LINCOLN ELECTRIC

GENUINE LINCOLN PARTS™

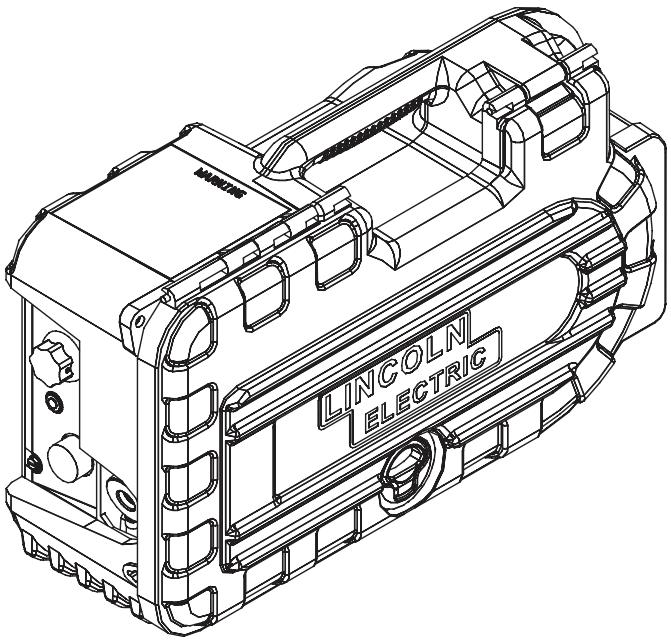
NOTE: This manual will cover most of the troubleshooting and repair procedures for the code numbers listed. Some variances may exist when troubleshooting/repairing later code numbers.

ACTIV8™

For use with machines having Code Numbers:

11770, 12198

SERVICE MANUAL



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⚠ 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.

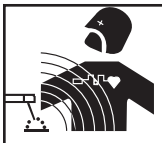
1.d. Keep all equipment safety guards, covers and devices in position and in good repair.Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

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.

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ELECTRIC SHOCK can kill.

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

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

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

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

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

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

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

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

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

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

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

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

ARC RAYS can burn.

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

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

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

FUMES AND GASES can be dangerous.

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

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

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

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

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

5.f. Also see item 1.b.

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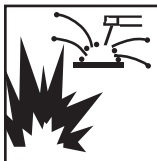

WELDING and CUTTING SPARKS can cause fire or explosion.

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

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

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

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

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

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

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

6.h. Also see item 1.c.

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

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

CYLINDER may explode if damaged.

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

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

7.c. Cylinders should be located:

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

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

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

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

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

FOR ELECTRICALLY powered equipment.

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

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

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

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

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PRÉCAUTIONS DE SÛRETÉ

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

Sûreté Pour Soudage A L'Arc

1. Protegez-vous contre la secousse électrique:

   a. Les circuits à l'électrode et à la piéce 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 vétements mouillés. Porter des gants secs et sans trous pour isoler les mains.
   b. Faire trés attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher metallique ou des grilles metalliques, 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 defonctionnement.
   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 precautions pour le porte-électrode s'applicuent aussi au pistolet de soudage.

2. Dans le cas de travail au dessus du niveau du sol, se protéger contre les chutes dans le cas ou on recoit un choc. Ne jamais enrouler le câble-électrode autour de n'importe quelle partie du corps.

3. Un coup d'arc peut être plus sévère qu'un coup de soliel, donc:

   a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
   b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
   c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.

4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.

5. Toujours porter des lunettes de sécurité dans la zone de soudage. Utiliser des lunettes avec écrans lateraux dans les zones où l'on pique le laitier.

6. Eloigner les matériaux inflammables ou les recouvrir afin de prévenir tout risque d'incendie dû aux étincelles.

7. Quand on ne soude pas, poser la pince à une endroit isolé de la masse. Un court-circuit accidental peut provoquer un échauffement et un risque d'incendie.

8. S'assurer que la masse est connectée le plus prés possible de la zone de travail qu'il est pratique de le faire. Si on place la masse sur la charpente de la construction ou d'autres endroits éloignés de la zone de travail, on augmente le risque de voir passer le courant de soudage par les chaines de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'echauffement des chaines et des câbles jusqu'à ce qu'ils se rompent.

9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particuliérement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des fumeés toxiques.

10. Ne pas souder en présence de vapeurs de chlore provenant d'opérations de dégraissage, nettoyage ou pistolage. La chaleur ou les rayons de l'arc peuvent réagir avec les vapeurs du solvant pour produire du phosgéne (gas fortement toxique) ou autres produits irritants.

11. Pour obtenir de plus amples renseignements sur la sûreté, voir le code "Code for safety in welding and cutting" CSA Standard W 117.2-1974.

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

1. Relier à la terre le chassis du poste conformement au code de l'électricité et aux recommendations du fabricant. Le dispositif de montage ou la piece à souder doit être branché à une bonne mise à la terre.

2. Autant que possible, l'installation et l'entretien du poste seront effectués par un électricien qualifié.

3. Avant de faires des travaux à l'interieur de poste, la debrancher à l'interrupteur à la boite de fusibles.

4. Garder tous les couvercles et dispositifs de sûreté à leur place.

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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.

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Electromagnetic Compatibility (EMC)

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

Methods of Reducing Emissions

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

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

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

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

Earthing of the Workpiece
Where the workpiece is not bonded to earth for electrical safety, not connected to earth because of its size and position, e.g., ships hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to users or damage to other electrical equipment. Where necessary, the connection of the workpiece to earth should be made by a direct connection to the workpiece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitance, selected according to national regulations.

Screening and Shielding
Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications. [1]

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

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FIGURE E.1 BLOCK LOGIC DIAGRAM

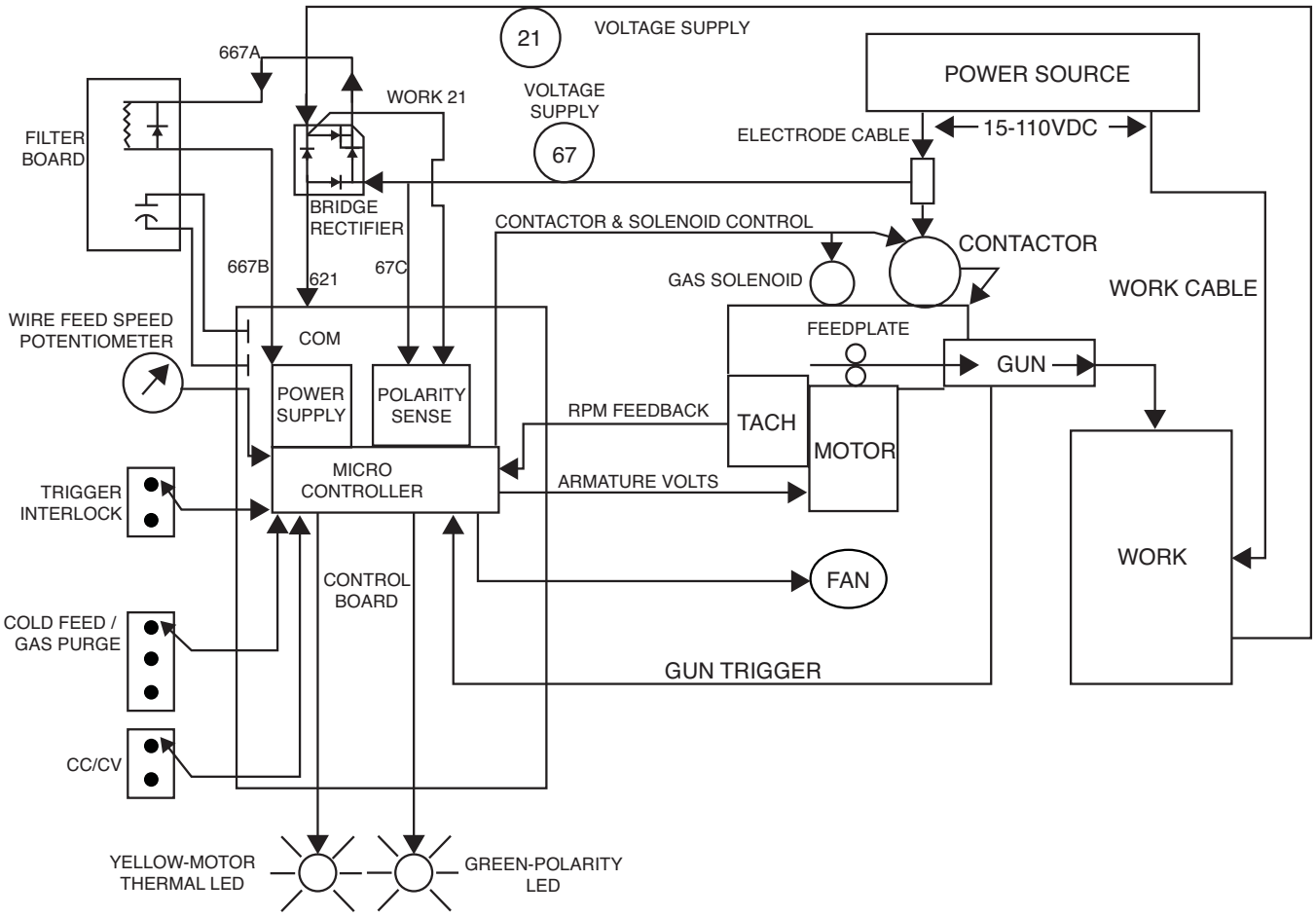
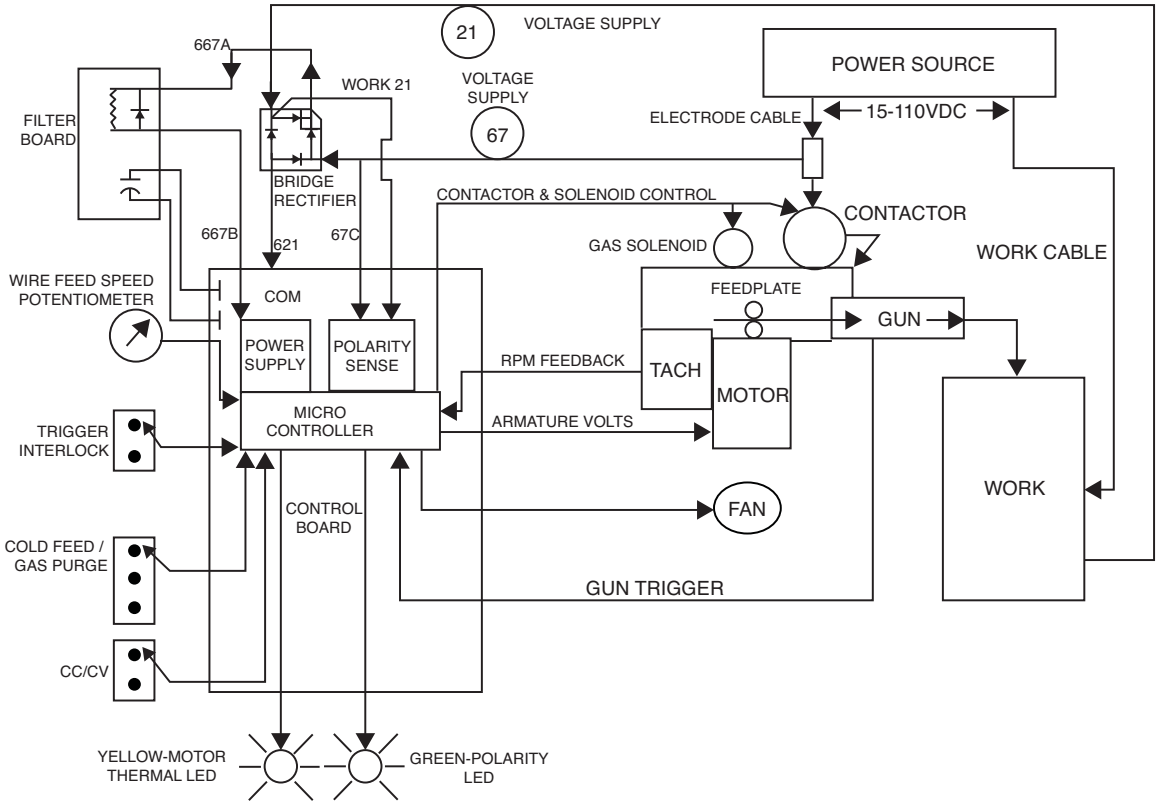


FIGURE E.2 - GENERAL DESCRIPTION



GENERAL DESCRIPTION

The ACTIV8™ is designed to use 15 lbs. / 8 in. spools specifically for ship building and offshore fabrication. This wire feeder provides excellent feeding and welding performance with hard and soft shell welding wires. It is compatible with any DC DV and/or DC CC power source (15-110VDC).

The ACTIV8™ comes factory equipped with a K1500-2 Magnum Tweco-compatible style #2-#4 gun bushing. Other K1500 series gun bushings are available as field installed options.

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

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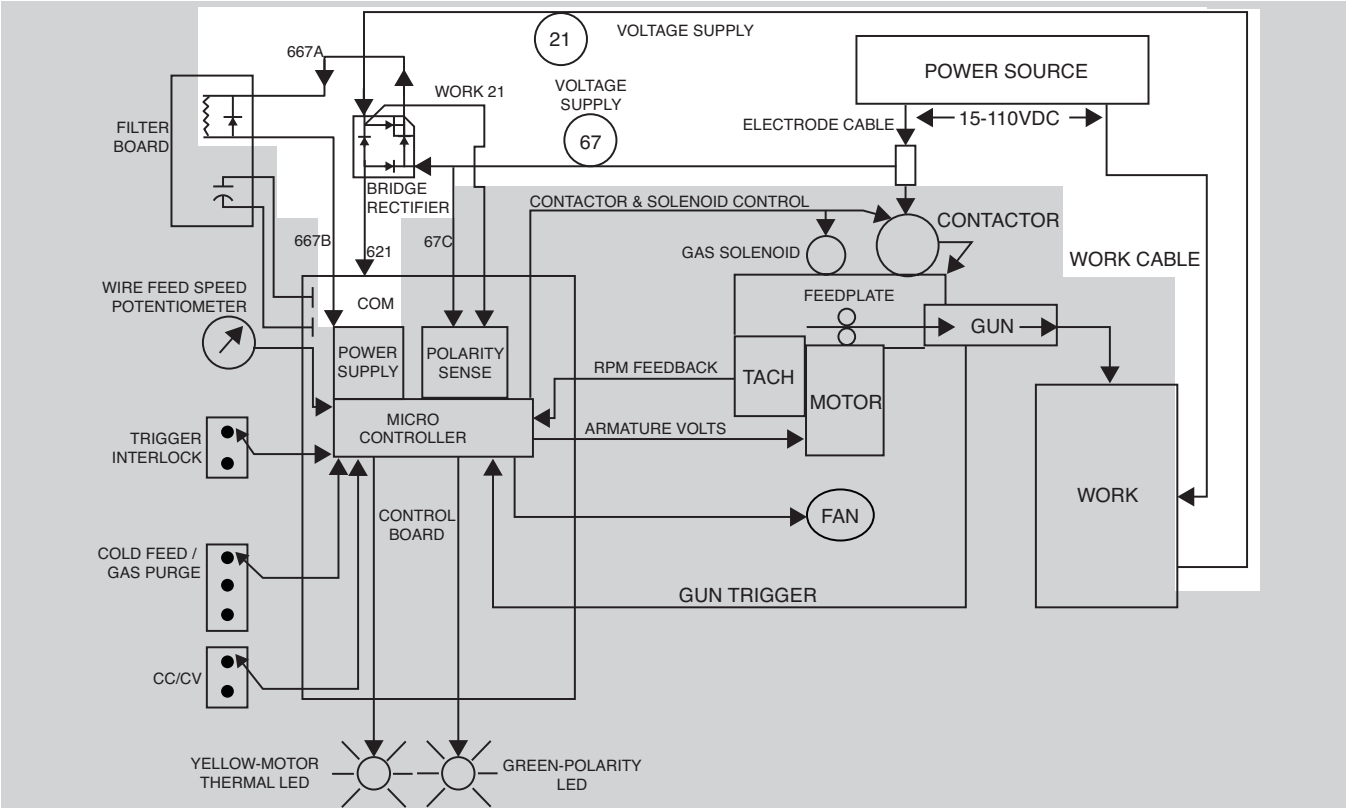
FIGURE E.3 - CONTROL CIRCUIT OPERATION



CONTROL CIRCUIT OPERATION

The DC arc voltage from the power source is applied to the ACTIV8™ through the electrode cable and work sensing lead. This DC voltage is applied through a bridge rectifier and then supplied to the control board.

A wire feed mode switch is included to give the user the capability of using a constant current voltage or in some processes a constant current power source.

The control board regulates and distributes the various supply voltages needed for machine operation.

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

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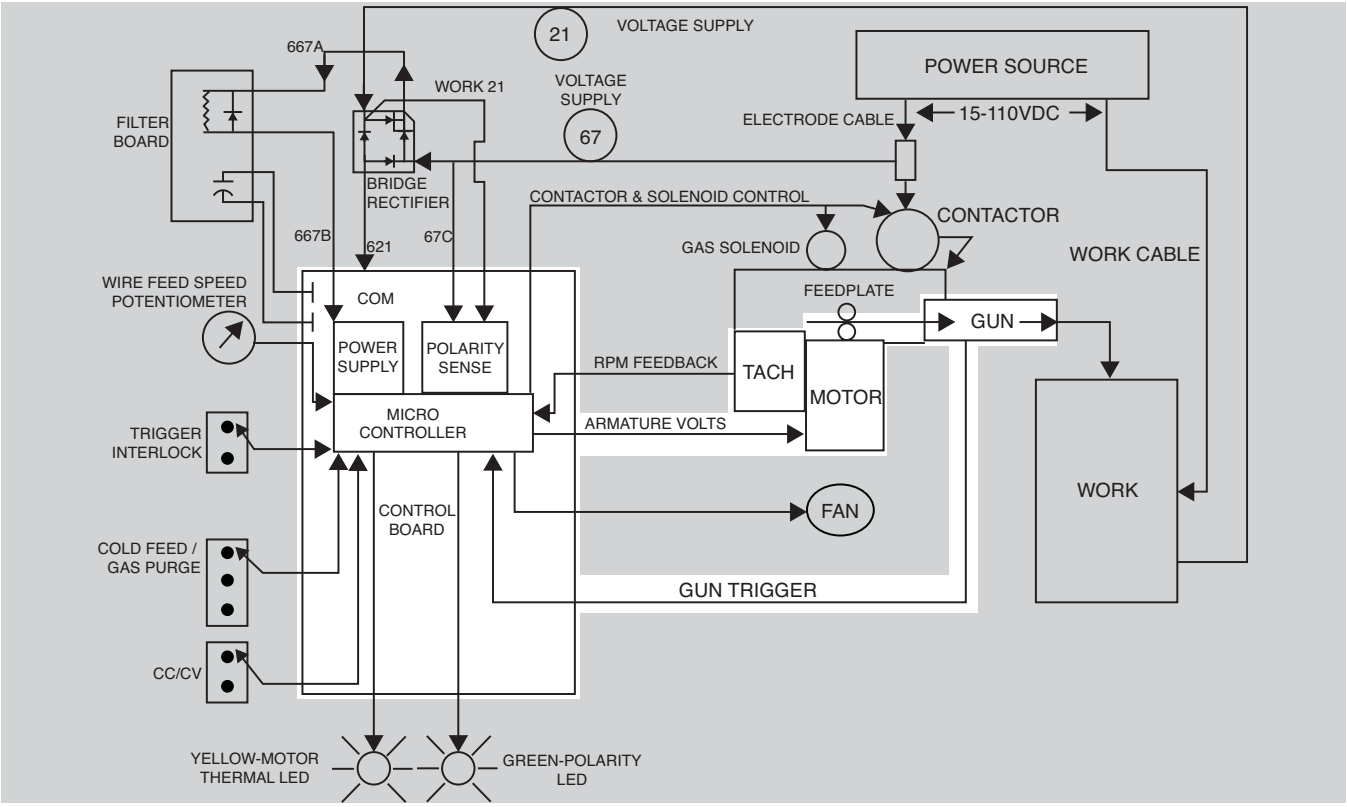
FIGURE E.4 - TRIGGER CIRCUIT



TRIGGER CIRCUIT

When the gun trigger is closed, the control board applies armature voltage to the drive motor and activates any auxiliary circuits that may be incorporated within the ACTIV8™.

Trigger interlock is primarily used for long welds. When an arc is established the trigger can be released. To stop welding, the gun trigger is pulled again and when it is released the second time, the welding power source output turns off and the wire speed stops.

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

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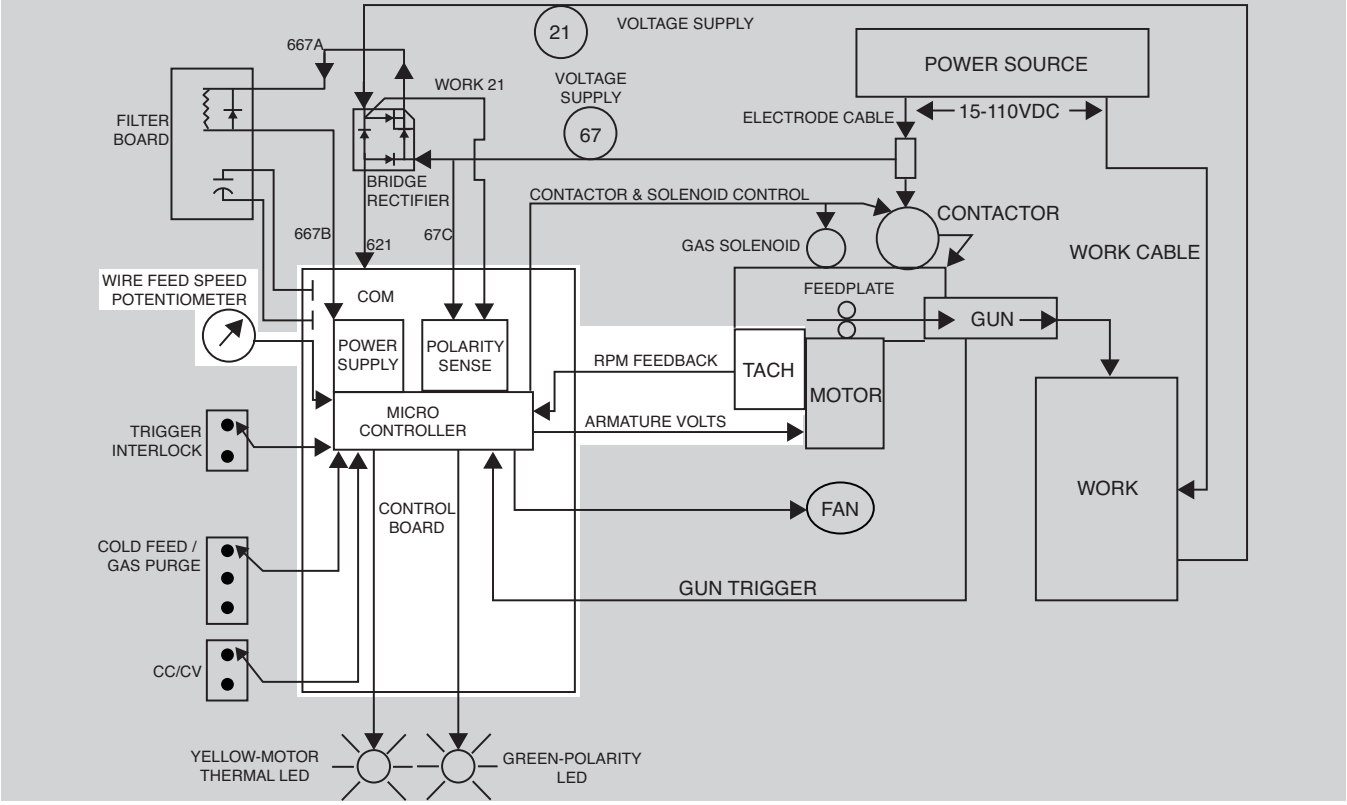
FIGURE E.5 - FEEDBACK AND CONTROL CIRCUITS



FEEDBACK AND CONTROL CIRCUITS

The wire speed potentiometer provides command signal to the control board indicating the desired wire speed. The tachometer transforms the motor RPM to a digital frequency that is fed back to the control board.

When operating in constant voltage (CV) mode, the control board monitors the feedback signal, compares it to the command signal and delivers the appropriate armature voltage to the wire drive motor. In this manner, a constant wire feed speed is maintained.

When operating in constant current (CC) mode, a variable wire speed is desireable to compensate for the varying arc voltages associated with the constant current process. To accomplish this, the control board monitors the command voltage and the feedback signal from the tach and the arc voltage. These three factors are monitored and compared, then the appropriate armature voltage is applied to the wire drive motor.

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 and gas shielding issues.

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.

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

- 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.

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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 PROBLEMS		
Thermal LED lit, motor overloaded, long term.	1. The wire drive motor has overheated.	1. Check to see if the wire moves smoothly through the gun and cable. 2. Check the tightness of the spindle brake. 3. Wait for the motor to cool and the error to reset.
Thermal LED lit, motor overload, short term.	1. The wire drive motor is in a locked state causing the motor to exceed it's maximum amperage draw.	1. Verify that the motor can move freely when the pressure arm is released. 2. Verify that the drive system is free of dirt and debris. 3. Perform the ***Motor Overload Test.***
The feeder does not power up, no cold feed. **NOTE:** Both the thermal and polarity LED will light for 2-3 seconds when power is supplied.	1. The work sense lead has an open or poor connection (across the arc model). 2. The power source is off.	1. Connect the work sense lead to the work in a location free of dirt or paint. 2. Turn on the power source.
The wire feeder powers up but there is no welder output when the gun trigger is pulled. The shielding gas flows and the drive rolls turn.	1. The contactor coil connections are loose. 2. The contactor has failed.	1. Verify the connections. 2. Check for opens in the leads. 3. Perform the ***Contactor Test***, replace if necessary.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact 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 PROBLEMS		
Inconsistent wire feeding or wire not feeding but the drive rolls are turning.	1. The gun cable is kinked. 2. The wire is jammed in the gun cable. 3. The gun liner is dirty or worn. 4. The electrode is rusty or dirty. 5. The gun tip is worn or contains splatter. 6. Improper gun liner, tip, drive rolls or wire guides. 7. Incorrect pressure on the wire drive rolls. 8. Spindle brake to tight. 9. Worn drive rolls.	1. Keep the gun as straight as possible. Avoid sharp corners or bends in the gun cable. 2. Remove the gun and clear the jam. 3. Clear liner with pressurized air (40 PSI) or less. Change liner if worn. 4. Use only clean electrode. Use only quality electrode, like L-50 or L-56 from Lincoln Electric. 5. Replace the contact tip. 6. Verify the proper parts are installed. 7. Adjust the tension arm per the manual. Most electrodes feed well with the tension at approximately “3”. 8. Verify the spool moves with minimal effort. 9. Replace the drive rolls if needed.
Wire feed speed consistently operates at the wrong value. The speed changes when the control knob is adjusted.	1. The jumper lead for normal speed / extra torque is connected improperly. 2. The wrong gear is installed in the wire drive unit. 3. The motor brushes are worn.	1. Properly connect the jumper. 2. Install the proper pinion gear in the wire drive unit. 3. Replace the motor/gearbox assembly.
The wire feeds but cannot be controlled with the wire speed potentiometer.	1. The tachometer is connected improperly. 2. The tachometer has failed.	1. Verify that tachometer leads are properly connected. 2. Perform the ***Drive Motor And Tach Feedback Test.*** Replace the tachometer if necessary. 3. Perform the ***Control Board Test***.

⚠ CAUTION

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

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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 PROBLEMS		
Variable or "hunting" arc.	1. Wrong size, worn or melted tip. 2. Worn work cable or poor connection. 3. Wrong polarity. 4. The gas nozzle is extended beyond the contact tip or the wire stickout is too long. 5. Poor gas shielding on processes requiring gas.	1. Replace the tip. 2. Verify all the work and electrode connections are tight and in good condition. Clean if necessary and replace. 3. Adjust polarity to recommended procedure and verify DIP switch 7 setting matches the electrode polarity. 4. Adjust the gas nozzle and shorten the stickout to 1/2 to 3/4 inches. 5. Check gas flow and mixture. 6. Remove or block sources of drafts. 7. Perform the ***Gas Solenoid Test***, replace if necessary.
Wire feed speed consistently operates at the wrong value. The speed changes when the wire feed speed knob is adjusted.	1. The brushes on the motor are worn. 2. Control board has failed. 3. Diode bridge has failed. 4. The wire feed speed potentiometer is defective.	1. Perform the ***Control Board Test***. 2. Perform the ***Diode Bridge Tests***. 3. Perform the ***Wire Feed Speed Potentiometer Test***. 4. Replace the motor and tachometer assembly.
The wire feed speed is stuck at 200-300 in/min and there is no change when the wire feed speed knob is adjusted.	1. The tachometer is connected improperly. 2. The tachometer has failed.	1. Verify all of the tachometer leads are properly connected. 2. Replace the motor and tachometer assembly.
Poor arc starts with sticking or "Blast-offs", weld porosity, narrow or ropy looking beads.	1. Improper procedures or techniques.	1. See "Gas metal arc welding guide" (GS-100).

⚠ 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
GAS SHIELDING ISSUES		
No shielding gas.	1. The gas supply is off or empty. 2. The gas hose is cut or crushed. 3. The flow meter is closed. Dirt or debris is in the solenoid. 4. There is a loose connection at the solenoid. 5. The solenoid has failed.	1. Verify the gas supply is ON and flowing. 2. Re-route the gas hose to avoid sharp corners and make sure it is free of debris. Repair or replace damaged hoses. 3. Open the flow meter valve. 4. Apply 80 psi of filtered air to the solenoid to remove dirt and debris. 5. Remove the cover and verify that all the connections are in good condition. 6. Perform the ***Gas Solenoid Test,*** replace if necessary.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact 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 Covers.

MATERIALS NEEDED

5/8" Wrench
5/8” Torque Wrench
5/16" Nutdriver
Cable Ties

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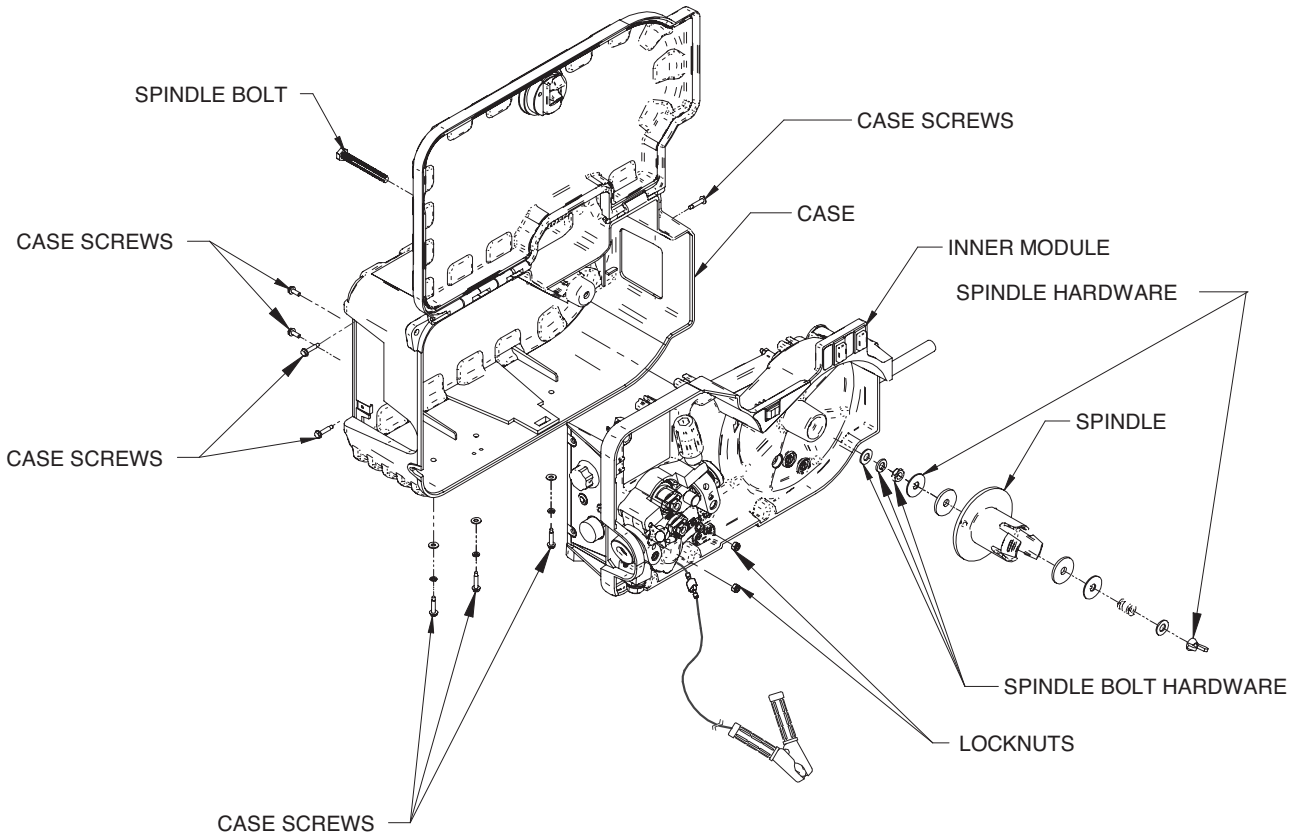
CASE COVER REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.1 – CASE COVER REMOVAL



REMOVAL PROCEDURE

⚠ WARNING

ELECTRIC SHOCK can kill.

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

---

1. Turn power off at the welding power source.
2. Remove the hardware securing the spindle to the spindle bolt and set aside. See Figure F.1.
3. Using a 5/8” wrench, remove the nut securing the spindle bolt and associated hardware to the inner module and set aside. See Figure F.1.
4. Using a 5/16” nutdriver, remove the eight screws and two locknuts securing the case to the inner module on the front, rear, back and bottom. See Figure F.1, ***Figure F.5 and F.6***.
5. Gently pry on lower portion of the inner module to clear inner module from speed clips. See ***Figure F.2***.
6. Remove the inner module from the case cover and set aside.
7. Position inner module as shown in ***Figure F.2***.
8. Replace speed clips as required (4 locations).

CASE COVER REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.2 – INNER MODULE

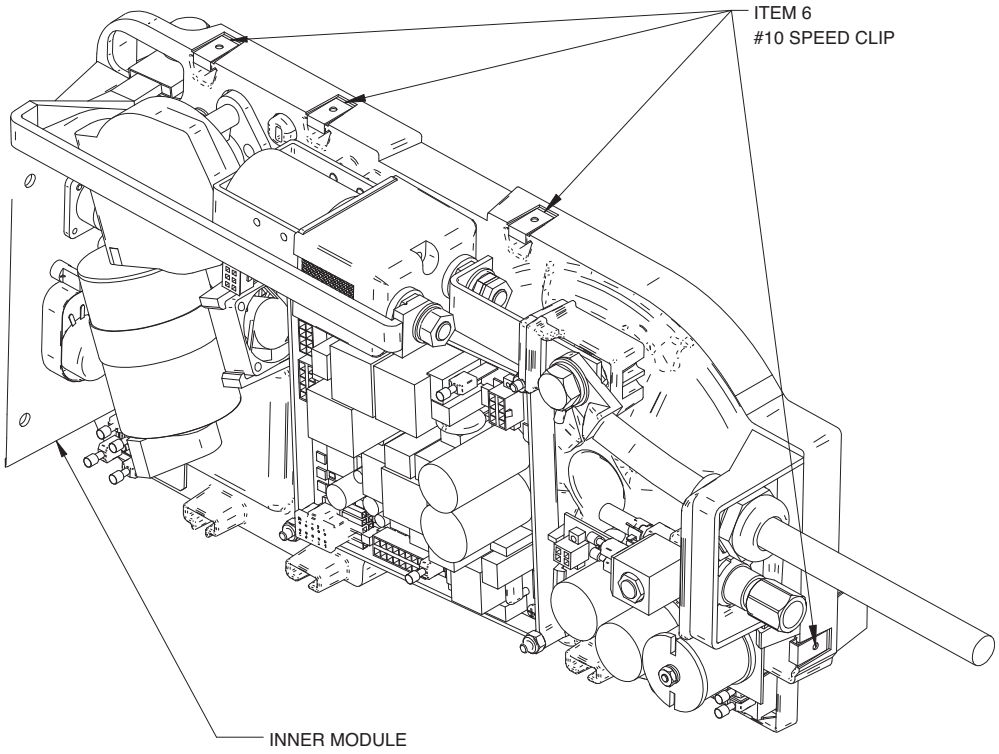
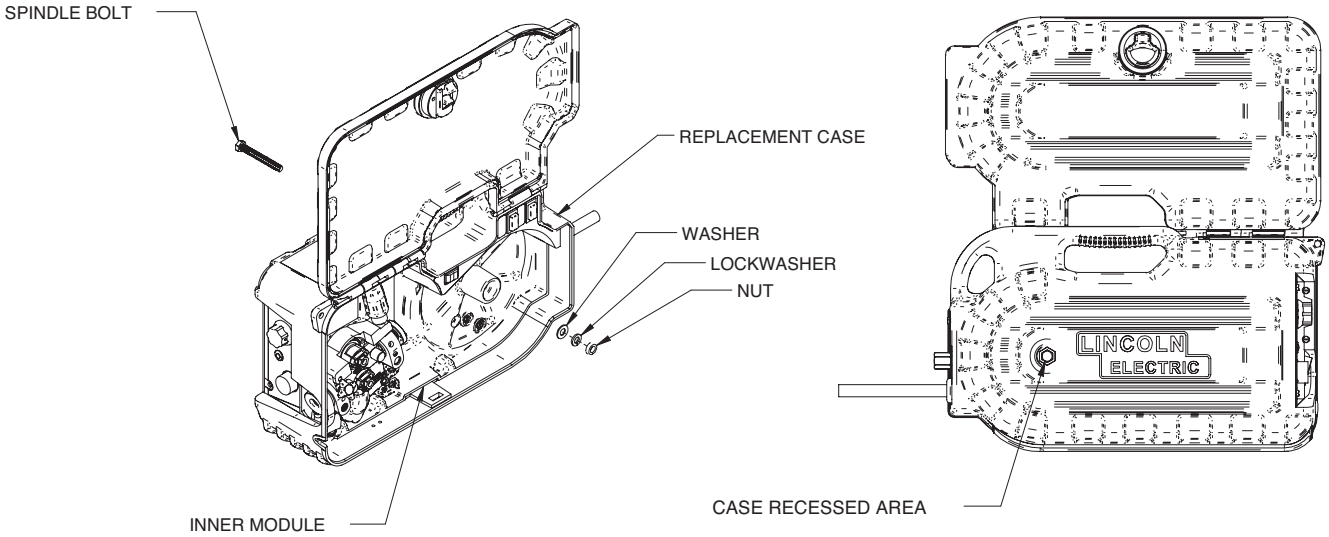


FIGURE F.3 – SPINDLE BOLT REPLACEMENT



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CASE COVER REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.4 – SPINDLE AND HARDWARE REPLACEMENT

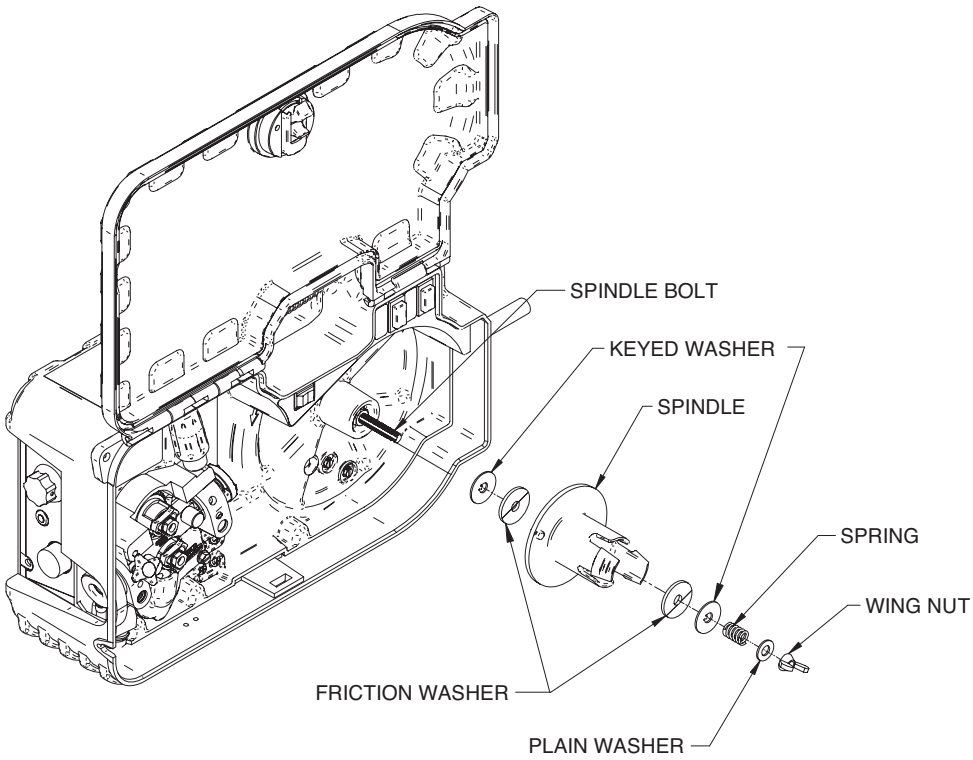
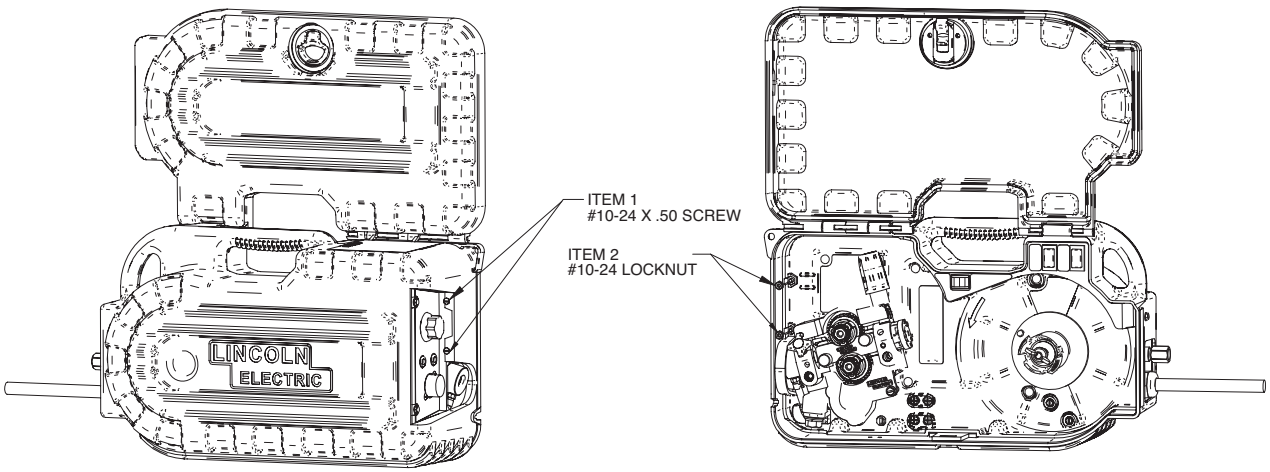


FIGURE F.5 – CASE COVER SCREW LOCATIONS



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CASE COVER REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.6 – CASE COVER SCREW LOCATIONS

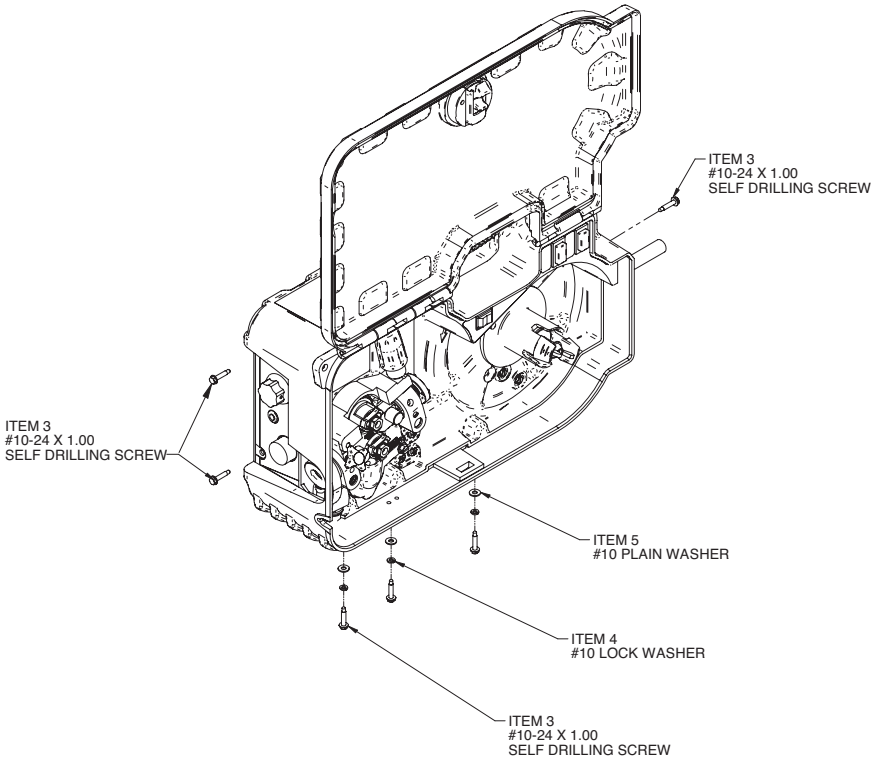
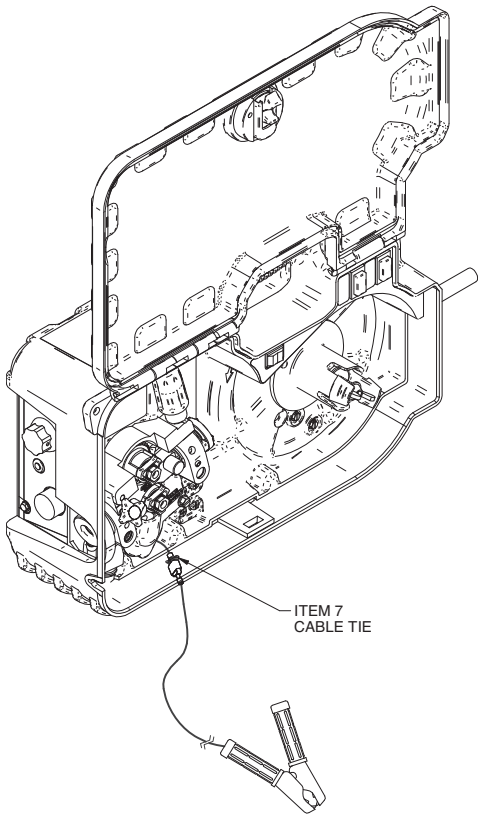


FIGURE F.7 – GROUND LEAD CABLE TIE LOCATION



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CASE COVER REMOVAL AND REPLACEMENT PROCEDURE (continued)

REPLACEMENT PROCEDURE

1. Position the inner module into the case.
2. Position spindle bolt in recessed area on case rear.
3. Using a 5/8" torque wrench, attach washer, lock washer and nut previously removed to the spindle bolt. Tighten to 23-29 in/lbs.
4. Attach the previously removed spindle hardware to the spindle bolt in the following order: (See ***Figure F.3***)

- Keyed washer (stainless)
- Friction washer (fiber)
- Spindle
- Friction washer (fiber)
- Keyed washer (stainless)
- Spring
- Plain washer
- Wing nut

5. Using a 5/16" nutdriver, attach the two screws and locknuts previously removed to the case and inner module. Tighten to 19-23 in/lbs. See ***Figure F.4***.
6. Using a 5/16" nutdriver, attach the three self tapping screws previously removed from the front and rear of the case. Tighten to 19-23 in/lbs. See ***Figure F.5***.
7. Using a 5/16" nutdriver, attach the three self drilling screws, lockwashers and plain washers previously removed to the bottom of the case. Tighten to 19-23 in/lbs. See ***Figure F.5***.
8. Secure the ground lead assembly to the case side using a cable tie. See ***Figure F.6***.

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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 Solenoid Circuit is faulty.

MATERIALS NEEDED

Multi Meter
Wiring Diagram

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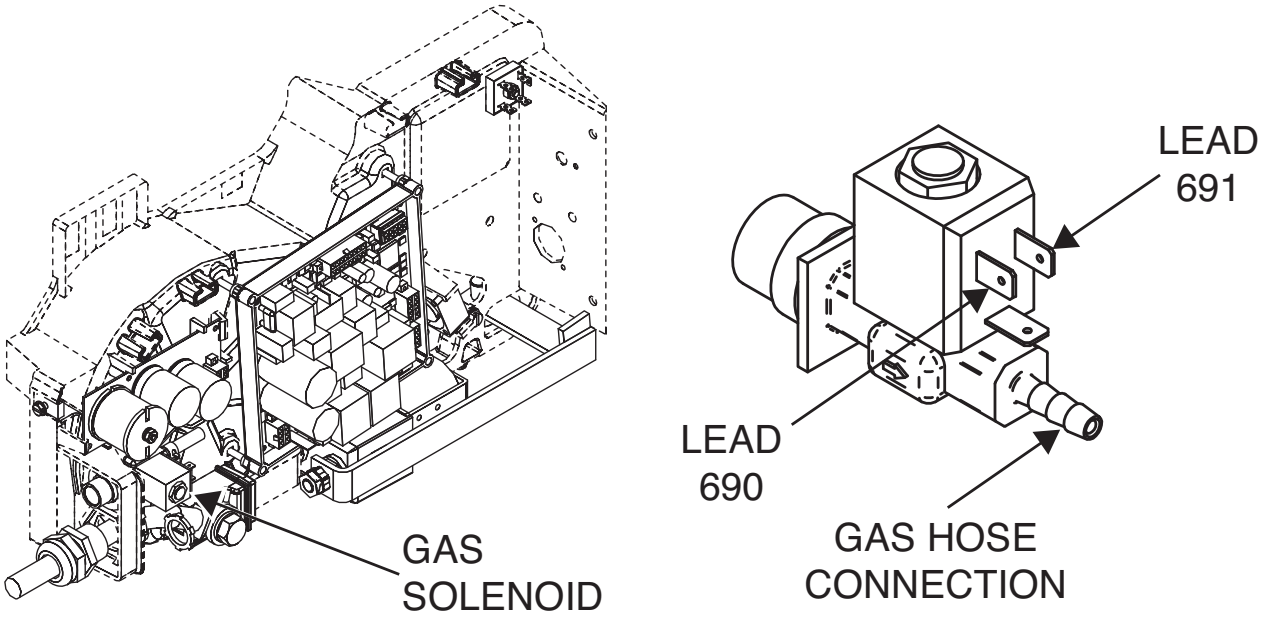
GAS SOLENOID TEST (continued)

FIGURE F.8 – GAS SOLENOID LOCATION



PROCEDURE

⚠ WARNING

ELECTRIC SHOCK can kill.

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

---

1. Remove input power from the ACTIV8™.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the gas solenoid. See Figure F.8.
4. Apply the correct input voltage to the ACTIV8™.
5. While pressing the gas purge button or activating the gun trigger, check for approximately 4VDC is present at solenoid leads 690 and 691. If the 4VDC is present the solenoid should activate. If the 4VDC is present but the solenoid does not activate the solenoid may be faulty.
6. If the 4VDC is missing or low, check the leads and connections between the solenoid and the control board. See the Wiring Diagram. If the leads and connections are ok, the control board may be faulty.
7. If high voltage is seen (approx 35 volts) the solenoid coil is open. Normal solenoid coil resistance is 22 ohms.
8. The solenoid coil can also be checked by disconnecting the leads and applying 12VDC directly to the terminals. If the solenoid does not activate, the solenoid is faulty.
9. If the solenoid fails any of these tests, perform the ***Gas Solenoid Removal and Replacement Procedure***.
10. Perform the ***Case Cover Replacement Procedure***.
11. Perform the ***Retest After Repair Procedure***.

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CONTACTOR 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 help determine if the Contactor is faulty.

MATERIALS NEEDED

Multi Meter
Wiring Diagram

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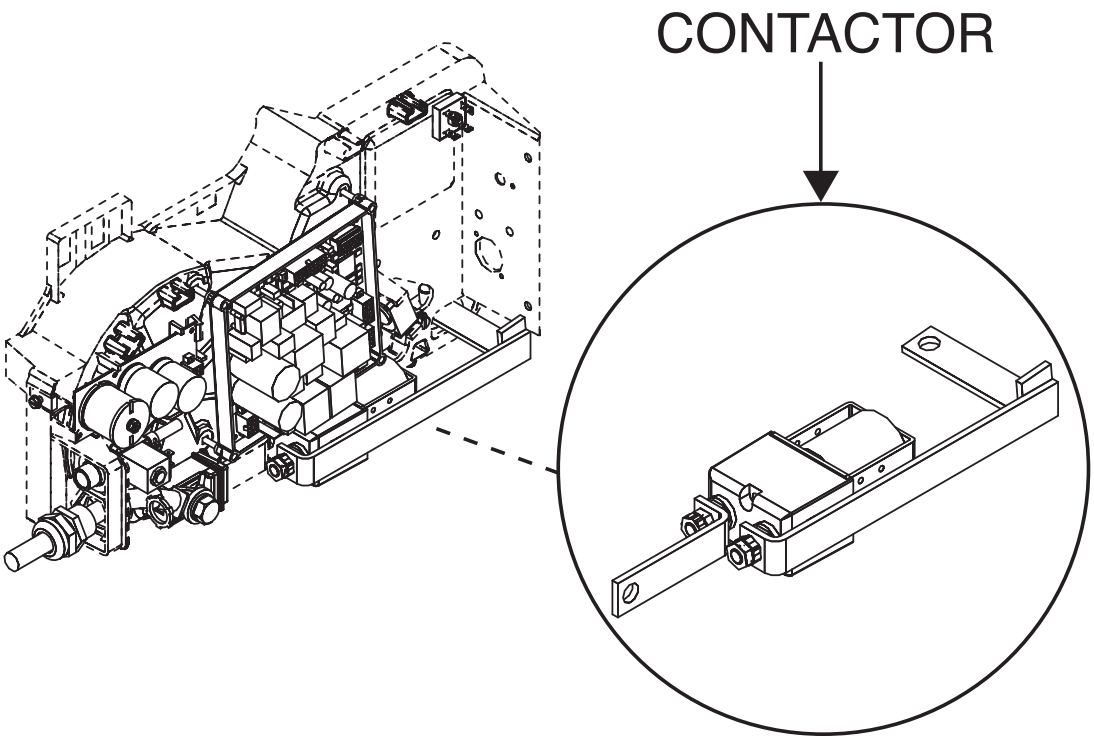
CONTACTOR TEST (continued)

FIGURE F.9 – CONTACTOR LOCATION



PROCEDURE

⚠ WARNING

ELECTRIC SHOCK can kill.

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

---

1. Remove input power from the ACTIV8™.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the contactor. See Figure F.9.
4. Apply the correct input voltage to the ACTIV8™.
5. Check for the correct voltage at leads 507 and 578 between Control Board and the contactor. Look for 32VDC when the trigger is open and 3VDC when it is closed. See Wiring Diagram.
6. If the 3VDC is missing or low, check the leads and connections between the contactor and the control board. See Wiring Diagram. If the leads and connections are ok, the control board may be faulty.
7. Normal solenoid coil resistance is 4 ohms.
8. The contactor can also be checked by disconnecting the leads and applying 12VDC directly to the terminals. If the solenoid does not activate the solenoid is faulty.
9. If the contactor does not pass all of these tests, perform the ***Contactor Removal And Replacement Procedure***.
10. Perform the ***Case Cover Replacement Procedure***.
11. Perform the ***Retest After Repair Procedure***.

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DRIVE MOTOR AND TACH FEEDBACK 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

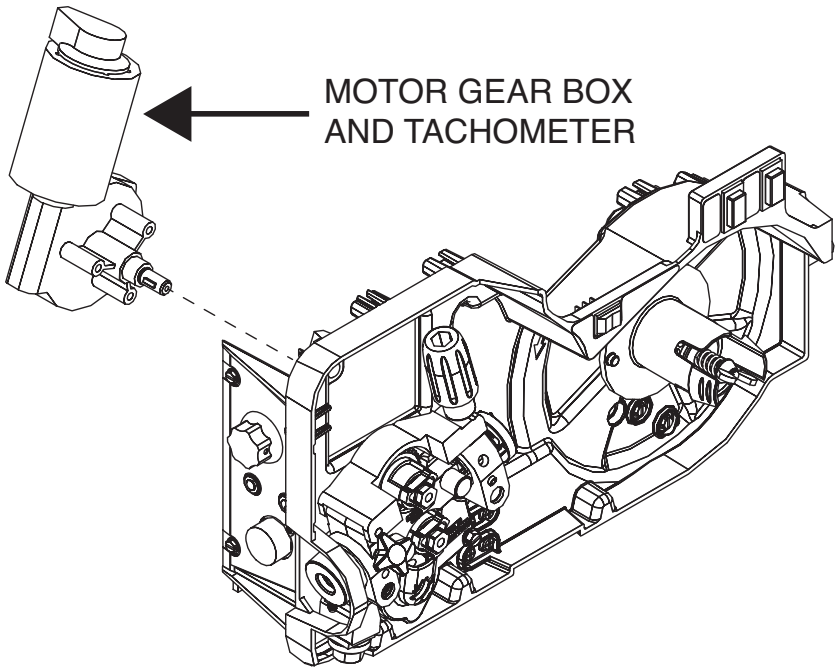
This test will help determine if the Drive Motor and Tach Circuit is faulty.

MATERIALS NEEDED

Multi Meter
Wiring Diagram

DRIVE MOTOR AND TACH FEEDBACK TEST (continued)

FIGURE F.10 – DRIVE MOTOR AND TACH LOCATION



PROCEDURE

⚠ WARNING

ELECTRIC SHOCK can kill.
- **Do not touch electrically live parts or electrodes with your skin or wet clothing.**
- **Insulate yourself from the work and ground.**
- **Always wear dry insulating gloves.**

---

1. Remove input power from the ACTIV8™.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the two motor leads and the three tach leads. See Wiring Diagram.
4. Apply the correct input voltage to the ACTIV8™.
5. With trigger activated and the motor is running check for 2.6VDC minimum to 32VDC maximum between the black and white motor leads (pins 7 and 8).

NOTE: If the tach feedback is missing the board will limit the motor voltage to 10VDC no matter where the wire feed speed potentiometer is set.

6. Check for 1.5 ohms of resistance between the black and white leads. Also make sure there is at least 550k ohms of resistance between both leads and the motor shell.
7. With the trigger activated and the motor running check for 15.6VDC input on the black and red tach leads. Check for 6.2VDC at any speed or (72hz) min. to (1.2khz)max. on the black and blue return leads.
8. For further testing on the drive motor you can use an isolated source and apply between 2.6VDC and 32VDC to the motor leads.
9. If all the above voltages are not present, your motor or tach needs to be replaced.
10. Perform the ***Wire Drive Motor and Gear Box Removal And Replacement Procedure***.
11. Perform the ***Case Cover Replacement Procedure***.
12. Perform the ***Retest After Repair Procedure***.

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MOTOR OVERLOAD 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 Motor Overload Circuit is faulty.

MATERIALS NEEDED

Multi Meter
Wiring Diagram

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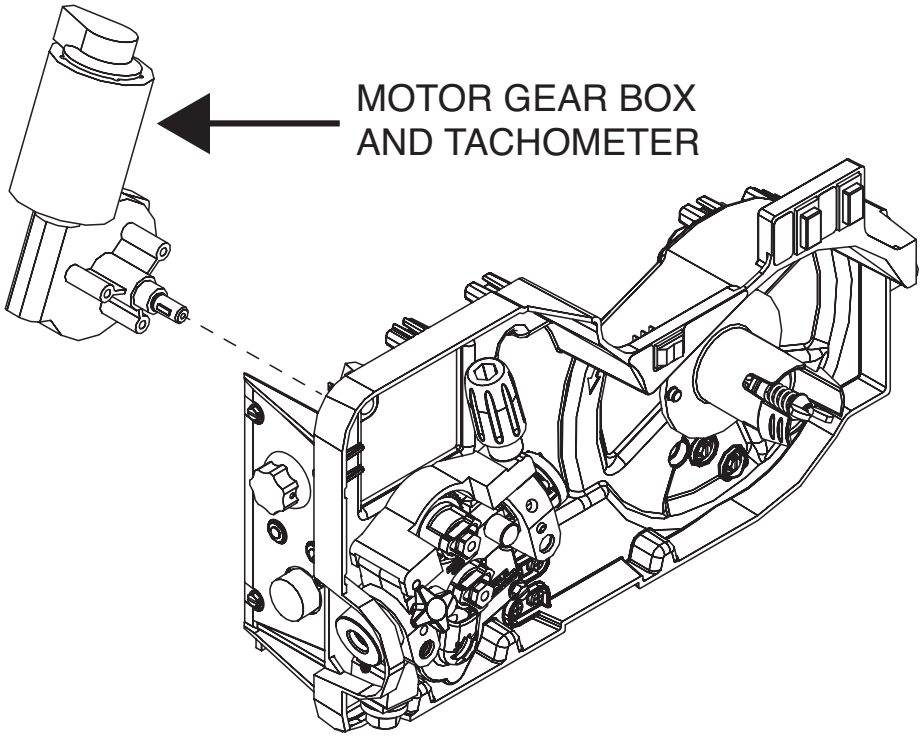
MOTOR OVERLOAD TEST (continued)

FIGURE F.11 – MOTOR AND TACH LOCATION



PROCEDURE

⚠ WARNING

ELECTRIC SHOCK can kill.

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

---

1. Remove input power from the ACTIV8™.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the two motor leads and the three tach leads. See Wiring Diagram.
4. Apply the correct input voltage to the ACTIV8™.
5. With the trigger activated and the motor running check the motor armature current. Normal armature current is less then 3 amps.
6. If the amperage exceeds 3.2 amps for more than 8 seconds the motor will be disabled.
7. If the motor armature current is normal and the motor still shuts down, the control board may be faulty.
8. Perform the ***Control Board Test***.
9. If the current is high, check for restrictions in the feed system. They can be caused by a clogged liner, spindle tightness, drive rolls to tight, faulty drive motor or a faulty gearbox.
10. After testing replace faulty parts and perform the ***Case Cover Replacement Procedure***.
11. Perform the ***Retest After Repair Procedure***.

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DIODE BRIDGE TESTS

⚠ 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 help determine if the Diode Bridge is receiving the correct AC input voltages and is converting them to the correct DC output voltages.

MATERIALS NEEDED

5/16” Nutdriver
42VAC Power Supply
Multi Meter
Wiring Diagram

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Return to Section TOC
Return to Master TOC
Return to Section TOC
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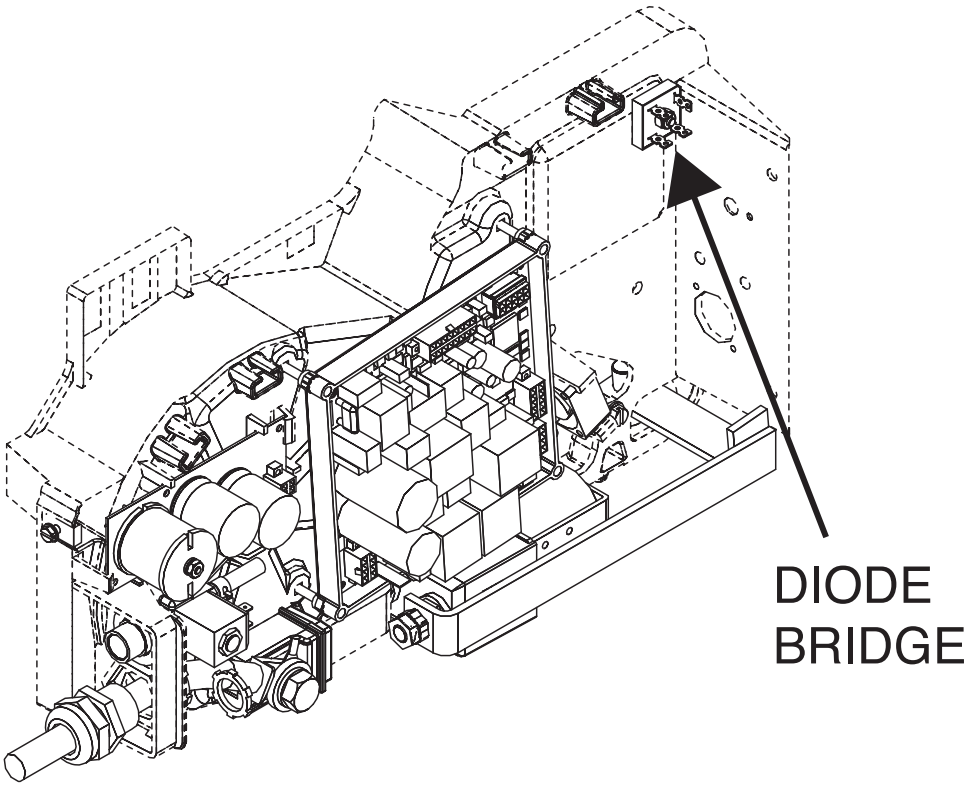
DIODE BRIDGE TESTS (continued)

FIGURE F.12 – DIODE BRIDGE LOCATION



ACTIVE DIODE BRIDGE TEST

⚠ WARNING

ELECTRIC SHOCK can kill.
- **Do not touch electrically live parts or electrodes with your skin or wet clothing.**
- **Insulate yourself from the work and ground.**
- **Always wear dry insulating gloves.**

---

1. Remove input power from the ACTIV8™.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the diode bridge on the vertical case panel. See Figure F.12.
3. Apply the correct input voltage to the ACTIV8™.
4. Check for the correct input voltage at leads WORK A and 67B on the bridge. If the input voltage is not there, inspect the wiring back to the work clip and electrode cable (electrode cable @ output contactor). See ***Figure F.13***. See Wiring Diagram.
5. Check for the proper output on leads 621 negative and 67B positive. The voltage should be the same as the input voltage at 667A and 621. See ***Figure F.13***. See Wiring Diagram.
6. If output voltage at 67A and 621 is significantly lower then at WORK A and 67B, then bridge is defective. See ***Figure F.13***. See Wiring Diagram.
7. If Bridge is faulty, replace it.
8. Perform the ***Case Cover Replacement Procedure***.
9. Perform the ***Retest After Repair Procedure***.

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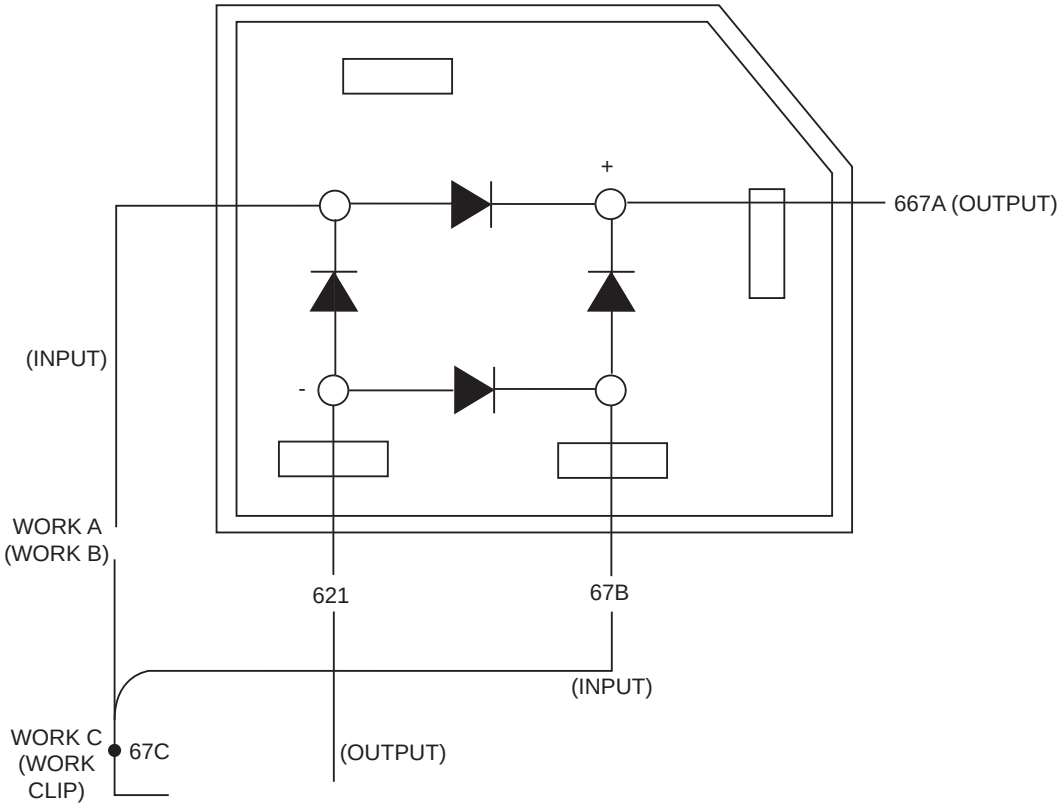
DIODE BRIDGE TESTS (continued)

FIGURE F.13 – ACTIVE DIODE BRIDGE TEST



PASSIVE DIODE BRIDGE TEST

⚠ WARNING

ELECTRIC SHOCK can kill.

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

---

1. Remove input power from the ACTIV8™.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the diode bridge on the vertical case panel. See ***Figure F.12***.
4. Set your volt/ohmmeter to check for continuity.
5. Make note of where the leads are currently on the diode bridge and then remove the leads to isolate the diode bridge for this test.
6. Verify values in Table F.1 and confirm the expected results. See Table F.1. See Wiring Diagram. See ***Figure F.14***.

TABLE F.1 – TEST POINTS

POSITIVE LEAD	NEGATIVE LEAD	EXPECTED RESULT
PIN 1	PINS 2 OR 4	OPEN
PINS 2 OR 4	PIN 1	SHORT
PINS 2 OR 4	PIN 3	OPEN
PIN 3	PINS 2 OR 4	SHORT

Short = Low Ohm Value

Open = High Ohm Value

7. If test results do not match the table, the diode bridge may be faulty.

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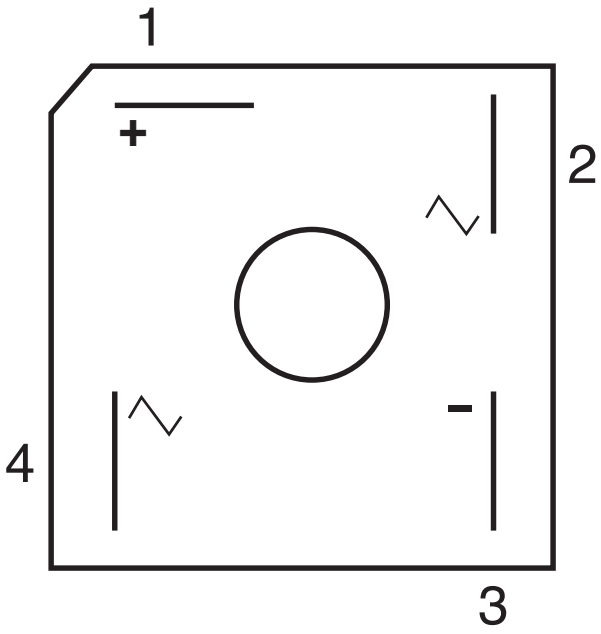
PASSIVE DIODE BRIDGE TESTS (continued)

FIGURE F.14 – PASSIVE DIODE BRIDGE TEST



8. If Bridge is faulty, replace it.
9. Perform the ***Case Cover Replacement Procedure***.
10. Perform the ***Retest After Repair Procedure***.

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CONTROL BOARD 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 Control Board is able to produce the PWM (Pulse Width Modulated) gate signal needed to control the IGBTs (Insulated Gate Bipolar Transistor) on the Chopper Module. This test will also verify that the Control Board can turn the PWM gate signal on and off properly.

MATERIALS NEEDED

Multi Meter
Wiring Diagram
Control Inner-Connection Diagram

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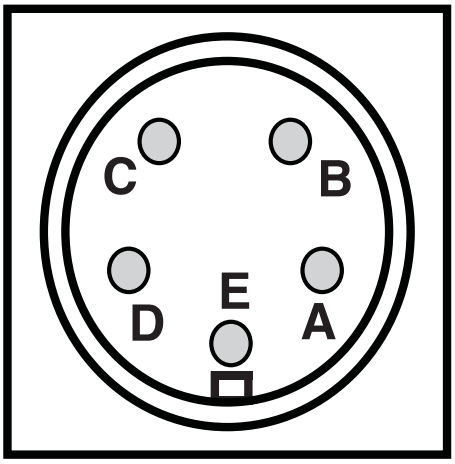
CONTROL BOARD TEST (continued)

FIGURE F.15 – 5-PIN AMPHENOL



PROCEDURE

⚠ WARNING

ELECTRIC SHOCK can kill.
- **Do not touch electrically live parts or electrodes with your skin or wet clothing.**
- **Insulate yourself from the work and ground.**
- **Always wear dry insulating gloves.**

---

1. Remove input power from the ACTIV8™.
2. Perform the ***Case Cover Removal Procedure***.
3. Apply the correct input DC voltage to the ACTIV8™.
4. Pull the trigger on gun / or close contactor by jumpering A & C together in the 5-pin amphenol. See Figure F.15.
5. Measure the input voltage at the control board lead 667B on plug J5-1 and lead 621 on plug J5-8. This voltage should be the same as the voltage applied to the electrode lead and WORK lead (21) in step 3. If the voltage is the same continue to step 9. If the voltage is less or there is no voltage at the control board see ***Diode Bridge Tests*** and then continue to the next step. See ***Figure F.16***. See Wiring Diagram.
6. If diode bridge checks good, check input at the motor filter board leads 667A and 621. See Wiring Diagram.
7. Check output at filter board leads 667B and 621. See Wiring Diagram. If they are the same the filter board is ok.
8. If the output is low or missing replace the motor filter board, then continue to step 9.

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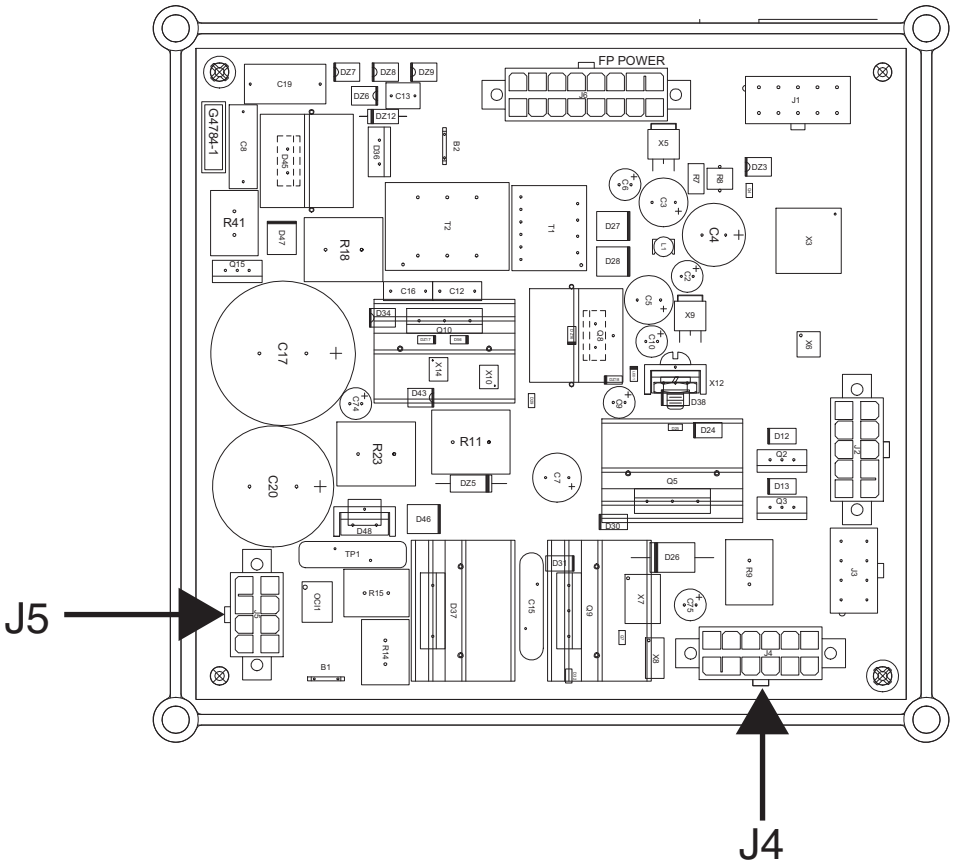
CONTROL BOARD TEST (continued)

FIGURE F.16 – CONTROL BOARD PLUG LOCATIONS



9. Measure the drive motor voltage at leads 551 on plug J4-2 and 550 on plug J4-1. The expected readings are as follows: 1.8 VDC at minimum wire feed speed to 23 VDC at maximum wire feed speed. See Figure F.16. See Wiring Diagram.
10. Check the voltage at contactor lead 578 on plug J4-8 and lead 507 on plug J4-5. The expected readings are as follows: 3 VDC with contactor closed and 35 VDC with contactor open. See Figure F.16. See Wiring Diagram.
11. Check the voltage at gas solenoid lead 690 on plug J4-3 and lead 691 on plug J4-4, The expected readings are as follows: 4 VDC with closed contactor and 35 VDC open contactor. See Figure F.16. See Wiring Diagram.
12. If any of these voltages are missing or outside the test parameters the control board is faulty.
13. If faulty, perform the ***Control Board Removal And Replacement Procedure***.
14. Connect any previously removed leads and plugs.
14. Perform the ***Case Cover Replacement Procedure***.
15. Perform the ***Retest After Repair Procedure***.

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NOTES

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WIRE FEED SPEED POTENTIOMETER 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 help determine if the Wire Feed Speed Potentiometer is receiving and sending the correct voltages.

MATERIALS NEEDED

Multi Meter
Wiring Diagram

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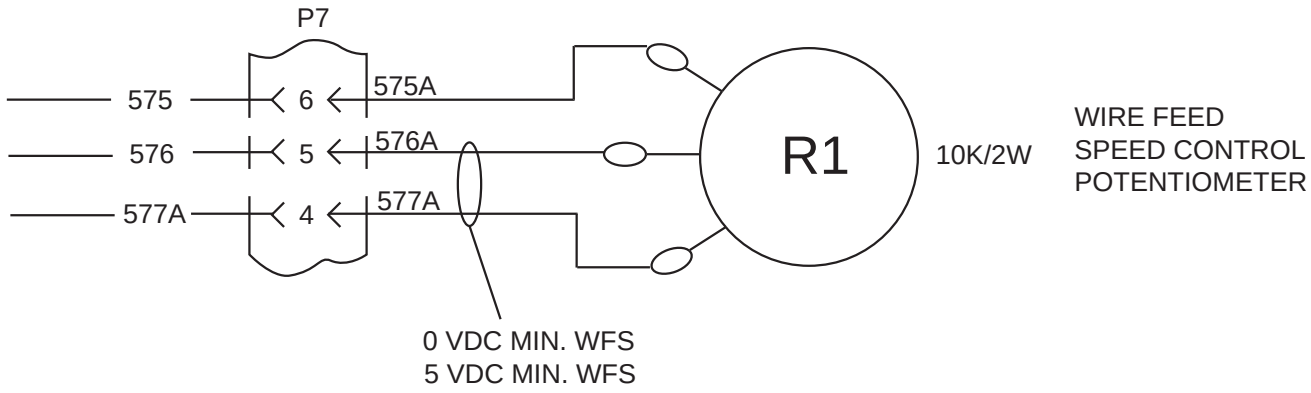
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

WIRE FEED SPEED POTENTIOMETER TEST (continued)

FIGURE F.17 – WIRE FEED SPEED POTENTIOMETER TEST POINTS



PROCEDURE

⚠ WARNING

ELECTRIC SHOCK can kill.

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

---

1. Remove input power from the ACTIV8™.
2. Perform the ***Case Cover Removal Procedure***.
3. Apply the correct input voltage to the ACTIV8™.
4. Locate the P7 plug in-line to the potentiometer. See Wiring Diagram. See Figure F.17.
5. Check for 0VDC minimum to 5VDC maximum between wires 577 and 576. If the voltage is not there, check the wires for continuity back to the control board. If the wiring checks out good, the control board may be faulty.
6. The potentiometer can also be checked by unplugging the P7 connection and checking for 0 to 10k ohms between leads 577 and 576. See Wiring Diagram.
7. Reconnect any previously removed plugs or leads.
8. Perform the ***Case Cover Replacement Procedure***.
9. Perform the ***Retest After Repair Procedure***.

Return to Section TOC
Return to Master TOC

CONTACTOR 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 Contactor.

MATERIALS NEEDED

17mm Nutdriver
3/4” Nutdriver
Phillips Screwdriver
Torque Wrench
Wiring Diagram

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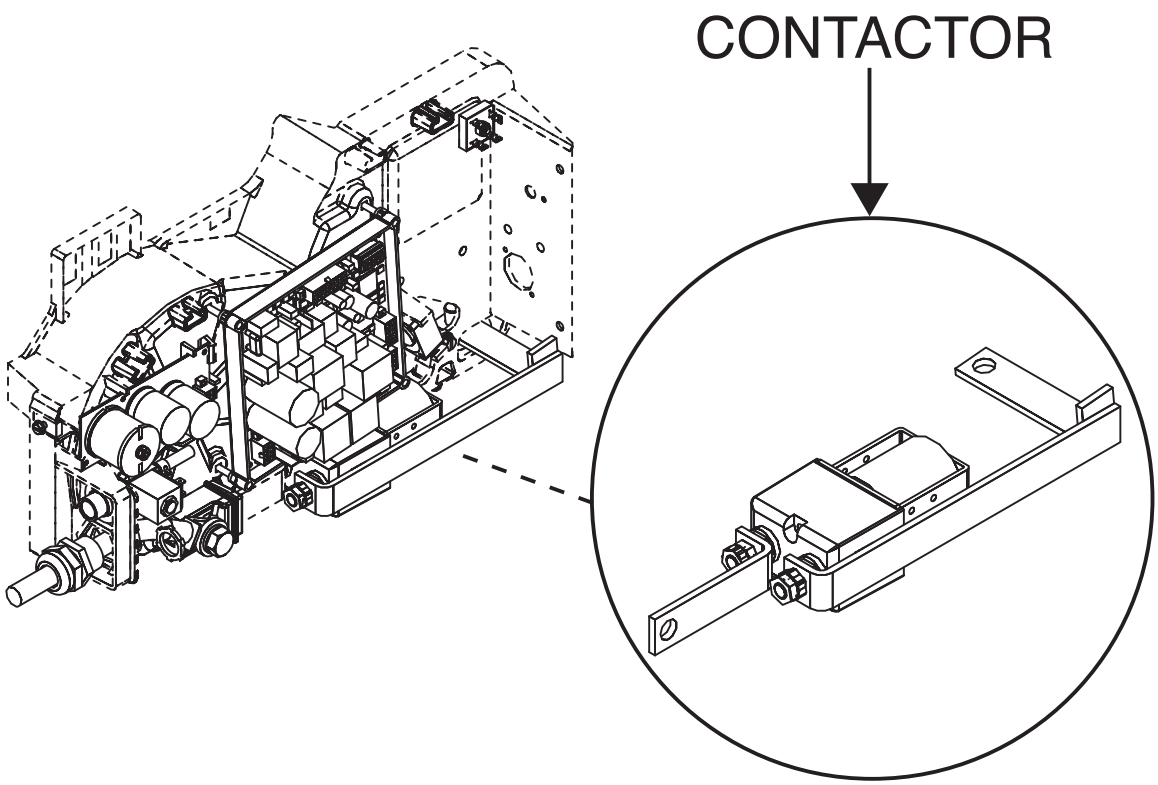
CONTACTOR REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.18 – CONTACTOR LOCATION



REMOVAL PROCEDURE

⚠ WARNING

ELECTRIC SHOCK can kill.

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

---

1. Remove input power from the ACTIV8™.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate contactor. See Figure F.18.
4. Disconnect in-line contactor connections. See Wiring Diagram.
5. Using a 17mm nutdriver, disconnect outer contactor nut and remove outer buss bar. See ***Figure F.19***. Note washer placement for reassembly.
6. Using a 3/4" nutdriver, remove the bolt securing the mounting block. See ***Figure F.19***. Note washer placement for reassembly.
7. Using a phillips screwdriver, remove the four mounting screws securing the contactor to the inner module. See ***Figure F.20***.
8. Using a 3/4" nutdriver, remove the bolt securing the inner buss bar. See ***Figure F.19***. Note washer and lead placement for reassembly.
9. Remove contactor from ACTIV8™.

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CONTACTOR REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.19 – CONTACTOR REMOVAL

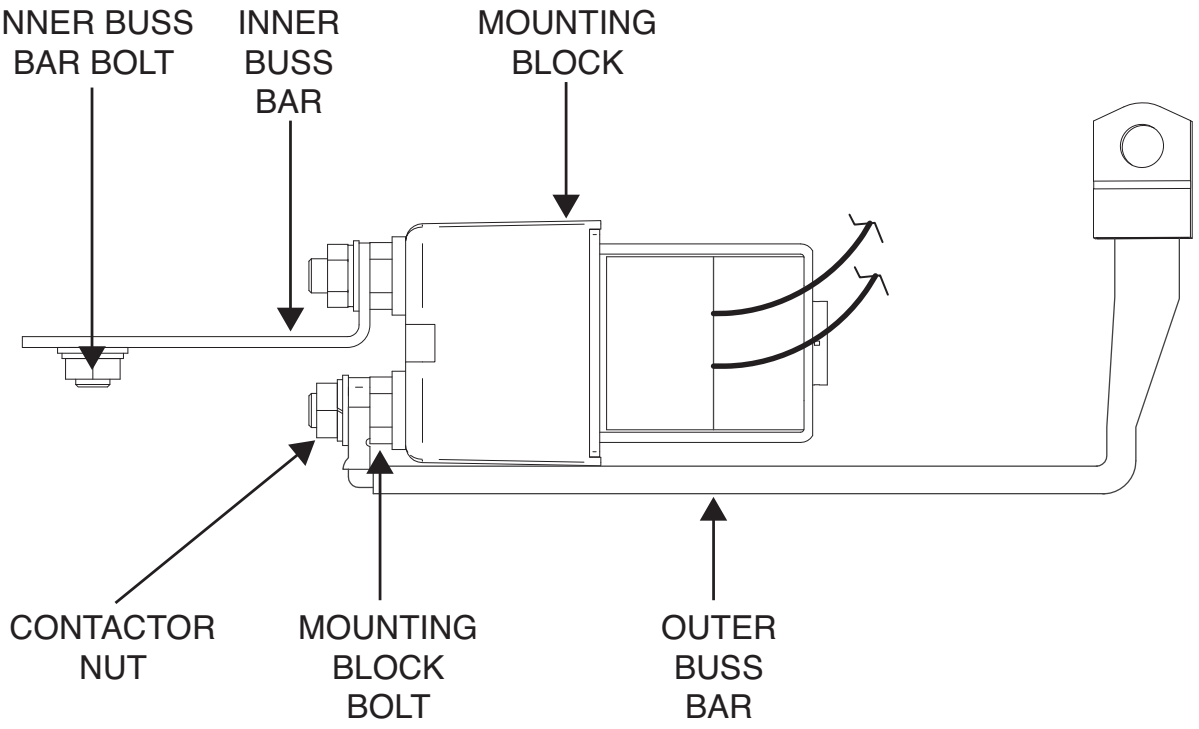
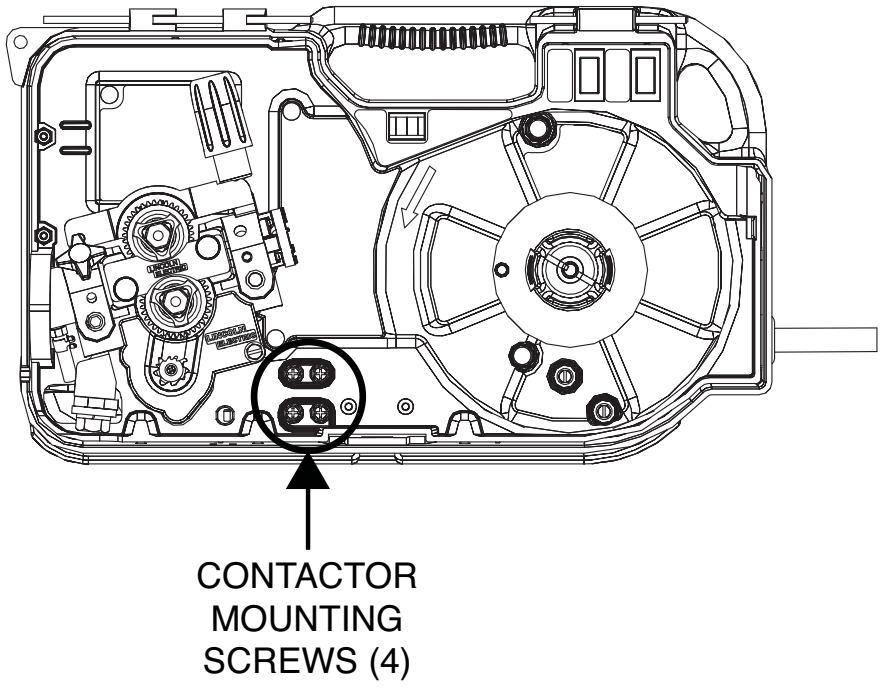


FIGURE F.20 – CONTACTOR MOUNTING SCREWS LOCATION



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CONTACTOR REMOVAL AND REPLACEMENT PROCEDURE (continued)

REPLACEMENT PROCEDURE

1. Carefully position new contactor into the machine.
2. Using a 3/4” nutdriver, loosely connect the inner buss bar to the new contactor. Align with mounting block on table and tighten inner contactor nut to 15 ft/lbs.
3. Slide the buss bar into the mounting block, attach cable and tighten the mounting bolt to 15 ft/lbs.
4. Using a phillips screwdriver, attach the previously removed screws securing the contactor to the control box.
5. Using a 3/4” nutdriver, tighten the bolt securing the mounting block.
6. Using a 17mm nutdriver, tighten the outer contactor nut securing the outer buss bars to the contactor (15 ft/lbs.).
7. Connect the previously removed in-line contactor leads. See Wiring Diagram.
8. Perform the ***Case Cover Replacement Procedure***.

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WIRE DRIVE MOTOR AND GEAR BOX 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 And Gear Box

MATERIALS NEEDED

3/8” Nutdriver
Pliers
3/4” Nutdriver
Phillips Screwdriver
Wiring Diagram

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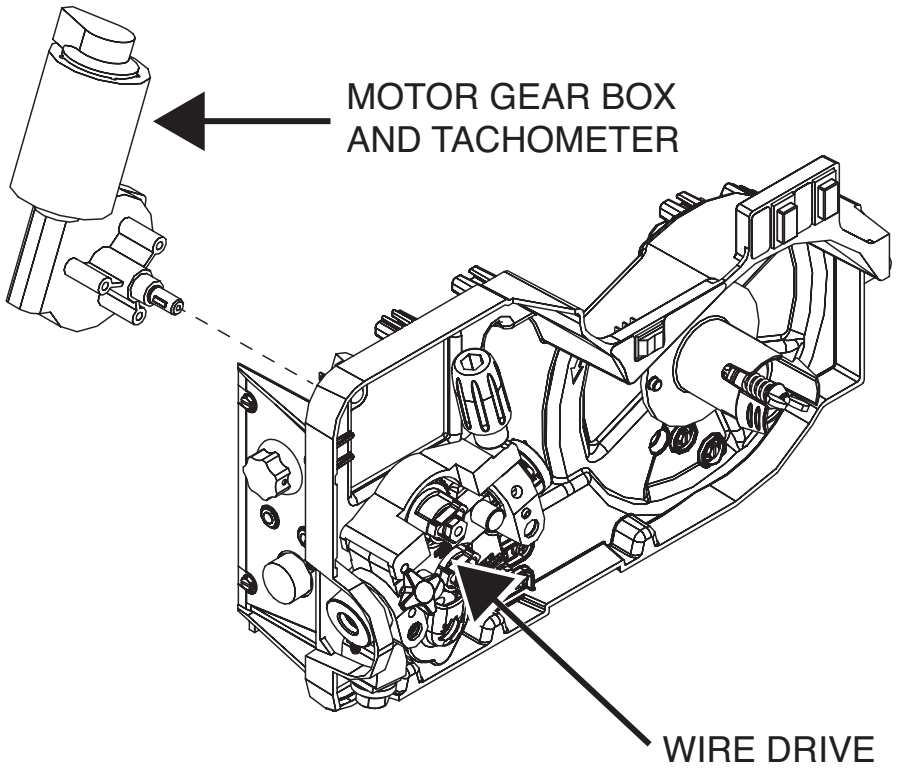
WIRE DRIVE MOTOR AND GEAR BOX REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.21 – WIRE DRIVE MOTOR AND GEAR BOX LOCATION



REMOVAL PROCEDURE

⚠ WARNING

ELECTRIC SHOCK can kill.

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

---

1. Remove input power from the ACTIV8™.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate wire drive motor and gear box assembly. See Figure F.21.
4. Using a 3/4" nutdriver, remove the bolt securing the buss bar to the wire drive. See ***Figure F.22***. Note washer placement for reassembly.
5. Using pliers, release tension on the hose clamp and disconnect gas hose from the drive motor. See ***Figure F.22***.
6. Using a 3/8" nutdriver, remove the plastic drive gear cover. See ***Figure F.23***.
7. Using a phillips screwdriver, remove the screw securing the drive gear. See ***Figure F.23***. Note washer and collar placement for reassembly.
8. Label and disconnect the P20 connector to remove the tach and motor leads. See Wiring Diagram.
9. Using a phillips screwdriver, remove the three pan head screws holding the motor gear box to the motor panel and lift the motor out of the machine. See ***Figure F.23***.
10. Using a 3/8" nutdriver, remove the four screws from the back of the panel and remove the wire drive. See ***Figure F.24***. Note screw locations for reassembly.

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WIRE DRIVE MOTOR AND GEAR BOX REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.22 – BUSS BAR AND GAS HOSE CONNECTIONS

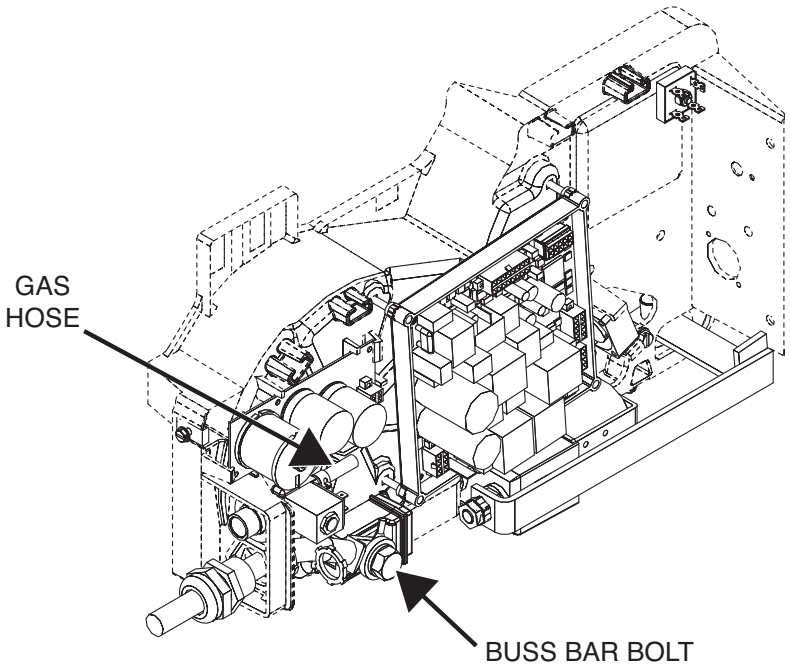
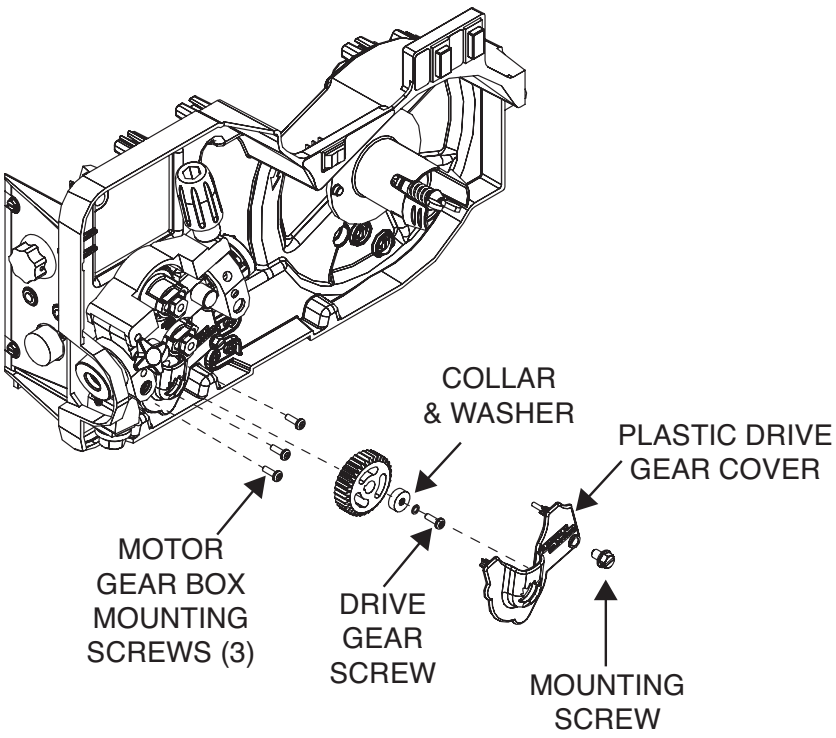


FIGURE F.23 – WIRE DRIVE REMOVAL



Return to Section TOC
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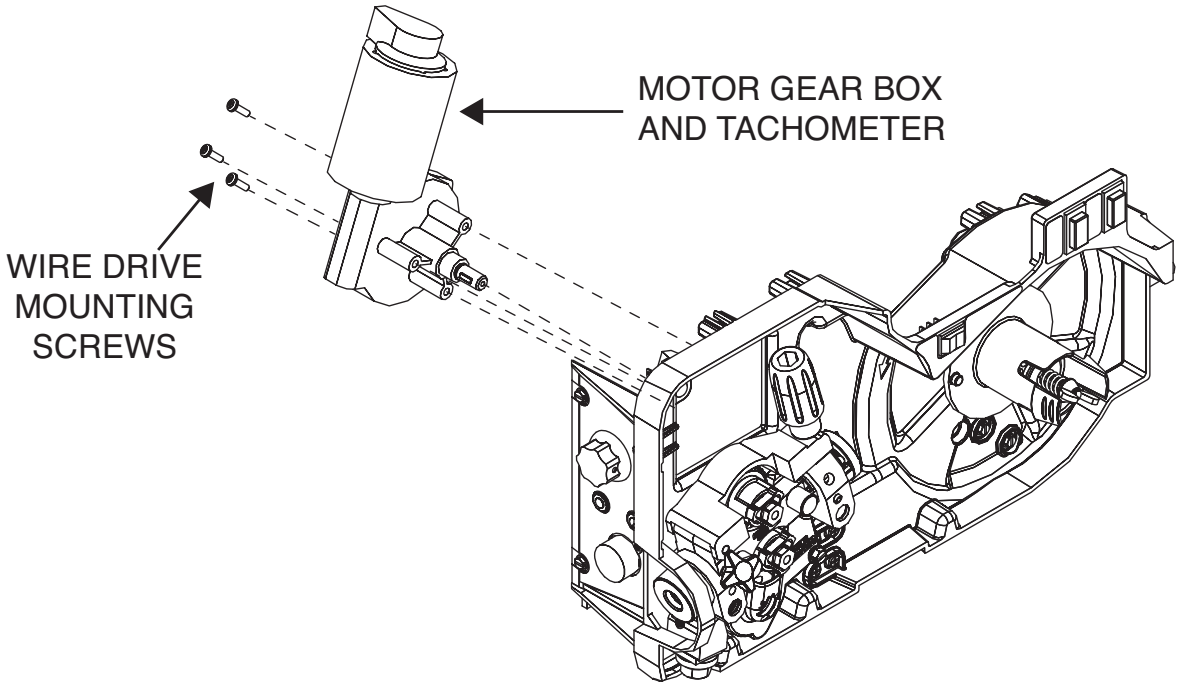
WIRE DRIVE MOTOR AND GEAR BOX REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.24 – WIRE DRIVE MOUNTING SCREWS LOCATION



REPLACEMENT PROCEDURE

1. Using a 3/8” nutdriver, attach the four screws securing the wire drive to the panel.
2. Place the motor gear box in to position on the machine.
3. Using a phillips screwdriver, attach the three previously removed pan head screws securing the motor gear box to the machine.
4. Connect the P20 connections for the motor and tach leads.
5. Using a phillips screwdriver, attach the screw, collar and washer securing the drive gear.
6. Using a 3/8” nutdriver, attach the previously removed plastic gear cover.
7. Attach the gas hose to the drive motor.
8. Using pliers, release tension on the hose clamp and slide into position to secure the gas hose to the drive motor.
9. Using a 3/4” nutdriver, attach the previously removed bolt and washer securing buss bar to the wire drive.
10. Perform the ***Case Cover Replacement Procedure***.

Return to Section TOC
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CONTROL BOARD AND MOTOR FILTER 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 and Motor Filter Board.

MATERIALS NEEDED

3/8” Nutdriver
Phillips Screwdriver
Wiring Diagram

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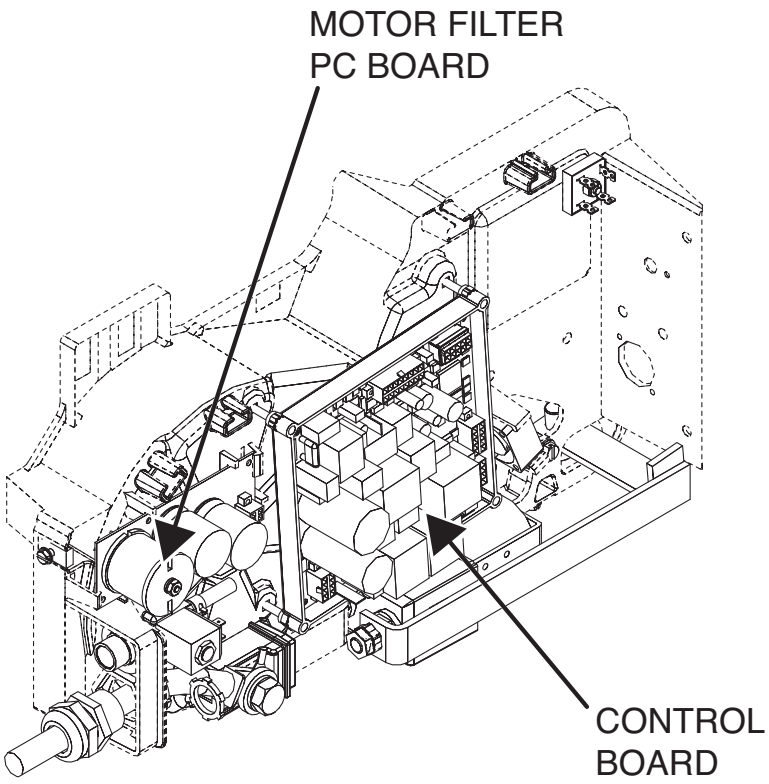
Return to Master TOC
Return to Section TOC
Return to Master TOC
Return to Section TOC
Return to Master TOC

CONTROL BOARD AND MOTOR FILTER BOARD REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.25 – CONTROL BOARD AND MOTOR FILTER BOARD LOCATION



REMOVAL PROCEDURE

⚠ WARNING

ELECTRIC SHOCK can kill.

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

---

1. Remove input power from the ACTIV8™.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the Control Board. See Figure F.25.
4. Label and remove leads B1 and B2 on Control Board. Observe static electricity precautions. See Figure F.25 and ***Figure F.26***.
5. Label and disconnect plugs J2, J3, J4, J5 and J6 from the Control Board. Figure F.25 and ***Figure F.26***.
6. Using a 3/8" nutdriver, remove the four nuts securing the Control Board and remove the board. Figure F.25 and ***Figure F.26***.
7. Locate the motor filter board. See Figure F.25.
8. Label and remove the J61 harness plug from the motor filter board. See Figure F.25 and ***Figure F.27***. See Wiring Diagram.
9. Using a phillips screwdriver, remove the two screws from the motor filter board. See Figure F.25 and ***Figure F.27***.
10. Gently depress the locking tab and remove the motor filter board.

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Return to Master TOC

CONTROL BOARD AND MOTOR FILTER BOARD REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.26 – CONTROL BOARD CONNECTIONS

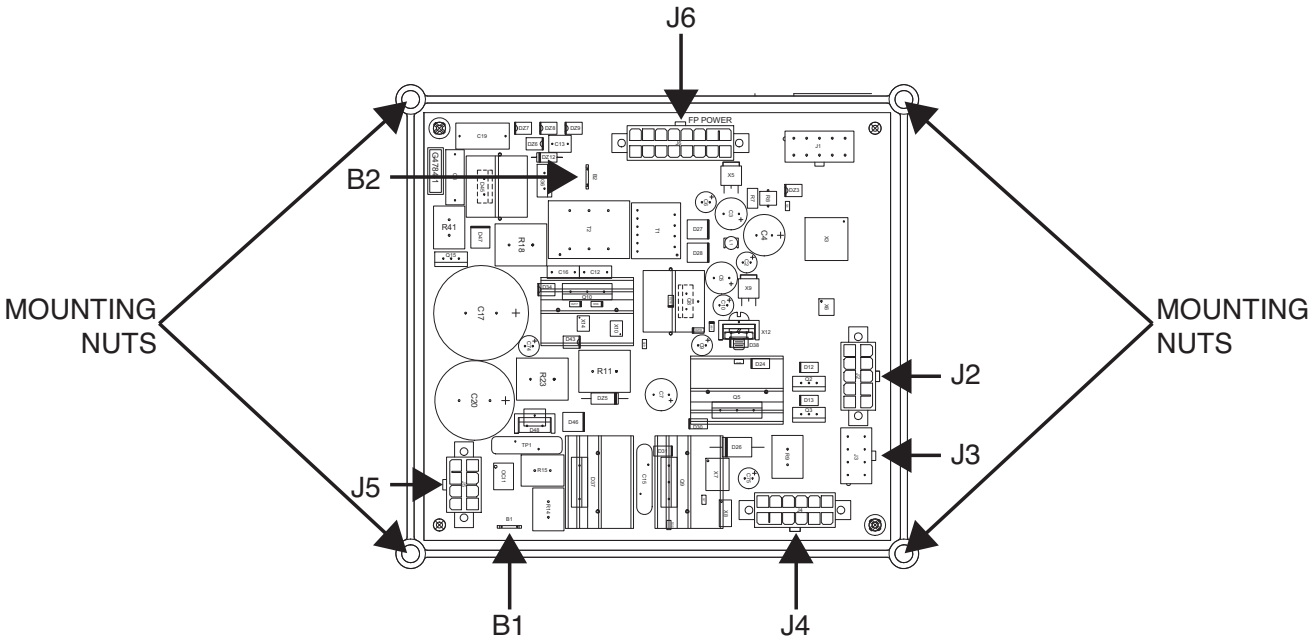
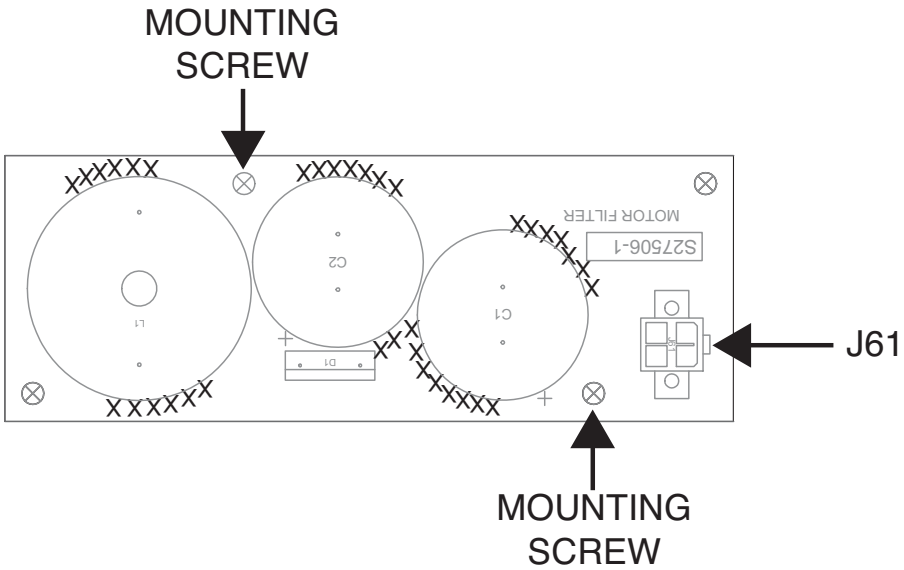


FIGURE F.27 – MOTOR FILTER BOARD CONNECTIONS



CONTROL BOARD AND MOTOR FILTER BOARD REMOVAL AND REPLACEMENT PROCEDURE (continued)

REPLACEMENT PROCEDURE

1. Gently place the new motor filter board into position.
2. Using a phillips screwdriver, attach the two previously removed screws securing the board.
3. Connect the previously removed harness plug to J61 on the motor filter board.
4. Position new Control Board in machine.
5. Using a 3/8” nutdriver, remove the four nuts securing the Control Board.
6. Attach the previously removed harness plugs and leads to the board.
7. Perform the ***Case Cover Replacement Procedure***.

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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

Pliers
Hammer
Slotted Screwdriver
Wiring Diagram

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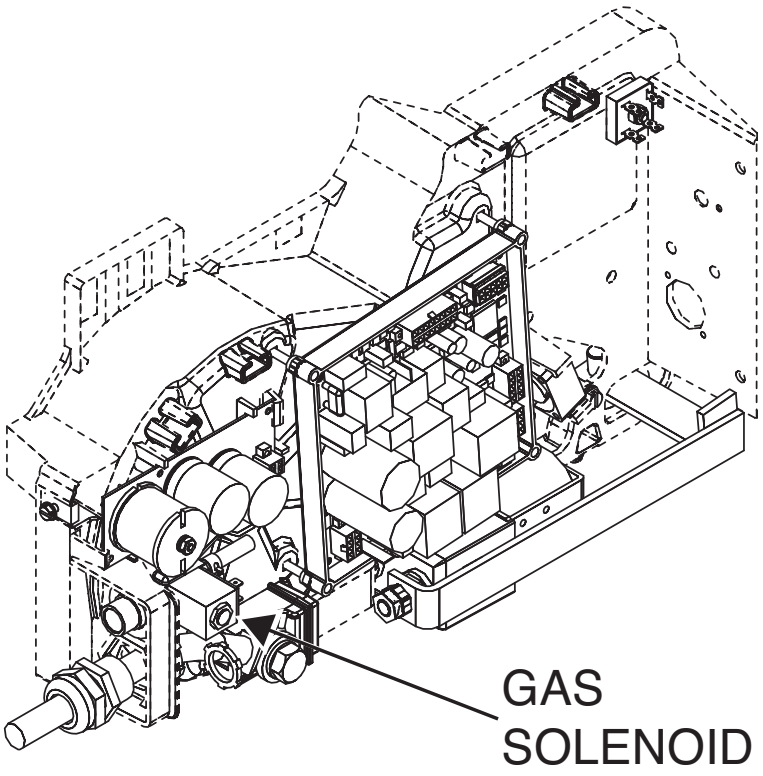
GAS SOLENOID
REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.28 – GAS SOLENOID LOCATION



REMOVAL PROCEDURE

⚠ WARNING

ELECTRIC SHOCK can kill.

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

---

1. Remove input power from the ACTIV8™.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the gas solenoid. See Figure F.28.
4. Label and remove leads 690 (Top) and 691 (Bottom) on the solenoid coil. See ***Figure F.29***. See Wiring Diagram.
5. Using pliers, release tension on the hose clamp and remove the gas hose. Be careful not to damage the hose. See ***Figure F.29***.
6. Using a hammer and slotted screwdriver, gently tap clockwise on and loosen the lock nut securing the solenoid to the machine.
7. The solenoid can now be removed from the ACTIV8™.

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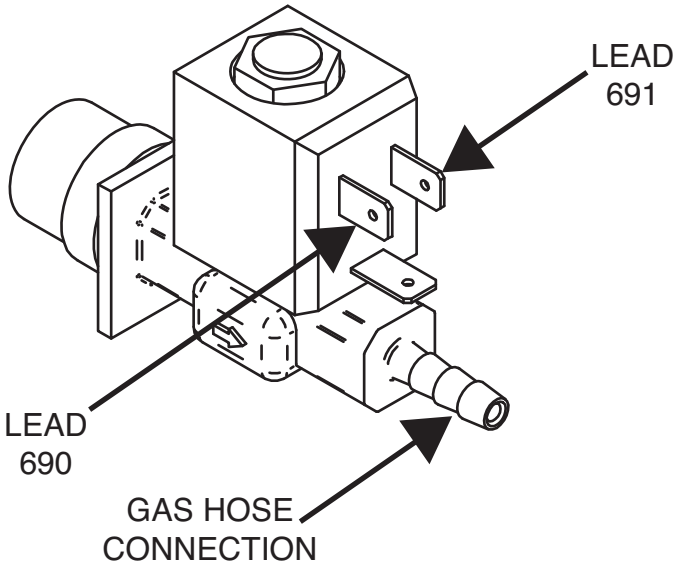
GAS SOLENOID
REMOVAL AND REPLACEMENT PROCEDURE (continued)

FIGURE F.29 – GAS SOLENOID CONNECTIONS



REPLACEMENT PROCEDURE

1. Carefully position new solenoid in machine.
2. Using a hammer and slotted screwdriver, gently tap counter-clockwise on lock nut to secure solenoid in place.
3. Attach gas hose to solenoid.
4. Using pliers, release tension on the hose clamp and slide into position to secure gas hose to solenoid.
5. Attach previously removed leads 690 (Top) and 691 (Bottom) to the solenoid.
6. Perform the ***Case Cover Replacement Procedure***.

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RETEST AFTER REPAIR

Retest a machine :

- If it is rejected under test for any reason that requires you to remove any part which could affect the machine's electrical characteristics.

OR

- If you repair or replace any electrical components.

SET UP

1. Connect a supply of filtered compressed air at 80 psi to the gas inlet.
2. Supply 15 to 110 VAC to the machine.
3. Connect the gun to the connector block.

OPERATION VERIFICATION

WIRE FEED SPEED (Standard).....50 through 800 IPM
GAS SOLENOID.....Must operate when gun trigger is activated.
CONTACTOR.....Must operate when gun trigger is activated or after Pre-flow time if Timer Kit is installed.

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NOTES

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Return to Section TOC
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TABLE OF CONTENTS - DIAGRAM SECTION

*** 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.

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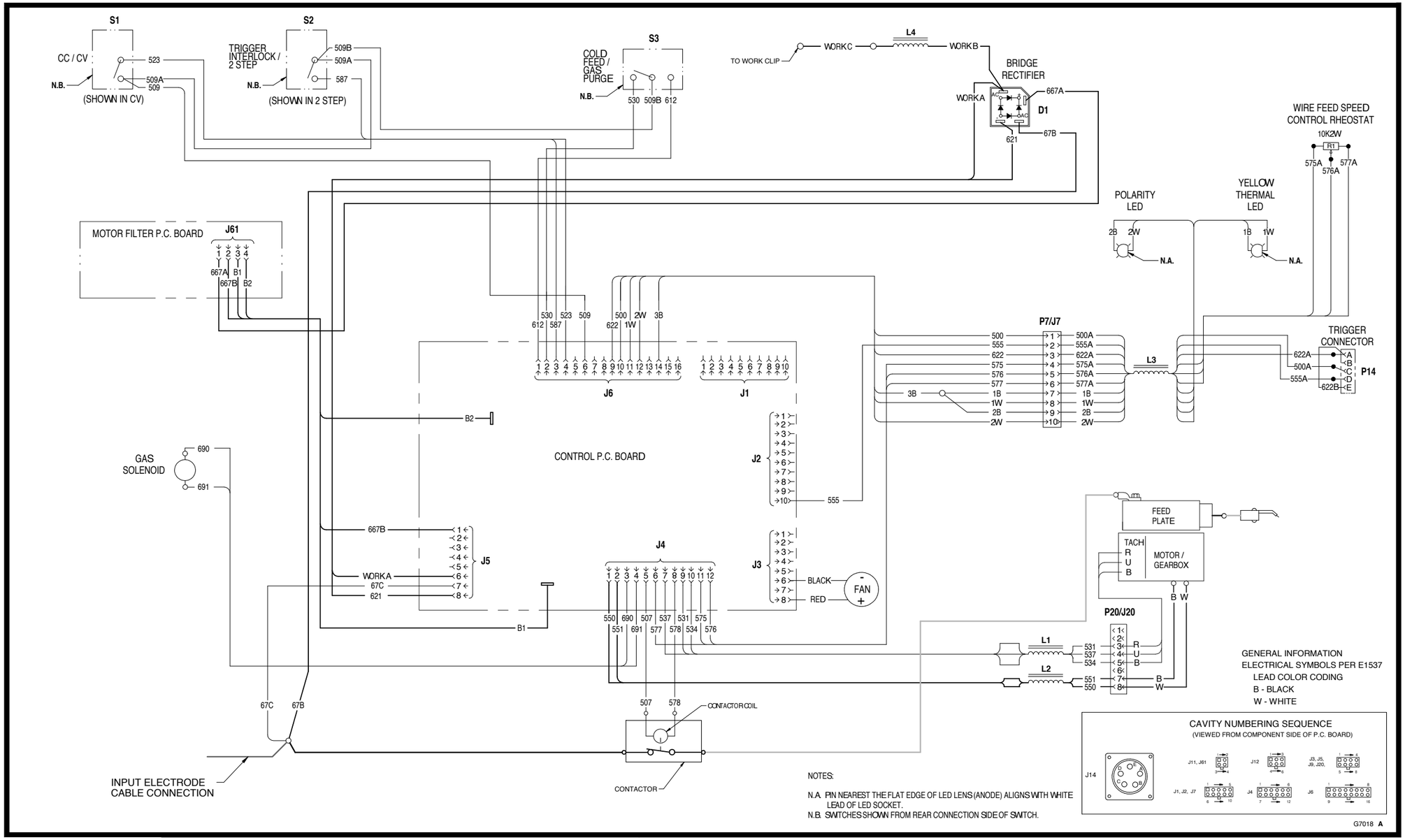
Return to Master TOC

WIRING DIAGRAM - COMPLETE MACHINE - CODE 11770 (G7018)

WIRING DIAGRAM - ACTIV8



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.

Return to Section TOC
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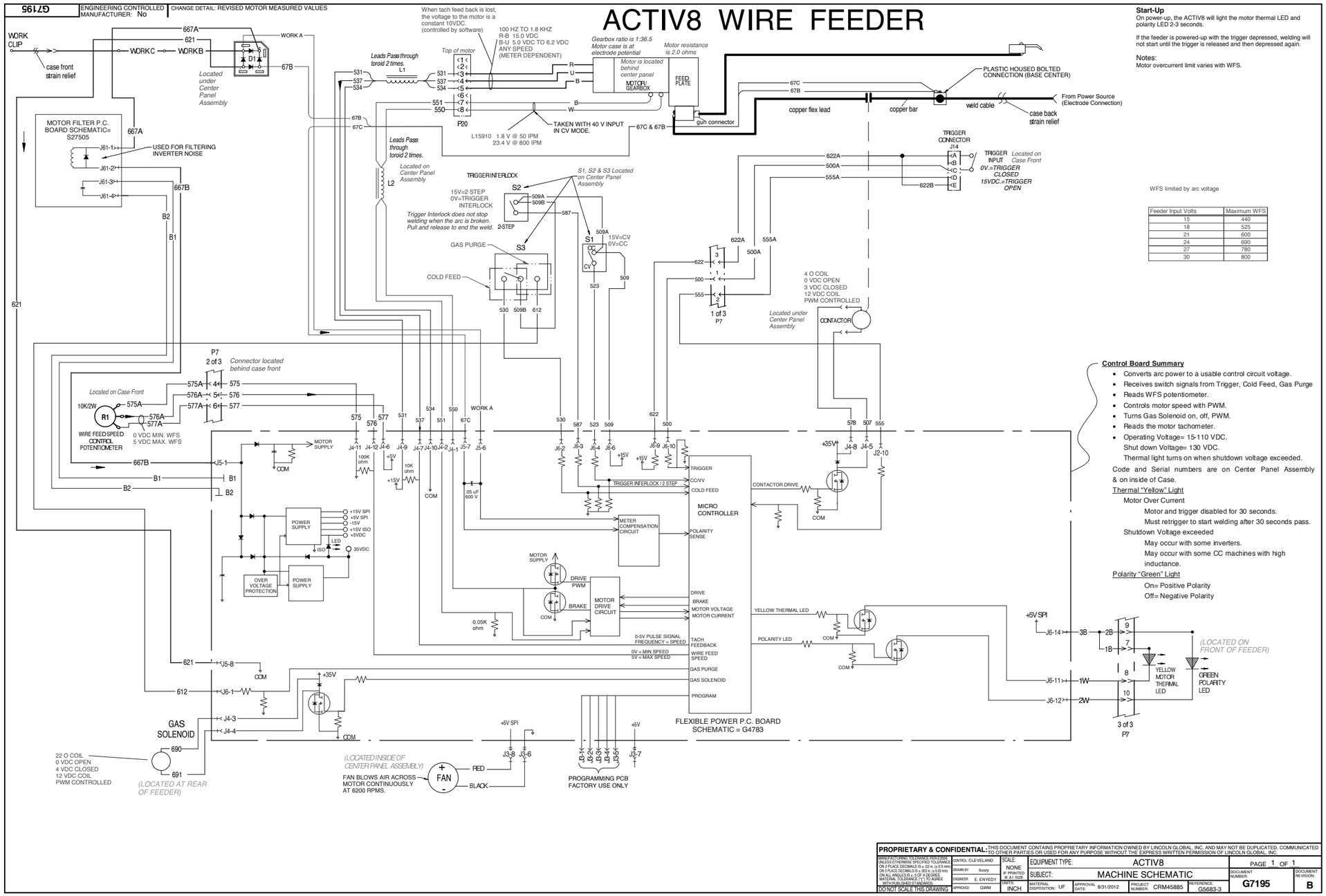
SCHEMATIC - COMPLETE MACHINE - CODE 11770 (G7195)



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

Return to Section TOC
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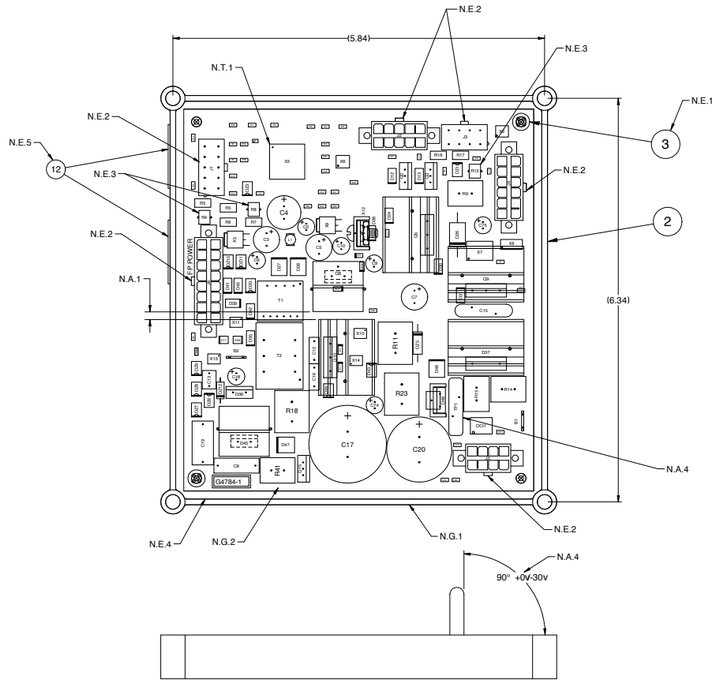
CONTROL PC BOARD - CODE 11770 (G4784-1)

G4784-1 | ENGINEERING CONTROLLED MANUFACTURER: Yes | CHANGE DETAIL: REMOVED ITEMS 6 & 9 & ADDED D48, DIODE HEATSINK ASSEMBLY. T12705-32, CHANGED TO QTY 1.



ASSEMBLY NOTES:

N.A.1 **Q8** HEATSINK MUST BE MOUNTED AT AN ANGLE THAT WILL NOT ALLOW CONTACT WITH **C5** OR THE HEATSINK FOR **Q10**. MINIMUM GAP BETWEEN THE HEATSINK OF **Q8** AND **Q10** SHALL BE .11.

N.A.2 THE CENTER LEAD OF **Q8** MUST BE FORMED TO NOT RUN ALONG THE PC BOARD SURFACE .

N.A.4 **TP1** IS TO BE POSITIONED AS SHOWN.

TEST NOTES:

N.T.1 PROGRAM **X3** PER **ITEM 10**.

ENVIRONMENTAL NOTES:

N.E.1 SECURE P.C.BOARD ASSEMBLY IN PLACE WITH **ITEM 3** (2 PLACES). HAND TIGHTEN SCREWS UNTIL SCREW HEAD TOUCHES BOARD AND THEN BACK OFF 1/ 4 TURN.

N.E.2 ALL CONNECTORS MUST BE GREASED WITH **ITEM 11** BEFORE POTTING AND KEPT FREE OF POTTING MATERIAL. CONNECTOR CAVITIES AND AREA AROUND THE LOCKING TAB TO BE FREE OF POTTING MATERIAL.

N.E.3 PARTS INDICATED MUST BE COMPLETELY COATED WITH **ITEM 4**.

N.E.4 DISPENSE POTTING MATERIAL TO A MINIMUM DEPTH SUCH THAT ALL COMPONENT LEADS ARE COVERED.

N.E.5 PLACE BARCODED ASSEMBLY IDENTIFICATION AND BARCODED SERIAL NUMBER IDENTIFICATION IN AREA SHOWN.

GENERAL NOTES:

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

N.G.2 ALLOW .12 LEAD PROTRUSION ON ALL THROUGH HOLE COMPONENTS.

ITEM (USED WITH)*	QTY	PART NUMBER	DESCRIPTION
1	1	G4784-C	PC BOARD BLANK
2	1	M19436-5	POTTING TRAY FOR 5.50 X 6.00 PCB
3	2	S8025-80	#6 SELF TAPPING SCREW
4	220 g	E2527	EPOXY ENCAPSULATING RESIN
10	1	Y00755-1	TEST FIRMWARE
11	3.2 g.	E2543	ELECTRICAL INSULATING COMPOUND
12	2	E3768-4	LABEL 0.25 X 2.50

REFER TO ELECTRONIC COMPONENT DATABASE FOR SPECIFICATIONS ON ITEMS LISTED BELOW

REFERENCES	QTY	PART NUMBER	DESCRIPTION
B1, B2	2	T13157-24	CONNECTOR,TAB,QC,VERTICAL,1/4,EXTENDED
C1, C25, C26, C27, C29, C33, C38, C43, C56, C70, C71	11	S25020-27SMT	CAPACITOR,SMD,CER,0.1MF,50V,-20%+80%,Z5U,S0805
C2, C6, C9, C10, C18, C74, C75	7	S13490-197	CAPACITOR,ALEL,82,35V,20%,LOW-ESR
C3, C5, C7	3	S13490-199	CAPACITOR,ALEL,220,25V,20%,LOW-ESR
C4	1	S13490-198	CAPACITOR,ALEL,1000,35V,20%,LOW-ESR
C8	1	S20500-5	CAPACITOR,PPMF,.0015,2000V,BOX
C11, C64	2	S25024-2SMT	CAPACITOR,SMD,TANTALUM,1.0MF,35V,10%,S3528
C12, C16	2	S20500-16	CAPACITOR,PPMF,0.0033,630V,5%,BOX
C13	1	S13490-173	CAPACITOR,PEMF,1.0,63V,10%
C15	1	T11577-46K	CAPACITOR,CD,.05,600V,+80/-20%
C17	1	S13490-229	CAPACITOR,ALEL,12000,50V,20%
C19	1	S20500-17	CAPACITOR,PPMF,0.1MF,630V,5%,BOX
C20	1	S13490-228	CAPACITOR,ALEL,470,350V,20%,.25MMX50MM
C21, C22, C23, C28, C30, C31, C34, C41, C42, C44, C45, C46, C48, C49, C50, C51, C52, C53, C54, C62, C65, C66, C72, C73	24	S25020-3SMT	CAPACITOR,SMD,CERAMIC,0.1MF,50V,10%,X7R,S0805
C24	1	S25020-15SMT	CAPACITOR,SMD,CERAMIC,22PF,50V,5%,COG,S0805
C55	1	S25020-14SMT	CAPACITOR,SMD,CERAMIC,330pF,100V,5%,COG,S0805
C57	1	S25020-2SMT	CAPACITOR,SMD,CERAMIC,0.022MF,50V,10%,X7R,S0805
C58, C60, C67	3	S25020-12SMT	CAPACITOR,SMD,CERAMIC,100pF,100V,5%,COG,S0805
C59, C68	2	S25020-13SMT	CAPACITOR,SMD,CERAMIC,150pF,100V,5%,COG,S0805
C61, C69	2	S25020-10SMT	CAPACITOR,SMD,CERAMIC,4700pF,50V,10%,X7R7,S0805
D1, D2, D3, D4, D5, D6, D8, D9, D10, D14, D16, D17, D18, D19, D20, D21, D22, D23, D25, D29, D32, D44, D50, D53, D54, D55	26	S25049-4SMT	DIODE,SMD,SCHOTTKY,DUAL,0.200A,30V,SOT-23
D7	1	S25040-4SMT	DIODE,SMD,DUAL,0.200A,70V,UFR
D12, D13, D24, D30, D31, D35	6	S25040-1SMT	DIODE,SMD,1A,400V,FAST RECOVERY,DO-214BA
D26	1	T12705-59	DIODE,AXLDS,3A,600V,UFR
D27	1	S25049-3SMT	DIODE,SMD,SCHOTTKY,3A,40V,CASE 403-3
D28, D46, D47	3	S25040-8SMT	DIODE,SMD,3A,600V,DO-214AB,ULTRA-FAST RECOVERY
D33, D34, D43	3	S25040-11SMT	DIODE,SMD,1A,600V,S403A,ULTRA-FAST RECOVERY
D36	1	T12705-32	DIODE,TO220,15A,600V,FR,MUR1560
D37	1	S18395-61	HEAT SINK ASSEMBLY,T12705-66 & S20590-3
D38, D39, D40, D41, D42	5	S25040-2SMT	DIODE,SMD,1A,400V,DO-214BA/AC
D45	1	S18395-71	HEAT SINK ASSEMBLY,T12705-68 & S20590-6
D48	1	S18395-85	DIODE HEAK SINK ASSEMBLY
D51, D52	2	S25040-6SMT	DIODE,SMD,DUAL,0.200A,70V,UDR,CC,SOT-23
D56	1	S25049-1SMT	DIODE,SMD,SCHOTTKY,0.5A,30V,SOD-123
DZ1, DZ3	2	S25044-1SMT	ZENER DIODE,SMD,3W,5.1V,5%, SMB
DZ5	1	T12702-50	ZENER DIODE,5W,17V,5%,1N5354B
DZ6	1	S25044-7SMT	ZENER DIODE,SMD,3W,56V,5%, SMB
DZ7, DZ8	2	S25044-11SMT	ZENER DIODE,SMD,3W,30V,5%, SMB
DZ9	1	S25044-12SMT	ZENER DIODE,SMD,3W,3.3V,5%, SMB
DZ10, DZ11	2	S25044-4SMT	ZENER DIODE,SMD,3W,15V,5%, SMB
DZ12	1	T12702-37	ZENER DIODE,1W,43V,5%,1N4755A
DZ13	1	S25046-1SMT	ZENER DIODE,SMD,0.5W,5.1V, 5%,SOD123
DZ14, DZ15, DZ16, DZ17, DZ19	5	S25046-3SMT	ZENER DIODE,SMD,0.5W,18V, 5%,SOD123
DZ18	1	S25046-7SMT	ZENER DIODE,SMD,0.5W,3.3V, 5%,SOD123
J1	1	S18248-10	CONNECTOR,MOLEX,MINI,PCB,10-PIN
J2	1	S24020-10	CONNECTOR,MOLEX,MINI,PCB,10-PIN,TIN
J3	1	S18248-8	CONNECTOR,MOLEX,MINI,PCB,8-PIN
J4	1	S24020-12	CONNECTOR,MOLEX,MINI,PCB,12-PIN,TIN
J5	1	S24020-8	CONNECTOR,MOLEX,MINI,PCB,8-PIN,TIN
J6	1	S24020-16	CONNECTOR,MOLEX,MINI,PCB,16-PIN,TIN

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

REVISION CONTROL

G4784-1C0

PART NO. IDENTIFICATION CODE

TEST PER E4446

POT WITH E2527

SCHEMATIC REFERENCE: G4783-1C0

BUY DETAIL
BUY PER E3867

MAKE DETAIL
MANUFACTURE PER E1911-ROHS

BUY BLANK COMPLETE
(4 BOARDS PER PANEL)

4 LAYER BOARD PER E3281-ROHS
SEE ELECTRONIC FILE FOR ADDITIONAL INFORMATION

	L1	1	S25083-4SMT	CHOKE,SMD,POWER,10UH,10%,1.02A,
	L2, L3	2	S25083-6SMT	CHOKE,SMD,RF,FERRITE_BEAD,600 OHMS
	LED1	1	S25080-2SMT	LED,SMD,GREEN,CLEAR,S1206
	OCI1	1	S15000-20SMT	OPTOCOUPLER,SMD,SSR,FORM:1A,0.09A,350V
	Q1, Q4, Q6	3	S25050-1SMT	TRANSISTOR,SMD,NPN,0.5A,40V,SOT-23,MMBT4401LT1
	Q2, Q3	2	T12704-104	TRANSISTOR,N,TO220,47A,55V,P77N06S2-12(SS)
	Q5, Q10	2	S18395-62	HEAT SINK ASSEMBLY,T12704-106 & S20590-3 (SS)
	Q7, Q11, Q12, Q13, Q14	5	S25051-4SMT	TRANSISTOR,SMD,NMF,SOT-23,0.115A,60V,7002LT1(SS)
N.A.1,N.A.2	Q8	1	S18395-70	HEAT SINK ASSEMBLY,T12704-114 & S20590-6 (SS)
	Q9	1	S18395-63	HEAT SINK ASSEMBLY,T12704-102 & S20590-3 (SS)
	Q15	1	T12704-95	TRANSISTOR,NMF,TO220,27A,250V(SS)
	R1, R81	2	S25000-2210SMT	RESISTOR,SMD,METAL FILM,1/10W,221OHMS,1%,S0805
	R2, R34, R80	3	S25000-4751SMT	RESISTOR,SMD,METAL FILM,1/10W,4.75K,1%,S0805
	R3, R5, R6, R7, R16, R17	6	S25003-1210SMT	RESISTOR,SMD,1W,121OHMS,1%
	R4, R8, R13	3	S18380-14	THERMISTOR,PTC,500OHMS,28mA
	R9	1	S25365-0R05	RESISTOR,STAND-UP,WW,5W,0.05,5%
	R10, R51, R68, R69, R82, R151, R152, R185, R186, R187	10	S25001-3320SMT	RESISTOR,SMD,332OHMS,1/4W,1206,1%,TR
	R11, R18, R23	3	S25739-3001	RESISTOR,STAND-UP,WW,10W,3K,5%
	R12	1	S25010-5SMT	RESISTOR,SMD,MF,1W,3.92K,1%,SURGE
	R14	1	S25923-5101	RESISTOR,STAND-UP,MF,5W,5.1K,5%
	R15	1	S25365-20R0	RESISTOR,STAND-UP,WW,5W,20.0,5%
	R19, R36, R57, R59, R94, R95, R96, R106, R107, R108	10	S25001-2000SMT	RESISTOR,SMD,200OHMS,1/4W,1206,1%,TR
	R20, R21, R22, R29, R32, R33, R84, R121, R148	9	S25012-1001SMT	RESISTOR,SMD,METAL FILM,1/16W,1.00K,1%,S0603
	R24, R25, R49, R66, R67, R188, R189, R190, R216, R217, R218, R219	12	S25000-1000SMT	RESISTOR,SMD,METAL FILM,1/10W,100OHMS,1%,S0805
	R26, R38	2	S25000-1003SMT	RESISTOR,SMD,METAL FILM,1/10W,100K,1%,S0805
	R27, R39, R172	3	S25000-1002SMT	RESISTOR,SMD,METAL FILM,1/10W,10.0K,1%,S0805
	R28, R40, R171	3	S25001-4750SMT	RESISTOR,SMD,475OHMS,1/4W,1206,1%,TR
	R30, R154	2	S25000-4752SMT	RESISTOR,SMD,METAL FILM,1/10W,47.5K,1%,S0805
	R31, R131, R149	3	S25012-3321SMT	RESISTOR,SMD,METAL FILM,1/16W,3.32K,1%,S0603
	R35, R50	2	S25000-4750SMT	RESISTOR,SMD,METAL FILM,1/10W,475OHMS,1%,S0805
	R37, R225	2	S25000-3321SMT	RESISTOR,SMD,METAL FILM,1/10W,3.32K,1%,S0805
	R41	1	S25365-02R2	RESISTOR,STAND-UP,WW,5W,2.2,5%
	R42	1	S25001-2672SMT	RESISTOR,SMD,26.7K,1/4W,1206,1%,TR
	R43	1	S25000-2211SMT	RESISTOR,SMD,METAL FILM,1/10W,2.21K,1%,S0805
	R44	1	S25000-1001SMT	RESISTOR,SMD,METAL FILM,1/10W,1.00K,1%,S0805
	R45	1	S25000-1501SMT	RESISTOR,SMD,METAL FILM,1/10W,1.50K,1%,S0805
	R46, R47, R52, R53	4	S25001-1502SMT	RESISTOR,SMD,15K,1/4W,1206,1%,TR
	R48	1	S25000-1652SMT	RESISTOR,SMD,METAL FILM,1/10W,16.5K,1%,S0805
	R56, R58, R97, R98, R109, R146, R212, R213, R214, R215, R226	11	S25012-1002SMT	RESISTOR,SMD,METAL FILM,1/16W,10.0K,1%,S0603
	R76, R78, R88, R90, R91	5	S25000-2001SMT	RESISTOR,SMD,METAL FILM,1/10W,2.00K,1%,S0805
	R77, R79, R89, R92, R93	5	S25001-4751SMT	RESISTOR,SMD,4.75K,1/4W,1206,1%,TR
	R83, R85, R105	3	S25000-2672SMT	RESISTOR,SMD,METAL FILM,1/10W,26.7K,1%,S0805
	R87, R101, R111	3	S25012-4751SMT	RESISTOR,SMD,METAL FILM,1/16W,4.75K,1%,S0603
	R99, R100, R110, R116, R117, R220	6	S25001-1000SMT	RESISTOR,SMD,100OHMS,1/4W,1206,1%,TR
	R102, R222, R227	3	S25001-15R0SMT	RESISTOR,SMD,15.0OHMS,1/4W,1206,1%,TR
	R103	1	S25012-2671SMT	RESISTOR,SMD,METAL FILM,1/16W,2.67K,1%,S0603
	R104, R170	2	S25000-2002SMT	RESISTOR,SMD,METAL FILM,1/10W,20.0K,1%,S0805
	R112	1	S25012-3322SMT	RESISTOR,SMD,METAL FILM,1/16W,33.2K,1%,S0603
	R113	1	S25000-3922SMT	RESISTOR,SMD,METAL FILM,1/10W,39.2K,1%,S0805
	R114, R115, R126, R127	4	S25001-2001SMT	RESISTOR,SMD,2K,1/4W,1206,1%,TR
	R118	1	S25001-1500SMT	RESISTOR,SMD,150OHMS,1/4W,1206,1%,TR
	R119, R120	2	S25000-3011SMT	RESISTOR,SMD,METAL FILM,1/10W,3.01K,1%,S0805
	R122, R159	2	S25012-1003SMT	RESISTOR,SMD,METAL FILM,1/16W,100K,1%,S0603
	R128	1	S25012-2212SMT	RESISTOR,SMD,METAL FILM,1/16W,22.1K,1%,S0603
	R129	1	S25012-2211SMT	RESISTOR,SMD,METAL FILM,1/16W,2.21K,1%,S0603
	R130	1	S25001-33R2SMT	RESISTOR,SMD,33.2OHMS,1/4W,1206,1%,TR
	R135, R136, R137, R138, R140, R141, R142, R143, R162, R163, R164, R165, R166, R167, R168, R169	16	S25006-10R0SMT	RESISTOR,SMD,METAL FILM,1/2W,10OHMS,1%,S2010
	R139	1	S25001-3010SMT	RESISTOR,SMD,301OHMS,1/4W,1206,1%,TR
	R144, R191	2	S25001-1821SMT	RESISTOR,SMD,1.82K,1/4W,1206,1%,TR
	R145	1	S25000-8252SMT	RESISTOR,SMD,METAL FILM,1/10W,82.5K,1%,S0805
	R147	1	S25000-3010SMT	RESISTOR,SMD,METAL FILM,1/10W,301OHMS,1%,S0805
	R150, R230, R231	3	S25001-1001SMT	RESISTOR,SMD,1K,1/4W,1206,1%,TR
	R153, R155	2	S25001-1003SMT	RESISTOR,SMD,100K,1/4W,1206,1%,TR
	R156, R157	2	S25001-1503SMT	RESISTOR,SMD,150K,1/4W,1206,1%,TR
	R160	1	S25000-2671SMT	RESISTOR,SMD,METAL FILM,1/10W,2.67K,1%,S0805
	R161	1	S25000-2802SMT	RESISTOR,SMD,METAL FILM,1/10W,28.0K,1%,S0805
	R173, R174, R175, R176, R177, R178, R179, R180, R181	9	S25001-2213SMT	RESISTOR,SMD,221K,1/4W,1206,1%,TR
	R182, R183	2	S25001-3321SMT	RESISTOR,SMD,3.32K,1/4W,1206,1%,TR
	R184	1	S25001-2211SMT	RESISTOR,SMD,2.21K,1/4W,1206,1%,TR
	R192, R193, R194, R195, R196, R197, R198, R199, R200, R201, R202, R203, R204, R205, R206, R207, R208, R209, R210, R211	20	S25001-1R00SMT	RESISTOR,SMD,1.00OHMS,1/4W,1206,1%,TR
	R223, R224	2	S25001-2671SMT	RESISTOR,SMD,2.67K,1/4W,1206,1%,TR
	T1	1	S20375-17	TRANSFORMER,PWM,FLYBACK,58P6091
	T2	1	S20375-28	TRANSFORMER,TX06101B
	TP1	1	T13640-16K	MOV,150VRMS,80J,20MM
	X1	1	S25065-5SMT	IC,SMD,CMOS,INVERTER,SCHMITT,SINGLE(SS)
	X2	1	S25065-4SMT	IC,SMD,CMOS,TRANSCEIVER,3V-5.5V,MAX3221,(SS)
	X3	1	S25073-8SMT	IC,SMD,CMOS,PSOC,8-BIT,TQFP-100,CY8C29866(SS)
	X5	1	S25068-9SMT	IC,SMD,VOLTAGE REGULATOR,FIXED,3-TERMINAL,0.5A,+15V
	X6	1	S15128-28SMT	IC,OP-AMP,SMT,QUAD,HIGH-PERF,33074ADT
	X7	1	S25068-2SMT	IC,SMD,CMOS,DRIVER,MOSFET,2113,SOIC-16(SS)
	X8	1	S17900-24SMT	IC,SMD,CMOS,GATE,NAND,2-INPUT,QUAD,SCHM(SS)
	X9	1	S25068-10SMT	IC,SMD,VOLTAGE REGULATOR,FIXED,3-TERMINAL,0.5A,-15V
	X10, X13	2	M15458-9SMT	IC,SMD,PWM-CONTROLLER,I-MODE,2843B, SOIC-8
	X11	1	S25068-6SMT	IC,SMD,VOLT REG,FIXED,3-T,(+),0.1A,5V,SOIC-8
	X12	1	S18395-69	HEAT SINK ASSEMBLY,S15128-5 & S20590-2
	X14	1	S25068-36SMT	IC,SMD,DRIVER,LOW-SIDE,SOIC-8(SS)

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

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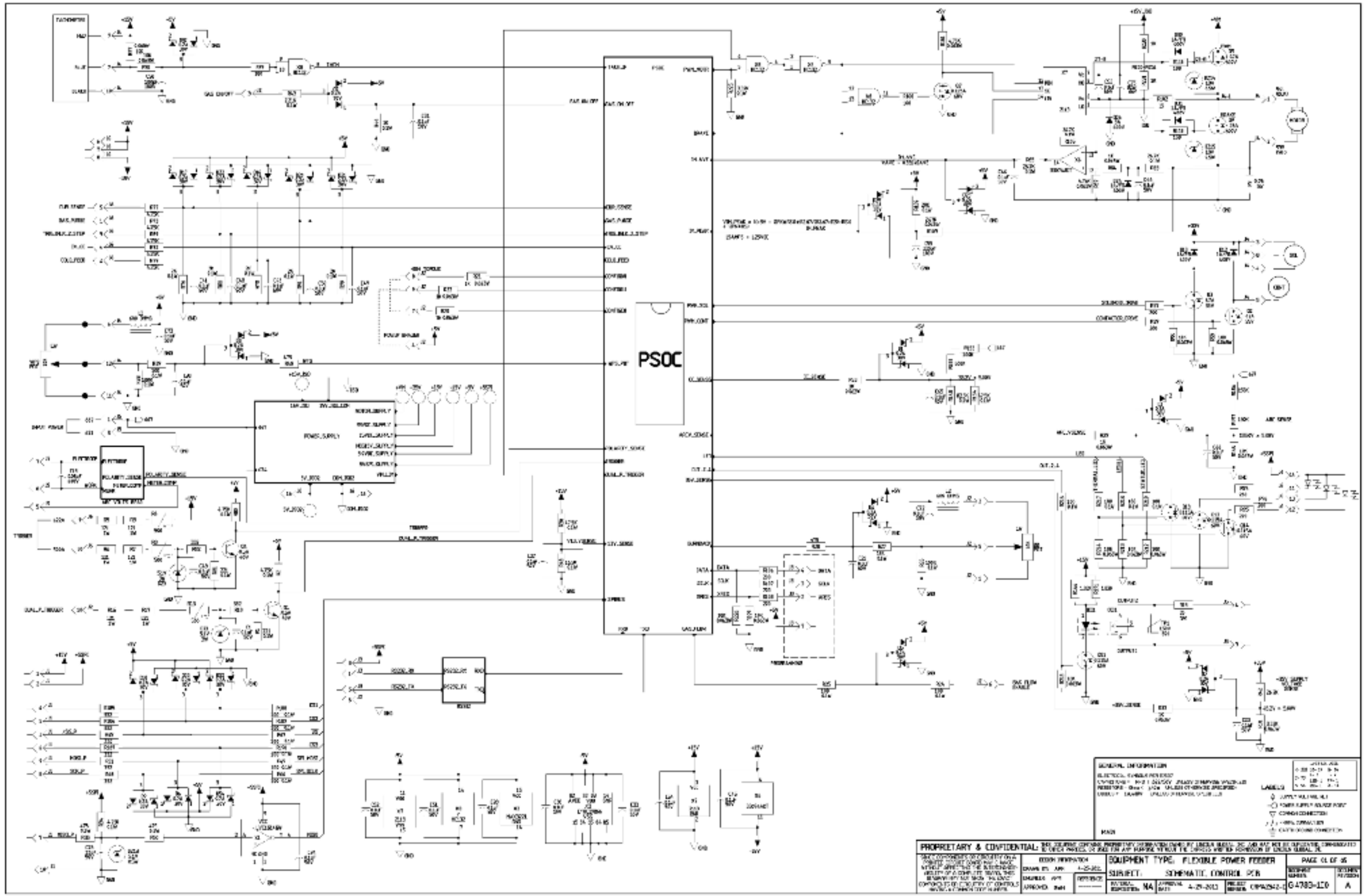
MANUFACTURING TOLERANCE PER ES358
UNLESS OTHERWISE SPECIFIED TOLERANCE ON 2 PLACE DECIMALS IS ± .02 in. (± 0.5 mm) ON 3 PLACE DECIMALS IS ± .002 in. (± 0.05 mm) ON ALL ANGLES IS ± 3.0° A DEGREE MATERIAL TOLERANCE (1) TO AGREE WITH PUBLISHED STANDARDS.
DO NOT SCALE THIS DRAWING

CONTROL: CLEVELAND	SCALE: 1:1	EQUIPMENT TYPE: MISC.		PAGE 1 OF 1	
DRAWN BY: sajones	IF PRINTED IS A1 SIZE	SUBJECT: FLEXIBLE POWER FEEDER P. C. BOARD		DOCUMENT NUMBER: G4784-1	DOCUMENT REVISION: F
ENGINEER: ENYEDY	UNITS: INCH	MATERIAL DISPOSITION: UF	APPROVAL DATE: 9-28-2012	PROJECT NUMBER: CRM45610	REFERENCE: G4746-1
APPROVED: GWM					

NOTE: Lincoln Electric assumes no responsibility for liablilities 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

SCHEMATIC - CONTROL BOARD - CODE 11770 (G4783-1C0 PG 1)



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

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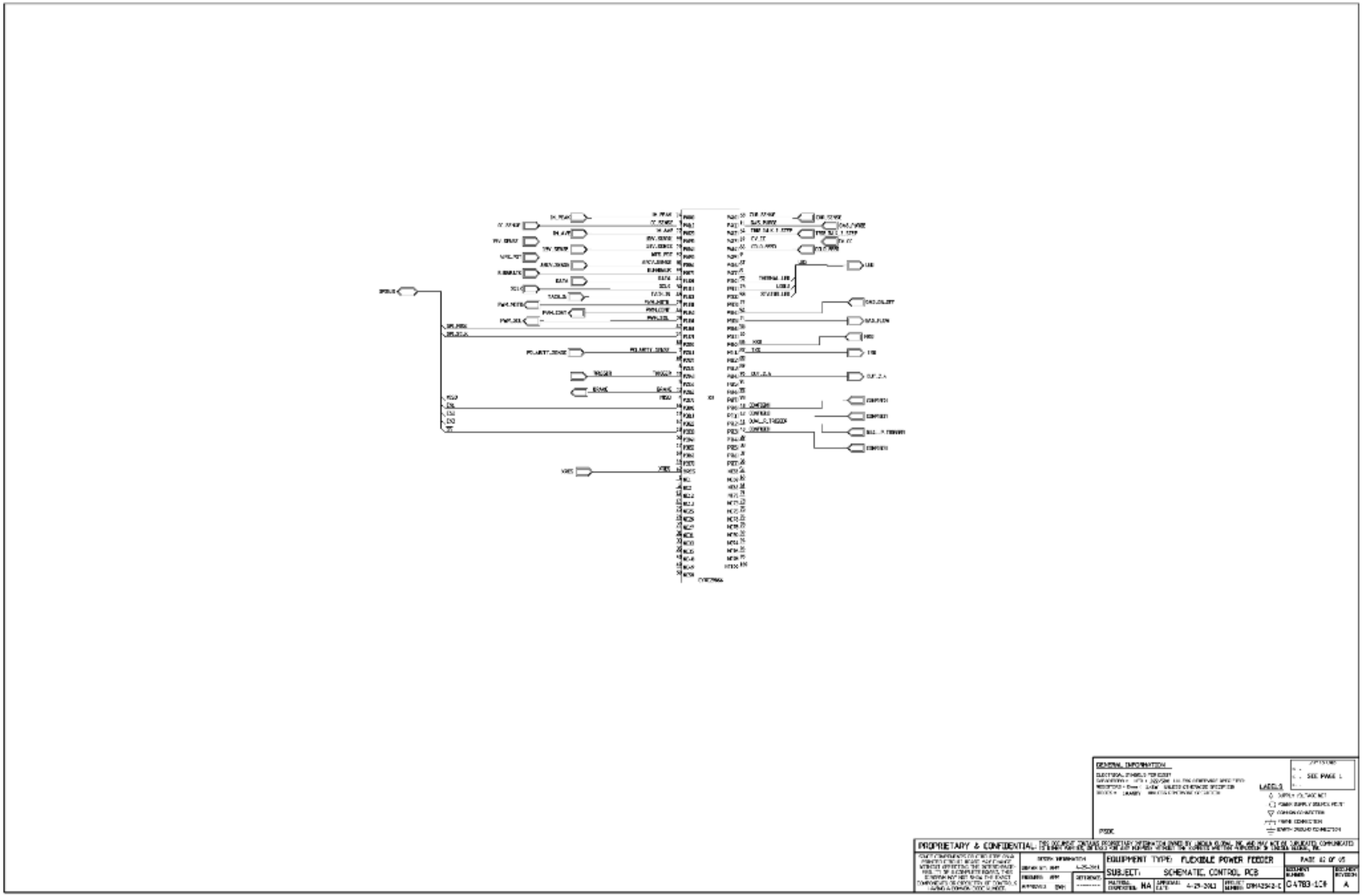
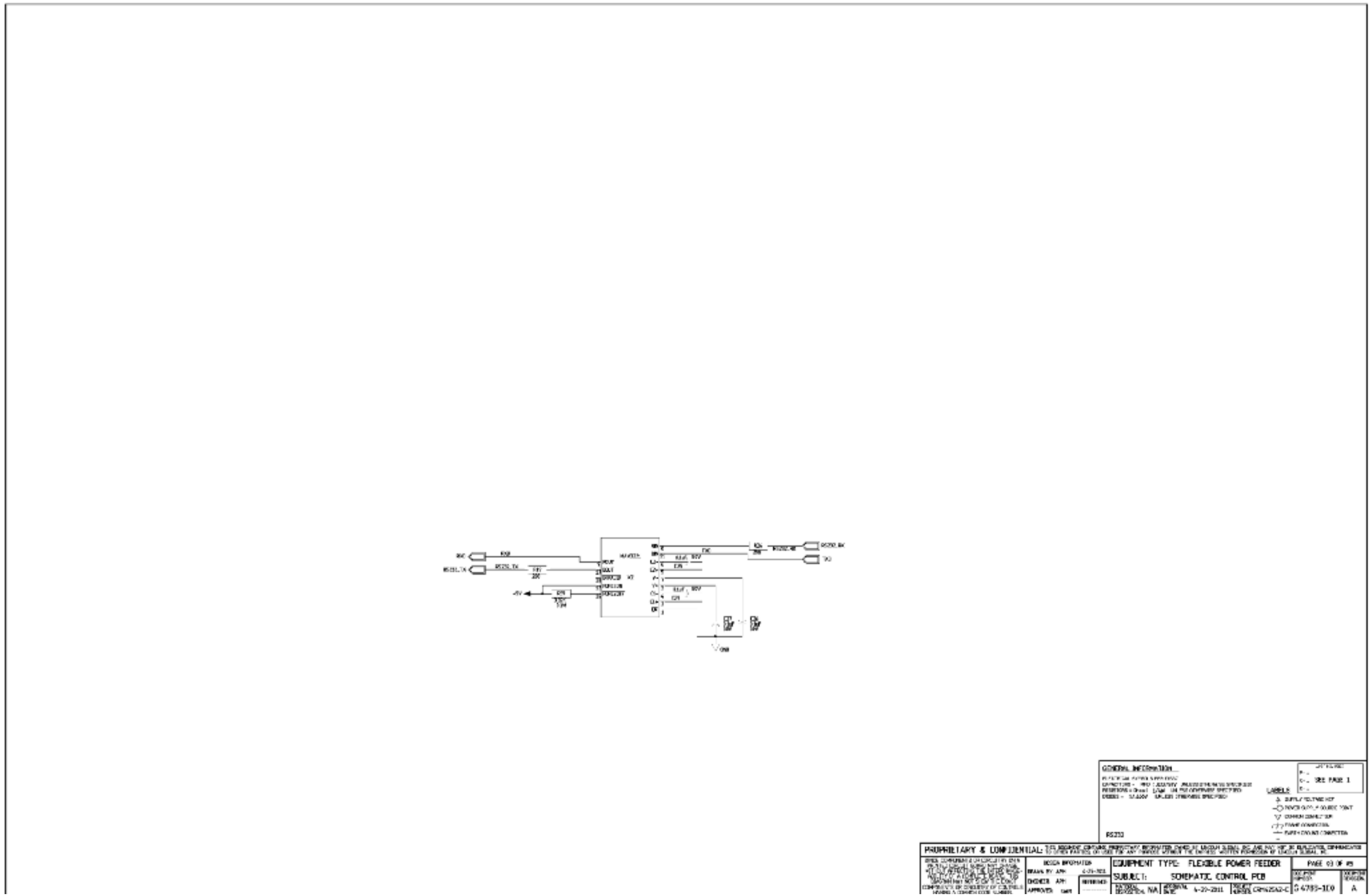
Return to Section TOC
Return to Master TOC

SCHEMATIC - CONTROL BOARD - CODE 11770 (G4783-1C0 PG 2)



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

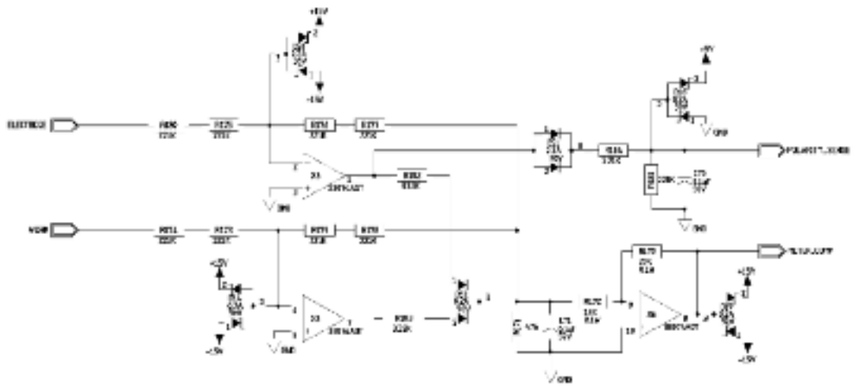
SCHEMATIC - CONTROL BOARD - CODE 11770 (G4783-1C0 PG 3)



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

Return to Section TOC Return to Master TOC

SCHEMATIC - CONTROL BOARD - CODE 11770 (G4783-1C0 PG 4)



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

Return to Section TOC
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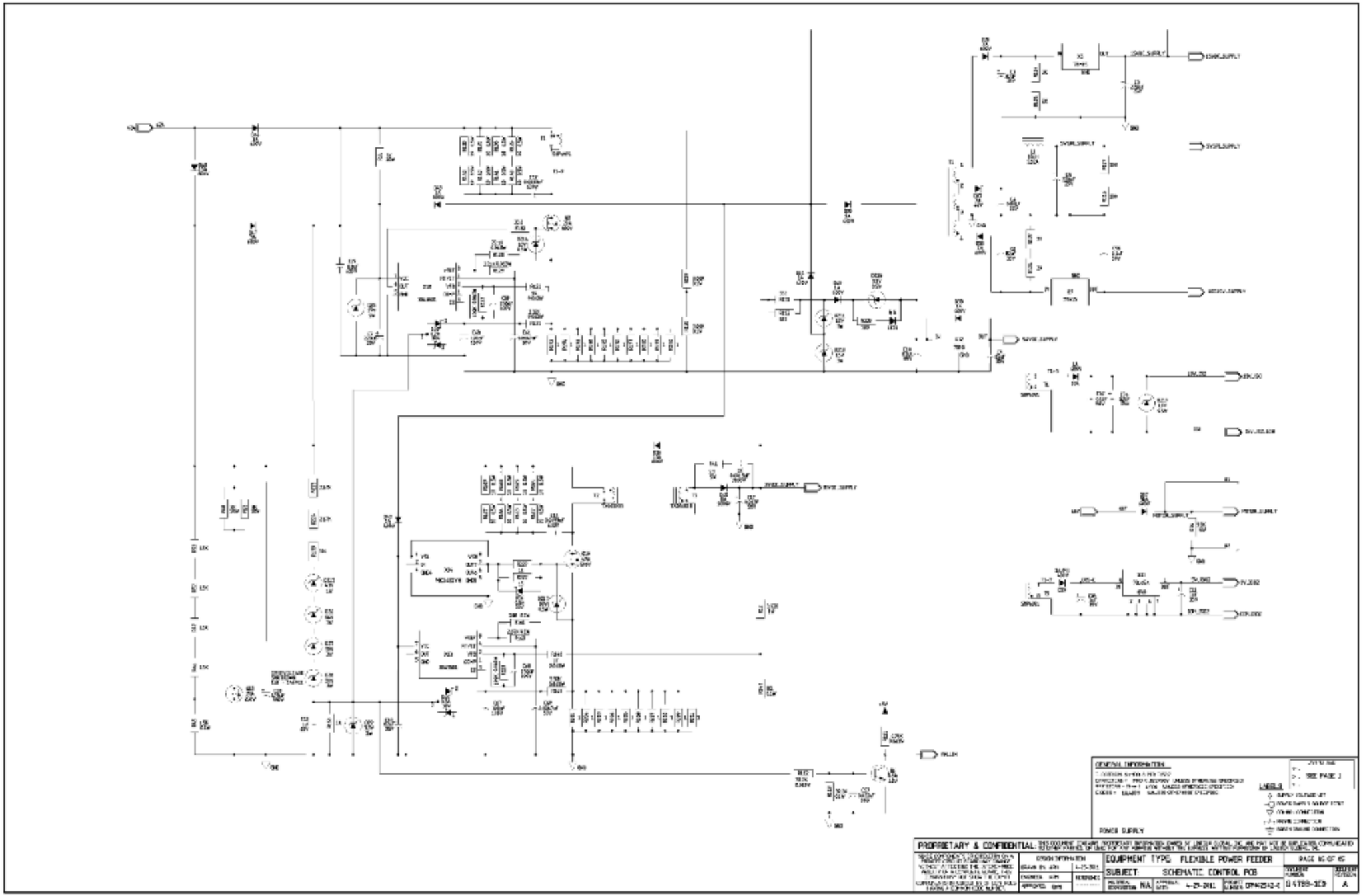
SCHEMATIC - CONTROL BOARD - CODE 11770 (G4783-1C0 PG 5)



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

MOTOR FILTER PC BOARD - CODE 11770 (S27506-1)

S27506-1	ENGINEERING CONTROLLED MANUFACTURER: Yes	CHANGE DETAIL: REVISED ITEM 1, AND SCHEMATIC REFERENCE & IDENTIFICATION CODE. REVISED BUY PER SPEC. TO ROHS COMPLIANCE.

ENVIRONMENTAL NOTES:

N.E.1 BEFORE ENCAPSULATION, APPLY **ITEM 2** ALONG BASE AS SHOWN.

N.E.2 BEFORE ENCAPSULATION, APPLY **ITEM 2** UP ALONG VERTICAL SIDE OF C2 AND D1 AS SHOWN.

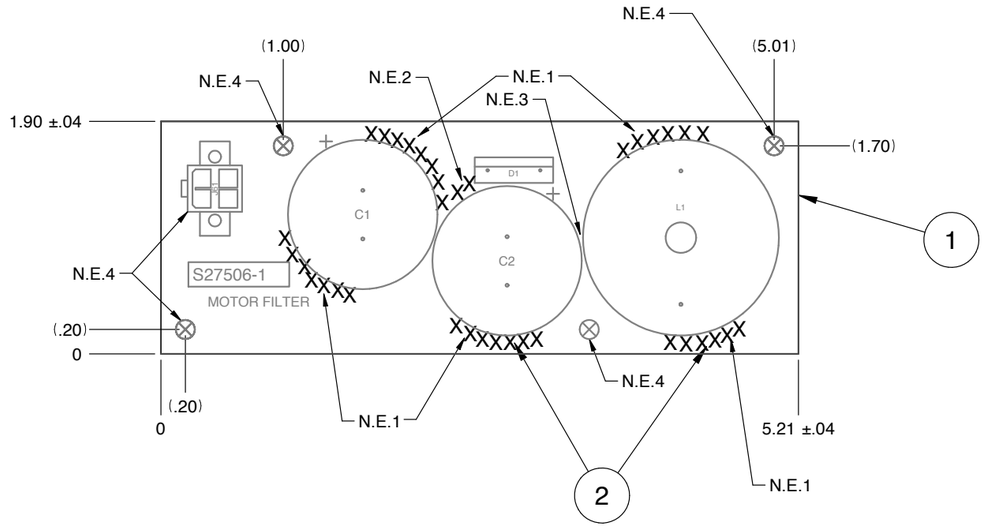
N.E.3 KEEP AREA BETWEEN L1 AND C2 FREE OF **ITEM 2**.

N.E.4 KEEP FREE OF ENCAPSULATION MATERIAL.

	ITEM	QTY	PART NUMBER	DESCRIPTION
	1	1	S27506-C	PC BOARD BLANK
N.E.1, N.E.2, N.E.3	2	.16 OZ.	E2861	SEALANT

REFER TO ELECTRONIC COMPONENT DATABASE FOR SPECIFICATIONS ON ITEMS LISTED BELOW

REFERENCES	QTY	PART NUMBER	DESCRIPTION
C1, C2	2	S13490-209	CAPACITOR,ALEL,470,350V,20%
D1	1	T12705-69	DIODE, TO247, 40A, 1600V.
J61	1	S24020-4	CONNECTOR,MOLEX,MINI,PCB,4-PIN,TIN
L1	1	T12218-14	CHOKE,470UH,10%,11.4A,RADIAL



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

REVISION CONTROL

S27506-1C0

PART NO. IDENTIFICATION CODE

TEST PER E4439
ENCAPSULATE WITH E1844.
SCHEMATIC REFERENCE: S27505-1C0

BUY DETAIL	MAKE DETAIL
BUY PER E3281-RoHS	MANUFACTURE PER E1911-ROHS BUY BLANK COMPLETE (18 BOARDS PER PANEL)

2 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.

MANUFACTURING TOLERANCE PER E2056 UNLESS OTHERWISE SPECIFIED TOLERANCE: ON 2 PLACE DECIMALS IS ± .02 in. (± 0.5 mm) ON 3 PLACE DECIMALS IS ± .002 ON ALL ANGLES IS ± .5 OF A DEGREE MATERIAL TOLERANCE ("t") TO AGREE WITH PUBLISHED STANDARDS. DO NOT SCALE THIS DRAWING	CONTROL: CLEVELAND DRAWN BY: ddietz ENGINEER: MECKLER APPROVED: GWM	SCALE: 1:1 IF PRINTED @ A3 SIZE UNITS: INCH	EQUIPMENT TYPE: LN-25 PRO SUBJECT: MOTOR FILTER PC BOARD ASSEMBLY MATERIAL DISPOSITION: UF APPROVAL DATE: 2/3/2012 PROJECT NUMBER: CRM44454 REFERENCE: -	PAGE 1 OF 1 DOCUMENT NUMBER: S27506-1 DOCUMENT REVISION: D					

NOTE: Lincoln Electric assumes no responsibility for liablilities 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.

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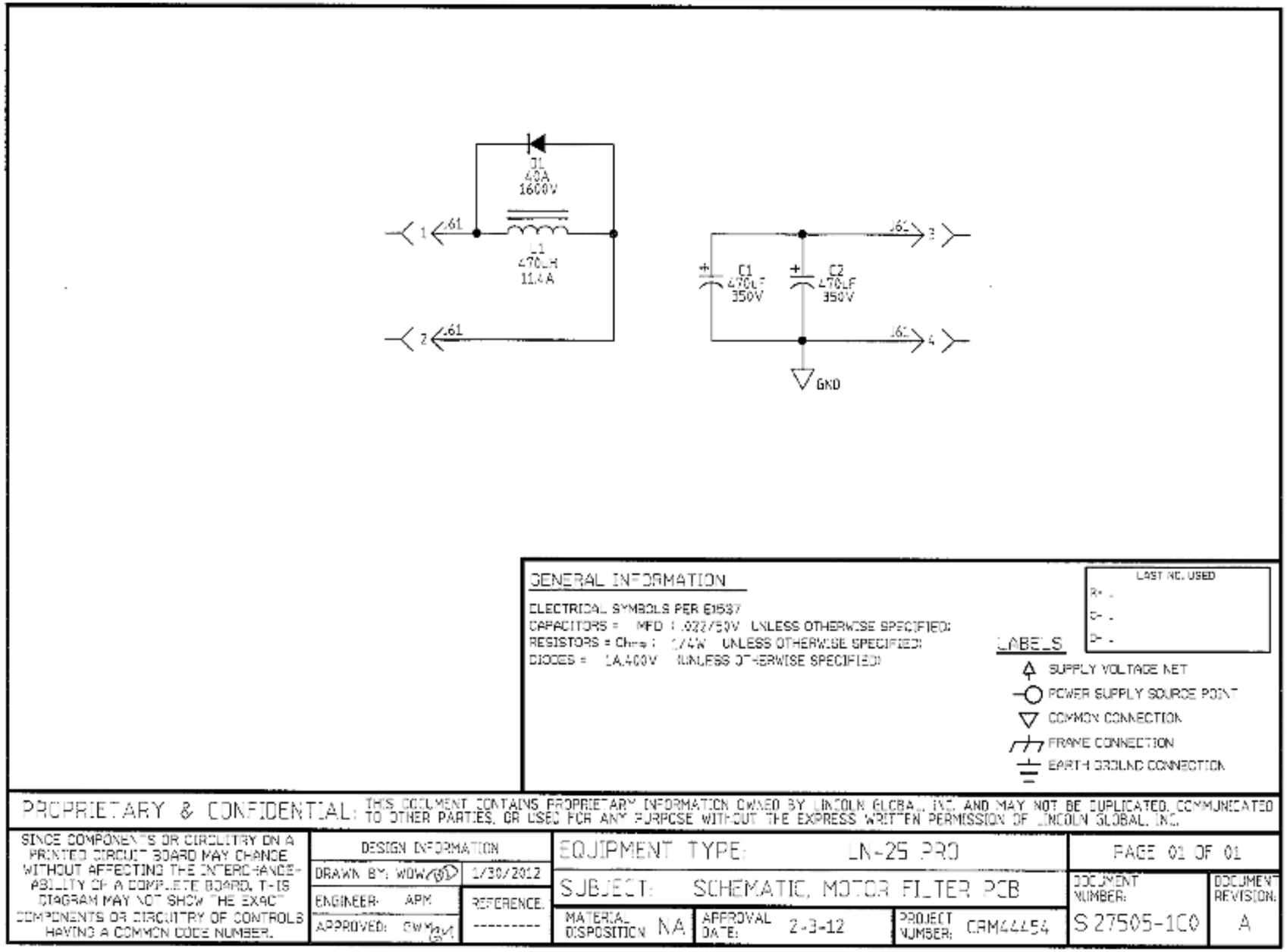
Return to Section TOC
Return to Master TOC

SCHEMATIC - MOTOR FILTER BOARD - CODE 11770 (S27505-1C0)



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

Return to Section TOC
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