



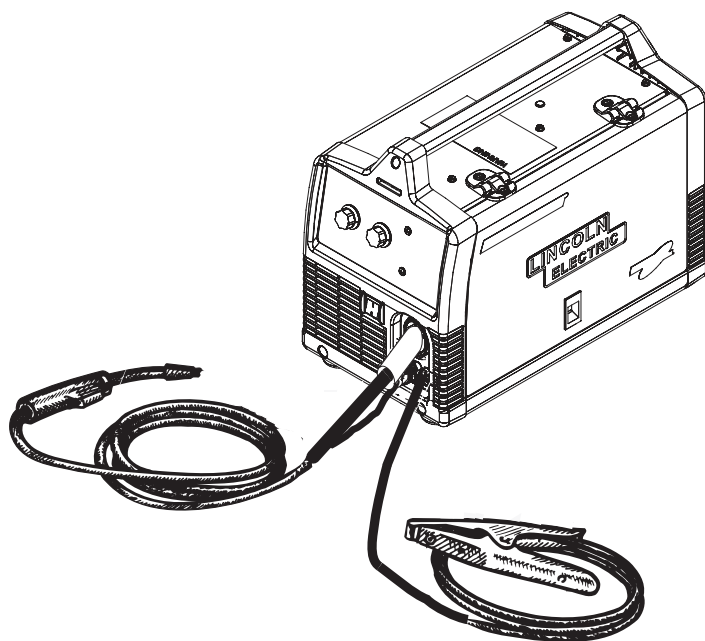
NOTE: This manual will cover most of the troubleshooting and repair procedures for the code numbers listed. Some variances may exist when troubleshooting/repairing later code numbers.

POWER MIG[®] 180 DUAL

For use with machines having Code Numbers:

11828

SERVICE MANUAL



⚠ 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 Z87.1 standards.

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

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



FUMES AND GASES can be dangerous.

5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding 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.**

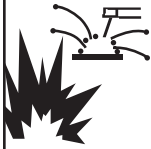
5.b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically 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.



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-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202.



FOR ELECTRICALLY powered equipment.

- 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.

PRÉCAUTIONS DE SÛRETÉ

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

Sûreté Pour Soudage A L'Arc

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

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

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

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

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 manufacturer's 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

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

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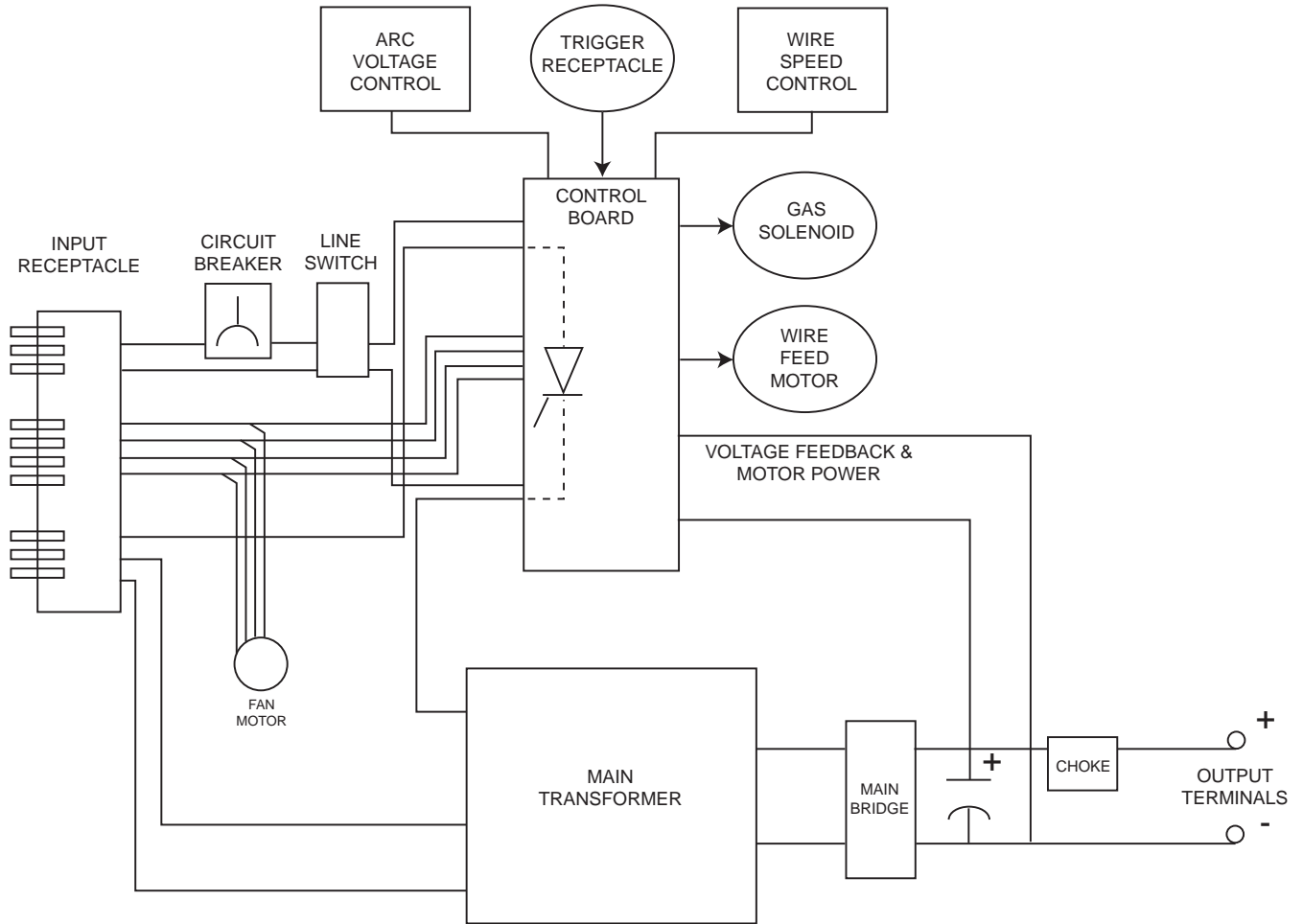
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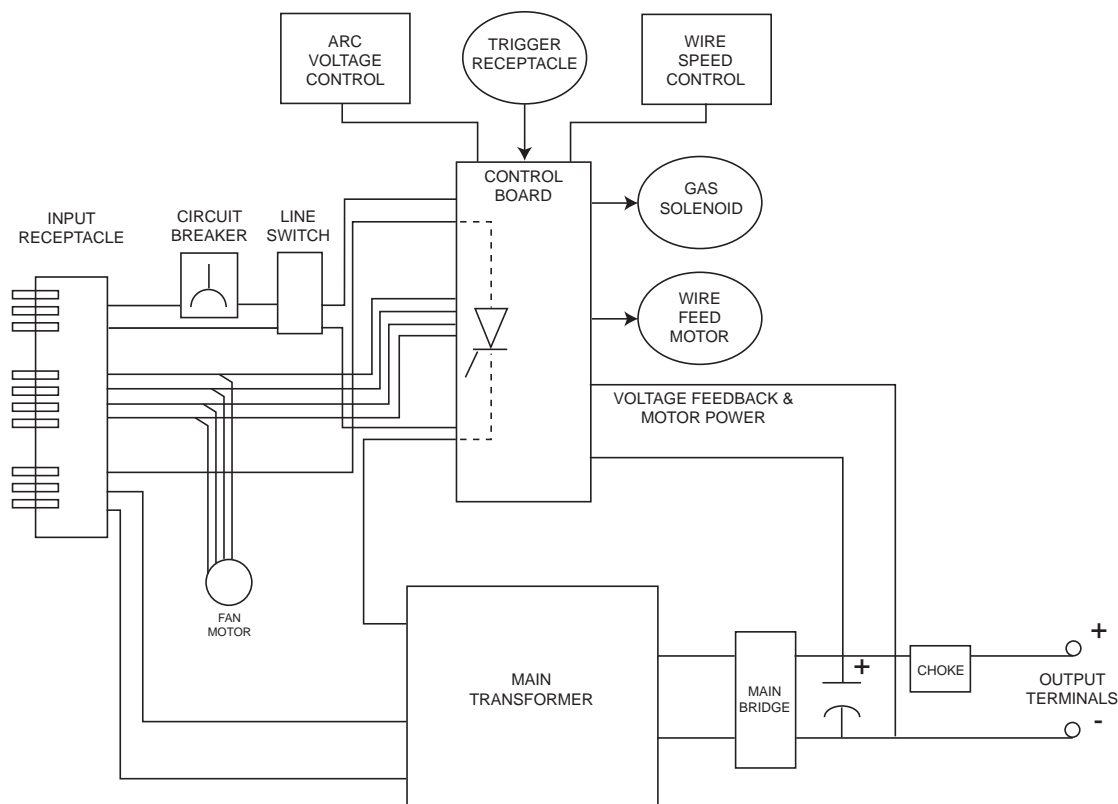
FIGURE E.1 BLOCK LOGIC DIAGRAM



POWER MIG® 180 DUAL



FIGURE E.2 - GENERAL DESCRIPTION



GENERAL DESCRIPTION

The Power Mig® 180 Dual Wire Welder is a Constant Voltage (CV) DC welder that can be used for MIG or Flux-Core process.

The Power Mig® 180 Dual Wire Welder features two power input cords to permit connecting the machine to a 120VAC or a 208/230VAC input supply. When using 120VAC, this machine is rated for 90 amps, 19.5 volts at a 20% duty cycle. When using 208/230VAC, this machine is rated for 130 amps, 17/20 volts at a 30% duty cycle.

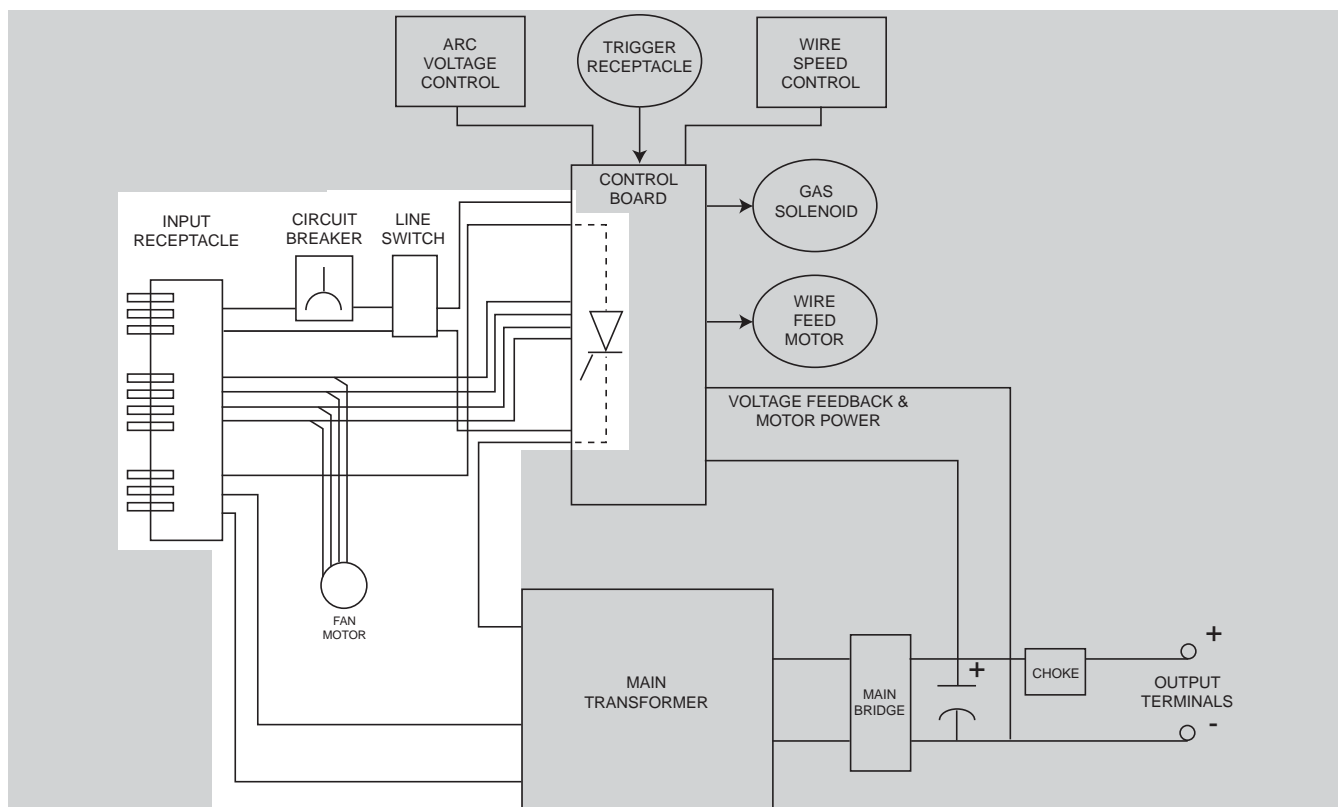
The Power Mig® 180 Dual Wire Welder is equipped with a 4-pin trigger connector to allow operation of the included MAGNUM 100L or MAGNUM PRO 100L gun. It will also allow operation of the MAGNUM 100SG spool gun for Aluminum MIG Welding.

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

POWER MIG® 180 DUAL

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



INPUT LINE VOLTAGE, FAN MOTOR & MAIN TRANSFORMER

120 VAC

When connecting to 120VAC via the appropriate input cable, input voltage enters the control board by means of the line switch. A circuit breaker is incorporated in the circuit to protect the unit from current overloads.

The input cable has jumpers in it to configure the main transformer and control board for 120VAC. 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 should run whenever the machines power switch is turned on.

208/230VAC

When connecting to 208/230VAC via the appropriate input cable, input voltage enters the control board by means of the line switch. A circuit breaker is incorporated in the circuit to protect the unit from current overloads.

The input cable has jumpers in it to configure the main transformer and control board for 208/230VAC. The main transformer receives the primary voltage from the control board and changes the high voltage and low current input power to a low voltage and high current output suitable for welding.

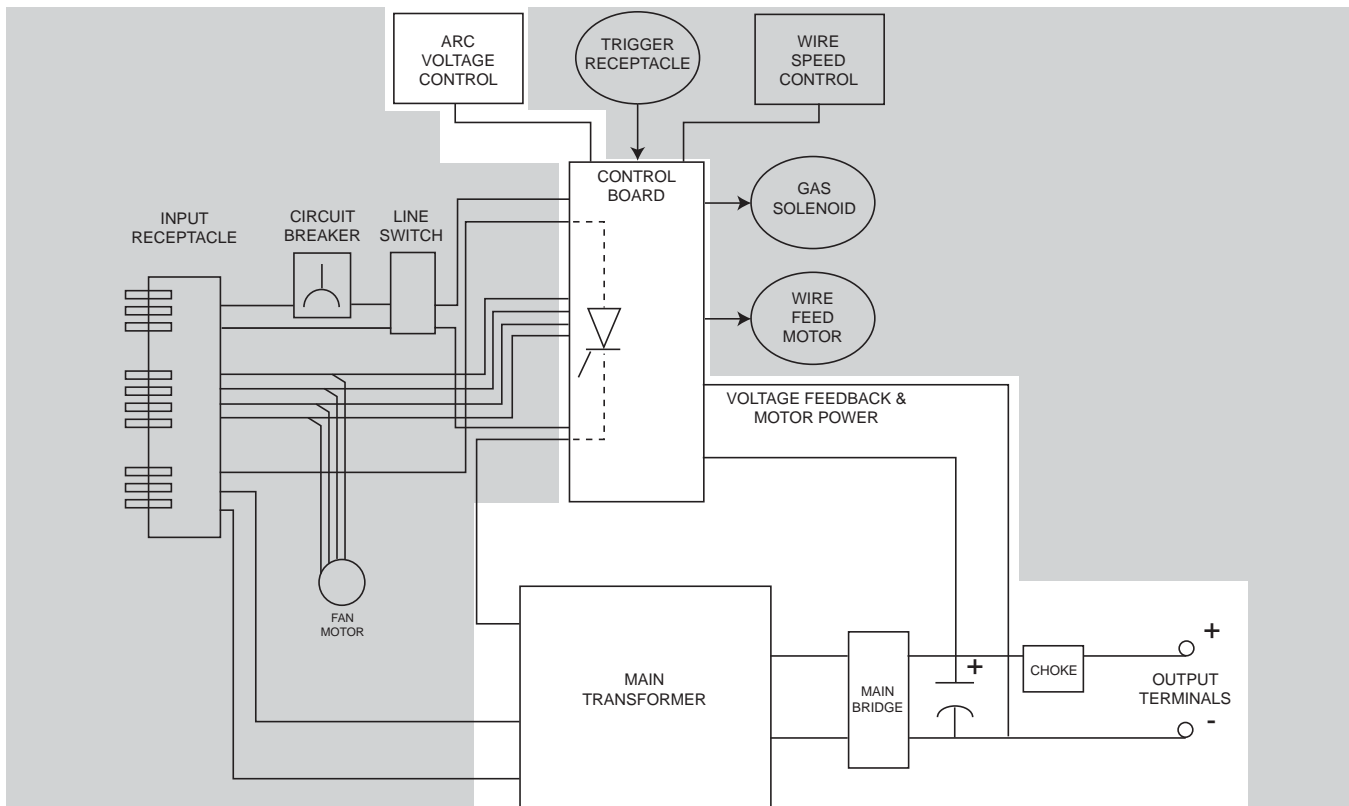
The fan motor should run whenever the machines power switch is turned on.

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

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



OUTPUT CONTROL, RECTIFICATION & VOLTAGE FEEDBACK

The AC voltage that is applied to the main transformer primary is controlled at the control board by two SCRs (Silicon Controlled Rectifiers). The SCRs are controlled by a pulse signal developed on the control board. The control board compares the commands of the arc voltage control with the voltage feedback signal. The Arc Voltage Control may be either a continuous control or a selector switch, depending on the model of the machine.

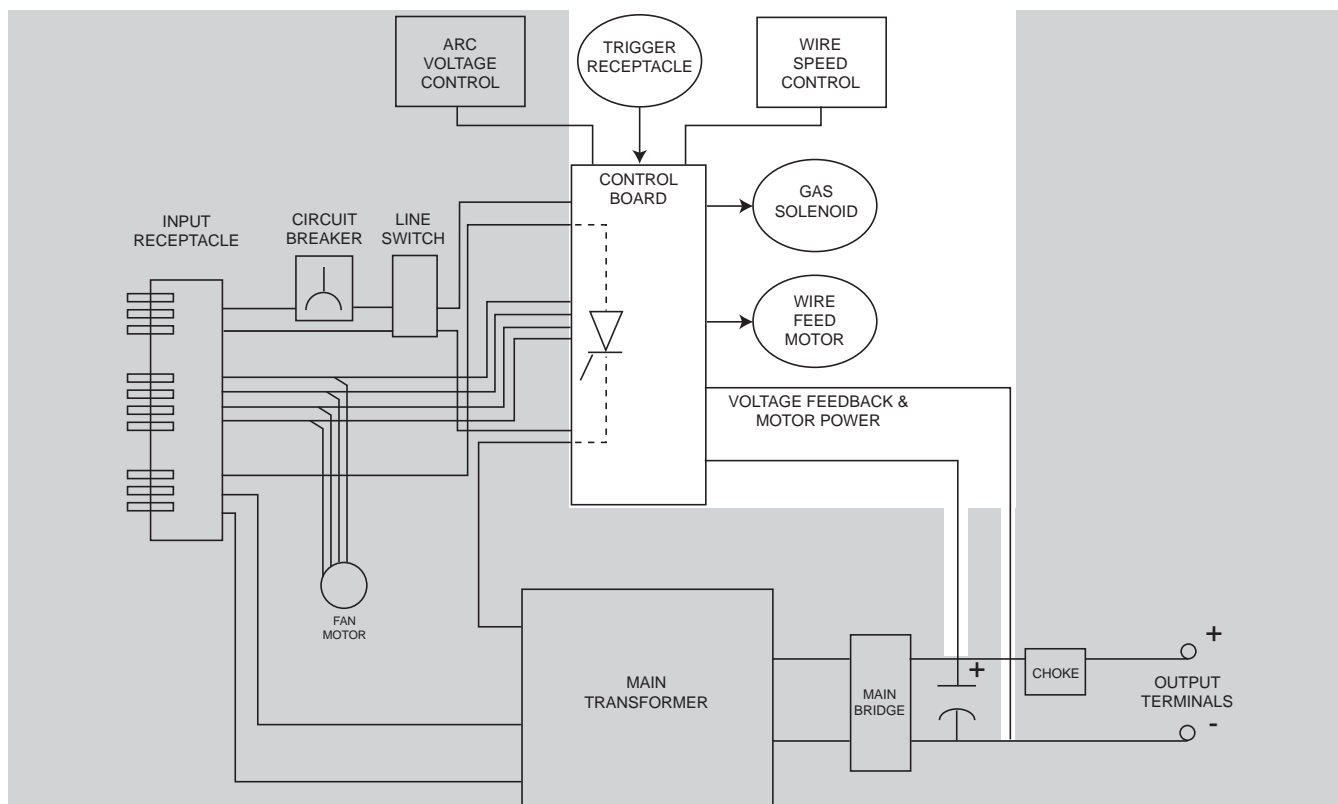
The board circuitry then sends pulses to the SCRs at the appropriate time to maintain the appropriate output. The timing of the pulses changes in response to the changes at the arc. See **SCR Operation**. As a result, the voltage at the primary of the transformer is varied and controlled. This controlled voltage is reflected at the transformer secondary winding and is applied to the rectifier diode bridge. 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

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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. A controlled AC voltage is applied to the transformer primary by way of two SCR's.

Once the DC output voltage is developed (as described previously), it is fed back to the control board to facilitate control of the output and to power the wire feed motor circuitry along with the gas solenoid.

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. It then compares the feedback information with the commands sent from the wire speed control to maintain constant wire speed.

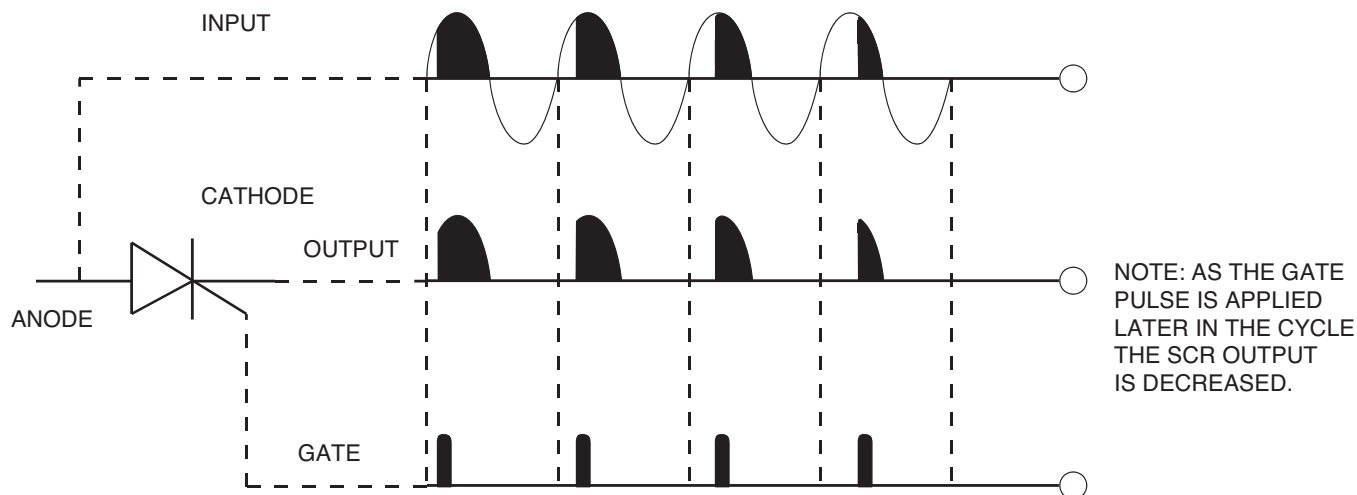
The control board also has an automatic protection circuit, which shuts off the trigger in the event of a wire drive motor overload.

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

POWER MIG® 180 DUAL

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FIGURE E.6 - SCR OPERATION



SCR OPERATION

A silicon controlled rectifier (SCR) is a three terminal device used to control large currents to a load. An SCR acts very much like a switch. When it is turned on, there is current flow from anode to cathode. In the ON state, the SCR acts like a closed switch. When the SCR is turned OFF, there is no current flow from anode to cathode, thus the device acts like an open switch. As the name suggests, the SCR is a rectifier, so it passes current only during positive half cycles of the AC supply. The positive half cycle is the portion of the sine wave in which the anode of the SCR is more positive than the cathode.

When an AC supply voltage is applied to the SCR, the device spends a certain portion of the AC cycle time in the ON state and a remainder of the time in the OFF state. The gate controls the amount of time spent in each state.

An SCR is fired by a short burst of current into the gate. This gate pulse must be more positive than the cathode voltage. Since there is a standard PN junction between gate and cathode, the voltage between these terminals must be slightly greater than 0.6V. Once the SCR has fired, it is not necessary to continue the flow of the gate current. As long as current continues to flow from anode to cathode, the SCR will remain on. When the anode to cathode current drops below a minimum value, called holding current, the SCR will shut off. This normally occurs as the AC voltage passes through zero into the negative portion of the sine wave. If the SCR is turned on early in the positive half cycle, the conduction time is longer, resulting in greater SCR output. If the gate firing occurs later in the cycle, the conduction time is less, resulting in lower SCR output.

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

THERMAL PROTECTION

The Power Mig® 180 Dual Wire Welder has a rated output duty cycle as defined in the **Technical Specifications** 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.

OUTPUT OVERLOAD

The Power Mig® 180 Dual Wire Welder are equipped with a circuit breaker which protects the machine from damage if maximum output is exceeded. The circuit breaker must be manually reset.

ELECTRONIC WIRE DRIVE MOTOR PROTECTION

The Power Mig® 180 Dual Wire Welder has built-in protection on the circuit board in case of wire drive motor overload.

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

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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, 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.

- 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.

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.	<ol style="list-style-type: none"> 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. 4. Check input cord. 	<ol style="list-style-type: none"> 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. Check plug and lead connections between J4 and J2. See Wiring Diagram. 4. Perform the Input Cord Continuity Test. 5. The Control P.C. Board may be faulty.
No weld output, wire feed, gas flow when the trigger is pulled. Fan does run.	<ol style="list-style-type: none"> 1. The thermostat may be open due to machine overheating. If machine operates normally after a cooling off period, check for proper fan ventilation and remove any obstructions. Make certain that the machine's duty cycle is not being exceeded. 2. Gun trigger may be faulty. 3. Check input cord. 	<ol style="list-style-type: none"> 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 6 and 3 on plug J5 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. Check plug and lead connections between J4 and J2. See Wiring Diagram. 6. Perform the Input Cord Continuity Test. 7. The control P.C. board may be faulty.

⚠ 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.

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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 and gas flow but NO fan.	<ol style="list-style-type: none"> 1. Possible faulty fan motor. 2. Possible faulty input cord. 3. Possible faulty control P.C. board. 	<ol style="list-style-type: none"> 1. Perform the Fan Motor Test. 2. Perform the Input Cord Continuity Test. 3. Check plug and lead connections between J4 and J2. See Wiring Diagram.
No wire feed when gun trigger is pulled. Fan runs, gas flows and machine has correct open circuit voltage. (33 VDC maximum) - weld output.	<ol style="list-style-type: none"> 1. Possible bad drive motor. 2. Check position of the spool gun switch. 3. Possible bad control P.C. board. 4. If the wire drive motor is running, make sure that the correct drive roll and wire guide is installed in the machine. 5. Check for clogged cable liner or contact tip. 6. Check for proper size cable liner and contact tip. 	<ol style="list-style-type: none"> 1. Perform the Wire Drive Test. 2. If 2 - 12 VDC is not at the drive motor check for OCV at the board on pins 1 and 10 on J3. If OCV is present, possible faulty control P.C. board. Replace. If OCV is not present, check continuity of wires CAP- and CAP+. See Wiring 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.

POWER MIG® 180 DUAL



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.	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Possible faulty drive motor. 2. Possible faulty control board. 	<ol style="list-style-type: none"> 1. Remove main supply power to the machine. Disconnect plug J3 from the control board. Test the resistance from lead MOT- in the harness plug to the wire feed motor case. If resistance is below 500,000 ohms, replace the drive motor. 2. If no voltage charge is seen on MOTA1 and MOT- when turning wire speed potentiometer, 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.

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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.	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Check for 10 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.	<ol style="list-style-type: none"> 1. Check gas supply, flow regulator and gas hoses. 2. Check gun connection to machine for obstruction or leaky seals. 	<ol style="list-style-type: none"> 1. Perform the Gas Solenoid Test. 2. 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.

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Return to Master 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.	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. Contact Lincoln Electric Service Department for possible motor replacement. 10. See Troubleshooting section in welding machine's instruction manual. 11. Replace contact tip with one that is the right size.
Sluggish wire feed when the spool gun trigger is pulled.	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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.

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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.	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Improper welding parameters or technique. (Example: CTWD (Contact Tip to Work Distance) is incorrect. 2. Wire may be feeding intermittently. 	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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.

POWER MIG® 180 DUAL



Observe Safety Guidelines detailed in the beginning of this manual.

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
SPOOL GUN PROBLEMS		
<p>Low or no shielding gas flow.</p>	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. Gently blow out debris from core tube. 5. Attempt to straighten out cable, or replace cable. See Maintenance section. 6. Clean or replace gas cone or gas diffuser. 7. Find and repair all leaks. 8. Replace liner assembly. See Maintenance section. 9. Damaged o-rings: replace both seals. Gun connector not fully inserted into machine. See Installation section.
<p>Spool gun runs or begins feeding wire without pulling the gun trigger.</p>	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Replace trigger. See Maintenance section. 2. 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.

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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

NOTE: These instructions are the same for several groups of machines. As a result, the pictures of the case may look different than the machine you are repairing.

Return to Section TOC

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Return to Master TOC

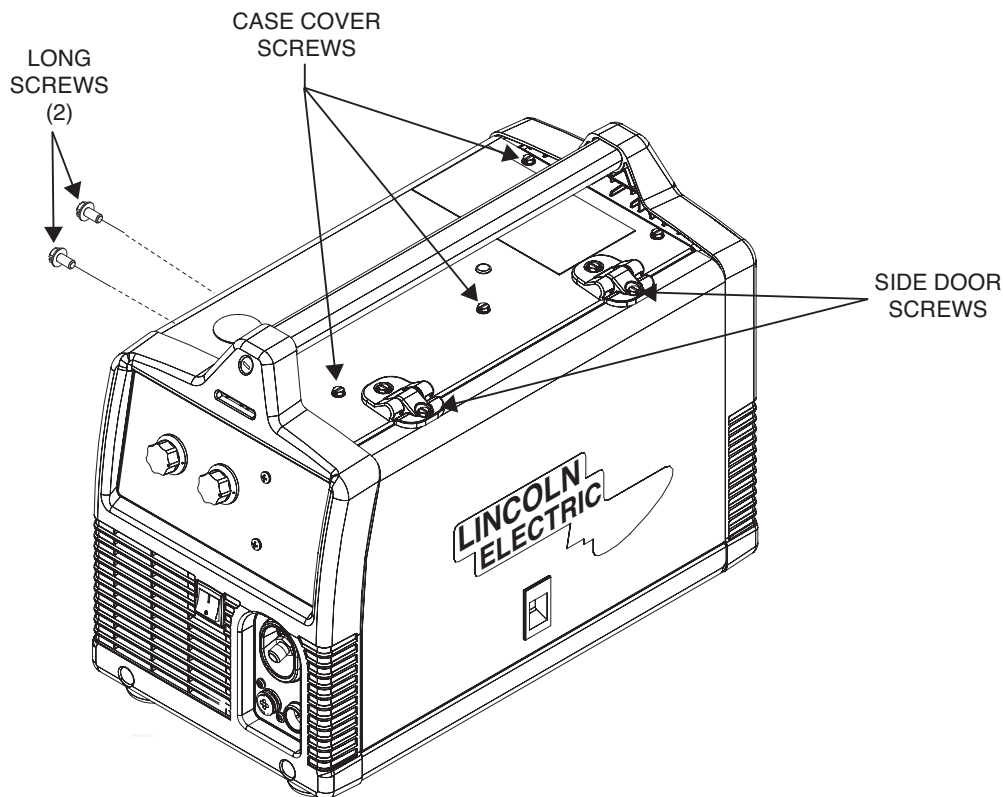
Return to Master TOC

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Return to Master TOC

CASE COVER REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.1 – CASE REMOVAL



REMOVAL PROCEDURE

⚠ WARNING



ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

3. Using a 5/16" nutdriver, remove the ten screws securing the case cover. Note the position of the two longer screws. See Figure F.1.
4. Carefully lift and remove case cover from the machine.

1. Disconnect input power to the Power Mig® 180 Dual machine.
2. Using a 5/16" nutdriver, remove the two screws securing the door. See Figure F.1.

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CASE COVER REMOVAL AND REPLACEMENT PROCEDURE (continued)

REPLACEMENT PROCEDURE

1. Carefully place the case cover into position on the machine.
2. Using a 5/16" nutdriver, attach the ten screws securing the case cover. Note the position of the two longer screws. See **Figure F.1**.
3. Using a 5/16" nutdriver, attach the two screws securing the door. See **Figure F.1**.

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Return to Section TOC Return to Section TOC Return to Section TOC
Return to Master TOC Return to Master 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 troubleshooting 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 is functional.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

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Return to Section TOC

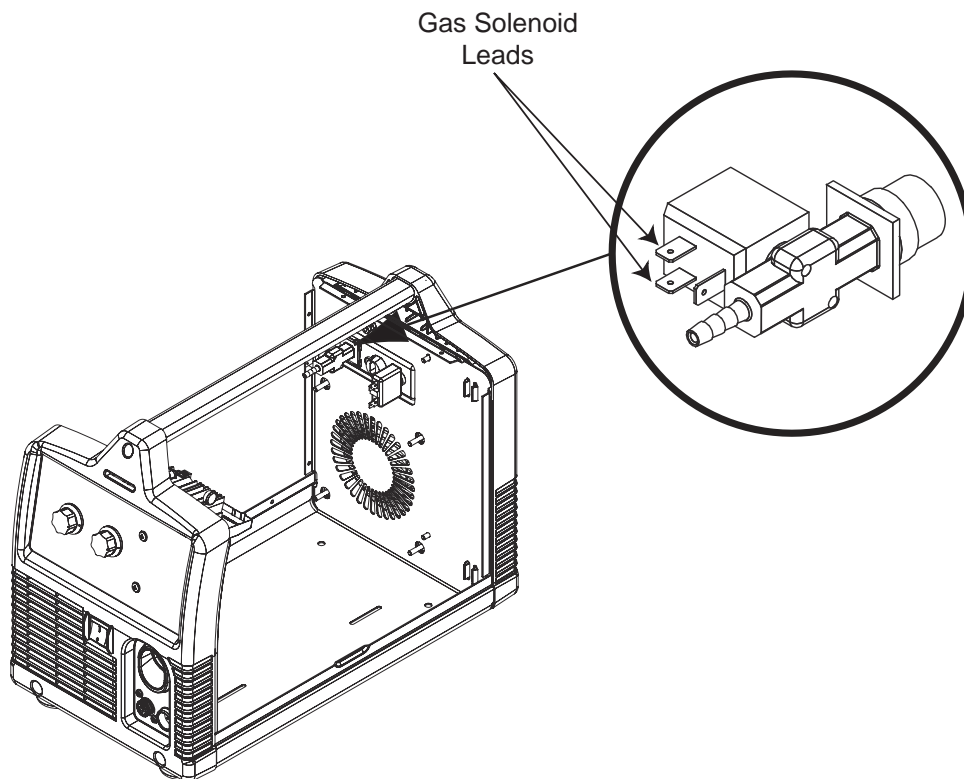
Return to Master TOC

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Return to Master TOC

GAS SOLENOID TEST (continued)

FIGURE F.2 – GAS SOLENOID LOCATION & LEADS



PROCEDURE

 **WARNING**


ELECTRIC SHOCK can kill.

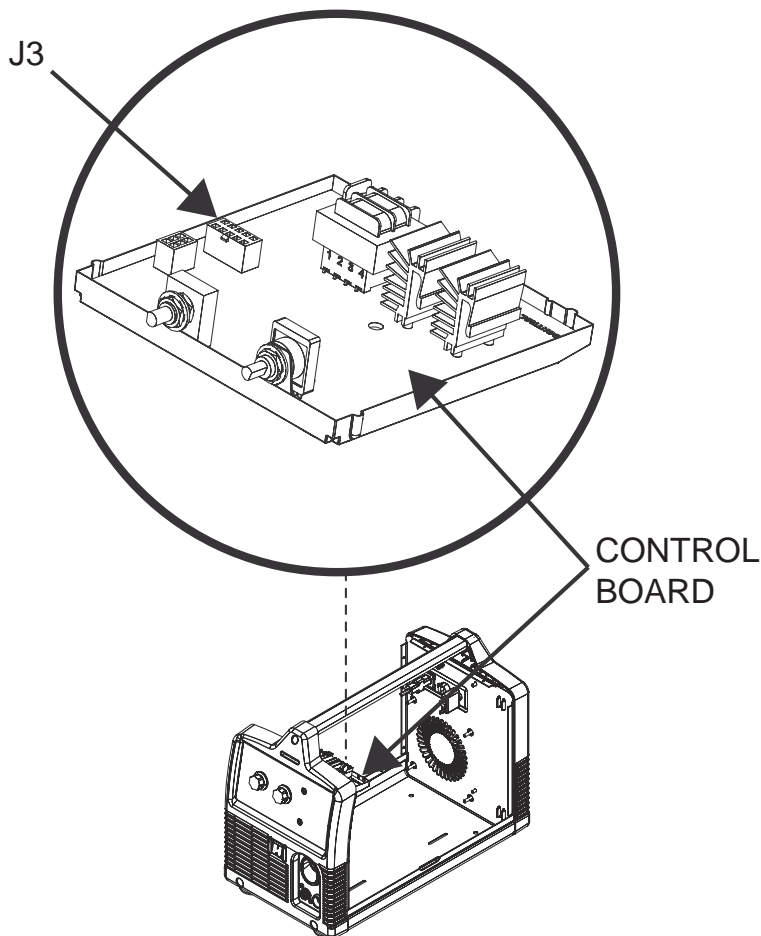
- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

1. Disconnect input power to the Power Mig® 180 Dual 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.
5. There should be approximately 6.5 VDC at the solenoid.
6. If the 6.5 VDC is missing or low, check the leads and connections between the solenoid and the control board. See Wiring Diagram.
7. If the leads and connections are good to the board, verify the correct supply voltage 9-33 VDC at pins 1 and 10 at P3 on the control board. Plug P3 is inserted into J3 on the control board. See **Figure F.3** and See **Figure F.4**. See Wiring Diagram.

GAS SOLENOID TEST (continued)

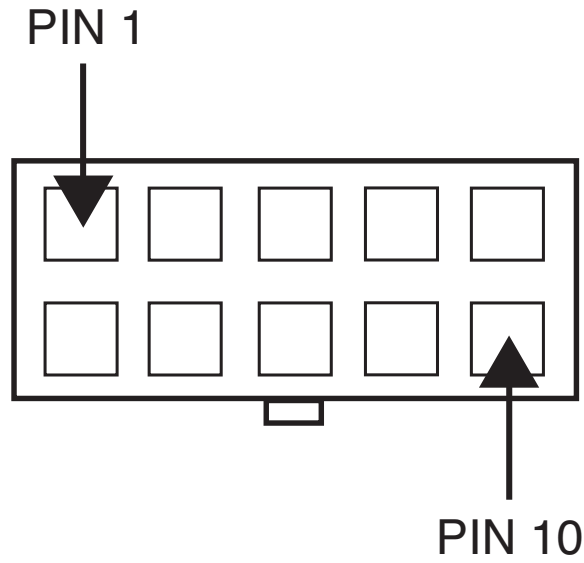
FIGURE F.3 – CONTROL BOARD LEAD LOCATIONS



8. If voltage is correct at P3, the control board may be faulty.
9. If faulty, perform the **Control P.C. Board Removal and Replacement Procedure**.
10. If the 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 22 ohms.
11. 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.
12. If faulty, perform the **Gas Solenoid Removal and Replacement Procedure**.
13. Replace all previously removed leads.
14. Perform the **Case Cover Replacement Procedure**.
15. Perform the **Retest After Repair**.

GAS SOLENOID TEST (continued)

FIGURE F.4 – PLUG P3 PIN LOCATIONS



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

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.

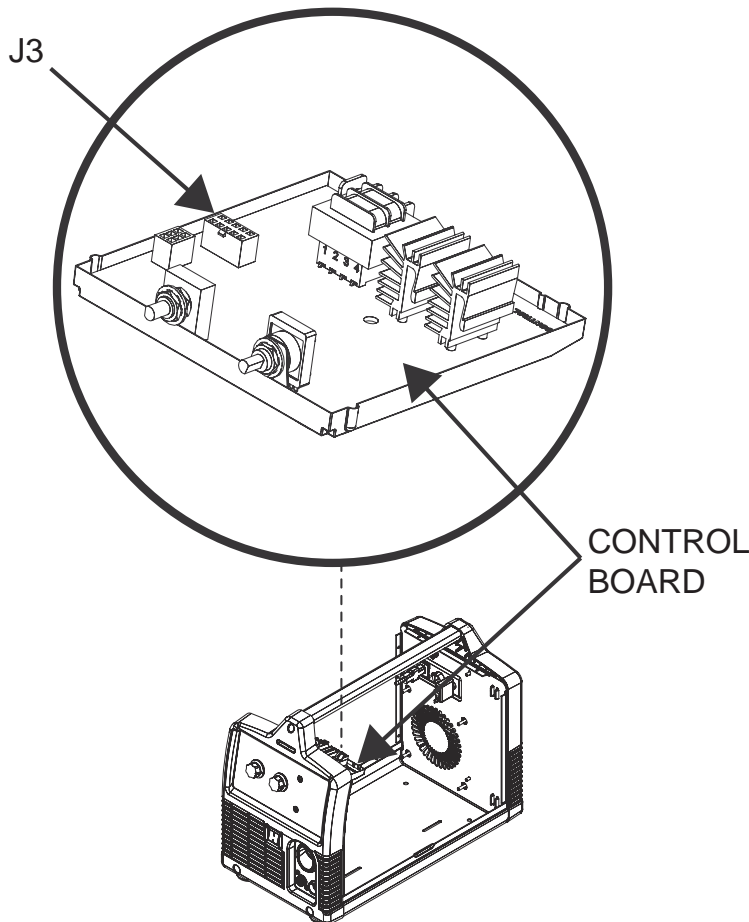
MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

NOTE: These instructions are the same for several groups of machines. As a result, the pictures of the case may look different than the machine you are repairing.

WIRE DRIVE MOTOR TEST (continued)

FIGURE F.5 – CONTROL BOARD AND J3 LOCATION



PROCEDURE


WARNING

ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

2. Perform the *Case Cover Removal Procedure*.
3. Locate plug P3 on the wiring harness. Plug P3 is inserted into J3 on the control board. See Figure F.5. See Wiring Diagram.
4. Locate the MOTA1 and MOT- armature leads on Plug P3. See *Figure F.6*. See Wiring Diagram.

NOTE: Polarity must be observed for these test.

Test for correct wire drive motor armature voltage.

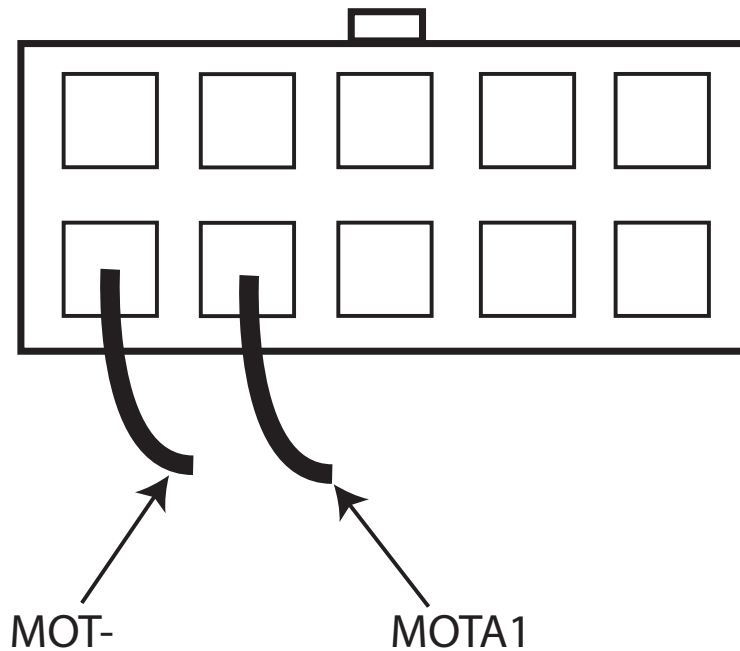
1. Disconnect input power to the Power Mig® 180 Dual machine.

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WIRE DRIVE MOTOR TEST (continued)

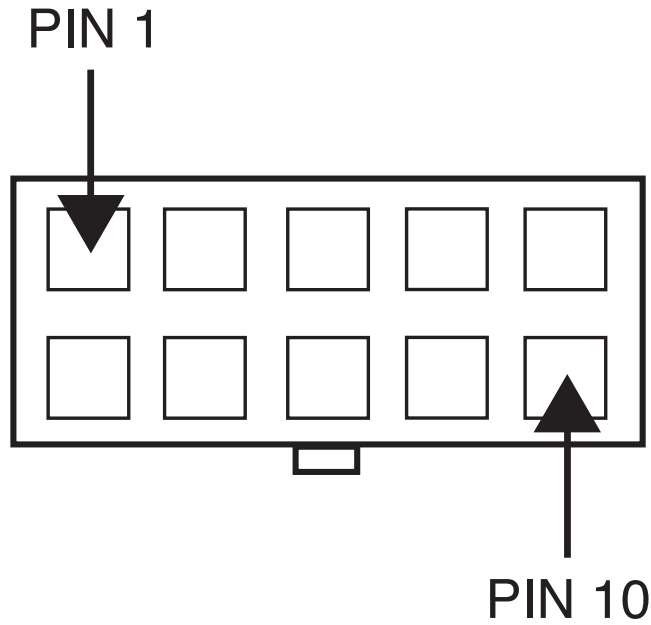
FIGURE F.6 – PLUG P3



5. Make the following voltage tests:
 - a. Turn the machine OFF between each test.
 - b. Carefully insert the meter probes into the lead side of plug P3. See Figure F.6.
 - c. Turn the machine ON and pull the gun trigger to conduct the voltage test.
- | FROM LEAD | TO LEAD | |
|-----------|---------|--------------|
| MOTA1 | MOT- | 1.5-12.5 VDC |
6. If the voltage to the wire drive motor armature is zero, check the wires between plug P8 and the wire drive motor.
 7. If the leads and connections are good to the board, verify the correct supply voltage 9-33 VDC at pins 1 and 10 at P3 on the control board. See **Figure F.7**. See Wiring Diagram.
 8. If voltage is correct at P3, the control board may be faulty.
 9. If faulty, perform the **Control P.C. Board Removal and Replacement Procedure**.

WIRE DRIVE MOTOR TEST (continued)

FIGURE F.7 – PLUG P3 PIN LOCATIONS



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

MAIN TRANSFORMER TEST 230 AND 120 VOLTS**⚠ 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

Volt/Ohmmeter
Wiring Diagram

MAIN TRANSFORMER TEST 230 AND 120 VOLTS (continued)

120 VOLT TEST PROCEDURE



ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

1. Disconnect input power to the Power Mig® 180 Dual machine.
2. Perform the **Case Cover Removal Procedure**.
3. Locate H1 and H2 on the control board terminal strips. See Wiring Diagram.
4. Place the voltage control to maximum.
5. Turn machine on and close trigger switch.

NOTE: Turn the machine OFF between each test.

6. The input voltage should be 120VAC at H1 and H2 on the terminal strips.
7. If the voltage at H1 and H2 is not correct check for correct input voltage at 1 and 6 on the terminal strips.
8. If the correct voltage is being applied at 1 and 6 and is not at H1 and H2, check the leads between J4 and J1. See Wiring Diagram.
9. If the leads and connections between J4 and J1 check out fine, check continuity of the 120 VAC input cord. See **Input Cord Continuity Test**.
10. If continuity of the 120 VAC input cord is good, the control board may be faulty.

SECONDARY TEST PROCEDURE

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

1. Locate X1 and X2. See Wiring Diagram. See **Figure F.8**.
2. Isolate the two secondary leads located in the rectifier. Turn the machine on and close the gun trigger.
3. There should be about 21VAC at X1 and X2.
4. If any of the voltages are incorrect or missing, check for loose or broken connections. The transformer may be faulty.

MAIN TRANSFORMER TEST 230 AND 120 VOLTS (continued)

230 VOLT TEST PROCEDURE

WARNING



ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

1. Disconnect input power to the Power Mig® 180 Dual machine.
2. Perform the **Case Cover Removal Procedure**.
3. Locate H1 and H2 on the control board terminal strips. See Wiring Diagram.
4. Place the voltage control to maximum.
5. Turn machine on and close trigger switch.

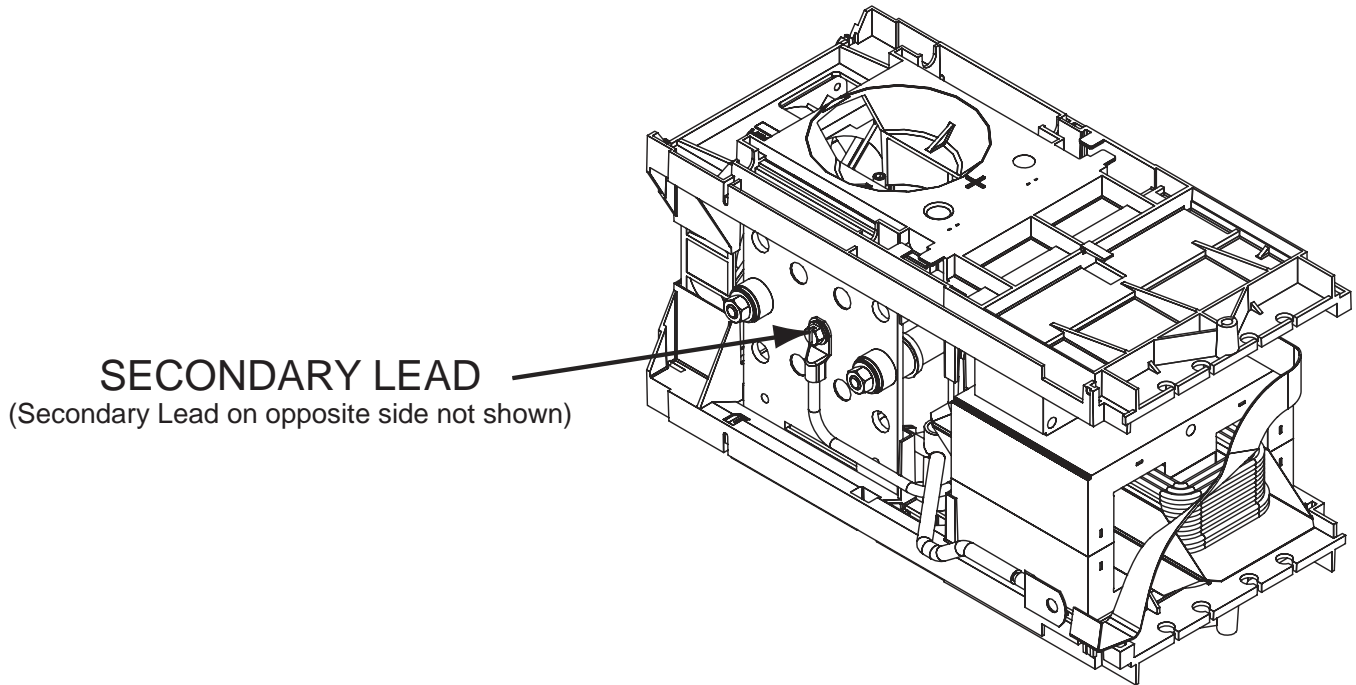
NOTE: Turn the machine OFF between each test.

6. The input voltage should be 230VAC at H1 and H2 on the terminal strips.
7. If the voltage at H1 and H2 is not correct check for correct input voltage at 1 and 6 on the terminal strips.
8. If the correct voltage is being applied at 1 and 6 and is not at H1 and H2, check the leads between J4 and J1. See Wiring Diagram.
9. If the leads and connections between J4 and J1 check out fine, check continuity of the 230 VAC input cord. See **Input Cord Continuity Test**.
10. If continuity of the 230 VAC input cord is good, the control board may be faulty.

SECONDARY TEST PROCEDURE

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

1. Locate X1 and X2. See Wiring Diagram. See **Figure F.8**.
2. Isolate the two secondary leads located in the rectifier. Turn the machine on and close the gun trigger.
3. There should be about 25VAC at X1 and X2 (slightly less with 208VAC input).
4. If any of the voltages are incorrect or missing, check for loose or broken connections. The transformer may be faulty.

MAIN TRANSFORMER TEST 230 AND 120 VOLTS (continued)**FIGURE F.8 – SECONDARY LEAD LOCATION**

FAN MOTOR TEST 230 AND 120 VOLT

⚠ 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

Volt/Ohmmeter
Wiring Diagram

Return to Section TOC

Return to Master TOC

Return to Section TOC

Return to Master TOC

Return to Section TOC

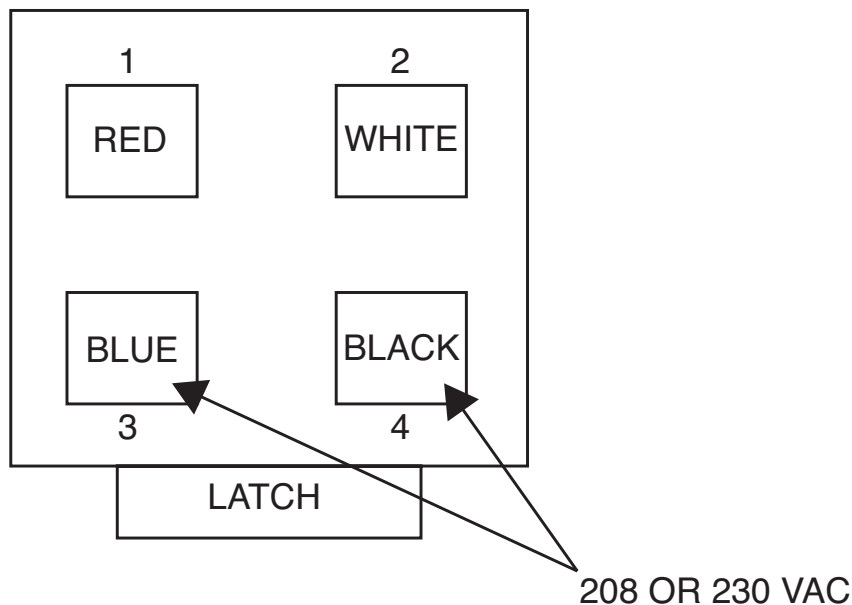
Return to Master TOC

Return to Section TOC

Return to Master TOC

FAN MOTOR TEST 230 AND 120 VOLT (continued)

FIGURE F.9 – PLUG P1



230 VOLT TEST PROCEDURE


WARNING

ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

1. Disconnect input power to the Power Mig® 180 Dual machine.
2. Perform the **Case Cover Removal Procedure**.
3. Locate plug P1. See Wiring Diagram. See Figure F.9.

4. Turn machine ON to conduct voltage test.

NOTE: Turn the machine OFF between each test.

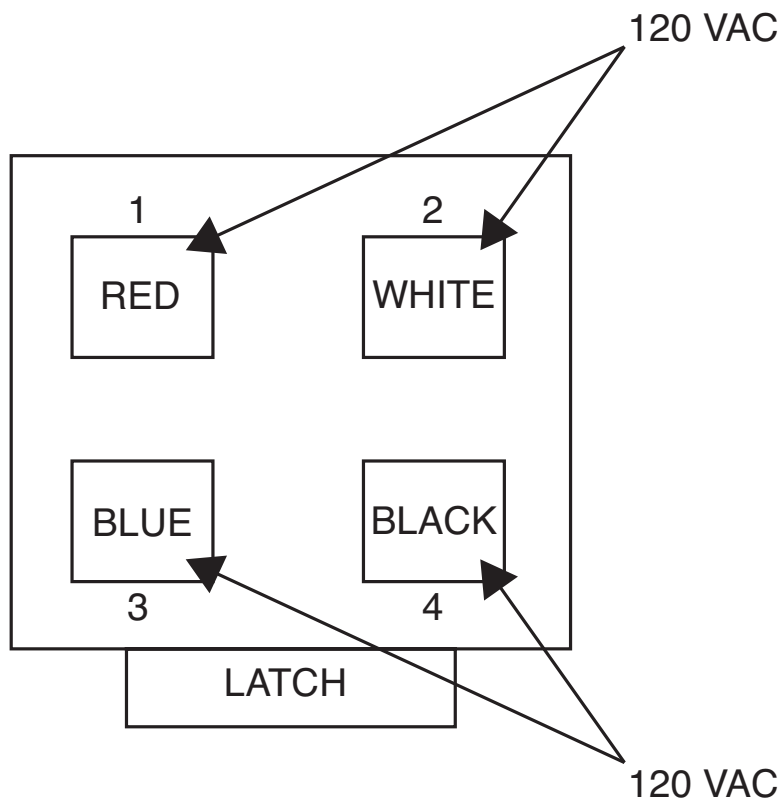
5. The voltage at pins 3 and 4 should be the same as the input voltage (230 or 208). See Wiring Diagram. See Figure F.9.
6. If the correct voltage is not there, check for input voltage at leads 703 and 704 on P4. See Wiring Diagram.
7. If correct voltage is not there, check the plug and leads between P4 and J2. See Wiring Diagram.
8. If plugs and leads between P4 and J2 are good, check continuity of the 230 volt input cable. See **Input Cord Continuity Test**.
9. If the correct voltages are at the fan motor, the motor may be faulty.

POWER MIG® 180 DUAL



FAN MOTOR TEST 230 AND 120 VOLT (continued)

FIGURE F.10 – PLUG P1



120 VOLT TEST PROCEDURE


WARNING


ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

1. Disconnect input power to the Power Mig® 180 Dual machine.
2. Perform the **Case Cover Removal Procedure**.
3. Locate plug P1. See Wiring Diagram. See Figure F.10.

4. Turn machine ON to conduct voltage test.

NOTE: Turn the machine OFF between each test.

5. When using this machine with 120 VAC, the coils of the transformer are in parallel so you will see 120 VAC at pins 1 and 2 of P1 and you will also see 120 VAC on pins 3 and 4 on P1. See Wiring Diagram. See Figure F.10.
6. If correct voltage is not there, check for input voltage at leads 703 and 704 and on leads 701 and 702 on P4. See Wiring Diagram.
7. If correct voltage is not there, check the plug and leads between P4 and J2. See Wiring Diagram.
8. If plugs and leads between P4 and J2 are good, check continuity of the 120 volt input cable. See **Input Cord Continuity Test**.
9. If the correct voltages are at the fan motor, the motor may be faulty.

POWER MIG® 180 DUAL



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

INPUT CORD CONTINUITY TEST 120 AND 230 VOLT**⚠ 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 Input Cords are configured correctly.

MATERIALS NEEDED

Ohmmeter
Wiring Diagram

Return to Section TOC

Return to Section TOC

Return to Section TOC

Return to Section TOC

Return to Master TOC

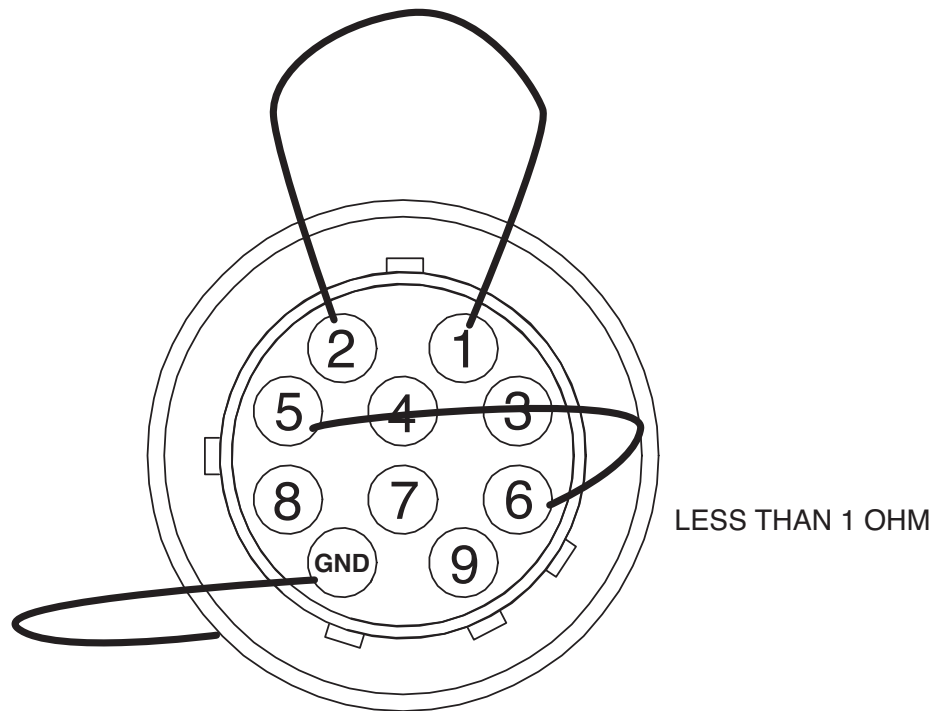
Return to Master TOC

Return to Master TOC

Return to Master TOC

INPUT CORD CONTINUITY TEST 120 AND 230 VOLT (continued)

FIGURE F.11 – INPUT CORD CONNECTOR 230 VOLT



230 VOLT TEST PROCEDURE

 **WARNING**


ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

1. Disconnect input power to the Power Mig® 180 Dual machine.
2. Remove the input cord from the rear of the Power Mig® 180 Dual machine.

NOTE: Turn the machine OFF between each test.

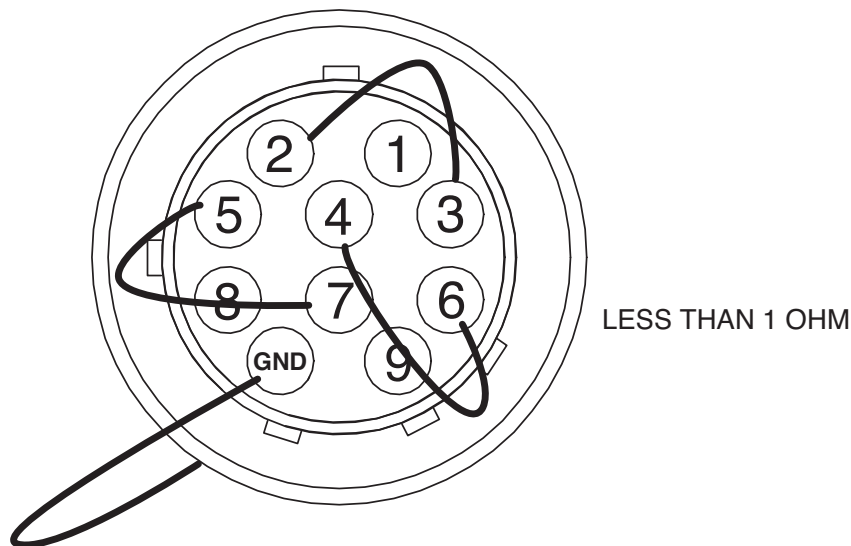
3. There should be less than 1 Ohm at the following test points: See Figure F.11.
 - A. Pins 1 and 2
 - B. Pins 5 and 6
 - C. GND and the shell of the connector

POWER MIG® 180 DUAL



INPUT CORD CONTINUITY TEST 120 AND 230 VOLT (continued)

FIGURE F.12 – INPUT CORD CONNECTOR 120 VOLT



120 VOLT TEST PROCEDURE

 **WARNING**


ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

1. Disconnect input power to the Power Mig® 180 Dual machine.
2. Remove the input cord from the rear of the Power Mig® 180 Dual machine.

NOTE: Turn the machine OFF between each test.

3. There should be less than 1 Ohm at the following test points: See Figure F.12.
 - A. Pins 2 and 3
 - B. Pins 4 and 6
 - C. Pins 5 and 7
 - D. GND and the shell of the connector

TYPICAL OUTPUT VOLTAGE WAVEFORM - MACHINE LOADED

Return to Section TOC

Return to Section TOC

Return to Section TOC

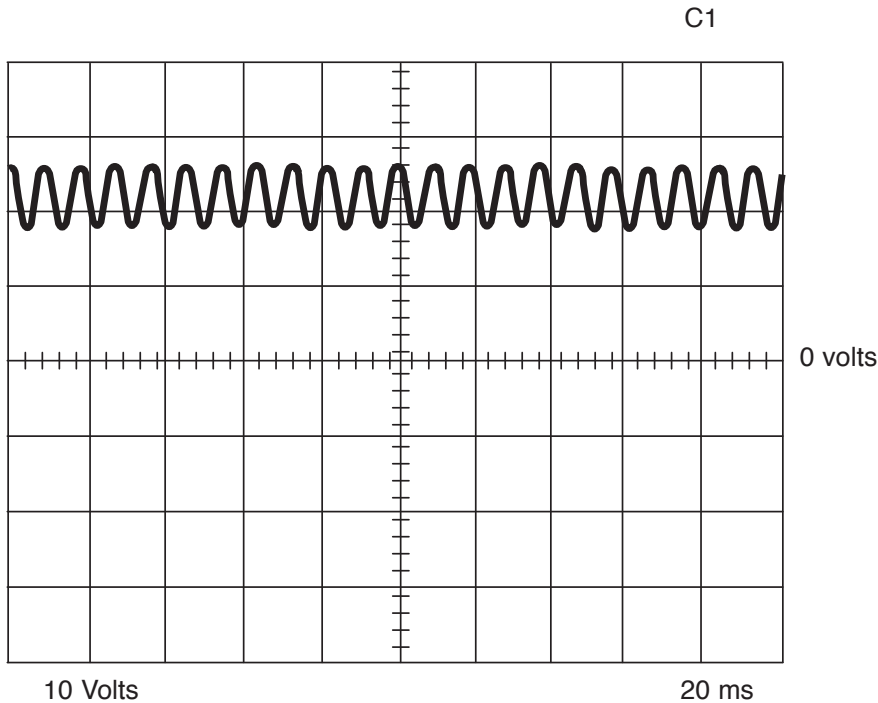
Return to Section TOC

Return to Master TOC

Return to Master TOC

Return to Master TOC

Return to Master TOC



This is the typical auxiliary output voltage generated from a properly operating machine. Note that each vertical division represents 10 volts and that each horizontal division represents 20 milliseconds in time. The machine was loaded with a resistance grid bank.

Note: Scope probes connected at 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

POWER MIG® 180 DUAL



TROUBLESHOOTING AND REPAIR

ABNORMAL OPEN CIRCUIT VOLTAGE WAVEFORM

Return to Section TOC

Return to Master TOC

Return to Section TOC

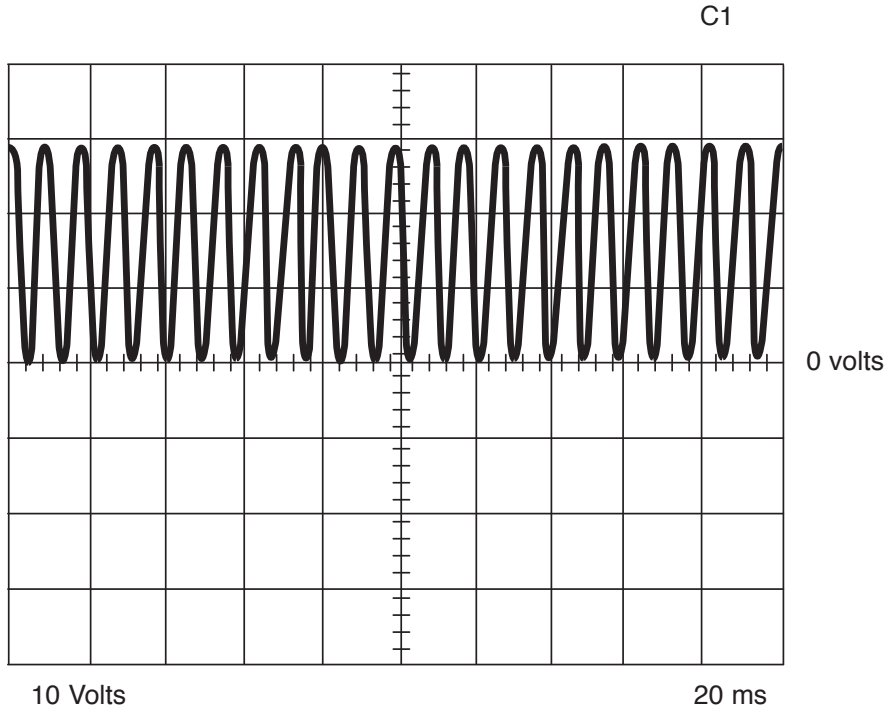
Return to Master TOC

Return to Section TOC

Return to Master TOC

Return to Section TOC

Return to Master TOC



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

POWER MIG® 180 DUAL



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

- 5/64" Allen Key
- 1/2" Nutdriver
- Phillips Screwdriver
- Wiring Diagram

NOTE: These instructions are the same for several groups of machines. As a result, the pictures of the case may look different than the machine you are repairing.

Return to Section TOC

Return to Section TOC

Return to Section TOC

Return to Section TOC

Return to Master TOC

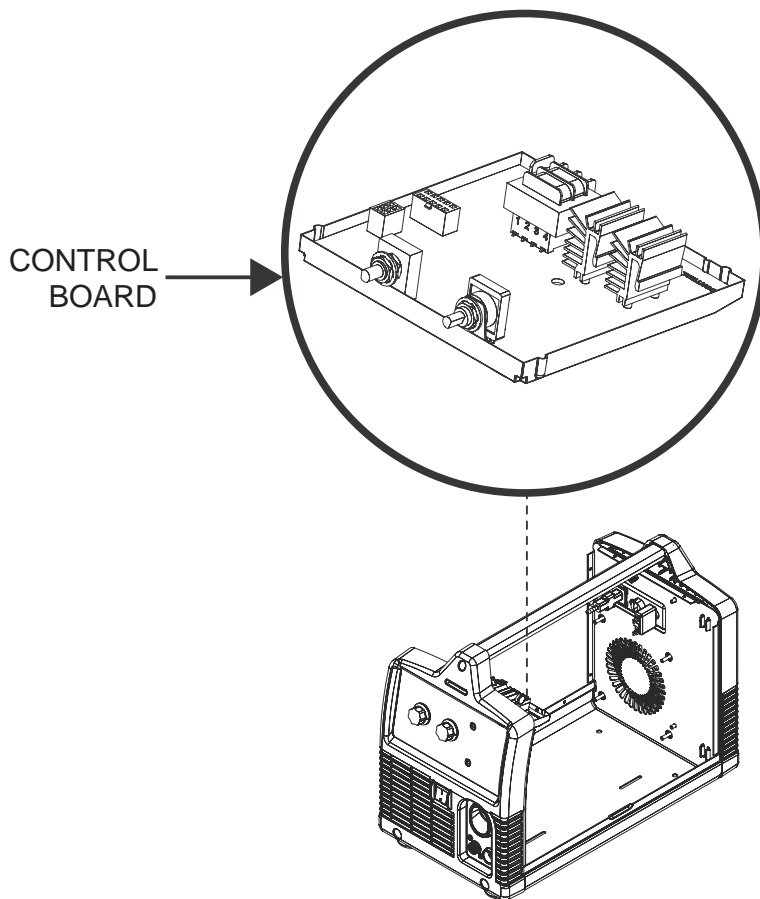
Return to Master TOC

Return to Master TOC

Return to Master TOC

CONTROL BOARD REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.13 – CONTROL BOARD LOCATION



REMOVAL PROCEDURE

WARNING



ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

4. Using a 5/64" allen key, loosen the set screws from the voltage and wire speed knobs. See *Figure F.14*.
5. Using a 1/2" nutdriver, remove the two nuts and washers. See *Figure F.14*.
6. Using a phillips screwdriver, remove the two phillips screws from the nameplate of the machine. See *Figure F.14*.
7. Using a phillips screwdriver, remove the screw securing the handle to the front panel. See *Figure F.14*.
8. Gently pull the case front forward about an inch to gain access to the control board.

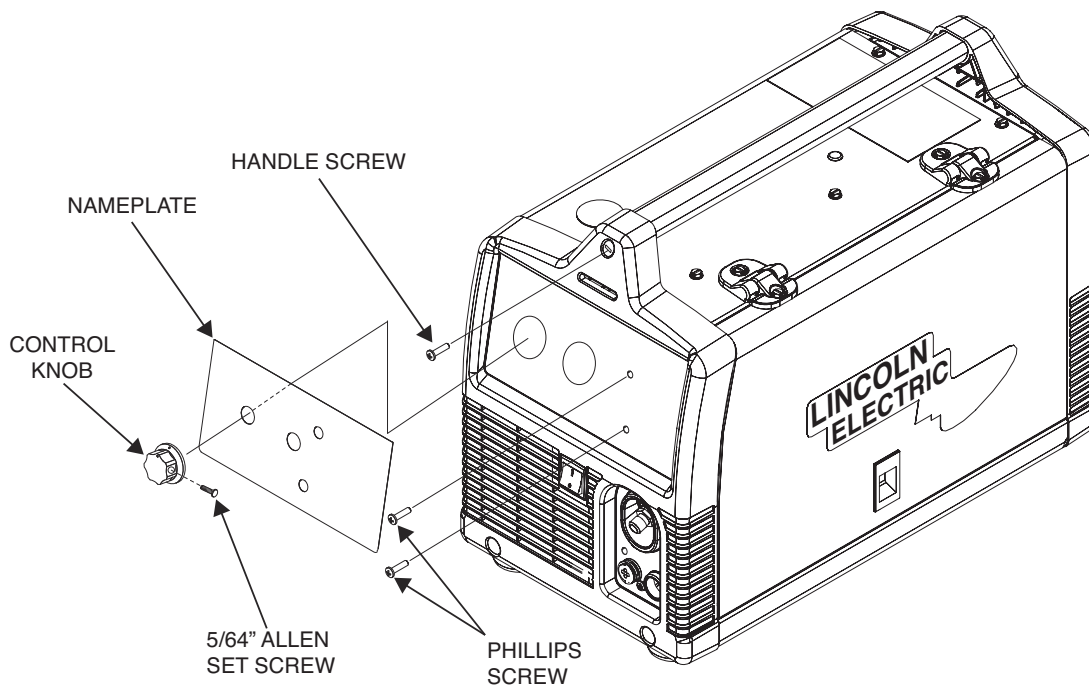
1. Disconnect input power to the Power Mig® 180 Dual machine.
2. Perform the **Case Cover Removal Procedure**.
3. Locate the Control Board. See Figure F.13.

POWER MIG® 180 DUAL



CONTROL BOARD REMOVAL AND REPLACEMENT PROCEDURE (continued)

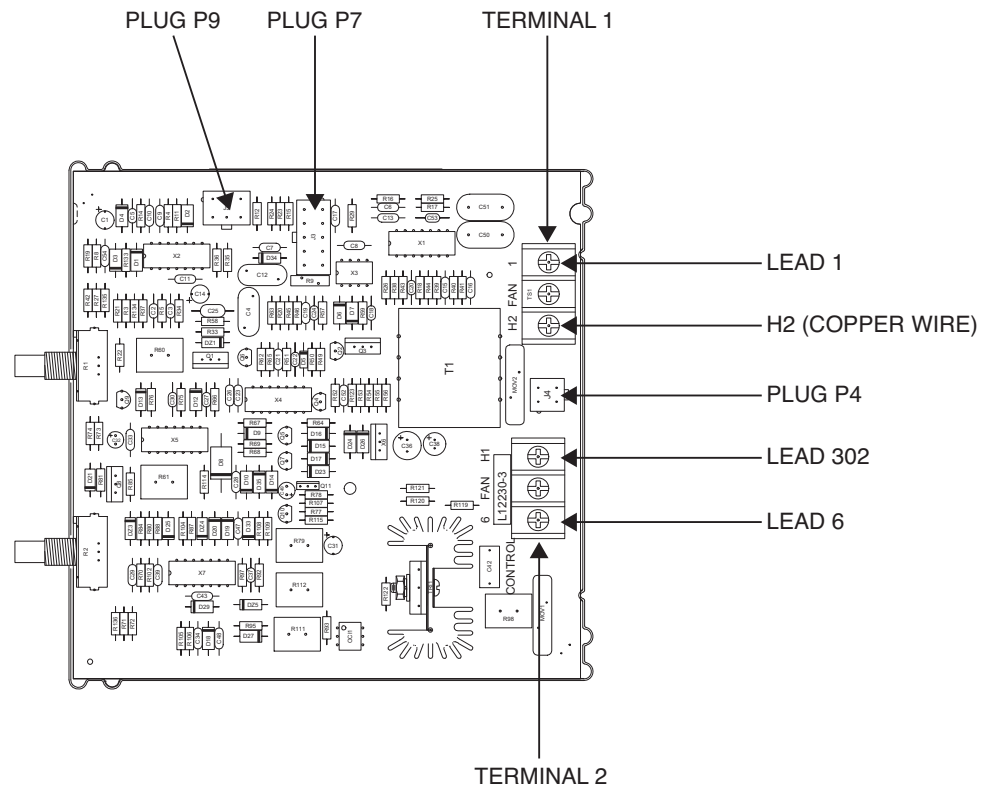
FIGURE F.14 – SCREW AND NUT LOCATIONS



9. Label and disconnect plugs P4, P7 and P9 from the control board. See **Figure F.15**. See Wiring Diagram.
10. Label and disconnect lead 1 and H2 (cooper wire) from terminal 1. See **Figure F.15**. See Wiring Diagram.
11. Label and disconnect lead 6 and lead 302 from terminal 2. See **Figure F.15**. See Wiring Diagram.
12. Remove the control board.

CONTROL BOARD REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.15 – CONTROL BOARD LEAD LOCATIONS



REPLACEMENT PROCEDURE

1. Carefully place the new control board into position.
2. Connect leads 6 and 302 previously removed to terminal 2. See Figure F.15. See Wiring Diagram.
3. Connect lead 1 and H2 (copper wire) previously removed to terminal 1. See Figure F.15. See Wiring Diagram.
4. Connect all previously removed plugs (P4, P7 and P9) to the control board. See Figure F.15. See Wiring Diagram.
5. Using a phillips screwdriver, attach the handle to the front panel. See **Figure F.14**.
6. Using a phillips screwdriver, attach the two screws securing the front panel. See **Figure F.14**.
7. Using a 1/2" nutdriver, attach the two nuts and washers previously removed. See **Figure F.14**.
8. Using a 5/64" nutdriver, tighten the set screws securing the voltage and wire speed knobs previously removed. See **Figure F.14**.
9. Perform the **Case Cover Replacement Procedure**.
10. Perform the **Retest After Repair Procedure**.

POWER MODULE 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

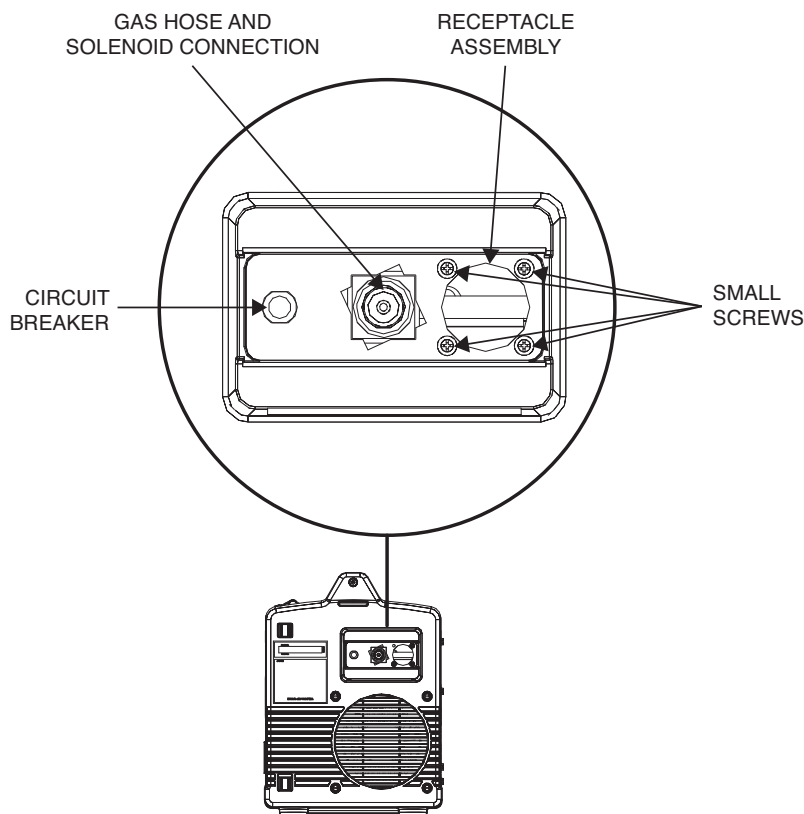
This procedure will aid the technician in the removal and replacement of the Power Module Assembly.

MATERIALS NEEDED

- Phillips Screwdriver
- Slotted Screwdriver
- Hammer
- 5/16" Nutdriver
- Wiring Diagram

POWER MODULE REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.16 – REAR PANEL CONNECTION



REMOVAL PROCEDURE

⚠ WARNING



ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

1. Disconnect input power to the Power Mig® 180 Dual machine.
2. Perform the **Case Cover Removal Procedure**.
3. Perform the **Control Board Removal Procedure**.

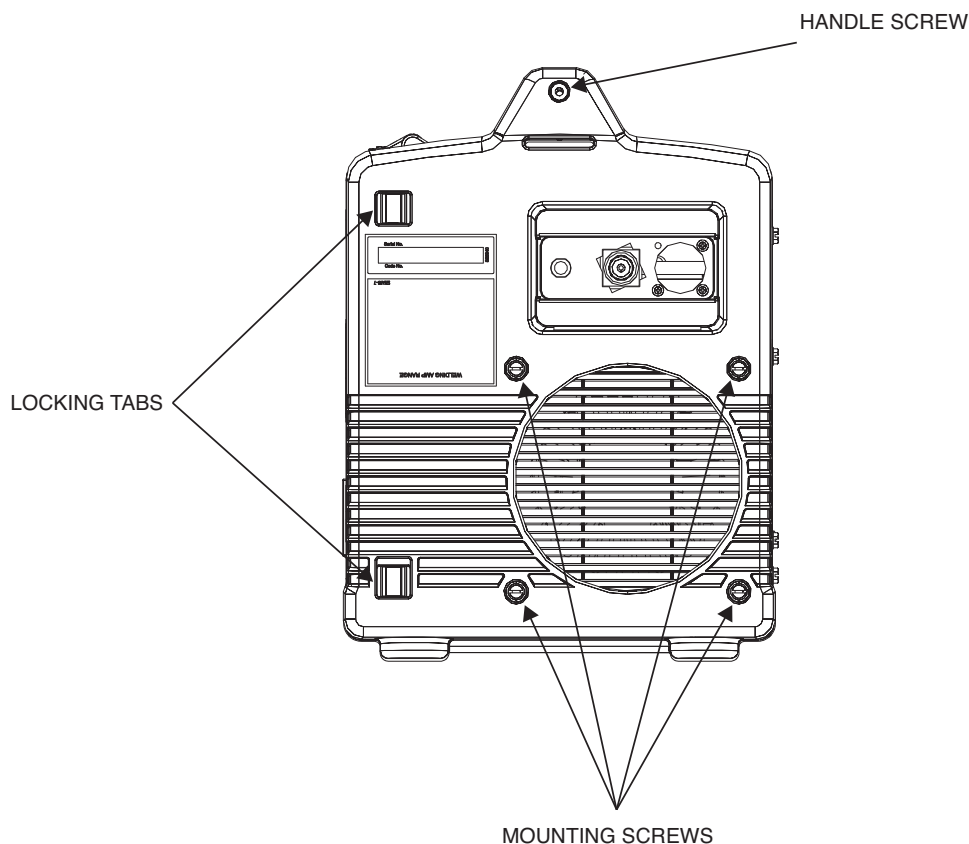
4. Using a 3/8" nutdriver, disconnect the two ground leads attached to the rear panel. See Wiring Diagram. Note washer placement for reassembly.
5. Using a phillips screwdriver, remove the four small screws securing the receptacle assembly. See Figure F.16.
6. Using a 9/16" nutdriver, remove the nut and washer securing the circuit breaker. See Figure F.16.
7. Using a slotted screwdriver and hammer, loosen and remove the lock washer and flat washer securing the gas hose and solenoid assembly. See Figure F.16.
8. Using a phillips screwdriver, remove the two screws securing the handle to the front and rear panels. See **Figure F.17**.

POWER MIG® 180 DUAL



POWER MODULE REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.17 – CASE BACK MOUNTING SCREWS



9. Using a 5/16" nutdriver, remove the four mounting screws securing the rear panel of the machine. See Figure F.17.
10. Using pliers, depress the two locking tabs to remove the case back panel. See Figure F.17.
11. Using a phillips screwdriver, remove the two screws securing the square flange female receptacle to the front cover. See **Figure F.18**.
12. Using a 5/16" nutdriver, remove the three screws from the center panel on the right side of the machine. See **Figure F.19**.
13. Using a 5/16" nutdriver, remove the two screws under the case back panel securing the center panel.
14. Label and disconnect the four leads (MOTB, MOTA2, MOTA1 and 543A) from the switch. The switch is attached to the center panel. See **Figure F.20**. See Wiring Diagram.
15. Note position and remove wing nuts and lead on the polarity panel from the choke and rectifier. See **Figure F.21**. See Wiring Diagram.
16. The power module may now be removed from the machine as a single unit.

POWER MODULE
REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.18 – SQUARE FLANGE FEMALE RECEPTACLE LOCATION

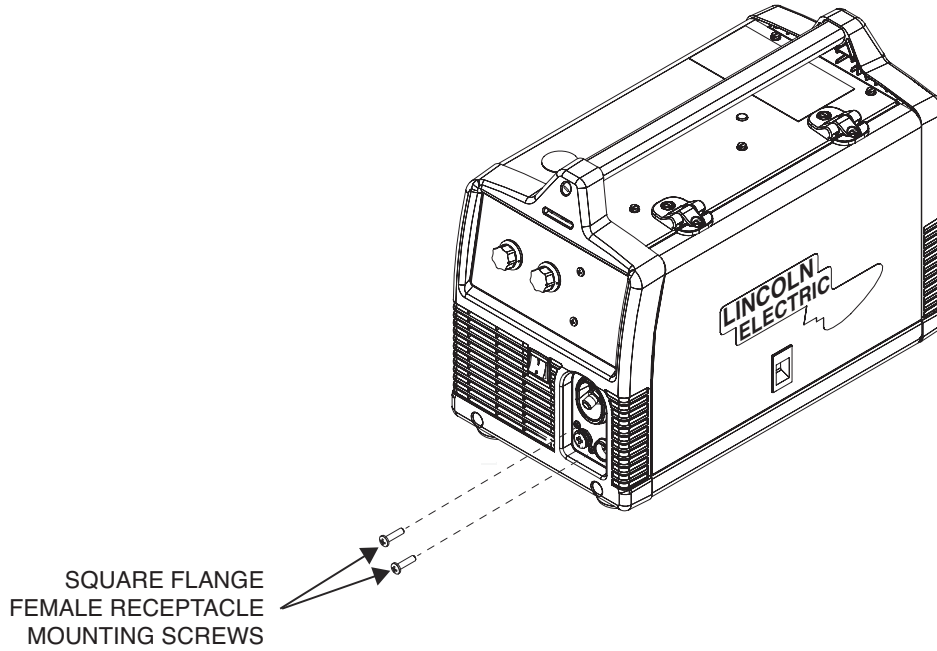
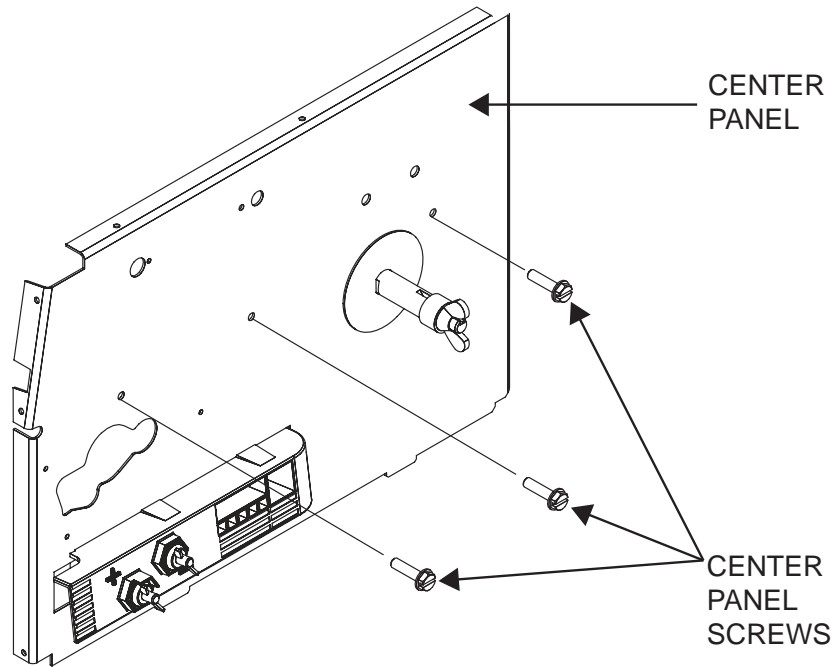


FIGURE F.19 – CENTER PANEL SCREWS



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

**POWER MODULE
REMOVAL AND REPLACEMENT PROCEDURE (continued)**

FIGURE F.20 – SWITCH LEAD CONNECTIONS

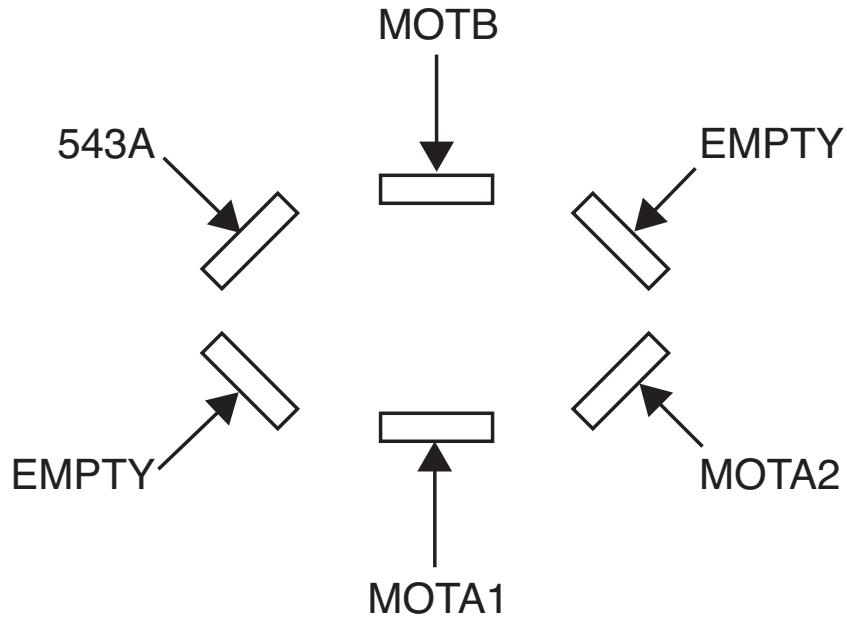
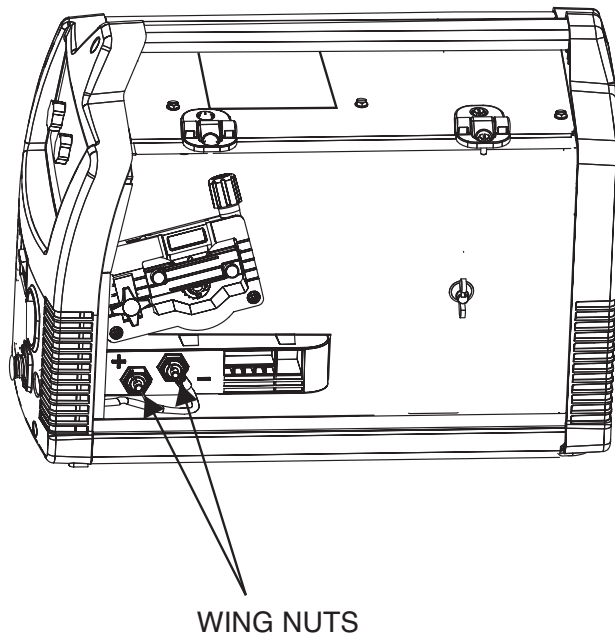


FIGURE F.21 – CENTER PANEL WING NUTS



Return to Section TOC

Return to Section TOC

Return to Section TOC

Return to Section TOC

Return to Master TOC

Return to Master TOC

Return to Master TOC

Return to Master TOC

POWER MODULE REMOVAL AND REPLACEMENT PROCEDURE (continued)

REPLACEMENT PROCEDURE

1. Carefully place the new power module assembly into the machine.
2. Connect wing nuts and lead previously removed from the polarity panel to the choke and rectifier. See **Figure F.21**. See Wiring Diagram.
3. Connect the four leads (MOTB, MOTA2, MOTA1 and 543A) to the switch. The switch is attached to the center panel. See **Figure F.20**. See Wiring Diagram.
4. Using a 5/16" nutdriver, attach the two screws securing the center panel.
5. Using a 5/16" nutdriver, attach the three previously removed screws securing the center panel on the right side of the machine. See **Figure F.19**.
6. Using a phillips screwdriver, attach the two previously removed screws securing the square flange female receptacle to the front cover. See **Figure F.18**.
7. Place the case back panel into position and press firmly until locking tabs snap in to position. See **Figure F.17**.
8. Using a 5/16" nutdriver, attach the four previously removed mounting screws securing the rear panel of the machine. See **Figure F.17**.
9. Using a phillips screwdriver, attach the two previously removed screws securing the handle to the front and rear panels. See **Figure F.17**.
10. Tighten the previously removed lock washer and flat washer securing the gas hose and solenoid assembly. See **Figure F.16**.
11. Using a 9/16" nutdriver, attach the previously removed nut and washer securing the circuit breaker. See **Figure F.16**.
12. Using a phillips screwdriver, attach the four previously removed small screws securing the receptacle assembly. See **Figure F.16**.
13. Using a 3/8" nutdriver, connect the two previously removed ground leads attached to the rear panel. See Wiring Diagram. Note washer placement from disassembly.
14. Perform the **Control Board Replacement Procedure**.
15. Perform the **Case Cover Replacement Procedure**.
16. Perform the **Retest After Repair Procedure**.

RECTIFIER, TRANSFORMER, CHOKE ASSEMBLY & CAPACITOR 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.

WARNING

The liquid electrode in the capacitors is toxic. Do not touch the capacitors with any part of your body.

TEST DESCRIPTION

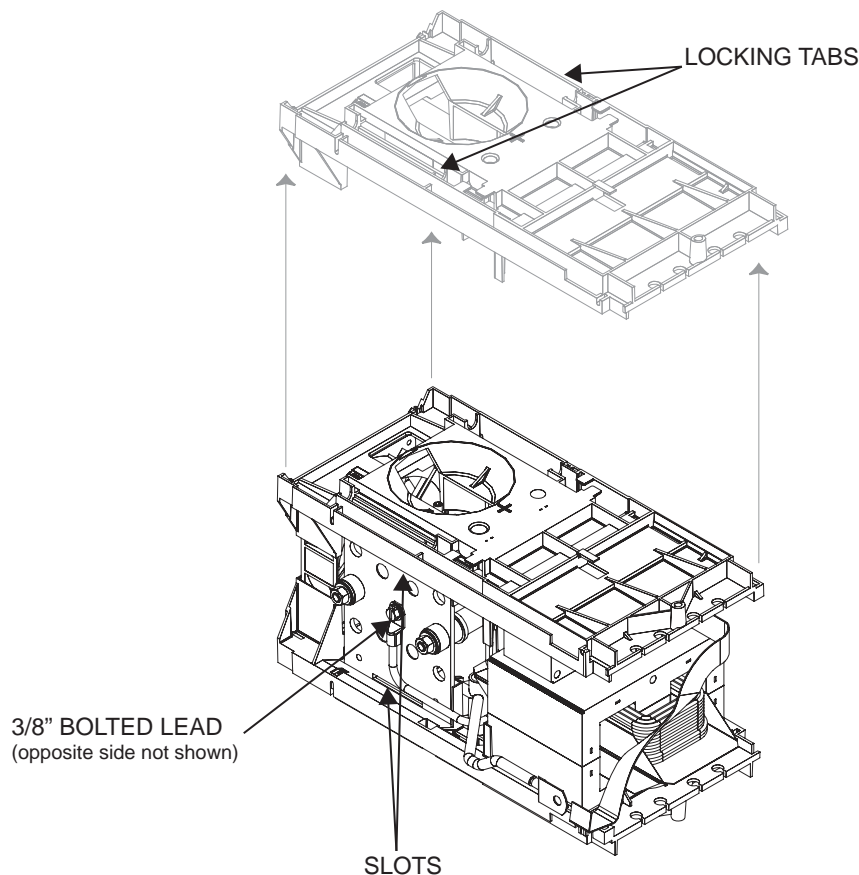
This procedure will aid the technician in the removal and replacement of the components in the Power Module Assembly.

MATERIALS NEEDED

- 9/16" Nutdriver
- 3/8" Nutdriver
- Dow Corning 340
- Fine Steel Wool
- Wiring Diagram

RECTIFIER, TRANSFORMER, CHOKE ASSEMBLY & CAPACITOR REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.22 – LOCKING TABS



REMOVAL PROCEDURE

WARNING



ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

1. Disconnect input power to the Power Mig® 180 Dual machine.
2. Perform the **Case Cover Removal Procedure**.
3. Perform the **Control Board Removal Procedure**.

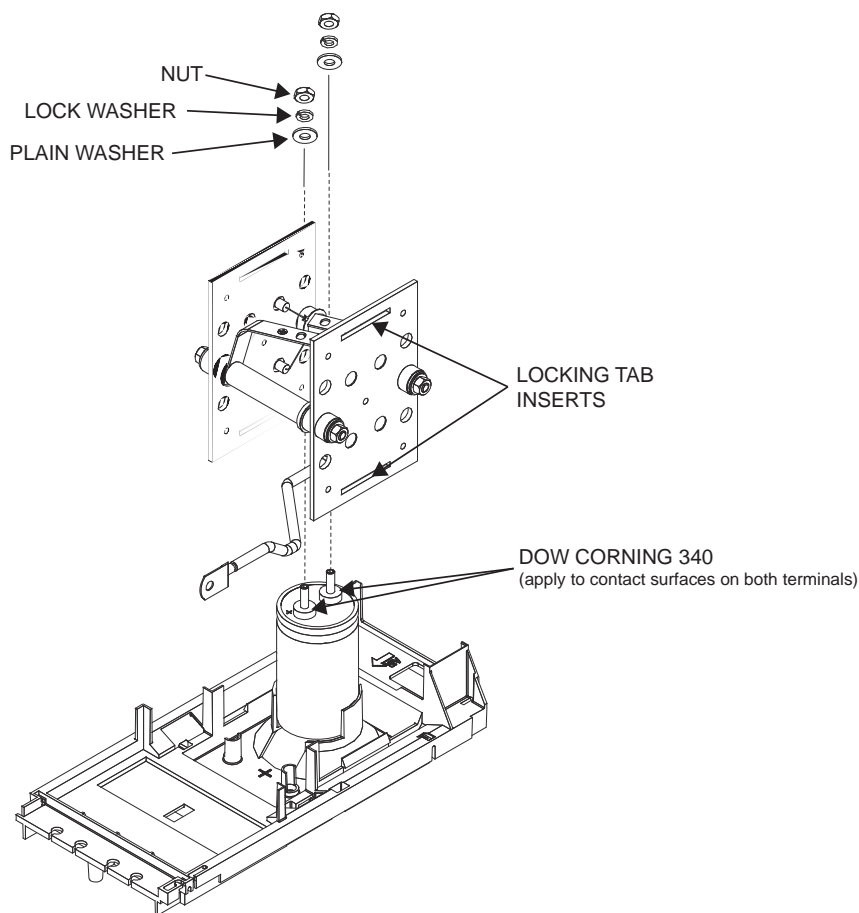
4. Perform the **Power Module Removal Procedure**.
5. With the power module removed from the machine, depress the locking tabs and remove the top chassis of the power module. See Figure F.22.
6. Using a 3/8" nutdriver, remove the two bolted leads from the sides of the rectifier. See Figure F.22.
7. Label and disconnect any associated leads. See Wiring Diagram.
8. Using a 9/16" nutdriver, remove the nut and washers securing the rectifier and capacitor to the machine and remove components. Note washer placement for reassembly. See **Figure F.23**.

POWER MIG® 180 DUAL



RECTIFIER, TRANSFORMER, CHOKE ASSEMBLY & CAPACITOR REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.23 – DOW CORNING APPLICATION AREAS



TRANSFORMER AND CHOKE

1. With the power module removed from the machine, depress the locking tabs and remove the top chassis of the power module. See **Figure F.22**.
2. Using a 3/8" nutdriver, remove the two bolted leads from the sides of the rectifier. See **Figure F.22**.

NOTE: This step may already be complete.

3. Label and disconnect any additional leads.
4. Remove the transformer. See **Figure F.24**.

RECTIFIER, TRANSFORMER, CHOKE ASSEMBLY & CAPACITOR REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.24 – TRANSFORMER / CHOKE REMOVAL

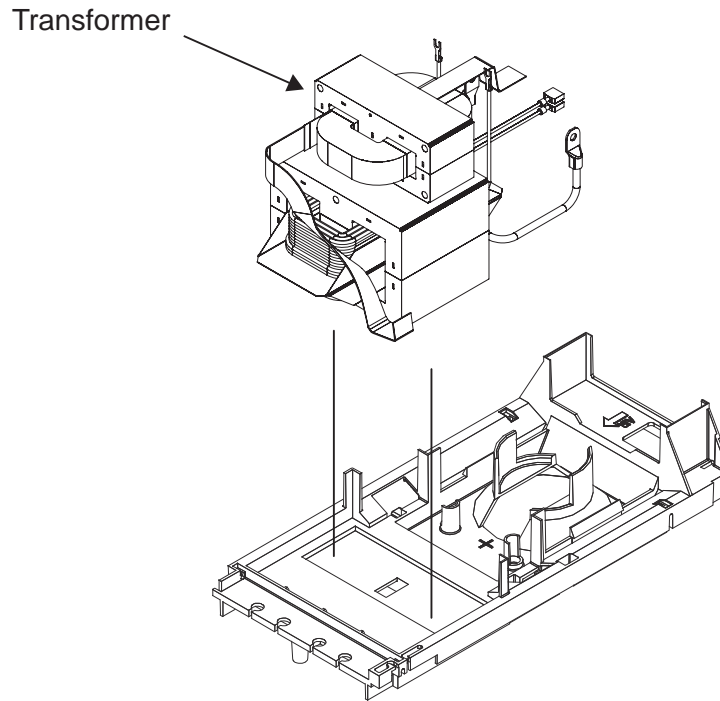
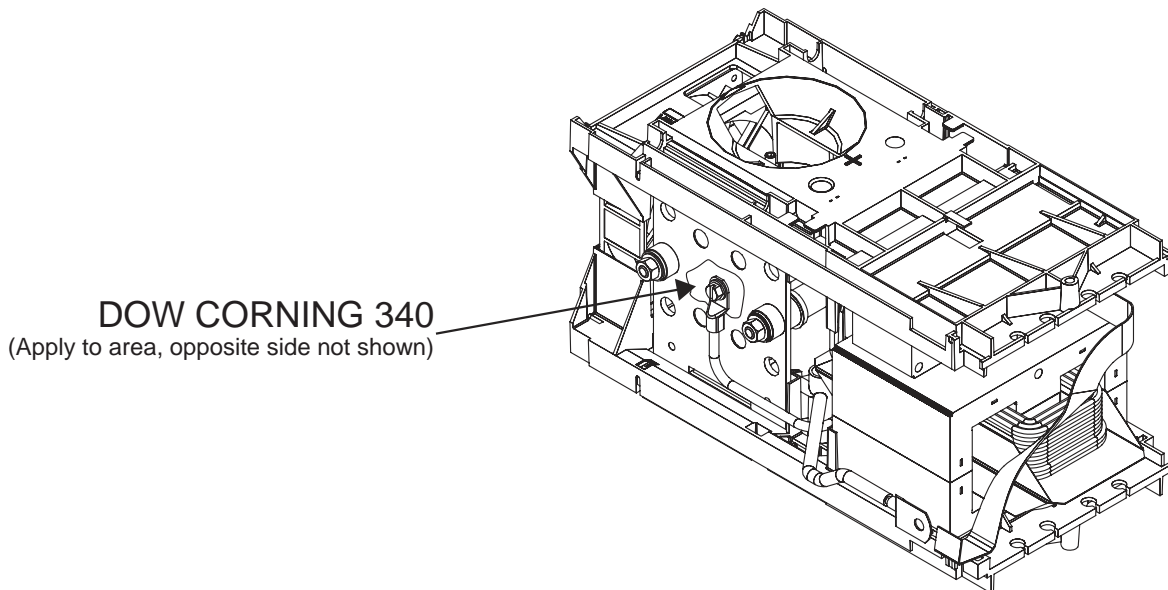


FIGURE F.25 – DOW CORNING 340 APPLICATION



RECTIFIER, TRANSFORMER, CHOKE ASSEMBLY & CAPACITOR REMOVAL AND REPLACEMENT PROCEDURE (continued)

REPLACEMENT PROCEDURE

1. Carefully position the new transformer and choke assembly into the power module assembly.
2. When re-installing the transformer, clean the terminal surface and apply Dow Corning 340 to the rectifier assembly leads. **See Figure F.25.**
3. Carefully position the new capacitor into the power module assembly.
NOTE: When re-installing the capacitor, make sure that the polarity is **NOT** reversed.
4. Clean the terminal surface with fine steel wool and apply a thin coating of Dow Corning 340 on the rectifier. **See Figure F.25.**
5. Using a 9/16" nutdriver, connect the nut and washers securing the rectifier and capacitor to the machine. **See Figure F.23.**
6. Secure the previously removed top chassis to the power module assembly. **See Figure F.22.**
7. Carefully place the power module assembly into the machine.
8. Connect any previously removed leads.
9. Using a 3/8" nutdriver, attach the two bolted leads to the sides of the rectifier. **See Figure F.22.**
10. Perform the **Power Module Replacement Procedure.**
11. Perform the **Control Board Replacement Procedure.**
12. Perform the **Case Cover Replacement Procedure.**
13. Perform the **Retest After Repair Procedure.**

Return to Section TOC

Return to Section TOC

Return to Section TOC

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Return to Master TOC

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Return to Master TOC

Return to Master TOC

POWER MIG® 180 DUAL



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.

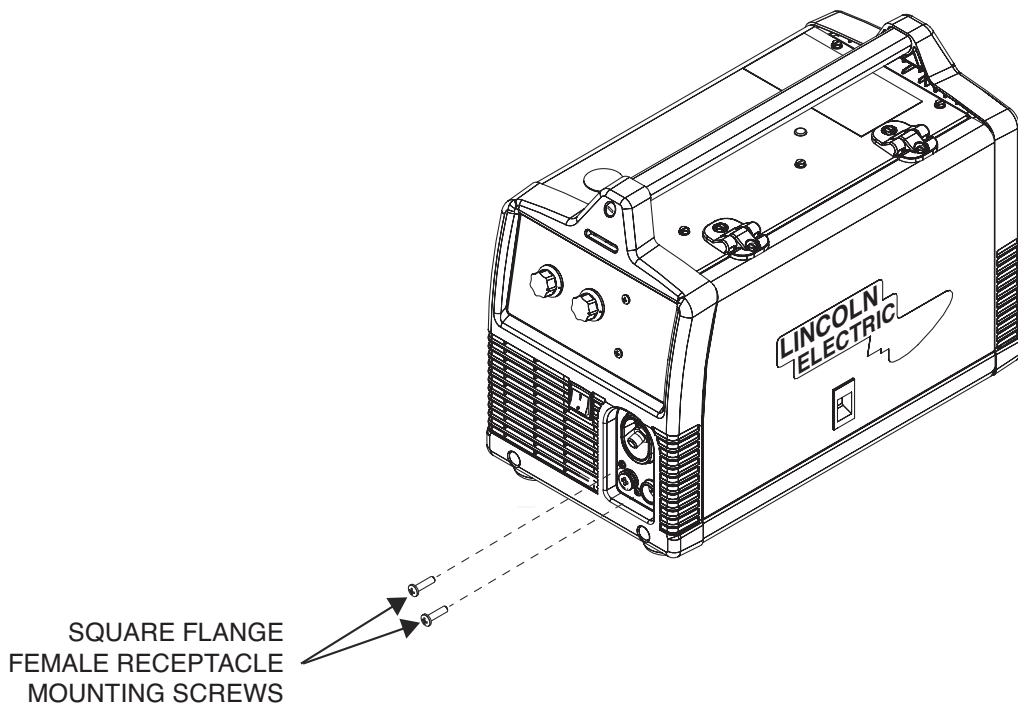
MATERIALS NEEDED

- 5/64" Allen Key
- 1/2" Nutdriver
- Pliers
- Phillips Screwdriver

NOTE: These instructions are the same for several groups of machines. As a result, the pictures of the case may look different than the machine you are repairing.

WIRE DRIVE MOTOR REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.26 – SQUARE FLANGE FEMALE RECEPTACLE LOCATION



REMOVAL PROCEDURE

WARNING



ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

1. Disconnect input power to the Power Mig® 180 Dual machine.
2. Perform the **Case Cover Removal Procedure**.

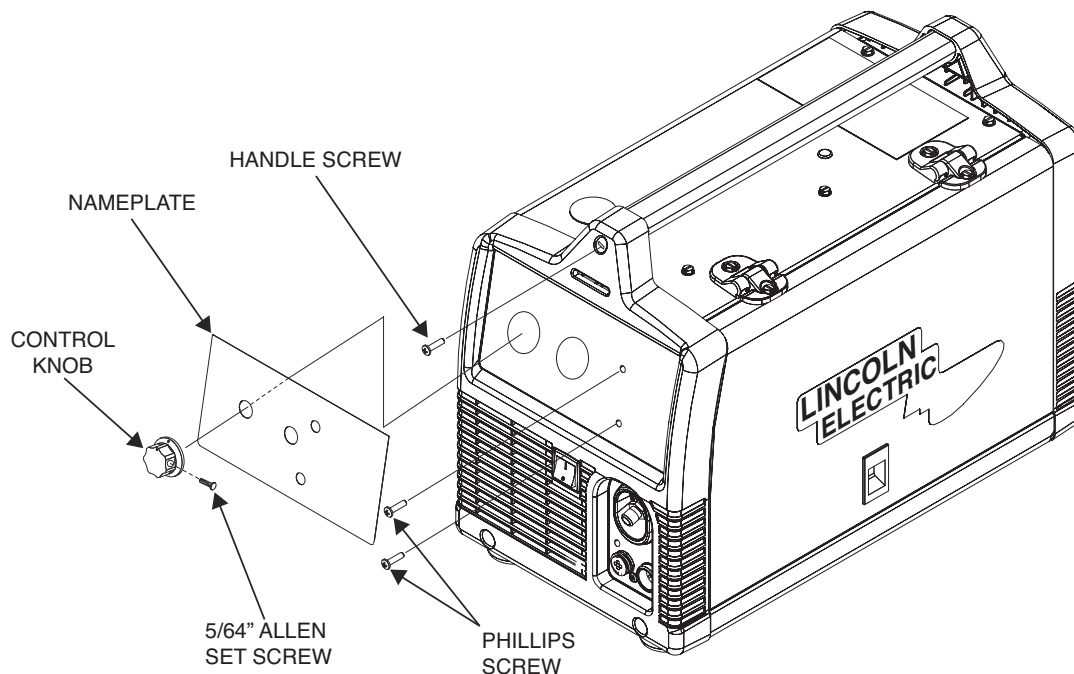
3. Using a phillips screwdriver, remove the two screws securing the square flange female receptacle to the front cover. See Figure F.26.
4. Using a 5/64" allen key, loosen the two set screws securing the voltage and wire speed knobs. See **Figure F.27**.
5. Using a 1/2" nutdriver, remove the two nuts and washers. See **Figure F.27**. Note washer placement for reassembly.
6. Using a phillips screwdriver, remove the two phillips screws from the nameplate of the machine. See **Figure F.27**.
7. Using a phillips screwdriver, remove the screw securing the handle to the front panel. See **Figure F.27**.
8. Gently pull the case front forward about an inch to allow for easier access to wire drive motor.

POWER MIG® 180 DUAL



WIRE DRIVE MOTOR REMOVAL AND REPLACEMENT PROCEDURE (continued)

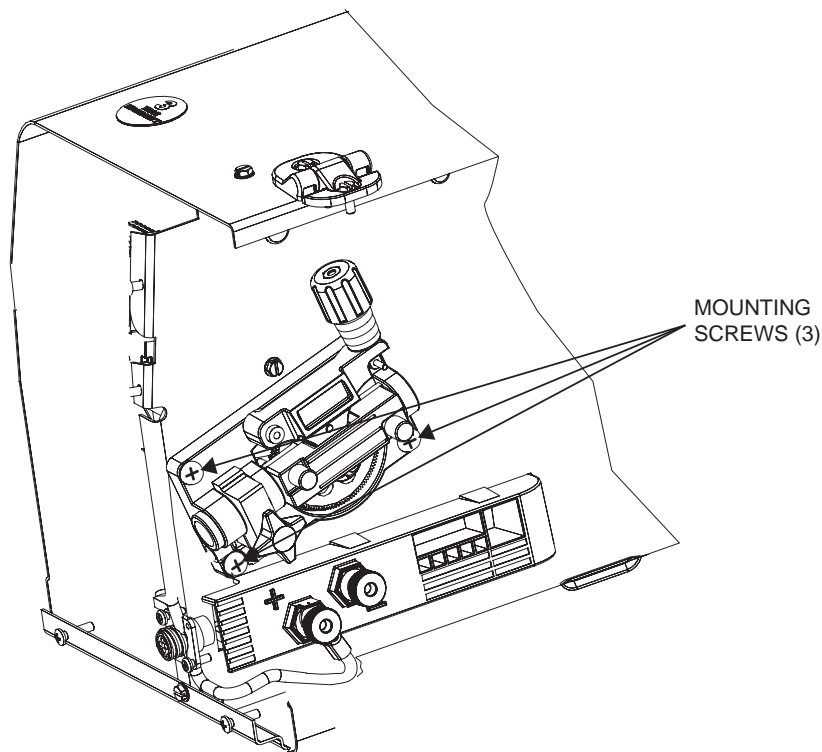
FIGURE F.27 – FRONT PANEL CONNECTIONS



9. Using pliers, disconnect the gas hose from the wire drive motor.
10. Label and disconnect lead MOT+ (gray lead on top) and MOT- (white lead on bottom) from the back of the wire drive motor assembly. See Wiring Diagram.
11. Using a phillips screwdriver, remove the three mounting screws securing the wire drive motor to the center panel. See **Figure F.28**.
12. Remove the wire drive motor and replace.

WIRE DRIVE MOTOR REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.28 – WIRE DRIVE MOTOR MOUNTING SCREWS



REPLACEMENT PROCEDURE

- Carefully position the new wire drive motor assembly on to the center panel of the machine.
- Using a phillips screwdriver, attach the three mounting screws securing the wire drive motor to the center panel. See Figure F.28.
- Connect lead MOT+ (gray lead on top) and MOT- (white lead on bottom) to the back of the wire drive motor assembly. See Wiring Diagram.
- Attach the gas hose to the wire drive motor.
- Using a phillips screwdriver, attach the screw securing the handle to the front panel. See **Figure F.27**.
- Using a phillips screwdriver, attach the two phillips screws through the nameplate of the machine. See **Figure F.27**.
- Using a 1/2" nutdriver, attach the two nuts and washers previously removed. See **Figure F.27**.
- Using a 5/64" allen key, tighten the two set screws securing the voltage and wire speed knobs. See **Figure F.27**.
- Using a phillips screwdriver, attach the two screws securing the square flange female receptacle to the front cover. See **Figure F.26**.
- Perform the **Case Cover Replacement Procedure**.
- Perform the **Retest After Repair Procedure**.

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

Wiring Diagram

Return to Section TOC

Return to Section TOC

Return to Section TOC

Return to Section TOC

Return to Master TOC

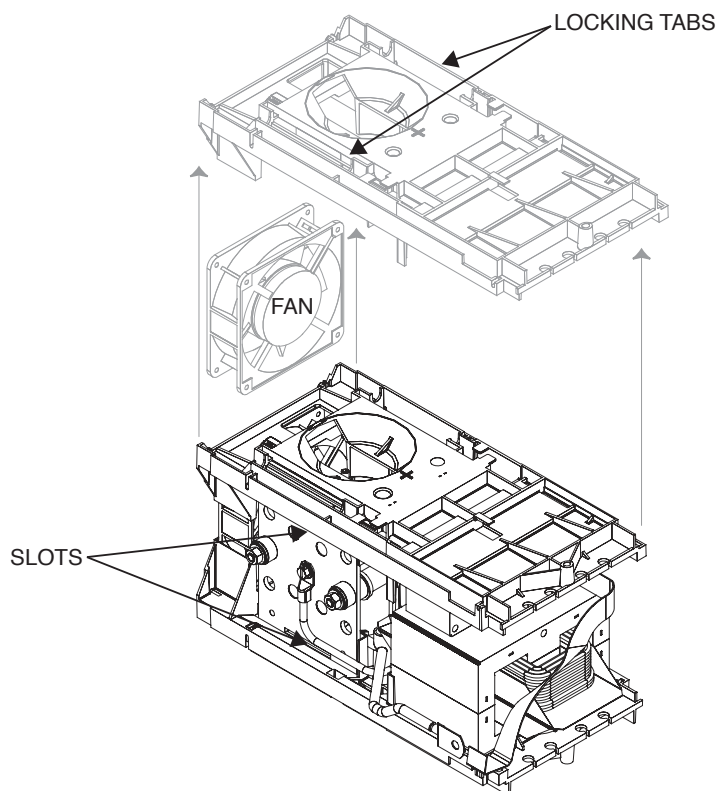
Return to Master TOC

Return to Master TOC

Return to Master TOC

FAN MOTOR ASSEMBLY REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.29 – LOCKING TABS AND FAN



REMOVAL PROCEDURE

WARNING



ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

4. Perform the *Power Module Removal Procedure*.
5. With the power module removed from the machine, depress the locking tabs and remove the top chassis of the power module. See Figure F.29.
6. Label and disconnect fan wiring harness. See Wiring Diagram.
7. Remove the fan motor assembly from the machine. Note direction of airflow through fan for reassembly.

1. Disconnect input power to the Power Mig® 180 Dual machine.
2. Perform the *Case Cover Removal Procedure*.
3. Perform the *Control Board Removal Procedure*.

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FAN MOTOR ASSEMBLY REMOVAL AND REPLACEMENT PROCEDURE (continued)

REPLACEMENT PROCEDURE

1. Carefully position the new fan motor assembly into place in the rear of the power module assembly. Be sure that the rotation arrow is pointing up and the flow arrow is pointing toward the front of the machine.
2. Connect fan wiring harness. See Wiring Diagram.
3. Secure the previously removed top chassis to the power module assembly. See *Figure F.29*.
4. Perform the *Power Module Replacement Procedure*.
5. Perform the *Control Board Replacement Procedure*.
6. Perform the *Case Cover Replacement Procedure*.
7. Perform the *Retest After Repair Procedure*.

NOTE: Fan should spin counter clockwise when viewed from the **rear** of the machine.

Return to Section TOC

Return to Section TOC

Return to Section TOC

Return to Section TOC

Return to Master TOC

Return to Master TOC

Return to Master TOC

Return to Master TOC

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GAS SOLENOID 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

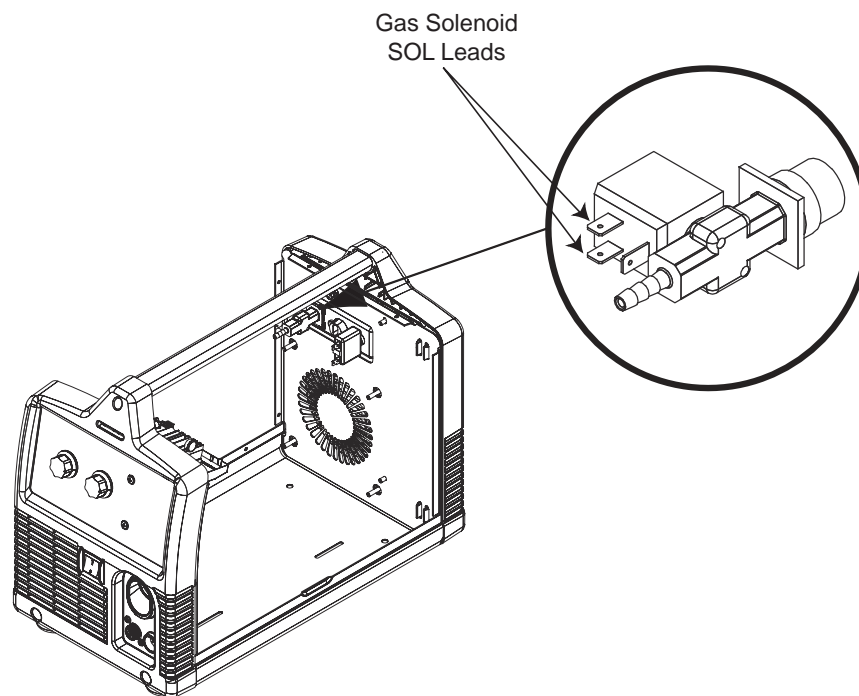
This procedure will aid the technician in the removal and replacement of the Gas Solenoid.

MATERIALS NEEDED

- Slotted Screwdriver
- Hammer
- Pliers
- Wiring Diagram

GAS SOLENOID REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.30 – GAS SOLENOID LOCATION



REMOVAL PROCEDURE

 **WARNING**


ELECTRIC SHOCK can kill.

- Have a qualified individual install and service this equipment.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

4. Label and disconnect both SOL leads from the gas solenoid. See Figure F.30. See Wiring Diagram.
5. Using a slotted screwdriver and hammer, loosen and remove the lock washer and flat washer securing the gas hose and solenoid assembly. See **Figure F.31**.
6. Using pliers, disconnect gas hose from solenoid assembly.
7. Remove the solenoid assembly.

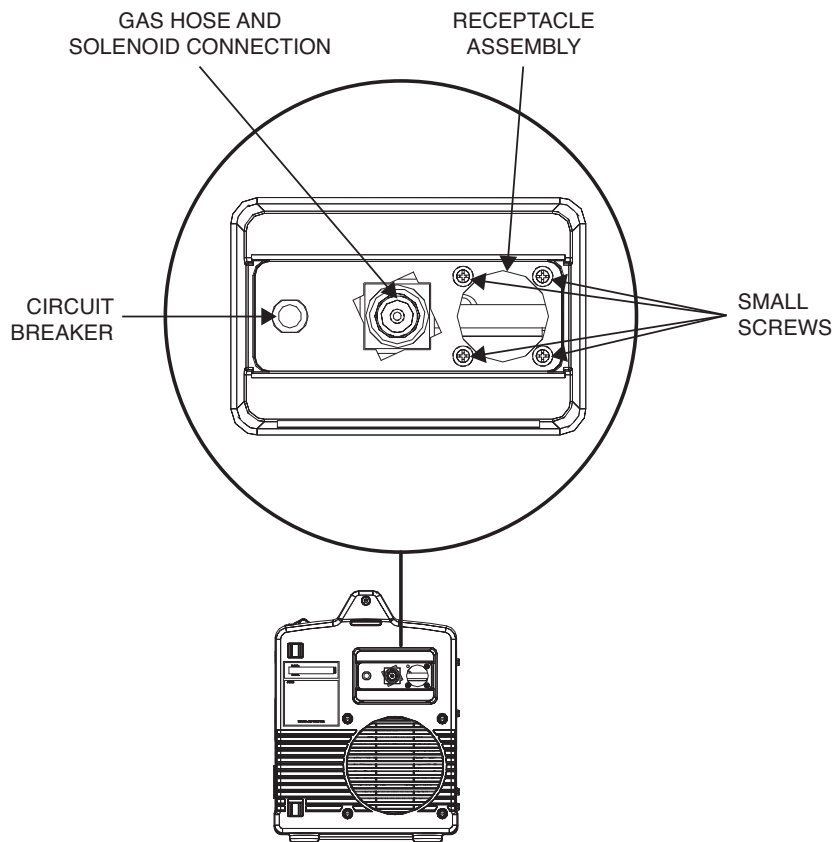
1. Disconnect input power to the Power Mig® 180 Dual machine.
2. Perform the **Case Cover Removal Procedure**.
3. Locate the gas solenoid. See Figure F.30.

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GAS SOLENOID REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.31 – GAS HOSE AND SOLENOID ASSEMBLY CONNECTION LOCATION



REPLACEMENT PROCEDURE

1. Carefully position the new solenoid assembly into the machine.
2. Connect previously removed gas hose to solenoid assembly.
3. Tighten the lock washer and flat washer securing the gas hose and solenoid assembly to the rear panel. See Figure F.31.
4. Connect the previously removed SOL leads to the solenoid assembly. See **Figure F.30**. See Wiring Diagram.
5. Perform the **Case Cover Replacement Procedure**.
6. Perform the **Retest After Repair Procedure**.

RETEST AFTER REPAIR 230 VOLT

INPUT IDLE AMPS & WATTS		
INPUT VOLTS / HERTZ	MAXIMUM IDLE AMPS	MAXIMUM IDLE WATTS
230/60	2.50	275

OPEN CIRCUIT VOLTAGE
13 - 34 VDC

WIRE SPEED RANGE
50 - 500 in./min. (1.3 - 12.7 m/min)

Return to Section TOC

Return to Section TOC

Return to Section TOC

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Return to Master TOC

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Return to Master TOC

Return to Master TOC

Return to Master TOC

Electrical Diagrams **G-1**

 Wiring Diagram (M22576) G-2

 Schematic – Complete Machine (M22578) G-3

 Schematic – Control PC Board (G4741-3N1) G-4

 PC Board Assembly – Control (L12230-3) G-5

 Wiring Diagram - Spot Timer Kit (S26766) G-6

 Schematic – Spot Timer C Board (M20960-2F0) G-7

 PC Board Assembly – Spot Timer (M20961-2) G-8

*** 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.

WIRING DIAGRAM - COMPLETE MACHINE (M22576)

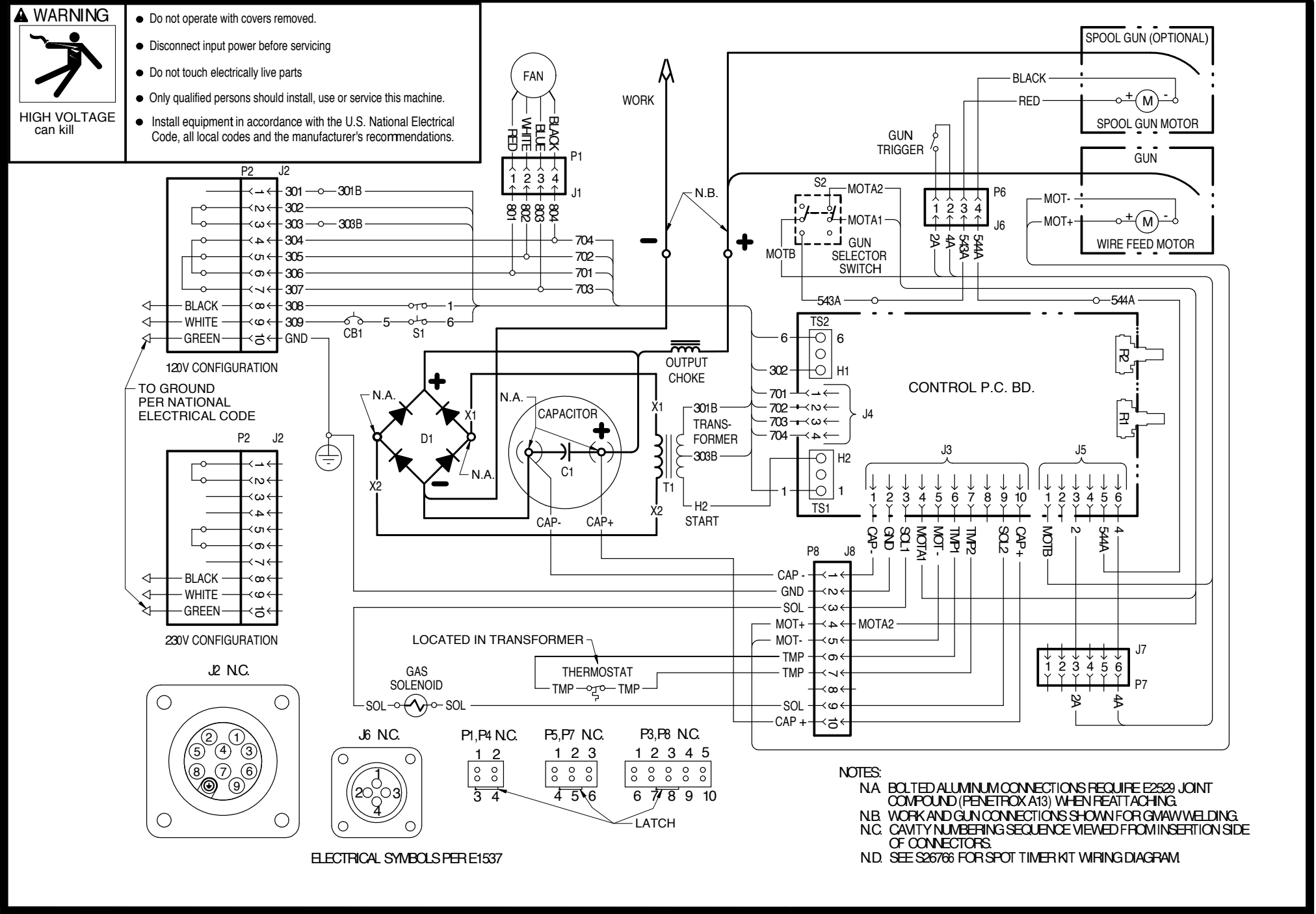
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WIRING DIAGRAM



M22576 A

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.

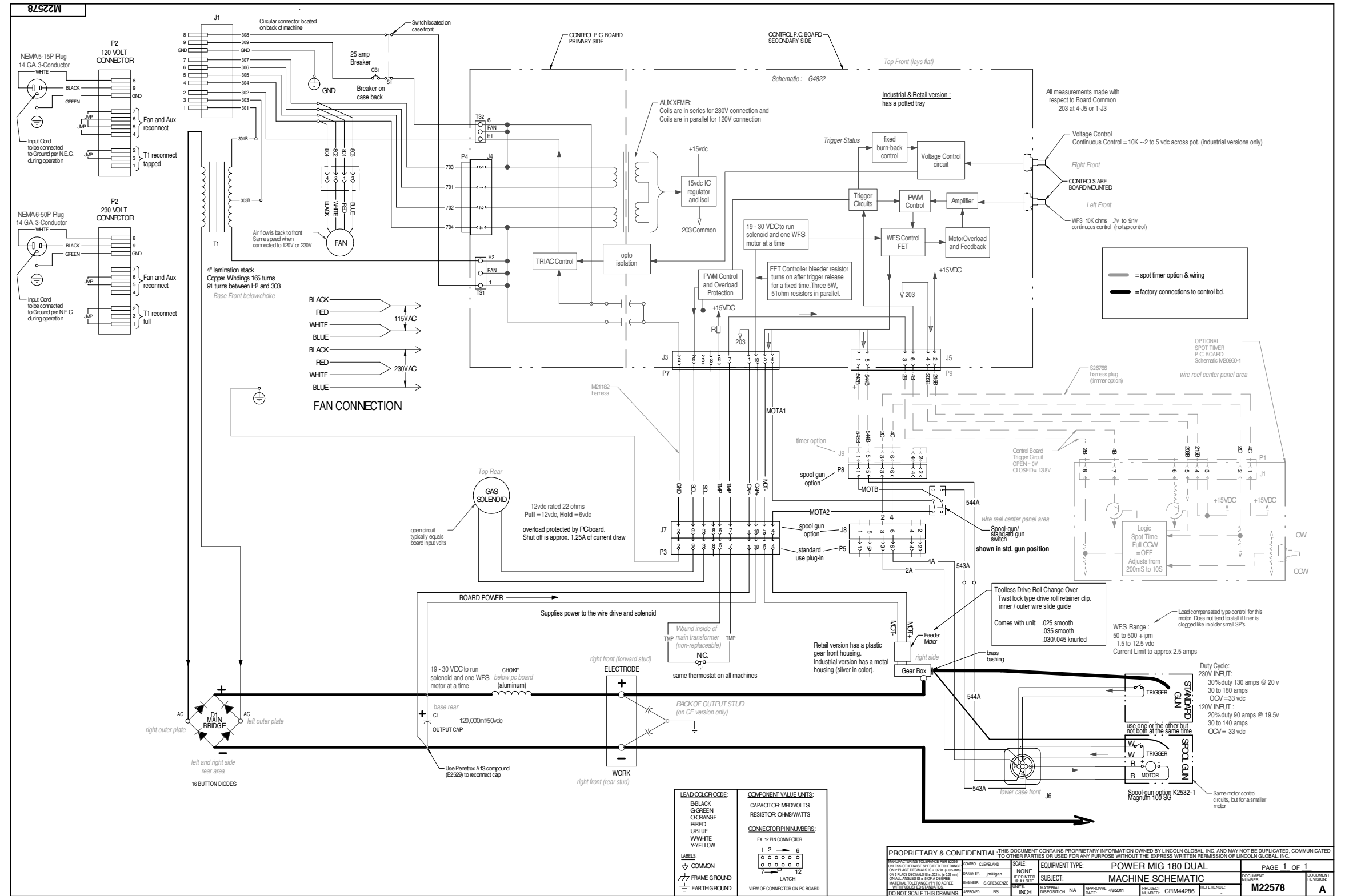
SCHEMATIC - COMPLETE MACHINE (M22578)

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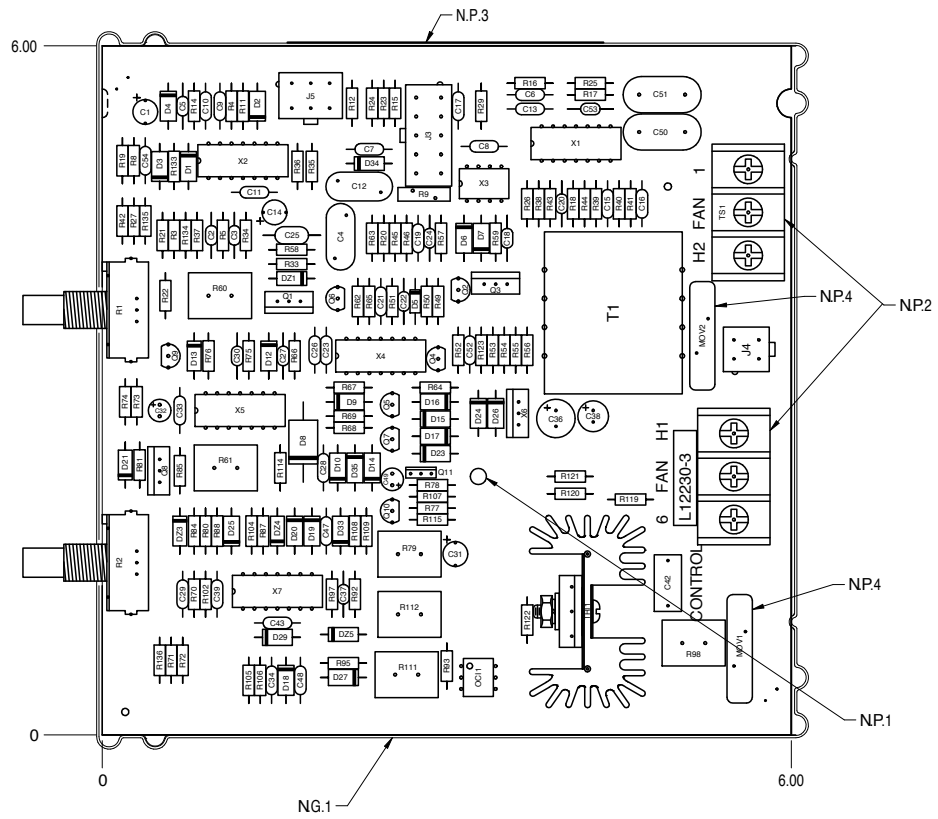
Return to Section TOC
Return to Master TOC



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

PC BOARD ASSEMBLY - CONTROL (L12230-3)

L12230-3				L12230-3				L12230-3			
ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	L12450-N	PC BOARD BLANK	J4	1	S18248-4	CONNECTOR,MOLEX,MINI,PCB,4-PIN	R38	1	S19400-2670	RESISTOR,MF,1/4W,267,1%
3	1	L12830	POTTING TRAY	J5	1	S18248-6	CONNECTOR,MOLEX,MINI,PCB,6-PIN	R40	1	S19400-2802	RESISTOR,MF,1/4W,28.0K,1%
4	190g	E4130	SILICONE TOUGH GEL	MOV1, MOV2	2	T13640-18K	MOV,320VRMS,150J,20MM	R42, R81	2	S19400-68R1	RESISTOR,MF,1/4W,68.1,1%
REFER TO ELECTRONIC COMPONENT DATABASE FOR SPECIFICATIONS ON ITEMS LISTED BELOW											
REFERENCES	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
C1, C14, C31	3	S13490-241	CAPACITOR,ALEL,1.0MF,100V,20%	OCH1	1	S15000-30	OPTOCOUPLER,TRIAC,DRV,RANDOM,60mA,800V	R43, R44, R73, R74	4	S19400-1002	RESISTOR,MF,1/4W,10.0K,1%
C2, C22	2	S16668-7	CAPACITOR,CEMO,820pF,50V,5%	Q1, Q3	2	T12704-121	TRANSISTOR,NMF,TO220,200V,19A,FOP19N20C(SS)	R46	1	S19400-5112	RESISTOR,MF,1/4W,51.1K,1%
C3, C18, C20	3	S16668-6	CAPACITOR,CEMO,4700pF,50V,10%	Q2	1	T12704-52	TRANSISTOR,NMF,TO226,195A,60V,BS170(SS)	R49	1	S19400-8251	RESISTOR,MF,1/4W,8.25K,1%
C4, C12	2	T11577-52K	CAPACITOR,CD,.0047/.005,1400V,20%	Q4, Q5, Q6, Q10	4	T12704-68	TRANSISTOR,NPN,TO226,0.5A,40V,2N4401	R50	1	S19400-1652	RESISTOR,MF,1/4W,16.5K,1%
C5, C24, C27, C30, C37, C53	6	S16668-5	CAPACITOR,CEMO,.022,50V,20%	Q7	1	T12704-69	TRANSISTOR,PNP,TO226,0.5A,40V,2N4403	R53, R54, R55, R56	4	S19400-2R00	RESISTOR,MF,1/4W,2.00,1%
C6, C7, C8, C9, C10, C11, C13, C15, C16, C17, C21, C23, C26, C28, C29, C33, C34, C39, C43, C47, C48, C52, C54	23	S16668-11	CAPACITOR,CEMO,0.1,50V,10%	Q8	1	T12704-80	TRANSISTOR,NMF,TO220,4A,100V,IRF510(SS)	R57, R68, R69	3	S19400-4751	RESISTOR,MF,1/4W,4.75K,1%
C19	1	S16668-3	CAPACITOR,CEMO,100pF,100V,5%	Q9	1	T12704-101	TRANSISTOR,NMF,TO92,120A,200V,BS107(SS)	R60	1	S25365-0R51	RESISTOR,STAND-UP,WW,5W,0.51,5%
C25	1	S16668-4	CAPACITOR,CEMO,2700pF,50V,5%	Q11	1	T12704-109	TRANSISTOR,NMF,IPAK,TO-251,10A,100V(SS)	R61	1	S25365-02R2	RESISTOR,STAND-UP,WW,5W,2.2,5%
C32, C49	2	S13490-181	CAPACITOR,ALEL,22.63V,20%	R1, R2	2	T10812-117	POT,RT-ANGLE,SINGLE-TURN,0.25W,10K,10%	R63	1	S19400-2211	RESISTOR,MF,1/4W,2.21K,1%
C36	1	S13490-206	CAPACITOR,ALEL,68.63V,20%,LOW-ESR	R3, R136	2	S19400-1501	RESISTOR,MF,1/4W,1.50K,1%	R71	1	S19400-5620	RESISTOR,MF,1/4W,562,1%
C38	1	S13490-197	CAPACITOR,ALEL,82.35V,20%,LOW-ESR	R4	1	S19400-6813	RESISTOR,MF,1/4W,681K,1%	R72	1	S19400-1500	RESISTOR,MF,1/4W,150,1%
C42	1	S20500-19	CAPACITOR,PPMF,0.1,275VAC,BOX,20%	R5, R24, R88	3	S19400-6812	RESISTOR,MF,1/4W,68.1K,1%	R77, R115	2	S19400-1004	RESISTOR,MF,1/4W,1.00M,1%
C50, C51	2	T11577-71	CAPACITOR,CD,.0047,250V,20%	R8, R25, R134	3	S19400-4750	RESISTOR,MF,1/4W,475,1%	R79, R98, R111, R112	4	S25365-51R0	RESISTOR,STAND-UP,WW,5W,51.0,5%
D1, D2, D3, D4, D6, D7, D9, D10, D12, D14, D15, D16, D17, D18, D19, D20, D23, D24, D25, D26, D27, D29, D33, D35	24	T12199-1	DIODE,AXLDS,1A,400V	R9	1	S18380-4	THERMISTOR,.02-.47 OHMS,0.9AMP	R80, R95, R106, R108, R109	5	S19400-1001	RESISTOR,MF,1/4W,1.00K,1%
D5	1	T12705-64	DIODE,SCHOTTKY,AXLDS,0.2A,30V,BAT42	R11, R37, R66, R67, R105	5	S19400-2212	RESISTOR,MF,1/4W,22.1K,1%	R87, R114	2	S19400-2672	RESISTOR,MF,1/4W,26.7K,1%
D8	1	T12705-50	DIODE,AXLDS,3A,600V,FR,856	R12, R15, R29	3	S19400-4321	RESISTOR,MF,1/4W,4.32K,1%	R93	1	S19400-1301	RESISTOR,MF,1/4W,1.30K,1%
D13, D21, D34	3	T12705-34	DIODE,AXLDS,1A,400V,FR,1N4936	R14	1	S19400-3322	RESISTOR,MF,1/4W,33.2K,1%	R119, R120, R121, R122	4	S19400-75R0	RESISTOR,MF,1/4W,75.0,1%
DZ1, DZ3	2	T12702-45	ZENER DIODE,1W,18V,5%,1N4746A	R16, R21, R84, R97, R133	5	S19400-1003	RESISTOR,MF,1/4W,100K,1%	R135	1	S19400-1821	RESISTOR,MF,1/4W,1.82K,1%
DZ4	1	T12702-27	ZENER DIODE,1W,10V,5%,1N4740A	R17, R41, R70, R92, R102, R104	6	S19400-5622	RESISTOR,MF,1/4W,56.2K,1%	T1	1	S13000-98	TRANSFORMER,PCB,XFD-3-20
DZ5	1	T12702-55	ZENER DIODE,1W,8.2V,5%,1N4738A	R18, R39	2	S19400-1503	RESISTOR,MF,1/4W,150K,1%	TR11	1	S18395-56	HEAT SINK ASSEMBLY,S15161-34 & S18104-6
J3	1	S18248-10	CONNECTOR,MOLEX,MINI,PCB,10-PIN	R19, R59	2	S19400-4752	RESISTOR,MF,1/4W,47.5K,1%	TS1, TS2	2	S25925-3	CONNECTOR,PTB,PCB,3-PIN
				R20, R51, R52, R62, R76, R78, R85, R107, R123	9	S19400-1000	RESISTOR,MF,1/4W,100,1%	X1, X2	2	S15128-18	OP-AMP,QUAD,HIGH-PERF,33074
				R22	1	S19400-3320	RESISTOR,MF,1/4W,332,1%	X3	1	M15458-8	IC,PWM-CONTROLLER,MODE,2843A
				R23, R33	2	S19400-3321	RESISTOR,MF,1/4W,33.2K,1%	X4	1	S15018-28	IC,BIPOLAR,TIMER,IC-14
				R26, R45, R64, R65, R75	5	S19400-1502	RESISTOR,MF,1/4W,15.0K,1%	X5	1	S15018-4	IC,CMOS,INVERTER,SCHMITT,HEX,4584(SS)
				R27	1	S19400-6810	RESISTOR,MF,1/4W,681,1%	X6	1	S15128-6	IC,VOLT REG,FXED,3-T,(+),1A,15V,TO220
				R34	1	S19400-2000	RESISTOR,MF,1/4W,200,1%	X7	1	S15128-4	OP-AMP,QUAD,GEN-PURPOSE,224N
				R35	1	S19400-9090	RESISTOR,MF,1/4W,909,1%				
				R36, R58	2	S19400-2001	RESISTOR,MF,1/4W,2.00K,1%				



UNLESS OTHERWISE SPECIFIED:
 CAPACITANCE = MFD/VOLTS
 INDUCTANCE = HENRIES
 RESISTANCE = OHMS

POTTING NOTES:

- NP.1 DISPENSE POTTING MATERIAL THROUGH THIS HOLE SO THAT IT FLOWS TO THE TOP OF THE BOARD ON ALL FOUR SIDES, COVERING ALL COMPONENT LEADS.
- NP.2 TOP OF THESE COMPONENTS MUST BE FREE OF POTTING MATERIAL.
- NP.3 PRINT L12230-[] (LATEST DASH NUMBER AND I.D. CODE) ON LABEL AND PLACE ON SIDE OF POTTING TRAY AS SHOWN.
- NP.4 LEADS NOT COVERED WITH POTTING MATERIAL IS ACCEPTABLE.

GENERAL NOTES:

- NG.1 CAUTION: THIS ASSEMBLY IS SUBJECT TO DAMAGE BY STATIC ELECTRICITY. SEE E2454 BEFORE HANDLING.
- REVIEW L12450-3 BEFORE MAKING ANY ADDITIONS, DELETIONS OR CHANGES TO THIS DRAWING.

REVISION CONTROL

L12230-3N1

PART NO. IDENTIFICATION CODE

TEST PER E4150-C
 POT WITH E4130

SCHEMATIC REFERENCE: G4741-3N1

MAKE DETAIL
 MANUFACTURE PER E1911
 (6 BOARDS PER PANEL)

2 LAYER BOARD BLANK PANEL
 SEE ELECTRONIC FILE FOR ADDITIONAL INFORMATION.

APPLICABLE DRAWING INFORMATION INDEX	
M23003-77	SLIDE LINE WORK INSTRUCTIONS

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MANUFACTURING TOLERANCE PER ES335: 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 ("1") TO AGREE WITH PUBLISHED STANDARDS	CONTROL: CLEVELAND	SCALE: 1:1 IF PRINTED @ A2 SIZE	EQUIPMENT TYPE: SMALL WIRE FEEDER WELDERS				PAGE 1 OF 1				
DRAWN BY: ddietz	ENGINEER:	UNITS: INCH	SUBJECT: CONTROL P.C. BOARD (CONTINUOUS)				DOCUMENT NUMBER: L12230-3	DOCUMENT REVISION: E			
APPROVED: BS	DATE: 2/1/2013	MATERIAL DISPOSITION: UF	APPROVAL: 2/1/2013	PROJECT NUMBER: CRM43589	REFERENCE: L12230-2						

NOTE: Lincoln Electric assumes no responsibility for liabilities resulting from board level troubleshooting. PC Board repairs will invalidate your factory warranty. **Individual Printed Circuit Board Components are not available from Lincoln Electric.** This information is provided for reference only. Lincoln Electric discourages board level troubleshooting and repair since it may compromise the quality of the design and may result in danger to the Machine Operator or Technician. Improper PC board repairs could result in damage to the machine.



Return to Section TOC
 Return to Master TOC

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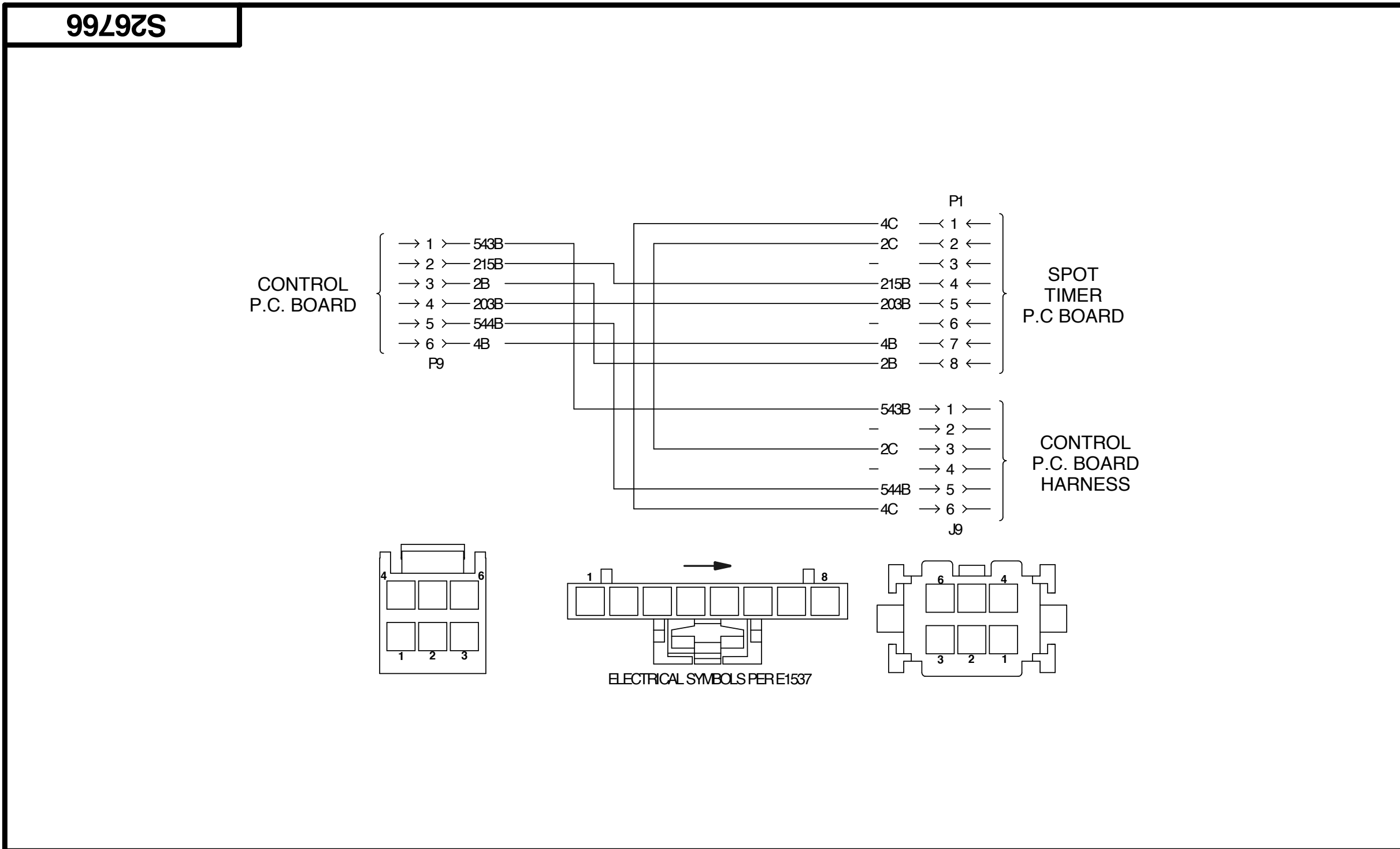
WIRING DIAGRAM - SPOT TIMER KIT (S26766)

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<small>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 ("I") TO AGREE WITH PUBLISHED STANDARDS.</small> DO NOT SCALE THIS DRAWING	DESIGN INFORMATION	SCALE: 1:1	EQUIPMENT TYPE: SPOT TIMER KIT		PAGE <u>1</u> OF <u>1</u>		
	DRAWN BY: cstuble	IF PRINTED @ A4 SIZE	SUBJECT: WIRING DIAGRAM		DOCUMENT NUMBER:	DOCUMENT REVISION:	
	ENGINEER: S. FARAH	UNITS: INCH	MATERIAL DISPOSITION: UF	APPROVAL DATE: 01/16/2007	PROJECT NUMBER: CRM38044-D	REFERENCE: -	S26766

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.

PC BOARD ASSEMBLY - SPOT TIMER (M20961-2)

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Return to Section TOC
Return to Master TOC

Return to Section TOC
Return to Master TOC

M20961-2

ENVIRONMENTAL NOTES:

N.E.1 BEFORE ENCAPSULATION, APPLY ITEM 3 AROUND BASE AS SHOWN. ENCAPSULATION/SEALANT HEIGHT ALLOWED UP TO TOP OF PLASTIC TAB. DO NOT GET ENCAPSULATION/SEALANT ON THREADS.

N.E.2 KEEP CONNECTOR CAVITIES AND PINS FREE OF ENCAPSULATION.

GENERAL NOTES:

N.G.1 **CAUTION** THIS ASSEMBLY IS SUBJECT TO DAMAGE BY STATIC ELECTRICITY. SEE E2454 BEFORE HANDLING.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	M20961-F	PC BOARD BLANK
2	1	Y00733-2	FIRMWARE
3	.03 OZ	E2519-1	SEALANT

REFER TO ELECTRONIC COMPONENT DATABASE FOR SPECIFICATIONS ON ITEMS LISTED BELOW

REFERENCES	QTY	PART NUMBER	DESCRIPTION
C1	1	S13490-93	CAPACITOR, TAE, 27, 35V, 10%
C2, C4	2	S16668-11	CAPACITOR, CEMO, 0.1, 50V, 10%
C3	1	S13490-25	CAPACITOR, TAE, 4.7, 35V, 10%
D1	1	T12199-1	DIODE, AXLDS, 1A, 400V
DZ1	1	T12702-52	ZENER DIODE, 1W, 5.1V, 5%, 1N4733A
N.E.2 J1	1	S19365-8	CONNECTOR, PCB, WW, MALE, RT-L, 8-PIN
N.E.1 Q2, Q3	2	T12704-52	TRANSISTOR, NMF, TO226, 195A, 60V, BS170(SS)
R1	1	T10812-116	POT, SINGLE-TURN, 0.25W, 10K, 10%
R2, R3, R6, R7, R8	5	S19400-6810	RESISTOR, MF, 1/4W, 681, 1%
R4, R14, R15	3	S19400-4751	RESISTOR, MF, 1/4W, 4.75K, 1%
R5	1	S19400-1003	RESISTOR, MF, 1/4W, 100K, 1%
R16, R17	2	S19400-9090	RESISTOR, MF, 1/4W, 909, 1%
R18	1	S19400-9092	RESISTOR, MF, 1/4W, 90.9K, 1%
R19	1	S19400-2213	RESISTOR, MF, 1/4W, 221K, 1%
R20	1	S19400-1001	RESISTOR, MF, 1/4W, 1.00K, 1%
R21	1	S19400-7500	RESISTOR, MF, 1/4W, 750, 1%
X1	1	M15101-24	IC, CMOS, PSOC, 8-BIT, CY8C27143, DIP-8(SS)
X2	1	S15128-34	IC, SMD, VOLT. REGULATOR, 3.3V/ADJ, 8-PIN(SS)

UNLESS OTHERWISE SPECIFIED:
 CAPACITANCE = MFD/VOLTS
 INDUCTANCE = HENRIES
 RESISTANCE = OHMS

REVISION CONTROL

M20961-2F0

PART NO. IDENTIFICATION CODE

TEST PER E4150-ST
 COAT WITH E1844 (2 COATS)
 SCHEMATIC REFERENCE: M20960-2F0

BUY DETAIL	MAKE DETAIL
BUY PER E3867	MANUFACTURE PER E1911-RoHS
	BUY BLANK COMPLETE (42 BOARDS PER PANEL)

4 LAYER BOARD BLANK PANEL
 SEE ELECTRONIC FILE FOR ADDITIONAL INFORMATION.

ALL COMPONENTS AND MATERIALS USED IN THIS ASSEMBLY ARE TO BE RoHS COMPLIANT PER E4253.

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