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Processes

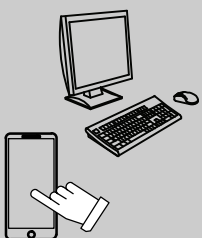
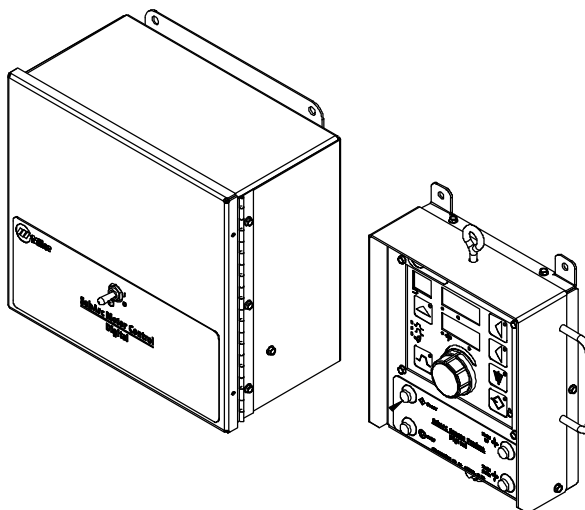


Submerged Arc (SAW) Welding

Description

Submerged Arc Controller For Automatic Welding

SubArc Motor Control And Remote Pendant Digital CE



For product information,
Owner's Manual translations,
and more, visit

www.MillerWelds.com

OWNER'S MANUAL

From Miller to You

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

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

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

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety Precautions. They will help you protect yourself against potential hazards on the worksite. We've made installation and operation quick and easy. With Miller, you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is, and our extensive service network is there to help fix the problem. Warranty and maintenance 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.



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



**ISO 9001
Quality**

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



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DECLARATION OF CONFORMITY

for European Community (CE marked) products.

MILLER Electric Mfg. LLC, 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), Commission Regulation(s) and Standard(s).

Product/Apparatus Identification:

Product	Stock Number
SUBARC WIRE DRIVE 400 DIGITAL LOW VOLTAGE	300938
SUBARC INTERFACE DIGITAL	300936
SUBARC MOTOR CONTROL DIGITAL	301425
SUBARC REMOTE PENDANT DIGITAL	301424
SUBARC TRACTOR INTERFACE DIGITAL	301423
SUBARC WIRE DRIVE 200 DIGITAL LOW VOLTAGE	301596

Council Directives and Commission Regulations:

- 2014/35/EU Low voltage
- 2014/30/EU Electromagnetic compatibility
- 2011/65/EU and amendment 2015/863 Restriction of the use of certain hazardous substances in electrical and electronic equipment

Standards:

- EN IEC 60974-5:2019 Arc welding equipment – Part 5: Wire feeders
- EN 60974-10:2014/A1:2015 Arc welding equipment – Part 10: Electromagnetic compatibility requirements
- EN IEC 63000:2018 – Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Signatory:

February 23, 2022

David A. Werba
MANAGER, PRODUCT DESIGN COMPLIANCE

Date of Declaration

268181F



DECLARATION OF CONFORMITY

For United Kingdom (UKCA marked) products.

MILLER Electric Mfg. LLC, 1635 West 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 Regulation(s) and Standard(s).

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Regulations:

- S.I. 2016/1101 Electrical Equipment (Safety) Regulations 2016
- S.I. 2016/1091 Electromagnetic Compatibility Regulations 2016
- S.I. 2012/3032 Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

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David A. Werba
MANAGER, PRODUCT DESIGN COMPLIANCE

Date of Declaration

SECTION 1 – SAFETY PRECAUTIONS – READ BEFORE USING

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

1-1. Symbol Usage

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

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

NOTICE – Indicates statements not related to personal injury.

 Indicates special instructions.



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

1-2. Arc Welding Hazards

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

 Only qualified persons should install, operate, maintain, and repair this equipment. A qualified person is defined as one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project and has received safety training to recognize and avoid the hazards involved.

 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 weld output in damp, wet, or confined spaces, 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!

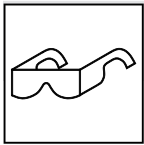
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install, ground, and operate this equipment according to its Owner's Manual and national, state, and local codes.
- Always 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.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Do not touch electrode holders connected to two welding machines at the same time since double open-circuit voltage will be present.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal. Disconnect cable for process not in use.
- Use GFCI protection when operating auxiliary equipment in damp or wet locations.



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.



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.



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.
- Ventilate the work 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 watchperson nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.



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.



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.

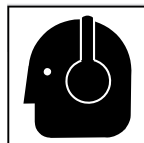
- Wear an approved welding helmet fitted with a proper shade of filter lenses to protect your face and eyes from arc rays and sparks when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens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



WELDING can cause fire or explosion.

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

- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Do not weld where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not cut or weld on tire rims or wheels. Tires can explode if heated. Repaired rims and wheels can fail. See OSHA 29 CFR 1910.177 listed in Safety Standards.
- 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 (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.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear body protection made from leather or flame-resistant clothing (FRC). Body protection includes oil-free clothing such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Use only correct fuses or circuit breakers. Do not oversize or bypass them.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.
- Read and understand the Safety Data Sheets (SDSs) and the manufacturer's instructions for adhesives, coatings, cleaners, consumables, coolants, degreasers, fluxes, and metals.



NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.



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.



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 proper equipment, correct procedures, and sufficient number of persons to lift, move, and transport 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 Hazards For Installation, Operation, And Maintenance



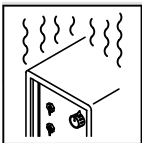
FIRE OR EXPLOSION hazard.

- 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.



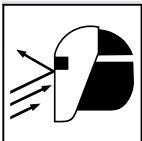
FALLING EQUIPMENT can injure.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use correct procedures and 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.



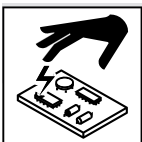
OVERUSE can cause OVERHEATING.

- 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.



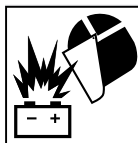
MOVING PARTS can injure.

- 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.



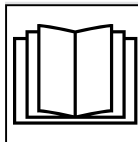
BATTERY EXPLOSION can injure.

- 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 microprocessors, 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



WARNING – This product can expose you to chemicals including lead, which are known to the state of California to cause cancer and birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov.

1-5. Principal Safety Standards

Safety in Welding, Cutting, and Allied Processes, American Welding Society standard ANSI Standard Z49.1. Website: <http://www.aws.org>.

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute. Website: www.ansi.org.

Safe Practices for the Preparation of Containers and Piping for Welding and Cutting, American Welding Society Standard AWS F4.1. Website: <http://www.aws.org>.

National Electrical Code, NFPA Standard 70 from National Fire Protection Association. Website: www.nfpa.org.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1 from Compressed Gas Association. Website: www.cganet.com.

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2 from Canadian Standards Association. Website: www.csagroup.org.

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B from National Fire Protection Association. Website: www.nfpa.org.

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910.177 Subpart N, Part 1910 Subpart Q, and Part 1926, Subpart J. Website: www.osha.gov.

OSHA *Important Note Regarding the ACGIH TLV, Policy Statement on the Uses of TLVs and BEIs*. Website: www.osha.gov.

Applications Manual for the Revised NIOSH Lifting Equation from the National Institute for Occupational Safety and Health (NIOSH). Website: www.cdc.gov/NIOSH.

SOM 2022–01

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

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

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

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

 Indique des instructions spécifiques.



Ce groupe de symboles veut dire Avertissement! Attention! DANGER DE CHOC ELECTRIQUE, PIECES EN MOUVEMENT, et PIECES CHAUDES. Reportez-vous aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout 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 ce symbole, prendre garde et suivre les instructions afférentes pour éviter tout risque. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les Normes de sécurité principales. Lire et suivre toutes les Normes de sécurité.

 L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées. Une personne qualifiée est définie comme celle qui, par la possession d'un diplôme reconnu, d'un certificat ou d'un statut professionnel, ou qui, par une connaissance, une formation et une expérience approfondies, a démontré avec succès sa capacité à résoudre les problèmes liés à la tâche, le travail ou le projet et a reçu une formation en sécurité afin de reconnaître et d'éviter les risques inhérents.

 Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.



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 utiliser de sortie de soudage CA dans des zones humides ou confinées ou s'il y a un risque de chute.
- Se servir d'une source électrique à courant électrique UNIQUEMENT si le procédé de soudage le demande.
- Si l'utilisation d'une source électrique à courant électrique s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- D'autres consignes de sécurité sont nécessaires dans les conditions suivantes : risques électriques dans un environnement humide ou si l'on porte des vêtements mouillés ; sur des structures

métalliques telles que sols, grilles ou échafaudages ; en position coincée comme assise, à genoux ou couchée ; ou s'il y a un risque élevé de contact inévitable ou accidentel avec la pièce à souder ou le sol. Dans ces conditions, utiliser les équipements suivants, dans l'ordre indiqué : 1) un poste à souder DC à tension constante (à fil), 2) un poste à souder DC manuel (électrode) ou 3) un poste à souder AC à tension à vide réduite. Dans la plupart des situations, l'utilisation d'un poste à souder DC à fil à tension constante est recommandée. En outre, ne pas travailler seul !

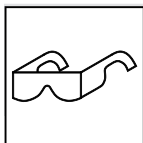
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Déverrouiller l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir normes de sécurité).
- Brancher correctement la mise à la terre et utiliser cet appareil conformément à son manuel d'utilisateur et aux codes nationaux, provinciaux et municipaux.
- Toujours vérifier la mise à la terre — vérifier et assurez-vous que le conducteur de mise à la terre du cordon d'alimentation est bien raccordé à la borne de mise à la terre dans le boîtier de déconnexion ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d'entrée, fixer d'abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Les câbles doivent être exempts d'humidité, d'huile et de graisse ; protégez-les contre les étincelles et les pièces métalliques chaudes.
- Vérifier fréquemment le cordon d'alimentation et le conducteur de mise à la terre afin de s'assurer qu'il n'est pas altéré ou dénudé -, le remplacer immédiatement s'il l'est -. Un fil dénudé peut entraîner la mort.
- L'équipement doit être hors tension lorsqu'il n'est pas utilisé.
- Ne pas utiliser des câbles usés, endommagés, de grosseur insuffisante ou mal épissés.
- Ne pas enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode provenant d'une autre machine.
- Ne pas toucher des porte électrodes connectés à deux machines en même temps à cause de la présence d'une tension à vide doublée.
- N'utiliser qu'un matériel en bon état. Réparer ou remplacer sur-le-champ les pièces endommagées. Entretenir l'appareil conformément à ce manuel.
- Porter un harnais de sécurité si l'on doit travailler au-dessus du sol.

- S'assurer que tous les panneaux et couvercles sont correctement en place.
- Fixer le câble de retour de façon à obtenir un bon contact métal-métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.
- Ne pas raccorder plus d'une électrode ou plus d'un câble de masse à une même borne de sortie de soudage. Débrancher le câble pour le procédé non utilisé.
- Utiliser une protection différentielle lors de l'utilisation d'un équipement auxiliaire dans des endroits humides ou mouillés.



LES PIÈCES CHAUDES peuvent provoquer des brûlures.

- Ne pas toucher des parties chaudes à mains nues.
- 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.



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

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



LES FUMÉES ET LES GAZ peuvent être dangereux.

Le soudage génère des fumées et des gaz. Leur inhalation peut être dangereux pour votre santé.

- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- 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 auxquelles est exposé le personnel.
- Si la ventilation est médiocre, porter un respirateur anti-vapeurs approuvé.
- Lire et comprendre les fiches de données de sécurité et les instructions du fabricant concernant les adhésifs, les revêtements, les nettoyants, les consommables, les produits de refroidissement, les dégraisseurs, les flux et les métaux.
- Travailler dans un espace fermé seulement s'il est bien ventilé ou en portant un respirateur à alimentation d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l'air et abaisser le niveau d'oxygène provoquant des blessures ou des accidents mortels. S'assurer que l'air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraisage, 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 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 RAYONS DE L'ARC peuvent provoquer des brûlures dans les yeux et sur la peau.

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

- Porter un casque de soudage approuvé muni de verres filtrants approprié pour protéger visage et yeux pendant le soudage (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des lunettes de sécurité avec écrans latéraux même sous votre casque.
- Avoir recours à des écrans protecteurs ou à des rideaux pour protéger les autres contre les rayonnements les éblouissements et les étincelles ; prévenir toute personne sur les lieux de ne pas regarder l'arc.
- Porter une protection corporelle en cuir ou des vêtements ignifuges (FRC). La protection du corps comporte des vêtements sans huile, comme des gants de cuir, une chemise solide, des pantalons sans revers, des chaussures hautes et une casquette.

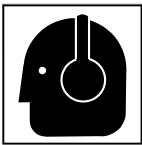


LE SOUDAGE peut provoquer un incendie ou une explosion.

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

- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité les recouvrir soigneusement avec des protections homologuées.
- Ne pas souder dans un endroit où des étincelles peuvent tomber sur des substances inflammables.
- Se protéger et d'autres personnes de la projection d'étincelles et de métal chaud.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- Ne pas couper ou souder des jantes ou des roues. Les pneus peuvent exploser s'ils sont chauffés. Les jantes et les roues réparées peuvent défaillir. Voir OSHA 29 CFR 1910.177 énuméré dans les normes de sécurité.
- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu'ils n'aient été préparés correctement conformément à AWS F4.1 (voir les Normes de Sécurité).
- Ne pas souder là où l'air ambiant pourrait contenir des poussières, gaz ou émanations inflammables (vapeur d'essence, par exemple).

- Brancher le câble de masse sur la pièce le plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution, d'étincelles et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porte-électrode ou couper le fil à la pointe de contact.
- Porter une protection corporelle en cuir ou des vêtements ignifuges (FRC). La protection du corps comporte des vêtements sans huile, comme des gants de cuir, une chemise solide, des pantalons sans revers, des chaussures hautes et une casquette.
- Avant de souder, retirer toute substance combustible de vos poches telles qu'un allumeur au butane ou des allumettes.
- Une fois le travail achevé, assurez-vous qu'il ne reste aucune trace d'étincelles incandescentes ni de flammes.
- Utiliser exclusivement des fusibles ou coupe-circuits appropriés. Ne pas augmenter leur puissance; ne pas les ponter.
- 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 dégraisseurs, les flux et les métaux.



Le BRUIT peut endommager l'ouïe.

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

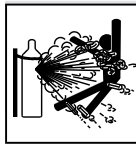
- Porter des protections approuvées pour les oreilles si le niveau sonore est trop élevé.



Les 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 le soudage à l'arc, du soudage par points, du gougeage, de la découpe plasma ou une opération de chauffage par induction.



Si des BOUTEILLES sont endommagées, elles pourront exploser.

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

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

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



Risque D'INCENDIE OU D'EXPLOSION.

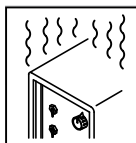
- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Ne pas installer l'appareil à proximité de produits inflammables
- Ne pas surcharger l'installation électrique – s'assurer que l'alimentation est correctement dimensionnée et protégée avant de mettre l'appareil en service.



LA CHUTE DE L'ÉQUIPEMENT peut provoquer des blessures.

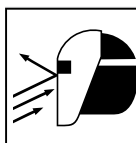
- Utiliser l'anneau de levage uniquement pour soulever l'appareil, NON PAS les organes de roulement, les bouteilles de gaz ou tout autre accessoire.
- Utilisez les procédures correctes et des équipements d'une capacité appropriée pour soulever et supporter l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.

- Tenir l'équipement (câbles et cordons) à distance des véhicules mobiles lors de toute opération en hauteur.
- Suivre les consignes du Manuel des applications pour l'équation de levage NIOSH révisée (Publication N°94-110) lors du levage manuel de pièces ou équipements lourds.



L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

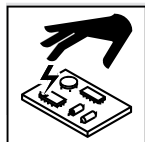
- Laisser l'équipement refroidir ; respecter le facteur de marche nominal.
- Réduire le courant ou le cycle opératoire avant de recommencer le soudage.
- Ne pas obstruer les passages d'air du poste.



LES ÉTINCELLES PROJÉTÉES peuvent provoquer des blessures.

- Porter un écran facial pour protéger le visage et les yeux.

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



LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Établir la connexion avec la barrette de terre AVANT de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimés.



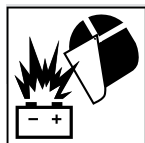
Les PIÈCES MOBILES peuvent causer des blessures.

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



LES FILS DE SOUDAGE peuvent provoquer des blessures.

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



L'EXPLOSION DE LA BATTERIE peut provoquer des blessures.

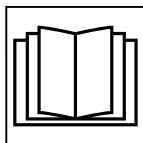
- Ne pas utiliser l'appareil de soudage pour charger des batteries ou faire démarrer des véhicules à l'aide de câbles de démarrage, sauf si l'appareil

dispose d'une fonctionnalité de charge de batterie destinée à cet usage.



Les PIÈCES MOBILES peuvent causer des blessures.

- S'abstenir de toucher des organes mobiles tels que des ventilateurs.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.
- Lorsque cela est nécessaire pour des travaux d'entretien et de dépannage, faire retirer les portes, panneaux, recouvrements ou dispositifs de protection uniquement par du personnel qualifié.
- Remettre les portes, panneaux, recouvrements ou dispositifs de protection quand l'entretien est terminé et avant de rebrancher l'alimentation électrique.

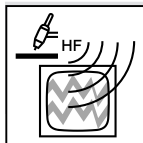


LIRE LES INSTRUCTIONS.

- Lire et appliquer les instructions sur les étiquettes et le Mode d'emploi avant l'installation, l'utilisation ou l'entretien de l'appareil. Lire les informations de sécurité au début du manuel et dans chaque

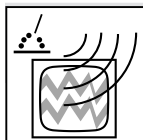
section.

- N'utiliser que des pièces de remplacement provenant du fabricant.
- 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.



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

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

2-4. Proposition californienne 65 Avertissements

⚠ AVERTISSEMENT – Ce produit peut vous exposer à des produits chimiques tels que le plomb, reconnus par l'État de Californie comme cancérigènes et sources de malformations ou d'autres troubles de la reproduction.

Pour plus d'informations, consulter www.P65Warnings.ca.gov.

2-5. Principales normes de sécurité

Safety in Welding, Cutting, and Allied Processes, American Welding Society standard ANSI Standard Z49.1. Website: <http://www.aws.org>.

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute. Website: www.ansi.org.

Safe Practices for the Preparation of Containers and Piping for Welding and Cutting, American Welding Society Standard AWS F4.1. Website: <http://www.aws.org>.

National Electrical Code, NFPA Standard 70 from National Fire Protection Association. Website: www.nfpa.org.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1 from Compressed Gas Association. Website: www.cganet.com.

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2 from Canadian Standards Association. Website: www.csagroup.org.

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B from National Fire Protection Association. Website: www.nfpa.org.

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910.177 Subpart N, Part 1910 Subpart Q, and Part 1926, Subpart J. Website: www.osha.gov.

OSHA *Important Note Regarding the ACGIH TLV, Policy Statement on the Uses of TLVs and BEIs*. Website: www.osha.gov.

Applications Manual for the Revised NIOSH Lifting Equation from the National Institute for Occupational Safety and Health (NIOSH). Website: www.cdc.gov/NIOSH.

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2-6. Informations relatives aux CEM

Le courant électrique qui traverse tout conducteur génère des champs électromagnétiques (CEM) à certains endroits. Le courant issu d'un soudage à l'arc (et de procédés connexes, y compris le soudage par points, le gougeage, le découpage plasma et les opérations de chauffage par induction) crée un champ électromagnétique (CEM) autour du circuit de soudage. Les 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: par exemple, des restrictions d'accès pour les passants ou une évaluation individuelle des risques pour les soudeurs. Tous les soudeurs doivent appliquer les procédures suivantes pour minimiser l'exposition aux CEM provenant du circuit de soudage:

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

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

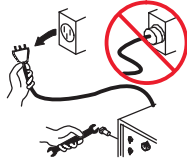
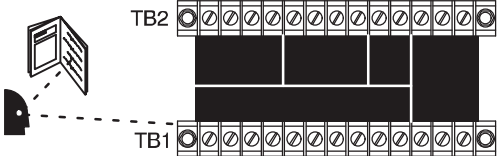
En ce qui concerne les implants médicaux :

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

SECTION 3 – DEFINITIONS

3-1. Additional Safety Symbol Definitions

 Some symbols are found only on CE products.

	Warning! Watch Out! There are possible hazards as shown by the symbols.
	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.
	Environmental Protection Use Period (China)
	Disconnect input plug or power before working on machine.
	Read Owner's Manual for terminal strip connection information.

3-2. Miscellaneous Symbols And Definitions

☞ Some symbols are found only on CE products.

A	Amperage
V	Voltage
Hz	Hertz
	Alternating Current (AC)
	Panel/Local
	Line Connection
	Input Voltage
I	On
O	Off
	Submerged Arc Welding (SAW)
	Read Operators Manual
	Fuse
1~	Single Phase

U₁	Primary Voltage
I₁	Primary Current
IP	Degree of Protection
	Protective Earth (Ground)
	Circuit Breaker
	Increase/Decrease Of Quantity
	Caution
	Frame Or Chassis
	Wire Feed
	Preflux Timer
	Start Time
	Start of Action
	Stop of Action

	Wire Feed Inch Down
	Wire Feed Inch Up
	Crater Time
	Program
	Flux
	Display Push Button
	Lock
	Remote
t (sec)	Time
	Set Up
	Sequence

SECTION 4 – SPECIFICATIONS

4-1. Serial Number And Rating Label Location

A. Serial Number And Rating Label Location For SubArc Motor Control Digital

The serial number and rating information for the motor control digital is located on the right side. Use rating label to determine input power requirements and/or rated output. For future reference, write serial number in space provided on back cover of this manual.

B. Serial Number And Rating Label Location For SubArc Remote Pendant Digital

The serial number and rating information for the remote pendant digital is located on the back plate. Use rating label to determine input power requirements. For future reference, write serial number in space provided on back cover of this manual.

4-2. Software Licensing Agreement

The End User License Agreement and any third-party notices and terms and conditions pertaining to third-party software can be found at <https://www.millerwelds.com/eula> and are incorporated by reference herein.

4-3. Information About Default Weld Parameters And Settings

NOTICE – Each welding application is unique. Although certain Miller Electric products are designed to determine and default to certain typical welding parameters and settings based upon specific and relatively limited application variables input by the end user, such default settings are for reference purposes only; and final weld results can be affected by other variables and application-specific circumstances. The appropriateness of all parameters and settings should be evaluated and modified by the end user as necessary based upon application-specific requirements. The end user is solely responsible for selection and coordination of appropriate equipment, adoption or adjustment of default weld parameters and settings, and ultimate quality and durability of all resultant welds. Miller Electric expressly disclaims any and all implied warranties including any implied warranty of fitness for a particular purpose.

4-4. Specifications

A. Specifications For SubArc Motor Control Digital

Specifications	Description
Type of power source	Single-Phase 24 VAC, 25 Amps 50/60 Hz
Overall dimensions including knobs, receptacles, etc.	Height: 11.5 in. (292 mm) Width: 12.5 in. (318 mm) Depth: 7.0 in. (178 mm)
Weight	Net: 12.9 lbs (5.8 kg)
Weld voltage and amperage capacity (AC or DC)	0 to 100 Volts 0 to 1500 Amperes
Wire feed speed range	Dependent on motor in system

B. Specifications For SubArc Remote Pendant Digital

Specifications	Description
Type of power source	Single-Phase 42 VDC, 1 Amps
Overall dimensions including knobs, receptacles, etc.	Height: 3.0 in. (76.2 mm) Width: 10.6 in. (269.2 mm) Depth: 3.3 in. (84 mm)
Weight	Net: 2.7 lbs (1.2 kg)
Weld voltage and amperage capacity (AC or DC)	0 to 100 Volts 0 to 1500 Amperes
Wire feed speed range	Dependent on motor in system

4-5. Environmental Specifications

A. IP Rating

IP Rating
IP23 This equipment is designed for outdoor use.

B. Information On Electromagnetic Compatibility (EMC)

 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.
--

C. Temperature Specifications

Operating Temperature Range*	Storage/Transportation Temperature Range
14 to 104°F (-10 to 40°C)	-4 to 131°F (-20 to 55°C)

*Output is derated at temperatures above 104°F (40°C).

D. EU Ecodesign Information

	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.
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Critical raw materials possibly present in indicative amounts higher than 1 gram at component level	
Component	Critical Raw Material
Printed circuit boards	Baryte, Bismuth, Cobalt, Gallium, Germanium, Hafnium, Indium, Heavy Rare Earth, Light Rare Earth, Niobium, Platinum Group Metals, Scandium, Silicon Metal, Tantalum, Vanadium
Plastic components	Antimony, Baryte
Electrical and electronic components	Antimony, Beryllium, Magnesium
Metal components	Beryllium, Cobalt, Magnesium, Tungsten, Vanadium
Cables and cable assemblies	Borate, Antimony, Baryte, Beryllium, Magnesium
Display panels	Gallium, Indium, Heavy Rare Earth, Light Rare Earth, Niobium, Platinum Group Metals, Scandium
Batteries	Fluorspar, Heavy Rare Earth, Light Rare Earth, Magnesium

E. China EEP Hazardous Substance Information

中国电器电子产品中有害物质的名称及含量 China EEP Hazardous Substance Information						
部件名称 Component Name (如果适用) (if applicable)	有害物质 Hazardous Substance					
	铅 Pb	汞 Hg	镉 Cd	六价铬 Cr6	多溴联苯 PBB	多溴二苯醚 PBDE
黄铜和铜部件 Brass and Copper Parts	X	O	O	O	O	O
耦合装置 Coupling Devices	X	O	O	O	O	O
开关装置 Switching Devices	O	O	X	O	O	O
线缆和线缆配件 Cable and Cable Accessories	X	O	O	O	O	O
电池 Batteries	X	O	O	O	O	O
本表格依据中国SJ/T 11364的规定编制。 This table is prepared in accordance with China SJ/T 11364.						
O: 表示该有害物质在该部件所有均质材料中的含量均在中国GB/T26572规定的限量要求以下。 Indicates that the concentration of the Hazardous Substance in all homogeneous materials of the part is below the relevant threshold of China GB/T 26572.						
X: 表示该有害物质至少在该部件的某一均质材料中的含量超出中国GB/T26572规定的限量要求。 Indicates that the concentration of the Hazardous Substance in at least one homogeneous material of the part is above the relevant threshold of China GB/T 26572.						
器电子产品的环保使用期限依据中国SJ/Z11388的规定确定。 The EFUP value of this EEP is defined in accordance with China SJ/Z 11388.						

4-6. SubArc System Compatibility

The following power source and accessory models are compatible. The interface will automatically detect the power source and wire drive type connected.

 Only like power source models can be connected with parallel or tandem cables.

Power Sources:

907620 - SubArc AC/DC 1000 Digital
907621 - SubArc AC/DC 1250 Digital
907622 - SubArc DC 650 Digital
907923 - SubArc DC 800 Digital
907624 - SubArc DC 1000 Digital
907625 - SubArc DC 1250 Digital

Interfaces:

300936 - SubArc Interface Digital
300937 - SubArc Interface Analog
301423 - SubArc Tractor Interface Digital
301424 - SubArc Remote Pendant Digital
301425 - SubArc Motor Control Digital

Wire Drives:

300938 - SubArc Wire Drive 400 Digital Low Voltage
301596 - SubArc Wire Drive 200 Digital Low Voltage
300938001 - SubArc Wire Drive 400 Digital Low Voltage For Tractors
300938002 - SubArc Wire Drive 400 Digital Low Voltage For SPWS
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
301445 - SubArc Manual Flux Hopper

4-7. Power Source Compatibility With 14-Pin To SubArc Digital Converter

The following power sources are compatible with the 14-Pin To SubArc Digital Converter. Will function with current and legacy Miller Big Blues 500, 600, and 800 without 120VAC supplied from the 14-Pin receptacle.

 If uncertain whether a 14-Pin To SubArc is needed, contact Miller Customer Service.

 CV+C is **NOT** functional with the 14-Pin To SubArc Digital Converter.

The current base model Big Blues listed below will function with SubArc Digital Accessories. Derivative Big Blue models are also compatible.

Power Sources:

907736 - Big Blue 500 Pro

907737 - Big Blue 600 Pro

907750 - Big Blue 600 Air Pack

907751 - Big Blue 800 Duo Pro

907752 - Big Blue 800 Duo Air Pak

903254 - Dimension 452

903255 - Dimension 452

903379 - Dimension 652

903650 - Dimension 1000

907617 - Dimension 650

907618 - Dimension 650

903377 - Deltaweld 452

903394 - Deltaweld 452

903396 - Deltaweld 652

907338 - SubArc DC 650

907344 - SubArc DC 800

907342 - SubArc DC 1000

907343 - SubArc DC 1250

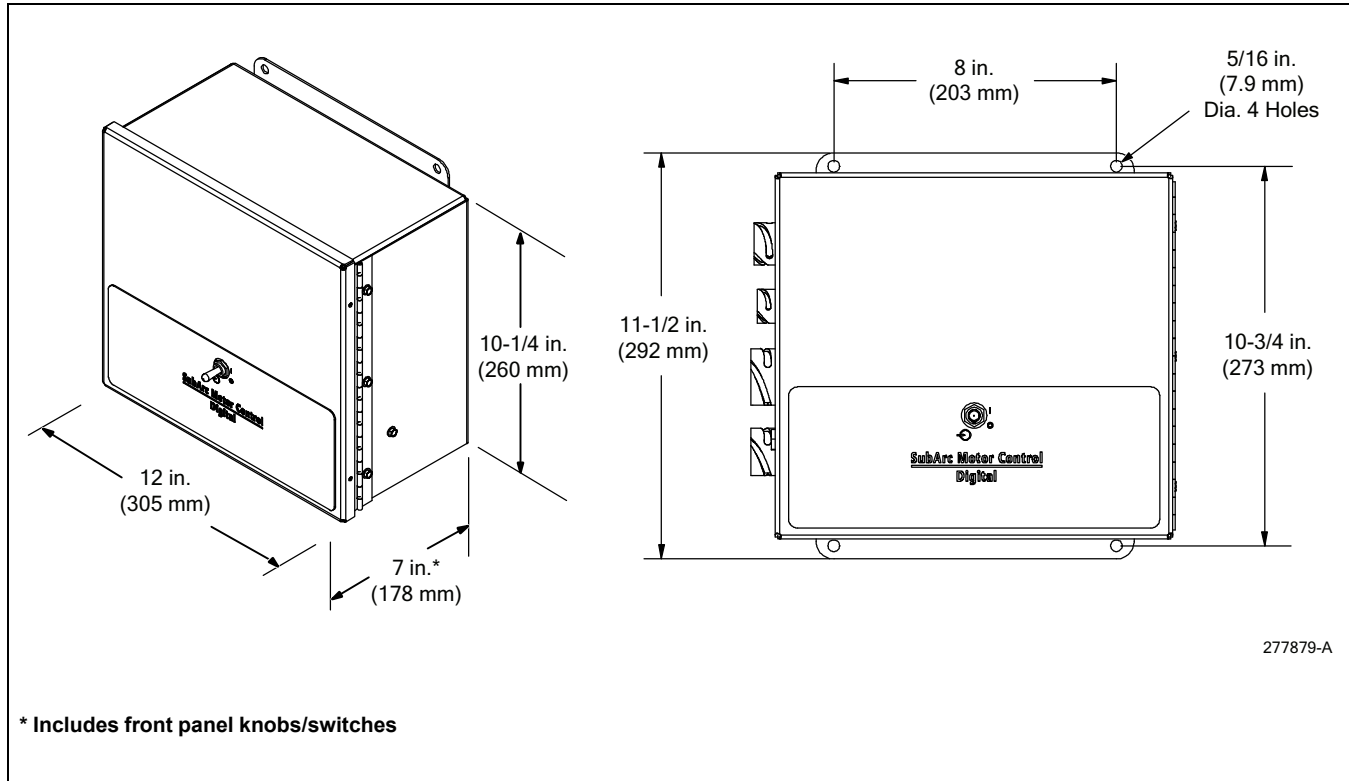
903530 - Summit Arc 1000

903570 - Summit Arc 1250

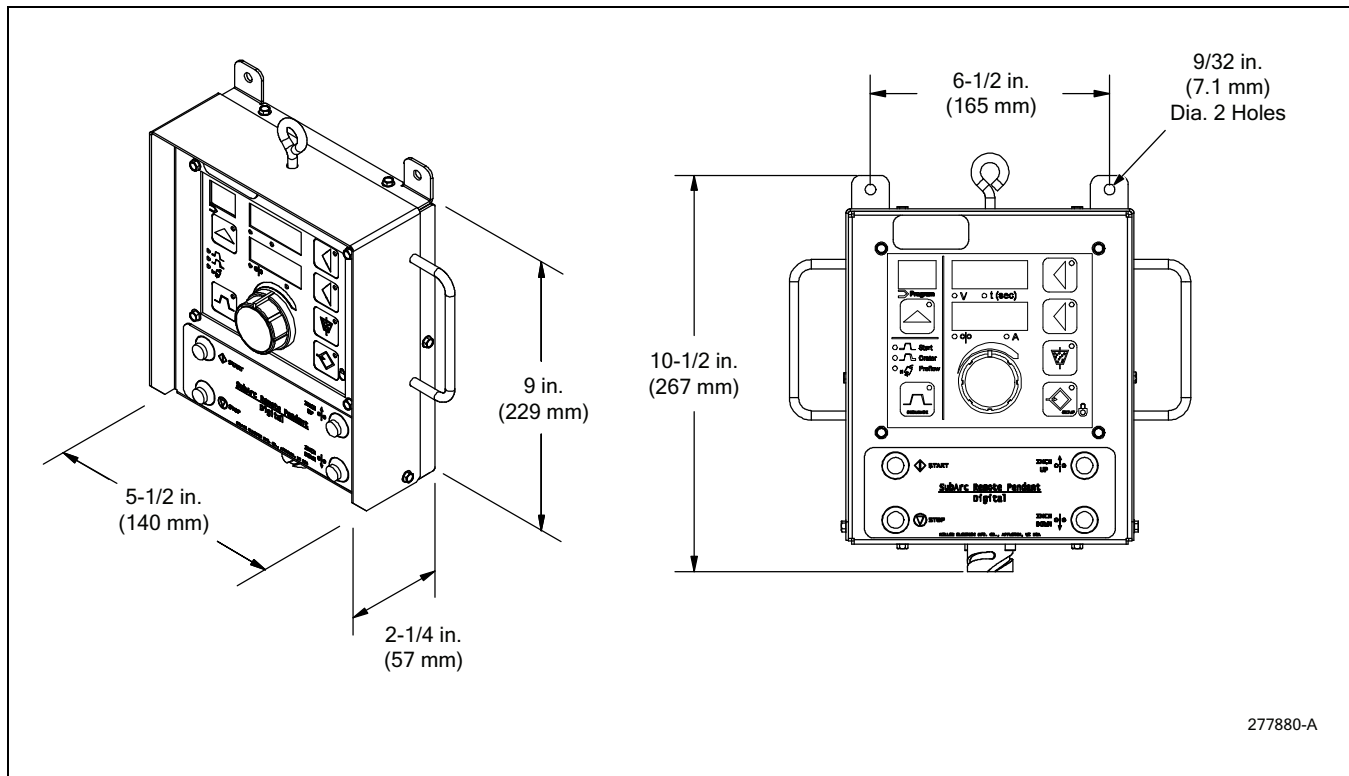
SECTION 5 – INSTALLATION

5-1. Dimensions And Mounting Hole Layout

A. SubArc Motor Control Digital Dimensions And Mounting Hole Layout

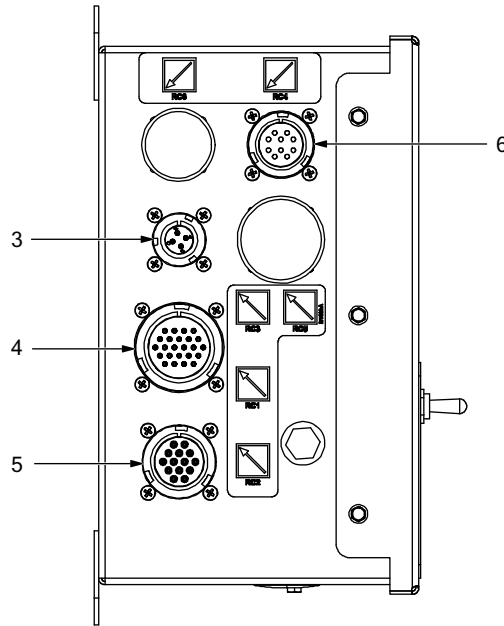
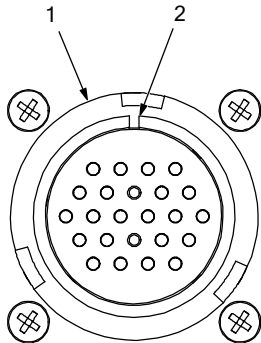


B. SubArc Remote Pendant Digital Dimensions And Mounting Hole Layout



SECTION 6 – SYSTEM CONNECTIONS

6-1. Left Side Panel Connections For SubArc Motor Control Digital



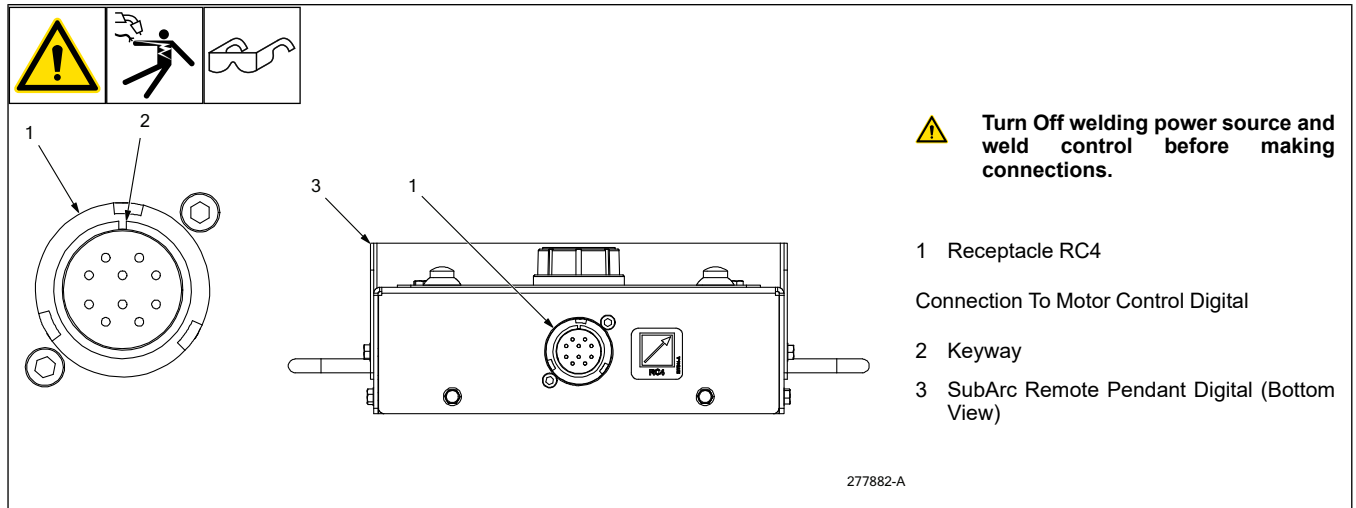
⚠ Turn Off welding power source and weld control and disconnect input power before opening access door.

- 1 Receptacle
- 2 Keyway
- 3 Receptacle RC3
- Connection to flux hopper.
- 4 Receptacle RC1
- Connection to welding power source.
- 5 Receptacle RC2
- Connection to wire drive motor.
- 6 Receptacle RC4
- Connection to remote pendant digital.

277881-B

RC1	RC2	RC3	RC4
Connection To Power Source	Connection To Wire Motor Drive	Connection To Flux Hopper	Connection To Remote Pendant Digital

6-2. Bottom Panel Connections For SubArc Remote Pendant Digital



6-3. Remote Receptacle RC1 Information For SubArc Motor Control Digital

Function	Circuit	Contact Information
Electrical Input Power	A, B	24 VAC. Protected by circuit breaker CB2
	C, D	24 VAC neutral
Accessory Serial Communication	J	+ Accessory RS-485 communication
	V	- Accessory RS-485 communication
	Q	Accessory serial communication common
Shield	H	Contact J/V shield drain lead
Volt Sense	W	+ Volt sense
	X	Reserved for - volt sense

6-4. Remote Receptacle RC2 Information For SubArc Motor Control Digital

Function	Circuit	Contact Information
Wire feed Drive Motor Hookups	J	Positive (+) motor armature (38 VDC motor)
	A	Negative (-) motor armature (38 VDC motor)
	H	Motor identification (resistor across H and B)
	C	Shield drain leads
	I	Encoder VCC (+5 VDC)
	K	Encoder channel A
	B	Encoder common and motor identification (resistor across H and B)
	E	Reserved for negative volt sense
	F	Positive volt sense

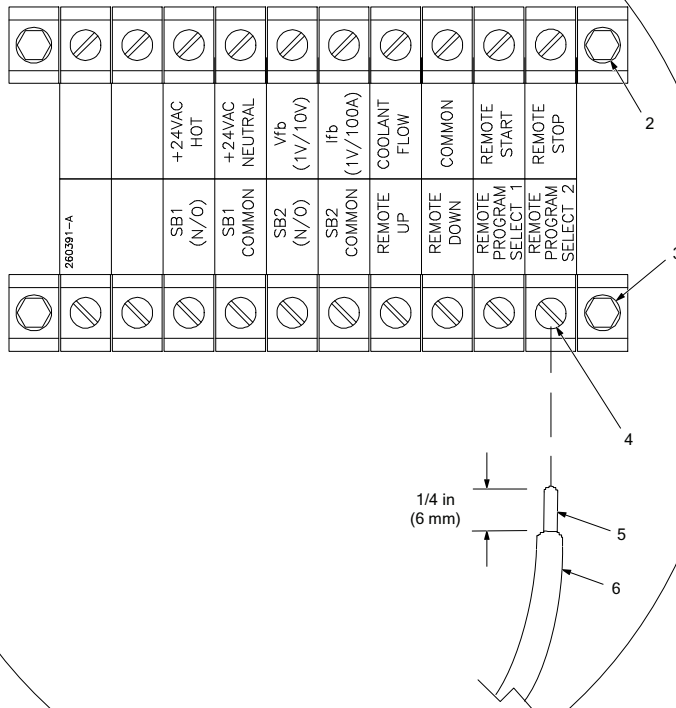
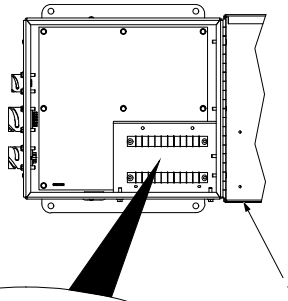
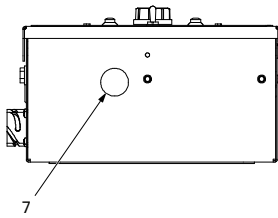
6-5. Remote Receptacle RC3 Information For SubArc Motor Control Digital

Function	Circuit	Contact Information
Flux Hopper Hookups	A	12 VDC average PWM drive for flux hopper
	B	Not used
	C	Circuit common for flux hopper
	D	Not used

6-6. Remote Receptacle RC4 Information For SubArc Remote Pendant Digital And Motor Control Digital

Function	Circuit	Contact Information
Electrical Input Power	B	42 VDC common.
	D	42 VDC.
Accessory Serial Communication	I	+Accessory RS-485 communication.
	G	–Accessory RS-485 communication.
	H	Chassis.
Push Buttons	A	Jog up.
	C	Start.
	E	Stop.
	F	COM EXT.
	J	Jog down.

6-7. Terminal Block TB1 And TB2 Connections For SubArc Motor Control Digital



⚠ Turn Off welding power source and weld control before making connections.

⚠ Disconnect input power before opening access door.

1 Access Door

Remove securing screws and open access door.

2 Terminal Block TB2

3 Terminal Block TB1

4 Securing Screw - Terminal Block

5 Stripped Lead

6 Typical Lead Being Connected To Terminal Block

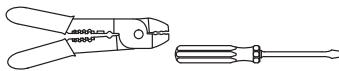
7 Access Hole - Used For Connections To Terminal Blocks, Flux Valve, etc.

👉 Install strain relief (customer supplied) in access hole.

Strip 1/4 in (6 mm) insulation off end of lead, insert end into proper location on TB1 and TB2. Tighten applicable securing screw.

Close and secure access door.

Ref. 265695-A / 267618-A



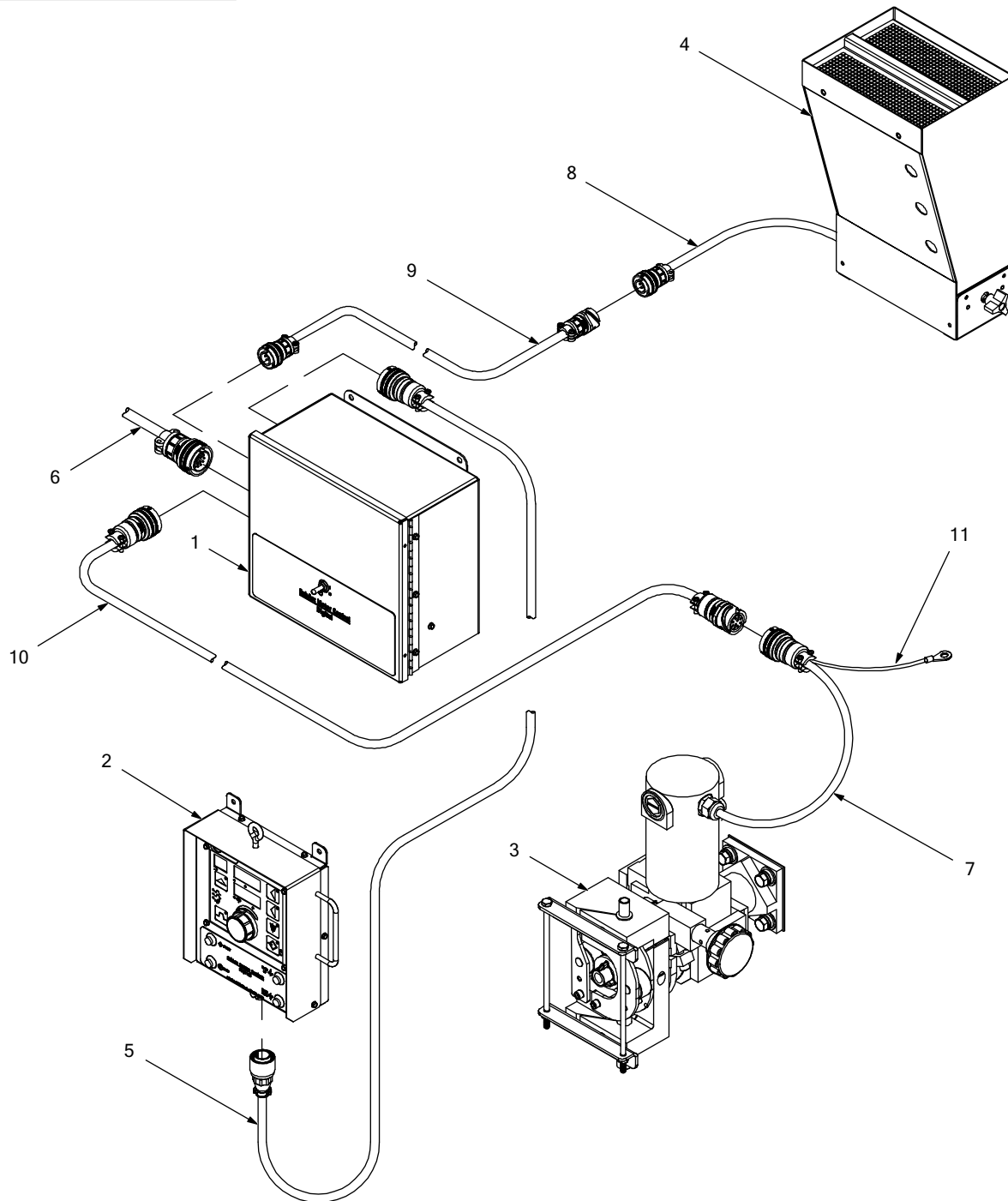
6-8. Terminal Block TB1 Connections For SubArc Motor Control Digital

Terminal	Function Information
Blank	Not used.
Blank	Not used.
SB1	Normally open set of contacts* that defaults close when power source contactor energizes after the start button is pressed and preflux has timed out. On digital models, this condition is programmable via auxiliary menus (see Section 7-7).
SB1 Common	Common used with Relay 1.
SB2	Normally open set of contacts* that close when an arc is established. These contacts are used when you want the side beam to start moving once an arc has been established. Contacts open again when the stop button is pressed. On digital models, this condition is programmable via auxiliary menus (see Section 7-7).
SB2 Common	Common used with Relay 2.
Remote UP	When connected to Common (on TB2), jogs wire up.
Remote Down	When connected to Common (on TB2), jogs wire down.
Remote Program Select 1	See Section 7-13.
Remote Program Select 2	See Section 7-13.
*All contacts are rated 10 amperes, 125 volts AC.	

6-9. Terminal Block TB2 Connections For SubArc Motor Control Digital

Terminal	Function Information
Blank	Not used.
Blank	Not used.
+24 volts Hot	24 VAC power supply.
24 volts AC Neutral	
VFB	Voltage feedback 1V/10V (Scaled feedback accuracy within $\pm 5\%$ of output. Feedback is for reference only.)
IFB	Current feedback 1A/100A (Scaled feedback accuracy within $\pm 5\%$ of output. Feedback is for reference only).
Coolant Flow*	Connect to coolant flow sensor. Coolant flow is detected when this pin is tied to Common.
Common	External common.
Remote Start	Starts the weld cycle when connected to Common
Remote Stop	Stops the weld cycle when connected to Common
*The Coolant Flow Sensor feature is only active when a Strip Drive 100 is connected to the interface.	

6-10. SubArc Motor Control Digital Plug Connections



278023-B

Motor shown without feed roller guard.

See section 6-10 for receptacle locations.

- 1 SubArc Motor Control Digital
- 2 SubArc Remote Control Digital
- 3 Wire Drive Assembly
- 4 Flux Hopper

The XXX part no. suffix refers to the cable length in feet (e.g. 020 suffix is a 20 ft extension cable).

- 5 Remote Pendant Control Cable - Part No. 263368XXX (Continuum Control Cable)
- 6 Power Source Control Cable Part No. 260622XXX
- 7 Motor Control Cable
- 8 Flux Hopper Control Cable

- 9 Flux Hopper Extension Cable Part No. 260623XXX

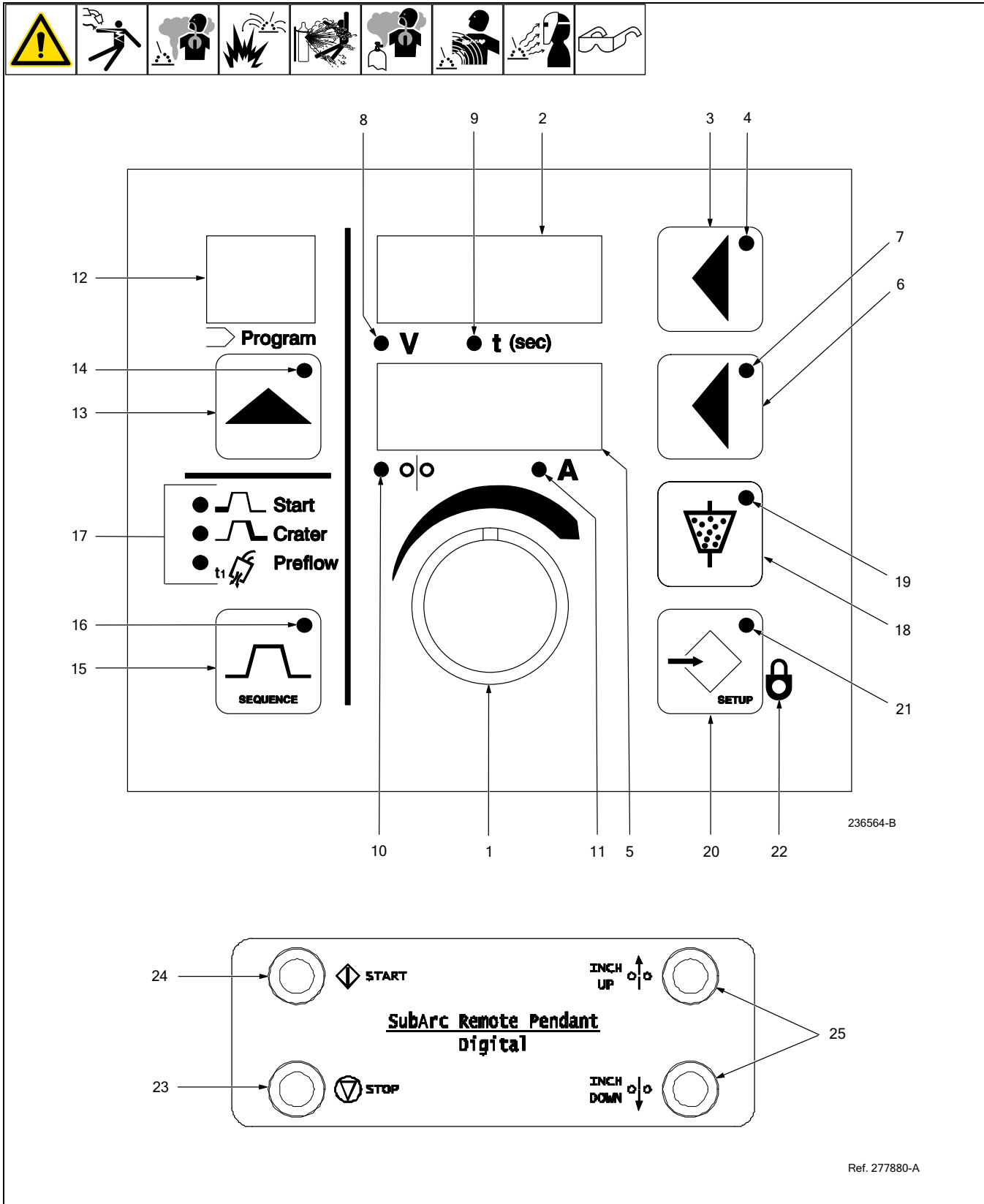
- 10 Motor Extension Cable - Part No. 254232XXX

- 11 Positive Volt Sense Lead

Connect positive volts sense leads to torch.

SECTION 7 – OPERATION

7-1. Weld Control Definitions



 When the system interface is turned on, it detects the type of power source and motor that are being connected.

 Power switch is located on the SubArc Motor Control Digital box. Turn switch ON to energize the control box. Turn switch OFF to shut down the controller.

1 Adjust Control

The adjust control is used to adjust various parameters. Refer to the definition for the function in question for information related to using the Adjust Control.

2 Upper Display

The upper display shows voltage or time. The unit displays both preset and actual arc voltage. When the unit is in a welding state, actual arc voltage is displayed. The upper display shows welding sequence time when the Time LED is illuminated.

3 Upper Display Push Button

Press and hold button to adjust or display weld time. Release button to display voltage.

4 Upper Display Push Button LED

The upper display push button LED illuminates to indicate that information displayed can be changed with the Adjust control.

5 Lower Display

The lower display shows wire feed speed or amperage.

6 Lower Display Push Button

Press button to choose between wire feed speed or amperage functions.

7 Lower Display Push Button LED

The lower display push button LED illuminates to indicate that information displayed can be changed with the Adjust control.

8 Volts LED

9 Time LED

10 Wire Feed Speed LED

11 Amps LED

The LEDs below each display illuminate to indicate.

12 Program Display

The number of the active program is displayed here.

13 Program Push Button

Press the Program push button to activate the program select feature. To change the program number, press the Program push button, or rotate the Adjust control.

14 Program Push Button LED

The LED lights to indicate the Program push button is active.

 For more information on setting sequence parameters See Section 7-2.

15 Sequence Push Button

The Sequence push button allows the selection of welding sequences. The default sequence is Weld and is active upon power up. Welding sequences other than Weld must be set prior to initiating the arc. When the unit enters a welding state, all sequence display modes are terminated and the weld display mode is activated.

16 Sequence Push Button LED

In the Weld sequence display mode, the sequence push button LED is off. When the Sequence push button is pressed, the LED flashes and continues to flash with subsequent button presses. The LED stops flashing and is off when the unit returns to the Weld sequence display mode.

17 Welding Sequence LEDs

Three welding sequence LEDs are located above the Sequence push button: Start, Crater, and Preflow/Postflow. The applicable LED illuminates to indicate the active welding sequence. The applicable LED will flash when changing the parameter.

18 Flux Push Button

Press the flux push button to open or close the flux valve.

19 Flux Push Button LED

When the Flux push button LED is lit, the flux valve control is open.

See Section 7-4 for more information on Setup Screens.

20 Setup Push Button

Press the Setup push button to activate the setup display mode. Subsequent button presses toggle through the setup screens.

21 Setup Push Button LED

The setup push button LED illuminates when the setup display mode is active.

22 Lock LED

The Lock LED illuminates when locks are active.

23 Stop Switch

Ends weld process.

24 Start Switch

Starts weld process.

25 Inch Up/Inch Down Push Buttons

These Inch or Jog switches are momentary push button switches, which energize only the drive motor, allowing for a cold wire jog. The welding wire jogs at the rate set by the Jog Speed control. To advance the wire out of the torch, press the Inch Down switch. To retract the wire into the torch, press the Inch Up switch.

- To set a sequence time, press the upper display push button repeatedly until time [t] is the active parameter. Use Adjust control to set desired time. To disable, set time to zero.
- The unit defaults to displaying welding voltage when a welding sequence display mode is first entered.

For CV Mode Only:

- At any time during welding, the Adjust control can be used to change the weld wire feed speed when the lower display push button LED is illuminated. Wire feed speed will show on the lower display. After approximately one second of inactivity, the lower display will revert to showing the previously viewed parameter.

For CV+C Mode Only:

- At any time during welding, the Adjust control can be used to change the weld amperage when the lower display push button LED is illuminated. Weld amperage will show in the lower display. After approximately one second of inactivity, the lower display will revert to showing the previously displayed parameter.

General Terms: The following is a list of terms and their definitions as they apply to this product.

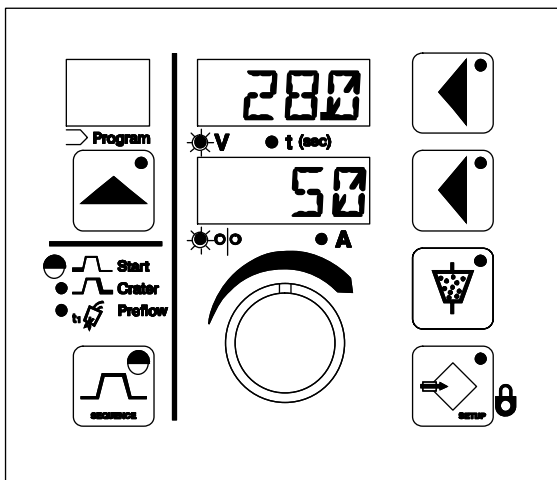
Sequence - A portion of the weld program, such as preflow, run-in, start, weld, crater, burnback, and postflow.

Weld Program - A group of sequences that make up a weld cycle.

7-2. Weld Sequence Displays



Start:



☉ = LED Flashing

☀ = LED On

CV mode – Start and Crater display wire feed speed in lower display.

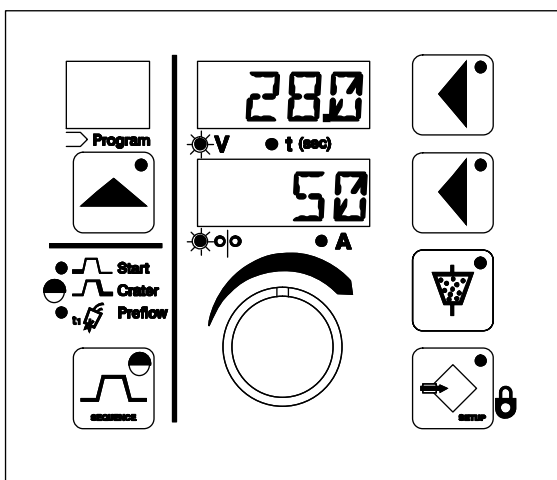
CV+C mode – Start and Crater display amps in lower display.

For all modes – When upper display push button LED is lit, use Adjust control to change corresponding display value. If the upper display push button LED is not lit and adjustments are desired, press the Upper Display push button to turn on the LED. Pressing the button again will toggle between voltage and time. The Volts or Time LED will illuminate to indicate which value is being displayed.

If the lower display push button LED is lit, use the Adjust control to change the value.

- Press Sequence push button, and the sequence push button LED and Start LEDs flash. In this condition, the unit is in the Start sequence display mode, and Start sequence parameters are shown in the displays.

Crater:



- Press Sequence push button a second time, and the sequence push button LED and the Crater sequence LED flash. In this condition, the unit is in the Crater sequence display mode and the Crater sequence parameters are shown in the displays.

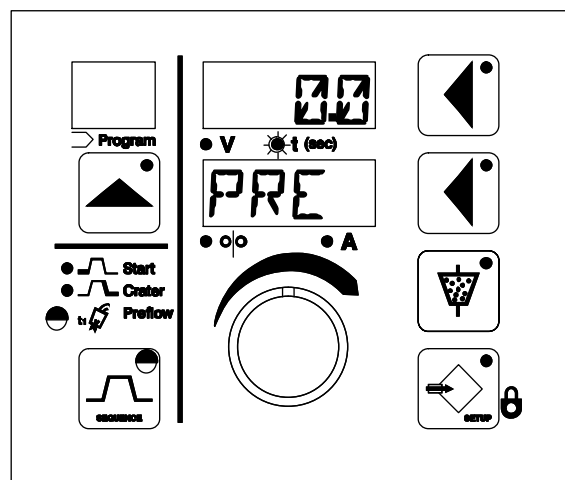
- Press Sequence push button a third time, and the sequence push button LED and the Prewflow/Postflow sequence LED flash.

- Press the lower display button to select between preflow and postflow.

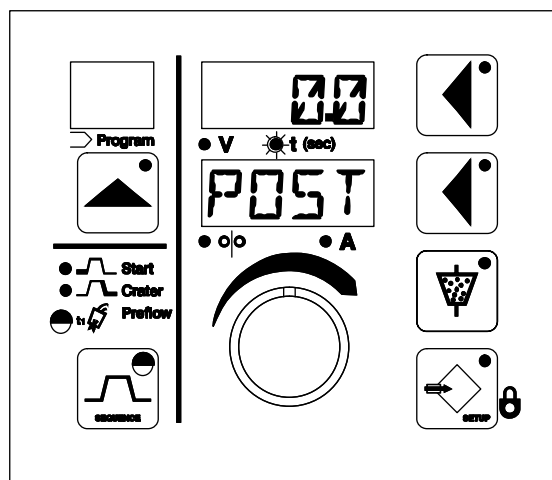
- In the Prewflow display mode, the upper display shows the preflow time and PRE is shown in the lower display. To change the preflow time, press the upper display button and turn the Adjust control.

- In Postflow display mode, the upper display shows the postflow time and POST is shown in the lower display. To change the postflow time, press the upper display button and turn the Adjust control.

PreFlow:



PostFlow:



7-3. Weld Sequence Parameters In A Program

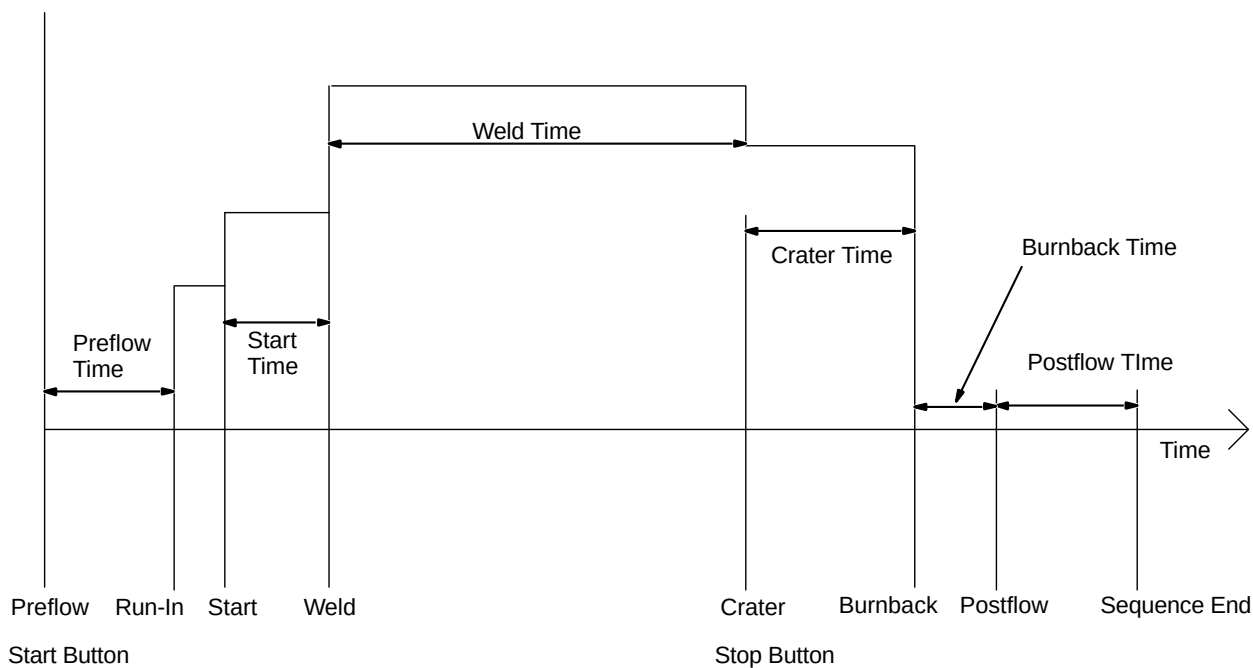


☞ For more information on Sequence push buttons, see Section 7-2.

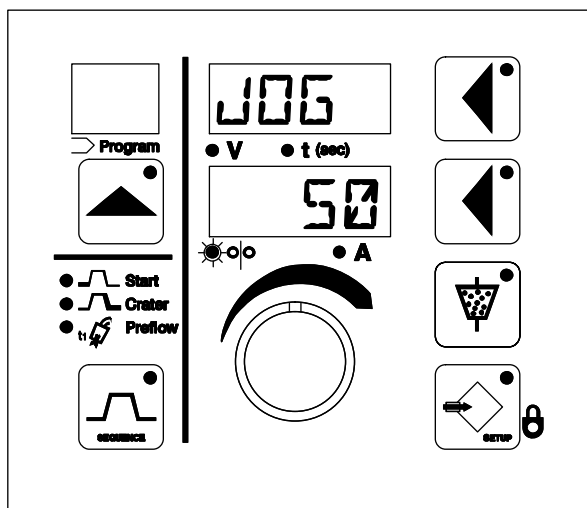
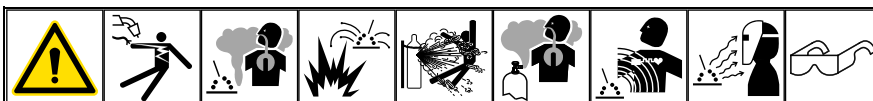
If time is set to zero in Weld Sequence, welding continues until stop button is pressed.

If time is set to zero in any timed sequence except Weld, the sequence is skipped.

Sequence	Parameters			
	Volts (CV or CV+C)	Amps (CV+C)	Wirespeed (CV)	Seconds
1. Preflow				0.0-10.0
2. Run-In			X	
3. Start	X	X	X	0.00-10.00
4. Weld	X	X	X	0.0-600.0
5. Crater	X	X	X	0.00-10.00
6. Burnback	X	X	X	0.00-10.00
7. Postflow				0.0-10.0



7-4. Setup Screens



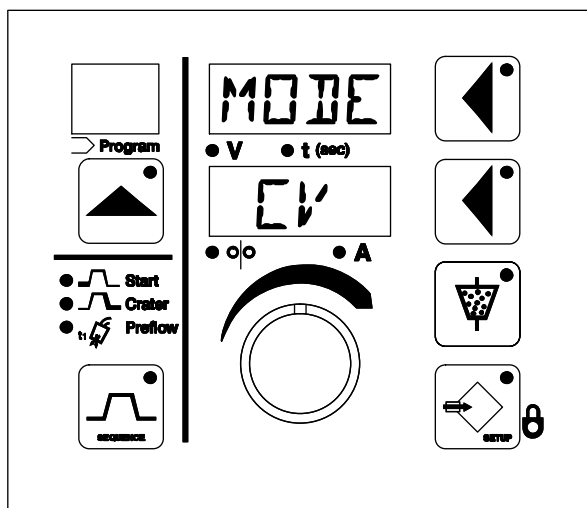
● = LED Flashing

☀ = LED On

☞ Press the setup push button to enter the setup screens. If the parameter is program specific, the active program is displayed in the program display. The active program can be changed by pressing the Program push button and then selecting the desired program with the Adjust control.

● Jog

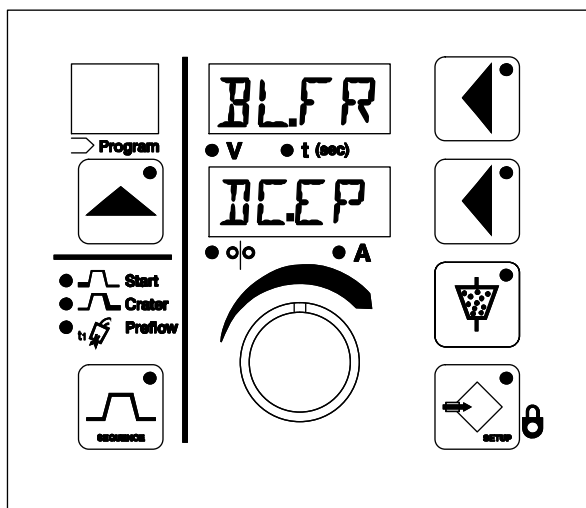
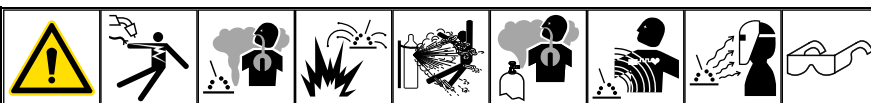
The jog speed selection, indicated by JOG in the upper display, can be changed by turning the Adjust control. The jog wire feed speed setting is the same for all programs. The jog wire feed speed may also be adjusted while the Inch Up or Inch Down button are pressed.



● Mode

Welding mode, indicated by MODE in the upper display, is set to CV for constant voltage or CV+C for constant voltage plus current, indicated in the lower display. Use the Adjust control to change the mode when the lower display push button LED is lit. This setting is program specific.

7-5. Setup Screens (Continued)



● = LED Flashing

☀ = LED On

☞ Press the setup push button to enter the setup screens. If the parameter is program specific, the active program is displayed in the program display. The active program can be changed by pressing the Program push button and then selecting the desired program with the Adjust control.

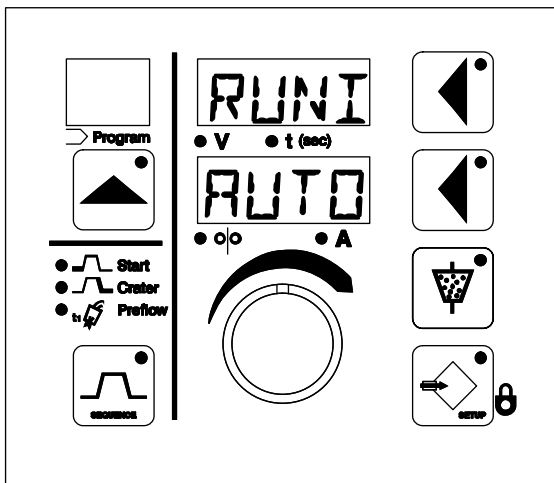
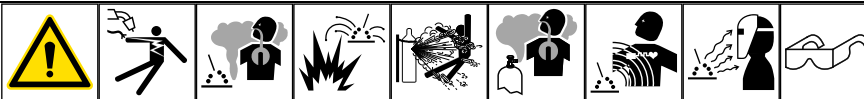
● Balance (AC Units Only)

Balance selection, indicated by BL.FR in the upper display, adjusts the AC balance and frequency, shown on the lower display. The first two digits indicate the positive balance value followed by a decimal point. The two digits after the decimal point indicate frequency. The balance and frequency are dependent on one another, and cannot be individually adjusted. Use the Adjust control to change this parameter when the lower display push button LED is lit. This setting is program specific (see Table 7-1 for a list of available balances and frequency).

Table 7-1. Balance/Frequency

Balance %Positive / %Negative	Display	
	60 Hz Line Input (US)	50 Hz Line Input (EU)
100/0	DC.EP	DC.EP
80/20	80.18	80.15
75/25	75.23	75.19
70/30	70.18	70.15
67/33	67.30	67.25
60/40	60.18	60.15
50/50	50.30	50.25
50/50	50.18	50.15
40/60	40.18	40.15
33/67	33.30	33.25
30/70	30.18	30.15
25/75	25.23	25.19
20/80	20.18	20.15
0/100	DC.EN	DC.EN

7-6. Setup Screens (Continued)



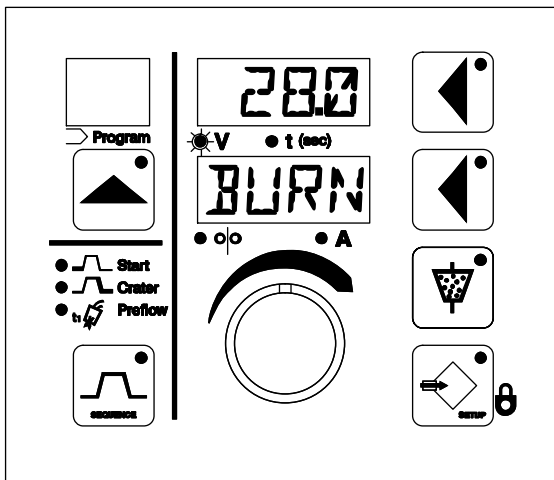
● = LED Flashing

☀ = LED On

☞ Press the setup push button to enter the setup screens. If the parameter is program specific, the active program is displayed in the program display. The active program can be changed by pressing the Program push button and then selecting the desired program with the Adjust control.

● Run-In

The run-in selection, indicated by RUNI in the upper display, is set to automatic, off, or manual run-in wire speed. The lower display shows AUTO to indicate that automatic run-in is active. The Adjust control can be used to change the setting from AUTO to a run-in speed setting. If a start condition is set, run-in is a percentage of the start wire speed. Otherwise, run-in is a percentage of the weld wire speed. This setting is program specific.

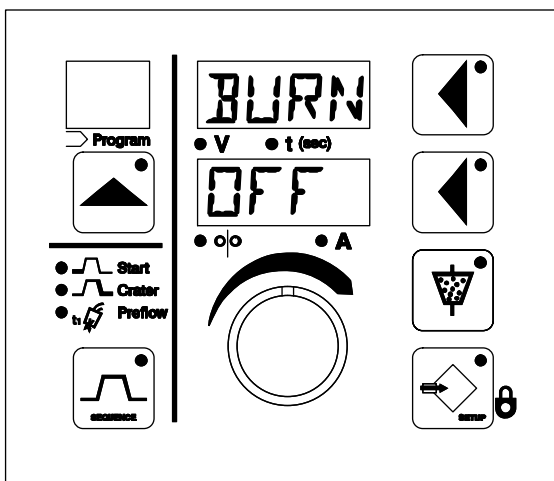


● Burnback

Burnback voltage and time are specified when the lower display shows BURN and the upper display shows voltage or time. The Adjust control is used to set the desired burnback voltage or time.

Burnback retract wire speed is specified when the upper display shows BURN and the lower display shows the setting. Burnback may be set to OFF with the lower display push button or changed with the Adjust control.

These settings are program specific.



7-7. Auxiliary Menus Screens



An auxiliary menu is provided when both the Sequence and Setup buttons are pressed simultaneously. The Setup and Sequence button LEDs flash when in the auxiliary menu. Press the Setup button to scroll forward or press the Sequence button to scroll backwards through the auxiliary menu.

To exit auxiliary menu, press Sequence and Setup simultaneously or press inch up or inch down button.

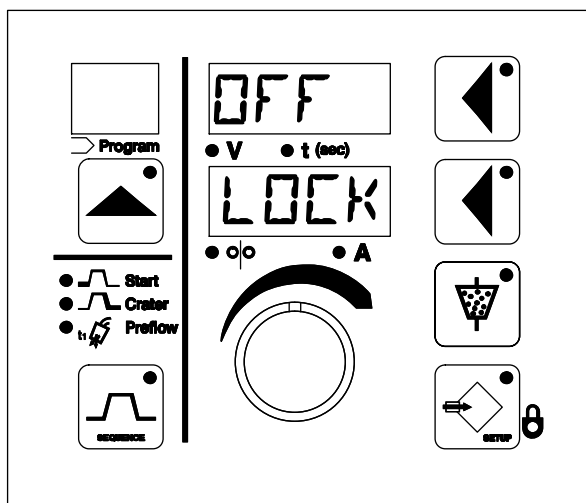
= LED Flashing

= LED On

Locks

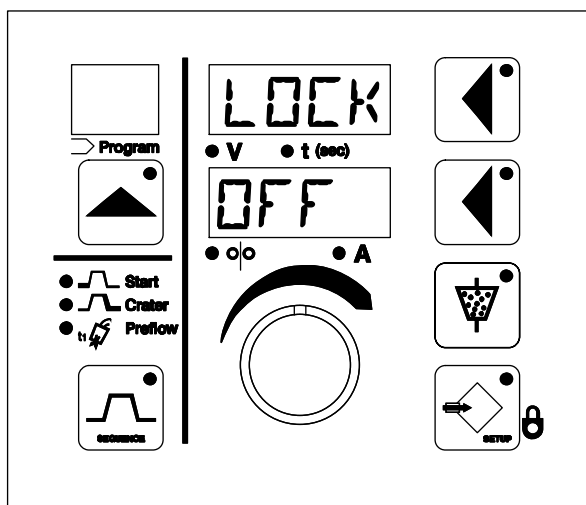
If locks are active, only locked programs are accessible and the lock LED will be on. To quickly disable the locks for all programs, press the upper and lower display push buttons at the same time.

All locks are program dependent and independent of each other. A different value can be set for each lock for each program.



● Voltage Range Lock

Voltage range lock is active when LOCK is shown in the lower display and the Volts LED is lit. The voltage range lock is off by default and is confirmed by OFF being shown in the upper display. To set a voltage variance between 0 to 10 volts from preset voltage, press the upper display button and rotate the adjust control to the desired voltage. The voltage range lock is program dependent and independent from the wire feed speed and amperage locks. A different voltage variance may be set for each program.



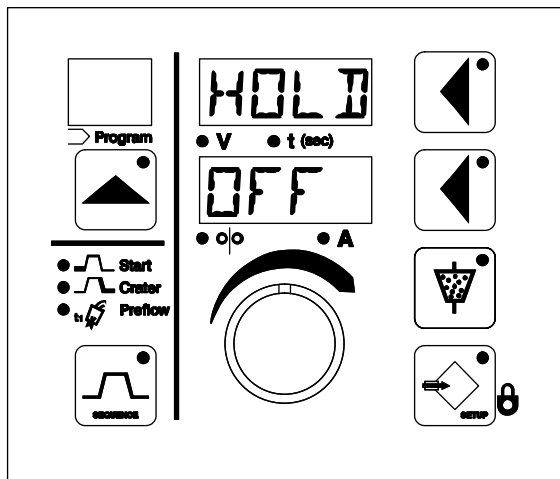
● Amperage Range Lock (For CV+C Mode Only)

The amperage range lock is indicated by LOCK in the upper display. The amperage range lock is off by default and OFF is shown in the lower display. To set an amperage variance of 0 to 250 amperes from the preset amperage, press the lower display button to illuminate the lower display button LED then turn the Adjust control until the desired amperage variance is set. The Amps LED will illuminate once the parameter is changed from off to a value.

● Wire Feed Speed Range Lock (For CV Mode Only)

The wire feed speed range lock is indicated by LOCK in the upper display. The wire feed speed range lock is off by default and OFF is shown in the lower display. To set a wire feed speed variance between 0 to 250 ipm (0 to 6.3 mpm) from the preset wire feed speed, press the lower display button to illuminate the lower display button LED then turn the adjust control until the desired wire feed speed variance is set. The Wire Speed LED will illuminate once the parameter is changed from off to a value.

7-8. Auxiliary Menus Screens (Continued)



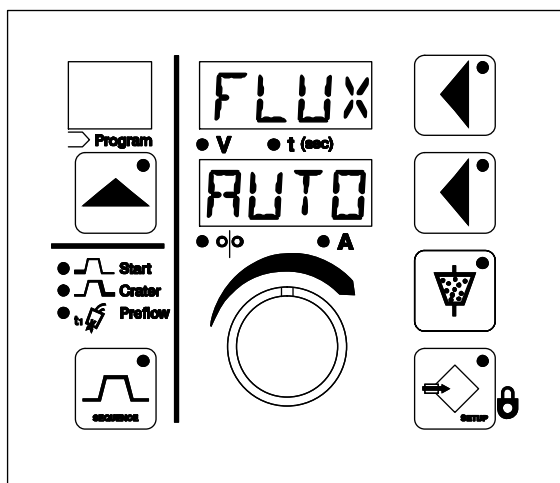
● = LED Flashing

● = LED On

● Lock Hold

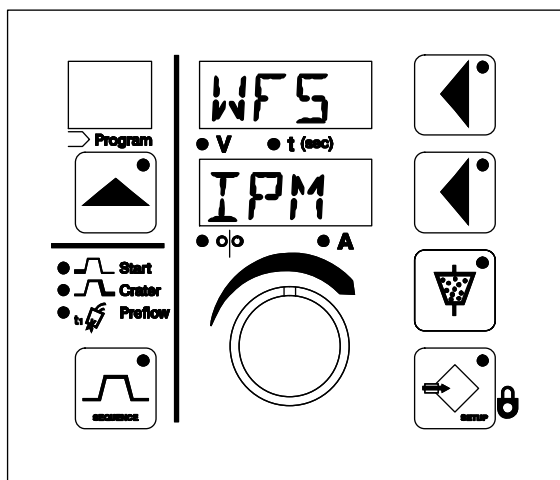
Lock Hold is indicated by HOLD in the upper display. Lock Hold is set to off by default and OFF is shown in the lower display. If Lock Hold is desired, press the lower display push button to illuminate the lower display push button LED then rotate the adjust control to change the setting to ON.

The Lock Hold feature only works when locks are active and provides the user with the ability to adjust voltage, amperage, or wire feed speed within set limits while welding. When welding stops, voltage, amperage, or wire feed speed adjusted while welding reverts back to the values preset prior to the weld start. If the Lock Hold feature is turned off, adjustments made to the preset values while welding become the new preset values when welding stops.



● Flux Valve Control

Flux valve control, indicated by FLUX in the upper display, is set to AUTO for automatic control or MAN for manual control. Setting the Flux valve control to AUTO energizes the flux hopper when the Start button is pressed and de-energizes the flux hopper when the last sequence is finished. The flux valve control can be overridden by using the flux button. Setting the flux valve control to MAN requires the user to close and open the flux valve relay with the flux button.

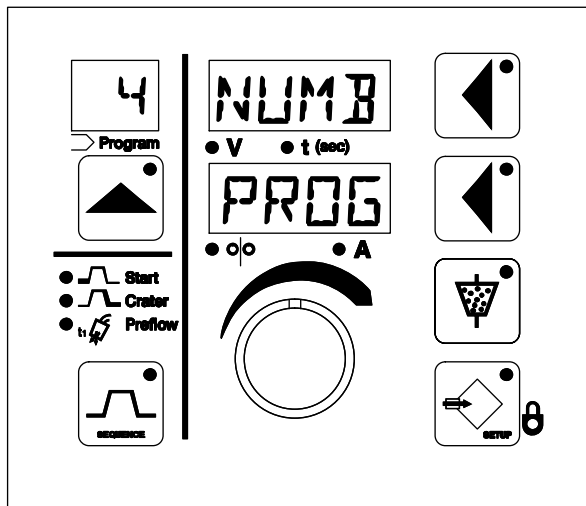


● Wire Feed Speed Setting

Wire feed speed setting, indicated by WFS in the upper display, can be set to IPM (inches per minute) or MPM (meters per minute). This setting is independent of the program selected.

In the Tractor Interface Digital the wire feed speed setting changes the tractor travel speed units.

7-9. Auxiliary Menu Screens (Continued)

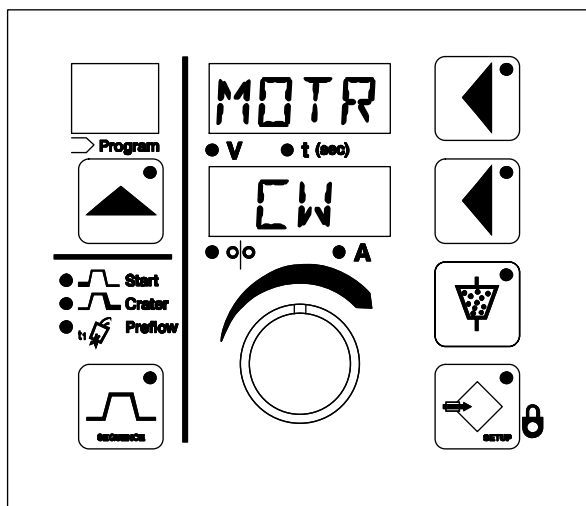


● = LED Flashing

● = LED On

● Number of Programs

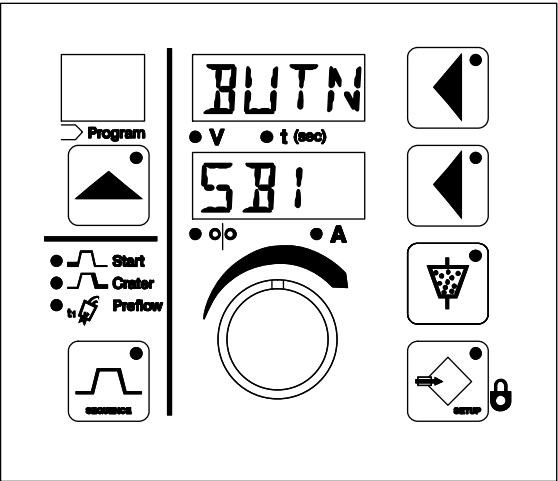
The number of programs is indicated by NUMB in the upper display and PROG in the lower display. The number of user allowed programs (1 through 15) is shown in the program display. Use the adjust control to change the maximum number of programs that can be accessed.



● Wire Drive Motor Rotation

The motor rotation is indicated by MOTR in the upper display and CW or CCW in the lower display. Changing between CW and CCW changes the rotation of the motor.

7-10. Auxiliary Menus Screens (Continued)



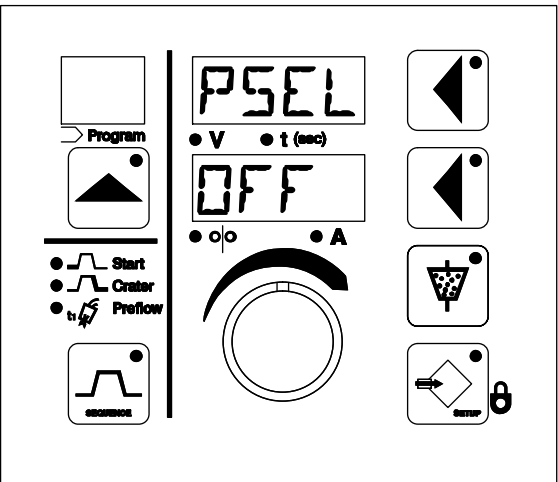
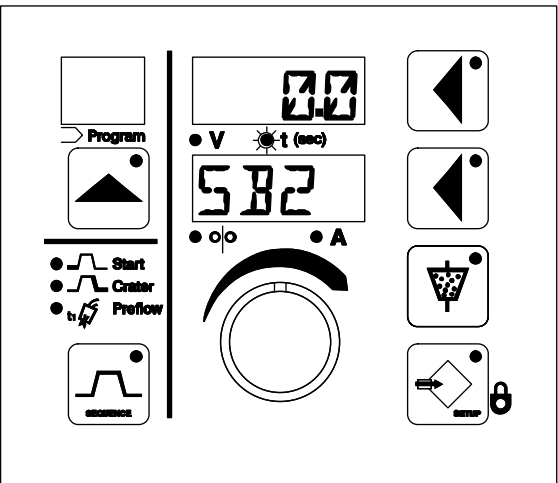
● = LED Flashing

● = LED On

● Motion Control

Motion control is indicated by SB1 or SB2 in the lower display and is used to set when the side beam relay engages. When "BUTN" is shown in the upper display, the side beam relay will engage when the start button is pressed and preflux has timed out. When a positive time is selected, the side beam relay will engage when the selected time has elapsed after an arc is established. When a negative time is selected, the side beam relay will engage when the start button is pressed, but the weld sequence will not start until the selected time has elapsed.

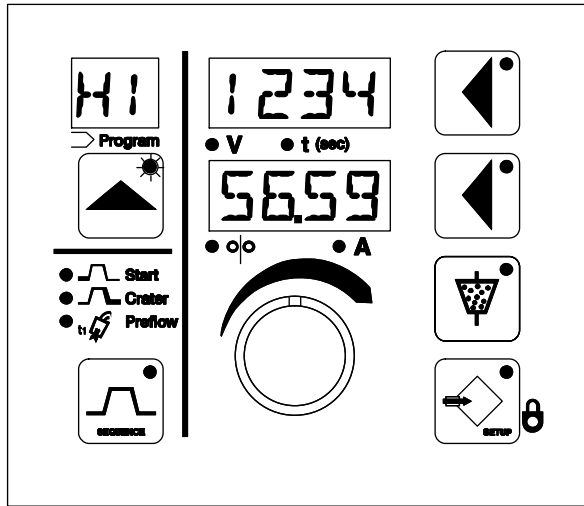
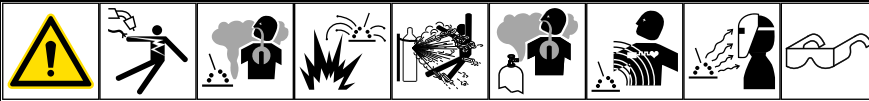
SB1 - For SubArc Tractor Interface Digital - Controls the tractor start of motion.



● Remote Program Select

Remote program select is indicated by PSEL in the upper display. Use adjust control to select ON or OFF. (See section 7-13 Remote Program Select for more information.)

7-11. Auxiliary Menu Screens (Continued)

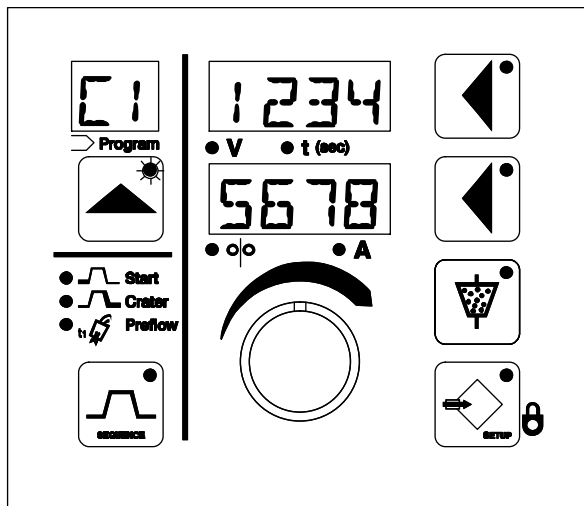


☉ = LED Flashing

☀ = LED On

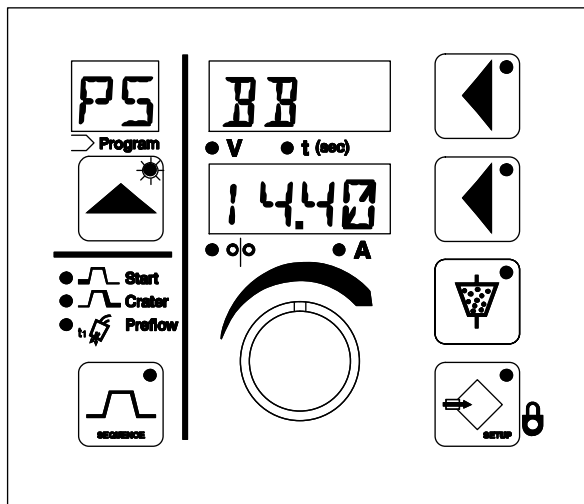
● = Arc Time

When H1 is shown in the program display, the total number of arc hours is shown in the lower display, wrapping to the upper display. The total number of arc hours cannot be reset. When H2 is shown in the program display, the resettable number of arc hours is shown in the lower display, wrapping to the upper display. The resettable number of arc hours is reset by pressing both the upper and lower display buttons at the same time. The number following the decimal point in the lower display shows the number of minutes. Switch between H1 and H2 by using the Adjust control.



● = Cycles

When C1 is shown in the program display, the total number of arc cycles is shown in the lower display, wrapping to the upper display. The total number of cycles cannot be reset. When "C2" is shown in the program display, the resettable number of arc cycles is shown in the lower display, wrapping to the upper display. The resettable number of arc cycles is reset by pressing both the upper and lower display buttons at the same time. Switch between C1 and C2 by using the Adjust control.



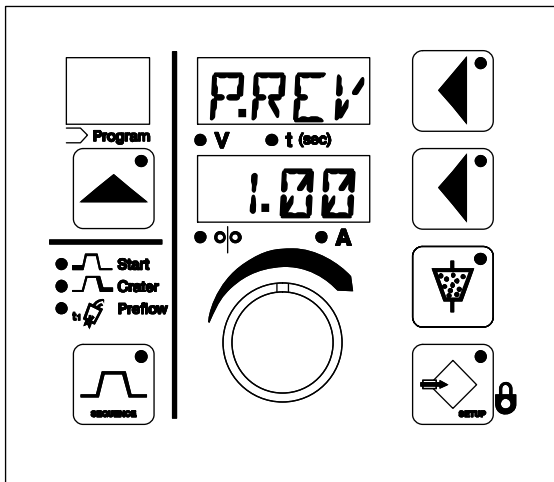
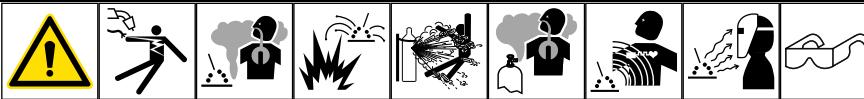
● = Power Source Selection

(14-Pin To SubArc Digital Converter Only)

☞ (see 14-Pin To SubArc Digital Converter owner's manual).

When PS is shown in the program selection window, you can cycle through the list of compatible power sources by rotating the turn knob. The format for compatible power sources is either listed in a **product/model** format, such as **DIM/650** (Dimension 650) **OR** as a **product/voltage range** format such as **BB/14.40** (Big Blue 14 to 40 volts). Only the Big Blue product line follows the **product/voltage range** format.

7-12. Auxiliary Menus Screens (Continued)



● = LED Flashing

☀ = LED On

● Software Revision Level

When P.REV is shown in the upper display, the process control board revision level is shown in the lower display.

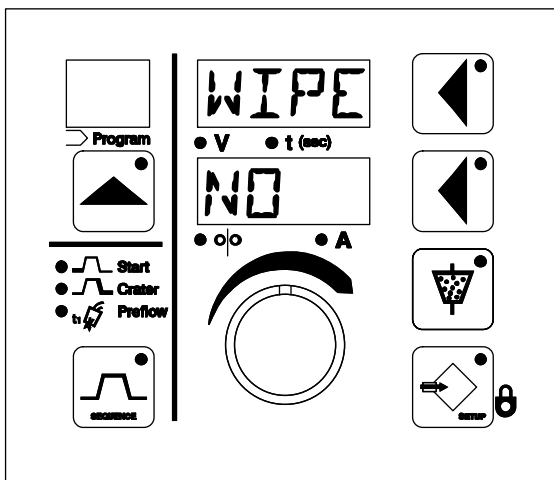
When C.REV is shown in the upper display, the conversion box control board revision level is shown in the lower display.

When D.REV is shown in the upper display, the display board or tractor board revision level is shown in the lower display.

When M.REV is shown in the upper display, the motor control board revision level is shown in the lower display.

When A.REV revision is shown in the upper display, the automation board revision level is shown in the lower display.

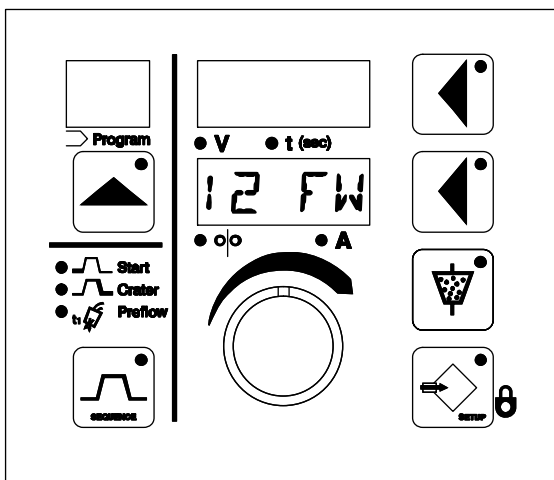
Switch between board revisions by using the Adjust control.



● Reset To Factory Settings

To access the reset menu and reset to factory default settings, proceed as follows: simultaneously press the Program, Sequence, Upper Display, and Setup buttons. WIPE is displayed on the upper display and NO is displayed on the lower display. The lower display button LED is also lit. Turn adjust control or push lower display button to change lower display from NO to YES. Simultaneously press the Program, Sequence, Upper Display, and Setup buttons again. All parameters except the arc time and cycle count are now reset to factory default settings.

If a reset is not desired, turn the adjust control until the lower display shows NO and simultaneously press the Program, Sequence, Upper Display, and Setup buttons.



● Prewflow/Side Beam/Wire Feed Timeout

When the Start button is pressed to initiate a weld, the lower display displays up to four specific characters.

- 1 – Indicates SB1 has been energized
- 2 – Indicates SB2 has been energized
- F – Indicates the flux valve has been activated
- W – Indicates that the motor has begun to feed wire (Run In)

The characters will display at different times, depending on if there is a preflow time set or if there is a negative time set in the SB menu.

The top display will count down from the longest preset time, or will display all zeros (0.0).

7-13. Remote Program Select For SubArc Motor Control Digital

 There are two methods to remotely change programs.

Method 1

Remote Program Select 1

In the auxiliary menu, turn Remote Program Select Off (see Section 7-10, Remote Program Select).

Connecting Terminal Block TB1 Remote Program Select 1 (see Section 6-8) to Terminal Block TB2 Common (see Section 6-9) will increment the program. Once the last program is reached, connecting Terminal Block TB1 Remote Program to Terminal Block TB1 Remote Common will change the program to the first program.

Example - If the number of programs is set to 4 (see Section 7-9, Number Of Programs) and locks are disabled, then repeatedly connecting and disconnecting Terminal Block TB1 Remote Program Select 1 to Terminal Block TB2 Common will change the programs in the following way:

Program1 ->Program 2 ->Program 3 ->Program 4 -> Program1

Remote Program Select 2

In the auxiliary menu, turn Remote Program select Off (see Section 7-10, Remote Program Select).

Connecting Terminal Block TB1 Remote Program Select 2 (see Section 6-8) to Terminal Block TB2 Common (see Section 6-9) will decrement the program. Once the first program is reached, connecting Terminal block TB1 Remote Program Select 2 to Terminal Block TB2 Common will change the program to the last program.

Example - If the number of programs is set to 4 (see Section 7-9, Number Of Programs) and locks are disabled, then repeatedly connecting and disconnecting Terminal Block TB1 Remote Program Select 2 to Terminal Block TB2 Common will change the programs in the following way:

Program 4> Program 3> Program 2> Program 1> Program 4.

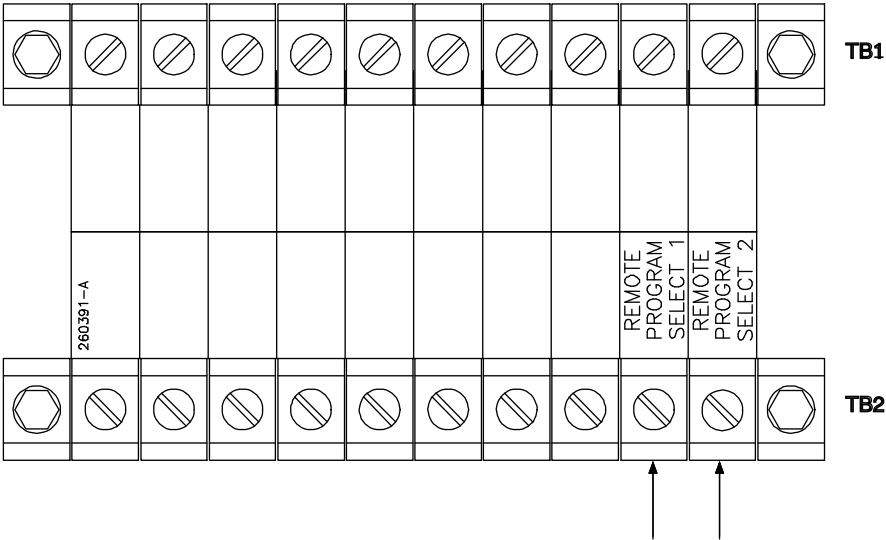
If locks are enabled, (see Section 7-7, Locks) Voltage Range Lock or Amperage Range Lock or Wire Feed Speed Range Lock) then the program will be incremented to the next locked program.

Method 2

In the auxiliary menu, turn remote program select on (see Section 7-10, Remote Program Select). Then one of 4 programs can be selected by connecting to the Remote Program Select Pins to common as shown in the following table.

Program Selected	Remote Program Select 1	Remote Program Select 2
Program 1	Not Connected	Not Connected
Program 2	Connected	Not Connected
Program 3	Not Connected	Connected
Program 4	Connected	Connected

 If locks are enabled (see Section 7-7 Locks) and an unlocked program is selected, a program select error is displayed until a locked program is selected or the remote program select feature is turned off. If method two is used, method 2 will automatically disable method 1.

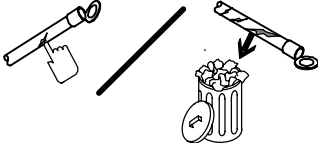
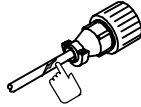
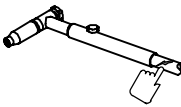
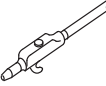


Ref. 267618-A

Terminal Strip

SECTION 8 – MAINTENANCE AND TROUBLESHOOTING

8-1. Routine Maintenance

   				
 Disconnect power before maintaining.				
 <i>Maintain more often during severe conditions.</i>				
	✓ = Check	◇ = Change	○ = Clean	☆ = Replace
Every 3 Months	 			
	✓ ☆ Labels			
	    			
	✓ ☆ Cables And Cords			
Every 6 Months				
	○ During heavy service, clean monthly.			

8-2. Troubleshooting Table

   	
Trouble	Remedy
Unit is completely inoperative.	Check 24 VAC input power and be sure it is energized.
Wire does not feed during jogging.	Place Power Switch S1 in On position.
	Check 24 volts AC input power and be sure it is energized.
	Jog Speed Control set too low; increase Jog Speed setting (see Section 7-4).
	Check wire feed motor, and repair or replace if necessary.
	Check Inch Up push buttons PB3 and Inch Down push button PB4, and replace if necessary (see Parts Manual).
	Have Factory Authorized Service Agent check control board PC1, and replace if necessary.
Wire feeds wrong direction during jogging.	Change wire drive motor rotation setting in the Auxiliary Menu (see Section 7-9).
Wire only feeds down whether Inch Down or Up button is pressed.	Have Factory Authorized Service Agent check control board PC1, and replace if necessary.
Wire does not feed after Start button is pressed (ensure that all wire feed jogging functions are operating properly before checking this problem).	Check Start switch PB1, and replace if necessary.
No wire feed speed control with Wire Speed control during welding. Wire speed remains at the Run-In Wire Speed setting.	Wire feed speed cannot be directly controlled in CV+C mode.
	Verify volt sense leads are properly connected.
	Have Factory Authorized Service Agent check control board PC1, and replace if necessary.
Erratic weld and no control of output.	Check remote voltage sense lead polarity.

8-3. Help Codes

A. SubArc System

 *HELP will display in the upper display, and the code number will display in the lower display.*

 *Each flash sequence will be followed by a one second pause. The sequence will then repeat.*

SubArc Help Code	SubArc Power Source Status/Trouble Light	Fault	Description
03	3 Slow (flashes)	See 30	
04	4 Slow	See 40	
05	5 Slow	Primary Circuit Over Temperature	Indicates unit has overheated. Unit has shutdown to allow fans to lower temperature. Operation will continue after unit is within normal temperature range.
06	6 Slow	See 60	
26	2 Quick, 6 Slow	Button Stuck On System Interface Motor Control	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.
30	3 Quick	Stuck Contactor On Power Source	Indicates stuck contactor on (Output On switch) the power source. Fault will clear when panel switch is set to remote or contactor is released.
32	3 Quick, 2 Slow	Coolant Flow Error	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.
40	4 Quick	Tach Error	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.
42	4 Quick, 2 Slow	Motor Error	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.
44	4 Quick, 4 Slow	Motor Low Bus	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.
45	4 Quick, 5 Slow	Button Stuck On Display Or Tractor Error	Indicates button is stuck on the digital interface upon power up. Fault will clear when button is released. OR A tractor error is present. The Tractor Speed Display will contain an additional help code indication. Refer to section 8-3-B for more details in specific tractor help codes.
48	4 Quick, 8 Slow	Trigger Fault	Indicates an arc was not established with the specified time (lesser of 8 seconds or 4 inches).
56	5 Quick, 6 Slow	Modbus Control Fault	Indicates PLC is enabling weld output, flux, or wire jog on initial communication. Clear all control bits of MODBUS 101 to reset.
60	6 Quick	Memory Card Fault	Indicates unable to read memory card. Faulty memory card or wrong format.
61	6 Quick, 1 Slow	File Read Error	Indicates faulty file on memory card.
62	6 Quick, 2 Slow	File Write Error	Indicates full or faulty memory card.
63	6 Quick, 3 Slow	Invalid File	Indicates an invalid file on memory card. The system was able to read the file; however, the contents of the file were invalid. Remove card or press any button to clear error.

64	6 Quick, 4 Slow	Memory Card Locked	Indicates a save was attempted to a locked card. This refers to the physical switch on the memory card. Unlock the memory card and try again. Try a different memory card. Remove card or press any button to clear error. If this code continues to appear on the display, contact the nearest Factory Authorized Service Agent.
65	6 Quick, 5 Slow	Read Only File	Indicates a save was attempted to a file that has been marked read-only. Check with the appropriate person to see if the attributes are read only for a reason (the attributes can be altered using a PC). Use a different card. Remove card or press any button to clear error.
66	6 Quick, 6 Slow	No Memory Card Detected	Indicates no memory card detected when a memory card operation was attempted. Insert a card or press any button to clear error. Try a different memory card. If this code continues to appear on the display, contact the nearest Factory Authorized Service Agent.
67	6 Quick, 7 Slow	Unsupported Memory Card Format	Indicates the file system is not supported. Memory card side is too small.
71	7 Quick, 1 Slow	Invalid Model Type	If paralleling units, firmware in controlling power source does not match firmware in the following power source. Update firmware in both machines to the latest revision. If code continues to display, contact nearest Factory Authorized Service Agent.
72	7 Quick, 2 Slow	Invalid Motor Type	Indicates resistor is missing or improperly installed in motor cable. Make sure the motor being used is support by this system (see Section 4-6). Check motor to system interface control cable connection and tighten if necessary. If this code continues to appear on the display, contact the nearest Factory Authorized Service Agent.
73	7 Quick, 3 Slow	Program Select Error	Indicates an invalid program has been selected using the program select inputs on the terminal strip. The program select is not available because locks are enabled. This error will only occur with program select mode enabled.
92	9 Quick, 2 Slow	Parallel Communication Loss	On trail unit – indicates communication cannot be established with lead unit. On lead unit – indicates communication was lost during welding.
93	9 Quick, 3 Slow	PLC Communication Loss	Indicates communication with PLC was lost during welding.
94	9 Quick, 4 Slow	Automation Interface Communication Loss	Indicates communication with Automation Interface was lost during welding.
95	9 Quick, 5 Slow	Serial Communication Loss	Indicates that the Process Control board lost communication with the Motor Control board in the SubArc interface.
97	9 Quick, 7 slow	Primary Communication Lost	Power source process control board cannot communicate with the output controller. Power cycle unit. If problem persists, contact the nearest Factory Authorized Service Agent.
98	9 Quick, 8 Slow	Serial Communication Loss	Indicates serial communication was initially made and is now malfunctioning. Check SubArc interface/power source control cable connection and tighten if necessary. May appear normally during firmware updates. If this code continues to appear on the display, contact the nearest Factory Authorized Service Agent.
99	9 Quick, 9 Slow	Serial Communication Malfunction	Indicates serial communication is malfunctioning. Check SubArc interface/power source control cable connection and tighten if necessary. May appear normally during firmware updates. If this code continues to appear on the display, contact the nearest Factory Authorized Service Agent.

SECTION 9 – ELECTRICAL DIAGRAMS

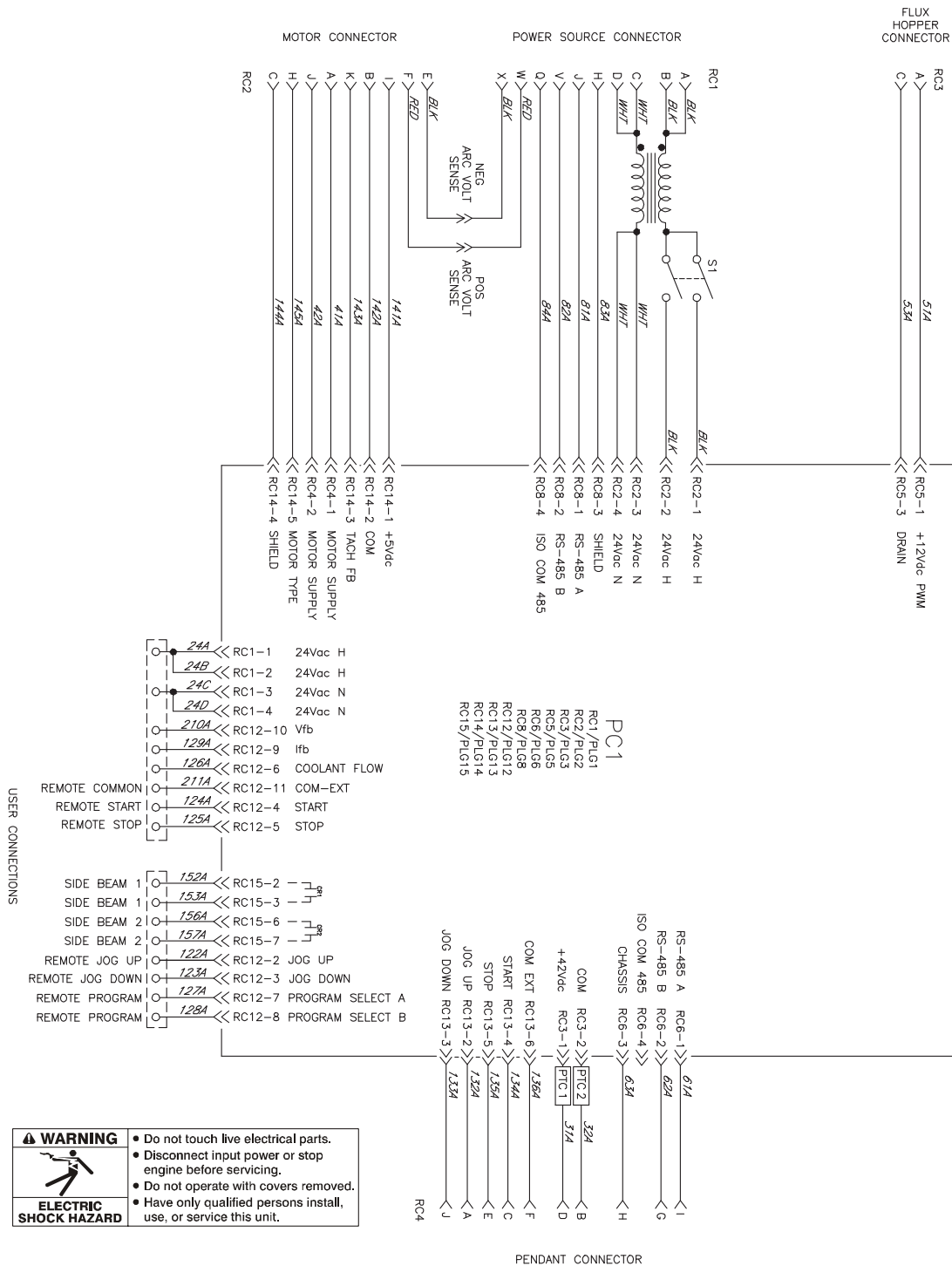
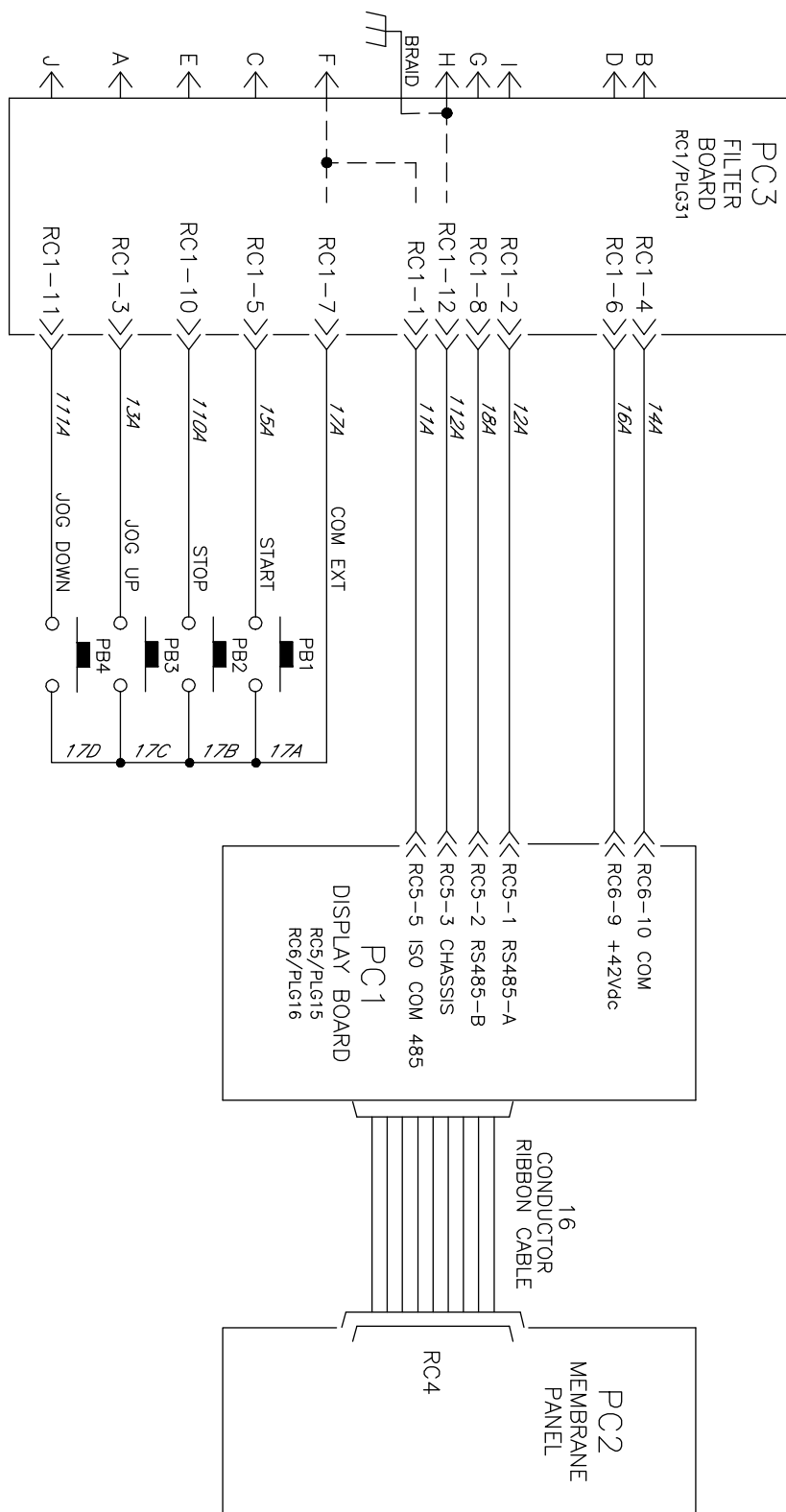


Figure 9-1. Circuit Diagram For SubArc Motor Control Digital



	⚠ 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.
ELECTRIC SHOCK HAZARD	

277431-A

Figure 9-2. Circuit Diagram For SubArc Remote Pendant Digital

Notes

Notes



Effective January 1, 2023 (Equipment with a serial number preface of ND or newer)

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

LIMITED WARRANTY - Subject to the terms and conditions below, Miller Electric Mfg. LLC, Appleton, Wisconsin, warrants to authorized distributors 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. Notifications submitted as online warranty claims must provide detailed descriptions of the fault and troubleshooting steps taken to diagnose failed parts. Warranty claims that lack the required information as defined in the Miller Service Operation Guide (SOG) may be denied by Miller.

Miller shall honor warranty claims on warranted equipment listed below in the event of a defect within the warranty coverage time periods listed below. Warranty time periods start on the delivery date of the equipment to the end-user purchaser, or 12 months after the equipment is shipped to a US or Canada distributor, or 18 months after the equipment is shipped to an international distributor, whichever occurs first.

1 5 Years Parts — 3 Years Labor

- Original Main Power Rectifiers Only to Include SCRs, Diodes, and Discrete Rectifier Modules in non-inverter products

2 4 Years Parts (No Labor)

- Auto-Darkening ClearLight 2.0 Helmet Lenses

3 3 Years — Parts and Labor Unless Specified

- Auto-Darkening Helmet Lenses (No Labor)
- Engine Driven Welder/Generators (Including EnPak) **(NOTE: Engines are Warranted Separately by the Engine Manufacturer.)**
- Insight Welding Intelligence Products (Except External Sensors)
- Inverter Power Sources
- Plasma Arc Cutting Power Sources
- Process Controllers
- Semi-Automatic and Automatic Wire Feeders
- Transformer/Rectifier Power Sources

4 2 Years — Parts and Labor

- Auto-Darkening Weld Masks (No Labor)
- Fume Extractors - Filtair 215, Capture 5, and Industrial Collector Series

5 1 Year — Parts and Labor Unless Specified

- ArcReach Heater
- AugmentedArc, LiveArc, and MobileArc Welding Systems
- Automatic Motion Devices
- Bernard BTB Air-Cooled MIG Guns (No Labor)

- CoolBelt, PAPR Blower, and PAPR Face Shield (No Labor)
- Desiccant Air Dryer System
- Field Options **(NOTE: Field options are covered for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)**
- RFCS Foot Controls (Except RFCS-RJ45)
- Fume Extractors - Filtair 130, MWX and SWX Series, ZoneFlow Extraction Arms and Motor Control Box
- HF Units
- ICE/XT Plasma Cutting Torches (No Labor)
- Induction Heating Power Sources, Coolers **(NOTE: Digital Recorders are Warranted Separately by the Manufacturer.)**
- Insight Sensors
- Load Banks
- Motor-Driven Guns (except Spoolmate Spoolguns)
- Positioners and Controllers
- Racks (For Housing Multiple Power Sources)
- Running Gear/Trailers
- Subarc Wire Drive Assemblies
- Supplied Air Respirator (SAR) Boxes and Panels
- TIG Torches (No Labor)
- Tregaskiss Guns (No Labor)
- Water Cooling Systems
- Wireless Remote Foot/Hand Controls and Receivers
- Work Stations/Weld Tables (No Labor)

6 6 Months — Parts

- 12 Volt Automotive-Style Batteries

7 90 Days — Parts

- Accessories (Kits)
- ArcReach Heater Quick Wrap and Air Cooled Cables
- Canvas Covers
- Induction Heating Coils and Blankets, Cables, and Non-Electronic Controls
- MDX Series MIG Guns
- M-Guns
- MIG Guns, Subarc (SAW) Torches, and External Cladding Heads
- Remote Controls and RFCS-RJ45
- Replacement Parts (No labor)
- 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.

4. Defects caused by accident, unauthorized repair, or improper testing.

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

The exclusive remedies for warranty claims are, at Miller's option, either: (1) repair; or (2) replacement; or, if approved in writing by Miller, (3) the pre-approved 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 use). Products may not be returned without Miller's written approval. Return shipment shall be at customer's risk and expense.

The above remedies are F.O.B. Appleton, WI, or Miller's authorized service facility. Transportation and freight are the customer's responsibility. TO THE EXTENT PERMITTED BY LAW, THE REMEDIES HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES REGARDLESS OF THE LEGAL THEORY. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT) REGARDLESS OF THE LEGAL THEORY. ANY WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTEE OR REPRESENTATION, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, ARE EXCLUDED AND DISCLAIMED BY MILLER.

Some US states do not allow limiting the duration of an implied warranty or the exclusion of certain damages, so the above limitations may not apply to you. This warranty provides specific legal rights, and other rights may be available depending on your state. In Canada, some provinces provide additional warranties or remedies, and to the extent the law prohibits their waiver, the limitations set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary by province.

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? The expertise of the distributor and Miller is there to help you, every step of the way.

Owner's Record

Please complete and retain with your personal records.

Model Name	Serial/Style Number
Purchase Date	(Date which equipment was delivered to original customer.)
Distributor	
Address	
City	
State	Zip

For Service

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

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:	Welding Supplies and Consumables Options and Accessories Personal Protective Equipment (PPE) Service and Repair Replacement Parts Training (Schools, Videos, Books) Welding Process Handbooks To locate a Distributor or Service Agency visit www.millerwelds.com or call 1-800-4-A-Miller
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Contact the Delivering Carrier to:	File a claim for loss or damage during shipment. For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.
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