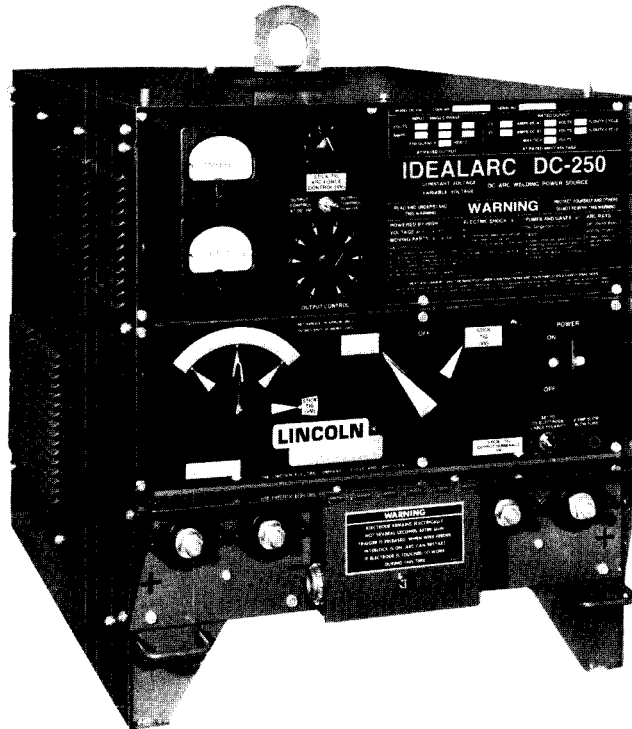


OPERATING MANUAL

IDEALARC[®] DC-250

This manual covers equipment which is obsolete and no longer in production by The Lincoln Electric Co. Specifications and availability of optional features may have changed.



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.

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. Insulate yourself from workpiece and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:
 - Semiautomatic DC Constant Voltage Welder
 - DC Manual (Stick) Welder.
 - AC Welder with Reduced Voltage Control.
- c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".
- 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.



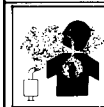
FOR ELECTRICALLY powered equipment.

- 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 U.S. National Electrical Code, all local codes and the manufacturer's recommendations.
- c. Ground the equipment in accordance with the U.S. 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 or CSA Standard W117.2-1974.

PRÉCAUTIONS DE SÛRETÉ

Pour votre propre protection lire et observer toutes les instructions et les précautions de sûreté spécifiques qui paraissent dans ce manuel aussi bien que les précautions de sûreté générales suivantes:

Sûreté Pour Soudage A L'Arc

1. Protégez-vous contre la secousse électrique:
 - a. Les circuits à l'électrode et à la pièce sont sous tension quand la machine à souder est en marche. Eviter toujours tout contact entre les parties sous tension et la peau nue ou les vêtements mouillés. Porter des gants secs et sans trous pour isoler les mains.
 - b. Faire très attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher métallique, ou des grilles métalliques, principalement dans les positions assis ou couché pour lesquelles une grande partie du corps peut être en contact avec la masse.
 - c. Maintenir le porte-électrode, la pince de masse, le câble de soudage et la machine à souder en bon et sûr état de fonctionnement.
 - d. Ne jamais plonger le porte-électrode dans l'eau pour le refroidir.
 - e. Ne jamais toucher simultanément les parties sous tension des porte-électrodes connectés à deux machines à souder parce que la tension entre les deux pinces peut être le total de la tension à vide des deux machines.
 - f. Si on utilise la machine à souder comme une source de courant pour soudage semi-automatique, ces précautions pour le porte-électrode s'appliquent aussi au pistolet de soudage.
2. Dans le cas de travail au dessus du niveau du sol, se protéger contre les chutes dans le cas ou on recoit un choc. Ne jamais enrouler le câble-électrode autour de n'importe quelle partie du corps.
3. Un coup d'arc peut être plus sévère qu'un coup de soliel, donc:
 - a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
 - b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
 - c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.
4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.

5. Toujours porter des lunettes de sécurité dans la zone de soudage. Utiliser des lunettes avec écrans latéraux dans les zones où l'on pique le laitier.
6. Eloigner les matériaux inflammables ou les recouvrir afin de prévenir tout risque d'incendie dû aux étincelles.
7. Quand on ne soude pas, poser la pince à une endroit isolé de la masse. Un court-circuit accidentel peut provoquer un échauffement et un risque d'incendie.
8. S'assurer que la masse est connectée le plus près possible de la zone de travail qu'il est pratique de le faire. Si on place la masse sur la charpente de la construction ou d'autres endroits éloignés de la zone de travail, on augmente le risque de voir passer le courant de soudage par les chaines de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'échauffement des chaines et des câbles jusqu'à ce qu'ils se rompent.
9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particulièrement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des fumeés toxiques.
10. Ne pas souder en présence de vapeurs de chlore provenant d'opérations de dégraissage, nettoyage ou pistolage. La chaleur ou les rayons de l'arc peuvent réagir avec les vapeurs du solvant pour produire du phosgène (gas fortement toxique) ou autres produits irritants.
11. Pour obtenir de plus amples renseignements sur la sûreté, voir le code "Code for safety in welding and cutting" CSA Standard W 117.2-1974.

PRÉCAUTIONS DE SÛRETÉ POUR LES MACHINES À SOUDER À TRANSFORMATEUR ET À REDRESSEUR

1. Relier à la terre le chassis du poste conformément au code de l'électricité et aux recommandations du fabricant. Le dispositif de montage ou la piece à souder doit être branché à une bonne mise à la terre.
2. Autant que possible, l'installation et l'entretien du poste seront effectués par un électricien qualifié.
3. Avant de faire des travaux à l'intérieur de poste, la debrancher à l'interrupteur à la boîte de fusibles.
4. Garder tous les couvercles et dispositifs de sûreté à leur place.

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PART A. INTRODUCTION

A1. GENERAL DESCRIPTION

The DC-250 is a compact, single phase DC arc welding power source capable of producing constant voltage or constant current output. It may be used with either manual or semiautomatic processes. Dual sets of output studs allow the welder to change from manual to semiautomatic processes without reconnecting the electrode and work cables.

The DC-250 provides an extremely flexible power source for welders performing medium duty welding fabrication or repair.

A2. RECOMMENDED PROCESSES AND EQUIPMENT

A2.1 CONSTANT CURRENT PROCESSES

A2.1.1 Manual Arc Welding (Stick)

The DC-250 may be utilized as a manual DC arc welder with the electrode cable, work cable and electrode holder being the only equipment required.

A2.1.2 TIG Welding

DC scratch start TIG welding may be performed with the DC-250. Output cables, TIG torch and cable assembly, and a regulated supply of shielding gas from a cylinder are required.

NOTE: The optional K799 HI-FREQ™ kit is required for high frequency DC TIG welding.

A2.1.3 Air Carbon Arc Cutting

Air Carbon Arc cutting may be performed with the DC-250 within its output rating, using 5/32" (4.0 mm) or 3/16" (4.8 mm) diameter carbon rods. Output cables, an air carbon arc electrode holder cable assembly and a source of compressed air are required.

NOTE: 1. Air Carbon Arc cutting may be performed using either Constant Voltage or Constant Current output; however, it usually will be smoother on CV.

2. If current momentarily exceeds approximately 350 amps, the electronic protection circuit in the DC-250 will reduce the current until the load is removed.

A2.2 CONSTANT VOLTAGE PROCESSES

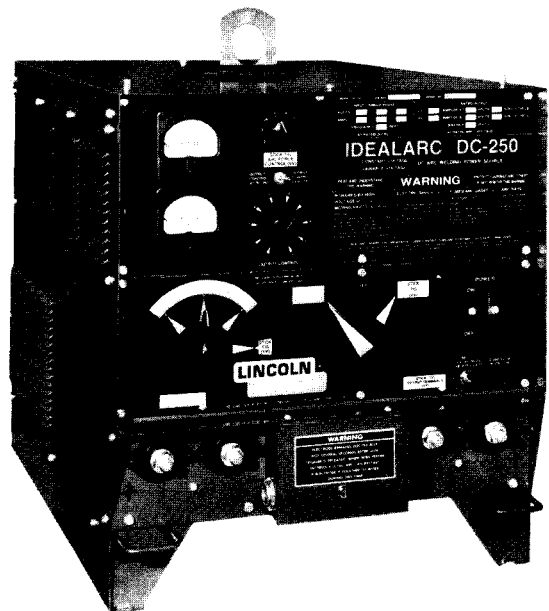
A2.2.1 Innershield® Self-Shielded Flux-Cored Electrodes

Semiautomatic flux-cored wire processes may be performed with the DC-250 using Lincoln Electric LN-7, LN-8, LN-9,

LN-22, LN-23P, or LN-25 Wire Feeders and an Innershield gun and cable assembly (K115, K126, K206⁽¹⁾ or K309⁽¹⁾ are recommended).

A2.2.2 Gas-Shielded Electrodes

Semiautomatic gas-shielded welding may be performed with the DC-250 using Lincoln Electric LN-7 GMA, LN-9 GMA or LN-25 wire feeders. An appropriate GMAW gun and cable assembly and a regulated supply of shielding gas from a cylinder are required. Consult with your local distributor for the proper shielding gas for your application.



⁽¹⁾Gun and Cable Assembly require Lincoln Electric K179 or K184 Smoke Exhaust Unit.

A3. DESIGN SUMMARY

A3.1 OPERATIONAL FEATURES AND CONTROLS

(Note that the DC-250 control panel nameplate is color coded to allow the welder to easily identify where controls or control position relate to only the constant voltage or constant current process. Red denotes FCAW/GMAW/Constant Voltage. White denotes Stick/TIG/Constant Current.)

A3.1.1 Input Power Switch

The input power to the DC-250 is controlled by a switch located on the lower control panel. When the switch is in the "on" position, the power source is energized and a red light next to the switch will be on.

A3.1.2 Mode Selector Switch

This two position switch selects the output characteristic of the DC-250. Either "FCAW/GMAW/CV" or "Stick/TIG/CC" may be chosen depending upon the process used.

A3.1.3 CV Arc Control

This selector switch allows the welder to select one of three positions which control the degree of "pinch effect" for FCAW or GMAW processes. This results in control of spatter, fluidity and bead shape primarily in those processes that use a shorting type arc transfer. Control of the pinch effect is very useful in low current-low voltage GMAW applications, particularly on vertical down and vertical up applications.

A3.1.4 CV Electrode Cable Polarity Switch

This switch must be set to the electrode cable polarity [(+) or (-)] to insure correct wire feeder voltmeter operation when operating in FCAW/GMAW/CV mode.

A3.1.5 Auxiliary Power Fuse

An 8 amp slow-blow fuse is provided to protect the DC-250 auxiliary power circuit should demand of the wire feeder exceed its rating of 1000 volt amperes at 115 VAC.

A3.1.6. Output Control

The output of the DC-250 in both FCAW/GMAW/CV and Stick/TIG/CC modes is controlled using the Output Control. In CV mode the *welding voltage* is controlled and in CC mode the *current* is controlled. The Output Control is a continuous single range control.

A3.1.7 Output Control Remote Switch

This two position toggle switch located above the Output Control determines whether the DC-250 output is controlled by the DC-250 Output Control setting or by a remote output control located on the wire feeder or on an optional remote output control (K775).

A3.1.8 Stick/TIG Arc Force Control

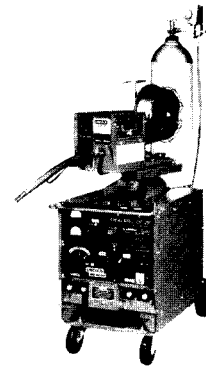
Effective only in the Stick/TIG/CC mode, the arc force control can be used to adjust short circuit current for a soft arc or a forceful, driving arc. It can reduce sticking and shorting of the electrode, particularly with globular transfer type electrodes such as stainless and low hydrogen. Especially effective for the root pass on pipe with stainless electrode. Helps to minimize spatter for certain electrodes such as low hydrogen types.

A3.1.9 Output Terminals

Two pairs of output terminals are provided, one for FCAW/GMAW Processes, the other for Stick/TIG Processes. Only the pair of output terminals corresponding to the output mode selected is energized. This allows simultaneous connection of output cables for two processes without both electrode cables being energized when welding. One common cable from DC-250 to work can be used by connecting a jumper cable between the CV and CC work terminals.

A3.2 LIMITATIONS

- The DC-250 is not recommended for processes where procedures exceed its output rating, such as submerged arc welding.
- Carbon size is limited to 3/16" (4.8 mm) diameter when air carbon arc cutting.



DC-250 Shown with LN-7 GMA Wire Feeder, Optional K178-1 Swivel Platform, and Optional K835 Undercarriage and Gas Cylinder Support.

A4. OPTIONS/ACCESSORIES AND COMPATIBLE LINCOLN ELECTRIC EQUIPMENT

A4.1 FACTORY INSTALLED OPTIONS

- Ammeter-Voltmeter: Factory-installed voltmeter and ammeter are available mounted on the control panel.

A4.2 FIELD INSTALLED OPTIONS

- Remote Output Control (K775): Provides the same single range continuous adjustment as the DC-250 Output Control from a location up to 25 feet from the power source. Simple connection to the DC-250 is made at the terminal strip.

NOTE: Only one Remote Output Control may be connected to the terminal strip at one time. If a wire feeder or amptrol remote output control is connected to the terminal strip, the K775 cannot be connected.




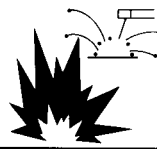

- Amptrol™ Adapter Kit (K843): 5-wire cable, 12" long, for easy connection of standard K812 Hand Amptrol or K870 Foot Amptrol when TIG welding. (The Amptrol "Arc Start Switch" is used to activate K799 High Freq Kit if used).
- Hi-Freq™ Kit (K799 Codes 8634 and Above): Supplies the high frequency plus gas valve for high frequency start and stabilized DC TIG welding.
- Swivel Platform (K178-1): Bolts to the DC-250 lift bail to provide a convenient means for mounting Lincoln Electric LN-7, LN-7 GMA, LN-8 or LN-9 wire feeders.
- Undercarriage And Gas Cylinder Support (K835): Front casters, rear wheels, handle, platform and support for one gas cylinder.

NOTE: Lift bail is restricted from use with parts provided.

PART B. INSTALLATION, OPERATION, MAINTENANCE

B1. INSTALLATION

B1.1 SAFETY PRECAUTIONS

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

WARNING: Turn the input power off at the disconnect switch before attempting to connect the input power lines to the DC-250.

- Only qualified personnel should perform this installation.
- Turn the power switch on the DC-250 "off" before connecting or disconnecting output cables or other equipment.
- Connect the DC-250 grounding screw located on the machine base inside the right case side panel to a good electrical ground.
- Connect the case grounding lead in any wire feeder or remote control cable to the DC-250 grounding screw inside the terminal strip enclosure on the casefront.

B1.2 DC-250 INSTALLATION

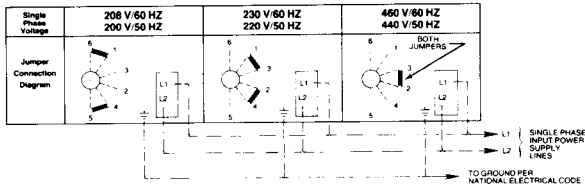
B1.2.1 Location

The machine should be located in a clean, dry place where there is free circulation of clean air such that air movement in the sides and out the back will not be restricted. Dirt and dust that can be drawn into the machine should be kept to a minimum. Failure to observe these precautions can result in excessive operating temperatures and nuisance shutdown of the DC-250.

DC-250's may be stacked three-high provided the bottom machine is on a stable, hard, level surface. Be sure the two pins in the roof fit into the slots in the base of the DC-250 above it.

B1.2.2 Electrical Installation

1. Be sure the voltage, phase and frequency of the input power to be connected to the DC-250 is as specified on the DC-250 nameplate. The DC-250 should be connected by a qualified electrician only to **Single Phase** input power at terminals L1 and L2 inside the right case panel. Installation should be made in accordance with the National Electrical Code, all local codes and the diagram inside the side panel (see diagram below). Use the input wire and fuse sizes recommended in Table 1.



Single Phase Input.

2. Triple voltage (e.g. 208/230/460) and dual voltage models are shipped connected for the highest rated input voltage. To change the connection, remove the access panel on the right side of the DC-250 and follow the instructions located inside the panel (see above).
3. The welder frame must be grounded. A stud marked with the symbol \equiv located inside the side access panel is provided for this purpose. Connect the stud to a good earth ground using a lead of the size specified in Table 1.

TABLE 1 — Recommended Input Wire, Grounding Wire And Fuse Sizes Based On The 1990 United States National Electrical Code

Input Volts/ Freq	Input Ampere Rating On Nameplate	Copper Wire Size (AWG); Type 75°C In Conduit		Super Lag Fuse Size In Amps
		Input Leads	Grounding Leads	
208/60	73	6	8	100
230/60	66	8	8	90
460/60	33	12	10	45
575/60	26	12	10	40
200/50/60	76	6	8	100
220/50/60	69	8	8	90
380/50/60	40	10	10	60
440/50/60	34.5	12	10	45

B1.2.3 Connection Of Other Equipment To The DC-250



B1.2.3.1 Connection Of Wire Feeders To The DC-250

Connect Lincoln Electric wire feeders LN-7, LN-7GMA, LN-8, LN-9, LN-9GMA, LN-22, LN-23P, and LN-25 per the instructions and per the wiring diagrams in the appendix. All control cable connections on the DC-250 are made at the terminal strips located on the lower casefront under a hinged cover.

a. Connection of the LN-7, LN-7GMA, LN-8, LN-9 and LN-9GMA

See the appropriate connection diagram for exact instructions covering the wire feeder being used.

1. Turn the DC-250 power switch off.
2. Connect the control cable from the semiautomatic wire feeding equipment to the terminal strip per the diagram in the appendix of this manual. Box connectors are provided for access into the terminal strip. If a K775 Remote Output Control or Amptrol is already connected to terminals 75, 76 and 77, it must be removed before connecting a wire feeder to those terminals.

NOTE: Do not connect any leads to 2 and 4 except those from a Lincoln wire feeder.

3. Connect the wire feeder grounding lead to the chassis grounding screw provided below the terminal strip and marked with the symbol ⏏ .
4. Connect the electrode cable to the FCAW/GMAW/CV output terminal of polarity required by electrode. Connect the work lead to the other CV terminal.
5. Place electrode negative-electrode positive switch to the same polarity as the electrode cable.
6. Place the Output Control Switch in the "Remote" position if Output Control is desired at the wire feeder rather than the DC-250.

NOTE: If an LN-9 wire feeder is used the "Remote" position must be selected to avoid automatic shutdown.

b. Connection of LN-22 and LN-25 Wire Feeder to DC-250

1. Turn off the DC-250 Power Switch.
2. Connect a jumper from 2-4 on terminal strip.
3. Connect the electrode cable to the FCAW/GMAW/CV output terminal of polarity required by electrode. Connect the work lead to the other CV terminal.
4. Place the DC-250 electrode negative-electrode positive switch to the same polarity as the electrode cable.
5. Place the DC-250 Output Control Switch in the "at DC-250" position unless a K775 Remote Control or Amptrol™ is connected to 75, 76, 77 on the DC-250 terminal strip. If a Remote Control or Amptrol is used the Output Control Switch should be placed in the "Output Control Remote" position.

6. Place the DC-250 mode switch to FCAW/GMAW/ CV.
7. Place the DC-250 CV Arc Control Switch to “1”, “2” or “3”. (MIN., NORMAL or MAX. on some machines.)

c. Connection of the LN-23P

1. Connect the LN-23P adapter cable to the DC-250 terminal strip per the diagram in the appendix of this manual, and the instructions in the LN-23P instruction manual.
2. Connect the electrode cable to the proper polarity FCAW/GMAW/CV output terminal as required by the electrode. Connect the work lead to the other CV output terminal.

See LN-22, LN-23P and LN-25 operating manuals (IM-282, IM-311 and IM-359) for further operating information.

WARNING: The electrode is always electrically hot when the power source is connected to the LN-22 or LN-25 and turned on. It will arc if it touches the work or any conductors touching the work. When not welding, store the gun in a safe manner, preferably in an insulated holder.

NOTE: To connect the DC-250 to wire feeders not covered in available connection diagrams at the rear of this manual, write to the factory for instructions giving complete nameplate information for the DC-250 and wire feeder.

B1.2.3.2 Remote Output Control (Optional)

NOTE: Output on the DC-250 may be controlled remotely using a K775 Remote Output Control, an Amptrol or a wire feeder with output control. Only one form of remote output control may be connected at the terminal strip at any given time.

An optional (K775) “Remote Output Control” is available. The K775 consists of a control box with 25 feet of four conductor cable. Leads in this cable connect to terminals 75, 76, 77 on the terminal strip and the case grounding screw marked with the symbol ∇ . These terminals are accessible by opening the terminal access cover on the casefront. This option will give the same control as the Output Control on the machine.

Foot and Hand Amptrols may also be used with the DC-250 and are installed in a similar manner to the K775 Remote Output Control.

NOTE: A K843 Amptrol Adapter is required for connection of the Amptrol to the screw-type terminals on the DC-250 terminal strip.

IMPORTANT: Extreme caution must be observed when installing or extending the wiring of a remote control. Improper connection of this unit can lead to failure of the output control rheostat or the control circuit. Only the green lead can and should be grounded to the machine case.

When extending the standard remote control make sure the leads are the same and the splice is waterproof. Be very careful not to ground the cable when in use and do not allow the lugs to touch the case.

B1.2.3.3 Output Cable Connection

1. Select the output cable size based upon Table 2.

TABLE 2 — Cable Sizes For Combined Length Of Electrode And Work Cable (Copper)

Duty Cycle	Current	Length		
		To 150 Ft	150-200 Ft	200-250 Ft
50%	250	#1 (50 mm ²)	#1(50 mm ²)	1/0 (55 mm ²)
50%	200	#2 (35 mm ²)	#1 (50 mm ²)	1/0 (55 mm ²)

2. Turn off the DC-250 power switch.
3. Connect the output cables for Stick, TIG or Air Carbon Arc to the output terminals marked Stick/TIG/CC. Route the leads through the strain relief loop located below the terminals in the base of the DC-250.
4. Connect the output cables for Innershield or GMAW to the output terminals marked FCAW/GMAW/CV. Route the leads through the strain relief loop located below the terminals in the base of the DC-250.
5. Tighten the output stud nuts with a wrench.

NOTE: Stick/TIG/CC output cables and FCAW/GMAW/CV output cables may both be connected to their respective terminals at the same time. Only one set of output terminals for the mode selected on the DC-250 control panel will be electrically hot.

If cables for both modes will be connected, the two work terminals may be connected with a short cable allowing a single common work cable for use with either output mode.

B1.2.3.4 Paralleling

The DC-250 is not designed to be paralleled with any power source.

B2. OPERATING INSTRUCTIONS

B2.1 SAFETY PRECAUTIONS

WARNING: When using this power source with wire feeders which do not have an electrical interlock (or with wire feeders with the electrical interlock in the *off* position), there will be a small spark if the electrode contacts the work or ground within several seconds after releasing the trigger.

When used with some wire feeders with the electrical interlock in the *on* position, the arc can restart if the electrode touches the work or ground within several seconds.

B2.2 POWER SOURCE OPERATION

B2.2.1 Duty Cycle

The DC-250 is rated at the following duty cycles.

TABLE 3 — Duty Cycles

Mode	Duty Cycle ⁽¹⁾	Amps	Volts
FCAW/GMAW/CV	100%	175	28
	50%	250	30
	35%	300	32
Stick/TIG/CC	50%	200	28
	35%	240	30

⁽¹⁾ Based upon 10 minute time period. For example, in the case of a 50% duty cycle, the welder is on for 5 minutes and off for 5 minutes.

B2.2.2 Control Function/Operation

- **Power Switch:** Place the lever in the “ON” position when welding output is desired. When the power is on the red light to the left of this switch will be lit.
- **Output Control:** This controls the output level of the DC-250 for FCAW/GMAW/CV or Stick/TIG/CC mode as selected. In FCAW/GMAW/CV mode the welding voltage is controlled. In Stick/TIG/CC the current is controlled.

Control is provided over the entire output range of the power source. The knob may be placed anywhere in the range from 1 to 10 on the dial. This control may be adjusted while under load to change power source output.

- **Output Control Local/Remote:** The toggle switch on the control panel labeled “Local” and “Remote” gives the operator the option of controlling the output from the machine control panel or from a remote location.

For remote control, the toggle switch is set in the “Remote” position and controlled by the wire feed unit, K775 Remote Control or Amptrol.

For control at the DC-250 control panel, the toggle switch is set in the “Local” position. (Exception: when used with an LN-9 or LN-9GMA wire feeder, the toggle switch must be in the “Remote” position or automatic shutdown of the wire feeder may occur.)

- **Polarity:** Turn off the DC-250 and connect the electrode cable to the “Positive” or “Negative” terminals depending upon the electrode polarity desired. Connect the work cable to the other stud. (See Section 1.5 for connection of the work and electrode cables.

If you are welding in the FCAW/GMAW/CV mode, set the DC-250 toggle switch labeled “Set to CV electrode cable polarity” to the symbol [(+) or (-)] corresponding to the polarity of the electrode cable connection at the FCAW/GMAW/CV output terminals. This switch setting is necessary for proper operation of some Lincoln wire feeders and does **not** change the welding polarity. This switch setting can be in either position for Stick/TIG/CC mode.

The DC-250 has two sets of output terminals. Be sure both the work and electrode cables for the process being used are connected to the terminals for that output mode. (i.e. If you are welding with Innershield electrode, be sure all output cables are connected to the terminals marked “FCAW/GMAW/CV”).

- **Mode Switch:** This switch **together** with the CV Arc Control Switch must be set to the proper output mode (i.e. either FCAW/GMAW/CV or Stick/TIG/CC) or **both** sets of output terminals will be cold.
- **CV Arc Control Switch:** This switch must be set considering two factors: The welding output mode selected and the degree of pinch effect desired (GMAW/FCAW/CV only).

- For Stick or TIG welding, set the handle to the “Stick/TIG/CC” position.
- For short-arc GMAW, set the handle to the “1” CV Arc Control setting. For out-of-position welding, setting “2” or “3” may be preferred.
- For welding with Innershield electrode, Outershield electrode (or other flux-cored wire) and spray arc GMAW, set the handle to the CV arc control position marked “2” and adjust as necessary. At high currents with Innershield electrode and spray arc GMAW, the choice of “1”, “2” or “3” will not have significant effect — set on “2”.

NOTE: Some machines have “MIN”, “NORMAL”, “MAX.” in place of “1”, “2”, “3”.

IMPORTANT: Both the Mode Switch and the CV Arc Control Switch must be set at the indicated positions. Never change the setting of either switch under load or with the 2 and 4 circuit closed, or equipment damage may result.

- **Stick/TIG Arc Force Control:** The arc force control is marked from “1” to “10”. Lower settings will provide less short circuit current and a softer arc.

Higher settings will provide a higher short circuit current and a more forceful arc. For most stick welding, the dial should be set at approximately mid-range, (“5-6”). Adjustment up (forceful arc) or down (soft arc) can then be made depending on the electrode, procedures and

operator preferences. TIG welding should be performed with the arc force control at or near minimum ("1").

NOTE: The white block on the nameplate containing the control description indicates it is effective only in the "Stick/TIG/CC" mode.

B2.3 AUXILIARY POWER

The DC-250 supplies the 115 VAC power needed for some wire feeding equipment. The power is available from

terminals #31 and #32 on the terminal strip. An 8 amp slow-blow fuse on the machine control panel protects the auxiliary power from excessive overloads. The circuit has a 1000 volt-ampere rating.

NOTE: Do not use terminals 2 or 4 for control of auxiliary loads. (The 2-4 circuit is isolated from the 31-32 circuit and cannot tolerate any outside voltage.)

B3. MAINTENANCE

WARNING: Have qualified personnel perform all installation, maintenance and troubleshooting work. Turn the input power off at the fuse box before working inside the machine.

B3.1 GENERAL MAINTENANCE

1. The fan motor has sealed bearings which require no service.
2. In extremely dusty locations, dirt may clog the air channels causing the welder to run hot. Blow out the welder with low pressure air at regular intervals to eliminate excessive dirt and dust build-up on internal parts.
3. In extremely dusty locations, dirt may accumulate on the control cable connection terminal strips. Wipe or blow these terminal strips off at regular intervals. This is particularly important in damp locations.
4. 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.

B3.2 MACHINE AND CIRCUIT PROTECTION

The power source is thermostatically protected with proximity thermostats against overload or insufficient cooling. If the machine is overloaded, the thermostat will open and the output will be zero. The fan will continue to run. The thermostat will remain open until the machine cools, at which time it will close and the output will again be available.

The power source is also protected against overloads on the SCR bridge assembly through an electronic protection circuit. This circuit senses an overload on the power source and limits the output by phasing back the SCR's until the load is removed.

Protection is provided to protect the circuitry from accidental grounds. If the customer accidentally "grounds" 75, 76 or 77 to the positive output lead, the DC-250 output will be reduced to a low value, thus preventing any damage to the machine. If the ground occurs between 75, 76 or 77

and the negative output lead, one of the PC board fuses will blow, preventing any machine damage. Also, any external voltage applied to the 2-4 circuit will cause a fuse to blow on the control board.

B3.3 TROUBLESHOOTING PROCEDURES

WARNING: Turn the input power to the DC-250 off using the disconnect switch at the fuse box before working inside the machine.

B3.3.1 Procedure for Replacing PC Boards

When a PC board is to be replaced, the following procedure must be followed:

1. Visually inspect PC board in question.
 - a. Are any of the components damaged?
 - b. Is a conductor on the back side of the board damaged?
 - c. Are any of the PC board fuses blown? If so, replace with 1/8 amp fuse and see if the problem is corrected.
 - d. If there is no damage to the PC board, insert a new PC board and see if this remedies the problem. If the problem is remedied, reinstall the old PC board and see if the problem still exists with the old PC board.
 1. If the problem does not exist with the old board, check the PC board lead harness plugs.
 2. Check leads in the harness for loose connections.
 - e. If there is damage to the PC board, return it to the local Lincoln Electric Field Service Shop.

B3.3.2 Output Voltage

The open circuit voltage of the machine should be adjustable from about 10 to 35 volts in CV. In the CC mode, the open circuit voltage should be approximately 64 volts (61 volts on 50 Hz) except at near minimum settings of the output control where it may be lower. If any other condition exists, refer to the Troubleshooting Guide.

B3.3.3 Fault Protection Operation

The overload protection circuit on the PC board will reduce the welding current to less than 100 amps if a short or

overload is applied to the machine. The load or short must be removed to return the machine to normal output.

B3.3.4 Checking Snubber Circuit

In case of an SCR malfunction or failure, the snubber assembly should be checked. Disconnect the input power to the DC-250 and remove the roof of the machine.

1. Visually inspect the snubber PC board assembly located on top of the transformer for overheated components or damaged components.

B3.3.5 Checking Output Control on Machine

1. Turn machine off.
2. Turn the output control switch to "Output Control Remote".
3. Remove the screws on the top half of the control panel and lower the front cover.
4. Disconnect the three harness plugs from the PC board.
5. With an ohmmeter on X1K, connect across the potentiometer.
6. Rotate the output control knob to its min. ("1"), then to its max. ("10") position. The resistance reading should range from around zero to 10K. Check the resistance reading between 75 on the terminal strip and 211 on Output Control Remote Switch (S5). The reading must be 10K. No reading will indicate an open potentiometer and a low reading will indicate a shorted or partially shorted potentiometer; in either case, replace.

B3.3.6 Remote Control Check

Disconnect the remote output control and connect an ohmmeter across leads 75 and 76 and rotate the rheostat in the remote control. The resistance reading should go from zero to 10K ohms. Repeat with ohmmeter across 77 and 76 with same results. Connect ohmmeter across 75 and 77. The reading should be 10K ohms. A lower reading will indicate a shorted or partially shorted rheostat. A very high reading will indicate an open rheostat. In either of the last two cases, replace rheostat.

B3.4 TROUBLESHOOTING GUIDE

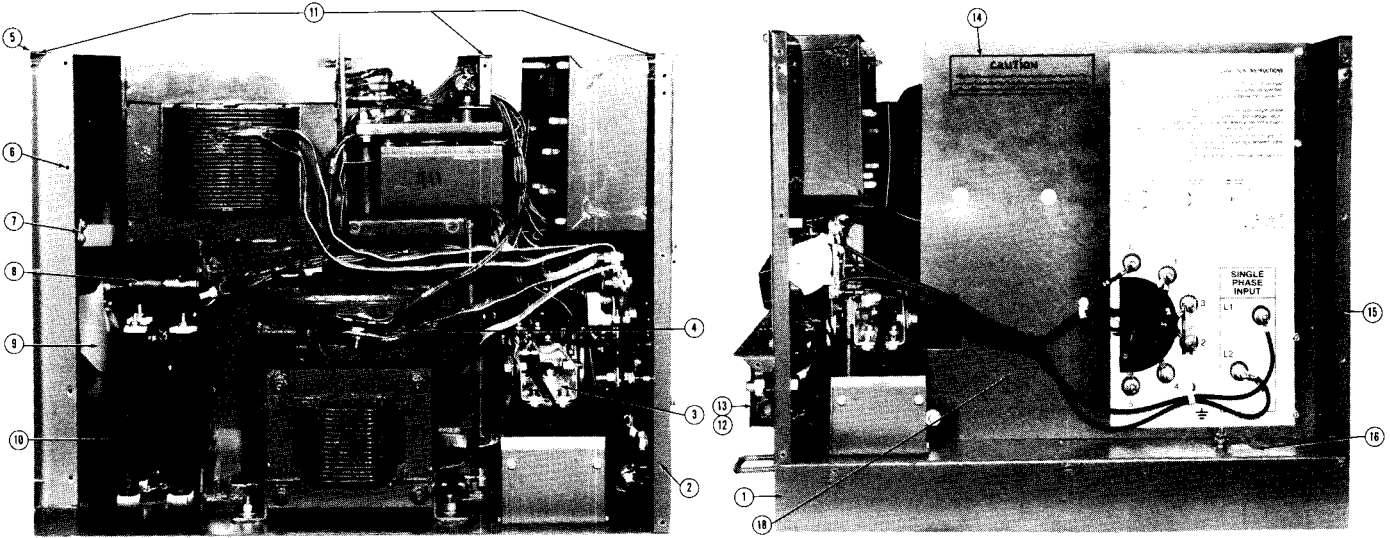
WARNING: Have qualified personnel do the maintenance and troubleshooting work. Turn the input power off using the disconnect switch at the fuse box before working inside the machine.

TROUBLE	CAUSE	WHAT TO DO
1. Machine has no output.	A. Mode and CV Arc Control switches set to different output mode. B. Electrode or work lead loose or broken. C. Defective PC board.	A. Correct setting of Mode or CV Arc Control selector switch so both are set to same output mode (i.e. FCAW/GMAW/CV). B. Repair connection. C. See PC Board Troubleshooting Procedure.
2. Machine has minimum output and no control.	A. Terminals 75, 76 or 77 grounded to positive output.	A. Check 75, 76 or 77 for ground to positive output circuit.
3. Machine has low output and no control.	A. Local/Remote Switch in wrong position. B. Local/Remote Switch faulty. C. Open in feedback circuitry. D. Faulty PC board. E. Output Control potentiometer circuit open (lead 75).	A. Check fuses on PC board. Check position of switch. Change to "Local". B. Check switch and replace if faulty. C. Check wiring and control and PC board wiring harness plugs. D. Check fuses. See PC Board Troubleshooting Procedure. E. Check and replace potentiometer if faulty. Check wiring of lead #75.
4. Machine does not have maximum output.	A. Faulty PC board. B. Output Control potentiometer defective. C. Output Control potentiometer leads open.	A. Check fuses. See PC Board Troubleshooting Procedure. B. Check and replace if faulty. C. Check and repair broken leads.
5. Machine has output but reduces to low output and remains there until the load is broken and arc restarted.	A. Excessive load causing the overload protection on the PC board to operate. B. Machine output shorted causing overload protection on PC board to operate. C. PC board defective.	A. Reduce load. B. Turn machine off and remove short. C. See PC Board Troubleshooting Procedure.
6. Machine will not shut off.	A. Defective on/off switch.	A. Replace.
7. Variable or sluggish welding arc.	A. Poor work or electrode connection. B. Welding leads too small. C. Welding current or voltage too low. D. Defective SCR bridge.	A. Check and clean all connections. B. Check table in operating manual. C. Check procedures for recommended settings. D. Check and replace if defective.
8. Output Control not functioning on the machine.	A. Local/Remote switch in the wrong position. B. Faulty Local/Remote switch. C. Faulty Output Control potentiometer. D. Leads or connections open in control circuit. E. Faulty PC board.	A. Place the switch in "Local" position. B. Check and replace if found faulty. C. Check and replace if found faulty. D. Check lead continuity and connections for an open and repair if necessary. E. Check fuses. See PC Board Troubleshooting Procedure.
9. Output Control not functioning on Remote Control or on wire feeder.	A. Local/Remote switch in wrong position. B. Faulty Local/Remote switch. C. Remote Control has an open circuit. D. Leads or connections open in control circuit. E. Faulty PC board.	A. Place switch in "Remote". B. Check and replace if found faulty. C. Check and replace if found faulty. D. Check all leads and connections, internal or remote, for continuity; repair if necessary. E. See PC Board Troubleshooting Procedure.
10. Poor Arc Striking with Semiautomatic wire feeders.	A. Poor work connection. B. Improper procedures. C. Defective PC board.	A. Work connection must be adequate for application. B. Adjust procedures for improved starting. C. See PC Board Troubleshooting Procedure.
11. Poor arc characteristics.	A. PC Board defective.	A. See PC Board Troubleshooting Procedure.

B4. APPENDIX

B4.1 REPLACEMENT PARTS

GENERAL ASSEMBLY



L-7150
2-15-85

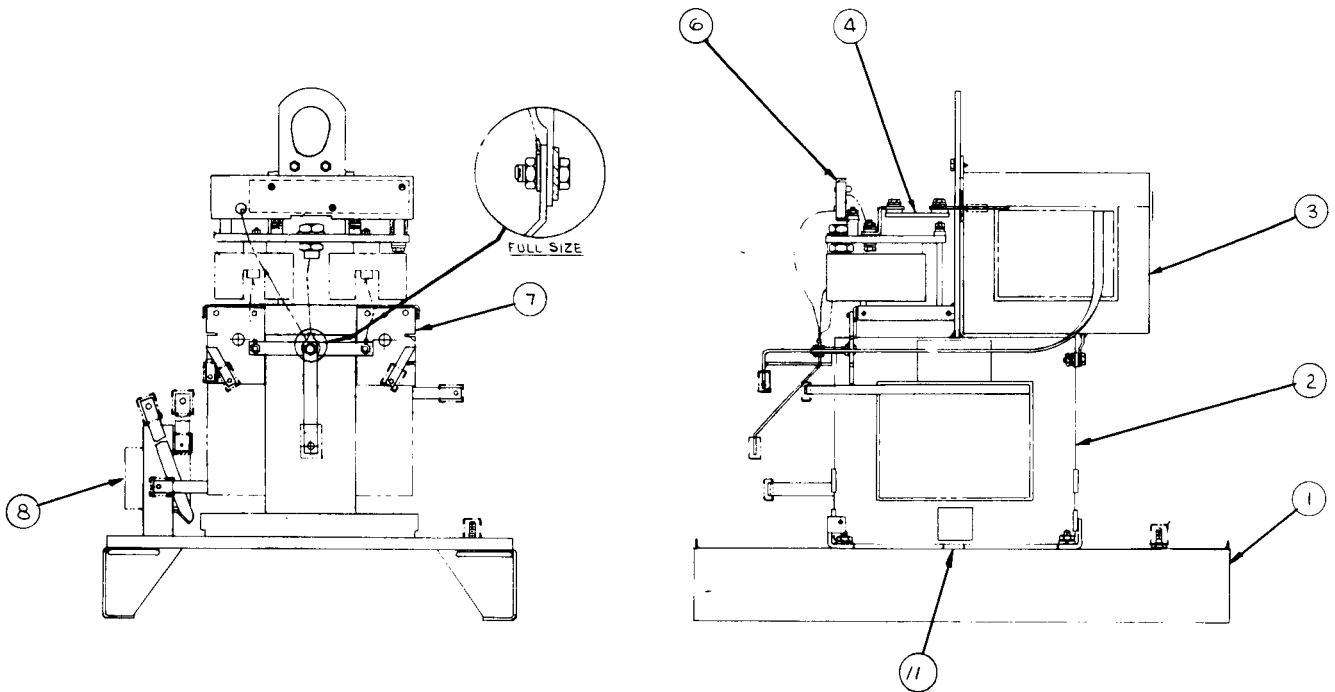
WHEN ORDERING GIVE: Item No., Part Name,
Parts List No., and Welder Code.

Parts List P-169-C

ITEM	PART NAME & DESCRIPTION	NO. REQ'D
1	Base, Transformer, Choke & Bridge Assembly	1
2	Case Front Assembly	1
3	Capacitor Bank Assembly, Includes: Capacitor Diode	1 5 1
4	Thermostat	2
5	Case Back	1
6	Fan Baffle	1
7	Fan Mounting Bracket	1
8	Fan Motor	1
9	Fan Blade	1
10	Resistor Round Head Screw Insulating Washer	3 3 6
11	Rubber Strip	As Req'd
12	Decal (Instruction)	1
13	Decal (Warning)	1
14	Decal (Caution)	1
15	Decal (Warning)	1
16	Decal (Ground)	1
18	Reconnect Panel Assembly, Includes: Reconnect Panel Jumper Link	1 1 2
	Instruction Sheet	1
	Items Not Illustrated:	
	Control Panel Assembly	1
	Baffle (Left Side)	1
	Case Right Side Panel	1
	Case Left Side Panel	1
	Roof Assembly	1
	Cover Seal	1

4-10-85

BASE, TRANSFORMER, CHOKE AND BRIDGE ASSEMBLY



L-7119
2-15-85

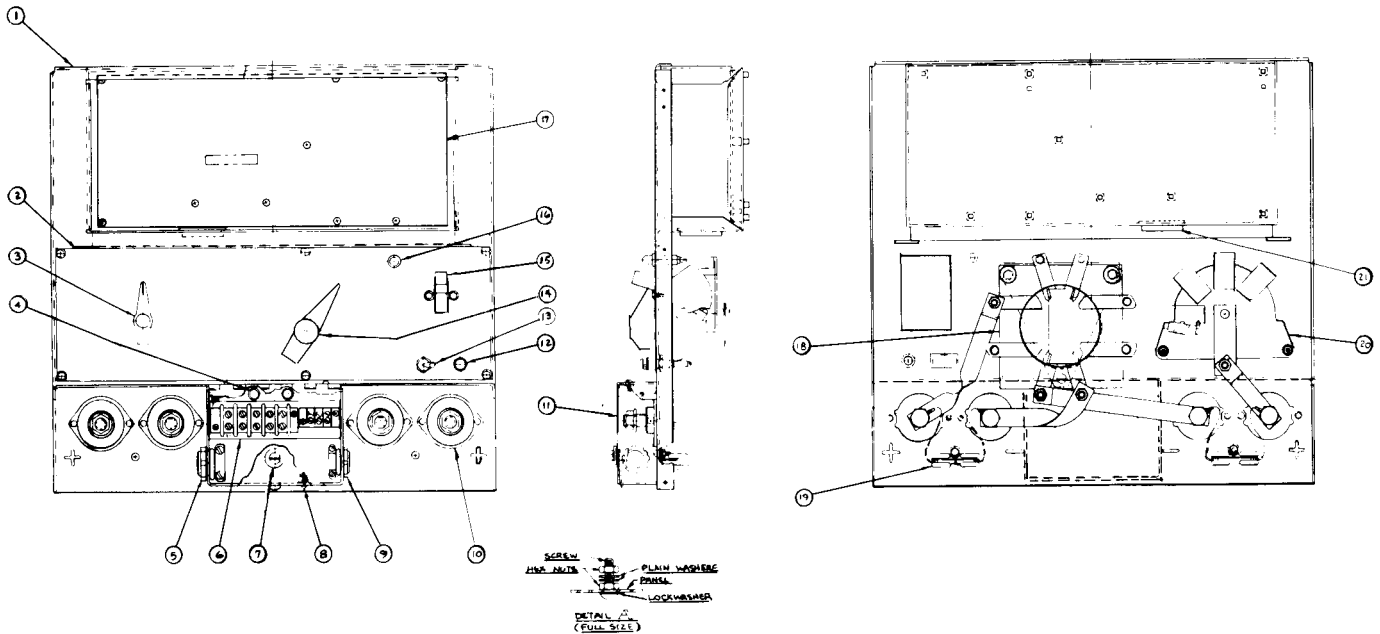
WHEN ORDERING GIVE: Item No., Part Name, Parts List No., and Welder Code.

Parts List P-169-D

ITEM	PART NAME & DESCRIPTION	NO. REQ'D
1	Base Welded Assembly	1
2	Transformer, Lift Bail & Feet Assembly,	
	Includes:	1
	Transformer and Lamination Assembly	1
3	Choke Coil & Lamination Assembly	1
4	Shunt Assembly	1
6	Bridge Assembly, Includes	1
	Snubber P.C. Board	1
7	Lead Insulator	2
8	Stabilizer Choke Assembly	1
11	Insulation	1

4-10-85

CASE FRONT ASSEMBLY



G-1683
2-15-85

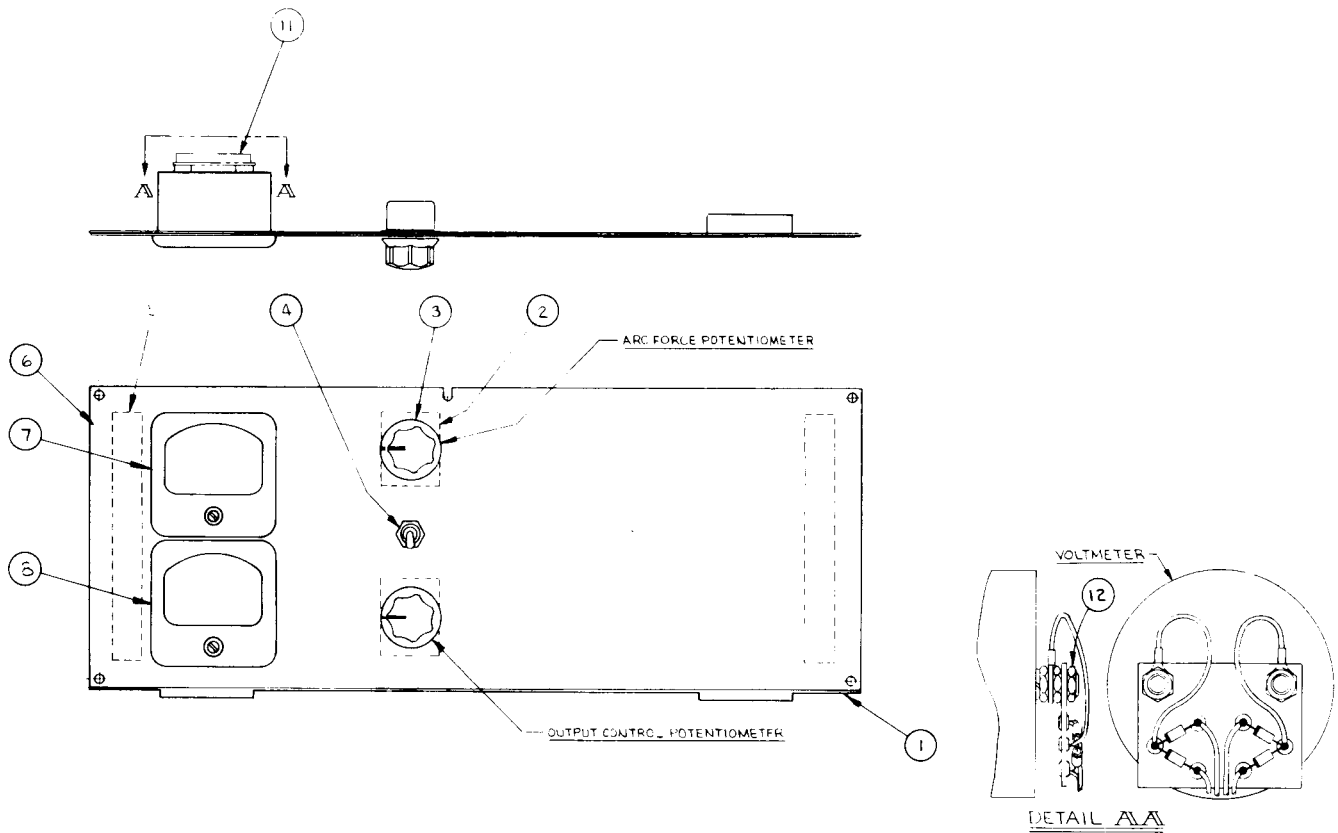
WHEN ORDERING GIVE: Item No., Part Name,
Parts List No., and Welder Code.

Parts List P-169-E

ITEM	PART NAME & DESCRIPTION	NO. REQ'D
1	Case Front Welded Assembly	1
2	Nameplate	1
3	Control Handle	1
4	Bushing	2
5	Box Connector	1
6	Terminal Strip (Large)	1
	Terminal Strip (Small)	1
	Number Plate	1
7	Door Latch Assembly	1
8	Ground Decal	1
9	Box Connector	1
10	Output Terminal	4
	Output Stud Nut	4
11	Door and Hinge Assembly	1
12	Fuse Holder	1
	Fuse	1
13	Switch	1
14	Control Handle Assembly	1
15	Line Switch	1
16	Pilot Light	1
17	Control P.C. Board	1
	Plastic Expansion Nut	9
18	Mode Switch	1
19	Output Bypass Assembly	2
20	Selector Switch	1
	Spacer	2
21	Bushing	1

4-10-85

CONTROL PANEL ASSEMBLY



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

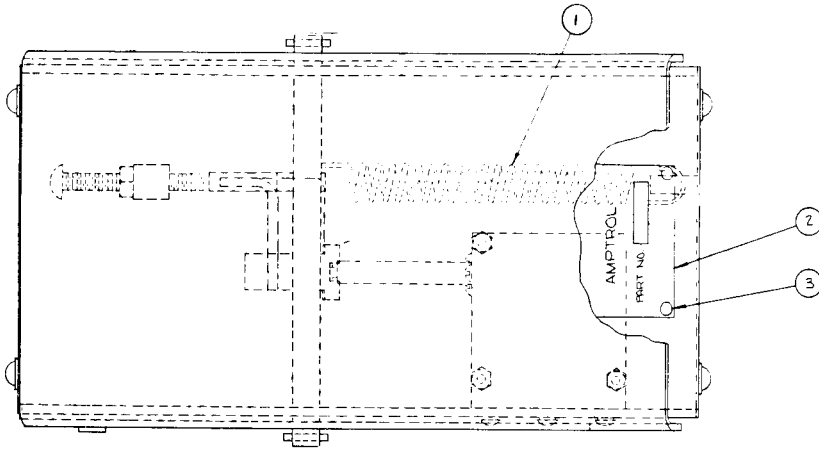
M-14916
2-15-85

Parts List P-169-F

ITEM	PART NAME & DESCRIPTION	NO. REQ'D
1	Control Panel	1
2	Insulation (Potentiometer)	2
3	Knob	2
4	Remote Switch	1
6	Nameplate (Without Meters)	1
6	Nameplate (With Meters)	1
7	Ammeter (Optional)	1
8	Voltmeter (Optional)	1
11	Diode & Base Assembly (Mounts on Optional Voltmeter)	1
12	Hex Jam Nuts (Used with Optional Voltmeter)	2
	Items Not Illustrated:	
	Arc Force Potentiometer	1
	Output Control Potentiometer	1

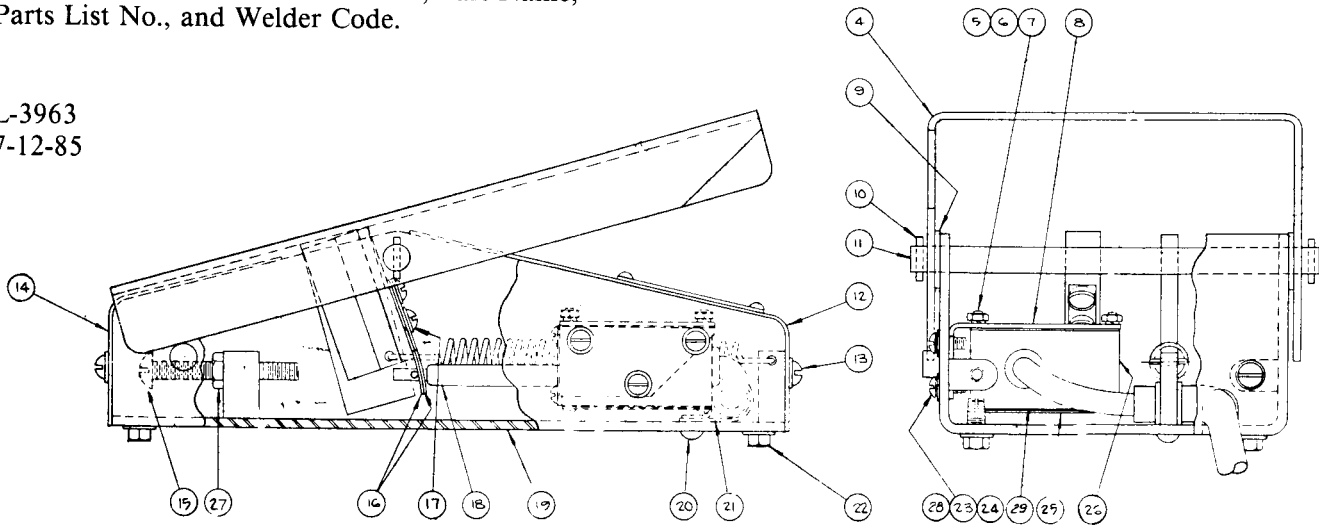
4-10-85

K870 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	ITEM	PART NAME & DESCRIPTION	NO. REQ'D
1	Foot Ampctrl, Includes: Tension Spring	1 1	17	Sems Screw	2
2	Nameplate	1	18	Actuator Arm Assembly	1
3	Drivescrew	4	19	Base	1
4	Foot Plate	1	20	Self Tapping Screw	1
5	Round Head Screw	4	21	Lead Clamp	1
6	Lock Washer	4	22	Thread Cutting Screw	4
7	Hex Nut	4	23	Round Head Screw	3
8	Bracket	1	24	Lock Washer	3
9	Washer	2	25	Cover Plate	1
10	Roll Pin	2	26	Control Unit, Includes: Rheostat	1 1
11	Pivot Pin	1		Micro Switch	1
12	Cover	1		Cable	1
13	Sems Screw	4	27	Hex Nut	1
14	Cover	1	28	Plain Washer	3
15	Hex Head Screw	1	29	Cover Insulation	2
16	Actuator Spring	1 or 2			

7-15-85

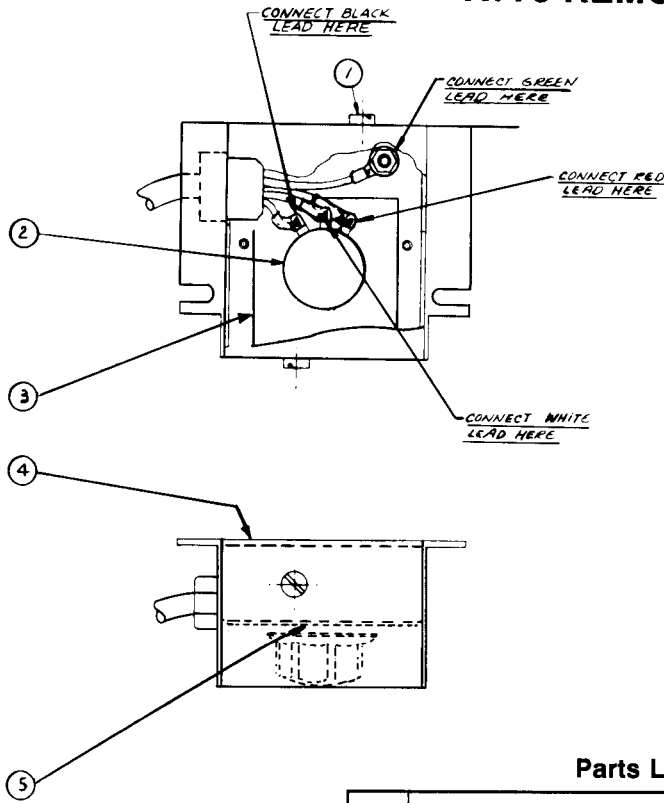
K812 HAND AMP TROL

Parts List P-66-K

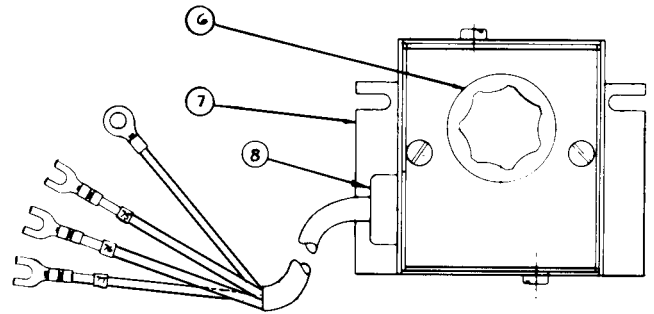
ITEM	PART NAME & DESCRIPTION	NO. REQ'D
	Hand Amptrol, Includes: Actuator Arm Assembly	1 1
	Nameplate Control Unit, Includes: Rheostat	1 1 1
	Micro Switch Cable Bottom Cover Plate	1 1 1

4-14-86

K775 REMOTE CONTROL



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



L-4829
12-4-81V

Parts List P-84-J

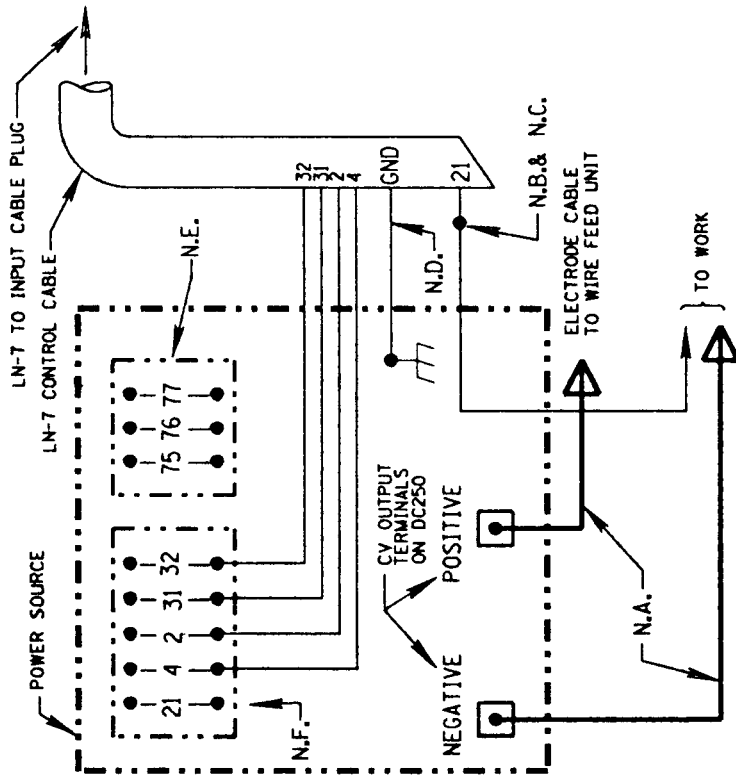
ITEM	PART NAME & DESCRIPTION	NO. REQ'D
1	Remote Control Box Assembly, Includes: Thread Cutting Screw	1 4
2	Potentiometer	1
3	Insulation	1
4	Wraparound	1
5	Nameplate	1
6	Knob	1
7	Case	1
8	Lead Grommet	1
9	Lead	1

6-10-86

B4.2 DIAGRAMS

B4.2.1 Connection Diagrams

CONNECTION DIAGRAM DC-250
TO LN-7 OR LN-7 GMA

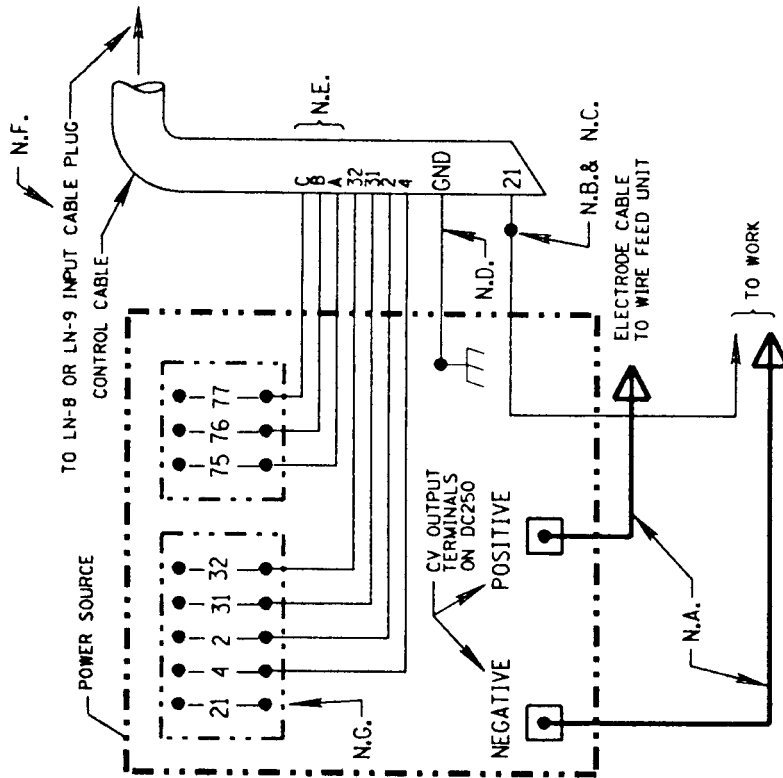


Above diagram shows electrode connected positive. To change polarity, turn power off, reverse the electrode and work leads at the power source and position the switch on power source and wire feeder (if equipped) to proper polarity. Also refer to note N.F.

- N. A. Welding cables must be of proper capacity for the current and duty cycle of immediate and future applications. See LN-7 Operating Manual for proper sizes.
- N. B. If LN-7 is equipped with a meter kit, extend LN-7 control cable lead #21 using 14 AWG or larger insulated wire physically suitable for the installation. An S16586-[LENGTH] remote voltage sensing work lead may be ordered for this purpose. Connect it directly to the work piece independent of the welding work cable connection. For convenience, this extended #21 lead should be taped to the welding work lead. (If the length of welding work cable is short, less than 25 feet, and connections can be expected to be reliable, then control cable lead #21 does not need to be extended and can be directly connected to terminal #21 on the terminal strip. Note that this is not the preferred connection because it adds error to the LN-7 voltmeter reading.)
- N. C. Tape up bolted connection if lead #21 is extended.
- N. D. Connect the control cable ground lead to the frame terminal marked \perp near the power source terminal strip. The power source grounding terminal (marked \perp and located near the power source input power connections) must be properly connected to electrical ground per the power source operating manual.
- N. E. If an optional remote voltage control is used, connect it to this terminal strip.
- N. F.* If lead #21 is to be connected to the terminal strip, connect to the #21 terminal that matches work polarity. This connection must be changed whenever the electrode polarity is changed.

* Does not apply to DC-400 below code 9200 with polarity switch.

CONNECTION DIAGRAM DC-250 TO LN-8 OR LN-9



Above diagram shows electrode connected positive. To change polarity, turn power off, reverse the electrode and work leads at the power source and position the switch on power source and wire feeder (if equipped) to proper polarity. Also refer to note N.G.

* Does not apply to DC-400 below code 9200 with polarity switch.

N. A. Welding cables must be of proper capacity for the current and duty cycle of immediate and future applications.

N. B. Extend lead #21 using #14 AWG or larger insulated wire physically suitable for the installation. An S16586-[LENGTH] remote voltage sensing work lead is available for this purpose. Connect it directly to the work piece keeping it electrically separate from the welding work lead circuit and connection. For convenience, this extended #21 lead should be taped to the welding work lead. (If the length of work lead circuit is short, and connections can be expected to be reliable, then control cable lead #21 does not need to be extended and can be directly connected to terminal #21 on the terminal strip. Note that this is not the preferred connection because it adds error to the wire feeder voltmeter reading.)

N. C. Tape up bolted connection if lead #21 is extended.

N. D. Connect the control cable ground lead to the frame terminal marked $\overline{\text{H}}$ near the power source terminal strip. The power source grounding terminal (marked $\overline{\text{H}}$) and located near the power source input power connections) must be properly connected to electrical ground per the power source operating manual.

N. E. If using an older LN-8 control cable; connect lead #75 to #75 on terminal strip, connect lead #76 to #76 on terminal strip, connect lead #77 to #77 on the terminal strip.

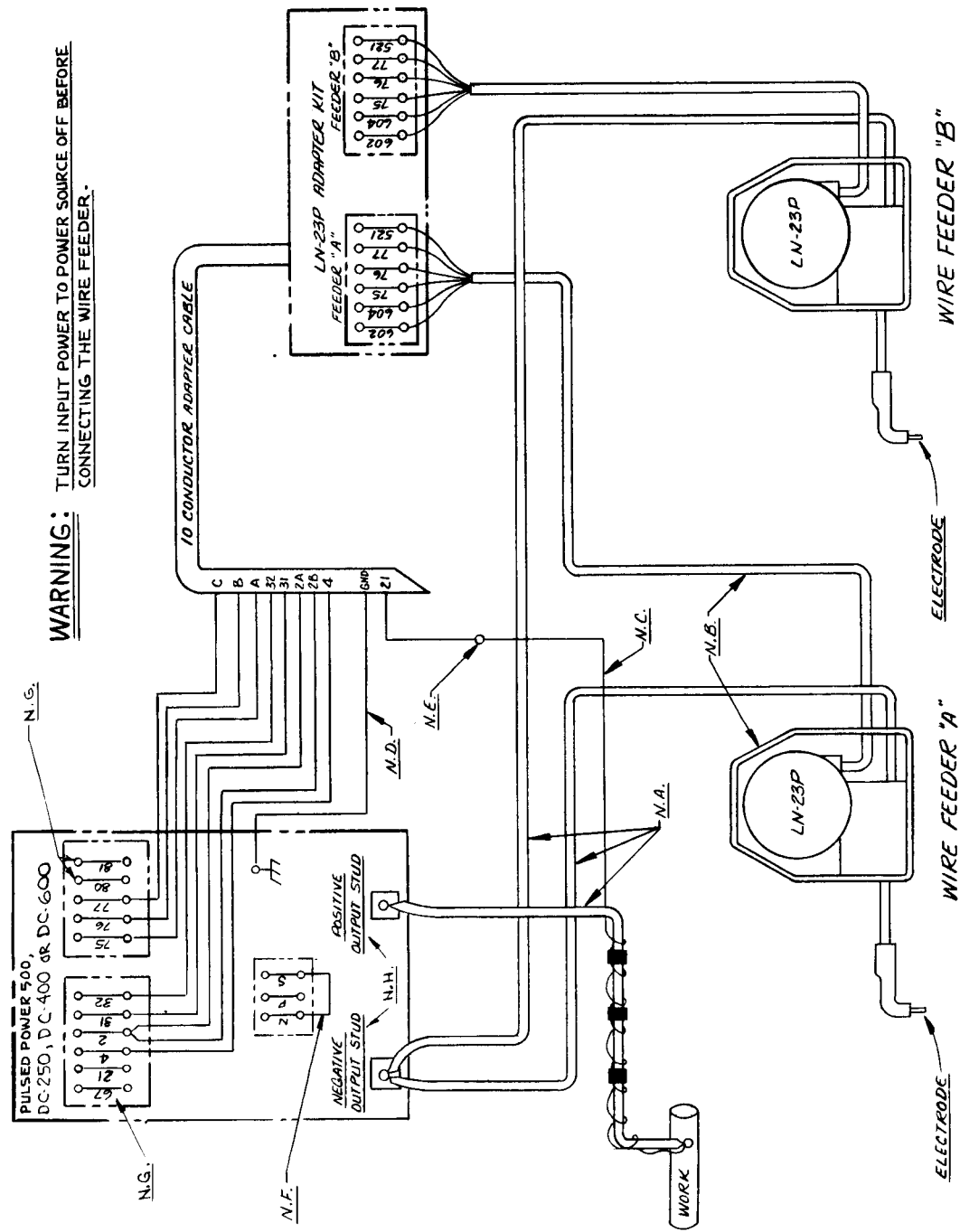
N. F. The LN-9 voltage control jumpers must be connected as follows (refer to LN-9 Operating Manual):

- White jumper on voltage board to pin 'S'.
- Blue jumper on voltage board (later units only), or on start board (earlier units), to pin 'B'.

N. G.* If lead #21 is to be connected to the terminal strip, connect to the #21 terminal that matches work polarity. This connection must be changed whenever the electrode polarity is changed.

CONNECTION DIAGRAM DC-250 TO LN-23-P

- N.A. Welding cables must be of proper capacity for the current and the duty cycle of immediate and future applications. See LN-23P Operating Manual for proper sizes.
- N.B. If only one LN-23P is used, connected to feeder "A" terminal strip in adapter.
- N.C. Remote voltage sensing lead to be extended by customer directly to work using #12 or larger rubber covered flex wire. Wrap wire around work lead and tape.
- N.D. Connect the adapter cable ground lead to the frame terminal marked 77 near the power source terminal strip. The power source grounding terminal (marked 77 and located near the power source input power connections) must be properly connected to electrical ground per the power source Operating Manual.
- N.E. Bolt and tape connection.
- N.F. For DC-600 codes below 8200, connect a jumper from "N" to "S". There is no "NPS" strip on DC-400's or DC-600's with codes above 8200 or DC-250's
- N.G. Terminals 67, 80 & 81 not present on some machines.
- N.H. C.Y. Output Terminals on DC-250



M14272
2-27-87E

CONNECTION OF NON-LINCOLN WIRE FEEDERS

DIAGRAM FOR WIRE FEEDERS THAT CLOSE A SET OF CONTACTS TO GET POWER OUTPUT:

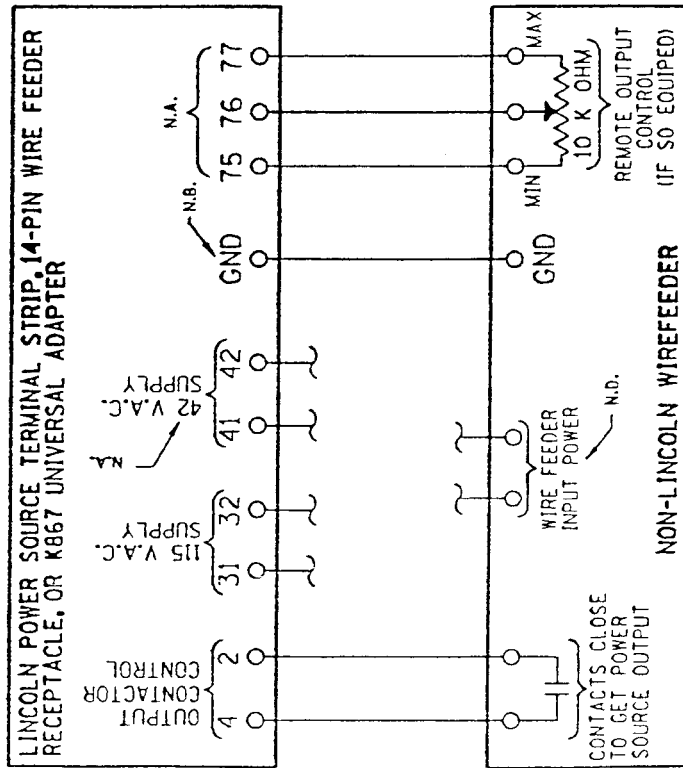
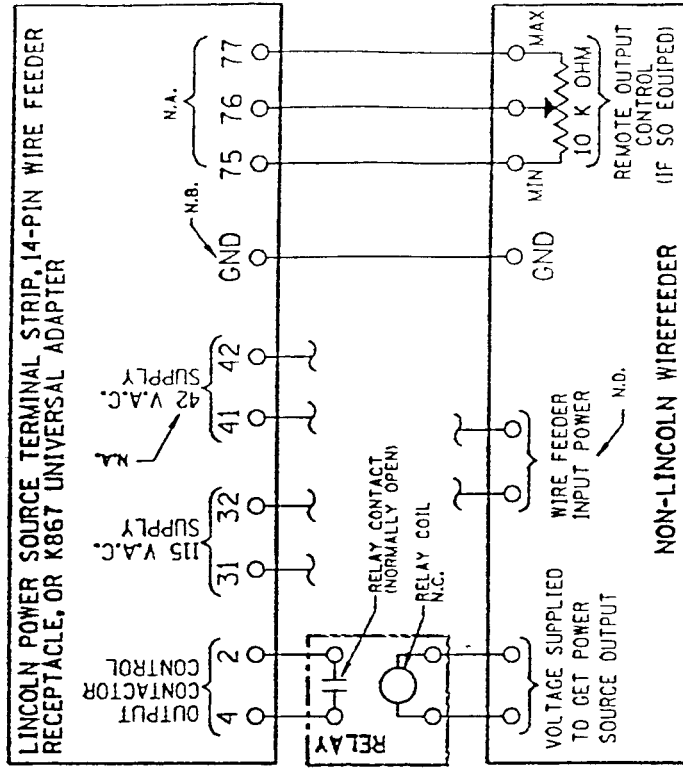


DIAGRAM FOR WIRE FEEDERS THAT SUPPLY A VOLTAGE TO GET POWER SOURCE OUTPUT:



N.A. CONNECTIONS 41,42,75,76,77 MAY NOT BE PRESENT ON ALL MACHINES.

N.B. POWER SOURCE MUST BE PROPERLY GROUNDED.

N.C. RELAY COIL MUST BE RATED FOR THE SAME VOLTAGE THAT IS SUPPLIED BY THE WIRE FEEDER.

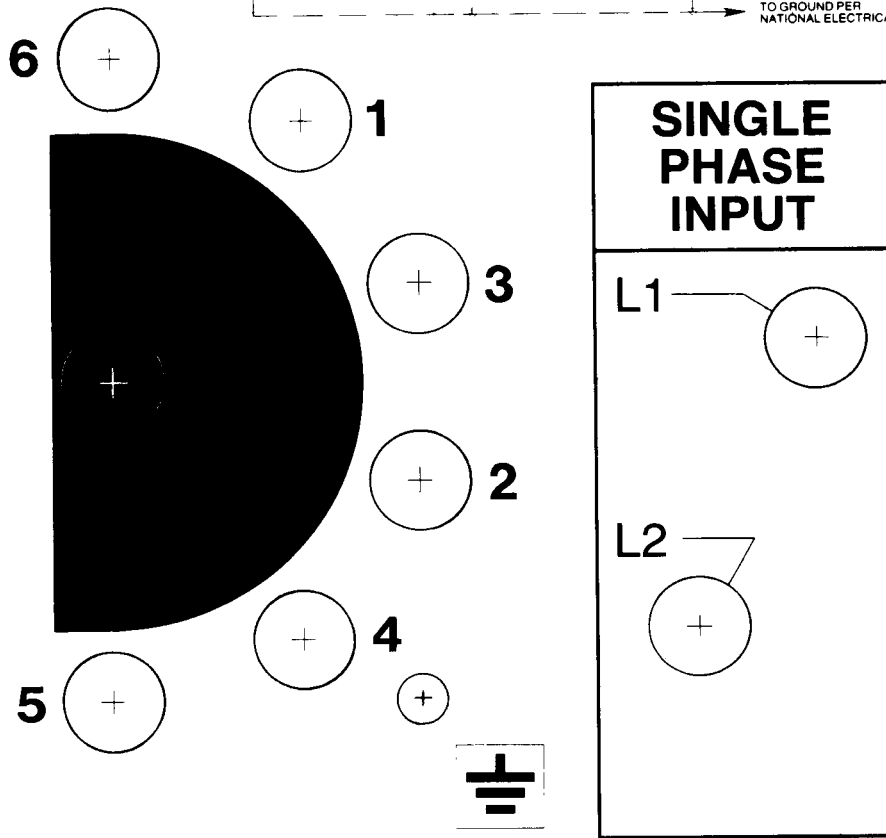
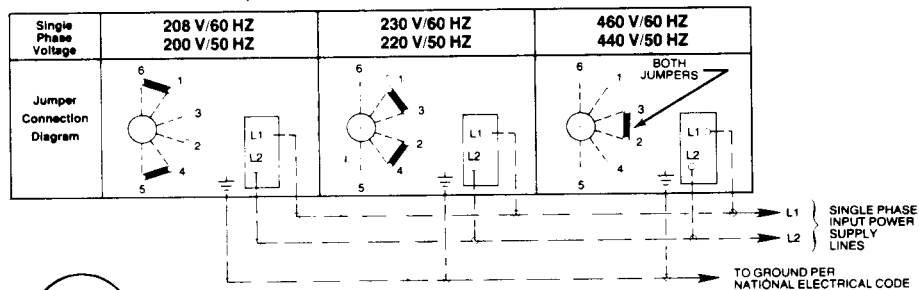
N.D. IF THE WIRE FEEDER REQUIRES AN INPUT VOLTAGE OTHER THAN 42 V.A.C OR 115 V.A.C., AN EXTERNAL POWER SUPPLY FOR THAT VOLTAGE MUST BE PROVIDED.

SINGLE PHASE INPUT POWER SUPPLY CONNECTION INSTRUCTIONS

SINGLE PHASE INPUT POWER SUPPLY CONNECTION INSTRUCTIONS

WARNING: Powered by high voltage which can kill. Turn off all input power before proceeding. Use input and grounding lead sizes as specified in the operating manual. Failure to follow instructions below can cause immediate failure of components within the welder.

1. Welders are shipped connected for highest nameplated single phase input voltage. To change connections for a different input voltage, reconnect both copper jumpers per diagrams below. Always connect jumpers between outer steel nut and inner brass nut on terminal studs.
2. Connect the input power leads to the input terminal studs, L1 and L2, at the lower right corner of this panel. Connect lead lugs between outer steel nut and inner brass nut on terminal studs.
3. Connect a grounding lead to the ground stud located on the machine base near the input terminal studs.

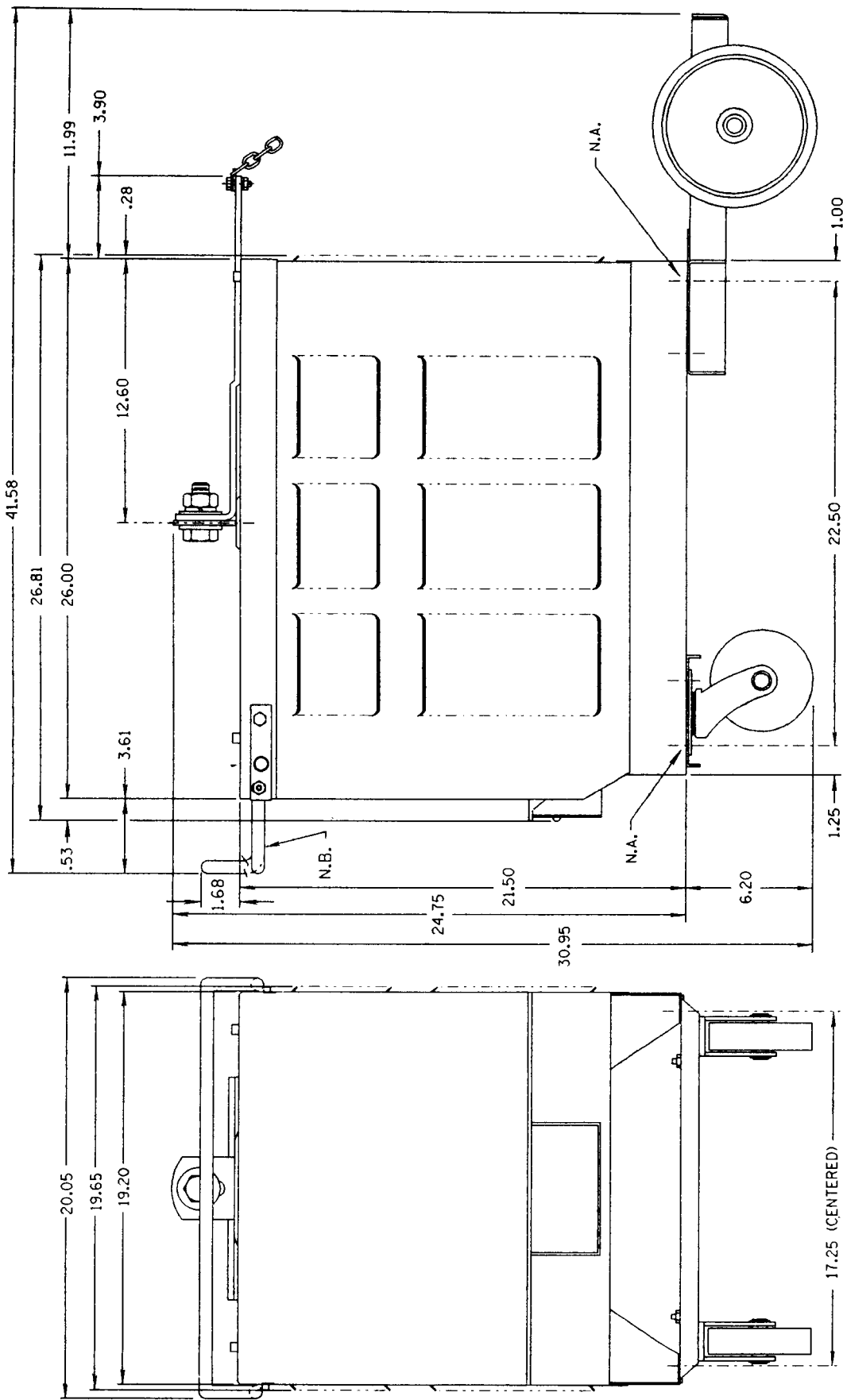


M-14925-1

M-14925-1
6-21-85E

B4.2.2 Miscellaneous Diagrams

**DIMENSION DIAGRAM
DC-250**

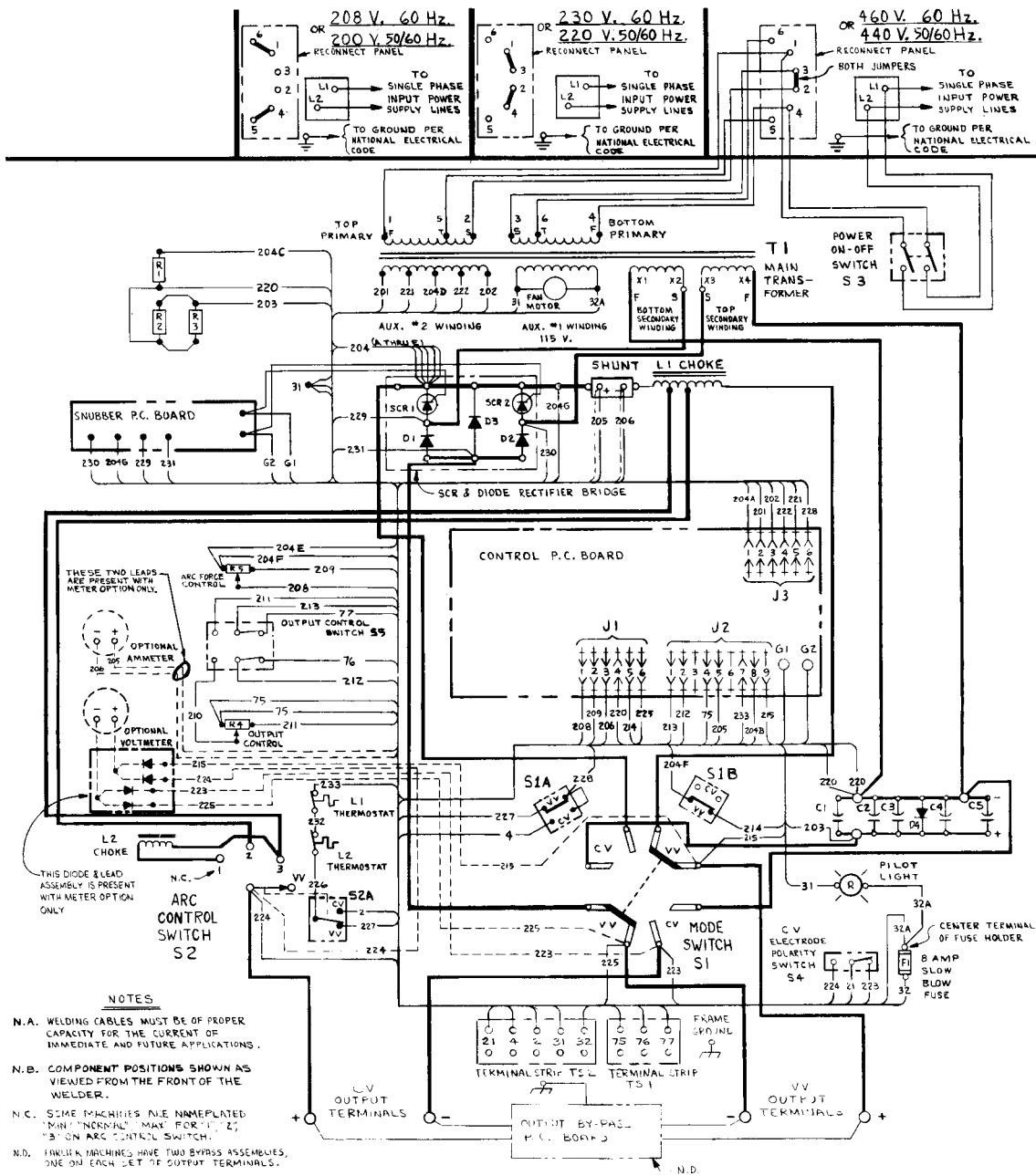


N.A. FOUR SLOTS IN BASE FOR MOUNTING
WELDER DOWN USING 5/16 SCREWS.

N.B. HANDLE CONFIGURATION ON EARLIER MODELS.

M14948
5-18-90J

WIRING DIAGRAM DC-250



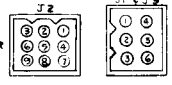
- NOTES**
- N.A. WELDING CABLES MUST BE OF PROPER CAPACITY FOR THE CURRENT OF IMMEDIATE AND FUTURE APPLICATIONS.
 - N.B. COMPONENT POSITIONS SHOWN AS VIEWED FROM THE FRONT OF THE WELDER.
 - N.C. SOME MACHINES N.E. MANUFACTURED WITH "NORMAL" MAX FOR "1", "2", "3" ON ARC CONTROL SWITCH.
 - N.D. FRAME MACHINES HAVE TWO BYPASS ASSEMBLIES, ONE ON EACH SET OF OUTPUT TERMINALS.

ELECTRICAL SYMBOLS PER E-1537

- C1 THRU C5 31,000 MFD
- D4 DIODE
- L1 DC OUTPUT FILTER CHOKE
- L2 C.V. STABILIZER CHOKE
- R1, R2, R3 15 OHM, 100 WATT
- R4 10 K OHM POTENTIOMETER
- R5 10 K OHM POTENTIOMETER

LEGEND

- S1A MICROSWITCH MOUNTED ON S1 - SHOWN NOT ACTUATED, IN VV POSITION
- S1B MICROSWITCH MOUNTED ON S1 - SHOWN ACTUATED, IN VV POSITION
- S2A MICROSWITCH MOUNTED ON S2 - SHOWN ACTUATED, IN VV POSITION



CONNECTOR CAVITY NUMBERING SEQUENCE COMPONENT SIDE OF P.C. BOARD

L7125
2-1-91D

NOTE: This diagram is for reference only. It is not accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels.

If the diagram is illegible, write to the Service Department for a replacement. Give the welder code number.


WARNING	<ul style="list-style-type: none"> Do not touch electrically live parts or electrode with skin or wet clothing. Insulate yourself from work and ground. 	<ul style="list-style-type: none"> Keep flammable materials away. 	<ul style="list-style-type: none"> Wear eye, ear and body protection.
Spanish AVISO DE PRECAUCION	<ul style="list-style-type: none"> No toque las partes o los electrodos bajo carga con la piel o ropa mojada. Aislese del trabajo y de la tierra. 	<ul style="list-style-type: none"> Mantenga el material combustible fuera del área de trabajo. 	<ul style="list-style-type: none"> Protéjase los ojos, los oídos y el cuerpo.
French ATTENTION	<ul style="list-style-type: none"> Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. Isolez-vous du travail et de la terre. 	<ul style="list-style-type: none"> Gardez à l'écart de tout matériel inflammable. 	<ul style="list-style-type: none"> Protégez vos yeux, vos oreilles et votre corps.
German WARNUNG	<ul style="list-style-type: none"> Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! Isolieren Sie sich von den Elektroden und dem Erdboden! 	<ul style="list-style-type: none"> Entfernen Sie brennbares Material! 	<ul style="list-style-type: none"> Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese ATENÇÃO	<ul style="list-style-type: none"> Não toque partes elétricas e electrodos com a pele ou roupa molhada. Isole-se da peça e terra. 	<ul style="list-style-type: none"> Mantenha inflamáveis bem guardados. 	<ul style="list-style-type: none"> Use proteção para a vista, ouvido e corpo.
Japanese 注意事項	<ul style="list-style-type: none"> 通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。 施工物やアースから身体が絶縁されている様にして下さい。 	<ul style="list-style-type: none"> 燃えやすいものの側での溶接作業は絶対にしてはなりません。 	<ul style="list-style-type: none"> 目、耳及び身体に保護具をして下さい。
Chinese 警告	<ul style="list-style-type: none"> 皮肤或湿衣物切勿接觸帶電部件及鏽條。 使你自己與地面和工件絕緣。 	<ul style="list-style-type: none"> 把一切易燃物品移離工作場所。 	<ul style="list-style-type: none"> 佩戴眼、耳及身體勞動保護用具。
Korean 위험	<ul style="list-style-type: none"> 전도체나 용접봉을 젖은 헝겊 또는 피부로 절대 접촉치 마십시오. 모재와 접지를 접촉치 마십시오. 	<ul style="list-style-type: none"> 인화성 물질을 접근 시키지 마세요. 	<ul style="list-style-type: none"> 눈, 귀와 몸에 보호장구를 착용하십시오.
Arabic تحذير	<ul style="list-style-type: none"> لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الألكترود بجلد الجسم أو بالملايس المبللة بالماء. ضع عازلا على جسمك خلال العمل. 	<ul style="list-style-type: none"> ضع المواد القابلة للاشتعال في مكان بعيد. 	<ul style="list-style-type: none"> ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

READ AND UNDERSTAND THE MANUFACTURER'S INSTRUCTION FOR THIS EQUIPMENT AND THE CONSUMABLES TO BE USED AND FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.

LISEZ ET COMPRENEZ LES INSTRUCTIONS DU FABRICANT EN CE QUI REGARDE CET EQUIPMENT ET LES PRODUITS A ETRE EMPLOYES ET SUIVEZ LES PROCEDURES DE SECURITE DE VOTRE EMPLOYEUR.

SE RECOMIENDA LEER Y ENTENDER LAS INSTRUCCIONES DEL FABRICANTE PARA EL USO DE ESTE EQUIPO Y LOS CONSUMIBLES QUE VA A UTILIZAR, SIGA LAS MEDIDAS DE SEGURIDAD DE SU SUPERVISOR.

LESEN SIE UND BEFOLGEN SIE DIE BETRIEBSANLEITUNG DER ANLAGE UND DEN ELEKTRODENEINSATZ DES HERSTELLERS. DIE UNFALLVERHÜTUNGSVORSCHRIFTEN DES ARBEITGEBERS SIND EBENFALLS ZU BEACHTEN.

			
<ul style="list-style-type: none"> ● Keep your head out of fumes. ● Use ventilation or exhaust to remove fumes from breathing zone. 	<ul style="list-style-type: none"> ● Turn power off before servicing. 	<ul style="list-style-type: none"> ● Do not operate with panel open or guards off. 	WARNING
<ul style="list-style-type: none"> ● Los humos fuera de la zona de respiración. ● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases. 	<ul style="list-style-type: none"> ● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio. 	<ul style="list-style-type: none"> ● No operar con panel abierto o guardas quitadas. 	Spanish AVISO DE PRECAUCION
<ul style="list-style-type: none"> ● Gardez la tête à l'écart des fumées. ● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail. 	<ul style="list-style-type: none"> ● Débranchez le courant avant l'entretien. 	<ul style="list-style-type: none"> ● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés. 	French ATTENTION
<ul style="list-style-type: none"> ● Vermeiden Sie das Einatmen von Schweißrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes! 	<ul style="list-style-type: none"> ● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!) 	<ul style="list-style-type: none"> ● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen! 	German WARNUNG
<ul style="list-style-type: none"> ● Mantenha seu rosto da fumaça. ● Use ventilação e exaustão para remover fumo da zona respiratória. 	<ul style="list-style-type: none"> ● Não opere com as tampas removidas. ● Desligue a corrente antes de fazer serviço. ● Não toque as partes elétricas nuas. 	<ul style="list-style-type: none"> ● Mantenha-se afastado das partes moventes. ● Não opere com os painéis abertos ou guardas removidas. 	Portuguese ATENÇÃO
<ul style="list-style-type: none"> ● ヒュームから頭を離すようにして下さい。 ● 換気や排煙に十分留意して下さい。 	<ul style="list-style-type: none"> ● メンテナンス・サービスに取りかかる際には、まず電源スイッチを必ず切して下さい。 	<ul style="list-style-type: none"> ● パネルやカバーを取り外したまま機械操作をしないで下さい。 	Japanese 注意事項
<ul style="list-style-type: none"> ● 頭部遠離煙霧。 ● 在呼吸區使用通風或排風器除煙。 	<ul style="list-style-type: none"> ● 維修前切斷電源。 	<ul style="list-style-type: none"> ● 儀表板打開或沒有安全罩時不準作業。 	Chinese 警告
<ul style="list-style-type: none"> ● 얼굴로부터 용접가스를 멀리하십시오. ● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시오. 	<ul style="list-style-type: none"> ● 보수전에 전원을 차단하십시오. 	<ul style="list-style-type: none"> ● 판넬이 열린 상태로 작동치 마십시오. 	Korean 위험
<ul style="list-style-type: none"> ● ابعء رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها. 	<ul style="list-style-type: none"> ● أقطع التيار الكهربائي قبل القيام بأية صيانة. 	<ul style="list-style-type: none"> ● لا تشغيل هذا الجهاز إذا كانت الاغطية الحديدية الواقية ليست عليه. 	Arabic تحذير

LEIA E COMPREENDA AS INSTRUÇÕES DO FABRICANTE PARA ESTE EQUIPAMENTO E AS PARTES DE USO, E SIGA AS PRÁTICAS DE SEGURANÇA DO EMPREGADOR.

使う機械や溶材のメーカーの指示書をよく読み、まず理解して下さい。そして貴社の安全規定に従って下さい。

請詳細閱讀並理解製造廠提供的說明以及應該使用的銀擇材料，並請遵守貴方的有關勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

اقرأ بتمعن وافهم تعليمات المصنع المنتج لهذه المعدات والمواد قبل استعمالها واتبع تعليمات الوقاية لصاحب العمل.

LIMITED WARRANTY

STATEMENT OF WARRANTY:

The Lincoln Electric Company (Lincoln) warrants to the original purchaser (end-user) of new equipment that it will be free of defects in workmanship and material.

This warranty is void if Lincoln finds that the equipment has been subjected to improper care or abnormal operation.

WARRANTY PERIOD:

All warranty periods date from the date of shipment to the original purchaser and are as follows:

Three Years:

- Transformer Welders
- Motor-generator Welders
- Semiautomatic Wire Feeders
- Plasma-cutting Power Source
- Engine Driven Welders (except engine and engine accessories) with operating speed under 2,000 RPM

Two Years:

- Engine Driven Welders (except engine and engine accessories) with operating speed over 2,000 RPM

All engine and engine accessories are warranted by the engine or engine accessory manufacturer and are not covered by this warranty.

Equipment not listed above such as guns and cable assemblies, automatic wire feeders and field-installed optional equipment is warranted for one year.

TO OBTAIN WARRANTY COVERAGE:

You are required to notify Lincoln Electric, your Lincoln Distributor, Lincoln Service Center or Field Service Shop of any defect within the warranty period. Written notification is recommended.

WARRANTY REPAIR:

If Lincoln's inspection of the equipment confirms the existence of a defect covered by this warranty, the defect will be corrected by repair or replacement at Lincoln's option.

WARRANTY COSTS:

You must bear the cost of shipping the equipment to a Lincoln Service Center or Field Service Shop as well as return shipment to you from that location.

IMPORTANT WARRANTY LIMITATIONS:

- Lincoln will not accept responsibility for repairs made without its authorization.
- Lincoln shall not be liable for consequential damages (such as loss of business, etc.) caused by the defect or reasonable delay in correcting the defect.
- Lincoln's liability under this warranty shall not exceed the cost of correcting the defect.
- This written warranty is the **only** express warranty provided by Lincoln with respect to its products. Warranties implied by law such as the Warranty of Merchantability are limited to the duration of this limited warranty for the equipment involved.



THE LINCOLN ELECTRIC COMPANY

World's Leader in Welding and Cutting Products • Premier Manufacturer of Industrial Motors
Sales and Service through Subsidiaries and Distributors Worldwide

Cleveland, Ohio 44117-1199 U.S.A.

Eff. Jan. '92 *RAM*

Litho in U.S.A.