LINCOLN ELECTRIC

GENUINE LINCOLN PARTS™

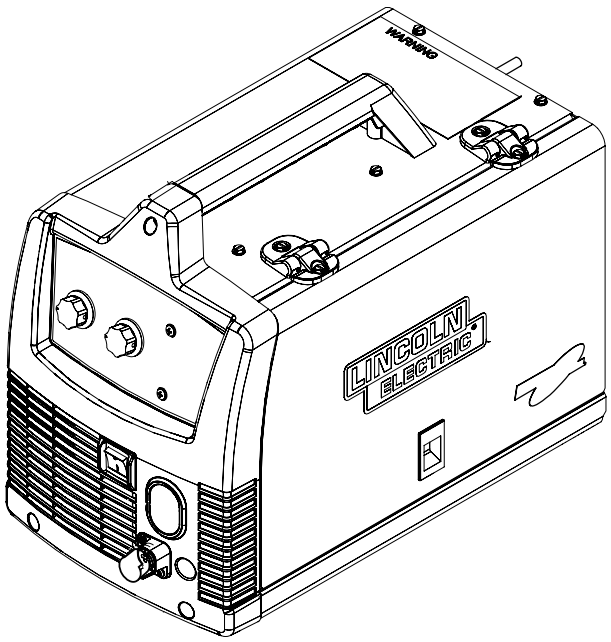
NOTE: This manual will cover most of the troubleshooting and repair procedures for the code numbers listed. Some variances may exist when troubleshooting/repairing later code numbers.

WIRE FEEDER WELDER (180 MODELS)

For use with machines having Code Numbers:

11937, 11938, 11939, 11940

SERVICE MANUAL



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THE LINCOLN ELECTRIC COMPANY
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Phone: +1.216.481.8100 • www.lincolnelectric.com

⚠ WARNING

⚠ CALIFORNIA PROPOSITION 65 WARNINGS ⚠

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

The Above For Diesel Engines

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

The Above For Gasoline Engines

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

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2-1974. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

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

FOR ENGINE powered equipment.

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

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

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

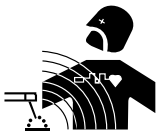
1.d. Keep all equipment safety guards, covers and devices in position and in good repair.Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

1.e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.

1.f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.

1.g. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.

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



ELECTRIC AND MAGNETIC FIELDS may be dangerous

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

2.d. 1.Route the electrode and work cables together - Secure them with tape when possible.

2.d. 2.Never coil the electrode lead around your body.

2.d. 3.Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.

2.d. 4.Connect the work cable to the workpiece as close as possible to the area being welded.

2.d. 5.Do not work next to welding power source.

ELECTRIC SHOCK can kill.

3.a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.

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

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- **Semiautomatic DC Constant Voltage (Wire) Welder.**
- **DC Manual (Stick) Welder.**
- **AC Welder with Reduced Voltage Control.**

3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".

3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.

3.e. Ground the work or metal to be welded to a good electrical (earth) ground.

3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.

3.g. Never dip the electrode in water for cooling.

3.h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.

3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.

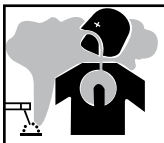
3.j. Also see Items 6.c. and 8.

ARC RAYS can burn.

4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87. I standards.

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

4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



FUMES AND GASES can be dangerous.

5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**

5. b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.

5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

5.d. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.

5.e. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.

5.f. Also see item 1.b.

Electromagnetic Compatibility (EMC)

Conformance
Products displaying the CE mark are in conformity with European Community Council Directive of 15 Dec 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility, 2004/108/EC. It was manufactured in conformity with a national standard that implements a harmonized standard: EN 60974-10 Electromagnetic Compatibility (EMC) Product Standard for Arc Welding Equipment.
It is for use with other Lincoln Electric equipment. It is 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 affect many kinds of electrical equipment; other nearby welding equipment, radio and TV reception, 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 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 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. In other cases it could involve construction of 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 authorized by a person who is competent to access whether the changes will increase the risk of injury, e.g., by allowing parallel welding current return paths which may damage the earth circuits of other equipment.

Assessment of Area
Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

a) other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;

b) radio and television transmitters and receivers;

c) computer and other control equipment;

d) safety critical equipment, e.g., guarding of industrial equipment;

e) the health of the people around, e.g., the use of pacemakers and hearing aids;

f) equipment used for calibration or measurement

g) the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;

h) the time of day that welding or other activities are to be carried out.

Electromagnetic Compatibility (EMC)

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 of 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 adjustments covered in the manufacturers instructions. In particular, the spark gaps of arc striking and stabilizing 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 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, not connected to earth because of its size and position, e.g., ships 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 the workpiece 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 a 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. [1]

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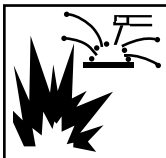
[1] Portions of the preceding text are contained in EN 60974-10: "Electromagnetic Compatibility (EMC) product standard for arc welding equipment."



WELDING and CUTTING SPARKS can cause fire or explosion.

6.a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

6.b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (ANSI Standard Z49.1) and the operating information for the equipment being used.

6.c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.

6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned". For information, purchase "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances", AWS F4.1 from the American Welding Society (see address above).

6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.

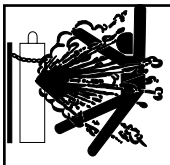
6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.

6.g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.

6.h. Also see item 1.c.

6.I. Read and follow NFPA 51B " Standard for Fire Prevention During Welding, Cutting and Other Hot Work", available from NFPA**,** 1 Batterymarch Park, PO box 9101, Quincy, Ma 022690-9101.

6.j. Do not use a welding power source for pipe thawing.



CYLINDER may explode if damaged.

7.a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.

7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

7.c. Cylinders should be located:

- Away from areas where they may be struck or subjected to physical damage.
- A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.

7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.

7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-l, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202.

FOR ELECTRICALLY powered equipment.

8.a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.

8.b. Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer's recommendations.

8.c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.

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

NOTES

RETURN TO MAIN INDEX

Page

Safety . . . . . i-vi

Installation, Operation, Accessories, Maintenance . . . . . **See IMT10135**
Theory of Operation . . . . . **Section E**

Troubleshooting and Repair. . . . . **Section F**

Electrical Diagrams . . . . . **Section G**

TABLE OF CONTENTS-THEORY OF OPERATION SECTION

Theory of Operation **E-1**

General Description E-2

Input Line Voltage, Fan Motor & Main Transformer E-3

Output Control, Rectification & Voltage Feedback E-4

Trigger, Gas Solenoid and Wire Drive E-5

Protective Devices and Circuits E-6

Return to Master TOC
Return to Master TOC
Return to Master TOC
Return to Master TOC

FIGURE E.1 BLOCK LOGIC DIAGRAM

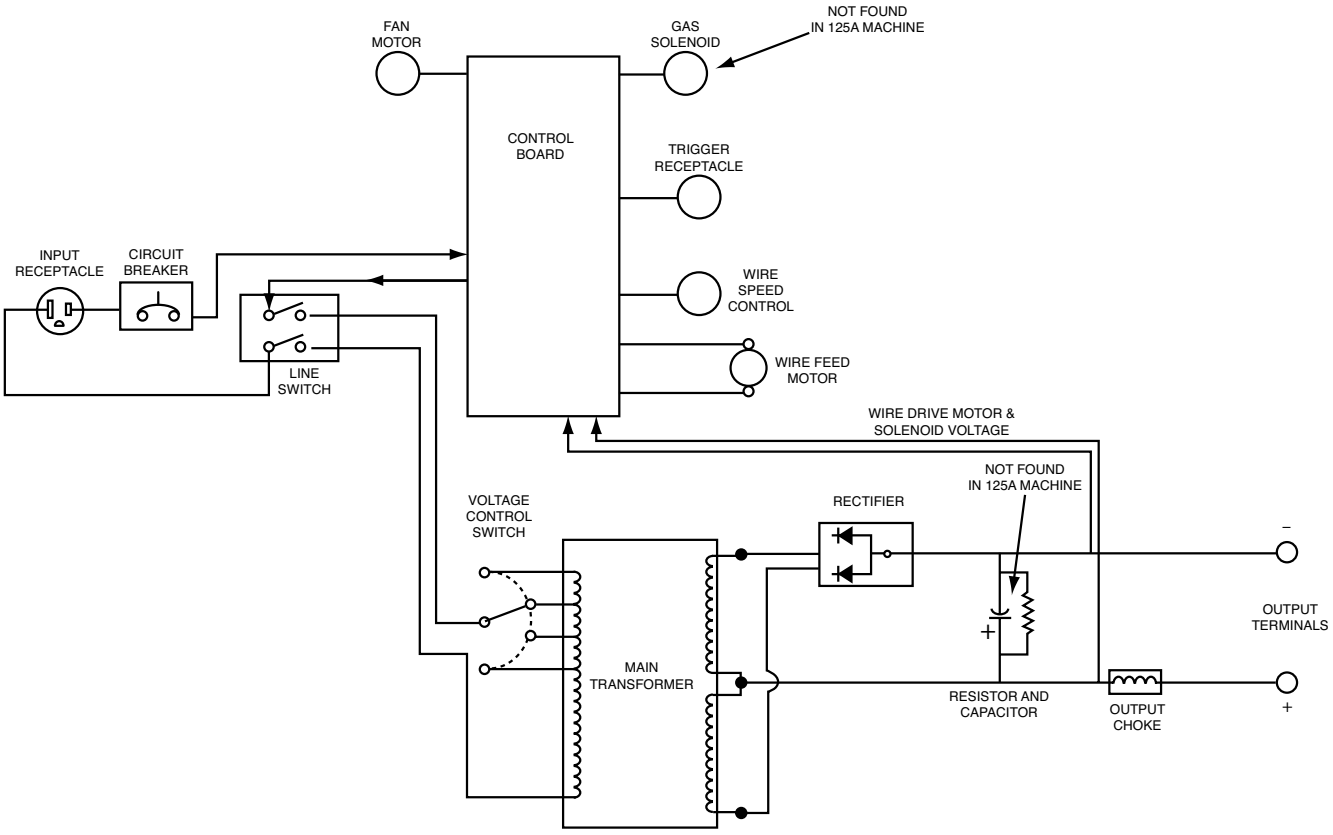
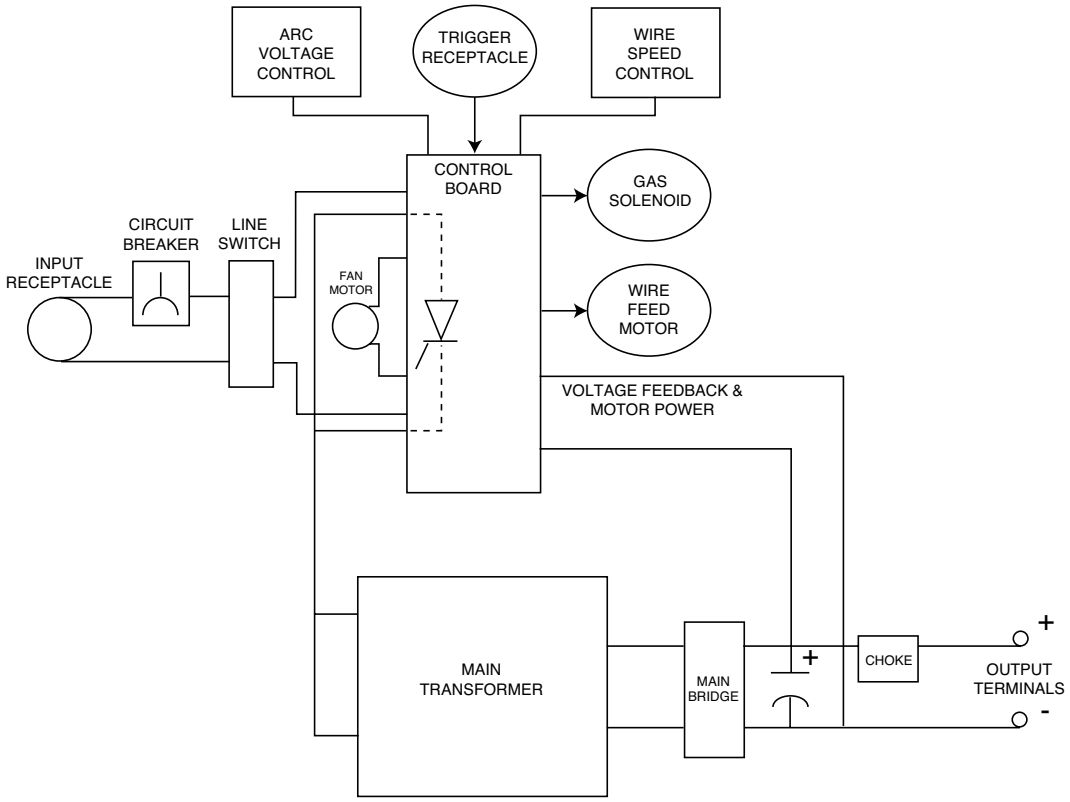


FIGURE E.2 - GENERAL DESCRIPTION



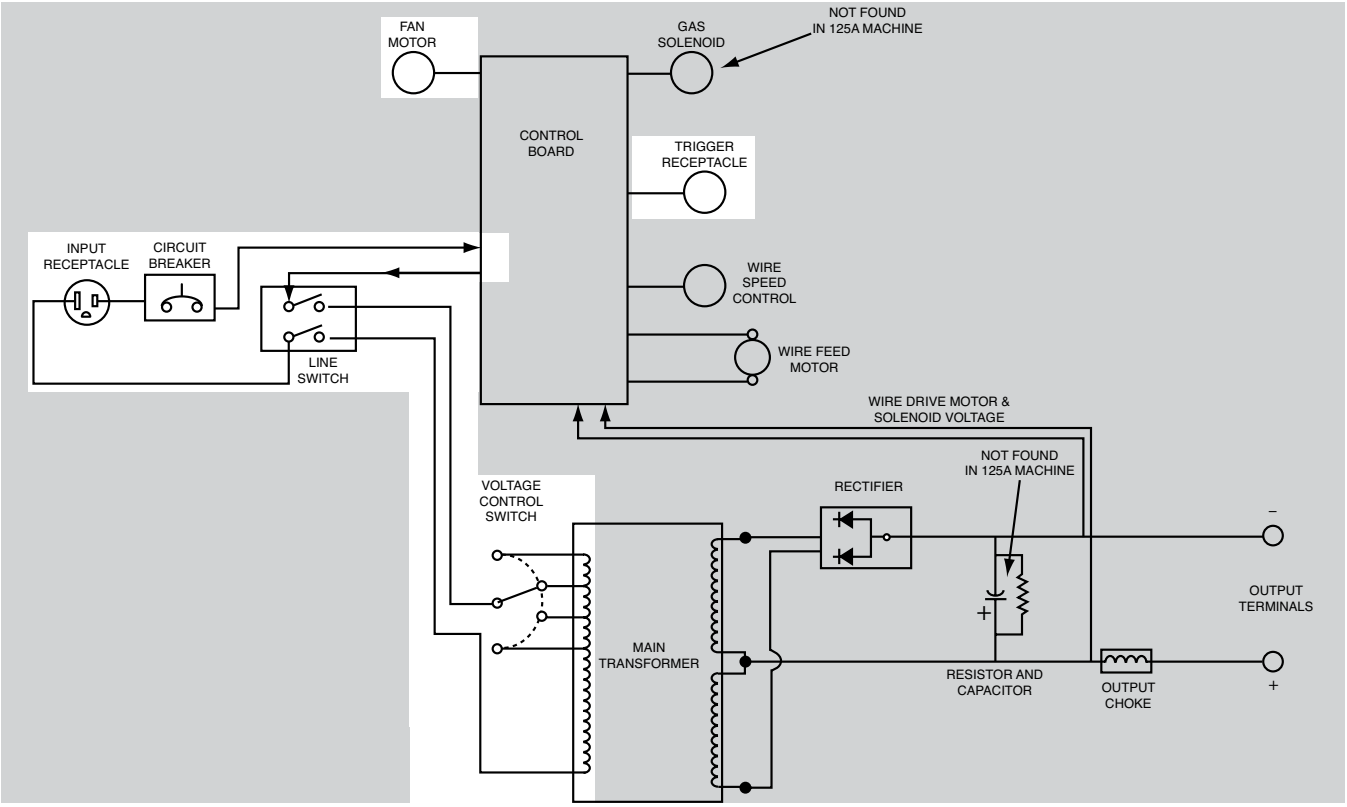
GENERAL DESCRIPTION

The 180 AMP COMPACT WIRE WELDERS that are covered by this manual are Constant Voltage (CV) DC welders that can be used for MIG or Flux-Core process. They can use either 208 or 230 VAC input voltage and are rated for 130 amps, 17 / 20 volts, at a 30% duty cycle.

All are equipped with a 4-pin trigger connector to allow operation of the included MAGNUM 100L gun or an optional MAGNUM 100SG spool gun for Aluminum MIG Welding.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion

FIGURE E.3 - INPUT LINE VOLTAGE, FAN MOTOR & MAIN TRANSFORMER



INPUT LINE VOLTAGE, FAN MOTOR & MAIN TRANSFORMER

A circuit breaker is incorporated in the circuit to protect the unit from current overloads.

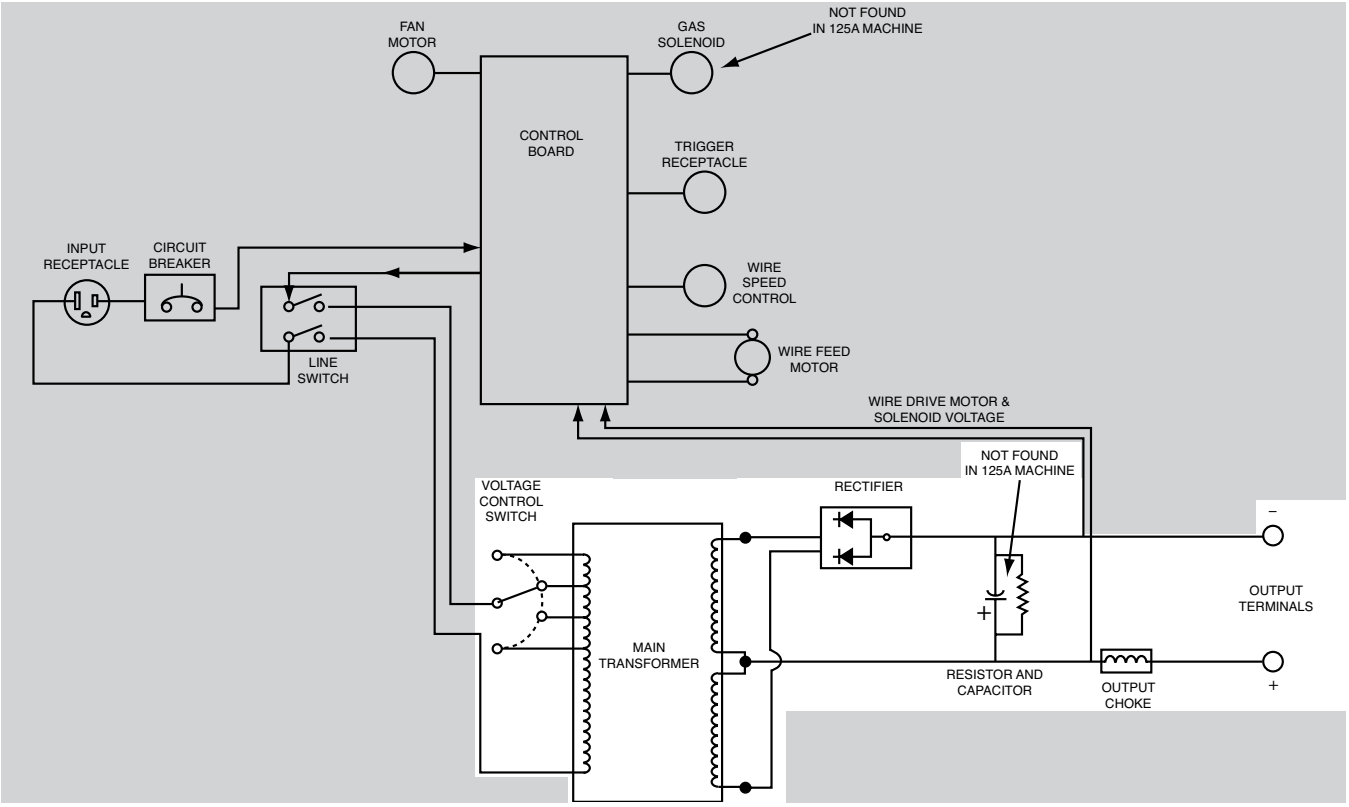
Upon trigger closer, the contacts on the CR1 relay which is located on the Control Board closes and input voltage is applied to the voltage control switch. Primary voltage that is sent to the main transformer is regulated by the selection of this voltage control switch.

The main transformer receives the primary voltage from the Control Board and changes that high voltage and low current input power to a low voltage and high current output suitable for welding.

The fan motor is rated for the same AC Voltage as the welder and should run whenever the machine is Power Switch is turned ON.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion

FIGURE E.4 - OUTPUT CONTROL, RECTIFICATION & VOLTAGE FEEDBACK



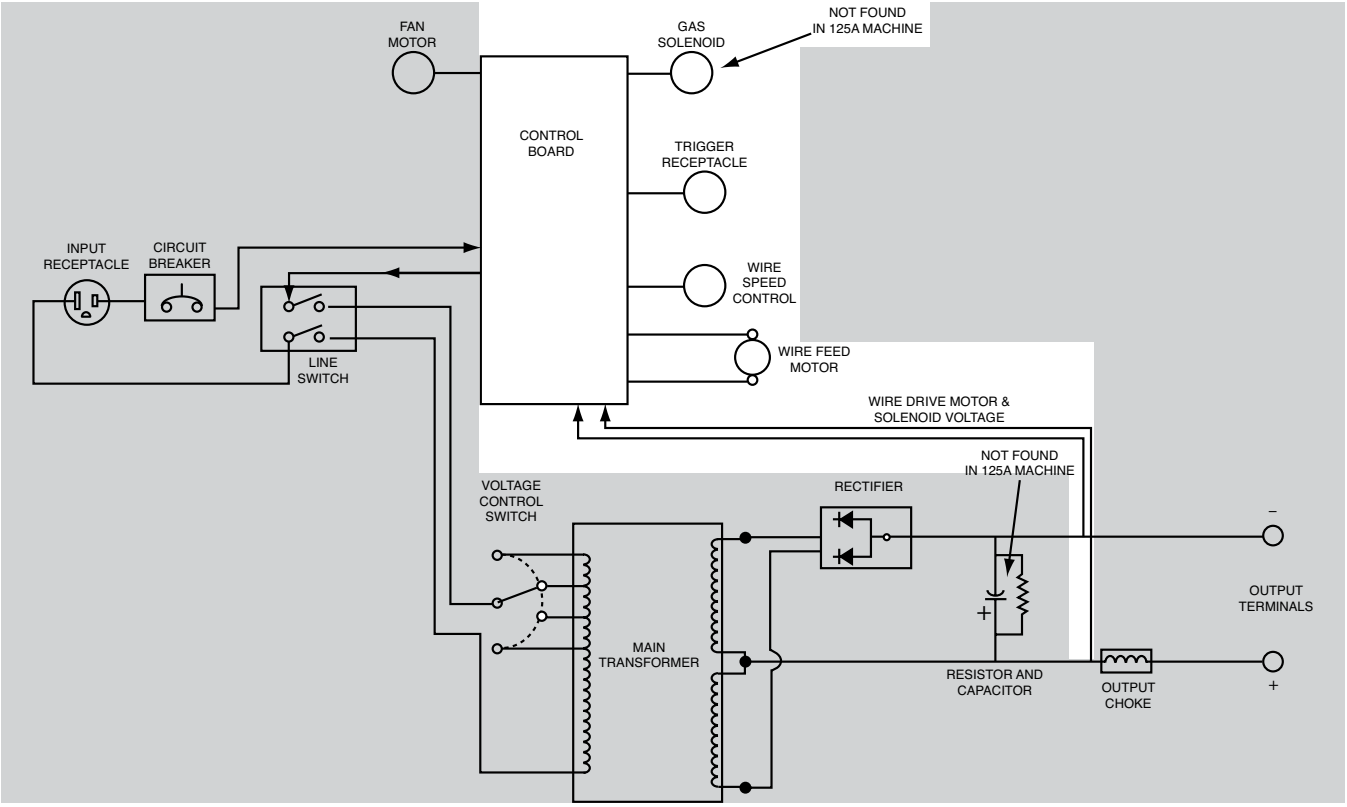
OUTPUT CONTROL, RECTIFICATION & VOLTAGE FEEDBACK

The AC output from the main transformer secondary windings is proportional to the selection of the voltage control switch.

This AC output from the main transformer secondary is rectified and this rectified DC voltage is filtered by the output capacitor and choke circuit and is applied to the machine's output terminals.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion

FIGURE E.5 - TRIGGER, GAS SOLENOID AND WIRE DRIVE



TRIGGER, GAS SOLENOID AND WIRE DRIVE

Closure of the trigger circuit (pulling the gun trigger) signals the control board to start several functions. The CR1 relay closes and voltage is applied to the main transformer.

The DC output voltage that is developed at the rectifier is fed back to the control board to power the wire feed motor and is applied to the gas solenoid circuitry (if present).

The voltage that powers the wire drive motor is varied and controlled on the control board in response to the setting of the Wire Speed Control. The control board monitors the drive motor armature current and voltage and compares the feedback information with the commands sent from the wire speed control to maintain a constant wire speed.

The control board also has an automatic protection circuit, which shuts off the trigger circuit in the event of a wire drive motor overload.

NOTE: Unshaded areas of Block Logic Diagram are the subject of discussion

Return to Section TOC
Return to Master TOC

PROTECTIVE DEVICES AND CIRCUITS

THERMAL PROTECTION

The Compact Wire Welders have a rated output duty cycle as defined in the ***Technical Specification*** page. If the duty cycle is exceeded, a thermal protector will shut off the output until the machine cools to a reasonable operating temperature. This is an automatic function and does not require user intervention. The fan continues to run during cooling. If the fan is not turning or the air intake louvers become obstructed, the input power must then be removed and the fan problem or air obstruction corrected.

THERMAL BREAKER

The Compact wire feeder welders features a resettable 25 amp thermal breaker. If the current conducted through the breaker exceeds 25 amps for an extended period of time, the breaker will open and will require manual reset.

WIRE FEED OVERLOAD PROTECTION

The compact wire feeder welders features an overload protection of the wire drive motor. If the motor becomes overloaded, the protection circuitry turns off the wire feed unit. To reset simply release and re-trigger.

TABLE OF CONTENTS - TROUBLESHOOTING AND REPAIR

Troubleshooting and Repair **F-1**

How to Use Troubleshooting Guide F-2

PC Board Troubleshooting Procedures F-3

Troubleshooting Guide F-4/F-10

Case Cover Removal And Replacement Procedure F-11

Gas Solenoid Test F-13

Wire Drive Motor Test F-15

Main Transformer Test F-17

Fan Motor Test F-19

Typical Output Voltage Waveform - Machine Loaded F-21

Abnormal Open Circuit Voltage Waveform F-22

Control Board Removal and Replacement Procedure F-23

Rectifier Removal and Replacement Procedure F-25

Transformer & Choke Assembly Removal and Replacement Procedure F-27

Wire Dive Motor Removal and Replacement Procedure F-31

Fan Motor Assembly Removal and Replacement Procedure F-35

Retest and Repair F-37

Return to Master TOC
Return to Master TOC
Return to Master TOC

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

HOW TO USE TROUBLESHOOTING GUIDE

⚠ WARNING

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

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

Step 1. LOCATE PROBLEM (SYMPTOM).
Look under the column labeled "PROBLEM (SYMPTOMS)". This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting. Symptoms are grouped into the following categories: output problems, function problems, wire feeding problems, welding problems, gas flow problems and spool gun problems.

Step 2. PERFORM EXTERNAL TESTS.
The second column labeled "POSSIBLE AREAS OF MISADJUSTMENT(S)" lists the obvious external possibilities that may contribute to the machine symptom. Perform these tests/checks in the order listed. In general, these tests can be conducted without removing the case wrap-around cover.

Step 3. RECOMMENDED COURSE OF ACTION
The last column labeled "Recommended Course of Action" lists the most likely components that may have failed in your machine. It also specifies the appropriate test procedure to verify that the subject component is either good or bad. If there are a number of possible components, check the components in the order listed to eliminate one possibility at a time until you locate the cause of your problem.

All of the referenced test procedures referred to in the Troubleshooting Guide are described in detail at the end of this chapter. Refer to the Troubleshooting and Repair Table of Contents to locate each specific Test Procedure. All of the specified test points, components, terminal strips, etc. can be found on the referenced electrical wiring diagrams and schematics. Refer to the Electrical Diagrams Section Table of Contents to locate the appropriate diagram.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

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:

PC 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.

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

- If you don't have a wrist strap, touch an un-painted, 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 PC board must be either conductive, anti-static or static-dissipative.

- Remove the PC board from the static-shielding bag and place it directly into the equipment. Don't set the PC board on or near paper, plastic or cloth which could have a static charge. If the PC board can't be installed immediately, put it back in the static-shielding bag.

- If the PC board uses protective shorting jumpers, don't remove them until installation is complete.

- If you return a PC 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.

Return to Section TOC
Return to Master TOC

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
OUTPUT PROBLEMS		
Major physical or electrical damage is evident.	1. Contact your local Lincoln Authorized Field Service Facility.	1. Contact the Lincoln Electric Service Dept. 1-888-935-3877.
Machine is dead - no open circuit voltage, wire feed, gas flow when trigger is pulled and fan does not operate.	1. Make sure correct voltage is applied to the machine. 2. Make certain that the power switch is in the “on” position. 3. Blown fuses in the input line. Check circuit breaker on the machine.	1. Check input power switch (S1) it may be faulty. See Wiring Diagram. 2. Check lead connection and correct function of circuit breaker. See Wiring Diagram. 3. The Control P.C. Board may be faulty
No weld output, wire feed, gas flow when the trigger is pulled. Fan does run.	1. The thermostat may be open due to machine overheating. If machine operates normal after a cooling off period then check for proper fan ventilation, remove any obstructions. Make certain that the machine’s duty cycle is not being exceeded. 2. Gun trigger may be faulty.	1. Check thermostat and associated leads for loose or broken connections. See Wiring Diagram. 2. Remove main power supply to the machine. With the gun trigger pulled check for continuity at pins 2 and 4 on plug J2 on the control board. 3. Perform the ***Transformer Test***. 4. Check all heavy current carrying leads. Check for loose or broken connections at the transformer, choke and rectifier. 5. Possible bad control board. Replace.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
OUTPUT/FEEDING PROBLEMS		
The machine has output, wire feed, gas flow but NO fan.	1. Possible faulty fan motor. 2. Possible faulty Control P.C. Board.	1. Perform the ***Fan Motor Test***.
The machine has output, gas flow and fan but **does not** have wire drive.	1. Possible bad drive motor. 2. Possible bad Control P.C. Board. 3. Make sure spool gun/MIG gun switch is in the right position.	1. Perform the ***Wire Drive Test***. 2. If 1.5 10.5 vdc is not at the drive motor check for OCV at the board on pins 7 and 10 on J3 on the 180 Amp machines. If OCV is present possible faulty Control P.C Board. If OCV is not present check continuity of wires 304 on the 30 on the 180 Amp machines.
No wire feed when gun trigger is pulled. Fan runs, gas flows and machine has correct open circuit voltage. (33 vdc maximum) - weld output.	1. If the wire drive motor is running, make sure that the correct drive roll and wire guide is installed in the machine. 2. Check for clogged cable liner or contact tip. 3. Check for proper size cable liner and contact tip. 4. Check Magnum 100SG / Magnum 100L switch is properly switched to activate proper gun.	1. Perform the ***Wire Drive Test***. 2. If wire drive test is OK, then check for OCV at the board leads 307 and 310 on the 180 Amp machines. If correct voltage is present, possible faulty Control P.C. Board. Replace. 3. If open circuit voltage is **not** present on said leads at the control board check continuity of leads.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
FEEDING PROBLEMS		
The machine stops feeding wire with trigger pulled. Re-trigger and machine starts feeding wire again.	1. Check for adequate wire supply. 2. Check for mechanical restrictions in the wire feeding path. The gun may be clogged. 3. Make sure the gun liner and tip are correct for the wire size being used. 4. Check spindle for ease of rotation.	1. Check the motor armature current. If high (over 2.5 amps) and there are no restrictions in the wire feeding path, then the motor or gear box may be faulty. Replace. 2. If motor armature current is below 2.5 amps. The Control P.C. board may be faulty. Replace.
Wire drive speed stays on one speed. No wire speed control.	1. Possible faulty drive motor. 2. Possible faulty Control board.	1. Remove main supply power to the machine. Unplug the voltage supply leads going to the wire feed motor. Test the resistance from each terminal of the wire feed motor to the wire feed motor case. If resistance is below 500,000 ohms, replace the wire drive motor. 2. Check the operation of the 5,000 ohm wire speed potentiometer. 3. The control P.C. board may be faulty. Replace.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
WELDING PROBLEMS		
The arc is unstable - poor starting.	1. Check for correct input voltage to the machine. 2. Check for proper electrode polarity for process. 3. Check gun tip for wear or damage-Replace. 4. Check for proper gas and flow rate for process. 5. Check work cable for loose or faulty connections. 6. Check gun for damage or breaks	1. Check for 21 to 33 VDC (dependent on Arc Voltage Control Setting) at the machine's output terminals. If present check gun and work cable. 2. If OCV is low, check output capacitor and output diodes. 3. Check for loose connections at the output terminals, the choke and all heavy current carrying leads. See Wiring Diagram. 4. The Control P.C. Board may be faulty. Replace.
GAS FLOW PROBLEMS		
Low or no gas flow when gun trigger is pulled. Wire feed, weld output and fan operate normally.	1. Check gas supply, flow regulator and gas hoses. 2. Check gun connection to machine for obstruction or leaky seals.	1. Perform the ***Gas Solenoid Test***.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
SPOOL GUN PROBLEMS		
No wire feed occurs when Spool Gun trigger is pulled.	1. Machine is switched off or unplugged. 2. Spool gun is out of wire 3. Contact tip burnback. 4. Fully or partially blocked gun tube liner. 5. Bird nest. 6. Machine's toggle selector switch is not set to spool gun mode. 7. Defective trigger. (contacts open) 8. Defective trigger circuit in gun. 9. Damaged spool gun motor. 10. No motor voltage or current from machine. 11. Contact tip size too small for wire diameter used.	1. Switch on or plug in machine. 2. Install full spool of specified wire. 3. Replace contact tip. 4. Replace and clean or replace gun tube liner. (See ***Maintenance Section***) 5. Cut out birds nest, reload wire, and check for proper wire alignment and wire's mechanical resistance. 6. Flip switch to proper operating position. 7. Replace trigger. (See ***Maintenance Section***). 8. Disconnect gun from machine and check trigger for continuity. 9. See ***Troubleshooting Section*** in welding machine's instruction manual. 10. Replace contact tip with one that is the right size.
Sluggish wire feed when the Spool Gun trigger is pulled.	1. Drive roll is worn or galled with aluminum. 2. Machine's wire feed speed setting is too low. 3. Wire is obstructed somewhere along the wire feed path in the gun. 4. Low motor voltage.	1. Clean drive roll of all aluminum or replace drive roll. 2. Increase wire feed speed. 3. Check for obstructions: remove any wire shavings; remove kinked wire; remove and clean or replace gun tube liner (See ***Maintenance Section***). 4. See ***Troubleshooting Section*** in welding machine's instruction manual.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Return to Section TOC
Return to Master TOC

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
SPOOL GUN PROBLEMS		
Intermittent wire feed when the Spool Gun trigger is pulled.	1. Wire is mechanically binding along its feed path inside gun. 2. Drive roll has become loose on hub and output shaft. 3. Drive roll has become galled with aluminum. 4. Wire has become kinked along its feed path. 5. Liner assembly is shaving wire.	1. Check that wire is properly aligned inside gun. 2. Check that drive roll is securely fastened in place by SHCS (socket head cap screw); replace hub and twist-lock if worn. 3. Remove and then clean or replace drive roll. (See ***Maintenance Section***). 4. Manually pull wire slowly thru gun until unkinked wire emerges. 5. Check that wire is properly aligned at liner inlet; realign gun tube with wire drive. (See Correcting Wire Shaving Issues ***Maintenance Section***)
Frequent occurrences of contact tip burnback when using the Spool Gun.	1. Improper welding parameters or technique. (Example: CTWD (Contact Tip to Work Distance) is incorrect. 2. Wire may be feeding intermittently.	1. See ***Operation Section*** for proper Welding information. 2. See symptoms on intermittent or sluggish wire feed.
Poor weld bead appearance (porosity or dull grey oxidized surface) When using the Spool Gun.	1. No gas flow. 2. Low gas flow. 3. Improper or contaminated shielding gas. 4. Welding in a windy environment. 5. Improper electrode polarity. 6. Improper welding parameters or technique.	1. See symptom “Low or no gas flow”. 2. Check that the gas supply’s labeling reads 100% argon. Temporarily use alternate, known gas supply and check for appearance improvement. 3. Erect a wind shield or move to a non-windy location before welding. 4. Reconnect machine’s welding output to electrode positive polarity. 5. See ***Operation Section*** for information.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
SPOOL GUN PROBLEMS		
Low or no shielding gas flow.	1. Out of gas. 2. Gas supply is turned off or disconnected. 3. Gas supply flow regulator is improperly set. 4. Machine's gas solenoid valve has malfunctioned. 5. Blockage in gun along gas path. 6. Gun cable kinked or flattened. 7. Blockage due to excessive spatter accumulation on gas cone or gas diffuser. 8. Excessive gas leakage from supply. 9. Gas leakage in gun between liner assembly and cable connector. 10. Gas leakage at gun-to-feeder connection.	1. Check that an adequate gas supply is available. 2. Check that all gas supply valves are open. 3. Check that all gas flow is set between 20 to 50 SCFH. 4. See machine's instruction manual. 5. Gently blow out debris from core tube. 6. Attempt to straighten out cable, or replace cable. (See ***Maintenance Section***). 7. Clean or replace gas cone or gas diffuser. 8. Find and repair all leaks. 9. Replace liner assembly. (See ***Maintenance Section***). 10. Damaged o-rings: replace both seals. Gun connector not fully inserted into machine (See ***Installation Section***).
Spool Gun runs or begins feeding wire without pulling the gun trigger.	1. Defective trigger (contacts closed). 2. Defective (closed) trigger circuit in the welding machine. 3. Trigger lead(s) inside gun cable are shorted together or commonly shorted to either welding or motor circuits.	1. Replace trigger (See ***Maintenance Section***). 2. See machine's instruction manual. 3. Damaged control leads between machine's P6 connector and cable; repair if possible. Otherwise, replace gun cable (See ***Maintenance Section***) for both.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

CASE COVER REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or 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.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Case Cover.

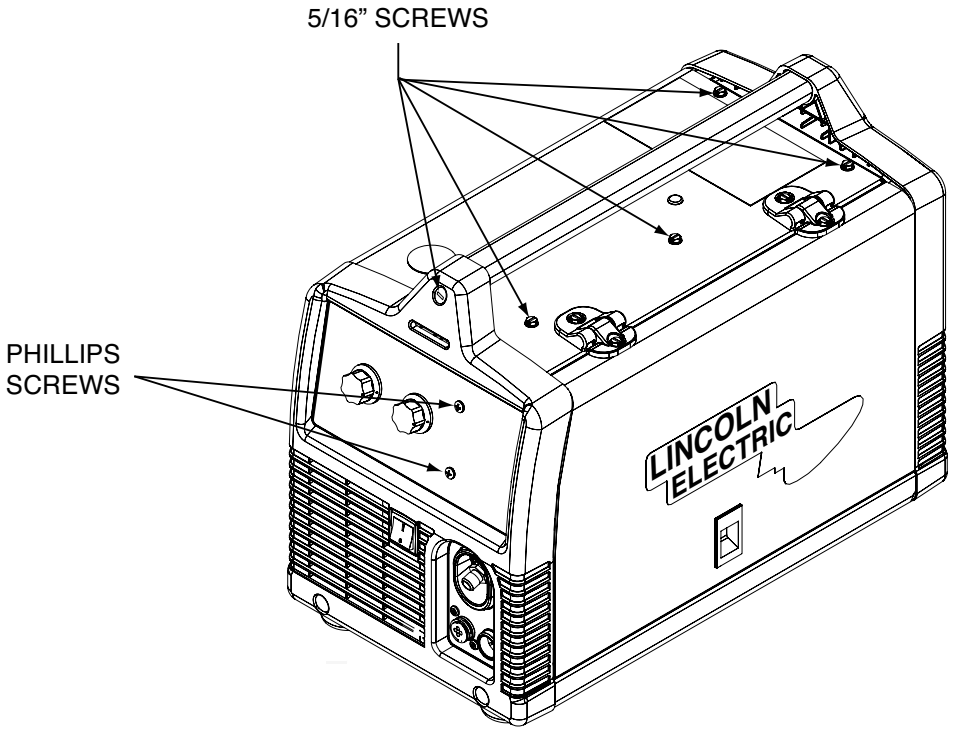
MATERIALS NEEDED

5/16” Nutdriver

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

CASE COVER REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.1 – CASE COVER SCREWS



PROCEDURE

1. Disconnect power to the machine.

⚠ 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.

2. Using a 5/16" nutdriver, remove the nine hex-head screws from the top and left side of the machine.
3. Using a 5/16" nutdriver, remove the screw from the front that secures the plastic handle. See Figure F.1.
4. Using a phillips screwdriver, remove the two screws from the case front. See Figure F.1.
5. Carefully lift and remove case cover from the machine.

Return to Section TOC
Return to Master TOC

GAS SOLENOID TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or 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.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical trouble-shooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This test will determine if the Gas Solenoid is receiving the correct voltage and if the Solenoid is functional.

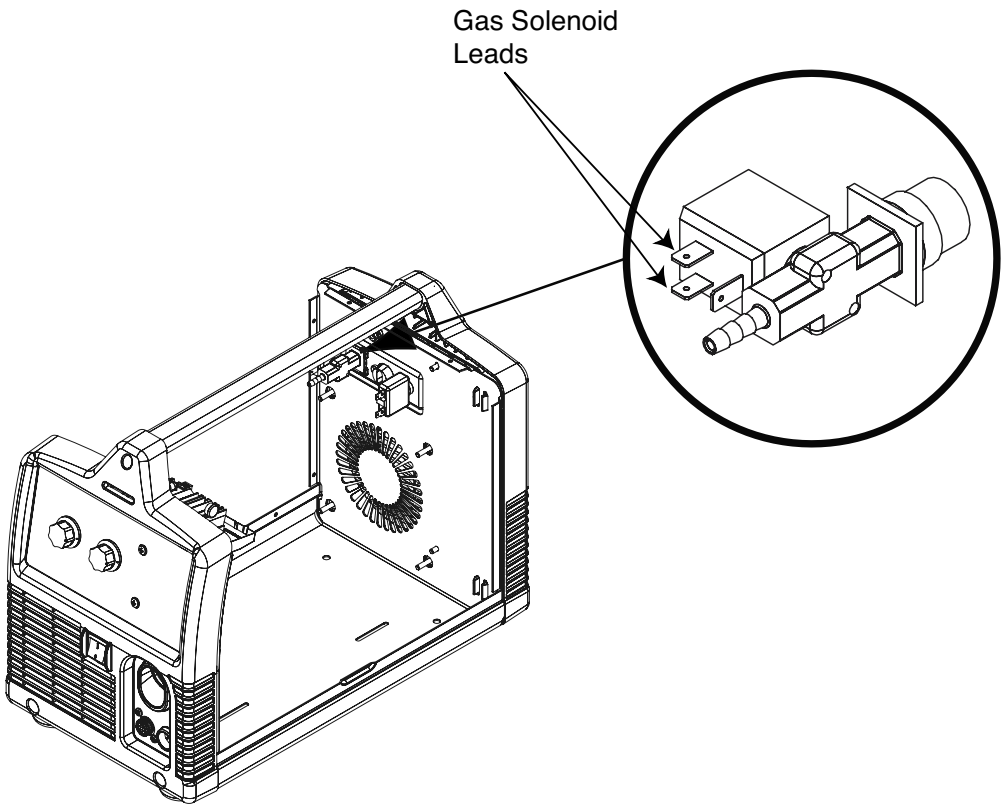
MATERIALS NEEDED

Miscellaneous Hand Tools
Volt/Ohmmeter

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

GAS SOLENOID TEST
(continued)

FIGURE F.2 – GAS SOLENOID LOCATION & LEADS



PROCEDURE

1. Remove input power to the machine.
2. Perform the ***Case Cover Removal Procedure.***
3. Locate the gas solenoid and lead connections. Do not disconnect the leads. See Figure F.2.
4. Turn the machine on and pull the gun trigger to conduct the voltage test.

⚠ 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.

5. There should be approximately 6.0 - 6.5 VDC at the solenoid.
6. If the 6.0 - 6.5 VDC is missing or is low, check the leads and connections between the solenoid and pins 7 and 8 in P3 on the control board. See Wiring Diagram.
7. If the leads and connections are good to the board, verify the correct supply voltage 18 - 32 VDC at pins 7 and 10 at P3 on the control board. See Wiring Diagram.
8. If voltage is correct at P3, the control board may be faulty. Replace the control board.
9. If the 6.0 - 6.5 VDC is present at the solenoid leads and the solenoid does not activate, the solenoid may be faulty. Normal solenoid coil resistance is approximately 20-22 ohms.
10. The solenoid can be further checked by disconnecting the solenoid leads and applying 12VDC directly to the terminals. If the solenoid does not activate, the solenoid is faulty.
11. Connect all disconnected leads and replace the previously removed case cover.

WIRE DRIVE MOTOR TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or 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.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

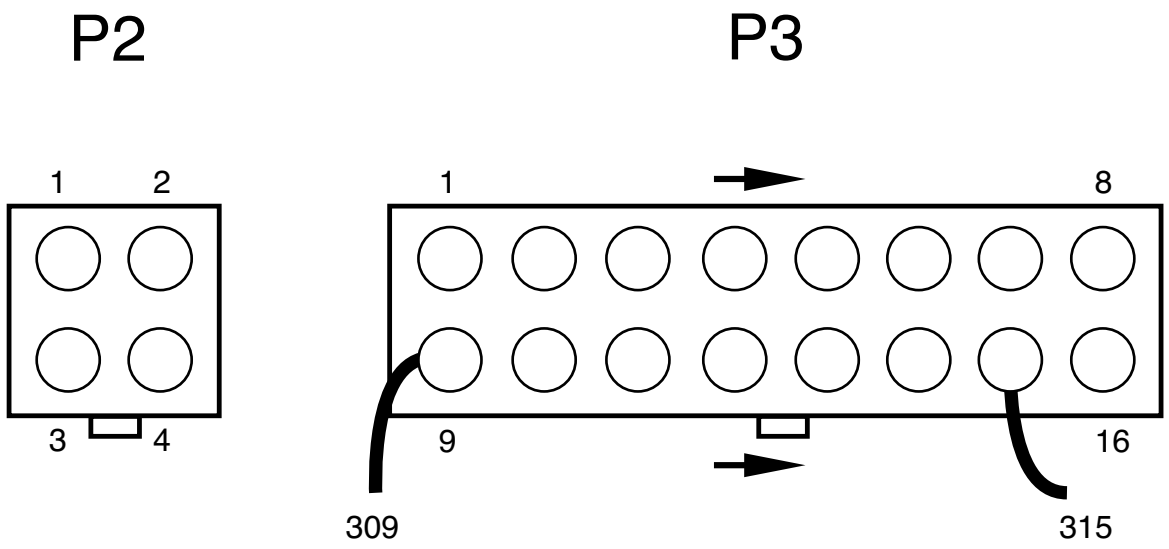
This test will determine if the Wire Drive Motor Circuit is functioning properly.

MATERIALS NEEDED

Miscellaneous Hand Tools
Volt/Ohmmeter

WIRE DRIVE MOTOR TEST (continued)

FIGURE F.3 – PLUGS P2 AND P3



PROCEDURE

NOTE: POLARITY MUST BE OBSERVED FOR THESE TESTS.

Test for correct wire drive motor armature voltage.

1. Disconnect main input power to the machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate plug P3 on the wiring harness. See Wiring Diagram. Plug P3 is inserted into J2 and J3 on the Control Board.
4. Locate leads 315 and 309 on Plug P3. See Figure F.3.
5. Make the following voltage tests:

⚠ 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.

A. Turn the machine off between each test.

B. Carefully insert the meter probes into the lead side of plug P3. See Figure F.3.

C. Turn the machine ON and pull the gun trigger to conduct the voltage test.

FROM LEAD	TO LEAD	
315	309	1.5 to 10.5 VDC

6. If the voltage to the wire drive motor armature is zero, check the wires between plug P3 and the wire drive motor.
7. If the leads and connections are good to the board, verify the correct supply voltage 18 - 32 VDC at pins 7 and 10 at P3 on the control board.
8. If voltage is correct at P3, the control board may be faulty. Replace the control board.

MAIN TRANSFORMER TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or 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.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This test will determine if the correct voltages are being applied.

a. Applied to the Primary Windings of the Main Transformers.

b. Induced on the Secondary Windings of the Main Transformer.

MATERIALS NEEDED

Miscellaneous Hand Tools
Volt/ohmmeter

MAIN TRANSFORMER TEST (continued)

FIGURE F.4 – VOLTAGE CONTROL SWITCH

TAP	VOLTS AC
A	17
B	19
C	22
D	26
E	46

PROCEDURE

1. Remove the input power to the machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Start with the voltage control switch on tap A.
4. Turn machine on and close trigger switch.

⚠ 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.

Turn the machine OFF between each test.

SECONDARY TEST PROCEDURE

NOTE: Secondary voltages will vary proportionately with primary input voltage. For this test, place voltage control potentiometer to maximum.

5. Check voltage at the rectifier. See Figure F.4.

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

FAN MOTOR TEST

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or 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.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

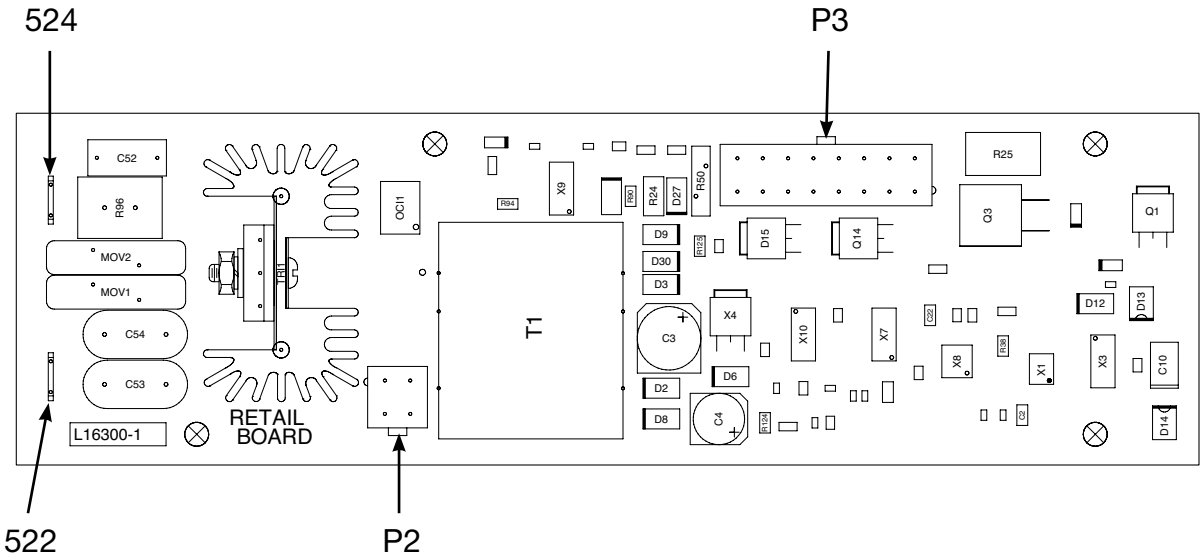
This test will determine if the Fan Motor is receiving the correct voltage.

MATERIALS NEEDED

Miscellaneous Hand Tools
Volt/Ohmmeter

FAN MOTOR TEST (continued)

FIGURE F.5 – CONTROL BOARD LEAD LOCATION(S)



PROCEDURE

1. Remove the input power to the machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the fan terminals on the Control board P2 pins 2 and 4. See Wiring Diagram. See Figure F.5.
4. Turn machine on to conduct voltage test.

⚠ WARNING

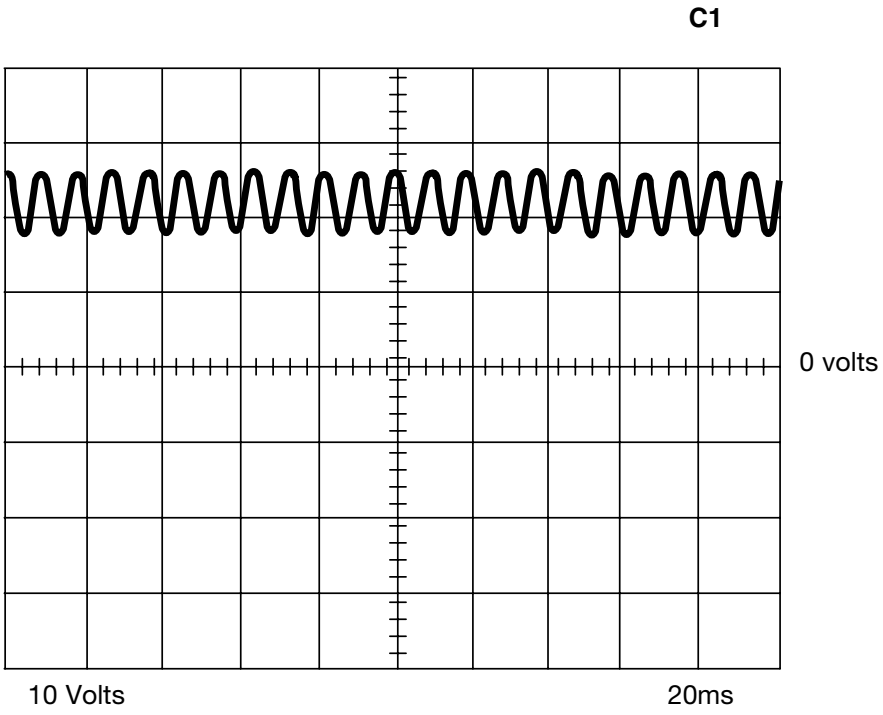
ELECTRIC SHOCK can kill.

- 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.

Turn the machine OFF between each test.

5. There should be 230 VAC on the Fan leads at P2 pins 2 and 4 on the Control Board. See Wiring Diagram.
6. If the correct voltages are not there, check for correct input voltages 230 VAC at leads 522 and 524 on the Control Board. See Wiring Diagram. See Figure F.5.
7. If correct voltages are at leads 522 and 524 and not at FAN terminals, possible faulty Control Board.
8. If the correct voltage **IS NOT** at leads 522 and 524, then check the input cord, circuit breaker, line switch and associated leads. See Wiring Diagram.
9. If the correct voltages are at the FAN terminals, then check for correct voltages at the fan motor. See Wiring Diagram.
10. If the correct voltages are at the fan motor, possible bad motor.

TYPICAL OUTPUT VOLTAGE WAVEFORM - MACHINE LOADED



This is the typical auxiliary output voltage generated from a properly operating machine. Note that each vertical division represents 50 volts and that each horizontal division represents 5 milliseconds in time.

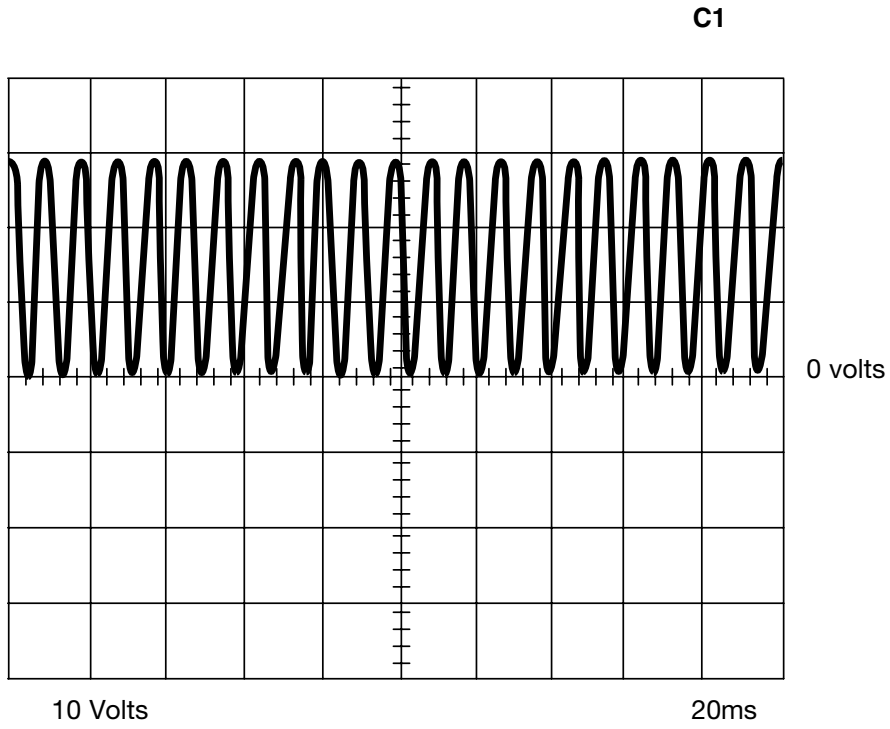
Note: Scope probes connect at the machine output terminals. Positive probe to (+) terminal, negative probe to (-) terminal.

SCOPE SETTINGS

Volts/Div	10V/Div.
Horizontal Sweep	20 ms/Div.
Coupling	DC
Trigger	Internal

Return to Section TOC
Return to Master TOC

ABNORMAL OPEN CIRCUIT VOLTAGE WAVEFORM



This is NOT the typical voltage waveform. The output capacitor was disconnected from the circuit. Note the increased ripple in the waveform. This condition simulates the faulty output filter capacitor. Each vertical division represents 10 volts and that each horizontal division represents 20 milliseconds in time.

Note: Scope probes connect at the machine output terminals. Positive probe to (+) terminal, negative probe to (-) terminal.

SCOPE SETTINGS

Volts/Div	10V/Div.
Horizontal Sweep	20 ms/Div.
Coupling	DC
Trigger	Internal

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

CONTROL BOARD
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or 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.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Control Board.

MATERIALS NEEDED

5/16” Nutdriver

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
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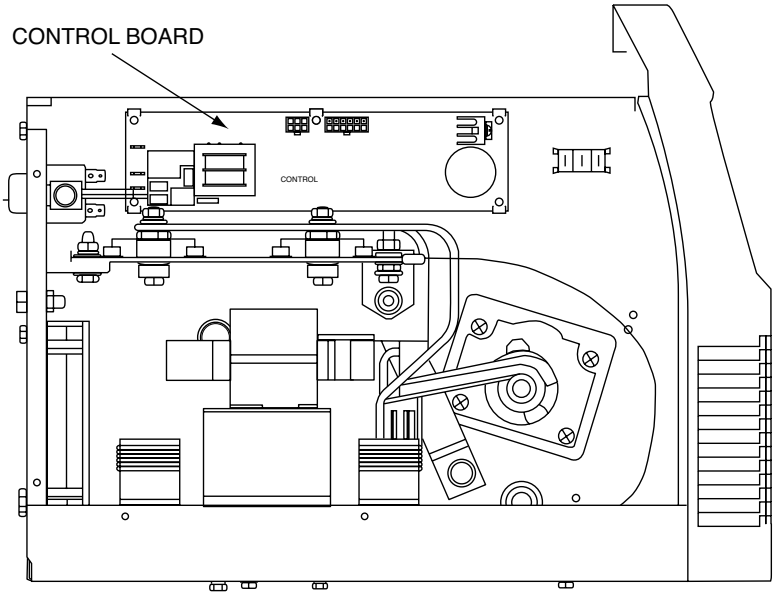
Return to Master TOC

CONTROL BOARD
REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.6 – CONTROL BOARD LOCATION



PROCEDURE

1. Remove the input power to the machine.

⚠ 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.

2. Perform the ***Case Cover Removal Procedure***.
3. Locate the Control Board. See Figure F.6.
4. Label and disconnect all plugs and leads connected to the Control Board.
5. Remove and replace the Control Board.
6. Connect all previously removed leads and plugs to the new Control Board.
7. Install case wraparound cover.

Return to Section TOC
Return to Master TOC

RECTIFIER REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or 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.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Rectifier Assembly.

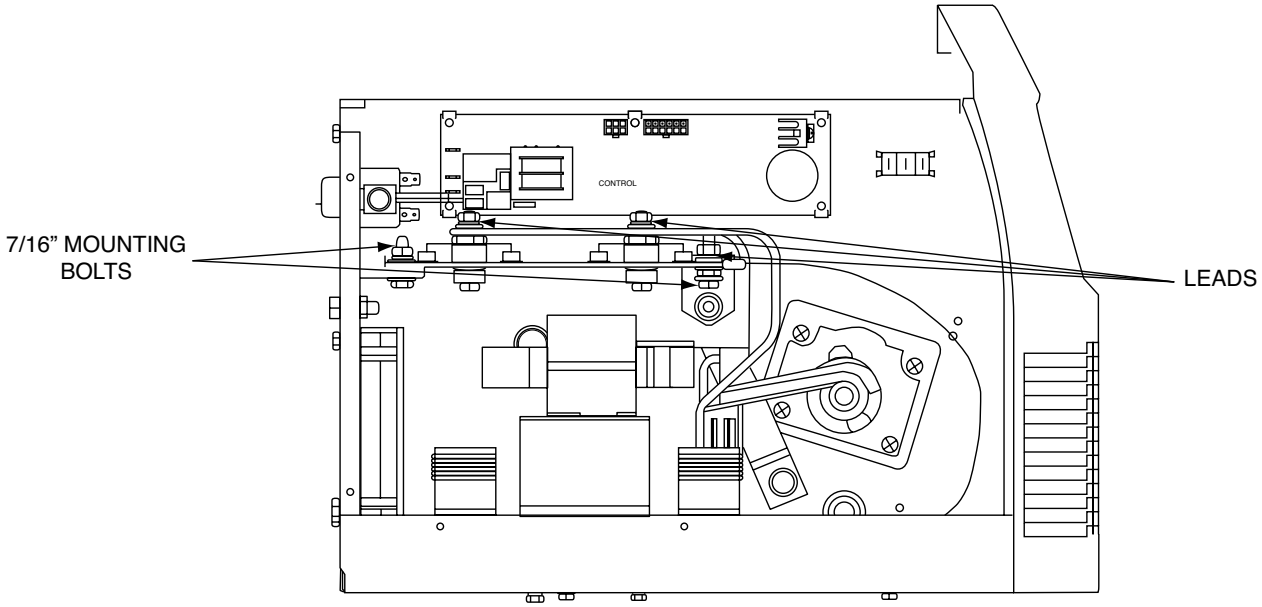
MATERIALS NEEDED

Miscellaneous Hand Tools
Cleaning Pad
Electrical Joint Compound

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

RECTIFIER REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.7 – RECTIFIER MOUNTING BOLTS



PROCEDURE

1. Remove the input power to the machine.
2. Perform the ***Case Cover Removal Procedure***.

⚠ 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.

3. Label and remove the leads going to the rectifier.
4. Using a 7/16" nutdriver, remove the two rectifier mounting bolts. See Figure F.7, take note of washer placement.
5. Remove the rectifier.
6. When re-installing the rectifier, torque the mounting bolts to 55 inch/lbs.
7. When re-installing the leads, clean with an abrasive cleaning pad and apply a thin coat of electrical joint compound. Torque connections to 55 inch/lbs.

Return to Section TOC
Return to Master TOC

TRANSFORMER & CHOKE ASSEMBLY REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or 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.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

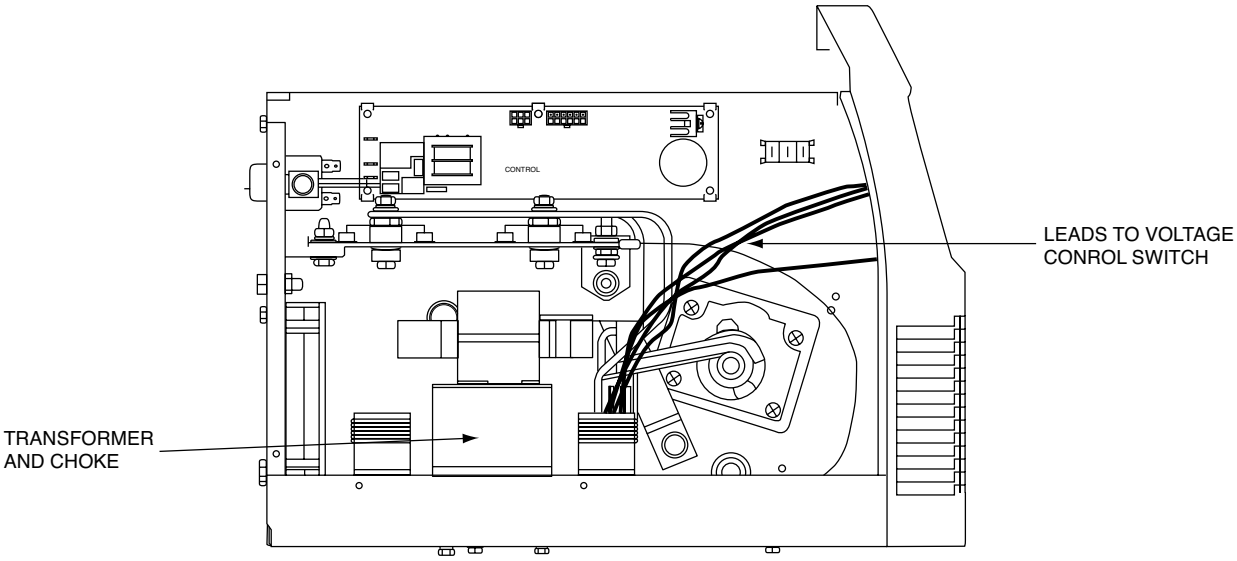
This procedure will aid the technician in the removal and replacement of the Transformer and Choke Assembly.

MATERIALS NEEDED

Miscellaneous Hand Tools

TRANSFORMER & CHOKE ASSEMBLY
REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.8 – LEADS TO VOLTAGE CONTROL SWITCH



PROCEDURE

1. Remove the input power to the machine.
2. Perform the ***Case Cover Removal Procedure***.

⚠ WARNING

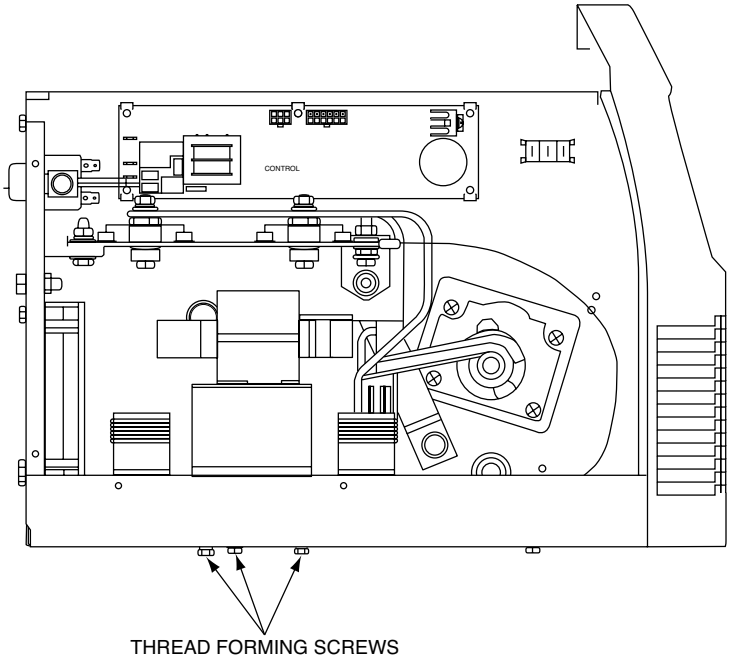
ELECTRIC SHOCK can kill.

- 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.

3. Perform the ***Rectifier Removal Procedure***.
4. Label and remove the leads connected to the voltage control switch. See Figure F.8.

TRANSFORMER & CHOKE ASSEMBLY
REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.9 – THREAD FORMING SCREWS



TRANSFORMER AND CHOKE

5. Label and remove the leads connected to the capacitor.
6. Unplug the thermostat leads.
7. Remove the four thread forming screws on the case bottom. See Figure F.9.
8. Remove transformer and choke assembly.
9. When re-installing the transformer and choke assembly, torque the four thread forming screws to 32 - 38 inch/lbs.

Return to Section TOC
Return to Master TOC

NOTES

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

WIRE DRIVE MOTOR
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or 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.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

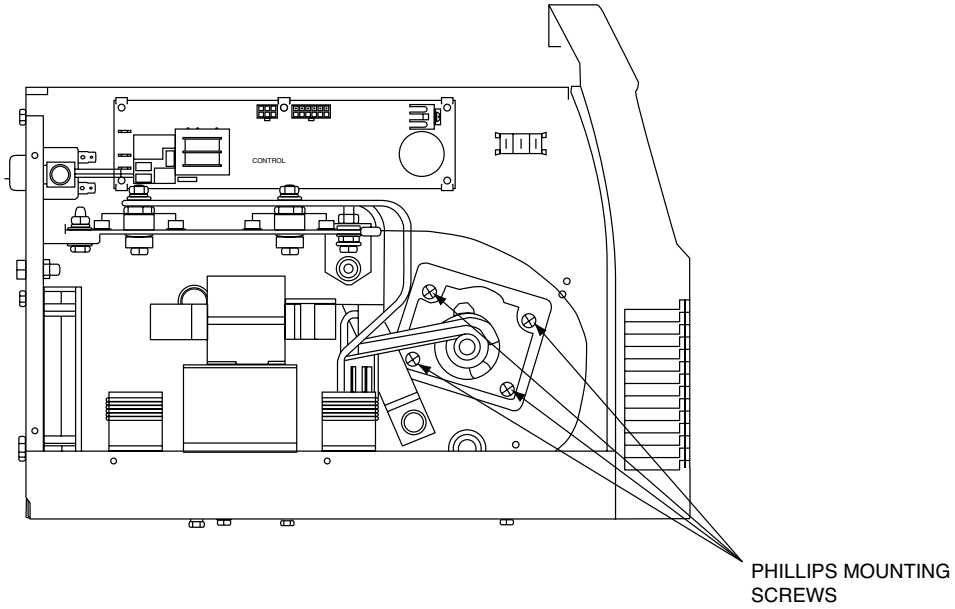
This procedure will aid the technician in the removal and replacement of the Wire Drive Motor.

MATERIALS NEEDED

Miscellaneous Hand Tools

WIRE DRIVE MOTOR
REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.10 – PHILLIPS SCREWS



PROCEDURE

1. Remove input power to the machine.
2. Perform the ***Case Cover Removal Procedure***.

⚠ WARNING

ELECTRIC SHOCK can kill.

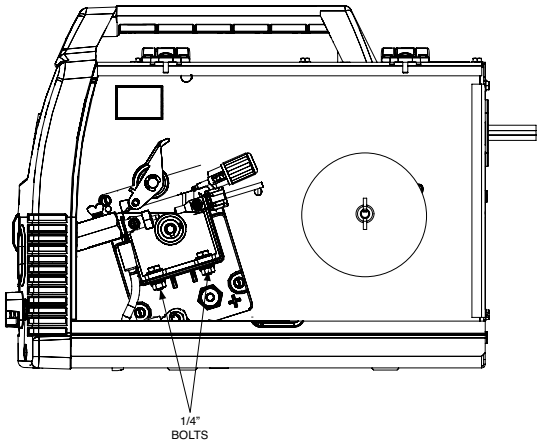
- Have an electrician install and service this equipment. Turn the input power OFF at the fuse box before working on equipment. Do not touch electrically hot parts.

3. Remove the gun and cable assembly from the machine.
4. Disconnect the power lead from the wire drive mount.
5. Label and disconnect the wire feed motors armature leads. Remove gas hose.
6. Remove the four phillips screws that are located inside of the machine. See Figure F.10.
7. Locate and remove the two 7/16” bolts that secure the wire drive gear box to the wire drive mount, note washer placement. ***See Figure F.11.***
8. Remove the Wire Drive Motor and replace. ***See Figure F.12.***

Return to Section TOC
Return to Master TOC

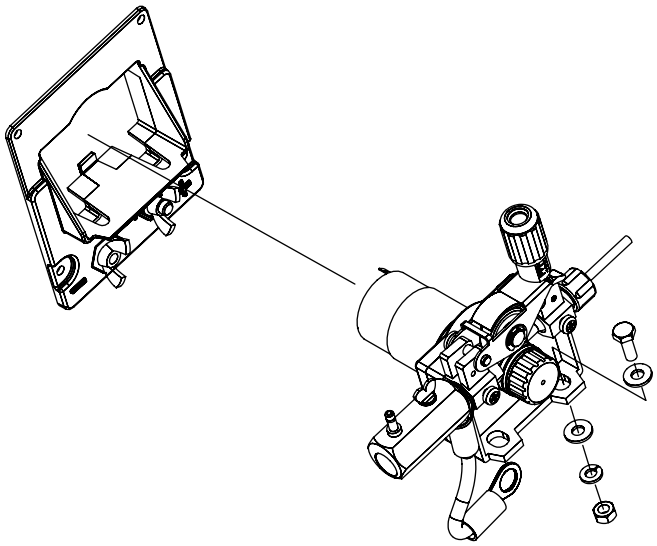
WIRE DRIVE MOTOR
REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.11 – 1/4" MOUNTING BOLTS LOCATION



9. Install the four phillips screws and the two 7/16" bolts previously and torque to 23 - 27 inch/lbs.

FIGURE F.12 – WIRE DRIVE MOTOR REMOVAL



NOTES

Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

FAN MOTOR ASSEMBLY
REMOVAL AND REPLACEMENT PROCEDURE

⚠ WARNING

Service and repair should be performed only by Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or 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.

If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the Fan Motor Assembly.

MATERIALS NEEDED

5/16” Nutdriver

FAN MOTOR ASSEMBLY
REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.13 – FAN LOCATION

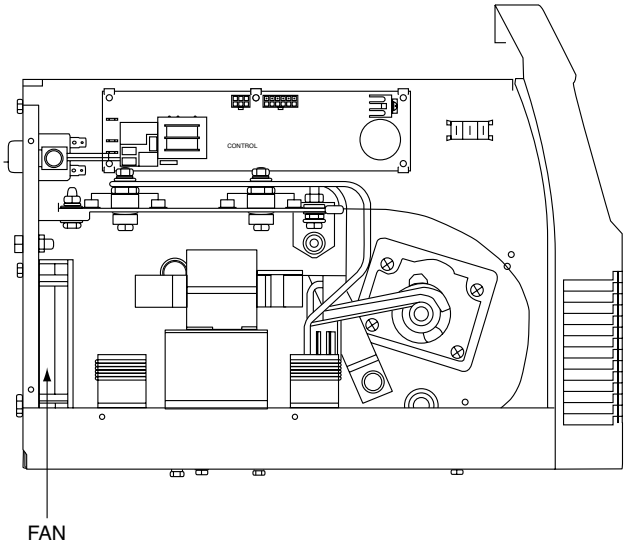
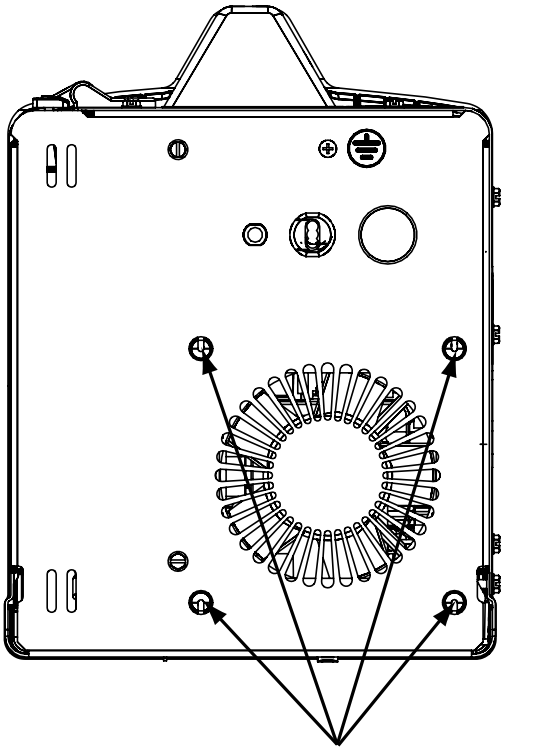


FIGURE F.14 – FAN MOUNTING SCREWS



PROCEDURE

1. Remove the input power to the machine.
2. Perform the ***Case Cover Removal Procedure***.

⚠ 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.

3. Locate Fan in Figure F.13 and the four mounting screws that hold the fan in Figure F.14.
4. Label and disconnect and associated leads.
5. Using a 5/16” nutdriver remove the four mounting screws and remove the fan.
6. Upon installation of the new fan motor, make sure that the air flow arrow is pointing towards the front of the machine.
7. Reconnect associated leads.
8. Mount new fan using previously removed 5/16” bolts.

Return to Section TOC
Return to Master TOC

RETEST AFTER REPAIR (180 AMP UNIT)

INPUT IDLE AMPS & WATTS

Input Volts/Hertz	Maximum Idle Amps	Maximum Idle Watts
230/60	3.00	400

OPEN CIRCUIT VOLTAGE

30.5 - 34 VDC

WIRE SPEED RANGE

30-500 in./min. (1.3-12.7 m/min)

TABLE OF CONTENTS - DIAGRAM SECTION

Electrical Diagrams **G-1**

Wiring Diagram - Code 11937, 11938, 11939, 11940 - (M24682) G-2

Machine Schematic – (M24683) G-3

Schematic – Control Board - (G7533-101) G-4

Set Up Instructions - (M24783) G-5

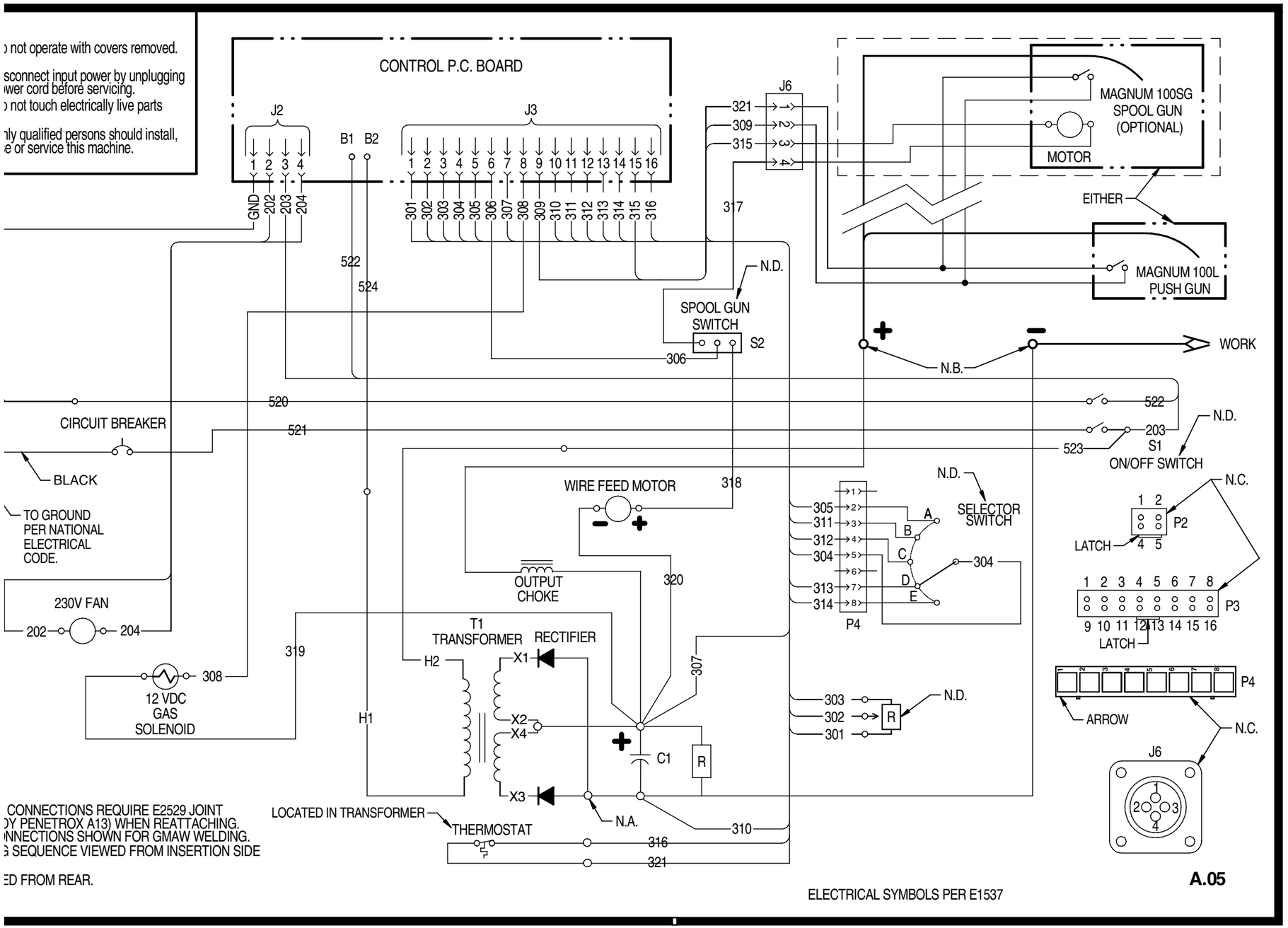
*** NOTE:** Many PC Board Assemblies are now totally encapsulated, surface mounted and or multi-layered and are therefore considered to be unserviceable. Assembly drawings of these boards are no longer provided.

Return to Master TOC
Return to Master TOC
Return to Master TOC

Return to Section TOC
Return to Master TOC

WIRING DIAGRAM - COMPLETE MACHINE - M24682 (CODES 11937, 11938, 11939, 11940)

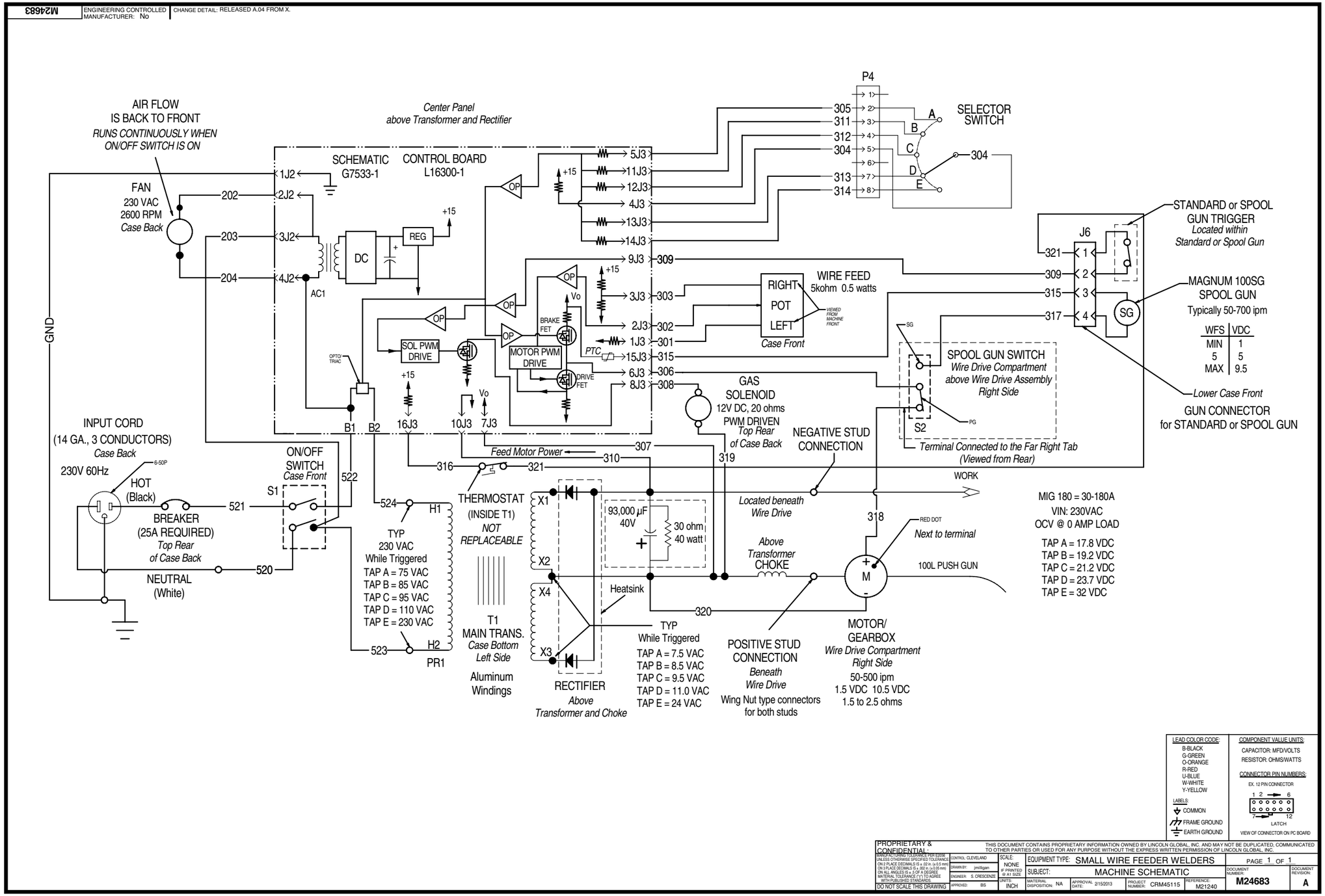
WIRING DIAGRAM



M24682

NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The wiring diagram specific to your code is pasted inside one of the enclosure panels of your machine.

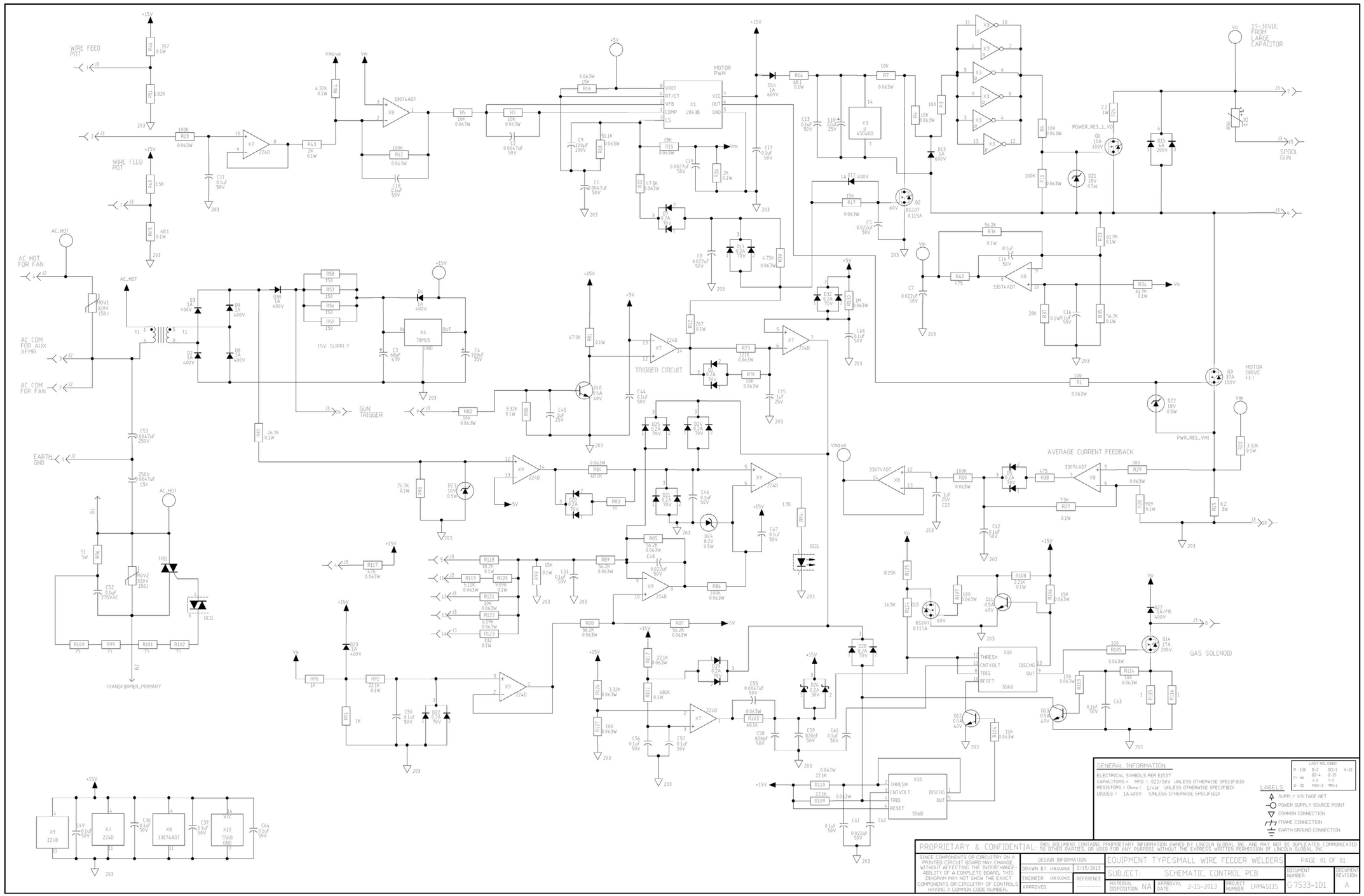
MACHINE SCHEMATIC - M24683



NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual.

Return to Section TOC
Return to Master TOC

SCHEMATIC - CONTROL BOARD (G7533-101)



NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual.

Return to Section TOC
Return to Master TOC

SET UP INSTRUCTIONS - (M24783)

M24783 | ENGINEERING CONTROLLED MANUFACTURER: Yes | CHANGE DETAIL: RELEASED A.01 FROM X.

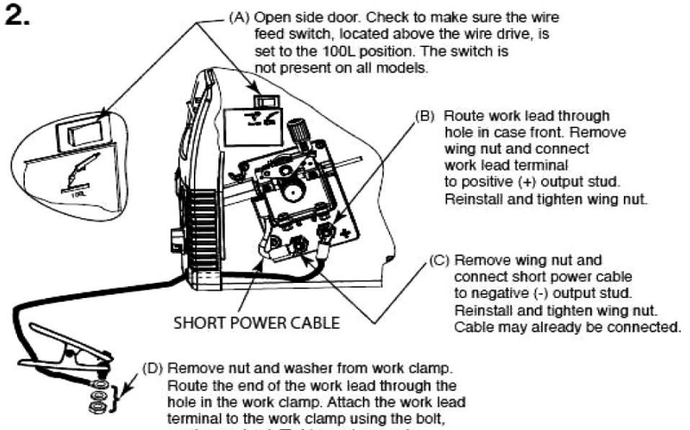
FLUX CORE WELDING SET-UP GUIDE FOR 125-AMP, 140-AMP OR 180-AMP MACHINES

IMPORTANT SAFETY NOTE: THIS GUIDE IS PROVIDED TO HELP YOU SET UP YOUR NEW LINCOLN ELECTRIC® WELDER. BEFORE USING IT, BE SURE TO READ AND FOLLOW THE SAFETY PRECAUTIONS IN THE OPERATOR'S MANUAL AND ALSO THE WARNING LABELS ON THE PRODUCT.
DO NOT CONNECT THE MACHINE TO POWER UNTIL INSTRUCTED.

1. COMPONENTS REQUIRED FOR FLUX-CORE WELDING MACHINE SET-UP:

Tools Required:
Wire Cutters
Adjustable Wrench
Pliers

2.



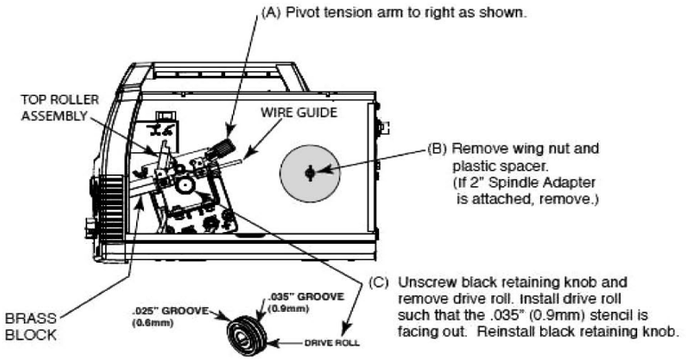
(A) Open side door. Check to make sure the wire feed switch, located above the wire drive, is set to the 100L position. The switch is not present on all models.

(B) Route work lead through hole in case front. Remove wing nut and connect work lead terminal to positive (+) output stud. Reinstall and tighten wing nut.

(C) Remove wing nut and connect short power cable to negative (-) output stud. Reinstall and tighten wing nut. Cable may already be connected.

(D) Remove nut and washer from work clamp. Route the end of the work lead through the hole in the work clamp. Attach the work lead terminal to the work clamp using the bolt, washer and nut. Tighten nut securely.

3.

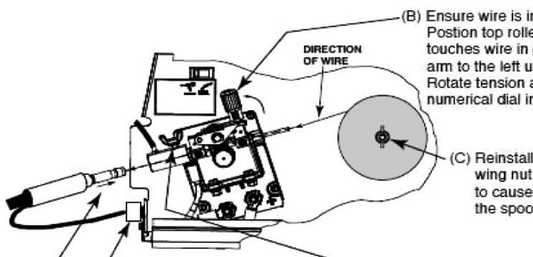


(A) Pivot tension arm to right as shown.

(B) Remove wing nut and plastic spacer. (If 2" Spindle Adapter is attached, remove.)

(C) Unscrew black retaining knob and remove drive roll. Install drive roll such that the .035" (0.9mm) stencil is facing out. Reinstall black retaining knob.

4. (A) Obtain spool of .035" (0.6mm) wire. **CAUTION:** Wire is under tension, continually grasp wire and spool to prevent unwinding. Carefully undo wire at the point where the wire anchors to the spool. Cut approximately 2 inches from the end of the wire and place the spool on the spindle such that the wire will feed off the top of the spool. Guide the wire through the wire guides until the wire exits the front of the machine via the brass block. See step 3 for location of wire guide and brass block.



(B) Ensure wire is in groove of drive roll. Postion top roller assembly so roller touches wire in groove then pivot tension arm to the left until it locks into place. Rotate tension arm knob until the numerical dial indicates about "3".

(C) Reinstall spacer and tighten wing nut against spacer enough to cause a light brake on the spool, do not overtighten.

(D) Remove wing screw.

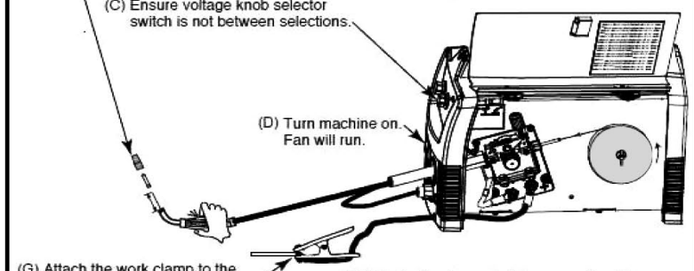
(E) Insert and rotate gun trigger connector clockwise until tight.

(F) Slide wire into gun connector then slide gun connector into the brass block. Ensure gun connector is fully seated, reinstall and tighten wing screw.

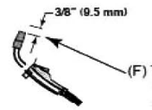
5. (A) Remove black nozzle and unscrew contact tip.

(B) Connect power cord to a suitable outlet. Refer to the "Technical Specifications" page of the operator's manual for requirements.

(C) Ensure voltage knob selector switch is not between selections.



(G) Attach the work clamp to the material intended to be welded.



(E) Set wire feed speed dial on case front to "5". Press and hold the trigger to feed wire until the wire is about 4 inches (102mm) past the gun tube end.

CAUTION: Wire is electrically hot while trigger is pressed.

(F) Turn the machine off. Install .035"(0.9mm) contact tip and black gun nozzle. Cut wire stick out to 3/8"(9.5mm).

6.

For welding techniques, refer to "Learn to Weld" DVD included with machine or visit: **www.youtube.com/user/lincolnelectrictv**

While welding, hold trigger to feed wire and maintain the welding arc. Maintain 3/8" (9.5mm) stick out while welding. Release trigger to stop welding.

FOR HELP PLEASE CALL 1-866-236-0044

LINCOLN ELECTRIC

PAGE 1 A M24783PRINT

MANUFACTURING TOLERANCE PER E2056 UNLESS OTHERWISE SPECIFIED TOLERANCE: ON 2 PLACE DECIMALS IS ± .02 in. (± 0.5 mm) ON 3 PLACE DECIMALS IS ± .002 in. (± 0.05 mm) ON ALL ANGLES IS ± .5 OF A DEGREE MATERIAL TOLERANCE ("t") TO AGREE WITH PUBLISHED STANDARDS. DO NOT SCALE THIS DRAWING	CONTROL: CLEVELAND DRAWN BY: jjezior ENGINEER: S. CRESCENZE APPROVED: BS	SCALE: NONE IF PRINTED @ A3 SIZE UNITS: INCH	EQUIPMENT TYPE: SMALL WIRE FEEDER WELDERS SUBJECT: QUICK SET UP INSTRUCTIONS MATERIAL DISPOSITION: NA APPROVAL DATE: 2/15/2013 PROJECT NUMBER: CRM45115 REFERENCE: M22749	PAGE 1 OF 6 DOCUMENT NUMBER: M24783 DOCUMENT REVISION: A			

EN-166 SOLID EDGE Insight

NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual.

Return to Section TOC Return to Master TOC