

# OPERATING MANUAL

This manual covers equipment which is obsolete and no longer in production by The Lincoln Electric Co. Specifications and availability of optional features may have changed.

## IDEALARC<sup>®</sup> TIG-250/250 250 Ampere AC/DC Arc Welding Power Source For Tungsten Inert Gas and Stick Electrode Welding (Code 8809 & Up)

Date of Purchase: \_\_\_\_\_  
Serial Number: \_\_\_\_\_  
Code Number: \_\_\_\_\_  
Model: \_\_\_\_\_  
Where Purchased: \_\_\_\_\_

### DAMAGE CLAIMS

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

### SAFETY DEPENDS ON YOU

Lincoln arc welding equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation . . . and thoughtful operation on your part. **DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS OPERATING MANUAL AND THE ARC WELDING SAFETY PRECAUTIONS ON THE INSIDE FRONT COVER.** And, most importantly, think before you act and be careful.

### PRODUCT DESCRIPTION

The Idealarc TIG-250/250 has been designed to fill the need for a lower current rated and lower cost TIG welder. Industry surveys revealed that 75 - 80% of all TIG welding employed air-cooled torches at 200 amps or less. This welder is rated at 250 amperes, 30 volts, 40% duty cycle for AC and DC stick electrode and DC TIG welding. For AC TIG welding, its rating is 200 amperes, 40% duty cycle.



# ARC WELDING SAFETY PRECAUTIONS



**WARNING: PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH.**



## **ELECTRIC SHOCK can kill.**

1. a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- b. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".
- c. Insulate yourself from work and ground using dry insulation. When welding in damp locations, on metal framework such as floors, gratings or scaffolds, and when in positions such as sitting or lying, make certain the insulation is large enough to cover your full area of physical contact with work and ground.
- d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
- e. Ground the work or metal to be welded to a good electrical (earth) ground.
- f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
- g. Never dip the electrode in water for cooling.
- h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
- i. When working above floor level, protect yourself from a fall should you get a shock.
- j. Also see Items 4c and 6.



## **ARC RAYS can burn.**

2. a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87.1 standards.
- b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- c. Protect other nearby personnel with suitable non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



## **FUMES AND GASES can be dangerous.**

3. a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. When welding on galvanized, lead or cadmium plated steel and other metals which produce toxic fumes, even greater care must be taken.
- b. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- c. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- d. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices.
- e. Also see item 7b.



## **WELDING SPARKS can cause fire or explosion.**

4. a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Have a fire extinguisher readily available.
- b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (ANSI Standard Z49.1) and the operating information for the equipment being used.
- c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
- d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned." For information purchase "Recommended Safe Practices for the Preparation for

Welding and Cutting of Containers and Piping That Have Held Hazardous Substances", AWS F4.1-80 from the American Welding Society (see address below).

- e. Vent hollow castings or containers before heating, cutting or welding. They may explode.
- f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.
- g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.
- h. Also see item 7c.



### **CYLINDER may explode if damaged.**

5. a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.
- b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- c. Cylinders should be located:
  - Away from areas where they may be struck or subjected to physical damage.
  - A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- d. Never allow the electrode, electrode holder, or any other electrically "hot" parts to touch a cylinder.
- e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- f. Valve protection caps should always be in place and handtight except when the cylinder is in use or connected for use.
- g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.



### **FOR ELECTRICALLY powered equipment.**

6. a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.
- b. Install equipment in accordance with the National Electrical Code, all local codes and the manufacturer's recommendations.
- c. Ground the equipment in accordance with the National Electrical Code and the manufacturer's recommendations.



### **FOR ENGINE powered equipment.**

7. a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.



- b. Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.



- c. Do not add the fuel near an open flame, welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.



- d. Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.
- e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.
- f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.
- g. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.



- h. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.

**HAVE ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR WORK performed by qualified people.**

For more detailed information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting — ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135.

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# PART B — INSTALLATION, OPERATION AND MAINTENANCE

## SECTION 1. INSTALLATION



**WARNING**

**ELECTRIC SHOCK can kill**

- Have an electrician install and service this equipment.
- Turn the input power off at the fuse box before working on equipment.
- Do not touch electrically hot parts.

**WARNING:** To prevent possible bodily injury from high frequency voltage keep the TIG torch and cables in good repair.

### 1.1 LOCATION/VENTILATION

Place the welder where clean, cooling air can freely circulate in through the front louvers and out through the rear louvers. Dirt, dust or any foreign material that can be drawn into the welder should be kept at a minimum. Failure to observe these precautions can result in excessive operating temperatures and nuisance welder trips off the line.

**NOTE:** Before planning the installation, read the section entitled “High Frequency Interference Protection”.

### 1.2 INPUT CONNECTION

Be sure the voltage, phase and frequency of the input power is as specified on the welder nameplate.

Welder supply line entry provision is in the case rear panel with a small removable cover over the contactor and reconnect panel area.

Have a qualified electrician connect the input leads to L1 and L2 of the input line contactor in accordance with the National Electrical Code, all local codes and the wiring diagram located inside the machine. Use a single phase line or one phase of a two or three phase line.

Fuse the input circuit with the recommended super-lag fuses. Choose an input and ground wire size according to local codes or refer to Table 1.

### 1.3 HIGH FREQUENCY INTERFERENCE PROTECTION

The high frequency generator within this welder has been tested under *recommended installation conditions* and has been found to comply with the F.C.C. tentatively allowable limits. However, since the spark gap oscillator in the welder is similar to a radio transmitter, improper welder installation can result in radio and TV interference or problems with nearby electronic equipment. Radiated interference can develop in the following four ways: (1) direct interference radiated from the welder, (2) direct interference radiated from the welding leads, (3) direct interference radiated from feed-back into the power lines, and (4) interference from re-radiation of “pick-up” by ungrounded metallic objects. Keeping these contributing factors in mind, installing equipment per the following instructions should minimize problems.

1. Keep the welder power supply lines as short as possible and completely enclose them in rigid metallic conduit or equivalent shielding for a minimum distance of 50 feet. There should be good electrical contact between this conduit and the welder. Both ends of the conduit should be connected to a driven ground and the entire length should be continuous.

**TABLE 1 — Recommended Input Wire Sizes**  
Based on the National Electrical Code

Input Volt/ Freq.	Ampere Rating on Nameplate		Type 75°C Wire In Conduit (AWG) Copper Cond.		Ground Wire (AWG Size) Copper Cond.		Fuse Size (Super Lag)	
	With Capacitor	Without Capacitor	With Capacitor	Without Capacitor	With Capacitor	Without Capacitor	With Capacitor	Without Capacitor
208/60	75	102	8	6	8	6	100	125
230/60	68	92	8	6	8	6	90	110
460/60	34	46	12	10	10	8	50	70
200/50	81	103	6	6	8	6	100	125
220/50	74	94	8	6	8	6	90	110
440/50	37	47	12	10	10	8	50	70

2. Keep the work and electrode leads as short as possible and as close together as possible. Lengths should not exceed 25 feet. Tape the leads together when practical.
3. Be sure the torch and work cable rubber coverings are free of cuts and cracks that allow high frequency leakage. Cables with high natural rubber content, such as Lincoln Stable-Arc®, better resist high frequency leakage than neoprene and other synthetic rubber insulated cables.
4. Keep the torch in good repair and all connections tight to retard high frequency leakage.
5. The work terminal must be connected to a ground within ten feet of the welder, using one of the following methods:
  - a. A metal underground water pipe in direct contact with the earth for ten feet or more.
  - b. A 3/4" galvanized pipe or conduit or a 5/8" solid iron or steel rod driven at least eight feet into the ground.

The ground connection should be securely made and the grounding cable should be as short as possible using cable of the same size as the work cable, or larger. Grounding to the building frame electrical conduit or a long pipe system can result in re-radiation, effectively making these members radiating antennas.

**NOTE:** The welder frame **MUST** also be grounded — see section on Grounding.

6. When the welder is in operation, keep all access panels and covers securely fastened in place to minimize radiated interference and to assure proper cooling of the welder.
7. All electrical conductors within 50 feet of the welder should be enclosed in grounded rigid metallic conduit or equivalent shielding. Flexible helically-wrapped metallic conduit generally is not suitable.
8. When the building enclosing the welding area is metallic, several good electrical driven grounds around the periphery of the building are recommended. When operating the high frequency, the spark gap spacing should be .040". This will minimize the level of radiated interference.

Failure to observe these recommended installation procedures can cause radio or TV interference prob-

lems, and result in unsatisfactory welding performance resulting from lost high frequency power.

A certificate is being sent with each welder for customer convenience. If the customer desires or is required to obtain certification of compliance with the F.C.C. RF Energy Radiation Limits, this certificate can be used. It is the customer's responsibility to obtain this certification.

## 1.4 GROUNDING

The frame of the welder *must be grounded*. A stud marked with the symbol  $\equiv$  located on the bottom of the contactor and reconnect panel box at the rear of the TIG 250/250 is provided for this purpose. See the National Electrical Code for details on proper grounding methods. Follow other grounding instructions per paragraphs under "High Frequency Interference Protection".

## 1.5 MULTIPLE INPUT VOLTAGE MODELS

Idealarcs equipped with a multiple voltage input panel are shipped connected for the higher input voltage.

**NOTE:** Connection illustrated in Figure 1 is for 460V/60 Hz or 440V/50 Hz.

To change this connection for other voltages shown on the nameplate, proceed as follows:

1. Remove the outer hex nut where the line contactor power lead is connected and remove the contactor lead only.
2. Replace the outer hex nut and fasten securely with the welder power transformer lead against the inner hex nut.
3. Relocate the contactor power lead onto the terminal indicating the supply line voltage to be used. Fasten securely with the welder power transformer lead between the inner and outer hex nuts.
4. After Steps 2 and 3 are completed, check to be certain that the terminal securing nut is still tight and is spaced .030/.070" from the inner hex nut.
5. Unplug the auxiliary transformer lead and plug into the receptacle corresponding to the supply line voltage used in Step 3.
6. Both the line contactor power lead and the auxiliary transformer input lead *must* be connected for the same voltage.

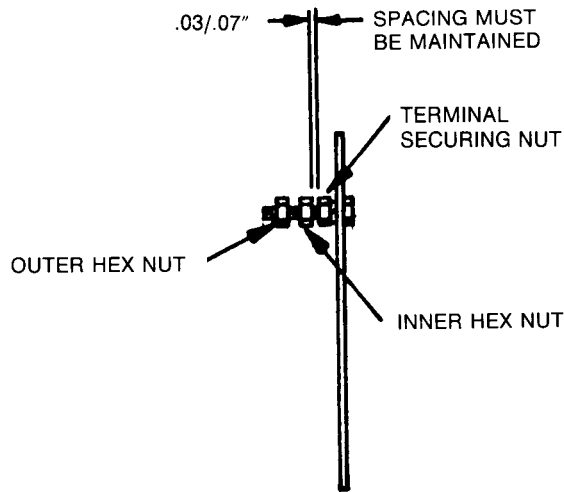
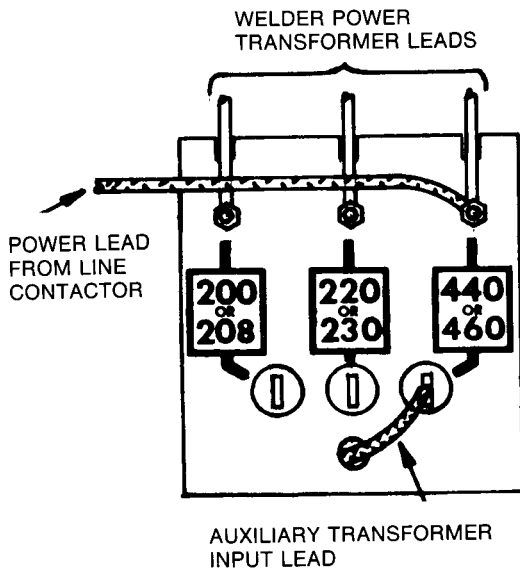


FIGURE 1 — Input Voltage Connection

## 1.6 TIG TORCH CONNECTION

### 1.6.1 Electrical Connection

TIG welding torches come with 15' or 25' cables. Use the shorter length whenever possible to minimize possible radio interference problems.

For connection, follow these instructions:

1. With power switch off, connect the torch cable to the "Electrode" stud on the welder.
2. Connect a separate work cable to the "To Work" stud of the welder.
3. Both work and electrode cables should be routed through the cable (grommeted) strain relief hole provided in the base directly below the welding output terminals.

### 1.6.2 Gas Supply Connection

TIG torches include the necessary gas hoses and, when designed for water cooling, water hoses. One gas hose must be routed from the cylinder of inert shielding gas to the Gas Inlet fitting located at the bottom left corner of the front of the machine. The second gas hose is routed from the Gas Outlet fitting on the machine to the TIG torch. Any torch conforming to CGA standards can be connected to the Idealarc

TIG. The fittings on the machine have the following threads:

Gas Inlet:  $\frac{5}{8}$ " — 18 right-hand female  
 Gas to Electrode:  $\frac{5}{8}$ " — 18 right-hand female

1. Connect one end of the cylinder hose to the Gas Inlet fitting on the machine.
2. Connect one end of the torch hose to the Gas Outlet fitting on the machine.
3. Connect the other end of the cylinder hose to the inert gas cylinder.

The cylinder of inert shielding gas must be equipped with a pressure regulator and flow meter. The gas flow volume setting depends upon the procedures used.

	<b>WARNING</b>
<p><b>CYLINDER may explode if damaged</b></p>	
<ul style="list-style-type: none"> <li>• Keep cylinder upright and chained to support.</li> <li>• Keep cylinder away from areas where it may be damaged.</li> <li>• Never lift welder with cylinder attached.</li> <li>• Never allow welding electrode to touch cylinder.</li> <li>• Keep cylinder away from welding or other live electrical circuits.</li> </ul>	



### 1.6.3 Water Cooling Connection

**DO NOT** operate a water-cooled torch unless water is flowing.

If using a water-cooled torch with a water recirculator, connect the recirculator water outlet directly to the torch water hose. Do not install the optional Water Valve Kit; the welder water valve would unnecessarily stop the recirculator water flow, possibly damaging the recirculator pump. (See the manufacturer's instructions for information on the installation of the water recirculator.

If using a water-cooled torch with a free-running water supply, install the optional K-801 water valve kit. It includes a water valve and the following fittings.

Water Inlet:  $\frac{5}{8}$ " — 18 left-hand female

Water to Electrode:  $\frac{5}{8}$ " — 18 left-hand female

1. Install a water line between the welder water inlet fitting and the supply.
2. *Include a strainer in the water supply line* to prevent dirt particles from obstructing water flow in the valve and cooling chamber of the TIG torch. Failure to do so could result in water valve malfunction and overheating of the water-cooled torch.
3. Make certain that the drain water from the torch comes out along the electrode cable and that the water into the torch goes up a separate tube in the torch assembly.
4. Use a non-metallic drain line from the electrode connection to the drain.
5. **DO NOT** operate a water-cooled torch unless water is flowing.

A **waterflow safety switch** can be used with the TIG welder by altering the operation of the water solenoid valve. The valve is reconnected to provide continuous water flow when the welder mode control is set for Inert Gas. The purpose of the waterflow safety switch is to protect water-cooled equipment against damage due to failure of the cooling water supply. It can be used in conjunction with a contactor to interrupt the welding current, or it can be used to operate an alarm. Write to the factory for installation instructions if they are not included with the waterflow safety switch.

### 1.7 STICK ELECTRODE CABLE CONNECTION

1. Select cable size according to the following Table 2:





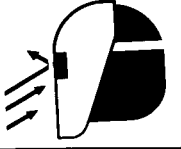
TABLE 2 — Cable Sizes for Combined Lengths of Copper Electrode and Work Cable

Machine Size	Lengths up to 100 ft.	100 to 200 ft.	200 to 250 ft.
250	#2	#1	#1/0

2. **Turn the power source off.** Route the electrode and work cables through the grommets strain relief hole below the welding output terminals, connect the cables to the proper terminals. This strain relief prevents damage to the welding output terminals if the cables are pulled excessively.

**CAUTION:** Do not leave stick electrode welding cables connected to the TIG 250/250 when TIG welding as they will be energized when TIG welding.

## SECTION 2. OPERATION

 <b>WARNING</b>	
	<ul style="list-style-type: none"> <li>• Do not touch electrically live parts or electrode with skin or wet clothing.</li> <li>• Insulate yourself from work and ground.</li> </ul>
<b>ELECTRIC SHOCK</b> can kill.	
	<ul style="list-style-type: none"> <li>• Keep your head out of fumes.</li> <li>• Use ventilation or exhaust to remove fumes from breathing zone.</li> </ul>
<b>FUMES AND GASES</b> can be dangerous.	
	<ul style="list-style-type: none"> <li>• Keep flammable material away.</li> </ul>
<b>WELDING SPARKS</b> can cause fire or explosion.	
	<ul style="list-style-type: none"> <li>• Wear eye, ear and body protection.</li> </ul>
<b>ARC RAYS</b> can burn.	

### 2.1 DUTY CYCLE

This welder is rated for 40% duty cycle. Since duty cycle is based on a ten-minute period, this welder can be operated at the nameplate rated output for four minutes out of every ten minute period without overheating.

### 2.2 FRONT PANEL

All control switches, receptacles, rheostat, etc. are located within the nameplated area on the recessed case front panel. The spark gap is also accessible for required gap adjustment through a removable corner of the nameplate.

The **Gas Solenoid Valve** is located within the recessed area at the bottom of the case front adjacent to the

output terminals. Provision for the optional Water Solenoid Valve has been made directly next to the Gas Solenoid Valve.

The **Printed Circuit boards** are in an enclosure and are accessible by removal of the cover located in the case front directly below the nameplated area.

### 2.3 CONTROLS

#### 2.3.1 Current Range Selector Switch

Current control is accomplished by setting the “Range Selector” switch to the desired range and then adjusting the “Current Control” to the desired current. The three-position “Range Selector” switch provides overlapping ranges from 8 to 275 amps.

**CAUTION:** Do not change the current range selector switch while welding because the current will arc between the contacts, seriously damaging the switch.

#### 2.3.2 Fine Adjustment Current Control

When stick electrode welding or TIG welding using an arc start switch (see Section 2.6.2) the “Current Control” rheostat raises and lowers the output current within the range set on the “Current Range Selector”. With this control, the operator dials the exact current desired.

See the “Amptrol” (Section 2.6.1) and “Arc Fade Control” (Section 2.6.3) instructions for the operation of the “Fine Adjustment Current Control” when these optional features are installed.

#### 2.3.3 Polarity Switch

The “Electrode Polarity” switch gives the operator a choice of AC, DC(–) or DC(+) welding as required for the particular application.

**CAUTION:** Do not change the polarity switch while welding because the current will arc between the contacts and result in immediate failure or, most certainly, shortened switch life.

#### 2.3.4 Remote Control

The remote control receptacle and switch provide for adaptation of the various remote control options available (see Section 2.6, “Operation of Optional Features”).

If no remote output control options are used, set the switch in the “Current Control at TIG-250” position.

### 2.3.5 Spark Switch

The three-position "Spark" switch enables the operator to (1) turn the spark off, (2) have it on continuously while TIG welding or, (3) in the start only position where the spark automatically turns off once the TIG arc is established.

### 2.3.6 Welding Mode Switch

The "Welding Mode Switch" should be in the "Inert Gas Welding" position when TIG welding and in the "Stick Welding" position when stick welding.

This switch closes the contactor, removes power from the timers, arc sensing and high frequency circuits when in the "Stick Welding" position.

In TIG welding, the contactor, gas and water valves, high frequency and arc sensing circuit are all controlled by the remote current control or arc start switch accessories.

### 2.3.7 Preflow and Afterflow Timers

The **Afterflow Timer** controls the length of time the water and gas flow after welding is stopped. The object of the gas afterflow is to cool the tungsten to a point where oxidation will be kept to a minimum. A darkening of the tungsten indicates inadequate duration of gas afterflow and could result in tungsten contamination of the weld. The timer control knob is set for the recommended gas and water afterflow time indicated on the nameplated calibration for the electrode size used. The afterflow time range is 5 to 73 seconds.

If welding is re-started before the afterflow timer times out, high frequency becomes available immediately (without the pre-flow time delay of .5 seconds).

A fixed time **Preflow** timer provided assures gas and water flow *before* welding and prevents any possible weld contamination.

When the Arc Start Switch or either of the Amptrols is depressed, the *Preflow Timer* becomes energized and in turn the gas and water valves are closed for a fixed time of approximately .5 seconds before high frequency becomes available and welding can be started. With the spark switch in the "Start Only" position, the *Arc Voltage Sensing* circuit cuts off the high frequency approximately .5 seconds after a welding arc has been established.

The electronic Preflow and Afterflow Timers and an arc voltage sensing circuit are all mounted on one printed circuit board. These functions are only required for TIG welding and are, therefore, in oper-

ation only when the "Welding Mode Switch" is in the Inert Gas Welding position.

## 2.4 TIG WELDING SEQUENCE OF OPERATION

1. Turn the welder, water supply (if so equipped) and gas supply on. The pilot light on the front panel indicates when the power is on.
2. Set the "Output Range Switch".
3. Set the "Current Control".
4. Set the "Afterflow Timer".
5. Set the "Polarity" and "Spark" switches as described in Section 2.3.3 and 2.3.5.
6. Turn the "Welding Mode Switch" to "Inert Gas Welding". This opens the gas and water valves purging the lines of air. These valves shut off after completing the time cycle set on the "Afterflow Timer". The welder is now ready for welding.
7. Press the arc start switch or operate the Amptrol and set the inert gas flowmeter according to the procedure recommendations. (See Table 3, "Recommended Tungsten Size".)
8. Position the tungsten electrode at the start of the weld at a 65° to 75° angle with the horizontal so that the electrode is approximately 1/8" above the work piece. Press the "Arc Start Switch" or operate the Amptrol. This opens the gas and water valves to automatically purge air from the hose and torch and closes the contactor. After the preflow time of about .5 seconds, the high frequency becomes available to strike the arc.
9. Hold the arc start switch down or operate the Amptrol until the weld is completed. Release the arc start switch or the Amptrol to stop the arc. When the "Afterflow Timer" completes the preset cycle, the gas and water valves close. To make another weld, repeat Steps 8 and 9.

## 2.5 STICK ELECTRODE WELDING SEQUENCE OF OPERATION

1. Turn the welder on. The pilot light on the front of the machine indicates when the power is on.
2. Turn the "Welding Mode Switch" to "Stick Welding".
3. Set the polarity and adjust the "Current Range Selector" and the "Current Control" for the desired output.
4. Make the weld.

## 2.6 OPERATION OF OPTIONAL FEATURES

### 2.6.1 AMPTROL™ (Optional)

The “Amptrol” remote current control is used for most TIG welding applications with the Idealarc TIG. It is available in either hand (K-812) or foot (K-813) operated models.

Both models plug into the Remote Control Receptacle located on the case front panel which in turn is controlled by the Remote Control Switch. With the Remote Control Switch in the “Control at TIG 250” position, the output current is controlled by the Current Control on the front panel of the welder. With the Remote Control Switch in the “Remote” position, the output current is controlled by the Amptrol. The range of control by the Amptrol is limited by the setting of the current control on the welder. The Amptrol will control from minimum of the range set by the “Range Selector” switch to the output determined by the welder current control setting. The remote controls also contain a switch which closes the contactor, starts the high frequency generator and starts the flow of gas and water to the torch.

Both hand and foot controls have a 25-ft. cable. It is recommended that this cable be taped alongside the work or electrode cables between the welder and the work table with the excess length tucked under the welder. This will minimize the possibility of accidental cut-through of the control cable by using the heavier cables as a buffer.

Slightly depress the FOOT OPERATED AMPTROL to close the contactor and start gas and water flow. Depressing the pedal increases the current. Raise the foot to reduce the current. Fully raising the pedal opens the contactor and starts the water and gas “Afterflow Timer”.

Tape the HAND OPERATED AMPTROL to the TIG torch in a position so the control can be extended conveniently by the operator’s thumb. A slight movement closes the contactor and starts the gas and the water flow. Extending the control raises the current. Extend the control fully to get the maximum set current. Reducing thumb pressure allows the spring-loaded control to return, reducing the current. Completely returning to the start position opens the contactor and starts the water and gas “Afterflow Timer”.

### 2.6.2 Arc Start Switch (K-814)

This Arc Start Switch, complete with 25’ cable, is available if Remote Current Control for TIG welding is not desired. It plugs into the Remote Control Receptacle and serves the purpose of closing the contactor, starting the high frequency generator, and

starting the flow of gas and water to the torch. The “Remote Control Switch” should be in the “Control at TIG 250” position.

Tape the arc start switch to the TIG torch where it can be conveniently pressed by the operator’s thumb when holding the torch in position for welding.

### 2.6.3 Automatic Arc Fade Control (K-820)

This control affords remote current control as well as the arc fade-out and cut-off level controls and does not disable the Line Voltage Compensation capability of the welder. The range of current fade-out rate is approximately one to 20 seconds.

To use the arc fade control, it must be plugged into the remote control receptacle; switch to remote control and inert gas welding; set the welder current control rheostat at maximum and control the current at the arc fade unit; plug the arc start switch (which is part of this accessory) into the arc fade unit; set all other welding controls for desired performance.

The arc is started when the arc start switch is depressed. When the arc start switch is released, the current will start to fade at a rate determined by the setting of the current fade-out rate control. The current cut-off level control setting determines the level of welding current at which the welder contactor drops out. It can be set to drop out slightly below the welding current level or at the minimum output of the selected range. Total time for contactor drop-out is determined by the settings of both the fade-out rate and cut-off level controls. The arc start switch cable is not to be extended beyond 25 feet for proper operation of the arc fade unit.

### 2.6.4 Auxiliary Power

The Auxiliary Power option provides 8 amps of 115 volt AC power through a fused duplex receptacle. This power is available when the power switch is “ON”. (Earlier models without the Auxiliary Power option provide auxiliary power only when the line contactor is closed.)

### 2.6.5 Pump Mounting Platform (K-827)

Formed metal platform which fits on top of welder; provides mounting surface suitable for certain water recirculating pumps.

### 2.6.6 Water Valve Option Kit (K-801)

For field installation only. Used when fresh water is used for a water cooled TIG torch. Installation instructions are included with the valve kit. Water cooling hose connection is described in Section 1.6.3 under INSTALLATION.

### 2.6.7 Power Factor Capacitors

Available factory installed, or contact the Lincoln Electric Service Department for field installation.

### 2.6.8 Undercarriage (K-778 or K-840)

Two models are available for field installation only.

**K-778** — Includes two casters for the front end of the machine and an axle with two wheels for the rear of the machine. The wheels and handle mount directly to the welder in pre-drilled holes.

**K-840** — Similar to the K-778, but with the addition of a Gas Cylinder Mounting Platform at the rear of the welder. Brackets are included for securing 1 or 2 gas cylinders.

**NOTE:** The lift bail is restricted from use with the parts provided.

All hardware and instructions for assembling and attaching each undercarriage to the power source are included with the undercarriage kit.

## 2.7 TIG WELDING INFORMATION

Recommended tungsten electrode sizes, currents and gas flow are tabulated below in Table 3. Since TIG applications can vary, Table 3 is intended as a guide only and deviations can be justified.

### 2.7.1 Aluminum

For aluminum welding, set the polarity switch on "AC", spark switch to "On" and the welding mode switch on "Inert Gas Welding". All other control settings will be made to suit the size tungsten and current. In general, pure tungsten electrode is best for aluminum welding.

### 2.7.2 Stainless Steel


For stainless steel welding, the polarity switch should be set on "DC(-)", the spark switch to "Start Only", and the welding mode switch in "Inert Gas Welding". When electrodes of the proper size are used, it is more desirable to have a square end. However, if the arc has a tendency to "wander", a common practice to overcome this is to grind the end to a point or to use the next smaller size tungsten.

TABLE 3

Electrode Diameter (Inches)	Current — Amperes						Aprox. Argon Gas Flow C.F.H. at 20 PSI		Cup or Metal Nozzle I.D. (Inches)
	Pure Tungsten Electrode			Thoriated Tungsten Zirconiated Tungsten Electrode			Welding Aluminum	Welding Stainless Steel	
	AC	DC(+)	DC(-)	AC	DC(+)	DC(-)			
.010	0-8	—	0-10	0-8	—	0-10	3-8	3-8	5/32-3/8
.015	5-12	—	5-15	5-12	—	5-15	5-10	5-10	
.020	5-15	—	5-20	5-20	—	5-20	5-10	5-10	
.040	10-60	—	15-80	15-80	—	15-80	5-10	5-10	
1/16	50-100	10-20	70-150	70-150	10-20	70-150	13-17	9-13	5/16-3/8
3/32	100-160	15-30	150-250	140-235	15-30	150-250	15-19	11-15	3/8-1/2
1/8	150-210	25-40	250-400	225-325	25-40	250-400	19-23	11-15	
3/32	200-275	40-55	—	—	40-55	—	21-25	13-17	1/2-5/8

The electrode should extend beyond the cup or nozzle a distance approx. equal to its diameter. Excessive electrode stickout may cause weld and electrode contamination, poor starts, etc.

## SECTION 3. MAINTENANCE

 <p><b>WARNING</b></p> <p><b>ELECTRIC SHOCK can kill</b></p>	<ul style="list-style-type: none"> <li>• Have an electrician install and service this equipment.</li> <li>• Turn the input power off at the fuse box before working on equipment.</li> <li>• Do not touch electrically hot parts.</li> </ul>
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**IMPORTANT SAFETY NOTE:** It is especially important to follow the safety precautions in the above warning when working on the secondary circuit of the high voltage transformer because the output voltage is dangerously high.

### 3.1 OVERLOAD PROTECTION

This welder has thermostats secured to the transformer secondary and primary coils.

When the welder is subjected to overload, the thermostats will open and result in the line contactor dropping out, the pilot light will go out, and control voltage will be removed from the remote control receptacle and solenoid valves. The fan motor will continue to run as long as the welder power switch is in the On position.

Depending on the amount of welder overload, the thermostats should reset within five minutes with the fan motor operating.

### 3.2 CAPACITOR

When the power factor correction capacitor fails, it is not always apparent from the appearance of the capacitor. To check the capacitor, operate the welder at rated input voltage drawing rated output current. The input current should correspond to the nameplate amperes. If the input current is 10% or 20% higher, the condenser has failed.

### 3.3 ROUTINE MAINTENANCE

**WARNING:** To prevent possible bodily injury from high frequency voltage, keep the TIG torch and cables in good repair.

1. Periodic blowing out of dust and dirt accumulated within the welder using an air stream.
2. Inspection of welder output and control cables for fraying, cuts, and bare spots. Also see Section 1.3 High Frequency Interference Protection.

3. Inspection of the spark gap spacing at regular intervals to maintain .040" air gap or less. (.040" air gap is consistent with good welding and is desirable to minimize R.F.I. problems.) Removal of the lower right hand corner of the welder nameplate provides access to the spark gap. Dressing or any re-finishing of the "points" of the spark gap contacts is not recommended. If the point surfaces become irregular or completely eroded, replacement of both electrodes is recommended.
4. The fan motor has sealed ball bearings which require no maintenance.
5. **Nameplates** — whenever routine maintenance is performed on this machine — or at least yearly — inspect all nameplates and labels for legibility. Replace those which are no longer clear. Refer to the parts list for the replacement item number.

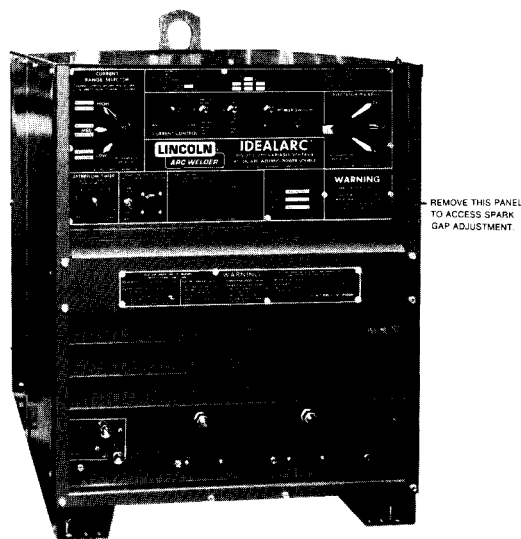


FIGURE 2 — Spark Gap Access

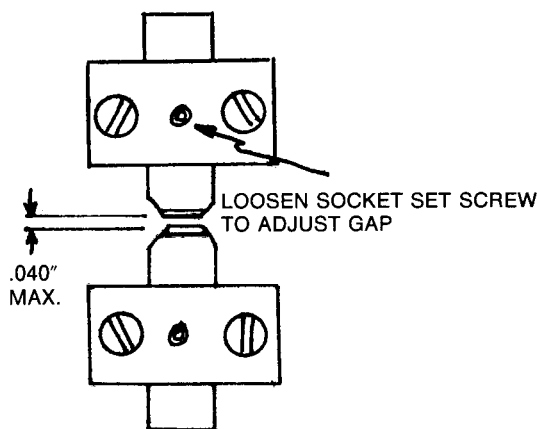



FIGURE 3 — Spark Gap Adjustment

### 3.4 TROUBLESHOOTING

	<p><b>WARNING</b></p> <ul style="list-style-type: none"> <li>• Have an electrician install and service this equipment.</li> <li>• Turn the input power off at the fuse box before working on equipment.</li> <li>• Do not touch electrically hot parts.</li> </ul>
<p><b>ELECTRIC SHOCK can kill</b></p>	

TROUBLE	CAUSE	WHAT TO DO
1. Contactor chatters.	A. Low line voltage. B. Faulty contactor.	A. Check with power company. B. Repair or replace.
2. Welder will not start (Contactor not operating).	A. Supply line fuse blown. B. Open power lead. C. Wrong voltage. D. Contactor or power switch jammed or broken. E. Contactor coil open. F. Thermostat tripped (welder overheated).	A. Replace (look for reason for blown fuse first). B. Repair. C. Check voltage against instructions. D. Remove obstruction or repair. E. Replace. F. a. Let welder cool. Make sure fan operates freely and there is no obstruction to air flow. b. Operate at rated current and duty cycle.
3. Welder will not weld (Contactors operating).	A. Electrode or work lead loose or broken. B. Open transformer. C. Range and/or polarity switches not seated properly on contacts.	A. Tighten and repair connection. B. Replace transformer coil. C. Center switch on contact.
4. Welder welds, but soon stops welding (thermostat tripped).	A. Proper ventilation hindered. B. Overloading — welding in excess of rating. C. Fan motor inoperative.	A. Make sure all case openings are free for proper circulation of air. B. Operate welder at rated load and duty cycle. C. Check leads and connections. Check voltage at transformer coil, should be 115 volts. Check motor on 115 V line.
5. Polarity or Range Switch won't turn.	A. Arced by switching under load.	A. Replace switch.
6. Variable or sluggish welding arc.	A. Current too low. B. Poor work, electrode, or control circuit connections.	A. Check recommended currents for electrode type and size being used. B. Check all connections. Clean and repair as required.
7. Welder welds only on minimum — no control.	A. Remote control switch in wrong position. B. Current Control Rheostat faulty. C. Open Control Circuit. D. Control P.C. board plug disconnected. E. Control P.C. board components failed. F. Diodes or SCR's in control rectifier. G. Open sat. reactor control coil. H. Control P.C. board fuse open.	A. Switch to "Control at TIG 250" for welder rheostat control and "Remote Control" for other. B. Replace. C. Repair broken leads or connections. D. Plug in properly. E. Replace P.C. board (determine cause first). F. Replace control P.C. board (determine cause first). G. Replace control coil. H. Check SCR-diode bridge and replace P.C. board and bridge assembly if faulty. Replace fuse if bridge and P.C. board assembly OK.

TROUBLE	CAUSE	WHAT TO DO
8. Welder welds only on maximum — no control.	A. Diodes or SCR's in control rectifier. B. Capacitors C201, 202, 203, 204 in control rectifier open or disconnected. C. Free wheeling diode open or disconnected. D. P.C. board components failed. E. Welder not properly grounded. F. Current control rheostat faulty. G. Output By-Pass capacitors open or disconnected. H. Control current sensing resistor or lead broken.	A. Replace (determine cause first). B. Replace or reconnect. C. Replace or reconnect. D. Replace P.C. board (determine cause first). E. Ground per recommended installation instructions. F. Replace rheostat. G. Replace or reconnect. H. Repair/replace resistor and/or lead.
9. Amptrol does not control output and panel control OK.	A. Remote control switch in wrong position. B. Amptrol plug not securely plugged into welder. C. Amptrol rheostat open. D. Open connections or broken leads in Amptrol or cable. E. Open connections or broken leads at remote control receptacle. F. Remote control switch failure.	A. Switch to "Remote Control." B. Secure plug with locking ring. C. Replace. D. Repair. E. Repair. F. Replace.
10. Gas and Water Valves not turning on or off properly.	A. No gas. B. No water. C. Faulty timer P.C. board.	A. a. Check cylinder for gas pressure. b. Check valve or gas line for obstructions. B. a. Check water line pressure. b. Check water line and valve for obstructions. C. Replace P.C. board.
11. High Frequency weak, intermittent, or not present.	A. Spark switch in "off" position. B. Weld switch in "Stick Welding" position. C. Open lead or connection in H.F. input circuit. D. H.F. being internally grounded in welder. E. Torch connections wrong. F. Spark gap out of adjustment or bad points. G. Bare or cut electrode cable with H.F. lead to ground. H. Faulty timer P.C. board.	A. Switch to "on" or "start only". B. Switch to "Inert Gas Welding". C. Repair. D. Check electrode circuit in welder for H.F. grounds; check output by-pass capacitor and leads. E. Connect to "electrode" terminal. F. Set gap to .040" or replace complete electrodes as required. G. Repair or replace cable. H. Replace P.C. board.
12. Arc "wandering"; lacking control of arc; difficulty in establishing arc.	A. Tungsten electrode too large for welding current.	A. Refer to Table 3 for recommended sizes.
13. Tungsten electrode oxidizing.	A. Not enough gas or water. B. Drafts blowing gas away from Tungsten.	A. Increase afterflow time; check for loose fittings or line leak and repair. B. Provide shield from drafts.
14. Intermittent control — High Frequency off.	A. Loose or improperly connected P.C. board plug. B. Short (intermittent) in saturable reactor control coil. C. Diodes or SCR's in control rectifier bridge.	A. Check plug connection. B. Replace control coil. C. Replace Control P.C. board.

### 3.5 PROCEDURE FOR CHECKING DIODES

- A. Isolate the diode in question. (Electrically disconnect from other circuits.)
- B. Use an ohmmeter X10 scale. Connect the meter across the diode and note the resistance value. Reverse the ohmmeter leads and note the resistance value.

*Shorted diode* — Low resistance readings in both directions.

*Open diode* — High or infinite resistance in both directions.

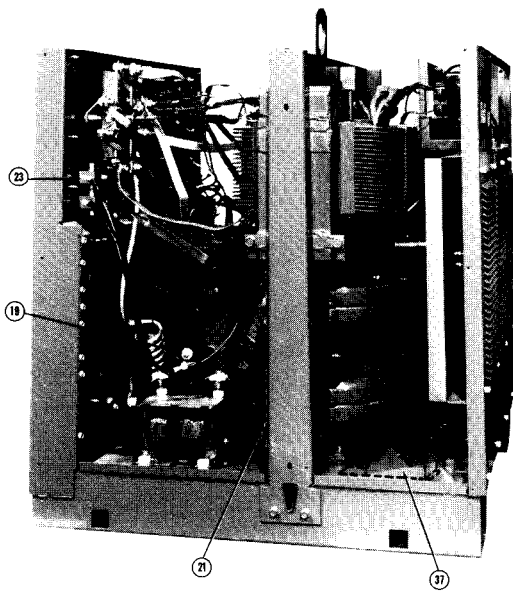
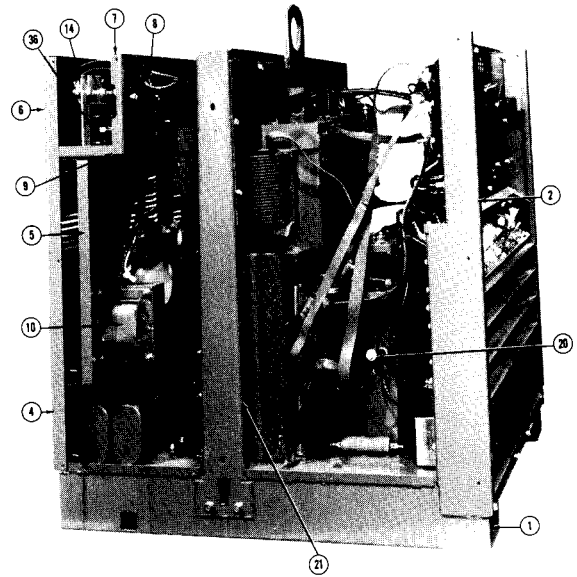
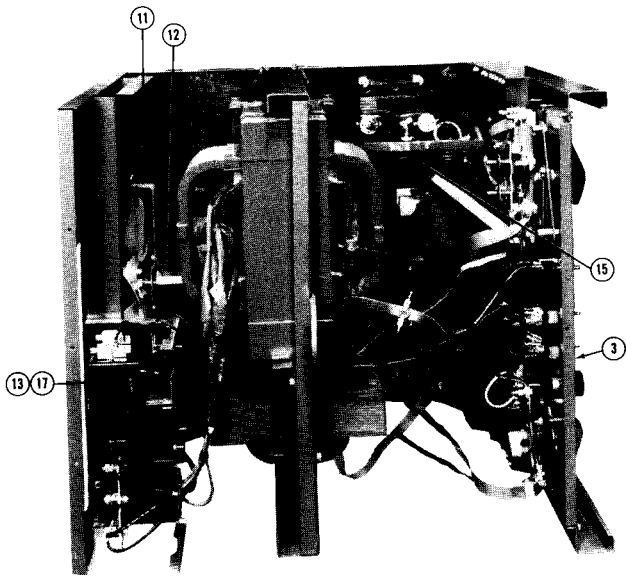
*Good diode* — One reading will be high or infinite and the other reading will be low.



# **SECTION 4. APPENDIX**

## **4.1 REPLACEMENT PARTS**

# GENERAL ASSEMBLY



**WHEN ORDERING GIVE:** Item No., Part Name, Parts List No., and Welder Code.

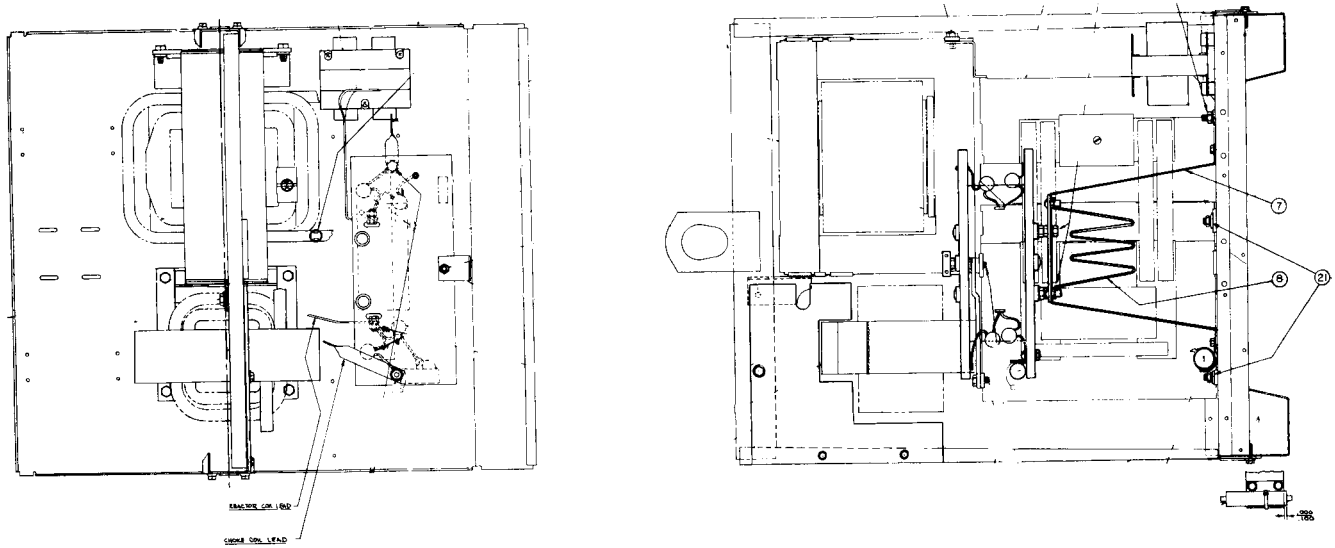
### Parts List P-141-C

ITEM	PART NAME & DESCRIPTION	NO. REQ'D
1	Lamination, Base, Lift Bail and Power Rectifier Assembly See P-141-D	
2	Case Front Assembly See P-141-E	
3	Control Panel Assembly See P-141-F	
4	Rear Panel	1
5	Fan Baffle	1
6	Access Door	1
7	Input Box	1
8	Bushing	1
9	Bushing	1
10	Auxiliary Transformer	1
11	Fan Mounting Bracket	1
12	Fan Motor	1
	Fan	1
13	Contactor	1
	By-Pass Capacitor Assembly	
	Included with Contactor orders	1
14	Reconnect Panel	1
	Mounting Bracket	1
15	Hi-Freq Capacitor and R.F. Choke	
	Assembly, Includes:	1
	Hi-Freq Capacitor Assembly	1
	R.F. Choke Assembly	1
16	Insulating Washer	2
	High Voltage Transformer	1
18	Capacitor (Not Illustrated)	1
	Mounting Strap	1
19	Resistor	1
	Round Head Screw	1
20	Insulating Washer	2
	Resistor	1
	Round Head Screw	1
21	Insulating Washer	2
	Air Baffle	1
22	Caution Decal	1
23	Spark Gap Assembly, Includes:	1
	Electrodes	2
	Spark Gap Support	2
	Base	1
36	Mounting Bracket	1
	Receptacle	A/R
37	Auxiliary Transformer (with "R" Option only)	1
	Items Not Illustrated:	
	Case Side	2
	Roof	1
	Receptacle (Mounts on Control P.C. Board)	1
	P.C. Board Cover	1
	Decal (Mounts on P.C. Board Cover)	1
	Decal (Mounts on Case Back by	
	Supply Line Hole)	1
	Cover Seal	1
	Power Factor Capacitors (Optional)	2
	Automatic Arc Fade Control (Optional) See P-141-G	
	Arc Start Switch	
	(Optional) See P-141-G	
	Water Valve (Optional) Includes:	1
	Water Solenoid Valve	1
	Female Connector (Left Hand Thread)	2
	Nameplate	1

**WHEN ORDERING GIVE:** Item No., Part Name,  
Parts List No., and Welder Code.

7-30-86

# LAMINATION, BASE, LIFT BAIL AND POWER RECTIFIER ASSEMBLY



G-1627  
10-11-85G

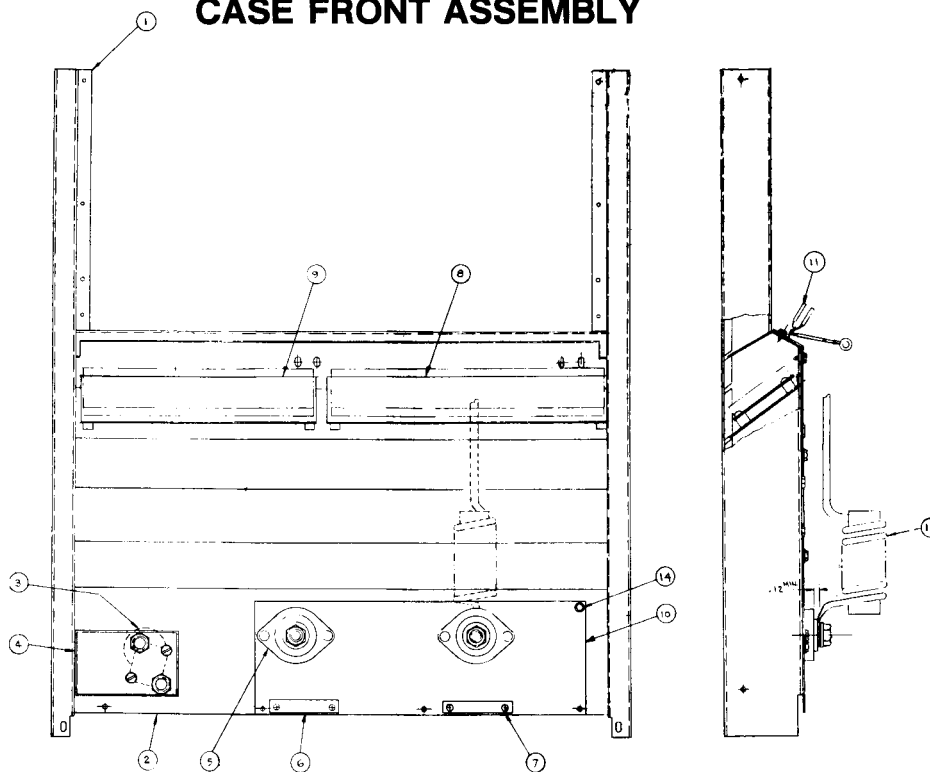
**WHEN ORDERING GIVE:** Item No., Part Name,  
Parts List No., and Welder Code.

**Parts List P-141-D**

ITEM	PART NAME & DESCRIPTION	NO. REQ'D
1	Base Welded Assembly	
2	Saturable Reactor Coils &	
	Lamination Assembly	1
4	Choke Assembly	1
7	Rectifier Mounting Bracket	1
8	Sensing Resistor Assembly, Includes:	1
	Resistance Strip	1
	Resistor	1
9	Rectifier Assembly, Includes:	1
	Diode (Positive)	2
	Diode (Negative)	2
	Transient Protector Assembly	1
	Suppressor Assembly	2
10	Rectifier Support Bracket	1
12	Lift Bail Assembly	1
	Lock Screw	4
14	Capacitor	
15	Thermostat	1
22	Transformer Assembly	1
23	Choke Baffle	1
25	High Voltage Transformer	1
	Stand-Off	3

6-12-85

## CASE FRONT ASSEMBLY



**WHEN ORDERING GIVE:** Item No., Part Name,  
Parts List No., and Welder Code.

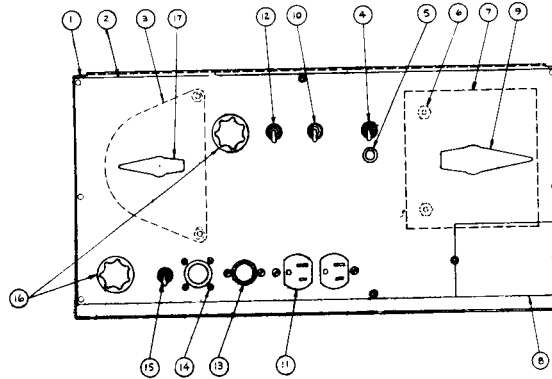
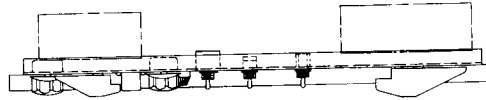
L-6903  
12-7-84L

### Parts List P-141-E

ITEM	PART NAME & DESCRIPTION	NO. REQ'D
1	Case Front Supports and Baffle Assembly	1
2	Output Panel	1
3	Gas Solenoid Valve	1
	Female Connector (Right Hand Thread)	2
4	Nameplate	1
5	Output Stud Replacement Kit, Includes:	2
	Output Stud	1
	Flanged Nut	2
	Self Tapping Screw	4
	Hex Head Screw	2
6	"To Work" Marker	1
	Self Tapping Screw	2
7	"Electrode" Marker	1
	Self Tapping Screw	2
8	Timer Printed Circuit Board	1
	Expansion Nut	6
	Self Tapping Screw	6
9	Control Printed Circuit Board	1
	Expansion Nut	5
	Self Tapping Screw	5
10	Output Terminal Insulation	1
11	Hi-Freq By-Pass Assembly	1
	Insulation	1
	Self-Tapping Screw	1
13	Hi-Freq Transformer Assembly	1

12-11-84

# CONTROL PANEL ASSEMBLY



L-6894  
10-5-84M

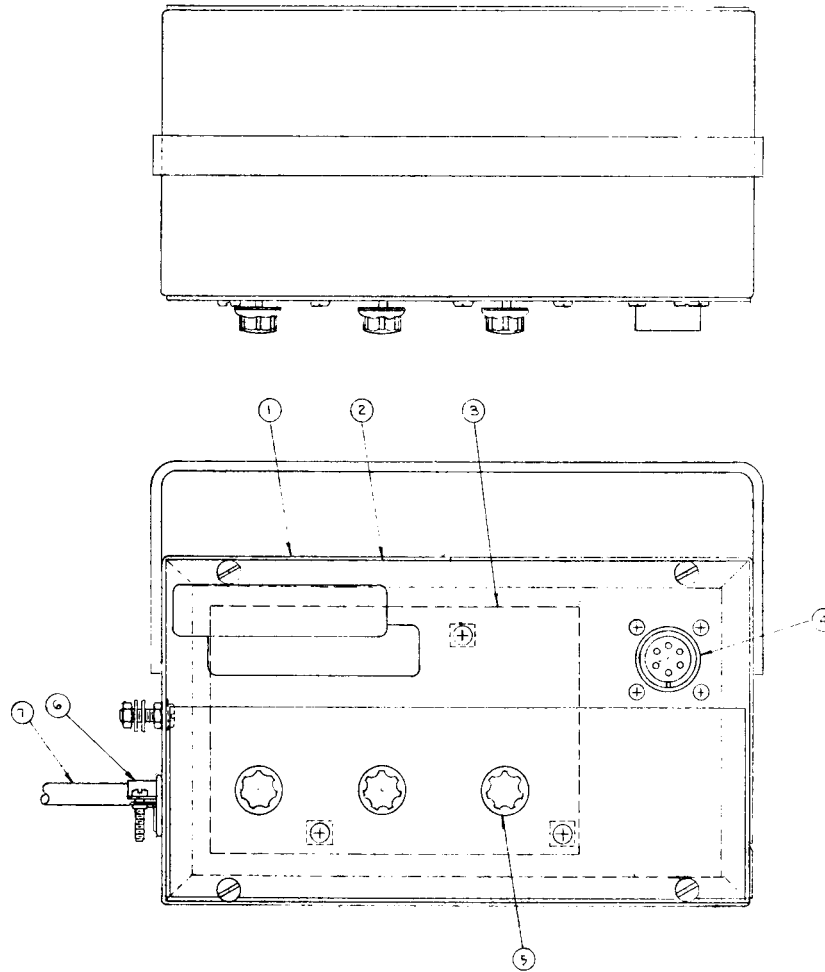
**WHEN ORDERING GIVE:** Item No., Part Name,  
Parts List No., and Welder Code.

## Parts List P-141-F

ITEM	PART NAME & DESCRIPTION	NO. REQ'D
1	Control Panel	1
2	Nameplate	1
3	Self Tapping Screw	3
4	Range Switch	1
4	Power Switch	1
5	Pilot Light	1
7	Polarity Switch	1
8	Spark Gap Plate	1
9	Control Handle	1
10	Spark Switch	1
11	Receptacle ("R" Option)	1
12	Thread Cutting Screw	2
12	Hex Nut	2
12	Welding Mode Switch	1
13	Capacitor Assy. (Mounts on Wldg. Mode Switch)	1
13	Fuse Holder ("R" Option)	1
	Insulating Washer	1
	Fuse	1
	Round Head Screw	2
14	Lock Washer	2
14	Hex Nut	2
14	Self Tapping Screw	4
15	Current Control Remote Switch	1
16	Insulation	2
16	Knob	2
17	Control Handle	1
	Items Not Part of Assembly:	
	Current Control Potentiometer	1
	After Flow Potentiometer	1
	Amphenol	1

10-24-83

# K-820 AUTOMATIC ARC FADE CONTROL



**WHEN ORDERING GIVE:** Item No., Part Name, Parts List No., and Welder Code.

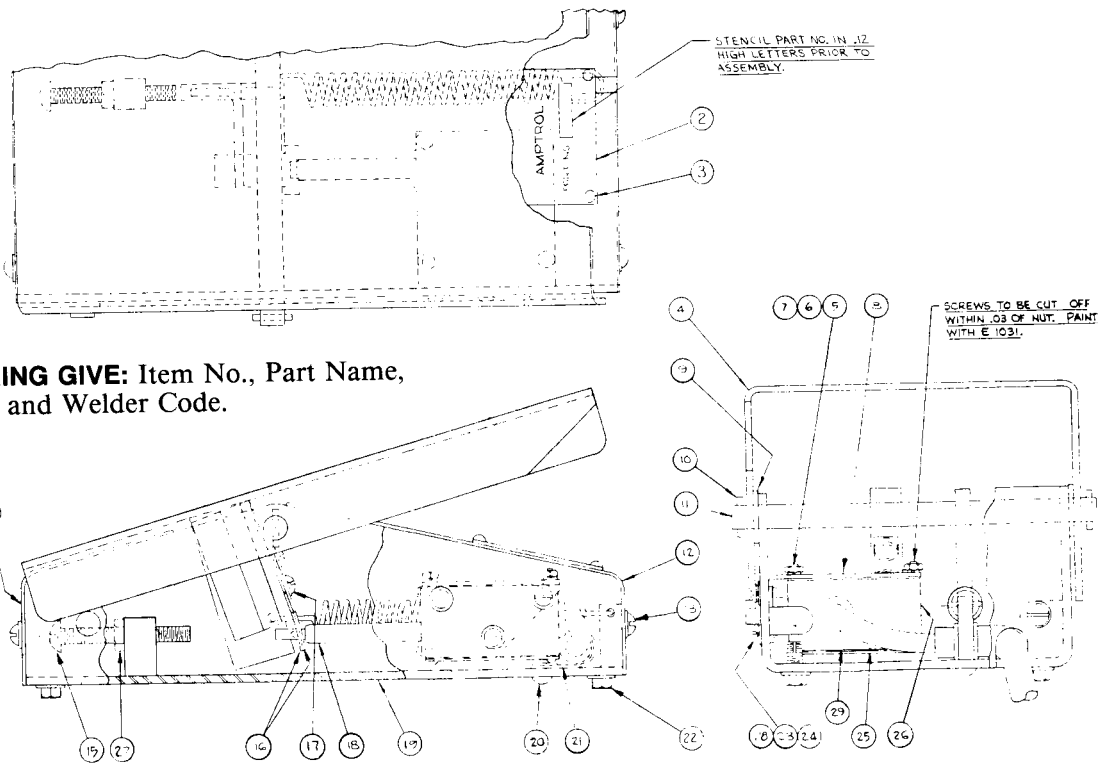
L-6638  
10-18-85M

## Parts List P-141-G

ITEM	PART NAME & DESCRIPTION	NO. REQ'D
1	Case Welded Assembly	1
2	Nameplate	1
3	Self Tapping Screw	4
4	Printed Circuit Board	1
	Receptacle	1
5	Self Tapping Screw	4
6	Knob	3
	Box Connector	1
7	Cable Assembly	1
	Items Not Illustrated:	
*	Arc Start Switch Assembly	1
	* Comes as part of K-820, also available separately as K-814.	

10-22-85

# FOOT AMPCTRL



**WHEN ORDERING GIVE:** Item No., Part Name, Parts List No., and Welder Code.

L-3963  
7-12-85

## Parts List P-66-J

ITEM	PART NAME & DESCRIPTION	NO. REQ'D
1	Foot Ampctrl Includes Tension Spring	1
2	Nameplate	1
3	Drive Screw	4
4	Foot Plate	1
5	Round Head Screw	4
6	Lockwasher	4
7	Hex Nut	4
8	Bracket	1
9	Washer	2
10	Roll Pin	2
11	Pivot Pin	1
12	Cover	1
13	Sems Screw	4
14	Cover	1
15	Hex Head Screw	1
16	Actuator Spring	1 or 2
17	Sems Screw	1
18	Actuator Arm Assembly	1
19	Base	1
20	Self Tapping Screw	1
21	Lead Clamp	1
22	Thread Cutting Screw	4
23	Round Head Screw	3
24	Lockwasher	3
25	Cover Plate	1
26	Control Unit Includes Rheostat Micro Switch	1 1 1

ITEM	PART NAME & DESCRIPTION	NO. REQ'D
27	Cable	1
28	Hex Nut	1
28	Plain Washer	1
29	Cover Insulation	2

7-15-85

# HAND AMPCTRL

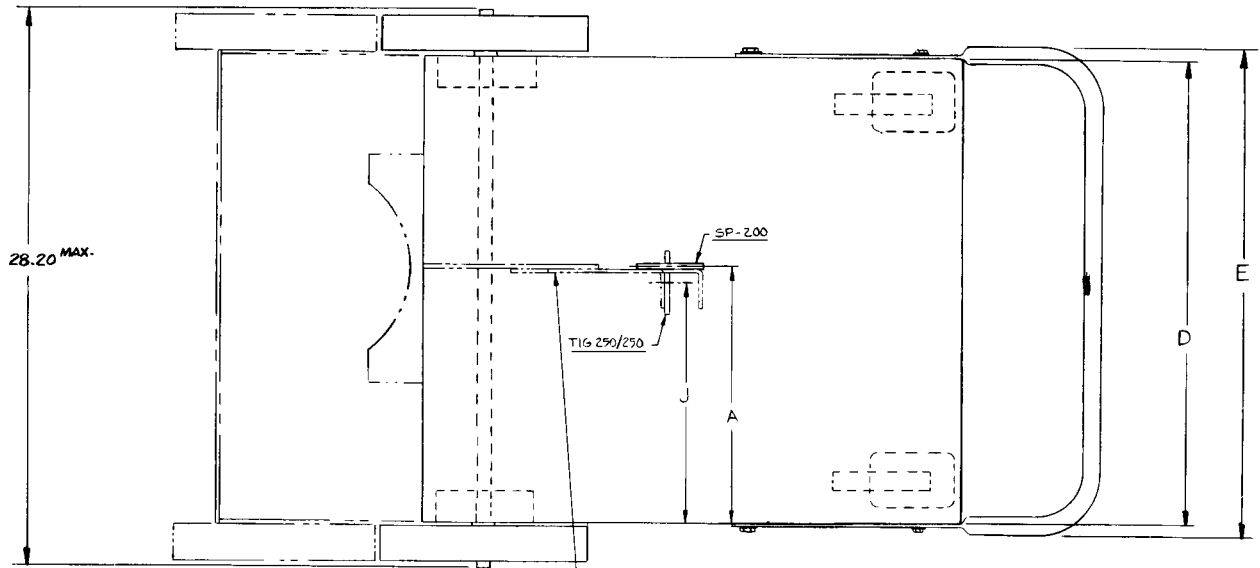
## Parts List P-66-K

ITEM	PART NAME & DESCRIPTION	NO. REQ'D
	Hand Ampctrl, Includes: Actuator Arm Assembly	1 1
	Nameplate	1
	Control Unit, Includes: Rheostat	1 1
	By-Pass Capacitor	1
	Micro Switch	1
	Cable	1
	Bottom Cover Plate	1

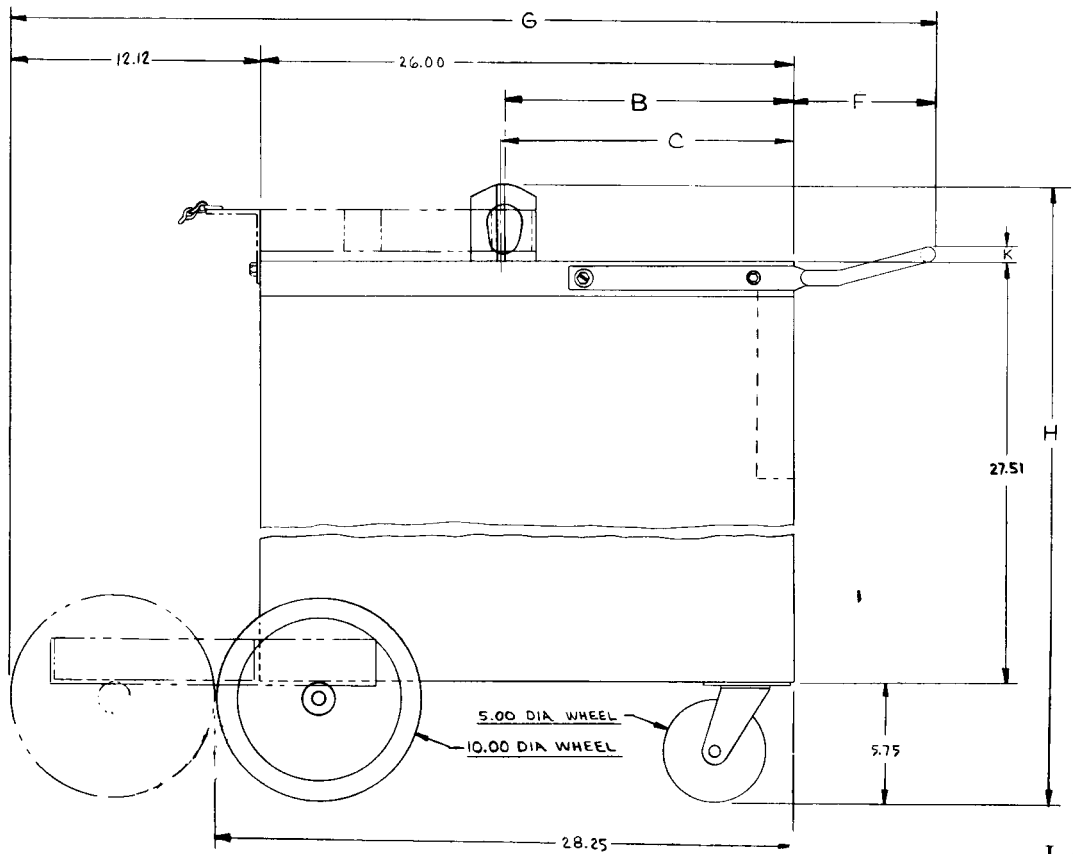
4-14-86



# DIMENSION DIAGRAM TIG 250/250

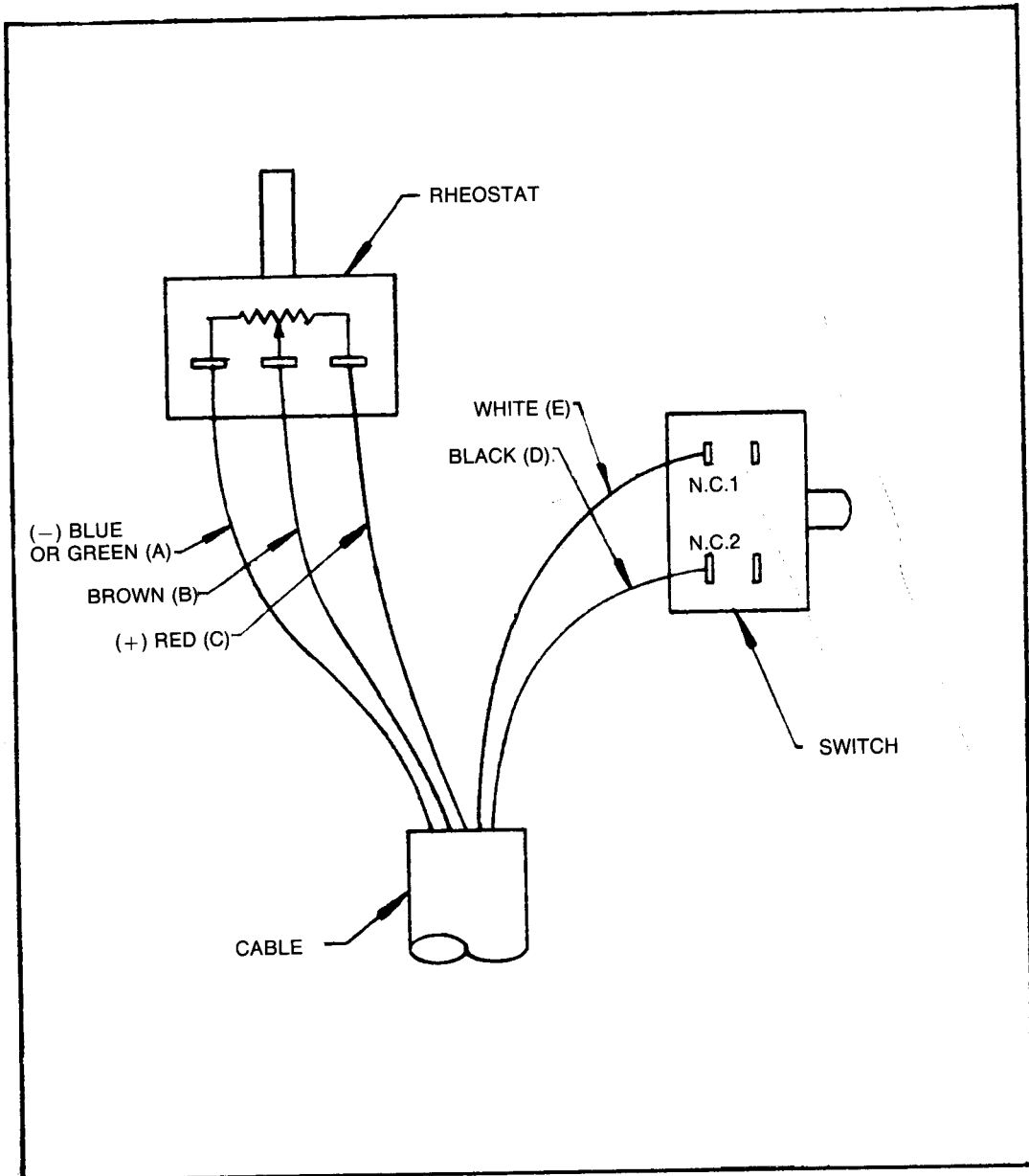


*APPENDIX ON TIG 250/250 & SP-200 WITH GAS CYLINDER SUPPORT ONLY.*



L-6480  
3-8-85C

# AMPTROL® WIRING DIAGRAM



T-13194  
2-12-82K





**EQUIPMENT MANUFACTURER'S CERTIFICATION**

Type of Equipment \_\_\_\_\_  
Model Number \_\_\_\_\_  
Code Number \_\_\_\_\_  
Serial Number \_\_\_\_\_  
Operating Instruction Manual Number \_\_\_\_\_

This certificate indicates manufacturer's conformity to FCC Rules & Regulations. User's compliance with these regulations requires he fill out this certificate and attach to equipment or other location where it will be conveniently available for inspection.

The High Frequency Generator of the above identified equipment has been tested under field test condition standards recommended by the Joint Industry Committee on High Frequency Stabilized Arc Welding Machines. It was found to comply with the Federal Communications Commission established maximum allowable R.F. energy radiation limit of 10 micro volts per meter at a distance of 1 mile.

If this equipment is installed, operated and maintained as recommended in the accompanying operating manual, it may reasonably be expected to meet the Federal Communications Commission established R.F. energy radiation limitation.

**The Lincoln Electric Company**

**EQUIPMENT INSTALLATION CERTIFICATION**

The above identified equipment has been installed and will be operated and maintained in compliance with manufacturer's recommendations made in the accompanying operating manual.

Certifying Signature and Title \_\_\_\_\_

Date \_\_\_\_\_

THE LINCOLN ELECTRIC CO. CLEVELAND, OHIO U.S.A.

S-14929

9-2-83E



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