	144	150	2.26	529

Program 4 --- .047 Aluminum 4043 --- Argon (For 304 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
110	0	268	31	50	1.35	529
172	10	298	56	75	1.45	529
234	20	309	86	82	1.59	529
296	30	329	109	97	1.75	529
358	40	348	134	126	1.90	529
420	50	356	152	135	2.14	529
482	60	373	163	148	2.31	529
544	70	387	174	171	2.50	529
606	80	400	199	195	2.74	529
668	90	400	257	212	3.11	529
730	100	400	257	227	3.70	529

Program 5 --- .035 Aluminum 4043 --- Argon (For 304 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
160	0	236	31	50	1.20	470
231	10	252	45	76	1.25	501
302	20	277	58	98	1.30	529
373	30	288	78	109	1.40	529
444	40	302	101	114	1.56	529
515	50	329	125	125	1.74	529
586	60	346	134	130	1.90	529
657	70	362	144	145	2.14	529
728	80	373	152	153	2.23	529
799	90	395	166	183	2.54	529
875	100	400	181	210	2.80	529

Program 6 --- .045 ER70S-3 Mild Steel --- 98 Argon / 2 CO₂ (For 304 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
80	0	323	48	57	2.20	498
127	10	345	65	89	2.30	529
174	20	370	90	105	2.45	529
221	30	390	92	138	2.60	529
268	40	390	108	155	2.70	529
315	50	400	119	175	2.80	529
362	60	400	144	185	2.90	529
409	70	400	155	200	2.96	529
456	80	400	181	215	3.05	529
503	90	400	221	230	3.12	529
550	100	400	277	250	3.27	529

Program 7 --- .045 ER70S-3 Mild Steel --- 95 Argon / 5 CO₂ (For 304 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
80	0	323	48	55	2.20	498
127	10	338	56	92	2.25	529
174	20	370	78	110	2.30	529
221	30	385	97	130	2.45	529
268	40	390	108	155	2.60	529
315	50	400	119	175	2.65	529
362	60	400	133	180	2.75	529
409	70	400	149	200	2.76	529
456	80	400	174	215	2.80	529
503	90	400	216	230	2.85	529
550	100	400	277	250	2.93	529

Program 8 -- .035 ER70S-3 Mild Steel -- 98 Argon / 2 CO₂ (For 304 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	293	42	51	1.60	451
168	10	309	56	91	1.66	491
236	20	332	72	110	1.80	501
304	30	359	81	120	1.99	529
372	40	370	86	150	2.15	529
440	50	390	92	170	2.25	529
508	60	400	108	180	2.35	529
576	70	400	112	195	2.45	529
644	80	400	123	200	2.60	529
712	90	400	133	220	2.70	529
780	100	400	144	240	2.85	529

Program 9 -- .035 ER70S-3 Mild Steel -- 95 Argon / 5 CO₂ (For 304 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	282	43	46	1.50	451
168	10	298	51	95	1.55	491
236	20	332	62	110	1.66	501
304	30	346	78	127	1.73	529
372	40	349	81	160	1.76	529
440	50	359	84	190	1.85	529
508	60	370	87	210	1.90	529
576	70	379	89	220	1.97	529
644	80	389	94	230	2.00	529
712	90	395	95	260	2.05	529
780	100	400	97	280	2.10	529

Program 10 -- .045 309L Stainless Steel -- 98 Argon / 2 CO₂ (For 304 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
90	0	288	31	90	1.80	442
143	10	318	54	105	2.00	475
196	20	351	75	125	2.00	505
249	30	359	97	143	2.20	529
302	40	379	100	160	2.40	529
355	50	390	109	175	2.50	529
408	60	400	117	185	2.50	529
461	70	400	133	200	2.65	529
514	80	400	149	220	2.70	529
567	90	400	167	240	2.85	529
620	100	400	175	260	2.80	529

Program 11 -- .045 309L Stainless Steel -- 95 Argon / 5 CO₂ (For 304 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	302	39	90	1.80	454
150	10	318	54	105	2.00	487
200	20	351	75	125	2.00	510
250	30	359	97	143	2.20	529
300	40	379	100	160	2.40	529
350	50	390	109	175	2.50	529
400	60	400	117	185	2.50	529
450	70	400	133	200	2.65	529
500	80	400	149	220	2.70	529
550	90	400	164	240	2.80	529
600	100	400	175	260	2.80	529

Program 12 -- .035 309L Stainless Steel -- 98 Argon / 2 CO₂ (For 304 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	257	26	55	1.63	400
168	10	266	42	80	1.75	430
236	20	282	67	90	1.85	451
304	30	298	81	105	1.95	472
372	40	313	86	121	1.98	494
440	50	327	92	135	2.00	510
508	60	348	108	147	2.12	529
576	70	362	112	171	2.20	529
644	80	379	117	180	2.25	529
712	90	400	120	182	2.30	529
780	100	400	123	190	2.43	529

Program 13 -- .035 309L Stainless Steel -- 95 Argon / 5 CO₂ (For 304 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	257	26	58	1.60	400
168	10	266	45	83	1.75	430
236	20	282	72	92	1.85	461
304	30	298	87	107	1.99	491
372	40	316	92	125	2.05	512
440	50	329	98	135	2.15	529
508	60	349	106	140	2.25	529
576	70	362	112	170	2.30	529
644	80	373	119	180	2.35	529
712	90	389	123	183	2.35	529
780	100	400	123	190	2.43	529

Program 14 -- .035 Silicon Bronze -- Argon (For 304 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
120	0	238	21	61	1.20	503
186	10	272	43	71	1.30	529
252	20	282	61	95	1.43	529
318	30	301	78	110	1.51	529
384	40	324	95	129	1.50	529
450	50	341	106	136	1.70	529
516	60	363	114	138	1.82	529
582	70	378	128	143	1.88	529
648	80	387	134	148	1.96	529
714	90	400	144	160	2.10	529
780	100	400	144	194	2.16	529

Program 15 -- .052 Metal Core -- Recommended Gases: Argon/CO₂ Gas: Argon/CO₂ mixes up to 20% CO₂ (For 304 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
60	0	360	36	40	2.00	529
99	10	365	70	50	2.10	529
138	20	370	94	73	2.20	529
177	30	374	116	94	2.35	529
216	40	379	133	112	2.50	529
255	50	384	147	129	2.65	529
294	60	387	160	144	2.85	529
333	70	390	174	159	3.00	529
372	80	393	186	174	3.15	529
411	90	396	199	189	3.35	529
450	100	400	210	204	3.50	529

Program 16 -- .045 Metal Core -- Recommended Gases: Argon/CO₂ Gas: Argon/CO₂ mixes up to 20% CO₂ (For 304 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	310	45	50	2.30	529
145	10	330	62	65	2.45	529
190	20	354	70	90	2.55	529
235	30	365	78	110	2.65	529
280	40	370	89	130	2.75	529
325	50	376	100	150	2.85	529
370	60	381	111	165	3.00	529
415	70	385	122	180	3.15	529
460	80	390	138	190	3.25	529
505	90	395	155	200	3.35	529
550	100	400	175	205	3.45	529

SECTION 5 – PROGRAMS FOR 350 MODEL WELDING POWER SOURCES

☞ Section 5-1 provides basic information on each of the programs in the unit's memory for the 350 Model welding power sources. See Section 5-2 for more detailed information on each of the programs.

☞ Synergic Information: The manufacturer makes no warranties, express or implied, that welds made using the synergic parameters of this equipment will meet the requirements of the application.

The synergic parameters contained in this equipment are intended only to be a general guideline. The choice and use of any synergic setting must be tested as to its suitability for the application.

5-1. Overview Of Programs

Program #	Wire Type	Wire Size	Shielding Gas	IPM: Min	IPM: Max
1	Nickel	.035 in.	75Ar/25He	80	780
2	5356AL	.047 in.	Argon	165	730
3	5356AL	.035 in.	Argon	200	875
4	4043AL	.047 in.	Argon	110	730
5	4043AL	.035 in.	Argon	160	875
6	Steel	.045 in.	98Ar/2CO ₂	80	550
7	Steel	.045 in.	95Ar/5CO ₂	80	550
8	Steel	.035 in.	98Ar/2CO ₂	100	780
9	Steel	.035 in.	95Ar/5CO ₂	100	780
10	Stainless	.045 in.	98Ar/2CO ₂	90	620
11	Stainless	.045 in.	95Ar/5CO ₂	100	600
12	Stainless	.035 in.	98Ar/2CO ₂	100	780
13	Stainless	.035 in.	95Ar/5CO ₂	100	780
14	Silicon Bronze	.035 in.	Argon	120	780
15	Metal Core	.052 in.	Argon/CO ₂	60	450
16	Metal Core	.045 in.	Argon/CO ₂	100	550
Manual MIG Pulser					
CV MIG					

5-2. Programs For 350 Model Welding Power Sources

Program 1 -- .035 Nickel -- 75 Argon / 25 Helium (For 350 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
80	0	221	14	40	1.90	458
141	10	268	36	60	2.10	505
212	20	294	58	84	2.40	529
283	30	327	73	96	2.50	563
354	40	337	89	114	2.65	563
425	50	346	105	124	2.72	563
496	60	368	111	139	2.84	563
567	70	382	122	149	2.90	563
638	80	395	138	170	3.00	563
709	90	400	152	182	3.16	563
780	100	400	169	167	3.55	563

Program 2 --- .047 Aluminum 5356 --- Argon (For 350 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
165	0	294	42	59	1.40	529
222	10	304	61	69	1.50	563
279	20	320	81	75	1.65	563
336	30	335	89	96	1.80	563
393	40	348	100	107	2.00	563
450	50	362	120	116	2.20	563
507	60	374	134	129	2.30	563
564	70	384	155	140	2.45	563
621	80	393	167	156	2.60	563
678	90	400	189	166	2.70	563
730	100	400	230	222	2.93	563

Program 3 --- .035 Aluminum 5356 --- Argon (For 350 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
200	0	272	31	51	1.30	484
268	10	272	43	71	1.30	510
336	20	277	54	90	1.35	529
404	30	288	67	99	1.41	563
472	40	298	78	104	1.53	563
540	50	313	86	106	1.66	563
608	60	323	103	111	1.75	563
676	70	330	117	121	1.85	563
744	80	354	134	139	2.00	563
812	90	374	149	150	2.20	563
875	100	389	144	150	2.26	563

Program 4 --- .047 Aluminum 4043 --- Argon (For 350 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
110	0	268	31	50	1.35	529
172	10	298	56	75	1.45	563
234	20	309	86	82	1.59	563
296	30	329	109	97	1.75	563
358	40	348	134	126	1.90	563
420	50	356	152	135	2.14	563
482	60	373	163	148	2.31	563
544	70	387	174	171	2.50	563
606	80	400	199	195	2.74	563
668	90	400	257	212	3.11	563
730	100	400	257	227	3.70	563

Program 5 --- .035 Aluminum 4043 --- Argon (For 350 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
160	0	236	31	50	1.20	470
231	10	252	45	76	1.25	501
302	20	277	58	98	1.30	529
373	30	288	78	109	1.40	563
444	40	302	101	114	1.56	563
515	50	329	125	125	1.74	563
586	60	346	134	130	1.90	563
657	70	362	144	145	2.14	563
728	80	373	152	153	2.23	563
799	90	395	166	183	2.54	563
875	100	400	181	210	2.80	563

Program 6 --- .045 ER70S-3 Mild Steel --- 98 Argon / 2 CO₂ (For 350 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
80	0	323	48	57	2.20	498
127	10	345	65	89	2.30	529
174	20	370	90	105	2.45	563
221	30	390	92	138	2.60	563
268	40	390	108	155	2.70	563
315	50	400	119	175	2.80	563
362	60	400	144	185	2.90	563
409	70	400	155	200	2.96	563
456	80	400	181	215	3.05	563
503	90	400	221	230	3.12	563
550	100	400	277	250	3.27	563

Program 7 --- .045 ER70S-3 Mild Steel --- 95 Argon / 5 CO₂ (For 350 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
80	0	323	48	55	2.20	498
127	10	338	56	92	2.25	529
174	20	370	78	110	2.30	563
221	30	385	97	130	2.45	563
268	40	390	108	155	2.60	563
315	50	400	119	175	2.65	563
362	60	400	133	180	2.75	563
409	70	400	149	200	2.76	563
456	80	400	174	215	2.80	563
503	90	400	216	230	2.85	563
550	100	400	277	250	2.93	563

Program 8 -- .035 ER70S-3 Mild Steel -- 98 Argon / 2 CO₂ (For 350 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	293	42	51	1.60	451
168	10	309	56	91	1.66	491
236	20	332	72	110	1.80	501
304	30	359	81	120	1.99	529
372	40	370	86	150	2.15	563
440	50	390	92	170	2.25	563
508	60	400	108	180	2.35	563
576	70	400	112	195	2.45	563
644	80	400	123	200	2.60	563
712	90	400	133	220	2.70	563
780	100	400	144	240	2.85	563

Program 9 -- .035 ER70S-3 Mild Steel -- 95 Argon / 5 CO₂ (For 350 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	282	43	46	1.50	451
168	10	298	51	95	1.55	491
236	20	332	62	110	1.66	501
304	30	346	78	127	1.73	529
372	40	349	81	160	1.76	563
440	50	359	84	190	1.85	563
508	60	370	87	210	1.90	563
576	70	379	89	220	1.97	563
644	80	389	94	230	2.00	563
712	90	395	95	260	2.05	563
780	100	400	97	280	2.10	563

Program 10 -- .045 309L Stainless Steel -- 98 Argon / 2 CO₂ (For 350 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
90	0	288	31	90	1.80	442
143	10	318	54	105	2.00	475
196	20	351	75	125	2.00	505
249	30	359	97	143	2.20	529
302	40	379	100	160	2.40	563
355	50	390	109	175	2.50	563
408	60	400	117	185	2.50	563
461	70	400	133	200	2.65	563
514	80	400	149	220	2.70	563
567	90	400	167	240	2.85	563
620	100	400	175	260	2.80	563

Program 11 -- .045 309L Stainless Steel -- 95 Argon / 5 CO₂ (For 350 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	302	39	90	1.80	454
150	10	318	54	105	2.00	487
200	20	351	75	125	2.00	510
250	30	359	97	143	2.20	529
300	40	379	100	160	2.40	563
350	50	390	109	175	2.50	563
400	60	400	117	185	2.50	563
450	70	400	133	200	2.65	563
500	80	400	149	220	2.70	563
550	90	400	164	240	2.80	563
600	100	400	175	260	2.80	563

Program 12 -- .035 309L Stainless Steel -- 98 Argon / 2 CO₂ (For 350 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	257	26	55	1.63	400
168	10	266	42	80	1.75	430
236	20	282	67	90	1.85	451
304	30	298	81	105	1.95	472
372	40	313	86	121	1.98	494
440	50	327	92	135	2.00	510
508	60	348	108	147	2.12	529
576	70	362	112	171	2.20	563
644	80	379	117	180	2.25	563
712	90	400	120	182	2.30	563
780	100	400	123	190	2.43	563

Program 13 -- .035 309L Stainless Steel -- 95 Argon / 5 CO₂ (For 350 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	257	26	58	1.60	400
168	10	266	45	83	1.75	430
236	20	282	72	92	1.85	461
304	30	298	87	107	1.99	491
372	40	316	92	125	2.05	512
440	50	329	98	135	2.15	529
508	60	349	106	140	2.25	563
576	70	362	112	170	2.30	563
644	80	373	119	180	2.35	563
712	90	389	123	183	2.35	563
780	100	400	123	190	2.43	563

Program 14 -- .035 Silicon Bronze -- Argon (For 350 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
120	0	238	21	61	1.20	503
186	10	272	43	71	1.30	529
252	20	282	61	95	1.43	563
318	30	301	78	110	1.51	563
384	40	324	95	129	1.50	563
450	50	341	106	136	1.70	563
516	60	363	114	138	1.82	563
582	70	378	128	143	1.88	563
648	80	387	134	148	1.96	563
714	90	400	144	160	2.10	563
780	100	400	144	194	2.16	563

Program 15 -- .052 Metal Core -- Recommended Gases: Argon/CO₂ Gas: Argon/CO₂ mixes up to 20% CO₂ (For 350 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
60	0	360	36	40	2.00	563
99	10	365	70	50	2.10	563
138	20	370	94	73	2.20	563
177	30	374	116	94	2.35	563
216	40	379	133	112	2.50	563
255	50	384	147	129	2.65	563
294	60	387	160	144	2.85	563
333	70	390	174	159	3.00	563
372	80	393	186	174	3.15	563
411	90	396	199	189	3.35	563
450	100	400	210	204	3.50	563

Program 16 -- .045 Metal Core -- Recommended Gases: Argon/CO₂ Gas: Argon/CO₂ mixes up to 20% CO₂ (For 350 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	310	45	50	2.30	563
145	10	330	62	65	2.45	563
190	20	354	70	90	2.55	563
235	30	365	78	110	2.65	563
280	40	370	89	130	2.75	563
325	50	376	100	150	2.85	563
370	60	381	111	165	3.00	563
415	70	385	122	180	3.15	563
460	80	390	138	190	3.25	563
505	90	395	155	200	3.35	563
550	100	400	175	205	3.45	563

SECTION 6 – PROGRAMS FOR 456 MODEL WELDING POWER SOURCES

☞ Section 6-1 provides basic information on each of the programs in the unit's memory for the 456 Model welding power sources. See Section 6-2 for more detailed information on each of the programs.

☞ Synergic Information: The manufacturer makes no warranties, express or implied, that welds made using the synergic parameters of this equipment will meet the requirements of the application.

The synergic parameters contained in this equipment are intended only to be a general guideline. The choice and use of any synergic setting must be tested as to its suitability for the application.

6-1. Overview Of Programs

Program #	Wire Type	Wire Size	Shielding Gas	IPM: Min	IPM: Max
1	Nickel	.035 in.	75Ar/25He	120	670
2	Nickel	.045 in.	75Ar/25He	100	600
3	5356AL	.062 in.	Argon	180	580
4	5356AL	.047 in.	Argon	200	750
5	5356AL	.035 in.	Argon	350	850
6	4043AL	.062 in.	Argon	120	520
7	4043AL	.047 in.	Argon	150	750
8	4043AL	.035 in.	Argon	240	840
9	Steel	.062 in.	95Ar/5CO ₂	60	400
10	Steel	.052 in.	95Ar/5CO ₂	70	750
11	Steel	.045 in.	95Ar/5CO ₂	80	750
12	Steel	.035 in.	95Ar/5CO ₂	80	750
13	Stainless	.045 in.	98Ar/2CO ₂	90	750
14	Stainless	.035 in.	98Ar/2CO ₂	100	750
15	Silicon Bronze	.035 in.	Argon	120	750
16	Metal Core	.062 in.	Ar/CO ₂	50	500
17	Metal Core	.052 in.	Ar/CO ₂	50	750
18	Metal Core	.045 in.	Ar/CO ₂	100	750
Manual MIG Pulser					
CV MIG					

6-2. Programs For 456 Model Welding Power Sources

Program 1 -- .035 Nickel -- 75 Argon / 25 Helium (For 456 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
120	0	254	37	40	2.85	501
175	10	287	49	54	2.96	501
230	20	312	61	68	3.08	511
285	30	331	72	77	3.20	522
340	40	348	84	89	3.32	532
395	50	360	91	99	3.40	543
450	60	374	98	108	3.48	554
505	70	390	105	117	3.55	564
560	80	404	112	126	3.62	575
615	90	418	120	135	3.69	585
670	100	432	127	144	3.76	596

Program 2 -- .045 Nickel -- 75 Argon / 25 Helium (For 456 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	289	56	56	3.00	600
150	10	315	75	76	3.22	600
200	20	345	89	100	3.34	600
250	30	364	103	116	3.50	628
300	40	385	117	129	3.62	645
350	50	404	134	142	3.72	660
400	60	423	150	155	3.82	670
450	70	440	164	168	3.92	677
500	80	458	176	180	4.02	688
550	90	475	188	192	4.12	702
600	100	491	197	204	4.20	712

Program 3 -- .062 Aluminum 5356 -- Argon (For 456 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
180	0	291	82	50	2.25	652
220	10	312	98	62	2.38	663
260	20	338	120	77	2.55	705
300	30	362	136	90	2.69	723
340	40	383	148	100	2.80	748
380	50	404	160	110	2.91	772
420	60	428	176	122	3.04	783
460	70	451	192	134	3.19	794
500	80	484	207	146	3.34	801
540	90	501	216	156	3.42	801
580	100	517	225	165	3.50	801

Program 4 -- .047 Aluminum 5356 -- Argon (For 456 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
200	0	240	47	55	2.10	501
255	10	270	58	80	2.20	600
310	20	301	65	98	2.30	600
365	30	320	72	110	2.40	652
420	40	341	80	120	2.50	652
475	50	350	91	130	2.60	652
530	60	388	101	140	2.70	652
585	70	411	110	153	2.80	702
640	80	421	120	163	2.90	702
695	90	440	131	168	2.95	702
750	100	461	141	170	3.00	702

Program 5 -- .035 Aluminum 5356 -- Argon (For 456 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
350	0	200	65	54	1.90	451
400	10	216	72	66	1.95	451
450	20	230	80	78	2.00	451
500	30	242	87	88	2.05	501
550	40	251	94	96	2.10	501
600	50	261	101	104	2.17	501
650	60	272	108	112	2.24	501
700	70	284	117	121	2.32	501
750	80	296	127	130	2.40	550
800	90	301	131	137	2.45	550
850	100	303	134	140	2.48	550

Program 6 -- .062 Aluminum 4043 -- Argon (For 456 Models)						
IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
120	0	258	56	40	2.15	550
160	10	270	89	60	2.40	649
200	20	298	115	80	2.60	649
240	30	336	134	106	2.89	702
280	40	367	148	122	3.15	720
320	50	400	157	134	3.35	737
360	60	421	169	144	3.55	748
400	70	440	181	154	3.70	758
440	80	461	192	164	3.90	772
480	90	480	204	174	4.05	787
520	100	498	216	180	4.18	801

Program 7 -- .047 Aluminum 4043 -- Argon (For 456 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
150	0	200	40	54	2.00	501
210	10	218	68	80	2.16	600
270	20	270	82	96	2.42	600
330	30	320	94	110	2.55	600
390	40	360	112	120	2.68	600
450	50	385	127	131	2.81	652
510	60	407	138	141	2.92	652
570	70	428	148	151	3.02	702
630	80	451	160	160	3.12	702
690	90	470	171	170	3.26	751
750	100	491	181	180	3.38	751

Program 8 -- .035 Aluminum 4043 -- Argon (For 456 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
240	0	157	42	35	2.05	402
300	10	160	61	40	2.10	451
360	20	181	80	60	2.17	451
420	30	218	101	75	2.30	451
480	40	244	112	90	2.40	501
540	50	256	120	104	2.50	501
600	60	268	131	117	2.60	501
660	70	280	141	127	2.70	550
720	80	291	152	138	2.80	550
780	90	301	162	148	2.90	550
840	100	312	174	158	3.00	550

Program 9 -- .062 ER70S-3 Mild Steel -- 95 Argon / 5 CO₂ (For 456 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
60	0	458	51	60	2.42	674
94	10	489	82	81	2.62	688
128	20	512	110	102	2.80	702
162	30	527	134	120	2.92	716
196	40	541	155	138	3.04	730
230	50	557	176	156	3.17	748
264	60	569	197	174	3.30	762
298	70	581	218	192	3.43	776
332	80	590	240	210	3.56	790
366	90	600	251	220	3.62	801
400	100	600	261	228	3.68	801

Program 10 -- .052 ER70S-3 Mild Steel -- 95 Argon / 5 CO₂ (For 456 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
70	0	369	44	57	2.30	600
138	10	449	68	94	2.43	600
206	20	484	89	125	2.58	624
274	30	512	117	150	2.70	652
342	40	538	138	170	2.80	674
410	50	562	162	191	2.90	698
478	60	574	174	212	3.00	727
546	70	585	185	235	3.10	755
614	80	595	195	248	3.15	780
682	90	600	200	253	3.18	801
750	100	600	204	256	3.20	801

Program 11 -- .045 ER70S-3 Mild Steel -- 95 Argon / 5 CO₂ (For 456 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
80	0	381	37	50	2.00	550
147	10	404	56	80	2.20	600
214	20	435	70	110	2.35	652
281	30	461	84	130	2.50	698
348	40	487	91	145	2.70	698
415	50	498	98	155	2.80	698
482	60	512	105	165	2.90	698
549	70	522	110	175	3.00	698
616	80	534	115	185	3.10	698
683	90	545	120	195	3.20	698
750	100	555	124	205	3.30	698

Program 12 -- .035 ER70S-3 Mild Steel -- 95 Argon / 5 CO₂ (For 456 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
80	0	291	37	33	1.48	398
147	10	315	65	59	1.62	480
214	20	345	82	85	1.75	508
281	30	385	96	100	1.87	522
348	40	421	101	110	1.95	536
415	50	442	110	120	1.98	547
482	60	458	120	130	2.10	561
549	70	472	124	140	2.20	571
616	80	487	129	150	2.26	582
683	90	501	134	160	2.32	592
750	100	510	138	165	2.37	600

Program 13 -- .045 309L Stainless Steel -- 98 Argon / 2 CO₂ (For 456 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
90	0	320	47	60	1.50	441
156	10	345	70	90	1.65	472
222	20	371	89	120	1.75	511
288	30	402	103	145	1.85	550
354	40	430	117	155	1.97	589
420	50	454	129	165	2.09	631
486	60	470	138	175	2.20	663
552	70	484	145	185	2.30	695
618	80	498	152	195	2.40	727
684	90	512	157	210	2.50	762
750	100	527	162	225	2.60	801

Program 14 -- .035 309L Stainless Steel -- 98 Argon / 2 CO₂ (For 456 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	272	40	44	1.52	402
165	10	298	49	77	1.67	420
230	20	310	72	88	1.79	441
295	30	322	96	100	1.91	458
360	40	334	108	112	2.03	480
425	50	348	115	125	2.14	494
490	60	362	122	138	2.22	501
555	70	374	129	151	2.29	508
620	80	388	136	164	2.35	515
685	90	400	143	177	2.40	522
750	100	411	150	190	2.45	529

Program 15 -- .035 Silicon Bronze -- Argon (For 456 Models)

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
120	0	280	37	42	1.30	501
183	10	331	54	57	1.40	540
246	20	371	68	72	1.50	582
309	30	402	77	93	1.60	610
372	40	421	87	108	1.70	642
435	50	442	96	119	1.80	663
498	60	463	108	130	1.90	684
561	70	482	115	140	2.00	705
624	80	496	122	150	2.10	720
687	90	508	127	160	2.20	730
750	100	520	131	170	2.30	737

**Program 16 -- .062 Metal Core -- Recommended Gases: Argon/CO₂
Gases: Argon/CO₂ mixes up to 20% CO₂ (For 456 Models)**

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
50	0	451	37	38	2.10	674
95	10	498	70	68	2.30	705
140	20	515	91	90	2.40	741
185	30	527	120	112	2.50	772
230	40	541	150	132	2.60	800
275	50	552	171	150	2.75	800
320	60	562	190	168	2.90	800
365	70	571	209	185	3.05	800
410	80	581	225	202	3.20	800
455	90	590	244	220	3.35	800
500	100	600	261	238	3.50	800

**Program 17 -- .052 Metal Core -- Recommended Gases: Argon/CO₂
Gases: Argon/CO₂ mixes up to 20% CO₂ (For 456 Models)**

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
50	0	360	30	35	1.90	600
120	10	421	54	75	2.00	649
190	20	461	72	105	2.10	698
260	30	491	91	125	2.25	751
330	40	512	105	145	2.40	800
400	50	531	120	165	2.50	800
470	60	545	127	180	2.60	800
540	70	564	138	190	2.70	800
610	80	576	143	202	2.80	800
680	90	588	148	214	2.90	800
750	100	600	150	225	3.00	800

**Program 18 -- .045 Metal Core -- Recommended Gases: Argon/CO₂
Gases: Argon/CO₂ mixes up to 20% CO₂ (For 456 Models)**

IPM	Trim	Peak Amp	Background Amp	Freq.	Pulse Width	Starting Amps
100	0	376	42	60	1.70	476
165	10	409	51	95	1.80	511
230	20	440	65	115	1.90	540
295	30	465	75	140	1.95	568
360	40	480	82	155	2.00	582
425	50	496	89	170	2.10	596
490	60	512	96	185	2.20	614
555	70	527	101	195	2.25	628
620	80	543	105	205	2.30	645
685	90	560	112	217	2.40	660
750	100	576	120	230	2.50	677

SECTION 7 – TROUBLESHOOTING

7-1. Error Codes



- 1 Program CRC Error
- 2 Program Range Error

If either error code appears, reset the display to factory settings as follows:

Press Parameter Select push button or turn welding power source Off and back On. Change settings and continue.

1

ERROR

Program CRC

Memory Will Be Reset

Press Parm. Select

2

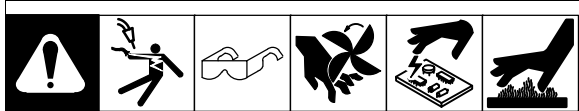
ERROR

Program Range

Memory Will Be Reset

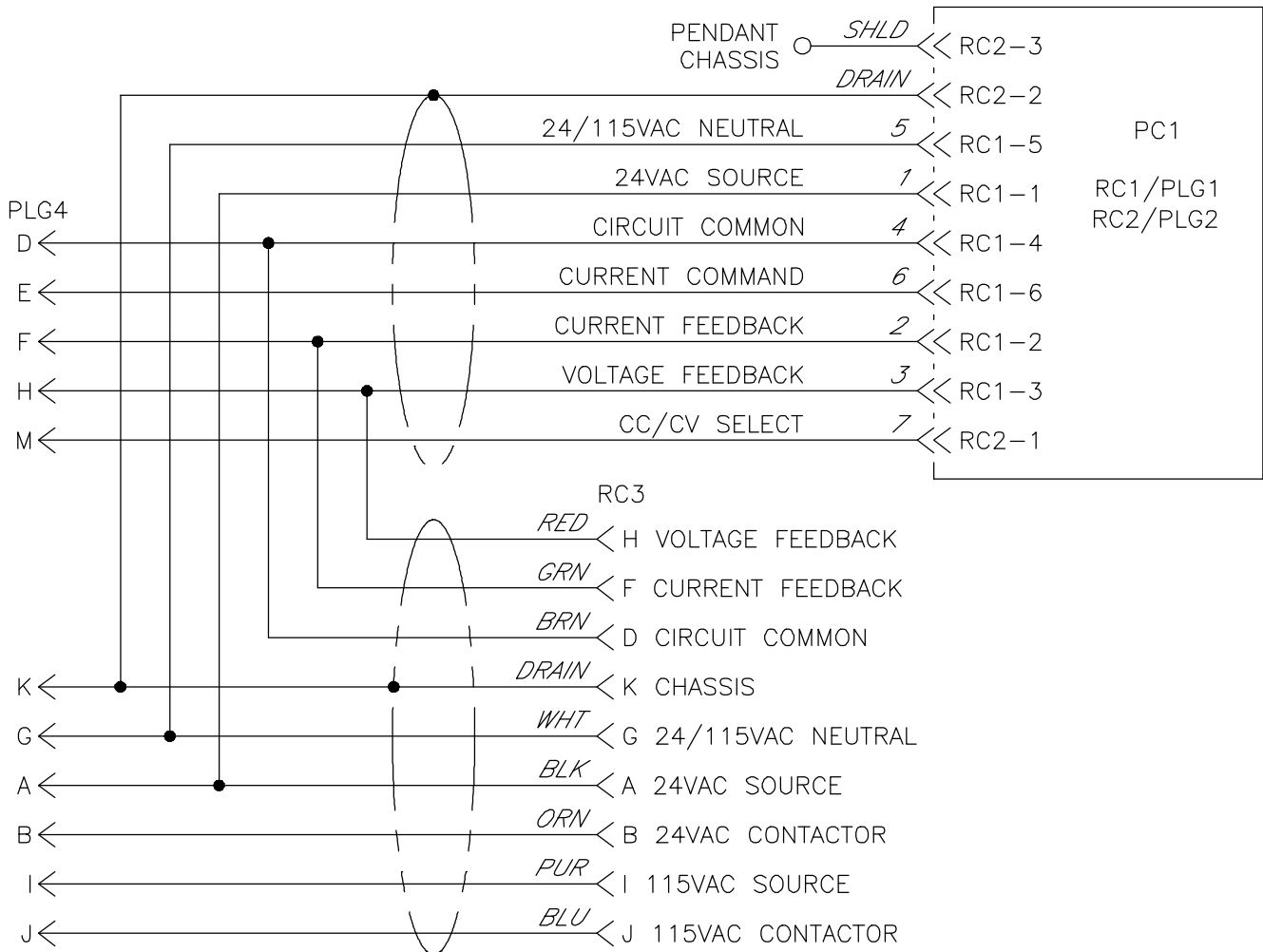
Press Parm. Select

7-2. Troubleshooting



Trouble	Remedy
No weld output.	Be sure welding power source Power switch is On.
	Check welding gun and/or wire feeder if applicable.
No control of weld output.	Check welding power source control settings.
	Tighten all interconnecting cord connections.
	Check pendant cord and replace if needed.
Erratic weld; incorrect weld characteristics.	Check to make sure correct program is selected for welding wire and shielding gas used.
	Check wire feeder and welding power source settings.

SECTION 8 – ELECTRICAL DIAGRAM




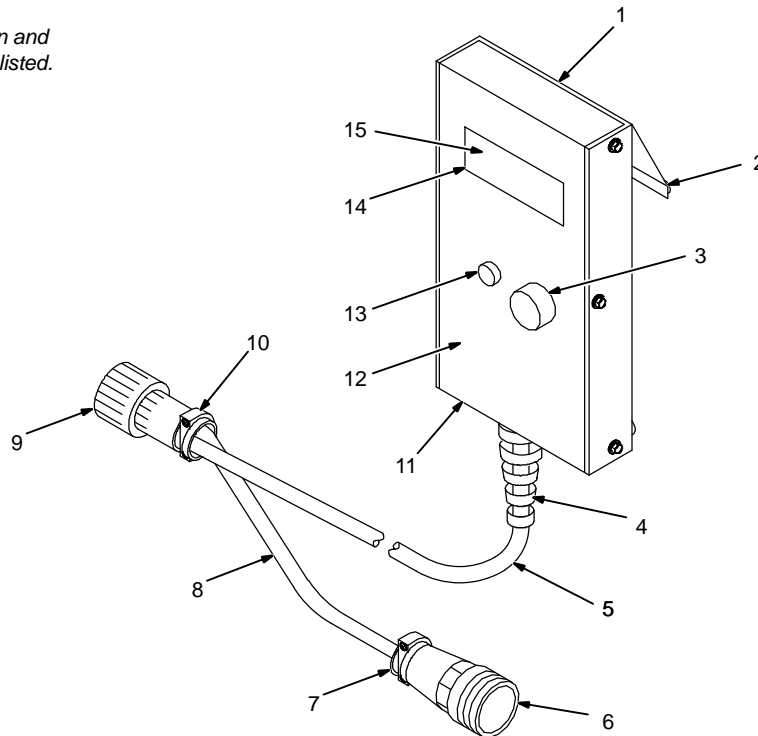
	WARNING
	<ul style="list-style-type: none"> ● Do not touch live electrical parts. ● Disconnect input power or stop engine before servicing. ● Do not operate with covers removed. ● Have only qualified persons install, use, or service this unit.
ELECTRIC SHOCK HAZARD	

Figure 8-1. Circuit Diagram

SECTION 9 – PARTS LIST

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 9-1. Main Assembly				
1		174 960	Panel, Rear & Sides	1
2		126 873	Bumper	4
3		263 478	Knob, Round 1.250Dia w/Recess	1
		167 633	Washer, Shoulder .612 Id X 1.060 Id Nyl	1
	PC1	242 869	Circuit Card Assembly, Remote Pendant	1
		144 844	Stand-Off, 6-32 X .875 Lg	6
		181 757	Cable, Extension 25Ft (Consisting Of)	1
4		134 900	Strain Relief	1
5		183 091	Cable, Shld 18Ga 7/C Nprn	25Ft
6	RC3	152 369	Connector & Sockets	1
7		143 922	Connector, Circ Cpc Clamp Str Rlf	1
8		097 426	Cable, Shld No. 18Ga 10/C	1Ft
9	PLG4	141 162	Connector & Pins	1
10		079 739	Connector, Circ Cpc Clamp Str	1
11		174 959	Case Section, Front & Ends	1
12			Nameplate, (Order By Model And Serial Number)	1
13		153 169	Actuator, Switch	1
14		174 446	Gasket, Meter Lens	1
15		155 024	Lens, Clear Antiglare	1
	PLG1	153 501	Connector & Sockets	1
	PLG2	164 900	Connector & Sockets	1

 Hardware is common and not available unless listed.



ST-801 315-A

Figure 9-1. Main Assembly

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, 2014

(Equipment with a serial number preface of ME 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 delivery date of the equipment to the original end-user purchaser, and not to exceed twelve months after the equipment is shipped to a North American distributor or eighteen months after the equipment is shipped to an International distributor.

- 5 Years Parts — 3 Years Labor
 - * Original Main Power Rectifiers Only to Include SCRs, Diodes, and Discrete Rectifier Modules
- 3 Years — Parts and Labor
 - * Auto-Darkening Helmet Lenses (Except Classic Series) (No Labor)
 - * Engine Driven Welding Generators
(NOTE: Engines are Warranted Separately by the Engine Manufacturer.)
 - * Inverter Power Sources (Unless Otherwise Stated)
 - * Plasma Arc Cutting Power Sources
 - * Process Controllers
 - * Semi-Automatic and Automatic Wire Feeders
 - * Transformer/Rectifier Power Sources
- 2 Years — Parts and Labor
 - * Auto-Darkening Helmet Lenses – Classic Series Only (No Labor)
 - * Fume Extractors – Capture 5, Filtair 400 and Industrial Collector Series
- 1 Year — Parts and Labor Unless Specified
 - * Automatic Motion Devices
 - * CoolBelt and CoolBand Blower Unit (No Labor)
 - * External Monitoring Equipment and Sensors
 - * Field Options
(NOTE: Field options are covered for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
 - * RFCS Foot Controls (Except RFCS-RJ45)
 - * Fume Extractors – Filtair 130, MWX and SWX Series
 - * HF Units
 - * ICE/XT Plasma Cutting Torches (No Labor)
 - * Induction Heating Power Sources, Coolers
(NOTE: Digital Recorders are Warranted Separately by the Manufacturer.)
 - * LiveArc Welding Performance Management System
 - * Load Banks
 - * Motor Driven Guns (except Spoolmate Spoolguns)
 - * PAPR Blower Unit (No Labor)
 - * Positioners and Controllers
 - * Racks
 - * Running Gear/Trailers
 - * Spot Welders
 - * Subarc Wire Drive Assemblies
 - * Water Coolant Systems
 - * TIG Torches (No Labor)
 - * Wireless Remote Foot/Hand Controls and Receivers
 - * Work Stations/Weld Tables (No Labor)

- 6 Months — Parts
 - * Batteries
 - * Bernard Guns (No Labor)
 - * Tregaskiss Guns (No Labor)
- 90 Days — Parts
 - * Accessory (Kits)
 - * Canvas Covers
 - * Induction Heating Coils and Blankets, Cables, and Non-Electronic Controls
 - * M-Guns
 - * MIG Guns and Subarc (SAW) Guns
 - * Remote Controls and RFCS-RJ45
 - * Replacement Parts (No labor)
 - * Roughneck Guns
 - * Spoolmate Spoolguns

Miller's True Blue[®] Limited Warranty shall not apply to:

- Consumable components; such as contact tips, cutting nozzles, contactors, brushes, relays, work station table tops and welding curtains, or parts that fail due to normal wear. (Exception: brushes and relays are covered on all engine-driven products.)**
- Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
- Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

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

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed. TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

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

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

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

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Warranty Questions?

Call
1-800-4-A-MILLER
for your local
Miller distributor.

Your distributor also gives
you ...

Service

You always get the fast,
reliable response you
need. Most replacement
parts can be in your
hands in 24 hours.

Support

Need fast answers to the
tough welding questions?
Contact your distributor.
The expertise of the
distributor and Miller is
there to help you, every
step of the way.





Owner's Record

Please complete and retain with your personal records.

Model Name

Serial/Style Number

Purchase Date

(Date which equipment was delivered to original customer.)

Distributor

Address

City

State

Zip



For Service

Contact a **DISTRIBUTOR** or **SERVICE AGENCY** near you.

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:

Welding Supplies and Consumables

Options and Accessories

Personal Safety Equipment

Service and Repair

Replacement Parts

Training (Schools, Videos, Books)

Technical Manuals (Servicing Information and Parts)

Circuit Diagrams

Welding Process Handbooks

To locate a Distributor or Service Agency visit www.millerwelds.com or call 1-800-4-A-Miller

Contact the Delivering Carrier to:

File a claim for loss or damage during shipment.

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

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For International Locations Visit
www.MillerWelds.com

