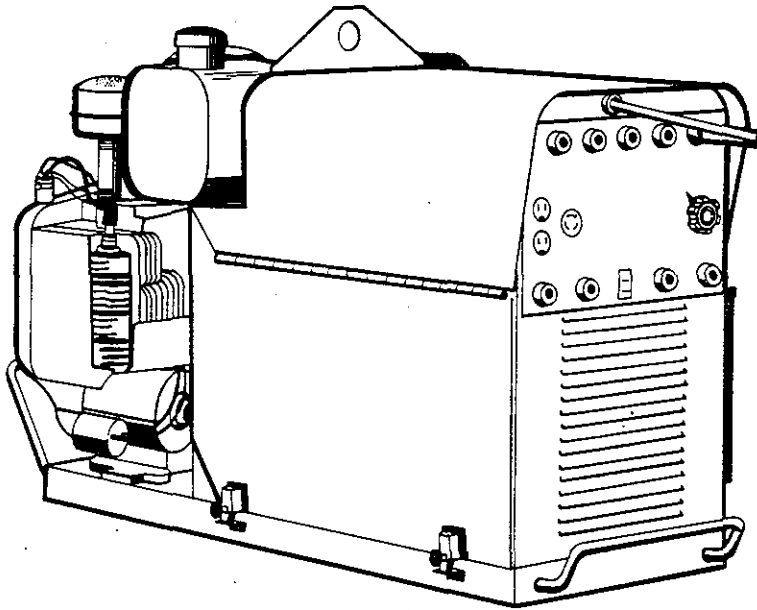


April 1974

FORM: OM-411A

Effective with serial No. HE738715

MODEL		STOCK NO.
AEAD-200	60 Hz	900 453
AEAD-200E	60 Hz	900 465
AEAD-200L	60 Hz	900 459
AEAD-200L	50 Hz	901 355
AEAD-200LE	60 Hz	900 468
AEAD-200LE	50 Hz	901 363



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.

WARRANTY

MILLER Electric Mfg. Co., Appleton, Wisconsin, warrants all new equipment to be free from defects in material and factory workmanship for the periods indicated below, provided the equipment is installed and operated according to manufacturer's instructions.

MILLER Electric Mfg. Co.'s obligation, under this warranty, is limited to replacing or repairing any defective part or correcting any manufacturing defect without charge during the warranty period if MILLER'S inspection confirms the existence of such defects. MILLER'S option of repair or replacement will be f.o.b. factory at Appleton, Wisconsin or f.o.b. a MILLER authorized service facility, and therefore no compensation for transportation costs of any kind will be allowed.

The warranty period, beginning on the date of sale to the original purchaser-user of the equipment, will be as follows:

1. Arc welders, power sources, and components — 1 year
2. Original main power rectifiers — 3 years (unconditionally)
3. MHFC-L1 Feeder, MHG-35C1, 20E, 20K, and all guns and torches — 90 days
4. All other Millermatic Feeders — 1 year
5. Mag-Diesel engine on DEL-200 — 6 months
6. All other engines — 1 year

Engine Warranties are covered by the engine manufacturers, subject to their procedures and to be handled through their authorized local Service Stations or agencies. No warranty will be made in respect to trade accessories, such being subject to the warranties of their respective manufacturers.

MILLER Electric Mfg. Co. will not be liable for any loss or consequential damage or expense accruing directly or indirectly from the use of equipment covered in this warranty.

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

OPTIONAL ACCESSORIES

No. 1000-2 Trailer (Stock No. 041 059)

Comes equipped with combination stop/signal/taillights also marker lights with reflectors.

Two safety chains, adjustable leveling jack and 2" ball and coupler are also included.

No. 4A Running Gear (Stock No. 040 020)

Two rear wheels with 480/400 x 8 pneumatic tires. Two 8" solid rubber tired front wheels with 30" towing handle.

No. 2BWA Welding Accessory Package (Stock No. 040 041)

Consists of 35' No. 2 electrode cable with insulated electrode holder and jack plug, 30' No. 2 ground cable with ground clamp and jack plug, welding helmet, wire scratch brush.

CC-1A Canvas Cover (Stock No. 040 252)

Heavy duty, olive drab, waterproof and mildew resistant.

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PARTS LIST

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.

Responsibilities of installer, user, and serviceman. Installation, operation, checking, and repair of this equipment must be done only by a competent person, experienced with such equipment.

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 these safety rules. ANSI Z49.1 is the most complete.

The National Electrical Code; Occupation 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.

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 reduce oxygen concentration dangerously. Do not bring gas cylinders into a confined space.

Leaving confined space, shut OFF gas supply at source. The space will then be safe to re-enter, if downstream valves have been accidentally opened or left open.

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 can not 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:

- combustibles (including building construction) are within 35 feet
- combustibles are further than 35 feet but can be ignited by sparks
- openings (concealed or visible) in floors or walls within 35 feet may expose combustibles to sparks
- 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 can produce flammable 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 in-

cludes: 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.

Secure from falling. Chain or secure cylinders upright when a regulator (and hose) are connected to it.

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 metal 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. For metal-to-metal seating, use correct wrenches, available from your supplier. For O-ring connections, hand tighten.

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.

Before opening cylinder valve, check that hoses are connected and that downstream valves are closed.

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. It will reduce backfiring and chance of flashbacks.

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 and repair them only if recommended in equipment instruction manual. Send others for repair to manufacturer's designated repair center where special techniques and tools are used by trained personnel. Refer to User Responsibilities 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 1-2 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. 9 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

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 volt 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, 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. 02110.
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.

SECTION 2 - INTRODUCTION

Model	Amperes Output 100% Duty Cycle	Amperes Welding Range	Open Circuit Voltage	Current Adjustment		Power	Dimensions (Inches)	Weight (Pounds)	
				AC	DC			Net	Ship
Welding Generator Only	225 AC	30-250 AC	80 Volts AC	30-60 55-100 75-140	30-45 40-60 55-85	115 Volt DC power while welding - 1 kva	Height - 27-1/2 Width - 20 Depth - 47	532	570
Welding Generator With Electric Start								582	620
Welding Generator With Power Plant	200 DC	30-200 DC	72 Volts DC	100-200 140-250	75-125 110-200	115 Volt DC power while welding - 1 kva 115/230 Volts single phase, 60 Hz AC - 5 kva	Height - 27-1/2 Width - 25 Depth - 47	537	575
Welding Generator With Power Plant & Electric Start								587	625

*4 kva on 50 Hz Models

Figure 2-1. Specifications

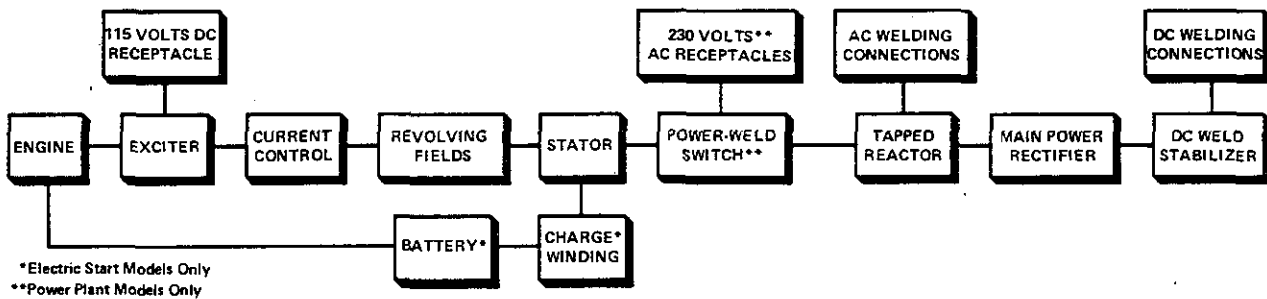


Figure 2-2. Block Diagram

TA-900 468-3B

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) Numbers of the equipment be supplied.

2-3. DESCRIPTION

This engine driven welding generator is designed to be used as the power source for the ac or dc Shielded Metal-Arc Welding process. From 30 to 250 amperes of ac weld current and 30-200 amperes of dc weld current may be obtained by means of the five coarse range receptacles and the Fine Current Control.

In addition to welding capability, all models are equipped with a two prong receptacle through which up to 1 kva of 115 volts dc electrical power can be obtained while welding.

Power-plant models are equipped to provide 5 kva of 115/230 volts ac electrical power when operating at power rpm.

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

Installation, operating, and maintenance procedures, practices, etc., which will result in personnel injury or loss of life if not carefully followed.

IMPORTANT

Installation, operating, and maintenance procedures, practices, etc., which will result in damage to equipment.

NOTE

Installation, operating, and maintenance procedures, practices, etc., which it is essential to emphasize.

SECTION 3 - INSTALLATION

3-1. LOCATION

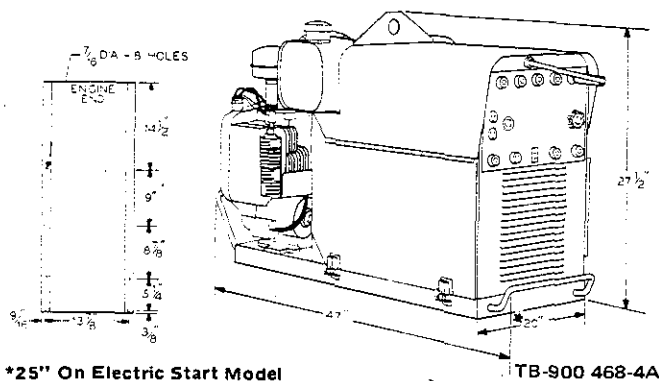
A good installation is essential if this welding generator is to provide satisfactory and dependable service. Tilting not to exceed 15 degrees in any direction is considered standard industrial specification.

Mounting holes are provided in the welding generator base for installations which require fixed mountings. Figure 3-1 gives base mounting hole and overall unit dimensions.

A lifting eye is provided on top of the unit for moving purposes.

CAUTION

If the unit is to be operated indoors, it should be located in a place where the engine exhaust fumes can be vented out of the building. Failure to comply with this recommendation may result in serious bodily injury or loss of life.



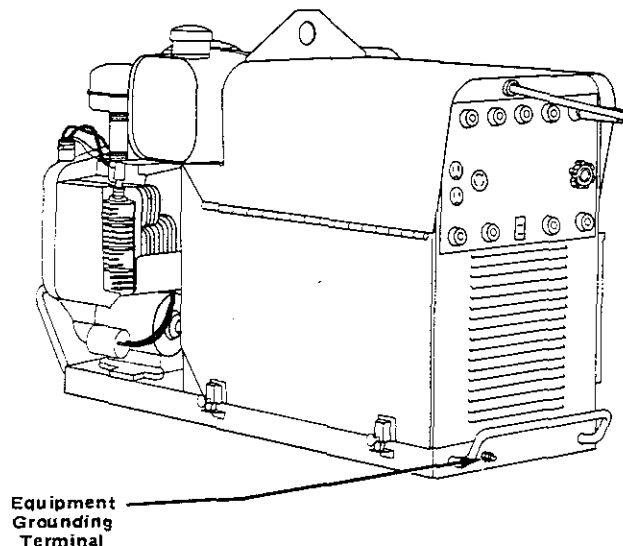
*25" On Electric Start Model

TB-900 468-4A

Figure 3-1. Dimensional Drawings And Base Mounting Hole Layout

3-2. GENERATOR CHASSIS GROUND (Figure 3-2)

Normally engine driven welding generators are not required to be grounded. However, this machine has auxiliary power plant capability, therefore, grounding of the frame and case is recommended. For this reason a convenient grounding terminal is provided on all weld/power units. For detailed grounding instructions consult your local or state codes or the latest issue of the National Electrical Code.



TB-900 468-5A

Figure 3-2. Chassis Ground

3-3. WELDING CABLES AND JACK PLUG INSTALLATIONS

Use Table 3-1 as a guide for selecting correct cable size for the anticipated maximum weld current which will be used. Table 3-1 takes into account total cable length, which means the length given in the table includes the electrode and work cable. Example: If the electrode holder cable is 75 feet long and work cable 25 feet long, you would select the size cable that is recommended for 100 feet at the maximum weld current you will be using. Two jack plugs are furnished with this unit.

Table 3-1. Welding Cable Sizes

Welding Amperes	*Total Length of Cable (Copper) in Weld Circuit†							
	*50	100	150	200	250	300	350	400
100	4	4	2	2	2	1	1/0	1/0
150	2	2	2	1	1/0	2/0	3/0	3/0
200	1	1	1	1/0	2/0	3/0	4/0	4/0
250	1/0	1/0	1/0	2/0	3/0	4/0	4/0	2-2/0

NOTE: *A. 50 FEET OR LESS

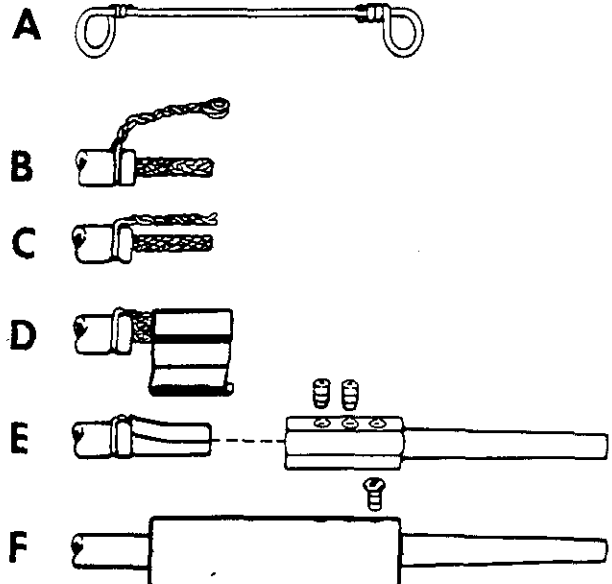
TA-901 181-10

*B. CABLE SIZE IS BASED ON DIRECT CURRENT (DC), 100% 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 GENERATOR MUST BE USED. WHILE MOST WELDING POWER GENERATORS HAVE AN OPEN-CIRCUIT VOLTAGE OR LESS THAN 100 VOLTS, SOME WELDING POWER GENERATORS OF SPECIAL DESIGN MAY HAVE HIGHER OPEN-CIRCUIT VOLTAGE.

Two jack plugs are furnished with this unit. Follow instructions carefully for proper installation of the jack plugs to the welding cables. See Table 3-1 for proper welding cable size. Standard jack plugs furnished with the unit will accommodate cable ranging from Size 6 to Size 1.

1. Clamp the welding cable in a vise with the uninsulated end protruding upward out of the vise approximately 1-3/4 inches.
2. Place the steel tie wire (See A Figure 3-3) approximately 1/4 inch from the end of the insulation.
3. Make a half turn around the cable bringing the looped ends of the tie wire together.
4. Insert a rod of approximately 3/8 inch diameter through the two looped ends of the tie wire.
5. Twist the tie wire (B) until the entire tie wire is twisted and is tight around the insulation of the welding cable.



TA-901 024-4

Figure 3-3. Jack Plug Installation

6. Clip off the looped ends of the tie wire.
7. Bend the twisted tie wire over along the side (C) of the uninsulated portion of the welding cable.
8. Wrap the strip of copper foil tightly around the uninsulated end of the welding cable and the twisted tie wire (D).
9. Place the jack plug on the end of the welding cable and push it onto the welding cable over the copper coil (E).
10. Insert the 1/4-20 set screws into the center and upper holes in the jack plug and tighten
11. Remove the welding cable from the vise and insert the jack plug into the fiber sleeve. Slide the fiber sleeve over the jack plug and welding cable until the hole in the fiber sleeve lines up with the 1/4 inch hole in the jack plug.
12. Insert the 1/4 inch self tapping screw through the hole in the fiber sleeve into the jack plug. Tighten the screw with a screw driver.

SECTION 4 - ENGINE PREPARATION

NOTE

See the Engine Manufacturer's manual for complete engine care.

CAUTION

Never allow the fuel to drain on the engine, the generator, or other components. Arrange provisions for catching the fuel when being drained and if the tank must be drained frequently, install a valve and drain line in the tank. When filling the fuel tank, do not fill completely full. The reason being that the cold fuel will expand due to engine heat and the outside air when operating in a warm climate. If the tank is too full, it will overflow causing a potential fire hazard. Also, do not attempt to fill the fuel tank with the engine running, always shut the engine down first.

4-1. LUBRICATION

This engine was shipped from the factory with its crankcase filled with the correct amount and type of break-in oil unless otherwise ordered. Check the oil level before attempting to operate the engine. It should be up to the full mark on the bayonet type indicator. Add a quality brand of detergent oil if the oil level is low. See the oil selection chart, Table 9-1 in Section 9.

IMPORTANT

New engines have very close clearance between their moving parts. Thus, it is recommended that loading of the engine be kept to a minimum during the first 10 hours of operation. Be sure to check the oil level several times each day during the engine break-in period. This engine requires about 10 hours of running time before it will be fully broken in.

After about 10 hours of running time, drain the break-in oil. See the oil selection chart, Table 9-1, in Section 9 for correct oil type and grade to use after the break-in oil is drained.

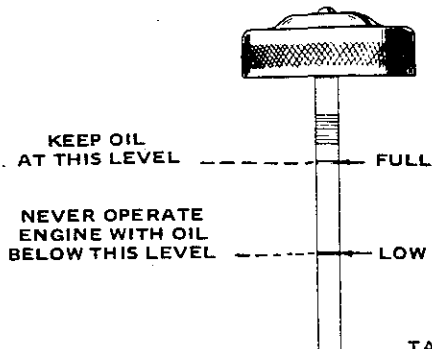


Figure 4-1. Oil Level Indicator

4-2. FUEL

IMPORTANT

Do not mix oil with the gasoline.

Use a good grade of "regular" gasoline, rated at least at 85 octane, for this engine. Fuels of lower octane ratings may cause detonations (knocking) which could result in damage to the engine bearings and head gasket. The fuel capacity of the fuel tank is 3.8 gallons (U.S. Measure).

4-3. READING NEW BATTERY FOR SERVICE (Electric Start Models Only)

This battery is shipped from the factory in a dry state. A sufficient amount of electrolyte is shipped along in separate containers to activate the dry charge battery. To prepare the new battery for operation, proceed as follows:

CAUTION

Put on protective eye cover and clothing prior to pouring the electrolyte solution.

1. Remove the battery from the unit and place it on a level work table or other suitable area.
2. Fill the battery cells to the required level with electrolyte.

NOTE

Do not dilute this electrolyte as it is pre-mixed to the required strength.

3. Place a battery thermometer in one of the center cells and check the specific gravity of each cell with a battery hydrometer.
4. The battery temperature must be above 80°F and the specific gravity reading above 1.240 prior to installation. If both conditions are not met, charge the battery following the below instructions:
 - a. Use an automotive type battery charger. This battery should be charged at about a 3.5 ampere rate until correct electrolyte conditions are met. Lower charging rates can be used, however, the time to obtain the correct electrolyte conditions will be longer.
 - b. When the battery is charged, remove it from the charger and re-check the electrolyte level. Add if necessary.
 - c. Rinse out the empty electrolyte containers with water before discarding. Sincer battery acid is corrosive to metals, do not pour into a metal sink or drain. Rinse and mutilate the empty electrolyte container before discarding. If acid has accidentally spilled on the battery or work area during filling or charging, flush and

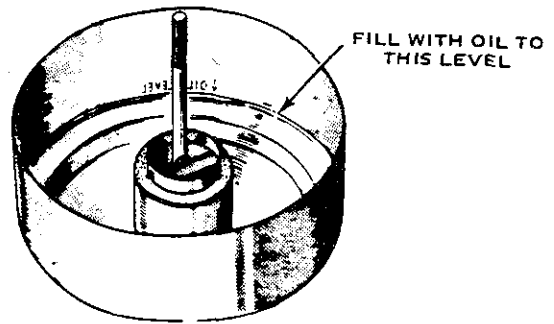
mutilate the empty electrolyte container before discarding. If acid has accidentally spilled on the battery or work area during filling or charging, flush off with clear water and neutralize with soda or ammonia solution. Use the same procedure if acid is spilled on clothing.

- Re-install the battery in the unit making sure that the negative (-) terminal of the battery is connected to the ground cable.

IMPORTANT

Do not attempt to operate the engine without the battery connected. Also, do not attempt to remove the battery while the engine is running.

factory dry. The air cleaner must be filled to the oil level line with the same type of oil which is used in the crankcase.



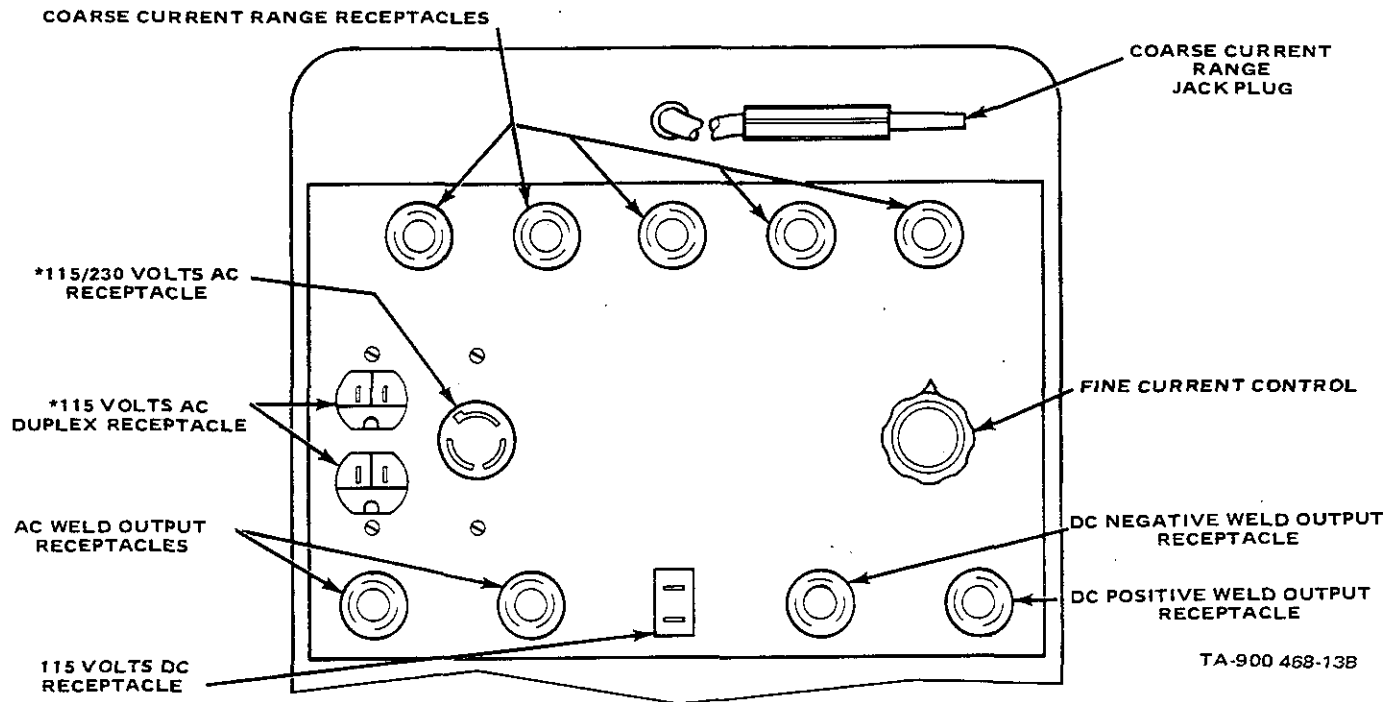
4-4. AIR CLEANER

The oil bath air cleaner on this engine is shipped from the

TA-900 435-9

Figure 4-2. Air Cleaner Oil Level

SECTION 5 - FUNCTION OF GENERATOR CONTROLS



TA-900 468-13B

*POWER PLANT MODELS ONLY

Figure 5-1. Generator Control Panel

5-1. CURRENT CONTROL (Figure 5-1)

A. Coarse Current Range Jack Plug & Receptacles

The jack plug and 5 receptacles at the top portion of the front panel provide the capability of being able to select the desired coarse current range. The range that is available at each of the five Coarse Current Range Receptacles is labeled above and below the receptacle. The range that is above the receptacle is the ac range and the range below the receptacle is the dc range.

To select the desired coarse current range, insert the Coarse Current Range Jack Plug into the desired Coarse Current Range Receptacle. To help ensure that the jack plug is secure in the receptacle, rotate the jack plug 1/4 turn in a clockwise direction.

B. Fine Current Control

The Fine Current Control permits selection of the exact amount of weld current desired within the range being used. As the Fine Current Control is rotated in a clockwise direction, weld current will increase.

NOTE

When utilizing the 115 volts duplex or 115/230 volts ac receptacles on power plant models, the Fine Current Control must be set at the 100 (maximum) position.

The scale which surrounds the Fine Current Control is calibrated in increments of ten from 0 to 100 percent. Due to this percentage calibration, it should be noted that if the operator is using this scale to select a fine amperage setting, the operator is selecting a percentage of the coarse range in use and not an actual amperage value.

C. AC/DC Weld Current Receptacles

Four receptacles are provided on the front panel for selection of either ac or dc welding current. To select either ac or dc weld current, insert the electrode cable jack plug and work cable jack plug into the AC WELD or DC WELD receptacles.

5-2. 115 VOLTS DC RECEPTACLE (Figure 5-1)

A straight 2 wire receptacle, located on the upper front panel, is provided as a junction point for connecting accessory equipment that requires 115 volts dc for operation. The 115 VOLTS DC Receptacle rated output is 1 kva.

5-3. 115/230 VOLTS AC CONTROLS (Power Plant Models Only)

A. Weld/Power Changeover Switch

A Weld/Power Changeover Switch, located behind the left access panel, is provided for selecting either weld amperage or power plant operation.

When welding is to be performed the switch must be in the WELD position. When the 115 volts duplex or 115/230 volts ac receptacles are to be used, the switch must be in the POWER position.

B. 115 Volts AC Duplex Receptacle

The duplex 115 VOLTS AC POWER Receptacle, located on the lower front control panel, will provide 15 amperes of 115 volts 60 Hertz power from each half of the receptacle. Whenever this receptacle is to be used, the engine must be operating at power rpm. Do not attempt to use the 115 VOLTS AC Receptacle while operating at weld rpm.

C. 115/230 Volts Receptacle (Figure 5-2)

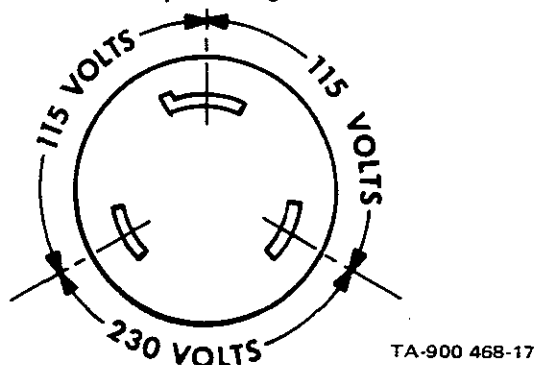


Figure 5-2. 115/230 Volts Receptacle Connections

Up to 5 KVA of 115 or 230 volts 60 Hertz power can be obtained from the three-pole, three-wire ungrounded, twist-lock receptacle on the front panel. Whenever this receptacle is to be used, the engine must be operating at power rpm. Do not attempt to utilize this receptacle while welding.

Figure 5-2 depicts the terminals of this receptacle which must be connected to in order to obtain 115 volts or 230 volts power.

5-4. VOLT-AMPERE CURVES (Figure 5-3)

These volt-ampere curves show the ac output voltage available at any given output current within the limits of the minimum and maximum Fine Current Control setting. Load voltage is predetermined to a large degree by arc characteristics. With the use of the volt-ampere curves, it is possible to determine the amperage required for a particular load voltage.

With reference to the volt-ampere curves, the curves show the maximum and minimum settings of the Fine Current Control only. Curves for other settings will fall between the maximum and minimum curves shown.

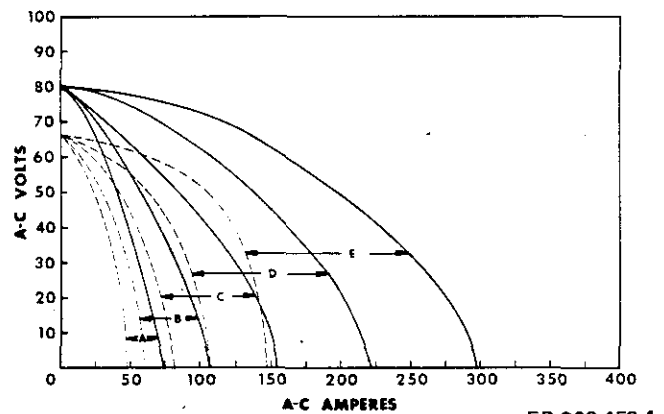


Figure 5-3. Volt-Ampere Curves

SECTION 6 - FUNCTION OF ENGINE CONTROLS

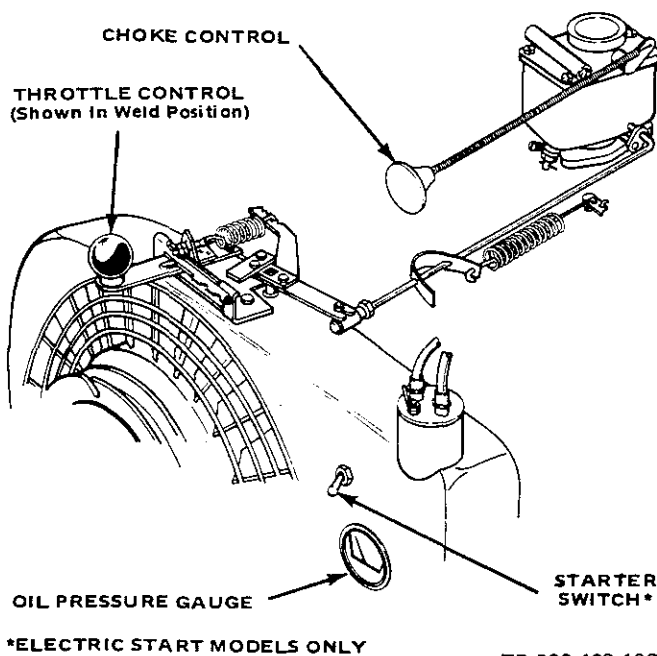


Figure 6-1. Engine Controls

6-1. CHOKE CONTROL (Figure 6-1)

A Choke Control is provided for varying the fuel-air mixture to the engine. When the Choke Control is pulled fully out, very little air will be admitted to the engine thru the carburetor thereby supplying a richer mixture of fuel. This position is required if the engine is cold when started. As the engine warms up it will be necessary to push the Choke Control inward slowly until it is pushed in as far as it will go. When the Choke Control is fully in, the engine should be ready for operation.

6-2. THROTTLE CONTROL (Figure 6-1)

The selection of weld, power, or idle rpm is made by adjustment of the THROTTLE Control.

To operate the engine at weld rpm, push the Throttle fully over the left. Placing the Throttle in the notch in the center of the throttle bracket will provide power rpm. Idle rpm is obtained by moving the Throttle into the notch on the extreme right.

6-3. OIL PRESSURE GAUGE (Figure 6-1)

A 0 to 50 psig Oil Pressure Gauge is provided on the engine. The Oil Pressure Gauge registers the lubricating system pressure in pounds per square inch. Normally, the pressure registered by the gauge should remain constant for a given engine speed. Should the pressure fluctuate or drop, stop the engine and do not operate the engine again until the trouble has been remedied.

NOTE

Normal engine oil pressure at weld rpm is approximately 40 psig.

6-4. STARTER SWITCH (Electric Start Models Only)

The Starter Switch, located on the engine blower housing, provides the following three functions:

A. Off Position

The OFF position removes voltage from the engine electrical

system. The Starter Switch is to be in this position when the engine is not running or for stopping the engine.

B. Run Position

Whenever the engine has started and is operating, the Starter Switch must be in the RUN position. The Starter Switch is spring-loaded to return to the RUN position automatically from the START position.

C. Start Position

The START position will actuate the engine starter and thereby start the engine.

SECTION 7 - SEQUENCE OF OPERATION

CAUTION

Never operate the unit with the hinged side doors open or removed. If the sides are left open or removed, a safety hazard exists to personnel from moving and electrical components. Also, weather protection to the internal components of the unit will be greatly reduced.

7-1. STARTING THE ENGINE

IMPORTANT

Make sure all electrical equipment connected to the 115 or 115/230 volts receptacles is turned off before starting the engine. The engine, when starting, has low speed which causes low voltage at the output receptacle of the generator. This could result in damage to electrical equipment.

1. Fill the fuel tank and check to ensure that oil level is adequate.
2. Pull the Choke Control fully out. Lesser degrees of choking may be required if the engine is warm.
3. Place the Throttle Control in the IDLE position.
4. On models without electric start, give a quick steady pull on the starter rope. For models with electric start, place the Starter Switch in the START position.
5. Once the engine has started, slowly push the Choke Control inward.
6. Allow the engine to run for a few minutes before applying a load. This is necessary to enable the engine to properly warm up and ensure proper lubrication.
7. Place the Throttle Control in the desired position.

7-2. STOPPING THE ENGINE

1. Remove the weld and/or power load from the welding generator.
2. Place the Throttle Control in the IDLE position. Operate the engine at this speed for 2 minutes; this will allow internal engine temperature to equalize.
3. To stop the rope-started engine, depress the Stop Button on the blower housing. On electric start models, place the Starter Switch in the OFF position.

7-3. SHIELDED METAL-ARC WELDING

1. Prepare the engine for operation as instructed in the engine preparation section.
2. Make weld connections from the electrode holder jack

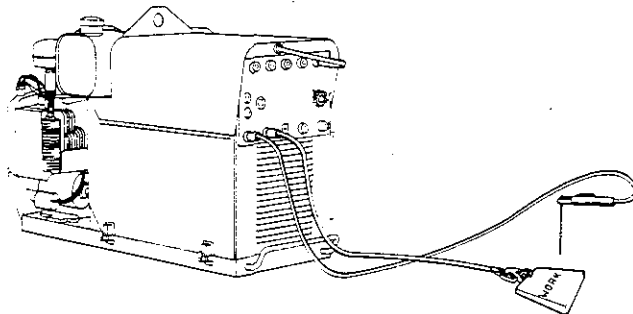
plug and from the work clamp jack plug to either the ac or dc weld output receptacles.

3. Rotate the Fine Current Control to the desired setting.
4. On models with a power plant, place the Weld/Power Changeover Switch in the WELD position.
5. Start the engine as instructed in paragraph 7-1.

CAUTION

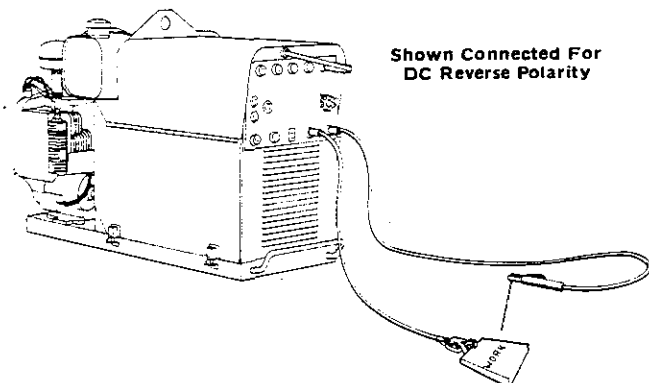
Prior to welding, it is imperative that proper protective clothing (welding coat and gloves) and eye protection (glasses and/or welding helmet) be put on. Failure to comply may result in serious and even permanent bodily damage.

6. Connect the work clamp to the object to be welded, place the desired electrode into the electrode holder, and commence welding.



TB-900 468-7A

Figure 7-1. AC Welding Connections



TB-900 468-6C

Figure 7-2. DC Welding Connections

7-4. 115 & 115/230 VOLTS AC POWER RECEPTACLES OPERATION

1. Prepare the engine for operation as instructed in the Engine Preparation Section.
2. Rotate the FINE CURRENT Control fully clockwise to the 100% setting.

3. Place the Throttle Control on the Engine in the POWER position.
4. Start the engine as instructed in paragraph 7-1.
5. Connect the auxiliary equipment or desired load to the receptacle and commence operation.

SECTION 8 - GENERATOR MAINTENANCE

CAUTION

If any work is to be done on the rotor of the generator, remove the spark plugs from the engine. This will prevent engine compression from turning the rotor and catching the repairman's hand between the rotor fan casting and the stationary adapter casting.

8-1. GENERAL

Economical operation and trouble-free service of this welding generator are based upon regular inspections and reasonable attention.

Occasional blowing out of the unit with clean dry compressed air is recommended. This should be performed periodically, depending upon the location of the unit and the amount of dust and dirt in the atmosphere.

8-2. COLLECTOR RING BRUSHES

The brushes should be inspected periodically to ensure their proper function. The brush life is very good under normal conditions. If the generator has been operating in an extremely dusty or dirty location, a close check of the brushes for freedom of movement and cleanliness should be made weekly. Under normal use the commutator and slip rings will discolor to a dark brown. If it should become necessary to clean the slip rings or commutator, use a 3/0 or finer sandpaper followed by a crocus cloth. Never use emery cloth as part of the emery will embed itself into the exciter or collector rings and in turn destroy the carbon brushes.

8-3. WELDING CABLES

Check connections periodically for tightness. The cables should be inspected frequently and all breaks in the insulation should be repaired with electrical insulating tape or the cables replaced.

SECTION 9 - ENGINE MAINTENANCE

9-1. LUBRICATION

This engine will require at least 10 hours of running time to become fully broken in. During this period, the load on the engine should be kept as light as possible. The oil level should be checked a number of times during an operating day, as some engines will use oil during the break-in period. After about 10 hours of running time on the break-in oil, drain the oil. Premium heavy duty oil, manufactured by any one of the major oil companies, should be used as a replacement oil. Table 9-1 gives a list of recommended grades and types of oil to use to keep oil level up during break-in and to use after the break-in oil is drained. The oil capacity of the engine is 3-1/2 quarts. Check the dip stick to make sure oil level is up to the required operating level.

In normal operation, oil should be changed after about 25 hours of operation. The oil should be drained after the engine has been warmed up to normal operating temperature, thus promoting foreign particle suspension in the oil and thereby removal when the oil is drained. Foreign particles tend to settle at the bottom of the crankcase when the oil is allowed to cool, thereby avoiding removal and thus contaminating the new oil added.

Table 9-1. Recommended Engine Oil

LOWEST TEMPERATURE AT THE ENGINE	SAE NO. OIL
Above 90°F (32°C) for Continuous Duty	No. 50
30°F (-1°C) to 90°F (32°C)	No. 30
0°F (-18°C) to 30°F (-1°C)	No. 10W
Below 0°F (18°C)	No. 5W

9-2. CLEANING THE ENGINE

The air-cooled engine operates most efficiently when kept clean. Maintain cleanliness at all times. Wipe oil spills from engine immediately to avoid accumulation of dust.

9-3. SPARK PLUGS

The area around the base of the spark plugs should be cleaned prior to removal of the spark plugs to help avoid dirt getting into the engine.

IMPORTANT

Do not attempt to clean the spark plug electrode by sandblasting. Particles of abrasive may stick to the spark plug and thereby enter the engine and cause damage to the internal engine components. Also, the spark plug gap should be kept at .025".

Remove the plugs periodically and clean the electrode with a wire brush or knife blade. Take care so as not to crack the porcelain insulator on the spark plugs.

9-4. FUEL FILTER

The fuel filter is located below the fuel tank. Check the sediment bowl periodically for water and dirt deposits. How often the filter has to be checked will depend on the grade of gasoline used and how dusty and dirty the location in which the engine is being used.

9-5. AIR CLEANER

Under certain weather conditions, frost may form in the air cleaner or oil may congeal, restricting the flow of air to the carburetor. Should either of these conditions exist, remove

Table 9-2. Periodic Engine Maintenance Chart

MAINTENANCE ITEMS	OPERATIONAL HOURS			
	8	50	100	200
Inspect Plant	x			
Check Fuel	x			
Check Oil Level	x			
Check Air Cleaner		x1		
Clean Governor Linkage		x1		
Check Spark Plug			x	
Change Crankcase Oil			x1	
Clean Crankcase Breather				x
Clean Fuel System				x
Check Battery				x

x1 - Perform more often in extremely dusty conditions.

the air cleaner cup and body and clean them thoroughly in gasoline or other suitable solvent. Reassemble the air cleaner and use it without oil until temperature conditions permit the use of oil in the normal manner.

and attention given it. By following a definite schedule of inspection and service, engine failure caused by neglect can be avoided. Service periods are based on hours of running time and are for normal operating conditions. For extreme conditions of load, dust, dirt, etc., service more often.

9-6. PERIODIC SERVICE

The efficiency of the engine depends a great deal on the care

SECTION 10 - GENERATOR TROUBLESHOOTING

INTRODUCTION

This data collected here, discusses some of the common problems which may occur in this welding generator. A little thought will probably solve the problem involved through the information provided.

The assumption of this data is that a proper welding and/or power condition has been achieved and has been used until trouble developed. In all cases of equipment malfunction, the

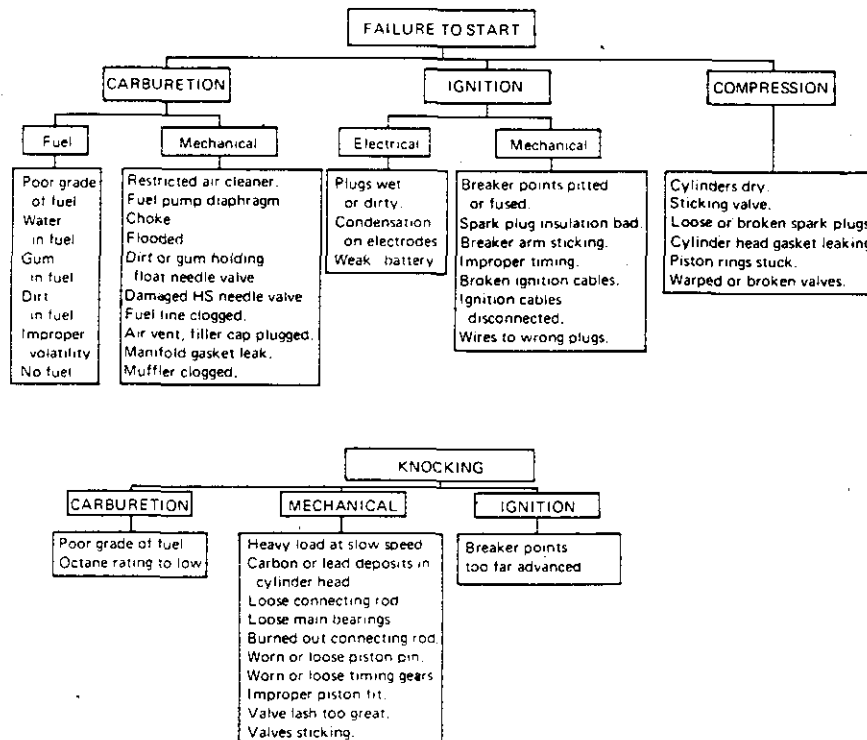
manufacturer's recommendations should be strictly adhered to and followed.

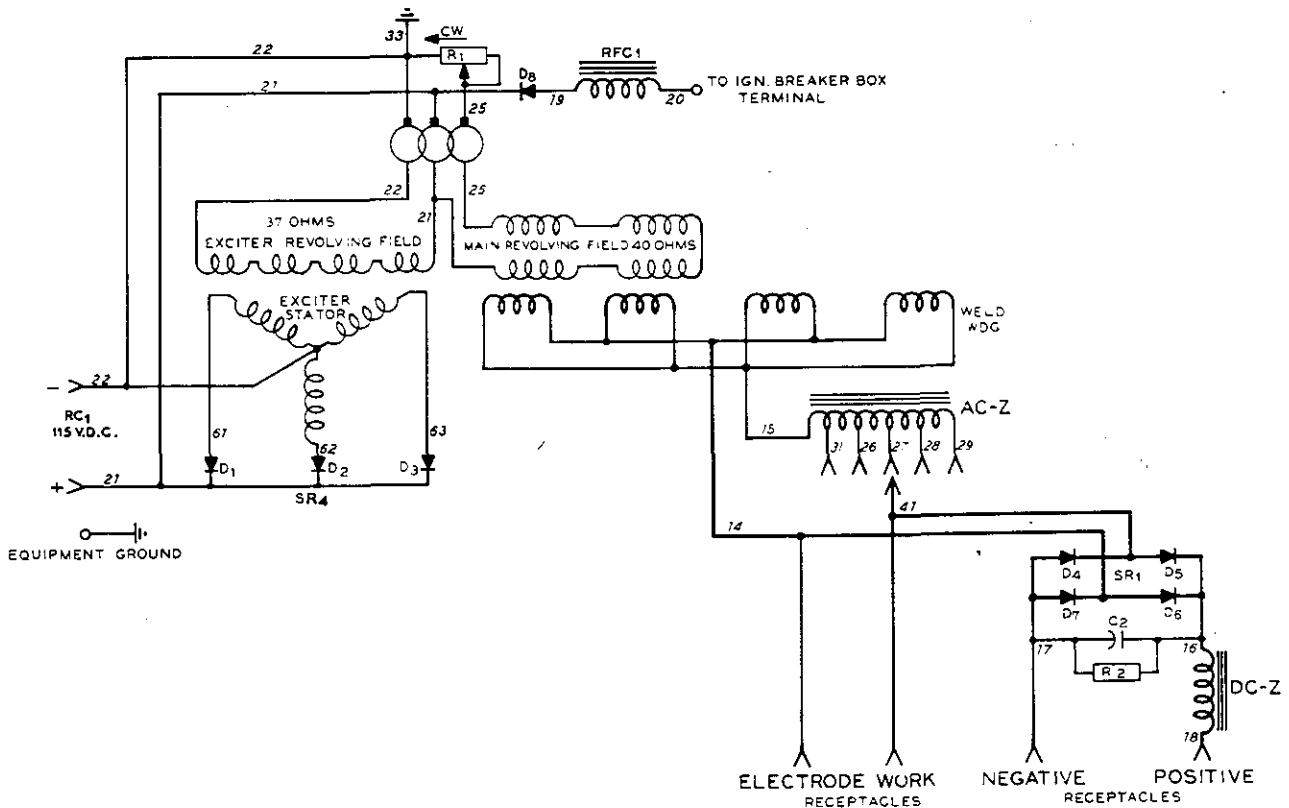
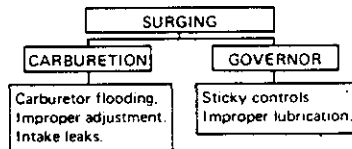
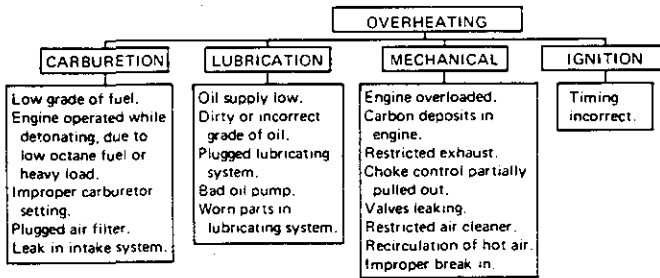
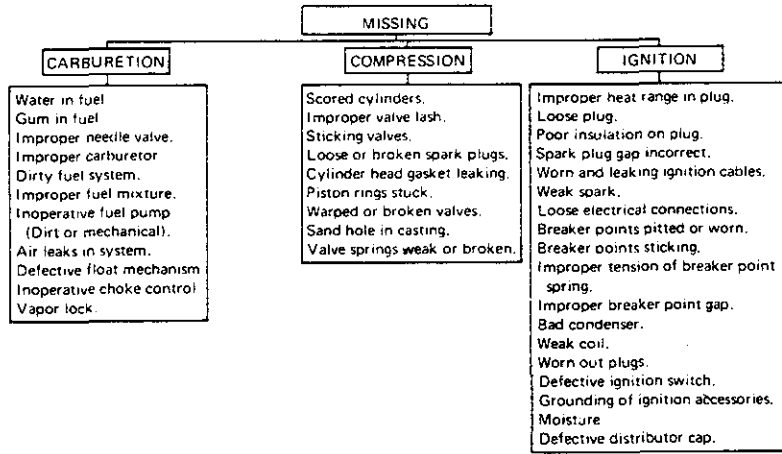
If after performing the following procedures the trouble is still not remedied, it is recommended that a serviceman be called.

It is recommended that the circuit diagram be used for reference during the troubleshooting.

TROUBLE	PROBABLE CAUSE	REMEDY
No 115 volts dc output.	Defective diode(s) in rectifier SR4.	Check diodes for continuity. Should conduct in one direction and not in other. Replace if defective.
	Loose lead in 115 vdc circuitry.	Ensure all leads are secure.
Low weld output.	Engine speed is low.	Adjust engine speed to 3000 rpm (no load speed). If engine rpm drops below 2600, engine servicing is indicated.
Erratic weld current.	Damp or defective electrodes.	Use new electrodes.
	Work or electrode connections loose.	Secure connections.
	Jack plugs loose in receptacles.	Secure jack plugs.

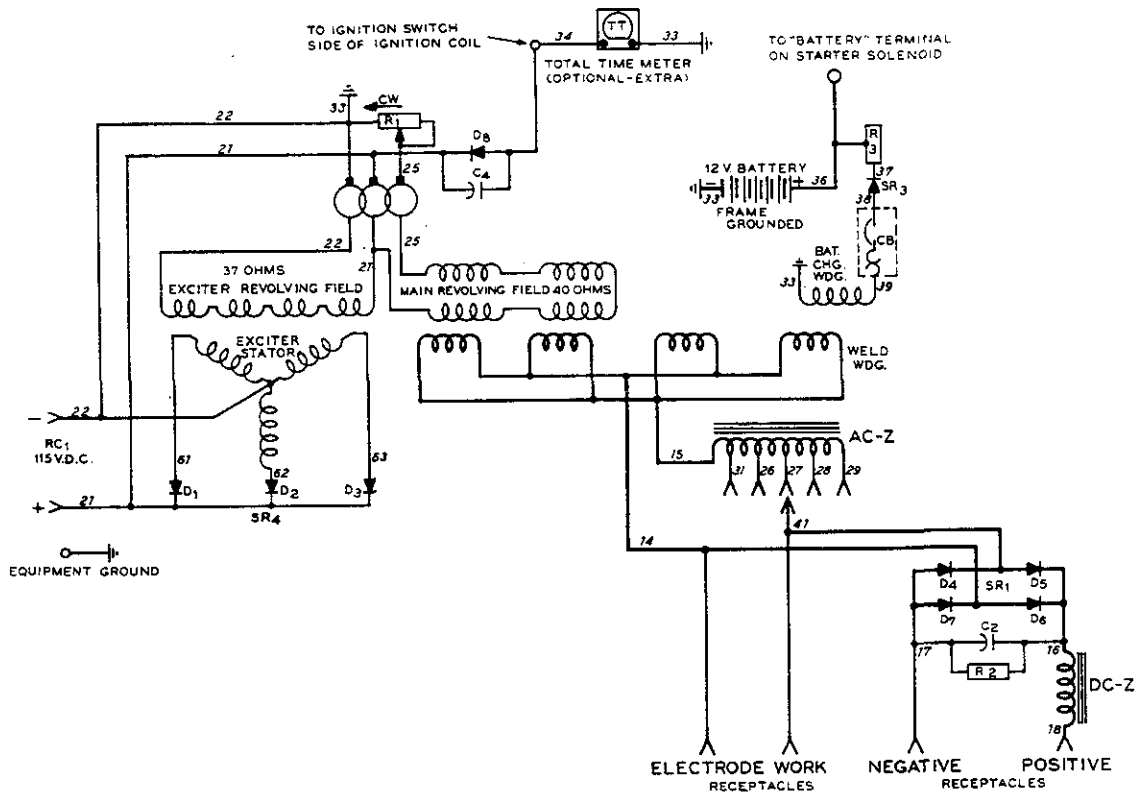
SECTION 11 - ENGINE TROUBLESHOOTING





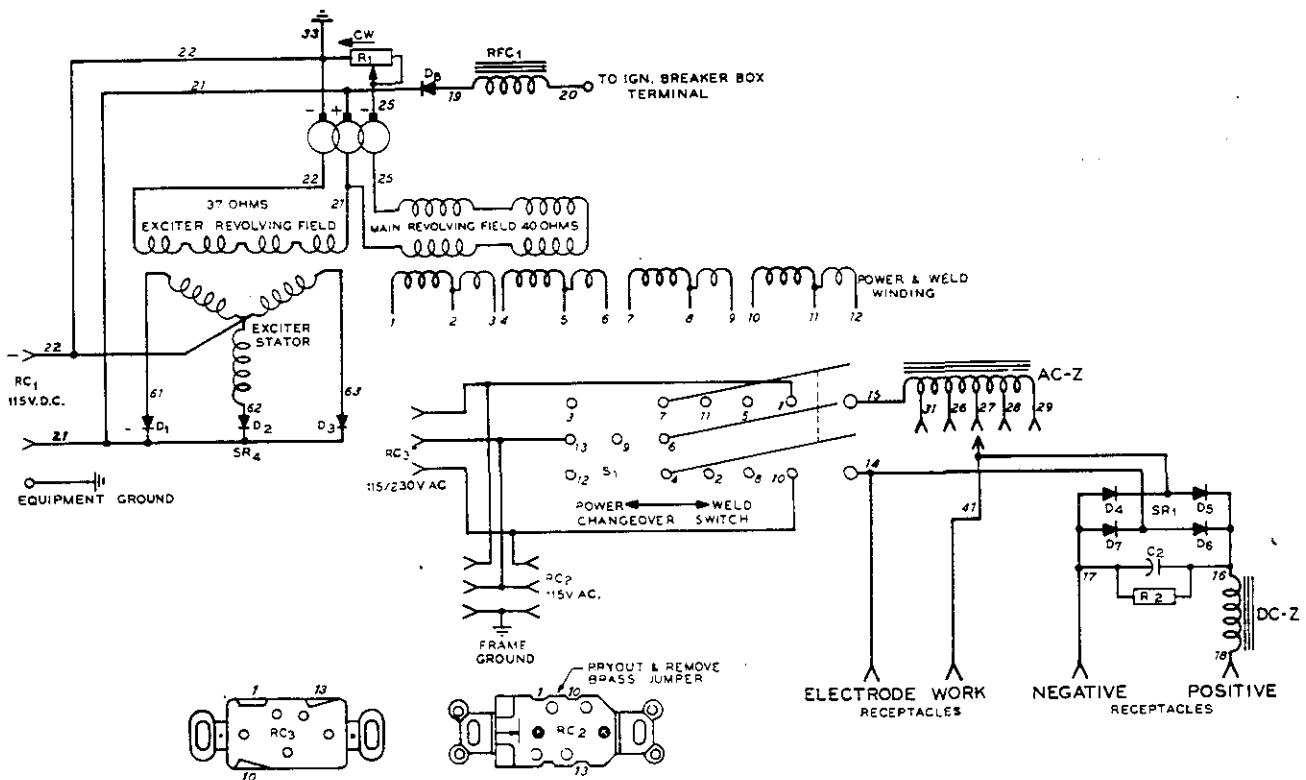
Circuit Diagram No. CB-900 453-2E

Figure 11-1. Circuit Diagram For Manual Start Welding Generator



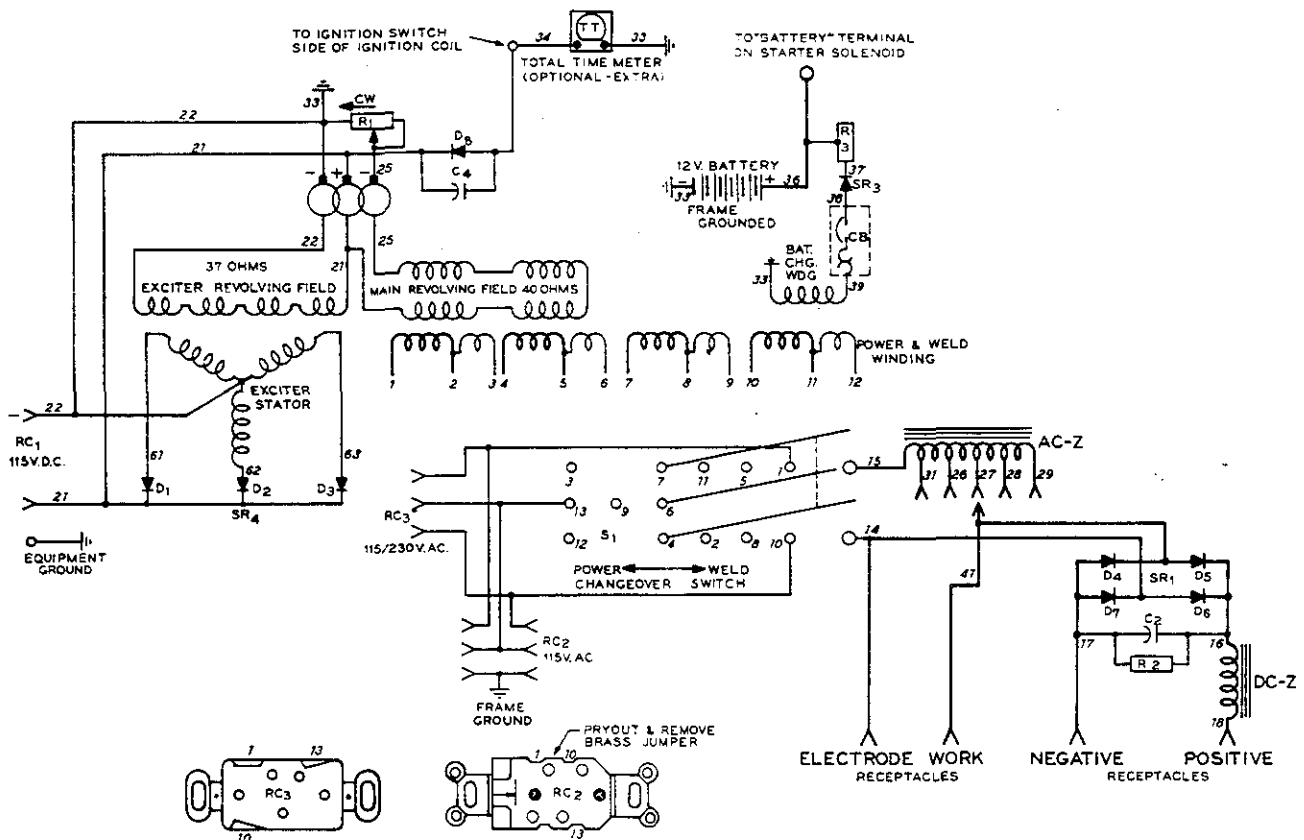
Circuit Diagram No. CB-900 465-1B

Figure 11-2. Circuit Diagram For Welding Generator With Electric Start



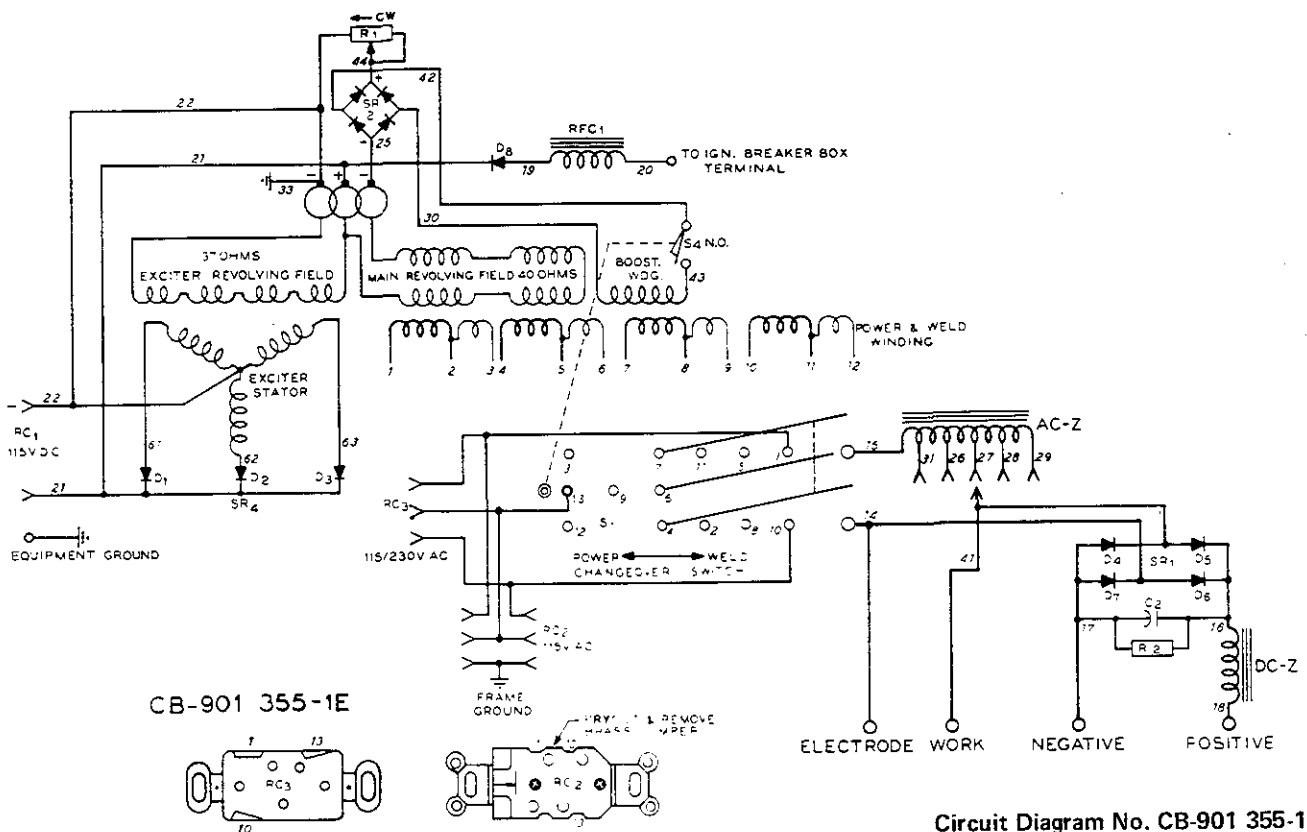
Circuit Diagram No. CB-900 459-2E

Figure 11-3. Circuit Diagram For Manual Start Welding Generator With 60 Hz Power Plant



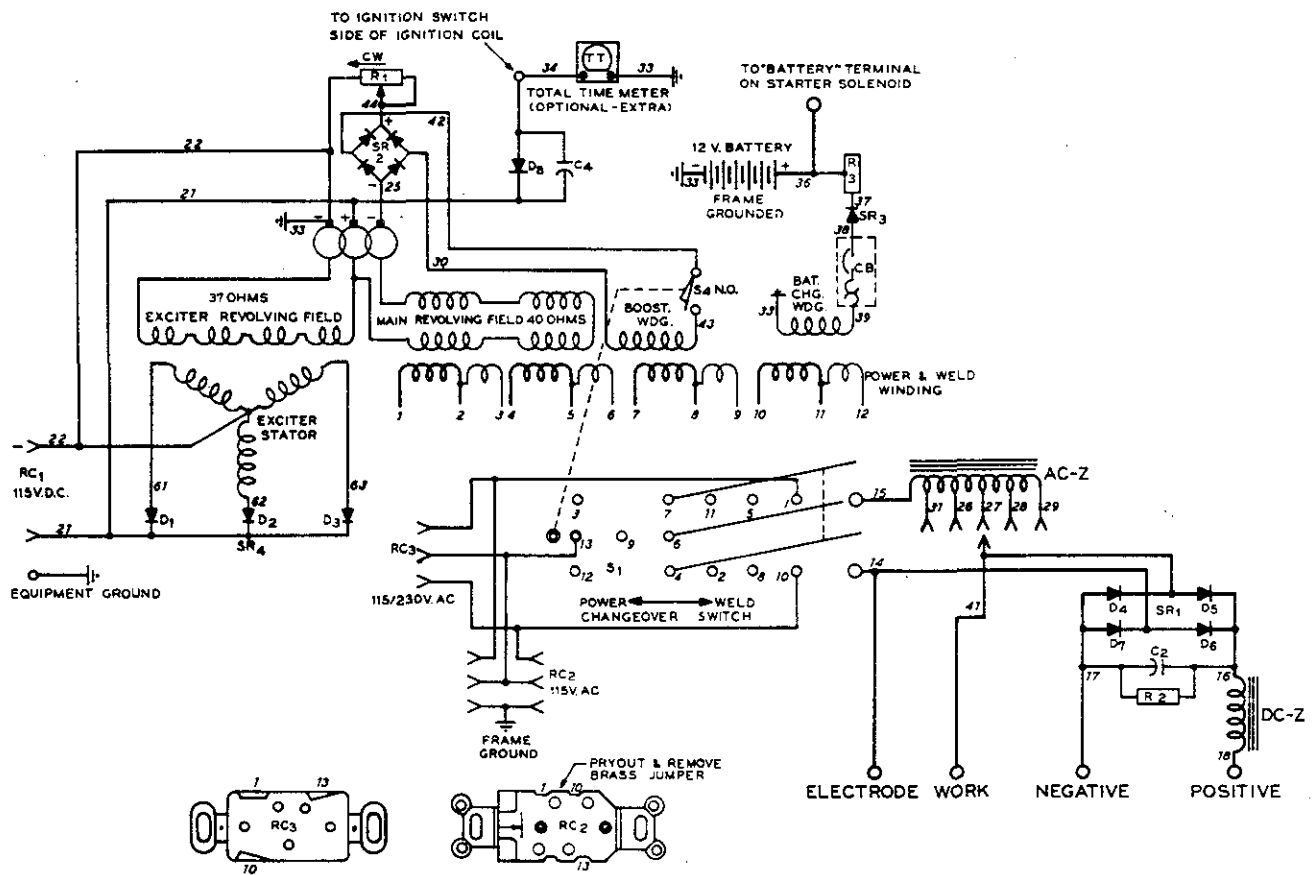
Circuit Diagram No. CB-900 468-1B

Figure 11-4. Circuit Diagram For Welding Generator With Electric Start and 60 Hz Power Plant



Circuit Diagram No. CB-901 355-1E

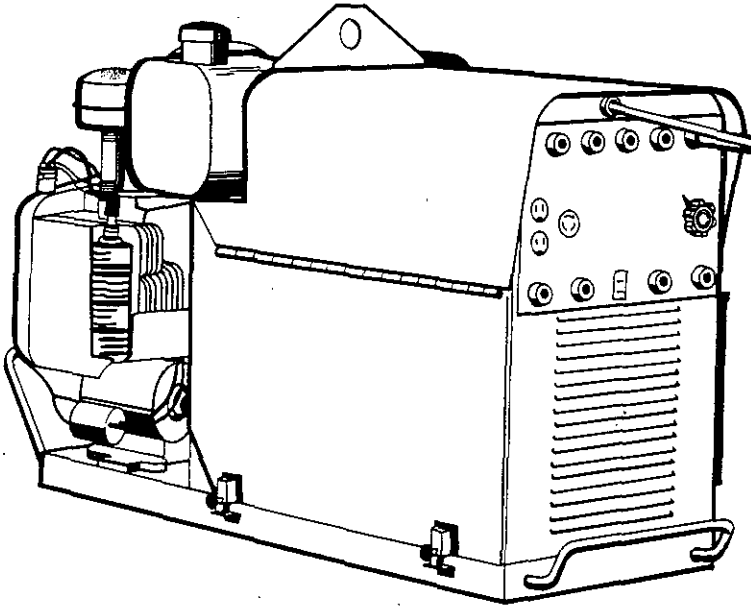
Figure 11-5. Circuit Diagram For Manual Start Welding Generator With 50 Hz Power Plant



Circuit Diagram No. CB-901 363-1B

Figure 11-6. Circuit Diagram For Welding Generator With Electric Start and 50 Hz Power Plant

MODEL	STOCK NO.
AEAD-200	900 453
AEAD-200E	900 465
AEAD-200L 60 Hz.	900 459
AEAD-200LE 60 Hz.	900 468
AEAD-200L 50 Hz.	901 355
AEAD-200LE 50 Hz.	901 363



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

PARTS LIST



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

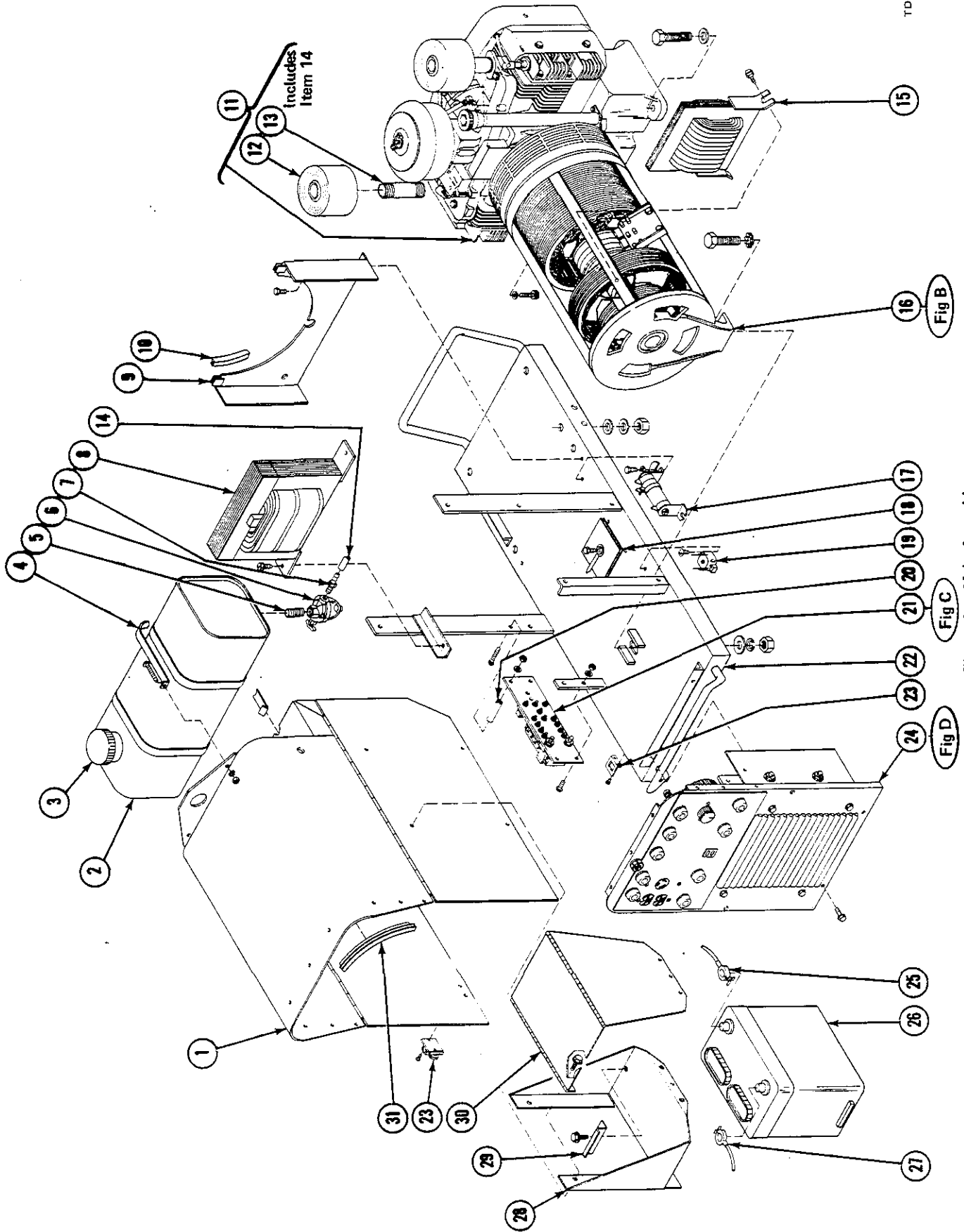


Figure A - Main Assembly

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity Model					
				Weld		Weld/Power			
				200 Manual Start	200E Electric Start	60 Hz.		50 Hz.	
				200L Manual Start	200LE Electric Start	200L Manual Start	200LE Electric Start		
Figure A			Main Assembly						
1		032 218	WRAPPER	1	1	1	1	1	1
2		015 670	TANK, fuel (consisting of)	1	1	1	1	1	1
3		015 603	. CAP	1	1	1	1	1	1
4		014 951	STRAP, mounting-tank fuel	2	2	2	2	2	2
5		602 898	NIPPLE, pipe-brass close 1/8	1	1	1	1	1	1
6		015 602	FILTER, fuel	1	1	1	1	1	1
7		010 731	NIPPLE, brass 1/8 NPT x 1/4 hose shank	1	1	1	1	1	1
8	DC-Z	036 527	STABILIZER	1	1	1	1	1	1
9		014 950	BAFFLE, air	1	1	1	1	1	1
10		603 124	SEAL, firewall (order by foot)	2 ft.	2 ft.	2 ft.	2 ft.	2 ft.	2 ft.
11		026 437	ENGINE (consisting of)	1		1			
11		026 438	ENGINE (consisting of)		1		1		
11		027 037	ENGINE (consisting of)					1	
11		027 036	ENGINE (consisting of)						1
12		*605 802	. MUFFLER	2	2	2	2	2	2
13		602 945	. NIPPLE, pipe	2	2	2	2	2	2
14		015 620	. HOSE, 1/4 x 1 braid-fuel line	1	1	1	1	1	1
		010 865	. CLAMP, hose self tightening	2	2	2	2	2	2
		019 603	. KNOB, ball 1-1/8 OD - throttle	1	1	1	1	1	1
		027 494	. NIPPLE, pipe 1/4 x 4	1	1	1	1	1	1
		027 495	. COUPLING, pipe 1/2	1	1	1	1	1	1
		026 551	. BRACKET, mounting-control throttle ..					1	1
15	ACZ	036 495	REACTOR	1	1	1	1	1	1
16		Figure B	GENERATOR (See Page 4)	1	1	1	1	1	1
17	R3	030 641	RESISTOR, WW adj 75 watt 4 ohm		1		1		1
18	SR3	037 633	RECTIFIER, selenium (charging ckt) ..		1		1		1
19	CB	+#012 612	CIRCUIT BREAKER, 10 amp (Spencer) or		1		1		1
19	CB	+#027 889	CIRCUIT BREAKER, 10 amp (ETA) ..		1		1		1
20		010 957	TUBING, steel 1/2 OD x 17 GA watt x 1-3/4			4	4	4	4
21	S1	011 729	SWITCH, changeover-weld/power (See Fig. C Page 5)			1	1		
21	S1	011 372	SWITCH, changeover-weld/power (See Fig. C Page 5)					1	1
22		018 293	BASE	1	1	1	1	1	1
23		602 253	CATCH & STRIKE	2	2	2	2	2	2
24		Figure D	PANEL, front with components (See Page 6)	1	1	1	1	1	1
25		600 806	CABLE, battery - positive		1		1		1
26		*605 427	BATTERY, 12 volt		1		1		1
27		023 641	CABLE, battery - negative		1		1		1
28		027 247	SHELF, battery		1		1		1
29		025 083	CLIP, holddown - battery		2		2		2
30		027 246	COVER, battery		1		1		1
		015 712	BUSHING, snap-in 7/8 hole		1		1		1
31		603 124	SEAL, firewall (order by foot)	2 ft.	2 ft.	2 ft.	2 ft.	2 ft.	2 ft.
	D8	027 369	DIODE, 3 amp 600 volt straight polarity	1	1	1	1	1	1
	C4	031 670	CAPACITOR, ceramic 0.05 uf 500 volts dc		1		1		1
	RFC	036 011	CHOKE, 30 melli-henry	1		1		1	
		032 184	BRACKET, mounting - choke	1		1		1	
		039 608	PLUG ASSEMBLY, jack (consisting of) .	2	2	2	2	2	2
		019 833	. STRIP, copper	1	1	1	1	1	1
		101 219	. PLUG, jack	1	1	1	1	1	1
		602 814	. INSULATOR, molded-red	1	1	1	1	1	1
		602 160	. SCREW, self tapping fil hd. 8-32 x 1/4.	1	1	1	1	1	1
		602 178	. SCREW, set socket hd. 1/4-20 x 3/8 ..	2	2	2	2	2	2
		027 303	CAP, twistlock 3P3W			1	1	1	1
		028 106	KIT, label (includes all labels)	1	1	1	1	1	1

*Recommended Spare Parts.

+Be sure to order correct circuit breaker, as the mounting holes are different.

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

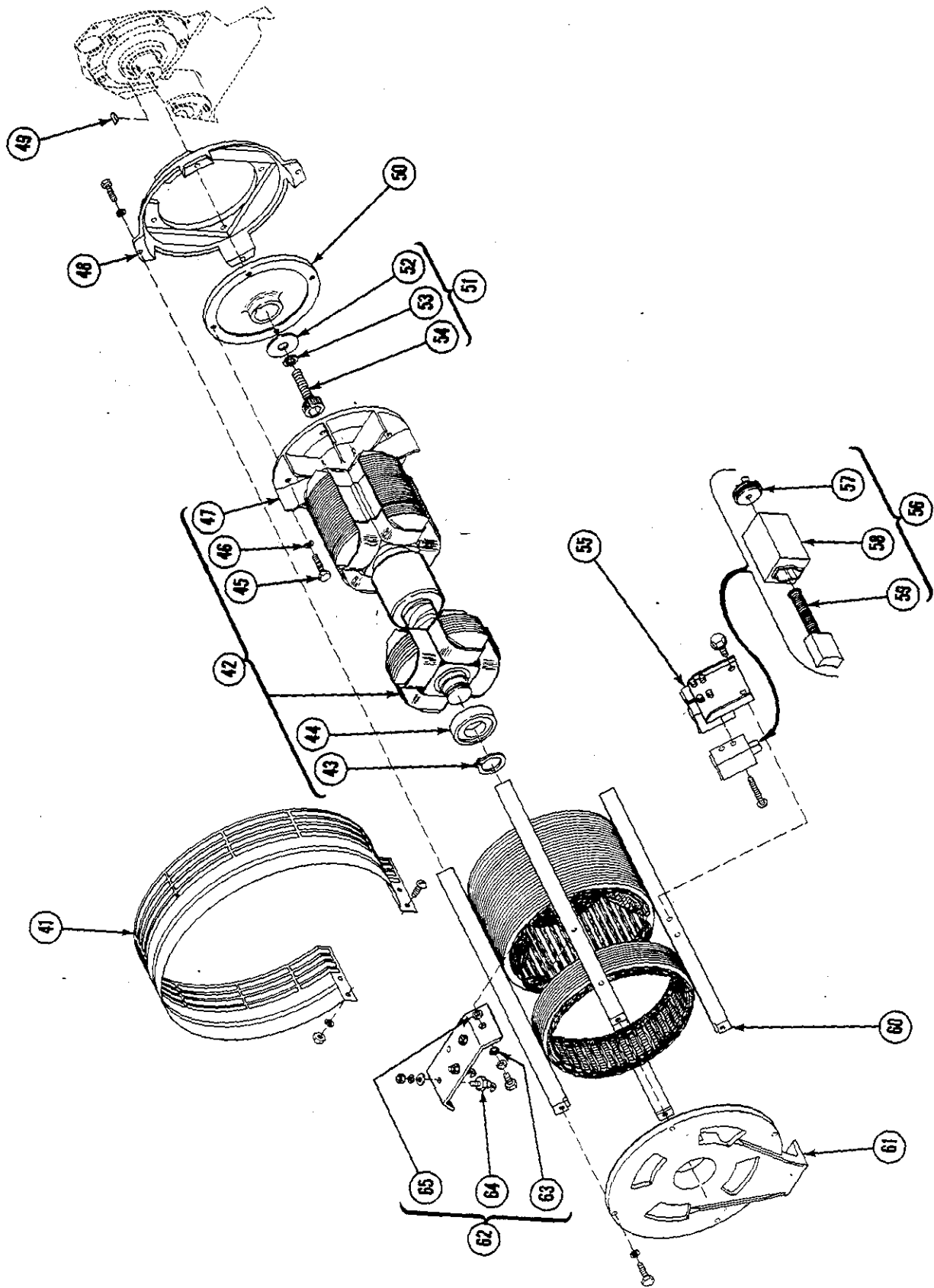


Figure B — Generator

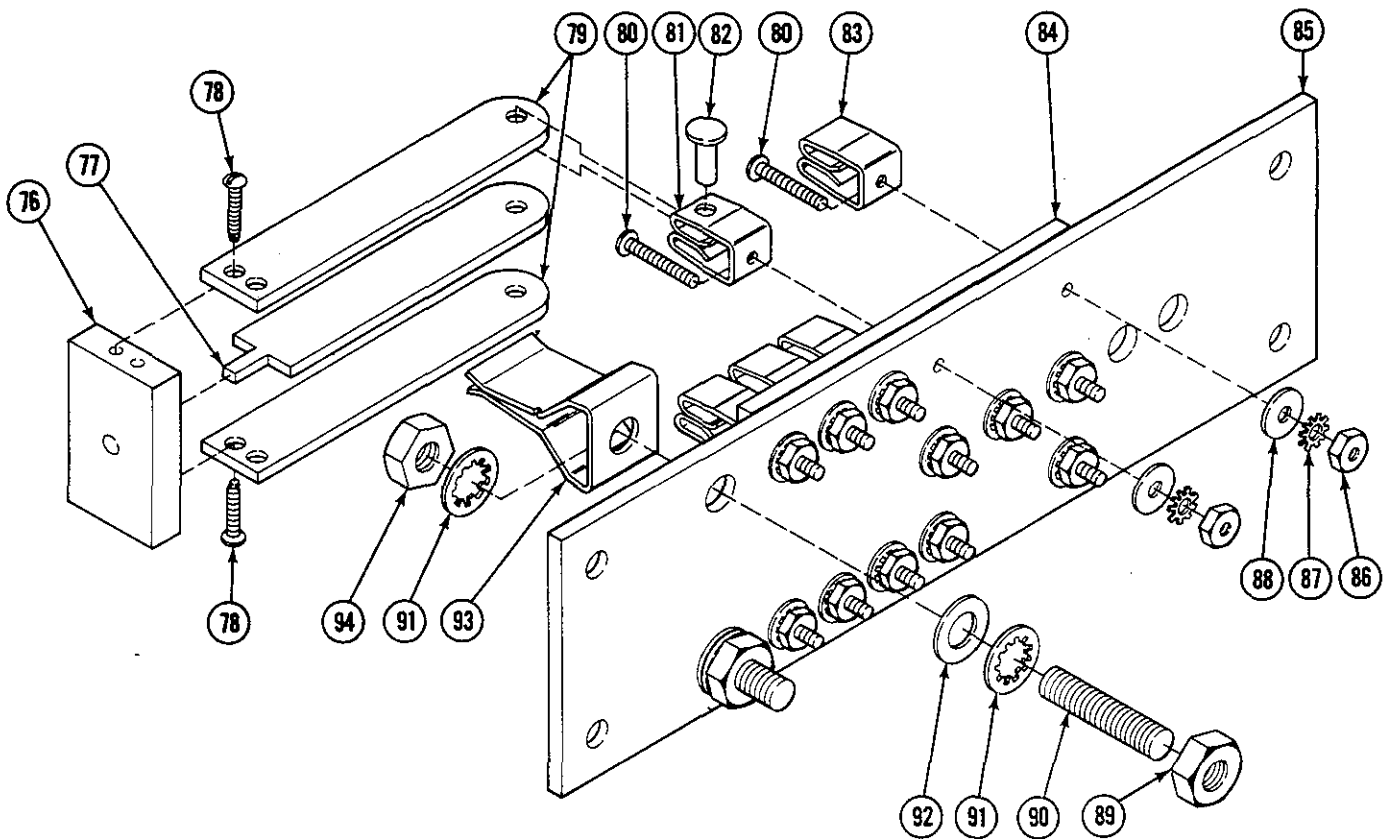
Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity Model					
				Weld		Weld/Power			
				200 Manual Start	200E Electric Start	60 Hz.		50 Hz.	
				200L Manual Start	200LE Electric Start	200L Manual Start	200LE Electric Start		
Figure B Generator (See Page 2 Item No. 16)									
41		014 376	GUARD, fan-rotor	1	1	1	1	1	1
42		**020 780	ROTOR (consisting of)	1	1	1	1	1	1
43		024 617	. RING, retaining-bearing	1	1	1	1	1	1
44		024 800	. BEARING	1	1	1	1	1	1
45		604 680	. SCREW, cap hex hd 5/16-18 x 7/8	4	4	4	4	4	4
46		602 211	. WASHER, lock split 5/16	4	4	4	4	4	4
47		017 624	. FAN	1	1	1	1	1	1
48		017 702	ADAPTER, engine	1	1	1	1	1	1
49		010 681	KEY	1	1	1	1	1	1
50		017 618	ADAPTER, fan	1	1	1	1	1	1
51		010 601	SCREW & WASHER (consisting of)	1	1	1	1	1	1
52		602 226	. WASHER, flat 7/16 ID x 2-1/4 OD x 3/16	1	1	1	1	1	1
53		602 215	. WASHER, lock split 7/16	1	1	1	1	1	1
54		602 018	. SCREW, cap sch 7/16-14 x 1-1/2	1	1	1	1	1	1
55		020 779	BRACKET, mounting-holder brush	1	1	1	1	1	1
56		018 614	BRUSH SET, electrical (consisting of)	3	3	3	3	3	3
57		018 665	. CAP	1	1	1	1	1	1
58		600 270	. HOLDER, brush	1	1	1	1	1	1
59		*020 034	. BRUSH, with spring	1	1	1	1	1	1
60		**020 848	STATOR	1					
60		**020 849	STATOR		1				
60		**020 850	STATOR			1			
60		**020 851	STATOR				1		
60		**020 852	STATOR					1	
60		**020 853	STATOR						1
61		020 908	ENDBELL	1	1	1	1	1	1
62	SR4	027 732	RECTIFIER (consisting of)	1	1	1	1		
63		020 326	. BUSHING, shoulder 7/16 ID x 1 OD x 1/4	2	2	2	2		
64	D1-3	037 572	. DIODE, 50 amp 400 volt	3	3	3	3		
65		010 291	. WASHER, flat 5/8 ID x 1-1/4 OD x 1/8 - mylafil	2	2	2	2		
62	SR4	027 731	RECTIFIER (consisting of)					1	1
63		020 326	. BUSHING, shoulder 7/16 ID x 1 OD x 1/4					2	2
64	D1-3	037 572	. DIODE, 50 amp 400 volt					3	3
65		010 291	. WASHER, flat 5/8 ID x 1-1/4 OD x 1/8 - mylafil					2	2
	SR2	037 346	. RECTIFIER, integrated 6.5 amp 400 volt					1	1

*Recommended Spare Parts.

**Rotor and stator replacements are available on exchange basis. Contact Factory Service Department for details.

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

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity	
Figure C				011 729	011 372
Switch, Changeover Weld/Power (See Fig. A Page 2 Item No. 21)					
76		019 752	HANDLE	1	1
77		010 844	BLADE	1	1
78		602 144	SCREW, self tapping round head 8-32 x 3/8	4	4
79		010 845	BLADE	2	2
80		602 034	SCREW, machine-brass round head 8-32 x 7/8	13	13
81		010 185	CLIP, pivot-blade	3	3
82		604 923	RIVET, brass-tubular 3/16 x 9/16	3	3
83		601 113	CLIP	10	10
84		038 156	RISER BOARD	1	1
85		038 157	MOUNTING BOARD, components	1	1
86		601 831	NUT, hex brass 8-32	13	13
87		602 201	WASHER, lock external tooth No. 8	13	13
88		602 237	WASHER, flat No. 8	13	13
89		601 838	NUT, hex brass 3/8-16 full	2	2
90		038 067	STUD, brass 3/8-16 x 1-1/2	2	2
91		602 221	WASHER, lock internal tooth 3/8	2	2
92		010 910	WASHER, flat 3/8 SAE	2	2
93		012 647	CLIP	2	2
94		601 837	NUT, hex brass 3/8-16 jam	2	2
S4		011 647	SWITCH, limit		1



TC-011 729

Figure C - Switch, Changeover Weld/Power

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

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity	
				Weld	Model/Power
Figure D Panel, Front With Components (See Fig. A Page 2 Item 24)					
101		023 894	CABLE & PLUG ASSEMBLY, jack (consisting of)	1	1
102		600 318	. CABLE, welding No. 3 (order by foot)	2 ft.	2 ft.
103		039 608	. PLUG ASSEMBLY, jack (consisting of)	1	1
104		019 833	. STRIP, copper	1	1
105		101 219	. PLUG, jack	1	1
106		602 814	. INSULATOR, molded - red	1	1
107		602 160	. SCREW, self tapping fil hd 8-32 x 1/4	1	1
108		039 801	RECEPTACLE, jack (consisting of)	5	5
109		039 796	. NUT, molded - black	1	1
110		010 291	. WASHER, flat 5/8 ID x 1-1/4 OD x 1/8 - mylafil	1	1
111		604 668	. NUT, self locking 1/2-20	1	1
112		038 198	. RECEPTACLE	1	1
113		601 881	. NUT, hex jam 1/2-20	1	1
114	RC3	039 607	RECEPTACLE, twistlock 3P3W-230 volt		1
115	RC2	039 864	RECEPTACLE, duplex grd 2P3W-115 volt		1
116	R1	030 664	RHEOSTAT, WW 150 watt 50 ohm	1	1
117		039 826	RECEPTACLE, jack (consisting of)	3	3
118		039 796	. NUT, molded - black	1	1
119		010 291	. WASHER, flat 5/8 ID x 1-1/4 OD x 1/8 mylafil	1	1
120		604 668	. NUT, self locking 1/2-20	1	1
121		020 015	. RECEPTACLE	1	1
122		601 881	. NUT, hex jam 1/2-20	1	1
123	SR1	037 356	RECTIFIER, silicon diode (See Fig. D1 Page 7)	1	1
124		039 800	RECEPTACLE, jack (consisting of)	1	1
125		601 881	. NUT, hex jam 1/2-20	1	1
126		020 015	. RECEPTACLE	1	1
127		604 668	. NUT, self locking 1/2-20	1	1
128		010 291	. WASHER, flat 5/8 ID x 1-1/4 OD x 1/8 mylafil	1	1
129		039 768	. NUT, molded - red	1	1
130		018 297	PANEL, front	1	1
131		010 325	CONNECTOR, cable	1	1
132			NAMEPLATE (order by stock, model & serial No.)	1	1
133		019 609	KNOB, pointer 1-5/8 OD x 1/4 bore	1	1
134	RC1	039 617	RECEPTACLE, straight 2P2W-115 volt dc	1	1

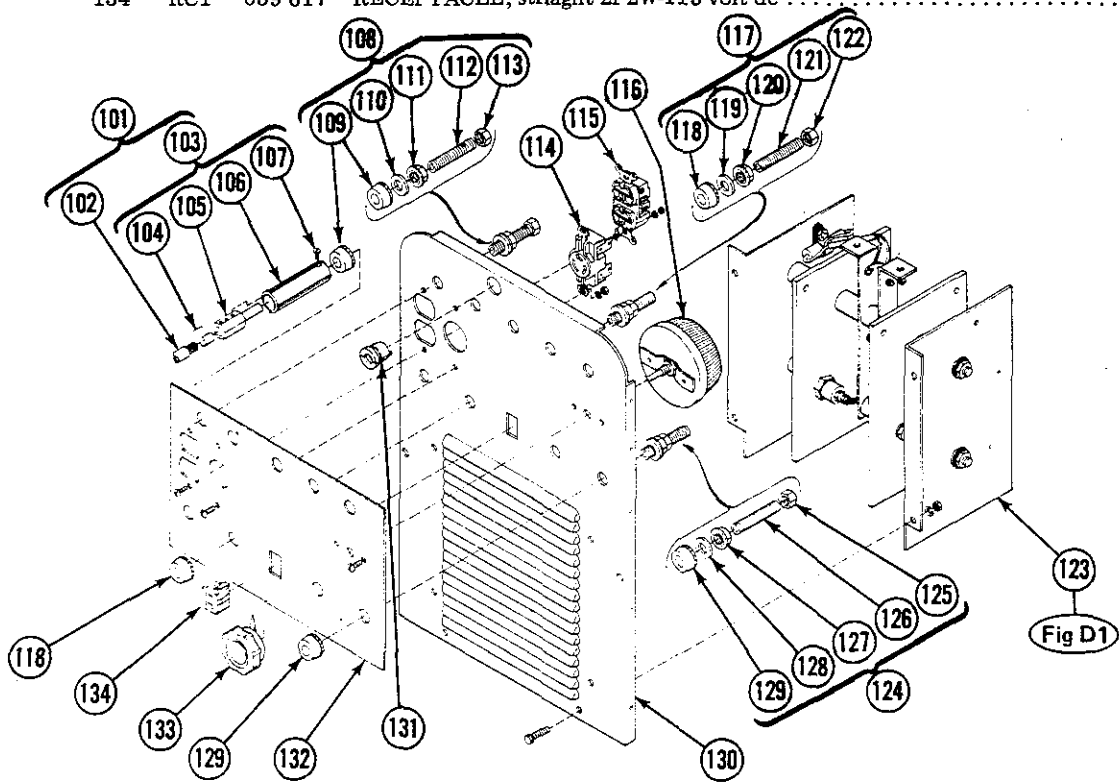
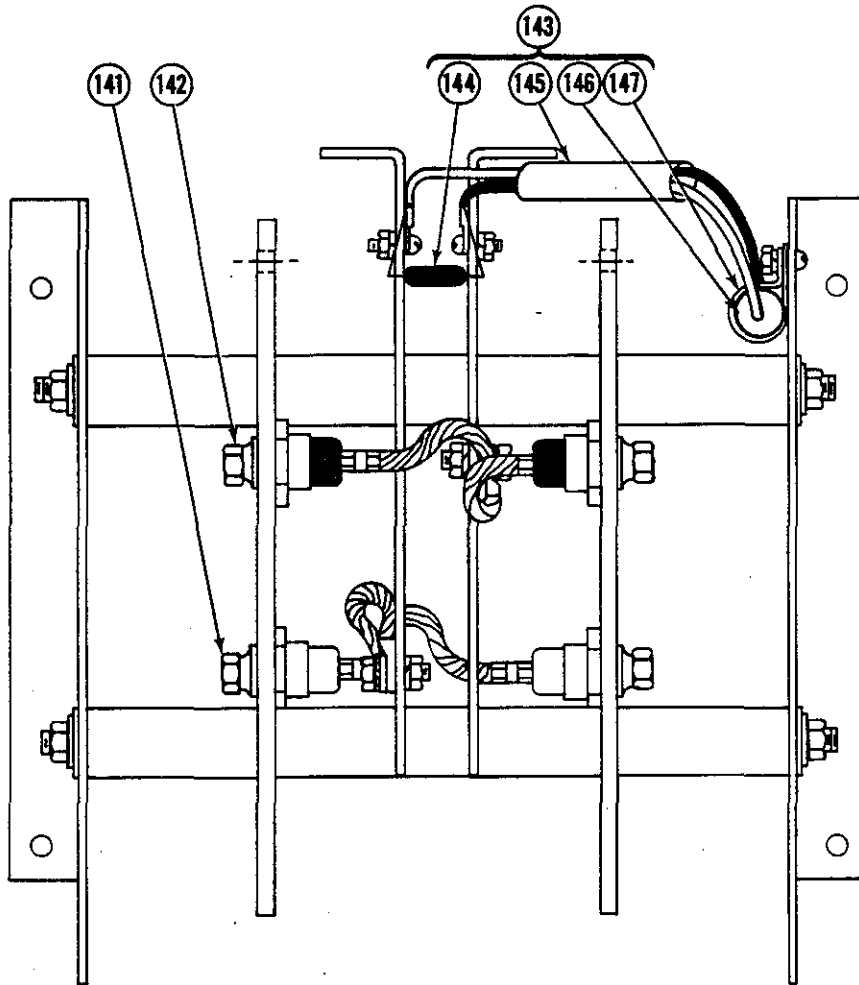


Figure D – Panel, Front With Components

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

Item No.	Dia. Mkgs.	Factory Part No.	Description	Quantity
Figure D1	037 356	Rectifier, Silicon Diode (See Fig. D Page 6 Item 123)		
141	D4,7	037 305	DIODE, 150 amp 300 volt straight polarity	2
142	D5,6	037 306	DIODE, 150 amp 300 volt reverse polarity	2
143		031 703	CAPACITOR ASSEMBLY (consisting of)	1
144	R2	030 726	. RESISTOR, WW fixed 5 watt 1000 ohm	1
145		026 780	. TUBING, vinyl No. 5 x 3 inches	1
146	C2	031 683	. CAPACITOR, paper-oil .5 uf 200 volt dc	1
147		010 014	. CLAMP, mounting-capacitor	1

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



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Figure D1 – Rectifier, Silicon Diode

