Processes

Submerged Arc (SAW) Welding
Electroslag (ESW) Welding
Air Carbon Arc (CAC-A)
Cutting and Gouging

Description

Arc Welding Power Source

SubArc DC 650/800, 1000/1250
Digital Power Sources
CE

OWNER’S MANUAL

File: Submerged (SAW)
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 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.
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WARRANTY

COMPLETE PARTS LIST – Available at www.MillerWelds.com
DECLARATION OF CONFORMITY

for European Community (CE marked) products.

MILLER Electric Mfg. Co., 1635 Spencer Street, Appleton, WI 54914 U.S.A. declares that the product(s) identified in this declaration conform to the essential requirements and provisions of the stated Council Directive(s) and Standard(s).

Product/Apparatus Identification:

<table>
<thead>
<tr>
<th>Product</th>
<th>Stock Number</th>
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<td>SubArc DC 650 Digital</td>
<td>907622</td>
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<tr>
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<td>907624</td>
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<tr>
<td>SubArc DC 1250 Digital</td>
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Council Directives:
- 2014/35/EU Low Voltage
- 2014/30/EU Electromagnetic Compatibility
- 2011/65/EU Restriction of the use of certain Hazardous Substances in electrical and electronic equipment

Standards:
- IEC 60974-1:2012 Arc welding equipment – Part 1: Welding power sources
- IEC 60974-10:2007 Arc Welding Equipment – Part 10: Electromagnetic compatibility (EMC) requirements

Signatory:

David A. Werba
MANAGER, PRODUCT DESIGN COMPLIANCE

Date of Declaration: May 12, 2015
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 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 the work or ground.
- 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 metal, 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 A6.8 (see Safety Standards).
- Do not weld where the atmosphere can 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.

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 installation, 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


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 can 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

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

**AVIS** – Indique des déclarations pas en relation avec des blessures personnelles.

**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.

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**AVIS** – 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 afférent 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 échauffadouges ; en position coincée comme assise, à genoux ou couchée ; ou si l’y a un risque élevé de contact inévitable ou accidentel avec la pièce à soudier 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 !

- Installait, mettez à la terre et utilisez correctement cet équipement conformément à son Manuel d’Utilisation et aux règlementations nationales, gouvernementales et locales.
- Toujours vérifier la terre du cordon d’alimentation. Vérifier s’assurer que le fil de terre du cordon d’alimentation est bien raccordée 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 portes électrodes connectées à deux machines en même temps à cause de la présence d’une tension à vide double.
- N’utiliser qu’un matériel en bon état. Réparer ou remplacer sur-le−champ les pièces endommagées. Entretienner 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 pièces 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.
- Éloigner 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 médicale, 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 nettoyants, les consommables, les produits de refroidissement, les dégraissateurs, 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 ventilation ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraisseage, 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 invisibles et invisibles intensifs (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 sous votre casque.
- Avoir recours à des écrans protecteurs ou à des rideaux pour protéger les autres contre les rayonnements les ébouilleuses 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.
- Avant de souder, retirer toute substance combustible de vos poches telles qu’un allumeur de 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 poncer.
- 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 nettoyants, les consommables, les produits de refroidissement, les dégraissateurs, les flux et les métaux.

DES PIÈCES DE METAL ou DES SALETES peuvent provoquer des blessures dans les yeux.

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

**Risque D'INCENDIE OU D'EXPLOSION.**

- Ne pas surcharger l'installation électrique – s'assurer que l'alimentation est correctement dimensionnée et protégée avant de mettre l'appareil en service.
- Ne pas surcharger l'appareil – s'assurer que les ventilateurs du ventilateur de soudage fonctionnent correctement.
- Ne pas surcharger l'appareil électrique – s'assurer que les câbles et les cordons sont suffisamment longs pour dépasser du côté opposé de l'appareil.
- 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 intégrée.

**Les PIÈCES MOBILES peuvent causer 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 soudeur.

**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 soudeur.

**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 intégrée.

**Les PIÈCES MOBILES peuvent causer des blessures.**

- S'abstenir de toucher des organes mobiles tels que les ventilateurs, les pièces mobiles, les portes, les panneaux, les recouvrements et dispositifs de protection.
- Lorsque cela est nécessaire pour des travaux d'entretien et de dépannage, faire retirer les portes, les panneaux, les recouvrements ou dispositifs de protection uniquement par du personnel qualifié.
- Remettre les portes, les panneaux, les 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’installation, l’entretien et toute intervention selon les manuels d’utilisateurs, les normes nationales, provinciales et de l’industrie, ainsi que les codes municipaux.
**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 électricien qualifié les interférences résultant de l’installation.

- Si le FCC signale des interférences, arrêter immédiatement l’appareil.

- Effectuer régulièrement le contrôle et l’entretien de l’installation.

- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et un blindage pour réduire les interférences éventuelles.

**2-4. Proposition californienne 65 Avertissements**

Les équipements de soudage et de coupe produisent des fumées et des gaz qui contiennent des produits chimiques dont l’État de Californie reconnait 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 reconnait 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**


**2-6. Informations relatives aux CEM**

Le courant électrique qui traverse tout conducteur génère des champs électromagnétiques (CEM) à certains endroits. Ce courant issu d’un soudage à l’arc (et de procédés connexes, y compris le soudage par points, de gougeage, du coupage plasma ou de chauffage par induction) crée un champ électromagnétique (CEM) autour du circuit de soudage. Les champs électromagnétiques produits peuvent causer interférence à certains implants médicaux, p. ex. les stimulateurs cardiaques. Des mesures de protection pour les porteurs d’implants médicaux doivent être prises: Limiter par exemple tout accès à des équipements électroniques de faire fonctionner l’installation.

- 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.

**En ce qui concerne les implants médicaux :**

Les porteurs d’implants médicaux 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.

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 du matériel du circuit de soudage.
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.
### SECTION 3 – DEFINITIONS

#### 3-1. Additional Safety Symbols And Definitions

Some symbols are found only on CE products.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>Warning! Watch Out! There are possible hazards as shown by the symbols. Safe1 2012–05</td>
</tr>
<tr>
<td></td>
<td>Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves. Safe2 2012–05</td>
</tr>
<tr>
<td></td>
<td>Protect yourself from electric shock by insulating yourself from work and ground. Safe3 2012–05</td>
</tr>
<tr>
<td></td>
<td>Disconnect input plug or power before working on machine. Safe5 2012–05</td>
</tr>
<tr>
<td></td>
<td>Keep your head out of the fumes. Safe6 2012–05</td>
</tr>
<tr>
<td></td>
<td>Use forced ventilation or local exhaust to remove the fumes. Safe8 2012–05</td>
</tr>
<tr>
<td></td>
<td>Use ventilating fan to remove fumes. Safe10 2012–05</td>
</tr>
<tr>
<td></td>
<td>Keep flammables away from welding. Do not weld near flammables. Safe12 2012–05</td>
</tr>
<tr>
<td></td>
<td>Welding sparks can cause fires. Have a fire extinguisher nearby, and have a watchperson ready to use it. Safe14 2012–05</td>
</tr>
<tr>
<td></td>
<td>Do not weld on drums or any closed containers. Safe16 2012–05</td>
</tr>
<tr>
<td>![Image]</td>
<td>Instruction</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>![Image]</td>
<td>Do not remove or paint over (cover) the label. Safe20 2012-05</td>
</tr>
<tr>
<td>![Image]</td>
<td>Disconnect input plug or power before working on machine. Safe30 2012-05</td>
</tr>
<tr>
<td>![Image]</td>
<td>Consult rating label for input power requirements. Safe34 2012-05</td>
</tr>
<tr>
<td>![Image]</td>
<td>Read Owner’s Manual and inside labels for connection points and procedures. Safe67 2012-06</td>
</tr>
<tr>
<td>![Image]</td>
<td>Do not discard product (where applicable) with general waste. Reuse or recycle Waste Electrical and Electronic Equipment (WEEE) by disposing at a designated collection facility. Contact your local recycling office or your local distributor for further information. Safe37 2012-05</td>
</tr>
<tr>
<td>![Image]</td>
<td>Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection. Safe38 2012-05</td>
</tr>
<tr>
<td>![Image]</td>
<td>Become trained and read the instructions before working on the machine or welding. Safe40 2012-05</td>
</tr>
<tr>
<td>![Image]</td>
<td>Move jumper links as shown on inside label to match input voltage at job site. Include extra length in grounding conductor and connect grounding conductor first. Connect line input conductors as shown on inside label. Double-check all connections, jumper link positions, and input voltage before applying power. Safe68 2012-06</td>
</tr>
<tr>
<td>![Image]</td>
<td>Close door before turning on unit. Safe69 2012-06</td>
</tr>
</tbody>
</table>
### 3-2. Miscellaneous Symbols And Definitions

Some symbols are found only on CE products.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Amperage</td>
</tr>
<tr>
<td>V</td>
<td>Voltage</td>
</tr>
<tr>
<td>Hz</td>
<td>Hertz</td>
</tr>
<tr>
<td></td>
<td>Temperature</td>
</tr>
<tr>
<td></td>
<td>Output</td>
</tr>
<tr>
<td></td>
<td>Input</td>
</tr>
<tr>
<td></td>
<td>Circuit Breaker Supplementary Protector</td>
</tr>
<tr>
<td></td>
<td>Amperage/Voltage Control–Panel</td>
</tr>
<tr>
<td></td>
<td>Remote</td>
</tr>
<tr>
<td>U₀</td>
<td>Rated No–Load Voltage (OCV)</td>
</tr>
<tr>
<td>U₁</td>
<td>Primary Voltage</td>
</tr>
<tr>
<td>U₂</td>
<td>Conventional Load Voltage</td>
</tr>
<tr>
<td>S₁</td>
<td>Product of Voltage and Current (KVA)</td>
</tr>
<tr>
<td></td>
<td>On</td>
</tr>
<tr>
<td></td>
<td>Off</td>
</tr>
<tr>
<td>I₁</td>
<td>Primary Current</td>
</tr>
<tr>
<td></td>
<td>I₂</td>
</tr>
<tr>
<td>X</td>
<td>Duty Cycle</td>
</tr>
<tr>
<td>IP</td>
<td>Degree Of Protection</td>
</tr>
<tr>
<td></td>
<td>Suitable For Welding In An Environment With Increased Risk Of Electric Shock</td>
</tr>
<tr>
<td>S</td>
<td>Suitable For Welding In An Environment With Increased Risk Of Electric Shock</td>
</tr>
<tr>
<td></td>
<td>Line Connection</td>
</tr>
<tr>
<td></td>
<td>Three-Phase Transformer Rectifier</td>
</tr>
<tr>
<td>%</td>
<td>Percent</td>
</tr>
<tr>
<td></td>
<td>Direct Current (DC)</td>
</tr>
<tr>
<td></td>
<td>Three Phase</td>
</tr>
<tr>
<td></td>
<td>Suitable For Welding In An Environment With Increased Risk Of Electric Shock</td>
</tr>
<tr>
<td></td>
<td>Negative Weld Output Terminal</td>
</tr>
<tr>
<td></td>
<td>Positive High Inductance Weld Output Terminal</td>
</tr>
<tr>
<td></td>
<td>Positive Low Inductance Weld Output Terminal</td>
</tr>
<tr>
<td></td>
<td>Temperature</td>
</tr>
<tr>
<td></td>
<td>Gas Metal Arc Welding (GMAW)</td>
</tr>
<tr>
<td></td>
<td>Shielded Metal Arc Welding (SMAW)</td>
</tr>
<tr>
<td></td>
<td>Gas Tungsten Arc Welding (GTAW)</td>
</tr>
<tr>
<td></td>
<td>Submerged Arc Welding (SAW)</td>
</tr>
<tr>
<td></td>
<td>Arc Force (DIG)</td>
</tr>
<tr>
<td></td>
<td>Single Phase</td>
</tr>
<tr>
<td></td>
<td>Start</td>
</tr>
<tr>
<td></td>
<td>Stop</td>
</tr>
<tr>
<td></td>
<td>Wire Feed Inch Up</td>
</tr>
<tr>
<td></td>
<td>Wire Feed Inch Down</td>
</tr>
<tr>
<td></td>
<td>Crater Time</td>
</tr>
<tr>
<td></td>
<td>Program</td>
</tr>
<tr>
<td></td>
<td>Flux</td>
</tr>
<tr>
<td></td>
<td>Postflow Timer</td>
</tr>
<tr>
<td></td>
<td>Preflux Timer</td>
</tr>
<tr>
<td></td>
<td>Start Time</td>
</tr>
</tbody>
</table>
SECTION 4 – SPECIFICATIONS

4-1. Serial Number And Rating Label Location
The serial number and rating information for the power sources is located on the front or the rear of the machine. Use the rating labels to determine input power requirements and/or rated output. For future reference, write serial number in space provided on back cover of this manual.

4-2. Specifications For SubArc DC Digital Power Sources
Do not use information in unit specifications table to determine electrical service requirements. See Sections 5-4, 5-5 and 5-6 for information on connecting input power.

<table>
<thead>
<tr>
<th>Model</th>
<th>Rated Welding Output**</th>
<th>Amperage/Voltage Range DC</th>
<th>Max OCV–DC</th>
<th>Amperes Input at Rated Load Output, 60 Hz, Three-Phase</th>
<th>Amperes Input at Rated Load Output, 50 Hz, Three-Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 650 Digital</td>
<td>650 A @ 44 Volts DC, 100% Duty Cycle</td>
<td>50 – 815 A In CC Mode</td>
<td>75 Vpk</td>
<td>126 3.8*</td>
<td>50.4 1.4*</td>
</tr>
<tr>
<td>DC 800 Digital</td>
<td>815 A @ 44 Volts DC, 60% Duty Cycle</td>
<td>20 – 44 V In Subarc Mode</td>
<td>95 1.9*</td>
<td>90 1.8*</td>
<td>83 1.6*</td>
</tr>
<tr>
<td>DC 1000 Digital</td>
<td>1000 A @ 44 Volts DC, 100% Duty Cycle</td>
<td>100 – 1250 A In CC Mode</td>
<td>180 5.8*</td>
<td>90 2.9*</td>
<td>72 2.4*</td>
</tr>
<tr>
<td>DC 1250 Digital</td>
<td>1250 A @ 44 Volts DC, 60% Duty Cycle</td>
<td>20 – 44 V In Subarc Mode</td>
<td>135 5.2*</td>
<td>128 5.0*</td>
<td>117 4.5*</td>
</tr>
</tbody>
</table>

*While idling
**The output ratings have been determined by performing heat tests in an ambient temperature of 25° C, and extrapolating the results for an ambient temperature of 40° C.

4-3. SubArc System Compatibility
The following accessory models will function with the SubArc DC 650/800 and 1000/1250 Digital power sources. The interface will automatically detect the power source and wire drive type connected.

Interfaces:
300936 – SubArc Interface Digital
300937 – SubArc Interface Analog

Wire Drives:
300938 – SubArc Wire Drive 400 Digital Low Voltage
300938001 – SubArc Wire Drive 400 Digital Low Voltage For Tractors
300939 – SubArc Strip Drive 100 Digital Low Voltage
300940 – SubArc Strip Drive 100 Digital Low Voltage w/Mounting Bracket
300941 – SubArc Wire Drive 780 Digital Low Voltage

Flux Hopper:
300942 – SubArc Flux Hopper Digital Low Voltage

4-4. Environmental Specifications

A. IP Rating For All Equipment Covered In This Manual

<table>
<thead>
<tr>
<th>IP Rating</th>
<th>Operating Temperature Range</th>
<th>Storage Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP23</td>
<td>−22 to 122 °F (−30 to 50°C)</td>
<td>−40 to 149 °F (−40 to 65°C)</td>
</tr>
</tbody>
</table>

This equipment is designed for outdoor use. It may be stored, but is not intended to be used for welding outside during precipitation unless sheltered.
B. Information On Electromagnetic Fields (EMF) For All Equipment Covered In This Manual

⚠️ This equipment shall not be used by the general public as the EMF limits for the general public might be exceeded during welding.
This equipment is built in accordance with EN 60974−1 and is intended to be used only in an occupational environment (where the general public access is prohibited or regulated in such a way as to be similar to occupational use) by an expert or an instructed person.
Wire feeders and ancillary equipment (such as torches, liquid cooling systems and arc striking and stabilizing devices) as part of the welding circuit may not be a major contributor to the EMF. See the Owner’s Manuals for all components of the welding circuit for additional EMF exposure information.

- The EMF assessment on this equipment was conducted at 0.5 meter.
- At a distance of 1 meter the EMF exposure values were less than 20% of the permissible values.

C. Information On Electromagnetic Compatibility (EMC) For DC 650/800 Amp Power Source Models

⚠️ This Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There can be potential difficulties in ensuring electromagnetic compatibility in those locations, due to conducted as well as radiated disturbances.
This equipment complies with IEC61000-3-11 and IEC 61000−3−12 and can be connected to public low-voltage systems provided that the public low-voltage system impedance Zmax at the point of common coupling is less than 20.21mΩ (or the short−circuit power Ssc is greater than 7,915,195 VA). It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the system impedance complies with the impedance restrictions.

D. Information On Electromagnetic Compatibility (EMC) For DC 1000/1250 Amp Power Source Models

⚠️ This Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There can be potential difficulties in ensuring electromagnetic compatibility in those locations, due to conducted as well as radiated disturbances.
IEC/TS 61000−3−4 can be used to guide parties concerned by the installation of arc welding equipment with an input current greater than 75 A in a low-voltage network.
4-5. Duty Cycle And Overheating

A. Duty Cycle And Overheating For DC 650/800 Amp Models

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

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

NOTICE – Exceeding duty cycle can damage unit and void warranty.

![Graph showing duty cycle and overheating for 650/800 Amp models]

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B. Duty Cycle And Overheating For DC 1000/1250 Amp Models

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

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

NOTICE – Exceeding duty cycle can damage unit and void warranty.

![Graph showing duty cycle and overheating for 1000/1250 Amp models]
4-6. Static Characteristics

The static (output) characteristics of the welding power source can be described as *drooping* during the SAW process. Static characteristics are also affected by control settings (including software), electrode, shielding gas, weldment material, and other factors. Contact the factory for specific information on the static characteristics of the welding power source.

SECTION 5 − INSTALLATION

5-1. Dimensions And Weights

<table>
<thead>
<tr>
<th>Dimensions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>30 in. (762 mm) Including lift eye</td>
</tr>
<tr>
<td>B</td>
<td>23 in. (584 mm)</td>
</tr>
<tr>
<td>C</td>
<td>38 in. (965 mm) Including strain relief</td>
</tr>
<tr>
<td>D</td>
<td>33-3/4 in. (857 mm)</td>
</tr>
<tr>
<td>E</td>
<td>1-1/4 in. (32 mm)</td>
</tr>
<tr>
<td>F</td>
<td>20 in. (508 mm)</td>
</tr>
<tr>
<td>G</td>
<td>1-1/8 in. (29 mm)</td>
</tr>
<tr>
<td>H</td>
<td>7/16 in. (11 mm) Dia.</td>
</tr>
</tbody>
</table>

Weight

- 650/800 Amp Models: 545 lb (247 kg)
- 1000 Amp Models: 644 lb (292 Kg)
- 1250 Amp Models: 650 lb (295 Kg)
5-2. Selecting A Location

Movement

Location And Airflow

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

1 Lifting Eye
2 Lifting Forks
3 Line Disconnect Device

Use lifting eye or lifting forks to move unit.
If using lifting forks, extend forks beyond opposite side of unit.
Locate unit near correct input power supply.

18 in. (460 mm)

5-3. Typical Equipment Location

1 Welding Power Source
2 Side Beam
3 Interface
4 Spool Support
5 Wire Drive Assembly
6 Torch

Ref. 131 138-A
5-4. Electrical Service Guide

A. Electrical Service Guide For DC 650/800 Digital Models

Failure to follow these electrical service guide recommendations could create an electric shock or fire hazard. These recommendations are for a dedicated circuit sized for the rated output and duty cycle of the welding power source.

In dedicated circuit installations, the National Electrical Code (NEC) allows the receptacle or conductor rating to be less than the rating of the circuit protection device. All components of the circuit must be physically compatible. See NEC articles 210.21, 630.11, and 630.12.

<table>
<thead>
<tr>
<th>Input Voltage (V)</th>
<th>60 Hz Models (DC 650 Digital)</th>
<th>50 Hz Models (DC 800 Digital)</th>
</tr>
</thead>
<tbody>
<tr>
<td>230</td>
<td>460</td>
<td>575</td>
</tr>
<tr>
<td>Input Amperes (A) At Rated Output</td>
<td>126</td>
<td>63</td>
</tr>
<tr>
<td>Max Recommended Standard Fuse Rating In Amperes 1</td>
<td>150</td>
<td>70</td>
</tr>
<tr>
<td>Time-Delay Fuses 2</td>
<td>200</td>
<td>90</td>
</tr>
<tr>
<td>Normal Operating Fuses 3</td>
<td>1 (50)</td>
<td>6 (16)</td>
</tr>
<tr>
<td>Min Input Conductor Size In AWG 4 (mm ²)</td>
<td>208</td>
<td>328</td>
</tr>
<tr>
<td>Max Recommended Input Conductor Length In Feet (Meters)</td>
<td>80</td>
<td>125</td>
</tr>
<tr>
<td>Min Grounding Conductor Size In AWG 4 (mm ²)</td>
<td>6 (16)</td>
<td>8 (16)</td>
</tr>
</tbody>
</table>

Reference: 2014 National Electrical Code (NEC) (including article 630)
1 If a circuit breaker is used in place of a fuse, choose a circuit breaker with time-current curves comparable to the recommended fuse.
2 “Time-Delay” fuses are UL class “RK5”. See UL 248.
3 “Normal Operating” (general purpose - no intentional delay) fuses are UL class “K5” (up to and including 60 amps), and UL class “H” (65 amps and above).
4 Conductor data in this section specifies conductor size (excluding flexible cord or cable) between the panelboard and the equipment per NEC Table 310.15(B)(16). If a flexible cord or cable is used, minimum conductor size may increase. See NEC Table 400.5(A) for flexible cord and cable requirements.

B. Electrical Service Guide For DC 1000/1250 Digital Models

Failure to follow these electrical service guide recommendations could create an electric shock or fire hazard. These recommendations are for a dedicated circuit sized for the rated output and duty cycle of the welding power source.

In dedicated circuit installations, the National Electrical Code (NEC) allows the receptacle or conductor rating to be less than the rating of the circuit protection device. All components of the circuit must be physically compatible. See NEC articles 210.21, 630.11, and 630.12.

<table>
<thead>
<tr>
<th>Input Voltage (V)</th>
<th>60 Hz Models (DC 1000 Digital)</th>
<th>50 Hz Models (DC 1250 Digital)</th>
</tr>
</thead>
<tbody>
<tr>
<td>230</td>
<td>460</td>
<td>575</td>
</tr>
<tr>
<td>Input Amperes (A) At Rated Output</td>
<td>180</td>
<td>90</td>
</tr>
<tr>
<td>Max Recommended Standard Fuse Rating In Amperes 1</td>
<td>225</td>
<td>110</td>
</tr>
<tr>
<td>Time-Delay Fuses 2</td>
<td>250</td>
<td>125</td>
</tr>
<tr>
<td>Normal Operating Fuses 3</td>
<td>3/0 (95)</td>
<td>3 (35)</td>
</tr>
<tr>
<td>Min Input Conductor Size In AWG 4 (mm ²)</td>
<td>204</td>
<td>337</td>
</tr>
<tr>
<td>Max Recommended Input Conductor Length In Feet (Meters)</td>
<td>20 (62)</td>
<td>337</td>
</tr>
<tr>
<td>Min Grounding Conductor Size In AWG 4 (mm ²)</td>
<td>4 (25)</td>
<td>6 (16)</td>
</tr>
</tbody>
</table>

Reference: 2014 National Electrical Code (NEC) (including article 630)
1 If a circuit breaker is used in place of a fuse, choose a circuit breaker with time-current curves comparable to the recommended fuse.
2 “Time-Delay” fuses are UL class “RK5”. See UL 248.
3 “Normal Operating” (general purpose - no intentional delay) fuses are UL class “K5” (up to and including 60 amps), and UL class “H” (65 amps and above).
4 Conductor data in this section specifies conductor size (excluding flexible cord or cable) between the panelboard and the equipment per NEC Table 310.15(B)(16). If a flexible cord or cable is used, minimum conductor size may increase. See NEC Table 400.5(A) for flexible cord and cable requirements.
5-5. Placing Jumper Links

**Disconnect and lockout/tagout input power before installing or moving jumper links.**

Check input voltage available at site.

1. Jumper Link Label For DC 650 Digital and DC 1000 Digital Machines
2. Jumper Link Label For DC 800 Digital and DC 1250 Digital Machines
3. Jumper Links

Move jumper links to match input voltage.

Close and secure access door, or go on to Section 5-6.

**Tools Needed:**

- 3/8 in.
- 3/8 in.

Ref. 265 207-A
5-6. Connecting 3-Phase Input Power

Tools Needed:
- 5/32 in.
- 3/8, 1/2 in.
- 3/8 in.

Ref. input3 2015-05 – Ref. 803 766-C / 800 103-D / Ref. 801 116-A
5-6. Connecting 3-Phase Input Power (Continued)

- Installation must meet all National and Local Codes – have only qualified persons make this installation.
- Disconnect and lockout/tagout input power before connecting input conductors from unit. Follow established procedures regarding the installation and removal of lockout/tagout devices.
- Make input power connections to the welding power source first.
- Always connect green or green/yellow conductor to supply grounding terminal first, and never to a line terminal.

See rating label on unit and check input voltage available at site.

1 Input Power Conductors (Customer Supplied Cord)

Select size and length of conductors using Section 5-4. Conductors must comply with national, state, and local electrical codes. If applicable, use lugs of proper amperage capacity and correct hole size.

Welding Power Source Input Power Connections
2 Strain Relief (Customer Supplied)
Install strain relief of proper size for unit and conductors. Route conductors (cord) through strain relief and tighten screws.
3 Welding Power Source Grounding Terminal
4 Green Or Green/Yellow Grounding Conductor
Connect green or green/yellow grounding conductor to welding power source grounding terminal first. Connect remaining end to grounding terminal in disconnect device.
5 Welding Power Source Line Terminals
6 Input Conductors L1 (U), L2 (V) And L3 (W)
Connect input conductors L1 (U), L2 (V) and L3 (W) to welding power source line terminals.

Close and secure access door on welding power source.

Disconnect Device Input Power Connections
7 Disconnect Device (switch shown in OFF position)
8 Disconnect Device (Supply) Grounding Terminal
9 Disconnect Device Line Terminals
Connect green or green/yellow grounding conductor to disconnect device grounding terminal first.

Connect input conductors L1 (U), L2 (V) And L3 (W) to disconnect device line terminals.

10 Over-Current Protection
Select type and size of over-current protection using Section 5-4 (fused disconnect switch shown).

Close and secure door on line disconnect device. Follow established lockout/tagout procedures to put unit in service.

Notes

---

Ref. input3 2015-01
### SECTION 6 – SYSTEM CONNECTIONS

#### 6-1. Terminal Strip TE2 and Remote Receptacle RC1 Information

<table>
<thead>
<tr>
<th>Function</th>
<th>Socket On RC1</th>
<th>Terminal On TE2</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Input Power</td>
<td>A, B</td>
<td>–</td>
<td>24 VAC. Protected by circuit breaker CB2.</td>
</tr>
<tr>
<td></td>
<td>C, D</td>
<td>–</td>
<td>24 VAC common.</td>
</tr>
<tr>
<td>Accessory Serial Communication</td>
<td>J</td>
<td>–</td>
<td>+Accessory RS-485 communication.</td>
</tr>
<tr>
<td></td>
<td>V</td>
<td>–</td>
<td>–Accessory RS-485 communication.</td>
</tr>
<tr>
<td></td>
<td>Q</td>
<td>–</td>
<td>Accessory serial communication common.</td>
</tr>
<tr>
<td>Shield</td>
<td>H</td>
<td>–</td>
<td>Contact E/F shield drain lead.</td>
</tr>
<tr>
<td>Power Source Serial Communication</td>
<td>P</td>
<td>–</td>
<td>+Power source RS-485 communication.</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>–</td>
<td>–Power source RS-485 communication.</td>
</tr>
<tr>
<td></td>
<td>Z</td>
<td>–</td>
<td>Power source serial communication common.</td>
</tr>
<tr>
<td>Shield</td>
<td>G</td>
<td>–</td>
<td>Contact H/J shield drain lead.</td>
</tr>
<tr>
<td>PS/PS Communication</td>
<td>K</td>
<td>–</td>
<td>Communication link in.</td>
</tr>
<tr>
<td>Power Source Synchronization</td>
<td>E</td>
<td>–</td>
<td>Synchronization in.</td>
</tr>
<tr>
<td>Volt Sense</td>
<td>W</td>
<td>–</td>
<td>+ Volt sense.</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>–</td>
<td>Reserved for – volt sense.</td>
</tr>
<tr>
<td>Shield</td>
<td>N</td>
<td>–</td>
<td>Contact M/L shield drain lead.</td>
</tr>
<tr>
<td>Remote Voltage Sensing</td>
<td>–</td>
<td>N</td>
<td>Voltage sensing signal from Work weld output terminal.</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>P</td>
<td>Voltage sensing signal from Electrode weld output terminal.</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>TP</td>
<td>Test point.</td>
</tr>
</tbody>
</table>

– Not Applicable

---

⚠️ **Turn Off welding power source before opening access door.**

1. Access Door
2. Remote Receptacle RC1 (Mounted Inside Access Area)
3. Terminal Strip TE2
4. SubArc Interface
5. Modbus RTU

For use with optional PLC control.

DC 650/800 model shown. Location is the same for DC 1000/1250 models.
6-2. Terminal Strip TE1

**Tools Needed:**

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Function Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10 VDC remote contactor.</td>
</tr>
<tr>
<td>B</td>
<td>Connecting terminals A and B will enable output.</td>
</tr>
<tr>
<td>C</td>
<td>Remote command reference +10 VDC. Connecting terminals C, D, and E will allow remote control.</td>
</tr>
<tr>
<td>E</td>
<td>Output command 0 – +10 VDC. Connecting terminals C, D, and E will allow remote control.</td>
</tr>
<tr>
<td>D</td>
<td>Remote common.</td>
</tr>
<tr>
<td>F</td>
<td>Connecting terminals F and D will provide current feedback (1V/100A).</td>
</tr>
<tr>
<td>H</td>
<td>Connecting terminals H and D will provide voltage feedback (1V/10A).</td>
</tr>
<tr>
<td>M</td>
<td>Remote power on/off.</td>
</tr>
<tr>
<td>L</td>
<td>Connecting a switch to terminals M and L allow the power source to be remotely turned on or off.</td>
</tr>
</tbody>
</table>

**Turn Off welding power source and disconnect input power before opening access door.**

1. Access Hole
   - Remove knockout or cover from access hole and install customer supplied strain relief. Route cable connections through the access hole.

2. 12-Pole Terminal Strip
3. Label
   - Remove and retain screws and open terminal strip panel. Make connections per the label on the panel. Close panel and replace screws.

*DC 650/800 model shown. Location is the same for DC 1000/1250 models.*
SECTION 7 − MAKING WELD OUTPUT CONNECTIONS

7-1. Weld Output Terminals And Selecting Cable Sizes*

**NOTICE** – The Total Cable Length in Weld Circuit (see table below) is the combined length of both weld cables. For example, if the power source is 100 ft (30 m) from the workpiece, the total cable length in the weld circuit is 200 ft (2 cables x 100 ft). Use the 200 ft (60 m) column to determine cable size.

<table>
<thead>
<tr>
<th>Welding Amperes</th>
<th>Weld Cable Size** and 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>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>
<tr>
<td>700</td>
<td>4/0 (120)</td>
</tr>
<tr>
<td>800</td>
<td>4/0 (120)</td>
</tr>
<tr>
<td>900</td>
<td>2x2/0 (2x70)</td>
</tr>
<tr>
<td>1000</td>
<td>2x2/0 (2x70)</td>
</tr>
<tr>
<td>1250</td>
<td>2x3/0 (2x95)</td>
</tr>
</tbody>
</table>

* This chart is a general guideline and may not suit all applications. If cable overheats, use next size larger cable.

**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

***For distances longer than those shown in this guide, call a factory applications rep. at 920-735-4505 (Miller) or 1-800-332-3281 (Hobart).

Ref: S-0007-L 2015−02

7-2. Weld Output Terminals

⚠️ Turn off power before connecting to weld output terminals.

⚠️ Do not use worn, damaged, undersized, or repaired cables.

1 Positive (+) Weld Output Terminal
2 Negative (−) Weld Output Terminal

For welding output terminal connections see Sections 7-4 and 7-5.
7-3. Connecting Weld Output Cables

![Diagram of connecting weld output cables]

**Tools Needed:**
- 3/4 in. (19 mm)

**Warning:**
- Turn off power before connecting to weld output terminals.
- Failure to properly connect weld cables may cause excessive heat and start a fire, or damage your machine.
- Do not place anything between weld cable terminal and copper bar. Make sure that the surfaces of the weld cable terminal and copper bar are clean.

**1** Correct Weld Cable Connection
**2** Incorrect Weld Cable Connection
**3** Weld Output Terminal
**4** Supplied Weld Output Terminal Nut
**5** Weld Cable Terminal
**6** Copper Bar

Remove supplied nut from weld output terminal. Slide weld cable terminal onto weld output terminal and secure with nut so that weld cable terminal is tight against copper bar.

**Notes**

---

**Work like a Pro!**

Pros weld and cut safely. Read the safety rules at the beginning of this manual.
7-4. Basic Subarc (SAW) Welding

Customer must supply the following: power source, power source control cable, wire drive assembly, wire drive extension cable, drive rolls, torch, welding wire, weld cables, remote voltage sense leads, flux hopper, flux hopper extension cable, and flux system for the desired application.

A. Basic Subarc (SAW) Equipment Connections For DCEP

- Turn off welding power source and weld control, and disconnect input power before making connections.
- Use remote voltage sense leads in all applications.
- Suggested size for remote voltage sense wire is 12 gauge or larger.
- DC 650/800 Digital model shown. Connections are the same for DC 1000/1250 Digital models.
B. Remote Voltage Sensing Leads Placement Guidelines For A Single Arc (Required)

**BAD**
Sense lead is affected by weld current.
Due to voltage drops across work piece, arc voltage may be low, causing need for deviation from standard procedures.

**BEST**
Sense leads are out of the current paths.
Sense leads detect arc voltage accurately.
Best starts, arcs and most reliable results.
C. Sensing Leads Placement Guidelines For Multiple Arcs

**BAD**
Current flow from lead affects trail sense.
Current flow from trail affects lead sense.
Neither sense lead picks up the correct work voltage, causing starting and welding arc instability.

**BAD**
Lead sense is affected by weld current from lead.
Trail sense lead is affected by weld current from trail.
Due to voltage drops across work piece, arc voltage may be low, causing need for deviation from standard procedures.

**BEST**
Both sense leads are out of the current paths.
Both sense leads detect arc voltage accurately.
No voltage drop between lead and trail sense.
Best starts, arcs and most reliable results.
D. Basic SubArc (SAW) Equipment Connections For DCEN

⚠️ Turn off welding power source and weld control, and disconnect input power before making connections.

⚠️ Use remote voltage sense leads in all applications.

⚠️ Suggested size for remote voltage sense wire is 12 gauge or larger.

⚠️ Tie-off and secure electrode-volt sense lead from motor cable when setting up to operate in DCEN.

DC 650/800 Digital model shown. Connections are the same for DC 1000/1250 Digital models.

Flux System

Flux Hopper

SubArc Interface

Motor Extension Cable

Electrode Volt-sense Lead From Motor Cable

Wire Drive Assembly

Workpiece

From Terminal Strip TE2 Terminal P

From Terminal Strip TE2 Terminal N

Weld Cable
7-5. Typical Connection For CAC-A Process

⚠️ Turn off power before making connections.

1. DC Power Source
2. Electrode Holder (Carbon Arc)
   For CAC-A process connect carbon arc cutting torch to positive (+) weld terminal.
3. Compressed Air Line
4. Work Lead
   Connect work lead to negative (−) output terminal.
5. Workpiece
7-6. Connecting Multiple Units

Parallel Connections For Digital 650/800 Machines:

CONTROLLING UNIT
RC1
RC2 (WHITE)
TO WORK
WHITE
TO ELECTRODE
TO ELECTRODE

FOLLOWING UNIT(S)
RC1
RC2 (WHITE)
TO WORK
To RC1 ON NEXT
DC 650 Digital UNIT
(OR DC 800 Digital UNIT
IF PARALLELING 800’S)

NOTICE – If there are any questions regarding the paralleling procedure, contact the factory before connecting units. Severe damage to units may occur if units are not correctly connected for parallel operation.

To use two or more units with one electrode, make connections as shown.

The first unit controls voltage. All remaining units supply additional current.

Only like power sources can be paralleled.

Parallel Connections For Digital 1000/1250 Machines:

CONTROLLING UNIT
RC1
RC2 (WHITE)
TO WORK
WHITE
TO ELECTRODE
TO ELECTRODE

FOLLOWING UNIT(S)
RC1
RC2 (WHITE)
TO WORK
To RC1 ON NEXT
DC 1000 Digital UNIT
(OR DC 1250 Digital UNIT
IF PARALLELING 1250’S)
SECTION 8 – POWER SOURCE OPERATION

8-1. Controls

1. Process Selector Switch
   - Subarc Mode – For SAW (Subarc) applications.
   - CC Mode - For gouging applications.
   Place switch in position for desired process.

2. Output Control Switch (Contactor)
   - For weld output, place switch in On position.
   - Switch is disabled when a SubArc Interface is connected to Remote Receptacle RC1 and powered on, or when a PLC has active control through the Modbus RTU connector. It is disabled if the power source is a following unit in parallel configuration.

3. Output On LED
   - Output is on and weld output studs are energized when LED is lit.

4. Amperage/Voltage Adjustment Control
   - When Process Selector switch is in the Constant Current position, turn control clockwise to increase amperage. Read amperage from outer scale of control. Numbers on scale are for reference only.
   - For front panel control of output, place switch in On position. For remote control of output, place switch in Remote position, and connect remote device to RC1. Remote control provides full range of unit output regardless of A/V Adjust control setting. If the output is on before a remote accessory is powered on, the power source will ignore the accessory until the output is turned off.

5. Status/Trouble Light
   - When a fault occurs, LED flashes a sequence code to identify the fault (see section 10-1).

6. Power Switch With Indicator Light
   - Turn Off power before connecting remote device.

262 962-B
9-1. Automation Interface Hardware Configuration (PLC Users Only)

Disconnect and lockout/tag-out input power before connecting input conductors from unit. Follow established procedures regarding the installation and removal of lockout/tagout devices.

Configure switch DIP 1 on Automation Interface board PC4 to match the network baud rate and parity settings, and set the MODBUS address for this device. (see Table 9-1 thru Table 9-3).

**Table 9-1. MODBUS Address**

<table>
<thead>
<tr>
<th>DIP1</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ON ON ON ON</td>
<td>40</td>
</tr>
<tr>
<td>OFF ON ON ON</td>
<td>41</td>
</tr>
<tr>
<td>ON OFF ON ON</td>
<td>42</td>
</tr>
<tr>
<td>OFF OFF ON ON</td>
<td>43</td>
</tr>
<tr>
<td>ON ON OFF ON</td>
<td>44</td>
</tr>
<tr>
<td>OFF ON OFF ON</td>
<td>45</td>
</tr>
<tr>
<td>ON OFF OFF ON</td>
<td>46</td>
</tr>
<tr>
<td>OFF OFF OFF ON</td>
<td>47</td>
</tr>
<tr>
<td>ON ON ON OFF</td>
<td>60</td>
</tr>
<tr>
<td>OFF ON ON OFF</td>
<td>61</td>
</tr>
<tr>
<td>ON OFF ON OFF</td>
<td>62</td>
</tr>
<tr>
<td>OFF OFF ON OFF</td>
<td>63</td>
</tr>
<tr>
<td>ON ON OFF OFF</td>
<td>64</td>
</tr>
<tr>
<td>OFF ON OFF OFF</td>
<td>65</td>
</tr>
<tr>
<td>ON OFF OFF OFF</td>
<td>66</td>
</tr>
<tr>
<td>OFF OFF OFF OFF</td>
<td>67</td>
</tr>
</tbody>
</table>

**Table 9-2. Baud Rate Data**

<table>
<thead>
<tr>
<th>DIP1</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 ON ON</td>
<td>9600</td>
</tr>
<tr>
<td>OFF ON</td>
<td>19200</td>
</tr>
<tr>
<td>ON OFF</td>
<td>38400</td>
</tr>
<tr>
<td>OFF OFF</td>
<td>reserved</td>
</tr>
</tbody>
</table>

**Table 9-3. Parity Data**

<table>
<thead>
<tr>
<th>DIP1</th>
<th>Parity</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ON ON</td>
<td>EVEN</td>
</tr>
<tr>
<td>OFF ON</td>
<td>ODD</td>
</tr>
<tr>
<td>ON OFF</td>
<td>NONE</td>
</tr>
<tr>
<td>OFF OFF</td>
<td>reserved</td>
</tr>
</tbody>
</table>
9-2. Connection To PLC
The automation interface uses an RJ45 connector to communicate MODBUS RTU over RS485.

It is NOT an Ethernet connection!
The pin connections are as follows:

<table>
<thead>
<tr>
<th>Function</th>
<th>RJ45 Pin</th>
<th>Circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Communication</td>
<td>4</td>
<td>D+</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>D−</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Common</td>
</tr>
<tr>
<td>Shield</td>
<td>Case</td>
<td>Shield</td>
</tr>
</tbody>
</table>

9-3. Example Power Source Operation Using A PLC

1. To enable welding control from the Automation Interface, set the “Automation Enable” bit (0x4000) in the Command Flags register (MODBUS Holding Register 101).
2. Set desired Weld Mode by writing MODBUS Holding Register 105 using look-up table Table 9-6.
3. Obtain Minimum and Maximum values by reading from Input Registers section 300 (See Table 9-8).
4. Set all relevant parameters (MODBUS Holding Registers 102-107) to their desired values. They must be within the minimum and maximum values read in Step 2. Verify the values are correct by reading Input Registers 102-107.
5. Enable weld output by setting the Output Enable Flag to 1 in the Command Flags register (MODBUS Holding Register 101).
6. Voltage & Current Feedback values can be read from Input Registers section 200 (See Table 9-8).
7. Disable weld output by clearing the Output Enable Flag to 0 in the Command Flags register (MODBUS Holding Register 101).
8. If there is no communication from the MODBUS master for a period greater than one second, the power source will reset all registers to their default value. Communication can consist of reading or writing.
9. It is recommended to continuously poll all welding parameters via the MODBUS master.

<table>
<thead>
<tr>
<th>Function</th>
<th>Function Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read Input Register</td>
<td>4</td>
</tr>
<tr>
<td>Read Holding Register</td>
<td>3</td>
</tr>
<tr>
<td>Write Single Register</td>
<td>6</td>
</tr>
<tr>
<td>Write Multiple Register</td>
<td>16</td>
</tr>
<tr>
<td>Read/Write Multiple Register</td>
<td>23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Register Address</th>
<th>Register Name</th>
<th>Register Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDU</td>
<td>MODBUS</td>
<td>Command Flags</td>
</tr>
<tr>
<td>100</td>
<td>101</td>
<td>Weld Voltage Command</td>
</tr>
<tr>
<td>101</td>
<td>102</td>
<td>Weld Current Command</td>
</tr>
<tr>
<td>102</td>
<td>103</td>
<td>Weld Wire Speed</td>
</tr>
<tr>
<td>103</td>
<td>104</td>
<td>Weld Mode</td>
</tr>
<tr>
<td>104</td>
<td>105</td>
<td>Run-In Speed Percentage</td>
</tr>
<tr>
<td>105</td>
<td>106</td>
<td>Burn Back Time</td>
</tr>
<tr>
<td>106</td>
<td>107</td>
<td>Drive Roll Diameter</td>
</tr>
</tbody>
</table>
### Table 9-7. Command Flags (MODBUS 101)

<table>
<thead>
<tr>
<th>Flag Name</th>
<th>Bitmask</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Enable</td>
<td>0x0001</td>
<td>Enable Weld Output</td>
</tr>
<tr>
<td>Wire Jog Up</td>
<td>0x0002</td>
<td>Feed Wire Up</td>
</tr>
<tr>
<td>Wire Jog Down</td>
<td>0x0004</td>
<td>Feed Wire Down</td>
</tr>
<tr>
<td>Flux On</td>
<td>0x0008</td>
<td>Open Flux Valve</td>
</tr>
<tr>
<td>Motor CW</td>
<td>0x2000</td>
<td>Motor Direction (Clockwise=1)</td>
</tr>
<tr>
<td>Automation Enable</td>
<td>0xC000</td>
<td>Enable Control From PLC</td>
</tr>
<tr>
<td>Reset Faults</td>
<td>0x0010</td>
<td>Fault Reset (All Other Bits MUST Be 0)</td>
</tr>
<tr>
<td>Reserved</td>
<td>0x0100</td>
<td>Reserved For Future Use (MUST Be 0)</td>
</tr>
</tbody>
</table>

### Table 9-8. Input Registers

<table>
<thead>
<tr>
<th>Register Address</th>
<th>Register Name</th>
<th>Register Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDU 100</td>
<td>101 Command Flags</td>
<td>Used for holding register verification (see Table 9-6).</td>
</tr>
<tr>
<td>PDU 101</td>
<td>102 Weld Voltage Command</td>
<td></td>
</tr>
<tr>
<td>PDU 102</td>
<td>103 Weld Current Command</td>
<td></td>
</tr>
<tr>
<td>PDU 103</td>
<td>104 Weld Wire Speed</td>
<td></td>
</tr>
<tr>
<td>PDU 104</td>
<td>105 Weld Mode</td>
<td></td>
</tr>
<tr>
<td>PDU 105</td>
<td>106 Run-In Speed Percentage</td>
<td></td>
</tr>
<tr>
<td>PDU 106</td>
<td>107 Burn Back Time</td>
<td></td>
</tr>
<tr>
<td>PDU 107</td>
<td>108 Drive Roll Diameter</td>
<td></td>
</tr>
<tr>
<td>PDU 200</td>
<td>201 Status Flags</td>
<td>See Table 9-9.</td>
</tr>
<tr>
<td>PDU 201</td>
<td>202 Voltage Feedback</td>
<td>Voltage feedback (volts x 10)</td>
</tr>
<tr>
<td>PDU 202</td>
<td>203 Current Feedback</td>
<td>Current feedback (amps)</td>
</tr>
<tr>
<td>PDU 203</td>
<td>204 Help Code</td>
<td>System help code during errors (0 otherwise).</td>
</tr>
</tbody>
</table>

#### Minimum/Maximum Values (Dependent Upon Power Source, Motor And Weld Mode)

<table>
<thead>
<tr>
<th>Register Address</th>
<th>Register Name</th>
<th>Value Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>301 Min Voltage</td>
<td>Minimum voltage (0.1V) for MODBUS 102.</td>
</tr>
<tr>
<td>301</td>
<td>302 Max Voltage</td>
<td>Maximum voltage (0.1V) for MODBUS 102.</td>
</tr>
<tr>
<td>302</td>
<td>303 Min Current</td>
<td>Minimum current (1A) for MODBUS 103.</td>
</tr>
<tr>
<td>303</td>
<td>304 Max Current</td>
<td>Maximum current (1A) for MODBUS 103.</td>
</tr>
<tr>
<td>304</td>
<td>305 Min WFS</td>
<td>Minimum wire feed speed (IPM) for MODBUS 104.</td>
</tr>
<tr>
<td>305</td>
<td>306 Max WFS</td>
<td>Maximum wire feed speed (IPM) for MODBUS 104.</td>
</tr>
<tr>
<td>306</td>
<td>307 Min Burnback Time</td>
<td>Minimum burnback time (ms) for MODBUS 107.</td>
</tr>
<tr>
<td>307</td>
<td>308 Max Burnback Time</td>
<td>Maximum burnback time (ms) for MODBUS 107.</td>
</tr>
<tr>
<td>308</td>
<td>309 Min Drive Roll Diameter</td>
<td>Minimum roll diameter (0.001 in.) for MODBUS 108.</td>
</tr>
<tr>
<td>309</td>
<td>310 Max Drive Roll Diameter</td>
<td>Maximum roll diameter (0.001 in.) for MODBUS 108.</td>
</tr>
</tbody>
</table>

#### System Information

<table>
<thead>
<tr>
<th>Register Address</th>
<th>Register Name</th>
<th>Value Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>401 Power Source Version</td>
<td>High byte – major version # / low byte – minor version #</td>
</tr>
<tr>
<td>401</td>
<td>402 Automation Board Version</td>
<td>High byte – major version # / low byte – minor version #</td>
</tr>
<tr>
<td>402</td>
<td>403 Motor Board Version</td>
<td>High byte – major version # / low byte – minor version #</td>
</tr>
<tr>
<td>403</td>
<td>404 Display Board Version</td>
<td>High byte – major version # / low byte – minor version #</td>
</tr>
</tbody>
</table>
Table 9-9. Status Flags (MODBUS 201)

<table>
<thead>
<tr>
<th>Flag Name</th>
<th>Bitmask</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid Arc</td>
<td>0x0001</td>
<td>A valid arc has been detected.</td>
</tr>
<tr>
<td>Output On</td>
<td>0x0002</td>
<td>The power source output is on.</td>
</tr>
<tr>
<td>Run In</td>
<td>0x0004</td>
<td>The power source is in Run In.</td>
</tr>
<tr>
<td>Weld</td>
<td>0x0008</td>
<td>The power source is in the weld state.</td>
</tr>
<tr>
<td>Burnback</td>
<td>0x0010</td>
<td>The power source is in the burnback State.</td>
</tr>
<tr>
<td>Error</td>
<td>0x8000</td>
<td>The power source is in an Error Condition (read MODBUS Input Register 204).</td>
</tr>
</tbody>
</table>

Table 9-10. Weld Mode Look Up Table

<table>
<thead>
<tr>
<th>Mode</th>
<th>Balance</th>
<th>Line Input Frequency (Hz)</th>
<th>Weld Mode Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Balance</td>
<td>60 Hz Line</td>
<td>50 Hz Line</td>
</tr>
<tr>
<td>CV</td>
<td>Electrode Positive</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>CV+C</td>
<td>Electrode Positive</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>CC</td>
<td>Electrode Positive</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

Notes
## SECTION 10 – MAINTENANCE AND TROUBLESHOOTING

### 10-1. SubArc System Help Codes

<table>
<thead>
<tr>
<th>SubArc Interface Digital Help Code</th>
<th>SubArc Power Source Status/Trouble Light</th>
<th>Fault</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HELP will display in the upper display, and the code number will display in the lower display.</td>
<td>Each flash sequence will be followed by a one second pause. The sequence will then repeat.</td>
<td>Fault</td>
<td>Description</td>
</tr>
<tr>
<td>03</td>
<td>3 Slow</td>
<td>See 30</td>
<td>Indicates unit has overheated. Unit has shutdown to allow fans to lower temperature. Operation will continue after unit is within normal temperature range.</td>
</tr>
<tr>
<td>04</td>
<td>4 Slow</td>
<td>See 40</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>5 Slow</td>
<td>Primary Circuit Over Temperature</td>
<td>Fault</td>
</tr>
<tr>
<td>06</td>
<td>6 Slow</td>
<td>See 60</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>2 Quick, 6 Slow</td>
<td>Button Stuck On System Interface Motor Control</td>
<td>Indicates button is stuck on the lower half of the SubArc Interface upon start up, or Remote Start, Jog Up, or Jog Down is being held low during start up. Fault will clear when button is released.</td>
</tr>
<tr>
<td>30</td>
<td>3 Quick</td>
<td>Stuck Contactor On Power Source</td>
<td>Indicates stuck contactor on (Output On switch) the power source. Fault will clear when panel switch is set to remote or contactor is released.</td>
</tr>
<tr>
<td>32</td>
<td>3 Quick, 2 Slow</td>
<td>Coolant Flow Error</td>
<td>Indicates coolant input on TB2 in the SubArc Interface is not connected to common on TB2 (see appropriate Interface OM). Check coolant flow and common connections. Ensure sensor being used has a normally-open contact. Sensor is only active if a Strip Drive 100 is connected.</td>
</tr>
<tr>
<td>40</td>
<td>4 Quick</td>
<td>Tach Error</td>
<td>Indicates tach error on motor. Check wire feed drive housing and wire spool for obstructions. Make sure motor cable is not routed with weld cable (If inching works properly, noise may be corrupting the tach signal). If this code continues to appear on the display, contact the nearest Factory Authorized Service Agent.</td>
</tr>
<tr>
<td>42</td>
<td>4 Quick, 2 Slow</td>
<td>Motor Error</td>
<td>Indicates motor overcurrent error on motor. Check wire feed drive housing and wire spool for obstructions. If this code continues to appear on the display, contact the nearest Factory Authorized Service Agent.</td>
</tr>
<tr>
<td>44</td>
<td>4 Quick, 4 Slow</td>
<td>Motor Low Bus</td>
<td>Indicates bus voltage in SubArc Interface is low. 24 VAC from power source may be low if input primary line voltage is too low or, for DC power sources, power source could be incorrectly linked. Increase primary line voltage to at least 90% of specified nominal voltage. Check for correct linking on DC power sources. If this code continues to appear, contact nearest Factory Authorized Service Agent.</td>
</tr>
<tr>
<td>45</td>
<td>4 Quick, 5 Slow</td>
<td>Button Stuck On System Interface Digital Display Board</td>
<td>Indicates button is stuck on the digital interface upon power up. Fault will clear when button is released.</td>
</tr>
<tr>
<td>48</td>
<td>4 Quick, 8 Slow</td>
<td>Trigger Fault</td>
<td>Indicates an arc was not established with the specified time (lesser of 8 seconds or 4 inches).</td>
</tr>
<tr>
<td>56</td>
<td>5 Quick, 6 Slow</td>
<td>Modbus Control Fault</td>
<td>Indicates PLC is enabling weld output, flux, or wire jog on initial communication. Clear all control bits of MODBUS 101 to reset.</td>
</tr>
<tr>
<td>60</td>
<td>6 Quick</td>
<td>Memory Card Fault</td>
<td>Indicates unable to read memory card. Faulty memory card or wrong format.</td>
</tr>
<tr>
<td>61</td>
<td>6 Quick, 1 Slow</td>
<td>File Read Error</td>
<td>Indicates faulty file on memory card.</td>
</tr>
<tr>
<td>62</td>
<td>6 Quick, 2 Slow</td>
<td>File Write Error</td>
<td>Indicates full or faulty memory card.</td>
</tr>
</tbody>
</table>
### 10-1. SubArc System Help Codes (Continued)

<table>
<thead>
<tr>
<th>SubArc Interface Digital Help Code</th>
<th>SubArc Power Source Status/Trouble Light</th>
<th>Fault</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HELP will display in the upper display, and the code number will display in the lower display.</td>
<td>Each flash sequence will be followed by a one second pause. The sequence will then repeat.</td>
<td>63</td>
<td>6 Quick, 3 Slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>64</td>
<td>6 Quick, 4 Slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>65</td>
<td>6 Quick, 5 Slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>66</td>
<td>6 Quick, 6 Slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>67</td>
<td>6 Quick, 7 Slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>71</td>
<td>7 Quick, 1 Slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>72</td>
<td>7 Quick, 2 Slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>73</td>
<td>7 Quick, 3 Slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>92</td>
<td>9 Quick, 2 Slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>93</td>
<td>9 Quick, 3 Slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>94</td>
<td>9 Quick, 4 Slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>95</td>
<td>9 Quick, 5 Slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>97</td>
<td>9 Quick, 7 slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>98</td>
<td>9 Quick, 8 Slow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99</td>
<td>9 Quick, 9 Slow</td>
</tr>
</tbody>
</table>
### 10-2. Routine Maintenance

<table>
<thead>
<tr>
<th>Every 3 Months</th>
<th>Every 6 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="path" alt="Check" /></td>
<td><img src="path" alt="Inside Unit" /></td>
</tr>
<tr>
<td><img src="path" alt="Change" /></td>
<td><img src="path" alt="Weld Cables" /></td>
</tr>
<tr>
<td><img src="path" alt="Clean" /></td>
<td><img src="path" alt="Weld Terminals" /></td>
</tr>
</tbody>
</table>

- Disconnect and lockout/tagout input power before performing maintenance or troubleshooting procedures.

- * ≡ Check, ◇ ≡ Change, ○ ≡ Clean, ☆ ≡ Replace
- * To be done by Factory Authorized Service Agent

- **Tools Needed:**
  - 3/8 in.

### 10-3. Fuse F1

- Disconnect and lockout/tagout input power before checking or changing fuse.
- **1** Fuse F1 (See Parts List For Rating)
- Fuse F1 protects control transformer from overload. If F1 opens, weld output and fan motor stops. Replace F1.
- Close and secure access door.

- ![Fuse Diagram]
### 10-4. Troubleshooting Table For Power Source

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| No weld output; unit completely inoperative; power switch light off. | Place line disconnect device in On position (see Section 5-6).  
Check for open line fuse(s), and replace if open (see Section 5-6).  
Check for proper input power connections (see Section 5-6).  
Check for proper jumper link position (see Section 5-5).  
Check fuse F1, and replace if necessary (see Section 10-3). |
| No weld output; power switch light on. | Unit overheated. Allow unit to cool with fan On (see Section 4-5).  
If using remote control, place Output (Contactor) switch in Remote 14 position, and connect remote control (see Sections 6-1 and 8-1). If remote is not being used, place switch in On position (see Section 8-1).  
Check, repair, or replace remote device. |
| No weld output; power switch light on; fan off. | Check for proper input power connections (see Section 5-6).  
Check for open line fuse(s), and replace if open, or reset circuit breaker (see Section 5-6).  
Turn power switch off then back on. If no output condition remains, have Factory Authorized Service agent check SCR’s. |
| Limited weld output and low open-circuit voltage. | Check position of Remote Amperage/Voltage Control switch (see Section 8-1).  
Check for open line fuse(s), and replace if open (see Section 5-6).  
Check for proper input power connections (see Section 5-6).  
Check for proper jumper link position (see Section 5-5).  
Clean and tighten all weld output connections. |
| Unit provides only maximum or minimum weld output. | Check position of Remote Amperage/Voltage Control switch (see Section 8-1).  
Have Factory Authorized Service Agent check control board PC1 and hall device HD1. |
| Erratic or improper weld output. | Use proper size and type of weld cable (see Section 7-1).  
Clean and tighten all weld connections.  
Check wire drive installation according to Owner’s Manual.  
Have Factory Authorized Service Agent check control board PC1 and hall device HD1. |
| No 24 volts AC output at Remote receptacle RC1. | Reset supplementary protector CB2. |
| Fan not operating. Note: fan only runs when cooling is necessary. | Check for and remove anything blocking fan movement.  
Have Factory Authorized Service Agent check fan motor. |
Notes

MATERIAL THICKNESS GAUGE

- 24 Ga. (.0239)
- 22 Ga. (.0299)
- 20 Ga. (.0359)
- 18 Ga. (.0478)
- 16 Ga. (.0599)
- 14 Ga. (.0747)
- 3/8" (.125)
- 1/2" (.1345)
- 1/2" (.1875)
- 3/4" (.250)
- 5/8" (.3125)
Figure 11-1. Circuit Diagram For DC 650/800 Models

**WARNING**
- 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.
Figure 11-2. Circuit Diagram For DC 1000/1250 Models
**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. If notification is submitted as an online warranty claim, the claim must include a detailed description of the fault and the troubleshooting steps taken to identify failed components and the cause of their failure.

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.

1. 5 Years Parts — 3 Years Labor
   - Original Main Power Rectifiers Only to Include SCRs, Diodes, and Discrete Rectifier Modules
2. 3 Years — Parts and Labor
   - Auto-Darkening Helmet Lenses (Except Classic Series) (No Labor)
   - Engine Driven Welder/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
3. 2 Years — Parts and Labor
   - Auto-Darkening Helmet Lenses – Classic Series Only (No Labor)
   - Fume Extractors – Capture 5, Filtair 400 and Industrial Collector Series
4. 1 Year — Parts and Labor Unless Specified
   - Automatic Motion Devices
   - CoolBelt and CoolBand Blower Unit (No Labor)
   - Desiccant Air Dryer System
   - 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, MXW 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)
5. 6 Months — Parts
   - Batteries
   - Bernard Guns (No Labor)
   - Tregaskiss Guns (No Labor)
6. 90 Days — Parts
   - Accessory (Kits)
   - Canvas Covers
   - Induction Heating Coils and Blankets, Cables, and Non-Electronic Controls
   - M-Guns
   - MIG Guns and Subarc (SAW) Torches
   - Remote Controls and RFCS-RJ45
   - Replacement Parts (No labor)
   - Roughneck Guns
   - Spoolmate Spoolguns

Miller’s True Blue® Limited Warranty shall not apply to:

1. 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.)
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, GUARANTEE 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.

*miller_warr 2015-01*
# Owner’s Record

Please complete and retain with your personal records.

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<tr>
<th>Model Name</th>
<th>Serial/Style Number</th>
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<th>Purchase Date</th>
<th>(Date which equipment was delivered to original customer.)</th>
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# 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.