XMT® 400
(400 Volt Model)

DESCRIPTION

× Multiprocess Welding

Arc Welding Power Source

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

## SECTION 1 - SAFETY PRECAUTIONS - READ BEFORE USING
1. Symbol Usage ................................................................. 1
2. Arc Welding Hazards ...................................................... 1
3. Additional Symbols For Installation, Operation, And Maintenance ........................................ 3
4. California Proposition 65 Warnings ..................................... 3
5. Principal Safety Standards ................................................ 4
6. EMF Information ............................................................. 4

## SECTION 2 - CONSIGNES DE SÉCURITÉ – À LIRE AVANT UTILISATION
2.1. Signification des symboles ................................................ 5
2.2. Dangers relatifs au soudage à l’arc ..................................... 5
2.3. Autres symboles relatifs à l’installation, au fonctionnement et à l’entretien de l’appareil. ............. 7
2.4. Principales normes de sécurité ......................................... 8
2.5. Information sur les champs électromagnétiques ..................... 8

## SECTION 3 - DEFINITIONS
3.1. Manufacturer’s Warning Label Definitions ............................ 9
3.2. Manufacturer’s Rating Labels ........................................... 11
3.3. Symbols And Definitions ............................................... 12

## SECTION 4 - INSTALLATION ............................................. 13
4.1. Specifications ............................................................. 13
4.2. Duty Cycle And Overheating .......................................... 13
4.3. Volt-Ampere Curves .................................................... 14
4.4. Selecting A Location .................................................... 15
4.5. Weld Output Terminals And Selecting Cable Sizes ............... 16
4.6. Remote 14 Receptacle Information ................................... 17
4.7. Electrical Service Guide .............................................. 17
4.8. Connecting Input Power .............................................. 18

## SECTION 5 - OPERATION ................................................. 19
5.1. Front Panel Controls .................................................... 19
5.2. Meter Functions ......................................................... 20
5.3. Mode Switch Settings .................................................. 21
5.4. Lift-Arc Trigger Hold TIG ............................................. 22

## SECTION 6 - MAINTENANCE & TROUBLESHOOTING .................. 23
6.1. Routine Maintenance .................................................... 23
6.2. Blowing Out Inside Of Unit ........................................... 23
6.3. Voltmeter/Ammeter Help Displays .................................. 24
6.4. Troubleshooting ......................................................... 25

## SECTION 7 - ELECTRICAL DIAGRAM .................................. 27

## SECTION 8 - PARTS LIST ............................................. 28

OPTIONS AND ACCESSORIES

WARRANTY
1-1. Symbol Usage

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

▲ Marks a special safety message.

ระว. Means “Note”; not safety related.

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

1-2. Arc Welding Hazards

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

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

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

ELECTRIC SHOCK can kill.

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

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Do not connect more than one electrode or work cable to any single weld output terminal.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.

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

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

FUMES AND GASES can be hazardous.

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

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer’s instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watchperson nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld in confined spaces. Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area. The area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.
Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

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

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

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.

Flying metal can injure eyes.

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

Buildup of gas can injure or kill.

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

Hot parts can cause severe burns.

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

Magnetic fields can affect pacemakers.

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

Noise can damage hearing.

- Noise from some processes or equipment can damage hearing.
- Wear approved ear protection if noise level is high.

Cylinders can explode if damaged.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.
1-3. Additional Symbols For Installation, Operation, And Maintenance

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

**FALLING UNIT can cause injury.**
- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.

**OVERUSE can cause OVERHEATING**
- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.

**STATIC (ESD) can damage PC boards.**
- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

**MOVING PARTS can cause injury.**
- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.

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

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

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

1-4. California Proposition 65 Warnings

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

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

For Diesel Engines:
- ▲ Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.
1-5. Principal Safety Standards


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


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


1-6. EMF Information

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

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

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

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

About Pacemakers:

Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.
SECTION 2 – CONSIGNES DE SÉCURITÉ – À LIRE AVANT UTILISATION

2-1. Signification des symboles

Identifie un message de sécurité particulier.

Signifie « NOTA » ; n’est pas relatif à la sécurité.

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

Les symboles ci-après sont utilisés tout au long du présent manuel pour attirer l’attention sur les dangers potentiels et les identifier. Lorsqu’on voit un symbole, faire preuve de vigilance et suivre les directives mentionnées afin d’éviter tout danger. Les consignes de sécurité énoncées ci-après ne font que résumer le contenu des normes de sécurité mentionnées à la section 2-4. Lire et respecter toutes ces normes.

Les décharges électriques peuvent être mortelles.

Un simple contact avec des pièces sous tension peut causer une électrocution ou des blessures graves. L’électrode et le circuit de soudage sont sous tension dès que l’appareil est en fonctionnement. Le circuit d’entrée et les circuits internes de l’appareil sont également sous tension. En soudage semi-automatique ou automatique, le fil, le dévidoir, le logement des galets d’entraînement et les pièces métalliques en contact avec le fil de soudage sont sous tension. Tout matériel mal installé ou mal mis à la terre présente un danger.

- Ne jamais toucher aux pièces électriques sous tension.
- Porter des gants et des vêtements de protection secs et exempts de trous.
- S’isoler de la pièce et de la terre au moyen de tapis ou autres dispositifs isolants suffisamment grands pour empêcher tout contact physique avec la pièce ou la terre.
- Ne pas se servir d’une source de courant alternatif en même temps et aux pièces chaudes.
- Ne pas connecter plus d’une électrode ou plus d’un câble de masse à un même terminal de sortie.

Il subsiste un COURANT CONTINU IMPORTANT dans les convertisseurs après la suppression de l’alimentation électrique.

- Arêter les convertisseurs, débrancher le courant électrique et décharger les condensateurs d’alimentation selon les instructions énoncées à la section Entretien avant de toucher les pièces.

Les fumées et les gaz peuvent être dangereux.

Le soudage génère des fumées et des gaz dont l’inhalation peut être dangereuse pour la santé.

- Se tenir à distance des fumées et ne pas les inhaler.
- À l’intérieur, ventiler la zone et/ou utiliser un dispositif d’aspiration au niveau de l’arc pour l’évacuation des fumées et des gaz de soudage.
- Si la ventilation est insuffisante, utiliser un respirateur à adduction d’air agréé.
- Lire les fiches techniques de santé-sécurité (FTSS) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraissants.
- Ne travailler dans un espace clos que s’il est bien ventilé ou porter un respirateur à adduction d’air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent se substituer à l’air, abaisser la teneur en oxygène et causer des lésions ou des accidents mortels. S’assurer que l’air est respirable.
- Ne pas souder 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 de métaux munis d’un revêtement, tels que la tôle d’acier galvanisée, plombée ou cadmiée, à moins que le revêtement n’ait été enlevé dans la zone de soudage, que l’endroit soit bien ventilé, et si nécessaire, porter un respirateur à adduction d’air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques lorsqu’on les soude.
LES RAYONS DE L’ARC peuvent causer des blessures ou même la mort.
- Le rayonnement de l’arc génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de causer des brûlures oculaires et cutanées. Des étincelles sont projetées pendant l’arcade.
- Protéger les yeux avec des lunettes de protection ou des masques de soudage appropriés.
- Ne pas regarder directement l’arcade avec des lunettes non adaptées.

LES PARTICULES PROJETÉES peuvent blesser les yeux.
- Le soudage, le burinage, le passage de la pièce à la brosse métallique et le meulage provoquent l’émission d’étincelles et de particules métalliques. Pendant leur refroidissement, les souches risquent de projeter du laitier.
- Porter des lunettes de sécurité à écrans latéraux agréés, même sous le masque de soudage.

LES CHAMPS MAGNÉTIQUES peuvent perturber le fonctionnement des stimulateurs cardiaques.
- Les personnes qui portent un stimulateur cardiaque doivent se tenir à distance.
- Ils doivent consulter leur médecin avant de s’approcher d’un lieu où on exécute des opérations de soudage à l’arc, de goudrage ou de soudage par points.

LES ACCUMULATIONS DE GAZ peuvent causer des brûlures graves.
- Ne pas toucher les pièces chaudes à main nue.
- Prévoir une période de refroidissement avant d’utiliser le pistolet ou la torche.

LES PIÈCES CHAUDES peuvent causer des brûlures graves.
- Se protéger et protéger les tiers de la projection d’étincelles et de métal chaud.
- Ne pas souder à un endroit où les étincelles peuvent tomber sur des substances inflammables.

LE BRUIT peut affecter l’ouïe.
- Le bruit de certains processus et équipements peut affecter l’ouïe.
- Porter des protecteurs d’oreille agréés si le niveau sonore est trop élevé.

LES BOUTEILLES endommagées peuvent exploser.
- Protéger les bouteilles de gaz comprimé de la chaleur excessive, des chocs mécaniques, du laitier, des flammes nues, des étincelles et des arcs.
- Ne jamais poser une bouteille de gaz sous haute pression – elle risquerait d’exploser.
- Ne jamais souder une bouteille contenant du gaz sous pression – elle risquerait d’exploser.
- Ne jamais souder une bouteille contenant du gaz sous pression – elle risquerait d’exploser.
- Laisser le capuchon protecteur sur la souffleuse, sauf en cas d’utilisation ou de branchement de la bouteille.

**Risque D’INCENDIE OU D’EXPLOSION**
- Ne pas placer l’appareil sur une surface inflammable, ni au-dessus ou à proximité d’elle.
- Ne pas surcharger l’installation électrique – s’assurer que l’alimentation est correctement dimensionnée et protégée avant de mettre l’appareil en service.

**LA CHUTE DE L’APPAREIL peut blesser.**
- N’utiliser que l’anneau de levage pour lever l’appareil. NE PAS utiliser le chariot, les bouteilles de gaz ou tout autre accessoire.
- Si on utilise un chariot élévateur pour déplacer l’unité, s’assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l’appareil.

**L’EMPLOI EXCESSIF peut FAIRE SURCHAUFFER L’ÉQUIPEMENT.**
- Prévoir une période de refroidissement ; respecter le cycle opératoire nominal.
- Ne pas obstruer les orifices ou filtrer l’alimentation en air du poste.

**LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.**
- Mettre un bracelet antistatique 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.**
- Se tenir à l’écart des pièces mobiles.
- Se tenir à l’écart des points de coincement tels que les dévidoirs.

**LES FILS DE SOUDAGE peuvent causer des blessures.**
- Ne pas appuyer sur la gâchette avant d’en avoir reçu l’instruction.
- Ne pas diriger le pistolet vers soi, vers d’autres personnes ou vers toute pièce mécanique en engageant le fil de soudage.

**LES ORGANES MOBILES peuvent causer des blessures.**
- Se tenir à l’écart des organes mobiles comme les ventilateurs.
- Maintenir fermés et bien fixés les portes, panneaux, recouvrements et dispositifs de protection.

**LE RAYONNEMENT HAUTE FRÉQUENCE (H. F.) risque de causer des interférences.**
- Le rayonnement haute fréquence peut causer des interférences avec les équipements de radio-navigation et de communication, les services de sécurité et les ordinateurs.
- Ne demander qu’à des personnes qualifiées familiarisées avec les équipements électroniques de faire fonctionner l’installation.
- Si la Federal Communications Commission signale des interférences, arrêter immédiatement l’appareil.
- Faire régulièrement contrôler et entretenir l’installation.
- Maintenir soigneusement fermés les panneaux et les portes des sources de haute fréquence, maintenir le jeu d’éclatement au réglage adéquat et utiliser une terre et un blindage pour réduire les interférences eventuelles.

**LE SOUDAGE À L’ARC peut causer des interférences.**
- L’énergie électromagnétique peut causer des interférences avec l’équipement électronique sensible tel que les ordinateurs et l’équipement commandé par ordinateur tel que les robots.
- Veiller à que tout l’équipement de la zone de soudage soit compatible au point de vue électromagnétique.
- Pour réduire la possibilité d’interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (par ex. : à terre).
- Veiller à soudier à une distance de 100 mètres de tout équipement électronique sensible.
- Veiller à que le poste de soudage soit posé et mis à la terre conformément au présent manuel.
- En cas d’interférences après exécution des directives précédentes, il incombe à l’utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l’utilisation de câbles blindés, l’utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.

**LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.**
- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d’un stimulateur cardiaque doivent d’abord consulter leur médecin avant de s’approcher des opérations de soudage à l’arc, de gougeage ou de soudage par points.
2-4. Principales normes de sécurité


National Electrical Code, norme NFPA 70, de la National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269–9101 (téléphone : (617) 770–3000, sites Web : www.nfpa.org et www.sparky.org).


Practice For Occupational And Educational Eye And Face Protection, norme ANSI Z87.1, de l’American National Standards Institute, 11 West 42nd Street, New York, NY 10036–8002 (téléphone : (212) 642–4900, site Web : wwwansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, norme NFPA 51B, de la National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269–9101 (téléphone : (617) 770–3000, site Web : www.nfpa.org et www.sparky.org).


2-5. Information sur les champs électromagnétiques

Données sur le soudage électrique et les effets des champs magnétiques basse fréquence sur l’organisme

En parcourant les câbles de soudage, le courant crée des champs électromagnétiques. Les effets potentiels de tels champs restent préoccupants. Cependant, après avoir examiné plus de 500 études qui ont été faites pendant une période de recherche de 17 ans, un comité de spécialistes du National Research Council a conclu : « L’accumulation de preuves n’a pas démontré que l’exposition aux champs magnétiques et aux champs électriques à haute fréquence constitue un risque pour la santé humaine ». Toutefois, les études et l’examen des preuves se poursuivent. En attendant les conclusions finales de la recherche, il serait souhaitable de réduire l’exposition aux champs électromagnétiquespendant le soudage ou le coupeage.

Afin de réduire les champs électromagnétiques en milieu de travail, respecter les consignes suivantes :

1. Garder les câbles ensemble en les torsadant ou en les fixant avec du ruban adhésif.
3. Ne pas s’enrouler les câbles autour du corps.
4. Garder le poste de soudage et les câbles le plus loin possible de soi.
5. Placer la pince de masse le plus près possible de la zone de soudage.

Consignes relatives aux stimulateurs cardiaques :

Les personnes qui portent un stimulateur cardiaque doivent avant tout consulter leur médecin. Si ce dernier les déclare aptes, il leur est recommandé de respecter les consignes ci-dessus.
3-1. Manufacturer’s Warning Label Definitions

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

1 Electric shock from welding electrode or wiring can kill.
   1.1 Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves.
   1.2 Protect yourself from electric shock by insulating yourself from work and ground.
   1.3 Disconnect input plug or power before working on machine.

2 Breathing welding fumes can be hazardous to your health.
   2.1 Keep your head out of the fumes.
   2.2 Use forced ventilation or local exhaust to remove the fumes.
   2.3 Use ventilating fan to remove fumes.

3 Welding sparks can cause explosion or fire.
   3.1 Keep flammables away from welding. Do not weld near flammables.
   3.2 Welding sparks can cause fires. Have a fire extinguisher nearby, and have a watchperson ready to use it.
   3.3 Do not weld on drums or any closed containers.

4 Arc rays can burn eyes and injure skin.
   4.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.

5 Become trained and read the instructions before working on the machine or welding.

6 Do not remove or paint over (cover) the label.
1 Warning! Watch Out! There are possible hazards as shown by the symbols.
2 Electric shock from wiring can kill.
3 Disconnect input plug or power before working on machine.
4 Hazardous voltage remains on input capacitors after power is turned off. Do not touch fully charged capacitors.
5 Always wait 60 seconds after power is turned off before working on unit, OR
6 Check input capacitor voltage, and be sure it is near 0 before touching any parts.

1 Warning! Watch Out! There are possible hazards as shown by the symbols.
2 When power is applied failed parts can explode or cause other parts to explode.
3 Flying pieces of parts can cause injury. Always wear a face shield when servicing unit.
4 Always wear long sleeves and button your collar when servicing unit.
5 After taking proper precautions as shown, connect power to unit.

1 Warning! Watch Out! There are possible hazards as shown by the symbols.
2 Falling equipment can cause injury and damage to unit.
3 Always lift and support unit using both handles. Keep angle of lifting device less than 60 degrees.
4 Use a proper cart to move unit.
5 Do not use one handle to lift or support unit.
3-2. Manufacturer’s Rating Labels

EN 60974-1

<table>
<thead>
<tr>
<th>50A 10V</th>
<th>400A</th>
<th>36V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uo 85</td>
<td>10V</td>
<td>400A</td>
</tr>
<tr>
<td>l2 400</td>
<td>l2 400</td>
<td>300</td>
</tr>
<tr>
<td>U2 34</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td>50/60 Hz</td>
<td>31</td>
<td>17</td>
</tr>
</tbody>
</table>

IP23

EN 60974-1

<table>
<thead>
<tr>
<th>5A 10V</th>
<th>400A</th>
<th>36V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uo 85</td>
<td>10V</td>
<td>400A</td>
</tr>
<tr>
<td>l2 400</td>
<td>l2 400</td>
<td>300</td>
</tr>
<tr>
<td>U2 36</td>
<td>32</td>
<td>30</td>
</tr>
<tr>
<td>50/60 Hz</td>
<td>31</td>
<td>17</td>
</tr>
</tbody>
</table>

IP23
### 3-3. Symbols And Definitions

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Amperage</td>
</tr>
<tr>
<td>™️</td>
<td>Panel</td>
</tr>
<tr>
<td>☢️</td>
<td>Alternating Current (AC)</td>
</tr>
<tr>
<td>V</td>
<td>Voltage</td>
</tr>
<tr>
<td>⚡️</td>
<td>Output</td>
</tr>
<tr>
<td>📦</td>
<td>Circuit Breaker</td>
</tr>
<tr>
<td>⬟️</td>
<td>Remote</td>
</tr>
<tr>
<td>⬤️</td>
<td>On</td>
</tr>
<tr>
<td>⚔️</td>
<td>Off</td>
</tr>
<tr>
<td>⚔️</td>
<td>Gas Tungsten Arc Welding</td>
</tr>
<tr>
<td>🌊</td>
<td>Negative</td>
</tr>
<tr>
<td>⚔️</td>
<td>Voltage Input</td>
</tr>
<tr>
<td>🌊</td>
<td>Direct Current (DC)</td>
</tr>
<tr>
<td>🌊</td>
<td>Positive</td>
</tr>
<tr>
<td>🌊</td>
<td>Inductance</td>
</tr>
<tr>
<td>⚔️</td>
<td>Protective Earth (Ground)</td>
</tr>
<tr>
<td>🌊</td>
<td>Constant Current</td>
</tr>
<tr>
<td>🌊</td>
<td>Constant Voltage</td>
</tr>
<tr>
<td>🌊</td>
<td>Foot Control</td>
</tr>
<tr>
<td>🌊</td>
<td>Line Connection</td>
</tr>
<tr>
<td>ℹ️</td>
<td>Arc Force</td>
</tr>
<tr>
<td>🌊</td>
<td>Shielded Metal Arc Welding (SMAW)</td>
</tr>
<tr>
<td>🌊</td>
<td>Gas Metal Arc Welding (GMAW)</td>
</tr>
<tr>
<td>🌊</td>
<td>Three Phase Static Frequency Converter-Transformer-Rectifier</td>
</tr>
<tr>
<td>U₀</td>
<td>Rated No Load Voltage (Average)</td>
</tr>
<tr>
<td>U₁</td>
<td>Primary Voltage</td>
</tr>
<tr>
<td>U₂</td>
<td>Conventional Load Voltage</td>
</tr>
<tr>
<td>X</td>
<td>Duty Cycle</td>
</tr>
<tr>
<td>Hz</td>
<td>Hertz</td>
</tr>
<tr>
<td>IP</td>
<td>Degree Of Protection</td>
</tr>
<tr>
<td>I₂</td>
<td>Rated Welding Current</td>
</tr>
<tr>
<td>%</td>
<td>Percent</td>
</tr>
<tr>
<td>🌊</td>
<td>Pulsed</td>
</tr>
<tr>
<td>🌊</td>
<td>Lift-Arc Trigger Hold Operation (GTAW)</td>
</tr>
<tr>
<td>🌊</td>
<td>Single Phase</td>
</tr>
<tr>
<td>🌊</td>
<td>Three Phase</td>
</tr>
<tr>
<td>I₁max</td>
<td>Rated Maximum Supply Current</td>
</tr>
<tr>
<td>I₁eff</td>
<td>Maximum Effective Supply Current</td>
</tr>
<tr>
<td>☢️</td>
<td>Increase</td>
</tr>
<tr>
<td>☢️</td>
<td>Lift-Arc Operation (GTAW)</td>
</tr>
</tbody>
</table>
SECTION 4 – INSTALLATION

4-1. Specifications

<table>
<thead>
<tr>
<th>Rated Welding Output</th>
<th>Voltage Range</th>
<th>Amperage Range</th>
<th>Maximum Open-Circuit Voltage DC</th>
<th>IP Rating</th>
<th>400 V</th>
<th>KVA</th>
<th>KW</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 A @ 32 Volts DC, 60% Duty Cycle</td>
<td>10 – 35</td>
<td>5 – 400</td>
<td>90</td>
<td>23</td>
<td>17.0 (0.15*)</td>
<td>12.4 (0.09*)</td>
<td>11.5 (0.04*)</td>
</tr>
</tbody>
</table>

*While idling

4-2. Duty Cycle And Overheating

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

If unit overheats, output stops, a Help message is displayed (see Section 6-3), and cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or duty cycle before welding.

Exceeding duty cycle can damage unit and void warranty.

Overheating

Ref. SA-178 651
4-3. Volt-Ampere Curves

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

A. CC Mode

B. CV Mode
4-4. Selecting A Location

Dimensions And Weight
87 lb (39.5 kg)

Movement

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

1 Lifting Handles
Use handles to lift unit.
2 Hand Cart
Use cart or similar device to move unit.
3 Plate Label
Use label to determine input power needs.
4 Line Disconnect Device
Locate unit near correct input power supply.

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

Location

18 in (460 mm)

Return To Table Of Contents
4-5. Weld Output Terminals And Selecting Cable Sizes

ARC WELDING can cause Electromagnetic Interference.

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

<table>
<thead>
<tr>
<th>Welding Amperes</th>
<th>Total Cable (Copper) Length In Weld Circuit Not Exceeding*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100 ft (30 m) Or Less</td>
</tr>
<tr>
<td></td>
<td>10 – 60% Duty Cycle</td>
</tr>
<tr>
<td>100</td>
<td>4 (20)</td>
</tr>
<tr>
<td>150</td>
<td>3 (30)</td>
</tr>
<tr>
<td>200</td>
<td>3 (30)</td>
</tr>
<tr>
<td>250</td>
<td>2 (35)</td>
</tr>
<tr>
<td>300</td>
<td>1 (50)</td>
</tr>
<tr>
<td>350</td>
<td>1/0 (60)</td>
</tr>
<tr>
<td>400</td>
<td>1/0 (60)</td>
</tr>
<tr>
<td>500</td>
<td>2/0 (70)</td>
</tr>
<tr>
<td>600</td>
<td>3/0 (95)</td>
</tr>
</tbody>
</table>

*Weld cable size (AWG) is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere.

() = mm² for metric use

S-0007-E
## 4-6. Remote 14 Receptacle Information

<table>
<thead>
<tr>
<th>Socket*</th>
<th>Socket Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>24 volts ac. Protected by circuit breaker CB2.</td>
</tr>
<tr>
<td>B</td>
<td>Contact closure to A completes 24 volts ac contactor control circuit.</td>
</tr>
<tr>
<td>I</td>
<td>115 volts ac. Protected by circuit breaker CB1.</td>
</tr>
<tr>
<td>J</td>
<td>Contact closure to I completes 115 volts ac contactor control circuit.</td>
</tr>
<tr>
<td>C</td>
<td>Output to remote control; 0 to +10 volts dc, +10 volts dc in MIG mode.</td>
</tr>
<tr>
<td>D</td>
<td>Remote control circuit common.</td>
</tr>
<tr>
<td>E</td>
<td>0 to +10 volts dc input command signal from remote control.</td>
</tr>
<tr>
<td>H</td>
<td>Voltage feedback; +1 volt dc per 10 output receptacle volts.</td>
</tr>
<tr>
<td>F</td>
<td>Current feedback; +1 volt dc per 100 amperes.</td>
</tr>
<tr>
<td>M</td>
<td>CC/CV select</td>
</tr>
<tr>
<td>G</td>
<td>Circuit common for 24 and 115 volts ac circuits.</td>
</tr>
<tr>
<td>K</td>
<td>Chassis common.</td>
</tr>
</tbody>
</table>

*The remaining sockets are not used.

## 4-7. Electrical Service Guide

<table>
<thead>
<tr>
<th>Input Voltage</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Amperes At Rated Output</td>
<td>17.0</td>
</tr>
<tr>
<td>Max Recommended Standard Fuse Or Circuit Breaker Rating In Amperes</td>
<td>30</td>
</tr>
</tbody>
</table>

NOTE: Actual input voltage should not exceed ± 10% of indicated required input voltage. If actual input voltage is outside of this range, output may not be available.


S-0092J
4-8. Connecting Input Power

Check input voltage available at site.

1 Input And Grounding Conductors

2 Line Disconnect Device

Select type and size of overcurrent protection using Section 4-7.

Always connect green/yellow wire to supply grounding terminal, never to a line terminal.

Always connect grounding conductor first.

= GND/PE

Tools Needed:
5-1. Front Panel Controls

1. Power On/Off Switch
   - The fan motor is thermostatically controlled and only runs when cooling is needed.

2. Voltmeter (see Section 5-2)

3. Ammeter (see Section 5-2)

4. Voltage/Amperage Adjustment Control

5. Mode Switch
   - The Mode switch setting determines both the process and output On/Off control (see Section 5-3). Source of control (panel or remote) for the amount of output is selected on the Voltage/Amperage Control switch.
   - For Air Carbon Arc (CAC-A) cutting and gouging, place switch in Stick position. For best results, place Inductance/Dig control in the maximum position.

6. Voltage/Amperage Control Switch
   - For front panel control, place switch in Panel position.
   - For remote control, make connections to Remote 14 receptacle, and place switch in Remote position. In most modes, remote control is a percent of the Voltage/Amperage Adjustment control setting (the value selected on Voltage/Amperage Adjustment control is maximum available on remote). In the MIG mode, remote control provides full range of unit output regardless of V/A Adjust control setting.

7. Inductance/Dig Control
   - Control adjusts Dig when a Stick (SMAW) welding position is selected on mode switch.
   - When set lower, short-circuit amperage at low arc voltage is the same as normal welding amperage.
   - When set higher, short-circuit amperage is increased at low arc voltage to assist with arc starts as well as reduce sticking while welding (see volt-ampere curves in Section 4-3).
   - Select setting best suited for application.
   - Control adjusts inductance when a MIG (GMAW) position is selected on the mode switch. Inductance determines the "wetness" of the weld puddle. When set higher, "wetness" (puddle fluidity) increases.
   - When pulsed MIG, or one of the TIG (GTAW) processes is selected, this control is not functional.
## 5-2. Meter Functions

The meters display the actual weld output values for approximately three seconds after the arc is broken.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Meter Reading At Idle</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Scratch Start TIG (GTAW)" /></td>
<td><strong>80.0</strong> A</td>
</tr>
<tr>
<td><strong>V</strong></td>
<td><strong>85</strong></td>
</tr>
<tr>
<td><strong>Actual Volts (OCV)</strong></td>
<td><strong>Preset Amps</strong></td>
</tr>
<tr>
<td><img src="image" alt="Lift-Arc Trigger Hold TIG (GTAW)" /></td>
<td><strong>V</strong> <strong>85</strong></td>
</tr>
<tr>
<td><strong>Blank</strong></td>
<td><strong>Preset Amps</strong></td>
</tr>
<tr>
<td><img src="image" alt="TIG (GTAW)" /></td>
<td><strong>V</strong> <strong>85</strong></td>
</tr>
<tr>
<td><strong>Blank</strong></td>
<td><strong>Preset Amps</strong></td>
</tr>
<tr>
<td><img src="image" alt="MIG (GMAW)" /></td>
<td><strong>24.5</strong> <strong>A</strong></td>
</tr>
<tr>
<td><strong>Preset Volts</strong></td>
<td><strong>Blank</strong></td>
</tr>
<tr>
<td><img src="image" alt="Pulsed MIG (GMAW-P)" /></td>
<td><strong>PPP</strong> <strong>PPP</strong></td>
</tr>
<tr>
<td><strong>V</strong></td>
<td><strong>A</strong></td>
</tr>
<tr>
<td><strong>Pulse Display</strong></td>
<td><strong>Pulse Display</strong></td>
</tr>
<tr>
<td><img src="image" alt="Remote Control SMAW" /></td>
<td><strong>V</strong> <strong>85</strong></td>
</tr>
<tr>
<td><strong>Blank</strong></td>
<td><strong>Preset Amps</strong></td>
</tr>
<tr>
<td><img src="image" alt="Panel Control SMAW" /></td>
<td><strong>80.0</strong> <strong>A</strong></td>
</tr>
<tr>
<td><strong>V</strong></td>
<td><strong>A</strong></td>
</tr>
<tr>
<td><strong>Actual Volts (OCV)</strong></td>
<td><strong>Preset Amps</strong></td>
</tr>
<tr>
<td><img src="image" alt="Voltage-Sensing Wirefeeder" /></td>
<td><strong>80.0</strong> <strong>A</strong></td>
</tr>
<tr>
<td><strong>V</strong></td>
<td><strong>A</strong></td>
</tr>
<tr>
<td><strong>Flashes (OCV) And Preset</strong></td>
<td><strong>Blank</strong></td>
</tr>
</tbody>
</table>
### 5-3. Mode Switch Settings

<table>
<thead>
<tr>
<th>Mode</th>
<th>Output Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scratch Start TIG (GTAW)</td>
<td>Select: ○ or ▲ Amp</td>
</tr>
<tr>
<td>Lift-Arc Trigger Hold TIG (GTAW)</td>
<td>Select: ○ or ▲ Amp</td>
</tr>
<tr>
<td>TIG (GTAW) With HF Unit, Pulsing Device, Or Remote Control</td>
<td>Select: ○ or ▲ Amp</td>
</tr>
<tr>
<td>MIG (GMAW)</td>
<td>Select: ○ or ▲ Volt</td>
</tr>
<tr>
<td>Pulsed MIG (GMAW-P) (Requires an external pulsing device.)</td>
<td>Select: ▲ Volt</td>
</tr>
<tr>
<td>Remote Control SMAW</td>
<td>Select: ○ or ▲ Amp</td>
</tr>
<tr>
<td>Panel Control SMAW</td>
<td>Select: ○ or ▲ Amp</td>
</tr>
<tr>
<td>Voltage-Sensing Wirefeeder</td>
<td>Select: ○ or ▲ Volt</td>
</tr>
</tbody>
</table>

**NOTE**
The SMAW modes provide the Adaptive Hot Start™ feature, which automatically increases the output amperage at the start of a weld should the start require it. This eliminates electrode sticking at arc start.
5-4. Lift-Arc Trigger Hold TIG

Procedure requires:

1 TIG Electrode
2 Workpiece

Start sequence:

- Touch tungsten electrode to workpiece at weld start point.
- Momentarily depress output switch.
- Slowly lift electrode. An arc will form when electrode is lifted.
- To stop welding, momentarily depress output switch and output will shut off.

Note: If output switch is momentarily depressed and tungsten is not touching workpiece:
Do not touch tungsten to work.
Output will shut off in 3 seconds.
Start sequence over.

Do NOT Strike Like A Match!
### 6-1. Routine Maintenance

| ![Warning Icon] | **Disconnect power before maintaining.** |
| ![Maintenance Icon] | **Maintain more often during severe conditions.** |

#### 3 Months

| ![Replacement Icon] | **Replace Damaged Or Unreadable Labels** |
| ![Repair Icon] | **Repair Or Replace Cracked Cables** |
| ![Replace Icon] | **Replace Cracked Torch Body** |
| ![Repair Icon] | **Repair Or Replace Cracked Cables And Cords** |
| ![Cleaning Icon] | **Clean And Tighten Weld Connections** |

#### 6 Months

- **Blow Out Inside**

### 6-2. Blowing Out Inside Of Unit

| ![Warning Icon] | **Do not remove case when blowing out inside of unit.** |
| ![Blow Out Icon] | **To blow out unit, direct airflow through front and back louvers as shown.** |

ST-801 192
6-3. Voltmeter/Ammeter Help Displays

1 Help 0 Display
Indicates a shorted thermistor RT2 on the left side of the unit. If this display is shown, contact a Factory Authorized Service Agent.

2 Help 1 Display
Indicates a malfunction in the primary power circuit. If this display is shown, contact a Factory Authorized Service Agent.

3 Help 2 Display
Indicates a malfunction in the thermal protection circuitry located on the left side of the unit. If this display is shown, contact a Factory Authorized Service Agent.

4 Help 3 Display
Indicates the left side of the unit has overheated. The unit has shut down to allow the fan to cool it (see Section 4-2). Operation will continue when the unit has cooled.

5 Help 4 Display
Indicates a malfunction in the thermal protection circuitry located on the right side of the unit. If this display is shown, contact a Factory Authorized Service Agent.

6 Help 5 Display
Indicates a malfunction in the thermal protection circuitry located on the right side of the unit. If this display is shown, contact a Factory Authorized Service Agent.

7 Help 6 Display
Indicates the right side of the unit has overheated. The unit has shut down to allow the fan to cool it (see Section 4-2). Operation will continue when the unit has cooled.

8 Help 7 Display
Indicates that the input voltage is too high and the unit has automatically shut down. Operation will continue when the voltage is within the acceptable upper range limit (15% above the applicable input voltage). If this display is shown, have an electrician check the input voltage. Help 7 can also indicate a bus voltage imbalance.

9 Help 8 Display
Indicates a malfunction in the secondary power circuit of the unit. If this display is shown, contact a Factory Authorized Service Agent.

10 Help 9 Display
Indicates a shorted thermistor RT1 on the right side of the unit. If this display is shown, contact a Factory Authorized Service Agent.
## 6-4. Troubleshooting

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>No weld output; unit completely inoperative.</td>
<td>Place line disconnect switch in On position (see Section 4-8).</td>
</tr>
<tr>
<td></td>
<td>Check and replace line fuse(s), if necessary, or reset circuit breaker (see Section 4-8).</td>
</tr>
<tr>
<td></td>
<td>Check for proper input power connections (see Section 4-8).</td>
</tr>
<tr>
<td>No weld output; meter display On.</td>
<td>If using remote control, be sure Mode Selector switch is in a position that provides output control at Remote 14 receptacle.</td>
</tr>
<tr>
<td></td>
<td>Check, repair, or replace remote control.</td>
</tr>
<tr>
<td></td>
<td>Unit overheated. Allow unit to cool with fan On (see Section 4-2).</td>
</tr>
<tr>
<td>Erratic or improper weld output.</td>
<td>Use proper size and type of weld cable (see Section 4-5).</td>
</tr>
<tr>
<td></td>
<td>Clean and tighten all weld connections.</td>
</tr>
<tr>
<td>No 110 volts ac output at duplex receptacle, Remote 14 receptacle.</td>
<td>Reset circuit breaker CB1.</td>
</tr>
<tr>
<td>No 24 volts ac output at Remote 14 receptacle.</td>
<td>Reset circuit breaker CB2.</td>
</tr>
</tbody>
</table>
Figure 7-1. Circuit Diagram For Welding Power Source
Figure 8-1. Parts Assembly
### Figure 8-1. Parts Assembly

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Dia. Mkgs.</th>
<th>Part No.</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+175 148</td>
<td>175 148</td>
<td>WRAPPER</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>175 256</td>
<td>195 585</td>
<td>INSULATOR, side</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>179 309</td>
<td>179 309</td>
<td>LABEL, caution falling equipment</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>PLG9</td>
<td>130 204</td>
<td>CONNECTOR &amp; PINS</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>194 546</td>
<td>175 139</td>
<td>BUS BAR, current sensor</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>179 535</td>
<td>181 853</td>
<td>BUS BAR, output rectifier</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>D1,2</td>
<td>201 161</td>
<td>KIT DIODE, power module</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>C5,6 R1</td>
<td>175 194</td>
<td>RESISTOR/CAPACITOR</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>179 276</td>
<td>170 667</td>
<td>BUSHING, snap-in nyl 1.000 ID x 1.375mtg hole</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>RT1,2</td>
<td>173 632</td>
<td>THERMISTOR, NTC 30K ohm</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>185 836</td>
<td>185 836</td>
<td>LABEL, warning exploding parts</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>+183 551</td>
<td>183 551</td>
<td>WINDTUNNEL, LH</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>175 138</td>
<td>182 445</td>
<td>NUT, 1.000 NPT</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>CB1</td>
<td>089 807</td>
<td>CIRCUIT BREAKER, man reset 1P 2.5A 250VAC</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>CB2</td>
<td>083 432</td>
<td>CIRCUIT BREAKER, man reset 1P 10A 250VAC</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>206 460</td>
<td>178 563</td>
<td>PANEL, rear (without aux. power)</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>210 397</td>
<td>178 563</td>
<td>BUSHING, strain relief</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>210 397</td>
<td>186 439</td>
<td>NUT, nylon 1.000 NPT</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>210 346</td>
<td>210 346</td>
<td>CABLE, pwr 6mm 4/c 60</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>175 138</td>
<td>175 138</td>
<td>PLATE, indent rear (order by model and serial number)</td>
<td>1</td>
</tr>
<tr>
<td>21</td>
<td>PC1</td>
<td>215 042</td>
<td>CIRCUIT CARD, control</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>PLG2</td>
<td>131 056</td>
<td>CONNECTOR &amp; SOCKETS</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>RC10</td>
<td>166 679</td>
<td>CONNECTOR &amp; SOCKETS</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>T2</td>
<td>217 322</td>
<td>TRANSFORMER, control 200/400VAC</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>T2</td>
<td>+207 727</td>
<td>WINDTUNNEL, RH</td>
<td>1</td>
</tr>
<tr>
<td>26</td>
<td>153 403</td>
<td>177 547</td>
<td>BUSHING, snap-in nyl .750 ID x 1.000mtg</td>
<td>2</td>
</tr>
<tr>
<td>27</td>
<td>177 547</td>
<td>177 547</td>
<td>BUSHING, snap-in nyl 1.125mtg</td>
<td>1</td>
</tr>
<tr>
<td>28</td>
<td>CT1</td>
<td>175 199</td>
<td>TRANSFORMER, current</td>
<td>1</td>
</tr>
<tr>
<td>29</td>
<td>185 836</td>
<td>185 836</td>
<td>STAND-OFF, insul</td>
<td>2</td>
</tr>
<tr>
<td>30</td>
<td>C1</td>
<td>188 446</td>
<td>CAPACITOR, polyp film .5uf 900VDC</td>
<td>1</td>
</tr>
<tr>
<td>31</td>
<td>C3,4</td>
<td>192 935</td>
<td>CAPACITOR, elctlt 2700uf 450VDC</td>
<td>2</td>
</tr>
<tr>
<td>32</td>
<td>PC2</td>
<td>212 210</td>
<td>CIRCUIT CARD, interconnect</td>
<td>1</td>
</tr>
<tr>
<td>33</td>
<td>PLG13</td>
<td>131 204</td>
<td>CONNECTOR &amp; SOCKETS</td>
<td>1</td>
</tr>
<tr>
<td>34</td>
<td>PLG14,21</td>
<td>115 093</td>
<td>CONNECTOR &amp; SOCKETS</td>
<td>2</td>
</tr>
<tr>
<td>35</td>
<td>175 140</td>
<td>175 140</td>
<td>BRACKET, DI/DT</td>
<td>1</td>
</tr>
<tr>
<td>36</td>
<td>175 482</td>
<td>175 482</td>
<td>COIL, DI/DT</td>
<td>2</td>
</tr>
<tr>
<td>37</td>
<td>SR1</td>
<td>179 629</td>
<td>KIT DIODE, power module</td>
<td>1</td>
</tr>
<tr>
<td>38</td>
<td>PM1,2</td>
<td>208 173</td>
<td>KIT, transistor IGBT module</td>
<td>1</td>
</tr>
<tr>
<td>39</td>
<td>Z1</td>
<td>173 570</td>
<td>STABILIZER</td>
<td>1</td>
</tr>
<tr>
<td>40</td>
<td>L1</td>
<td>173 563</td>
<td>INDUCTOR, input</td>
<td>1</td>
</tr>
<tr>
<td>41</td>
<td>L1</td>
<td>207 725</td>
<td>HEAT SINK, power module</td>
<td>1</td>
</tr>
<tr>
<td>42</td>
<td>T1</td>
<td>179 616</td>
<td>TRANSFORMER, HF</td>
<td>1</td>
</tr>
<tr>
<td>43</td>
<td>T1</td>
<td>207 675</td>
<td>HEAT SINK, rect</td>
<td>1</td>
</tr>
<tr>
<td>44</td>
<td>175 255</td>
<td>175 969</td>
<td>INSULATOR, rectifier</td>
<td>1</td>
</tr>
<tr>
<td>45</td>
<td>175 969</td>
<td>181 197</td>
<td>INSULATOR, PC card</td>
<td>2</td>
</tr>
<tr>
<td>46</td>
<td>173 693</td>
<td>173 693</td>
<td>FOOT, mtg unit</td>
<td>4</td>
</tr>
<tr>
<td>47</td>
<td>176 736</td>
<td>176 736</td>
<td>SCREW, mtg foot</td>
<td>4</td>
</tr>
</tbody>
</table>

Return To Table Of Contents
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Dia. Mkgs.</th>
<th>Part No.</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>. . . 47</td>
<td>...........</td>
<td>175 132</td>
<td>BASE</td>
<td>1</td>
</tr>
<tr>
<td>. . . 48</td>
<td>. PC3</td>
<td>214 700</td>
<td>CIRCUIT CARD, front panel display</td>
<td>1</td>
</tr>
<tr>
<td>. . . . PLG11</td>
<td>115 091</td>
<td>CONNECTOR &amp; SOCKETS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>. . . 49</td>
<td>FM</td>
<td>175 084</td>
<td>FAN, muffin 24VDC 3000 RPM</td>
<td>1</td>
</tr>
<tr>
<td>. . . . 50</td>
<td>RC1</td>
<td>186 706</td>
<td>RECEPTACLE, w/leads &amp; plug</td>
<td>1</td>
</tr>
<tr>
<td>. . . 51</td>
<td>.</td>
<td>178 548</td>
<td>TERMINAL, connector friction</td>
<td>2</td>
</tr>
<tr>
<td>. . . 52</td>
<td>C7,8</td>
<td>186 543</td>
<td>CAPACITOR, assembly</td>
<td>2</td>
</tr>
<tr>
<td>. . . 53</td>
<td>.</td>
<td>185 732</td>
<td>PANEL, front</td>
<td>1</td>
</tr>
<tr>
<td>. . . 54</td>
<td>.</td>
<td>129 525</td>
<td>RECEPTACLE, twlk insul fem</td>
<td>2</td>
</tr>
<tr>
<td>. . . . .</td>
<td></td>
<td>145 088</td>
<td>KIT, connection Dinse</td>
<td>1</td>
</tr>
<tr>
<td>. . . 55</td>
<td>.</td>
<td></td>
<td>NAMEPLATE, (order by model and serial number)</td>
<td>1</td>
</tr>
<tr>
<td>. . . . .</td>
<td></td>
<td>070 590</td>
<td>TUBING, gl acryl .325 (order by ft)</td>
<td>1ft</td>
</tr>
<tr>
<td>. . . 56</td>
<td>.</td>
<td>174 992</td>
<td>KNOB, pointer .840</td>
<td>2</td>
</tr>
<tr>
<td>. . . 57</td>
<td>.</td>
<td>175 855</td>
<td>DOOR, front</td>
<td>1</td>
</tr>
<tr>
<td>. . . 58</td>
<td>.</td>
<td>174 991</td>
<td>KNOB, pointer 1.250</td>
<td>2</td>
</tr>
<tr>
<td>. . . 59</td>
<td>.</td>
<td>176 226</td>
<td>INSULATOR, switch power</td>
<td>1</td>
</tr>
<tr>
<td>. . . 60</td>
<td>S1</td>
<td>128 756</td>
<td>SWITCH, tgl 3PST 40A 600VAC</td>
<td>1</td>
</tr>
<tr>
<td>. . . 61</td>
<td>.</td>
<td>179 310</td>
<td>LABEL, warning general precautionary</td>
<td>2</td>
</tr>
<tr>
<td>. . . 62</td>
<td>.</td>
<td>199 840</td>
<td>BUS BAR, diode</td>
<td>2</td>
</tr>
</tbody>
</table>

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

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

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

Your distributor also gives you ...

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

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

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

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

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

1. 5 Years Parts — 3 Years Labor
   * Original main power rectifiers
   * Inverters (input and output rectifiers only)
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Inverter Power Supplies
   * Intellitig
   * Maxstar 150
   * Engine Driven Welding Generators
   *(NOTE: Engines are warranted separately by manufacturer.)*
3. 1 Year — Parts and Labor Unless Specified
   * DS-2 Wire Feeder
   * Motor Driven Guns (w/exception of Spoolmate Spoolguns)
   * Process Controllers
   * Positioners and Controllers
   * Automatic Motion Devices
   * RFC2 Foot Controls
   * Induction Heating Power Sources
   * Water Coolant Systems
   * Flowgauge and Flowmeter Regulators (No Labor)
   * HF Units
   * Grids
   * Maxstar 85, 140
   * Spot Welders
   * Load Banks
   * Racks
   * Running Gear/Trailers
   * Plasma Cutting Torches (except APT & SAF Models)
   * Field Options
   *(NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)*
4. 6 Months — Batteries
5. 90 Days — Parts
   * MIG Guns/TIG Torches
   * Induction Heating Coils and Blankets
   * APT & SAF Model Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts (No labor)
   * Spoolmate Spoolguns
   * Canvas Covers

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

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

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller’s option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer’s risk and expense. Miller’s option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

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

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

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

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

Please complete and retain with your personal records.

<table>
<thead>
<tr>
<th>Model Name</th>
<th>Serial/Style Number</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Purchase Date</th>
<th>(Date which equipment was delivered to original customer.)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Distributor</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Address</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>City</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>State</th>
<th>Zip</th>
</tr>
</thead>
</table>

### For Service

Call 1-800-4-A-Miller or see our website at [www.MillerWelds.com](http://www.MillerWelds.com) to locate a DISTRIBUTOR or SERVICE AGENCY near you.

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:
- Welding Supplies and Consumables
- Options and Accessories
- Personal Safety Equipment
- Service and Repair
- Replacement Parts
- Training (Schools, Videos, Books)
- Technical Manuals (Servicing Information and Parts)
- Circuit Diagrams
- Welding Process Handbooks

Contact the Delivering Carrier 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.