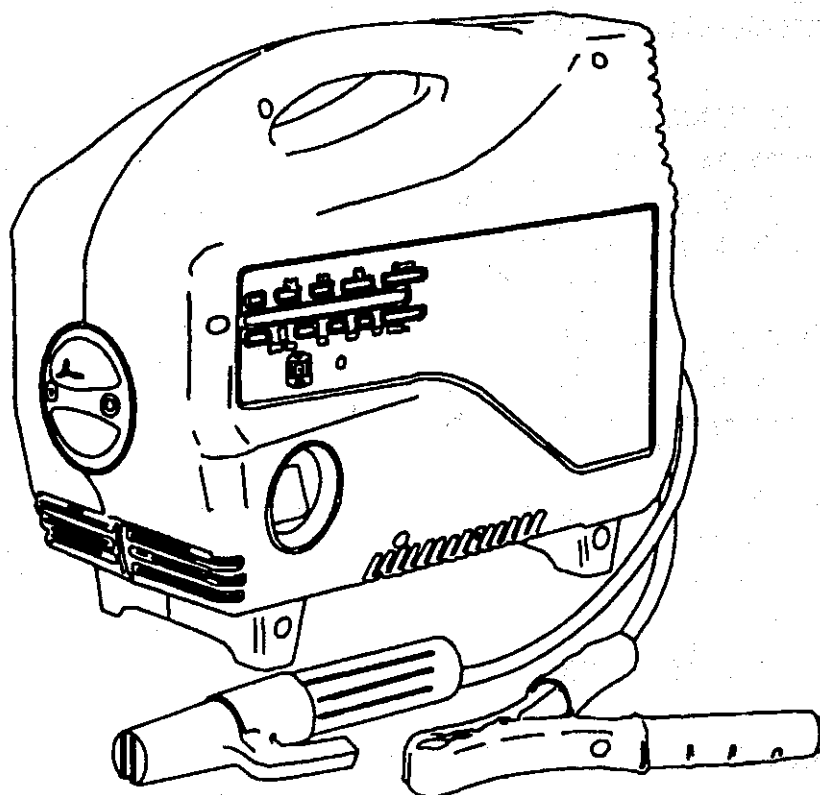

100 AMP ARC WELDER - SERIES A



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St. Louis, Missouri 63120-1578
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ARC Section

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1.0 INTRODUCTION

Your new welder has been sturdily constructed and is a thoroughly tested machine. It has been engineered to give you many years of efficient troublefree service and satisfaction. It is a normal characteristic of this unit to hum or buzz during normal operation.

We recommend that you read through this manual at least once to learn the features of your new machine and to refresh your knowledge about the important safety precautions you must always follow. If you are not particularly experienced, this manual will inform you of the correct and safe procedures to follow when using your welder.

2.0 SAFETY RULES

PERSONAL PROTECTION

Use a proper face shield fitted with the correct filter and cover plates to protect your eyes, face, neck and ears from sparks and rays of the welding arc when welding or observing welding. WARN bystanders not to watch the arc and not to expose themselves to the welding-arc rays or to hot metal.

Wear flameproof gauntlet-type gloves, heavy long-sleeve shirt, cuffless trousers, high-topped shoes and a welding helmet or cap for hair protection to protect the skin from arc rays and hot sparks or hot metal. A flameproof leather or asbestos apron may also be desirable as protection against radiated heat and sparks.

Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs or pockets. Sleeves and collars should be kept buttoned, and pockets eliminated from the front.

All Safety Precautions as per ANSI Standards:

Z87.1 Practice for Occupational and Educational Eye and Face Protection.

Z49.1 Safety in Welding and Cutting.

FIRE PREVENTION

WARNING: Hot slag, sparks, or metal can cause serious fires when in contact with combustible solids, liquids or gases.



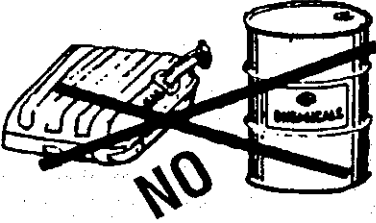
WEAR YOUR SAFETY GOGGLES

FORESIGHT IS BETTER THAN NO SIGHT

- ▲ Always wear safety goggles when in a welding area.
- ▲ Use safety glasses with side shields or goggles when chipping slag or grinding.
- ▲ Chipped slag is hot and may travel considerable distances. Bystanders should also wear safety glasses or goggles.



- ▲ Make workshop kidproof—with padlocks, master switches, or by removing starter keys.
- ▲ Keep children away. All visitors should be kept a safe distance from work area.



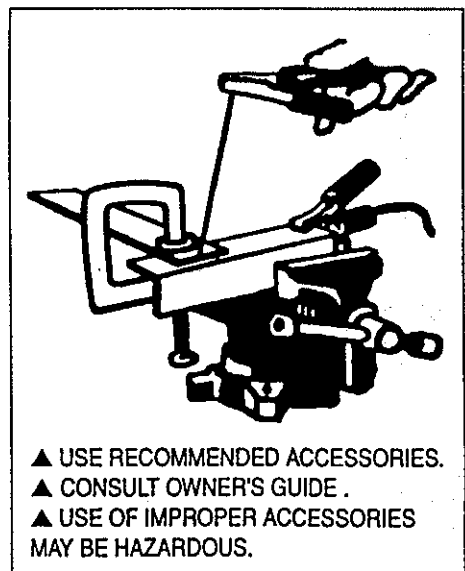
- ▲ Remove all combustible materials well away from the welding area. Such combustible materials include wood, clothing, sawdust, gasoline, kerosene, paints, solvents, natural gas, acetylene, propane and similar combustible articles.

1. Hot sparks or hot metal can fall into cracks in floors or wall openings and cause a hidden smoldering fire. Make certain that such openings are protected from hot sparks and metal.
2. Do not weld, cut, or perform other hot work on used barrels, drums, tanks or other containers until they have been completely cleaned so that there are no substances in the container which might produce flammable or toxic vapors.
3. After completion of welding or hot work, inspect the work area to make certain that there are no hot sparks or hot metal which could cause a later fire.
4. Keep work area clean. Cluttered areas and benches invite accidents.
5. Don't overreach. Keep your proper footing and balance at all times.

ELECTRICAL SHOCK

WARNING: Voltage of 110 volts or less can cause severe burns to the body or fatal shock. Severity of electrical shock is determined by the path and amount of current through the body.

1. Never allow live metal parts of an electrode holder to touch bare skin or any wet clothing. Be sure gloves are dry.
2. When standing on metal or welding in a damp area, make certain that you are well insulated from the ground by wearing dry gloves and rubber-soled shoes and standing on a dry board or platform.
3. When working above floor level, protect yourself from a fall should you get a shock. Never wrap the electrode cable around any part of your body.
4. Always connect the welder to a grounded outlet having the correct voltage. Welder is equipped with three-prong plug, it should be plugged into a three-hole electrical receptacle.
5. Keep your work area well illuminated.
6. Do not use bare, taped or overloaded welding cables. Use a well maintained electrode holder and ground clamp. Never cool the holder by dipping into water.
7. When not welding, place the electrode holder where it is insulated from the ground system. Accidental grounding can cause overheating and create a fire hazard. Do not coil or loop the welding cable around parts of the body.
8. Be sure the ground cable is connected to the workpiece as close to the welding area as possible.
9. Keep everything dry, including work clothing, work area, welding cables, electrode holder and welding machine.
10. Disconnect welder before servicing and when changing accessories.
11. Avoid accidental starting. Make sure switch is OFF before plugging in cord.
12. Secure work. Use clamps or a vise to hold work, when practical. It's safer than using your hand, frees both hands to operate welder.



VENTILATION

WARNING: Welding fumes, particularly in confined spaces, can cause discomfort and physical harm if breathed over an extended period of time.

Provide adequate ventilation in the welding area at all times by natural ventilation or mechanical ventilation. Do not weld on galvanized, zinc, lead, beryllium or cadmium materials unless positive mechanical ventilation is provided to prevent breathing fumes from these materials.

Do not weld in locations close to chlorinated hydrocarbon vapors coming from degreasing or spraying operations. The heat or arc rays can react with solvent vapors to form phosgene, a highly toxic gas, and other irritant gases.

If you develop momentary eye, nose or throat irritation during welding, it is an indication that ventilation is not adequate. Stop work and take necessary steps to improve ventilation in the welding area. Do not continue to weld if physical discomfort persists.



FLAMMABLE AND EXPLOSIVE MATERIALS

1. Remove flammable and explosive material at least 35 feet from the welding arc to prevent welding sparks or molten metal from starting a fire. Keep a type ABC fire extinguisher within easy reach.
2. Welding on or near containers which hold combustibles can cause an explosion, even when they have been cleaned. For information purchase "Safe Practices for Welding and Cutting Containers that Have Held Combustibles" (F4.1) from the American Welding Society AWS, 550 N.W. Lejeune Rd Miami, Florida 33126.
3. Electrodes shall be removed from electrode holders when not in use, and holders shall be so placed that they cannot make electrical contact with persons, conducting objects, flammable liquids, or compressed gas cylinders.
4. Never connect the work cable or clamp to any object but the work piece or metal work table. Connecting to other objects such as building ground can create a fire hazard.
5. Never weld anything on or to the welder cabinet, as a burn through may cause transformer failure.

PREVENTIVE MAINTENANCE

WARNING: Faulty or improperly maintained welding equipment can result in poor welding work, but most importantly it can cause physical injury or death through fires or electrical shock.

1. Never apply power to the welder with any part of the "cabinet" removed. Position on-off switch in "Off" position and disconnect power supply at the circuit breaker or fuse box before doing maintenance work inside the machine.
2. Before connecting the welder power cord to the receptacle, check the following:
 - a. Inspect the power cord and welding cables for cuts or burns and make sure blades and ground pin on the plug are straight.
 - b. Inspect "On-Off" switch lever for cracks or broken parts.
 - c. Inspect electrode holder jaw insulators for cracks or broken parts.
 - d. Do not operate the welding machine or equipment that is in faulty condition. Maintain welding cables, grounding wire and connections, power cord, and welding machine in safe working order.

- e. Do not abuse the welding machine or accessory equipment. Keep the equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres and inclement weather.
- f. Keep all safety devices and cabinet covers in position and in good repair.
- g. Use the welding machine for its intended purpose and do not modify it in any manner.
- h. For additional safety information, purchase copies of "Practice for Occupational and Educational Eye & Face Protection" (ANSI Z87.1) and "Safety in Welding and Cutting" (ANSI Z49.1) from the American Welding Society or the American National Standards Institute ANSI, 1430 Broadway, New York, New York 10018, and "Code for Safety in Welding and Cutting" (CSA Standard W117.2-1574) from the Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario M9W1 R3.

ELECTRICAL REQUIREMENTS

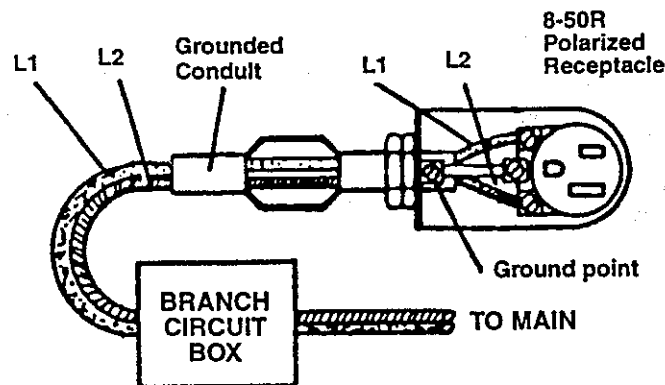
It is recommended that a separate circuit be provided for the welder. For best results, the circuit should be protected by a 60 ampere fuse of the delayed action type such as "Fustat" or "Fusetron" in the fuse block.

The voltage, cycles and current must correspond to the information on the welder face plate.

The installation must comply with the local electrical code requirements.

Electrical connections between the welder and 230-volt, single-phase, 60-cycle a-c power source should be made by a qualified electrician.

Install an individual (separate) line for the welder with a fuse block in the line. For best results this circuit should be as short as possible. For power leads use armored cable or non-metallic sheathed cable, in accordance with the local electrical code.



Power Plug Wiring Connect 230-volt power lines and ground as shown above.

3.0 OPERATING INSTRUCTIONS

ELECTRICAL REQUIREMENTS

It is recommended that a separate circuit be provided for the welder. For best results, the circuit should be protected by a 30 ampere time delay fuse or circuit breaker.

The voltage, cycles and current must correspond to the information on the welder face plate.

The installation must comply with the local electrical code requirements.

Where the proper receptacle is not installed, we strongly recommend that a properly grounded three-prong wall receptacle be installed by a qualified electrician in accordance with the National Electrical Code and local codes and ordinances.

WARNING: This welder must be grounded while in use to protect the operator from electrical shock. If you are not sure that your outlet is properly grounded, have it checked by a qualified electrician. Do not cut off ground prong or alter plug in any way.

4.0 USER MANUAL 100 AMP ARC WELDER WITH LIMITED DUTY CYCLE.

SAFETY STANDARDS

The use of welding equipment and the execution of welding operations place both the operator and others at risk. It is the operator's duty to read, assimilate and observe the safety regulations indicated below. It is worth remembering that a prudent operator familiar with and observant of the relative safety regulations, is the best safeguard against accidents. Before connecting, preparing, using or transporting the arc welder, carefully read the safety regulations indicated below.

EXPLOSION AND FIRE PREVENTION

Molten slag and sparks may cause fires. Fires and explosions are dangers which can be avoided following the regulations indicated below:

- Remove all flammable substances and objects such as wood, sawdust, clothing, paints, solvents, petrol, kerosene, natural gas, acetylene, propane and any other flammable substance.
- Even if the object or pipe to be welded is open, empty, purge and thoroughly clean the welding area. Exercise and use caution when consulting any weldings operations.
- Always make sure that a fire extinguisher, sand or water etc. is at hand as a fire-fighting measure.

SAFETY OF OPERATOR AND THIRD PARTIES

Since welding is a source of radiation, loud noise, heat and toxic gaseous fumes, the safety of the operator and third parties must be guaranteed by appropriate safety measures. Never expose yourself to the action of the electrical arc or incandescent metal without wearing the necessary protective clothing. Disregard of the regulations indicated below when carrying out welding operations, may cause serious damage to your health.

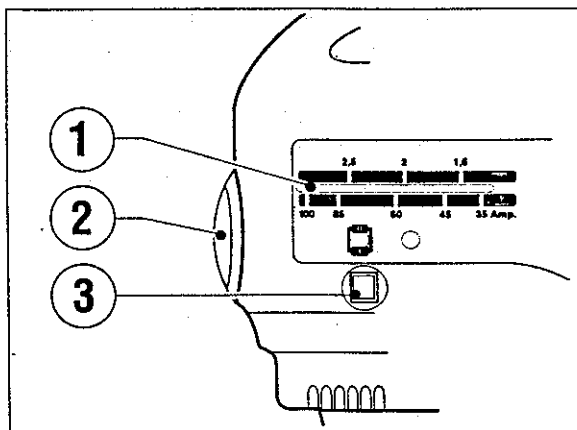
- Always wear suitable protective clothing, i.e.: non-flammable heavy gauntlet-type gloves, thick shirt with long sleeves, trousers without turn-ups, ankle-high boots to protect the skin from arc rays, sparks or incandescent metal, and hard hat or welder's cap to protect hair.
- Always wear a mask with special protection filter (at least NR10 protection or more) to protect the eyes. Also take care to protect the face, ears and neck. Notify those in the vicinity to keep well clear of the range of arc rays and incandescent metal. Always use ear protectors. Welding operations can be noisy and may even disturb others working in the vicinity.
- Always wear safety glasses with side shields, particularly when removing slag either manually or mechanically. Slag is generally very hot in temperature and may throw sparks some considerable distance. Notify work colleagues in the vicinity when removing such material. Cordon off the welding area with a fireproof partition, since rays, sparks and incandescent slag may injure colleagues or persons in the vicinity of the welding area.

5.0 GENERAL DEFINITION

The welding unit provides a smooth electrical arc in order to weld two metal parts together. In fact, the electrical arc struck between the electrode and welding joint, generates such a high temperature that it melts both the electrode and base metal. The molten metal droplets which form the electrode are deposited on the welding joint, thereby creating a molten metal pool which welds the joint as it solidifies.

The electric welding unit primarily comprises a metal or plastic housing which contains the transformer. It is the transformer which serves to reduce the line voltage to one that is suitable and harmless. This voltage which is available at the transformer output generates a flow of electrons and a corresponding high electric current (35-100 AMP) each time the welding electrode contacts the piece to be welded. The welding unit is fitted with a device which regulates the current setting. This device optimises the welding current in accordance with the electrode diameter. The starter switch (3) which is usually located on the panel interrupts the primary supply line (i.e.: 230 V).

Some welding units may be supplied by two different voltages, which are selected using the starter switch. The indicator lights on the welding unit respectively indicate welding unit "ON" and THERMOSTAT tripped.



OPERATION PARAMETERS

The table printed on the generator indicates the operation parameters which are expressed in number of electrodes and which are as follows: **nc:** indicates the number of reference electrodes the generator can weld starting at ambient temperature before the thermostat is tripped. **nh:** indicates the average number of reference electrodes which can be welded between thermostat resetting and tripping. **nc1:** represents the total number of reference electrodes which can be welded in an hour starting with the generator at ambient temperature. **nh1:** represents the total number of reference electrodes which can be welded in an hour after the first thermostat reset.

THERMOSTATIC PROTECTION

A thermostatic protection (thermostat) is fitted on the transformer to protect the windings from overheating (in heavy duty welding applications). If the windings exceed a pre-determined temperature threshold, which might damage the insulation, the thermostat cuts off the power supply. The illumination of the relative indicator light indicates that the thermostat has been tripped.

6.0 INSTALLATION

CONNECTING TO THE PLUG

It is essential before you connect your welder to the electrical power receptacle to make sure that the power socket outlet is adequate to the amperage and voltage required by your welder (see rating plate). In case your welder is delivered without plug you should fit one complying with the standard of your country.

MAINTENANCE

Connect the work clamp (ground) as close as possible to the work piece using cables of adequate cross section. An work clamp far away from the operation site reduces the efficiency and increases the possibility of electric discharges.

Make sure that welding cables are not near cranes lifts or electric cables. Mind the wear of cables plugs and sockets and replace them if damaged. provide for a periodical maintenance of the welder.

7.0 WELDING ACCESSORIES

- **GROUND CABLE:** the ground cable is connected by a clamp directly to the welding piece or to the metal support (work bench) on which the welding operation is carried out.

Make sure that the earth cable clamp is in full contact with the piece. Remove any trace of rust or paint.

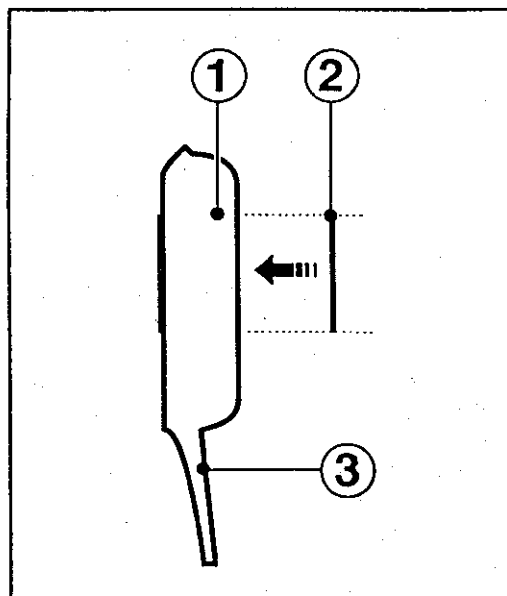
- **ELECTRODE HOLDER CLAMP CABLE:**

Fit the exposed end (uncoated) of the electrode in the clamp jaws. Regularly check the condition of the clamp, in particular its plastic insulation covering.

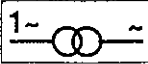
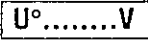
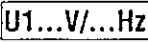
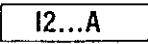
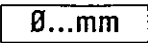
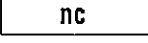
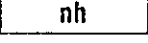
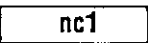
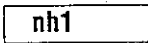
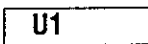
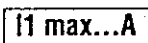
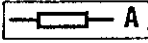

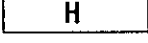
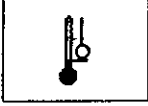


- **WELDING MASK :**

Always wear a mask when welding. This serves to protect the eyes and face from the harmful rays emitted, while ensuring sufficiently clear vision of the flux pool.

- 1 - MASK
- 2 - FILTER (DIN 11)
- 3 - HANDGRIP



8.0 GRAPHIC SYMBOLS AND TECHNICAL DATA

1.  This symbol shows a schematic diagram of the welding unit (single-phase transformer).
2.  This symbol shows the secondary no-load voltage (in Volts).
3.  This symbol shows the rated supply voltage (in Volts) and rated line frequency in Hertz.
4.  This symbol shows the welding current in AMPs.
5.  This symbol shows the diameter of the electrodes which can be welded in mm.
6.  This symbol shows the number of electrodes that can be welded consecutively before the thermostat trips starting with the welding unit at ambient temperature.
7.  This symbol shows the number of electrodes that can be welded consecutively before the thermostat trips after the first thermostat reset.
8.  Represent the total number of reference electrodes which can be welded in an hour starting with the generator at ambient temperature.
9.  Represent the total number of reference electrodes which can be welded in an hour after the first thermostat reset.
10.  This symbol shows the rated supply voltage.
11.  This symbol shows the welding unit's maximum absorbed current in AMPs.
12.  This symbol shows the type of protection fuse to be fitted on the welding unit.
13.  This symbol shows the welding unit's protection class.
14.  This symbol shows the transformer's insulation class.
15.  This symbol shows the transformer's insulation class.
16.  This symbol shows the transformer's insulation class.
17.  This symbol shows the transformer's insulation class.

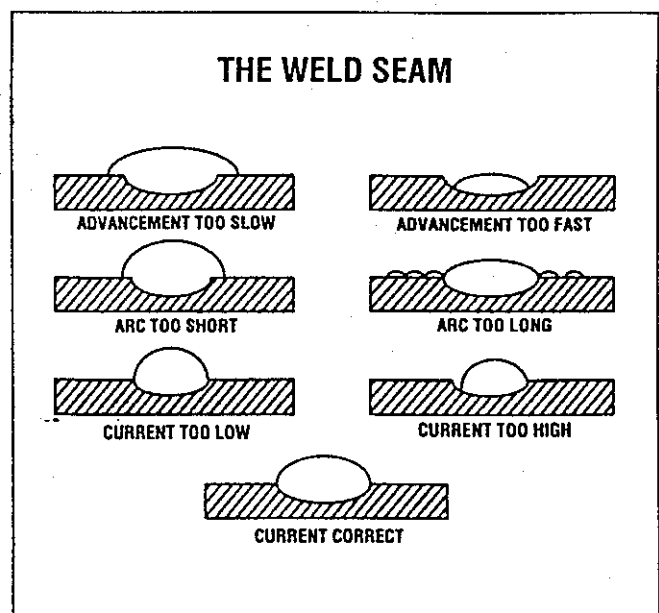
9.0 EFFECTIVE WELDING OPERATIONS

Make the necessary electrical connections (as described above),

Electrode Ø (mm)	Welding curr. (A)
1,6	25 - 50
2	40 - 80
2,5	60 - 100
3,15	100 - 130
4	110 - 180

switch on the welding unit and adjust the welding current using the handwheel in accordance with the electrode to be used.

Wearing the protection mask, rub the electrode on the welding piece to ignite the arc. **ALWAYS take care to stroke the electrode tip across the welding surface and not rap it since this would damage the external coating which prevents oxygen in the air from coming into contact with the molten metal and causing it to oxidize.** Once the arc is ignited, tilt the electrode forward at an angle of approximately 30° and hold it at a distance from the welding piece equal to the diameter of the electrode being used.

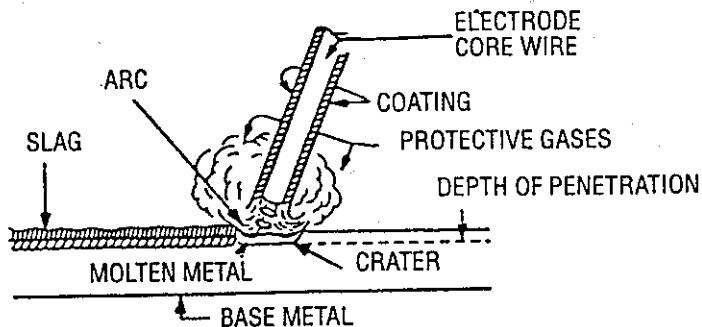


10 BASIC WELDING INFORMATION

THE ARC WELDING PROCESS

When arc welding, energy flows from the electrode to the grounded metal work. This arc creates an intense heat between the end of the electrode and the surface of the metal to be welded. The heat generated is so great that the metal is immediately heated to a liquid state at the point where the arc is directed. This creates a molten pool (puddle) of metal.

This heat also melts down the electrode. As it melts, the metal from the electrode falls through the arc into the molten pool. This adds additional molten metal which mixes in the puddle resulting in complete fusion of the two metals. As the electrode is moved along the seam, the material added from the electrode forms a uniform deposit of metal, called a bead.

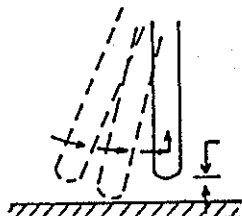


LEARNING TO WELD Learning to weld is simply a process of trial and error. The best way to teach yourself how to weld is with short periods of practice at regular intervals. All practice welds should be done on scrap metal that can be discarded. Do not attempt to make any repairs on valuable equipment until you have satisfied yourself that your practice welds are of good appearance and free of slag or gas inclusions. What you fail to learn during practice, will be learned through mistakes and rewelds later on. The ground connection is as much a part of the welding circuit as the cable is a part of the electrode holder. A poor ground connection can render the best of welding equipment inefficient.

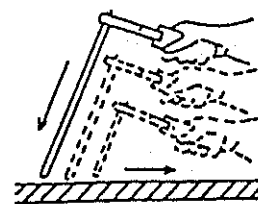
To start an arc, bring the tip of the rod in contact with the work and then quickly raise it until there is about a 1/8 in. gap between the rod and the work. The easiest way to strike an arc is to scratch the tip of the rod a short distance on the surface of the work, as you would a match, and then quickly lift it the required 1/8 in. Another method is to strike the work a hard blow with the tip of the rod and allow it to bounce up to form the gap. The important thing is to strike the arc quickly and not allow the rod to remain in contact with the work for too long a time.

One of the most common mistakes a beginner makes is that of pointing the rod toward the work and then, after lowering his helmet, feel slowly about until the tip of the rod touches the work. This results in sticking or "freezing" of the rod which causes a direct short across the circuit. When this occurs, the rod can be loosened by bending it from side to side while pulling on the holder.

Practice striking and maintaining an arc for a few seconds, then snap it out by rapidly pulling the rod away from the work. Repeat this until the arc can be started and the gap or distance between the rod and the work maintained as uniformly as possible.



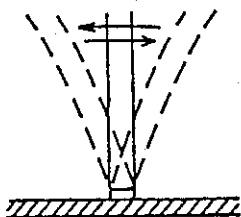
To strike an arc, scratch the end of the rod on the plate and then quickly raise about 1/8 of an inch.



To lay a weld bead only two movements are used, downward and the direction the weld is to be laid.

THE WELD BEAD To lay a weld bead, only two movements are used, a steady downward feeding of the rod to maintain the correct length and as slow travel in the direction in which the weld is to be laid. While doing this, watch the weld puddle and arc length. Move the rod steadily in a straight line as the back of the crater fills up. The slight angle of the rod will keep the flux or slag flowing over the deposited weld metal to form a protective coating. If the rod is moved too slowly, the slag will flow in front of the puddle and be trapped in the weld, causing inclusions and gas pockets.

Should the rod stick or "freeze" bend it from side to side while pulling upward on the rod holder.



Watch the weld puddle to keep the slag from flowing in front of it, causing inclusion and gas pockets.



TROUBLESHOOTING GUIDE

WARNING: ALWAYS DISCONNECT WELDER BEFORE REMOVING COVER OR ATTEMPTING INSPECTION OR REPAIRS INSIDE THE UNIT.

SYMPTOM	REMEDIAL ACTION
1. Electrical shocks.	<p>A. Check "ground" connection of welder receptacle to be sure "hot" wire has not been connected to "ground" terminal.</p> <p>CAUTION: NEVER USE WELDER UNTIL CAUSE OF SHOCK HAS BEEN DETERMINED AND CORRECTED.</p> <p>B. Re-check electrical shock section of safety precautions in front of this manual.</p>
2. No output or welding current.	<p>A. Check fuses and circuit breakers.</p> <p>B. Check all connections inside and outside of welder.</p>
3. Fan motor does not run, but welder operates.	<p>A. Check fan motor connections.</p> <p>B. If leads are connected properly and fan motor turns freely, motor could be burned out.</p> <p>CAUTION: NEVER OPERATE WELDER IF FAN DOES NOT OPERATE PROPERLY OR IF COVER IS NOT IN PLACE.</p>
4. Output current low or weak.	<p>A. Have electrician check incoming voltage and circuit.</p> <p>B. Check welding current setting and adjust to recommended current for electrode being used.</p> <p>C. Check for poor connections.</p>
5. Erratic weld current or arc .	<p>A. Check for proper electrode selection. Use only AC general purpose electrodes. Type E6011 or E6013.</p> <p>B. Possible bad or damp electrodes. Try different electrodes.</p>

COMMON WELDING PROBLEMS

PROBLEM	ACTION
1. Difficulty in striking arc.	<p>A. Check for proper electrode selection; check both size and type. Use only AC general purpose electrodes. DC rods will not operate properly on an AC welder.</p> <p>B. Check ground connection carefully and be sure electrode holder is making good contact with the electrode.</p>
2. High bead, little penetration and arc difficult to maintain.	<p>A. Current too low. Use higher output current.</p> <p>B. Try smaller diameter rod.</p>
3. Wide thin bead, undercut in places. Rod burns off very fast.	<p>A. Current too high. Use lower output current.</p>
4. Small bead undercut in places with little penetration.	<p>A. Travel too fast. Slow welding process.</p>
5. Wide heavy bead overlapped at sides in places.	<p>A. Travel too slow.</p>
6. Excessive spatter and surface of weld rough with rod melting off in globules.	<p>A. Arc too long.</p>
7. Electrode sticks to work pieces.	<p>A. Move rod away from work quickly when striking arc.</p>



FIG. 1

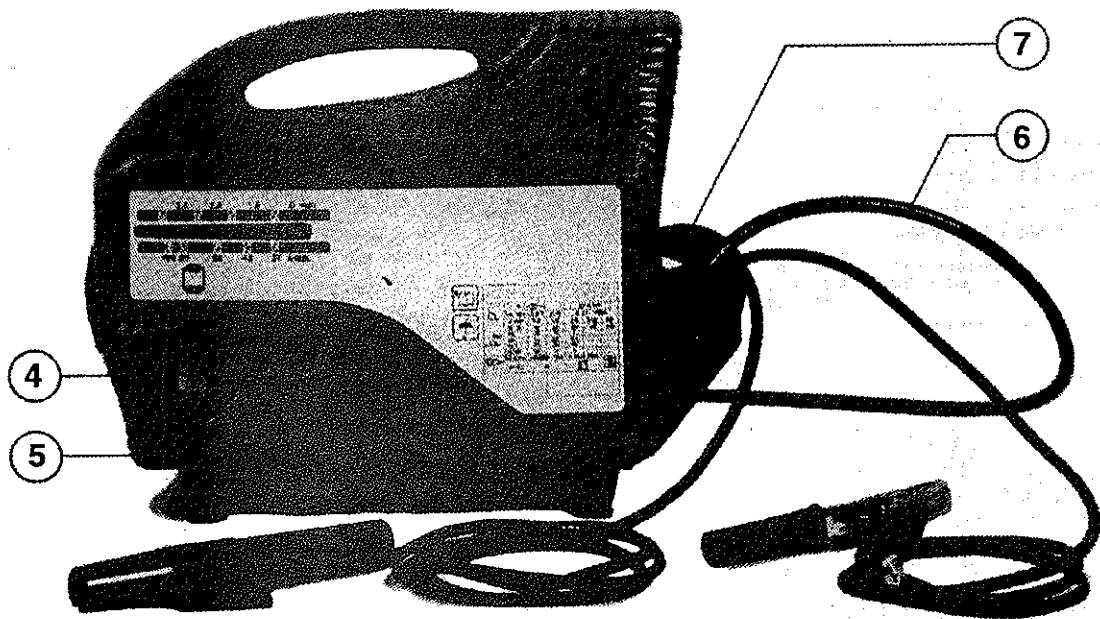


FIG. 2

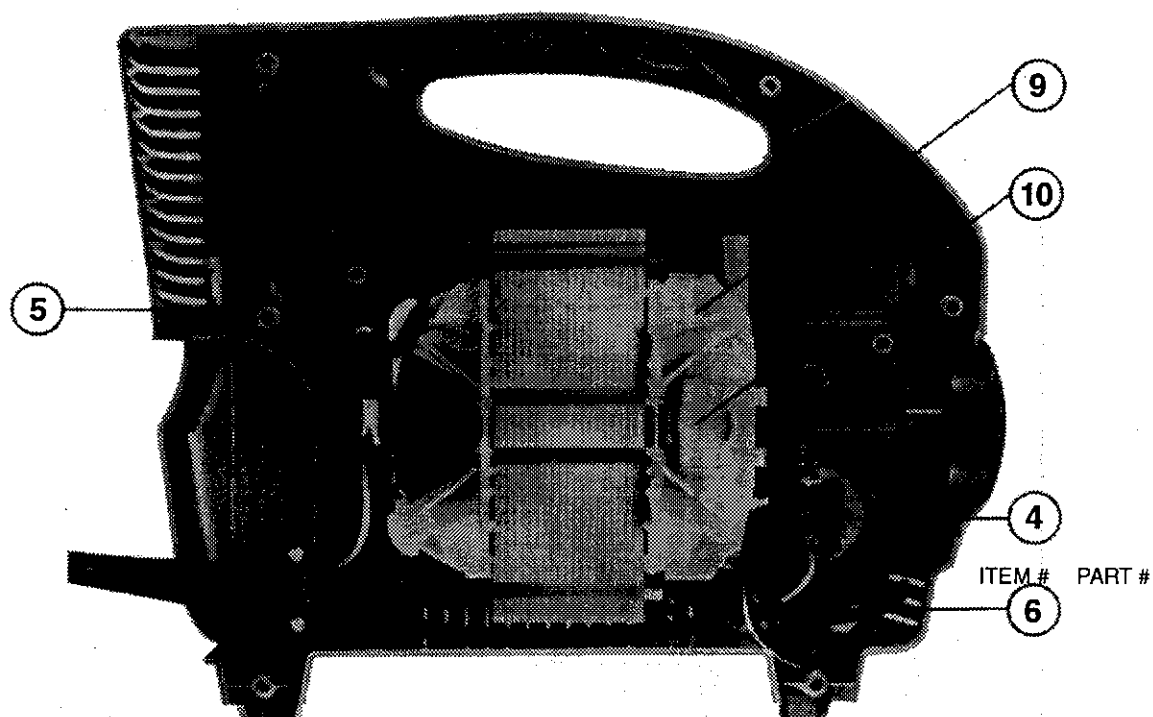


FIG. 3

ITEM #	PART #	DESCRIPTION
1*	250944	SIDE PANEL
2	250935	KNOB
3	250936	CABLE W/ ELECTRODE CLAMP
4	246-495-666 (250941)	SWITCH
5*	250946	LOWER SIDE PANEL
6	250945	INPUT CABLE
7	250933	COVER, RECESS

ITEM #	PART #	DESCRIPTION
8	250937	CABLE W/ CLAMP
9	250932	TRANSFORMER 115 VAC 60 HZ
10	250943	THERMOSTAT
11@	247509	WARNING LABEL
12@	247510(n)/247511(m)	SIDE PANEL LABEL

* These items are not normal stock items but can be made available on an as needed requirement.

@ These items are not on the detail.

(m) These items are for Marquette Welders.

(n) These items are for Napa Welders.

