

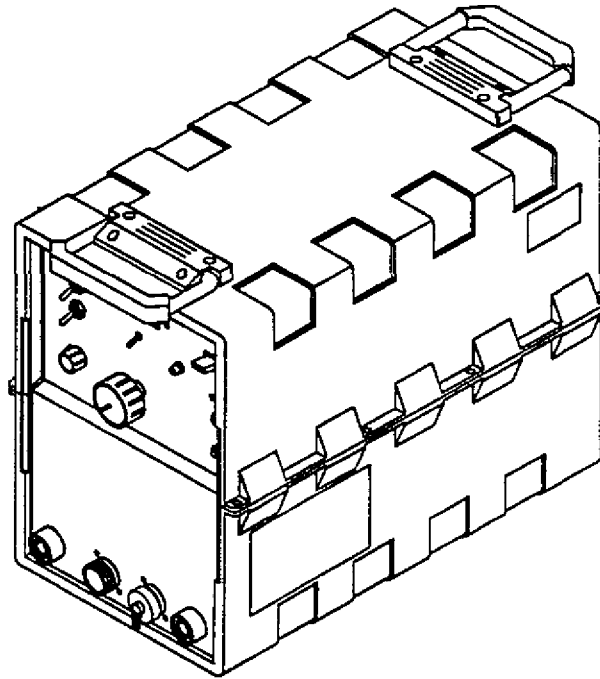


May 1990

FORM: OM-2205

Effective With Serial No. KA745201

MODEL: XMT™ 300 CC/CV



OWNER'S MANUAL

IMPORTANT: Read and understand the entire contents of this manual, with special emphasis on the safety material throughout the manual, before installing, operating, or maintaining this equipment. This unit and these instructions are for use only by persons trained and experienced in the safe operation of welding equipment. Do not allow untrained persons to install, operate, or maintain this unit. Contact your distributor if you do not fully understand these instructions.

MILLER ELECTRIC Mfg. Co.
A Miller Group Ltd., Company

P.O. Box 1079
Appleton, WI 54912 USA
Tel. 414-734-9821

LIMITED WARRANTY

EFFECTIVE: FEBRUARY 1, 1990

This 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 hereof, Miller Electric Mfg. Co., Appleton, Wisconsin warrants to its Distributor/Dealer that all new and unused Equipment furnished by Miller is free from defect in workmanship and material as of the time and place of delivery by Miller. No warranty is made by Miller with respect to engines, trade accessories or other items manufactured by others. Such engines, trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any. All engines are warranted by their manufacturer for two years from date of original purchase, except Deutz engines which have a one year, 2000 hour warranty.

Except as specified below, Miller's warranty does not apply to components having normal useful life of less than one (1) year, such as spot welder tips, relay and contactor points, MILLER-MATIC parts that come in contact with the welding wire including nozzles and nozzle insulators where failure does not result from defect in workmanship or material.

Miller shall be required to honor warranty claims on warranted Equipment in the event of failure resulting from a defect within the following periods from the date of delivery of Equipment to the original user:

1. Arc welders, power sources, robots, and 1 year components
2. Load banks 1 year
3. Original main power rectifiers 3 years (labor – 1 year only)
4. All welding guns, feeder/guns and torches 90 days
5. All other Millermatic Feeders 1 year
6. Replacement or repair parts, exclusive of labor 60 days
7. Batteries 6 months

provided that Miller is notified in writing within thirty (30) days of the date of such failure.

As a matter of general policy only, Miller may honor claims submitted by the original user within the foregoing periods.

In the case of Miller's breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefore shall be, at Miller's option (1) repair or (2) replacement or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at Customer's risk and expense. MILLER's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a MILLER authorized service facility, therefore, no compensation for transportation costs of any kind will be allowed. Upon receipt of notice of apparent defect or failure, Miller shall instruct the claimant on the warranty claim procedures to be followed.

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

EXCEPT AS EXPRESSLY PROVIDED BY MILLER IN WRITING, MILLER PRODUCTS ARE INTENDED FOR ULTIMATE PURCHASE BY COMMERCIAL/INDUSTRIAL USERS AND FOR OPERATION BY PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT AND NOT FOR CONSUMERS OR CONSUMER USE. MILLER'S WARRANTIES DO NOT EXTEND TO, AND NO RESELLER IS AUTHORIZED TO EXTEND MILLER'S WARRANTIES TO, ANY CONSUMER.

ERRATA SHEET

After this manual was printed, refinements in equipment design occurred. This sheet lists exceptions to data appearing later in this manual.

AMENDMENT TO SECTION 4 – INSTALLATION OR RELOCATION

Add Section 4-5A. DIGITAL METER HOLD FUNCTION ENABLE/DISABLE

IMPORTANT: *The digital meter is shipped with the hold function enabled (on). The procedure in this section is necessary only if the operator desires to change the existing state of the hold function.*

The optional digital meter (see Section 5-7) is capable of holding the displayed value for fifteen seconds after the contactor is deenergized (off). This procedure allows the hold function to be enabled or disabled as desired.



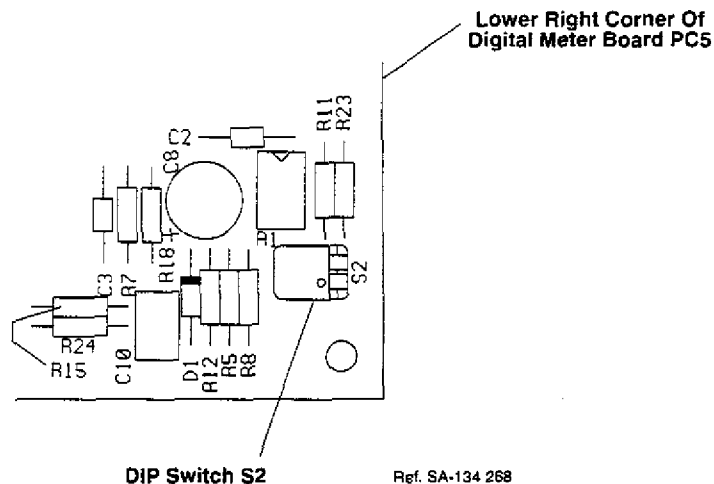
WARNING: ELECTRIC SHOCK can kill. SIGNIFICANT DC VOLTAGE exists after removal of input power.

- Do not touch live electrical parts.
- Shut down welding power source, disconnect input power employing lockout/tagging procedures, wait 60 seconds, and measure voltage on input capacitors according to Section 7-3 before touching any parts.

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

1. Locate Digital Meter Board PC5 (see Figure 9-2).
2. Locate DIP switch S2 on Digital Meter Board PC5 (see Figure 4-3A on this Errata Sheet).
3. Set DIP switch S2 as follows:
 - a. Hold enabled:
toggle 1 - off (up), toggle 2 - on (down)
 - b. Hold disabled:
toggle 1 - on (down), toggle 2 - off (up)
4. Reinstall top of unit.

Add Figure 4-3A. Location of DIP Switch S2 On Digital Meter Board PC5



Ref. SA-134 268

Figure 4-3A. Location Of DIP Switch S2 On Digital Meter Board PC5

AMENDMENT TO SECTION 5 – OPERATOR CONTROLS

Add the following paragraph at the end of Section 5-7 AMPERAGE/VOLTAGE DIGITAL METER AND SWITCH

The meter is capable of holding the displayed actual amperage or voltage for fifteen seconds after the contactor is deenergized (off). After fifteen seconds, the display returns to the preset condition. The hold function may be enabled or disabled by following the procedure in Section 4-5A on this Errata Sheet.

AMENDMENT TO SECTION 8 – ELECTRICAL DIAGRAMS

Amend Diagram 8-1. Circuit Diagram (see Page 3 on this Errata Sheet)

Amend Diagram 8-2. Wiring Diagram (see Pages 4 and 5 on this Errata Sheet)

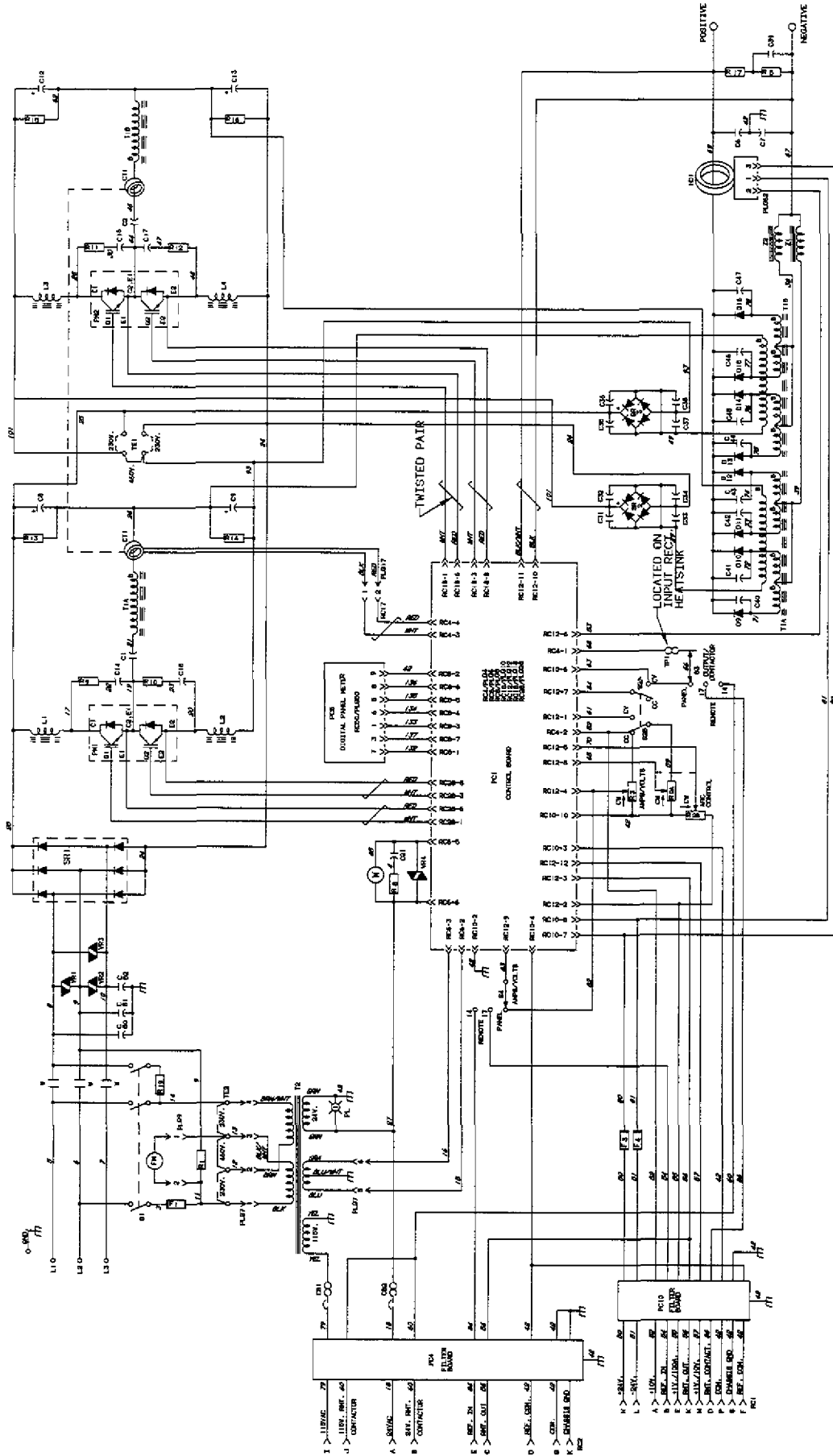
AMENDMENT TO SECTION 9 – PARTS LIST

Amend Parts List as follows:

| ** | Dia. Mkgs. | Part No. | Replaced With | Description | Quantity |
|-------|------------|----------|---------------|--|----------|
| 33-5 | | 133 407 | 137 198 | NUT, insert No. 10-24 panel mtg (Eff w/KA823684) | 4 |
| 33-13 | C31-38 | 128 236 | 139 849 | CAPACITOR ASSEMBLY | 2 |
| 33-24 | | 135 744 | +140 113 | CASE SECTION, front/bottom/rear | 1 |
| 33-30 | | 133 406 | 137 197 | NUT, insert .312-18 panel mtg (Eff w/KA823684) | 4 |
| 33-32 | | 123 154 | 134 327 | LABEL, warning general precautionary | 2 |
| 35-1 | C6,7 | 134 296 | 138 115 | CAPACITOR ASSEMBLY | 2 |
| 35-13 | | 133 796 | Deleted | Eff w/KA823684 | |
| 36-21 | C7 | 134 298 | Deleted | | |
| 36-25 | | 039 885 | 039 885 | CAP, dust connector | 2 |
| 37-11 | PC1 | 135 067 | 138 735 | CIRCUIT CARD, control (Eff w/KA831552) | 1 |
| 37- | C40-43 | 126 005 | 138 114 | CAPACITOR ASSEMBLY | 4 |
| 37-30 | C50-52 | 087 209 | 120 920 | CAPACITOR | 3 |
| 39- | C44-47 | 126 005 | 138 114 | CAPACITOR ASSEMBLY | 4 |
| 39-49 | | 133 293 | 139 575 | STRIP, bus rectifier | 1 |
| 39- | R19 | Added | 030 982 | RESISTOR, WW fxd 5W 10 ohm | 1 |

**First digit represents page no – digits following dash represent item no.

+When ordering a component originally displaying a precautionary label, the label should also be ordered.
BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.



Circuit Diagram No. SD-138 341

Diagram 8-1. Circuit Diagram Effective With Serial No. KA745201

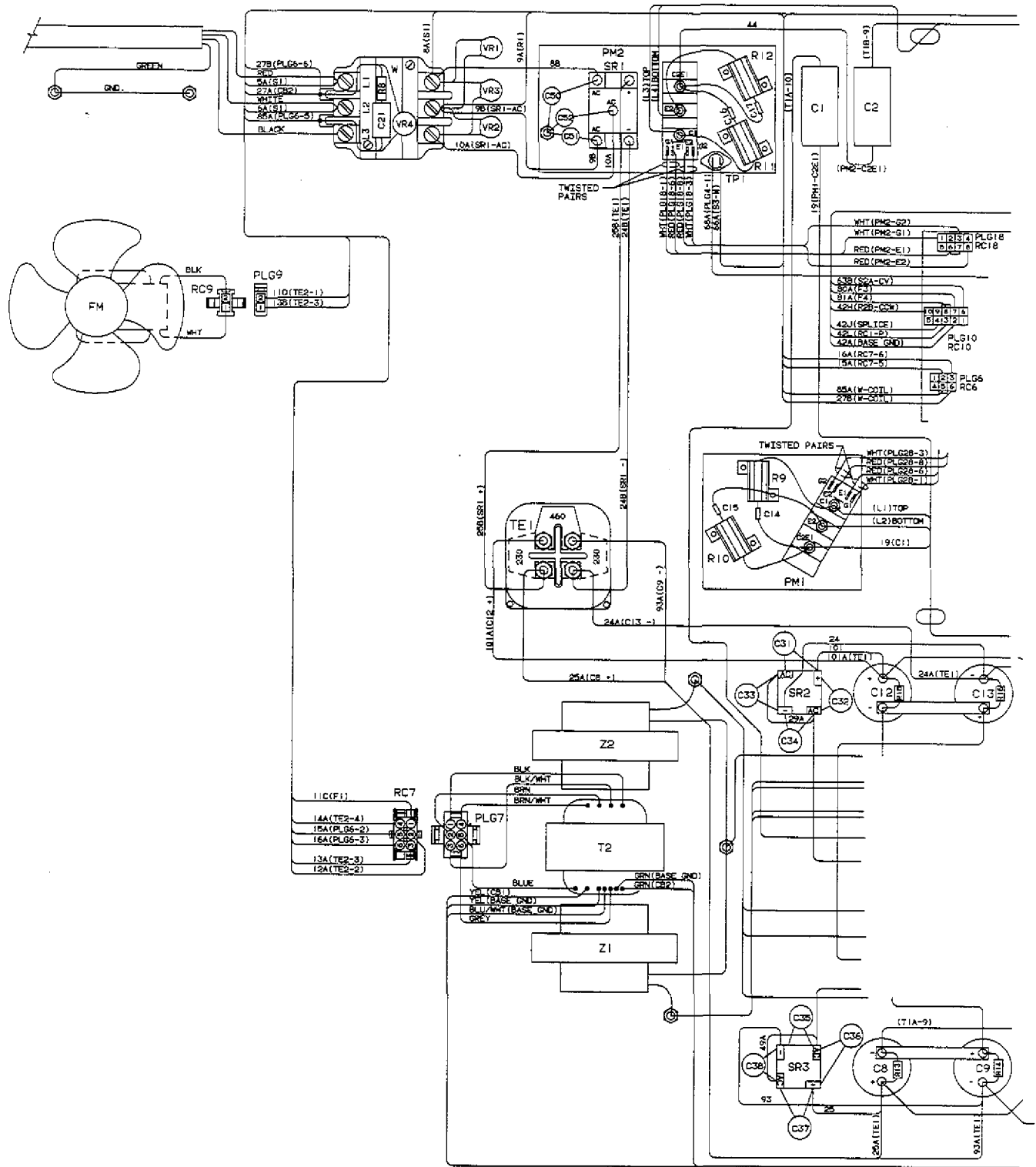
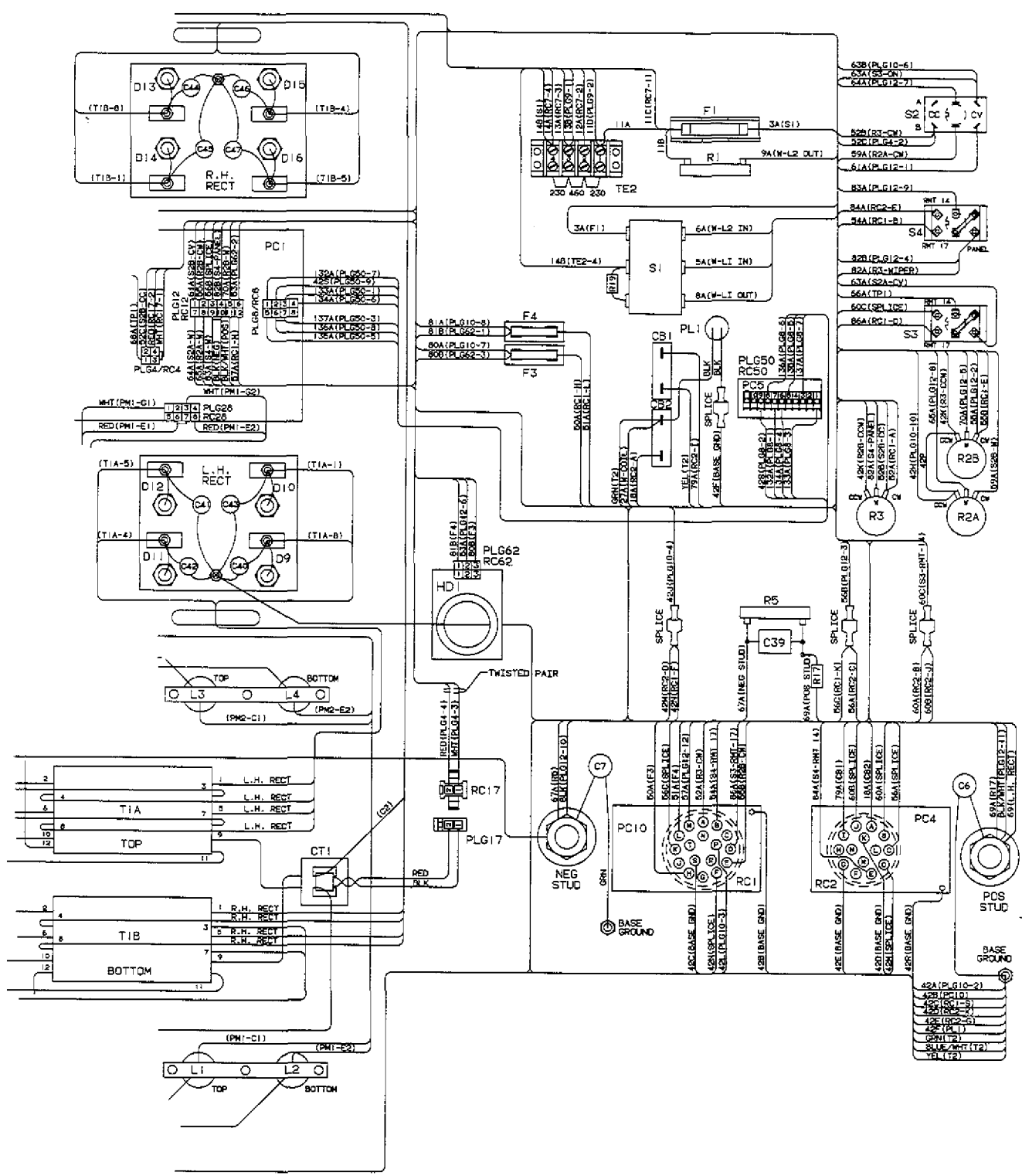


Diagram 8-2. Wiring Diagram Effective With Serial No. KA745201



Wiring Diagram No. SD-138 346-A

RECEIVING-HANDLING

Before unpacking equipment, check carton for any damage that may have occurred during shipment. File any claims for loss or damage **with the delivering carrier**. Assistance for filing or settling claims may be obtained from the distributor and/or the equipment manufacturer's Transportation Department.

When requesting information about this equipment, always provide the Model Description and Serial or Style Number.

Use the following spaces to record the Model Designation and Serial or Style Number of your unit. The information is located on the data card or the nameplate.

Model _____

Serial or Style No. _____

Date of Purchase _____

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SECTION 1 – SAFETY RULES FOR OPERATION OF ARC WELDING POWER SOURCE

1-1. INTRODUCTION

We learn by experience. Learning safety through personal experience, like a child touching a hot stove is harmful, wasteful, and unwise. Let the experience of others teach you.

Safe practices developed from experience in the use of welding and cutting are described in this manual. Research, development, and field experience have evolved reliable equipment and safe installation, operation, and servicing practices. Accidents occur when equipment is improperly used or maintained. The reason for the safe practices may not always be given. Some are based on common sense, others may require technical volumes to explain. It is wiser to follow the rules.

Read and understand these safe practices before attempting to install, operate, or service the equipment. Comply with these procedures as applicable to the particular equipment used and their instruction manuals, for personal safety and for the safety of others.

Failure to observe these safe practices may cause serious injury or death. When safety becomes a habit, the equipment can be used with confidence.

These safe practices are divided into two Sections: 1-General Precautions, common to arc welding and cutting; and 2-Arc Welding (and Cutting) (only).

Reference standards: Published Standards on safety are also available for additional and more complete procedures than those given in this manual. They are listed in the Standards Index in this manual. ANSI Z49.1 is the most complete.

The National Electrical Code, Occupational Safety and Health Administration, local industrial codes, and local inspection requirements also provide a basis for equipment installation, use, and service.

1-2. GENERAL PRECAUTIONS

Different arc welding processes, electrode alloys, and fluxes can produce different fumes, gases, and radiation levels. In addition to the information in this manual, be sure to consult flux and electrode manufacturers Material Safety Data Sheets (MSDSs) for specific technical data and precautionary measures concerning their material.

A. Burn Prevention

Wear protective clothing-gauntlet gloves designed for use in welding, hat, and high safety-toe shoes. Button shirt collar and pocket flaps, and wear cuffless trousers to avoid entry of sparks and slag.

Wear helmet with safety goggles and glasses with side shields underneath, appropriate filter lenses or plates (protected by clear cover glass). This is a MUST for

welding or cutting, (and chipping) to protect the eyes from radiant energy and flying metal. Replace cover glass when broken, pitted, or spattered. See 1-3A.2.

Avoid oily or greasy clothing. A spark may ignite them.

Hot metal such as electrode stubs and workpieces should never be handled without gloves.

Medical first aid and eye treatment. First aid facilities and a qualified first aid person should be available for each shift unless medical facilities are close by for immediate treatment of flash burns of the eyes and skin burns.

Ear plugs should be worn when working on overhead or in a confined space. A hard hat should be worn when others work overhead.

Flammable hair preparations should not be used by persons intending to weld or cut.

B. Toxic Fume Prevention

Severe discomfort, illness or death can result from fumes, vapors, heat, or oxygen enrichment or depletion that welding (or cutting) may produce. Prevent them with adequate ventilation as described in ANSI Standard Z49.1 listed in Standards Index. NEVER ventilate with oxygen.

Lead -, cadmium -, zinc -, mercury -, and beryllium-bearing and similar materials, when welded (or cut) may produce harmful concentrations of toxic fumes. Adequate local exhaust ventilation must be used, or each person in the area as well as the operator must wear an air-supplied respirator. For beryllium, both must be used.

Metals coated with or containing materials that emit toxic fumes should not be heated unless coating is removed from the work surface, the area is well ventilated and, if necessary, while wearing an air-supplied respirator.

Work in a confined space only while it is being ventilated and, if necessary, while wearing an air-supplied respirator.

Gas leaks in a confined space should be avoided. Leaked gas in large quantities can change oxygen concentration dangerously. Do not bring gas cylinders into a confined space.

Leaving confined space, shut OFF gas supply at source to prevent possible accumulation of gases in the space if downstream valves have been accidentally opened or left open. Check to be sure that the space is safe before re-entering it.

Vapors from chlorinated solvents can be decomposed by the heat of the arc (or flame) to form PHOSGENE, a highly toxic gas, and other lung and eye irritating products. The ultraviolet (radiant) energy of the arc can also decompose trichloroethylene and perchloroethylene vapors to form phosgene. DO NOT WELD or cut where solvent vapors can be drawn into the welding or cutting atmosphere or where the radiant energy can penetrate

to atmospheres containing even minute amounts of trichloroethylene or perchloroethylene.

C. Fire and Explosion Prevention

Causes of fire and explosion are: combustibles reached by the arc, flame, flying sparks, hot slag or heated material; misuse of compressed gases and cylinders; and short circuits.

BE AWARE THAT flying sparks or falling slag can pass through cracks, along pipes, through windows or doors, and through wall or floor openings, out of sight of the goggled operator. Sparks and slag can fly 35 feet.

To prevent fires and explosion:

Keep equipment clean and operable, free of oil, grease, and (in electrical parts) of metallic particles that can cause short circuits.

If combustibles are in area, do NOT weld or cut. Move the work if practicable, to an area free of combustibles. Avoid paint spray rooms, dip tanks, storage areas, ventilators. If the work cannot be moved, move combustibles at least 35 feet away out of reach of sparks and heat; or protect against ignition with suitable and snug-fitting, fire-resistant covers or shields.

Walls touching combustibles on opposite sides should not be welded on (or cut). Walls, ceilings, and floor near work should be protected by heat-resistant covers or shields.

Fire watcher must be standing by with suitable fire extinguishing equipment during and for some time after welding or cutting if:

- a. appreciable combustibles (including building construction) are within 35 feet
- b. appreciable combustibles are further than 35 feet but can be ignited by sparks
- c. openings (concealed or visible) in floors or walls within 35 feet may expose combustibles to sparks
- d. combustibles adjacent to walls, ceilings, roofs, or metal partitions can be ignited by radiant or conducted heat.

Hot work permit should be obtained before operation to ensure supervisor's approval that adequate precautions have been taken.

After work is done, check that area is free of sparks, glowing embers, and flames.

An empty container that held combustibles, or that can produce flammable or toxic vapors when heated, must never be welded on or cut, unless container has first been cleaned as described in AWS Standard A6.0, listed 7 in Standards Index.

This includes: a thorough steam or caustic cleaning (or a solvent or water washing, depending on the combustible's solubility) followed by purging and inerting with nitrogen or carbon dioxide, and using protective equip-

ment as recommended in A6.0. Waterfilling just below working level may substitute for inerting.

A container with unknown contents should be cleaned (see preceding paragraph). Do NOT depend on sense of smell or sight to determine if it is safe to weld or cut.

Hollow castings or containers must be vented before welding or cutting. They can explode.

Explosive atmospheres. Never weld or cut where the air may contain flammable dust, gas, or liquid vapors (such as gasoline).

D. Compressed Gas Equipment

Standard precautions. Comply with precautions in this manual, and those detailed in CGA Standard P-1, SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS, listed 11 in Standards Index.

1. Pressure Regulators

Regulator relief valve is designed to protect only the regulator from overpressure; it is not intended to protect any downstream equipment. Provide such protection with one or more relief devices.

Never connect a regulator to a cylinder containing gas other than that for which the regulator was designed.

Remove faulty regulator from service immediately for repair (first close cylinder valve). The following symptoms indicate a faulty regulator:

Leaks-if gas leaks externally.

Excessive Creep-if delivery pressure continues to rise with downstream valve closed.

Faulty Gauge-if gauge pointer does not move off stop pin when pressurized, nor returns to stop pin after pressure release.

Repair. Do NOT attempt to repair. Send faulty regulators for repair to manufacturer's designated repair center, where special techniques and tools are used by trained personnel.

2. Cylinders

Cylinders must be handled carefully to prevent leaks and damage to their walls, valves, or safety devices:

Avoid electrical circuit contact with cylinders including third rails, electrical wires, or welding circuits. They can produce short circuit arcs that may lead to a serious accident. (See 1-3C.)

ICC or DOT marking must be on each cylinder. It is an assurance of safety when the cylinder is properly handled.

Identifying gas content. Use only cylinders with name of gas marked on them; do not rely on color to identify gas content. Notify supplier if unmarked. NEVER DEFACE or alter name, number, or other markings on a cylinder. It is illegal and hazardous.

Empties: Keep valves closed, replace caps securely; mark MT; keep them separate from FULLS and return promptly.

Prohibited use. Never use a cylinder or its contents for other than its intended use, NEVER as a support or roller.

Locate or secure cylinders so they cannot be knocked over.

Passageways and work areas. Keep cylinders clear of areas where they may be struck.

Transporting cylinders. With a crane, use a secure support such as a platform or cradle. Do NOT lift cylinders off the ground by their valves or caps, or by chains, slings, or magnets.

Do NOT expose cylinders to excessive heat, sparks, slag, and flame, etc. that may cause rupture. Do not allow contents to exceed 130°F. Cool with water spray where such exposure exists.

Protect cylinders particularly valves from bumps, falls, falling objects, and weather. Replace caps securely when moving cylinders.

Stuck valve. Do NOT use a hammer or wrench to open a cylinder valve that can not be opened by hand. Notify your supplier.

Mixing gases. Never try to mix any gases in a cylinder.

Never refill any cylinder.

Cylinder fittings should never be modified or exchanged.

3. Hose

Prohibited use. Never use hose other than that designed for the specified gas. A general hose identification rule is: red for fuel gas, green for oxygen, and black for inert gases.

Use ferrules or clamps designed for the hose (not ordinary wire or other substitute) as a binding to connect hoses to fittings.

No copper tubing splices. Use only standard brass fittings to splice hose.

Avoid long runs to prevent kinks and abuse. Suspend hose off ground to keep it from being run over, stepped on, or otherwise damaged.

Coil excess hose to prevent kinks and tangles.

Protect hose from damage by sharp edges, and by sparks, slag, and open flame.

Examine hose regularly for leaks, wear, and loose connections. Immerse pressured hose in water; bubbles indicate leaks.

Repair leaky or worn hose by cutting area out and splicing (1-2D3). Do NOT tape.

4. Proper Connections

Clean cylinder valve outlet of impurities that may clog orifices and damage seats before connecting regulator. Except for hydrogen, crack valve momentarily, pointing

outlet away from people and sources of ignition. Wipe with a clean lintless cloth.

Match regulator to cylinder. Before connecting, check that the regulator label and cylinder marking area, and that the regulator inlet and cylinder outlet match. NEVER CONNECT a regulator designed for a particular gas or gases to a cylinder containing any other gas.

Tighten connections. When assembling threaded connections, clean and smooth seats where necessary. Tighten. If connection leaks, disassemble, clean, and retighten using properly fitting wrench.

Adapters. Use a CGA adapter (available from your supplier) between cylinder and regulator, if one is required. Use two wrenches to tighten adapter marked RIGHT and LEFT HAND threads.

Regulator outlet (or hose) connections may be identified by right hand threads for oxygen and left hand threads (with grooved hex on nut or shank) for fuel gas.

5. Pressurizing Steps:

Drain regulator of residual gas through suitable vent before opening cylinder (or manifold valve) by turning adjusting screw in (clockwise). Draining prevents excessive compression heat at high pressure seat by allowing seat to open on pressurization. Leave adjusting screw engaged slightly on single-stage regulators.

Stand to side of regulator while opening cylinder valve.

Open cylinder valve slowly so that regulator pressure increases slowly. When gauge is pressurized (gauge reaches regulator maximum) leave cylinder valve in following position: For oxygen, and inert gases, open fully to seal stem against possible leak. For fuel gas, open to less than one turn to permit quick emergency shutoff.

Use pressure charts (available from your supplier) for safe and efficient, recommended pressure settings on regulators.

Check for leaks on first pressurization and regularly there-after. Brush with soap solution (capfull of Ivory Liquid* or equivalent per gallon of water). Bubbles indicate leak. Clean off soapy water after test; dried soap is combustible.

E. User Responsibilities

Remove leaky or defective equipment from service immediately for repair. See User Responsibility statement in equipment manual.

F. Leaving Equipment Unattended

Close gas supply at source and drain gas.

G. Rope Staging-Support

Rope staging-support should not be used for welding or cutting operation; rope may burn.

*Trademark of Proctor & Gamble.

1-3. ARC WELDING

Comply with precautions in 1-1, 1-2, and this section. Arc Welding, properly done, is a safe process, but a careless operator invites trouble. The equipment carries high currents at significant voltages. The arc is very bright and hot. Sparks fly, fumes rise, ultraviolet and infrared energy radiates, weldments are hot, and compressed gases may be used. The wise operator avoids unnecessary risks and protects himself and others from accidents. Precautions are described here and in standards referenced in index.

A. Burn Protection

Comply with precautions in 1-2.

The welding arc is intense and visibly bright. Its radiation can damage eyes, penetrate lightweight clothing, reflect from light-colored surfaces, and burn the skin and eyes. Skin burns resemble acute sunburn, those from gas-shielded arcs are more severe and painful. **DON'T GET BURNED; COMPLY WITH PRECAUTIONS.**

1. Protective Clothing

Wear long-sleeve clothing (particularly for gas-shielded arc) in addition to gloves, hat, and shoes (1-2A). As necessary, use additional protective clothing such as leather jacket or sleeves, flame-proof apron, and fire-resistant leggings. Avoid outer garments of untreated cotton.

Bare skin protection. Wear dark, substantial clothing. Button collar to protect chest and neck and button pockets to prevent entry of sparks.

2. Eye and Head Protection

Protect eyes from exposure to arc. **NEVER** look at an electric arc without protection.

Welding helmet or shield containing a filter plate shade no. 12 or denser must be used when welding. Place over face before striking arc.

Protect filter plate with a clear cover plate.

Cracked or broken helmet or shield should **NOT** be worn; radiation can pass through to cause burns.

Cracked, broken, or loose filter plates must be replaced **IMMEDIATELY**. Replace clear cover plate when broken, pitted, or spattered.

Flash goggles with side shields **MUST** be worn under the helmet to give some protection to the eyes should the helmet not be lowered over the face before an arc is struck. Looking at an arc momentarily with unprotected eyes (particularly a high intensity gas-shielded arc) can cause a retinal burn that may leave a permanent dark area in the field of vision.

3. Protection of Nearby Personnel

Enclosed welding area. For production welding, a separate room or enclosed bay is best. In open areas, surround the operation with low-reflective, non-combustible screens or panels. Allow for free air circulation, particularly at floor level.

Viewing the weld. Provide face shields for all persons who will be looking directly at the weld.

Others working in area. See that all persons are wearing flash goggles.

Before starting to weld, make sure that screen flaps or bay doors are closed.

B. Toxic Fume Prevention

Comply with precautions in 1-2B.

Generator engine exhaust must be vented to the outside air. Carbon monoxide can kill.

C. Fire and Explosion Prevention

Comply with precautions in 1-2C.

Equipment's rated capacity. Do not overload arc welding equipment. It may overheat cables and cause a fire.

Loose cable connections may overheat or flash and cause a fire.

Never strike an arc on a cylinder or other pressure vessel. It creates a brittle area that can cause a violent rupture or lead to such a rupture under rough handling.

D. Compressed Gas Equipment

Comply with precautions in 1-2D.

E. Shock Prevention

Exposed hot conductors or other bare metal in the welding circuit, or in ungrounded, electrically-HOT equipment can fatally shock a person whose body becomes a conductor. **DO NOT STAND, SIT, LIE, LEAN ON, OR TOUCH** a wet surface when welding, without suitable protection.

To protect against shock:

Wear dry insulating gloves and body protection. Keep body and clothing dry. Never work in damp area without adequate insulation against electrical shock. Stay on a dry duckboard, or rubber mat when dampness or sweat can not be avoided. Sweat, sea water, or moisture between body and an electrically HOT part or grounded metal reduces the electrical resistance, and could enable dangerous and possibly lethal currents to flow through the body.

A voltage will exist between the electrode and any conducting object in the work circuit. Examples of conducting objects include, but are not limited to, buildings, electrical tools, work benches, welding power source cases, workpieces, etc. **Never touch the electrode and any metal object unless the welding power source is off.**

1. Grounding the Equipment

Arc welding equipment must be grounded according to the National Electrical Code, and the work must be grounded according to ANSI Z49.1 "Safety In Welding And Cutting."

When installing, connect the frames of each unit such as welding power source, control, work table, and water circulator to the building ground. Conductors must be adequate to carry ground currents safely. Equipment made

electrically HOT by stray current may shock, possibly fatally. Do NOT GROUND to electrical conduit, or to a pipe carrying ANY gas or flammable liquid such as oil or fuel.

Three-phase connection. Check phase requirements of equipment before installing. If only 3-phase power is available, connect single-phase equipment to only two wires of the 3-phase line. Do NOT connect the equipment ground lead to the third (live) wire, or the equipment will become electrically HOT—a dangerous condition that can shock, possibly fatally.

Before welding, check ground for continuity. Be sure conductors are touching bare metal of equipment frames at connections.

If a line cord with a ground lead is provided with the equipment for connection to a switchbox, connect the ground lead to the grounded switchbox. If a three-prong plug is added for connection to a grounded mating receptacle, the ground lead must be connected to the ground prong only. If the line cord comes with a three-prong plug, connect to a grounded mating receptacle. Never remove the ground prong from a plug, or use a plug with a broken off ground prong.

2. Electrode Holders

Fully insulated electrode holders should be used. Do NOT use holders with protruding screws.

3. Connectors

Fully insulated lock-type connectors should be used to join welding cable lengths.

4. Cables

Frequently inspect cables for wear, cracks and damage. IMMEDIATELY REPLACE those with excessively worn or damaged insulation to avoid possibly-lethal shock from bared cable. Cables with damaged areas may be taped to give resistance equivalent to original cable.

Keep cable dry, free of oil and grease, and protected from hot metal and sparks.

5. Terminals And Other Exposed Parts

Terminals and other exposed parts of electrical units should have insulating covers secured before operation.

6. Electrode

a. Equipment with output on/off control (contactor)

Welding power sources for use with the gas metal arc welding (GMAW), gas tungsten arc welding (GTAW) and similar processes normally are equipped with devices that permit on-off control of the welding power output. When so equipped the electrode wire becomes electrically HOT when the power source switch is ON and the welding gun switch is closed. Never touch the electrode wire or any conducting object in contact with the electrode circuit unless the welding power source is off.

b. Equipment without output on/off control (no contactor)

Welding power sources used with shielded metal arc welding (SMAW) and similar processes may not be equipped with welding power output on-off control devices. With such equipment the electrode is electrically HOT when the power switch is turned ON. Never touch the electrode unless the welding power source is off.

7. Safety Devices

Safety devices such as interlocks and circuit breakers should not be disconnected or shunted out.

Before installation, inspection, or service, of equipment, shut OFF all power and remove line fuses (or lock or red-tag switches) to prevent accidental turning ON of power. Disconnect all cables from welding power source, and pull all 115 volts line-cord plugs.

Do not open power circuit or change polarity while welding. If, in an emergency, it must be disconnected, guard against shock burns, or flash from switch arcing.

Leaving equipment unattended. Always shut OFF and disconnect all power to equipment.

Power disconnect switch must be available near the welding power source.

F. Protection For Wearers of Electronic Life Support Devices (Pacemakers)

Magnetic fields from high currents can affect pacemaker operation. Persons wearing electronic life support equipment (pacemaker) should consult with their doctor before going near arc welding, gouging, or spot welding operations.

1-4. STANDARDS BOOKLET INDEX

For more information, refer to the following standards or their latest revisions and comply as applicable:

1. ANSI Standard Z49.1, SAFETY IN WELDING AND CUTTING obtainable from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126.
2. NIOSH, SAFETY AND HEALTH IN ARC WELDING AND GAS WELDING AND CUTTING obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
3. OSHA, SAFETY AND HEALTH STANDARDS, 29CFR 1910, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
4. ANSI Standard Z87.1, SAFE PRACTICES FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.
5. ANSI Standard Z41.1, STANDARD FOR MEN'S SAFETY-TOE FOOTWEAR obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.
6. ANSI Standard Z49.2, FIRE PREVENTION IN THE USE OF CUTTING AND WELDING PROCESSES

obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

7. AWS Standard A6.0, WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES obtainable from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126.
8. NFPA Standard 51, OXYGEN-FUEL GAS SYSTEMS FOR WELDING, CUTTING, AND ALLIED PROCESSES obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.
9. NFPA Standard 70, NATIONAL ELECTRICAL CODE obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.
10. NFPA Standard 51B, CUTTING AND WELDING PROCESSES obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.
11. CGA Pamphlet P-1, SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS obtainable from the Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.
12. CSA Standard W117.2, CODE FOR SAFETY IN WELDING AND CUTTING obtainable from the Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.
13. NWSA booklet, WELDING SAFETY BIBLIOGRAPHY obtainable from the National Welding Supply Association, 1900 Arch Street, Philadelphia, PA 19103.
14. American Welding Society Standard AWSF4.1, RECOMMENDED SAFE PRACTICES FOR THE PREPARATION FOR WELDING AND CUTTING OF CONTAINERS AND PIPING THAT HAVE HELD HAZARDOUS SUBSTANCES, obtainable from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126.
15. ANSI Standard Z88.2, PRACTICE FOR RESPIRATORY PROTECTION, obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

SECTION 2 – SAFETY PRECAUTIONS AND SIGNAL WORDS

2-1. GENERAL INFORMATION AND SAFETY

A. General

Information presented in this manual and on various labels, tags, and plates on the unit pertains to equipment design, installation, operation, maintenance, and troubleshooting which should be read, understood, and followed for the safe and effective use of this equipment.

The nameplate of this unit uses international symbols for labeling the front panel controls. The symbols also appear at the appropriate section in the text.

B. Safety

The installation, operation, maintenance, and troubleshooting of arc welding equipment requires practices and procedures which ensure personal safety and the safety of others. Therefore, this equipment is to be installed, operated, and maintained only by qualified persons in accordance with this manual and all applicable codes such as, but not limited to, those listed at the end of Section 1 – Safety Rules For Operation Of Arc Welding Power Source.

2-2. SAFETY ALERT SYMBOL AND SIGNAL WORDS

The following safety alert symbol and signal words are used throughout this manual to call attention to and identify different levels of hazard and special instructions.



This safety alert symbol is used with the signal words **WARNING** and **CAUTION** to call attention to the safety statements.



WARNING statements identify procedures or practices which must be followed to avoid serious personal injury or loss of life.



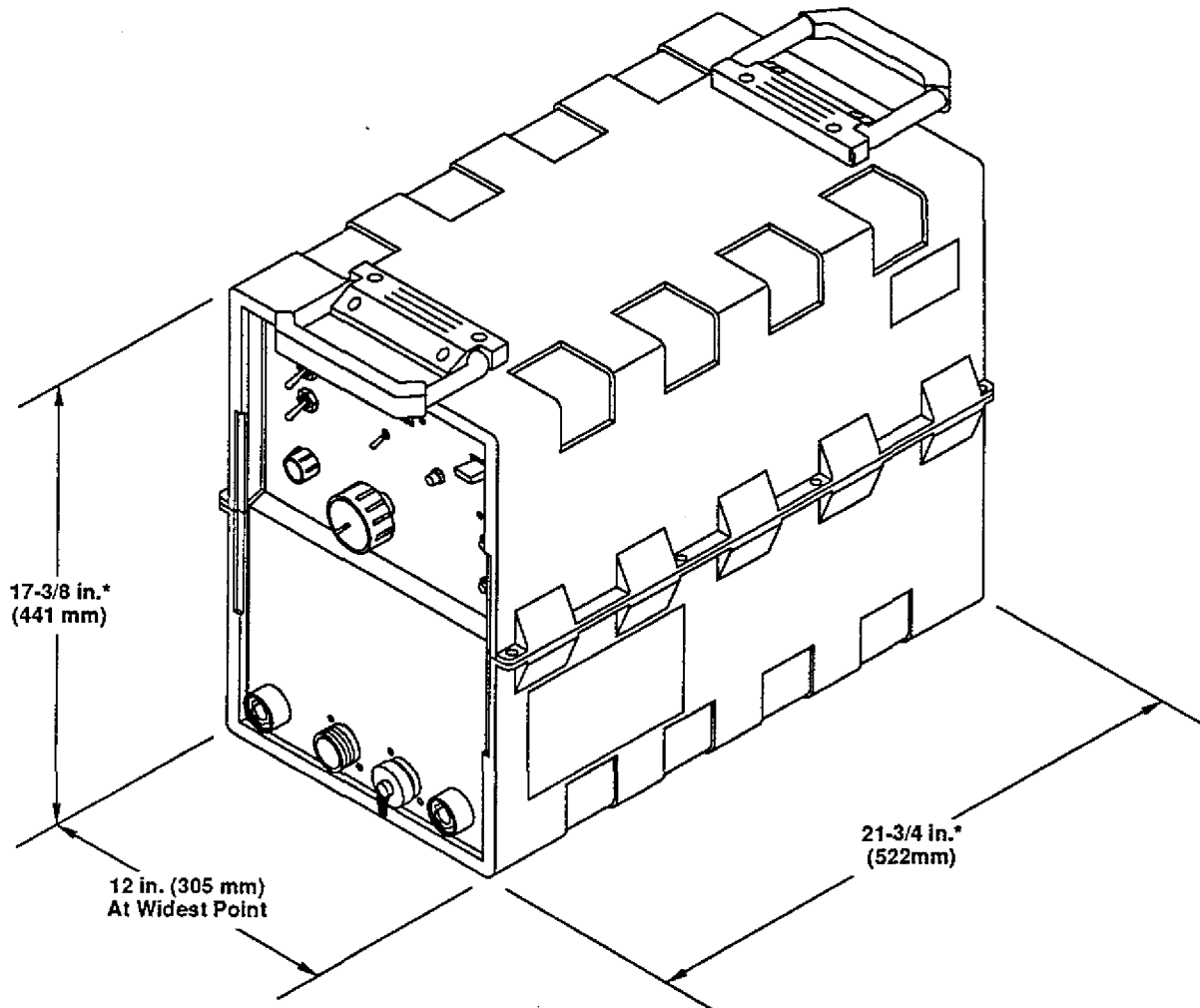
CAUTION statements identify procedures or practices which must be followed to avoid minor personal injury or damage to this equipment.

IMPORTANT statements identify special instructions necessary for the most efficient operation of this equipment.

SECTION 3 – SPECIFICATIONS

Table 3-1. Specifications

| Input Power Connection | NEMA Class I (60) Rated Welding Output At 60% Duty Cycle | Voltage Range In CV Mode | Amperage Range In CC Mode | Max. Open-Circuit Voltage In CC Mode | Input At Rated Load Output 50/60 Hz | | | | Weight | |
|------------------------|--|--------------------------|---------------------------|--------------------------------------|-------------------------------------|------|------|------|----------------|-----------------|
| | | | | | Amperes At | | kVA | kW | Net | Ship |
| | | | | | 230V | 460V | | | | |
| Three-Phase | 300 Amperes At 32 Volts DC | 12-36 Volts | 5-375 Amperes | 80 | 42 | 21 | 16.1 | 11.3 | 77 lbs (35 kg) | 82 lbs. (37 kg) |
| Single-Phase | 225 Amperes At 29 Volts DC | | 5-225 Amperes | | 58 | 29 | 12.8 | 7.8 | | |



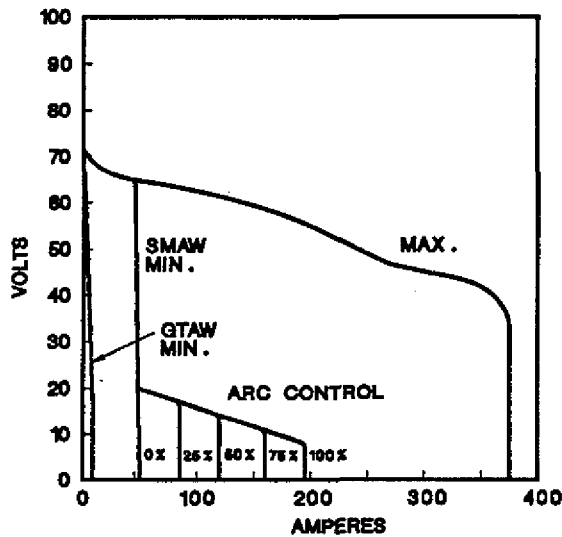
* Includes handles.

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Figure 3-1. Dimensions

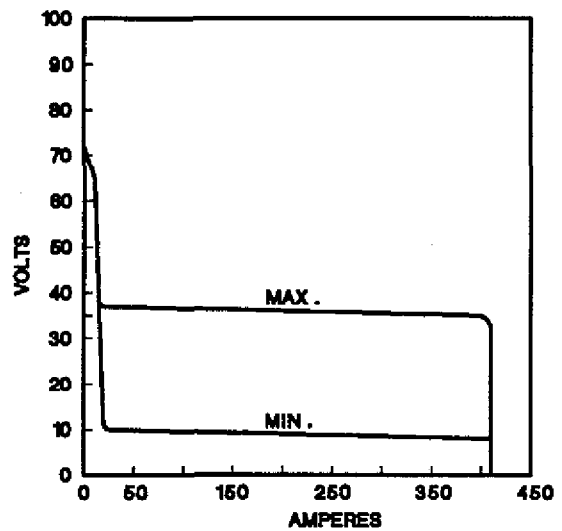
Chart 3-1. Volt-Ampere Curves

Volt-Ampere Curves For CC Mode



SB-136 507

Volt-Ampere Curves For CV Mode



SB-136 509

3-1. VOLT-AMPERE CURVES (Chart 3-1)



The volt-ampere curves show the voltage and amperage output capabilities of the welding power source. Curves of other settings will fall between the curves shown.

3-2. DUTY CYCLE (Chart 3-2)

The duty cycle of a welding power source is the percentage of a ten minute period that a welding power source can be operated at a given output without causing overheating and damaging of the unit. This unit is rated at 60 percent duty cycle when operated at 300 amperes from three-phase input power, or when operated at 225 amperes from single-phase input power. If the unit is operated from three-phase input power the unit can be operated at 300 amperes for six consecutive minutes, but it must operate at no load for the remaining four minutes to allow proper cooling. When the welding power source is operated from single-phase input power, the unit can be operated at 225 amperes for six consecutive minutes, but it must operate at no load for the remaining four minutes to allow proper cooling. If the welding amperes decrease, the duty cycle increases. If the welding amperes are increased beyond rated output, the duty cycle will decrease.

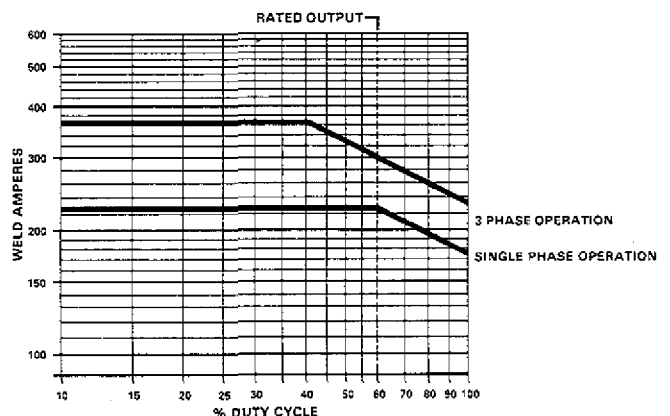
Refer to the duty cycle chart (Chart 3-2) to determine the output of the welding power source at various duty cycles.



CAUTION: EXCEEDING DUTY CYCLE RATINGS will damage the welding power source.

- Do not exceed indicated duty cycles.

Chart 3-2. Duty Cycle



B-097 023-A

3-3. DESCRIPTION

This unit is a three-phase, or single-phase if derated, dc, arc welding power source with constant current (CC) and constant voltage (CV) output characteristics available by selection. This unit is designed for use with Shielded Metal Arc (SMAW), Gas Metal Arc (GMAW), Flux Cored Arc (FCAW), and scratch start Gas Tungsten Arc (GTAW) Welding processes.

SECTION 4 – INSTALLATION OR RELOCATION

4-1. SITE SELECTION

Select an installation site which provides the following:

1. Correct input power supply (see unit nameplate)
2. Shielding gas supply (if applicable)
3. Water supply (if applicable)
4. Adequate ventilation and fresh air supply
5. No flammables
6. A clean and dry area
7. Proper temperature that avoids extremes of heat or cold
8. Proper airflow around unit
9. Adequate space for opening the case for installation, maintenance, and repair functions



WARNING: FIRE OR EXPLOSION can result from placing unit on or over combustible surfaces; RESTRICTED AIRFLOW can cause overheating and possible damage to internal parts.

- Do not locate unit over combustible surfaces.
- Maintain at least 3 inches (76 mm) of space from sides of unit, 6 inches (152 mm) from rear, and open, unrestricted access to ambient air at front of unit.
- Do not place any filtering device over the intake air passages that provide airflow for cooling this unit.

Warranty is void if any type of filtering device is used at intake air passages.

4-2. TRANSPORTING METHODS

This unit is equipped with two handles for carrying purposes.



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Disconnect input power conductors from deenergized supply line **BEFORE** moving welding power source.

FALLING EQUIPMENT can cause serious personal injury and equipment damage.

- Lift unit at handles on top ends of case.

- Have two persons of adequate physical strength lift unit.

- Move unit with hand cart or similar device of adequate capacity.

- If using a fork lift vehicle, place unit on a proper skid before transporting.

This unit has built-in handles on top ends of case for lifting. Be sure unit is lifted and transported safely and securely.

4-3. WELD OUTPUT CONNECTIONS (Figure 5-1)

RATED OUTPUT

To obtain full rated output from this unit, it is necessary to select, prepare, and install proper weld cables. Failure to comply in any of these areas may result in unsatisfactory welding performance.

A. Weld Cable Selection

Use the following guidelines to select weld cables:

1. Use the shortest possible cables, and place cables close together. Excessive cable lengths may reduce output or cause unit overload due to added resistance.
2. Use weld cable with an insulation voltage rating equal to or greater than the maximum open-circuit voltage (ocv) of the welding power source (see Table 3-1 for unit maximum ocv rating).
3. Select welding cable size according to maximum weld output and total length of connecting cables in weld circuit. For example, if a 25 foot (7.5 m) electrode holder (torch) or wire feeder cable is used with a 25 foot (7.5 m) work cable, select the cable size recommended in Table 4-1 for 50 feet (15 m).
4. Do not use damaged or frayed cables.

B. Weld Cable Preparation

1. Install terminal lugs of adequate amperage capacity and correct stud size onto cables that connect to the work clamp, and wire feeder or electrode holder.
2. If installing an electrode holder, follow manufacturer's installation instructions. Always use an insulated electrode holder to ensure operator safety.
3. Install work clamp onto cable.
4. Install supplied male connectors onto remaining ends of both cables according to Subsection C.

Table 4-1. Weld Cable Size

| Welding Amperes | Total Cable (Copper) Length In Weld Circuit Not Exceeding* | | | | | | | |
|-----------------|--|----------------------------|-------------------------|-------------------|-------------------|-------------------|--------------------|--------------------|
| | 100 ft. Or Less (30 m) | | 150 ft. (45 m) | 200 ft. (60 m) | 250 ft. (70 m) | 300 ft. (90 m) | 350 ft. (105 m) | 400 ft. (120 m) |
| | 10 To 60% Duty Cycle | 60 Thru 100% Duty Cycle | 10 Thru 100% Duty Cycle | | | | | |
| 100 | 4 | 4 | 4 | 3 | 2 | 1 | 1/0 | 1/0 |
| 150 | 3 | 3 | 2 | 1 | 1/0 | 2/0 | 3/0 | 3/0 |
| 200 | 3 | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | 4/0 |
| 250 | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | 2-2/0 | 2-2/0 |
| 300 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | 2-2/0 | 2-3/0 | 2-3/0 |
| 400 | 1/0 | 2/0 | 3/0 | 4/0 | 2-2/0 | 2-3/0 | 2-4/0 | 2-4/0 |

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

S-0007/8-88

C. Connector Installation (Figure 4-1)

Install the supplied male connectors onto proper cables as follows:

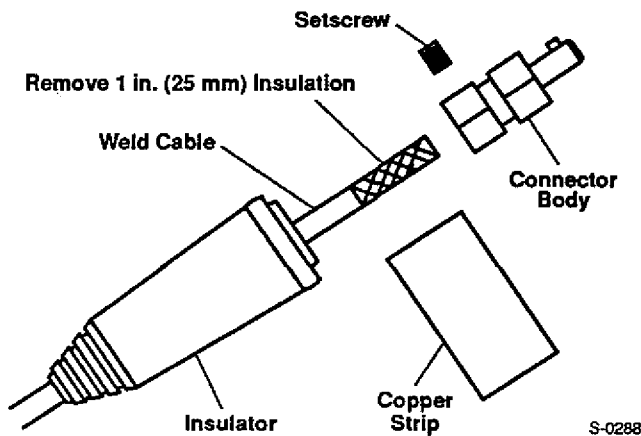




Figure 4-1. Connector Installation

1. Obtain cable of desired length and proper size for installation.
2. If the installation requires cable larger than 3/0 AWG, prepare one end of 3/0 AWG pigtail no longer than 2 feet (610 mm) for connector installation. The remaining end of the pigtail is connected to the main run of 3/0 AWG or larger weld cable.
3. Push weld cable through insulator as shown in Figure 4-1.
4. Remove 1 in. (25 mm) of insulation from end of cable.
5. Wrap copper strip tightly around stripped end of cable.
6. Insert cable wrapped with copper strip into connector body so that cable is snug and against bottom of connector body.
7. Install and tighten setscrew to secure connector body onto cable.
8. Push insulator onto connector body to cover setscrew.

D. Weld Cable Connections (Figure 5-1)

POSITIVE  **NEGATIVE** 



WARNING: ELECTRIC SHOCK can kill; ARCING can burn skin or damage electrical connections.

- Do not touch live electrical parts.
- Shut down unit before making any weld output connections.
- Do not change position of the welding cable connectors while welding.
- Be sure the connectors are secure in receptacles before welding.

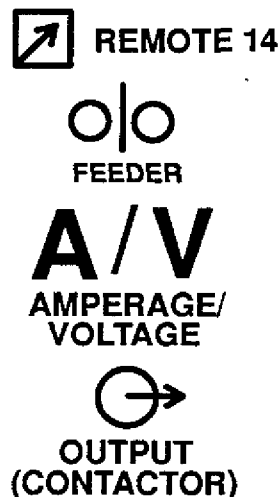
1. For Shielded Metal Arc Welding (SMAW) (Electrode Positive/Reverse Polarity)
 - a. Connect end of electrode holder cable to POSITIVE (+) weld output receptacle as follows: align keyway, insert plug, and rotate plug clockwise until it is securely seated in receptacle.
 - b. Connect work cable connector to NEGATIVE (-) weld output receptacle as follows: align keyway, insert plug, and rotate plug clockwise until it is securely seated in receptacle.
- IMPORTANT:** For Electrode Negative/Straight Polarity connections, reverse cable connections to weld output receptacles; electrode becomes negative.
2. For Gas Metal Arc (GMAW) and Flux Cored Arc (FCAW) Welding (Electrode Positive/Reverse Polarity)
 - a. Connect one weld cable to POSITIVE (+) weld output receptacle as follows: align keyway, insert plug, and rotate plug clockwise until it is securely seated in receptacle. Connect remaining end to terminal on drive housing of wire feeder (see wire feeder Owner's Manual for location).
 - b. Connect work cable connector to NEGATIVE (-) weld output receptacle as follows: align keyway, insert plug, and rotate plug clockwise until it is securely seated in receptacle.

IMPORTANT: For Electrode Negative/Straight Polarity connections, reverse cable connections to weld output receptacles; electrode becomes negative.

3. For Gas Tungsten Arc Welding (GTAW) (Electrode Negative/Straight Polarity)
 - a. Connect torch cable connector to NEGATIVE (-) weld output receptacle as follows: align keyway, insert plug, and rotate plug clockwise until it is securely seated in receptacle.
 - b. Connect work cable connector to POSITIVE (+) weld output receptacle as follows: align keyway, insert plug, and rotate plug clockwise until it is securely seated in receptacle.

IMPORTANT: For Electrode Positive/Reverse Polarity connections, reverse cable connections to weld output receptacles; electrode (torch) becomes positive.

4-4. REMOTE 14 RECEPTACLE INFORMATION AND CONNECTIONS (Figures 4-2 And 5-1)

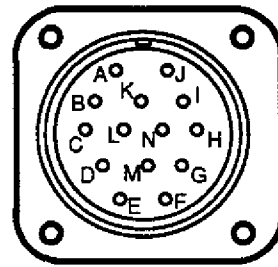


REMOTE 14 receptacle RC2 is used to connect any of the following equipment to the welding power source circuitry:

- a. Remote Contactor
- b. Remote Amperage or Voltage control
- c. Wire feeder which provides contactor control to the welding power source.
- d. Combination of the above.

To make connections align keyway, insert plug, and rotate threaded collar fully clockwise.

The following socket information is included in case the supplied cord is not suitable, and it is necessary to wire a plug or cord to interface with REMOTE 14 receptacle RC2.



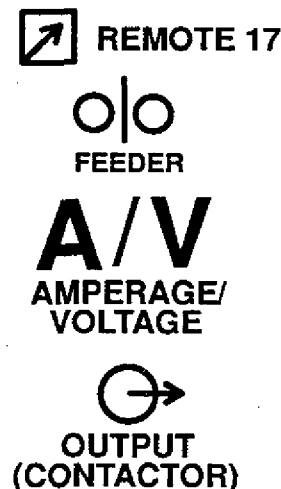
S-0004

Figure 4-2. Front View Of 14-Socket Amphenol Receptacle With Socket Locations

- Socket A: Up to 10 amperes of 24 volts ac, 60 Hz, with respect to Socket G (circuit common); protected by circuit breaker CB2.
- Socket B: Input to energize the solid-state contactor; 24VAC (closure from A to B energizes the solid-state contactor).
- Socket C: Remote amperage/voltage reference signal; 0 to +10 volts (set by main rheostat) in CC or CV.
- Socket D: Printed circuit board common; use as return for remote control inputs/outputs.
- Socket E: Amperage/voltage remote control input command signal; +10 volts for maximum.
- Socket G: 24 and 115 volts ac circuit common; also connected to welding power source chassis.
- Socket I: Up to 1.5 amperes of 115 volts ac, 60 Hz, with respect to Socket G (circuit common); protected by circuit breaker CB1.
- Socket J: Input control to energize weld contactor for 115 volts ac wire feeder. A contact closure from Socket I to Socket J completes the 115 volt circuit.
- Socket K: Chassis common.

IMPORTANT: The remaining sockets in the receptacle are not used.

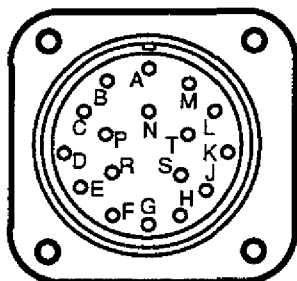
4-5. REMOTE 17 RECEPTACLE INFORMATION AND CONNECTIONS (Figures 4-3 And 5-1)



The 17-socket REMOTE 17 receptacle RC1 provides a junction point for connecting various remote controls to the welding power source. The functions available from this receptacle are: remote pulsing, remote control of voltage or amperage, contactor control, signals indicating weld current and voltage for remote metering, and robot control.

To make connections, align keyway, insert plug, and rotate threaded collar fully clockwise.

The following socket information is included in case the supplied cord is not suitable, and it is necessary to wire a plug or cord to interface with REMOTE 17 receptacle RC1.



S-0003

Figure 4-3. Front View Of 17-Socket Amphenol Receptacle With Socket Locations

- Socket A: Amperage/voltage reference output signal; +10 volts; for use with Pulse Controls.
- Socket B: Amperage/voltage remote control input command signal; +10 volts for machine maximum.
- Socket D: Solid-state contactor remote control command signal; +24 volts (operates above +13 volts) turns contactor On; 0 volts (open or ground) turns contactor Off.
- Socket E: Actual weld current output signal; +1 volt per 100 amperes of output current.
- Socket F: Printed circuit board common; use as return for remote control inputs/outputs only from Terminals A, B, C, D, E, J, and K.
- Socket H: +24 volts unregulated; fused for 1/2 ampere.
- Socket K: Remote amperage/voltage reference signal; 0 to +10 volts (set by main rheostat) in CC and CV.
- Socket L: -24 volts unregulated; fused for 1/2 ampere.
- Socket M: Load voltage output signal (V1); +1 volt per 10 volts of load voltage.
- Socket P: Circuit common (printed circuit board common and internal chassis ground); use as return for ± 18 volts logic supply only (pins H and L).
- Socket S: Chassis ground.

IMPORTANT: The remaining sockets in the receptacle are not used.

4-6. ELECTRICAL INPUT CONNECTIONS (Figure 4-4)



WARNING: ELECTRIC SHOCK can kill; SIGNIFICANT DC VOLTAGE exists after removal of input power.

- Do not touch live electrical parts.
- Shut down power source, disconnect input power employing lockout/tagging procedures, wait 60 seconds, and measure voltage on input capacitors according to Section 7-3 before touching any parts.

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

A. Electrical Input Requirements

Operate the welding power source from a three-phase, or single-phase if derated, 50/60 Hertz, ac power supply. The input voltage must match one of the electrical input voltages shown on the input data label on the unit nameplate. Contact the local electric utility for information about the type of electrical service available, how proper connections should be made, and inspection required.

B. Jumper Link Installation (Figures 4-4 and 4-5)



WARNING: Read and follow safety information at beginning of Section 4-6 before proceeding.

Jumper links are used to allow the equipment to operate from different line voltages. This unit is shipped with the jumper links installed on the input terminal board and terminal strip for the highest voltage shown on the input voltage label. If the unit is to be operated from a lower input voltage, or if a change in voltage is required, reposition the jumper links to match the available line voltage as follows:

1. Remove top from unit according to Section 7-2.
2. Compare position of jumper links on input terminal board TE1 and terminal strip TE2 to the voltage link arrangement shown in Figure 4-4.



CAUTION: INCORRECT INPUT VOLTAGE JUMPER LINK PLACEMENT can damage unit.

- Position jumper links as shown in Figure 4-4.
 - Store unused jumper links across linked terminals.
3. Install jumper links onto input terminal board TE1 and terminal strip TE2 to match the available input line voltage.

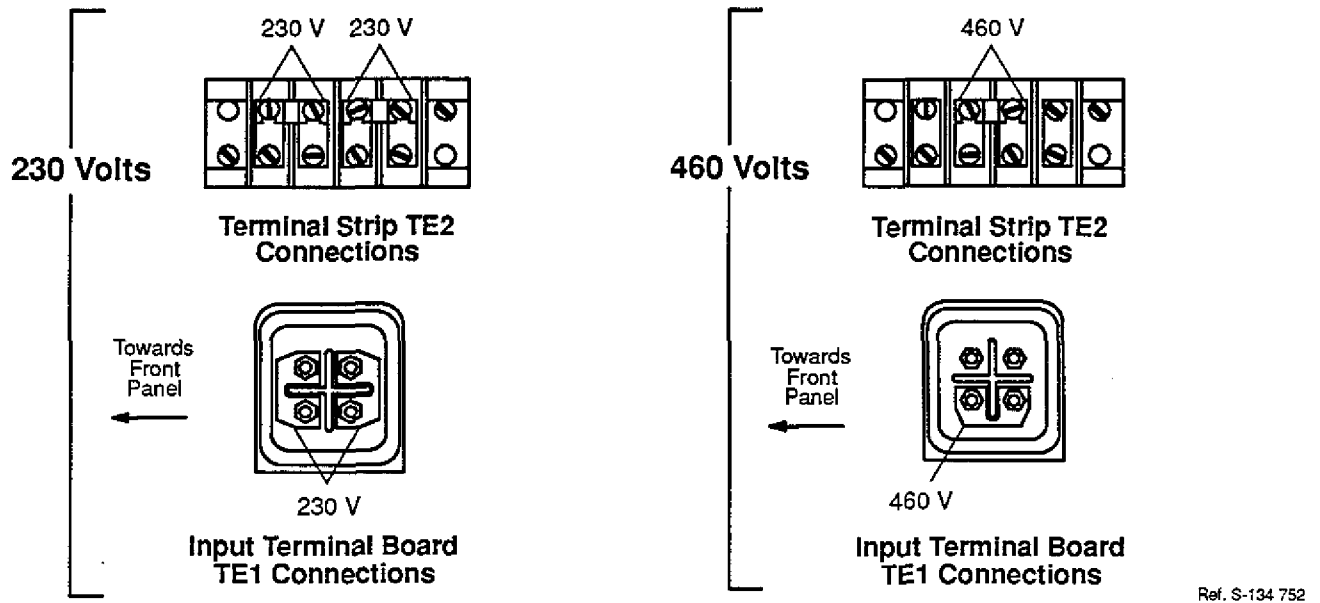


Figure 4-4. Jumper Link Installation Label

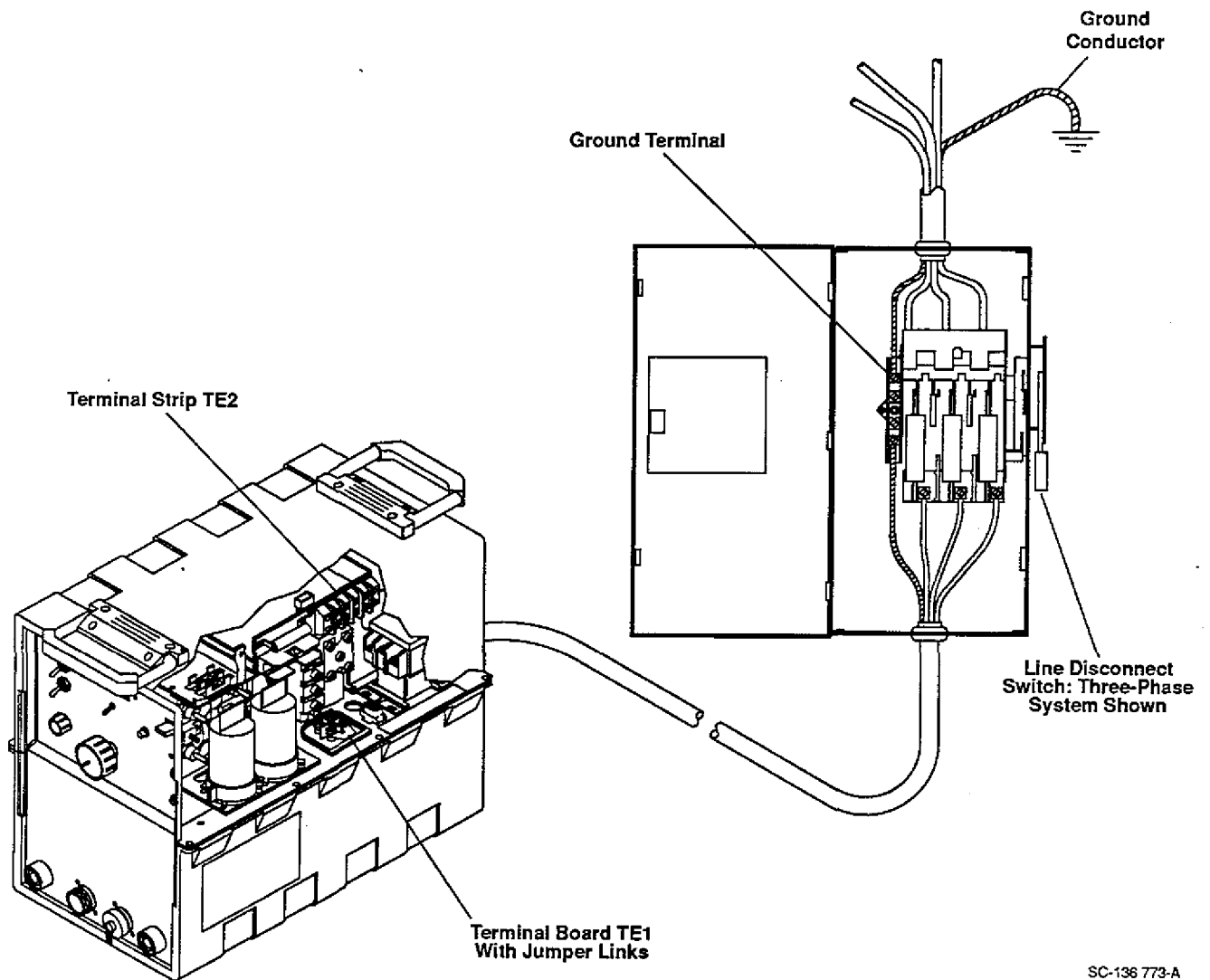


Figure 4-5. Electrical Input Connections And Components

C. Welding Power Source Input Power Connections



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Install a fusible line disconnect switch in the input circuit to the welding power source.
- Read and follow safety information at beginning of Section 4-6 before proceeding.

The line disconnect switch provides a safe and convenient means to completely remove all electrical power from the welding power source whenever it is necessary to inspect or service the unit.

IMPORTANT: This unit is equipped with a three-conductor and ground power cable that is connected at the welding power source end for three-phase electrical input power.



WARNING: ELECTRIC SHOCK can kill.

- Do not connect an input (white, red, or black) conductor to the ground terminal.
- Do not connect the ground (green) conductor to an input line terminal.

1. Connect end of green ground conductor to a suitable ground. Use a grounding method that complies with all applicable electrical codes.

2. For three-phase electrical input power: Connect ends of red, white, and black input conductors to a deenergized line disconnect switch.
3. For single-phase electrical input power: Connect ends of red and white input conductors to a deenergized line disconnect switch.
4. Use Table 4-2 as a guide to select line fuses for the disconnect switch. Obtain and install proper fuses.

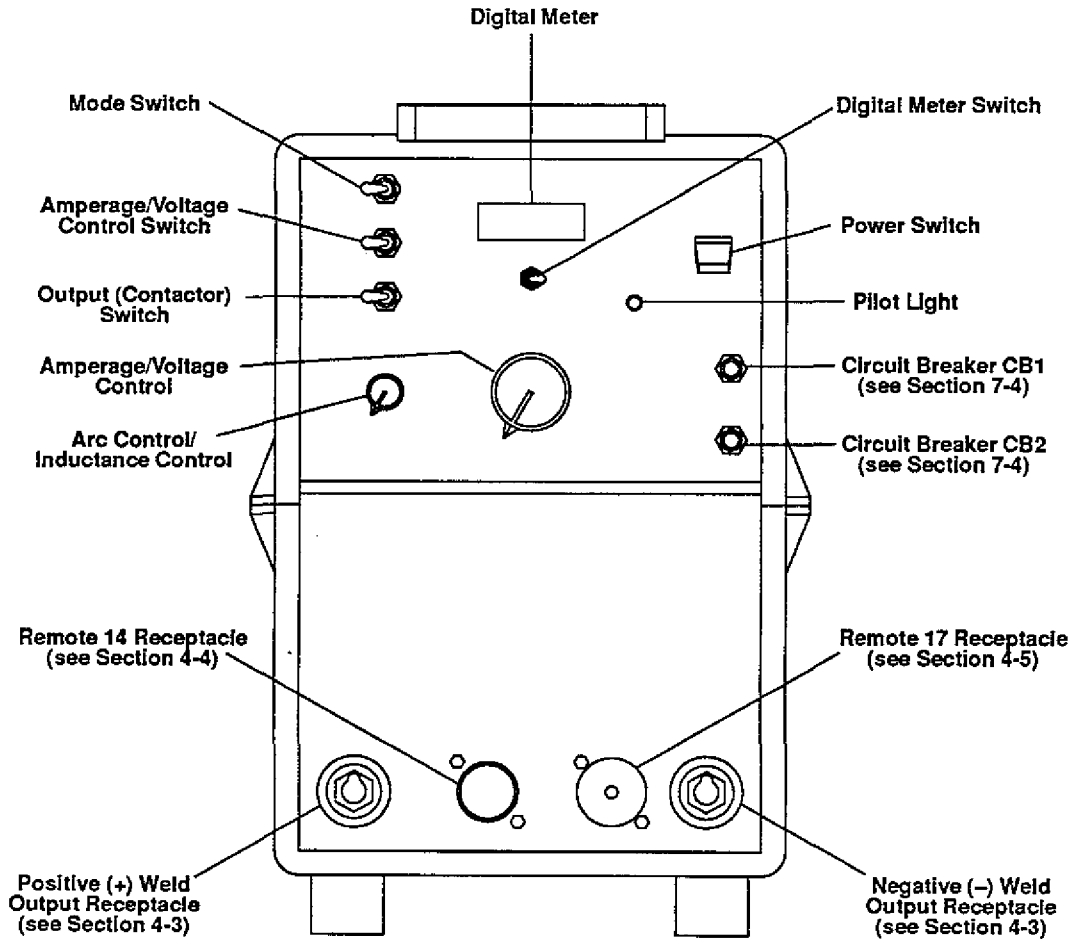
Table 4-2. Fuse Size*

| Input Power | Input Voltage | Fuse Size In Amperes |
|--------------|---------------|----------------------|
| Single-Phase | 230 | 80 |
| | 460 | 35 |
| Three-Phase | 230 | 50 |
| | 460 | 25 |

*Fuse size is based on not more than 200 percent of the rated input amperage of the welding power source (Article 630 of NEC).

Ref. 0092/4-89

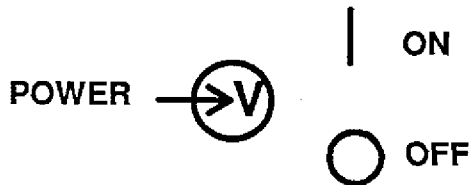
SECTION 5 – OPERATOR CONTROLS



SA-136 755

Figure 5-1. Operator Controls

5-1. POWER SWITCH AND PILOT LIGHT (Figure 5-1)



Placing the POWER switch in the ON position energizes the welding power source. The pilot light comes on when the POWER switch is in the ON position, indicating that the unit is energized. Placing the power switch in the OFF position shuts down the welding power source and turns off the pilot light.

IMPORTANT: When the power switch is placed in the ON position, there is a precharge time delay of approximately 4-5 seconds before the unit is ready to weld. The pilot light will be on during the precharge time delay.

5-2. AMPERAGE/VOLTAGE CONTROL (Figure 5-1)



The Amperage/Voltage control provides a means of selecting the desired output within the entire range of the welding power source. Rotating this control in a clockwise direction increases the weld output.

The scale surrounding the Amperage/Voltage control is calibrated in actual amperage and voltage values and is to be read according to the selected Mode: Constant Voltage (CV) or Constant Current (CC). The amperage scale (CC) is for SMAW and GTAW. The voltage scale (CV) is for GMAW and FCAW.

IMPORTANT: The Amperage/Voltage control may be adjusted while welding.

5-3. ARC CONTROL/INDUCTANCE CONTROL (Figure 5-1)

CC•ARC CONTROL/ CV•INDUCTANCE

IMPORTANT: *The ARC CONTROL/INDUCTANCE control may be adjusted while welding. For Gas Tungsten Arc Welding (GTAW), set ARC CONTROL/INDUCTANCE control to 0 (zero).*

Operation of this control depends on the mode selected.

A. Arc Control For CC Mode

In the CC Mode, the ARC CONTROL/INDUCTANCE control functions as a Dig control when being used for Shielded Metal Arc Welding (SMAW).

As a Dig function, the ARC CONTROL/INDUCTANCE control provides variable selection of short-circuit amperage to suit individual welding situations. Rotating this control clockwise causes the amperage to increase as a short-circuit condition is approached.

When the control is set at 100, the short-circuit amperage is considerably higher than normal welding amperage. This provides extra amperage for arc starting in out-of-position welds as well as momentary overamperage necessary for certain types of electrodes.

When the control is set at 0 (zero), short-circuit amperage above normal welding amperage is minimal.

When the control is set at 50, short-circuit amperage is approximately half that of the 100 position, but still higher than normal welding amperage. The 50 position provides a moderate amperage increase for arc starting necessary for certain type of electrodes and applications.

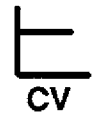
Select a setting best suited for the application and type of electrode.

B. Inductance Control For CV Mode

In the CV Mode, the ARC CONTROL/INDUCTANCE control functions as an inductance control, adjusting the dynamic properties of the arc to control the puddle. The 0 (zero) setting gives a minimum inductance, i.e., a stiff, fast-responding arc, and a small, fast-freezing puddle. The 100 setting gives maximum inductance characteristics, i.e., a soft, slower-responding, low spatter arc, and high weld puddle fluidity.

Select a setting best suited for the application.

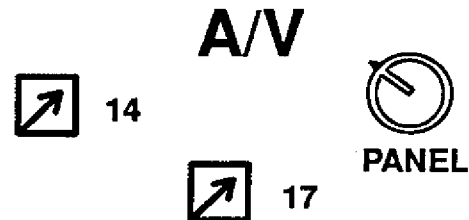
5-4. MODE SWITCH (Figure 5-1)



This two-position toggle switch provides a means of selecting weld output characteristics for the desired process. In the CV position, the Inductance function of the ARC CONTROL/INDUCTANCE control is active, the Voltage scale of the Amperage/Voltage control is applicable, and the unit provides weld output characteristics specifically designed for wire feeding applications. In the CC position, the Dig function of the ARC CONTROL/INDUCTANCE control is active, and Amperage scale of the Amperage/Voltage control is applicable, and the unit provides weld output characteristics specifically designed for SMAW and GTAW welding applications.

Place this switch in the desired position to suit the application.

5-5. AMPERAGE/VOLTAGE CONTROL SWITCH (Figure 5-1)



This switch determines whether the amperage/voltage is adjusted by the front panel Amperage/Voltage controls or by a remote control device. If remote control is not desired, place this switch in the PANEL position.

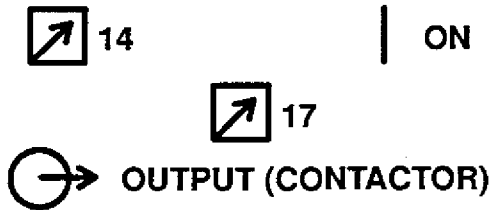
If remote amperage/voltage control is desired, place the Amperage/Voltage Control switch in the REMOTE 14 position if remote control connections are made to the REMOTE 14 receptacle, or to the REMOTE 17 position if remote control connections are made to the REMOTE 17 receptacle.

When the REMOTE 14 receptacle is used, remote control is a percentage of the value set by the front panel Amperage/Voltage control. For example, if the Amperage/Voltage control is set at half maximum output, the maximum output available from the remote control will be half the welding power source maximum output.

When the REMOTE 17 receptacle is used, two possibilities exist. If socket K is used to determine remote output, the REMOTE 17 receptacle functions the same as the REMOTE 14 receptacle (remote control is a percentage of the value set by the front panel Amperage/Voltage control). If socket B is used to determine remote output,

the REMOTE 17 receptacle will command the full range of the welding power source output, independent of what the front panel Amperage/Voltage control is set at. Which socket is used depends on the remote control device used for the application.

5-6. OUTPUT (CONTACTOR) SWITCH (Figure 5-1)



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Do not touch the weld output receptacles when the contactor is energized.
- Do not touch electrode (or gun wire) and work clamp at the same time.

If the OUTPUT (CONTACTOR) switch is in the ON position, open-circuit voltage will be present at the output receptacles whenever the POWER switch ON button is depressed.

IMPORTANT: Although the term CONTACTOR is used on the nameplate and throughout this manual, the output is not switched on or off by a physical contactor; rather, the unit uses solid-state output control.

If remote contactor control is desired, place the OUTPUT (CONTACTOR) switch in the REMOTE 14 position if remote contactor control connections are made to the REMOTE 14 receptacle, or to the REMOTE 17 position if remote contactor control connections are made to the REMOTE 17 receptacle.

If remote contactor control is not desired, place the OUTPUT (CONTACTOR) switch in the ON position. Open-circuit voltage will be available whenever the POWER switch ON button is depressed.

5-7. AMPERAGE/VOLTAGE DIGITAL METER AND SWITCH (Figure 5-1)



The back-lit LCD meter displays either an amperage or voltage value. The selected (preset) value is displayed when welding is not taking place. Refer to Table 5-1 for the values displayed for each meter switch setting and parameters selected.

The meter is not intended for exact amperage or voltage measurements. The amperage display indicates amperage output of the welding power source and is driven by circuitry on control board PC1. The voltage sensing circuitry is internally connected to the welding power source output terminals. The voltage display indicates the voltage at the weld output terminals, but does not necessarily indicate the actual voltage at the welding arc (due to cable resistance, poor connections, etc.).

Table 5-1. Digital Meter Displays

| Meter Switch Position | Contactors | Mode | Meter Indication |
|-----------------------|------------|------|------------------|
| Amps | Off | CC | Preset Amps |
| Amps | Off | CV | Preset Volts |
| Amps | On | CC | Actual Amps |
| Amps | On | CV | Actual Amps |
| Volts | Off | CC | Preset Amps |
| Volts | Off | CV | Preset Volts |
| Volts | On | CC | Actual Volts |
| Volts | On | CV | Actual Volts |

SECTION 6 – SEQUENCE OF OPERATION



WARNING: ELECTRIC SHOCK can kill; MOVING PARTS can cause serious injury; IMPROPER AIRFLOW AND EXPOSURE TO ENVIRONMENT can damage internal parts.

- *Do not touch live electrical parts.*
- *Keep all covers and panels in place while operating.*

Warranty is void if the welding power source is operated with any portion of the outer enclosure removed.

ARC RAYS, SPARKS, AND HOT SURFACES can burn eyes and skin; NOISE can damage hearing.

- *Wear correct eye, ear, and body protection.*

FUMES AND GASES can seriously harm your health.

- *Keep your head out of the fumes.*
- *Ventilate to keep from breathing fumes and gases.*
- *If ventilation is inadequate, use approved breathing device.*

WELDING WIRE can cause puncture wounds.

- *Do not point gun toward any part of the body, any conductive surface, or other personnel.*

HOT METAL, SPATTER, AND SLAG can cause fire and burns.

- *Watch for fire.*
- *Keep a fire extinguisher nearby, and know how to use it.*
- *Do not use near flammable material.*
- *Allow work and equipment to cool before handling.*

MAGNETIC FIELDS FROM HIGH CURRENTS can affect pacemaker operation.

- *Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.*

See Section 1 - Safety Rules For Operation Of Arc Welding Power Source for basic welding safety information.

6-1. GAS METAL ARC WELDING (GMAW)



WARNING: Read and follow safety information at beginning of entire Section 6 before proceeding.

IMPORTANT: *If a Miller XR wire feeder (or derivative model) is used with this welding power source, the wire feeder must be modified to ensure proper welding power source contactor control operation. To modify the wire feeder, shut down and remove power from the wire feeder, and remove snubber SN2 from terminal strip 2T internal to the wire feeder. Refer to the XR (or derivative) wire*

feeder Owner's Manual for more information, and the wiring diagram in that manual for component locations.

2. Install and connect unit according to Section 4.
3. Install and connect wire feeding system according to its Owner's Manual.
4. Wear dry insulating gloves and clothing.
5. Connect work clamp to clean, bare metal at work-piece.
6. Place Mode switch in CV position.
7. Place OUTPUT (CONTACTOR) switch in correct REMOTE position.
8. Place Amperage/Voltage Control switch in desired position (see Section 5-5).
9. Rotate Amperage/Voltage control to desired position (see Section 5-2).
10. Rotate ARC CONTROL/INDUCTANCE control to desired position (see Section 5-3).
11. Turn on shielding gas supply.
12. Wear welding helmet with proper filter lens according to ANSI Z49.1.
13. Place power switch in ON position.
14. Begin welding.

6-2. SHIELDED METAL ARC WELDING (SMAW)



WARNING: Read and follow safety information at beginning of entire Section 6 before proceeding.

1. Install and connect unit according to Section 4.
2. Wear dry insulating gloves and clothing.
3. Connect work clamp to clean, bare metal at work-piece.
4. Select proper electrode.
5. Place Mode switch in CC position.
6. Place OUTPUT (CONTACTOR) switch in ON position.
7. Place Amperage/Voltage Control switch in desired position (see Section 5-5).
8. Rotate Amperage/Voltage control to desired position (see Section 5-2).
9. Rotate ARC CONTROL/INDUCTANCE control to desired position (see Section 5-3).
10. Insert electrode into electrode holder.
11. Wear welding helmet with proper filter lens according to ANSI Z49.1.
12. Place power switch in ON position.
13. Begin welding.

6-3. GAS TUNGSTEN ARC WELDING (GTAW)



WARNING: Read and follow safety information at beginning of entire Section 6 before proceeding.

1. Install and connect unit according to Section 4.
2. Install and connect high-frequency unit according to its Owner's Manual if applicable. Scratch start Gas Tungsten Arc Welding does not require the use of external high frequency.
3. Select and obtain proper tungsten electrode (see Table 7-2).
4. Prepare tungsten electrode according to Section 7-5, and insert into torch.
5. Wear dry insulating gloves and clothing.
6. Connect work clamp to clean, bare metal at work-piece.
7. Place Mode switch in CC position.
8. Place OUTPUT (CONTACTOR) switch in desired position (see Section 5-6).
9. Place Amperage/Voltage Control switch in desired position (see Section 5-5).
10. Rotate Amperage/Voltage control to desired position (see Section 5-2).
11. Rotate ARC CONTROL/INDUCTANCE control to zero.
12. Turn on shielding gas and water supplies as applicable.
13. Turn on high-frequency unit, if applicable.
14. Wear welding helmet with proper filter lens according to ANSI Z49.1.
15. Place power switch in ON position.
16. Begin welding.

6-4. FLUX CORED ARC WELDING (FCAW)



WARNING: Read and follow safety information at beginning of entire Section 6 before proceeding.

IMPORTANT: If a Miller XR wire feeder (or derivative model) is used with this welding power source, the wire feeder must be modified to ensure proper welding power source contactor control operation. To modify the wire feeder, shut down and remove power from the wire feeder, and remove snubber SN2 from terminal strip 2T internal to the wire feeder. Refer to the XR (or derivative) wire feeder Owner's Manual for more information, and the wiring diagram in that manual for component locations.

1. Install and connect unit according to Section 4.
2. Install and connect wire feeding system according to its Owner's Manual.
3. Wear dry insulating gloves and clothing.
4. Connect work clamp to clean, bare metal at work-piece.
5. Place Mode switch in CV position.
6. Place OUTPUT (CONTACTOR) switch in correct REMOTE position.
7. Place Amperage/Voltage Control switch in desired position (see Section 5-5).
8. Rotate Amperage/Voltage control to desired position (see Section 5-2).
9. Rotate ARC CONTROL/INDUCTANCE control to desired position (see Section 5-3).
10. Wear welding helmet with proper filter lens according to ANSI Z49.1.
11. Place power switch in ON position.
12. Begin welding.

6-5. SHUTTING DOWN

1. Stop welding.
2. Place the power switch in the OFF position.
3. Turn off the high-frequency unit, if applicable.
4. Turn off the shielding gas and water supplies, if applicable.



WARNING: HIGH CONCENTRATION OF SHIELDING GAS can harm health or kill.

- Shut off gas supply when not in use.

SECTION 7 -- MAINTENANCE & TROUBLESHOOTING

7-1. ROUTINE MAINTENANCE (Table 7-1)

IMPORTANT: Every six months inspect the labels on this unit for legibility. All precautionary labels must be maintained in a clearly readable state and replaced when necessary. See Parts List for part number of precautionary labels.



WARNING: ELECTRIC SHOCK can kill; SIGNIFICANT DC VOLTAGE exists after removal of input power.

- Do not touch live electrical parts.

• Shut down welding power source, disconnect input power employing lockout/tagging procedures, wait 60 seconds, and measure voltage on input capacitors according to Section 7-3 before touching any parts.

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

A. Fan Motor

This unit is equipped with an exhaust fan and relies on forced draft for adequate cooling. The fan motor is manufactured with lifetime sealed bearings and requires no maintenance.

B. Weld Cables



WARNING: Read and follow safety information at beginning of Section 7-1 before proceeding.

Every three months inspect cables for breaks in insulation. Repair or replace cables if insulation breaks are present. Clean and tighten connections at each inspection.

C. Internal Cleaning



WARNING: Read and follow safety information at beginning of Section 7-1 before proceeding.

Every six months blow out or vacuum dust and dirt from the inside of the welding power source. Remove the outer enclosure, and use a clean, dry airstream or vacuum suction for the cleaning operation. If dusty or dirty conditions are present, clean the unit monthly.

Table 7-1. Maintenance Schedule

| FREQUENCY* | MAINTENANCE |
|-----------------|---|
| Every month. | Units in heavy service environments: Check labels, weld cables, clean internal parts. |
| Every 3 months. | Check weld cables (see Section 7-1B). |
| Every 6 months. | Check all labels (see IMPORTANT block, Section 7-1). Clean internal parts (see Section 7-1C). |

*Frequency of service is based on units operated 40 hours per week. Increase frequency of maintenance if usage exceeds 40 hours per week.

7-2. REMOVING CASE



WARNING: ELECTRIC SHOCK can kill; SIGNIFICANT DC VOLTAGE exists after removal of input power.

- Do not touch live electrical parts.
- Shut down welding power source, disconnect input power employing lockout/tagging procedures, wait 60 seconds, and measure voltage on input capacitors according to Section 7-3 before touching any parts.

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

A. Removing Top Of Case



WARNING: Read and follow safety information at beginning of Section 7-2 before proceeding.

1. Remove bolts on left and right sides securing top of case to bottom.
2. Remove two screws nearest edge of case from front and rear handles.
3. Remove top.
4. When inspection or installation is complete, reinstall top, and secure with hardware removed in Steps 1 and 2.

B. Removing Bottom Of Case



WARNING: Read and follow safety information at beginning of Section 7-2 before proceeding.

1. Remove bolts on left and right sides securing top of case to bottom (if applicable).
2. Carefully place unit on its side.
3. Remove four feet on bottom case by turning entire foot in a counterclockwise direction.
4. Remove bottom.

IMPORTANT: Be sure mounting holes in unit are aligned with mounting holes in bottom of case when reinstalling bottom.

5. When inspection or reinstallation is complete, reinstall bottom, and secure with hardware removed in Steps 1 and 3.

7-3. MEASURING INPUT CAPACITOR VOLTAGE (Figure 7-1)

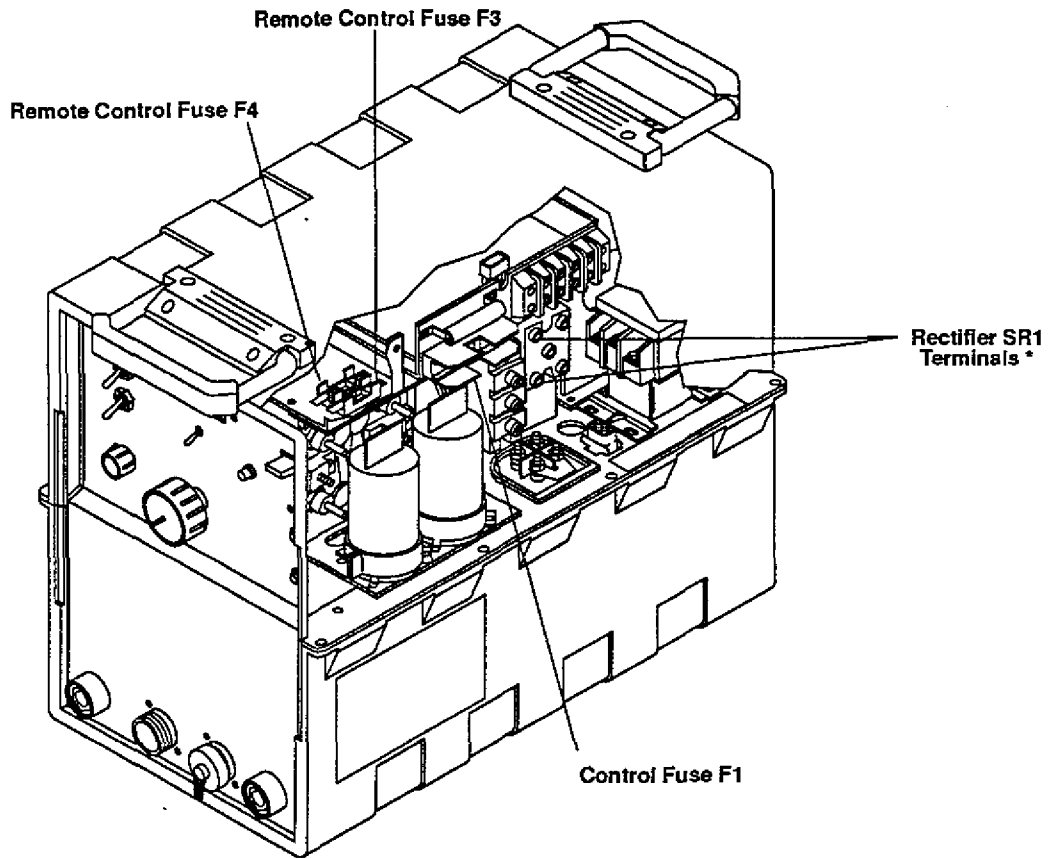


WARNING: ELECTRIC SHOCK can kill; SIGNIFICANT DC VOLTAGE exists after removal of input power.

- Do not touch live electrical parts.
- Shut down welding power source, disconnect input power employing lockout/tagging procedures, wait 60 seconds, and measure voltage on input capacitors according to following procedure before touching any parts.

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

1. Remove top from unit according to Section 7-2.
2. Locate input rectifier SR1 (see Figure 7-1).
3. Using a proper voltmeter, measure the dc voltage across + and - terminals of input rectifier SR1. These are the two terminals closest to the front panel (polarity is marked).
4. Continue to measure voltage at 30 second intervals until voltage drops to 0 (zero) volts.
5. Proceed with task requiring access to internal parts.
6. After task is completed, reinstall top of unit.



* Polarity marked on component.

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Figure 7-1. Location Of Fuses And Input Rectifier SR1 Terminals

7-4. OVERLOAD PROTECTION



WARNING: ELECTRIC SHOCK can kill; SIGNIFICANT DC VOLTAGE exists after removal of input power.

- Do not touch live electrical parts.
- Shut down power source, disconnect input power employing lockout/tagging procedures, wait 60 seconds, and measure voltage on input capacitors according to Section 7-3 before touching any parts.

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

IMPROPER FUSES can damage unit.

- Be sure replacement fuses are same type, size, and rating (see Parts List).

A. Circuit Breaker CB1 (Figure 5-1)



Circuit Breaker CB1 protects the 115 volts ac winding of transformer T2 from overload. Should an overload on CB1 occur, the 115 volts connection at REMOTE 14 receptacle would be inoperative, and remote devices re-

quiring 115 volts will not run. If CB1 opens, correct the problem, and manually reset it.

B. Circuit Breaker CB2 (Figure 5-1)



Circuit Breaker CB2 protects the 24 volts ac winding of transformer T2 from overload. Should an overload on CB2 occur, the 24 volts connection on REMOTE 14 receptacle would be inoperative, and remote devices requiring 24 volts will not run. If CB2 opens, correct the problem, and manually reset it.

C. Control Fuse F1 (Figure 7-1)



WARNING: Read and follow safety information at beginning of Section 7-4 before proceeding.

The control transformer T2 and associated circuitry are protected by fuse F1, located internally on the upper right side of the unit (see Figure 7-1). If fuse F1 should open, the unit will be completely inoperative.

To replace fuse F1, proceed as follows:

1. Remove top from unit according to Section 7-2.
2. Check F1 and replace if necessary.
3. Reinstall and secure top.

D. Remote Control Fuses F3 And F4 (Figure 7-1)



WARNING: Read and follow safety information at beginning of Section 7-4 before proceeding.

Control Board PC1 is protected by fuses F3 and F4, located internally on the upper right front of the unit (see Figure 7-1). If F3 and/or F4 open, the remote control connected to REMOTE 17 receptacle RC1 may become completely inoperative.

To replace fuses F3 and F4, proceed as follows:

1. Remove top from unit according to Section 7-2.
2. Check F3 and F4, and replace if necessary.
3. Reinstall and secure top.

E. Thermal Protection

The power modules are protected from overheating by normally-closed thermostat TP1 located on right heat sink assembly. If the unit becomes too warm, TP1 opens, shutting down weld output. If TP1 opens, no open-circuit voltage is available, but the fan motor FM runs, and the pilot light PL1 stays on. Thermostat TP1 automatically resets (closes) when the unit has cooled down, allowing weld output to be available.

7-5. TUNGSTEN ELECTRODE (Table 7-2, Figures 7-2 And 7-3)

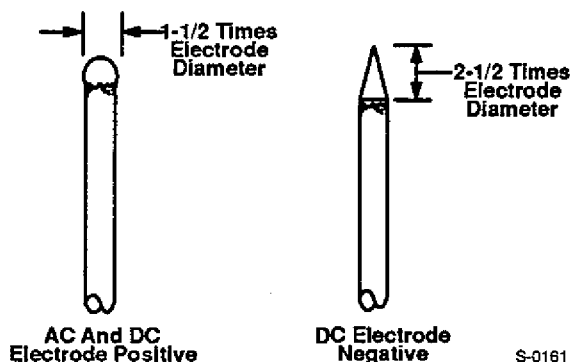


Figure 7-2. Properly Prepared Tungsten Electrodes

Use Table 7-2 to select the correct size and type tungsten electrode. Prepare the tungsten electrode using the following guidelines. A properly prepared tungsten electrode is essential in obtaining a satisfactory weld.

A. For AC or DC Electrode Positive Welding (Figure 7-2)

Ball the end of tungsten electrodes used for ac or dc electrode positive welding before beginning the welding operation. Weld amperage causes the tungsten electrode to form the balled end. The diameter of the end should not exceed the diameter of the tungsten elec-

trode by more than 1-1/2 times. For example, the end of a 1/8 in. (3.2 mm) diameter tungsten electrode should not exceed a 3/16 in. (4.8 mm) diameter end.

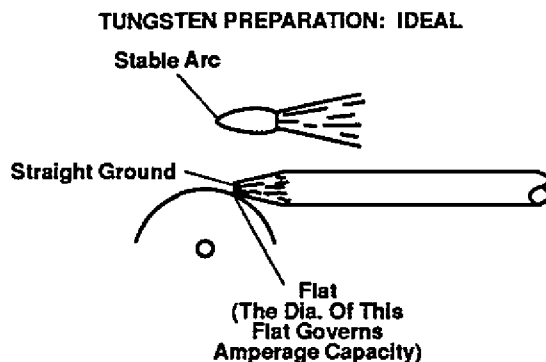
B. For DC Electrode Negative Welding (Figures 7-2 And 7-3)



CAUTION: HOT FLYING METAL PARTICLES can injure personnel, start fires, and damage equipment; TUNGSTEN CONTAMINATION can lower weld quality.

- Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.
- Do not use same wheel for any other job, or the tungsten will become contaminated.
- Shape tungsten electrodes on a fine grit, hard abrasive wheel used only for tungsten shaping. Grind tungsten electrodes so that grinding marks run lengthwise with the electrode. These procedures reduce the possibility of the tungsten electrode transferring foreign matter into the weld and help reduce arc wander.

Grind the end of the tungsten electrode to a taper for a distance of 2 to 2-1/2 electrode diameters in length. For example, the ground surface for a 1/8 in. (3.2 mm) diameter tungsten electrode should be 1/4 to 5/16 in. (6.4 to 8.0 mm) long. For additional information, see your distributor for a handbook on the Gas Tungsten Arc Welding (GTAW) process.



TUNGSTEN PREPARATION: WRONG

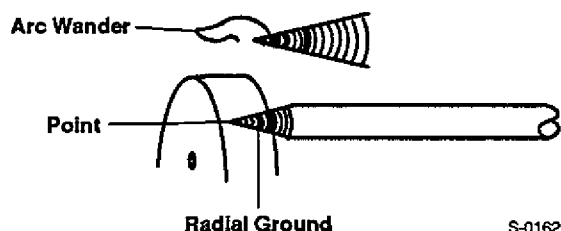


Figure 7-3. Tungsten Preparation

Table 7-2. Tungsten Size

| Electrode Diameter | Amperage Range - Polarity - Gas Type | | | |
|--|--|---|----------------------------------|--|
| | DC-Argon Electrode Negative/Straight Polarity | DC-Argon Electrode Positive/Reverse Polarity | AC-Argon Using High Frequency | AC-Argon Balanced Wave Using High Freq. |
| Pure Tungsten (Green Band) | | | | |
| .010" | Up to 15 | * | Up to 15 | Up to 10 |
| .020" | 5-20 | * | 5-20 | 10-20 |
| .040" | 15-80 | * | 10-60 | 20-30 |
| 1/16" | 70-150 | 10-20 | 50-100 | 30-80 |
| 3/32" | 125-225 | 15-30 | 100-160 | 60-130 |
| 1/8" | 225-360 | 25-40 | 150-210 | 100-180 |
| 5/32" | 360-450 | 40-55 | 200-275 | 160-240 |
| 3/16" | 450-720 | 55-80 | 250-350 | 190-300 |
| 1/4" | 720-950 | 80-125 | 325-450 | 250-400 |
| 2% Thorium Alloyed Tungsten (Red Band) | | | | |
| .010" | Up to 25 | * | Up to 20 | Up to 15 |
| .020" | 15-40 | * | 15-35 | 5-20 |
| .040" | 25-85 | * | 20-80 | 20-60 |
| 1/16" | 50-160 | 10-20 | 50-150 | 60-120 |
| 3/32" | 135-235 | 15-30 | 130-250 | 100-180 |
| 1/8" | 250-400 | 25-40 | 225-360 | 160-250 |
| 5/32" | 400-500 | 40-55 | 300-450 | 200-320 |
| 3/16" | 500-750 | 55-80 | 400-500 | 290-390 |
| 1/4" | 750-1000 | 80-125 | 600-800 | 340-525 |
| Zirconium Alloyed Tungsten (Brown Band) | | | | |
| .010" | * | * | Up to 20 | Up to 15 |
| .020" | * | * | 15-35 | 5-20 |
| .040" | * | * | 20-80 | 20-60 |
| 1/16" | * | * | 50-150 | 60-120 |
| 3/32" | * | * | 130-250 | 100-180 |
| 1/8" | * | * | 225-360 | 160-250 |
| 5/32" | * | * | 300-450 | 200-320 |
| 3/16" | * | * | 400-550 | 290-390 |
| 1/4" | * | * | 600-800 | 340-525 |

***NOT RECOMMENDED**

The figures listed are intended as a guide and are a composite of recommendations from American Welding Society (AWS) and electrode manufacturers.

S-0009/B-88

7-6. CIRCUIT BOARD HANDLING PRECAUTIONS



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Shut down welding power source, disconnect input power employing lockout/tagging procedures, wait 60 seconds, and measure voltage on input capacitors according to Section 7-3 before touching any parts.

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.



CAUTION: ELECTROSTATIC DISCHARGE (ESD) can damage circuit boards.

- Put on properly grounded wrist strap BEFORE handling circuit boards.
- Transport circuit boards in proper static-shielding carriers or packages.
- Perform work only at a static-safe work area.

INCORRECT INSTALLATION or misaligned plugs can damage circuit board.

- Be sure that plugs are properly installed and aligned.

EXCESSIVE PRESSURE can break circuit board.

- Use only minimal pressure and gentle movement when disconnecting or connecting board plugs and removing or installing board.

7-7. TROUBLESHOOTING (Table 7-3)



WARNING: ELECTRIC SHOCK can kill.

- Do not touch live electrical parts.
- Shut down welding power source, disconnect input power employing lockout/tagging procedures, wait 60 seconds, and measure voltage on input capacitors according to Section 7-3 before touching any parts.

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

MOVING PARTS can cause serious injury.

- Keep away from moving parts.

HOT SURFACES can cause severe burns.

- Allow cooling period before servicing.

Troubleshooting to be performed only by qualified persons.

It is assumed that the unit was properly installed according to Section 4 of this manual, the operator is familiar with the function of controls, the welding power source was working properly, and that the trouble is not related to the welding process.

The following table is designed to diagnose and provide remedies for some of the troubles that may develop in this welding power source. Use this table in conjunction with the circuit diagram while performing troubleshooting procedures. If the trouble is not remedied after performing these procedures, contact the nearest Factory Authorized Service Station. In all cases of equipment malfunction, strictly follow the manufacturer's procedures and instructions.

Table 7-3. Troubleshooting

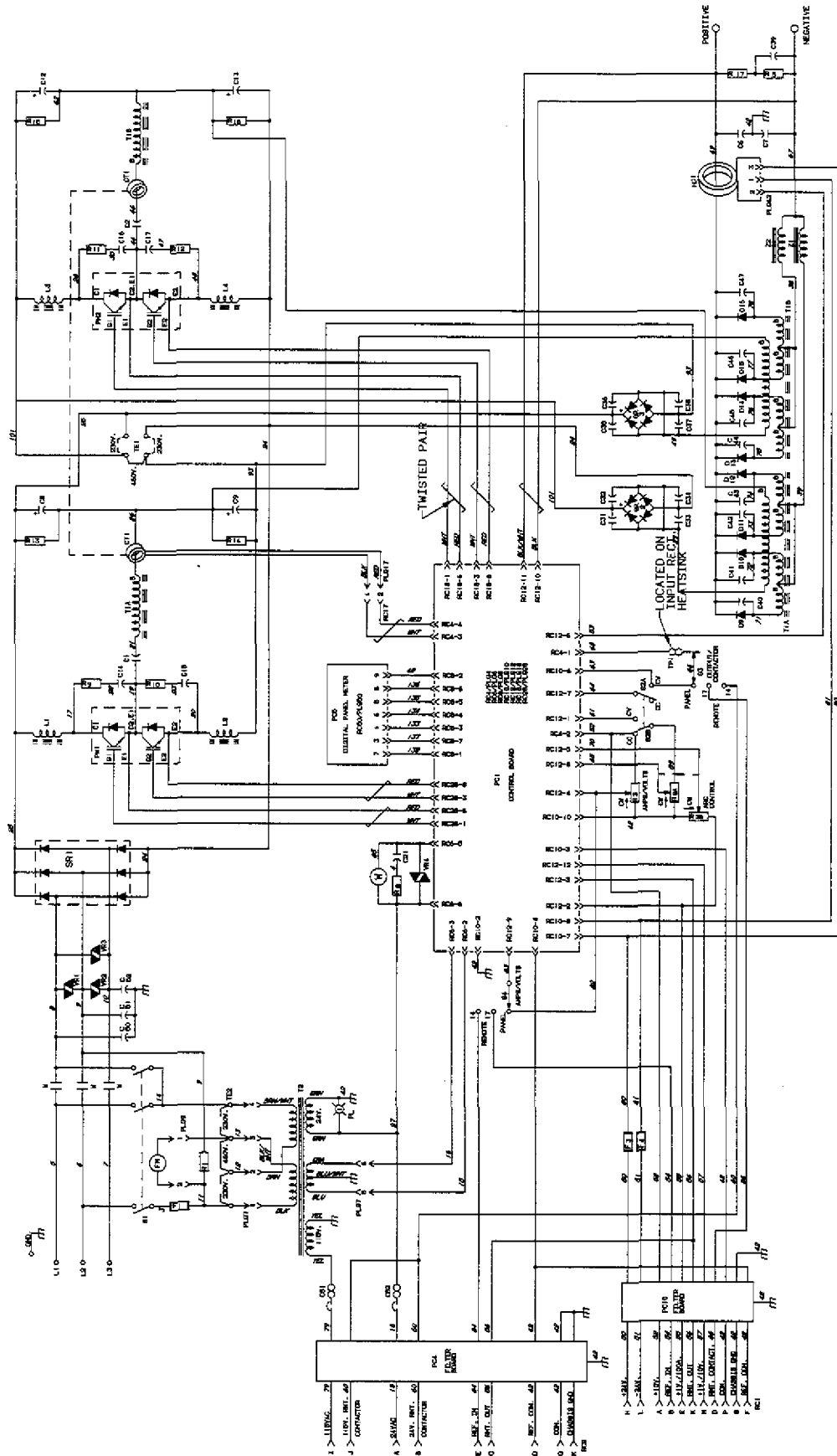
| TROUBLE | CAUSE | REMEDY |
|--|---|--|
| No weld output; unit completely inoperative. | Line disconnect switch in the OFF position. | Place line disconnect switch in the ON position. |
| | Line fuse(s) open. | Check and replace line fuse(s) if necessary. |
| | Improper electrical input connections. | See Section 4-6C for proper input connections. |
| | Input voltage jumper links not in proper position. | See Section 4-6B for proper jumper link position. |
| | Fuse F1 open. | Check and replace F1 if necessary (see Section 7-4C). |
| | POWER switch S1 | Check and replace S1 if necessary. |
| No weld output; fan motor FM running and pilot light on. | OUTPUT(CONTACTOR) switch S3 in a REMOTE position with no remote contactor control connected to REMOTE receptacle. | Place S3 in ON position or connect remote contactor control to correct REMOTE receptacle (see Sections 4-4 and 4-5). |
| | Thermostat TP1 open (thermal shutdown). | Allow a cooling period of approximately five minutes (see Section 7-4E). |

Table 7-3. Troubleshooting (Continued)

| TROUBLE | CAUSE | REMEDY |
|---|--|---|
| Low weld output with no control. | Amperage/Voltage Control switch S4 in REMOTE position with no remote control connected to a REMOTE receptacle. | Place S4 in PANEL position or connect remote control to correct REMOTE receptacle (see Sections 4-4 and 4-5). |
| | Control board PC1. | See Section 7-6, and contact nearest Factory Authorized Service Station. |
| Limited output and low open-circuit voltage. | Open line fuse on one phase (when using three-phase power only). | Check incoming power for correct voltage. Replace line fuse if open. |
| | Input voltage jumper links connected for incorrect input voltage. | See Section 4-6B for proper connections. |
| | Poor and/or improper input and/or output connections. | See Sections 4-6 and 4-3 for proper input and output connections. |
| Erratic or improper weld output. | Loose welding cable connections. | Tighten all welding cable connections. |
| | Incorrect welding cable size. | Use proper size and type of cable (see Section 4-3A). |
| | Poor and/or improper input and/or output connections. | See Sections 4-6 and 4-3 for proper input and output connections. |
| | Improper wire feeding setup, if applicable. | See INSTALLATION Section in wire feeder Owner's Manual. |
| | SMAW Electrode. | Replace electrode. |
| Remote device completely inoperative. | Circuit breaker CB1 or CB2 tripped. | Reduce equipment load and reset CB1 or CB2 (see Section 7-4). |
| Remote control completely inoperative. | No remote control connected to a REMOTE receptacle. | Connect remote control to correct REMOTE receptacle (see Sections 4-4 and 4-5). |
| | Fuse F3 and/or F4 open. | Check and replace F3 and/or F4 if necessary (see Section 7-4D). |
| Fan motor does not run. | Fan motor FM. | Replace FM. |
| Tungsten electrode oxidizing and not remaining bright after conclusion of weld. | Loose gas fittings on regulator or gas line. This will siphon oxygen into the weld zone. | Check and tighten all gas fittings. |
| | Insufficient gas flow. | Increase gas flow setting. |
| | Drafts blowing gas shield away from tungsten. | Shield weld zone from drafts. |
| Difficulty in establishing an arc; wandering arc; poor control of direction of arc. | Use of tungsten larger than recommended for welding amperage. | Use proper size tungsten for welding amperage (see Table 7-2). |
| | Improperly prepared tungsten. | Prepare tungsten as instructed in Section 7-5. |

NOTES

SECTION 8 - ELECTRICAL DIAGRAMS



Circuit Diagram No. SC-133 518-B

Diagram 8-1. Circuit Diagram

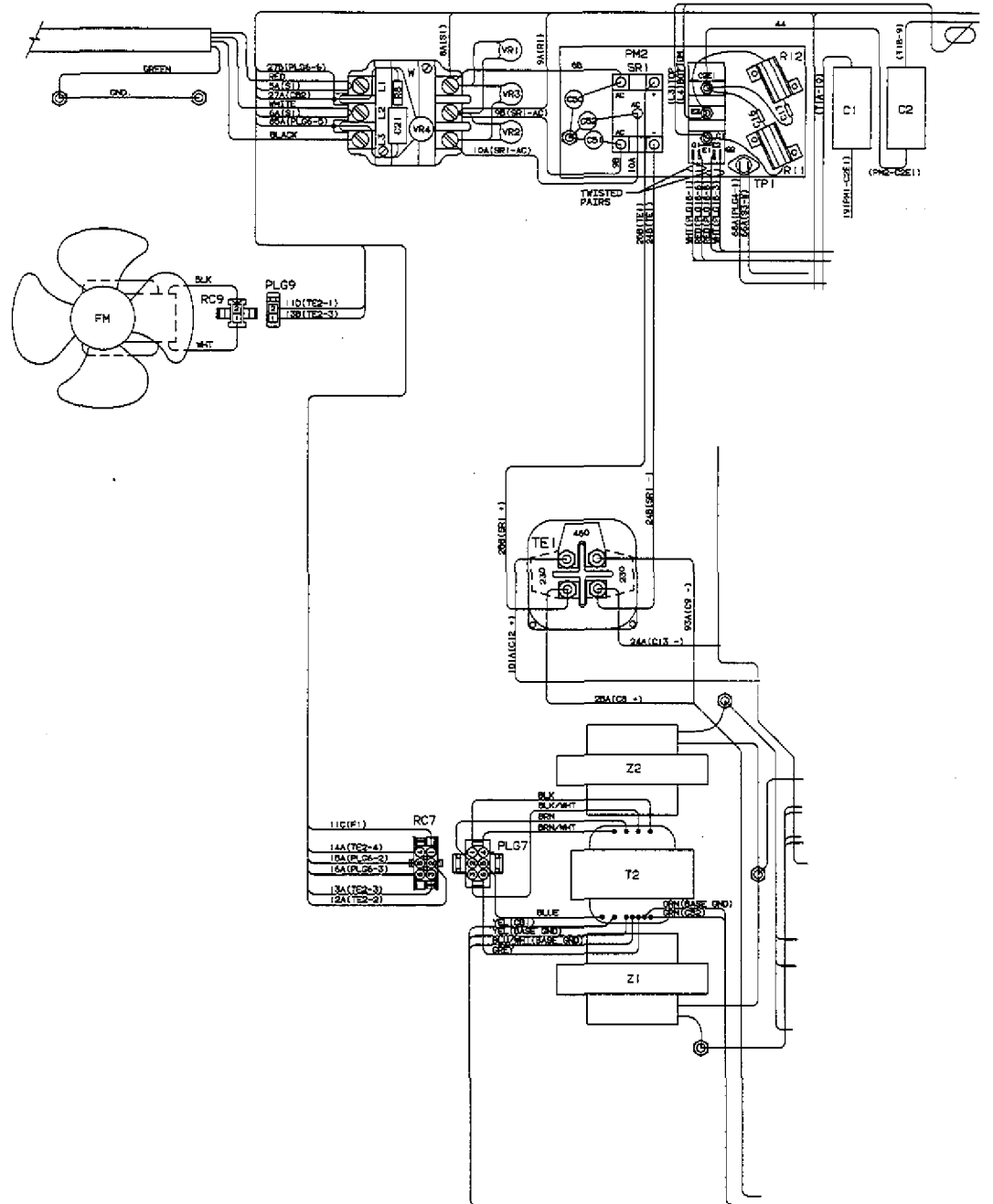
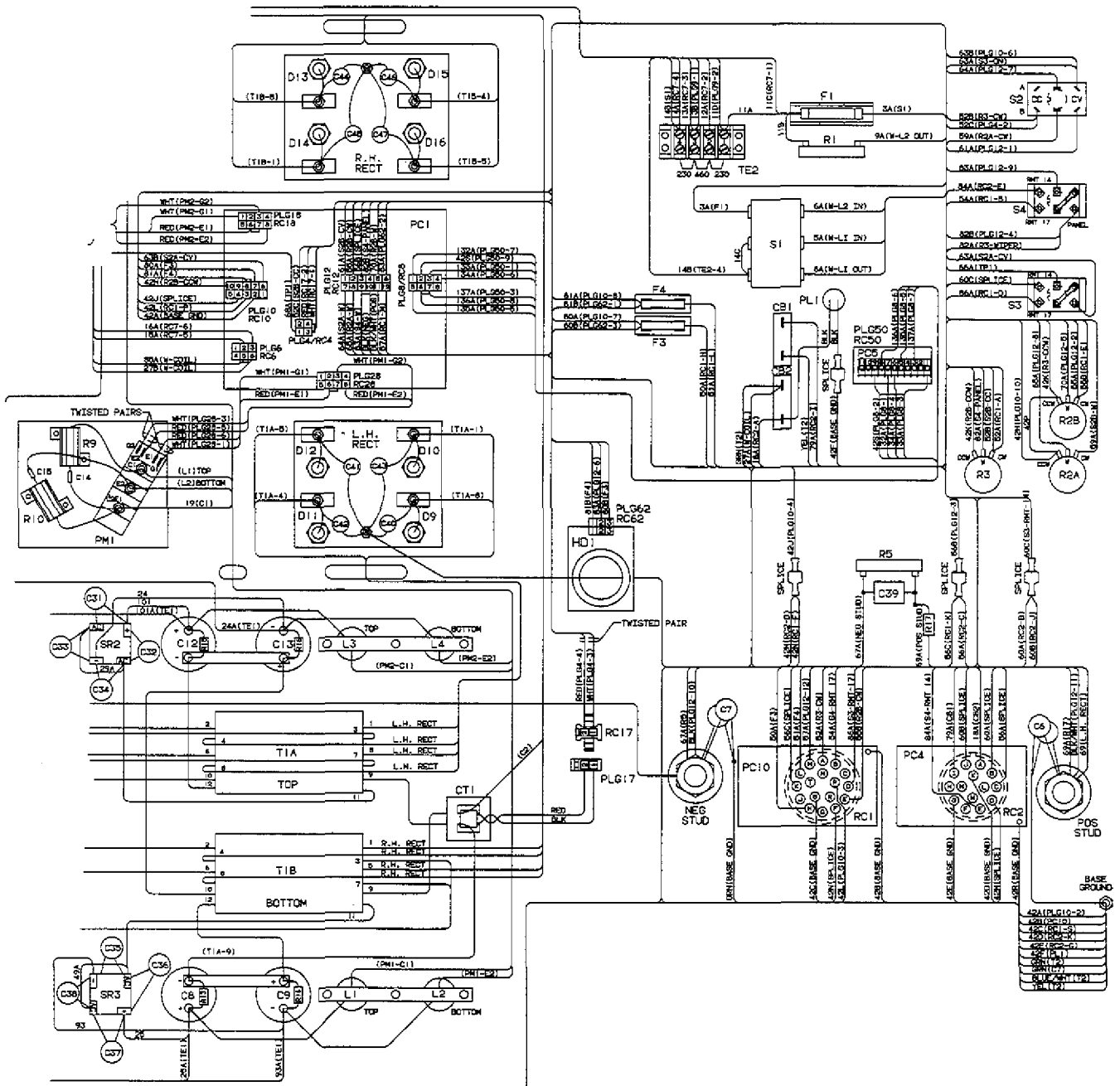
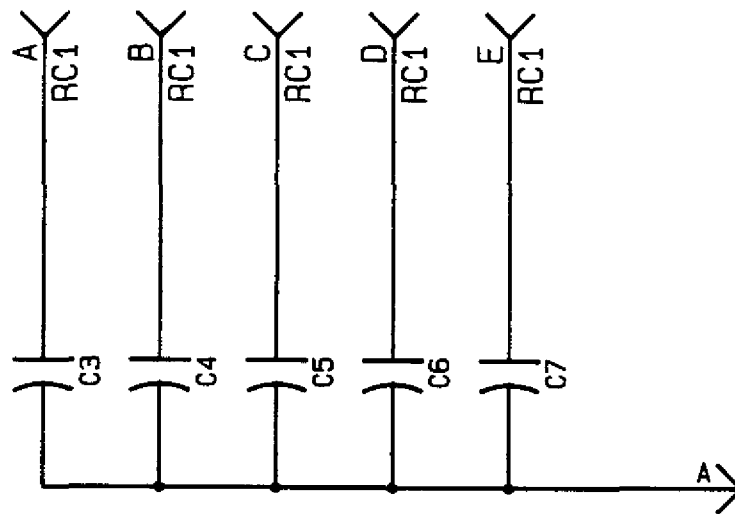


Diagram 8-2. Wiring Diagram

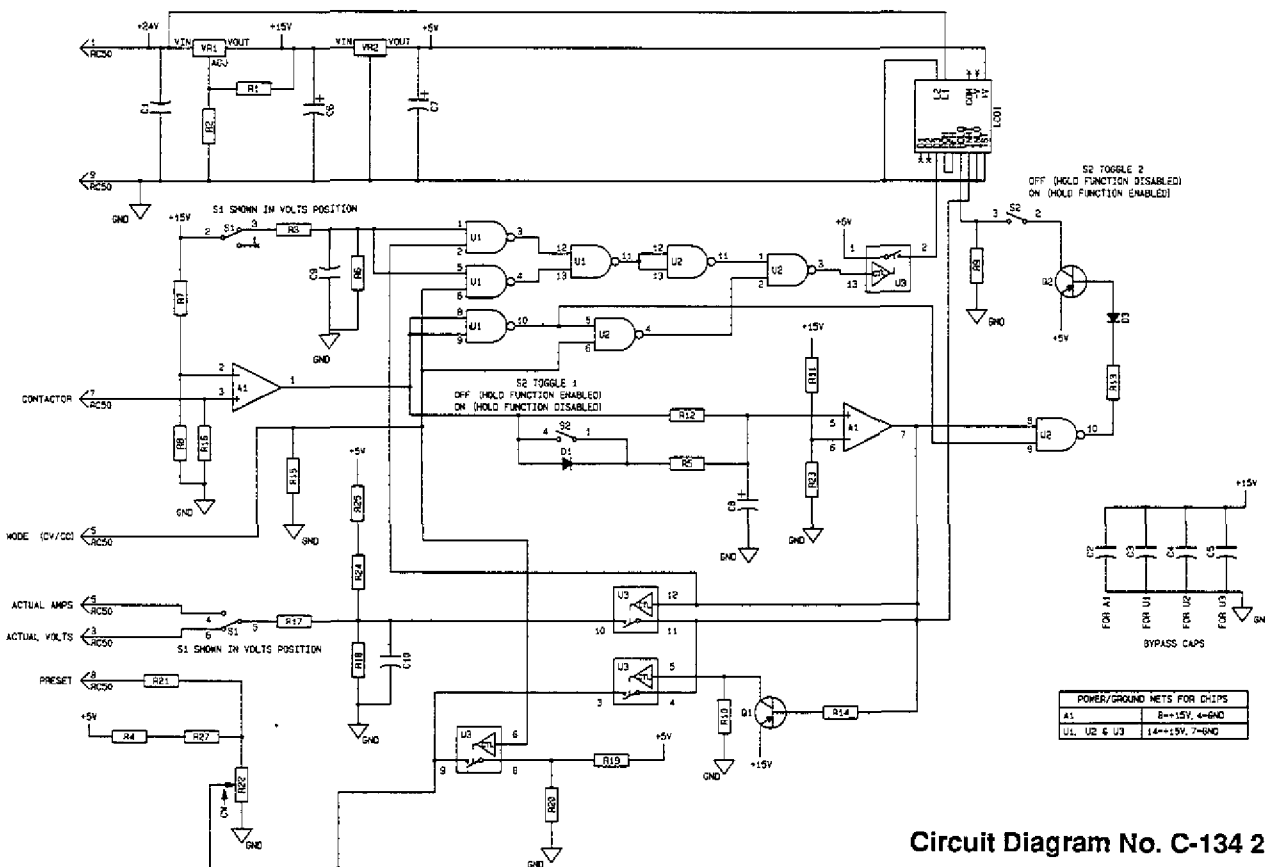


Wiring Diagram No. SD-134 000-B



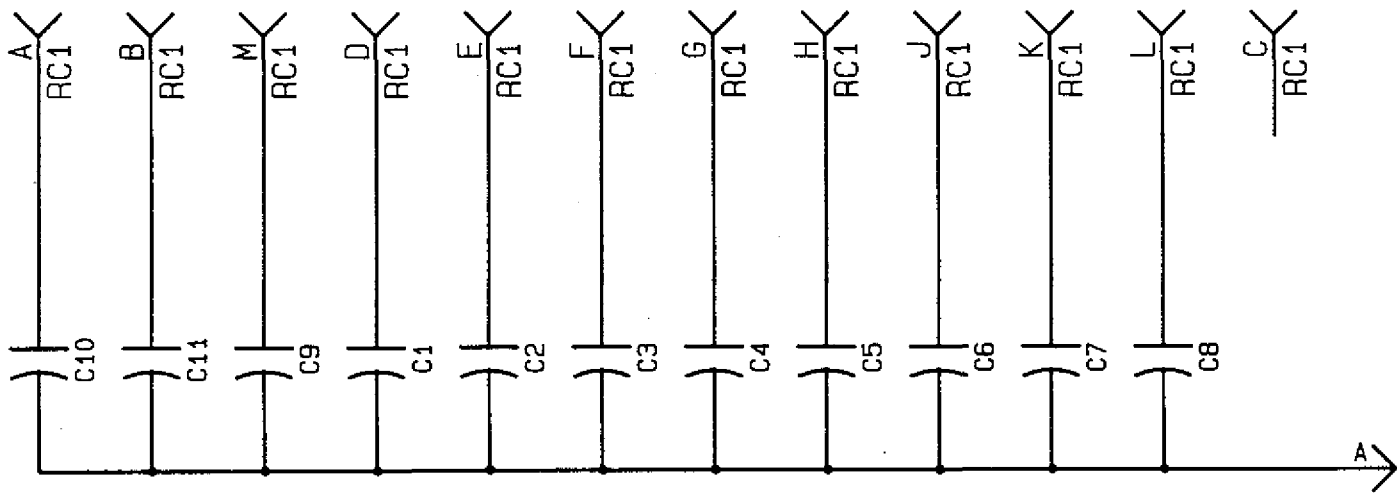
Circuit Diagram No. A-134 691

Diagram 8-3. Circuit Diagram For Filter Board PC4



Circuit Diagram No. C-134 270

Diagram 8-4. Circuit Diagram For Digital Meter Board PC5



Circuit Diagram No. A-124 988-A

Diagram 8-5. Circuit Diagram For Filter Board PC10

SECTION 9 - PARTS LIST

SD-136 598

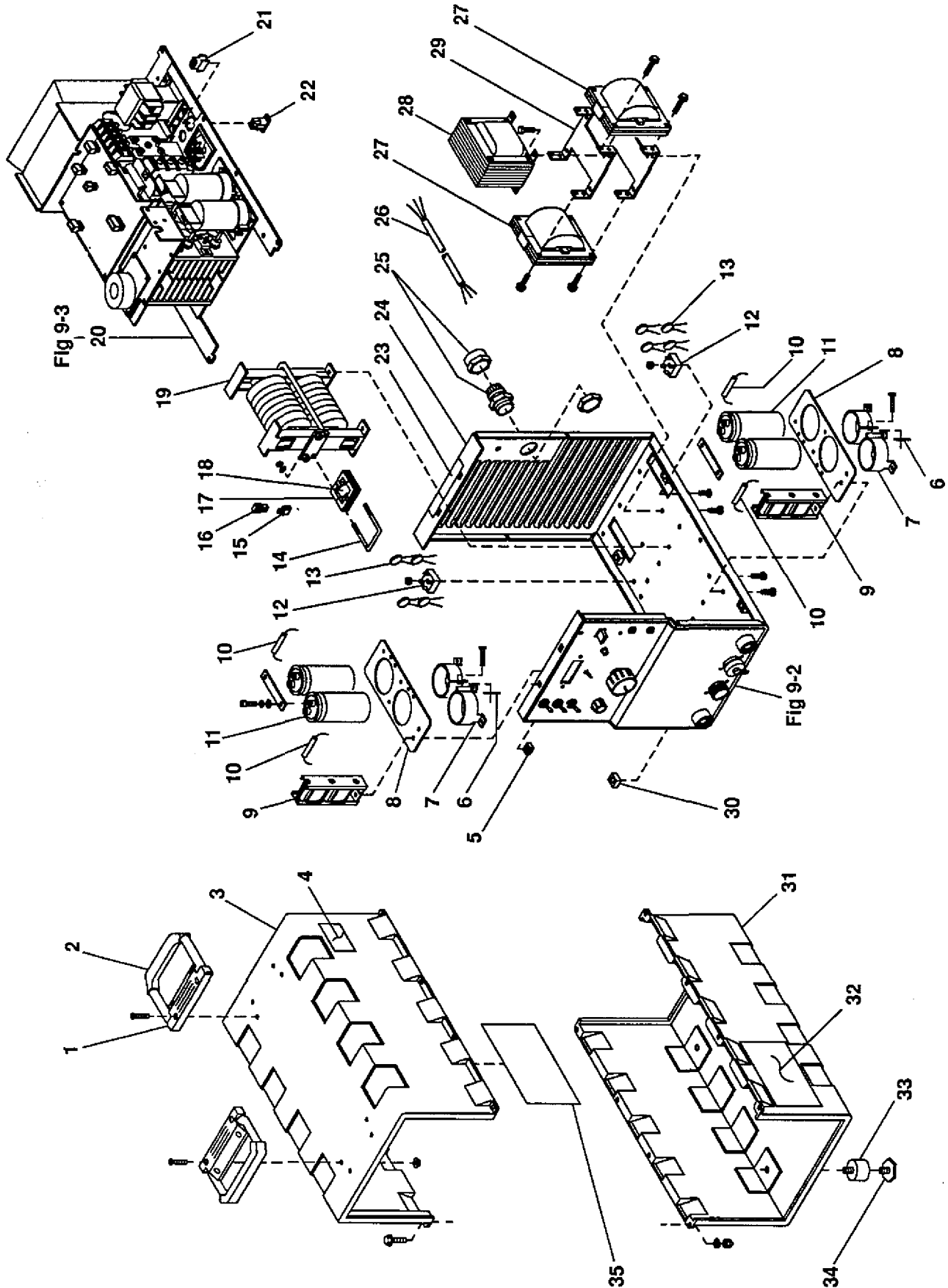


Figure 9-1. Main Assembly

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|----------------------------------|------------|----------|---|----------|
| Figure 9-1. Main Assembly | | | | |
| 1 | | 126 415 | CLAMP, saddle | 2 |
| 2 | | 126 416 | HANDLE, molded plastic | 2 |
| 3 | | +132 434 | CASE | 1 |
| 4 | | 134 756 | LABEL, warning electric shock | 1 |
| 5 | | 133 407 | NUT, retaining self anchoring | 4 |
| 6 | | 133 405 | NUT, speed 10-24 flat type | 4 |
| 7 | | 108 105 | CLAMP, capacitor 2.500 dia | 4 |
| 8 | | 136 227 | STRIP, mtg capacitor bracket | 2 |
| 9 | L1-4 | 133 639 | CHOKE, DVDT | 2 |
| 10 | R13-16 | 000 037 | RESISTOR, WW fxd 10W 5K ohm | 4 |
| 11 | C8,9,12,13 | 135 786 | CAPACITOR, elctt 4000uf 250VDC | 4 |
| 12 | SR2,3 | 109 373 | RECTIFIER, integ 35A 600V | 2 |
| | | 136 191 | CAP, protective vinyl .313 ID x .500 lg | 2 |
| 13 | C31-38 | 128 236 | CAPACITOR ASSEMBLY, (consisting of) | 2 |
| | | 044 176 | · CAPACITOR, cer disc .01uf 1000VDC | 4 |
| 14 | | 097 865 | BOLT, U brs 6-32 x 1.925 wide x 2.250 deep | 1 |
| 15 | PLG17 | 131 054 | HOUSING RECEPTACLE & SOCKETS, (consisting of) | 1 |
| | | 113 746 | · TERMINAL, female 1skt 24-18 wire | 2 |
| 16 | RC17 | 135 635 | HOUSING PLUG & PINS, (consisting of) | 1 |
| | | 114 656 | · TERMINAL, male 1 pin 24-18 wire | 2 |
| 17 | | 097 863 | CORE, ferrite E | 2 |
| 18 | CT1 | 128 485 | COIL, current transformer 500/1 | 1 |
| | | 122 681 | INSULATOR, coil | 1 |
| 19 | T1 | 133 688 | TRANSFORMER, HF | 1 |
| 20 | | Fig 9-3 | CHASSIS, mid | 1 |
| 21 | RC7 | 116 045 | HOUSING PLUG & PINS, (consisting of) | 1 |
| | | 113 633 | · TERMINAL, male 1 pin .084 dia 20-14 wire | 6 |
| 22 | PLG7 | 135 556 | HOUSING PLUG & SOCKETS, (consisting of) | 1 |
| | | 114 066 | · TERMINAL, female 1skt 20-14 wire | 6 |
| 23 | | 126 026 | LABEL, warning electric shock | 1 |
| 24 | | +135 744 | CASE SECTION, front/bottom/rear | 1 |
| | | 601 836 | NUT, brs hex .250-20 jam hvy | 1 |
| 25 | | 134 229 | BUSHING, strain relief .709/1.000 ID x 1.500 mtg hole | 1 |
| 26 | | 604 939 | CABLE, pwr No. 8ga 4/c (order by ft) | 12ft |
| 27 | Z1,2 | 133 634 | STABILIZER | 2 |
| 28 | T2 | 126 464 | TRANSFORMER, control 230/460 VAC | 1 |
| 29 | | 133 356 | BRACKET, mtg stab | 2 |
| 30 | | 133 406 | NUT, retaining self anchoring .312-18 | 4 |
| 31 | | +134 200 | CASE, bottom | 1 |
| 32 | | 123 154 | LABEL, warning general precautionary | 2 |
| 33 | | 133 947 | MOUNT, sgf stud & threaded 1.5 dia .312-18 | 4 |
| 34 | | 133 948 | FOOT, mounting | 4 |
| 35 | | 134 752 | LABEL, warning electric shock | 1 |

+When ordering a component originally displaying a precautionary label, the label should also be ordered.
BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.

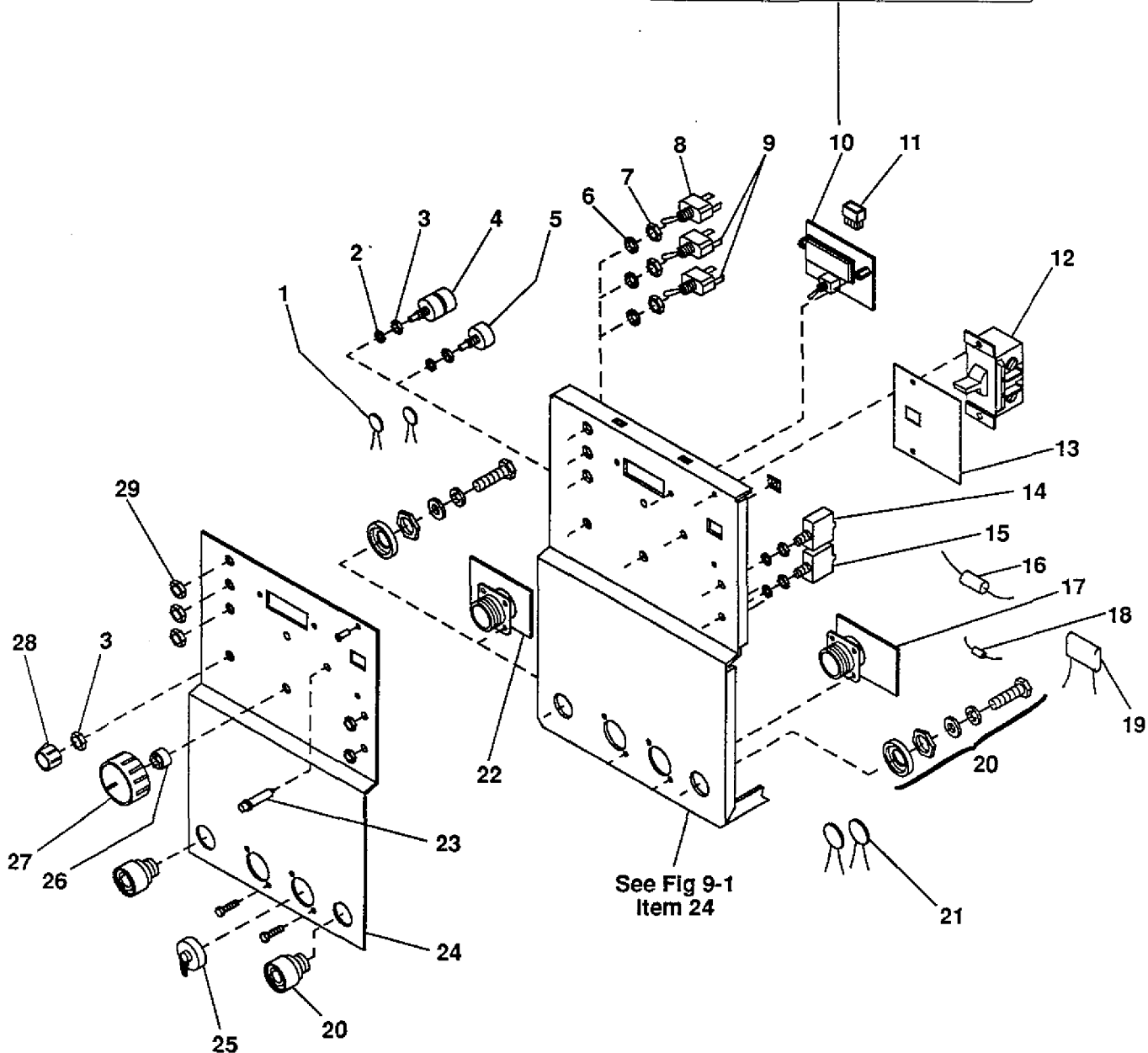
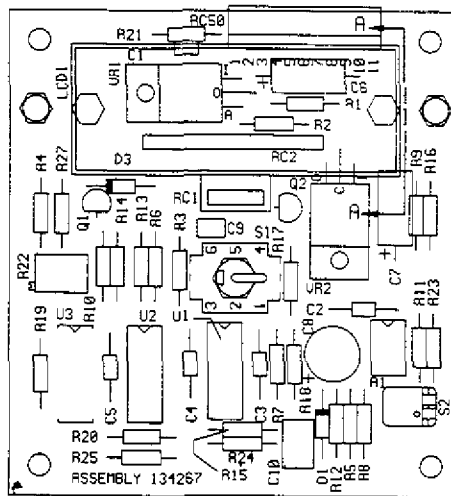


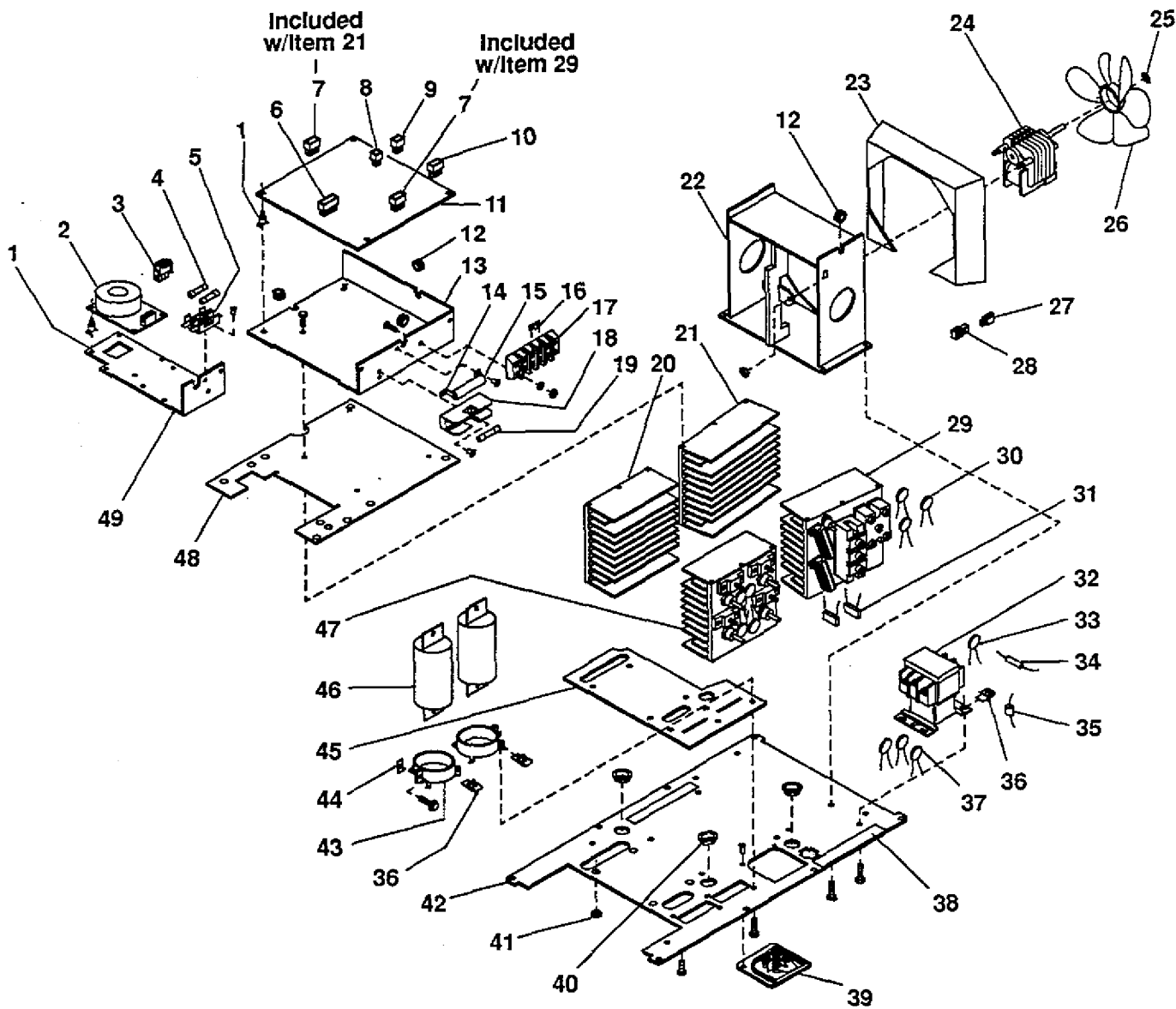
Figure 9-2. Panel, Front w/Components

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|--|--------------------|----------|---|----------|
| Figure 9-2. Panel, Front w/Components (Fig 9-1) | | | | |
| 1 | C6 | 134 296 | CAPACITOR ASSEMBLY, (consisting of) | 1 |
| | | 032 924 | · CAPACITOR, cer disc .0047uf 3000VDC | 2 |
| 2 | | 605 339 | WASHER, lock stl intl tooth .375 | 4 |
| 3 | | 604 645 | NUT, stl hex .375-32 | 3 |
| 4 | R2 | 009 155 | POTENTIOMETER, C sstd sft 1/T 2W 10K/10K ohm | 1 |
| 5 | R3 | 035 897 | POTENTIOMETER, C sstd sft 1/T 2W 1000 ohm | 1 |
| 6 | | 602 222 | WASHER, lock stl intl tooth .437 | 3 |
| 7 | | 605 321 | NUT, stl hex .468-32 | 3 |
| 8 | S2 | 134 848 | SWITCH, tgl DPDT 15A 125VAC | 1 |
| 9 | S3,4 | 134 840 | SWITCH, tgl SPTT 15A 125VAC | 2 |
| 10 | PC5 | 134 267 | CIRCUIT CARD, meter (consisting of) | 1 |
| | A1 | 009 159 | · IC, linear 358 | 1 |
| | C1-5 | 122 723 | · CAPACITOR, cer mono .1uf 50VDC | 5 |
| | C6,7 | 007 742 | · CAPACITOR, elctlt 10uf 35V | 2 |
| | C8 | 039 482 | · CAPACITOR, elctlt 100uf 35VDC | 1 |
| | C9 | 084 128 | · CAPACITOR, cer mono .01uf 50VDC | 1 |
| | C10 | 119 199 | · CAPACITOR, polye metfilm 1uf 50V | 1 |
| | D1,3 | 028 351 | · DIODE, sig .020A 75V SP | 2 |
| | LCD1 | 134 532 | · METER, digital 0 to 2VDC | 1 |
| | Q1,2 | 037 201 | · TRANSISTOR, PNP 200MA 40V | 2 |
| | R1 | 035 828 | · RESISTOR, MF .25W 243 ohm | 1 |
| | R2 | 115 530 | · RESISTOR, MF .25W 2.67K ohm | 1 |
| | R3,5 | 035 825 | · RESISTOR, CF .25W 1K ohm | 2 |
| | R4,15,16, 24,25 | 049 015 | · RESISTOR, CF .25W 10 meg ohm | 5 |
| | R6-9,11 | 035 827 | · RESISTOR, CF .25W 10K ohm | 5 |
| | R10,23 | 035 888 | · RESISTOR, CF .25W 2.2K ohm | 2 |
| | R12,13 | 035 884 | · RESISTOR, CF .25W 100K ohm | 2 |
| | R14 | 039 336 | · RESISTOR, CF .25W 220K ohm | 1 |
| | R17 | 095 823 | · RESISTOR, MF .25W 44.8K ohm | 1 |
| | R18 | 095 822 | · RESISTOR, MF .25W 5K ohm | 1 |
| | R19 | 052 146 | · RESISTOR, MF .25W 619K ohm | 1 |
| | R20 | 093 037 | · RESISTOR, MF .25W 47.5K ohm | 1 |
| | R21 | 052 145 | · RESISTOR, MF .25W 475K ohm | 1 |
| | R22 | 009 391 | · POTENTIOMETER, cermet trmr 25/T .5W 50K ohm | 1 |
| | R27 | 072 934 | · RESISTOR, CF .25W 8.2 meg ohm | 1 |
| | RC1 | 136 124 | · TERMINAL, hdr 4skt | 1 |
| | RC2 | 136 125 | · TERMINAL, hdr 13skt | 1 |
| | RC5 | 089 240 | · TERMINAL, hdr 11 pin | 1 |
| | S1 | 134 841 | · SWITCH, tgl DPDT .5VA 28VDC | 1 |
| | S2 | 092 367 | · SWITCH, DIP SPST 2posn | 1 |
| | U1,2 | 008 970 | · IC, digital 4011 | 2 |
| | U3 | 052 149 | · IC, interface 4066 | 1 |
| | VR1 | 095 269 | · IC, linear 317T | 1 |
| | VR2 | 083 773 | · IC, linear 7805 | 1 |
| | | 115 443 | · STAND-OFF, No. 6-32 x .750 lg | 2 |
| | | 134 843 | · NUT, brs hex .250-40 jam | 1 |
| | | 137 421 | JUMPER, PC card (consisting of) | 1 |
| 11 | PLG50 | 089 222 | · HOUSING, term hdr 11skt posn | 1 |
| | PLG8 | 115 092 | · HOUSING PLUG & SOCKETS, (consisting of) | 1 |
| | | 113 746 | · TERMINAL, female 1skt 24-18 wire | 8 |
| | | 134 843 | NUT, brs hex .250-40 jam | 1 |
| 12 | S1 | 128 756 | SWITCH, tgl 3PST 40A 600VAC | 1 |
| 13 | | 133 796 | INSULATOR, switch pwr | 1 |
| 14 | CB1 | 089 807 | CIRCUIT BREAKER, man reset 1P 2.5A 250V | 1 |
| 15 | CB2 | 083 432 | CIRCUIT BREAKER, man reset 1P 10A 250V | 1 |
| 16 | R17 | 604 178 | RESISTOR, C 2W 100 ohm | 1 |
| 17 | RC1, PC10 | 137 542 | CIRCUIT CARD, rcpt 17 pin | 1 |

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|--|------------|----------|---|----------|
| Figure 9-2. Panel, Front w/Components (Fig 9-1) (Continued) | | | | |
| 18 | R5 | 030 002 | RESISTOR, C .5W 100K ohm | 1 |
| 19 | C39 | 035 561 | CAPACITOR, polye met film 4uf 200V | 1 |
| 20 | POS,NEG | 129 525 | RECEPTACLE, twlk insul male (Dinse type) 50/70 series | 2 |
| | | 131 605 | TERMINAL, connector friction | 2 |
| | | 129 527 | CONNECTOR, twlk insul male (Dinse type) 50 series | 2 |
| | | 134 746 | WRENCH, hex 5mm short | 1 |
| 21 | C7 | 134 298 | CAPACITOR ASSEMBLY, (consisting of) | 1 |
| | | 032 924 | CAPACITOR, cer disc .0047uf 3000VDC | 2 |
| 22 | RC2, PC4 | 137 541 | CIRCUIT CARD, rcpt 14 pin | 1 |
| 23 | PL1 | 135 199 | LIGHT, ind red lens 28V | 1 |
| 24 | | | NAMEPLATE, (order by model and serial number) | 1 |
| 25 | | 039 885 | CAP, dust connector 9760-20 | 1 |
| 26 | | 135 299 | LOCK, shaft knob .375-32 x .250 dia shaft | 1 |
| 27 | | 097 924 | KNOB, pointer 1.625 dia x .250 ID | 1 |
| 28 | | 097 922 | KNOB, pointer .875 dia x .250 ID | 1 |
| 29 | | 134 842 | NUT, brs hex .468-32 jam | 3 |

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

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|---|------------|----------|--|----------|
| Figure 9-3. Chassis, Mid (Fig 9-1 Item 20) | | | | |
| 1 | | 134 058 | STAND-OFF SUPPORT, PC card .156 dia | 8 |
| 2 | HD1 | 137 156 | TRANSDUCER, current | 1 |
| 3 | PLG62 | 130 204 | HOUSING PLUG & SOCKETS, (consisting of) | 1 |
| | | 114 006 | · TERMINAL, female 1skt 20-14 wire | 3 |
| 4 | F3,4 | *012 652 | FUSE, mintr gl sol-blo .5A | 2 |
| 5 | | 098 376 | HOLDER, fuse mintr .250 x 1.250 clip 2 fuses 30A | 1 |
| 6 | PLG12 | 130 203 | HOUSING PLUG & SOCKETS, (consisting of) | 1 |
| | | 113 746 | · TERMINAL, female 1skt 24-18 wire | 12 |
| 7 | PLG18,28 | 115 092 | HOUSING PLUG & SOCKETS, (consisting of) | 2 |
| | | 113 746 | · TERMINAL, female 1skt 24-18 wire | 8 |
| 8 | PLG4 | 115 094 | HOUSING PLUG & SOCKETS, (consisting of) | 1 |
| | | 113 746 | · TERMINAL, female 1skt 24-18 wire | 4 |
| 9 | PLG6 | 115 093 | HOUSING PLUG & SOCKETS, (consisting of) | 1 |
| | | 113 746 | · TERMINAL, female 1skt 24-18 wire | 6 |
| 10 | PLG10 | 115 091 | HOUSING PLUG & SOCKETS, (consisting of) | 1 |
| | | 113 746 | · TERMINAL, female 1skt 24-18 wire | 10 |
| 11 | PC1 | 135 067 | CIRCUIT CARD, control | 1 |
| 12 | | 010 116 | GROMMET, rbr .375 ID x .500 mtg hole | 2 |
| 13 | | 133 285 | TRAY, mtg PC card | 1 |
| 14 | | 605 741 | CLIP, mtg resistor .312 ID core | 2 |
| 15 | R1 | 079 781 | RESISTOR, WW fxd 25W 50 ohm | 1 |
| 16 | | 601 219 | LINK, jumper term blk 20A | 2 |
| 17 | TE2 | 038 081 | BLOCK, term 30A 4P | 1 |
| 18 | | 095 847 | HOLDER, fuse crtg 30A 600V 13/32 x 1-1/2 lg | 1 |
| 19 | F1 | *099 398 | FUSE, crtg 3A 500V time delay | 1 |
| 20 | | 133 969 | RECTIFIER, si diode LH (consisting of) | 1 |
| | C40-43 | 126 005 | · CAPACITOR ASSEMBLY, (consisting of) | 2 |
| | | 044 176 | · CAPACITOR, cer disc .01uf 1000VDC | 2 |
| | D9-12 | 132 556 | · DIODE, fast recovery 85A 600V w/pig tail | 4 |
| | | 133 290 | · HEAT SINK, rect | 1 |
| | | 072 253 | · STUD, connection single 10-32 x .500 x 1.250 mtg | 4 |
| 21 | | 133 967 | IGBT, LH (consisting of) | 1 |
| | C14,15 | 093 085 | · CAPACITOR, ploye met film .0047uf 1000V | 2 |
| | PM1 | 132 843 | · TRANSISTOR, IGBT module 75A 600V | 1 |
| | R9,10 | 123 231 | · RESISTOR, WW fxd 50W 35 ohm | 2 |
| | | 133 288 | · HEAT SINK, IGBT LH | 1 |
| 22 | | 136 873 | WINDTUNNEL, 6-1/2 in | 1 |
| 23 | | 133 295 | CHAMBER, plenum 6.500 in | 1 |
| 24 | FM | 132 952 | MOTOR, fan 230V 50/60 Hz 3000 RPM | 1 |
| 25 | | 134 209 | NUT, speed push-on-type .250 | 1 |
| 26 | | 132 951 | BLADE, fan 6.5 in 6wg .250 bore CW | 1 |
| 27 | PLG9 | 131 054 | HOUSING RECEPTACLE & SOCKETS (consisting of) | 1 |
| | | 113 746 | · TERMINAL, female 1skt 24-18 wire | 2 |
| 28 | RC9 | 135 635 | HOUSING PLUG & PINS, (consisting of) | 1 |
| | | 114 656 | · TERMINAL, male 1 pin 24-18 wire | 2 |
| 29 | | 133 966 | IGBT, RH (consisting of) | 1 |
| 30 | C50-52 | 087 209 | · CAPACITOR, cer disc .003uf 2000VAC | 3 |
| 31 | C16,17 | 093 085 | · CAPACITOR, ploye met film .0047uf 1000V | 2 |
| | PM2 | 132 843 | · TRANSISTOR, IGBT module 75A 600V | 1 |
| | R11,12 | 123 231 | · RESISTOR, WW fxd 50W 35 ohm | 2 |
| | SR1 | 131 828 | · RECTIFIER, integ 100A 1200V 3ph | 1 |
| | TP1 | 006 334 | · THERMOSTAT, NC open 180F close 150F | 1 |
| | | 133 291 | · HEAT SINK, IGBT RH | 1 |
| 32 | W | 132 889 | CONTACTOR, def prp 40A 3P 24V | 1 |
| 33 | VR4 | 087 156 | VARIATOR, 10 joule 68VDC .636 dia disc type | 1 |
| 34 | C21 | 028 294 | CAPACITOR, ploye met film 1uf 250VDC | 1 |
| 35 | R8 | 030 937 | RESISTOR, C .5W 10 ohm | 1 |
| 36 | | 136 190 | NUT, speed U type 10-32 | 6 |



SD-136 597

Figure 9-3. Chassis, Mid

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity | |
|---|------------|----------|--|---|---|
| Figure 9-3. Chassis, Mid (Fig 9-1 Item 20) (Continued) | | | | | |
| 37 | VR1-3 | 098 747 | VARISTOR ASSEMBLY, (consisting of) | 1 | |
| | | 090 304 | · VARISTOR, 220 joule 730VDC .89 dia disc type | 3 | |
| 38 | | 126 026 | LABEL, warning electric shock | 2 | |
| 39 | TE1 | 122 385 | TERMINAL ASSEMBLY, chgov (consisting of) | 1 | |
| | | 116 620 | · TERMINAL BOARD, chgov | 1 | |
| | | 038 618 | · LINK, jumper term bd pri | 2 | |
| | | 038 887 | · STUD, primary board brs 10-32 x 1.375 | 4 | |
| | | 601 835 | · NUT, brs hex 10-32 reg | 8 | |
| | | 010 913 | WASHER, flat brs .218 ID x .460 OD x .031 thk | 4 | |
| | | 601 835 | NUT, brs hex 10-32 reg | 12 | |
| 40 | | | 010 493 | BUSHING, snap-in nyl .625 ID x .875 mtg hole | 3 |
| 41 | | | 133 400 | WASHER, shldr nyl .380 OD x .195 ID x .062 x .062 shldr | 4 |
| 42 | | | +135 486 | PANEL, center | 1 |
| 43 | | 006 426 | CLAMP, capacitor 2.000 dia | 2 | |
| 44 | | 133 405 | NUT, speed 10-24 flat type rectangular | 2 | |
| 45 | | 133 301 | INSULATOR, heat sink lower | 1 | |
| 46 | C1,2 | 132 844 | CAPACITOR, ployp film 2.1uf 1000VDC | 2 | |
| 47 | | | 133 968 | RECTIFIER, si diode RH (consisting of) | 1 |
| | C44-47 | 126 005 | · CAPACITOR ASSEMBLY, (consisting of) | 2 | |
| | | | 044 176 | · CAPACITOR, cer disc .01uf 1000VDC | 2 |
| | D13-16 | 132 556 | · DIODE, fast recovery 85A 600V w/pig tail | 4 | |
| | | | 133 290 | · HEAT SINK, rect | 1 |
| | | | 072 253 | · STUD, connection single 10-32 x .500 x 1.250 mtg | 4 |
| 48 | | 133 287 | INSULATOR, heat sink upper | 1 | |
| 49 | | 133 293 | STRIP, bus rectifier | 1 | |

*Recommended Spare Parts.

+When ordering a component originally displaying a precautionary label, the label should also be ordered.
BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.

OPTIONS AND ACCESSORIES

REMOTE CONTROLS

RFC-14 FOOT CONTROL (#129 339)

Foot current and contactor control. Includes 20 ft. (6 m) cord and 14-pin Amphenol plug.

RHC-14 HAND CONTROL (#129 340)

Miniature hand control for remote current and contactor control. Dimensions: 4 in. (102 mm) x 4 in. (102 mm) x 3-1/4 in. (82 mm). Includes 20 ft. (6 m) cord and 14-pin Amphenol plug.

TORCH-MOUNTED REMOTE HAND CONTROLS

RMLS-14 (#129 337)

Momentary-and maintained-contact rocker switch for contactor control. Push forward for maintained contact and back for momentary contact. Includes 20 ft. (6 m) cord and 14-pin Amphenol plug.

FTC-14 REMOTE CONTACTOR AND CURRENT CONTROL (#129 338)

Fastens to TIG torch handle. Includes 28 ft. (8.5 m) cord and 14-pin Amphenol plug.

EXTENSION CORDS FOR REMOTE CONTROLS AND 24 VAC WIRE FEEDERS

14-pin Amphenol plug to a 14-pin Amphenol socket.

- 10 ft. (3 m) (#122 972)
- 25 ft. (7.6 m) (#122 973)
- 50 ft. (15.2 m) (#122 974)
- 75 ft. (22.8 m) (#122 975)

XMT™ ECONOMY CART (#134 505)

Small, lightweight with reversible handles. Slanted for convenient access to front panel controls. Storage compartment for gloves, helmet, torch tips, etc. Can be used with Maxtron™ or XMT inverter power supplies.

PC-300 PULSED GTAW (DC TIG) CONTROL (#042 297)

The PC-300 provides two internally switchable scales. The pulsing frequencies are limited by the type of power source. A non-inverter power source is capable of responding to the 0.5 to 20 pulses per second scale. An inverter power source can utilize the 0.5 to 20 pulses per second scale or the 10 to 300 pulses per second scale.

The PC-300 can be used with welding power sources with, or without, built-in high-frequency or with external high-frequency units (for example, HF-251D-1).

Front panel controls provide:

- Peak Amperage Adjustment
- Background Amperage Adjustment
- Pulses Per Second Adjustment
- Percent On Time Adjustment
- Amperage REMOTE/PANEL
- Output Contactor ON/OFF
- Pulser ON/OFF
- Power ON/OFF

A remote control receptacle is also included for use with a remote hand or foot control.

An 8 ft. (2.4 m) interconnecting cord and 115 VAC power cord are provided.

XMT™ CYLINDER CART (#042 537)

Small, lightweight with reversible handles. Slanted for convenient access to front panel controls. Carries two 160 lb. (72.6 kg) gas bottles or one gas bottle and one coolant system for TIG (GTAW) welding. Feeder mounted to tray above power supply. Storage compartment for gloves, helmet, torch tips, etc. Can be used with the Maxtron™ or XMT inverter power supplies.

XMT WIRE FEEDER QUICK DISCONNECT (#042 491)

Attaches S-21E or S-22A wire feeder to XMT case.

OPTIMA™ ADAPTIVE SYNERGIC GMAW (MIG) PULSE CONTROL (#042 171)

The Optima provides pulse spray transfer control to eliminate spatter associated with the short circuit transfer process.

The Optima is a versatile and cost effective synergic GMAW (MIG) pulsing pendant. The adaptive synergic control circuitry provides precise pulsing on 10 selectable operating channels. This includes programs for Aluminum, Stainless, Mild Steel, Nickel, and Silicon Bronze.

Pulse spray transfer reduces heat input associated with the standard spray transfer, thereby reducing distortion, and allowing the operator to weld thinner materials and weld out of position.

The Optima is designed for use with an inverter power source and any wire feeder, including Automatic controls and spool guns. A 25 ft. (7.6 m) cord with 17-pin Amphenol plug for connecting to the XMT 300 CC/CV is included.

BACK-LIT LCD DIGITAL METERS

Allow presetability and real time display of voltage and amperage. Presetting welding current and voltage helps to provide optimum welding conditions. Meters feature a "hold" function that allows operator to read actual weld values after he/she stops welding. Weld setting is held for 5 seconds before meter is automatically cleared. Meters are easy to read in indoor or outdoor environment.

OPTIONS AND ACCESSORIES

All XMT™ power sources are equipped with International style connectors for secondary connections. (Power source is shipped with two 50 mm male International style plugs for use with #1 or #2 AWG size cable.)

INTERNATIONAL STYLE CONNECTOR KIT

Required if male plugs shipped with power source must be replaced, if additional plugs are needed, or if #1/0 or #2/0 AWG size cable is to be used.

Kit includes one International style male plug which attaches to the work and/or weld cables and plugs into the International style receptacles on the power source.

(#042 418) 50 mm

Accepts #1 or #2 AWG size cable.

(#042 533) 70 mm

Accepts #1/0 or #2/0 AWG cable size.

EXTENSION KIT FOR INTERNATIONAL STYLE CABLE CONNECTORS

Used to adapt or extend weld and/or work cables.

Kit includes one male International style plug and one in-line female International style receptacle.

(#042 419) 50 mm

Accepts #1 or #2 AWG size cable.

(#042 534) 70 mm

Accepts #1/0 or #2/0 AWG size cable.

INTERNATIONAL/TWECO® ADAPTER

(#042 465)

Kit includes one International style male plug (to power source) and one female Tweco receptacle (for weld cable connection).

INTERNATIONAL/CAM-LOK ADAPTER

(#042 466)

Kit includes one International style male plug (to power source) and one female Cam-Lok receptacle (for weld cable connection).

INTERNATIONAL/TIG BLOCK CONNECTOR

Required for direct connection of water-cooled torches or air-cooled torches with a one-piece cable assembly.

For Air-Cooled Torches

Kit includes gas hose, gas hose fitting, and International style TIG Block.

(#135 492)

For 90 Amp, air-cooled torch with one-piece cable assembly.

(#135 493)

For 150 Amp, air-cooled torch with one-piece cable assembly.

(#135 494)

For 200 Amp, air-cooled torch with one-piece cable assembly.

For Water-Cooled Torches

Kit includes water fitting and International style TIG Block.

(#135 495)

For 250/350 Amp, water-cooled torch.