

## OPERATING MANUAL

# IDEALARC DC-600



### **SAFETY DEPENDS ON YOU**

Lincoln Electric welders are designed and built with safety in mind. However, your overall safety can be increased by proper installation and thoughtful operation on your part. Read and observe the general safety precautions on page 2 and follow specific installation and operating instructions included in this manual. Most importantly, think before you act and be careful.

**THE LINCOLN ELECTRIC COMPANY  
(AUSTRALIA) PTY. LTD. A.B.N. 36 000 040 308  
SYDNEY, AUSTRALIA**

**A Subsidiary of**

**THE LINCOLN ELECTRIC CO. U.S.A.**

**Associated Subsidiaries in Australasia, Asia, Canada, Europe, North and South America.**

**THE WORLD'S LEADER IN WELDING AND CUTTING PRODUCTS**

**PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. READ AND UNDERSTAND BOTH THE SPECIFIC INFORMATION GIVEN IN THE OPERATING MANUAL FOR THE WELDER AND/OR OTHER EQUIPMENT TO BE USED AS WELL AS THE FOLLOWING GENERAL INFORMATION.**

## ARC WELDING SAFETY PRECAUTIONS



### ELECTRIC SHOCK can kill

- electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- b. In semi-automatic and automatic wire welding, the electrode, electrode reel, welding head and nozzle or semi-automatic welding gun are also electrically "hot".
  - c. Insulate yourself from work and ground using dry insulation. When welding in damp locations, on metal framework such as floors, gratings or scaffolds, and when in positions such as sitting or lying, make certain the insulation is large enough to cover your full area of physical contact with work and ground.
  - d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
  - e. Ground the work or metal to be welded to a good electrical (earth) ground.
  - f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
  - g. Never dip the electrode holder 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.



### FUMES AND GASES can be dangerous

2. 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 galvanised, 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 vapours coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapours 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 ensure 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.



### ARC RAYS can burn

3. 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 AS 1674.2-2003 AS1337-1992 and AS1338-1992 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 or expose themselves to the arc rays or to hot spatter or metal.



### 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 AS1674 Parts 1 & 2 "Safety in Welding and Allied Processes", WTIA Technical Note 7 "Health and Safety in Welding" 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 vapours from substances inside. These can cause an explosion even though the vessel has been "cleaned". For information purchase AS 1674-1990.
- 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 possible. 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 and 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 hand-tight except when the cylinder is in use or connected for use.
- g. Read and follow the instructions on compressed gas cylinders and associated equipment, and AS 2030 Parts 1 & 2.



## 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 SAA Wiring Rules, all local codes and the manufacturer's recommendations.
- c. Ground the equipment in accordance with the SAA Wiring Rules 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 fuel near an open flame, welding arc or when the engine is running. Stop the engine and allow it to cool before refuelling 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 petrol 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 INSTALLATIONS, 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 and Cutting - ANSI Standard Z 49.1" and WTIA Technical Note 7. All WTIA publications and ANSI/AWS Standards are available from the Welding Technology Institute of Australia, P.O. Box 6165, Silverwater NSW 2128. For copies of various Australian Standards contact your local S.A.A. office.

### HOW TO ORDER REPLACEMENT PARTS

To ensure that you receive the correct replacement part the following procedure should be followed:

1. Quote Serial Number and Code Number.
2. Quote the Description, Item Number and Parts List Number of the desired part. When ordering parts for items carrying brand names of other companies, such as fan motors, drive shafts, etc., be sure to include the other company's name and part number and other relevant information.
3. Should the primary cord be damaged, a special cord is required, and is available from Lincoln Electric.
4. Parts should be ordered from Lincoln, its offices or the nearest Authorised Service Facilities. (The "Lincoln Service Directory" listing these shops geographically is available on request.)

**Note:** "Hardware" in the Lincoln Parts Lists are not Lincoln stock items but can be obtained via the Authorised Service Facilities.

Component parts of assemblies such as stator coils or armature coils, etc., which require electrical testing or locating fixtures are not considered replaceable items. This is to ensure that the customer receives parts which will keep the welder in the best operating condition.

### BUY ONLY GENUINE REPAIR PARTS

# WELDING, EMF & PACEMAKERS

All welders should follow safe practices that minimise their exposure to electric and magnetic fields (EMF).

For welders wearing implanted pacemakers, safe welding practices are particularly important and additional procedures should be followed by those who have decided to continue to weld. (Hopefully in keeping with a doctor's advice).

The following procedures will not eliminate exposure to EMF or the possibility of arc welding having an effect on a pacemaker, however if followed, they will significantly reduce exposure to electric and magnetic fields. Electric and magnetic fields are created any time electric current flows through a conductor, however it is not clear whether such exposure affects one's health.

Some researchers have reported that exposure to EMF may cause leukemia or other illnesses. These claims originally arose in relation to high voltage electric power lines and are very much in dispute in the medical and scientific arena, however the best advice is to minimise your exposure to EMF to protect your health should doctors eventually decide there is a risk.

There are four fundamental facts about EMF:

- With direct current (DC), the field strength is relatively constant and does not change.
- With alternating current (AC), the field strength constantly changes.
- The greater the current flow, i.e. the higher the amps, the stronger the field created by the current
- The closer the conductor or electrical device is to the body, the greater the exposure to the field.

## Minimising exposure

All welders should use the following procedures to minimise EMF exposure.

- Route electrode or gun and work cables together. Secure them with tape if possible.
- Never coil the electrode lead around your body.
- Do not place your body between the electrode and work cables. If your electrode cable is on your right side the work cable should also be on your right side.
- Connect the work cable to the work piece as close as possible to the area being welded. (This is also a good practice to eliminate a common problem on welding - a poor work connection.
- Do not work next to the welding power source.

## Welders with pacemakers

There is no question that the fields in arc welding can interfere with a pacemaker's function. Generally the interference does not permanently damage the pacemaker. Once the wearer leaves the arc welding environment or stops welding, the pacemaker returns to normal functioning. The welding arc has little or no effect on the operation of some pacemakers, especially designs that are bi-polar or designed to filter out such interference.

For a welder or anyone working around electrical equipment the selection of a pacemaker is very important. Get a doctor's advice about which pacemaker is the least sensitive to interference from welding while still being medically suitable.

In addition to the normal safety precautions, the following additional procedures should be adopted by welders with pacemakers.

- Use gas welding when the application is suitable.
- Use the lowest current setting appropriate for the application. Do not exceed 400 amps. Low current (75-200 amps) direct current (DC) welding should be used if arc welding is necessary. Do not TIG weld with high frequency.
- Do not use repeated, short welds. Wait about ten seconds between stopping one weld and starting the next. When having difficulty starting an electrode, do not re-strike the rod repeatedly.
- If you feel light headed, dizzy or faint, immediately stop welding. Lay the electrode holder down so that it does not contact the work and move away from any welding being performed. Arrange your work in advance so that, if you become dizzy and drop the electrode holder, the electrode holder will not fall on your body or strike the work.
- Do not work on a ladder or other elevated position or in a cramped, confined place.
- Do not work alone. Work only in the presence of an individual who understands these precautions and the possible effect welding may have on your pacemaker.
- Do not work near spot welding equipment.
- If you have a pacemaker and wish to continue arc welding, discuss this and any other questions you may have with your physician and follow his or her advice. The doctor may wish to contact the pacemaker manufacturer for a recommendation. As mentioned before, the design of the pacemaker significantly affects the degree to which it is subject to interference from a welding circuit. Do not rely on the fact that you know another welder with a pacemaker who has welded for years without experiencing a problem. That welder and his or her pacemaker may be quite different from you and your pacemaker.

# INSTRUCTIONS FOR ELECTROMAGNETIC COMPATIBILITY



## WARNING

This welding machine must be used by trained operators only. Read this manual carefully before attempting to use the welding machine.

### Conformance

Products displaying the C-Tick mark are in conformity with Australian/New Zealand requirements for Electromagnetic Compatibility (EMC) according to standard AS/NZS "Industrial scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement".

Products displaying the CE mark are in conformity with European Community Council Directive 89/336/EEC requirements for EMC by implementing EN60974-10 "Arc Welding Equipment - Part 10: Electromagnetic Compatibility (EMC) requirements".

- manufactured in conformity with Australian/New Zealand Standard (Emission):- AS/NZS 3652 'Electromagnetic Compatibility - Arc Welding Equipment' (Identical to and reproduced from British Standard EN 50199)

Products are:

- for use with other Lincoln Electric/LiquidArc equipment.
- designed for industrial and professional use.

### Introduction

All electrical equipment generates small amounts of electromagnetic emission. Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter. When emissions are received by other equipment, electrical interference may result. Electrical emissions may effect many kinds of electrical equipment: other nearby welding equipment, radio and TV transmitters and receivers, numerical controlled machines, telephone systems, computers, etc. Be aware that interference may result and extra precautions may be required when a welding power source is used in a domestic establishment.

### Installation and Use

The purchaser/user is responsible for installing and using the welding equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the purchaser/user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing (grounding) the welding circuit (see note below). In other cases it could involve constructing an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

NOTE: The welding circuit may or may not be earthed for safety reasons according to national codes. Changing the earthing arrangements should only be authorised by a person who is competent to assess whether the changes increase the risk of injury, eg. by allowing parallel welding current return paths which may damage the earth circuits of other equipment.

## Assessment of Area

Before installing welding equipment the purchaser/user shall make an assessment of potential problems in the surrounding area.

The following shall be taken into account:

- Other supply cables, control cables, signalling and telephone cables above, below and adjacent to the welding equipment;
- Radio and television transmitters and receivers;
- Computer and other control equipment;
- Safety critical safety equipment, eg. guarding of industrial equipment;
- The health of people around, eg. the use of pacemakers and hearing aids;
- Equipment used for calibration or measurement;
- The immunity of other equipment in the environment. The purchaser/user shall ensure that other equipment being used

in the environment is compatible. This may require additional protection measures;

- The time of the day that welding or other activities are to be carried out.

The size of the surrounding area to be considered will depend on the structure of the building and other activities that are taking place. The surrounding area may extend beyond the boundaries of the premises.

## Methods of Reducing Emissions

### Mains Supply

Welding equipment should be connected to the mains supply according to the manufacturer's recommendations. If interference occurs, it may be necessary to take additional precautions such as filtering the mains supply. Consideration should be given to shielding the supply cable of permanently installed welding equipment in metallic conduit or equivalent. Shielding should be electrically continuous throughout its length. The shielding should be connected to the welding power source so that good electrical contact is maintained between the conduit and the welding power source enclosure.

### Maintenance of the Welding Equipment

The welding equipment should be routinely maintained according to the manufacturer's recommendations. All access and service doors and covers should be closed and properly fastened when the welding equipment is in operation. The welding equipment should not be modified in any way except for those changes and adjustment covered in the manufacturer's instructions. In particular, the spark gaps of arc initiation and stabilising devices should be adjusted and maintained according to the manufacturer's recommendations.

### Welding Cables

The welding cables should be kept as short as possible and should be positioned close together, running at or close to the floor level.

### Equipotential Bonding

Bonding of all metallic components in the welding installation and adjacent to it should be considered. However, metallic components bonded to the work piece will increase the risk that the operator could receive a shock by touching these metallic components and the electrode at the same time. The operator should be insulated from all such bonded metallic components.

### Earthing of the workpiece

Where the workpiece is not bonded to earth for electrical safety, nor connected to earth because of its size and position, eg. ship's hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of work pieces increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the connection of the workpiece to earth should be made by direct connection to the workpiece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitance, selected according to national regulations.

### Screening and Shielding

Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications.\*

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# INSTALLATION

## TECHNICAL SPECIFICATIONS - IDEALARC DC-600

### INPUT - THREE PHASE ONLY

Part No..	Standard Voltage	Rated Input Current to AS1966
KA1342-1	415/3/50/60	62
KA1342-2	380/500/3/50/60	68/51
KA1342-3	220/380/440/3/50/	117/68/58
KA1342-3	230/380/460/3/60	100/68/50
KA1342-4	200/3/5/60	129
KA1342-5	380/550/3/50	79/55
KA1342-5	380/575/3/60	79/47

### RATED OUTPUT

Duty Cycle	Amps	Volts at Rated Amps
100%	600	44
60%	680	44
50%	750	44

### OUTPUT

Mode	Current Range	Maximum Open Circuit Voltage	Auxilliary Power
Constant Current	90 to 850 Amps	72 VDC	42/115 VAC, 8 Amps
Constant Voltage	70 to 850 Amps	55 VDC	

### RECOMMENDED INPUT WIRE AND FUSE SIZES

Input Voltage / Frequency	Fuse (Super Lag) or breaker Size	Input Ampere Rating on Nameplate
220 50/60	175	125
230 50/60	175	113
415 50/60	100	63
460 50/60	90	57
575 50/60	80	45

### PHYSICAL DIMENSION (approx)

Height	Width	Depth	Weight
780mm	570mm	990mm	240kg

## SAFETY PRECAUTIONS



### **ELECTRIC SHOCK can kill**

- Only qualified personnel should install this machine.
- Turn the input power OFF at the disconnect switch or fuse box before working on the equipment.
- Do not touch electrically hot parts.
- Always connect the Idealarc DC-600 grounding terminal to a good electrical earth ground.
- Set the Idealarc DC-600 Power ON/OFF PUSH BUTTON to the OFF position when connecting power cord to input power.

## SELECT PROPER LOCATION

Place the Idealarc DC-600 where clean air can freely circulate in through the front intake and out through the rear louvers. Dirt, dust, or any foreign material that can be drawn into the machine should be kept at a minimum. Not following these precautions can result in the nuisance shutdown of the machine because of excessive operating temperatures.

## STACKING

Three IDEALARC DC-600 machines can be stacked.

DO NOT stack more than three machines in one grouping.

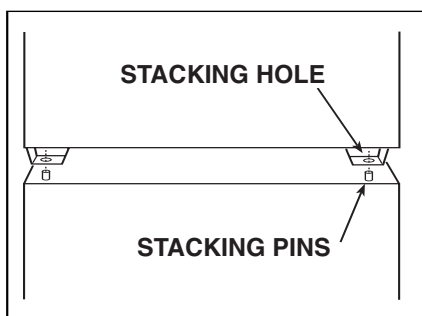
DO NOT stack the Idealarc DC-600 on another type of machine.

Following these guidelines when stacking:

1. Select a firm, level surface capable of supporting the total weight of up to three machines 720kg.
2. Set the bottom machine in place.
3. Stack the second machine on top of it by aligning the two holes in the base rails of the second machine with the two pins on top front of the bottom machine.
4. Repeat process for third machine.

**Note:** The machines must be stacked with the Case Front of each machine flush with each other. See Figure A.1.

**Figure A.1**  
Stacking Idealarc DC-600 machines



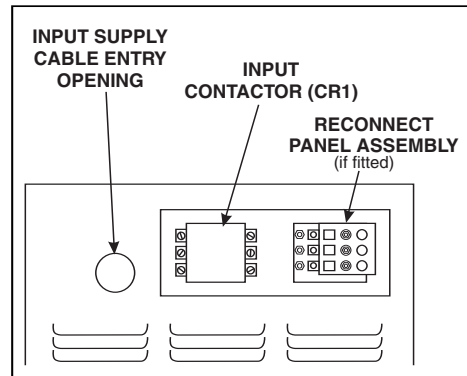
## TILTING

The Idealarc DC-600 must be placed on a stable, level surface so it will not topple over.

## ELECTRICAL INPUT CONNECTIONS

Before installing the machine, check that the input supply voltage, phase, and frequency are the same as the machine's voltage, phase, and frequency as specified on the machine's rating plate on the Case Rear Panel Assembly. Input power supply entry is through the hole in the Case Rear Panel Assembly. See Figure A.2 for the location of the machine's input cable entry opening, Input Contactor (CR1), and reconnect panel assembly for multi-voltage machines.

**Figure A.2**  
Rear Panel



## FUSE AND WIRE SIZES

Protect the input circuit with the super lag fuses or delay type circuit breakers. They are also called inverse time or thermal/magnetic circuit breakers.

DO NOT use fuses or circuit breakers with too low amp rating. This can result in "nuisance" tripping caused by inrush current even when machine is not being used for welding at high output currents. Use input and grounding wire sizes that meet local electrical codes or see the Technical Specifications page in this manual.

## GROUND CONNECTION

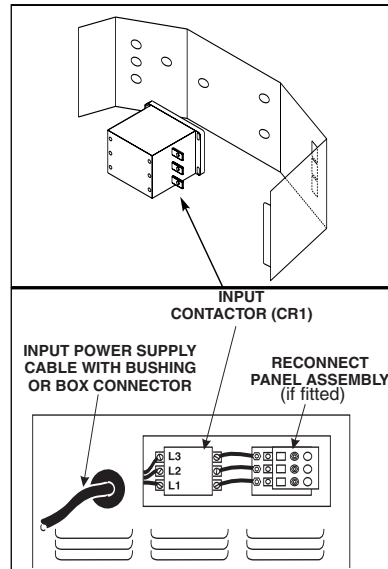
Ground the frame of the machine. A ground terminal marked with the symbol (⊕) is located inside the Case Rear Panel Assembly of the machine near the input contactor. Access to the Input Box Assembly is at the upper rear of the machine. See your local and national electrical codes for proper grounding methods.

## INPUT POWER SUPPLY CONNECTIONS

A qualified electrician should connect the input power supply leads.

1. Follow all national and local electrical codes.
2. Follow Input Supply Connection Diagram located on the inside of the machine.
3. Use a three-phase line.
4. Remove Input Access Door at upper rear of machine.
5. Connect the three-phase AC power supply leads L1, L2, and L3 to the input contactor terminals in the Input Box Assembly by passing them thru the three aligned .50" diameter holes in the baffle and tighten them in the terminal connectors. Be sure to close the baffle by inserting the tab into the slot in the baffle. See Figure A.3.

**Figure A.3**  
**Input Power Supply Connections**



## RECONNECT PROCEDURE

Multiple voltage machines are shipped connected to the highest input voltage listed on the machine's rating plate. Before installing the machine, check that the Reconnect Panel in the Input Box Assembly is connected for the proper voltage.



### CAUTION

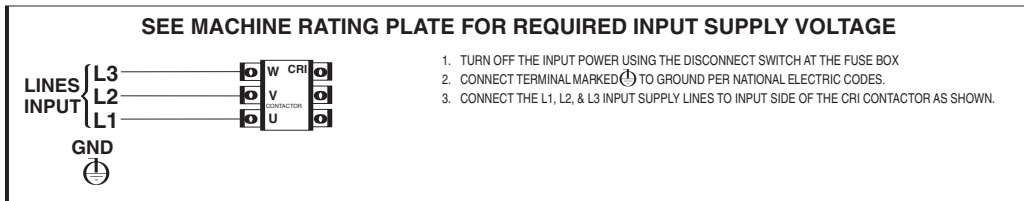
Failure to follow these instructions can cause immediate failure of components within the machine.

To reconnect a multiple voltage machine to a different voltage, remove input power and change the position of the reconnect board on the Reconnect Panel. Follow The Input Connection Diagram located on the inside of Case Rear Input Access Door. These connection diagrams for the following codes are listed below.

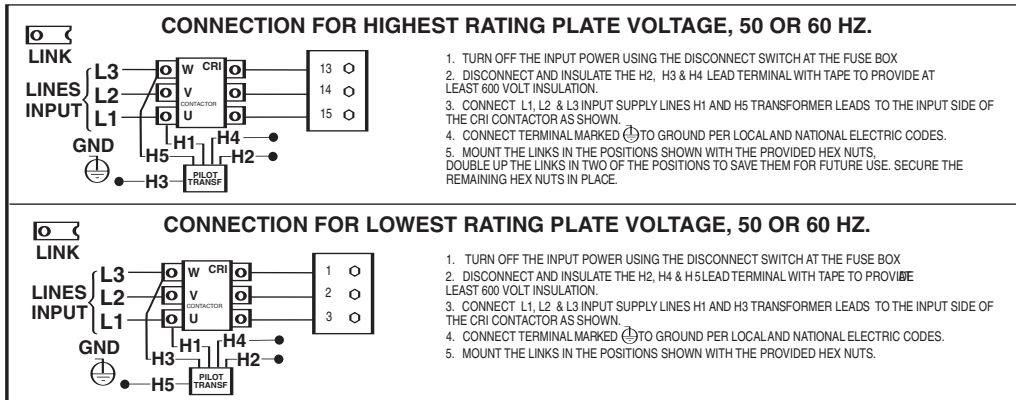
1. For 415 Voltage, see Figure A.4. (AT3164-1).
2. For Dual Voltage 380/500, see Figure A.5. (AT3164-9).
3. For 220/380/440, see Figure A.6. (AM3237)
4. For 200 Voltage, see Figure A.4. (AT3164-11).
5. For 380/550/575, see Figure A.5. (AT3164-12).
6. For Voltages not listed, see the Input Connection Diagram pasted on the inside of the Case Back Input Access Door.



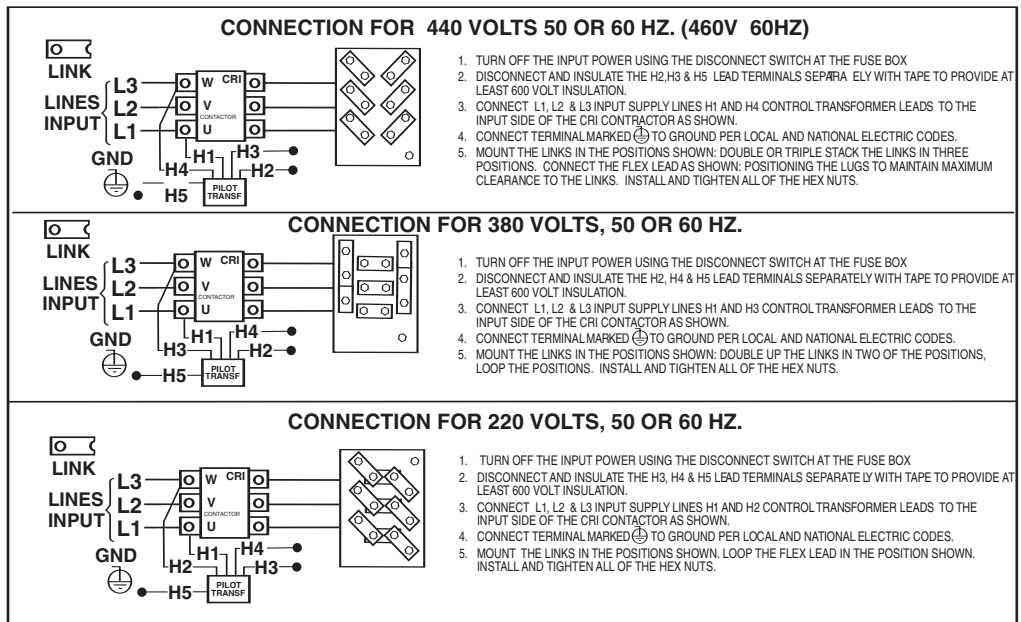
**Figure A.4**  
Reconnect Panel Board Positions for Single Voltage Machines



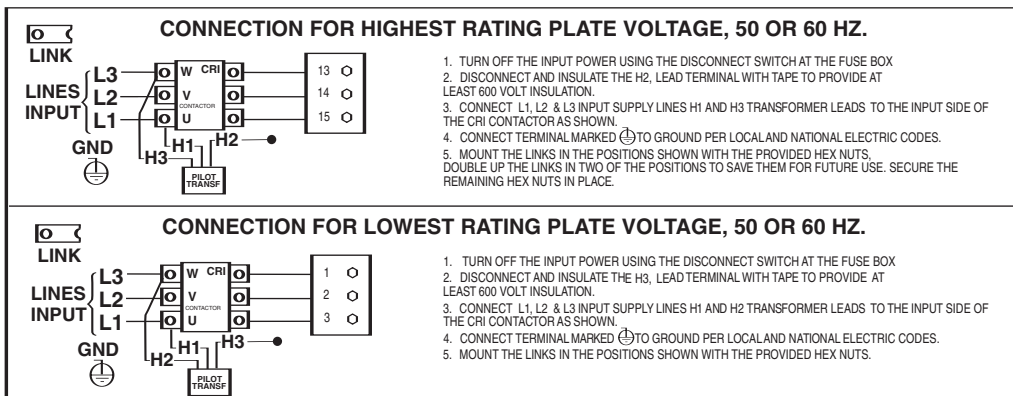
**Figure A.5**  
Reconnect Panel Board Positions for 380/500 VAC Machines



**Figure A.6**  
Reconnect Panel Board Positions for 220/380/440 VAC Machines



**Figure A.7**  
Reconnect Panel Board Positions for 380/550 and 380/575 Voltage Machines



# OUTPUT CONNECTIONS

See Table A.1 for recommended IDEALARC DC-600 cable sizes for combined lengths of electrode and work cables.

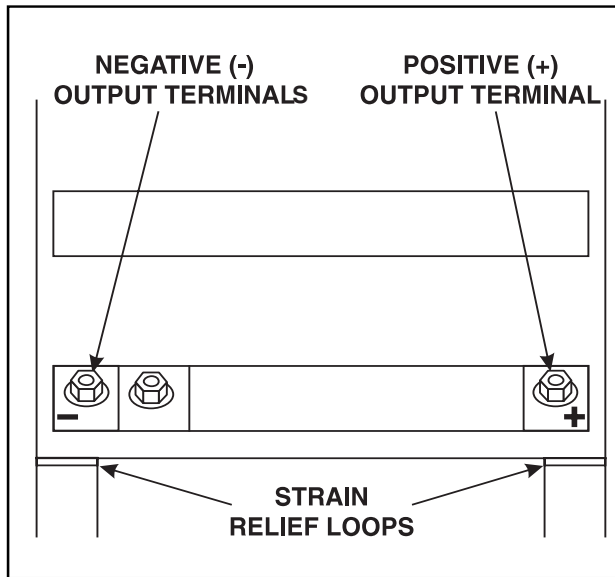
**Table A.1**  
**Idealarc DC-600 Cable Sizes for Combined Lengths of Electrode and Work Cable (Copper) at 100% Duty Cycle**

Cable Length	Parallel Cables	Cable Size
Lengths up to 45m	2	50mm <sup>2</sup>
45m to 60m	2	70mm <sup>2</sup>
60m to 85m	2	95mm <sup>2</sup>

### Connect Electrode and Work Leads to Output Terminals.

1. Set the ON/OFF PUSH BUTTON to OFF.
2. Locate the retractable strain relief loops directly below the output terminals in the lower right and lower left corners of the Case Front Assembly. See Figure A.9.
3. Pull out the retractable strain relief loops.
4. Insert the electrode lead through the loop directly below the desired polarity (positive or negative). Pull through enough cable to reach the output terminals.
5. Connect electrode lead to the desired terminal (positive/negative).
6. Tighten the output terminal nut with a spanner.
7. Connect the work lead to the other output terminal following steps 4-6.

**Figure A.9**  
**Output Terminals**



### Connection For Semi-Automatic or Automatic Wire Feeder Control

**Note:** See the ACCESSORIES Section of this manual for specific instructions on connecting the following semi-automatic and automatic wire feeders:

- LN-7 } Semi-Automatic Wire Feeders
- LN-8 }
- LN-9 }
- NA-3 } Automatic Wire Feeders
- NA-5 }
- LT-7 } Tractors
- LT-56 }

### Connection for Stick Welding and Air/Carbon Arc Cutting Operation

## WARNING

The output terminals are energised at all times when the Idealarc DC-600 is connected for stick welding and air/carbon arc cutting.

1. Set ON/OFF PUSH BUTTON to OFF.
2. Locate and open the hinged access door on the Front Case Assembly.
3. If necessary, disconnect all wire feeder control cable connections from the DC-600 terminal strip / amphenol.
4. Remove the leads from the unit by pulling them through and out of the strain relief loops.
5. Connect a jumper wire from terminal #2 to terminal #4 on the terminal strip.
6. Set the Welding Mode Switch to the VV position for both stick welding and air/carbon arc cutting.

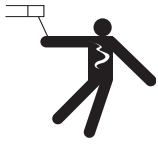
**Note:** To use the Idealarc DC-600 for both stick welding / air/carbon arc cutting, AND semi-automatic / automatic welding, the optional Multi-Process Switch (K804-1) must be used. See the ACCESSORIES Section of this manual for instructions on installing and using the Multi-Process Switch. When the Multi-Process Switch is not used, all control, work, and electrode leads from semi-automatic or automatic wire feeders must be disconnected from the Idealarc DC-600 before connecting the machine for stick welding or air/carbon arc cutting.

# OPERATING INSTRUCTIONS



## WARNING

Read and understand entire section before operating machine.



### ELECTRIC SHOCK can kill

- Do not touch electrically live parts or electrode with skin or wet clothing.
- Insulate yourself from work and ground.
- Always wear dry insulating gloves.



### FUMES AND GASES can be dangerous.

- Keep your head out of fumes.
- Use ventilation or exhaust to remove fumes from breathing zone.



### WELDING, CUTTING and GOUGING SPARKS can cause fire or explosion

- Keep flammable material away.
- Do not weld, cut or gouge on containers that have held combustibles.



### ARC RAYS can burn

- Wear eye, ear and body protection.

Observe additional Safety Guidelines detailed in the beginning of this manual.

## RECOMMENDED PROCESSES AND EQUIPMENT

The Idealarc DC-600 is recommended for the following welding or cutting processes within its output capacity of 70 amps to 850 amps in the Constant Voltage mode and 90 amps to 850 amps in the Constant Current mode:

- Submerged Arc Semi-Automatic or Automatic Welding
- Open Arc Semi-Automatic or Automatic Welding
- Stick Welding (Standard on All Machines)
- Air/Carbon Arc Cutting (Carbon Rod Sizes up to 3/8" Diameter)

## OPERATIONAL FEATURES AND CONTROLS

The Idealarc DC-600 comes with the following standard controls:

- ON/OFF PUSH BUTTON
- OUTPUT CONTROL POTENTIOMETER
- OUTPUT CONTROL SWITCH (Remote or Panel)
- WELDING MODE SWITCH
- CONTROL CIRCUIT POLARITY SWITCH
- POWER SOURCE PILOT LIGHT
- DC AMMETER
- DC VOLTMETER

## DESIGN FEATURES AND ADVANTAGES

The following list of design features will help you understand the machine's total capabilities and how you can take advantage of them to get maximum use of your machine.

- Excellent arc characteristics for optimum constant voltage submerged arc and Innershield welding performance.
- A control circuit designed to provide good starting for a large variety of processes and procedures.
- Output Control Potentiometer that provides easy single range continuous control.
- Output Control Switch that provides simple switching from local to remote control.
- Red neon pilot light to confirm that the Input Contactor is energised.
- Auxiliary power source to provide 42/115-volt AC power 330/1000 to wire feeding equipment.
- Multi-functional amphenol plug to terminal strip for easy connection of wire feeding control cables and switching between CV Innershield and CV Submerged Arc welding when using the Dual Process or Dual Procedure Kits.
- Recessed output terminals to avoid any person or object from accidentally coming into contact with the output terminals and labeled positive and negative for easy identification.
- Thermostatically protected power source.
- Electronic protection circuit to protect power source against overloads.
- Input line voltage compensation to provide an essentially constant output.
- SCR electronically controlled welder output provides extra long life, especially for highly repetitive welding applications.
- Three circuit solid state control system provides maximum performance and circuit protection.
- Low profile case provides maximum use of space.
- Convenient access to all controls.

## GENERAL DESCRIPTION

The Idealarc DC-600 is an SCR controlled three phase welding and cutting power source. It uses a single range potentiometer to control:

- Submerged Arc Semi-Automatic or Automatic Welding
- Open Arc Semi-Automatic or Automatic Welding
- Stick Welding (Standard on All Machines)
- Air/Carbon Arc Cutting (Carbon Rod Sizes up to 3/8" Diameter)

The Idealarc DC-600 has a three-position Welding Mode Switch to enable the user to operate in one of three modes:

- Constant Voltage (CV) Submerged Arc
- Constant Voltage (CV) Innershield
- Constant Current (CC) Stick

The Idealarc DC-600 can be easily connected to wire feeding equipment, including:

- Semi-automatic wire feeders LN-7, LN-8, and LN-9
- Automatic wire feeders NA-3 and NA-5
- Tractors LT-56 and LT-7

The optional Multi-Process Switch allows the user to switch between semi-automatic or automatic welding and stick welding or air/carbon arc cutting without disconnecting the wire feeder equipment control, electrode, and work leads.

- Output lead strain relief loops to prevent terminal and cable damage.
- Easily removed case side, even when stacked.
- Outdoor operation because enclosure is designed with air intake louvers that keep dripping water from entering the unit. Transformer, SCR bridge, and choke have special corrosion resistant varnish for added protection.

## WELDING CAPABILITY

The IDEALARC DC-600 has the following duty cycle ratings:

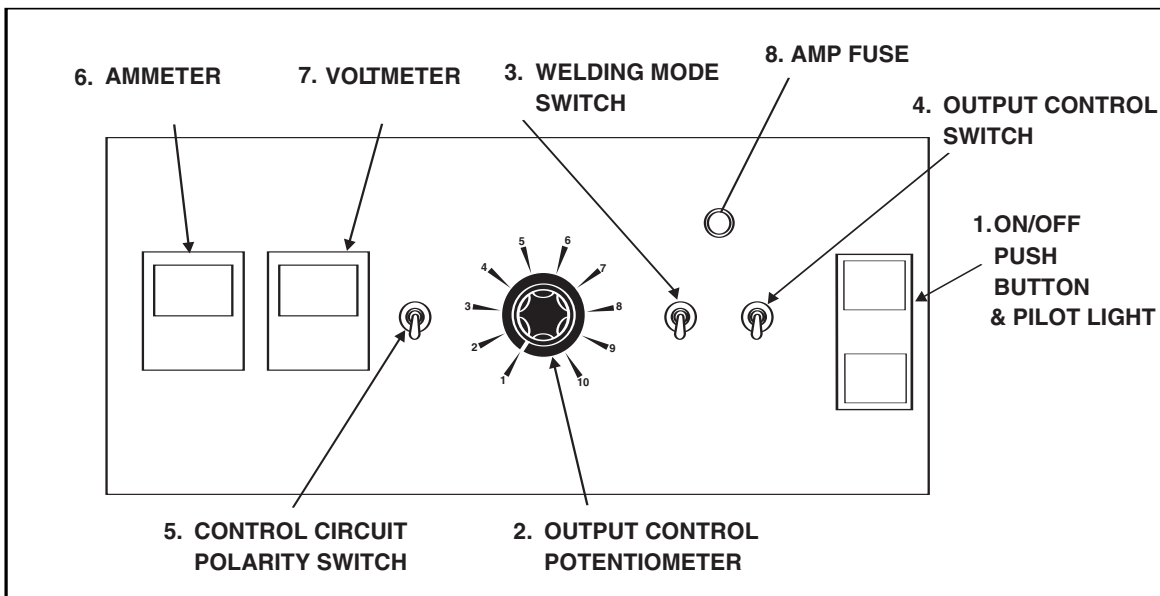
If the duty cycle is exceeded, a thermal protector will shut off the output of the machine until it cools to the normal operating temperature.

Duty Cycle	Amps	Volts	Hertz
50% (Based on 10 min)	750	44	50/60
60% (Based on 10 min)	680	44	50/60
100%	600	44	50/60

## CONTROLS AND SETTINGS

All operator controls and adjustments are located on the Case Front Assembly of the Idealarc DC-600. See Figure B.1 for the location of each control.

Figure B.1  
Control Panel Keys



- 1. ON/OFF PUSH BUTTON:** This push button turns the machine ON or OFF. (Illuminated in ON position).
- 2. OUTPUT CONTROL POTENTIOMETER:** This control provides tapered, continuous control of the machine output. The control can be rotated from minimum to maximum while machine is under load to adjust the machine output.
- 3. WELDING MODE SWITCH:** This toggle switch is used to select the proper welder performance characteristics for the process being used. There are three modes: CV (Constant Voltage) Submerged Arc, CV (Constant Voltage) Innershield, and CC (Constant Current) Stick.
- 4. OUTPUT CONTROL SWITCH:** This toggle switch is used to switch between "Panel" for local control of machine output and "Remote" for remote control of machine output.
- 5. CONTROL CIRCUIT POLARITY SWITCH:** This toggle switch is used to set power source voltage sensing polarity to match the polarity to which the electrode is connected to the machine. This provides the correct polarity at the amphenol/terminal strip for correct operation of the automatic wire feeding equipment powered by the auxiliary power from the power source.
- 6. AMMETER:**
- 7. VOLTMETER:**

## OPERATING STEPS

The following procedures are for using the Idealarc DC-600 in the local control mode of operation. For remote control of the machine, see the Remote Control of Machine Operation section.

Before operating the machine, make sure you have all materials needed to complete the job. Be sure you are familiar with and have taken all possible safety precautions before starting work. It is important that you follow these operating steps each time you use the machine.

1. Turn on the main AC power supply to the machine.
2. Set the CONTROL CIRCUIT POLARITY SWITCH to the appropriate position.
  - Set toggle to "Electrode Negative" position if the electrode is connected to the negative (-) output terminal.
  - Set toggle to "Electrode Positive" position if the electrode is connected to the positive (+) output terminal.
3. Set the WELDING MODE SWITCH to welding process being used.
  - CV Submerged Arc
  - CV Innershield
  - CC Stick
4. Push the ON/OFF PUSH BUTTON to the ON position
  - The red neon light glows.
  - The fan starts.
5. Set Output Control Potentiometer to desired voltage or current.
6. Make the weld (**Note:** Terminal #2 and #4 must be connected together to energize the machine output).

## REMOTE CONTROL OF MACHINE OPERATION

The toggle switch on the control panel labelled "Remote - Panel" gives the operator the option of controlling the machine output from a remote location. If in the Remote position a wire feeder with remote control capabilities or a remote control device such as a K857 must be connected to terminals 75, 76, and 77. Refer to Accessories Section for wire feeder remote information.

## WELDING PROCEDURE RECOMMENDATIONS

Select Welding Mode Switch position based on type of welding to be done.

1. Innershield Welding/Other Open Arc Processes: Use the CV Innershield mode.
2. Submerged Arc Welding: Use the CV Submerged Arc mode. If performing high speed welding, switch between the CV Submerged Arc and the CV Innershield mode and use the mode that produces the best welding results.
3. Air/Carbon Arc Cutting / Stick Welding / High Current, Large Puddle Submerged Arc Welding: Use the CC Stick mode. When the Idealarc DC-600 is used for Air/Carbon Arc cutting, the OUTPUT CONTROL POTENTIOMETER should be set to "9" initially. Based on the size of the carbon being used or the process, turn the potentiometer to a lower setting as required by the process. You can use carbon rods up to 3/8" in diameter at currents as high as 750 amps with excellent arc control. The welder protection circuit protects the machine from extremely high short circuiting pulses.

## SEMI-AUTOMATIC AND AUTOMATIC WIRE FEEDING WITH A IDEALARC DC-600 AND WIRE FEEDERS

When using the Idealarc DC-600 with semi-automatic or automatic wire feeding equipment and for stick welding or air/carbon arc cutting, it is recommended that the optional MULTI-PROCESS SWITCH be used. This switch permits you to easily change the polarity of the connected wire feeding equipment or switch to stick welding or air/carbon arc cutting.

## NA-3 AUTOMATIC WIRE FEEDER

1. Set the DC-600 Output Control Switch to Remote. **Note:** Later model NA-3 automatic wire feeders are capable of cold starts when the NA-3 Mode switch is in the CV or CC mode position. Some earlier models are capable of cold starting only in the CC mode position. Cold starting enables you to inch the wire down to the work, automatically stop, and automatically energize the flux hopper valve.
2. Set the DC-600 welding mode switch for the desired process: CV Submerged Arc, CV Innershield mode or CC mode.
3. Set the NA-3 mode Switch Position to either CV or CC to match the DC-600 mode selected in step 2.
4. Refer to the NA-3 operators manual for instructions on how to use the NA-3 in conjunction with the DC-600.
5. Follow the following guidelines for good arc striking detailed below for each welding mode.

### GOOD ARC STRIKING GUIDELINES FOR THE NA-3 WITH THE IDEALARC DC-600 IN THE CV INNERSHIELD, CV SUBMERGED ARC OR CC STICK WELDING MODES.

Following are some basic arc striking techniques that apply to all wire feed processes. Using these procedures should provide trouble-free starting. These procedures apply to single, solid wires and Innershield wires.

1. Cut the electrode to a sharp point.
2. Set the NA-3 Open Circuit Voltage Control to the same dial setting as the Arc Voltage Control. If this is a new welding procedure, a good starting point is to set the Open Circuit Voltage Control to # 6.

**Note:** The open circuit voltage of the IDEALARC DC-600 varies from approximately 16 volts to 56 volts in the CV Innershield or CV Submerged Arc modes. The open circuit voltage is constant in the CC Stick mode.

3. Run a test weld. Set proper current, voltage, and travel speed.
  - a. For the best starting performance, the NA-3 Open Circuit Voltage Control and Voltage Control setting should be the same. Set the Inch Speed Control for the slowest inch speed possible.
  - b. To adjust the Open Circuit Voltage Control to get the best starting performance, make repeated starts observing the NA-3 voltmeter.

When the voltmeter pointer swings smoothly up to the desired arc voltage, without undershooting or overshooting the desired arc voltage, the Open Circuit Voltage Control is set properly.

If the voltmeter pointer overshoots the desired voltage and then returns back to the desired voltage, the Open Circuit Voltage Control is set too high. This can result in a bad start where the wire tends to "Blast off."

If the voltmeter pointer hesitates before coming up to the desired voltage, the Open Circuit Voltage Control is set too low. This can cause the electrode to stub.

4. Start and make the weld.
  - a. Cold starts. For cold starts, be sure the work piece is clean and the electrode makes positive contact with the work piece.
  - b. Hot "On the Fly" starts. For hot starts, travel should begin before the wire contacts the work piece.

## ARC STRIKING WITH IDEALARC DC-600 AND THE NA-3 START BOARD

When electrical strikeouts exceed 44.4mm (1 3/4") an NA-3 Start Board may be required to improve arc striking.

When the NA-3 Start Board is used to improve arc striking, use the following procedures:

1. Set start time at 0.
2. Set NA-3 start current and start voltage at mid-range.
3. Set the NA-3 output current and voltage to the proper settings for the welding procedure to be used.
4. Turn the Start Board Timer to maximum.
5. Set Start Board current and voltage control.
  - a. Set the Start Board current control to 1 1/2 dial numbers below that set on the NA-3 current control.
  - b. Set the Start Board voltage control equal with the NA-3 voltage control setting.

**Note:** These Start Board current and voltage settings result in a start up current that is lower than the NA-3 current setting and approximately equal with the NA-3 voltage setting for the desired welding procedure.

6. Establish the correct arc striking procedure with the NA-3 Start Board timer set at maximum.
  - a. For the best starting performance, the NA-3 Open Circuit Voltage Control and Voltage Control setting should be the same. Set the Inch Speed Control for the slowest inch speed possible.
  - b. To adjust the Open Circuit Voltage Control to get the best starting performance, make repeated starts observing the NA-3 voltmeter.

When the voltmeter pointer swings smoothly up to the desired arc voltage, without undershooting or overshooting the desired arc voltage, the Open Circuit Voltage Control is set properly.

If the voltmeter pointer overshoots the desired voltage and then returns back to the desired voltage, the Open Circuit Voltage Control is set too high. This can result in a bad start where the wire tends to "Blast off."

If the voltmeter pointer hesitates before coming up to the desired voltage, the Open Circuit Voltage Control is set too low. This can cause the electrode to stub.

- c. Set NA-3 Start Board current and voltage as close to the welding procedure current and voltage as possible.

**Note:** The Start Board current and voltage should be as close as possible to the welding procedure current and voltage, while still getting satisfactory starts.

- d. Set the start time to as low a time as possible while still getting satisfactory starts.

7. Start and make the weld.

## IDEALARC DC-600 POWER SOURCE SETTING WHEN CONNECTED TO NA-5 WIRE FEEDER

When using the Idealarc DC-600 with the NA-5 wire feeder, set the controls on the Idealarc DC-600 as follows for the best performance:

1. Turn OFF main AC input power supply to the Idealarc DC-600.
2. Connect the electrode cables to terminal polarity to be used.
3. Set the CONTROL CIRCUIT POLARITY SWITCH to the same polarity as the electrode cable connection.
4. Set the OUTPUT CONTROL SWITCH to REMOTE.

5. Set the Idealarc DC-600 WELDING MODE SWITCH to the position that matches the welding process being used.
  - a. For submerged arc welding, set WELDING MODE SWITCH TO CV SUBMERGED ARC position.
  - b. For all open arc welding processes set WELDING MODE SWITCH TO CV INNERSHIELD position.

## LN-8 SEMI-AUTOMATIC WIRE FEEDER

To use the LN-8 Semi-Automatic Wire Feeder with Idealarc DC-600.

1. Set the Idealarc DC-600 WELDING MODE SWITCH to either CV Innershield mode or CV Submerged Arc mode depending on the welding process being used.
2. Set the Idealarc DC-600 OUTPUT CONTROL SWITCH to the REMOTE position.
3. Set the LN-8 Welding Mode Switch to the CV position. The LN-8 Welding Mode Switch is located on the variable voltage (CC) board.
4. Refer to the LN-8 Operator's Manual for instructions on how to use the LN-8.

## LN-7 AND LN-9 SEMI-AUTOMATIC WIRE FEEDERS OR OTHER CONSTANT WIRE FEEDERS

To use the LN-7, LN-9, or other constant wire feed speed semi-automatic wire feeders with Idealarc DC-600.

1. Set the Idealarc DC-600 WELDING MODE SWITCH to either CV Innershield mode or CV Submerged Arc mode depending on the welding process being used.

**Note:** These semi-automatic wire feeders cannot be used in the CC Stick mode.
2. Set the Idealarc DC-600 OUTPUT CONTROL SWITCH.
  - a. LN-7: Use either an optional K857 Remote Control Box Assembly or set the Idealarc DC-600 OUTPUT CONTROL SWITCH in the Local position.
  - b. LN-9: Refer to the LN-9 Operator's Manual for instructions of how to use the LN-9.

## OPTIONS/ACCESSORIES

- Multi-Process Switch (K804-1)
  - Remote Control Box Assembly (K857)
  - Undercarriages (KA1236 & KA1237)
  - Paralleling Kit (KA1010)
- Semi-Automatic and Automatic Wire Feeders
- LN-7 } Semi-Automatic Wire Feeders
  - LN-8 }
  - LN-9 }
  - NA-3 } Automatic Wire Feeders
  - NA-5 }

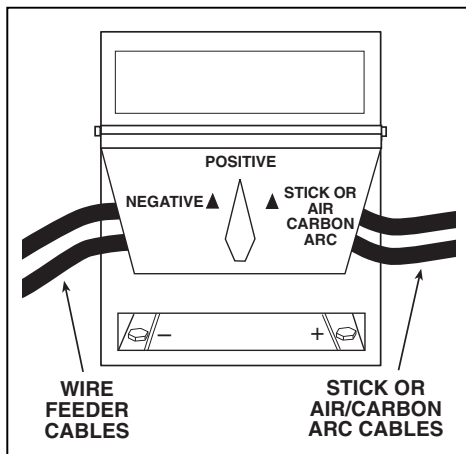
## MULTI-PROCESS SWITCH

The MULTI-PROCESS SWITCH gives you the ability to:

- Switch between "stick welding or air/carbon arc cutting" and using a semi-automatic or automatic wire feeder.
- Change the polarity of a semi-automatic or automatic wire feeder without changing any electrical cable connections.

The MULTI-PROCESS SWITCH has two sets of out-put terminals. You connect the wire feeder unit cables to the set of terminals on the left side of the box and the stick or air/carbon arc cables to the set of terminals on the right side (facing the front of the machine) as shown in Figure C.1.

Figure C.1  
Multi-Process Switch

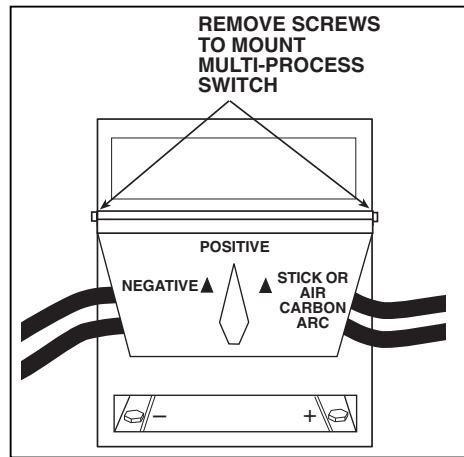


When the MULTI-PROCESS SWITCH is in the "Stick or Air/Carbon Arc" position, only those terminals are energised. The wire feeder nozzle or gun and electrode are not electrically "hot" when in this mode.

Follow these steps to install the MULTI-PROCESS SWITCH:

1. Confirm that the Idealarc DC-600 ON/OFF PUSH BUTTON is in the OFF position.
2. Disconnect main AC input power to the Idealarc DC-600.
3. Open the terminal strip access door located on the Case Front Assembly.
4. Remove the two front, middle screws that secure the two side panels of the machine. See Figure C.2.

Figure C.2  
Side Panel Removal

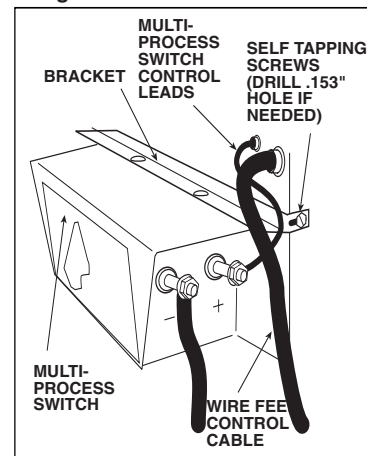


5. Attach the MULTI-PROCESS SWITCH bracket across the front of the machine with the flange down. Use the long, self-tapping screws and lock washers provided. The bracket should be on the outside of the side panel. See Figure C.3.

**Note:** If the machine does not have any holes in the front of the machine, use the switch template and drill two .153" diameter holes.

6. Position the MULTI-PROCESS SWITCH at the front of the machine. See Figure C.3.

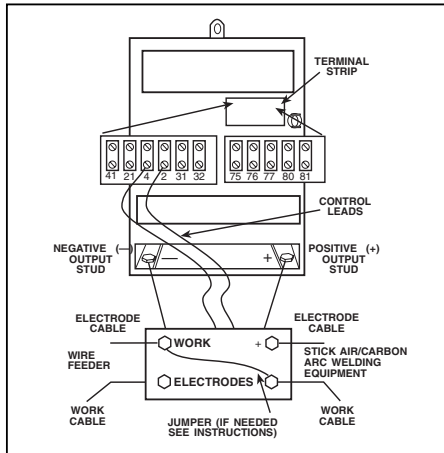
Figure C.3  
Attaching the Multi-Process Switch Bracket




7. Route the MULTI-PROCESS SWITCH control leads through the strain-relief box connectors and into the terminal strip. The wire feeder control cable is routed through the strain-relief box connector also. See Figure C.3.
8. Connect the control leads from the MULTI-PROCESS SWITCH to terminals #2 and #4 on the Idealarc DC-600's terminal strip.
9. Position the MULTI-PROCESS SWITCH flush with the front of the machine about 2" lower than the bracket. Slide the switch straight up to the bracket.
10. Check that the bottom of the switch is hooked behind the top of the bottom louvre.

- Connect the right cable from the MULTI-PROCESS SWITCH (facing the front of the machine) to the Idealarc DC-600 positive (+) output terminal. See Figure C.4.

**Figure C.4**  
**Multi-Process Switch Cable Connections**



- Connect the left cable from the MULTI-PROCESS SWITCH (facing the front of the machine) to the Idealarc DC-600 negative (-) output terminal. See Figure C.4.
  - Connect the wire feeder electrode and work cables. See Figure C.4.
    - Insert the wire feeder electrode and work cables through the strain relief loop on the left side of the Idealarc DC-600 (facing the front of the machine).
    - Connect the wire feeder electrode and work cables to the electrode and work terminals on the left side of the MULTI-PROCESS SWITCH.
- Note:** When using Dual Process Kits K317 or K318, connect the electrode and work cables to these terminals instead of the power source output terminals. See connection diagrams for details.
- Connect wire feeder control cable to the amphenol/terminal strip of the Idealarc DC-600.
 

**Note:** Connect the control cable ground lead to the frame terminal marked (  ).

**Note:** See the connection diagram for the wire feeder being used for connection instructions.
  - Connect stick or air/carbon arc electrode and work cable. See Figure C.4.
    - Insert the electrode and work cables through the strain relief loop on the right side (facing the front of the machine) of the Idealarc DC-600.
    - Connect the electrode cable to the "Positive" terminal on the right side of the MULTI-PROCESS SWITCH.
    - Connect the work cable to the "Negative" terminal on the right side of the MULTI-PROCESS SWITCH.

**Note:** The instructions above are for connecting the stick polarity positive. To change the polarity, turn the Idealarc DC-600 OFF, and reverse the cables.

**Note:** When it is not necessary to have separate ground cables for stick and semi-automatic or automatic welding, connect a jumper from the MULTI-PROCESS SWITCH "Work" terminal to the MULTI-PROCESS SWITCH "negative" terminal. See Figure C.4.

To operate the MULTI-PROCESS SWITCH, refer to the operating instructions on the switch nameplate.

## UNDERCARRIAGE (KA1236, KA1237)

The IDEALARC DC-600 is designed for use with the Lincoln Undercarriage. Complete installation instructions are included with the undercarriage. When any of the undercarriages are

installed, the Idealarc DC-600 lift bail is no longer functional. Do not attempt to lift the machine with the undercarriage attached. The undercarriage is designed for moving the machine by hand only. Mechanised towing can lead to injury and/or damage to the Idealarc DC-600.


## METERS

Voltmeter and ammeter are factory installed.

## PARALLELING KIT FOR DC-600


Kit AT4000 - field installation only, permits paralleling of two DC-600's for welding currents of up to 1200 amps, 100% duty cycle. (See instructions shipped with the kit for installation and operation.)

## CONNECTIONS FOR SEMI-AUTOMATIC OR AUTOMATIC WIRE FEEDER CONTROL

- Set the ON/OFF PUSH BUTTON to OFF.
- Locate and open the hinged access door on the Front Case Assembly.
- Insert control cable through the strain relief box connector and pull enough cable through to reach the terminal strip, or connect to amphenol plug base.
- Connect the automatic wire feeder control cable to the amphenol/terminal strip. See corresponding connection diagram in this Section of the manual, or the instructions included with the wire feeder.
- Connect the wire feeder grounding wire to the chassis ground screw marked with the symbol (  ).

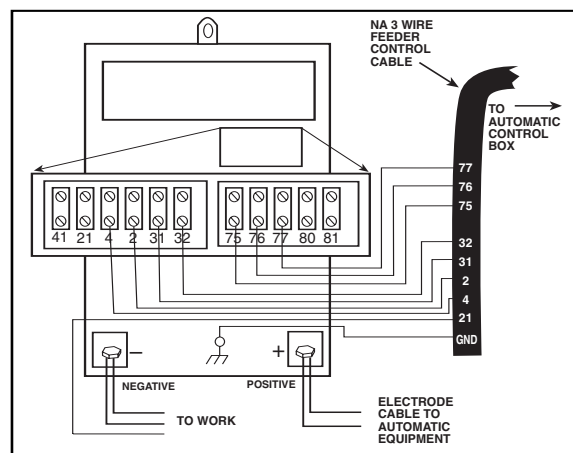
**Note:** The IDEALARC DC-600 Auxiliary Power Circuit supplies 42/115-volt AC power to the wire feeding equipment. The circuit has a 1000 volt ampere rating. An 8-amp slow blow fuse on the machin300/e's control panel protects the auxiliary power supply from excessive overloads.

## CONNECTING THE NA-3 IDEALARC DC-600

- Disconnect main AC input power to the Idealarc DC-600.
- Set Idealarc DC-600 ON/OFF PUSH BUTTON to OFF.
- Connect the wire feeder control cable leads to the Idealarc DC-600 amphenol/terminal strip as shown in Figure C.5.
- Connect the wire feeder control cable ground lead to the frame terminal marked (  ).

**Note:** The Idealarc DC-600 must be properly grounded.

**Figure C.5**  
**Connection to the Idealarc DC-600**





5. Extend wire feeder control cable lead # 21 so it can be connected directly to the work piece.
  - a. Make a bolted connection using AWG #14 or larger insulated wire. Tape the bolted connection with insulating tape.
  - b. An S-16586- X remote voltage sensing work lead is available for this purpose.
  - c. Keep the # 21 lead electrically separate from the work cable circuit and connection.
  - d. Tape the # 21 lead to work cable for ease of use.

**Note:** The connection diagram shown in Figure C.5 shows the electrode connected for positive polarity.

To change polarity:

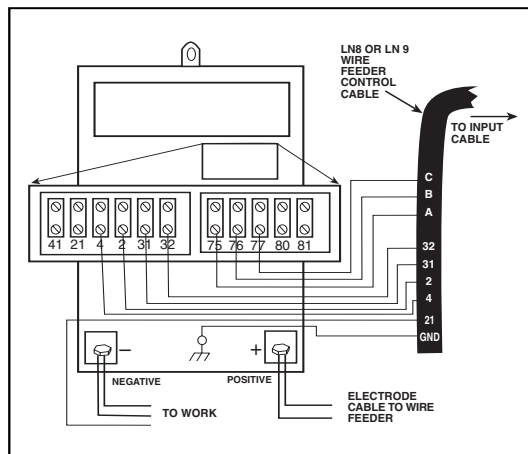
- a. Set the Idealarc DC-600 ON/OFF PUSH BUTTON to OFF
- b. Move the electrode cable to the Negative (-) output terminal
- c. Move the work cable to the Positive (+) output terminal.
- d. Set the Idealarc DC-600 CONTROL CIRCUIT POLARITY SWITCH to NEGATIVE.
- e. Reverse the leads at the back of the ammeter and voltmeter on the wire feeder automatic control box.

## CONNECTING THE NA-5 TO THE IDEALARC DC-600

**Note:** For optimum performance use the NA-5 with Idealarc DC-600 codes 8288 and above.

1. Disconnect main AC input power to the Idealarc DC-600.
2. Set the Idealarc DC-600 ON/OFF PUSH BUTTON to OFF.
3. Connect the wire feeder control cable leads to the Idealarc DC-600 amphenol/terminal strip as shown in Figure C.6.

**Figure C.6**  
NA-5 Wire Feeder Connection to the Idealarc DC-600



**Note:** If using a K215 control cable, connect control cable leads #75, #76, and #77 to the matching #75, #76, and #77 terminals on the terminal strip of the Idealarc DC- 600.

4. Connect the wire feeder control cable ground lead to the frame terminal marked (  $\text{GND}$  ).

**Note:** The Idealarc DC-600 must be properly grounded.

5. Extend wire feeder control cable lead # 21 so it can be connected directly to the work piece.
  - a. Make a bolted connection using AWG #14 or larger insulated wire. Tape the bolted connection with insulating tape.
  - b. An S-16586- X remote voltage sensing work lead is available for this purpose.
  - c. Keep the # 21 lead electrically separate from the work cable circuit and connection.
  - d. Tape the # 21 lead to work cable for ease of use.

6. Connect NA-5 wire feeder control jumpers on Voltage Control Board. See NA-5 Operator's Manual.
  - a. Connect red jumper on Voltage Control Board to pin "S."
  - b. Connect white jumper on Voltage Control Board to pin "B."

**Note:** The connection diagram shown in Figure C.6 shows the electrode connected for positive polarity.

To change polarity:

- a. Set the Idealarc DC-600 ON/OFF PUSH BUTTON to OFF.
- b. Move the electrode cable to the Negative (-) output terminal.
- c. Move the work cable to the Positive (+) output terminal.
- d. Set the Idealarc DC-600 CONTROL CIRCUIT POLARITY SWITCH to NEGATIVE.

**Note:** For proper NA-5 operation, the electrode cables must be secured under the clamp bar on the left side of the NA-5 Control Box.

## CONNECTING THE LN-8 OR LN-9 TO THE IDEALARC DC-600

1. Disconnect AC input power to the Idealarc DC-600.
2. Set the Idealarc DC-600 ON/OFF PUSH BUTTON to OFF.
3. Connect the wire feeder control cable leads to the Idealarc DC-600 amphenol/terminal strip as shown in Figure C.7.
4. Connect the wire feeder control cable ground lead to the frame terminal marked (  $\text{GND}$  ).

**Note:** The Idealarc DC-600 must be properly grounded.

5. Extend wire feeder control cable lead #21 so it can be connected directly to the work piece.

- a. Make a bolted connection using AWG #14 or larger insulated wire. Tape the bolted connection with insulating tape.
- b. An S-16586- X remote voltage sensing work lead is available for this purpose.
- c. Keep the #21 lead electrically separate from the work cable circuit and connection.
- d. Tape the #21 lead to work cable for ease of use.

**Note:** Using the extended #21 lead eliminates the need to use the LN-9's remote work lead accessory which has a direct work lead jack.

6. Connect LN-9 wire feeder control jumpers on Voltage Control board. See LN-9 Operator's Manual.
  - a. White jumper on Voltage Control Board to pin "S."
  - b. Blue jumper on Voltage Control Board to pin "B."

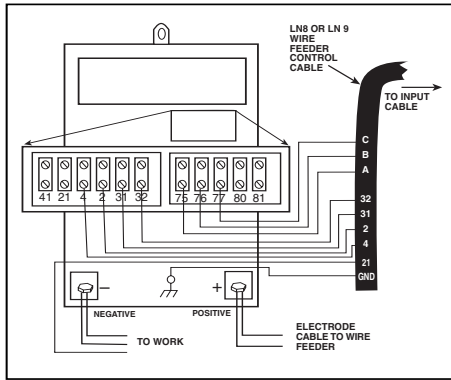
**Note:** On earlier units, the blue jumper on Voltage Control Board is connected to Pin "B" on Start Board.

**Note:** The connection diagram shown in Figure C.7 shows the electrode connected for positive polarity.

To change polarity:

- a. Set the Idealarc DC-600 ON/OFF PUSH BUTTON to OFF.
- b. Move the electrode cable to the Negative (-) output terminal.
- c. Move the work cable to the Positive (+) output terminal.
- d. Set the Idealarc DC-600 CONTROL CIRCUIT POLARITY SWITCH to NEGATIVE.

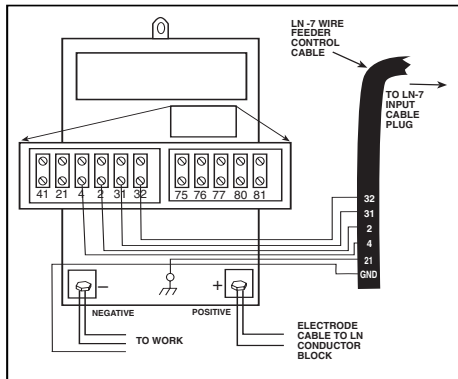
**Figure C.7**  
**LN-8 or LN-9 Wire Feeder Connection to the Idealarc DC-600**



**LN-7 IDEALARC DC-600**

1. Disconnect main AC input power to the Idealarc DC-600.
2. Set the IDEALARC DC-600 ON/OFF PUSH BUTTON to OFF.
3. Connect the wire feeder control cable leads to the Idealarc DC-600 amphenol/terminal strip as shown in Figure C.8.
4. Connect the wire feeder control cable ground lead to the frame terminal marked ( ).

**Figure C.8**  
**LN-7 Wire Feeder Connection to the Idealarc DC-600**



**Note:** The Idealarc DC-600 must be properly grounded.

5. PERFORM THIS STEP ONLY IF THE LN-7 IS EQUIPPED WITH A METER KIT.

Extend wire feeder control cable lead #21 so it can be connected directly to the work piece.

- a. Make a bolted connection using AWG #14 or larger insulated wire. Tape the bolted connection with insulating tape.

**Note:** If the work cable length is less than 25 feet and the connections to the work piece are secure, then wire feeder control cable lead #21 can be connected directly to the DC-600 terminal strip.

- b. An S-16586- X remote voltage sensing work lead is available for this purpose.
- c. Keep the #21 lead electrically separate from the work cable circuit and connection.
- d. Tape the #21 lead to work cable for ease of use.

**Note:** The connection diagram shown in Figure C.8 shows the electrode connected for positive polarity.

To change polarity:

- a. Set the Idealarc DC-600 ON/OFF PUSH BUTTON to OFF.
- b. Move the electrode cable to the Negative (-) output terminal.
- c. Move the work cable to the Positive (+) output terminal.
- d. Set the IDEALARC DC-600 CONTROL CIRCUIT POLARITY SWITCH to NEGATIVE.

# GROUND TEST PROCEDURE



## WARNING

This procedure is only suitable for applications using DC mega testers up to 500V.

**Note:** This procedure is for 'machines as built' many modifications could have taken place over the life of a particular machine, so details of this procedure may need to be 'adjusted' to suit these modifications.

For prompt service contact your local authorised Lincoln field service shop.

The insulation resistance values listed below are from Australian Standard AS1966.2.

1. Disconnect input power mains supply.
2. Remove welding leads (electrode cables, control cables and work lead) from the machine before any tests are carried out.
3. Remove plugs from all PCB's, install a shorting socket into the harness plugs. (shorting all pins together. The firing board harness shorting plugs must have leads connecting the plugs to the SCR heat sinks. The control board harness shorting plugs must be connected together, shorting plugs or machine wiring harness must not touch any part of pcb or pcb mountings during mega testing.
4. On each of the 6 power SCR's, connect a jumper to both heat sinks anode and cathode, also connect a jumper from each gate lead to one of the heatsinks.
5. Disconnect the ground lead on the by - pass capacitor mounted on the front panel.
6. Jumper all input and output lead connections on the input contactor (1cr).
7. Disconnect leads 222, 210 and 256 from transient suppressor assy. (if equipped).

8. Jumper volt & amp meter terminals, set local / remote switch to local and CV / CC to cc position.
9. **Input circuit test:** Connect one lead of the mega tester to the frame of the machine and the other lead to the input contactor jumper. Apply the test. (Min. resistance 1M $\Omega$ ).
10. **Welding circuit test:** Connect one lead of the mega tester to the frame of the machine and the other lead to the positive output stud. Apply the test. (Min. resistance 1M $\Omega$ ).
11. **Input circuit to welding circuit test:** Connect one lead of the mega to the input contactor jumper and the other to the positive output stud. Apply the test/s. (Min. resistance 10M $\Omega$ ).
12. **Auxiliary circuit test:** Connect one lead of the mega tester to the frame of the machine and the other lead to terminal No32A. Apply the test. (Min. resistance 1M $\Omega$ ).
13. **Input circuit to auxiliary circuit test:** connect one lead of the mega to the input contactor jumper and the other lead to terminal No32A. Apply the test. (Min. resistance 1M $\Omega$ ).
14. **Welding circuit to auxiliary circuit test:** Connect one lead of the mega tester to the positive output stud and the other lead to terminal No32A. Apply the test. (Min. resistance 1M $\Omega$ ).
15. **Control board harness test:** Connect one lead of the mega tester to the control board harness plugs and the other lead to the frame of the machine. Apply the test. (Min. resistance 1M $\Omega$ ).
16. **Control board harness to input circuit test:** connect one lead of the mega tester to the control board harness shorting plugs and the other lead to terminal No32A. Apply the test. (Min. resistance 1M $\Omega$ ).
17. Remove all shorting plugs, and jumpers and reconnect all plus and leads.

If any problems are encountered refer to your nearest authorised Lincoln Field Service Shop.

# MAINTENANCE

## ROUTINE AND PERIODIC



## ELECTRIC SHOCK can kill

- Only qualified personnel should perform this maintenance.
- Turn the input power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

## MAINTENANCE

1. Disconnect input AC power supply lines to the machine before performing periodic maintenance, tightening, cleaning, or replacing parts. See Figure D.1

### Perform the following daily:

1. Check that no combustible materials are in the welding or cutting area or around the machine.
2. Remove any debris, dust, dirt, or materials that could block the air flow to the machine for cooling.
3. Inspect the electrode cables for any slits or punctures in the cable jacket, or any condition that would affect the proper operation of the machine.

### Perform Periodically:

Clean the inside of the machine with low pressure air stream. Clean the following parts. Refer to Figure D.1.

- Main transformer and choke.
- Electrode and work cable connections.
- SCR rectifier bridge and heat sink fins.
- Control board.
- Firing board.
- Fan Assembly.

**Note:** The fan motor has sealed bearings which require no maintenance.

# NOTES

# TROUBLESHOOTING

## HOW TO USE TROUBLESHOOTING GUIDE



### WARNING

Service and Repair should only be performed by Lincoln Electric Factory Trained Personnel. Unauthorised 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.



### CAUTION

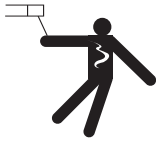
If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

# TROUBLESHOOTING

## PC BOARD TROUBLESHOOTING PROCEDURES



### WARNING



#### ELECTRIC SHOCK can kill

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



### CAUTION

Sometimes machine failures appear to be due to PC board failures. These problems can sometimes be traced to poor electrical connections. To avoid problems when troubleshooting and replacing PC boards, please use the following procedure:

1. Determine to the best of your technical ability that the PC board is the most likely component causing the failure symptom.
2. Check for loose connections at the PC board to assure that the PC board is properly connected.
3. If the problem persists, replace the suspect PC board using standard practices to avoid static electrical damage and electrical shock. Read the warning inside the static resistant bag and perform the following procedures:



**ATTENTION**  
Static-Sensitive  
Devices  
Handle only at  
Static-Safe  
Workstations

Reusable  
Container  
Do Not Destroy

#### P.C. Board can be damaged by static electricity.

Remove your body's static charge before opening the static-shielding bag. Wear an anti-static wrist strap. For safety, use a 1 Meg ohm resistive cord connected to a grounded part of the equipment frame.

- If you don't have a wrist strap, touch an unpainted, grounded, part of the equipment frame. Keep touching the frame to prevent static build-up. Be sure not to touch any electrically live parts at the same time.
  - Tools which come in contact with the P.C. Board must be either conductive, anti-static or static-dissipative.
  - Remove the P.C. Board from the static-shielding bag and place it directly into the equipment. Don't set the P.C. Board on or near paper, plastic or cloth which could have a static charge. If the P.C. Board can't be installed immediately, put it back in the static-shielding bag.
  - If the P.C. Board uses protective shorting jumpers, don't remove them until installation is complete.
  - If you return a P.C. Board to The Lincoln Electric Company for credit, it must be in the static-shielding bag. This will prevent further damage and allow proper failure analysis.
4. Test the machine to determine if the failure symptom has been corrected by the replacement PC board.

**Note:** It is desirable to have a spare (known good) PC board available for PC board troubleshooting.

**Note:** Allow the machine to heat up so that all electrical components can reach their operating temperature.

5. Remove the replacement PC board and substitute it with the original PC board to recreate the original problem.
  - a. If the original problem does not reappear by substituting the original board, then the PC board was not the problem. Continue to look for bad connections in the control wiring harness, junction blocks, and terminal strips.
  - b. If the original problem is recreated by the substitution of the original board, then the PC board was the problem. Reinstall the replacement PC board and test the machine.
6. Always indicate that this procedure was followed when warranty reports are to be submitted.

**Note:** Following this procedure and writing on the warranty report, "INSTALLED AND SWITCHED PC BOARDS TO VERIFY PROBLEM," will help avoid denial of legitimate PC board warranty claims.

# TROUBLESHOOTING

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>OUTPUT PROBLEMS</b>		
Major Physical or Electrical Damage is Evident	Contact the Lincoln Electric Service	If all recommended possible areas of misadjustment have been checked and the problem persists, contact your local <b>Lincoln Authorised Field Service Facility</b> .
The machine is dead - the Input contactor does not operate.	<ol style="list-style-type: none"> <li>1. Check for blown or missing fuses in input lines.</li> <li>2. Check the three-phase input line voltage at the machine. The input voltage must match the rating plate and reconnect panel.</li> </ol>	
Input contactor (CR1) chatters.	<ol style="list-style-type: none"> <li>1. The input line voltage may be low. Check all three phases.</li> <li>2. Make sure input line voltage matches machine rating and the reconnect panel is connected correctly for the line voltage.</li> </ol>	
Input contactor pulls in when start button is pressed but immediately drops out when start button is released.	<ol style="list-style-type: none"> <li>1. Make sure input line voltage matches machine rating and the reconnect panel is connected correctly for the line voltage.</li> <li>2. Remove all external wires attached to terminal strip or amphenol plug.(2,4,31,32,75,76,77). If contactor (CR1) functions correctly there may be a "ground" or negative intrusion on the remote control leads (75,76 or 77). There may also be a "short" at the welder output terminals.</li> <li>3. If the problem persists after performing steps #1 and #2 the problem is in the DC-600.</li> </ol>	
Machine input contactor operates but machine has no weld output. Fan runs and pilot light glows.	<ol style="list-style-type: none"> <li>1. Install a jumper from #2 to #4 on machine terminal strip. If machine weld output is restored the problem is in the wire feeder or control cable.</li> <li>2. If remote control is not being used make certain the OUTPUT CONTROL SWITCH (SW3) is in the "Panel" position.</li> <li>3. Check 8AMP fuse in the front panel. Replace if blown.</li> <li>4. Check for loose or faulty weld cable connections.</li> </ol>	
Machine has maximum weld output and no control.	<ol style="list-style-type: none"> <li>1. If remote control is being used set OUTPUT CONTROL SWITCH (SW3) in "Panel" position and control weld output with the OUTPUT CONTROL POTENTIOMETER (R1) at DC-600. If the problem is solved check the remote control unit (or wire feeder) and associated control cable.</li> </ol>	

# TROUBLESHOOTING

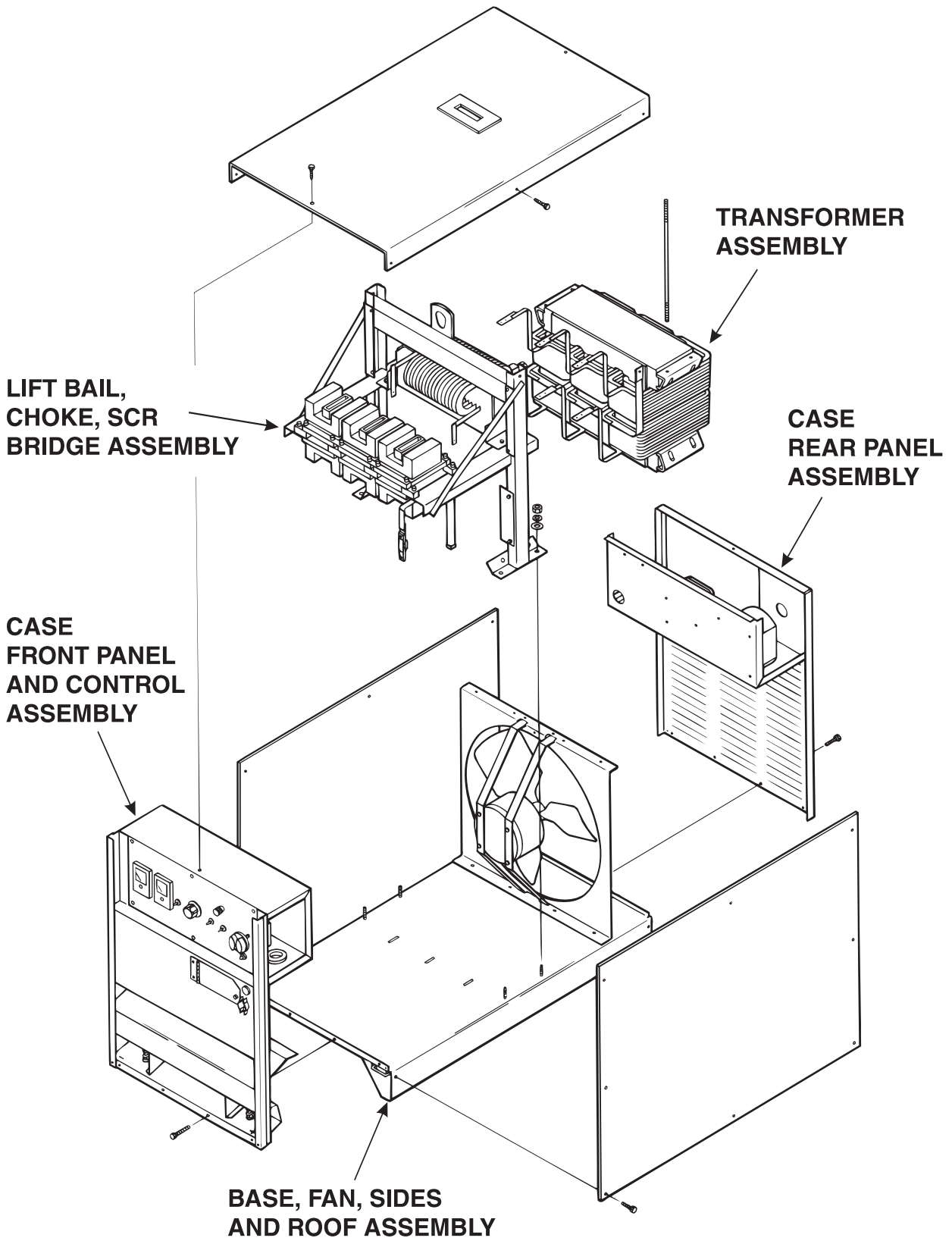
PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>OUTPUT PROBLEMS</b>		
Machine has minimum output and no control.	<ol style="list-style-type: none"> <li>1. If a remote control unit is NOT connected to the terminal strip #75, #76 and #77 terminals, the OUTPUT CONTROL SWITCH must be in the "Panel" position.</li> <li>2. If a remote control cable is connected to terminals #75, #76 and #77 the leads may be "shorted" to the positive weld output.</li> <li>3. Make certain the Three Phase input voltage is correct and matches the machine rating and the reconnect panel.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, contact your local <b>Lincoln Authorised Field Service Facility</b></p>
The machine does not have maximum weld output.	<ol style="list-style-type: none"> <li>1. Check all Three-Phase input lines at the DC-600. Make sure input voltages match machine rating and reconnect panel.</li> <li>2. Put OUTPUT CONTROL SWITCH (SW3) in "Panel" position. If problem is solved then check remote control unit or wire feeder.</li> </ol>	
Machine shuts off (input contactor drops out) when the welder output terminals are made electrically "hot". (#2 to #4 closure at terminal strip).	<ol style="list-style-type: none"> <li>1. Remove all welding cables and control cables from the DC-600. Jumper #2 to #4 at the terminal strip. If the machine does NOT shut off and normal open circuit voltage is present at the welder output terminals the problem is external to the DC-600. Either the remote leads #75,#76 or #77 are grounded to the negative output cable or there is a short on the welding output terminals.</li> <li>2. If the machine still shuts off when all control and welding cables are removed then the problem is internal to the DC-600.</li> </ol>	
The DC-600 will NOT shut off when the Stop button is pushed.	<ol style="list-style-type: none"> <li>1. Contact your local Lincoln Authorised Field Service Facility.</li> </ol>	
The weld output terminals are always electrically "hot".	<ol style="list-style-type: none"> <li>1. Remove any external leads hooked to #2 and #4 on the terminal strip. If the problem disappears the fault is in the control cable or wire feeder.</li> <li>2. If some open circuit voltage is present (over 3VDC) after performing Step #1, then the problem is within the DC-600.</li> </ol>	



# TROUBLESHOOTING

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
<b>WELDING PROBLEMS</b>		
Poor arc starting when the DC-600 is in the CV Sub-Arc or CV Innershield modes.	<ol style="list-style-type: none"> <li>1. Make sure the proper welding procedures are being used (wire feed speed, arc voltage and wire size).</li> <li>2. Check weld cables for loose or faulty connections.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, contact your local <b>Lincoln Authorised Field Service Facility</b></p>
Poor arc characteristics in all processes.	<ol style="list-style-type: none"> <li>1. Check for the correct input voltages on the three-phase input lines at the DC-600.</li> <li>2. Make sure the proper welding procedures are being used (wire feed speed, arc voltage and wire size).</li> <li>3. Check the welding cables for loose or faulty connections.</li> </ol>	

Figure D.1  
General Assembly Exploded View



# DC-600

## (For Codes 1272 to 1633)

### Model Index

NUMBERS IN THE TABLE BELOW INDICATE WHICH COLUMN TO USE IN EACH PARTS LIST FOR EACH INDIVIDUAL CODE NUMBER.

**DO NOT** attempt to use this Parts List for machine if its code number is not listed. Contact the Service Department for any code numbers not listed. (Only those suffixes which require distinction from the basic codes are shown.)

PARTS LIST TITLES	Optional Equipment	Miscellaneous Items	Case Front panel Assembly	Control Box Assembly	Case Rear Panel Assembly	Transformer Assembly	SCR bridge Assembly	Life Bale & Choke Assembly	Base, Fan, Sides & Roof Assembly	K804-1 Multi-Process Switch	Remote Control (Optional)
	AP216-B.1	AP216-B.2	AP216-C	AP216-D	AP216-E	AP216-F	AP216-G	AP216-H	AP216-J	AP239	AP84-J
PARTS LIST NO. →											
CODE NO. ↓											
1272		1		1	1	1	1	1	1	1	1
1273		2	1	1	2	2	1	1	1	1	1
1311		1	1	1	1	1	1	1	1	1	1
1312		2	1	1	2	2	1	1	1	1	1
1318		2	1	1	2	2	1	1	1	1	1
1319		1	1	1	1	1	1	1	1	1	1
1322		1	1	1	1	1	1	1	1	1	1
1323		2	1	1	2	2	1	1	1	1	1
1327		1	1	1	1	1	1	1	1	1	1
1329		1	1	1	1	1	1	1	1	1	1
1334		2	1	1	2	2	1	1	1	1	1
1435		1	1	1	1	1	1	1	1	1	1
1434		2	1	1	2	2	1	1	1	1	1
1485		1	1	1	1	1	1	1	1	1	1
1503		1	1	1	1	1	1	1	1	1	1
1548		1	2	1	1	1	1	1	1	1	1
1549		2	2	1	2	2	1	1	1	1	1
1622		3	2	1	2	3	1	1	1	1	1
1623		4	2	1	2	4	1	1	1	1	1
1633		5	2	1	2	5	1	1	1	1	1

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## OPTIONAL EQUIPMENT LISTING

Miscellaneous Options Available for your machine are listed below:

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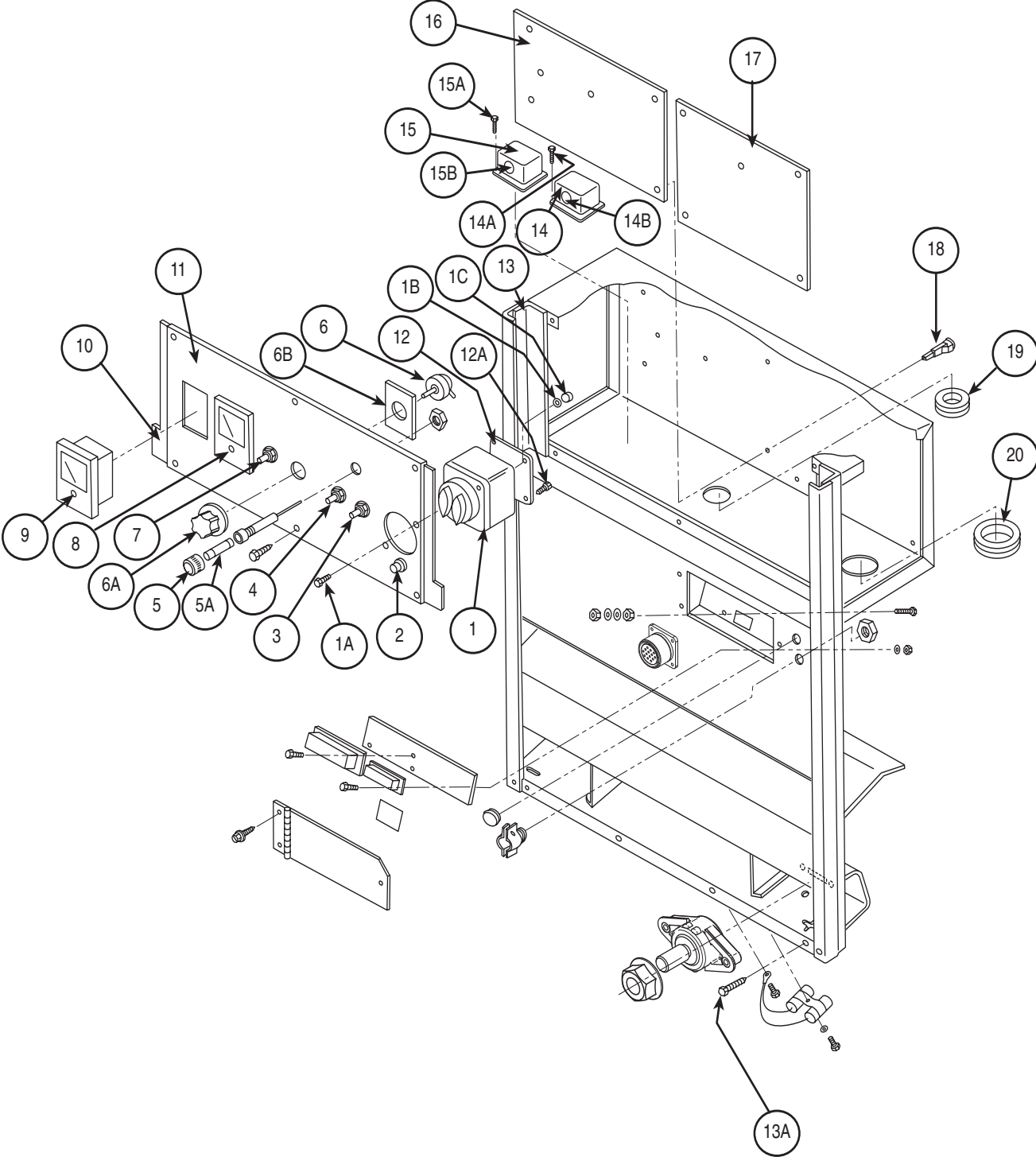
DESCRIPTION .....	PART NUMBER
Hand Amptrol .....	Order K812
Arc Start Switch .....	Order K812
Undercarriage without Gas Rack .....	Order KA1236
Undercarriage with Gas Rack .....	Order KA1237
Twist Mate Plug Kit (25mm-95mm) .....	Order KA1346
Remote Output Control (8.5m suits terminal strip connection) .....	Order K775
Remote Output Control 6 pin Connector (8.5m req K864 Adapter) .....	Order K857
Remote Output Control 6 pin Connector (20m req K864 Adapter) .....	Order K857-20
Remote Output Control 14 pin Connector (20m) .....	Order K857A20
Remote Control Adapter .....	Order K864
Universal Adapter for 14 Pin Cable Connector .....	Order K867
Foot Amptrol .....	Order K870
DC TIG Starter .....	Order K900-1
Multi Process Switch (8.5m req K864 Adapter) .....	Order KA1237
Paralleling Kit .....	Order KA1010

## MISCELLANEOUS ITEMS

(These items are not illustrated)

# Indicates a change this printing.  <div style="background-color: black; color: white; padding: 2px; font-weight: bold;">Recommended Spare Parts are highlighted in bold</div>	Use only the parts marked "X" in the column under the heading number called for in the model index page.										
DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
Input Connection Diagram: 414/3/50	AT3164-1	1	x								
Input Connection Diagram 220/380/440/3/50	AM3237			x							
Input Connection Diagram 200/3/50	AT3164-11				x						
Input Connection Diagram 380/550/575/3/50	AT3164-12					x					
Input Connection Diagram 380/550/3/50	AT3164-9						x				
Wiring Diagram 415/3/50 220/380/440/3/50 200/3/50 380/550/575/3/50 380/500/3/50	AL2331 AL2331 AL2331 AL2331 AL2331										
Ground Decal	T13259	1	X								
Identification Sticker (CR1)	T14798-1	1	X								
Caution Decal	S16307	1	X								
Warning Decal	AS4244	1	X								
Instruction Decal	T14446	1	X								
Ground Decal	T13259	1	X								
Caution Decal (Case Front)	T13086-20	1	X								
Reed Switch (3CR)	S12334-32	1	X								

# Case Front Panel Assembly (Control Box Assembly shown)



# Indicates a change this printing.

\* Items not illustrated.

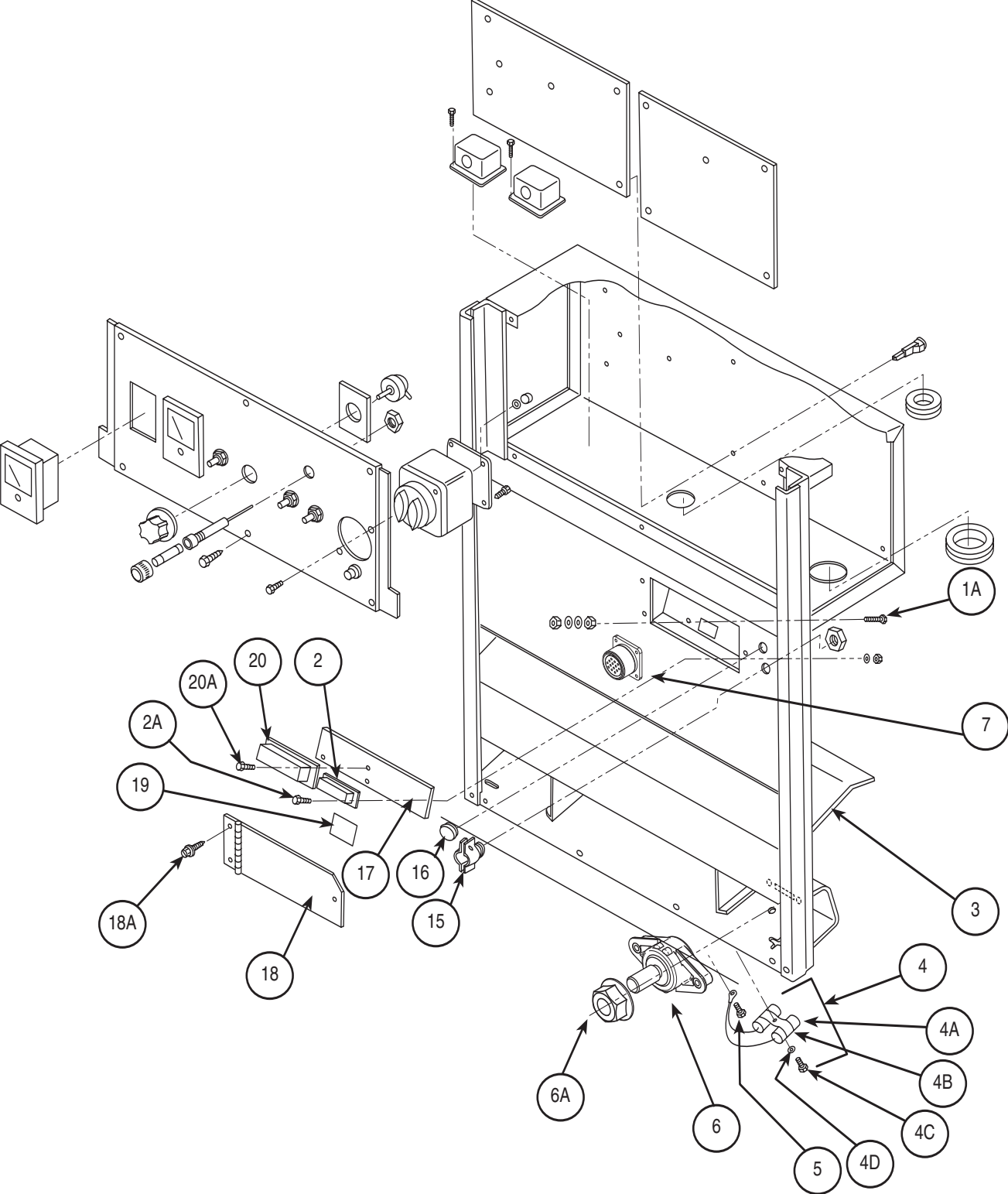
Use only the parts marked "X" in the column under the heading number called for in the model index page.

**Recommended Spare Parts are highlighted in bold**

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
1	Pushbutton switch with light	AS4208	1	X								
2	Pilot Light	Part of switch										
3	Output Control Switch (SW3)	T10800-24	1	X								
4	Welding Mode Switch (SW4)	T13381-3	1	X								
5	Fuse Holder	S10433-1	1	X								
5A*	Fuse	T10728-16	1	X								
6	Output Control Potentiometer	T10812-97	1	X								
6A	Knob	T10491	1	X								
6B	Potentiometer Insulation	T12792-1	1	X								
7	Control Circuit Polarity Switch (SW2) (10 Amp,250 Vac: 15 Amp, 125 Vac)	T13562	1	X								
8	DC Ammeter	M10485-5	1	X								
9	DC Voltmeter	M10486-3	1	X								
10	Control Box Cover	AM3176A	1	X								
11	Nameplate	AM3292A	1	X								
12	Bottom Cover (Push Button) Part of AS4208											
13	Front Panel Welded Assy (Use AL1978-1 + AS4450 plug)	AL1978		X								
13	Front Panel Welded Assembly (14 pin )	AL1978-1	1		X							
13A	Self Tapping Screw	S8025-71	7	X								
14	Relay (Fault)	S15122-11	1	X								
14A	Self Tapping Screw	S8025-62	2	X								
14B	Identification Sticker	T12286-2	1	X								
15	Relay (Pilot)	S14293-8	1	X								
15A	Self Tapping Screw	S8025-62	2	X								
15B	Identification Sticker	T12286-4	1	X								
16	Firing Circuit PC Board	G1486-[ ]	1	X								
17	Control PC Board	G1504-[ ]	1	X								
18	PC Board Support	S19300-3	11	X								
19	Bushing	T14614-1	1	X								
20	Bushing	T12380-1	1	X								

**Note:** When ordering new printed circuit boards indicate the dash number [ ] of the "Old" board that is to be replaced. This will aid Lincoln in supplying the correct and latest board along with any necessary jumpers or adapters. The dash number brackets [ ] have purposely been left blank so as to eliminate errors, confusion and updates.

# Control Box Assembly (Case Front Panel Assembly shown)





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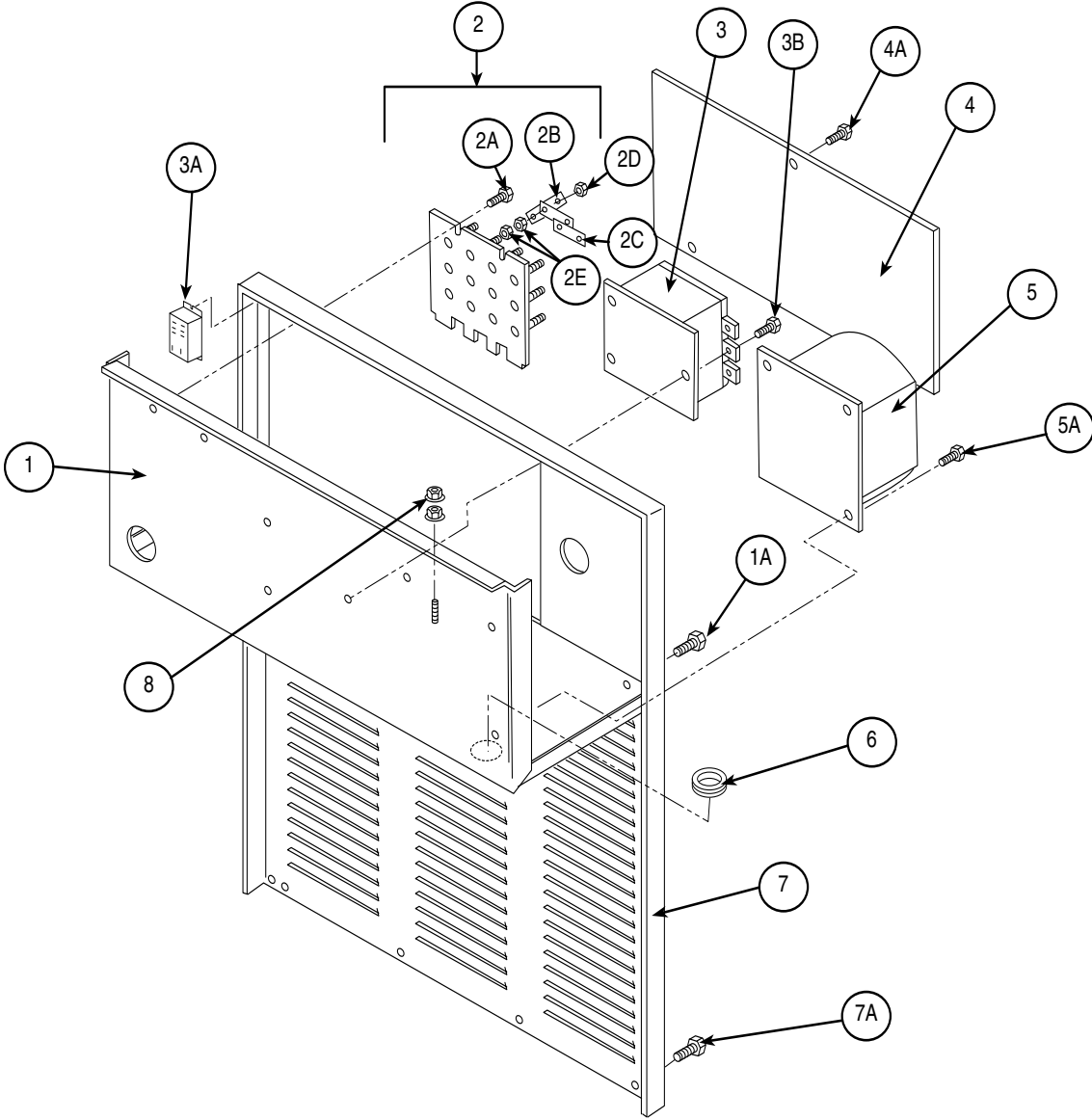
\* Items not illustrated.

Use only the parts marked "X" in the column under the heading number called for in the model index page.

**Recommended Spare Parts are highlighted in bold**

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
1A	Thread Cutting Screw	S9225-36	1	X								
2	Terminal Strip	S14530-11	1	X								
3	Air Baffle (part of Front Panel Welded Assy (14 pin )	NSS	1	X								
4	Capacitor Assembly, Includes:	S17222	1	X								
4A	Capacitor	T11577-47	2	X								
4B	Clamp	T12563-8	2	X								
4C	Thread Cutting Screw	S9225-36	1	X								
4D	Plain Washer	S9262-136	1	X								
5	Thread Cutting Screw	S9225-8AZ	1	X								
6	Moulded Output Stud	AM2464-1	3	X								
6A	Flange Nut	T3960	3	X								
7	14 pin Amphenol Plug Base (code 1548 & above)	S12021-40	1	X								
15	Box Connector	T9639-1	1	X								
16	Plug Button	T13597-1	1	X								
17	Number Plate	AS4236	1	X								
18	Door and Welded Assembly	S17750	1	X								
18A	Self Tapping Screw	S8025-71	2	X								
19	Decal	T13260-3	1	X								
20	Terminal Strip	S8542-7	1	X								
20A	Self Tapping Screw	S8025-15	2	X								

# Case Rear Panel Assembly



# Indicates a change this printing.

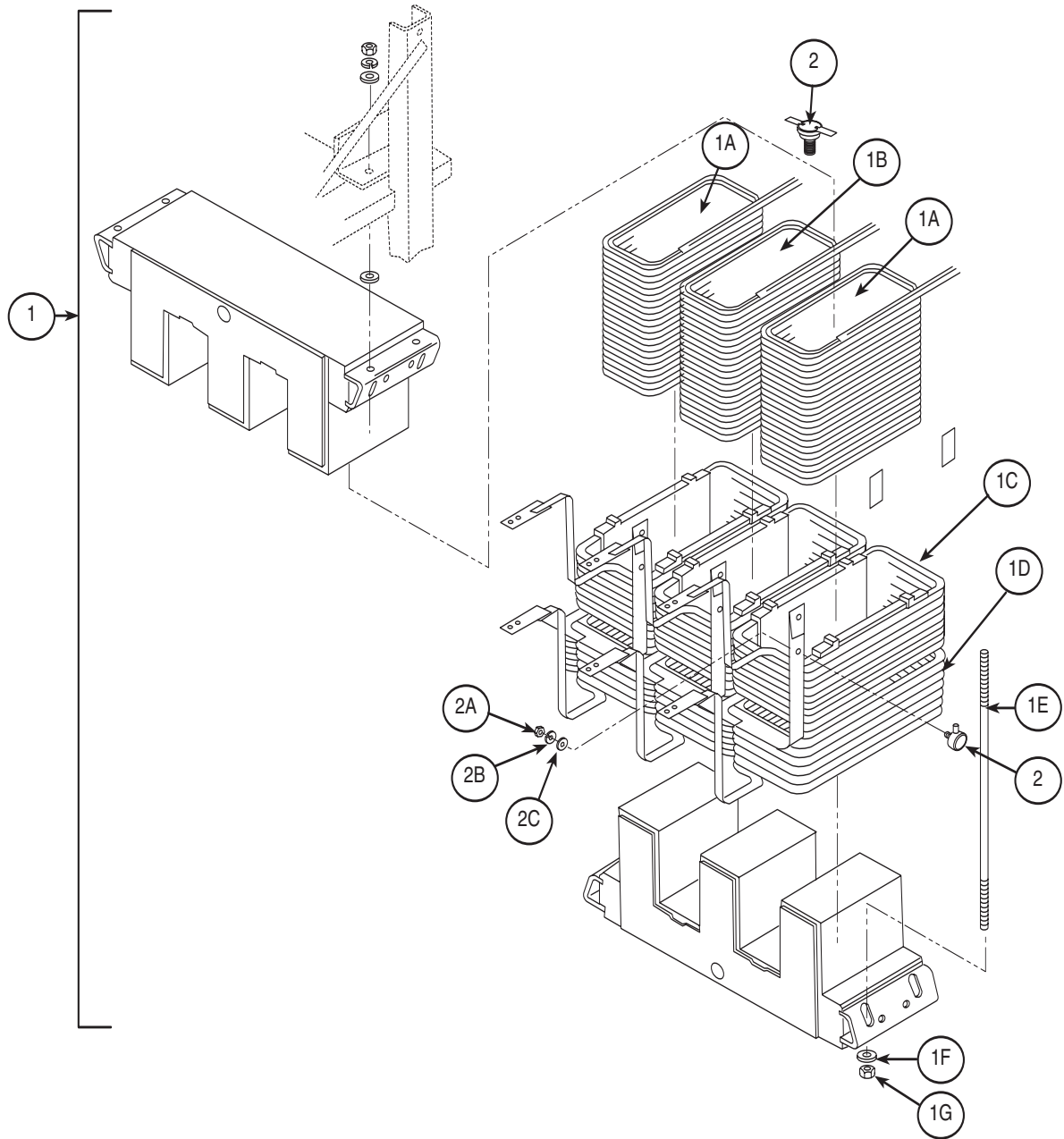
\* Items not illustrated.

Use only the parts marked "X" in the column under the heading number called for in the model index page.

Recommended Spare Parts are highlighted in bold

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
1	Input Box Assembly	AL1890	1	X	X							
1A	Self Tapping Screw	S8025-71	3	X	X							
2	Reconnect Panel	AS3745	1	-	X							
2A	Self Tapping Screw	S8025-71	2	-	X							
2B	Reconnect Panel Link	T14190	As Req'd	-	X							
2C	Reconnect Panel Link	T14190	As Req'd	-	X							
2D	1/4-20 Heavy Hex Nut	AM3055-90	As Req'd	-	X							
2E	1/4-20 Brass - Hex Nut	AM3055-90	As Req'd	-	X							
2F	Grommet Strip (Not Shown)	T12823-4	1	X	X							
3	Contactor (see note below)	M18712	1	X	X							
3A	Relay	S15122-10	1	•	X							
3B	Self Tapping Screw	S8025-71	3	X	X							
4	Input Access Door	AM3257	1	X	X							
4A	Self Tapping Screw	S8025-71	3	X	X							
5	Control Transformer (Aux.Pilot Transformer)											
	415 Volt (50/60HZ)	AM2681- 2	1	X								
	220/380/440 Volt	AM2681- 1	1		X							
	200 (50 HZ)	PT0063	1	X	X							
	380/500 Volt	AM2681-2	1	X	X							
	575 Volt (60HZ) 380/500/575	PT0064	1	X	X							
5A	Self Tapping Screw	S8025-71	3	X	X							
6	Bushing	T12380-2	1	X	X							
7	Rear Panel	AL2375	1	X								
7A	Self Tapping Screw	S8025-71	12	X	X							
8	1/4 - Whit Hex Nut	AM3055-90	2	X	X							
	* Codes below 1503 require Contactor Kit	G3146										

# Transformer Assembly



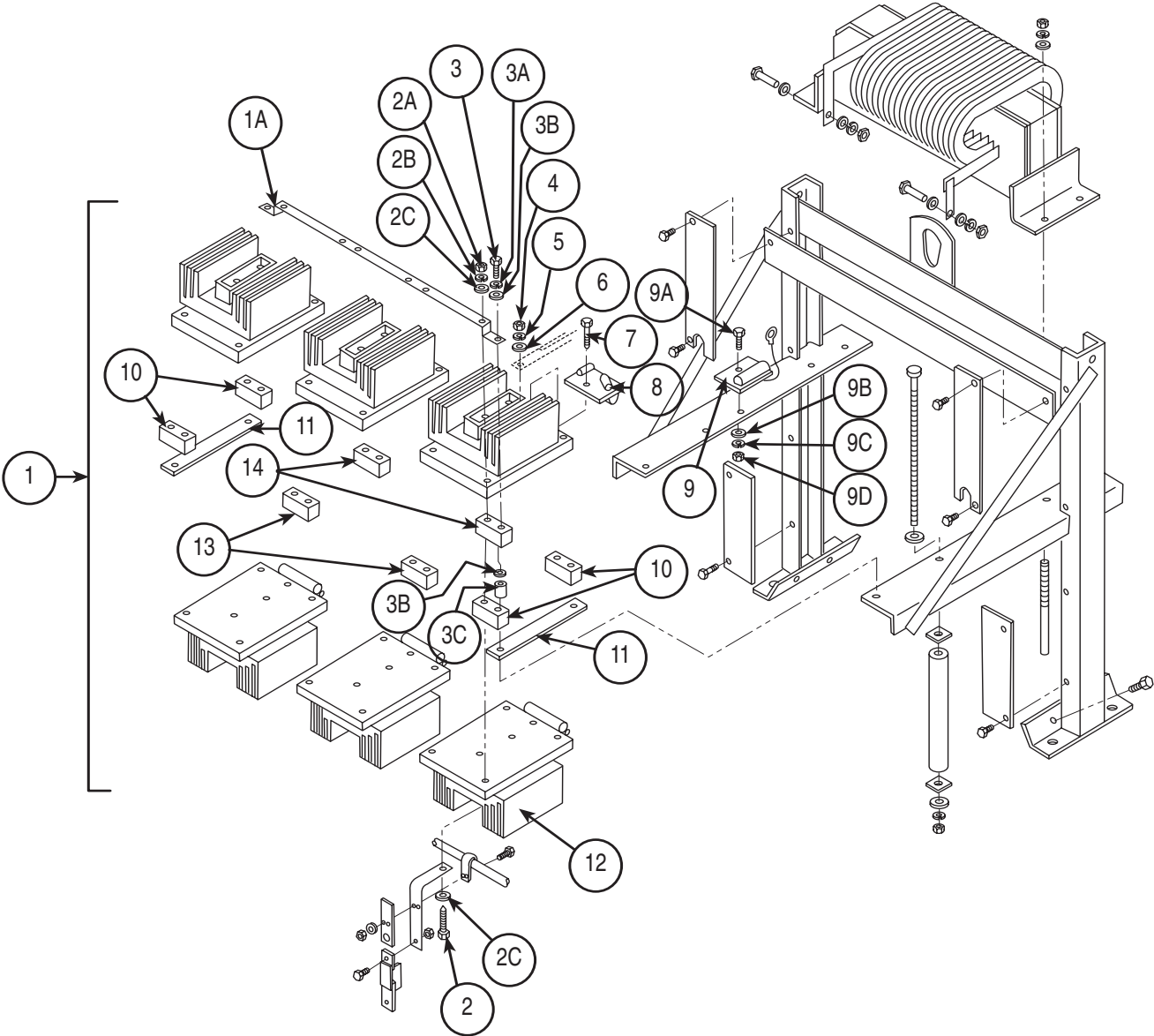
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 \* Items not illustrated.

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Recommended Spare Parts are highlighted in bold

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
<b>1</b>	<b>Transformer Assembly (1A thru 1H)</b>											
	415V	AL2335-1	1	X								
	220/380/440/3/0	AL2335-3	1	X								
	200/3/50	AL2335-4	1	X								
	380/500/3/50	AL2335-2	1	X								
	380/500/575/50	AL2335-5	1	X								
<b>1A</b>	<b>Left Primary Coil</b>											
	415V	9356L	1	X								
	220/380/440/3/50	9363										
	200/	9355L	1	X								
	380/500	9359L	1	X								
	380/500/575	9384LX	1	X								
	<b>Right Primary Coil</b>											
	415V/3/50	9356R										
	220/380/440/3/50	9363R										
	200/3/50	9355R										
	380/500/3/50	9359R										
	380/ 500/575/3/50	9384RX										
<b>1B</b>	<b>Center Primary Transformer Coils 415V</b>											
	415V	9356C	1	X								
	220/380/440/3/50	9363C	1	X								
	200/3/50	9355C	1	X								
	380/500/3/50	9359C	1	X								
	380/500/575/3/50	9384CX	1	X								
<b>1C</b>	<b>Top Secondary Transformer Coil</b>	<b>M13904-1</b>	<b>3</b>	<b>X</b>								
<b>1D</b>	<b>Bottom Secondary Transformer Coil</b>	<b>M13904-2</b>	<b>3</b>	<b>X</b>								
1E	Threaded Rod	AS4324-6	4	X								
1F	Washer	S9262-120	12	X								
1G	3/8-16 Hex Nut	AM3055-115	8	X								
1H	Transformer Lamination Assembly	L3841-29	2	X								
2	Thermostat (Secondary)	T13359-7	1	X								
	Thermostat (Primary)	M17192-2	1	X								

# SCR Bridge Assembly (Lift Base Assembly shown)



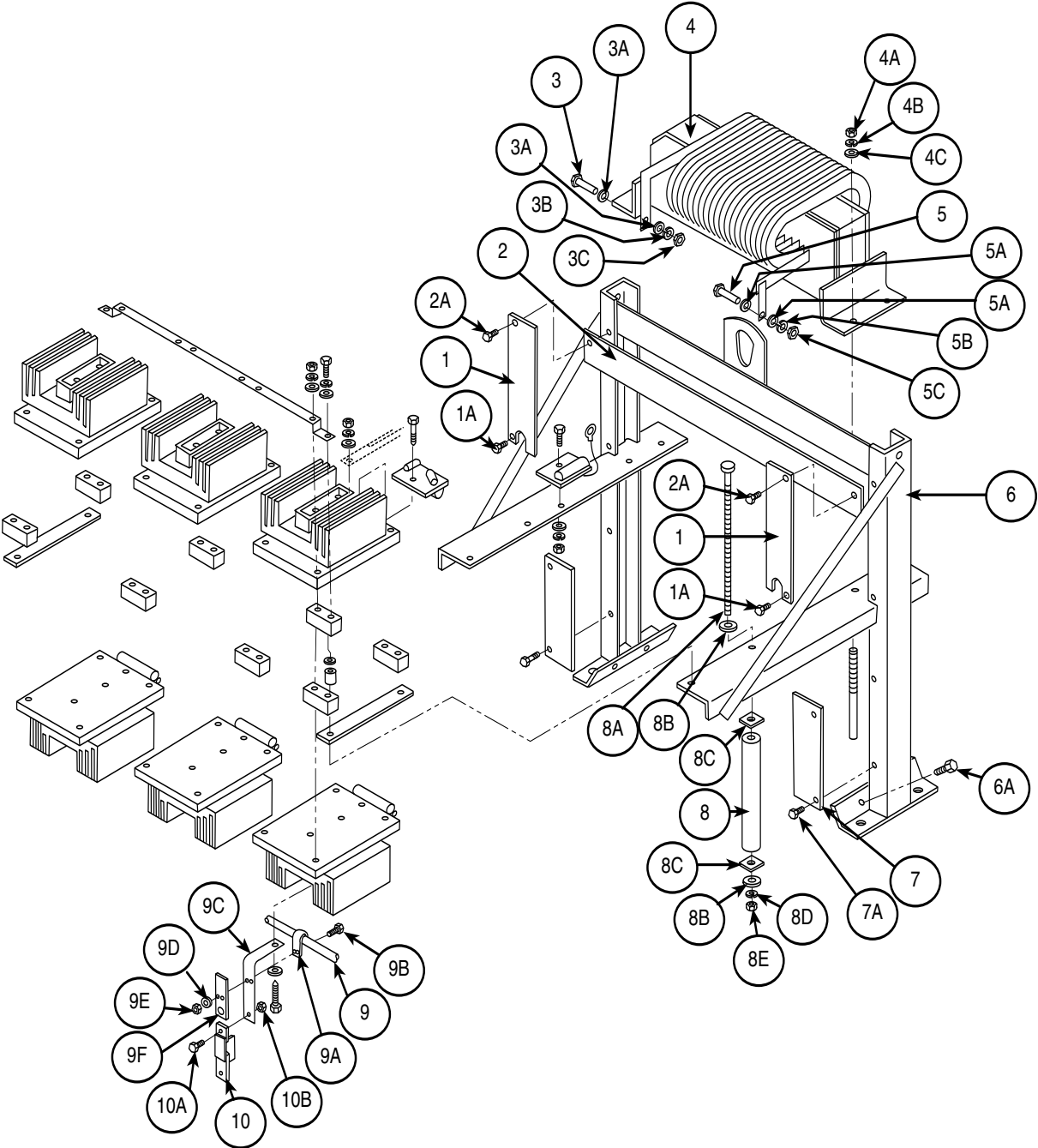
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\* Items not illustrated.

Use only the parts marked "X" in the column under the heading number called for in the model index page.

**Recommended Spare Parts are highlighted in bold**

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
1	Three Phase Bridge Assembly, Includes:	AL1899-2	1	X								
1A	Stiffener	S16818	1	X								
2	<sup>5</sup> / <sub>16</sub> -18 x 2.50 Hex Head Cap Screw	T9447-44	12	X								
2A	<sup>5</sup> / <sub>16</sub> -18 Hex Nut	AM3055-104	12	X								
2B	Lock Washer	E106A14	12	X								
2C	Plain Washer	S9262-121	18	X								
3	Self tapping Screw	S8025-73	4	X								
3A	Plain Washer	S9262-120	4	X								
3B	Insulating Washer	S10773-23A	4	X								
3C	Insulating Tube	T7028-176	4	X								
4	<sup>5</sup> / <sub>16</sub> " 18 Hex Nut	AM3055-104	12	X								
5	Lock Washer	E106A14	12	X								
6	Plain Washer	S9262-121	18	X								
7	Thread Forming Screw	S9225-8AZ	1	X								
8	Snubber P.C. Board Assembly	AL1898B	6	X								
9	Snubber P.C. Board Assembly	S16182-2	6	X								
9A	<sup>1</sup> / <sub>4</sub> -20 x .625 Hex Head Cap Screw		1	X								
9B	Plain Washer	S9262-98	1	X								
9C	Lock Washer	E106A2	1	X								
9D	<sup>1</sup> / <sub>4</sub> -20 Hex nut	AM3055-90	1	X								
10	Bridge Tie Bar	S16181-4	4	X								
11	Insulation	S13330-6	2	X								
12	Aluminum Heat Sink	M12314-3	6	X								
13	Bridge Tie Bar	S16181-6	2	X								
14	Bridge Tie Bar	S16181-5A	2	X								
15	SCR*	M12283-10	6	X								
16	Plug & Lead Assembly (Not Shown)	S18250-213	1	X								
17*	Cathode Heat Sink	AM2435-1	6	X								
18A	Mounting Clamp Spring	S14724A	6	X								
18B	Mounting Clamp,	S14724B	6	X								
19	Shunt Assembly	M19044	1	X								

# Lift Bale, Choke Assembly (SCR bridge Assembly shown)





# Indicates a change this printing.

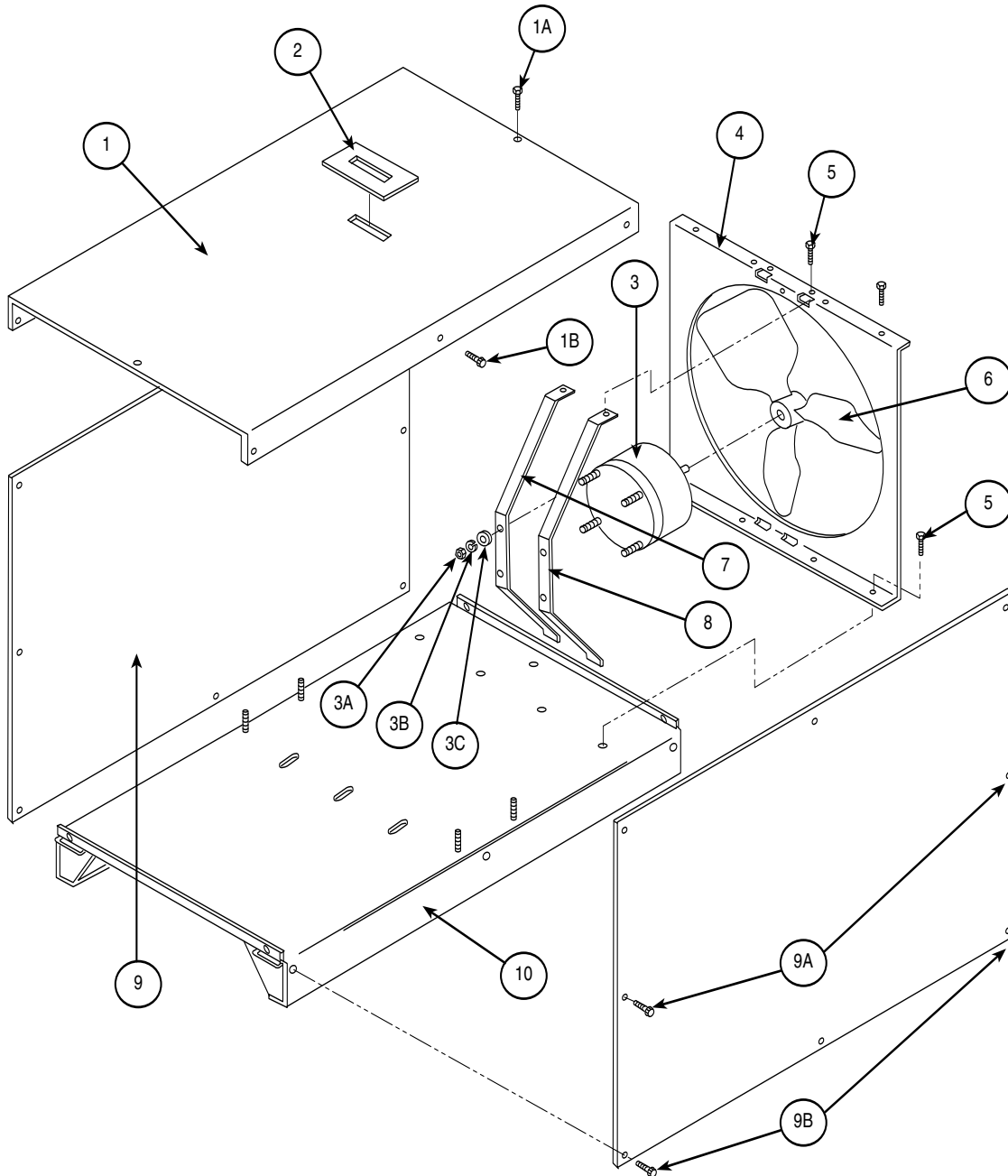
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Recommended Spare Parts are highlighted in bold

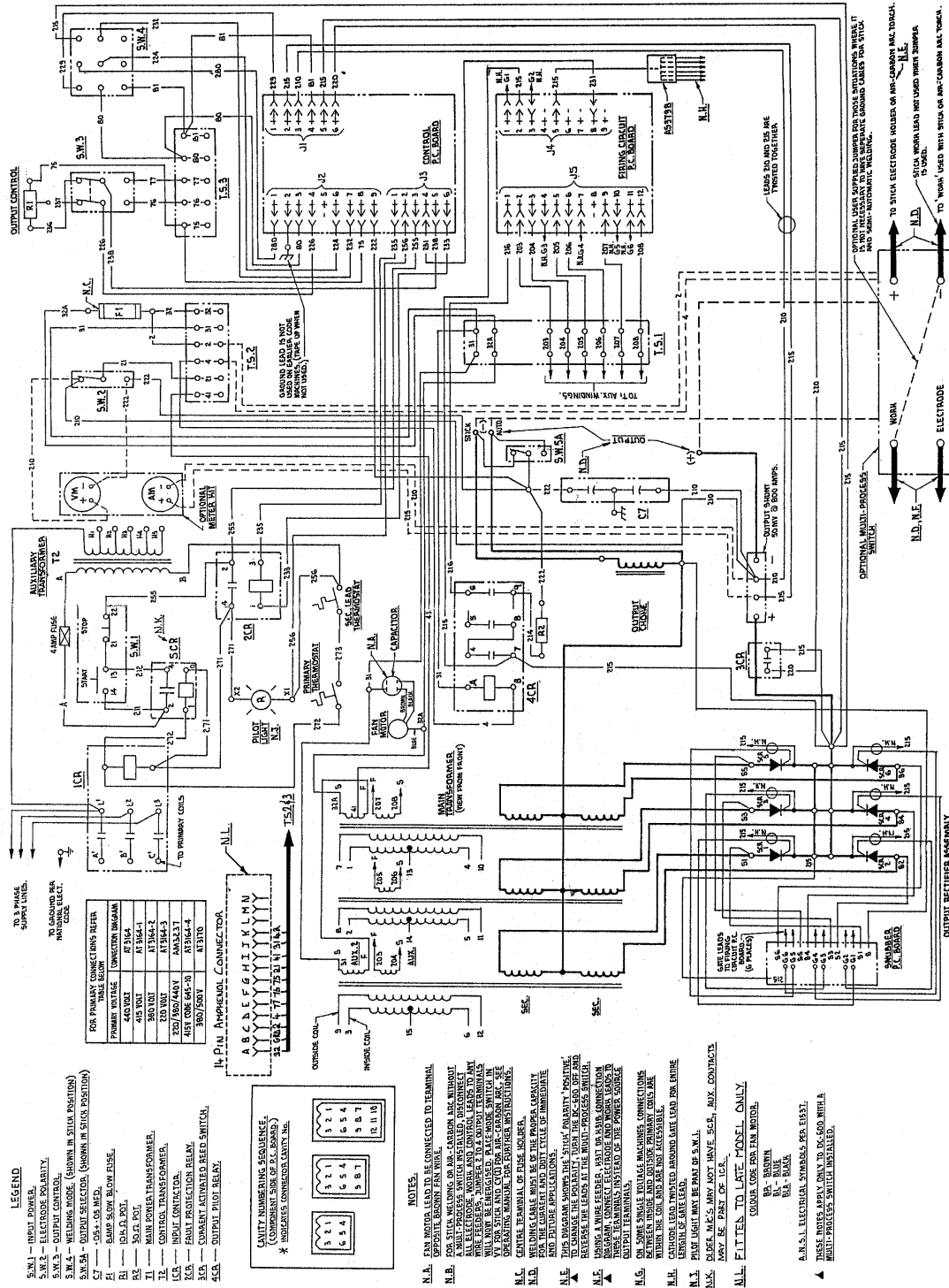
ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
1	Choke Side Baffle	AT3760	2	X								
1A	Self Tapping Screw	S8025-79	2	X								
2	Choke Top Baffle	S16642	1	X								
2A	Thread Forming Screw	S9225-17	2	X								
3	<sup>3</sup> / <sub>8</sub> -16 x 1.00 Hex Head Screw		1	X								
3A	Plain Washer		2	X								
3B	Lock Washer		1	X								
3C	<sup>3</sup> / <sub>8</sub> -16 Hex Nut		1	X								
4	Choke & Lamination Assembly, Includes:	AM2866	1	X								
	Edge Wound Coil	NSS	1	X								
4A	3/8-16 Hex Nut	NSS	4	X								
4B	Lock Washer	NSS	4	X								
4C	Plain Washer	NSS	4	X								
5	<sup>3</sup> / <sub>8</sub> -16 x 1.25 Hex Head Cap Screw	NSS	1	X								
5A	Plain Washer	NSS	2	X								
5B	Lock Washer	NSS	1	X								
5C	<sup>3</sup> / <sub>8</sub> -16 Hex Nut	NSS	1	X								
6	Lift Bale Assembly	AL1822	1	X								
6A	Self Tapping Screw	S8025-58	4	X								
7	Transformer Insulating Baffle	T11357-18	2	X								
7A	Self Tapping Screw	S8025-79	4	X								
8*	Resistor	S10404-79	1	X								
8A	#10-24 x 7.50 Round Head Screw	NSS	1	X								
8B	Plain Washer	NSS	2	X								
8C	Insulating Washer	T4479A	2	X								
8D	Lock Washer	NSS	1	X								
8E	#10-24 Hex Nut	NSS	1	X								
9*	Reed Switch Assy	S12334-32	1	X								
9A	Clamp	T8970-17	2	X								
9B	#8-32 x .50 Round Head Screw	NSS	2	X								
9C	Reed Switch Plate	S11797-15	1	X								
9D	Lock Washer		2	X								
9E	#8-32 Hex Nut		2	X								
9F	Identification Sticker	T14798-3	1	X								
10	Shunt Assembly includes:	M19044	1	X								
10A	<sup>3</sup> / <sub>8</sub> -16 x 1.00 Hex Head Cap Screw		3	X								
10B	<sup>3</sup> / <sub>8</sub> -16 Hex Nut		3	X								
10C	Shunt (500 amp)	S6602-20	1	x								

# Base, Fan, Sides & Roof Assembly





## Wiring Diagram (Various Single, Dual and Triple Voltage Machines)



**Note:** This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for your particular machine is pasted inside the enclosure panels.

AL2331

# NOTES

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**STATEMENT OF LIMITED WARRANTY**

The Lincoln Electric® Company (Australia) Pty Limited ("Lincoln") warrants all new machinery and equipment ("goods") manufactured by Lincoln® against defects in workmanship and material subject to certain limitations hereinafter provided.

This warranty is void if Lincoln® or its Authorised Service Facility finds that the equipment has been subjected to improper installation, improper care or abnormal operations.

**PERIOD OF WARRANTY "LINCOLN BRANDED GOODS"**

The period from the commencement of the warranty in respect of goods covered by this warranty shall be as follows:

**Three Years**

All Lincoln® welding machines, wire feeders and plasma cutting machines unless listed below.

**Two Years**

All Weldanpower®, Ranger®, Italian Invertec® welders, PC65 and PC105 Plasmas.

**One Year**

- PC60 & PC100 Plasmas
- All water coolers (internal and external).
- Arc welding and cutting robots and robotic controllers.
- All stick electrodes, welding wires and fluxes.
- All Environmental Systems equipment, including portable units, central units and accessories. (Does not include consumable items listed under 30-day warranty).
- All welding and cutting accessories including wire feed modules, undercarriages, field installed options that are sold separately, unattached options, welding supplies, standard accessory sets, replacement parts. (Does not include expendable parts and guns/torches listed under 90 and 30 day warranties).

**90 Days**

- All Gun and Cable Assemblies (manufactured by Lincoln®) and Spool guns.
- All MIG, TIG and Plasma Torches.
- All "Pro Torch" TIG Torches.

**30 Days**

- All consumable items that may be used with the environmental systems described above. This includes hoses, filters, belts and hose adapters.
- Expendable Parts - Lincoln® is not responsible for the replacement of any expendable part that is required due to normal wear.

**ENGINE WARRANTY**

To the extent permitted by law Lincoln® shall be entitled to in its absolute discretion repair all engines and engine accessories however Lincoln® shall not be held responsible for any such repair which shall be the sole responsibility of the engine manufacturer which provides for warranties for the period and subject to any limitations provided for by those manufacturers of the respective engines and engine accessories.

**Three Years\***

**Deutz 912 Engine and Accessories**  
(Warranty service can only be carried out an authorised Deutz service dealer)

\*Subject to conditions imposed by Deutz.

**Cummins B3.3 Engine and Accessories**  
(Warranty service can only be carried out an authorised Cummins service dealer)

\*Subject to conditions imposed by Cummins

**Two Years**

**Perkins Engines and Accessories**  
(The Perkins Distributor Organisation provides all warranty service (accessories included) for the Perkins Engines powering goods manufactured by Lincoln.

\*Subject to conditions imposed by Perkins

**Briggs & Stratton Vanguard Engines and Accessories.** (Warranty service can only be carried out by an authorised Briggs & Stratton service dealer).

\*The Magneton ignition system is warranted by Briggs & Stratton for 5 years.

**Kubota Engines and Accessories**  
(Warranty service can only be carried out an authorised Kubota service dealer)

\*Subject to conditions imposed by Kubota.

**One Year\***

**Ruggerini Engines and Accessories**  
(Warranty service can only be carried out by authorised Lincoln Field Service Shop or the engine distributors authorised by the Lincoln® branch office).

**BATTERY WARRANTY**

Lincoln® supplies certain batteries in connection with its supply of goods and the purchaser acknowledges that any such battery is warranted by its manufacturer and any claim in respect of such a battery whether as to a defect in the battery or as to damage consequential upon a defect in a battery shall be made by the purchaser to the manufacturer of the battery and the purchaser shall not hold Lincoln® in any way liable for the operation, non-operation or malfunction of any such battery.

**CONDITION OF WARRANTY TO OBTAIN WARRANTY COVERAGE:**

The purchaser must contact Lincoln® or Lincoln's Authorised Service Facility about any defect claimed under Lincoln's warranty.

Determination of warranty on welding and cutting equipment will be made by Lincoln® or Lincoln's Authorised Service Facility.

**WARRANTY REPAIR**

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

At Lincoln's request, the purchaser must return, to Lincoln® or its Authorised Service Facility, any "Goods" claimed defective under Lincoln's warranty.

**FREIGHT COSTS**

The purchaser is responsible for shipment to and from the Lincoln® Authorised Service Facility.

**WARRANTY LIMITATIONS**

Certain conditions warranties and obligations are implied by law (for example under the Trade Practices Act 1974) and cannot be excluded or modified ("the statutory warranties").

Where the statutory warranties do apply then any express warranties given by Lincoln® (the "express warranties") are given in addition and without derogation from the statutory warranties. Apart from the express warranties and (in cases where they apply by law but not otherwise) the statutory warranties Lincoln® gives no warranties whether express or implied by operation of law or otherwise in respect of any goods manufactured or supplied by Lincoln® or by its authorised distributor.

Any warranty whether express or statutory and the term of any such warranty as set out herein commences on the date Lincoln® or Lincoln's authorised distributorship forwards the goods from the premises of Lincoln® or Lincoln's authorised distributor to the purchaser.

In respect of any claim under the warranty herein provided a purchaser must furnish Lincoln® with written notice of any claim under the warranty within the time period of the warranty as further specified herein.

The extent of Lincoln's warranty whether express or statutory is limited to a liability to repair, replace or pay to the purchaser an amount equal to:

- a) The cost of replacing the goods;
- b) The cost of obtaining equivalent goods; or
- c) cost of having the goods repaired whichever remedy in its absolute discretion Lincoln® chooses.

Upon request by Lincoln® the purchaser must permit Lincoln® to inspect the goods the subject of any claim under this warranty and Lincoln® may at its absolute discretion repair or replace the goods F.O.B. at its own premises or at such other premises as Lincoln® may designate provided that all freight charges to and from Lincoln's premises or such other premises as Lincoln® may designate shall be paid by the purchaser.

Subject to the express and statutory warranties hereinbefore provided Lincoln® provides no other warranties in respect of the manufacture or sale of goods and in particular Lincoln® shall have no responsibility or liability in respect of:

- a) Repairs done to Lincoln's goods and undertaken by the purchaser outside Lincoln's premises without written authority from Lincoln® obtained prior to any such repair;
- b) Any damage or failure of the goods as a result of normal wear and tear or the neglect misuse abuse or failure to properly service goods by any purchaser.

The liability of Lincoln® is limited as hereinbefore provided and Lincoln® shall not be liable for any incidental special or consequential damage suffered by a purchaser whether or not arising out of circumstances known or foreseeable known by Lincoln® and in particular arising out of the supply of goods to a purchaser or the use of goods by a purchaser whether based on breach of contract negligence or tort.

**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 this type of fabrication methods and service requirements.



THE WELDING EXPERTS®

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**Singapore:** 11 Pandan Crescent, Singapore (65) 6773 6689

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