INSTRUCTIONS for F-15-080-A
May, 2001

STANDARD MIG ANALOG INTERFACE CONTROL
for
ROBOTIC WELDING SYSTEMS

This book covers the following interfaces:

ABB ......................................................... P/N 31679
Fanuc/Kawasaki ....................................... P/N 31675
Hitachi ..................................................... P/N 31677
REIS .............................................. P/N 0558001376

CAUTION
These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for electric welding equipment, we urge you to read our booklet, “Precautions and Safe Practices for Arc Welding, Cutting, and Gouging”, Form 52-529. Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information. Be sure to read the Safety Precautions on page 2 and 3 before installing or operating this equipment.

Be sure this information reaches the operator.
You can get extra copies through your supplier.
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SAFETY PRECAUTIONS

WARNING: These Safety Precautions are for your protection. They summarize precautionary information from the references listed in Additional Safety Information section. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below as well as all other manuals, material safety data sheets, labels, etc. Failure to observe Safety Precautions can result in injury or death.

PROTECT YOURSELF AND OTHERS -- Some welding, cutting, and gouging processes are noisy and require ear protection. The arc, like the sun, emits ultraviolet (UV) and other radiation and can injure skin and eyes. Hot metal can cause burns. Training in the proper use of the processes and equipment is essential to prevent accidents. Therefore:

1. Always wear safety glasses with side shields in any work area, even if welding helmets, face shields, and goggles are also required.
2. Use a face shield fitted with the correct filter and cover plates to protect your eyes, face, neck, and ears from sparks and rays of the arc when operating or observing operations. Warm bystanders not to watch the arc and not to expose themselves to the rays of the electric-arc or hot metal.
3. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuffless trousers, high-topped shoes, and a welding helmet or cap for hair protection, to protect against arc rays and hot sparks or hot metal. A flameproof apron may also be desirable as protection against radiant heat and sparks.
4. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned, and open pockets eliminated from the front of clothing
5. Protect other personnel from arc rays and hot sparks with a suitable non-flammable partition or curtains.
6. Use goggles over safety glasses when chipping slag or grinding. Chipped slag may be hot and can fly far. Bystanders should also wear goggles over safety glasses.

FIRES AND EXPLOSIONS -- Heat from flames and arcs can start fires. Hot slag or sparks can also cause fires and explosions. Therefore:

7. Do not use equipment beyond its ratings. For example, overloaded welding cable can overheat and create a fire hazard.
8. After completing operations, inspect the work area to make sure there are no hot sparks or hot metal which could cause a later fire. Use fire watchers when necessary.

ELECTRICAL SHOCK -- Contact with live electrical parts and ground can cause severe injury or death. DO NOT use AC welding current in damp areas, if movement is confined, or if there is danger of falling.

10. Refer to ANSI/ASC Standard Z49.1 (listed on next page) for specific grounding recommendations. Do not mistake the work lead for a ground cable.

ELECTRIC AND MAGNETIC FIELDS — May be dangerous. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and cutting current creates EMF around welding cables and welding machines. Therefore:

1. Welders having pacemakers should consult their physician before welding. EMF may interfere with some pacemakers.
2. Exposure to EMF may have other health effects which are unknown.
3. Welders should use the following procedures to minimize exposure to EMF:
   A. Route the electrode and work cables together. Secure them with tape when possible.
   B. Never coil the torch or work cable around your body.
   C. Do not place your body between the torch and work cables. Route cables on the same side of your body.
   D. Connect the work cable to the workpiece as close as possible to the area being welded.
   E. Keep welding power source and cables as far away from your body as possible.
FUMES AND GASES -- Fumes and gases, can cause discomfort or harm, particularly in confined spaces. Do not breathe fumes and gases. Shielding gases can cause asphyxiation. Therefore:

1. Always provide adequate ventilation in the work area by natural or mechanical means. Do not weld, cut, or gouge on materials such as galvanized steel, stainless steel, copper, zinc, lead, beryllium, or cadmium unless positive mechanical ventilation is provided. Do not breathe fumes from these materials.
2. Do not operate near degreasing and spraying operations. The heat or arc rays can react with chlorinated hydrocarbon vapors to form phosgene, a highly toxic gas, and other irritant gases.
3. If you develop momentary eye, nose, or throat irritation while operating, this is an indication that ventilation is not adequate. Stop work and take necessary steps to improve ventilation in the work area. Do not continue to operate if physical discomfort persists.
4. Refer to ANSI/ASC Standard Z49.1 (see listing below) for specific ventilation recommendations.
5. WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code §25249.5 et seq.)

CYLINDER HANDLING -- Cylinders, if mishandled, can rupture and violently release gas. Sudden rupture of cylinder, valve, or relief device can injure or kill. Therefore:

1. Use the proper gas for the process and use the proper pressure reducing regulator designed to operate from the compressed gas cylinder. Do not use adaptors. Maintain hoses and fittings in good condition. Follow manufacturer's operating instructions for mounting regulator to a compressed gas cylinder.
2. Always secure cylinders in an upright position by chain or strap to suitable hand trucks, undercarriages, benches, walls, post, or racks. Never secure cylinders to work tables or fixtures where they may become part of an electrical circuit.
3. When not in use, keep cylinder valves closed. Have valve protection cap in place if regulator is not connected. Secure and move cylinders by using suitable hand trucks. Avoid rough handling of cylinders.
4. Locate cylinders away from heat, sparks, and flames. Never strike an arc on a cylinder.
5. For additional information, refer to CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders", which is available from Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.

EQUIPMENT MAINTENANCE -- Faulty or improperly maintained equipment can cause injury or death. Therefore:

1. Always have qualified personnel perform the installation, troubleshooting, and maintenance work. Do not perform any electrical work unless you are qualified to perform such work.
2. Before performing any maintenance work inside a power source, disconnect the power source from the incoming electrical power.
3. Maintain cables, grounding wire, connections, power cord, and power supply in safe working order. Do not operate any equipment in faulty condition.
4. Do not abuse any equipment or accessories. Keep equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres and inclement weather.
5. Keep all safety devices and cabinet covers in position and in good repair.
6. Use equipment only for its intended purpose. Do not modify it in any manner.

ADDITIONAL SAFETY INFORMATION -- For more information on safe practices for electric arc welding and cutting equipment, ask your supplier for a copy of "Precautions and Safe Practices for Arc Welding, Cutting and Gouging", Form 52-529.

The following publications, which are available from the American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126, are recommended to you:
1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting"
2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding"
3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting"
4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting"
5. AWS C5.5 - "Recommended Practices for Gas Tungsten Arc Welding"
6. AWS C5.6 - "Recommended Practices for Gas Metal Arc Welding"
8. ANSI/AWS F4.1, "Recommended Safe Practices for Welding and Cutting of Containers That Have Held Hazardous Substances."

MEANING OF SYMBOLS - As used throughout this manual: Means Attention! Be Alert! Your safety is involved.

⚠️ DANGER ⚠️
Means immediate hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.

⚠️ WARNING ⚠️
Means potential hazards which could result in personal injury or loss of life.

⚠️ CAUTION ⚠️
Means hazards which could result in minor personal injury.
PRÉCAUTIONS DE SÉCURITÉ


1. PROTECTION INDIVIDUELLE— Les brûlures de la peau et des yeux dues au rayonnement de l’arc électrique ou du métal incandescent, lors du soudage au plasma ou à l’électrode ou lors du gougeage à l’arc, peuvent s’avérer plus graves que celles résultant d’une exposition prolongée au soleil. Aussi convient-il d’observer les précautions suivantes:
   a. Portez un écran facial adéquat muni des plaques protectrices et des verres filtrants appropriés afin de vous protéger les yeux, le visage, le cou et les oreilles des étincelles et du rayonnement de l’arc électrique lorsque vous effectuez des soudures ou des coupes ou lorsque vous en observez l’exécution. AVERTISSEZ les personnes se trouvant à proximité de façon à ce qu’elles ne regardent pas l’arc et à ce qu’elles ne s’exposent pas à son rayonnement, ni à celui du métal incandescent.
   b. Portez des gants ignifugés à crispins, une tunique épaisse à manches longues, des pantalons sans rebord, des chaussures à bout d’acier et un casque de soudage ou une calotte de protection, afin d’éviter d’exposer la peau au rayonnement de l’arc électrique ou du métal incandescent. Il est également souhaitable d’utiliser un tablier ininflammable de façon à se protéger des étincelles et du rayonnement thermique.
   c. Les étincelles ou les projections de métal incandescent risquent de se loger dans des manches retroussées, des bords relevés de pantalons ou dans des poches. Aussi convient-il de garder boutonnés le col et les manches et de porter des vêtements sans poches à l’avant.
   d. Protégez des étincelles et du rayonnement de l’arc électrique les autres personnes travaillant à proximité à l’aide d’un écran ininflammable adéquat.
   e. Ne jamais omettre de porter des lunettes de sécurité lorsque vous vous trouvez dans un secteur où l’on effectue des opérations de soudage ou de coupage à l’arc. Utilisez des lunettes de sécurité à écrans ou verres latéraux pour piquer ou meûler le laitier. Les piquettes incandescentes de laitier peuvent être projetées à des distances considérables. Les personnes se trouvant à proximité doivent également porter des lunettes de protection.
   f. Le gougeage à l’arc et le soudage à l’arc au plasma produisent un niveau de bruit extrêmement élevé (de 100 à 114 dB) et exigent par conséquent l’emploi de dispositifs appropriés de protection auditive.

2. PRÉVENTION DES INCENDIES— Les projections de laitier incandescent ou d’étincelles peuvent provoquer des incendies au contact de matériaux combustibles solides, liquides ou gazeux. Aussi faut-il observer les précautions suivantes:
   a. Éloignez suffisamment tous les matériaux combustibles du secteur où l’on exécute des soudures ou des coupes à l’arc, à moins de les recouvrir complètement d’une bâche non-inflammable. Ce type de matériaux comprend notamment le bois, les vêtements, la sciure, l’essence, le kérosène, les peintures, les solvants, le gaz naturel, l’acétylène, le propane et autres substances combustibles semblables.
   b. Les étincelles ou les projections de métal incandescent peuvent tomber dans des fissures du plancher ou dans des ouvertures des murs et y déclencher une ignition lente cachée. Veillez à protéger ces ouvertures des étincelles et des projections de métal.
   c. N’exécutez pas de soudures, de coupes, d’opérations de gougeage ou autres travaux à chaud à la surface de barils, bidons, réservoirs ou autres contenants usagés, avant de les avoir nettoyés de toute trace de substance susceptible de produire des vapeurs inflammables ou toxiques.
   d. En vue d’assurer la prévention des incendies, il convient de disposer d’un matériel d’extinction prêt à servir immédiatement, tel qu’un tuyau d’arrosage, un seau à eau, un seau de sable ou un extincteur portatif.
   e. Une fois le travail à l’arc terminé, inspectez le secteur de façon à vous assurer qu’aucune étincelle ou projection de métal incandescent ne risque de provoquer ultérieurement un feu.

3. CHOC ÉLECTRIQUE— Le gougeage à l’arc et à l’arc au plasma exige l’emploi de tensions à vide relativement importantes; or, celles-ci risquent de causer des dommages corporels graves et même mortels en cas d’utilisation inadéquate. La gravité du choc électrique reçu dépend du chemin suivi par le courant à travers le corps humain et de son intensité.
   a. Ne laissez jamais de surfaces métalliques sous tension venir au contact direct de la peau ou de vêtements humides. Veillez à porter des gants bien secs.
   b. Si vous devez effectuer un travail sur une surface métallique ou dans un secteur humide, veillez à assurer votre isolation corporelle en portant des gants secs et des chaussures à semelles de caoutchouc et en vous tenant sur une planche ou une plate-forme sèche.
   c. Mettez toujours à la terre le poste de soudage/coupage en le reliant par un câble à une bonne prise de terre.
   e. Mettez l’équipement hors tension lorsqu’il n’est pas en service. une mise à la masse accidentelle peut en effet provoquer une surchauffe de l’équipement et un danger d’incendie. Ne pas enrouler ou passer le câble autour d’une partie quelconque du corps.
   f. Vérifiez si le câble de masse est bien relié à la pièce en un point aussi proche que possible de la zone de travail. Le branchement des câbles de masse à l’ossature du bâtiment ou en un point éloigné de la zone de travail augmente en effet le risque de passage d’un courant de sortie par des chaînes de
levage, des câbles de grue ou divers chemins électriques.

g. Empêchez l’apparition de toute humidité, notamment sur vos vêtements, à la surface de l’emplacement de travail, des câbles, du poste-électrode et du poste de soudage/coupage. Réparez immédiatement toute fuite d’eau.

4. VENTILATION-- La respiration prolongée des fumées résultant des opérations de soudage/coupage, à l’intérieur, d’un local clos, peut provoquer des maux de gorge, des maux de tête et des dommages corporels. Aussi convient-il d’observer les précautions suivantes:

a. Assurez en permanence une aération adéquate de l’emplacement de travail en maintenant une ventilation naturelle ou à l’aide de moyens mécaniques. N’effectuez jamais de travaux de soudage ou de coupage sur des matériaux de zinc, de plomb, de beryllium ou de cadmium en l’absence de moyens mécaniques de ventilation capables d’empêcher l’inhalation des fumées dégagées par ces matériaux.

b. N’effectuez jamais de travaux de soudage ou de coupage à proximité de vapeurs d’hydrocarbure chloré résultant d’opérations voisines de dégraissage ou de pulvérisation. La chaleur dégagée ou le rayonnement de l’arc peut déclencher la formation de phosgène -- gaz particulièrement toxique -- et d’autres gaz irritants, à partir des vapeurs de solvant.

c. Une irritation momentanée des yeux, du nez ou de la gorge constatée au cours de l’utilisation de l’équipement dénote un défaut de ventilation. Arrêtez-vous de travailler afin de prendre les mesures nécessaires à l’amélioration de la ventilation. Ne poursuivez pas l’opération entreprise si le malaise persiste.

d. Certaines commandes comportent des canalisations où circule de l’hydrogène. L’armoire de commande est munie d’un ventilateur destiné à empêcher la formation de poches d’hydrogène, lesquelles présentent un danger d’explosion; ce ventilateur ne fonctionne que si l’interrupteur correspondant du panneau avant se trouve placé en position ON (Marche). Veillez à manœuvrer cette commande en vérifiant si le couvercle est bien en place, de façon à assurer l’efficacité de la ventilation ainsi réalisée. Ne jamais débrancher le ventilateur.

e. Les fumées produites par l’opération de soudage ou de coupage peuvent s’avérer toxiques. Aussi est-il nécessaire de disposer en permanence d’un dispositif adéquat de ventilation de type aspirant, afin d’éliminer du voisinage de l’opérateur tout dégagement de fumée visible.

f. Consultez les recommandations particulières en matière de ventilation indiquées à l’alinéa 6 de la norme Z49.1 de l’AWS.

5. ENTRETIEN DE L’ÉQUIPEMENT-- Un équipement entretenu de façon défectueuse ou inadéquate risque non seulement de réaliser un travail de mauvaise qualité mais, chose plus grave encore, d’entraîner des dommages corporels graves, voire mortels en déclenchant des incendies ou des chocs électriques. Observez par conséquent les précautions suivantes:


b. Ne procédez jamais à une tâche d’entretien quelconque à l’intérieur du poste de soudage/coupage, avant d’avoir débranché l’alimentation électrique.

c. Maintenez en bon état de fonctionnement les câbles, le câble de masse, les branchements, le cordon d’alimentation et le poste de soudage/coupage. N’utilisez jamais le poste ou l’équipement s’il présente une défectuosité quelconque.


e. Laissez en place tous les dispositifs de sécurité et tous les panneaux de l’armoire de commande en veillant à les garder en bon état.

f. Utilisez le poste de soudage/coupage conformément à son usage prévu et n’effectuez aucune modification.

6. INFORMATIONS COMPLÉMENTAIRES RELATIVES À LA SÉCURITÉ--
Pour obtenir des informations complémentaires sur les règles de sécurité à observer pour le montage et l’utilisation d’équipements de soudage et de coupe électriques et sur les méthodes de travail recommandées, demandez un exemplaire du livret N° 52529 “Precautions and Safe Practices for Arc Welding, Cutting and Gouging” publié par ESAB. Nous conseillons également de consulter les publications suivantes, tenues à votre disposition par l’American Welding Society, 550 N.W. LeJuene Road, Miami, FL 32126:

a. “Safety in Welding and Cutting” AWS Z49.1


f. “Recommended Safe Practices for Air Carbon Arc Gouging and Cutting” AWS-C5. 3.

1. INTRODUCTION

This state-of-the-art, microprocessor control is designed to interface with robot computer controllers using analog-system programming. The ESAB ANALOG INTERFACE receives analog parameter inputs from a robot controller, processes these signals and accurately controls the welding power supply and wire feeding system. Other data is exchanged between the ESAB INTERFACE and robot controller such as start/stop signals, shielding gas control, wire touch work, weld enable, etc.

THE STANDARD MIG ANALOG INTERFACE Control can be used for Mig applications such as short arc, spray arc or flux cored wire welding. Welding parameters can be preset at the INTERFACE Control (Panel Mode) or totally controlled by signals from the robot controller (Robot Mode).

IMPORTANT: This booklet covers the instructions for various Standard Analog Controls used for the different Robot vendors listed in Section 2.1 following. Some of the control's components and features described in the text are not required or used in all of the robots, and these exceptions are specifically noted as they appear in the instructions.
2.0 HOW TO ASSEMBLE A TYPICAL ROBOT MIG WELDING SYSTEM - FIGURE 2

2.1 Equipment Supplied

Select one of the following:
- STANDARD MIG ANALOG INTERFACE Control; Fanuc/Kawasaki ............... 31675
- Hitachi ....................................... 31677
- Reis ........................................... 0558001376

2.2 Equipment Required

2.2.1 Select an EH-10A Digital Welding Head (20-999 ipm). Each model includes motor w/gear box, accessory support tach feedback unit and 52" cable
a. EH-10A Digital Mtr ...................... 679774
b. Insulating Ring ........................... 60N90
c. Motor Control Cable, 25-ft .............. 996808
d. 2 Roll Accessory Support ............... 49V51
e. 4 Roll Accessory Support ............... 600216
f. Extension cable, 25-ft, 6-cond. (J2-control to welding head) ........... 996808

2.2.2 Select feed rolls, outlet guides and other wire feed accessories for wire sizes and types that will be used. (See Table 1; Feed Rolls and Outlet Guides)

2.2.3 Select a DC power supply suitable for your application:

The STANDARD MIG ANALOG INTERFACE requires an electronic controlled power supply:

- Transformer/SCR type power supplies: 453cv; 230/460vac, 3-Ph ............... 37969
  653cvcc; 230/460vac, 3-Ph ............... 37829
- Inverter type power supplies: SVI-450i cv/cc; 230/460vac, 3-Ph .... 31950

2.2.4 Select a control cable (J1-welding control to power supply cable). A 19 PIN to 19 PIN Cable for Standard and Inverter Power Supplies:

- 6-ft, Control Cable ....................... 30686
- 30-ft, Control Cable ..................... 30780
- 60-ft, Control Cable ..................... 30781

The cable will be the same for all power sources of 6-ft, 30-ft and 60-ft length.

2.2.5 Select gas control equipment:

- R-5007 inert gas reg./flowmeter ...... 998124
- R-5008 CO₂ reg./flowmeter .......... 998125
- 12.5-ft standard duty gas hose ....... 40V77
- 25-ft standard duty gas hose ........ 34V38
- 12.5 ft heavy duty gas hose ......... 19416
- 25-ft heavy duty gas hose .......... 19415
  (use heavy duty hose for CO₂ gas)
- Gas Hose Coupler ....................... 11N17

2.2.6 When using a water cooled torch, some of the following items may be required to supply and drain the cooling water:

- 12.5 ft water hose ....................... 40V76
- 25-ft water hose ......................... 406196
- Water Hose Coupling ................... 11N18
- Water Adaptor, connects 5/8-18 (LH) hose to 1/4 NPT hose .......... 11N16

2.3 Optional Accessories

1. Digital DC Ammeter Kit, LED display of welding current up to 999 amps ..................... 679111

2. Plumbing Box; contains solenoid valves, for shielding gas and torch coolant, and coolant pressure switch to protect against inadequate cooling water ..................... 34749

3. Cable Assemblies:

- Plumbing Box Control Cable (J4-Interface Control to Plumbing Box);
  a. 3.5-ft, 6-cond. cable .................... 34199
  b. 25-ft, 6-cond. cable .................... 34845

4. Torch Coolant Recirculator:

- WC-8C vertical, 115vac, 60 Hz, upright.... 33739

5. Wire Straightener; 3 roll adjustable ........ 34V74

6. Wire Wiper Accessory; effectively cleans and lubricates wire:

- Felt Wiper, pkg. of 10 .................... 598537
- Wiper Holder, mounts to outlet guide ... 598764
2.4 Mounting/Connecting The Equipment

For complete Interconnection Diagram information on the Interface Control with all required and/or optional accessories, see Figures 1, 2 and 3.

Since the operating controls for the Standard Interface are located on and behind the front cover, the box should be positioned within easy reach of the Robot operator. The control is designed to be mounted on a vertical surface on or near the robot using the mounting holes provided.

As shown in Figure 2, the wire-feed motor/accessory support and the plumbing box are designed to be mounted on the Robot itself.

**IMPORTANT:** Make sure you read notes 1 and 2 (located on Figure 2) relating to the wire feed motor, and plumbing box, respectively.

Additional connections and/or adjustments can be found as follows:

Torch connections are provided in their respective instruction booklets.
NOTES:
1. If wire feed runs backwards, reverse motor direction as follows: In the control, disconnect the blue wire (RLY-7) from T1-5 and connect it to T1-6; disconnect orange wire (RLY-9) from T1-6 and connect it to T1-5.
2. The WSV in the Plumbing Box is hooked-up for "continuous waterflow", and the pressure switch (PS) is factory connected to normally-close (N.C.) position - if the normally-open (N.O.) is desired, move wire to position shown dotted.

Figure 2 - Interconnection Diagram
Figure 3 - Specific Robot Interface Connections to Analog Control

**ROBOT RECEPTACLE/CABLE CONNECTIONS AT "J3" CONNECTOR ON INTERFACE CONTROL (See Fig. 2)**

**ABB ROBOT INTERFACE**

- **WIRE CONTACT**
- **WELDER READY**
- **COMMON B**
- **SPATTER CLEAN**
- **INCH UP**
- **SPEED REF.**
- **VOLTAGE REF.**

**FANUC/KAWASAKI ROBOT INTERFACE**

- **INCH FWD.**
- **INCH REV.**
- **TOUCH REQUEST**
- **+24V ROBOT**
- **24 VOLT**

**HITACHI ROBOT INTERFACE**

- **INCH FWD.**
- **INCH REV.**
- **TOUCH REQUEST**
- **SPEED**
- **COMMON SPD.**
- **VOLTAGE**
- **COMMON VLT.**
- **-24 V**

**REIS ROBOT INTERFACE**

*NOTE: REMOVE GREY JUMPER WIRE BETWEEN 12-7 AND T2-9.*
2.5 CONTROL FUNCTIONS

IMPORTANT

Some of the control and features covered in the following are not required or used in “all” of the robots, and these exceptions will be specifically noted in the text as they occur.

2.5.1 Front Panel Controls

For location of controls, see Figure 4 following.

2.5.2 Power-Switch

Pulling-out the mushroom-style red button of this switch turns power “on” into the control as indicated by the illuminated display windows. To turn power “off”, simply push-in red button and the display windows and control will deenergize.

NOTE: Immediately after the control is turned “on” a number will appear in the IPM window (e.g. 3) and another number will appear in the VOLTS window, and these numbers will only be displayed for 1-second. This information identifies the E-Prom “program” used in your control. The number shown in the VOLTS windows will be in decimal for (e.g., .1, .2, .3 etc.)

2.5.3 Gas Purge/Reset Rocker

A momentary “on” switch, this rocker provides a dual function when actuated.

a. Prior to starting the welding sequence, it actuates the gas solenoid and lets you “purge” the shielding gas line of the torch. At the same time, the IPM and VOLTS windows will also display the preset times (in seconds) for gas preflow and gas postflow respectively.

b. After starting the welding sequence -- if an abort “shutdown” condition occurs (indicated by flashing digital display), the Purge/Reset rocker can be actuated and the control will automatically “reset”.

2.5.4 INCH Up-Down Rocker

This switch is used to “cold inch” the wire, up or down, at a preset speed which you have programmed. If you wish to change the preset cold-wire inch speed, you must actuate this switch (Up or Down) while simultaneously operating the “Inc.-Dec.” toggle under the IPM display on inside panel. Information for cold inch comes from the robot, if an analog signal is present, otherwise the information is from the panel setting.

2.5.5 Start-Stop Rocker

The functional operation of this two-position (no neutral) switch is dependent upon the positioning of the Robot-Panel switch located on the inside panel of this control.

If the Analog Control is to be used for Robot operation, the Start-Stop rocker must be left in its STOP position.

If the Control is to be used in its Panel position for manual operation; the Start-Stop rocker is used to initiate the welding sequence in its START position, and terminates the welding sequence in its STOP position.

2.5.6 Digital Readout Windows

Three individual 3-digit windows labeled AMPS (optional ammeter), IPM and VOLTS are provided to display actual welding current, preset or actual welding parameters (wire feed speed and welding voltage) and time parameters as follows:

a. AMP Digital Readout. This window is normally blank unless the optional Ammeter Kit is provided to monitor actual welding current. When installed, the window displays d.c. current (AMPS) in a range from 0-999 amperes in one amp increments.
b. **IPM Digital Readout.** This window is primarily used to display wire feed speed in IPM from 20 to 999 inches per minute in one inch increments. However, with the appropriate function selector actuated, this window can also display the following:

-- **PREFLOW** Time from .1 to 99.9 seconds in one tenth of a second increments

-- **SPOT** welding time from 1 to 999 cycles in one cycle increments or in seconds where 60 cycles equals one second (must be set to zero for continuous seam welding)

-- cold wire INCH speed in IPM from 20 to 999 inches per minute in one-inch increments.

**NOTE:** *With the inside Panel/Robot switch in “Panel” and Power switch turned “on”, but not welding, the IPM window will continuously read Preset wire speed. When the arc is struck, the IPM window will then continuously read Actual welding wire speed.*

c. **Volts Digital Readout.** This window is primarily used to display arc voltage in VOLTS from 12 to 50 vdc in one tenth volt increments. However, with the appropriate toggle selector actuated, this window can also display the following:

-- **POST FLOW** Time from .1 to 99.9 seconds in one tenth of a second increments.

-- manual **BURNBACK** time. Manually adjustable burnback time period which when preset will override the automatic adaptive anti-stick feature. This time period will be set in one-cycle (60-cycle = 1 sec.) increments. When set to “zero”, the Automatic Adaptive Anti-stick feature will be operational.

-- accumulative welding arc hours (A.H.) usage record in one-tenth of an hour increments.

**NOTE:** *With the inside Panel-Robot switch in PANEL and Power switch turned “on”, but not welding, the VOLTS window will continuously read Preset voltage. When the arc is struck, the VOLTS window will then continuously read Actual welding voltage.*

2.5.6 **Panel-Robot (L.E.D.) Lights.** These lights indicate the “location” from which this control is being operated; either the PANEL location or the ROBOT location. The appropriate light will energize as soon as the control is turned “on”.

2.5.7 **Input/Output Robot Function (L.E.D.) Lights.** Primarily these lights only function when the control is used in the ROBOT mode; however two Output LED’s, Arc Established and Abort/Arc Out, will also function in the panel mode. The appropriate light or lights will energize to indicate the specific function(s) being used at the appropriate time in a welding sequence. Remember, some of the following Input/Output functions are not required or utilized in all Robot models:

**LED Input From Robot:** Weld Start, Contactor (ASEA only), Gas Purge, Inch Up, Inch Down, and Touch Request.

**LED Input To Robot:** Ready, Arc Established, Abort/Arc Out, Wire Stick, and Wire Contact.

2.5.8 **Reset Circuit Breaker.** A seven (7) ampere circuit breaker provides protection to the 115 volt control circuit and the wire feed motor. If an overload occurs, the breaker will trip and suspend all operation. To restore service, simply depress the breaker button on the front panel.

2.6 **Inside Panel Controls**

For location of inside panel controls, see Figure 5.

2.6.1 **Robot-Panel Toggle Switch** - This two-position switch is used to set the “location” from which this control is to be setup and operated. The ROBOT position allows the control to be set up and operated from the Robot; while the PANEL position allows the welding sequence to be set-up and operated from the Analog Control itself.

2.6.2 **Spot/Burnback - A.H./Inch Set Selector.** Operating this toggle allows you to select the following:

a. Activating the SPOT/BURNBACK time mode (down position) allows you to preset either or both of these welding features. However, once preset, these features automatically become part of the operating mode (Panel or Robot).

The SPOT mode allows you to preset “timed-arc” periods (from 1 to 999 cycles) in the IPM window using its Inc./Dec. toggle switch. When a spotweld time is preset into the control, all “continuous-type” welding programs are “temporarily disabled.” To resume normal (continuous) operation, you must deactivate the spotweld program by keying its “time” parameter back to zero (000).
At the same time (or independently), you can also preset a manual BURNBACK time into the VOLTS window using its Inc./Dec. toggle switch. The Burnback time is adjustable in one cycle increments (60 cycles/sec); and when preset, it will override the automatic adaptive anti-stick feature in either the Panel or Robot modes of operation. If automatic anti-stick operation is desired, the preset Burnback time must be set back to “zero”.

b. The A.H. (Arc Hours)/Inch Set selector is only functional when the wire feeder is not operating. When actuated in its up position you can program a coldwire INCH PRE-SET speed in the IPM window by operating its Inc/Dec toggle switch, or you can observe the total accumulated ARC HOUR usage record displayed in the VOLTS window. To “zero-out” the arc hour record, “toggle-down” the Inc/Dec switch below the Volts window.

**NOTE:** Actuating this position (Arc Hours/Inch Preset) during an actual weld allows you to check the factory-preset numbers that will determine the quality of starts (hot, cold, etc.) for your preset welding condition. These numbers are preset to provide optimum starting characteristics required for most welding applications. This is a diagnostic tool available to the experienced operator or serviceman and need not be activated during a normal operation unless you are experiencing weld starting problems, or weld condition (speed and/or voltage aborting problems. The factory-set “starting condition” is represented by numbers that are displayed, on command, in the digital IPM and VOLTS windows. For good welds and starts, these numbers should be in a range from 105 to 115 (with 110 being the norm) in the IPM window, and from 90 to 100 (with 95 being the norm) in the VOLTS window. If your weld starts are not acceptable, please refer to page 12 (Hot Start Adjustment) for a simple adjustment procedure that will enhance good starting. If you are experiencing inordinate speed and/or voltage aborts, please refer to Section VII. (Troubleshooting) for checking and resetting servo functions.

### 2.6.3 Inc./Dec Set-Up Switches

Two set-up control switches are provided to preset the individual welding parameters required for the selected welding operation, as follows:

**“IPM” Increase/Decrease Control.** This toggle switch is primarily used to set and/or vary the wire feed speed (IPM), along with its other functions; re-flow, Spot and Inch. With the appropriate function selector actuated each parameter setting will be displayed in the digital window directly above this toggle.

**“VOLTS” Increase/Decrease Control.** This toggle switch is primarily used to set and/or vary the arc Volts, along with all its other functions; Postflow, Burnback and to “zero” the A.H. accumulation. With the appropriate function selector actuated, each parameter setting will be displayed in the digital window directly above this toggle.

### 2.6.4 TEST Toggle Switches -- ANALOG INPUT and AMPS.

These two toggles provide a convenient way of test-sequencing the program parameters to either diagnose a problem, or to demonstrate the control without actually striking a welding arc as follows:

a. **The Test/Analog Input toggle** is a two-position (momentary up, maintain down) switch that allows the user to test the proper operation of the Analog Interface board. In its normal Analog position the switch provides continuity to the actual Robot Input signals, both voltage and speed. When the toggle is raised and held in its momentary TEST position, a 5-volt analog signal will be connected to both the speed and voltage terminals of the Analog Input board. Assuming that the Robot-Panel toggle switch is in the Robot position, the speed and voltage display windows should now reflect the digital equivalent of approximately 500 IPM and approximately 25 volts. If these numbers appear, the analog interface board is functioning properly.
b. **The Test/Amps toggle** is a two-position (maintain contacts) switch that allows the user to test/demonstrate the control. The AMPS position (toggle down) is the “normal” location for all actual welding operations. To test or demonstrate the control, place the Amps/Test toggle in its TEST position. This provides an arc detection signal required to sequence through the welding cycle. With this accomplished, open up the accessory support clapper to release wire feed pressure and place the “Start-Stop” rocker in the START position. The control will sequence through the programmed welding cycle (preflow, weld, post-flow, etc.).

Please note that if you inadvertently leave the switch in the amps position instead of setting the Test position (when testing the control), the control will shut-down with both windows “flashing” within 2-seconds after receiving the “Start” signal.
3.0 SETTING UP PROGRAM PARAMETERS

To preset a typical welding schedule that can be used in either the PANEL or ROBOT location modes do the following:

Typical Welding (Parameters):

Cold Wire Inch Speed ......................... 75 IPM  
Wire Feed Speed ............................. 185 IPM  
Arc Voltage .................................. 17.9 Volts  
Spot Weld Time ............................... 45 Cycles  
Preflow Time ................................ 1.2 Seconds  
Postflow Time ............................... 3.1 Seconds  
Burnback Time ............................... 7 Cycles

3.1 Preliminary Power Supply Checks

Before programming the control, make sure that the power supply is properly set-up as follows:

- Check the rear panel of the power supply to make sure that only the control cable is connected - the remaining “stick control receptacle/cable” must be disconnected.

- Depending on the welding process, set the power supply INDUCTOR control pot as follows:

  For SHORT ARC mode, set Inductance potentiometer to 5 and adjust for best performance when welding.

  For SPRAY ARC modes set Inductance at MINIMUM.

3.2 Program Parameters

A. Pull-out the Power Switch button to energize the control. The display windows will light up.

B. Although the welding parameters can be set with the Panel-Robot switch in either position, it is suggested that the PANEL position be used so that the program can be weld tested prior to switching over the ROBOT for actual analog input signals to run the operation.

C. Place the Start-Stop rocker switch in the STOP position -- the Stop position is “normal” for all Robot operation; however, the Start position must be used to energize the system for weld testing or welding without using the Robot interface.

3.2.1 The Wire Feed Speed parameter (185 ipm) - is set differently for Panel and Robot mode operation as follows:

3.2.2 For PANEL weld-test operation-- To set a Wire Feed Speed parameter of 185 ipm, raise and hold the toggle of the left Inc./Dec. switch in its INCREASE position until 185 appears in the IPM window. Notice that this parameter setting will start at zero and immediately jump to 20 and then rapidly increases (1 ipm at a time) until the 185 ipm setting is reached. If you overshoot the planned setting, simply “bump” the DECREASE position of the left Inc./Dec. toggle to obtain the exact IPM setting.

3.2.3 For ROBOT welding operation -- the robot control will send an appropriate analog input signal to the microprocessor to set the wire feed speed parameter of 185 ipm.

3.2.4 Arc Voltage must be preset by the operator and is dependent on the setting of the Panel-Robot switch as follows:

3.2.5 For PANEL weld-test operation -- Using the right-side Inc./Dec. toggle switch (on the inside panel), set an Arc Voltage parameter of 17.9 volts. Raise and hold the toggle switch in its INCREASE position until 17.9 appears in the VOLTS window. Notice that this parameter setting will start at zero and immediately jump to 12 and then rapidly increases (1/10 volt at a time) until the 17.9 volt setting is reached. If you overshoot the planned setting, simply “bump” the DECREASE position of the right toggle switch to obtain the exact VOLT setting.

3.2.6 For Robot welding operation -- The robot control will send an appropriate analog input signal to the microprocessor to set the required arc voltage parameter of 17.9 volts.

3.2.7 If a cold-wire INCH parameter (of 75 ipm) is desired -- Actuate the A.H. toggle to its “up” position and hold it while simultaneously operating the inside Inc./Dec. toggle until 75 appears in the IPM window. Note that the cold inch setting starts at 50 ipm and rapidly increases (1 ipm at a time) until the 75 ipm setting is reached.

3.2.8 If shielding gas Preflow and Postflow times (of 1.2 seconds and 3.1 seconds, respectively) are desired, actuate the Purge/Reset rocker on the front cover and hold it. Simultaneously actuate the inside left Inc./Dec. toggle switch to its INC position until the digital window directly above displays the desired Gas
Preflow (in sec.) setting. Now, actuate the inside-right Inc./Dec. toggle switch to its INC position desired Gas Postflow (in sec.) setting. Both of these parameter times will start at zero and rapidly increase (1/10 second at a time) until the desired times are achieved. **If neither of these features are desired, or if they are to be controlled by the Robot, both of these time parameters must be set to zero.**

3.2.9 If either Spotwelding and/or manual Burnback times (of 45 cycles and 7 cycles, respectively) are desired, actuate the Spot/Burnback toggle switch to its “down” position and hold it. Simultaneously activate the left Inc./Dec. toggle switch to its INC position until the digital window directly above displays the desired SPOT time (in cycles) setting. Now actuate the right Inc./Dec. toggle switch to its INC position until the digital window directly above displays the desired BURNBACK time (in cycles) setting. Both of these parameter times will start at zero and rapidly increase (1 cycle at a time) until the desired cycles are achieved. **If neither of these features are desired, or if they are to be controlled by the Robot, their “times” must be set to zero (0). Release all switches.**

**Remember -- if a manual Burnback function is programmed, it will override the normal “automatic adaptive anti-stick” feature in either welding mode.**

3.2.10. Assuming all desired parameters have been programmed, place the control’s Start-Stop switch in its START position to weld-test the programmed parameters. If your weld starts are not acceptable, refer to the following Hot Start Adjustment procedures that will enhance starting.

3.3 Hot Start Adjustment Procedures

The control is preset at the factory to provide the optimum starting characteristics for most welding conditions. However, due to factors such as incorrect parameters, welding technique, shielding gas, or wire feed speed, you may have to readjust the factory-set calibrations to provide a hot start characteristic in which the initial starting voltage will be slightly higher than actual welding voltage (arc voltage) and speed which initially is somewhat lower than the desired wire feed speed.

To set-up the control to provide this, do the following:

a. Program the welding condition you need in the IPM (wire feed speed) and VOLTS (arc voltage) windows, and fine-tune these parameters until you have the welding arc desired - Do not at this point concern yourself with the “arc starts”, this follows.

b. If after the welding condition is fine-tuned, the arc starts are unsatisfactory, proceed as follows:

1. During the weld, actuate and hold the A.H./Inch Preset switch and observe the numbers displayed in the IPM and VOLTS windows.

2. For proper starts, the number in the IPM window should be in the range from 105 to 115. If it is not, adjust the Inc/Dec toggle (below the IPM window) until the displayed number reads about 110.

3. Similarly, the number in the VOLTS window should be in the range of 90 to 100. Again, if it is not, adjust the Inc/Dec toggle (below the VOLTS window) until the displayed number reads about 95.

4. These adjustments to the control should provide good arc starts to a legitimate welding condition.

5. A good “rule-of-thumb” to follow whenever you set up a new welding condition and you experience unstable starts, is to simply check the start characteristic numbers (while welding) to make sure they are within the ranges described in the preceding steps.

c. If you continue experiencing problems, refer to the Troubleshooting procedures.

d. If the weld test is satisfactory, the control can now be placed in the Robot mode.

For ROBOT welding operation w/Robot interface, the control’s Start-Stop switch must always remain in the Stop position, and the Robot controls the welding sequence.

3.4 WELDING OPERATION

3.4.1 Welding In Robot Position

All functions are controlled from the Robot. The sequence is as follows:

Assuming the Robot controller sends the appropriate analog signals to preset the Analog Control with the desired wire speed (IPM) and arc voltage (VOLTS), the microprocessor is programmed to operate from the Robot Control.
(a) Initiate shielding gas requirements (purge, pre/postflow), and an input logic signal will illuminate the control's GAS LED to indicate this function.

(c) If provided in the Robot, actuate the desired Inch Up or Inch Down Robot controls to position the wire above the workpiece (the wire will feed at the preset rate). The appropriate input logic signal will illuminate one of the control’s LED’s to indicate which function, INCH UP or INCH DOWN, is being performed. When completed, the LED will go “off”.

If the cold INCH function is not provided in the Robot simply operate the control’s up/down INCH rocker switch on the front cover to position the wire above the workpiece. (If you wish to change the cold wire inch speed rate; simply press the desired Up/Down Inch direction to INC. or DEC. the cold wire speed rate).

(d) To start welding, initiate the Robot's Cycle Start control to energize the wire feed motor, input logic signal(s) will illuminate the Cycle Start LED and the Arc Established LED after the wire strikes the workpiece. The preset/actual wire speed and arc voltage will also be displayed in their appropriate windows.

(f) To stop welding, operate the Robot's cyclestop, contactor-stop, and gas-stop controls, respectively, to terminate the weld.

The system will also shutdown if the preset wire speed or arc voltage parameters cannot be maintained due to an abnormal condition; a flashing digital display will indicate parameter.

The weld will also terminate if a start signal is provided and 2-seconds later the arc is still not established. This condition is indicated by both windows flashing.

⚠️ **WARNING**

Do not allow metal-to-metal contact between the control box and a metal surface connected in any way to a welding ground. With such contact, a poor welding ground connection may create a difference in potential that sends part of the welding current through the safety ground wiring in the control cable and wire feeder, resulting in burnout of that wiring and/or damage to the circuitry. If the safety ground burns out, the operator may be exposed to 115V shock hazard.
4.0 TROUBLESHOOTING

WARNING

Be sure that all primary power to the machine has been externally disconnected. Open wall disconnect switch or circuit breaker before attempting inspection or work inside of the power supply.

Listed below are a number of trouble symptoms, each followed by the checks or action suggested to determine the cause. Listing of checks and/or actions is in “most probable” order, but is not necessary 100% exhaustive. Always follow this general rule: Do not replace a printed circuit (PC) board until you have made all the preceding checks. Always put the power switch in “off” position before removing or installing a PC board. Take great care not to grasp or pull on components when removing a PC board. Always place PC boards on a “static free” surface. If a printed circuit (PC) board is determined to be the problem, check with your ESAB supplier for a trade-in on a new PC board. Supply the distributor with the part number of the PC board (and preprogram number, as described in step 1-c. following) as well as the serial number of the wire feeder. Do not attempt to repair the PC board yourself. Warranty on a PC board will be null and void if repaired by customer or an unauthorized repair shop.

4.1 General
a. Check interconnection between control and power supply and robot.
b. Energize the power supply and the control.
c. Immediately after the control is turned “on”, a number (e.g. : 3) will appear in the IPM readout window and will only be displayed for 1-second. This number identifies the current program (E-PROMS) used in your control. When a program is changed, the new E-PROMS will automatically identify the new program number being used. If a revision is made to an existing program a number .1, .2, .3, etc. indicating the numerical revision will also appear in the VOLTS readout window simultaneously.
d. After the one (1) second delay; the preset “Weld” parameters will be displayed in the IPM and VOLTS windows.
e. If the control is not functioning properly (or as described above); for example, the numbers that appear in one or both of the display windows are meaningless (all zeros, eights, decimals, etc.), or are completely incorrect in relation to your settings, - the memory must be cleared. This condition might occur after a bad lightning storm, extremely bad power line surges, etc. To clear the memory, do the following:

(1) Place the Run-Set key switch in its SET position (if provided).
(2) Turn “off” the unit’s 115-volt Power switch.
(3) Using one hand, hold both of the Inc/Dec toggle switches in the INC position while reapplying 110-volt power with the other hand.
(4) Almost immediately after the Power has been turned “On”, release the Inc/Dec toggle switches to the neutral (spring-return center) position and the windows should display the following: IPM = 0, VOLTS - 100, the indicating a successful reset or clearing has taken place.
f. You can now enter the desired information as described in this booklet.

4.2 No preset displays appear in windows.
a. Make sure the LED Display board harness/plug is plugged into the P5 receptacle on the MPU board.
b. Check that 115 vac is available across terminals T1-1 and T1-3, if present; switch closed.
c. Check for plus (+) 5 volts between terminals T1-10 and T1-12; if voltage is present, replace the MPU board. If voltage is not present, check the voltage regulator (VR). The voltage regulator is located on the bottom panel of the control box.
d. Check the input and output voltage of the regulator “VR”.

(1) The input should be approx. 11 volts across capacitor on regulator socket. If voltage is not present, replace I/O board.
(2) The output should be 5 volts between terminals T1-12 and T1-10. If voltage is not present, replace VR, voltage regulator.
4.3 Present display is provided, but cannot be varied.
   a. Check normal setup procedures described in Section IV, then;
   b. Make sure the key wiring harness plug is properly connected to receptacle P6 on the MPU board.
   c. If the above does not resolve the problem, replace the MPU board.

4.4 Motor does not run.
   a. Check to make sure all required (and/or optional) accessories are correctly assembled as described in Section II.
   b. Make sure that power supply is connected, plug P2 is securely connected to receptacle P2 on the I/O Board, and then release the clapper arm (pressure roll) on the Accessory Support Assembly.
   c. If the above does not resolve the problem, replace the MPU board.

(1) Operate the control INCH switch. If motor does not run; replace I/O and MPU boards respectively.
(2) If the motor inches, but does not run when the torch switch is operated (energized), check the start/stop switch circuit components. If motor still does not run, check if power supply is providing open-circuit voltage of 72 volts to the control - if o.c.v. is not being supplied, motor will not run. Check the power supply for trouble.
(3) Also check that the +/- 12 vdc are provided from the power supply on T1-16 and T1-17 to T124 common, respectively.
(4) If power supply O.K., replace the I/O and MPU boards respectively.

4.5 Motor runs, but not at right speed.
   a. Check tachometer assembly mounted on the end of EH-10 wire feed motor.
   b. Make sure the tach disc is securely fastened to the motor shaft and that the strobe markings are not scratched. Check that the disc is properly centered in the strobe pickup on the PC board.
   c. If all items in step b. are in order, and motor speed is still incorrect, replace MPU board.

4.6 Arc VOLTS display reads zero after Start is operated.
   a. Check that the 5-pin plug is securely connected to the P receptacle on the MPU board.
   b. If no reading is displayed, check for arc voltage feed-back between terminals TP1 and TP2 test points on the I/O p.c. board (see Fig. 6). This voltage signal should correspond to that shown on the power supply voltmeter.
   c. If voltage still reads zero, trace the voltage pickup wiring from the power supply to J6 or control.
   d. Remove the current detector 31419 board to gain access to the P3 plug (harness) on the MPU p.c. board. Disconnect the P3 plug from its MPU board socket and, using a meter check for +/- 12 volt power supply output between plug pins P3-1 and P3-2 (for +12v.) and between plug pins P3-4 and P3-2 (for -12v.) respectively. If voltage is present, replace the MPU board.

4.7 Control Shut-Down - either preset VOLTS or IPM displays will flash. The control will flash the parameter VOLTS or IPM that cannot be maintained.

These symptoms can occur if the preset conditions, IPM or VOLTS, cannot be maintained by the control.

a. IPM (speed) abort (IPM window flashes) and possible causes:
   (1) Initial “hot start” parameters incorrectly set. For proper adjustment, refer to Set-up Procedures following IV-B-10.
   (2) Defective J-governor board.
   (3) Defective Motor tachometer board.
   (4) Defective I/O board.
   (5) Defective MPU board.

b. VOLTS (voltage) abort (VOLT window flashes) and possible causes:

   This problem may be located in the wire feeder or the power source. To determine this, check the wire feeder as follows.
   (1) Strike an arc and while welding, measure the potential between T1-15 and T1-24. Note that as the arc voltage setting is increased, the potential between T1-15 and T1-24 also increases, and will range from 0 to 10 vdc. If it does not, replace the I/O and/or MPU board.
   If the potential is present and responding to the voltage change setting, continue with step (2) following.
   (2) If the arc is still unsatisfactory, the problem is either in the interconnecting cable, the welding setup, or in the power source. If possible, substitute a cable or power supply (known to be good) to check out the possible problem.
Wiring Diagram - Analog Interface Skeletal - Sheet 1 of 3
5.0 REPLACEMENT PARTS DATA

5.1 All replacement parts are keyed on the illustrations which follow. Order replacement parts by part number and part name, as shown on illustrations. DO NOT ORDER BY PART NUMBER ALONE.

5.2 Always state the series or serial number of the machine on which the parts are to be used. The serial number is stamped on the unit nameplate.

Revision History

Edition "A" (5/2001) includes the REIS Model of the Standard Mig Analog Interface and updates the Equipment Required listing in Section 2.
### Replacement Parts List for Figure 7

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<td>5-SOCKET RECEPTACLE - MOTOR TACH. - J2</td>
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<td>6-SOCKET RECEPTACLE - PLUMBING BOX - J4</td>
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<td>3-PIN RECEPTACLE - VOLTAGE PICKUP - J6</td>
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<td>TRANSISTOR SOCKET (T0-3)</td>
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<td>CAPACITOR (C4) - 1UF, 35 WVDC</td>
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<td>POWER SW. OPERATOR</td>
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<td>POWER SW. BUTTON</td>
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<td>START-STOP ROCKER SW. (SW1)</td>
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<td>PURGE/RESET ROCKER SW. (SW4)</td>
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<td>INCH. ROCKER SW. (SW5)</td>
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<td>950874</td>
<td>CIRCUIT BREAKER, 7-AMP (CB)</td>
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**FIGURE 7, STANDARD MIG ANALOG INTERFACE MICROPROCESSOR CONTROL**

(See Code List for Model P/N's)
### Replacement Parts List for Figure 8.

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<tr>
<th>ITEM NO.</th>
<th>QTY REQ.</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
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<td>- GMF</td>
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<td>- HITACHI</td>
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<td>22-PIN P.C. BD, RECEPTACLES (P1 &amp; P3)</td>
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<td>17145315</td>
<td>RESISTOR 15K OHM, 2W (R1 BET. P1-13 &amp; P1-16)</td>
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<td>LATCH</td>
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<td>VOLTS/IPM DISPLAY P.C. BD. ASSEMBLY</td>
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<td>ANALOG INPUT TEST SWITCH (SW-10)</td>
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<td>A.H./INCH-SPOT/B'BACK SWITCH (SW7)</td>
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<td>INPUT/OUTPUT (I/O) P.C. BD. ASSEMBLY</td>
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**FIGURE 8, STANDARD MIG ANALOG INTERFACE, INSIDE CONTROL PANEL**
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<td>C</td>
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<td>ANALOG TO ANALOG P.C. BD. ASSY</td>
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<td>24-PT. TERMINAL BOARD (T1 &amp; T2)</td>
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<td>D.C. RELAY (REVRLY)</td>
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FIGURE 9, STANDARD MIG ANALOG INTERFACE, INNER CABINET COMPONENTS

Replacement Parts List for Figure 9.
A. CUSTOMER SERVICE QUESTIONS:
Order Entry  Product Availability  Pricing  Delivery
Order Changes  Saleable Goods Returns  Shipping Information

Eastern Distribution Center
Telephone: (800) 362-7080 / Fax: (800) 634-7548

Central Distribution Center
Telephone: (800) 783-5360 / Fax: (800) 783-5362

Western Distribution Center
Telephone: (800) 235-4012 / Fax: (888) 586-4670

B. ENGINEERING SERVICE:
Telephone: (843) 664-4416 / Fax: (800) 446-5693
Welding Equipment Troubleshooting
Warranty Returns  Authorized Repair Stations

C. TECHNICAL SERVICE:
Telephone: (800) ESAB-123 / Fax: (843) 664-4452
Part Numbers  Technical Applications
Performance Features  Technical Specifications  Equipment Recommendations

D. LITERATURE REQUESTS:
Telephone: (843) 664-5562 / Fax: (843) 664-5548

E. WELDING EQUIPMENT REPAIRS:
Telephone: (843) 664-4487 / Fax: (843) 664-5557
Repair Estimates  Repair Status

F. WELDING EQUIPMENT TRAINING:
Telephone: (843) 664-4428 / Fax: (843) 679-5864
Training School Information and Registrations

G. WELDING PROCESS ASSISTANCE:
Telephone: (800) ESAB-123 / Fax: (843) 664-4454

H. TECHNICAL ASST. CONSUMABLES:
Telephone: (800) 933-7070

IF YOU DO NOT KNOW WHOM TO CALL
Telephone: (800) ESAB-123 / Fax: (843) 664-4452 / Web: http://www.esab.com

Hours: 7:30 AM to 5:00 PM EST