



Operator's Manual

IDEALARC® DC-1500



For use with machines having Code Numbers:
12479



Register your machine:
www.lincolnelectric.com/register

Authorized Service and Distributor Locator:
www.lincolnelectric.com/locator

Save for future reference

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)

Need Help? Call 1.888.935.3877
to talk to a Service Representative

Hours of Operation:
8:00 AM to 6:00 PM (ET) Mon. thru Fri.

After hours?
Use "Ask the Experts" at lincolnelectric.com
A Lincoln Service Representative will contact you
no later than the following business day.

For Service outside the USA:
Email: globalservice@lincolnelectric.com

THANK YOU FOR SELECTING A QUALITY PRODUCT BY LINCOLN ELECTRIC.

PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

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 and cutting 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 MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.** And, most importantly, think before you act and be careful.

WARNING

This statement appears where the information must be followed exactly to avoid serious personal injury or loss of life.

CAUTION

This statement appears where the information must be followed to avoid minor personal injury or damage to this equipment.



KEEP YOUR HEAD OUT OF THE FUMES.

DON'T get too close to the arc. Use corrective lenses if necessary to stay a reasonable distance away from the arc.

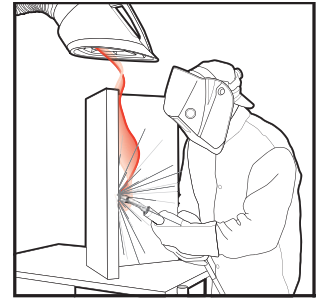
READ and obey the Safety Data Sheet (SDS) and the warning label that appears on all containers of welding materials.

USE ENOUGH VENTILATION or exhaust at the arc, or both, to keep the fumes and gases from your breathing zone and the general area.

IN A LARGE ROOM OR OUTDOORS, natural ventilation may be adequate if you keep your head out of the fumes (See below).

USE NATURAL DRAFTS or fans to keep the fumes away from your face.

If you develop unusual symptoms, see your supervisor. Perhaps the welding atmosphere and ventilation system should be checked.



WEAR CORRECT EYE, EAR & BODY PROTECTION

PROTECT your eyes and face with welding helmet properly fitted and with proper grade of filter plate (See ANSI Z49.1).

PROTECT your body from welding spatter and arc flash with protective clothing including woolen clothing, flame-proof apron and gloves, leather leggings, and high boots.

PROTECT others from splatter, flash, and glare with protective screens or barriers.

IN SOME AREAS, protection from noise may be appropriate.

BE SURE protective equipment is in good condition.

Also, wear safety glasses in work area **AT ALL TIMES.**



SPECIAL SITUATIONS

DO NOT WELD OR CUT containers or materials which previously had been in contact with hazardous substances unless they are properly cleaned. This is extremely dangerous.

DO NOT WELD OR CUT painted or plated parts unless special precautions with ventilation have been taken. They can release highly toxic fumes or gases.

Additional precautionary measures

PROTECT compressed gas cylinders from excessive heat, mechanical shocks, and arcs; fasten cylinders so they cannot fall.

BE SURE cylinders are never grounded or part of an electrical circuit.

REMOVE all potential fire hazards from welding area.

ALWAYS HAVE FIRE FIGHTING EQUIPMENT READY FOR IMMEDIATE USE AND KNOW HOW TO USE IT.



SECTION A: WARNINGS



CALIFORNIA PROPOSITION 65 WARNINGS

Diesel Engines

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Gasoline Engines

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety 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. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.



FOR ENGINE POWERED EQUIPMENT.

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



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

- 1.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.



- 1.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.



- 1.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.

- 1.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.

- 1.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.

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



ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS



- 2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines
- 2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.
- 2.c. Exposure to EMF fields in welding may have other health effects which are now not known.
- 2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:
- 2.d.1. Route the electrode and work cables together - Secure them with tape when possible.
- 2.d.2. Never coil the electrode lead around your body.
- 2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.
- 2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.
- 2.d.5. Do not work next to welding power source.



ELECTRIC SHOCK CAN KILL.



- 3.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.
- 3.b. Insulate yourself from work 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 (Wire) Welder.
 - DC Manual (Stick) Welder.
 - AC Welder with Reduced Voltage Control.
- 3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically “hot”.
 - 3.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.
 - 3.e. Ground the work or metal to be welded to a good electrical (earth) ground.
 - 3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
 - 3.g. Never dip the electrode in water for cooling.
 - 3.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.
 - 3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.
 - 3.j. Also see Items 6.c. and 8.



ARC RAYS CAN BURN.



- 4.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.
- 4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- 4.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.



- 5.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 hardfacing (see instructions on container or SDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation unless exposure assessments indicate otherwise. In confined spaces or in some circumstances, outdoors, a respirator may also be required. Additional precautions are also required when welding on galvanized steel.**
- 5.b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.
- 5.c. 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.
- 5.d. 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.
- 5.e. Read and understand the manufacturer’s instructions for this equipment and the consumables to be used, including the Safety Data Sheet (SDS) and follow your employer’s safety practices. SDS forms are available from your welding distributor or from the manufacturer.
- 5.f. Also see item 1.b.



WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION.



- 6.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. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.
- 6.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.
- 6.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.
- 6.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 from the American Welding Society (see address above).
- 6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.
- 6.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.
- 6.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.
- 6.h. Also see item 1.c.
- 6.i. Read and follow NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work", available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, MA 02269-9101.
- 6.j. Do not use a welding power source for pipe thawing.



CYLINDER MAY EXPLODE IF DAMAGED.

- 7.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. 
- 7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- 7.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.
- 7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.
- 7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- 7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- 7.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, 14501 George Carter Way Chantilly, VA 20151.



FOR ELECTRICALLY POWERED EQUIPMENT.



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

Refer to
<http://www.lincolnelectric.com/safety>
for additional safety information.

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Parts List	parts.lincolnelectric.com
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Content/details may be changed or updated without notice. For most current Instruction Manuals, go to parts.lincolnelectric.com.

TECHNICAL SPECIFICATIONS – DC-1500

INPUT: THREE PHASE ONLY						
INPUT AC VOLTAGE (U ₁)	FREQUENCY	AC INPUT CURRENT (I _{1MAX} , I _{1EFF}) AT 1500A 44V MAXIMUM RATED OUTPUT (I ₂ , U ₂)				
380V _{RMS}	50/60Hz	216A _{RMS}				
440V _{RMS}	50/60Hz	187A _{RMS}				
RATED OUTPUTS (ALL MODES)						
	DUTY CYCLE ⁽¹⁾ (X)	DC AMPS _{AVG}		DC VOLTS _{AVG}		
MAXIMUM	100%	1500 (I ₂)		44 (U ₂)		
MINIMUM	100%	200		24		
ADDITIONAL OUTPUTS (ALL MODES)						
	DUTY CYCLE ⁽¹⁾ (X)	DC AMPS _{AVG}		DC VOLTS _{AVG}		
MAXIMUM	100%	1500		60		
MINIMUM	100%	200		20		
OCV VOLTAGE AND AUXILIARY POWER						
PEAK OPEN CIRCUIT (NO-LOAD) DC VOLTAGE (U ₀)			AC AUXILIARY POWER			
CV SUBMERGED ARC: 100V			110 VOLTS _{RMS} 8 AMPS _{RMS}			
CV INNERSHIELD: 97V						
CC SUBMERGED ARC: 100V						
RECOMMENDED INPUT WIRE AND FUSE SIZES FOR MAXIMUM RATED OUTPUT. IN ADDITION, FOLLOW LATEST NATIONAL ELECTRICAL CODE AND LOCAL CODE.						
INPUT AC VOLTAGE (U ₁)	FREQUENCY	MAXIMUM EFFECTIVE INPUT CURRENT (I _{1EFF})	TYPE 90°C COPPER WIRE IN CONDUIT AWG (mm ²)	COPPER GROUND WIRE IN CONDUIT AWG (mm ²)	BUSSMANN LIMITRON FUSE SIZE AND CATALOG NUMBER ⁽²⁾	
					FUSE SIZE	CATALOG NUMBER
380V _{RMS}	50/60HZ	216A _{RMS}	4/0 (120)	3 (25)	400A	KTS-R-400
440V _{RMS}	50/60HZ	187A _{RMS}	3/0 (95)	3 (25)	350A	KTS-R-350
PHYSICAL DIMENSIONS						
HEIGHT	WIDTH	DEPTH		WEIGHT		
57.2 IN. 1453 MM	22.3 IN. 566 MM	38 IN. 965 MM		1420 LBS 644 KG.		
TEMPERATURE RANGES						
OPERATING TEMPERATURE RANGE			STORAGE TEMPERATURE RANGE			
14° F TO 104° F (-10° C TO +40° C)			-40° F TO 140° F (-40° C TO +60° C)			
INSULATION CLASS						
PRIMARY COILS		SECONDARY COILS		INTERPHASE COILS		
CLASS H (180° C)		CLASS F (155° C)		CLASS F (155° C)		
STANDARDS COMPLIANCE						
CCC, CE, IP21S						

(1) Based upon 10 minute time period (for 100% duty cycle, it is 10 minutes on and 0 minutes off).

(2) Use only Bussmann Limitron fuses specified. Other fuses may not protect the welder and may cause overheating and possible fire damage.



 WARNING	
	<ul style="list-style-type: none"> • Do not lift this machine using lift bale if it is equipped with a heavy accessory such as a trailer or gas cylinder. • Lift only with equipment of adequate lifting capacity. • Be sure machine is stable when lifting.
FALLING EQUIPMENT can cause injury.	

LOCATION

Install the welder in a dry location where there is free circulation of air in through the louvers in the front and out through the louvers in the back of the case. A location which minimizes the amount of smoke and dirt drawn into the machine reduces the chance of dirt accumulation that can block air passages and cause overheating.

This equipment is for industrial use only and it is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There can be potential difficulties in residential locations due to conducted as well as radiated radio-frequency disturbances. The EMC or RF classification of this equipment is Class A.


INPUT WIRING

 WARNING	
	<ul style="list-style-type: none"> • 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.
ELECTRIC SHOCK can kill.	

Failure to fuse the input lines per the specifications in this manual will constitute customer abuse and void the warranty.

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

Have a qualified electrician remove the lower right side case panel and connect 3 phase AC power to terminals L₁, L₂ and L₃ of the input contactor in accordance with the National Electrical Code, all local codes and the wiring diagram located inside the machine.

The frame of the welder must be grounded. A stud marked with the symbol  located on the fan shroud is provided for this purpose. See the U.S. National Electrical Code for details on proper grounding methods.

Connect the transformer input leads for the proper input voltage in accordance with the connection diagram pasted to the inside of the lower right side case panel.

 CAUTION

- Failure to follow these instructions can cause immediate failure of components within the machine.
- When powering welder from a generator be sure to **turn off the welder first, before generator is shut down in order to prevent damage to welder.**

OUTPUT CONNECTION (Turn Power Source Off)

1. Output Studs

The “Positive” and “Negative” output studs are located on the front panel. Two of each are provided to simplify connecting multiple electrode or work cables as suggested in the table below.

Connect the electrode cables to the “Positive” studs for electrode positive (DC+) polarity or to the “Negative” stud for electrode negative (DC-) polarity as required by the welding procedures. Connect the work cables to the other set of studs. Tighten the nuts with a wrench.

Suggested Copper Cable Sizes — 80% Duty Cycle		
Below 1000 amps	Two 4/0 (120mm ²)	Up to 200' (61m)
1000 to 1200 amps	Three 4/0 (120mm ²)	
1200 to 1500 amps	Four 4/0 (120mm ²)	

2. Auxiliary Power


This machine supplies the 8 amperes of 110 volt, AC power needed for the automatic wire feeders. The power is available from terminals #31 and #32 on the terminal strip.

3. Wire Feeder Connection

Turn the welder off. Remove the screw and lift the hinged door on the front of the control panel to expose the terminal strips. Connect the leads of the wire feeder input control cable to the terminal strip *exactly* as specified in the appropriate connection diagram included in the wire feeder Operating Manual. Attach the control cable to the panel at the right of the terminal strip using the clamp attached to the control cable. Close the door and replace the screw.

To connect the DC-1500 to wire feeders not covered in available connection diagrams, contact the factory for instructions giving complete nameplate information for the DC-1500 and wire feeder.

4. Optional Remote Control (K775)

To install, turn the power off. Remove the screw and lift the hinged door on the front of the control panel to expose the terminal strips. Connect the numbered leads to the appropriate terminals — 75 to 75, etc — on the terminal strip and the green lead to the stud marked with the symbol . Attach the control cord to the panel at the right of the terminal strip using a suitable clamp. Close the door and replace the screw. The Remote Control cord can be lengthened to any length by properly splicing an appropriate four conductor rubber-covered cable to the standard 25' (7.6m) cord before connecting to the DC-1500 terminal strip.

5. Connecting for Air Carbon Arc

To use the DC-1500 for air carbon arc or other applications, disconnect all wire feeder welding cables and control leads and connect a jumper between #2 and #4 on the terminal strip on the front of the DC-1500. With the #2 to #4 jumper connected, the output studs are energized whenever the machine is on.

WARNING

If the electrode leads to the wire are not disconnected per instructions, the wire feeder nozzle or gun and electrode will be electrically "hot".

6. DC-1500 Paralleling Kit

A kit for field installation only, (order K1900-1) is available for paralleling two DC-1500's for currents up to 3000 amperes, 100% duty cycle. Complete installation instructions are shipped with the kit.

7. Connecting for High Frequency Starting

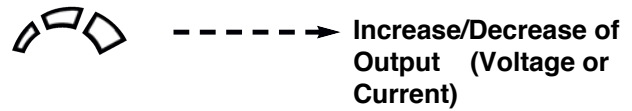
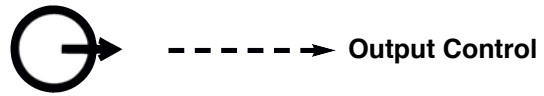
As shipped, these welders can be used with a high frequency unit for improved automatic welding starting characteristics.

SAFETY PRECAUTIONS

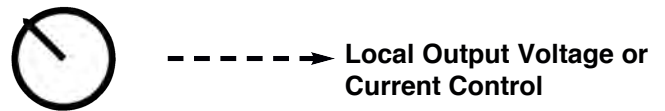
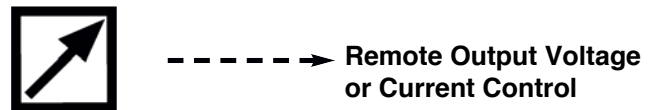
⚠ WARNING

 ELECTRIC SHOCK can kill.	<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.
 FUMES AND GASES can be dangerous.	<ul style="list-style-type: none"> • Keep your head out of fumes. • Use ventilation or exhaust to remove fumes from breathing zone.
 ARC RAYS can burn.	<ul style="list-style-type: none"> • Wear eye, ear and body protection.
 WELDING SPARKS can cause fire or explosion.	<ul style="list-style-type: none"> • Keep flammable material away.

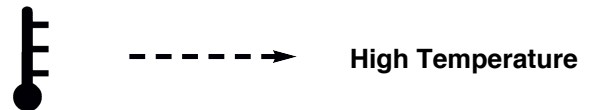
OUTPUT CONTROL DIAL



OUTPUT CONTROL LOCAL-REMOTE SWITCH



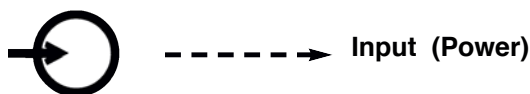
THERMAL PROTECTION LIGHT



MEANINGS OF SYMBOLS

The DC-1500 nameplate has been designed to use international symbols in describing the function of the various components. Below are the symbols used.

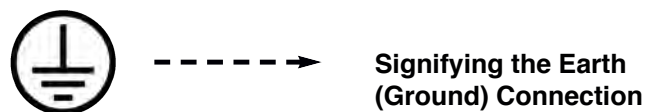
POWER ON-OFF SWITCH










ELECTRODE POLARITY SWITCH



EARTH GROUND CONNECTION ON FAN SHROUD



RATING PLATE

IEC 60974-1	----->	Designates welder complies with International Electrotechnical Commission requirements 60974-1.
3 ~	----->	Three Phase Power
	----->	Transformer
	----->	Rectifier
	----->	Rectified DC Output
	----->	Line Connection
	----->	Flux Cored Arc Welding
	----->	Submerged Arc Welding
IP21S	----->	Degree of protection provided by the enclosure
CE	----->	Designates welder complies with low voltage directive and with EMC directive.
	----->	Designates welder complies with China Compulsory Certificate
-10 Class A	----->	Designates welder complies with IEC 60974-10 Electromagnetic Capability (EMC) requirements for equipment used in industrial locations.
GB 15579.1-2013	----->	Designates welder complies with Chinese National Standard GB 15579.1-2013.

RATING PLATE

U ₀	----->	Rated peak no-load voltage (DC _{peak}).
U ₁	----->	Rated supply voltage (AC _{rms}).
U ₂	----->	Conventional load voltage (DC _{avg}).
I _{1max}	----->	Rated maximum supply current (AC _{rms}).
I _{1eff}	----->	Maximum effective supply current (AC _{rms}).
I ₂	----->	Rated welding current (DC _{avg}).
X	----->	Duty cycle. (Based upon 10 minute time period).

SET POLARITY

Connect the electrode cable to the “Positive” or “Negative” studs depending upon the electrode polarity desired. Connect the work cable to the other studs.

Set the “Electrode – / Electrode +” switch to correspond to the polarity of the electrode cable connection. This switch setting is necessary for proper operation of the Lincoln wire feeder attached to the power source.

START THE WELDER

Press the “On - Off” pushbuttons to start and stop the welder. The white pilot light near the center of the control panel indicates when the welder is on.

SET FOR MACHINE OR REMOTE CONTROL

The output can be controlled either at the wire feeder or the DC-1500.

To adjust the output from the wire feeder, set the toggle switch on the front of the DC-1500 to “Output Control Remote”. To adjust the output using the DC-1500 “Output Control” rheostat, set this switch to “Output Control Local”.

SET THE WELDER OUTPUT

With the toggle switch set to “Output Control Local”, rotating the “Output Control” rheostat on the DC-1500 from 1 to 10 increases the machine output from minimum to maximum. The same full range control is set from the wire feeder or K775 when the toggle switch is set to “Output Control Remote”.

Set the output as required by the welding procedures.

MODE SWITCH

The toggle switch labeled CV Innershield, CV Submerged Arc, CC Submerged Arc, is used to select the proper welder characteristics for the process being used.

The CV Innershield Mode permits the DC-1500 to produce essentially a flat output characteristic that can be varied from approximately 20 to 60 volts. In this position the dynamic characteristics of the machine under welding conditions provides optimum welding characteristics for Innershield welding and other open arc processes.

The CV Submerged Arc Mode also produces an essentially flat output characteristics that can be varied from approximately 20 to 60 volts. The dynamic characteristics of the CV Submerged Arc Mode are such that excellent submerged arc welding can be obtained for most procedures that previously required a constant current type power source.

The CC Submerged Arc Mode permits the DC-1500 to produce a constant current output characteristic through the range of 200A-28V to 1500A-60V with an open circuit voltage of 45 to 98 volts. Although almost

all submerged arc welding can now be done in the CV mode, the CC mode is available for those procedures where CC may still be desirable.

Set-up for Various Processes

Selection of mode switch position — There are several general rules to follow in the selection of the mode switch position.

1. Use the CV Innershield mode for all Innershield welding.
2. Use the CV Submerged Arc mode for most submerged arc welding. However, some high speed welding procedures may perform better on the CV Innershield mode.
3. The CC Submerged Arc mode is available for high current, large puddle submerged arc procedures that cannot be done as well with the constant voltage mode.
4. **Air Carbon Arc Gouging or Cutting** — For air carbon arc gouging, the CV Innershield mode is used with the output control set between 4 and max. depending on the application, carbon size, etc. Up to 1/2” (12.7mm) carbons, start with the machine control set at 4 and increase as required for long cable lengths. With 1/2” (12.7mm) and 5/8” (15.9mm) carbons, short (100')(30m) cable lengths can lead to occasional trip out of the protection circuit when the carbon is shorted to the work. Cutting back the output setting will reduce the short circuit current and minimize tripping. Longer cable lengths do an even better job since this also reduces the short circuit current but even more significantly permits raising the open circuit voltage (by increasing control setting) for smoother operation. See the table below for optimum cable size and length.

TABLE B.1

Carbon Size	Typical Current Range	Combined Total Electrode and Work Lead Length		Electrode and Work Lead Size
		(Min)	(Max)	
1/2” (12.7mm)	600-1000 Amps	250’ (76m)	825’ (250m)	2 — 4/0 (120mm ²)
5/8” (15.9mm)	800-1200 Amps	375’ (114m)	925’ (280m)	3 — 4/0 (120mm ²)

If ever longer leads are used and the output control is already set on max., the unit has reached its maximum air carbon arc capability.

3/4” (19mm) carbons are not recommended for use with the DC-1500 because the high surge currents that occur with this diameter can cause the DC-1500 fault protection circuitry to trip the machine off the line, if the operator does not gouge in such a way to limit the currents.

General Set-Up Procedures When Using DC-1500 and Lincoln Automatic Head NA-3

(Read the following and refer to Table B.3 in the Operation Section.)

- 1. NA-3** — The NA-3 should be set for the mode being used on the power source. If using either of the CV modes, the NA-3 VV board switch should be set for CV. If the power source is used in the CC mode, then the NA-3 VV board mode switch should be placed in the VV position.

All NA-3's when used with the DC-1500 are capable of cold starting with the variable voltage board mode switch in VV. Cold starting permits the wire to be inched down to the work, automatically stop and automatically energize the flux hopper valve. All NA-3's made after September 1976, are capable of cold starting on either CV or VV settings of the variable voltage board switch.

- 2. Arc striking with DC-1500 mode switch on CV Submerged Arc or CV Innershield** — There are a number of basic techniques for good arc striking that apply to all processes and power sources. It may not be necessary in every application to follow these guidelines, but when striking problems do occur, following the suggestions below should provide trouble-free starting. These procedures apply to all single solid wire, Innershield wire, and Twinarc 1/8" (3.2mm) and 3/32" (2.4mm) solid wire.

- Except for long stickout Innershield procedures and Tiny Twinarc 1/16" (1.6mm) procedures, an NA-3 start board is not needed. If a start board is not needed, it should be removed from the machine, or at least disconnected and the logic board jumper plug replaced. Leaving it connected makes the setup for arc striking more difficult. Also, if a crater board is not needed, it should be removed from the NA-3 or at least electrically disconnected and the jumper plug replaced.
- Cut electrode to a sharp point.
- For cold starts, make certain work piece is clean and electrode makes positive contact with plate.
- For hot starts, travel should be started before wire contacts the work ("on the fly" starting).
- Set NA-3 open circuit voltage control to approximately the same setting as the weld setting. For initial test welds, choose the voltage setting based on the Table B.2. Set the inch control to 2.

These are approximate settings only until the welding procedure has been set.

It should be noted that with the DC-1500 the OCV required for optimum starting is lower than that required with other type power sources.

TABLE B.2

Approximate Voltage	Voltage Control Setting
22-24	2
34-36	4
46-48	6
56-60	8

- Run a test weld, setting the proper current, voltage and travel speed.
- Once the proper welding procedure is established and if the start is poor — wire blast-off, stub, etc., adjust the OCV and inch speed for optimum starting. In general, a low inch speed will provide the best starting.

Adjust the OCV by making repeated starts and observing the voltmeter action.

With proper adjustment of the OCV control, the voltmeter needle will swing smoothly up to the desired arc voltage and thus provide repeatable starts.

If the voltmeter swings *above* then back to the desired welding voltage, the OCV setting is *too high*. This usually results in a bad start where the wire tends to "blast-off".

If the voltmeter needle *hesitates* before coming up to the desired voltage, the OCV is set *too low*.

This will cause the electrode to stub.

- For Twinarc welding, clipping both wires to equal lengths will be beneficial to make consistently good starts.
- 3. Single Innershield Wire** — Procedures and techniques are the same as above, except starting is generally better "hot" than "cold". For electrical stickouts above 1 3/4" (44mm) an NA-3 start board is required.
 - 4. Twinarc Innershield** — Procedures and techniques are the same as above, except starting is generally better "hot" than "cold". Use of an NA-3 start board improves starting.
 - 5. Twinarc Submerged Arc 1/16" (1.6mm)** — Procedures and techniques are the same as above, except starting is best when using CV Innershield and the NA-3 start board.
 - 6. Use of the NA-3 Start Board** — For those processes above that recommend use of the NA-3 start board, the following method should be used to set up the procedure.
 - A Set start time at 0 and start current and voltage at mid-range. Start the weld and set the proper current and voltage for the welding procedure.
 - B Turn the start board timer to maximum.
 - C Set start board current 1 to 1 1/2 dial numbers below NA-3 front control settings.

- D Place start board's voltage control approximately equal to NA-3 voltage control setting.
- When set per C and D, above, the starting only procedure will provide a current setting lower than the NA-3 current setting and a voltage setting nearly equal to the desired welding procedure.
- E With the start board time delay set at maximum, establish the correct arc striking procedure as described previously by changing OCV and inch speed.
- F Now increase the start board current and voltage to bring the start current and voltage closer to the welding procedure. The start board current and voltage should be as close to the welding procedure as possible while still getting satisfactory starts.
- G Now decrease the start time as low as possible for optimum starts.

7. Arc striking with the DC-1500 mode switch in CC Submerged Arc.

- **NA-3** — The NA-3 variable voltage board mode switch should be set to the VV position.
- Set OCV control at 6.5 to 7.0.
- Other techniques recommended in the previous sections for good arc striking apply here also.

General Set-Up Procedures When Using DC-1500 and Lincoln Automatic Head NA-5

(See Table B.3)

1. Install the NA-5 per the information in the NA-5 operating manual. Connect the NA-5 to the DC-1500 as described on the connection diagram.
2. Place the DC-1500 mode switch in the proper position according to the process and procedure to be used.
3. Place the local/remote switch in remote.
4. Connect the work lead to the work or a suitable piece of scrap. Clip the end of the electrode to a sharp point.
5. Preset the Start (if used), Weld and Crater (if used) Controls to the wire speed and voltage specified in the procedure.
6. Make several test welds, readjusting the starting and stopping controls in the following order:
 - Set the Arc Striking Wire Speed and Volts Controls for optimum arc striking.



For initial test welds, set the NA-5 arc striking wire speed control to 1/2 the weld wire feed speed and the arc striking voltage control 4 volts above the weld voltage.

- If striking is still not satisfactory, see the NA-5 operating manual for information on the feed motor acceleration.
- If installed, adjust the “Start Controls” to set the welding procedures for the time set on the timer to provide the bead size, penetration, or other factor as needed for the application. If not used, this board should be disconnected and the jumper plug replaced.
- If installed, adjust the “Crater Controls” to set the welding procedures for the set time after the stop button is pressed to provide the bead size or fill the crater as needed for the application. If not used, this board should be disconnected and the jumper plug replaced.
- Set the “Burnback Time” to provide the stopping characteristics needed.

**TABLE B.3
RECOMMENDED SET-UP PROCEDURES FOR NA-3/DC-1500, NA-5/DC-1500**

Equipment and Control Settings	INNERSHIELD						SUBMERGED ARC							
	Single Innershield Stickout under 1 3/4" (44mm)		Single Innershield Stickout over 1 3/4" (44mm)		Twinarc Innershield		Single Solid Wire		Tiny Twin 1/16" (1.6mm)		Tiny Twin Over 1/16" (1.6mm)		High Current Very Large Puddle	
Wire Feed Type Control	NA-3S or NA-3N	NA-5	NA-3S or NA-3N	NA-5	NA-3S or NA-3N	NA-5	NA-3S	NA-5	NA-3S	NA-5	NA-3S	NA-5	NA-3S	NA-5
NA-3S VV Board Mode Switch	CV	—	CV	—	CV	—	CV	—	CV	—	CV	—	VV	—
NA-3 Inch Speed Dial Setting ⁽⁵⁾	2	—	2	—	2	—	2	—	2	—	2	—	2	—
NA-5 Arc Striking Wire Speed ⁽⁵⁾	—	⁽⁴⁾	—	⁽⁴⁾	—	⁽⁴⁾	—	⁽⁴⁾	—	⁽⁴⁾	—	⁽⁴⁾	—	⁽⁴⁾
NA-3 OCV Control ⁽⁶⁾	⁽⁶⁾	—	⁽⁶⁾	—	⁽⁶⁾	—	⁽⁶⁾	—	⁽⁶⁾	—	⁽⁶⁾	—	6.5 - 7.0	—
NA-5 Arc Striking Volts Control	—	⁽⁴⁾	—	⁽⁴⁾	—	⁽⁴⁾	—	⁽⁴⁾	—	⁽⁴⁾	—	⁽⁴⁾	—	⁽⁴⁾
NA-3 Start Board	⁽²⁾	—	Req'd ⁽²⁾	—	Req'd ⁽²⁾	—	⁽²⁾	—	⁽²⁾	—	⁽²⁾	—	⁽²⁾	—
DC-1500 Output Control Switch — Local or Remote	Remote		Remote		Remote		Remote		Remote		Remote		Remote	
DC-1500 Mode Switch	CV Innershield		CV Innershield		CV Innershield		CV Submerged Arc ⁽³⁾		CV Innershield		CV Submerged Arc ⁽³⁾		NA-3S	NA-5
													CC	CVS
DC-1500 Output Control	Inoperative		Inoperative		Inoperative		Inoperative		Inoperative		Inoperative		Inoperative	

⁽¹⁾ Starting is best with “hot” starting. Start button is pressed with wire above the work.
⁽²⁾ If an NA-3 start board is called for, refer to **(General Set-Up Procedures When Using DC-1500 and Lincoln Automatic Head NA-3 in this Operation Section)** for details on how to set the controls. If an NA-3 start board is not required, it should be electrically disconnected and the jumper plug replaced.
⁽³⁾ Some high speed welding procedures may perform better on the CV Innershield mode. Merely change the switch between CV Innershield and CV Submerged Arc position and select the best welding.
⁽⁴⁾ The NA-5 arc striking wire speed should initially be set at 1/2 the welding wire feed speed, and the NA-5 arc striking volts control 4 volts above the welding voltage. These controls can be adjusted as required for optimum arc striking.
⁽⁵⁾ Exact dial setting depends on cable size and length, carbon size, etc.
⁽⁶⁾ Set the OCV control to the same dial setting as the NA-3 voltage control. For initial test welds, choose the setting on Table B.1 in this Operation Section.

 WARNING	
	<ul style="list-style-type: none">• 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.
ELECTRIC SHOCK can kill.	

GENERAL MAINTENANCE

1. The fan motors have 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.

OVERLOAD PROTECTION AND THE THERMAL PROTECTION LIGHT

The DC-1500 has built-in protective thermostats. If the rectifier or transformer reaches the maximum safe operating temperature because of frequent overload or high room temperature plus overload, the contactor drops out stopping the welder. Pressing the “On” button will illuminate an amber light on the front of the machine indicating that one of the thermostats has opened. The thermostat will automatically reset when the temperature reaches a safe operating level. Press the “On” button to start the welder.

The power rectifiers are also protected by a special solid state circuit. With the occurrence of a short circuit or excessively high overloads, the input contactor opens. When the overload is removed, press the “On” button to start the welder.

An 8 amp slow blow fuse located on the front of the machine protects the 110 volt auxiliary AC circuit (#31 and #32) from overload. If replacing, use the same type and size fuse.

HOW TO USE TROUBLESHOOTING GUIDE

WARNING

Service and Repair should only be performed by Lincoln Electric Factory Trained Personnel. Unauthorized repairs performed on this equipment may result in danger to the technician and machine operator and will invalidate your factory warranty. For your safety and to avoid Electrical Shock, please observe all safety notes and precautions detailed throughout this manual.

This Troubleshooting Guide is provided to help you locate and repair possible machine malfunctions. Simply follow the three-step procedure listed below.

Step 1. LOCATE PROBLEM (SYMPTOM).

Look under the column labeled "PROBLEM (SYMPTOMS)". This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting.

Step 2. POSSIBLE CAUSE.

The second column labeled "POSSIBLE CAUSE" lists the obvious external possibilities that may contribute to the machine symptom.

Step 3. RECOMMENDED COURSE OF ACTION

This column provides a course of action for the Possible Cause, generally it states to contact your local Lincoln Authorized Field Service Facility.

If you do not understand or are unable to perform the Recommended Course of Action safely, contact your local Lincoln Authorized Field Service Facility.

Note: To locate the "Firing Circuit" and "Control Circuit" P.C. boards, remove the upper case panel on the left side of the machine. The names are printed on the boards.

CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Input contactor (CR1) chatters.	<ol style="list-style-type: none"> 1. Faulty input contactor (1CR). 2. Low line voltage. 3. Faulty protection relay (2CR). 	<ol style="list-style-type: none"> 1. Repair or replace. 2. Check with power company. 3. Replace relay.
Machine input contactor does not operate.	<ol style="list-style-type: none"> 1. Supply line fuse blown. 2. Contactor power circuit dead. 3. Broken power lead. 4. Wrong input voltage. 5. Primary or power SCR thermostats open. Amber thermostat light will illuminate when the "On" button is pressed. 6. Open input contactor (1CR). 7. Faulty on-off switch. 8. Faulty protection relay (2CR). 	<ol style="list-style-type: none"> 1. Replace if blown. Look for reason first. 2. Check pilot transformer T1 and associated leads and 5 amp fuse. 3. Check input voltage at contactor. 4. Check voltage against nameplate. 5. Check for overheating. Make sure both fans are operating and there is no obstruction to free air flow. Faulty thermostats — replace. 6. Replace contactor. 7. Replace switch. 8. Replace relay.
Machine input contactor operates but no output when trying to weld.	<ol style="list-style-type: none"> 1. Electrode or work lead loose or broken. 2. Open main transformer (T5) primary or secondary circuit. 3. "Firing Circuit" P.C. board not connected or is faulty. 4. Output pilot relay (6CR) not operating or faulty. 	<ol style="list-style-type: none"> 1. Repair connection. 2. Repair. 3. All nine light emitting diodes (1 thru 9) must be lit. (See "P.C. Board Troubleshooting Guide".) 4. Check relay by connecting a jumper across terminals 2 and 4 on DC-1500 terminal strip. Replace if faulty.
Machine has maximum output but no control.	<ol style="list-style-type: none"> 1. "Output Control" switch (SW4) in wrong position. 2. "Output Control" switch faulty. 3. Open in feed back circuitry. 4. Faulty "Control Circuit" or "Firing Circuit" P.C. boards. 5. Output control potentiometer open (lead no. 75). 	<ol style="list-style-type: none"> 1. Check position of switch. 2. Check switch and replace if faulty. 3. Check wiring and control and "Firing Circuit" P.C. board wiring harness plugs. 4. All light emitting diodes must be lit, except 4 on "Control Circuit" board. (See "P.C. Board Troubleshooting Guide".) 5. Check and replace if faulty.

 **CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

IDEALARC® DC-1500



Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Machine does not have maximum output.	<ol style="list-style-type: none"> 1. One input fuse blown. 2. One phase of main transformer open. 3. Faulty "Control Circuit" or "Firing Circuit" P.C. boards. 4. Output control potentiometer defective. 5. Output control potentiometer leads open 226, 237, 236, 73, 74, 76, 77. 	<ol style="list-style-type: none"> 1. Check and replace if blown after checking for reason for blown fuse. 2. Check for open and repair. 3. All light emitting diodes must be lit on both P.C. boards, except 4 on "Control Circuit" board. (See "P.C. Board Troubleshooting Guide.") 4. Check and replace if faulty. 5. Check and repair broken leads.
Machine has output but trips off immediately.	<ol style="list-style-type: none"> 1. Machine has either an internal or external short circuit on the output. 2. Faulty "Control Circuit" P.C. board. 3. Machine output voltage applied to control leads. 	<ol style="list-style-type: none"> 1. Check internally and externally for any shorts and remove or repair. 2. If no short circuits, LED 4 must be lit (See "P.C. Board Troubleshooting Guide"). 3. Check control cable or wire feeder for shorted or grounded control leads.
Variable or sluggish welding arc.	<ol style="list-style-type: none"> 1. Poor work or electrode connection. 2. Welding Cables too small. 3. Welding current or voltage too low. 	<ol style="list-style-type: none"> 1. Check and clean all connections. 2. Check Suggested Copper Cable Sizes in the table of the Installation Section. 3. Check procedures for recommended settings.
Machine will not shut off.	<ol style="list-style-type: none"> 1. Input contacts frozen. 2. Output pilot relay (6CR) contacts stuck closed. 	<ol style="list-style-type: none"> 1. Check for approximately .13 inch (3.3mm) clearance between contacts. 2. Check and replace if necessary.

 **CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

IDEALARC® DC-1500



Observe all Safety Guidelines detailed throughout this manual



PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Output control not functioning on the machine.	<ol style="list-style-type: none"> 1. "Output Control" switch in the wrong position. 2. Faulty output control switch. 3. Faulty "Output Control" rheostat. 4. Leads or connections open in "Control Circuit". 5. Faulty "Firing Circuit" or "Control Circuit" P.C. board. 	<ol style="list-style-type: none"> 1. Place switch in "Output Control at Local". 2. Check and replace if found faulty. 3. Check and replace if found faulty. 4. Check lead continuity and connections for an open and repair if necessary. 5. All light emitting diodes must be lit on both P.C. boards, except 4 on "Control Circuit" board. (See "P.C. Board Troubleshooting Guide.")
Output control not functioning on the machine.	<ol style="list-style-type: none"> 1. "Output Control" switch (SW4) in the wrong position. 2. Faulty output control switch (SW4). 3. Faulty remote control rheostat. 4. Leads or connections open in "Control Circuit" 5. Faulty "Firing Circuit" or "Control Circuit" P.C. board. 	<ol style="list-style-type: none"> 1. Place switch in "Output Control Remote". 2. Check and replace if found faulty. 3. Check and replace if found faulty. 4. Check all leads and connections, internal and remote, for continuity and repair if necessary. 5. All light emitting diodes must be lit on both P.C. boards, except 4 on "Control Circuit" board. (See "P.C. Board Troubleshooting Guide.")
Machine trips off with High Current Procedures on starting.	<ol style="list-style-type: none"> 1. OCV setting too high. 2. Defective "Control Circuit" P.C. board. 	<ol style="list-style-type: none"> 1. Reduce OCV setting. 2. Replace "Control Circuit" P.C. board.

 **CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

IDEALARC® DC-1500



 WARNING	
	<ul style="list-style-type: none"> • 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.
ELECTRIC SHOCK Can kill.	

CONTROL CIRCUIT P.C. BOARD

1. LED 1 indicates AC input voltage is present at pins 255-256. If not lit, check the voltage across the secondary winding of the control transformer T7. The voltage should be approximately 42 volts. If not, the problem is in the power supply and not the P.C. board.
2. LED 2 indicates welder output voltage is being supplied to the control circuit. If not lit, check to make certain 222 from pin 2 of the 12-pin control circuit P.C. board connector is connected to the power source negative output stud, and is not broken.
3. LED 3 indicates power is being applied to fault protection relay 2CR, when wire feeder button is pressed or jumper is connected across 2 and 4.
4. LED 4 indicates when fault protection circuit is being activated.
5. LED 5 indicates a control signal is being supplied to the firing circuit. As the output control is varied, LED 5 should change brilliancy.

FIRING CIRCUIT P.C. BOARD

Machine settings for P.C. board troubleshooting Terminals #2 and #4 jumpered on DC-1500. Output Control at Local. CC Submerged Arc operation.

All nine light emitting diodes must be lit when the power source is turned on and the wire feed arc start button is pressed or a jumper is connected between 2 and 4.

1. LED 7 indicates AC power being supplied to P.C. board from control transformer T2. If not lit, check voltage across terminals 203 and 204 on the terminal strip located on the left side of the bottom fan baffle. Voltage should be approximately 33 volts. If no voltage indicates a supply problem, check wiring and transformer.

If voltage is present, turn the machine off, remove the 12-pin harness plug from the P.C. board, turn the machine back on and check the voltage across pins 2 and 4 on the plug. This should be approximately 33 volts.

If no voltage and there is voltage at terminals 203 and 204 on terminal strip TS-1 this indicates a broken lead or loose terminal on either lead 203 or 204. If voltage is present and LED 7 is not lit, replace P.C. board.

2. LED 8 indicates AC power being supplied to P.C. board from control transformer T3. If not, follow the same procedure as above in (1) for terminals 205 and 206 on terminal strip TS-1 and pins 7 and 3 on the connector.
3. LED 9 indicates AC power being supplied to P.C. board from control transformer T4. If not, follow the same procedure as above in (1) for terminals 207 and 208 on terminal strip TS-1 and pins 9 and 8 on the connector.
4. LED 1 through 6 indicate gate signals are being supplied to the main power SCR's 1 through 6 respectively. If light LED 5 on the "Control Circuit" P.C. board and LED's 7 through 9 on the "Firing Circuit" P.C. board are lit and LED's 1 through 6 are not lit, check lead 231 between the "Firing Circuit" P.C. board and the "Control Circuit" P.C. board that is not broken and is connected to each connector. If the lead shows continuity and LED 1 through 6 are not lit, replace the "Firing Circuit" P.C. board. If any one of the LED's 1 through 6 is not lit and LED's 7 through 9 are lit, replace the "Firing Circuit" P.C. board.

If troubleshooting guide indicates a possible P.C. board problem, the guide on **TABLE E.1** can be used to locate the problem.

CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

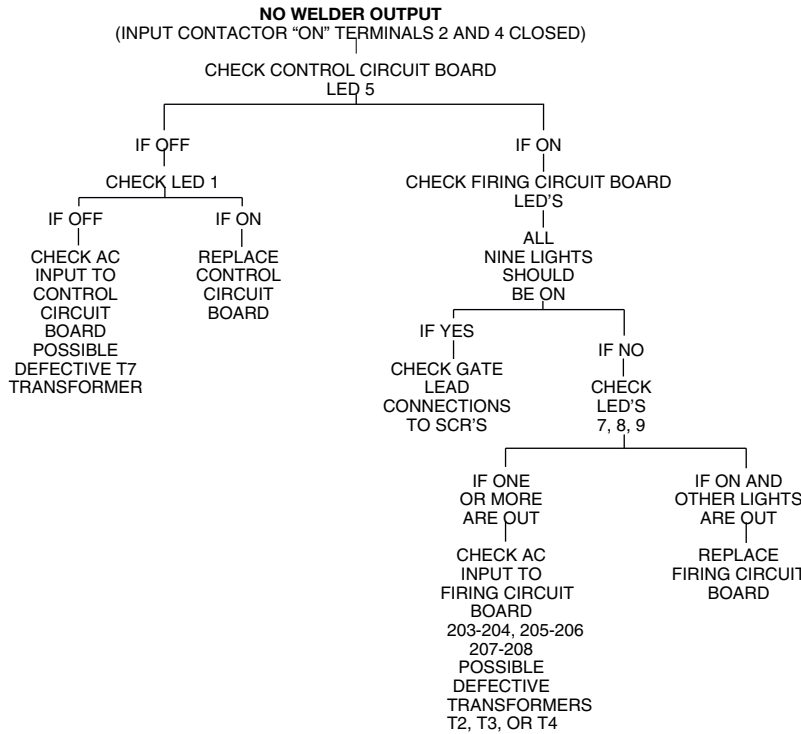
IDEALARC® DC-1500



Observe all Safety Guidelines detailed throughout this manual

TABLE E.1

OUTLINE FOR DC-1500 TROUBLESHOOTING GUIDE



MACHINE HAS OUTPUT BUT TRIPS OFF IMMEDIATELY

CHECK FOR SHORT BETWEEN ELECTRODE AND WORK LEADS. REMOVE EXTERNAL LEADS FROM THE OUTPUT TERMINALS

IF TROUBLE STILL PERSISTS, CHECK LED 3 ON CONTROL CIRCUIT BOARD

IF LIGHT GOES ON, THEN QUICKLY OUT WHEN START BUTTON IS PRESSED, CONTROL CIRCUIT BOARD IS DEFECTIVE AND SHOULD BE REPLACED


ERRATIC WELDING

CHECK PROCEDURE

CHECK MODE SWITCH FOR PROPER POSITION FOR PROCESS BEING USED

CHECK LED'S 1,2,3,4,5,6 FOR EQUAL BRILLIANCY

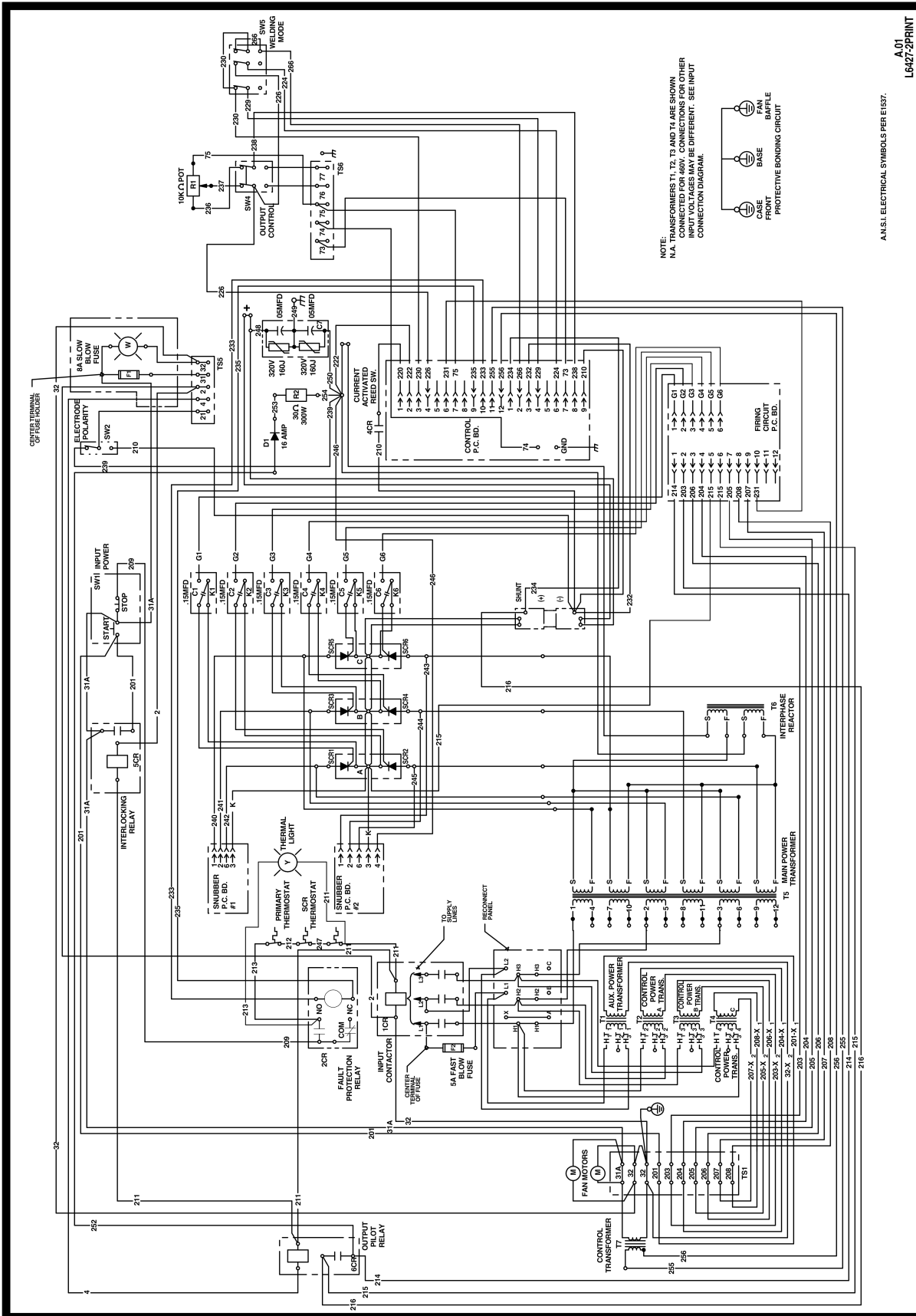
IF LIGHTS ARE NOT ALL APPROXIMATELY EQUAL BRIGHT, REPLACE FIRING CIRCUIT BOARD

⚠ WARNING	
	<ul style="list-style-type: none"> • 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.
ELECTRIC SHOCK can kill.	

⚠ CAUTION

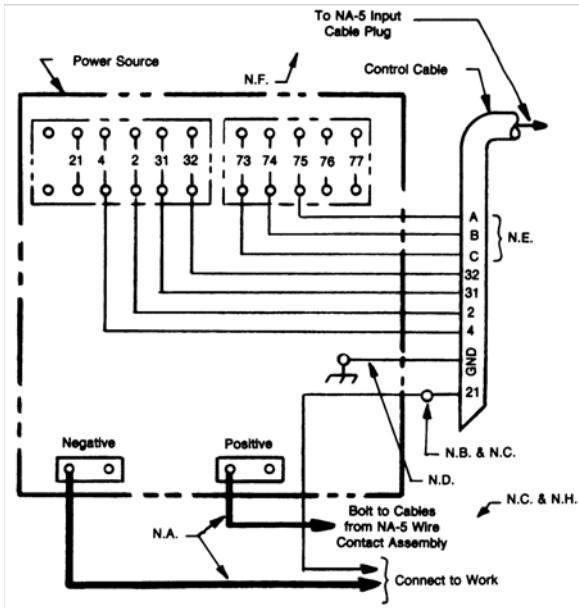
If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

DC1500 AMP IDEALARC - WIRING DIAGRAM




NOTE: This diagram is for reference only. It may not be 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 equipment code number.

Connection of DC-1500 to NA-5

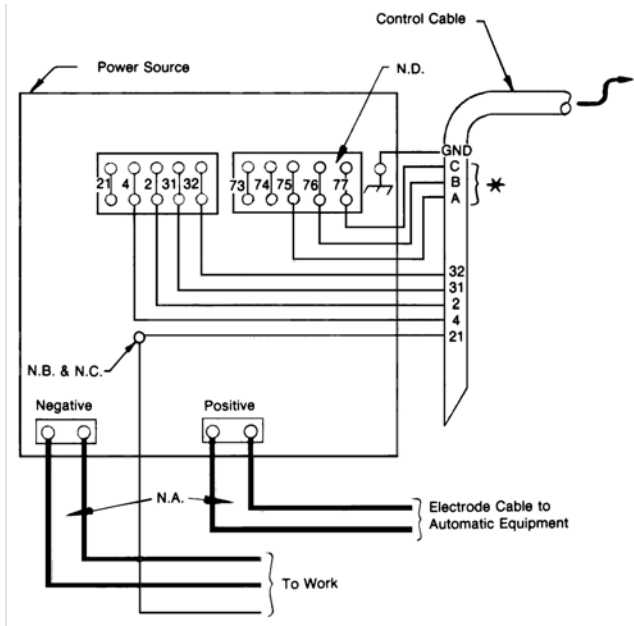



Above diagram shows electrode connected positive. To change polarity, turn power off, reverse the electrode and work leads at the power source, and position the switch on power source to proper polarity.

- 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 (2.5mm²) or larger insulated wire physically suitable for the installation. An S16586-[] remote voltage sensing work lead is available for this purpose. Connect it directly to the work piece keeping it separate from the welding work cable connection to work piece. For convenience, this extended #21 lead should be taped along the welding work cable. (This extended #21 lead connection replaces the need to employ the remote work lead accessory on LN-9's which have a direct work lead jack.)
- N.C. Tape up bolted connection.
- N.D. Connect the NA-5 control cable ground lead to the frame terminal marked  near the power source terminal strip. The power source must be properly grounded.
- N.E. If using an older automatic control cable with leads 75, 76, 77; connect lead 75 to #75 on terminal strip, connect lead #76 to #74 on terminal strip, connect lead #77 to #73 on terminal strip.
- N.F. Connect the jumpers on the NA-5 voltage board as follows: connect RED jumper to pin "S", connect WHITE jumper to pin "B".
- N.G. Set the DC-1500 controls as follows:
Set the control switch to "Output Control Remote". For C.V. Submerged Arc Processes, set the mode switch to "C.V. Submerged Arc". For Open Arc Processes, set the mode switch to "C.V. Innershield".
- N.H. For proper operation, the electrode cable **must** be snugged under the clamp bar on the left side of the NA-5 control box.

S16889
7-6-84G

Connection of DC-1500 to NA-3 (All), LT-5 or LT-7



Connect the control cable ground lead to the frame terminal marked  near the power source terminal strip. The power source must be properly grounded.

To automatic control box.

* If using an older control cable: Connect lead #75 to #75 on terminal strip, connect lead #76 to #76 on terminal strip, connect lead #77 to #77 on terminal strip.

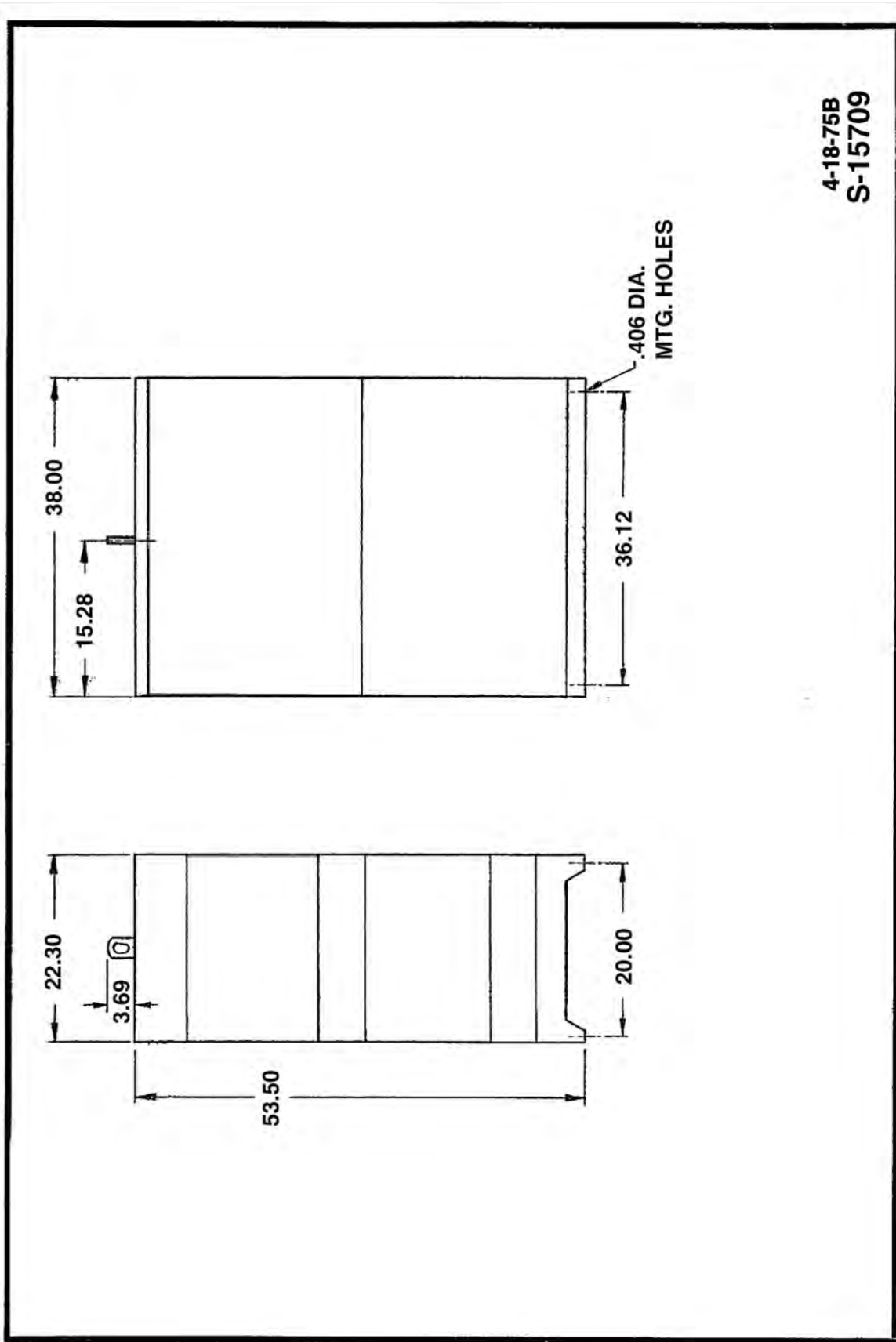
N.A. Welding cables must be of proper capacity for the current and duty cycle of immediate and future applications.

N.B. Extend lead 21 using #14 (2.5mm²) or larger insulated wire physically suitable for the installation. An S16586 remote voltage sensing work lead is available for this purpose. Connect it directly to the work piece keeping it separate from the welding work lead circuit and connection for convenience, this extended #21 lead should be taped to the welding work lead.

N.C. Tape up bolted connection.

Above diagram shows electrode connected positive. To change polarity, turn power source off, reverse the electrode and work leads at the power source and position the switch on power source to proper polarity. Also reverse the leads on the back of the ammeter and voltmeter in the automatic control box.

S15534
2-26-82B



IDEALARC® DC-1500





Service Navigator 2.0

Idealarc DC1500 - 12479

Index of Sub Assemblies - 12479

KEY	PART NUMBER	DESCRIPTION	QTY
	P-887-A	Index of Sub Assemblies	AR
	P-887-C	Front Panel Assembly	AR
	P-887-D	Transformer Assembly & Internal Parts -R	AR
	P-887-E	Internal Parts - Left Side	AR
	P-887-G	Rectifier Assembly	AR
	P-887-J	Remote Control	AR

Index of Sub Assemblies - 12479

**NO IMAGE
AVAILABLE**

No Image

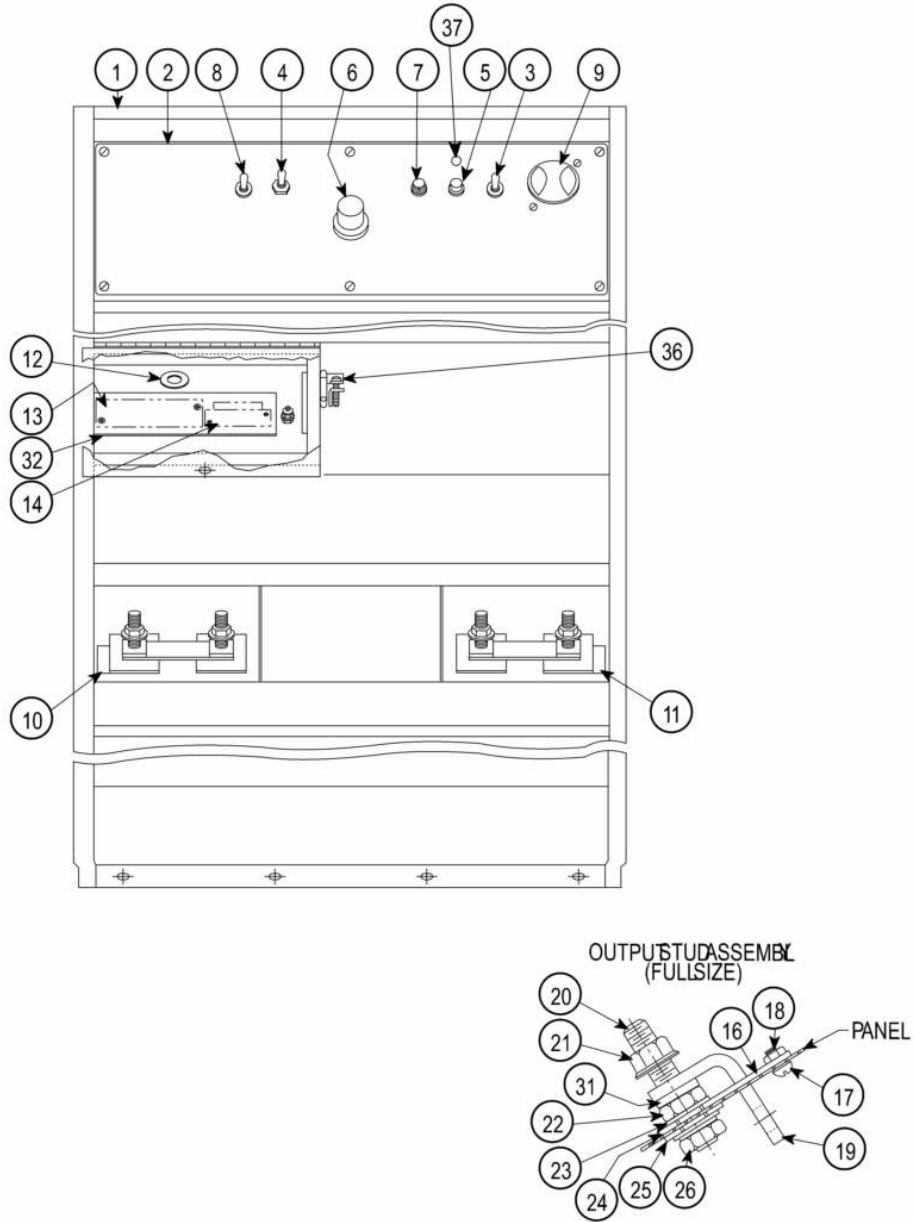
Front Panel Assembly

KEY	PART NUMBER	DESCRIPTION	QTY
1	9SL6477	FRONT PANEL ASBLY	1
2	9SL5813-6	Nameplate	1
3	9ST13562-1	TOGGLE SWTICH	1
4	9ST11160	SWITCH	1
5	9ST13486-4	PILOT LIGHT	1
6	9ST10812-40	RHEOSTAT	1
	9ST12792-1	INSULATION	1
	9ST10491	KNOB	1
7	9SS10433	FUSE-HOLDER30A	1
	9ST10728-16	FUSE	1
8	9ST13381-3	SWITCH TOGGLE 3PDT	1
9	9SM6574-A	PUSH BUTTON ASBLY	1
10	9ST12893	DECAL-NEGATIVE	1
11	9ST12892	DECAL-POSITIVE	1
12	9SS10255-14	GROMMET	1
13	9SS8542	TERMINAL STRIP	1
14	9SS14530-11	TERMINAL STRIP	1
16	9ST14373	INSULATION	4
17	9ST10082-4	SEMS SCREW	4
18	9SCF000010	#10-24HN	4
19	9ST8141-4	CONNECTION STRAP	4
20	9ST6931-11	STUD	4
21	9ST3960	FLANGE NUT	4
22	9SCF000054	1/2-13HJN	8
23	9SS9262-1	PLAIN WASHER	8
24	9ST14374	INSULATING BUSHING	4
25	9SS10773-9	INSULATING WASHER	4
26	9SE106A-15	LOCKWASHER	4
31	9SM8772-127	LEAD	2
32	9SS17405	NUMBER PLATE	1
36	9ST9639-1	CLAMP	1
37	9ST13486-2	PILOT LIGHT	1
	9SL6374-1	ROOF	1
	9SL5347-1	CASE SIDE	2

Front Panel Assembly

KEY	PART NUMBER	DESCRIPTION	QTY
	9SL5347-2	CASE SIDE	2
	9SL5353	REAR PANEL	1
	9SL5352	REAR PANEL	1
	9SS17201-1	OUTPUT BY-PASS CAPACITORASBLY	1
	9ST13260-4	DECAL-EARTH GROUND CONN	1

Front Panel Assembly

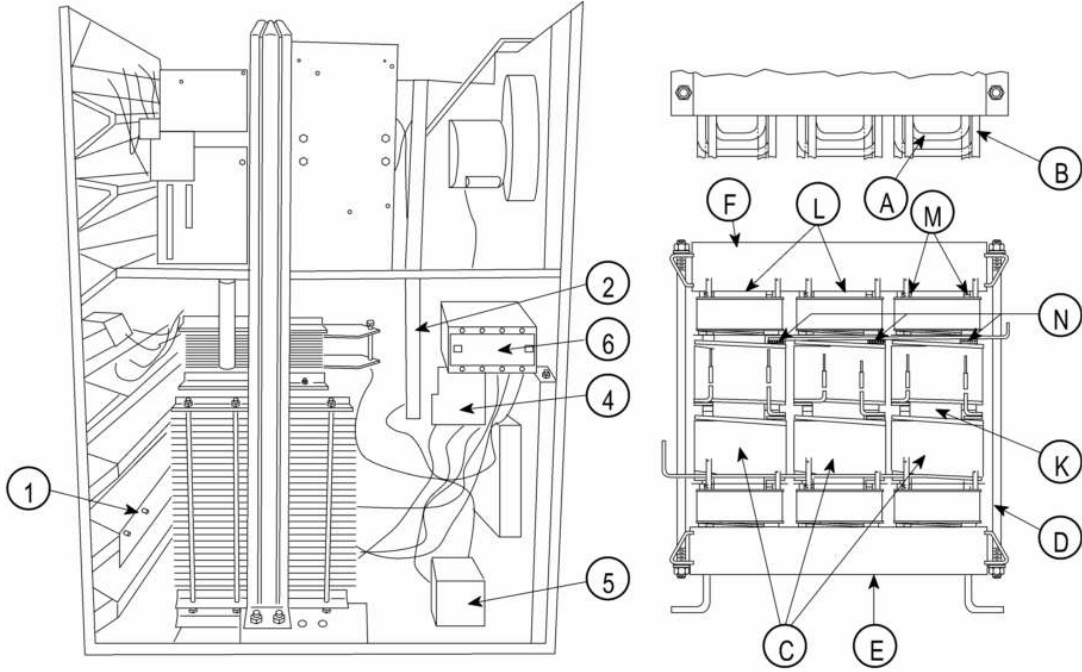


P-887-C.jpg

Transformer Assembly & Internal Parts -Right Side

KEY	PART NUMBER	DESCRIPTION	QTY
1	9SL5403-5	WELDED ASBLY DC1500	1
A	9SM12763-1	PRIMARY COIL ASBLY	6
B	9SM12763-2	PRIMARY COIL ASBLY	6
C	9SM12572-95	SECONDARY COIL ASBLY	6
D	9ST9781-45	MOUNTING STUD	8
E	9SM12811-2	Upper Lamination Assembly	1
F	9SL3841-11	Upper Lamination Assembly	1
K	9SS15325	Middle Lamination Assembly	3
L	9SS15420-1	INSULATING BARRIER	6
M	9ST13914	MOLDING COMPOUND INSERT	6
N	9SS15420	INSULATION BARRIER	6
2	9SM12810	INTERPHASE COIL & LAMINATION ASBLY	1
	9SM12572-96	SECONDARY COIL ASBLY	2
3	9ST13398	PRIMARY THERMOSTAT	1
4	9SM14120-1	RECONNECT PANEL REFERENCE ASBLY	1
5	9SM12750-9	Auxiliary Power Transformer	1
	9SM12479-11/8502-6	Auxiliary Transformer Coil	1
6	9SM12161-95	CONTACTOR	1

Transformer Assembly & Internal Parts -Right Side

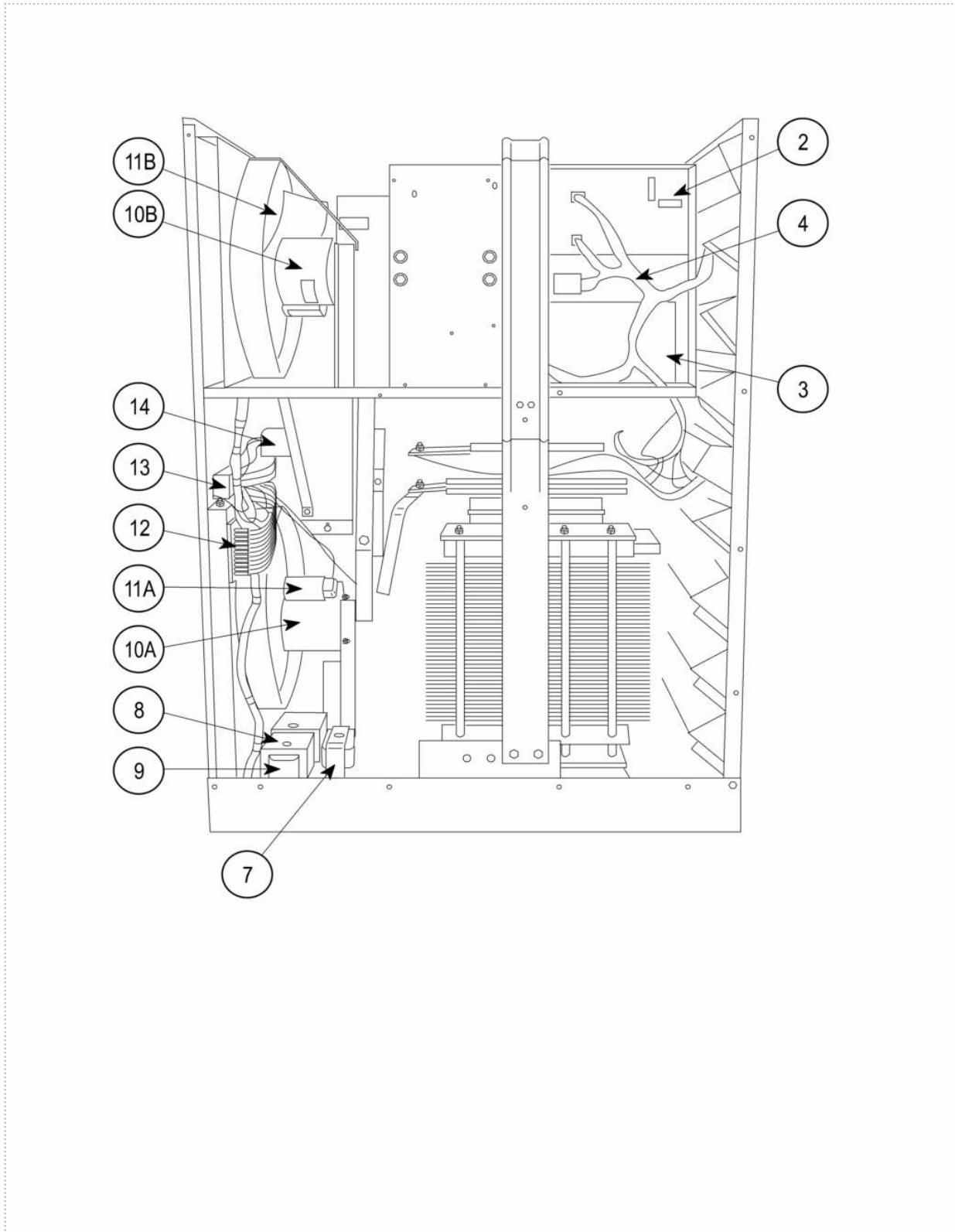


P-887-D.jpg

Internal Parts - Left Side

KEY	PART NUMBER	DESCRIPTION	QTY
2	9SG8394-1	Control Circuit PC Board	1
3	9SG8390-1	Firing Circuit PC Board	1
4	9SS15122-11	RELAY	1
7	9SM12390-74	Transformer T2 380V 440V	1
8	9SM12390-75	Transformer T3 380V 440V	1
9	9SM12390-76	Transformer T4 380V 440V	1
10A	9SS14779-4	FAN MOTOR	1
10B	9SS14779-6	FAN MOTOR	1
11A	9SM6819-7	FAN	1
11B	9SM6819-8	FAN	1
12	9SS14530-7	TERMINAL STRIP	1
	9ST10726-95	NUMBER PLATE	1
13	9SM12390-72	TRANSFORMER ASBLY	1
14	9SS15611	PILOT RELAY	1
	9SM13028	DUST COVER	1
	9SS14293-9	RELAY	1
	9SS18922-1	Ground Screw Assembly	5
	9SL10671	OUTPUT STUD COVER REF ASBLY	1
	9SS14113-10	Ground Strap	1

Internal Parts - Left Side

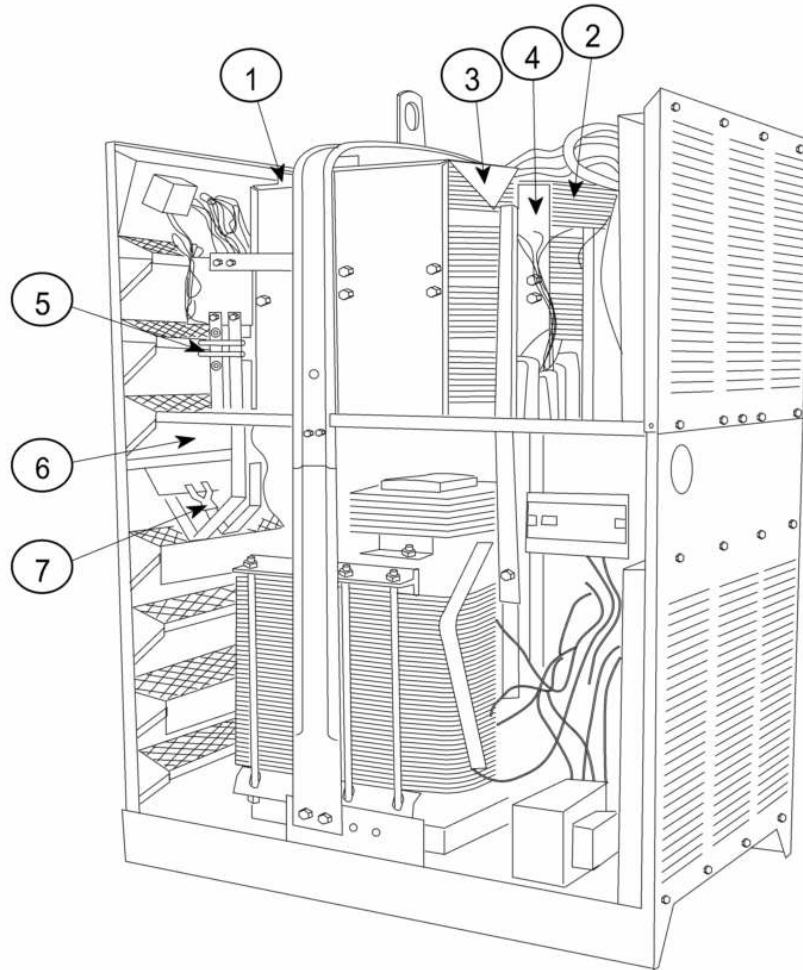


P-887-E.jpg

Rectifier Assembly

KEY	PART NUMBER	DESCRIPTION	QTY
1	9SL5348-5	RECTIFIER ASBLY	1
2	9SL5348-4	RECTIFIER ASBLY	1
3	9SL5348-6	RECTIFIER ASBLY	1
4	9SL6981	SNUBBER PC BD ASBLY	1
4	9SL6980	SNUBBER PC BD ASBLY	1
5	9SS16018	SHUNT	1
5	9SS15326	SHUNT ASBLY	1
	9SS12334-23	REED SWITCH ASBLY	1
	9SS12334-33	REED SWITCH ASBLY	1
6	9ST13840	RESISTOR DIODE ASBLY PURCH DPNI	1
6	9ST14450	RESISTOR DIODE ASBLY	1
7	9SS10404-7	RESISTOR-WIREWOUND	1
	9ST9781-34	THRU BOLT	1
	9ST9764-2	INSULATING WASHER	4

Rectifier Assembly

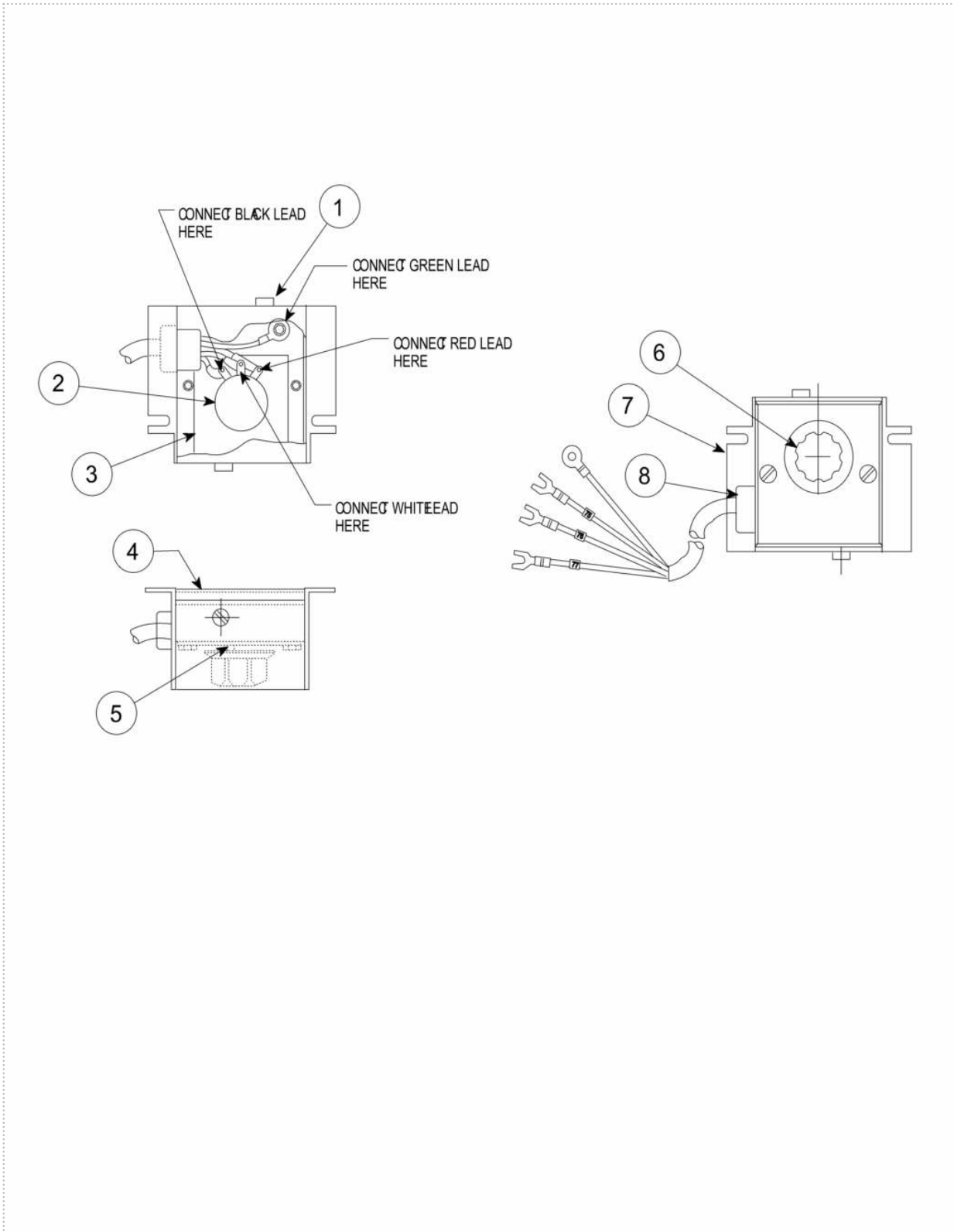


P-887-G.jpg

Remote Control

KEY	PART NUMBER	DESCRIPTION	QTY
	K775	Remote Control	1
1	9SS8025-70	SELF TAPPING SCREW	4
2	9ST10812-40	RHEOSTAT	1
3	9ST12792-1	INSULATION	1
4	9SM12695	BOX WRAPAROUND	1
5	9SS14268	NAMEPLATE	1
6	9ST10491	KNOB	1
7	9SM12618	REMOTE CONTROL BOX	1
8	9ST9274-4	GROMMET	1
9	9SM12617	PORT VOLT CONT CABLE ASBLY	1

Remote Control



P-887-J.jpg

			
<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ってください。 	<ul style="list-style-type: none"> ● パネルやカバーを取り外したままで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"> ● ابعد 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"> ● اقطع التيار الكهربائي قبل القيام بأية صيانة. 	<ul style="list-style-type: none"> ● لا تشغيل هذا الجهاز اذا 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焊材料，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.

			
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. Aíslese 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触带电部件及焊条。 使你自已与地面和工作件绝缘。 	<ul style="list-style-type: none"> 把一切易燃物品移离工作场所。 	<ul style="list-style-type: none"> 佩戴眼、耳及身体劳动保护用具。
Korean 위험	<ul style="list-style-type: none"> 전도체나 용접봉을 젖은 형갑 또는 피부로 절대 접촉치 마십시오. 모재와 접지를 접촉치 마십시오. 	<ul style="list-style-type: none"> 인화성 물질을 접근시키지 마십시오. 	<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 بجسدك أو بالملابس 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.

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.

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.

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

CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for advice or information about their use of our products. We respond to our customers based on the best information in our possession at that time. Lincoln Electric is not in a position to warrant or guarantee such advice, and assumes no liability, with respect to such information or advice. We expressly disclaim any warranty of any kind, including any warranty of fitness for any customer's particular purpose, with respect to such information or advice. As a matter of practical consideration, we also cannot assume any responsibility for updating or correcting any such information or advice once it has been given, nor does the provision of information or advice create, expand or alter any warranty with respect to the sale of our products.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.com for any updated information.



THE LINCOLN ELECTRIC COMPANY

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