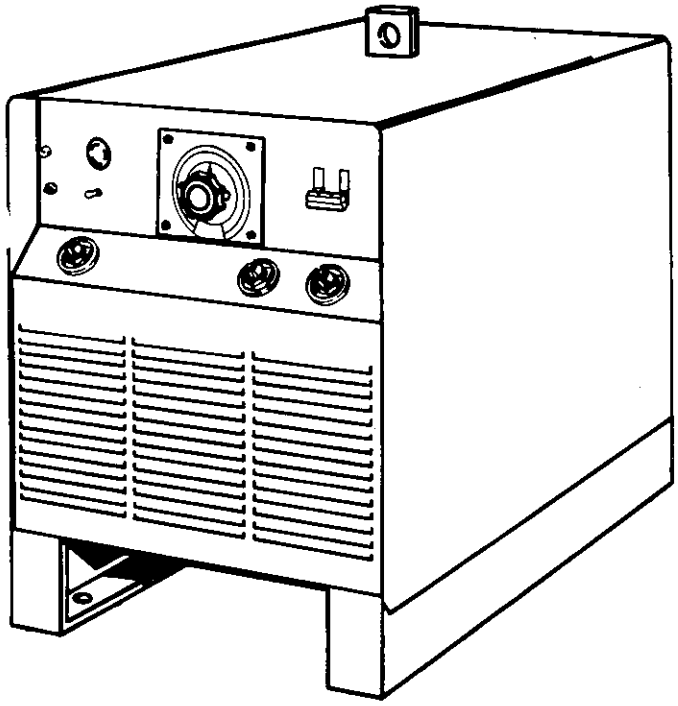
April 1977 FORM: OM-231B

Effective with Serial No. HG012150

MODEL	STOCK NO
SRH-303	901 856
SRH-404	901 907



MODEL/STOCK NO.	SERIAL/STYLE NO.	DATE PURCHASED

OWNER'S MANUAL

MILLER ELECTRIC MFG. CO.
APPLETON, WISCONSIN, USA 54911

NWSA CODE NO. 4579

PRINTED IN U.S.A.

LIMITED WARRANTY

EFFECTIVE: NOVEMBER 1, 1976

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

LIMITED WARRANTY—Miller Electric Mfg. Co., Appleton, Wisconsin warrants to Customer 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. At the present time, the manufacturer's warranty on the Mag-Diesel engine on DEL-200 is limited to six months and on all other engines to one year.

MILLER 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, MILLERMATIC 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.

In the case of Miller's breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefor 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. Upon receipt of notice of apparent defect or failure, Miller shall instruct the claimant on the warranty claim procedures to be followed.

As a matter of general policy only, Miller may honor an original user's 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, and components ... 1 year
2. Original main power rectifiers ..... 3 years
   (Labor — 1 year only)
3. All welding guns and feeder/guns ..... 90 days
4. All other Millermatic Feeders ..... 1 year

provided that the user so notifies Miller in writing within thirty (30) days of the date of such failure.

5. Replacement or repair parts exclusive of labor .. 60 days

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' 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.

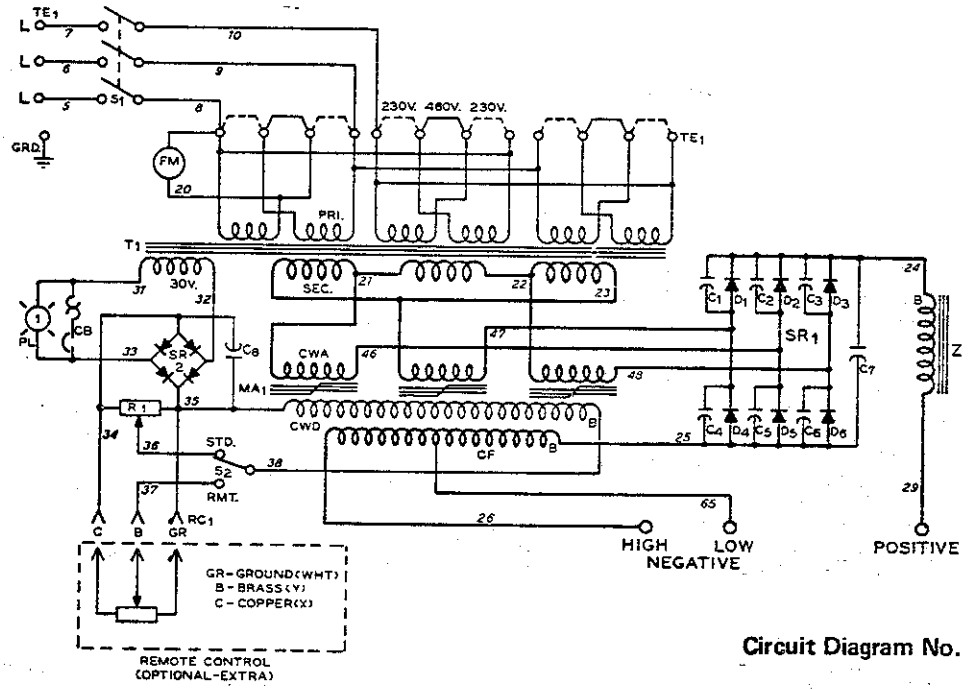
Effective With Serial No. HH

AMENDMENT TO SECTION 7 – TROUBLESHOOTING

Amend Figure 7-1 as follows:

NOTE

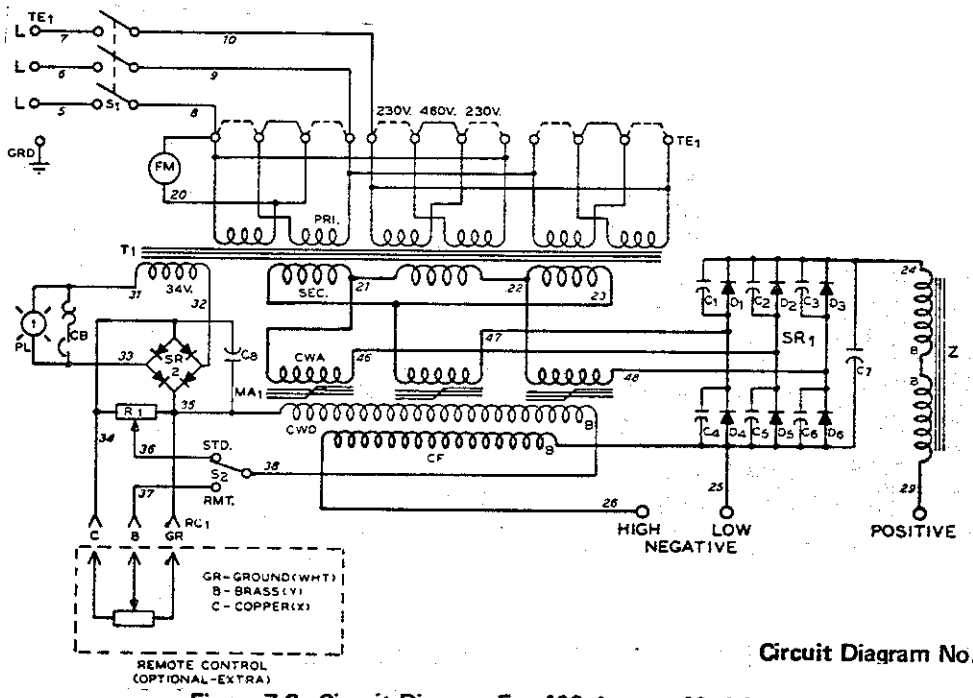
The circuit diagram(s) on this supplement replace any other circuit diagram(s) appearing later in this manual.



Circuit Diagram No. CA-901 856-1C

Figure 7-1. Circuit Diagram For 300 Ampere Models

Amend Figure 7-2 as follows:



Circuit Diagram No. CA-901 907-1B

Figure 7-2. Circuit Diagram For 400 Ampere Models

Item No.	Dia. Mkgs.	Part No. Listed In Parts List	Replaced With Part No.	Description	Quantity Model 300 AMP	Quantity Model 400 AMP
5	SR2	037 888	035 914	RECTIFIER, integrated 30 amp 400 volts	1	1
6		014 019	Deleted			
42	CB	011 693	*003 693	CIRCUIT BREAKER, manual reset 10 amp 250 volts ac	1	1
	C8		003 886	CAPACITOR, ceramic 0.01 uf 500 volts dc	1	1

Recommended Spare Parts.
BE SURE TO PROVIDE STOCK, MODEL, AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

TABLE OF CONTENTS

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

A. Burn Prevention

Wear protective clothing - leather (or asbestos) gauntlet gloves, 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 or 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

Adequate ventilation. 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 1 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, or the operator wears 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 accidently 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 3 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 equipment as recommended in A6.0. Waterfilling just below working level may substitute for inerting.

A container with unknown contents should be cleaned (see paragraph above). 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, PRECAUTIONS FOR SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS, listed 6 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 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 use 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 agree, 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 thereafter. Brush with soap solution (capful 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.

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 outergarments 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 later 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:

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 body surface electrical resistance, enabling dangerous and possibly lethal currents to flow through the body.

1. Grounding the Equipment

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 a flammable liquid such as oil or fuel.

Three-phase connection. Check phase requirement 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.

*Trademark of Proctor & Gamble.

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 Wire

Electrode wire becomes electrically HOT when the power switch of gas metal-arc welding equipment is ON and welding gun trigger is pressed. Keep hands and body clear of wire and other HOT parts.

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.

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, 2501 NW 7th St., Miami, Fla. 33125.

2. ANSI Standard Z87.1, SAFE PRACTICE FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION, obtainable from American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.

3. American Welding Society Standard A6.0, WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES, obtainable same as item 1.

4. NFPA Standard 51, OXYGEN-FUEL GAS SYSTEMS FOR WELDING AND CUTTING, obtainable from the National Fire Protection Association, 470 Atlantic Avenue, Boston, Mass. 02210.

5. NFPA Standard 51B, CUTTING AND WELDING PROCESSES, obtainable same as item 4.

6. CGA Pamphlet P-1. SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS, obtainable from the Compressed Gas Association, 500 Fifth Avenue, New York, N. Y. 10036.

7. OSHA Standard 29 CFR, Part 1910, Subpart Q, WELDING, CUTTING AND BRAZING.

Model	Rated Welding Current Amperes	Welding Current Range Amperes		Open-Circuit Volts	Amperes Input At Rated Load Output 60 Hz Three-Phase			kw	Dimensions (Inches)	Weight (Pounds)	
		Low Range	High Range		230 Volts	460 Volts	kva			Net	Ship
300 Amp	300 Amps @ 32 Volts 60% Duty Cycle	45-375	50-390	80	60	30	24	14.4	Height - 30 Width - 22-1/4 Depth - 35-3/4	639	654
400 Amp	400 Amps @ 36 Volts 60% Duty Cycle	50-400	55-500		82	41	32.6	20.3		747	762

Figure 2-1. Specifications

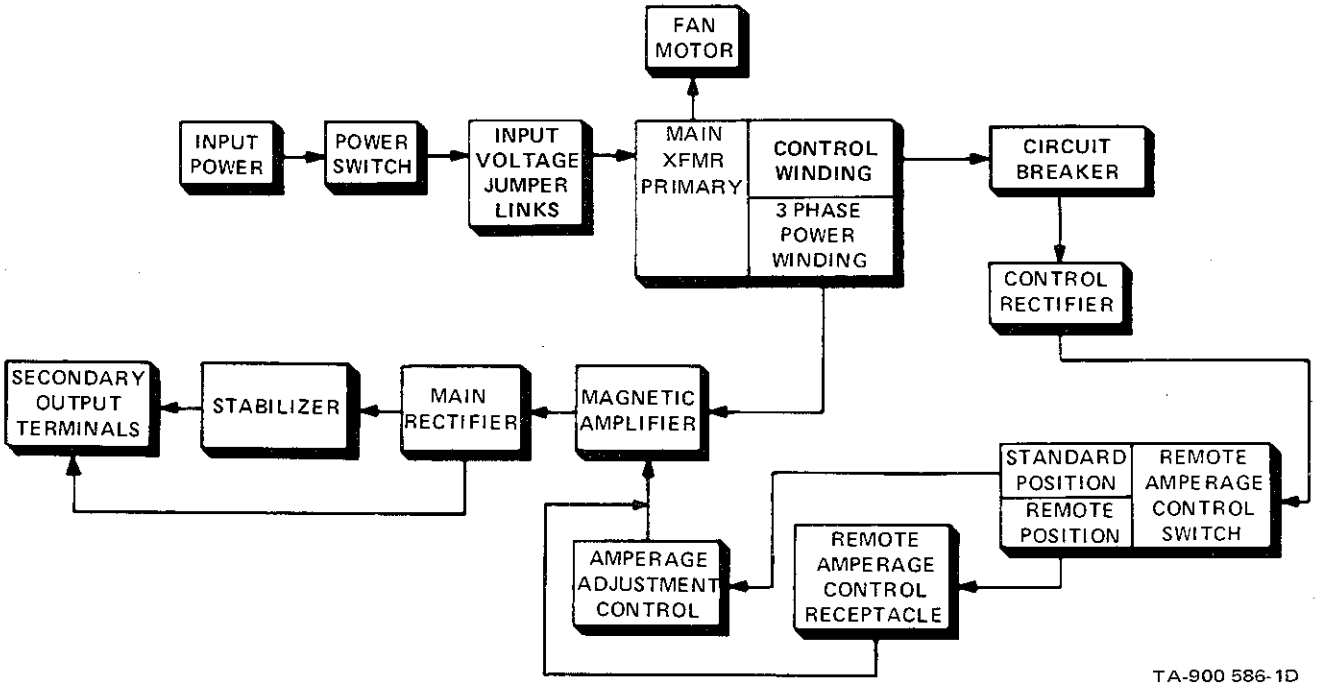


Figure 2-2. Block Diagram

2-1. GENERAL

This manual has been prepared especially for use in familiarizing personnel with the design, installation, operation, maintenance, and troubleshooting of this equipment. All information presented herein should be given careful consideration to assure optimum performance of this equipment.

2-2. RECEIVING-HANDLING

Prior to installing this equipment, clean all packing material from around the unit and carefully inspect for any damage that may have occurred during shipment. Any claims for loss or damage that may have occurred in transit must be filed by the purchaser with the carrier. A copy of the bill of lading and freight bill will be furnished by the carrier on request if occasion to file claim arises.

When requesting information concerning this equipment, it is essential that Model Description and/or Stock Number and Serial (or Style) Number of the equipment be supplied.

2-3. DESCRIPTION

This unit is a three-phase welding power source which produces dc welding current. This welding power source is designed to be used in conjunction with the Shielded Metal-Arc (SMAW) Welding process.

2-4. SAFETY

Before the equipment is put into operation, the safety section at the front of this manual should be read completely. This will help avoid possible injury due to misuse or improper welding applications.

The following definitions apply to CAUTION, IMPORTANT, and NOTE blocks found throughout this manual:

CAUTION

Under this heading, installation, operating, and maintenance procedures or practices will be found that if not carefully followed may create a hazard to personnel.

IMPORTANT

Under this heading, installation, operating, and maintenance procedures or practices will be found that if not carefully followed may result in damage to equipment.

NOTE

Under this heading, explanatory statements will be found that need special emphasis to obtain the most efficient operation of the equipment.

SECTION 3 - INSTALLATION

3-1. LOCATION (Figure 3-1)

A proper installation site should be selected for the welding power source if the unit is to provide dependable service, and remain relatively maintenance free.

A proper installation site permits freedom of air movement into and out of the welding power source, and also least subjects the unit to dust, dirt, moisture, and corrosive vapors. A minimum of 18 inches of unrestricted space must be maintained between the welding power source front and rear panels and the nearest obstruction. Also, the underside of the welding power source must be kept completely free of obstructions. The installation site should also permit easy removal of the welding power source outer enclosure for maintenance functions.

IMPORTANT

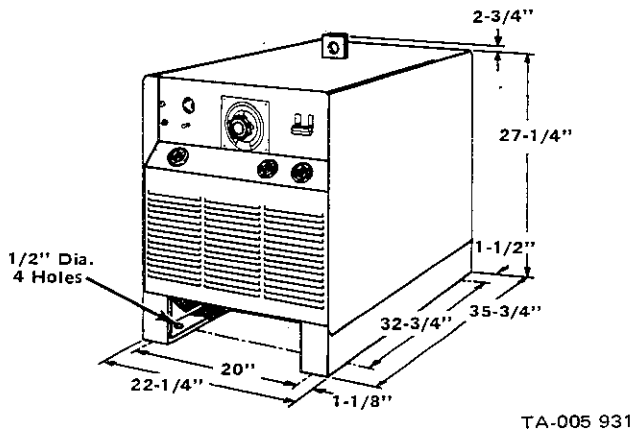
Do not place any filtering device over the intake air passages of the welding power source as this would restrict the volume of intake air and thereby subject the welding power source internal components to an overheating condition and subsequent failure. Warranty is void if any type of filtering device is used.

Holes are provided in the welding power source base for mounting purposes. Figure 3-1 gives overall dimensions and the base mounting hole layout.

On most welding power sources a lifting device is provided for moving the unit. However, if a fork lift vehicle is used for lifting the unit, be sure that the lift forks are long enough to extend completely under the base.

IMPORTANT

The use of lift forks too short to extend out of the opposite side of the base will expose internal components to damage should the tips of the lift forks penetrate the bottom of the unit.



TA-005 931

Figure 3-1. Dimensional Drawing

3-2. ELECTRICAL INPUT CONNECTIONS

A. Electrical Input Requirements

This welding power source is designed to be operated from a three-phase, 60 Hertz, ac power supply which has a line voltage rating that corresponds with one of the electrical input voltages shown on the nameplate. Consult the local electric utility if there is any question about the type of electrical system available at the installation site or how proper connections to the welding power source are to be made.

B. Input Conductor Connections

NOTE

It is recommended that a line disconnect switch be installed in the input circuit to the welding power source. This would provide a safe and convenient means to completely remove all electrical power from the welding power source whenever it is necessary to perform any internal function on the unit.

CAUTION

Before making electrical input connections to the welding power source, "machinery lockout procedures" should be employed. If the connection is to be made from a line disconnect switch, the switch should be padlocked in the open position. If the connection is made from a fuse box, remove the fuses from the box and padlock the cover in the closed position. If the unit is connected to a circuit breaker, or other disconnecting device without locking facilities, attach a red tag to the device to warn others that the circuit is being worked on.

CAUTION

Connect the input conductors to the welding power source before making connections to the three-phase power supply.

The input conductors should be covered with an insulating material which conforms to local electrical standards. Table 3-1 is provided only as a guide for selecting the proper size input conductors and fuses.

Table 3-1. Input Conductor and Fuse Size

Model	Input Conductor Size - AWG*				Fuse Size In Amperes			
	208V	230V	460V	575V	208V	230V	460V	575V
300 Amp	6 (8)	6 (8)	10 (12)	10 (14)	100	90	45	30
400 Amp	4 (6)	4 (6)	8 (10)	10 (10)	150	125	60	50

*Input conductor sizes are based on allowable ampacities of insulated copper conductors, having a temperature rating of 75°C, with not more than three conductors in a raceway or cable. Numbers in ( ) are equipment ground conductor sizes.

Insert the three input conductors plus one ground conductor through the access hole on the rear panel. This hole will accept standard conduit fittings. See Figure 3-2 for hole location and size.

NOTE

It is recommended that a terminal lug of adequate amperage capacity be attached to the ends of the input and ground conductors. The hole diameter in the terminal lug must be of proper size to accommodate the line and ground terminal studs.

Connect the three input conductors to the line terminals on the primary terminal board and connect the ground conductor to the ground terminal. (Refer to the input voltage label for identification of these terminals. See Figure 3-2 for location of this label.) The remaining end of the ground conductor should be connected to a proper ground. Use a grounding method that is acceptable to the local electrical inspection authority.

CAUTION

The ground terminal is connected to the welding power source chassis and is for grounding purposes only. Do not connect a conductor from the ground terminal to any one of the line terminals as this will result in an electrically energized welding power source chassis.

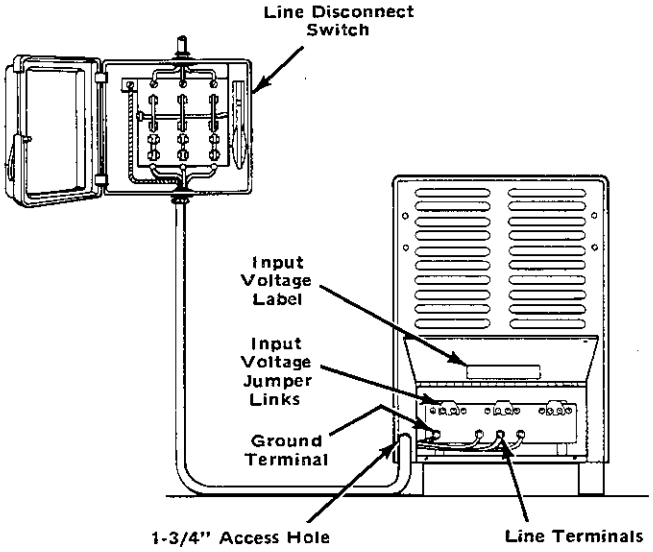


Figure 3-2. Input Conductor Connections

C. Matching The Welding Power Source To The Available Input Voltage

The input voltage jumper links provided on the primary terminal board permit the welding power source to be operated from various line voltages. The various voltages from which this unit may be operated are stated on the nameplate and on the input voltage label. See Figure 3-2 for location of this label. The input voltage jumper links are positioned for the highest of the voltages stated on the nameplate. If the welding power source is to be operated from a line voltage which is lower than the highest voltage for which the unit was designed, the jumper links will have to be moved to the proper positions before operating the unit. Figure 3-3 shows the various positions of the jumper links on the standard welding power source. If the input voltages on the nameplate differ from those shown in Figure 3-3, the input voltage jumper links must be positioned as shown on the input voltage label.

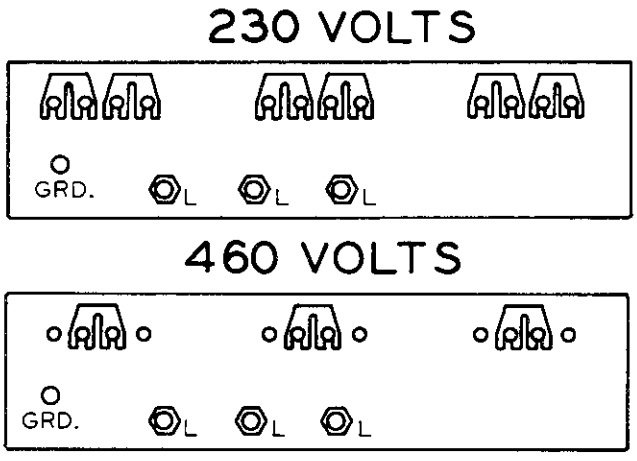


Figure 3-3. Input Voltage Jumper Link Arrangement

NOTE

If only one jumper link is required on each of the grouped terminals, it is recommended that the unused jumper links be placed across the terminals which are to be used. This will prevent losing the jumper links which are not required for this connection.

3-3. SECONDARY WELDING CONNECTIONS

It is recommended that the welding cables be kept as short as possible, placed close together, and be of adequate current carrying capacity. The resistance of the welding cables and connections cause a voltage drop which is added to the voltage of the arc. Excessive cable resistance may result in overloading as well as reducing the maximum current output of which the welding power source is capable. The proper operation of any arc welding power source is to a great extent dependent on the use of welding cables and connections that are in good condition and of adequate size. An insulated electrode holder must be used to ensure the operator's safety.

Use Table 3-2 as a guide for selecting the correct welding cable size for the anticipated maximum weld current that will be used. Table 3-2 takes into account the total cable length for the weld circuit. This means the length of the Electrode cable that connects the Electrode Holder to the welding power source and the Work or ground cable between the welding power source and the work piece. For example: If the Electrode cable is 75 feet long and the Work or ground cable is 25 feet long, select the cable size from Table 3-2 that is recommended for 100 feet. In a situation where a maximum weld current of 150 amperes is anticipated, No. 3 weld cable is recommended for both the Electrode and Work cables.

Table 3-2. Secondary Weld Cable Size

WELDING AMPERES	*TOTAL LENGTH OF CABLE (COPPER) IN WELD CIRCUIT							
	*50	100	150	200	250	300	350	400
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	2	2	1	1/0	2/0	3/0	4/0	4/0
250	1	1	1/0	2/0	3/0	4/0	4/0	2-2/0
300	1/0	1/0	2/0	3/0	4/0	4/0	2-2/0	2-3/0
350	1/0	1/0	3/0	4/0	4/0	2-2/0	2-3/0	2-3/0
400	2/0	2/0	3/0	4/0	2-2/0	2-3/0	3-2/0	2-4/0
500	3/0	3/0	4/0	2-2/0	2-3/0	2-3/0	2-4/0	3-3/0
600	4/0	4/0	2-2/0	2-3/0	3-2/0	2-4/0	3-3/0	3-4/0

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NOTE: *A. 50 FEET OR LESS.

B. CABLE SIZE IS BASED ON DIRECT CURRENT (DC), 60% DUTY CYCLE AND EITHER A 4 VOLTS OR LESS DROP OR A CURRENT DENSITY OF NOT OVER 300 CIRCULAR MILS PER AMP.

C. WELD CABLE INSULATION WITH A VOLTAGE RATING TO WITHSTAND THE OPEN-CIRCUIT VOLTAGE (OCV) OF THE WELDING POWER SOURCE MUST BE USED. WHILE MOST WELDING POWER SOURCES HAVE AN OPEN-CIRCUIT VOLTAGE OF LESS THAN 100 VOLTS, SOME WELDING POWER SOURCES OF SPECIAL DESIGN MAY HAVE HIGHER OPEN-CIRCUIT VOLTAGE.

If reverse polarity is to be used for the welding operation, connect the electrode holder cable to the POSITIVE secondary terminal and the work cable to the desired NEGATIVE secondary terminal. To obtain straight polarity, connect the electrode holder cable to the desired NEGATIVE secondary terminal and the work cable to the POSITIVE secondary terminal.

Choice of either the LOW or HIGH terminal will depend on the current range required for the particular welding job.

3-4. REMOTE AMPERAGE CONTROL CONNECTIONS

The REMOTE AMPERAGE CONTROL Receptacle, located on the front panel of the welding power source, provides a junction point for connecting a Remote Amperage Control to the amperage control circuitry in the welding power source.

To connect the Remote Amperage Control to the REMOTE AMPERAGE CONTROL Receptacle, insert the three-pole

plug from the Remote Amperage Control into the receptacle and rotate the plug as far as it will turn in a clockwise direction. Once fully rotated, the plug will be locked in the receptacle and will not pull out under stress.

SECTION 4 - FUNCTION OF CONTROLS

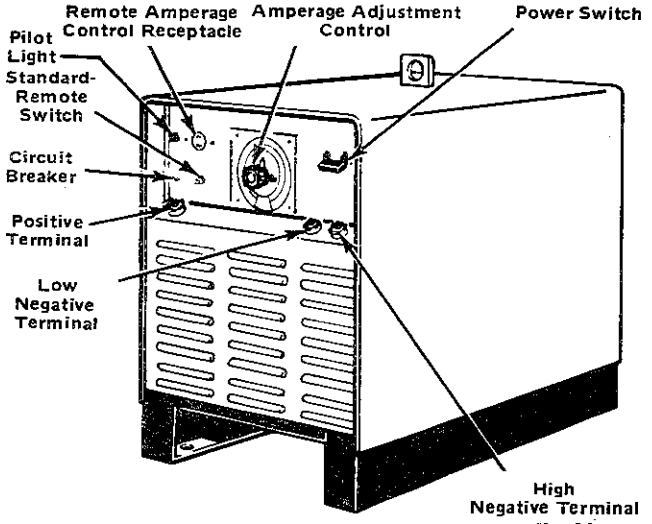

Figure 4-1. Control Panel View

4-1. POWER SWITCH (Figure 4-1)

Placing the POWER Switch in the ON position will energize the welding power source fan and control circuitry and place the welding power source in a ready-to-weld status. Placing the POWER Switch in the OFF position will shut the welding power source down.

CAUTION

Placing the POWER switch in the OFF position does not remove power from all of the welding power source internal circuitry. Completely terminate all electrical power to the welding power source by employing "machinery lockout procedures" before attempting any inspection or work on the inside of the unit. If the welding power source is connected to a disconnect switch, padlock the switch in an open position. If connected to a fuse box, remove the fuses and padlock the cover in the closed position. If the unit is connected to a circuit breaker, or other disconnecting device without locking facilities, attach a red tag to the device to warn others that the circuit is being worked on.

4-2. AMPERAGE ADJUSTMENT CONTROL (Figure 4-1)

The AMPERAGE ADJUSTMENT Control, located on the upper center portion of the front panel, provides a means of selecting the exact amperage desired within the range being used. Rotating the control in a clockwise direction will increase the amperage output.

The two amperage range scales which surround the AMPERAGE ADJUSTMENT Control are labeled A and B. The A range is to be read when secondary connections are made to the LOW NEGATIVE secondary terminal and the B range when secondary connections are made to the HIGH NEGATIVE secondary terminal.

NOTE

The contacts of the AMPERAGE ADJUSTMENT Control are of the continuous contact type, thereby making it possible to adjust the amperage output while welding.

4-3. CONTROL CIRCUIT OVERLOAD BREAKER & PILOT LIGHT (Figure 4-1)

This circuit breaker and pilot light are connected in the control circuit to protect the control coil. In the event of an overload or incorrect wiring of the remote amperage control unit, the circuit breaker will open and the pilot light will be lighted thus indicating an abnormal condition exists. When the circuit breaker opens, the weld current will drop to the minimum of the amperage range. Also, neither the AMPERAGE ADJUSTMENT Control on the welding power source nor the Remote Amperage Control will have any effect on the weld output. To place the welding power source in a ready-to-weld status should this circuit breaker trip, the circuit breaker should be manually depressed. Should the circuit breaker continue to trip after each reset, an internal trouble in the control circuitry is most probably present. Do not attempt any further welding until the trouble has been remedied.

4-4. REMOTE AMPERAGE CONTROL RECEPTACLE & SWITCH (Figure 4-1)

If a Remote Amperage Control is to be used, make connections from the Remote Amperage Control to the REMOTE AMPERAGE CONTROL Receptacle as instructed in item 3-4.

When remote control of the amperage is desired, it is essential that the REMOTE AMPERAGE CONTROL Switch be placed in the REMOTE position. When in the REMOTE position, the Remote Amperage Control will have complete control of the weld current. Likewise, if a Remote Amperage Control is not to be utilized, the switch must be in the STANDARD position. When in the STANDARD position, only the AMPERAGE ADJUSTMENT Control on the front panel will control the amperage.

4-5. DUTY CYCLE (Figure 4-2)

The duty cycle of the welding power source is the percentage of the ten minute period that a welding power source can safely be operated at a given output current setting. This welding power source is rated at 60 percent duty cycle. This means the welding power source can be safely operated at rated load welding current for six minutes out of every ten. If the welding current is decreased, the duty cycle will increase. Figure 4-2 enables the operator to determine the safe output of the welding power source at various duty cycles.

IMPORTANT

Exceeding the indicated duty cycle will cause the welding power source to overheat and thereby cause damage to the welding power source.

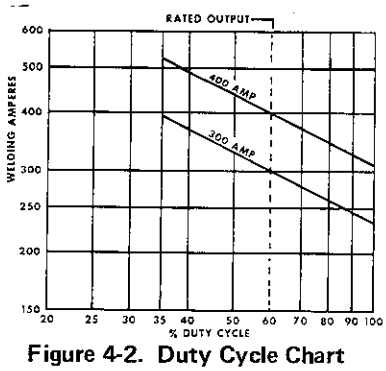

Figure 4-2. Duty Cycle Chart

4-6. VOLT-AMPERE CURVE (Figure 4-3)

The volt-ampere curve shows the output voltage available at any given output current within the limits of the minimum and maximum AMPERAGE ADJUSTMENT Control setting. Load voltage is predetermined to a large degree by arc characteristics. With the use of the volt-ampere curve, it is possible

to determine the amperage required for a specific load voltage. With reference to the volt-ampere curve (Figure 4-3), the curve shows the maximum and minimum settings of the AMPERAGE ADJUSTMENT Control only. Curves of other settings will fall between the maximum and minimum curves shown.

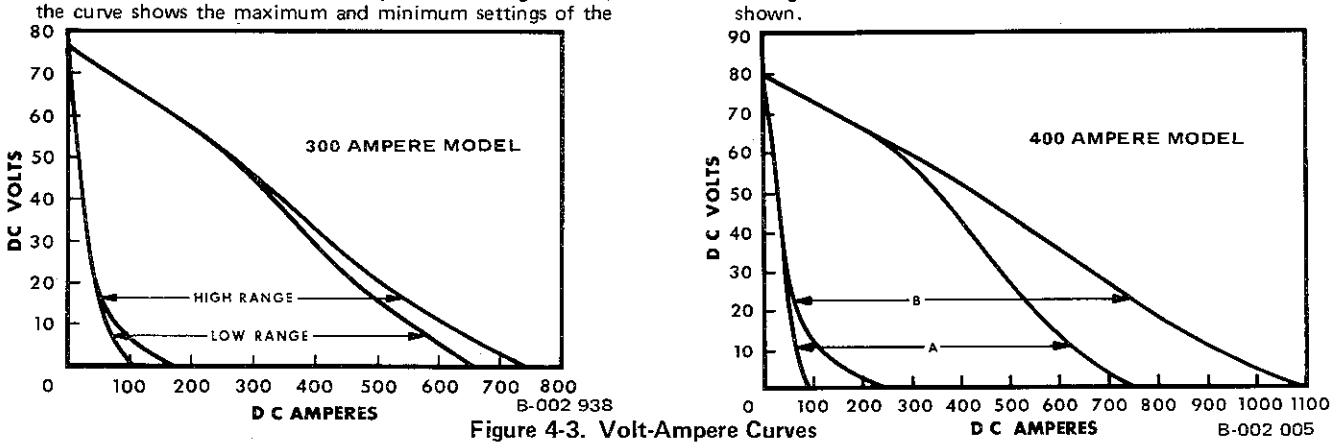

Figure 4-3. Volt-Ampere Curves

SECTION 5 - SEQUENCE OF OPERATION

5-1. SHIELDED METAL-ARC (SMAW) WELDING (Figure 5-1)

The connections shown in this drawing are for dc reverse polarity.

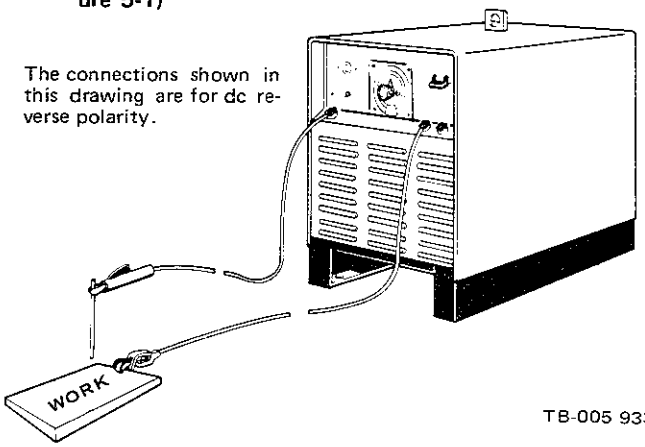

Figure 5-1. Shielded Metal-Arc Welding Connections

CAUTION

Never, under any circumstances, operate the welding power source with any portion of the outer enclosure removed. In addition to a safety hazard, improper cooling may result in damage to the welding transformer and the welding power source components. Warranty is void if the welding power source is operated with any portion of the outer enclosure removed.

1. Make electrical input connections as explained in Section 3-2.
2. Make secondary welding connections as explained in Section 3-3.
3. Select the proper electrode for the welding application and insert it into the electrode holder.
4. If a Remote Amperage Control is used, connect the plug from the Remote Amperage Control into the REMOTE AMPERAGE CONTROL Receptacle and place the REMOTE AMPERAGE CONTROL Switch in the REMOTE position. If a Remote Amperage Control is not to be used, place the REMOTE AMPERAGE CONTROL Switch in the STANDARD position.

CAUTION

Prior to welding, it is imperative that proper protective clothing (welding coat and gloves) and eye protection (glasses and/or welding helmet) be put on. Failure to comply may result in serious or permanent bodily damage.

5. Rotate the AMPERAGE ADJUSTMENT Control for the approximate desired welding current. The A scale current values correspond with the LOW NEGATIVE terminal and the B scale with the HIGH NEGATIVE terminal.
6. Place the POWER Switch in the ON position.
7. Commence welding.
8. Readjust the AMPERAGE ADJUSTMENT Control (or Remote Amperage Control) if necessary.

5-2. SHUTTING DOWN

1. Break the arc.
2. Allow the welding power source to idle for 3 minutes with no load applied.
3. Place the POWER Switch in the OFF position.

SECTION 6 - MAINTENANCE

CAUTION

Placing the POWER switch in the OFF position does not remove power from all of the welding power source internal circuitry. Completely terminate all electrical power to the welding power source by employing "machinery lockout procedures" before attempting any inspection or work on the inside of the unit. If the welding power source is connected to a disconnect switch, padlock the switch in an open position. If connected to a fuse box, remove the fuses and padlock the cover in the closed position. If the unit is connected to a circuit breaker, or other disconnecting device without locking facilities, attach a red tag to the device to warn others that the circuit is being worked on.

6-1. FAN MOTOR

All models are equipped with an exhaust fan and rely on forced draft for adequate cooling. The fan motor is manufactured with lifetime lubricated sealed ball bearings and no attention should be required.

6-2. TRANSFORMER

Occasional blowing out of the dust and dirt from around the transformer is recommended. This should be done periodically depending upon the location of the unit and the amount of dust and dirt in the atmosphere. The welding power source outer enclosure should be removed and a clean dry air stream should be used for this cleaning operation.

6-3. RECTIFIER

It is recommended that the rectifier be cleaned occasionally by blowing it out with compressed air. This cleaning operation is necessary so that maximum cooling will be accomplished by the air stream. This should be done periodically, depending upon the location of the unit and the amount of dust and dirt in the atmosphere. It will be necessary to remove the outer enclosure for this cleaning operation.

6-4. AMPERAGE ADJUSTMENT CONTROL RHEOSTAT REPLACEMENT (Figure 6-1)

Proceed as follows if the AMPERAGE ADJUSTMENT Control rheostat should ever become defective and require replacement:

1. Remove the four bolts (item 3, Figure 6-1) from the AMPERAGE ADJUSTMENT Control Plate (1) and pull out the AMPERAGE ADJUSTMENT Control rheostat assembly.
2. Disconnect leads No. 34, 35, & 36 from the Rheostat (2).
3. Loosen the allen screw on the AMPERAGE ADJUSTMENT Control knob (5) and pull the knob off.
4. Remove the two bolts (4) and pull out the defective rheostat (2).
5. To install the new rheostat, reverse the above procedures. See Figure 6-1 for connecting leads, 34, 35, & 36 to the rheostat.

NOTE

Ensure that the terminals on the rheostat are on top when installed.

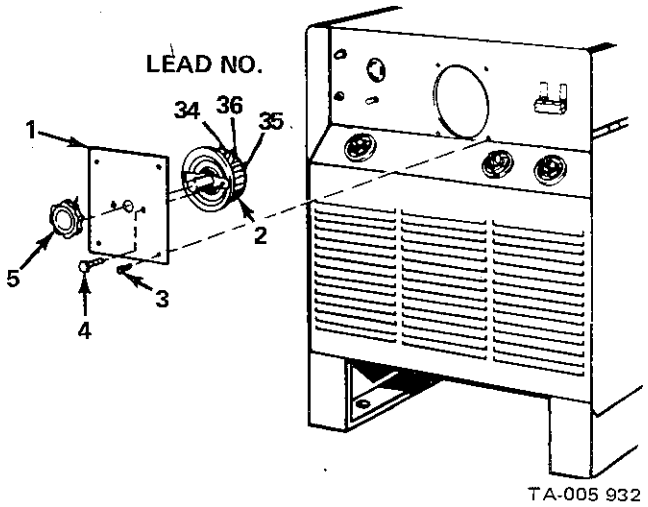

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Figure 6-1. Amperage Adjustment Control Replacement

SECTION 7 - TROUBLESHOOTING

CAUTION

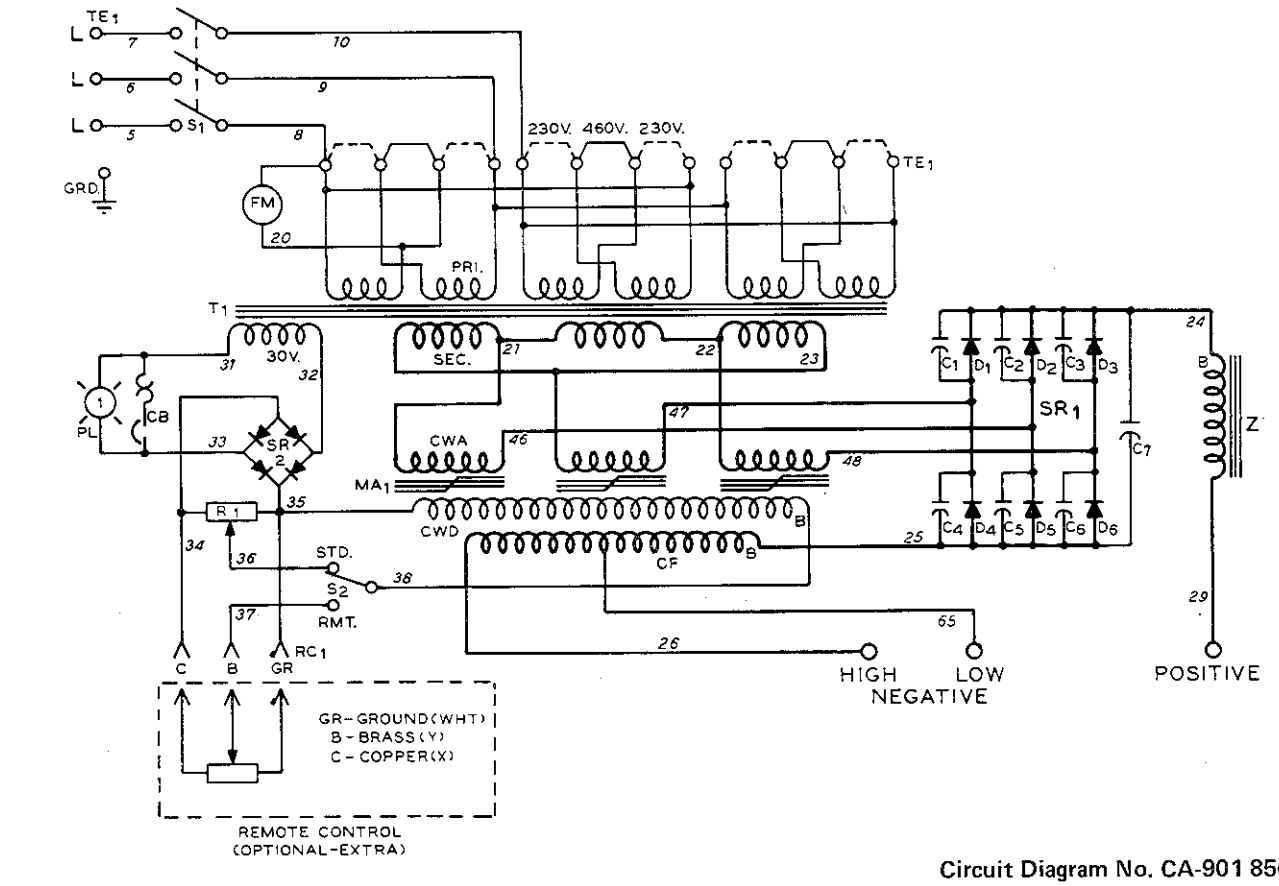
Hazardous voltages are present on the internal circuitry of the welding power source as long as power is connected to the unit. Disconnect power before attempting any inspection or work on the inside of the unit. Troubleshooting of internal circuitry should be performed by qualified personnel only.

The following chart is designed to diagnose and provide remedies for some of the troubles that may develop in this welding power source.

It is assumed that proper installation has been made, according to Section 3 of this manual, and that the welding power source has been functioning properly until this trouble developed.

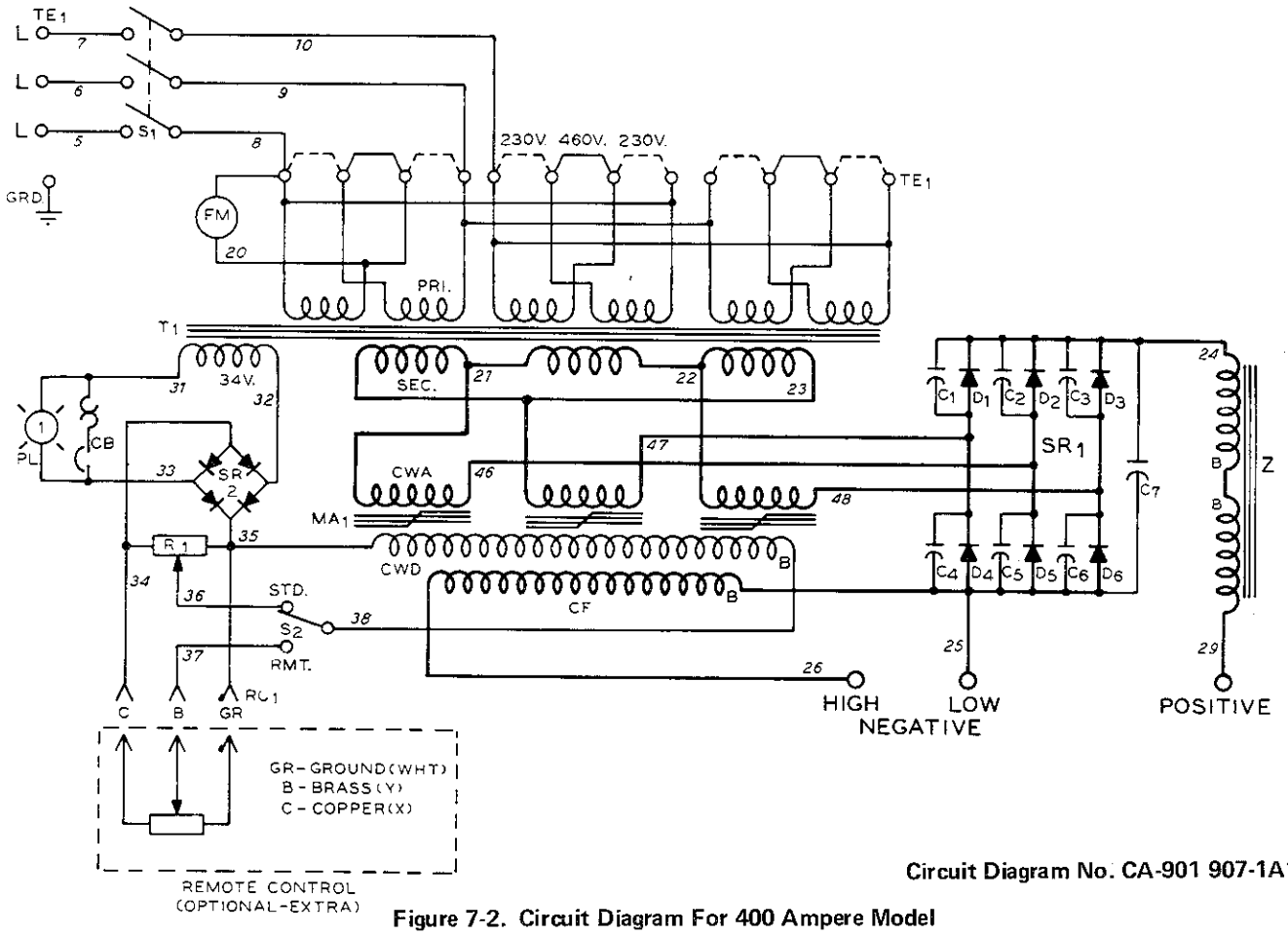
Use this chart in conjunction with the circuit diagram while performing troubleshooting procedures. If the trouble is not remedied after performing these procedures, the nearest Factory Authorized Service Station should be contacted. In all cases of equipment malfunction, the manufacturer's recommendations should be strictly followed.

TROUBLE	PROBABLE CAUSE	REMEDY
No output or welding current.	Open line fuse.	Replace line fuse.
	POWER switch (S1) defective.	Replace POWER switch (S1).
Erratic weld current.	Loose welding connections.	Secure connections.
	Bad or damp electrodes.	Use new dry electrodes.
Fan does not run.	POWER switch (S1) defective.	Replace POWER switch (S1).
	Fan motor (FM) defective.	Replace fan motor (FM).
	Line fuse open.	Replace fuse.
Welding current low. AMPERAGE ADJUSTMENT Control does not control current.	CIRCUIT BREAKER (CB) open.	Reset circuit breaker (CB).
	CIRCUIT BREAKER (CB) defective.	Replace circuit breaker (CB).
	Low line voltage.	Use correct voltage.
	Use of welding cable which is too long or too small for welding current employed.	Use proper size cable.
	Loose connections to workpiece or welding cable connections.	Secure connections.
	Input voltage jumper links improperly connected.	Connect jumper links to proper terminals; see Section 3-2 and Figure 3-3.
	REMOTE AMPERAGE CONTROL switch (S2) in REMOTE position without a remote amperage control connected to the welding power source.	If remote amperage control is not desired, place the REMOTE AMPERAGE CONTROL switch (S2) in the STANDARD position. If remote amperage control is desired, retain the REMOTE AMPERAGE CONTROL switch (S2) in the REMOTE position and make remote amperage control connections as instructed in Section 3-4.



Circuit Diagram No. CA-901 856-1B

Figure 7-1. Circuit Diagram For 300 Ampere Model



Circuit Diagram No. CA-901 907-1A1

Figure 7-2. Circuit Diagram For 400 Ampere Model

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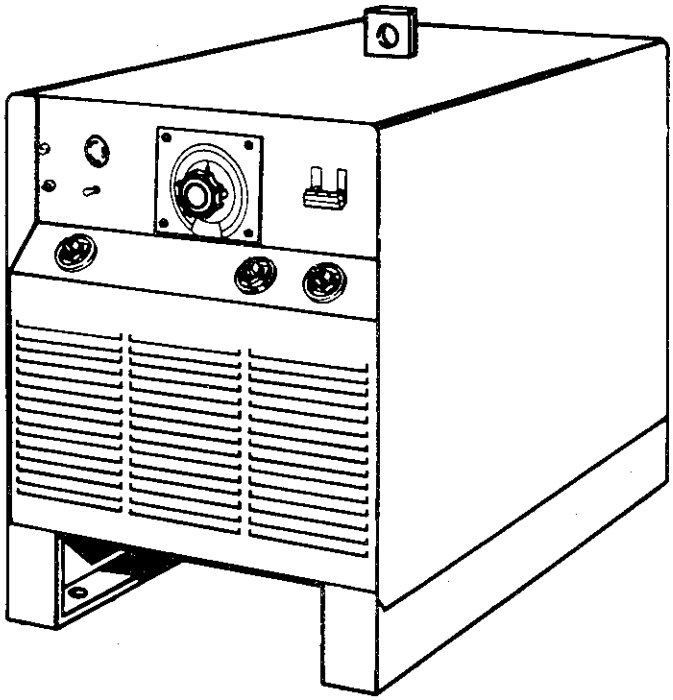


MODEL/STOCK NO.	SERIAL/STYLE NO.	DATE PURCHASED

PARTS LIST

PRINTED IN U.S.A.

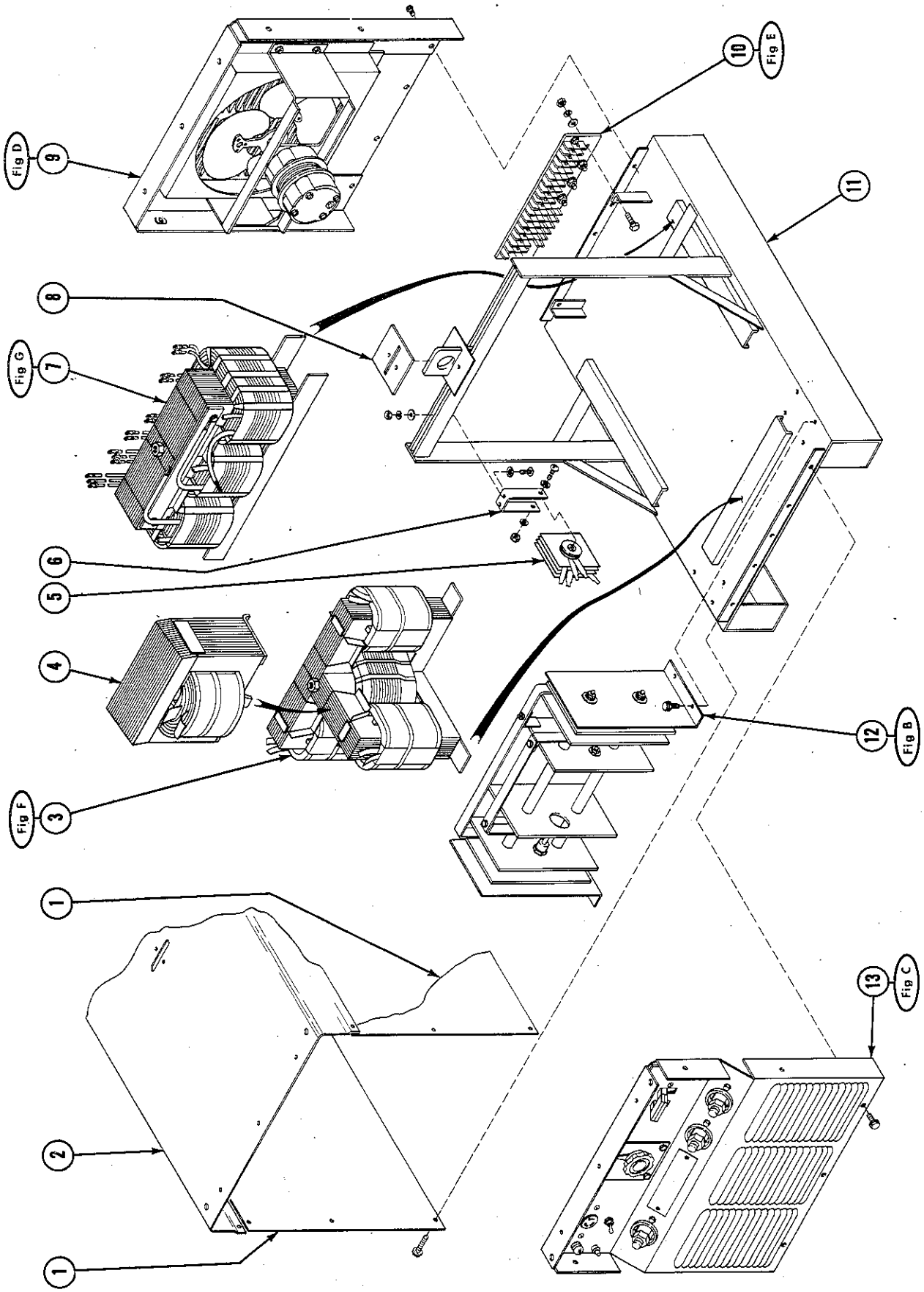
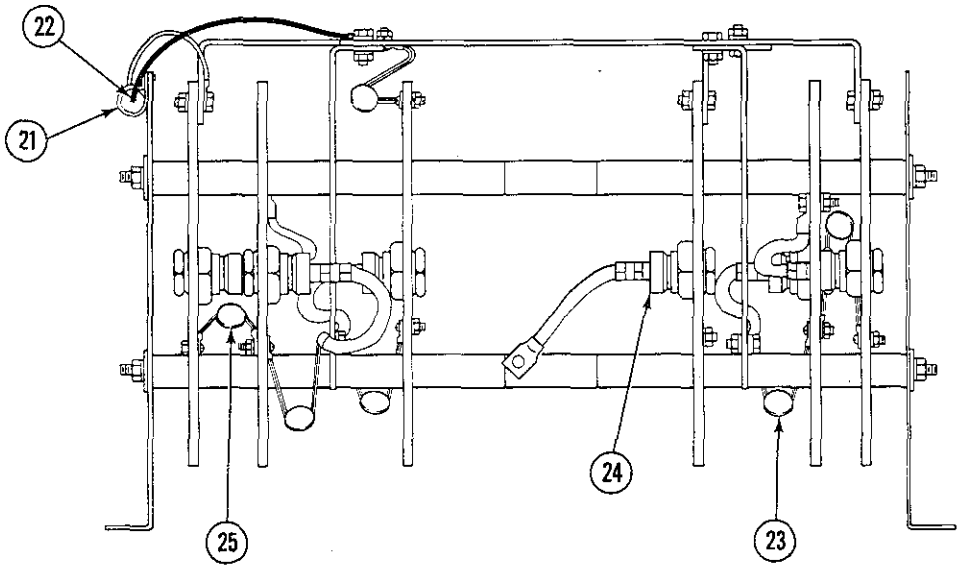


Figure A — Main Assembly

TD-901 856-B

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity Model 300 Amp	Quantity Model 400 Amp
Figure A *			Main Assembly		
1		006 016	PANEL, side	2	2
2		006 890	COVER, top	1	1
3	MA1	038 543	AMPLIFIER, magnetic (See Fig. F Page 5)	1	
3	MA1	025 357	AMPLIFIER, magnetic (See Fig. F Page 5)		1
4	Z	036 556	STABILIZER	1	
4	Z	025 348	STABILIZER		1
5	SR2	037 888	RECTIFIER, selenium - control	1	1
6		014 019	BRACKET, mounting - control rectifier	1	1
7	T1	022 297	TRANSFORMER, power - main (See Fig. G Page 6)	1	
7	T1	025 353	TRANSFORMER, power - main (See Fig. G Page 6)		1
8		026 627	GASKET, *lifting eye cover*	1	1
9		Figure G	PANEL, rear - with components (See Fig. D Page 4)	1	1
10	TE1	038 145	TERMINAL ASSEMBLY, primary (See Fig. E Page 4)	1	1
11		025 347	BASE	1	1
12	SR1	021 771	RECTIFIER, silicon diode (See Fig. B Page 2)	1	
12	SR1	021 772	RECTIFIER, silicon diode (See Fig. B Page 2)		1
13		Figure C	PANEL, front - with components (See Fig. C Page 3)	1	1
		025 363	BUS BAR, 6-3/4 inches lg (ac coil to leads off rectifier)		1
		025 364	BUS BAR, 9 inches lg (stabilizer)		1
		025 365	BUS BAR, 12-15/32 inches lg (ac coil to ac rectifier output)		2
		025 366	BUS BAR, 13-25/32 inches lg (stabilizer to positive secondary)		1



TD-021 772

Figure B — Rectifier, Silicon Diode

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity Model 300 Amp	Quantity Model 400 Amp
Figure B			Rectifier, Silicon Diode (See Fig. A Page 2 Item 12)	021 771	021 772
21		010 014	CLAMP, cushioned 3/4 dia	1	1
22	C7	031 683	CAPACITOR, paper - oil 0.5 uf 200 volts dc	1	1
23		031 689	CAPACITOR, ceramic 0.01 uf with 3/16 x 1/4 terminals	3	3
24	D1-6	037 305	DIODE, 150 amp 300 volts straight polarity	6	
24	D1-6	037 956	DIODE, 275 amp 250 volts straight polarity		6
25		031 688	CAPACITOR, ceramic 0.01 uf with 3/16 terminals	3	3

BE SURE TO PROVIDE STOCK, MODEL, AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity Model 300 Amp	Quantity Model 400 Amp
Figure C			**Panel, Front - With Components (See Fig. A Page 2 Item 13)**		
31		027 623	LIGHT, indicator w/red stove lens	1	1
32	PL1	*027 625	BULB, slide base 55 volts	1	1
33			NAMEPLATE (order by stock, model, & serial numbers)	1	1
34		039 047	TERMINAL, power output - red (consisting of)	1	1
35		601 879	. NUT, steel - hex full 1/2-13	1	1
36		039 044	. BUS BAR	1	1
37		601 880	. NUT, steel - hex jam 1/2-13	1	1
38		039 043	. CLIP, spring - bus bar	1	1
39		039 049	. TERMINAL BOARD, red	1	1
40		601 976	. SCREW, cap - steel hex hd 1/2-13 x 1-1/2	1	1
41		031 593	PANEL, front	1	1
42	CB	*011 972	CIRCUIT BREAKER, 10 amp 250 volts	1	1
43	RC1	039 607	RECEPTACLE, twistlock 3P3W	1	1
44	S2	011 609	SWITCH, toggle SPDT 10 amp 125 volts	1	1
45	R1	*030 653	RHEOSTAT, WW 150 watt 15 ohm	1	1
46	S1	011 789	SWITCH, toggle 3PST 60 amp	1	1
47		039 046	TERMINAL, power output - black (consisting of)	2	2
48		039 043	. CLIP, spring - bus bar	1	1
49		601 976	. SCREW, cap - steel hex hd 1/2-13 x 1-1/2	1	1
50		039 045	. TERMINAL BOARD, black	1	1
51		601 880	. NUT, steel - hex jam 1/2-13	1	1
52		039 044	. BUS BAR	1	1
53		601 879	. NUT, steel - hex full 1/2-13	1	1
54		013 325	LABEL, dc welding - polarity selection	1	1
55		038 522	PLATE, indicator - current	1	
55		025 232	PLATE, indicator - current		1
56		019 627	KNOB, pointer R1	1	1

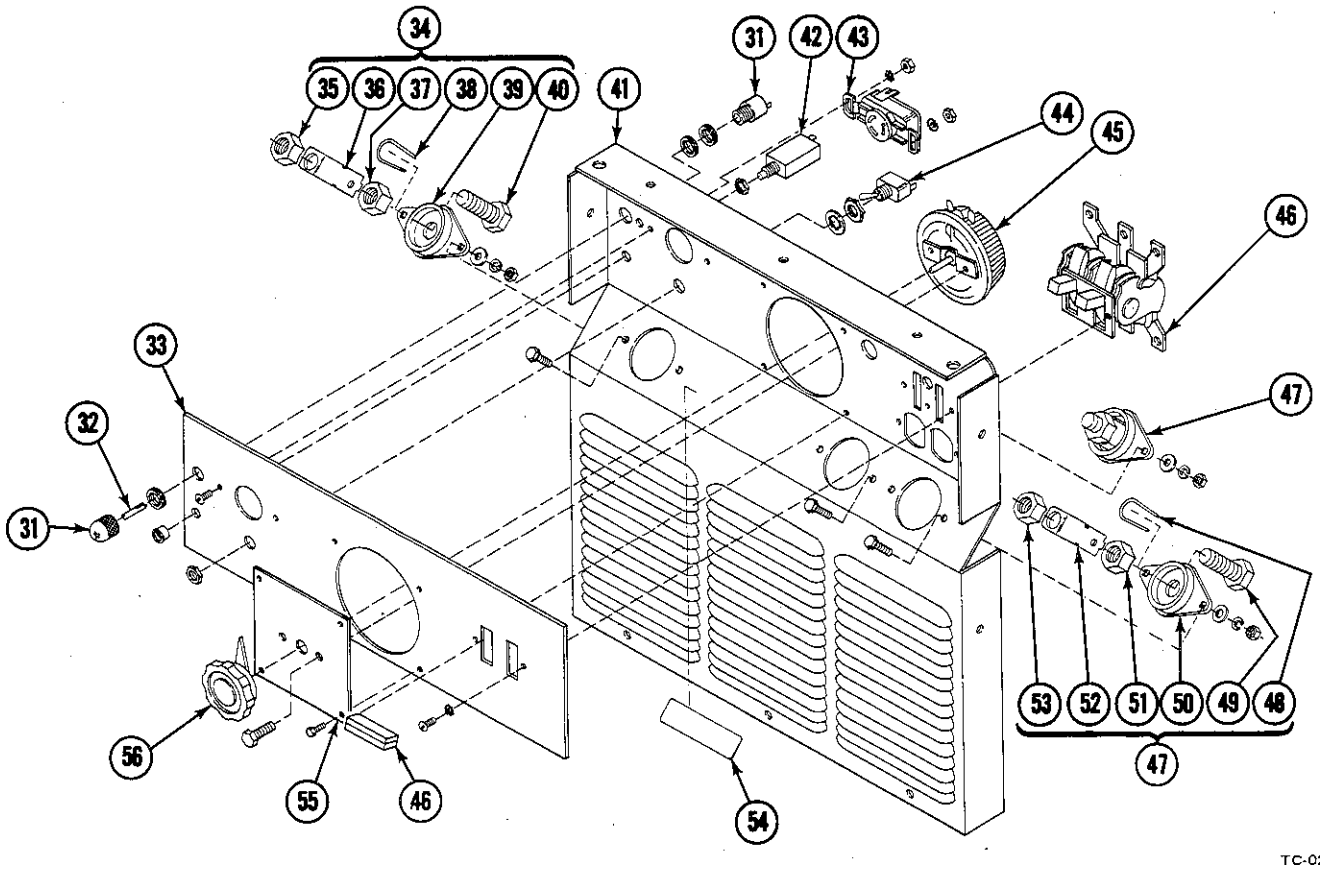


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Figure C — Panel, Front - With Components

*Recommended Spare Parts

BE SURE TO PROVIDE STOCK, MODEL, AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure D			Panel, Rear - With Components (See Fig. A Page 2 Item 9)	
61	FM	032 603	MOTOR, fan 230 volts (consisting of)	1
		024 601	. BEARING	2
62		016 258	CHAMBER, plenum	1
63		032 604	BLADE, fan 60 Hz 14 inch 3 wing 19 degree	1
64		018 144	PANEL, rear	1

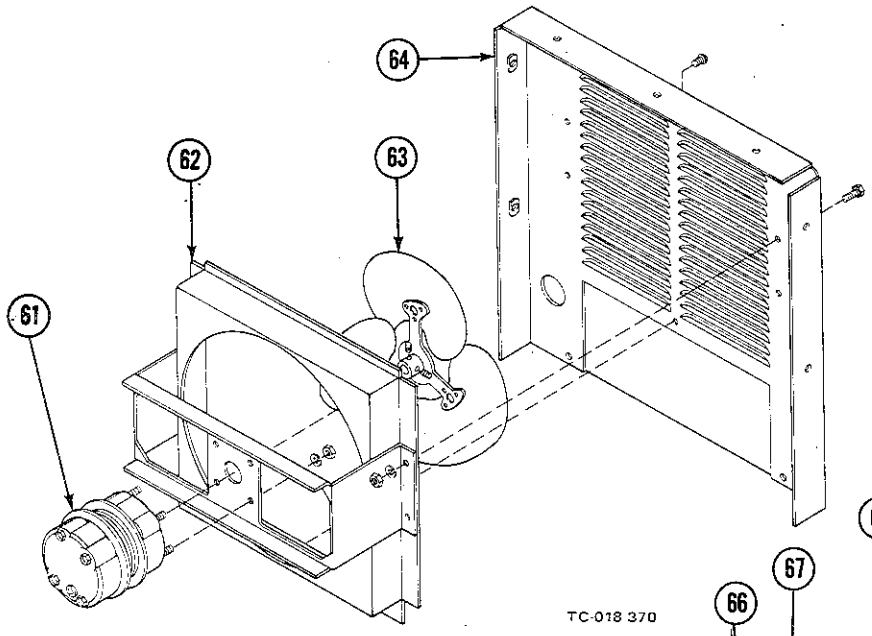

Figure D — Panel, Rear - With Components

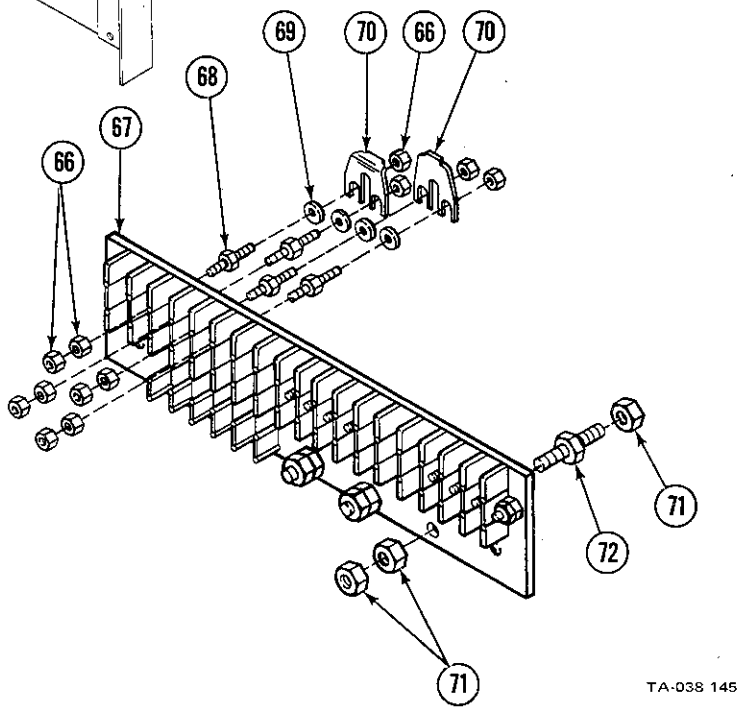

Figure E — Terminal Assembly, Primary

Item No.	Factory Part No.	Description	Quantity
Figure E	038 145	Terminal Assembly, Primary (See Fig. A Page 2 Item 10)	
66	601 835	NUT, brass - hex 10-32	24
67	038 058	TERMINAL BOARD	1
68	038 887	STUD, brass 10-32 x 1-3/8 with hex collar	12
69	010 913	WASHER, flat - brass 3/16	12
70	038 618	LINK, jumper	6
71	601 836	NUT, brass - hex jam 1/4-20	6
72	038 888	STUD, brass 1/4-20 x 1-1/2 with hex collar	3

BE SURE TO PROVIDE STOCK, MODEL, AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity Model 300 Amp (038 543)	Quantity Model 400 Amp (025 357)
Figure F			**Amplifier, Magnetic (See Fig. A Page 2 Item 3)**		
86		**027 066	AMPLIFIER SUBASSEMBLY, magnetic (consisting of)	1	
87		024 245	. STRIP, glastic 1/32 x 2-15/16 x 3-1/8	6	
88		023 066	. WEDGE, glastic - single bevel 1/8 x 1 x 4-1/2	1	
89		026 967	. WEDGE, hardwood - single bevel 5/16 x 1 x 6	2	
90		022 234	. STRIP, fiber 0.010 x 2-1/2 x 3-1/2	3	
91		023 066	. WEDGE, glastic - single bevel 1/8 x 1 x 4-1/2	3	
92		020 516	. WEDGE, hardwood - single bevel 1/2 x 1 x 6	6	
86		**025 358	AMPLIFIER SUBASSEMBLY, magnetic (consisting of)		1
87		027 052	. STRIP, glastic 0.031 x 2-33/64 x 4-3/8		6
89		010 338	. WEDGE, hardwood - single bevel 1/4 x 1 x 5-1/2		2
90		026 925	. STRIP, fiber 0.010 x 2-1/2 x 4		3
91		010 338	. WEDGE, hardwood - single bevel 1/2 x 1 x 5-1/2		2
92		010 338	. WEDGE, hardwood - single bevel 1/4 x 1 x 5-1/2		4
92		025 362	. STRIP, glastic 1/8 x 1 x 5-1/4		3
93	CWA	**033 596	COIL, control ac	3	
93	CWA	**025 244	COIL, control ac		3
94	CWD	**035 959	COIL, control dc	1	
94	CWD	**025 245	COIL, control dc		1

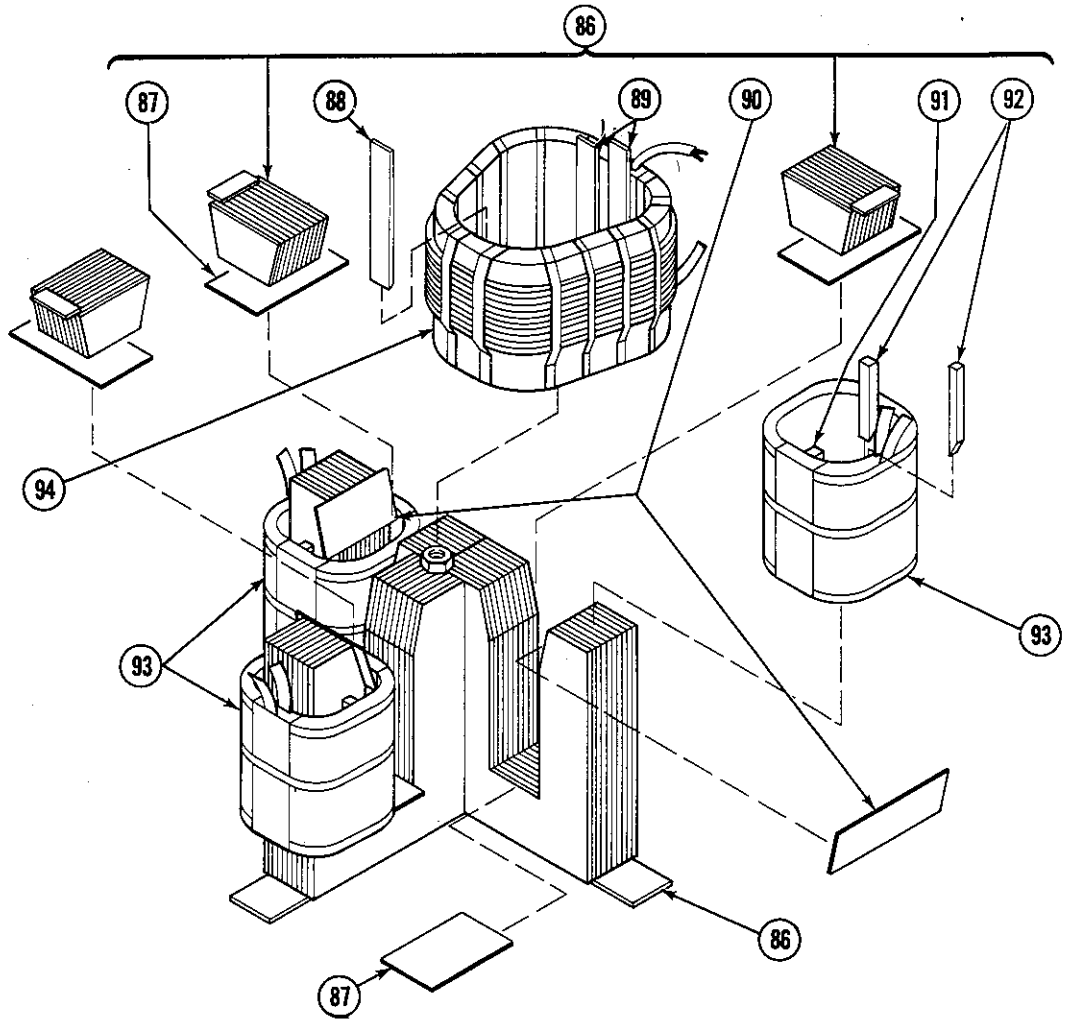

Figure F — Amplifier, Magnetic

*Replace at Factory or Authorized Service Station.
BE SURE TO PROVIDE STOCK, MODEL, AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

Item No.	Factory Part No.	Description	Quantity Model 300 Amp	Quantity Model 400 Amp
	Figure G	**Transformer, Power - Main (See Fig. A Page 2 Item 7)**	022 297	025 353
101	**027 067	TRANSFORMER SUBASSEMBLY (consisting of)	1	
102	603 519	. TUBING, plastic No. 2 (order by foot)	1 ft.	
103	016 879	. BAR, clamping - core	2	
104	024 205	. STRIP, glastic 1/16 x 3-15/32 x 4-7/8	4	
105	026 966	. WEDGE, hardwood - single bevel 1/4 x 1 x 6	6	
101	**025 354	TRANSFORMER SUBASSEMBLY (consisting of)		1
102	603 519	. TUBING, plastic No. 2 (order by foot)		2 ft.
103	016 879	. BAR, clamping - core		2
104	023 532	. STRIP, glastic 1/16 x 3-15/32 x 6		4
105	021 741	. WEDGE, hardwood - single bevel 1/4 x 5/8 x 6		6
106	**033 290	COIL, primary/secondary	2	
106	**025 243	COIL, primary/secondary		2
107	**033 289	COIL, primary/secondary - with 30 volts winding	1	
107	**025 242	COIL, primary/secondary - with 30 volts winding		1

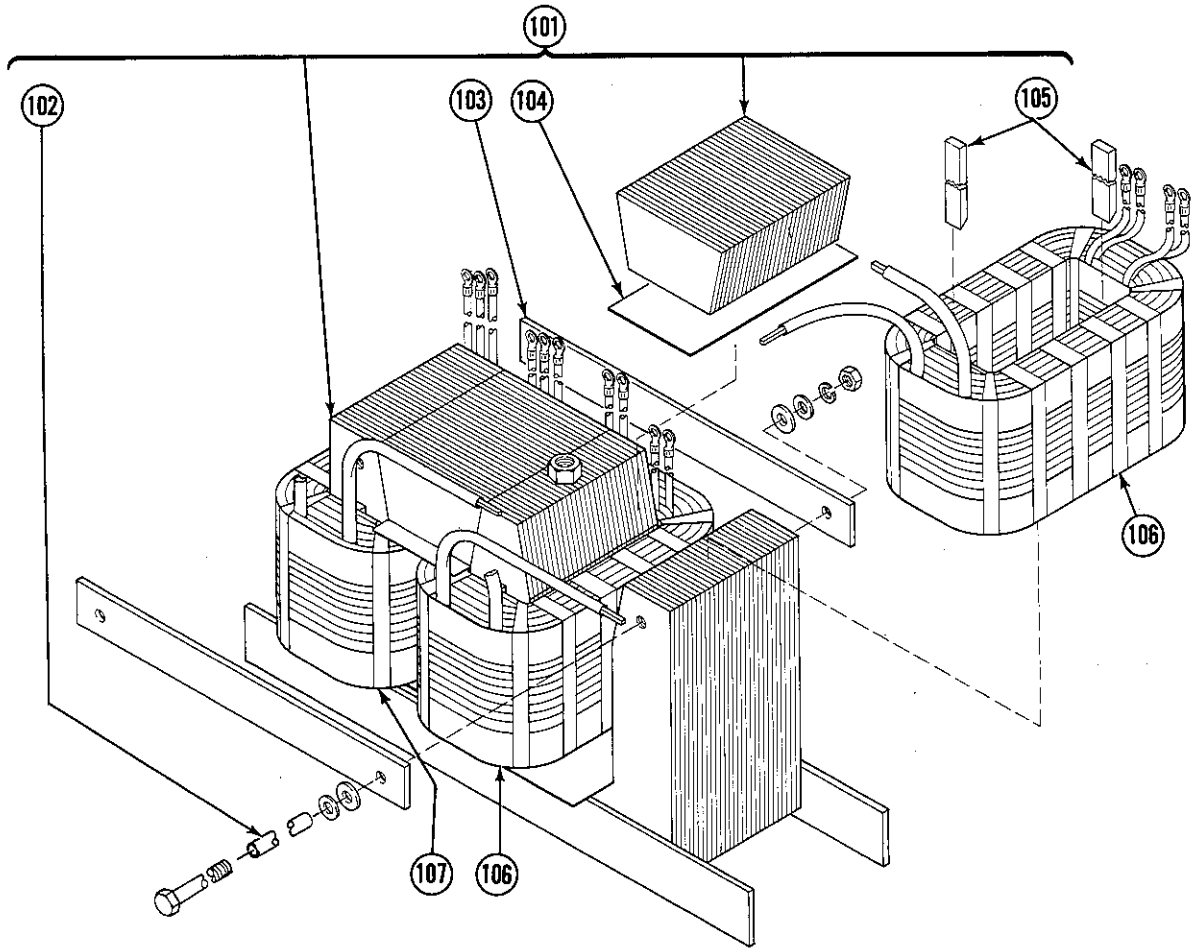

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Figure G — Transformer Power, Main

*Replace at Factory or Authorized Service Station.
BE SURE TO PROVIDE STOCK, MODEL, AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.