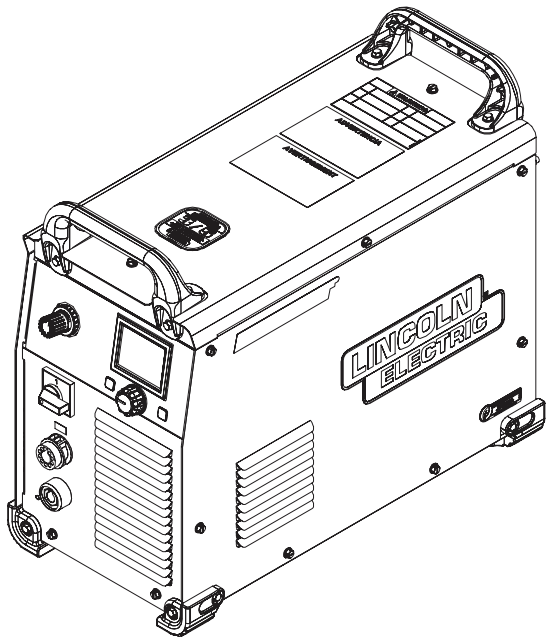
FlexCut™ 125

For use with machines having Code Numbers:

FlexCut 125: 12478

SERVICE MANUAL



SVM276 | Issue Date 18-Oct

THE LINCOLN ELECTRIC COMPANY
22801 St. Clair Avenue • Cleveland, OH • 44117-1199 • U.S.A.
Phone: +1.216.481.8100 • www.lincolnelectric.com

THANK YOU FOR SELECTING A QUALITY PRODUCT BY LINCOLN ELECTRIC.

PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

SAFETY DEPENDS ON YOU

Lincoln arc welding and cutting equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part. **DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.** And, most importantly, think before you act and be careful.

⚠ WARNING

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

⚠ CAUTION

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

KEEP YOUR HEAD OUT OF THE FUMES.

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

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

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

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

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

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

WEAR CORRECT EYE, EAR & BODY PROTECTION

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

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

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

IN SOME AREAS, protection from noise may be appropriate.

BE SURE protective equipment is in good condition.

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

SPECIAL SITUATIONS

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

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

Additional precautionary measures

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

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

REMOVE all potential fire hazards from welding area.

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

SECTION A: WARNINGS

CALIFORNIA PROPOSITION 65 WARNINGS

WARNING: Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects, or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an exposed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65 warnings.ca.gov/diesel

WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code § 25249.5 *et seq.)*

WARNING: Cancer and Reproductive Harm www.P65warnings.ca.gov

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

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

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

FOR ENGINE POWERED EQUIPMENT.

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

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

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

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

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

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

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

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

ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS

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

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

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

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

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

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

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

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

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

ELECTRIC SHOCK CAN KILL.

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

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

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

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

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

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

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

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

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

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

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

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

ARC RAYS CAN BURN.

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

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

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

FUMES AND GASES CAN BE DANGEROUS.

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

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

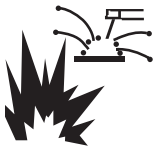
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

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

5.e. Read and understand the manufacturer’s instructions for this equipment and the consumables to be used, including the Safety Data Sheet (SDS) and follow your employer’s safety practices. SDS forms are available from your welding distributor or from the manufacturer.

5.f. Also see item 1.b.

WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION.



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

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

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

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

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

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

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

6.h. Also see item 1.c.

6.I. Read and follow NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work", available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, MA 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-I, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association, 14501 George Carter Way Chantilly, VA 20151.

FOR ELECTRICALLY POWERED EQUIPMENT.

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

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

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

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

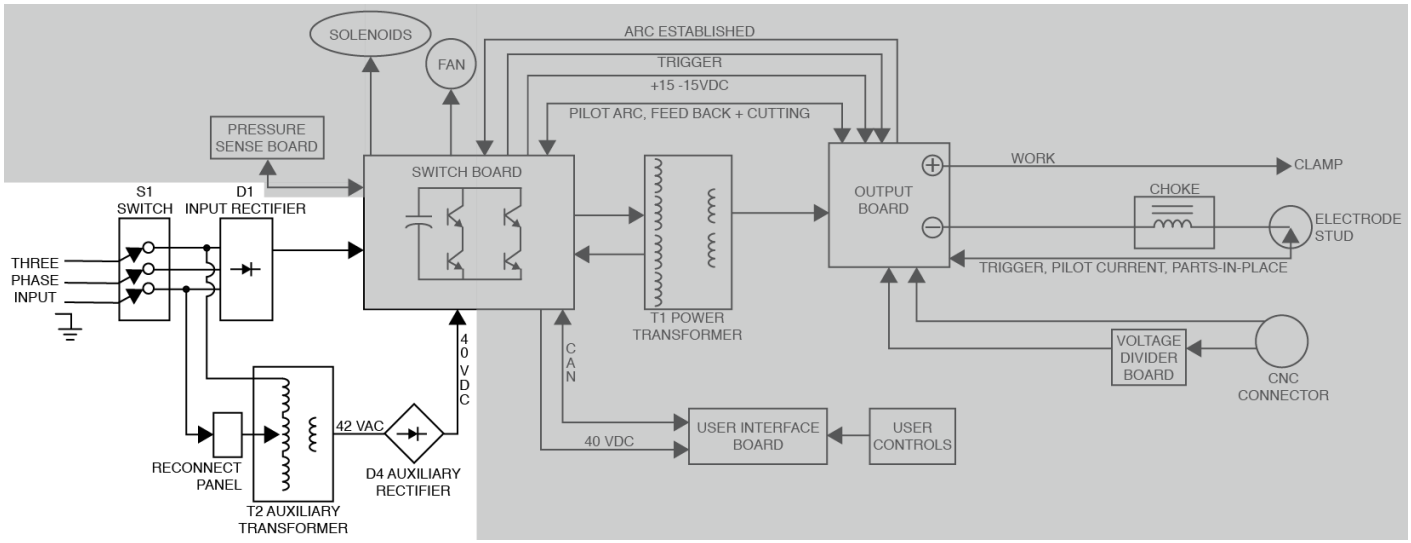
FlexCut™ 125

Service Manual

Last update: 2018/10/01

Theory of Operation

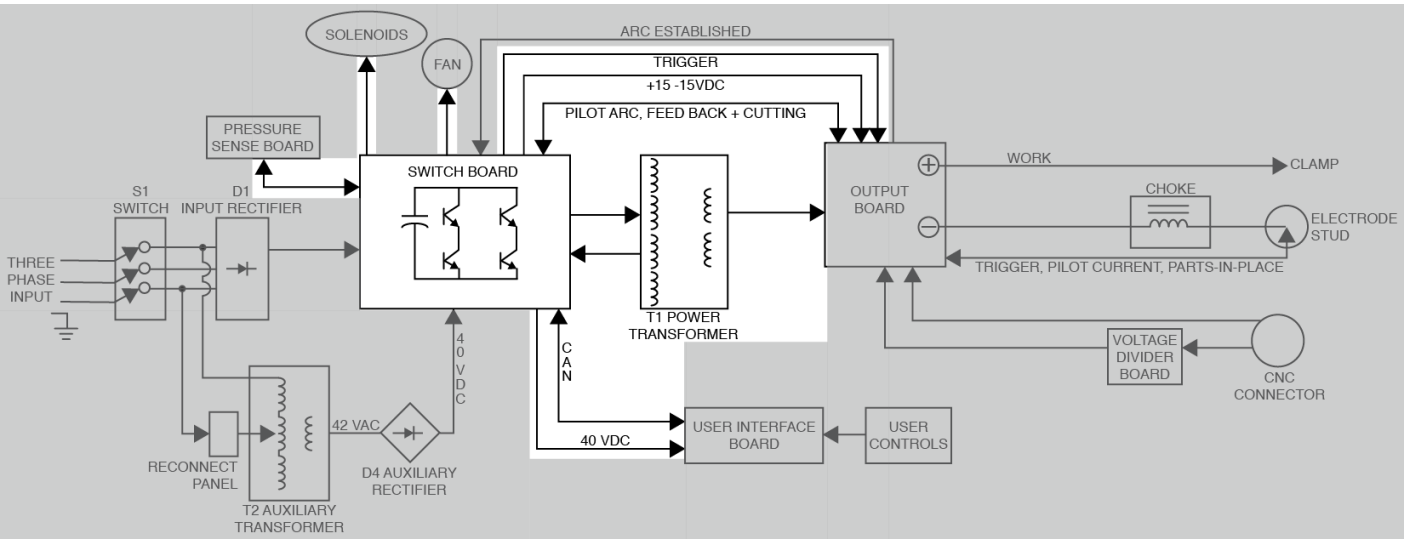
Figure E.1 – Input section



Input Section

When the correct three-phase input voltage is applied to the FlexCut 125, via the input line switch, the AC voltage is applied to the input rectifier and the T2 auxiliary transformer. The single phase input voltage is applied to the auxiliary transformer primary winding via the reconnect panel. The 42VAC generated from the secondary winding on the T2 transformer is rectified by the D4 rectifier and the resultant 40VDC is sent to the switch board.

Figure E.2 – Switch board and main transformer



Switch Board And Main Transformer

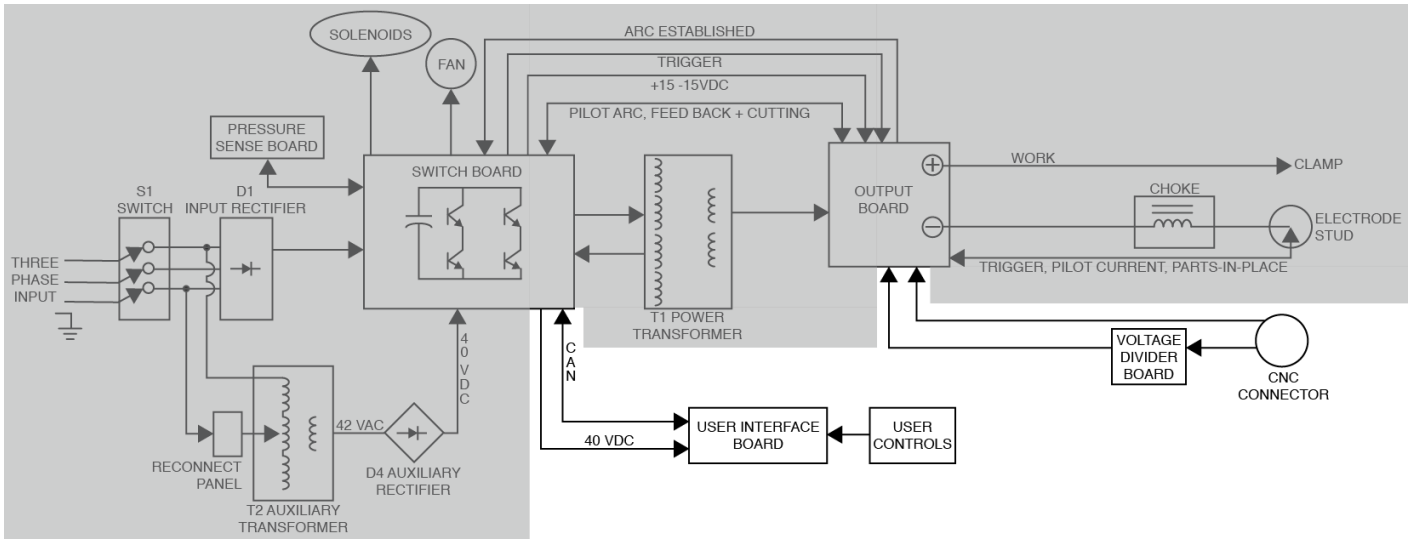
The main function of the switch board is to receive (from the input rectifier) and process rectified primary voltage. The circuitry is designed to function from a three-phase input voltage range from 380VAC to 575VAC. The switch board provides Pulse Width Modulated (PWM) power to the primary windings of the T1 main transformer. The operating frequency is 20Khz. Each IGBT pair on the switch board acts as a high speed switch assembly. Each switch assembly drives current through the primary winding of the main transformer. When the first IGBT pair is on driving current in one direction, the other IBGT pair is off. When the first IGBT pair is off the second IGBT pair turns on driving primary current in the opposite direction. Thus, the main transformer is receiving AC current in the primary winding. The switch board also utilizes the 40VDC received from the D4 rectifier to create several regulated DC supplies for the CAN communications and the internal circuitry of the FlexCut 125.

LED 1 indicates the status of the digital signal processer (DSP)
LED 2 indicates the +5VDC is present for the CAN communications
LED 3 Indicates Micro Status – Green OK
LED 4 indicates +15VDC is present on the switch board
LED 5 indicates +5VDC is present on the switch board
LED 8 indicates high voltage present when lit

In addition the switch board monitors the feedback information received from the output board and compares these with the command signals received from the user interface board (via CAN communication) and sends the appropriate Pulse Width Modulated power to the T1 main transformer primary winding. This 20Khz. secondary voltage is applied to the output board.

The switch board also controls the cooling fan and the two gas solenoids. The switch board also supplies +5VDC to the pressure sense board and processes the feedback from the pressure sense board.

Figure E.3 – User interface board, voltage divider board and CNC connector

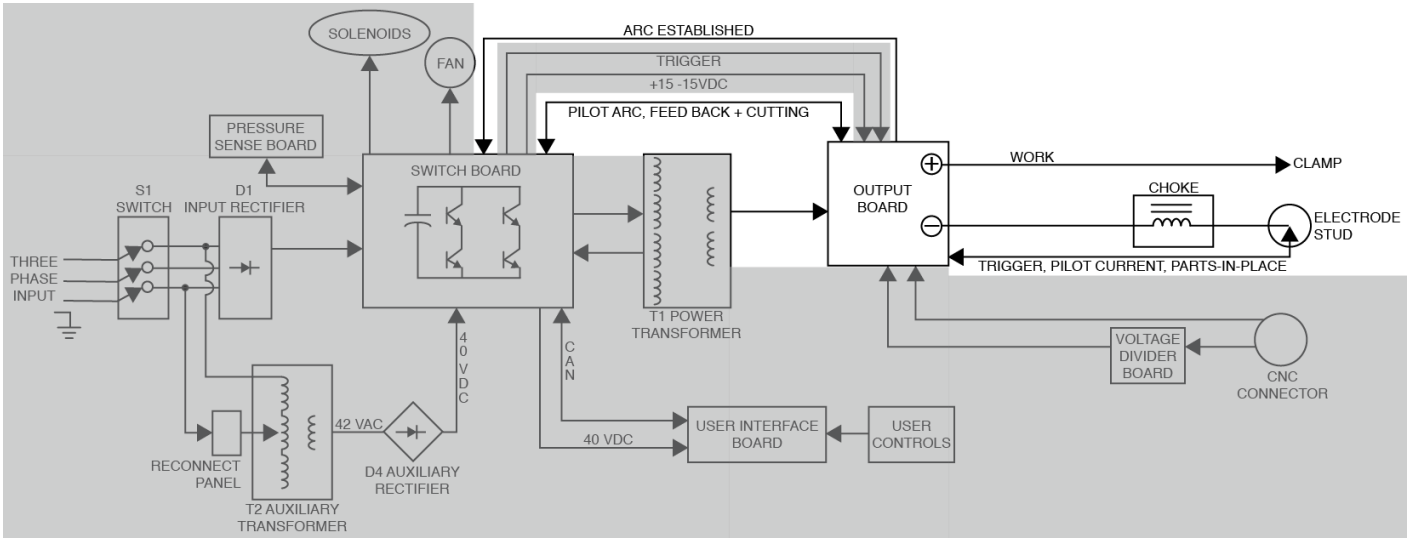


User Interface Board, Voltage Divider Board And CNC Connector

The user interface board and associated user controls allow the operator to communicate to the switch board the desired process and cutting parameters via CAN communication. The user interface board is powered by 40VDC received from the switch board. The LCD display that is incorporated in the user interface board shows available cutting modes and real time parameters.

The voltage divider board and 14-pin CNC connector are connected to the output board and allow access to Arc Start Trigger, Arc initiated contact, raw or divided Arc voltage and Forced Mark. The raw or divided Arc voltage can be set by the dip switches located on the voltage divider board.

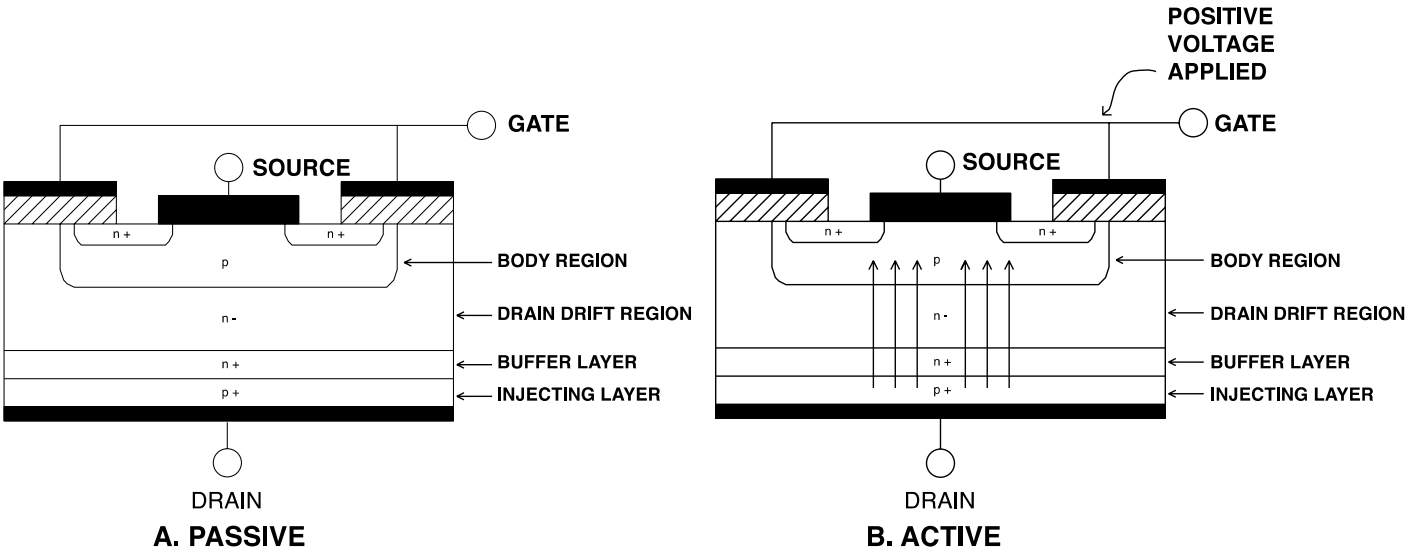
Figure E.4 – Output board and torch connector



Output Board And Torch Connector

The secondary winding of the T1 main transformer is coupled to the output board. The output of the secondary winding is a 270VAC square wave at 20Khz. All of the outputs (both pilot and cutting) go through the output board. The function of this board is to manage the output currents and signals. Four diode modules configured as a full wave bridge, rectify the secondary AC output of the main transformer to create the DC output. Two current sensors monitor the current that flows through the work piece and the torch electrode. This feedback information is sent to the switch board. The output board also receives the parts-in-place and trigger information from the torch connector. This information is passed onto the switch board. The pilot arc (18amps for 4 seconds) is managed by an IGBT switch located on the output board. The output choke that is in series with both the pilot circuit and the cutting circuit provides current filtering to enhance arc stability. The output choke is connected between the negative output of the output board and the torch connector. The positive output is connected to the work clamp.

Figure E.5 – Insulated gate bipolar transistor (IGBT) operation



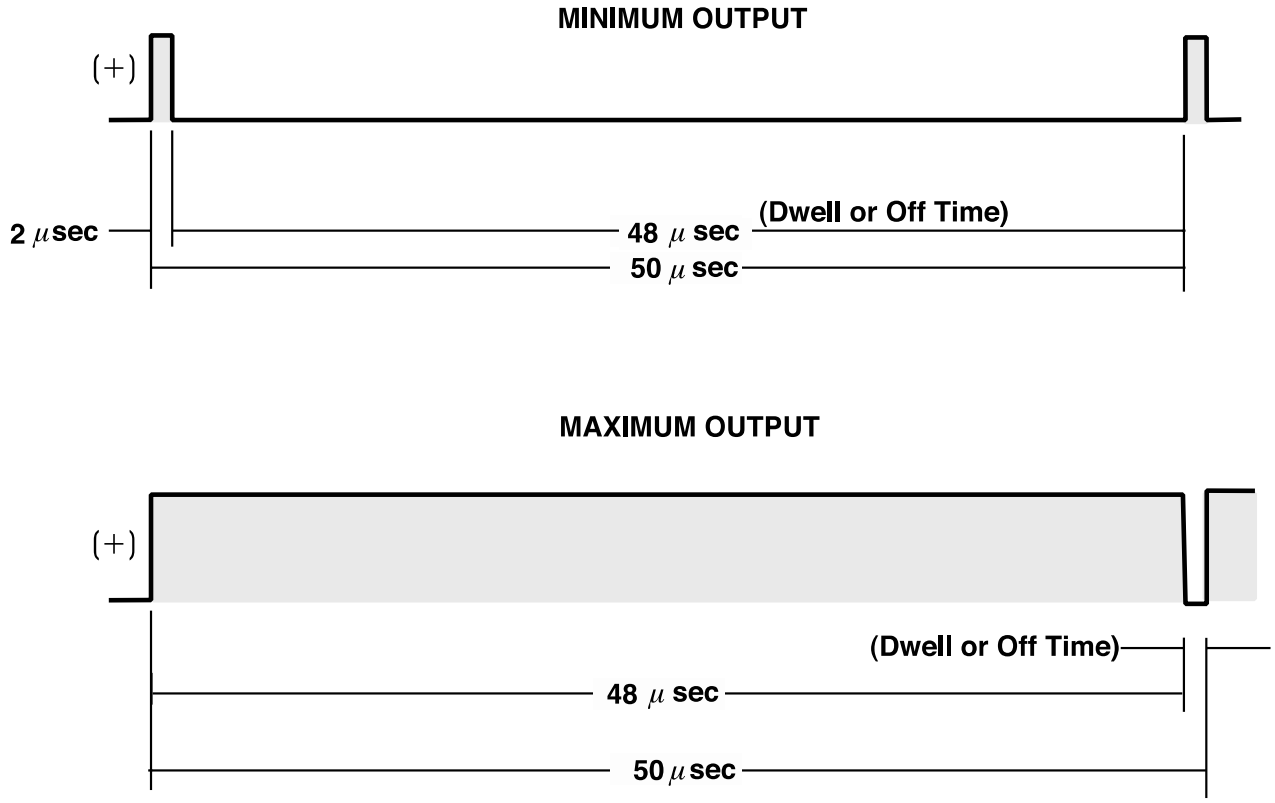
Insulated Gate Bipolar Transistor (IGBT) Operation

The IGBT is a type of transistor. IGBTs are semiconductors well suited for high frequency switching and high current applications.

Drawing A shows an IGBT in a passive mode. There is no gate signal, (zero volts relative to the source) and therefore, no current flow. The drain terminal of the IGBT may be connected to a voltage supply; but since there is no conduction the circuit will not supply current to components connected to the source. The circuit is turned off like a light switch in the OFF position.

Drawing B shows the IGBT in an active mode. When the gate signal, a positive DC voltage relative to the source, is applied to the gate terminal of the IGBT, it is capable of conducting current. A voltage supply connected to the drain terminal will allow the IGBT to conduct and supply current to circuit components coupled to the source. Current will flow through the conducting IGBT to downstream components as long as the positive gate signal is present. This is similar to turning ON a light switch.

Figure E.6 – Pulse width modulation



Pulse Width Modulation

The term PULSE WIDTH MODULATION is used to describe how much time is devoted to conduction in the cycle. Changing the pulse width is known as MODULATION. Pulse Width Modulation (PWM) is the varying of the pulse width over the allowed range of a cycle to affect the output of the machine.

Minimum Output

By controlling the duration of the gate signal, the IGBT is turned on and off for different durations during a cycle. The top drawing shows the minimum output signal possible over a 50-microsecond time period. The positive portion of the signal represents one IGBT group conducting for 2 microsecond. The dwell time (off time) is 48 microseconds. Since only 2 microseconds of the 50-microsecond time period is devoted to conducting, the output power is minimized.

Maximum Output

By holding the gate signals on the 48 microseconds and allowing only 2 microseconds of dwell time (off time) during the 50-microseconds cycle, the output is maximized. The darkened area under the top curve can be compared to the area under the bottom curve. The more darkened area under the curve, the more power is present.

Troubleshooting & Repair

HOW TO USE TROUBLESHOOTING GUIDE

⚠ WARNING

Service and repair should be performed by only 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 two main categories: Function Problems and Output Problems.

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

Step 3. PERFORM COMPONENT TESTS. 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 section. Refer to the Troubleshooting and Repair Table of Contents to locate each specific Test Procedure. All of the referred to 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 test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

PC BOARD TROUBLESHOOTING PROCEDURES

⚠ WARNING

ELECTRIC SHOCK can kill.

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

⚠ CAUTION

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

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

PC board can be damaged by static electricity.

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

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

Reusable Container
Do Not Destroy

• 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.

Troubleshooting guide

Observe Safety Guidelines detailed in the beginning of this manual.		**TROUBLESHOOTING GUIDE**
PROBLEMS (SYMPTOMS)	**POSSIBLE AREAS OF MISADJUSTMENT(S)**	**RECOMMENDED COURSE OF ACTION**
FUNCTION PROBLEMS		
Major physical or electrical damage is evident when the sheet metal covers are removed.	1. Contact your local authorized Lincoln Electric Service Facility.	1. Contact the Lincoln Electric Service Department at 1-888-935-3877.
The circuit breaker trips when power is applied to the machine.	1. Verify that the input circuit breakers are correct for the input voltage being applied.	1. Perform the ***Input Rectifier Test Procedure***. 2. Perform the ***Auxiliary Transformer Test Procedure***. 3. Perform the ***Input Switch Test Procedure***. 4. Perform the ***Switch Board Test Procedure***.
No display after the power switch is turned on.	1. Check to make sure the correct three phase input is being applied to the machine. 2. Check to make sure the machine's reconnect panel is configured correctly for the input voltage being applied. 3. Check the 4 amp fuse located in the reconnect panel.	1. Perform the ***Input Switch Test Procedure***. 2. Perform the ***Auxiliary Transformer Test Procedure***. 3. Perform the ***User Interface Board Test Procedure***. 4. Perform the ***Auxiliary Rectifier (D4) Test Procedure***.
⚠ CAUTION 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.		

Observe Safety Guidelines detailed in the beginning of this manual.		**TROUBLESHOOTING GUIDE**
PROBLEMS (SYMPTOMS)	**POSSIBLE AREAS OF MISADJUSTMENT(S)**	**RECOMMENDED COURSE OF ACTION**
OUTPUT PROBLEMS		
Thermal error 0036 is displayed.	1. Check that the rear brickwork is not blocked. 2. Make sure the fan rotates freely. 3. Make sure the heat sink fins on the output board are not blocked. 4. Make sure the cutting process is not exceeding the current limitations and duty cycle of the machine.	1. Perform the ***Fan And F.A.N. Circuit Test Procedure***. 2. Perform the ***Thermostat Circuit Test Procedure***.
The machine powers up properly but there is no response (air flow or pilot arc) when the output is triggered.	1. Make sure the air pressure is set correctly. 2. Check the torch consumables and look for kinks in the lines. 3. Check for proper CNC trigger operation if applicable. 4. The torch may be faulty.	1. Press the purge button on the front of the machine. If air does not flow, perform the ***Solenoid 1 & 2 Test Procedure***. 2. Perform the ***Output Board Test Procedure***. 3. Perform the ***Switch Board Test Procedure***.
When the output trigger is activated air begins to flow but there is a very brief pilot arc. The sequence is repeated with subsequent trigger pulls.	1. Make sure the input voltage is correct. 2. Make sure the air pressure is correct. 3. Check the torch consumables. 4. Make sure there are no kinks or restrictions in the torch cable.	1. Perform the ***Output Board Test Procedure***. 2. Perform the ***Switch Board Test Procedure***. 3. Perform the ***User Interface Board Test Procedure***.

⚠ CAUTION

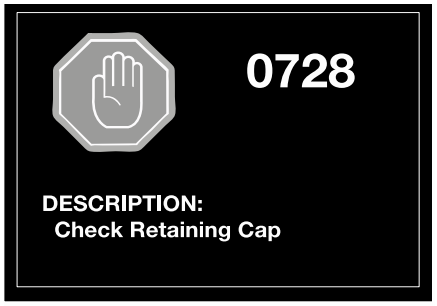
If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

Observe Safety Guidelines detailed in the beginning of this manual.		**TROUBLESHOOTING GUIDE**
PROBLEMS (SYMPTOMS)	**POSSIBLE AREAS OF MISADJUSTMENT(S)**	**RECOMMENDED COURSE OF ACTION**
OUTPUT PROBLEMS		
The cutting arc starts but sputters badly.	1. Check the torch consumables. 2. Make sure the work clamp is connected tightly to the work piece. 3. Make sure the air pressure is correct. 4. The torch may be faulty.	1. Perform the ***Choke Test Procedure***. 2. Perform the ***Output Board Test Procedure***. 3. Perform the ***Switch Board Test Procedure***.
The pilot arc starts but the arc will not transfer to the work piece to establish a cutting arc.	1. Make sure the work clamp is connected tightly to the work piece. 2. The work piece must be electrically conductive material.	1. Perform the ***Output Board Test Procedure***. 2. Perform the ***Switch Board Test Procedure***. 3. Perform the ***User Interface Board Test Procedure***. 4. Perform the ***Choke Test Procedure***. 5. Perform the ***Main Transformer Test Procedure***.

⚠ CAUTION

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.

Error codes

Observe Safety Guidelines detailed in the beginning of this manual.	**ERROR CODES**	
ERROR CODE	**POSSIBLE CAUSE**	**RECOMMENDED COURSE OF ACTION**
	Gas input line is disconnected or input is too low.	Check the gas line feeding the machine is properly connected and that the pressure is above 90 psi for cutting or above 50 psi for marking or gouging.
	Torch is disconnected or the torch retaining cap is missing or loose.	Check that the consumables are properly installed. Tighten retaining cap (hand-tight only) and check that it touches the two pins extending down from the torch body. The pins on the torch should extend and retract freely.
	Pilot timer error.	In cut, mark and grid modes, the pilot arc will only run for five seconds to prevent unnecessary consumable wear. Verify the correct torch to work piece height and that the work lead is connected and making a good electrical connection. If error occurs immediately after triggering, verify correct three phase input.
	Trigger locked.	Release the trigger before continuing. The trigger must be disabled at machine startup or when changing modes.

Observe Safety Guidelines detailed in the beginning of this manual.	**ERROR CODES**	
ERROR CODE	**POSSIBLE CAUSE**	**RECOMMENDED COURSE OF ACTION**
	Pilot stuck open.	Nozzle could be missing or debris could be stuck between the torch consumables. Remove and replace the consumables, checking for proper installation.
	Pilot stuck closed.	Electrode is not retracting from the nozzle after trigger initiation. The parts could be stuck together or air is not properly flowing through the torch. Remove and replace the consumables, checking for proper installation. Check the electrode for structural damage. If electrode is fine, replace front isolator assembly (BK14300-18).
	Machine has overheated and must be allowed to cool before continuing.	Check that the fan is spinning freely and that the rear brickwork and side/front louvers are not obstructed. If thermal faults continue, blow dust out from the rear of the machine.
	Communication error between power board and control board.	Cycle power to the machine to see if error clears. Otherwise a qualified technician must check communication between the power and control boards.

Observe Safety Guidelines detailed in the beginning of this manual.		**ERROR CODES**
ERROR CODE	**DESCRIPTION**	**RECOMMENDED COURSE OF ACTION**
6	**User interface not connected to switch board**. CAN communication between switch board and user interface board has timed out.	1. Check the physical wiring and connections between the user interface board and the switch board. 2. Verify power supply to switch board. 3. Replace defective switch board assembly or user interface board.
31	**Primary Overcurrent**. Peak current through the transformer primary has exceeded threshold (140 amps).	1. Verify connections to the switch board, transformer and output rectifier assemblies are made correctly and there are no damaged components in the machine. 2. Replace shorted output rectifier diode. 3. Replace defective main transformer. 4. Replace defective switch board assembly.
36	**Thermal Fault**. Thermostat on output rectifier heat sink has tripped.	1. Do not exceed allowable ambient temperature or duty cycle limits. 2. Verify that fan is operating and airflow is not being blocked. 3. Measure thermostats at switch board and replace if defective.
213	**Switch board is offline**. Switch board failed to turn on.	1. Mapping error. Cycle power to attempt to clear error. 2. Switch board has a fatal error. Read error code at on-board status LED and decode error. 3. Replace defective switch board assembly.
713	**Misconnection – Primary supply voltage too high**. Switch board auxiliary supply voltage is too high at machine power-up.	1. Improper input voltage configuration. Verify primary reconnect position, measure input voltage level and check three phase operation. 2. Damaged auxiliary transformer or intermittent “A” lead connection. 3. Replace defective user interface board.
714	**Misconnection – Primary supply voltage too low**. Switch board auxiliary supply voltage is too low at machine power-up.	1. Improper input voltage configuration. Verify primary reconnect position, measure input voltage level and check three phase operation. 2. Damaged auxiliary transformer or intermittent “A” lead connection. 3. Replace defective user interface board assembly.

Test Procedures

CASE COVER REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only 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

3/8” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Using a 3/8” nutdriver, remove the four screws securing the roof panel to the machine. See ***Figure F.1***.
3. Using a 3/8” nutdriver, remove the six screws securing the left case side panel. See ***Figure F.2***.
4. Using a 3/8” nutdriver, remove the six screws securing the right case side panel. See ***Figure F.3***.
5. Perform any tests / replacement procedure.

REPLACEMENT PROCEDURE

1. Carefully position the left case side panel onto the machine.
2. Using a 3/8” nutdriver, attach the six screws securing the left case side panel to the machine.
3. Carefully position the right case side panel onto the machine.
4. Using a 3/8” nutdriver, attach the six screws securing the right case side panel to the machine.
5. Carefully position the roof panel onto the machine.
6. Using a 3/8” nutdriver, attach the four screws securing the roof panel to the machine.

Figure F.1 – Roof panel mounting screw locations

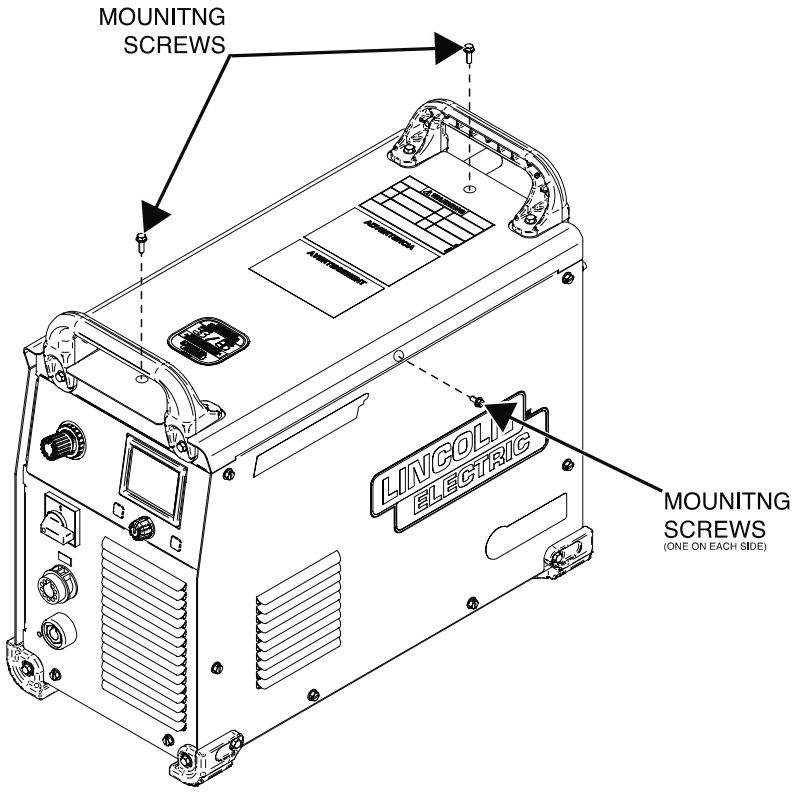


Figure F.2 – Left case side panel mounting screw locations

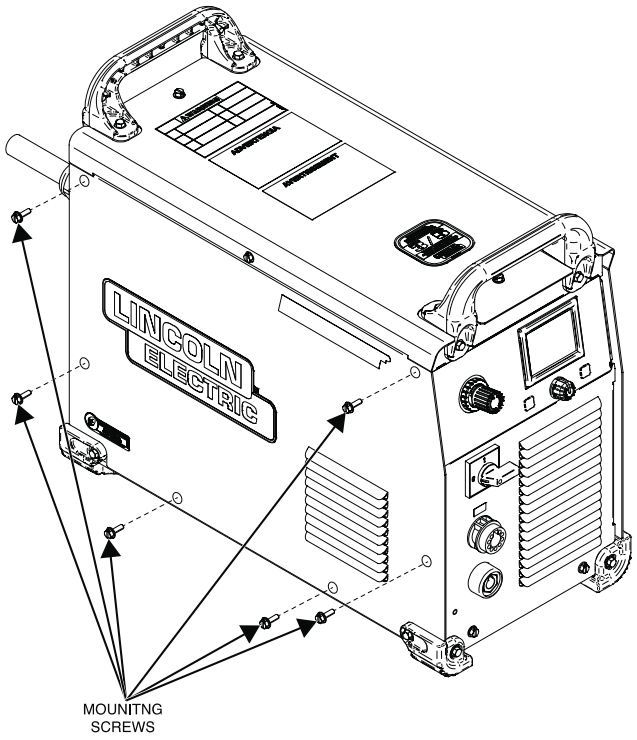
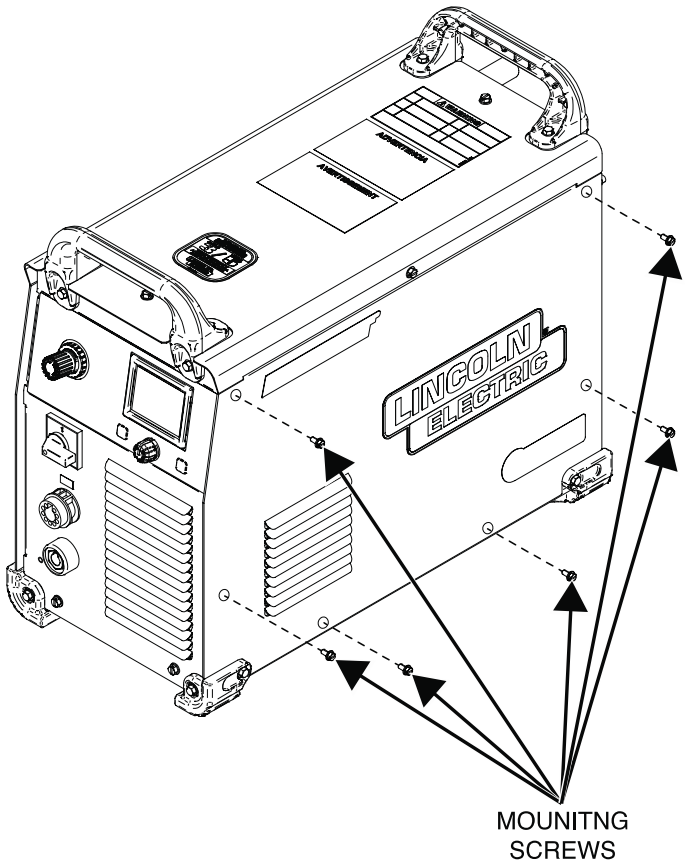


Figure F.3 – Right case side mounting screw locations



CAPACITOR DISCHARGE PROCEDURE

Service and repair should be performed by only 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 help determine if the Capacitors are discharged.

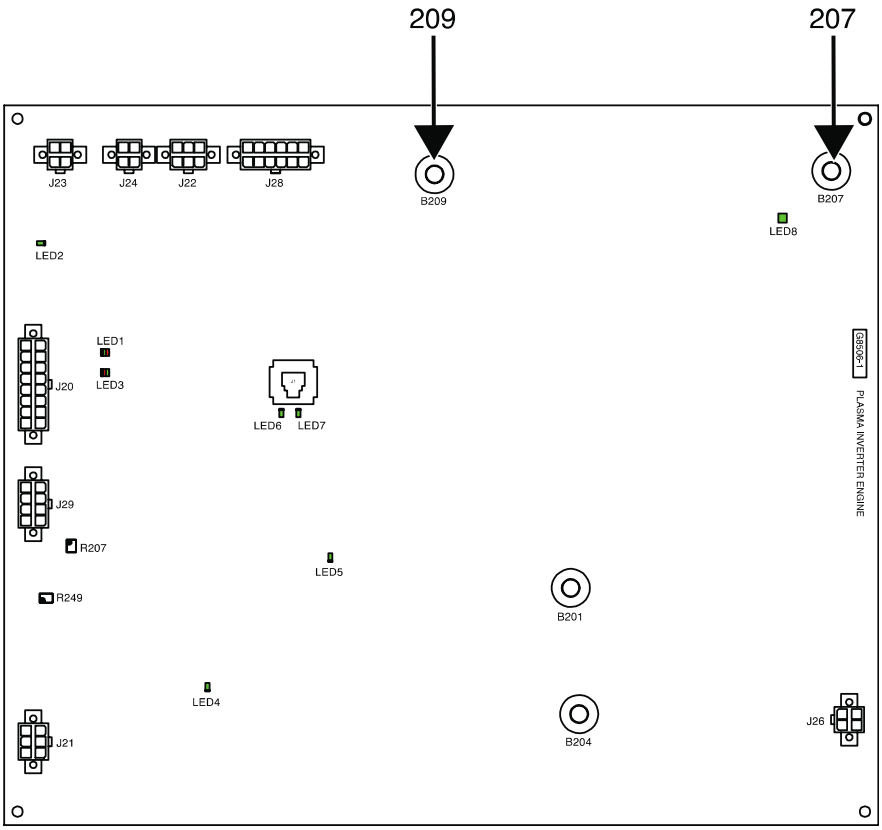
MATERIALS NEEDED

Resistor (25-1000 ohms and 25 watts minimum) Lincoln Part #S01404-114 Works Well For This Purpose
Electrically Insulated Gloves
Electrically Insulated Pliers
Jumper Leads
Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the two large bolted connections on the switch board labeled “207” and “209”. See ***Figure F.4***. See Wiring Diagram.
4. Using a 25 watt or more resistor (25 to 1000 ohm) connected to two test leads, carefully discharge the capacitors.
5. Using a digital volt/ohmmeter, ensure the capacitors are discharged by connecting the positive meter probe to “209” and the negative meter probe to “207” on the switch board. The voltage should be zero, if not repeat the discharge procedure. See Wiring Diagram.

Figure F.4 – Switch board connections 207 and 209 location



INPUT RECTIFIER TEST PROCEDURE

Service and repair should be performed by only Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual. If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This test will determine if the Input Rectifier is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Phillips Screwdriver
Wiring Diagram

TEST PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the input rectifier. See ***Figure F.5***. See Wiring Diagram.
5. Using a digital volt/ohmmeter, perform the forward diode drop tests in ***Table F.1***. See ***Figures F.5*** and ***F.6***. See Wiring Diagram.
6. If the test results are questionable, using a Phillips screwdriver, label and disconnect all leads and MOVs from the input rectifier and retest. See Wiring Diagram.
7. If any portion of the test fails, the input rectifier may be faulty.
8. If faulty, perform the ***Input Rectifier Removal And Replacement Procedure***.
9. Connect any previously disconnected leads to the input rectifier.
10. Perform the ***Case Cover Replacement Procedure***.

Table F. 1 – Forward diode drop tests

TEST POINT (POSITIVE)	TEST POINT (NEGAITIVE)	EXPECTED RESULTS
Terminal A	Positive Terminal	.03V – 1.0V
Terminal B	Positive Terminal	.03V – 1.0V
Terminal C	Positive Terminal	.03V – 1.0V
Negative Terminal	Terminal A	.03V – 1.0V
Negative Terminal	Terminal B	.03V – 1.0V
Negative Terminal	Terminal C	.03V – 1.0V

Figure F.5 – Input rectifier location

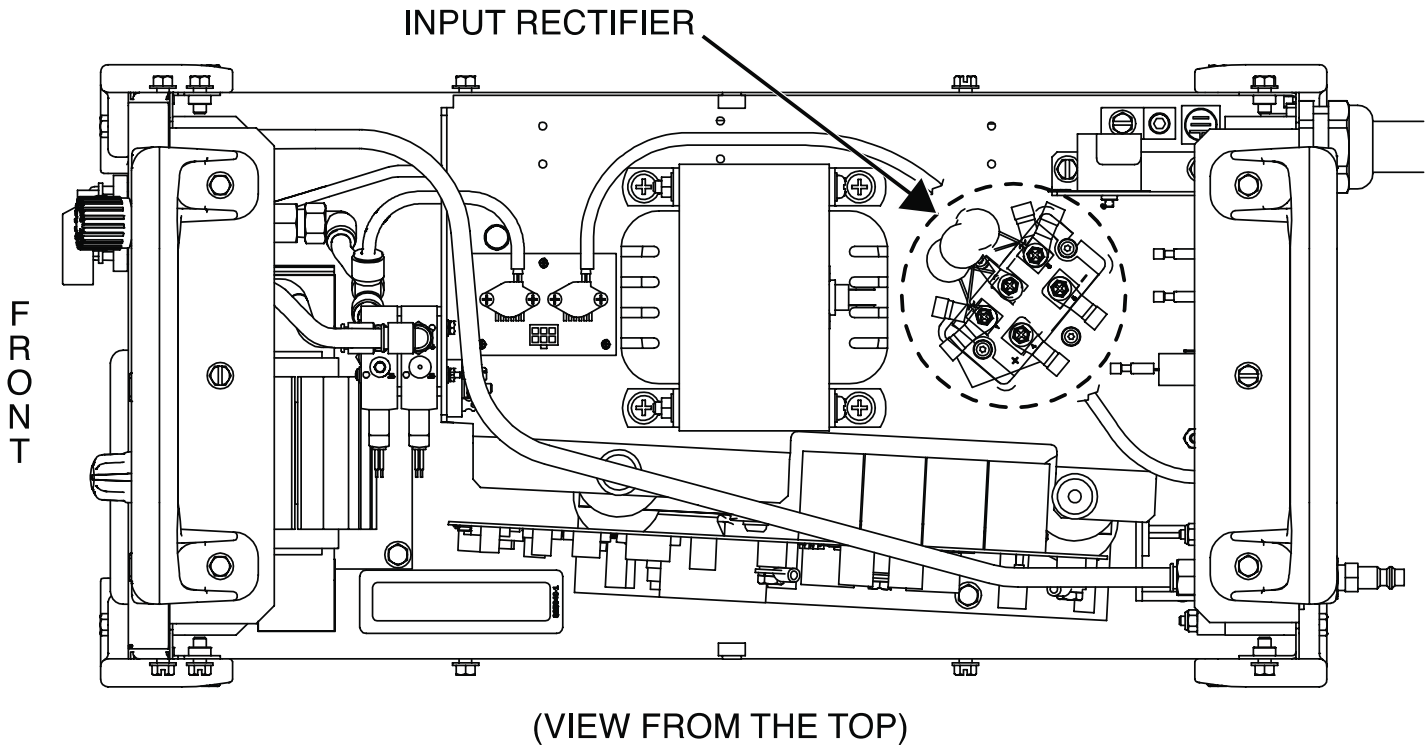
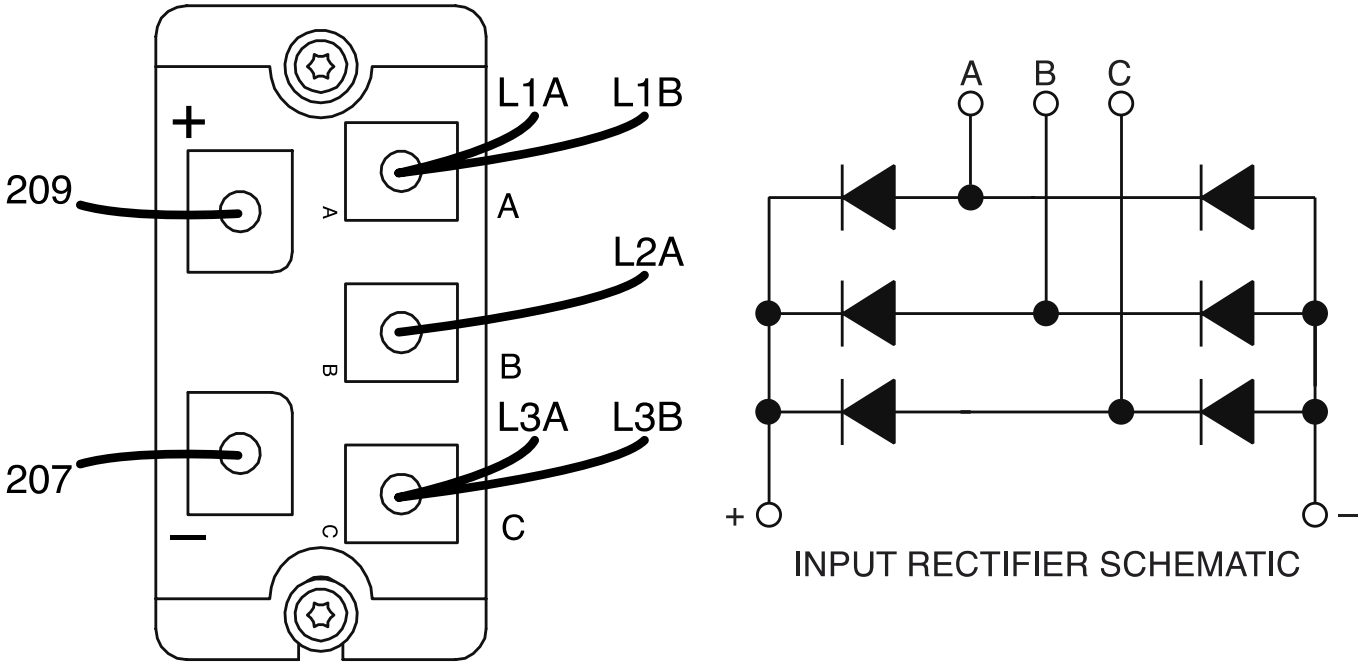


Figure F.6 – Input rectifier detail



AUXILIARY TRANSFORMER (T1) TEST PROCEDURE

Service and repair should be performed by only 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 Auxiliary Transformer (T1) is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the auxiliary transformer (T1). See ***Figure F.7***. See Wiring Diagram.
5. Carefully apply the correct input power to the machine and turn ON the machine.
6. Using a digital volt/ohmmeter, test for the correct primary voltages at the reconnect panel. See ***Table F.2***. See ***Figure F.7***. See Wiring Diagram.
   NOTE: The reconnect jumper must be in the correct position for the supply voltage being used.
7. If the correct primary voltages are NOT present, check all input power leads, reconnect jumper, fuse and connections. See Wiring Diagram.
8. If the correct primary voltages are present continue testing.
9. Using a digital volt/ohmmeter, test for the correct secondary voltages at the auxiliary rectifier (D4). See ***Table F.2***. See ***Figures F.8*** and ***F.9***. See Wiring Diagram.
10. If the primary voltages are correct and the secondary voltages are low or not present, label and disconnect the AC leads (X3 and X4) from the auxiliary rectifier and retest. If the AC secondary voltages are still low or not present the auxiliary transformer may be faulty.
11. If faulty, perform the ***Auxiliary Transformer Removal And Replacement Procedure***.
12. When testing is complete, reconnect any previously disconnected leads. See Wiring Diagram.
13. Perform the ***Case Cover Replacement Procedure***.

Table F. 2 – Primary and secondary voltage tests

DESCRIPTION	TEST POINT	TEST POINT	EXPECTED READING
PRIMARY VOLTAGE (460 VAC H1 to H5)	H1	H2	0 VAC
PRIMARY VOLTAGE (460 VAC H1 to H5)	H1	H3	120 VAC
PRIMARY VOLTAGE (460 VAC H1 to H5)	H1	H4	380 VAC
PRIMARY VOLTAGE (460 VAC H1 to H5)	H1	H6	575 VAC
SECONDARY VOLTAGE	X3	X4	42 VAC

Figure F.7 – Auxiliary transformer (T1), auxiliary rectifier and reconnect panel locations

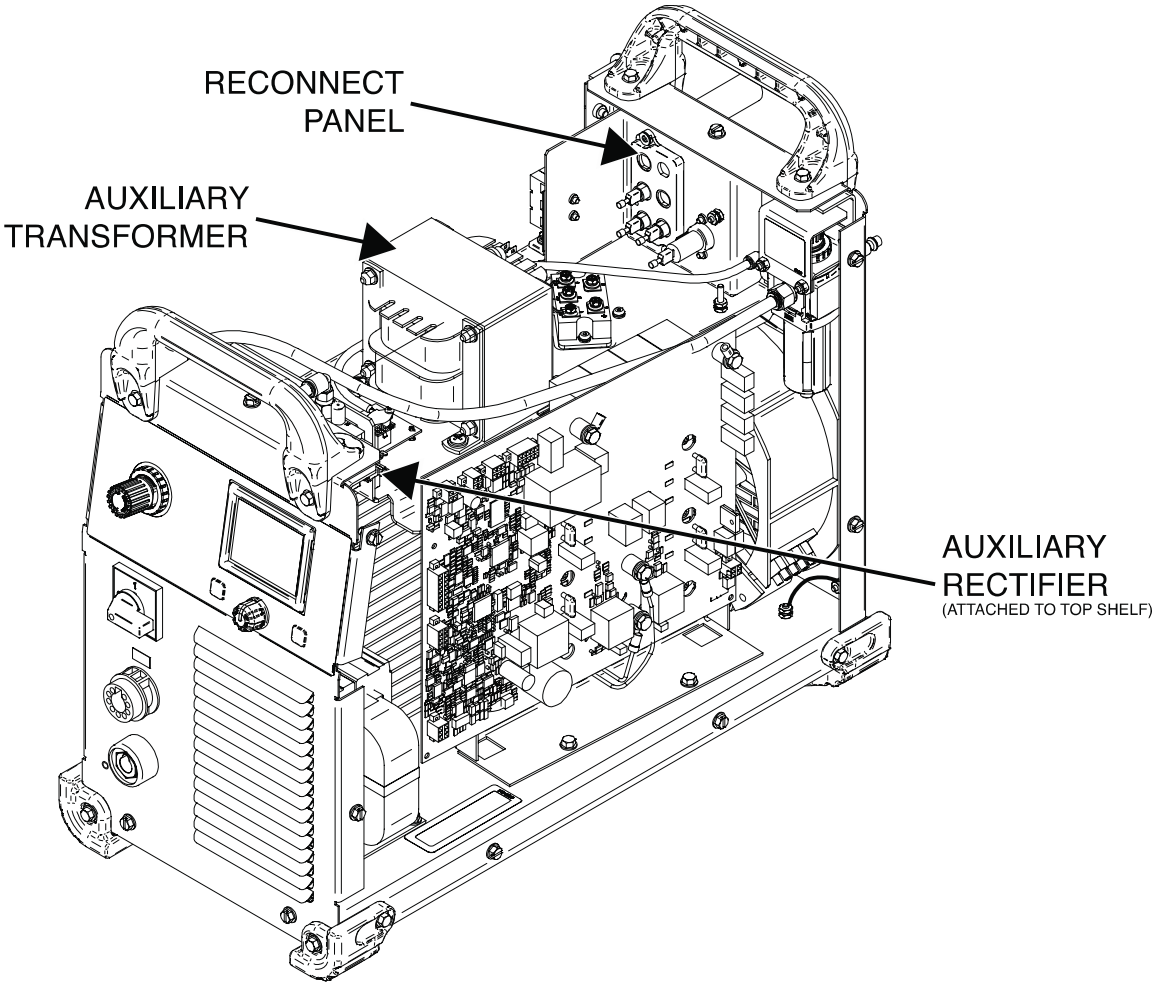


Figure F.8 – Auxiliary transformer lead locations

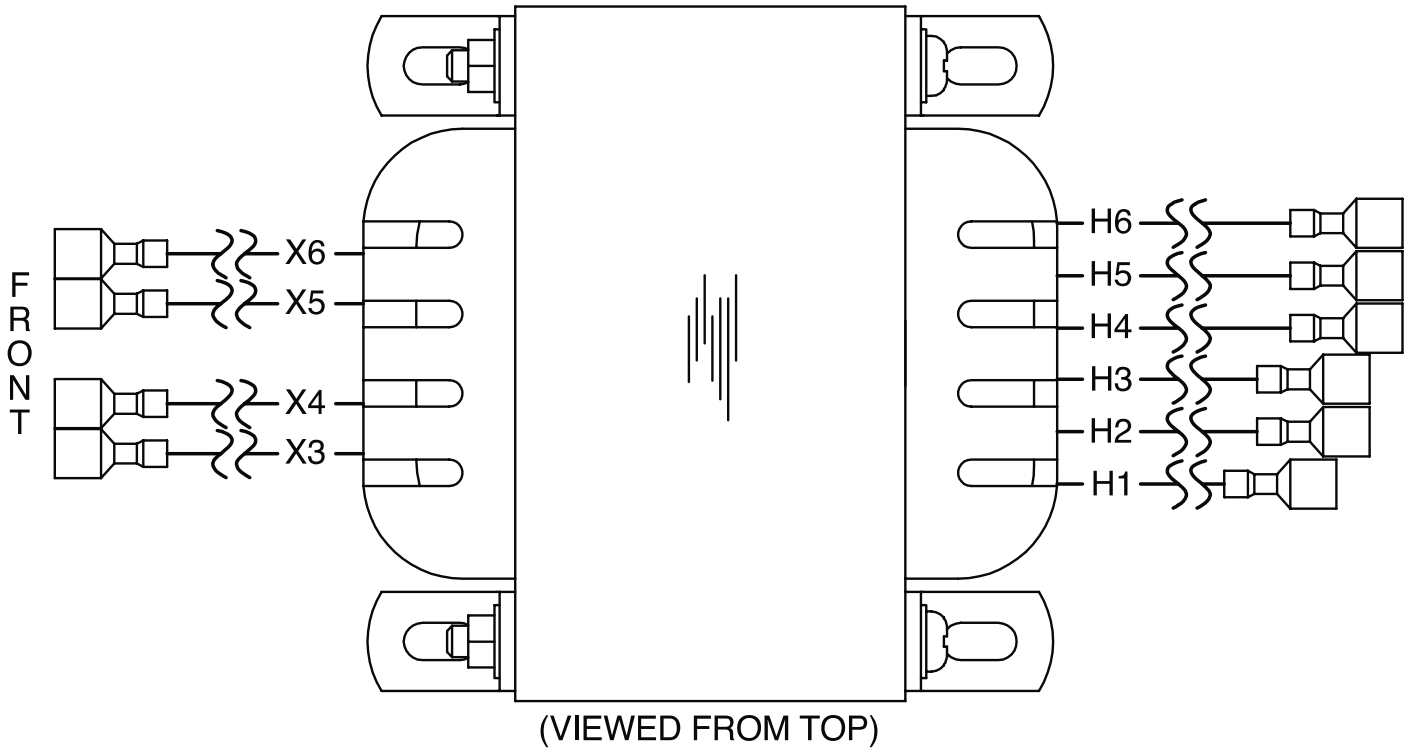
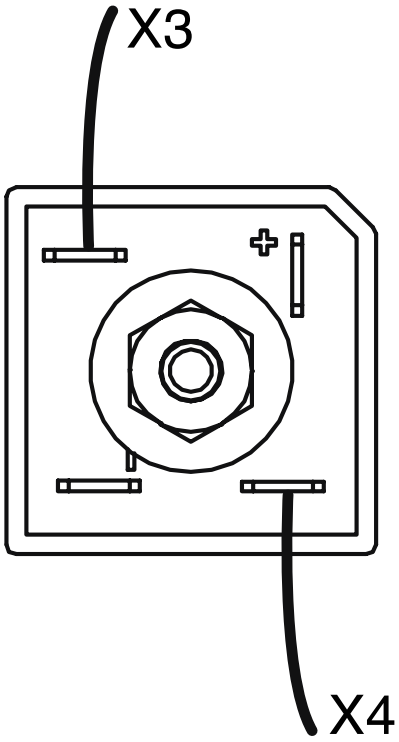


Figure F.9 – Auxiliary rectifier lead locations



FAN AND F.A.N. CIRCUIT TEST PROCEDURE

Service and repair should be performed by only Lincoln Electric factory trained personnel. Unauthorized repairs performed on this equipment may result in danger to the technician or machine operator and will invalidate your factory warranty. For your safety and to avoid electrical shock, please observe all safety notes and precautions detailed throughout this manual. If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.

TEST DESCRIPTION

This test will determine if the Fan and F.A.N. Circuit are functioning properly.

MATERIALS NEEDED

Jumper Wire
Wiring Diagram

TEST PROCEDURE

NOTE: The fan should turn ON briefly when the machine is turned on. The fan turns on during welding and remains of for five minutes after output is disabled. The fan also turns on during a thermal fault.

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate plug J26 on the switch board. See ***Figure F.10***. See Wiring Diagram.
5. Label and disconnect plug J26 from the switch board and insert a jumper wire into the end of the connector to short leads 24 and 22 together. See ***Figure F.11***. See Wiring Diagram.
6. Carefully apply the correct input power to the machine.
7. When the machine is turned on, the fan should start and run as long as the power is on. If this test results in the fan operating properly, all components of the fan circuit are OK with the possible exception of the switch board.
8. If the test fails to start the fan, check the 115 volt primary of the auxiliary transformer (T2) and the fan itself. Perform the ***Auxiliary Transformer Test Procedure***. If the transformer produces the required 115 volts and the plug J26 leads are jumped, the fan and/or fan capacitor are suspect. See Wiring Diagram.
9. If the test results in a running fan, remove the jumper wire from between leads 24 and 22. Connect plug J26 to the switch board. Label and disconnect one lead from the thermostat. See ***Figure F.12***. See Wiring Diagram.
10. If removing the lead from the thermostat causes the switch board to flash error 36 and the thermo LED (on the user interface) turns on but the fan still does not start, the switch board may be faulty. Perform the ***Switch Board Test Procedure***.

11. If no error 36 flashes and the thermo LED does not turn on, the user interface board may be faulty. Perform the ***User Interface Board Test Procedure***.
12. If any component tests faulty, replace the suspect component.
13. Connect any previously removed leads and plugs.
14. Perform the ***Case Cover Replacement Procedure***.

Figure F.10 – Switch board plug J26 location

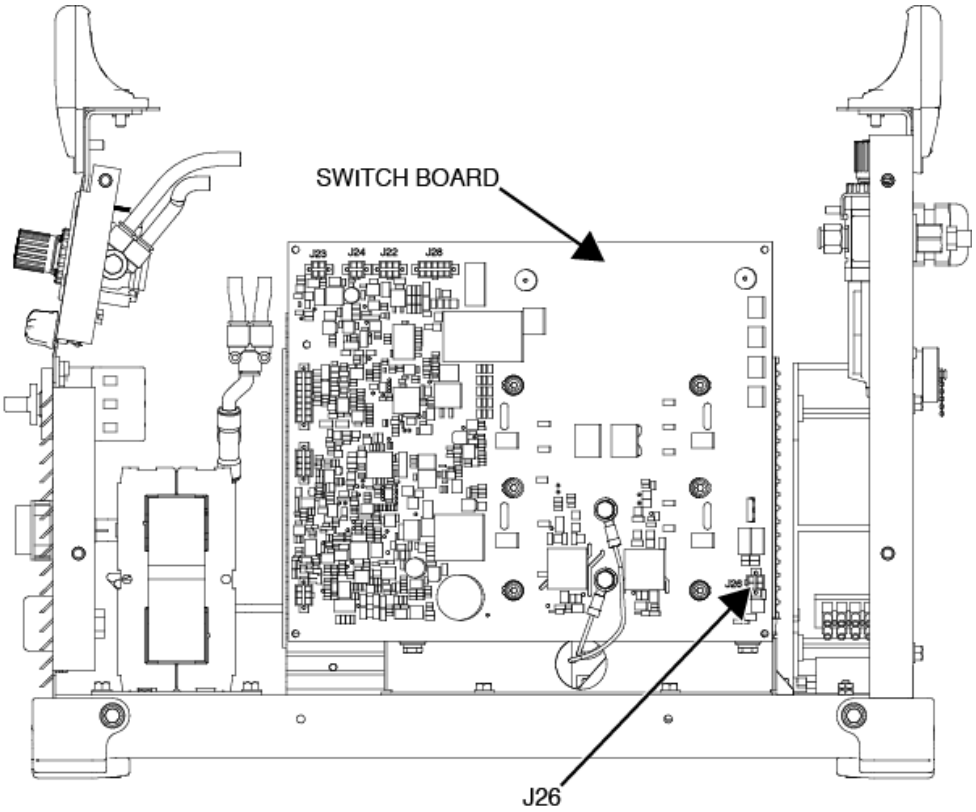


Figure F.11 – Plug J26 lead locations

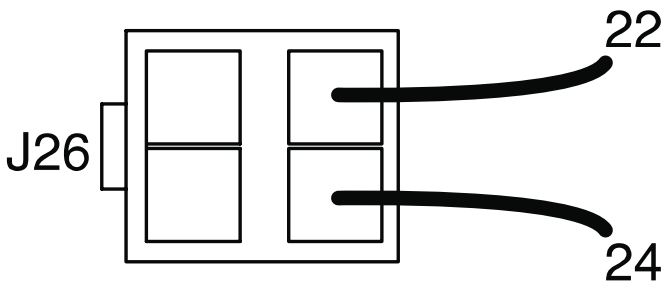
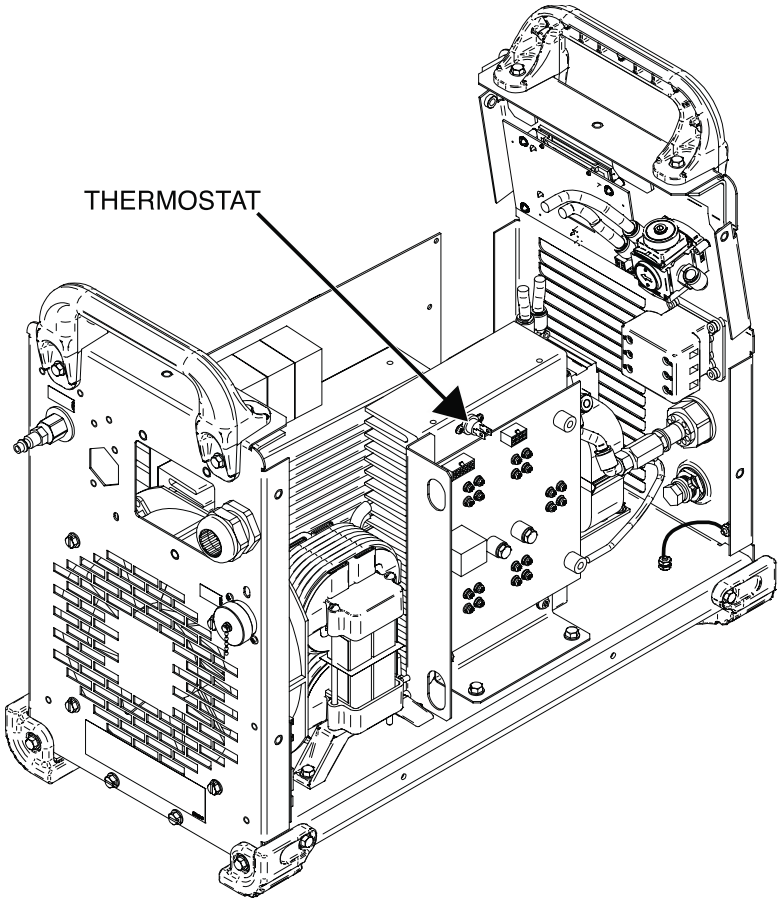


Figure F.12 – Thermostat location



OUTPUT BOARD TEST PROCEDURE

Service and repair should be performed by only 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 Output Board is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the output board. See ***Figure F.13***. See Wiring Diagram.
5. Using a volt/ohmmeter, perform the diode tests outlined in ***Table F.3***. See ***Figure F.14***. See Wiring Diagram.
6. Using a volt/ohmmeter, perform the resistance tests outlined in ***Table F.4***. See ***Figures F.14***, ***F.15*** and ***F.16***. See Wiring Diagram.
7. If any of the tests fail, label and disconnect all leads from the terminals to be tested and retest.
8. Connect all previously disconnected leads and continue testing.
9. Carefully apply the correct input power to the machine and turn ON the machine.
10. Perform the voltage tests outlined in ***Table F.5***. See ***Figures F.14*** and ***F.15***. See Wiring Diagram.
11. Perform the LED inspections outlined in ***Table F.6***. See ***Figure F.14***. See Wiring Diagram.
12. If any of the tests fail, the output board may be faulty.
13. If faulty, perform the ***Output Board Removal And Replacement Procedure***.
14. Connect any previously disconnected leads.
15. Perform the ***Case Cover Replacement Procedure***.

Table F. 3 – Output board diode tests

TEST POINT (POS)	TEST POINT (NEG)	EXPECTED READING	MACHINE CONDITION
B5	B10	.325 VDC	MACHINE OFF. NO INPUT POWER APPLIED.
B6	B10	.325 VDC	MACHINE OFF. NO INPUT POWER APPLIED.
B9	B5	.325 VDC	MACHINE OFF. NO INPUT POWER APPLIED.
B9	B6	.325 VDC	MACHINE OFF. NO INPUT POWER APPLIED.
B5	B6	"OL"	MACHINE OFF. NO INPUT POWER APPLIED.
B11	B10	.325 VDC	MACHINE OFF. NO INPUT POWER APPLIED.
B10	B11	"OL"	MACHINE OFF. NO INPUT POWER APPLIED.

Table F. 4 – Output board resistance tests

TEST POINT (POS)	TEST POINT (NEG)	EXPECTED READING	MACHINE CONDITION
PLUG J2 PIN 1 (LEAD 9)	ELECTRODE STUD PIN 9	LOW RESISTANCE (LESS THAN ONE OHM)	MACHINE OFF. NO INPUT POWER APPLIED.
PLUG J2 PIN 2 (LEAD 1)	ELECTRODE STUD PIN 1	LOW RESISTANCE (LESS THAN ONE OHM)	MACHINE OFF. NO INPUT POWER APPLIED.
PLUG J2 PIN 3 (LEAD 3)	ELECTRODE STUD PIN 3	LOW RESISTANCE (LESS THAN ONE OHM)	MACHINE OFF. NO INPUT POWER APPLIED.
TERMINAL B12 (LEAD 5)	ELECTRODE STUD PIN 5	LOW RESISTANCE (LESS THAN ONE OHM)	MACHINE OFF. NO INPUT POWER APPLIED.
TERMINAL B12 (LEAD 6)	ELECTRODE STUD PIN 6	LOW RESISTANCE (LESS THAN ONE OHM)	MACHINE OFF. NO INPUT POWER APPLIED.

Table F. 5 – Output board voltage tests

DESCRIPTION	TEST POINT (POS)	TEST POINT (NEG)	EXPECTED READING	CONDITION
INPUT POWER SUPPPLY FROM THE SWITCH BOARD	PLUG J4 PIN 3 (LEAD 213)	PLUG J4 PIN 6 (LEAD 216)	-15 VDC	MACHINE ON.
INPUT POWER SUPPPLY FROM THE SWITCH BOARD	PLUG J4 PIN 2 (LEAD 212)	PLUG J29 PIN 6 (LEAD 216)	15 VDC	MACHINE ON.
INPUT POWER SUPPPLY FROM THE SWITCH BOARD	PLUG J1 PIN 6 (LEAD 296)	PLUG J1 PIN 12 (LEAD 290)	15 VDC	MACHINE ON.

Table F. 6 – Output board LED functions

LED #	COLOR	FUNCTION
1	GREEN	15V POWER “OK”
2	RED	ILLUMINATES WHEN PILOT IGBT IS CLOSED (PILOT ON)
3	GREEN	+15V PILOT SUPPLY “OK”
	OFF	PILOT IS LIKELY SHORTED

Figure F.13 – Output board location

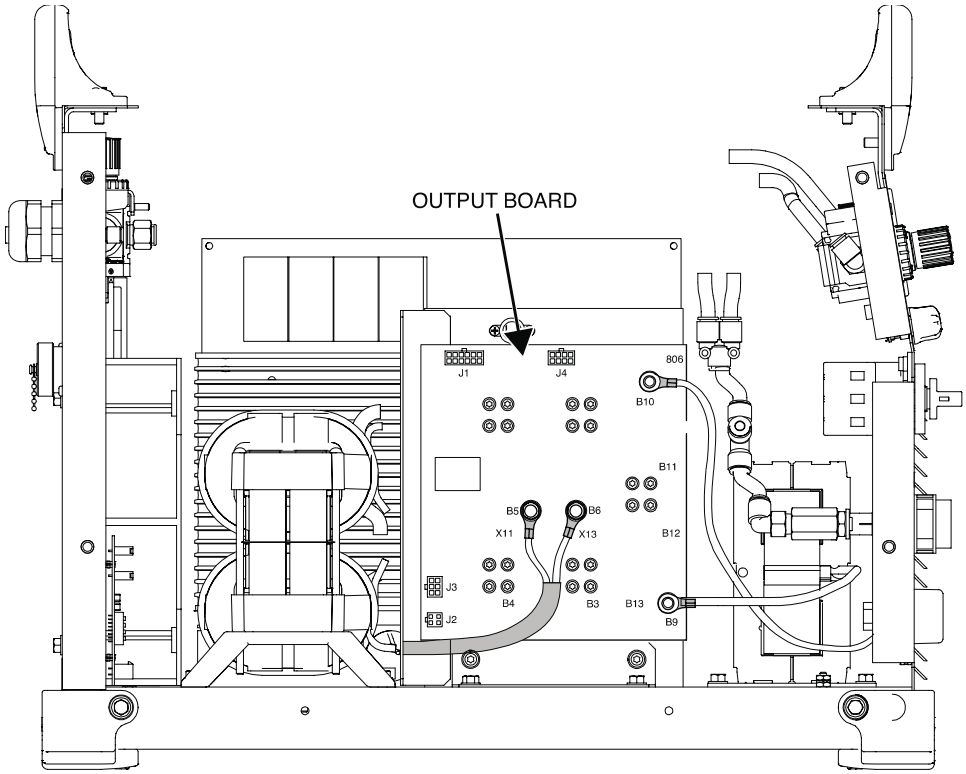


Figure F.14 – Output board plug and LED locations

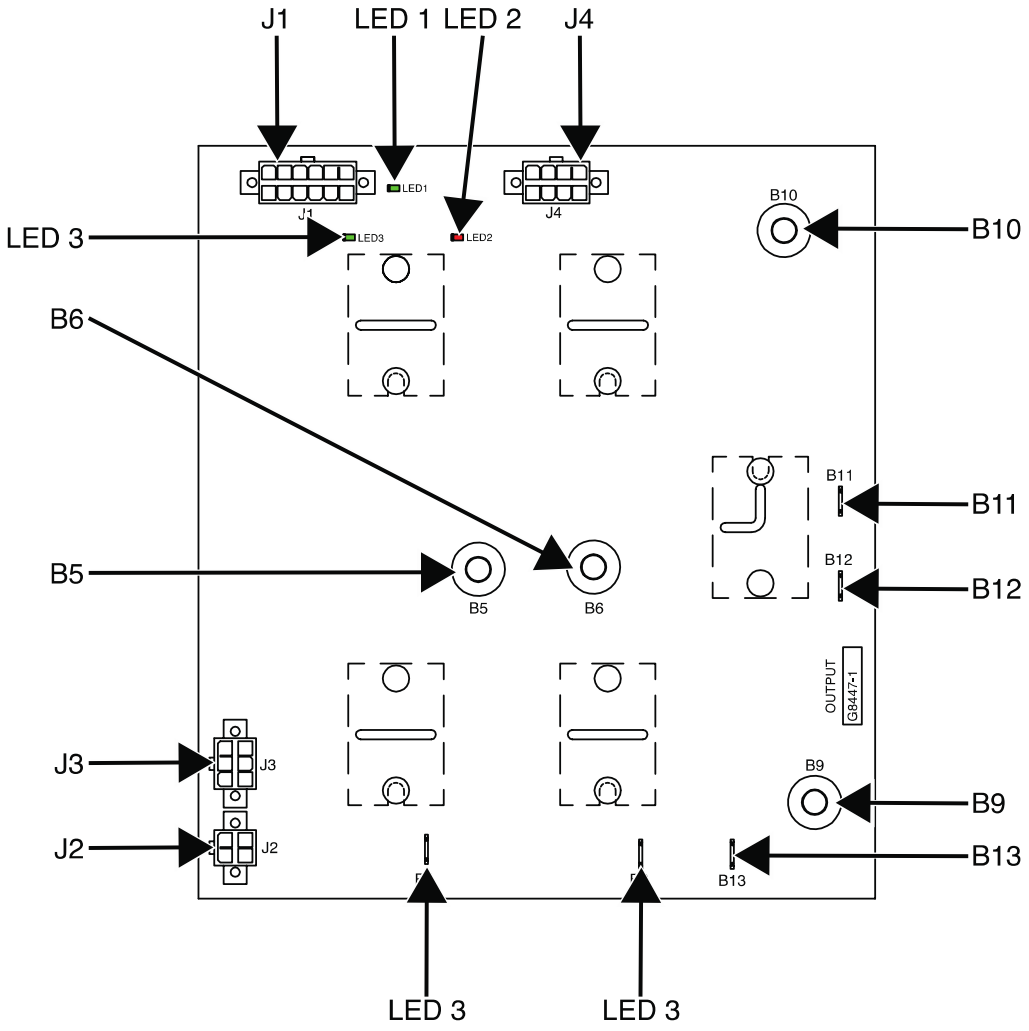


Figure F.15 – Output board lead locations

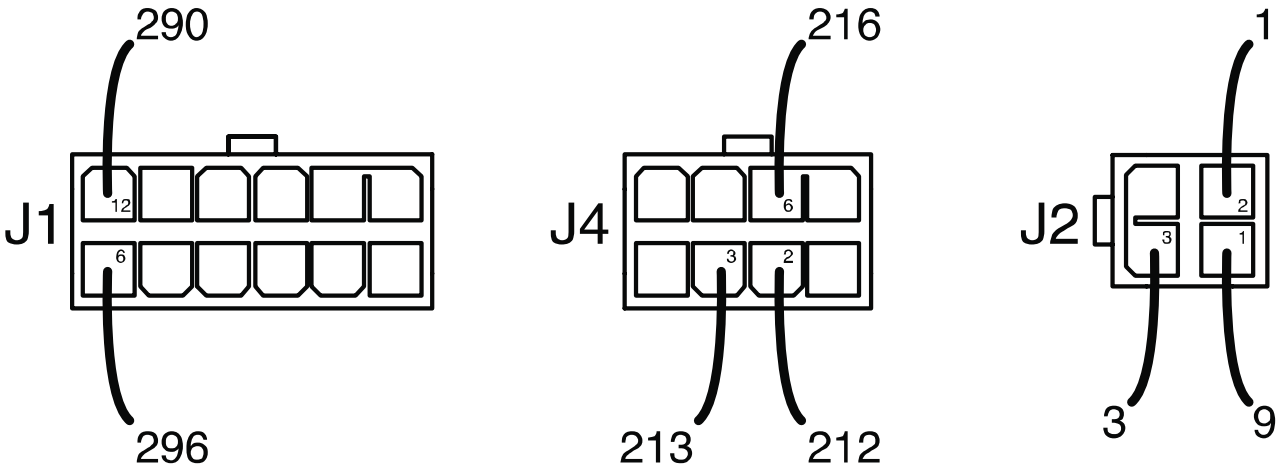
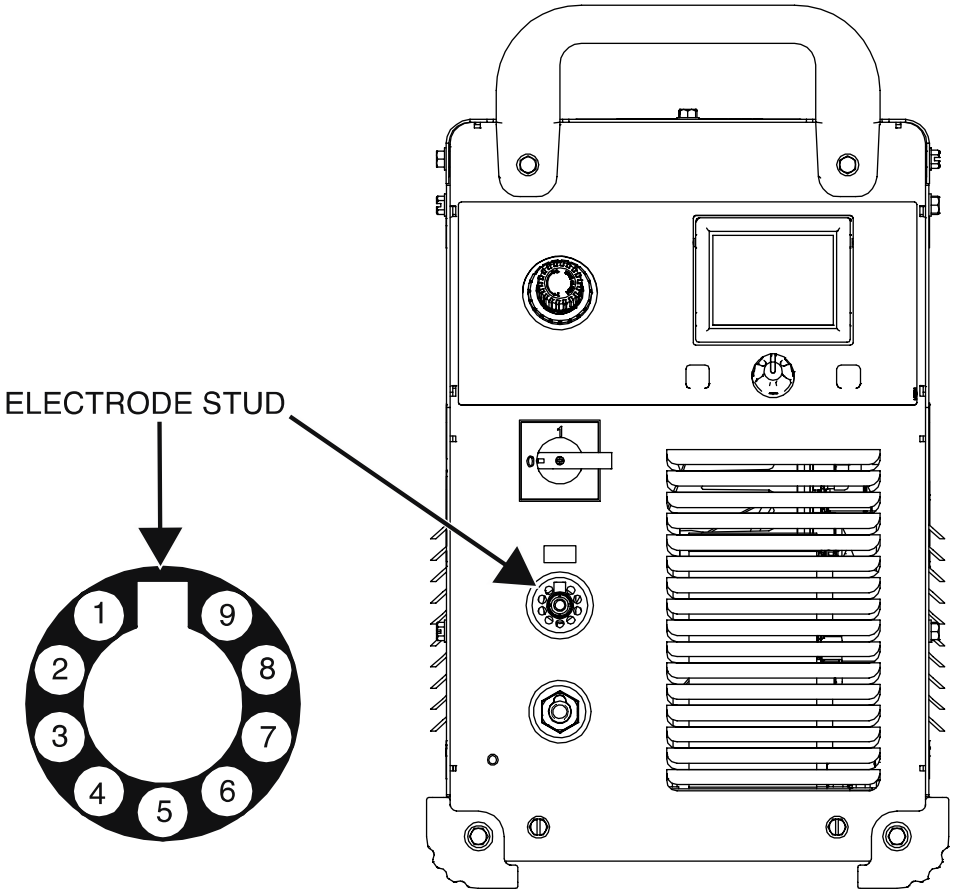


Figure F.16 – Electrode stud pin location



CHOKE TEST PROCEDURE

Service and repair should be performed by only 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 Choke is open, shorted (turn to turn) or grounded.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the choke assembly. See ***Figure F.17***. See Wiring Diagram.
5. **Open:** No weld output. Using a digital volt/ohmmeter, test the resistance from the output board terminal B9 to the rear of the electrode stud. See ***Figures F.18*** and ***F.19***. See Wiring Diagram. Typical resistance is less than one ohm.
6. **Turn To Turn Short:** Reduced inductance, arc instability, excessive heating of the choke. Check for any physical signs of arcing within the choke assembly. See ***Figure F.20***. See Wiring Diagram.
7. **Choke Coil Grounded:** Reduced inductance, alternate weld current path. Electrically isolate the choke coil by disconnecting the choke lead from output board terminal B9 and the choke lead from the rear of the electrode stud. Using a digital volt/ohmmeter, check the resistance from choke coil to chassis ground. Resistance should be at least 500,000 ohms. See ***Figure F.18***. See Wiring Diagram.
8. If any of the tests fail, the choke may be faulty.
9. If faulty, perform the ***Choke Removal And Replacement Procedure***.
10. Connect any previously disconnected leads. See Wiring Diagram.
11. Perform the ***Case Cover Replacement Procedure***.

Figure F.17 – Choke location

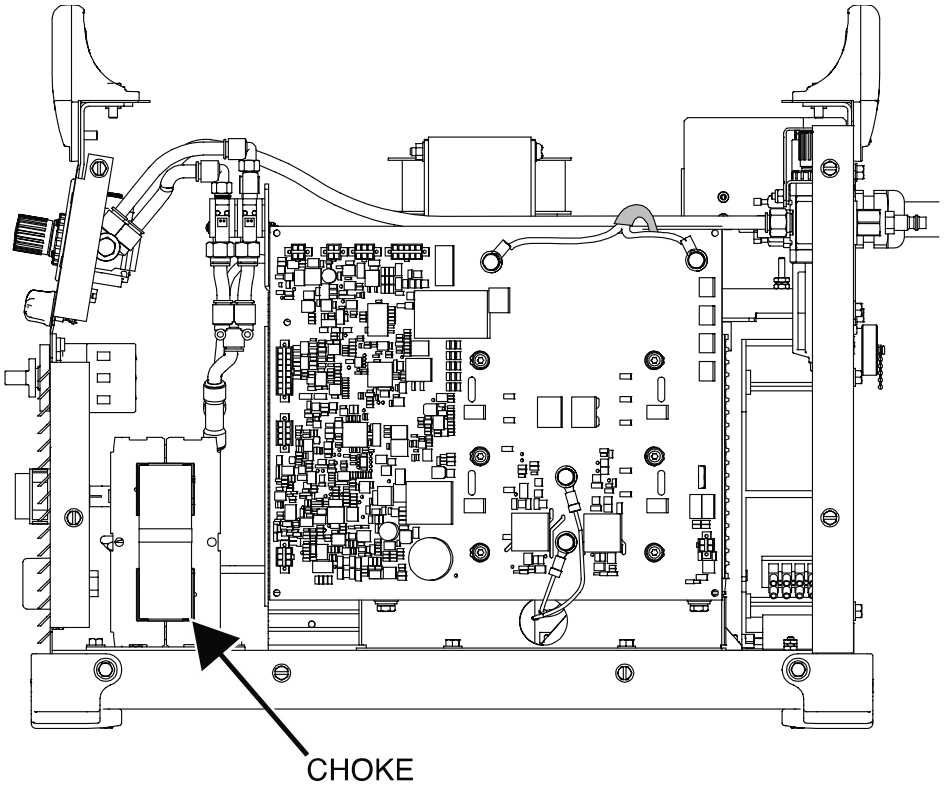


Figure F.18 – Output board terminal B9 location

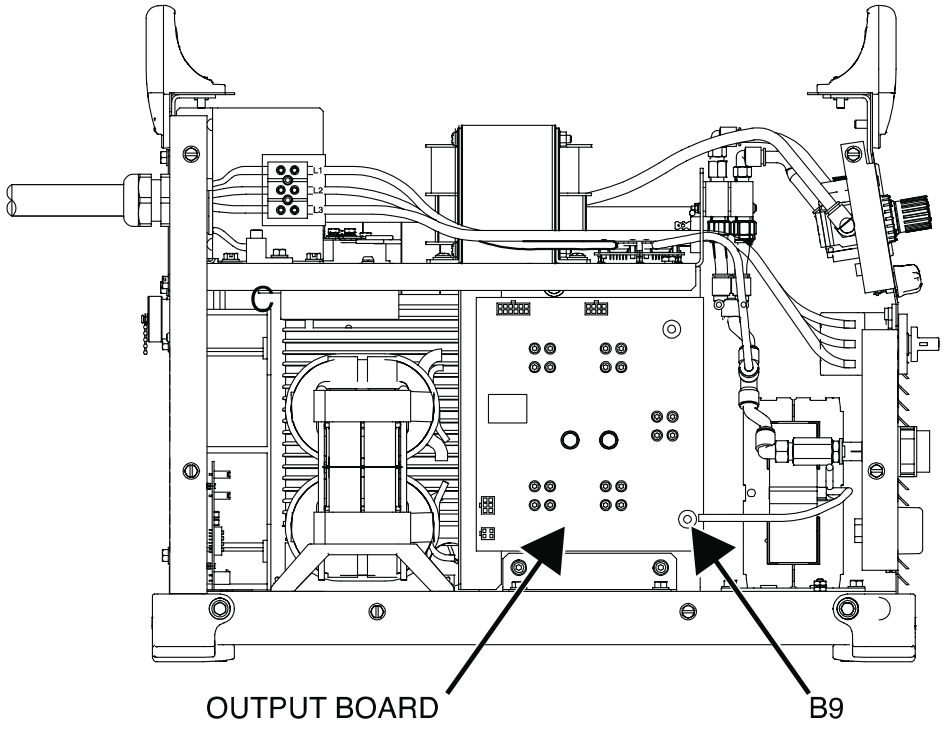


Figure F.19 – Electrode terminal location

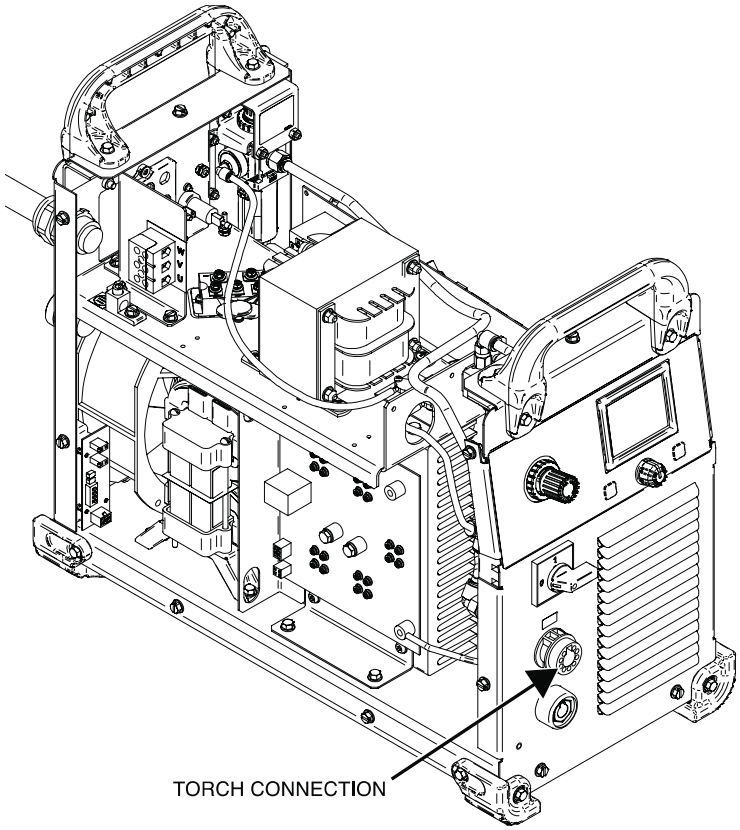
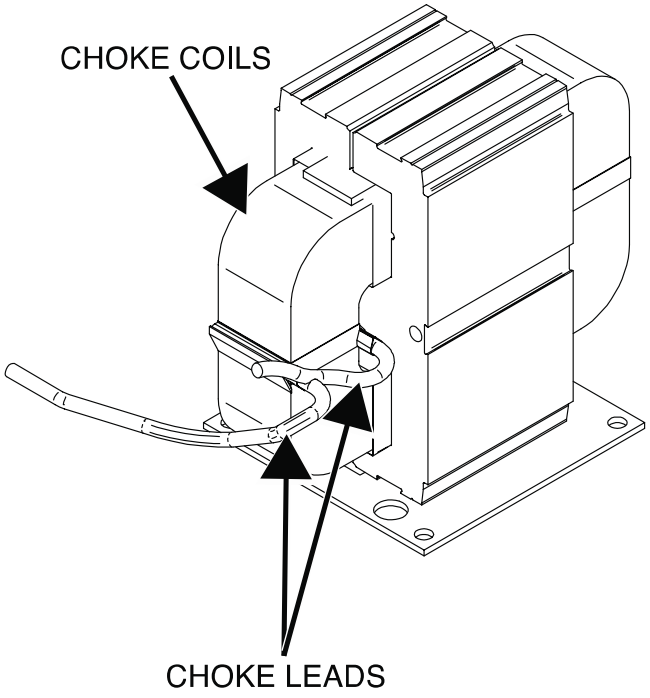


Figure F.20 – Choke detail



THERMOSTAT CIRCUIT TEST PROCEDURE

Service and repair should be performed by only 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 Thermal Protection Thermostat is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the thermostat, on the heat sink above the output board. See ***Figure F.21***. See Wiring Diagram.
5. Locate plug J20 on the switch board. Label and disconnect plug J20 from the switch board. See ***Figure F.22***. See Wiring Diagram.
6. Using a digital volt/ohmmeter, check the resistance between pin 5 (lead #409) and pin 13 (lead #410). See ***Figure F.23***. See Wiring Diagram. The resistance should be very low (less than one ohm).
7. If the resistance is greater than one ohm, electricity isolate the thermostat and retest. See Wiring Diagram.
8. To electrically isolate the thermostat, label and disconnect leads 409 and 410 from the thermostat. See Wiring Diagram.
9. Using a digital volt/ohmmeter, measure the resistance from one terminal of the thermostat to the other. The resistance should be very low (less than one ohm). See Wiring Diagram.
10. If the test fails, the thermostat may be faulty.
11. If faulty, perform the ***Thermostat Removal And Replacement Procedure***.
12. Connect leads 409 and 410 to the thermostat and connect plug J20 to the switch board. See Wiring Diagram.
13. Perform the ***Case Cover Removal And Replacement Procedure***.

Figure F.21 – Thermostat location

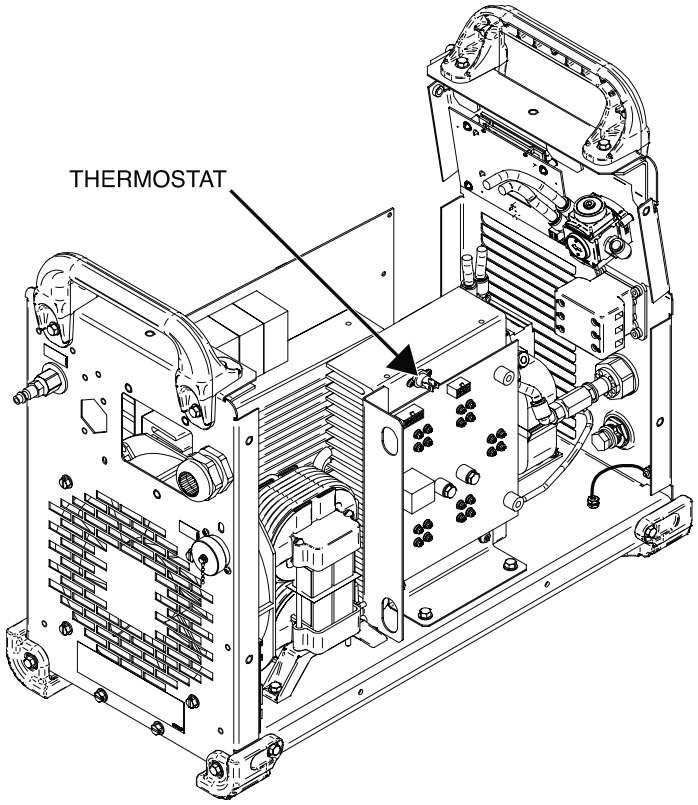


Figure F.22 – Switch board and plug J20 locations

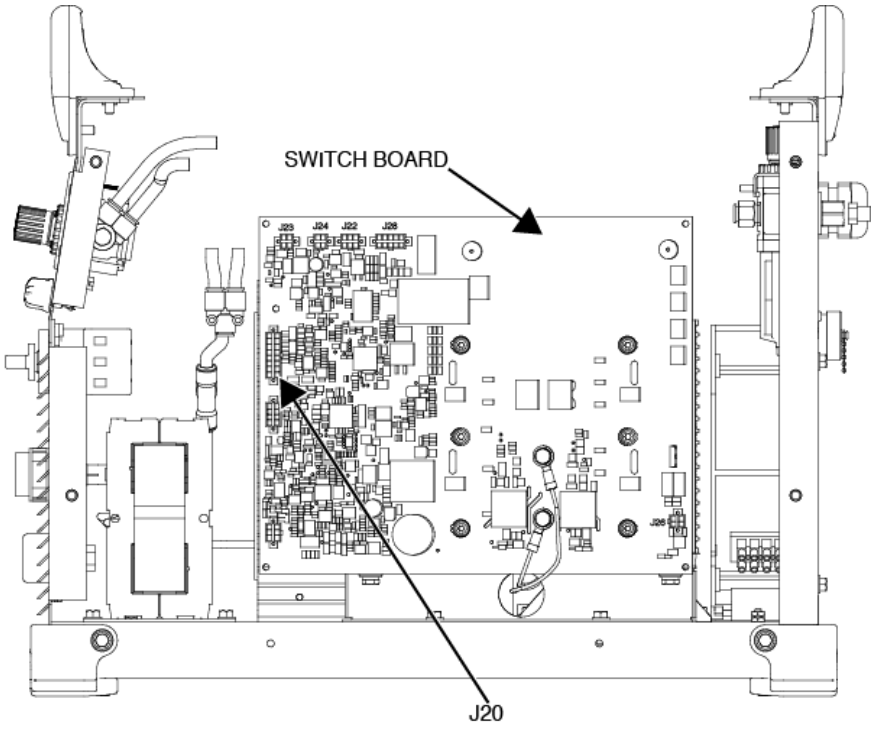
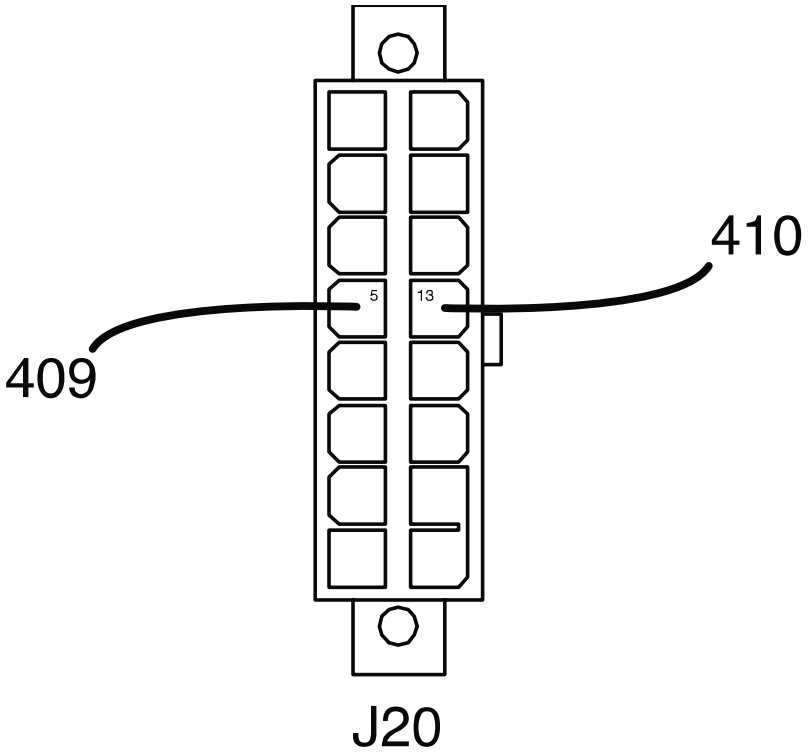


Figure F.23 – Plug J20 thermostat lead locations



AUXILIARY RECTIFIER (D4) TEST PROCEDURE

Service and repair should be performed by only 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 Auxiliary Rectifier (D4) is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

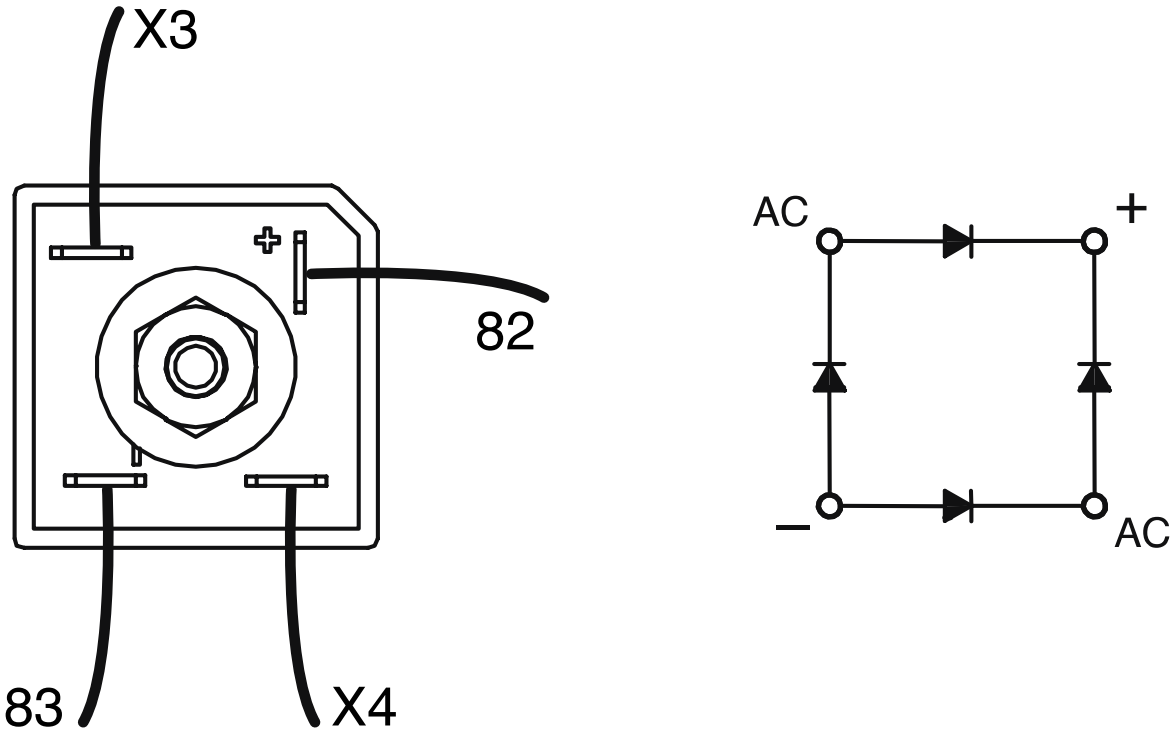
TEST PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the auxiliary rectifier (D4), on the top shelf at the vertical flange of the horizontal divider. See Wiring Diagram.
5. Label and disconnect leads 82, 83, X3 and X4 from the auxiliary rectifier. See ***Figure F.24***. See Wiring Diagram.
6. Using a digital volt/ohmmeter, perform the diode drop tests outlined in ***Table F.7***. See ***Figure F.24***. See Wiring Diagram.
7. If any of the tests fail, the auxiliary rectifier may be faulty.
8. If faulty, perform the ***Auxiliary Rectifier Removal And Replacement Procedure***.
9. Connect leads 82, 83, X3 and X4 to the auxiliary rectifier. See Wiring Diagram.
10. Perform the ***Case Cover Replacement Procedure***.

Table F. 7 – Rectifier diode drop tests

TEST POINTS (POS)	TEST POINTS (NEG)	EXPECTED READING
TOP AC TERMINAL	POSITIVE TERMINAL	.2VDC – 0.7VDC
BOTTOM AC TERMINAL	POSITIVE TERMINAL	.2VDC – 0.7VDC
NEGATIVE TERMINAL	TOP AC TERMINAL	.2VDC – 0.7VDC
NEGATIVE TERMINAL	BOTTOM AC TERMINAL	.2VDC – 0.7VDC

Figure F.24 – Auxiliary rectifier test points



USER INTERFACE BOARD TEST PROCEDURE

Service and repair should be performed by only 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 User Interface Board is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the user interface board, on the rear of the front panel. See ***Figure F.25***. See Wiring Diagram.
5. Carefully apply the correct input power to the machine and turn ON the machine.
6. Using a volt/ohmmeter, check for the presence of 40 VDC at plug J1 pins 3 and 4. See ***Figure F.26***. See Wiring Diagram.
7. If the 40 VDC is not present, perform the ***Switch Board Test Procedure***.
8. If the 40 VDC is present, continue with this test.
9. Using a volt/ohmmeter, check for the presence of 2 VDC at plug J1 pins 1 and 2. See ***Figure F.26***. See Wiring Diagram.
10. Perform the LED inspections outlined in ***Tables F.8*** and ***F.9***. See ***Figure F.26***. See Wiring Diagram.
11. If any of the tests fail, the user interface board may be faulty.
12. If faulty, perform the ***User Interface Board Removal And Replacement Procedure***.
13. Perform the ***Case Cover Replacement Procedure***.

Table F. 8 – User interface board LED functions

LED #	COLOR	FUNCTION
1	GREEN	INPUT POWER CONNECTED
2	GREEN	+3.3V POWER SUPPLY “OK”
3	GREEN	+5V CAN POWER SUPPLY “OK”
4	GREEN	STATUS “OK”
	RED	STATUS “ERROR” (CHECK CODE FOR SPECIFIC ERROR)
5	GREEN	+5V USB POWER “OK” (NOT USED)

Table F. 9 – User interface board LED light conditions

LIGHT CONDITION	MEANING
STEADY GREEN	SYSTEM OK.
ALTERNATING GREEN AND RED	A SYSTEM FAULT HAS OCCURRED. IF THE USER INTERFACE BOARD STATUS LED IS FLASHING ANY COMBINATION OF RED AND GREEN, ERRORS ARE PRESENT. INDIVIDUAL CODE DIGITS ARE FLASHED IN RED WITH A LONG PAUSE BETWEEN DIGITS. IF MORE THAN ONE CODE IS PRESENT, THE CODES WILL BE SEPARATED BY A GREEN LIGHT. SEE ***ERROR CODES*** IN TROUBLESHOOTING GUIDE.

Figure F.25 – User interface board location

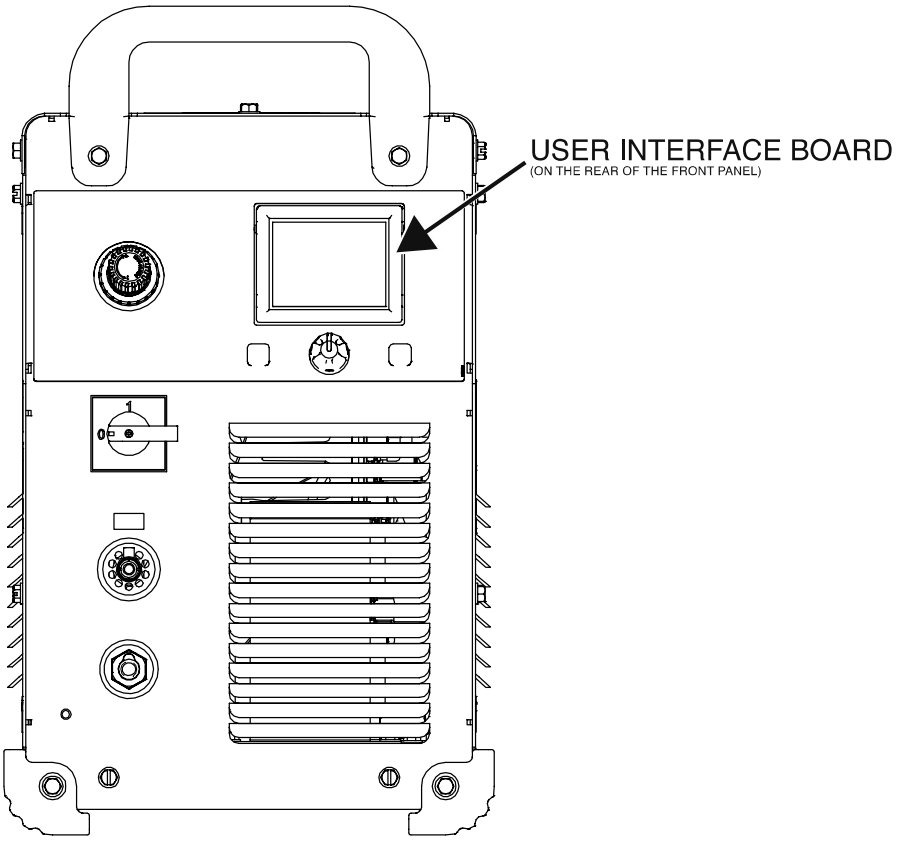
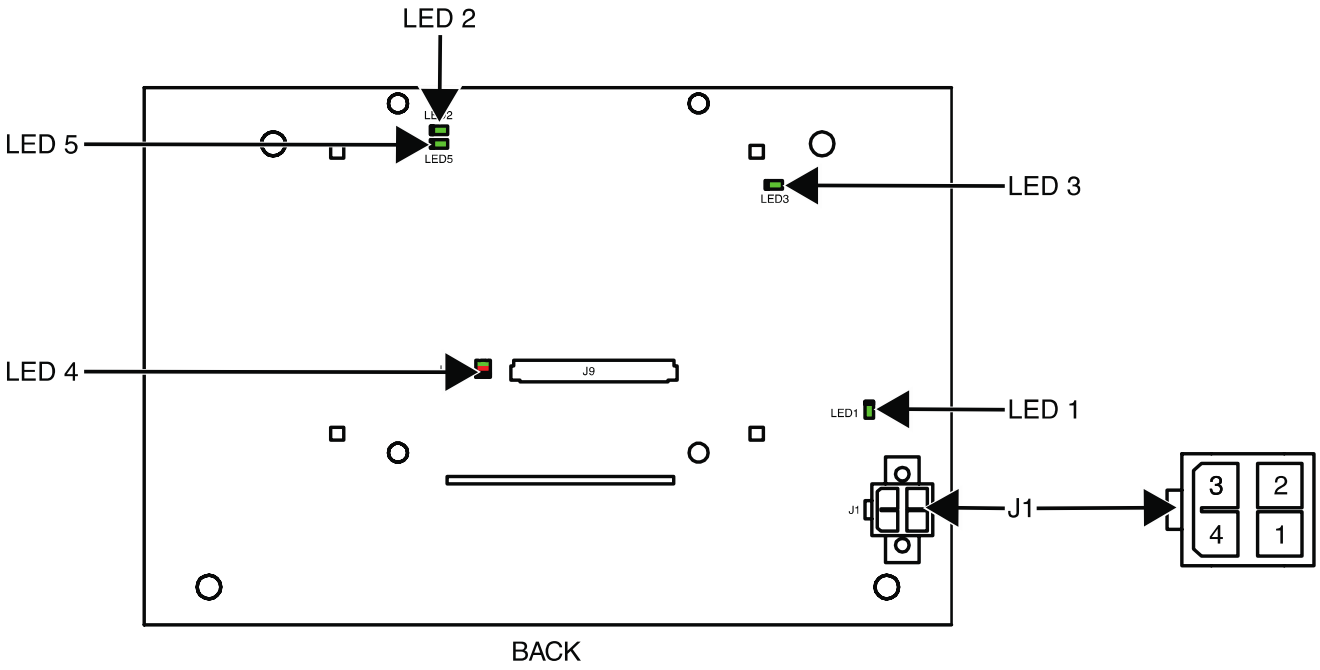


Figure F.26 – User interface board LED and plug J1 locations



SWITCH BOARD TEST PROCEDURE

Service and repair should be performed by only 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 Switch Board functioning properly.

MATERIALS NEEDED

7/16” Nutdriver
Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the switch board. See ***Figure F.27***. See Wiring Diagram.
5. Using a volt/ohmmeter, perform the resistance tests outlined in ***Table F.10***. See ***Figures F.28***, ***F.29***, ***F.30*** and ***F.31***. See Wiring Diagram.
6. If any of the resistance tests results are not as expected, using a 7/16” nutdriver, label and disconnect the leads attached to the terminals and retest. See Wiring Diagram.
7. Connect leads when resistance testing is complete.
8. Carefully apply the correct input power and turn ON the machine.
9. Check the LEDs per ***Tables F.11*** and ***F.12***. See ***Figure F.28***, for LED locations. See Wiring Diagram.
10. Using a volt/ohmmeter, perform the voltage tests outlined in ***Table F.13***. See ***Figure F.28*** and ***F.31***. See Wiring Diagram.
11. If any of the tests fail, the switch board may be faulty.
12. If faulty, perform the ***Switch Board Removal And Replacement Procedure***.
13. Perform the ***Case Cover Replacement Procedure***.

Table F. 10 – Switch board resistance tests

DESCRIPTION	TEST POINT (POS)	TEST POINT (NEG)	EXPECTED READING	CONDITION
DIODE DROP TEST	B209 (+)	B204 (–)	OL	MACHINE “OFF” NO INPUT POWER APPLIED
DIODE DROP TEST	B204 (+)	B209 (–)	.390 VDC	MACHINE “OFF” NO INPUT POWER APPLIED
DIODE DROP TEST	B209 (+)	B201 (–)	OL	MACHINE “OFF” NO INPUT POWER APPLIED
DIODE DROP TEST	B201 (+)	B209 (–)	.390 VDC	MACHINE “OFF” NO INPUT POWER APPLIED
DIODE DROP TEST	B207 (+)	B204 (–)	.325 VDC	MACHINE “OFF” NO INPUT POWER APPLIED
DIODE DROP TEST	B204 (+)	B207 (–)	OL	MACHINE “OFF” NO INPUT POWER APPLIED
DIODE DROP TEST	B207 (+)	B201 (–)	.390 VDC	MACHINE “OFF” NO INPUT POWER APPLIED
DIODE DROP TEST	B201 (+)	B207 (–)	OL	MACHINE “OFF” NO INPUT POWER APPLIED
NEGATIVE VOLTAGE FEEDBACK	PLUG J21 PIN 3 (LEAD 802)	ELECTRODE STUD	VERY LOW RESISTANCE (LESS THAN ONE OHM)	MACHINE “OFF” NO INPUT POWER APPLIED
POSITIVE VOLTAGE FEEDBACK	PLUG J21 PIN 6 (LEAD 806)	WORK STUD	VERY LOW RESISTANCE (LESS THAN ONE OHM)	MACHINE “OFF” NO INPUT POWER APPLIED
PILOT ARC VOLTAGE FEEDBACK	PLUG J29 PIN 8 (LEAD 809)	TERMINAL B11 ON THE OUTPUT BOARD	VERY LOW RESISTANCE (LESS THAN ONE OHM)	MACHINE “OFF” NO INPUT POWER APPLIED

Table F. 11 – Switch board LED functions

LED #	COLOR	FUNCTION
1	GREEN	DSP STATUS “OK”
	RED	DSP STATUS “ERROR” (CHECK ERROR CODE FOR SPECIFIC ERROR)
2	GREEN	+5V CAN POWER SUPPLY “OK”
3	GREEN	MICRO STATUS “OK”
	RED	MICRO STATUS “ERROR” (CHECK CODE FOR SPECIFIC ERROR)
4	GREEN	+15VDC POWER SUPPLY “OK”
5	GREEN	+5VDC PRIMARY POWER SUPPLY “OK”
6	GREEN	LINK “OK” FOR ETHERNET
7	GREEN	ETHERNET ACTIVITY
8	GREEN	INPUT CAP VOLTAGE BLEEDER HIGH VOLTAGE PRESENT WHEN ILLUMINATED

Table F. 12 – Switch board LED light conditions

LIGHT CONDITION	MEANING
STEADY GREEN	SYSTEM OK.
BLINKING GGREEN	OCCURS DURING STARTUP OR RESET AND INDICATES THAT THE SWITCH BOARD STATUS IS WAITING FOR COMMUICATION FROM THE CONTROL BOARD. NORMAL FOR THE FIRST 1-10 SECONDS AFTER POWER IS TURNED ON.
ALTERNATING GREEN AND RED	A SYSTEM FAULT HAS OCCURRED. IF THE SWITCH BOARD STATUS LED IS FLASHING ANY COMBINATION OF RED AND GREEN, ERRORS ARE PRESENT. INDIVIDUAL CODE DIGITS ARE FLASHED IN RED WITH A LONG PAUSE BETWEEN DIGITS. IF MORE THAN ONE CODE IS PRESENT, THE CODES WILL BE SEPARATED BY A GREEN LIGHT. SEE ***ERROR CODES*** IN TROUBLESHOOTING GUIDE.

Table F. 13 – Switch board voltage tests

DESCRIPTION	TEST POINT (POS)	TEST POINT (NEG)	EXPECTED READING	CONDITION
INPUT POWER TO SWITCH BOARD	PLUG J21 PIN 1 (LEAD 82)	PLUG J21 PIN 4 (LEAD 83)	40 VDC	MACHINE ON.
CAN COMMUNICATION	PLUG J23 PIN 1 (LEAD 53)	PLUG J23 PIN 2 (LEAD 54)	2 VDC	MACHINE ON.
FAN SUPPLY VOLTAGE FROM AUXILIARY TRANSFORMER (T2)	PLUG J26 PIN 1 (LEAD 24)	PLUG J26 PIN 2 (LEAD 22)	115 VAC	FAN NOT ACTIVATED. IF 115VAC IS NOT PRESENT, PERFORM THE ***AUXILIARY TRANSFORMER TEST PROCEDURE***.
FAN SUPPLY VOLTAGE FROM AUXILIARY TRANSFORMER (T2)	PLUG J26 PIN 1 (LEAD 24)	PLUG J26 PIN 2 (LEAD 22)	0 VAC	FAN ACTIVATED
RECTIFIED AND FILTERED INPUT VOLTAGE	B209 (+)	B207 (–)	535 VDC TO 815 VDC DEPENDING UPON THE INPUT VOLTAGE (380 VAC TO 575 VAC)	CORRECT INPUT POWER TO MACHINE AND PRE-CHARGE COMPLETED. IF NOT CORRECT, PERFORM THE ***INPUT RECTIFIER TEST PROCEDURE***.
CUTTING SOLENOID (1) DRIVE VOLTAGE	PLUG J20 PIN 8 (LEAD R1)	PLUG J20 PIN 7 (LEAD B1)	12 TO 15 VDC	MACHINE ON. VOLTAGE PRESENT DURING PURGE OR WHEN OUTPUT IS ON. MACHINE IN CUT, GRID OR GOUGE MODES.
MARKING SOLENOID (2) DRIVE VOLTAGE	PLUG J20 PIN 16	PLUG J20 PIN 15	12 TO 15 VDC	MACHINE ON. VOLTAGE PRESENT IN ALL MODES DURING

	(LEAD R2)	(LEAD B2)		PURGE, POST FLOW AND WHEN OUTPUT IS ON.
POWER SUPPLY TO USER INTERFACE BOARD	PLUG J21 PIN 2 (LEAD 82A)	PLUG J21 PIN 5 (LEAD 83A)	40 VDC	MACHINE ON.
POWER SUPPLY TO OUTPUT BOARD	PLUG J29 PIN 3 (LEAD 213)	PLUG J29 PIN 6 (LEAD 216)	-12 TO -15 VDC	MACHINE ON.
POWER SUPPLY TO OUTPUT BOARD	PLUG J29 PIN 2 (LEAD 212)	PLUG J29 PIN 6 (LEAD 216)	12 TO 15 VDC	MACHINE ON.
POWER SUPPLY TO OUTPUT BOARD	PLUG J28 PIN 6 (LEAD 296)	PLUG J28 PIN 12 (LEAD 290)	12 TO 15 VDC	MACHINE ON.
POWER SUPPLY TO PRESSURE SENSE BOARD	PLUG J22 PIN 3 (LEAD 223)	PLUG J22 PIN 4 (LEAD 224)	5 VDC	MACHINE ON.
POWER SUPPLY TO PRESSURE SENSE BOARD	PLUG J22 PIN 6 (LEAD 226)	PLUG J22 PIN 4 (LEAD 224)	5 VDC	MACHINE ON.

Figure F.27 – Switch board location

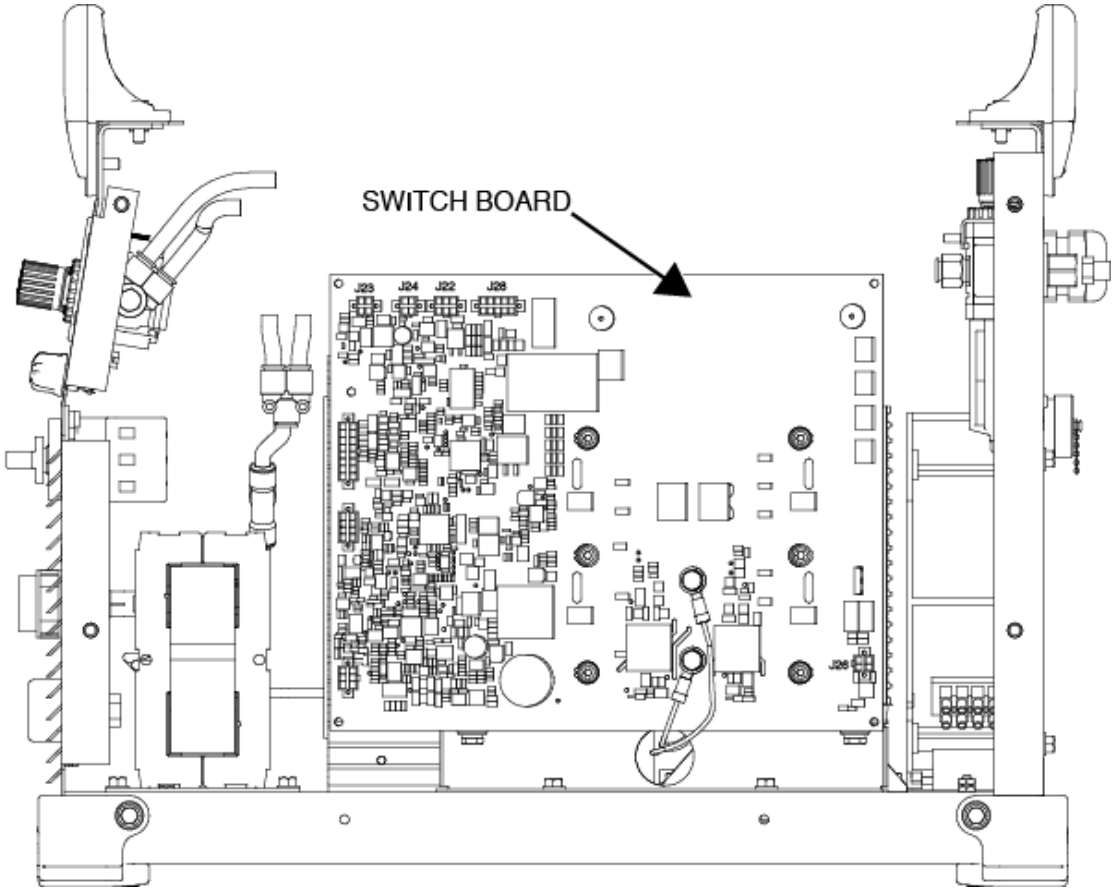


Figure F.28 – Switch board plug and LED locations

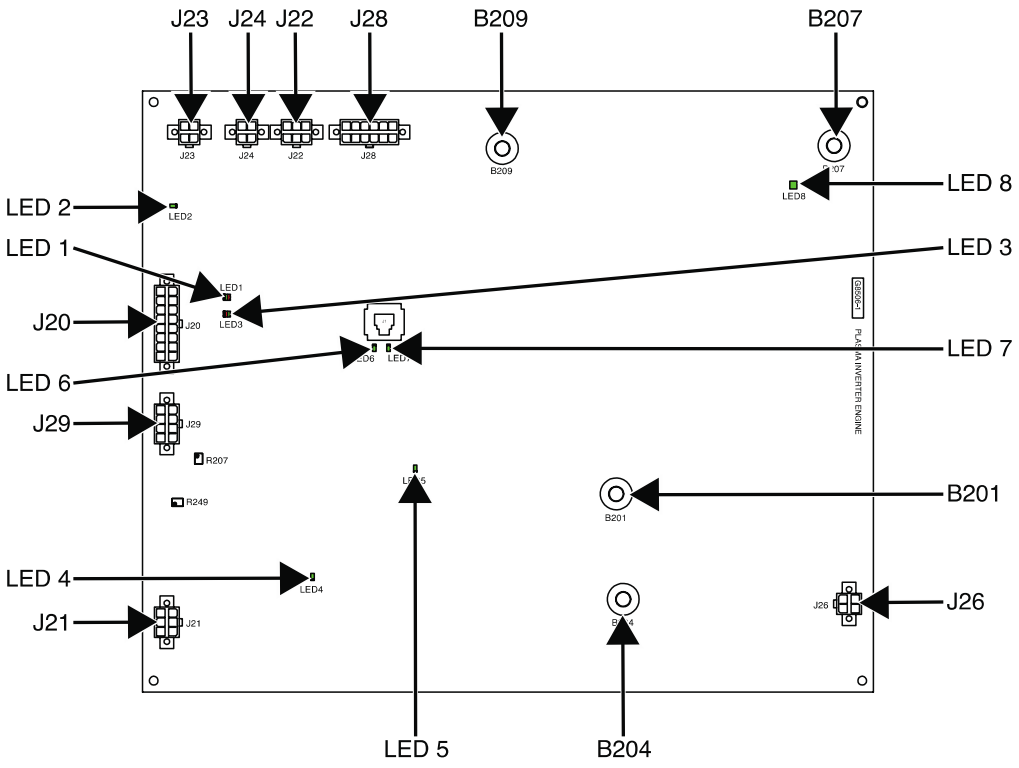


Figure F.29 – Electrode stud and work stud locations

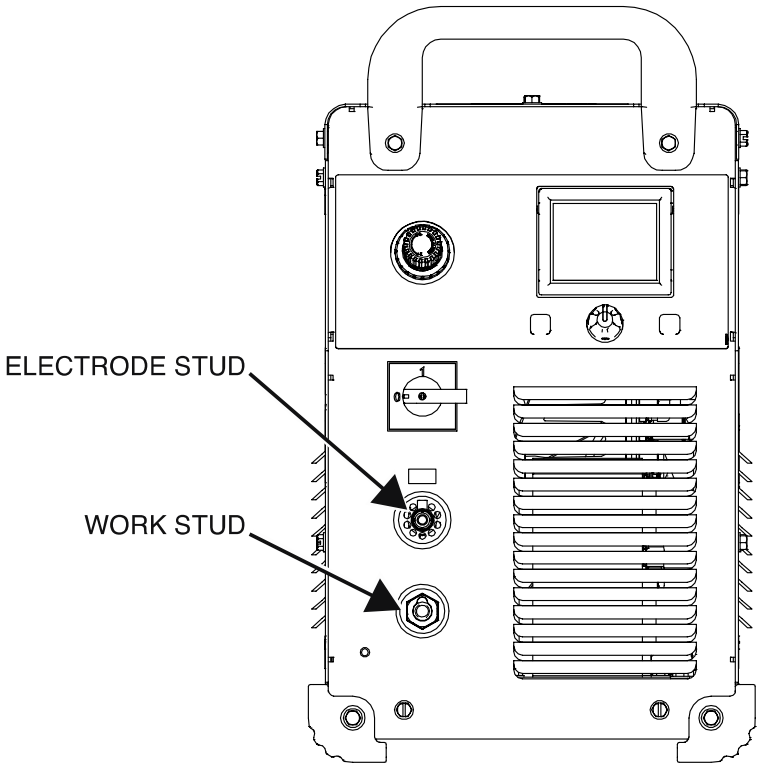


Figure F.30 – Output board terminal B11 location

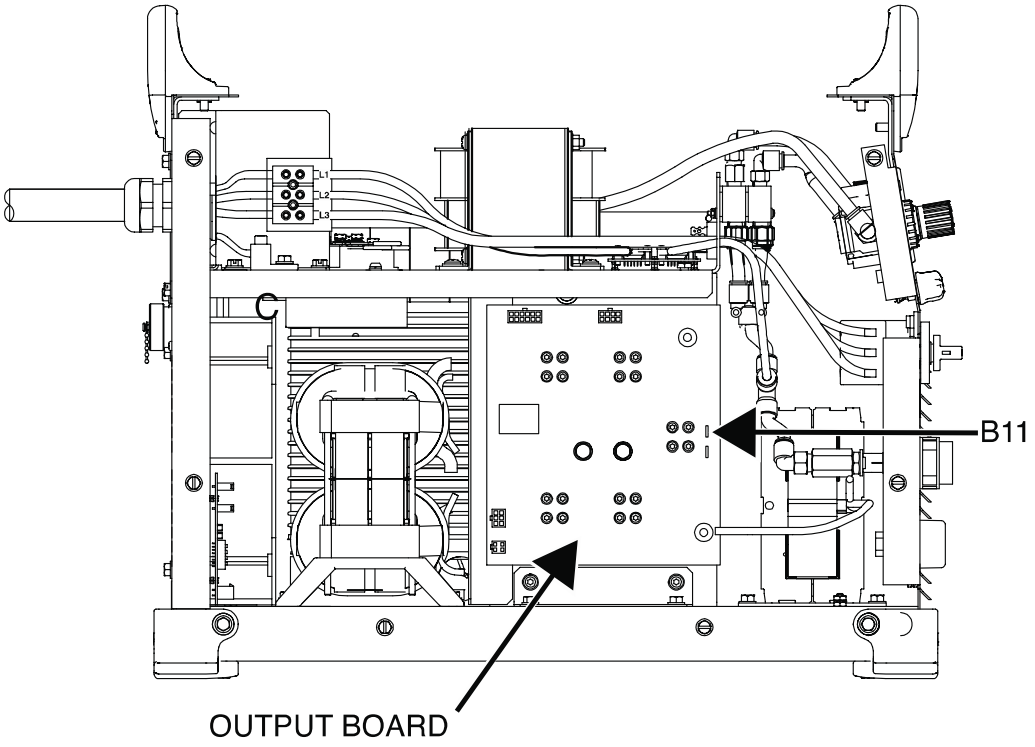
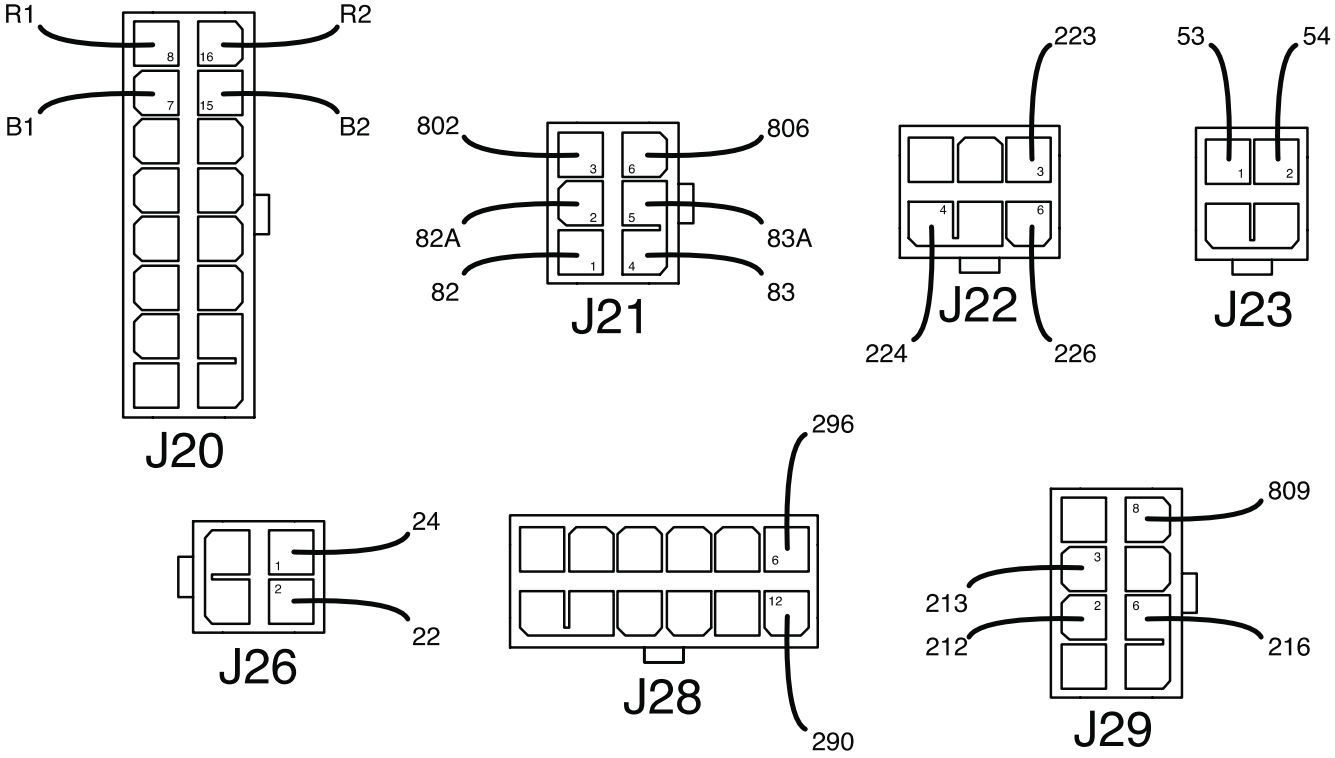


Figure F.31 – Switch board lead locations



INPUT SWITCH TEST PROCEDURE

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TEST DESCRIPTION

This test will determine if the Input Switch is functioning properly.

MATERIALS NEEDED

Offset Phillips Screwdriver
Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the input switch on the rear of the front panel. See ***Figure F.32***. See Wiring Diagram.
5. Using an offset Phillips screwdriver, remove the six screws securing the leads L1, L2, L3, L1A, L2A and L3A to the input switch. See ***Figure F.33***. See Wiring Diagram. Label and disconnect leads from the input switch.
6. Using a volt/ohmmeter, perform the resistance test outlined in ***Table F.14***. See ***Figures F.34*** and ***F.35***. See Wiring Diagram.
7. If any of the tests fail, the input switch may be faulty.
8. If faulty, perform the ***Input Switch Removal And Replacement Procedure***.
9. Using an offset Phillips screwdriver, attach the six screws securing the leads L1, L2, L3, L1A, L2A and L3A to the input switch. See Wiring Diagram.
10. Perform the ***Case Cover Removal And Replacement Procedure***.

Table F. 14 – Input switch resistance tests

TEST POINT	TEST POINT	EXPECTED READING	SWITCH POSITION
L1	L1A	VERY LOW RESISTANCE (LESS THAN ONE OHM)	“ON” POSITION
L2	L2A	VERY LOW RESISTANCE (LESS THAN ONE OHM)	“ON” POSITION
L3	L3A	VERY LOW RESISTANCE (LESS THAN ONE OHM)	“ON” POSITION
L1	L1A	HIGH RESISTANCE (GREATER THAN 50OK OHMS)	“OFF” POSITION
L2	L2A	HIGH RESISTANCE (GREATER THAN 50OK OHMS)	“OFF” POSITION
L3	L3A	HIGH RESISTANCE (GREATER THAN 50OK OHMS)	“OFF” POSITION

Figure F.32 – Input switch location

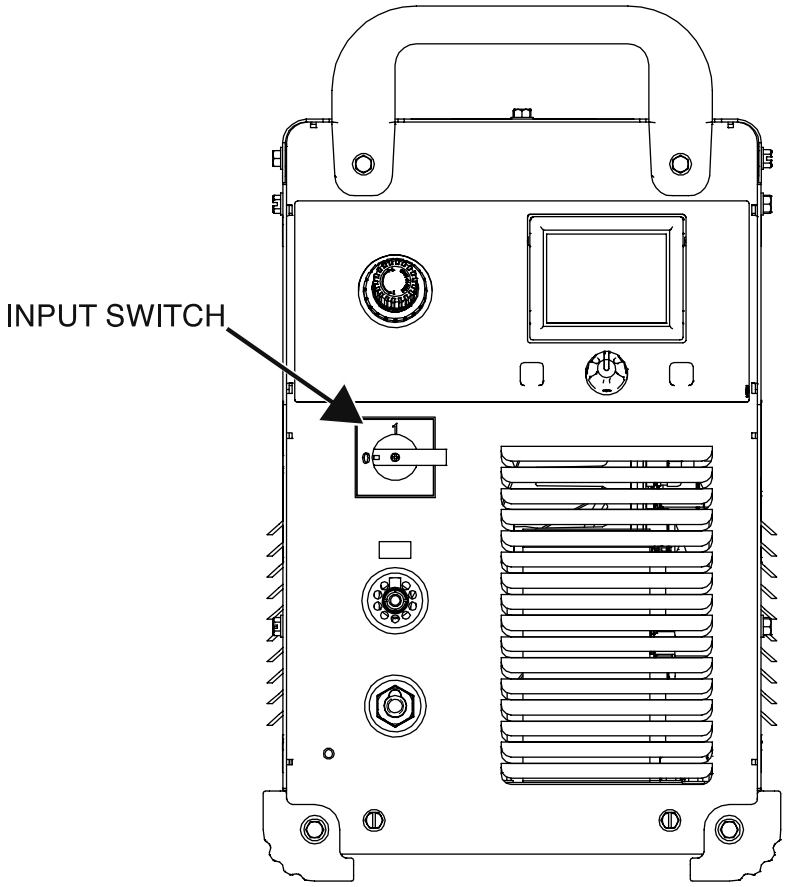


Figure F.33 – Input switch lead location

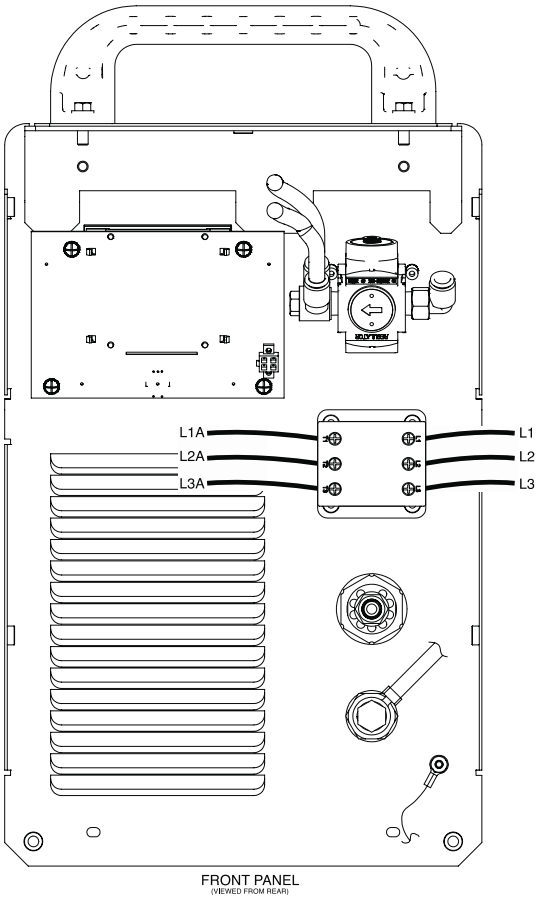


Figure F.34 – Input switch terminal locations

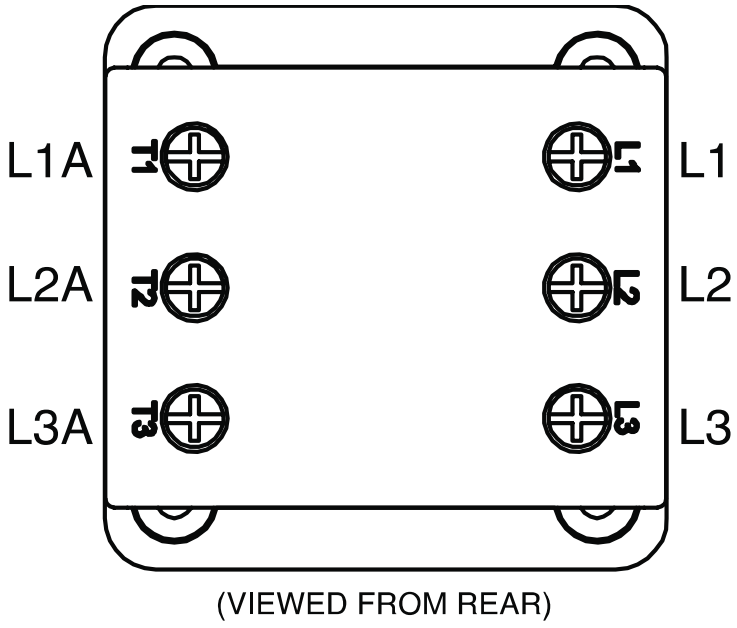
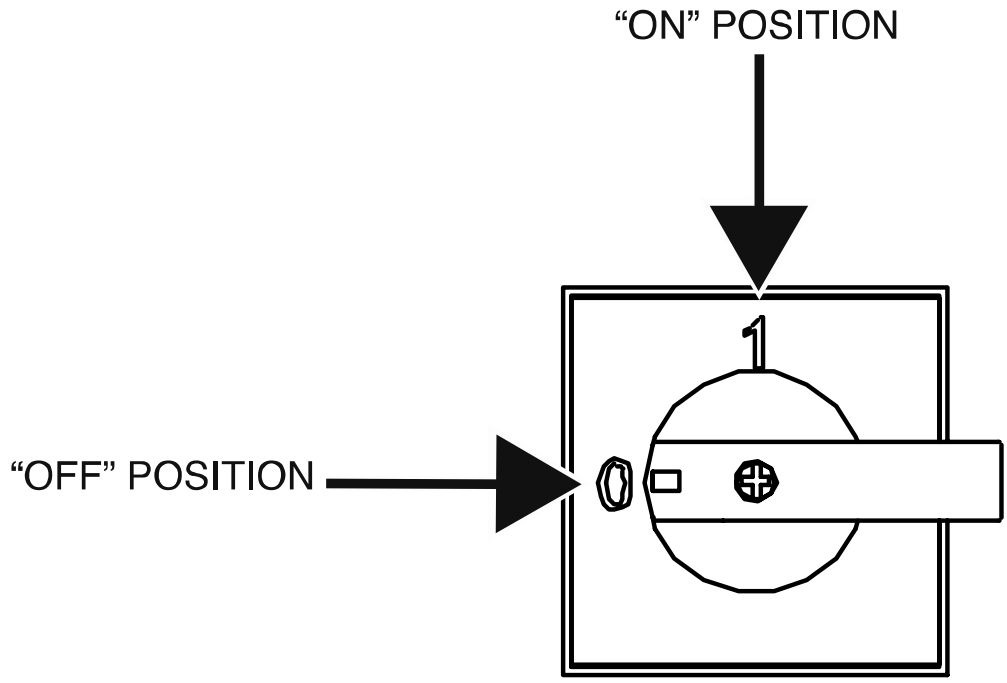


Figure F.35 – Input switch positions



SOLENOID 1 & 2 TEST PROCEDURE

Service and repair should be performed by only 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 Solenoid 1 (Cutting) and Solenoid 2 (Marking) are functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate solenoid 1 and 2 on the vertical flange of the horizontal divider. See ***Figure F.36***. See Wiring Diagram. Solenoid 1 is closest to the front of the machine and solenoid 2 is between solenoid 1 and the divider panel.
5. Locate plug J20 on the switch board. See ***Figure F.36***. See Wiring Diagram.
6. Label and disconnect plug J20 from the switch board. See ***Figure F.36***. See Wiring Diagram.
7. Using a volt/ohmmeter, perform the diode drop tests outlined in ***Table F.15***. See ***Figure F.37***. See Wiring Diagram.
8. If any of the tests fail, the solenoid may be faulty.
9. If faulty, perform the ***Solenoid 1 & 2 Removal And Replacement Procedure***.
10. Connect plug J20 to the switch board.
11. Perform the ***Case Cover Replacement Procedure***.

Table F. 15 – Solenoid 1 & 2 locations

TEST POINTS (POS)	TEST POINTS (NEG)	EXPECTED READING
PLUG J20 PIN 8 (LEAD R1)	PLUG J20 PIN 7 (LEAD B1)	.80 VDC
PLUG J20 PIN 16 (LEAD R2)	PLUG J20 PIN 15 (LEAD B2)	.80 VDC

Figure F.36 – Solenoid 1 & 2 and switch board plug J20 locations

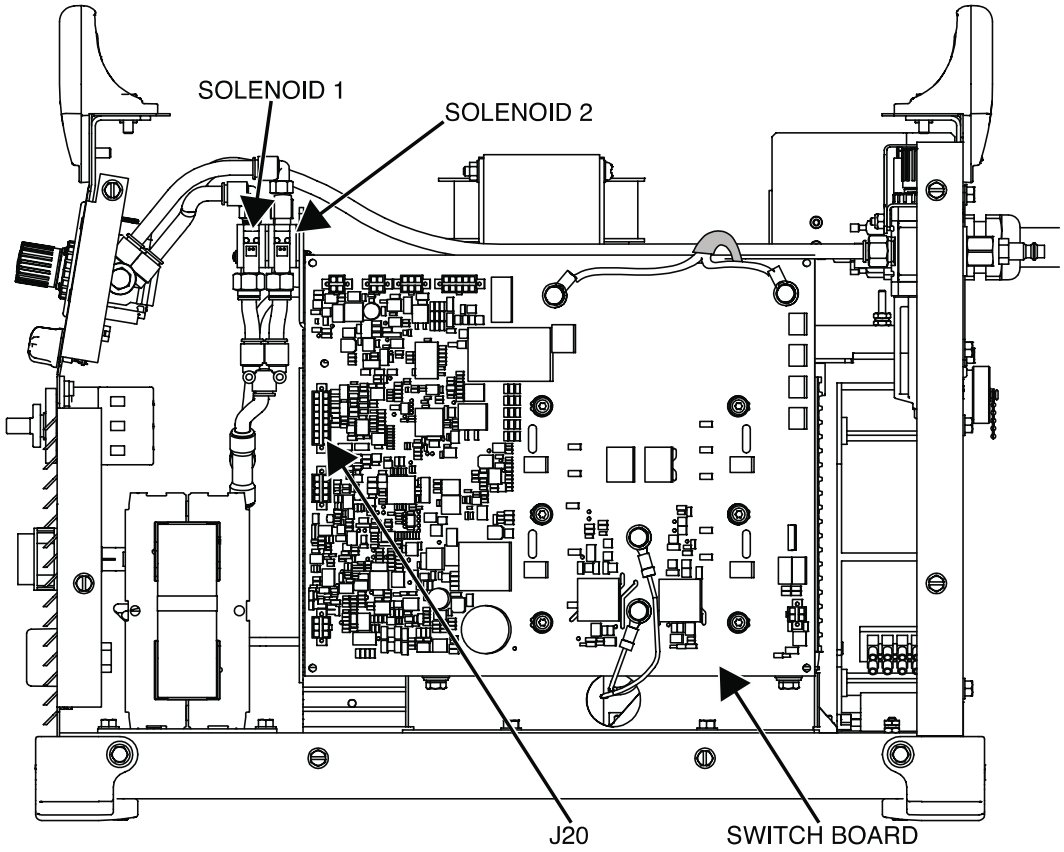
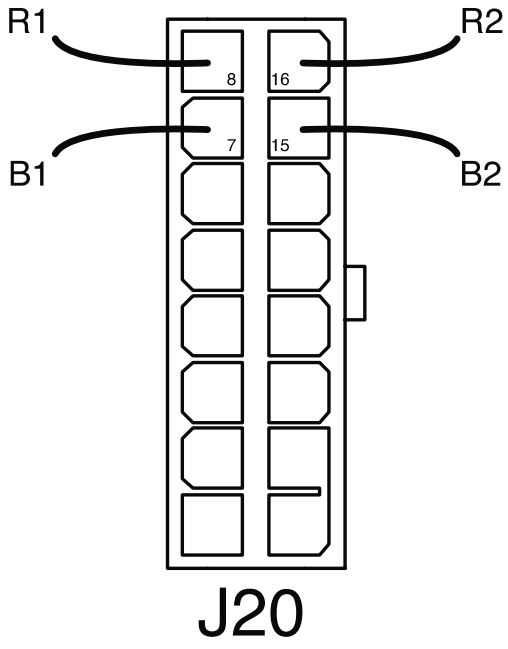


Figure F.37 – Switch board plug J20 lead locations



MAIN TRANSFORMER TEST PROCEDURE

Service and repair should be performed by only 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 Main Transformer (T1) is functioning properly.

MATERIALS NEEDED

7/16” Nutdriver
Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Locate the main transformer (T1). See ***Figure F.38***. See Wiring Diagram.
5. Using a 7/16” nutdriver, remove the two bolts, lock washers and flat washers securing the secondary transformer leads (X11 and X13) to the output board. See ***Figure F.38***. See Wiring Diagram. Label and disconnect leads X11 and X13.
6. Using a 7/16” nutdriver, remove the two bolts, lock washers and flat washers securing the primary transformer leads (201 and 204) to the switch board. See ***Figure F.39***. See Wiring Diagram. Label and disconnect leads 201 and 204.
7. Using a digital volt/ohmmeter, perform the resistance tests outlined in ***Table F.16***. See Wiring Diagram.
8. If any of the tests fail, the main transformer may be faulty.
9. If faulty, perform the ***Main Transformer Removal And Replacement Procedure***.
10. Using a 7/16” nutdriver, attach the two bolts, lock washers and flat washers securing the primary transformer leads (201 and 204) to the switch board. See Wiring Diagram.
11. Using a 7/16” nutdriver, attach the two bolts, lock washers and flat washers securing the secondary transformer leads (X11 and X13) to the output board. See Wiring Diagram.
12. Perform the ***Case Cover Replacement Procedure***.

Table F. 16 – Main transformer resistance tests

DESCRIPTION	TEST POINT	TEST POINT	EXPECTED READING
SECONDARY WINDING	SECONDARY WINDING LEAD (DISCONNECTED FROM OUTPUT BOARD TERMINAL B5)	SECONDARY WINDING LEAD (DISCONNECTED FROM OUTPUT BOARD TERMINAL B6)	VERY LOW RESISTANCE (LESS THAN ONE OHM)
PRIMARY WINDING	LEAD #201 (DISCONNECTED FROM THE SWITCH BOARD)	LEAD #204 (DISCONNECTED FROM THE SWITCH BOARD)	VERY LOW RESISTANCE (LESS THAN ONE OHM)

Figure F.38 – Main transformer location

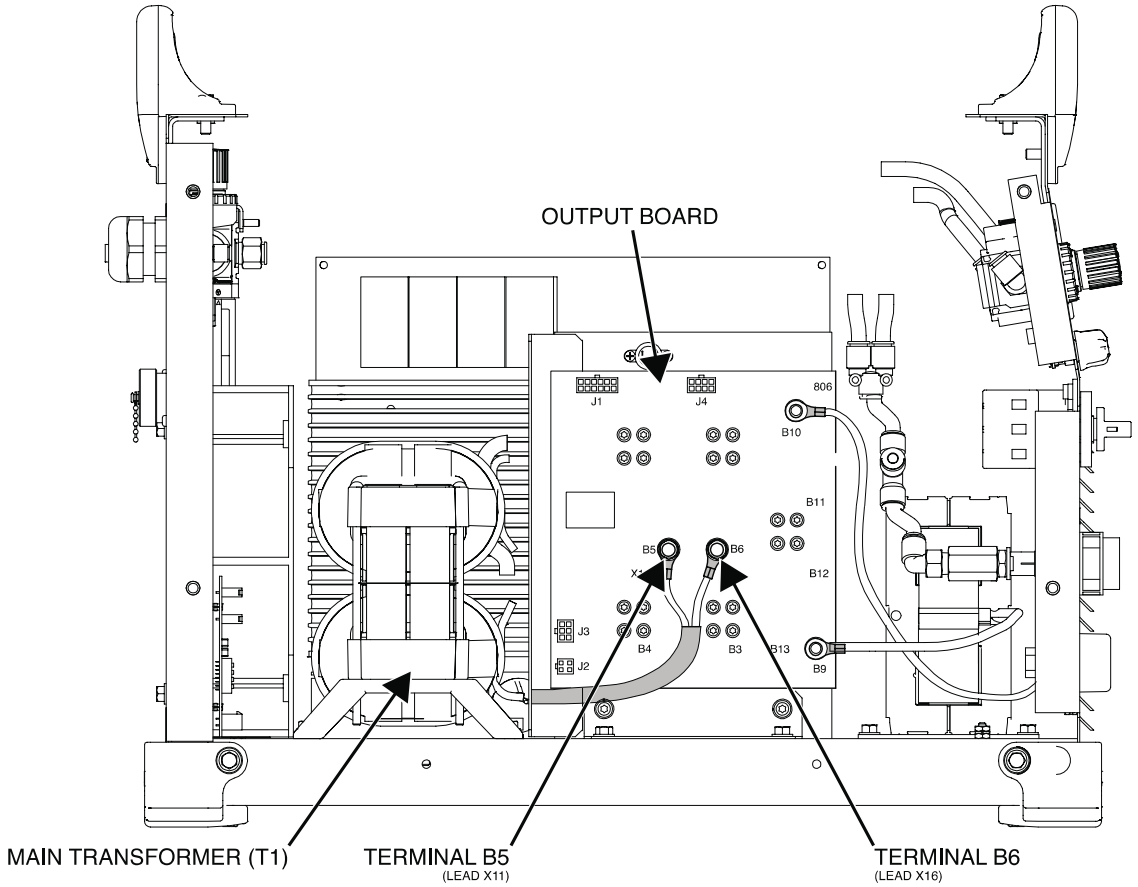
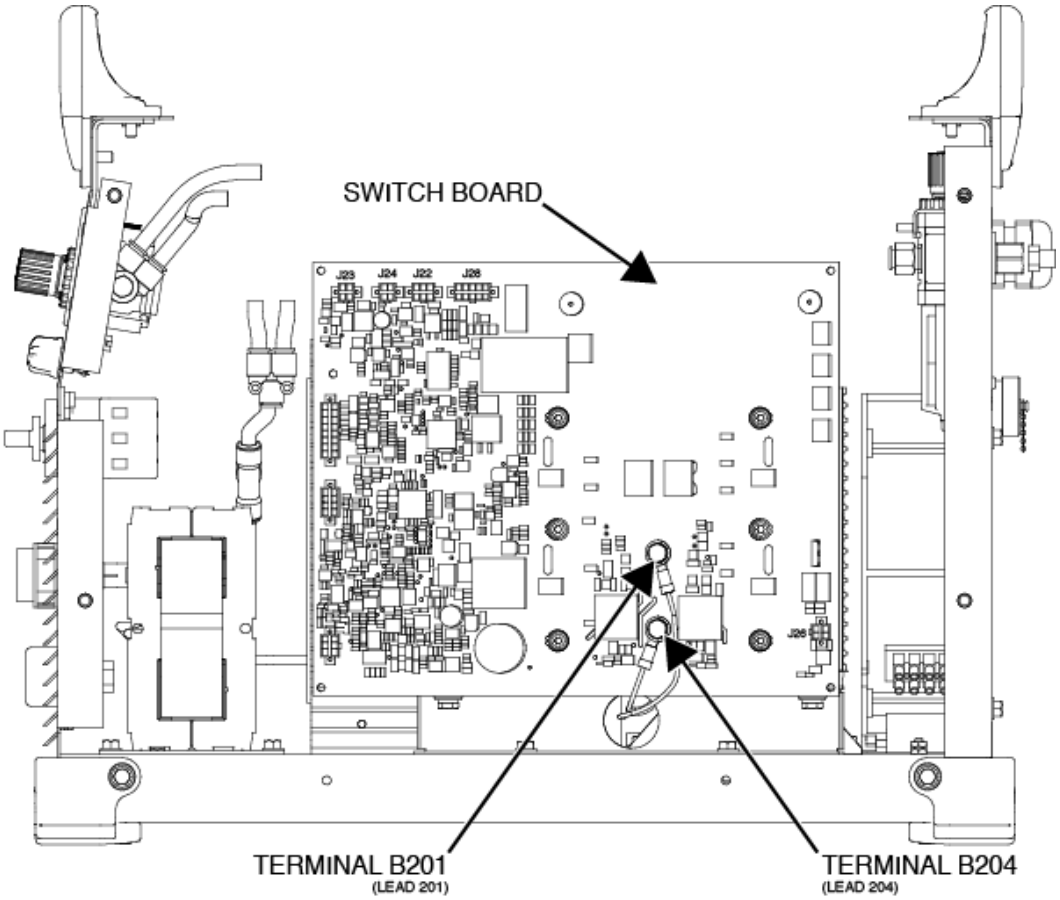


Figure F.39 – Main transformer secondary lead locations



Removal And Replacement Procedures

INPUT RECTIFIER REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only 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 Input Rectifier.

MATERIALS NEEDED

5/16” Nutdriver
Torx Nutdriver (Size T25)
Silicone Sealant
Dow Corning 340 Heat Sink Compound (Lincoln Part #T12837)
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Using a 5/16” nutdriver, remove the five screws, lock washers and flat washers securing the leads to the input rectifier. See ***Figure F.40***. See Wiring Diagram.
5. Label and disconnect leads 207, 209, L1A, L1B, L2A, L3A and L3B from the input rectifier. See ***Figure F.40***. See Wiring Diagram.
6. Using a Torx nutdriver (size T25), remove the two screws, lock washers and flat washers securing the input rectifier to the heat sink. See ***Figure F.41***.
7. The input rectifier can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Apply a thin coating of Dow Corning 340 heat sink compound to the mating surfaces of the input rectifier and heat sink.
2. Carefully position the new input rectifier onto the heat sink.
3. Using a Torx nutdriver (size T25), attach the two screws, lock washers and flat washers securing the input rectifier to the heat sink.

4. Connect leads 207, 209, L1A, L1B, L2A, L3A and L3B from the input rectifier. See Wiring Diagram.
5. Using a 5/16” nutdriver, attach the five screws, lock washers and flat washers securing the leads to the input rectifier. See Wiring Diagram.
6. Apply a heavy coating of silicone sealant to protect the lead connection points.
7. Perform the ***Case Cover Replacement Procedure***.
8. Perform the ***Retest After Repair Procedure***.

Figure F.40 – Input rectifier lead locations

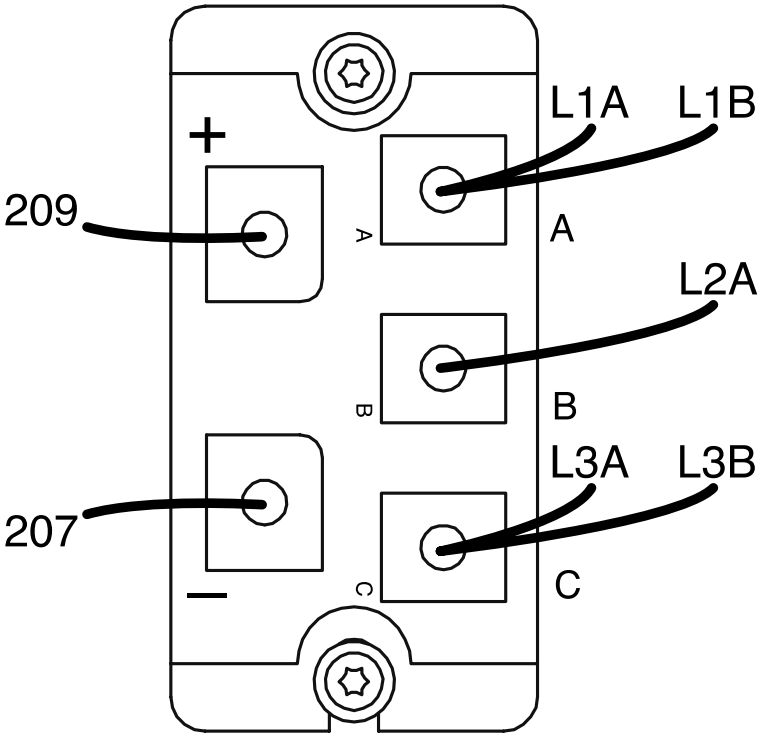
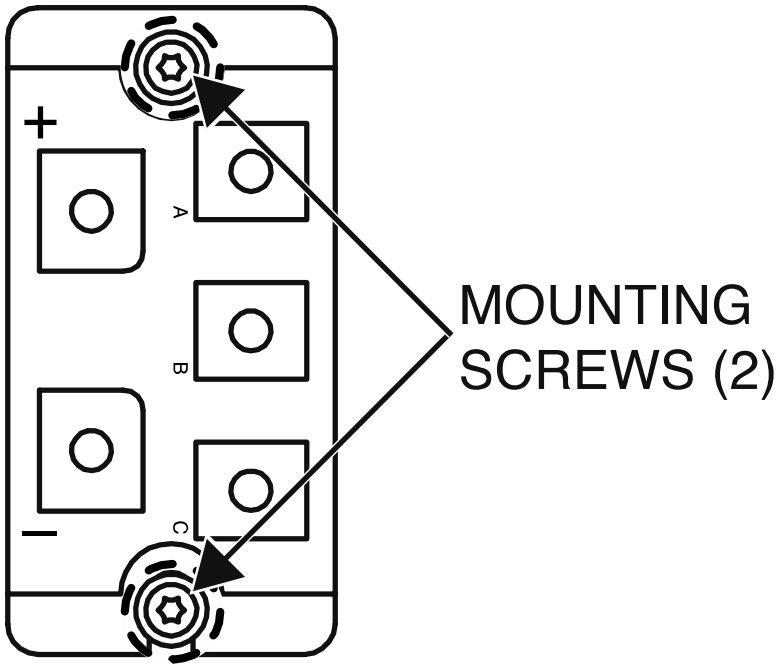


Figure F.41 – Mounting hardware location



AUXILIARY TRANSFORMER REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only 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 Auxiliary Transformer (T1).

MATERIALS NEEDED

Phillips Screwdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Label and disconnect leads X3 and X4 from the auxiliary rectifier (D4). See ***Figures F.42*** and ***F.43***. See Wiring Diagram.
5. Label and disconnect leads H2 and H3 from the quick-connects at leads 22 and 23. See Wiring Diagram.
6. Label and disconnect lead H1 from the quick-connect at lead L3B. See Wiring Diagram.
7. Label and disconnect leads H4, H5 and H6 from the reconnect panel. See ***Figure F.42***. See Wiring Diagram.
8. Using a Phillips screwdriver, remove the four screws and washers securing the transformer to the top shelf. See ***Figure F.44***.
9. The auxiliary transformer can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position new auxiliary transformer (T1) into the machine.
2. Using a Phillips screwdriver, attach the four screws and washers securing the transformer to the top shelf.
3. Connect leads H4, H5 and H6 to the reconnect panel. See Wiring Diagram.
4. Connect lead H1 to the quick-connect at lead L3B. See Wiring Diagram.
5. Connect leads H2 and H3 from the quick-connects at leads 22 and 23. See Wiring Diagram.
6. Connect leads X3 and X4 from the auxiliary rectifier (D4). See Wiring Diagram.
7. Perform the ***Case Cover Replacement Procedure***.

8. Perform the ***Retest After Repair Procedure***.

Figure F.42 – Auxiliary transformer (T1), auxiliary rectifier (D4) and reconnect panel locations

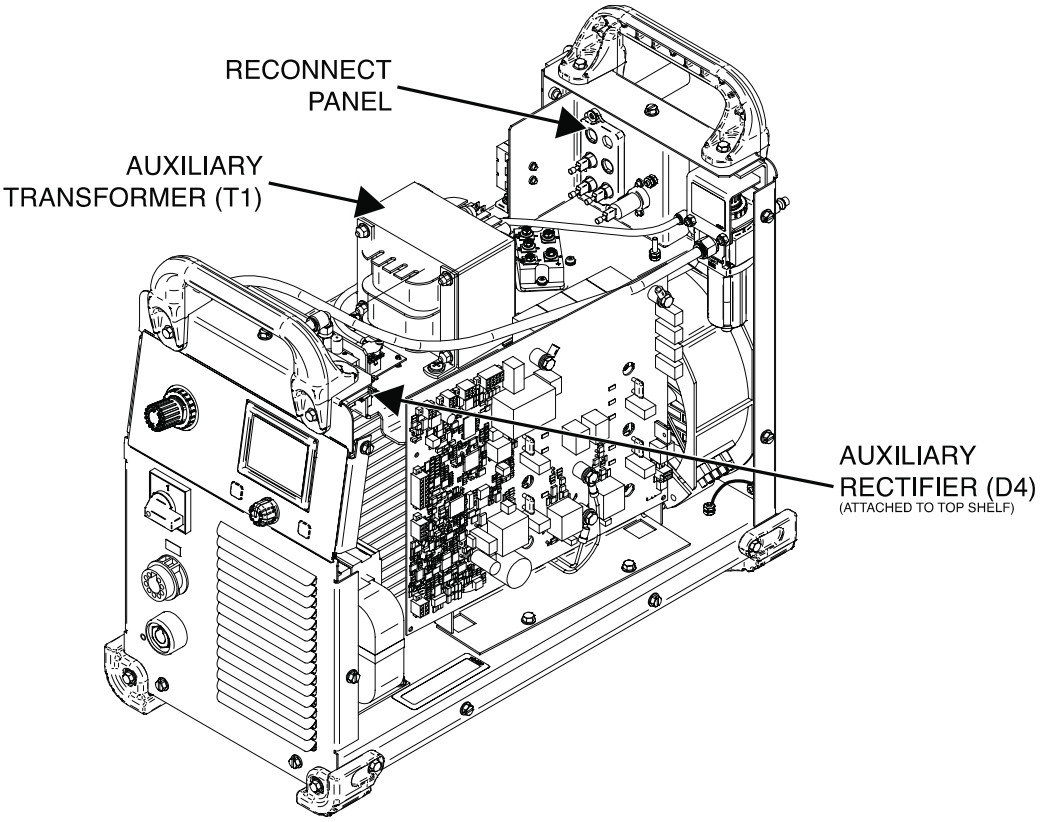


Figure F.43 – Lead X3 and X4 connection locations

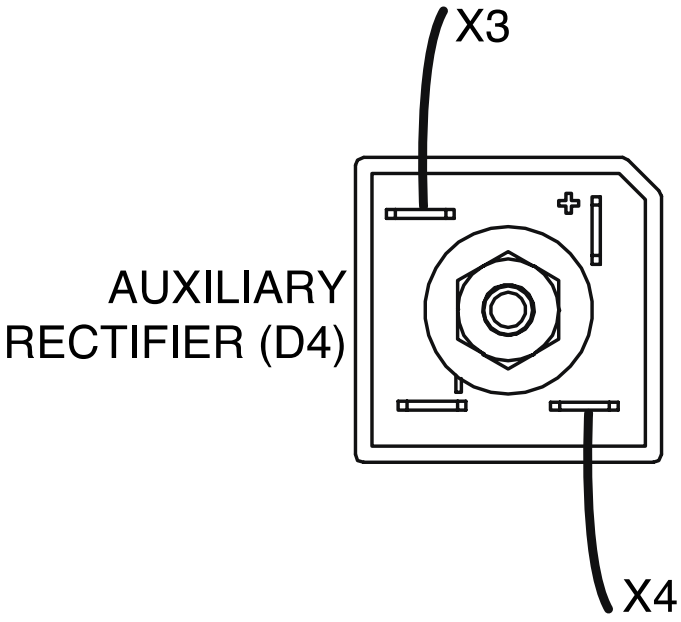
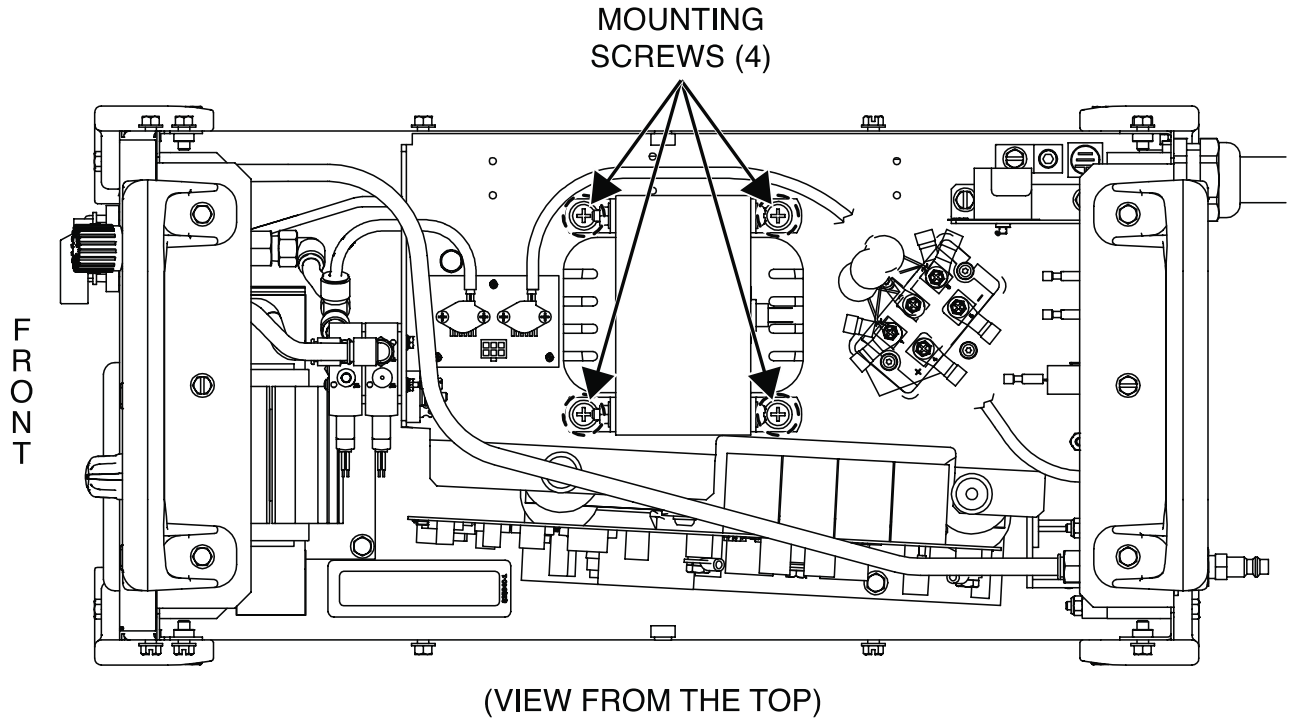


Figure F.44 – Auxiliary transformer mounting screw locations



OUTPUT BOARD REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only 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 Output Board, Diode Modules and IGBT Module.

MATERIALS NEEDED

7/16" Nutdriver
Torx Nutdriver (Size T20)
Dow Corning 340 Heat Sink Compound (Lincoln Part #T12837)
Penetrox Heat Sink Compound (Lincoln Part #T12837-1)
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Label and disconnect plugs J1, J2, J3 and J4 from the output board. See ***Figure F.45***. See Wiring Diagram.
5. Label and disconnect leads from terminals B3, B4, B11, B12 and B13 of the output board. See ***Figure F.45***. See Wiring Diagram.
6. Using a 7/16" nutdriver, remove the screw, lock washer and flat washer securing leads 806 and work to terminal B10 of the output board. See ***Figure F.45***. See Wiring Diagram.
7. Using a 7/16" nutdriver, remove the screw, lock washer and flat washer securing lead B9 to terminal B9 of the output board. See ***Figure F.45***. See Wiring Diagram.
8. Using a 7/16" nutdriver, remove the two screws, lock washers and flat washers securing leads X11 and X13 to terminals B5 and B6 of the output board. See ***Figure F.45***. See Wiring Diagram.
9. Using a Torx nutdriver (size T20), remove the twenty screws, lock washers and flat washers securing the output board to the modules. See ***Figure F.46***.
10. The output board can now be removed and replaced.
11. Using a Torx nutdriver (size T20), remove the 10 screws, lock washers and flat washers securing the four diode modules and the IGBT module to the heat sink. See ***Figure F.47***. See Wiring Diagram. Note orientation of the modules for reassembly.
12. The four diode modules and IGBT module can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Apply a coating of Dow Corning 340 heat sink compound to the mating surfaces of the diode modules, IGBT module and heat sink.
2. Carefully position new diode modules and IGBT module onto the heat sink. See ***Figure F.47***, for slot location.
3. Using a Torx nutdriver (size T20), attach the ten screws, lock washers and flat washers securing the four diode modules and the IGBT module to the heat sink. Torque to 11-13 in/lbs.
4. Carefully position the new output board onto the modules.
5. Using a Torx nutdriver (size T20), attach the twenty screws, lock washers and flat washers securing the output board to the modules. Torque to 9-11 in/lbs.
6. Apply a thin coating of Penetrox heat sink compound to terminals B5, B6, B9 and B10.
7. Using a 7/16" nutdriver, attach the two screws, lock washers and flat washers securing leads X11 and X13 to terminals B5 and B6 of the output board. See Wiring Diagram.
8. Using a 7/16" nutdriver, attach the screw, lock washer and flat washer securing lead B9 to terminal B9 of the output board. See Wiring Diagram.
9. Using a 7/16" nutdriver, attach the screw, lock washer and flat washer securing leads 806 and work to terminal B10 of the output board. See Wiring Diagram.
10. Connect leads to terminals B3, B4, B11, B12 and B13 of the output board. See Wiring Diagram.
11. Connect plugs J1, J2, J3 and J4 from the output board. See Wiring Diagram.
12. Perform the ***Case Cover Replacement Procedure***.
13. Perform the ***Retest After Repair Procedure***.

Figure F.45 – Output board plug and terminal locations

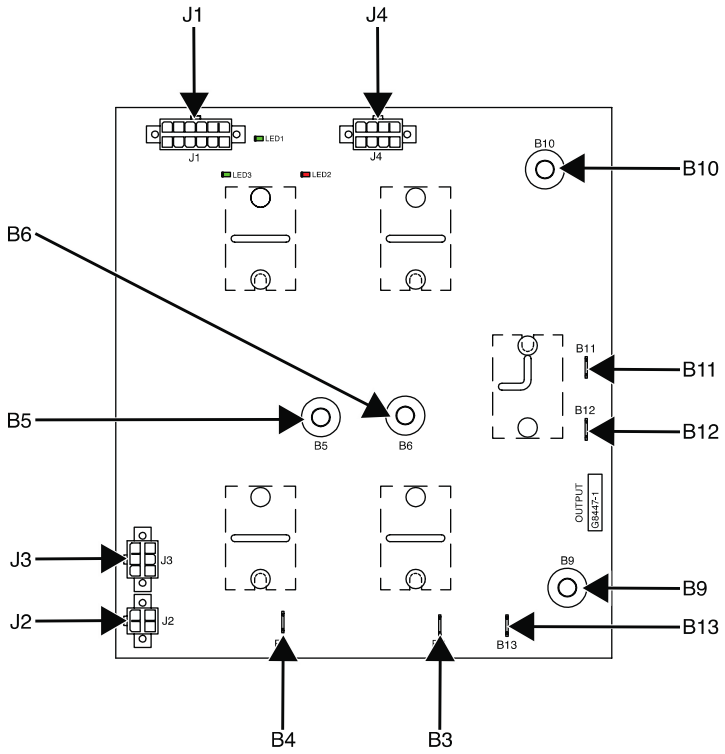


Figure F.46 – Output board mounting screw location

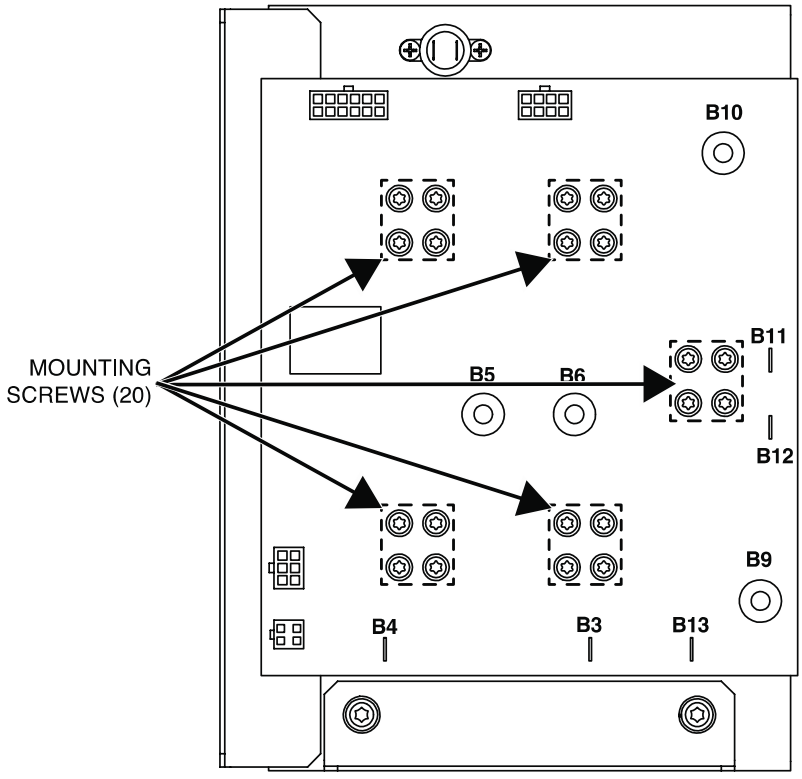
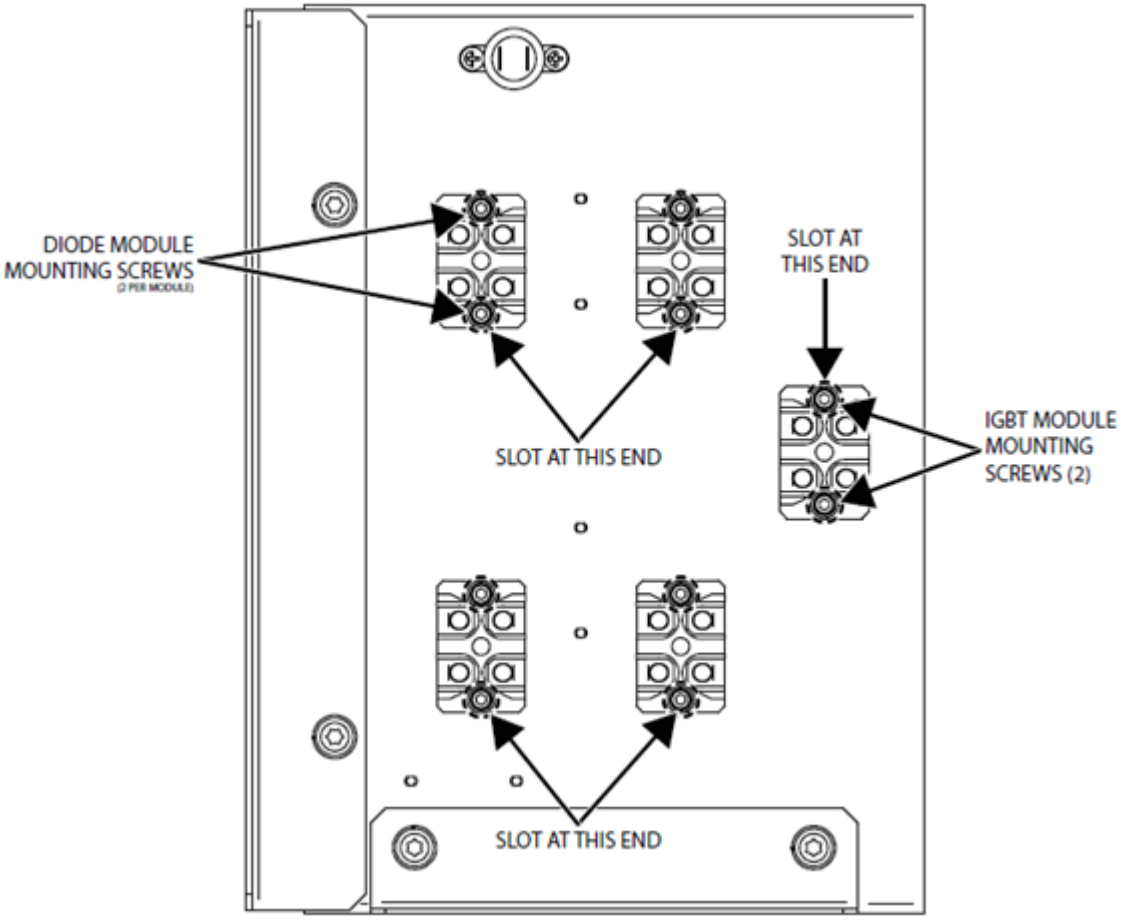


Figure F.47 – Diode module and IGBT module orientation and mounting screw location



CHOKE REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only 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 Choke.

MATERIALS NEEDED

7/16” Nutdriver
Two Large Crescent Wrenches
3/8” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Using a 7/16” nutdriver, remove the screw, lock washer and flat washer securing lead B9 to terminal B9 on the output board. See ***Figure F.48***. See Wiring Diagram.
5. Disconnect the air hose from the rear of the torch connector. See ***Figure F.48***.
6. Using two large crescent wrenches, remove the adapter securing the choke lead to the rear of the torch connector. See ***Figure F.48***. See Wiring Diagram.
7. Using a 3/8” nutdriver, remove the four screws securing the choke assembly to the base of the machine. See ***Figure F.49***.
8. The choke assembly can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the new choke assembly into the machine.
2. Using a 3/8” nutdriver, attach the four screws securing the choke assembly to the base of the machine.
3. Using two large crescent wrenches, attach the adapter securing the choke lead to the rear of the torch connector. See Wiring Diagram.
4. Connect the air hose to the rear of the torch connector.
5. Using a 7/16” nutdriver, attach the screw, lock washer and flat washer securing lead B9 to terminal B9 on the output board. See Wiring Diagram.

6. Perform the ***Case Cover Replacement Procedure***.
7. Perform the ***Retest After Repair Procedure***.

Figure F.48 – Choke lead connection locations

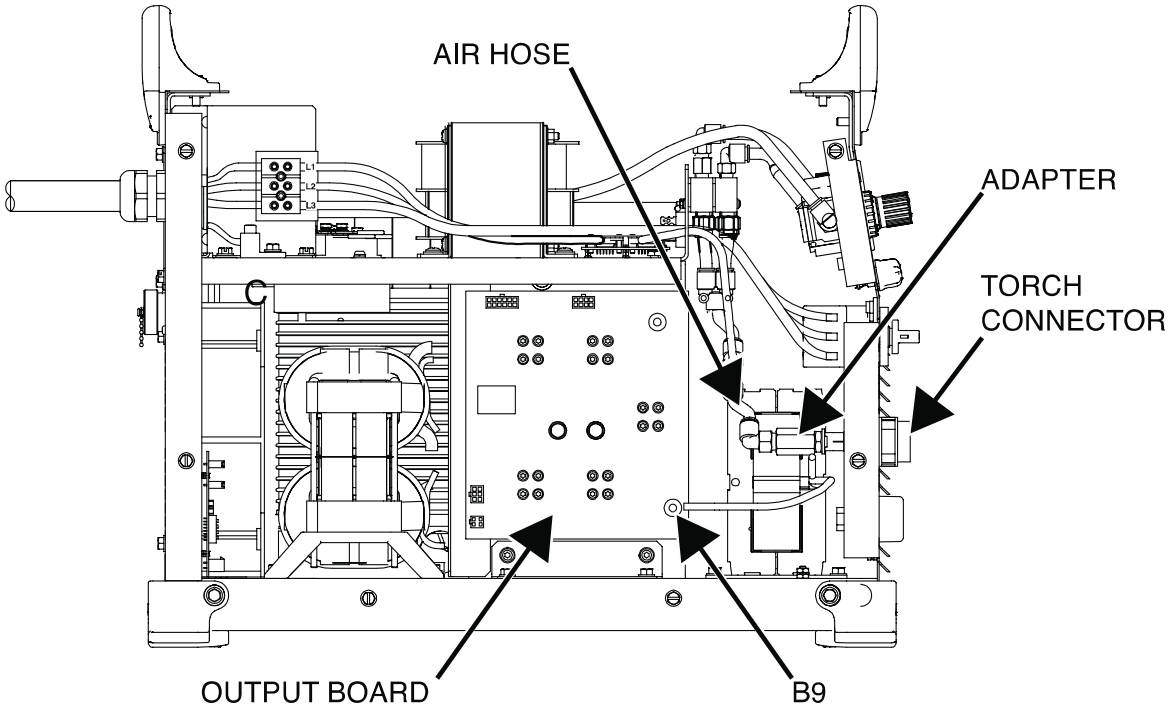
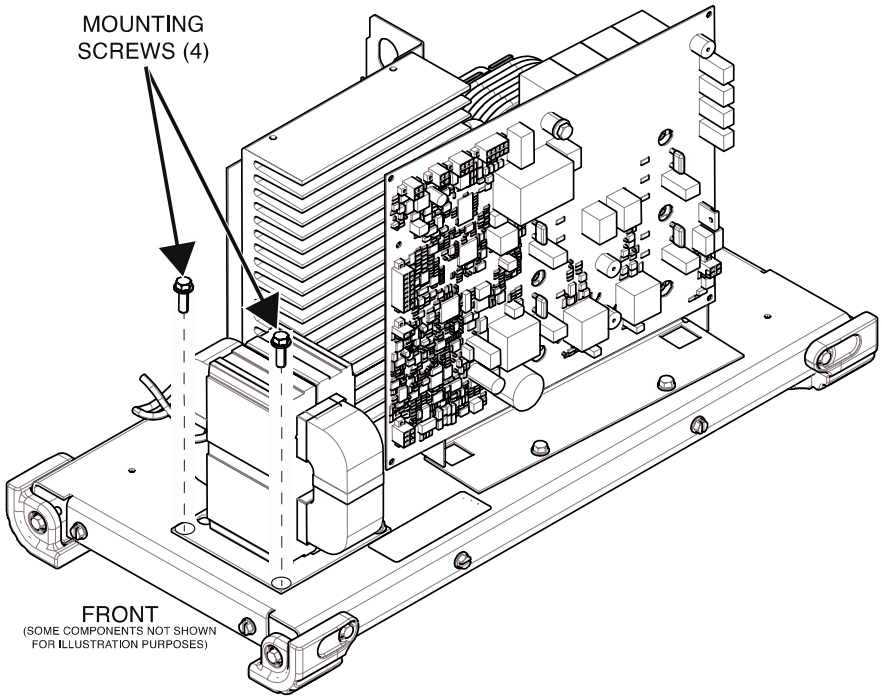


Figure F.49 – Choke mounting screw locations



THERMOSTAT REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only 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 Thermostat.

MATERIALS NEEDED

Phillips Screwdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Label and disconnect leads 409 and 410 from the thermostat. See ***Figure F.50***. See Wiring Diagram.
5. Using a Phillips screwdriver, remove the two screws securing the thermostat to the heat sink. See ***Figure F.51***.
6. The thermostat can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the new thermostat into the machine.
2. Using a Phillips screwdriver, attach the two screws securing the thermostat to the heat sink.
3. Connect leads 409 and 410 to the thermostat. See Wiring Diagram.
4. Perform the ***Case Cover Replacement Procedure***.
5. Perform the ***Retest After Repair Procedure***.

Figure F.50 – Thermostat lead locations

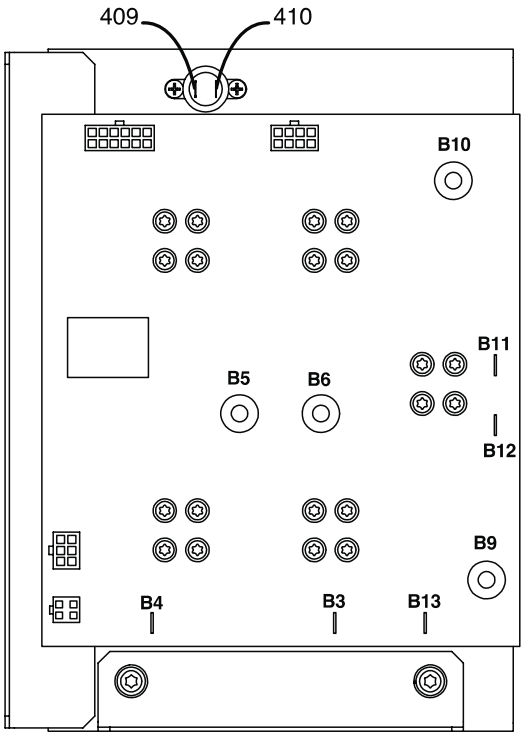
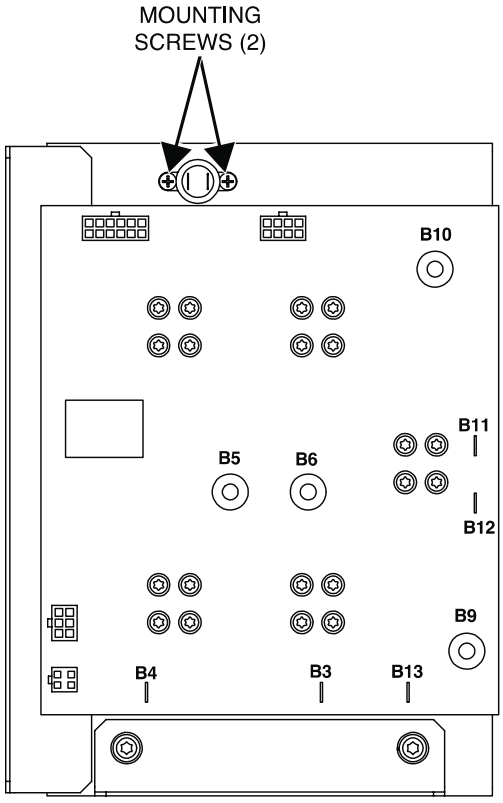


Figure F.51 – Thermostat mounting screw locations



AUXILIARY RECTIFIER REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only 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 Auxiliary Rectifier (D4).

MATERIALS NEEDED

3/8” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Label and disconnect leads 82, 83, X3 and X4 from the auxiliary rectifier (D4). See ***Figure F.52***. See Wiring Diagram.
5. Using a 3/8” nutdriver, remove the nut, lock washer and flat washer securing the auxiliary rectifier to the top shelf. See ***Figure F.53***.
6. The auxiliary rectifier (D4) can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Apply a layer of Dow Corning 340 heat sink compound to the mating surfaces of the auxiliary rectifier and the top shelf.
2. Carefully position new auxiliary rectifier into the machine.
3. Using a 3/8” nutdriver, attach the nut, lock washer and flat washer securing the auxiliary rectifier to the top shelf.
4. Connect leads 82, 83, X3 and X4 to the auxiliary rectifier (D4). See Wiring Diagram.
5. Perform the ***Case Cover Replacement Procedure***.
6. Perform the ***Retest After Repair Procedure***.

Figure F.52 – Auxiliary rectifier lead locations

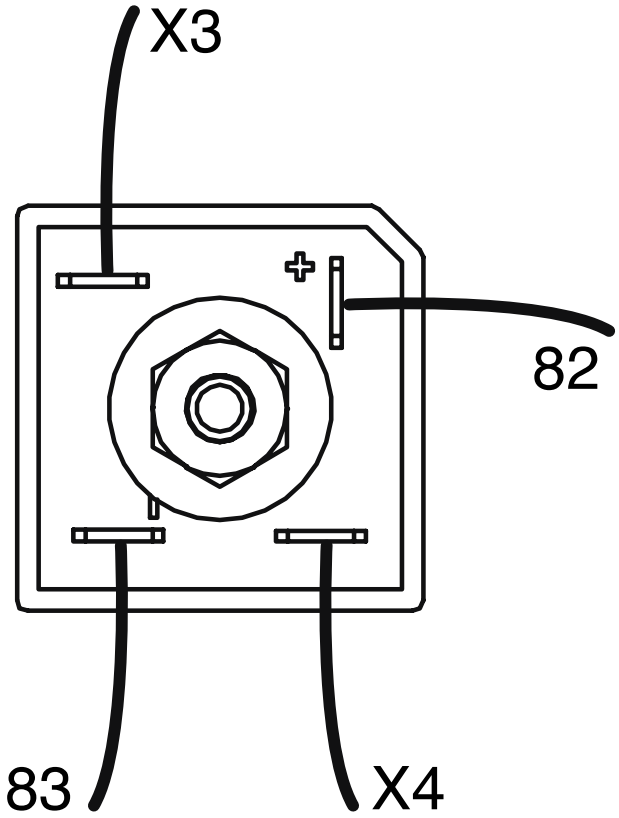
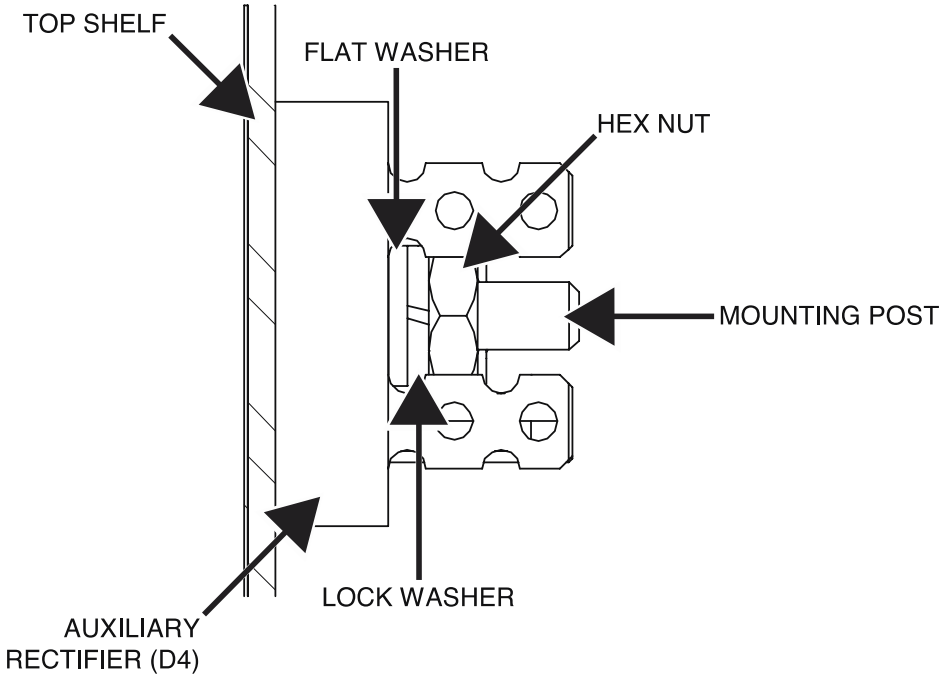


Figure F.53 – Auxiliary rectifier mounting hardware locations



USER INTERFACE BOARD REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only 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 User Interface Board.

MATERIALS NEEDED

5/64” Allen Wrench
1/2” Nutdriver
Phillips Screwdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Label and disconnect plug J1 from the user interface board. See ***Figure F.54***. See Wiring Diagram.
5. Using a 5/64” Allen wrench, loosen the setscrew securing the knob to user interface board. See ***Figure F.55***.
6. Using a 1/2” nutdriver, remove the nut securing the user interface board to the case front panel. See ***Figure F.55***.
7. Using a Phillips screwdriver, remove the four screws and washers securing the user interface board to the rear of the case front panel. See ***Figure F.55***.
8. The user interface board can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position new user interface board into the machine.
2. Using a Phillips screwdriver, attach the four screws and washers securing the user interface board to the case front panel.
3. Using a 1/2” nutdriver, attach the nut securing the user interface board to the case front panel.
4. Using a 5/64” Allen wrench, tighten the setscrew securing the knob to user interface board.
5. Connect plug J1 to the user interface board. See Wiring Diagram.
6. Perform the ***Case Cover Replacement Procedure***.
7. Perform the ***Retest After Repair Procedure***.

Figure F.54 – User interface board plug J1 location

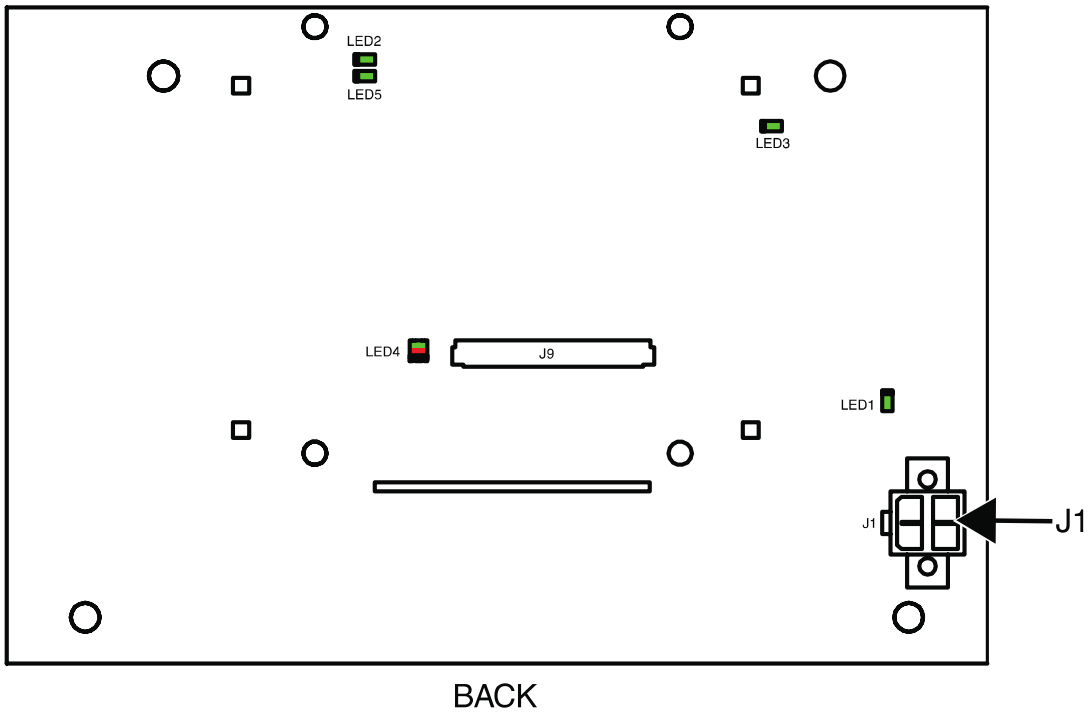
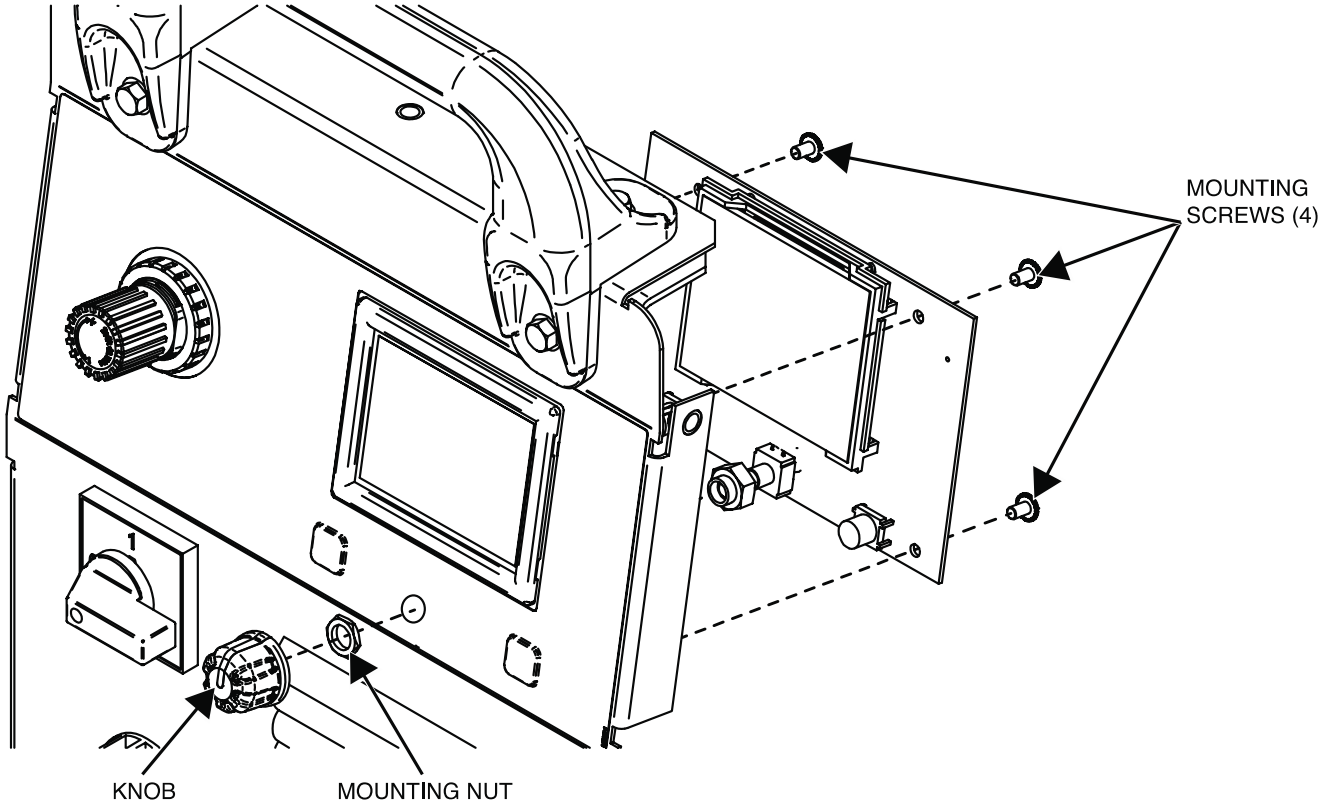


Figure F.55 – User interface board mounting hardware locations



SWITCH BOARD REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only 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 Switch Board.

MATERIALS NEEDED

7/16” Nutdriver
Torx Nutdriver (Size T25)
Dow Corning 340 Heat Sink Compound (Lincoln Part #T12837)
Penetrox Heat Sink Compound (Lincoln Part #T12837-1)
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Label and disconnect plugs J20, J21, J22, J23, J26, J28 and J29 from the switch board. See ***Figure F.56***. See Wiring Diagram.
5. Label and disconnect the Ethernet cable from the switch board. See ***Figure F.56***. See Wiring Diagram.
6. Using a 7/16” nutdriver, remove the four screws, lock washers and flat washers securing leads 201, 204, 207 and 209 to terminals B201, B204, B207 and B209 on the switch board. See ***Figure F.57***. See Wiring Diagram. Label and disconnect the leads.
7. Using a Torx nutdriver (size T25), remove the six screws and lock washers securing the switch board to the heat sink. See ***Figure F.57***.
8. The switch board can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Apply a coating of Dow Corning 340 heat sink compound to the mating surface of the heat sink and the switch board.
2. Carefully position the new switch board onto the heat sink.
3. Using a Torx nutdriver (size T25), attach the six screws and lock washers securing the switch board to the heat sink.

4. Using a 7/16” nutdriver, attach the four screws, lock washers and flat washers securing leads 201, 204, 207 and 209 to terminals B201, B204, B207 and B209 on the switch board. See Wiring Diagram. Apply a coating of Penetrox heat sink compound to the connections.
5. Connect the Ethernet cable to the switch board. See Wiring Diagram.
6. Connect plugs J20, J21, J22, J23, J26, J28 and J29 to the switch board. See Wiring Diagram.
7. Perform the ***Case Cover Replacement Procedure***.
8. Perform the ***Retest After Repair Procedure***.

Figure F.56 – Switch board lead locations

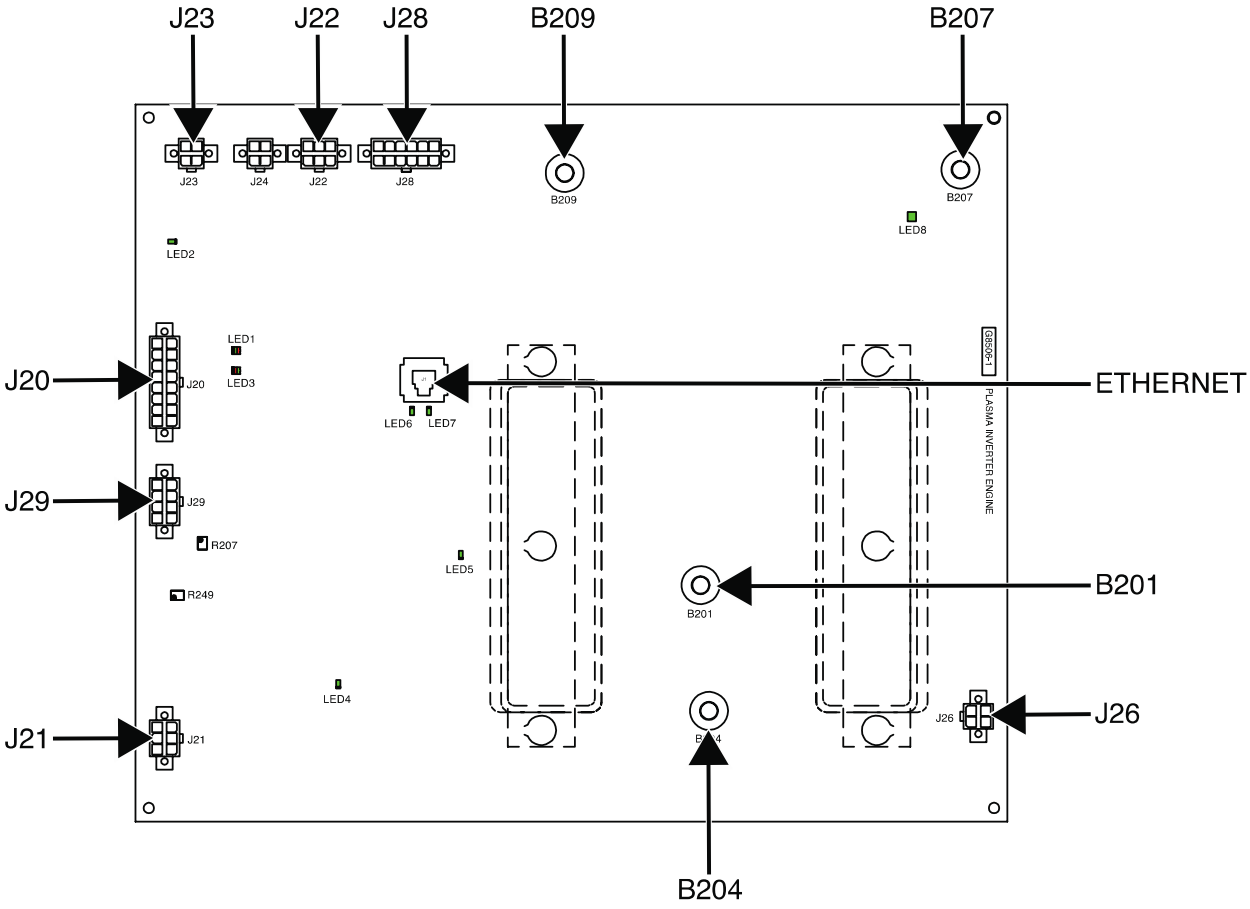
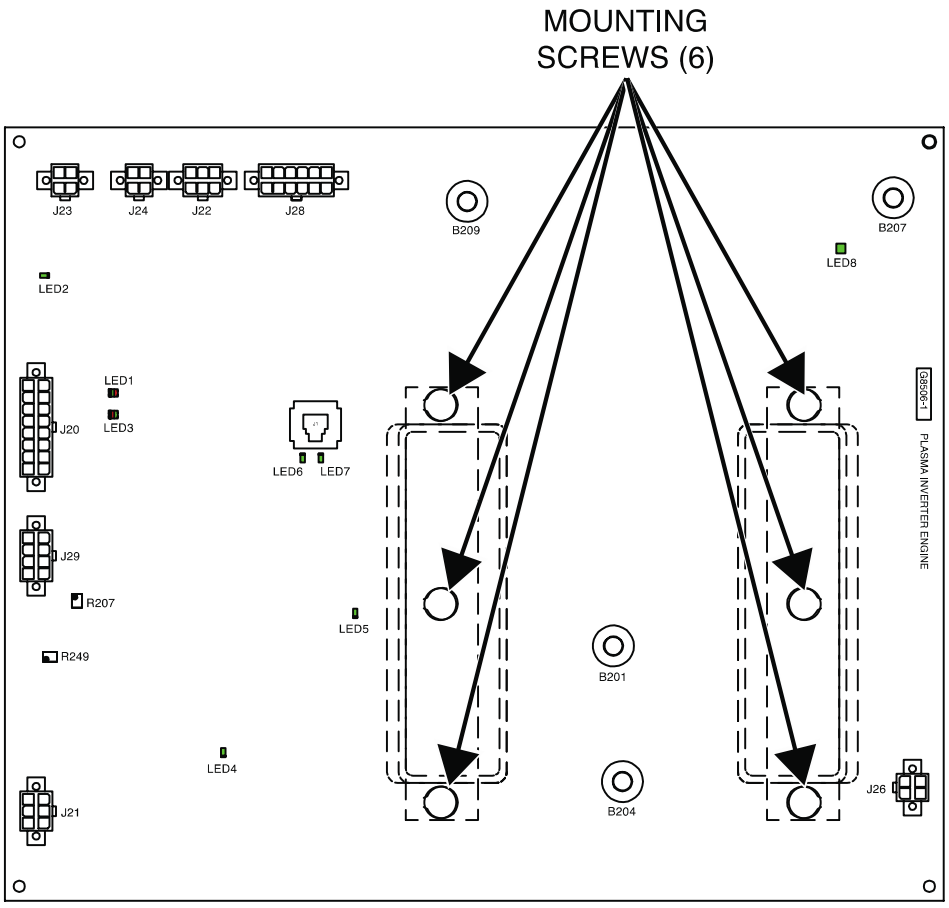


Figure F.57 – Switch board mounting screw locations



INPUT SWITCH REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only 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 Input Switch.

MATERIALS NEEDED

Offset Phillips Screwdriver
Small Phillips Screwdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Using an offset Phillips screwdriver, loosen the six screws securing the leads L1, L2, L3 L1A, L2A and L3A from the input switch. See ***Figure F.58***. See Wiring Diagram.
5. Using a small Phillips screwdriver, remove the screw securing the knob to the machine. See ***Figure F.59***.
6. Remove the plastic spacer from the shaft of the input switch. See ***Figure F.59***.
7. Remove the switch cover plate. See ***Figure F.59***.
8. Using a Phillips screwdriver, remove the four screws securing the switch to the machine. See ***Figure F.59***.
9. The input switch can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position new input switch into the machine.
2. Using a Phillips screwdriver, attach the four screws securing the switch to the machine.
3. Attach the cover plate to the switch.
4. Attach the plastic spacer to the shaft of the input switch.
5. Using a small Phillips screwdriver, attach the screw securing the knob to the machine.
6. Using an offset Phillips screwdriver, tighten the six screws securing the leads L1, L2, L3 L1A, L2A and L3A to the input switch. See Wiring Diagram.
7. Perform the ***Case Cover Replacement Procedure***.
8. Perform the ***Retest After Repair Procedure***.

Figure F.58 – Input switch lead locations

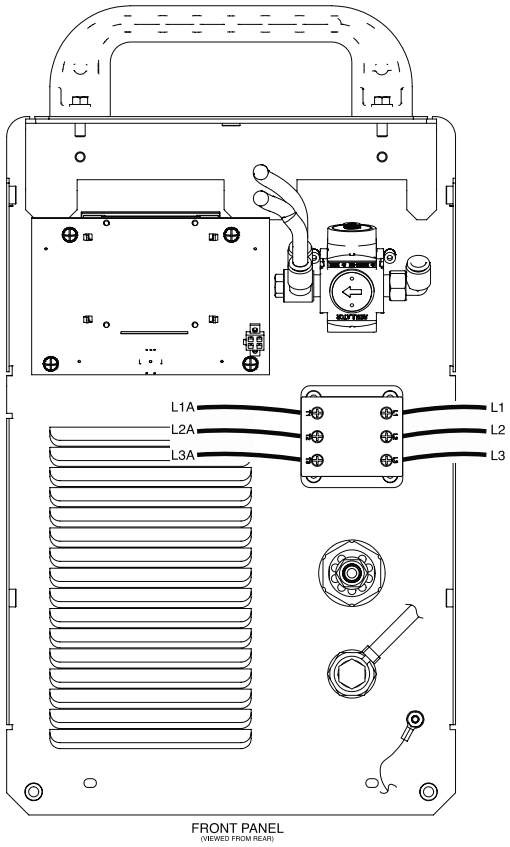
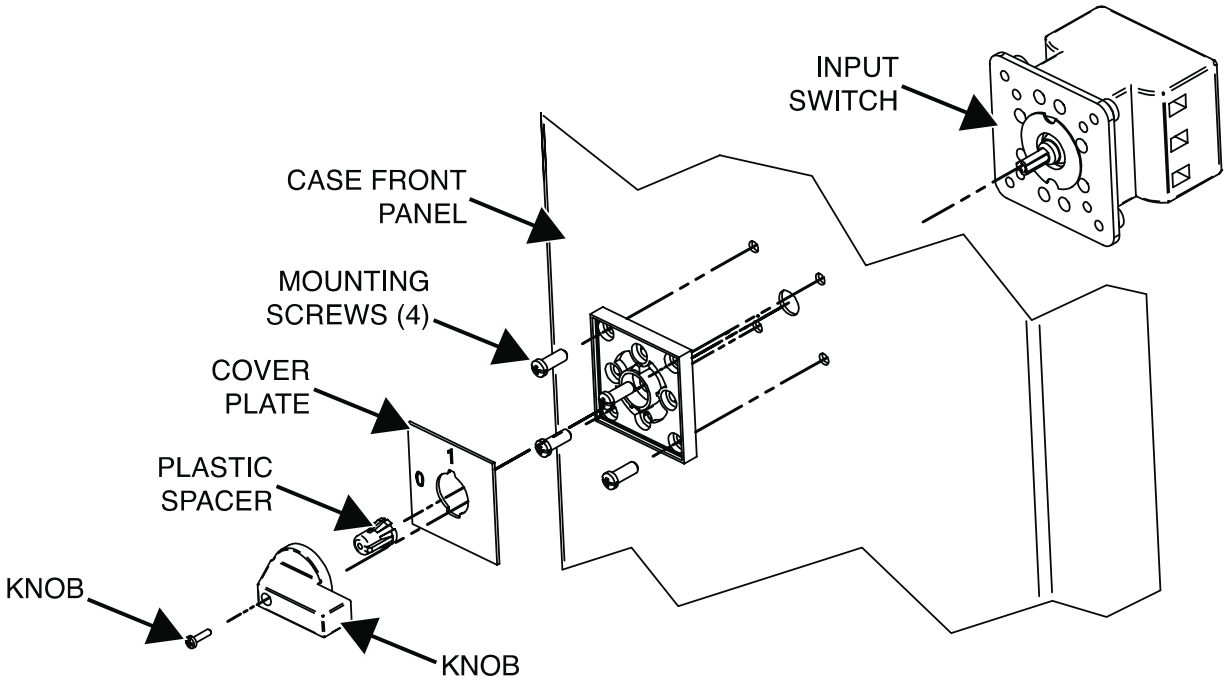


Figure F.59 – input switch mounting hardware location



SOLENOID 1 & 2 REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only 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 Solenoids 1 & 2.

MATERIALS NEEDED

1/4” Nutdriver
Phillips Screwdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Label and disconnect the five air hoses from the solenoids. See ***Figure F.60***.
5. Using a 1/4” nutdriver and Phillips screwdriver, remove the two nuts, lock washers and flat washers securing the solenoids to the top shelf. See ***Figure F.61***.
6. Using a 1/4” nutdriver, remove the two mounting nuts securing the solenoids to each other. See ***Figure F.61***.
7. Using a Phillips screwdriver, remove the two screws securing the solenoids to each other. See ***Figure F.61***.
   NOTE: Retain the solenoid spacers for reassembly.
8. Using a Molex extraction tool, remove the solenoid leads from plug J20. See ***Figure F.62***. See Wiring Diagram.
9. Remove and retain air hose fittings as necessary.
10. The solenoids can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Attach previously removed air hose fittings.
2. Carefully position two new solenoids together, use solenoid spacers between the two solenoids and between the solenoids and top shelf.
3. Using a Phillips screwdriver, attach the two screws securing the solenoids to each other.
4. Using a 1/4” nutdriver, attach the two mounting nuts securing the solenoids to each other.

5. Using a 1/4” nutdriver and Phillips screwdriver, attach the two nuts, lock washers and flat washers securing the solenoids to the top shelf.
6. Using a Molex extraction tool, connect the solenoid leads to plug J20. See Wiring Diagram.
7. Perform the ***Case Cover Replacement Procedure***.
8. Perform the ***Retest After Repair Procedure***.

Figure F.60 – Solenoid air hose locations

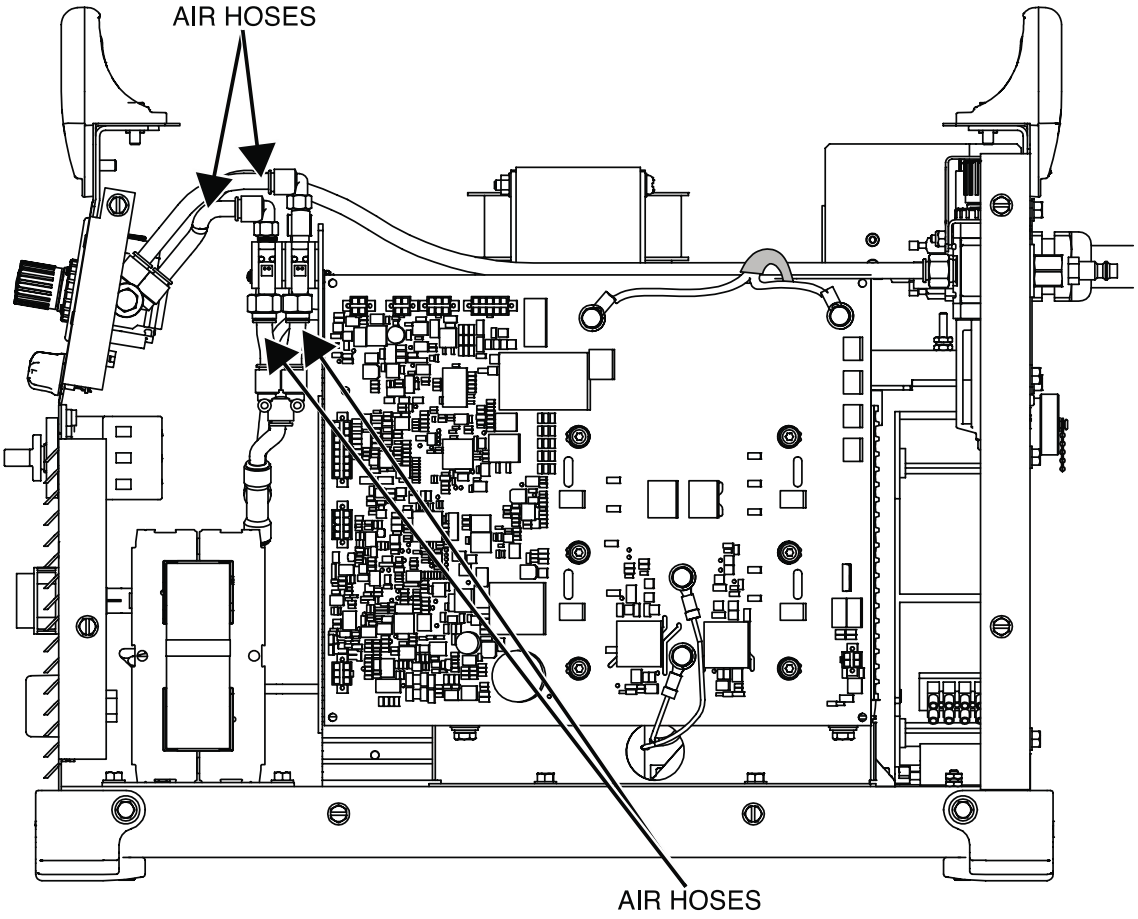


Figure F.61 – Solenoid mounting hardware locations

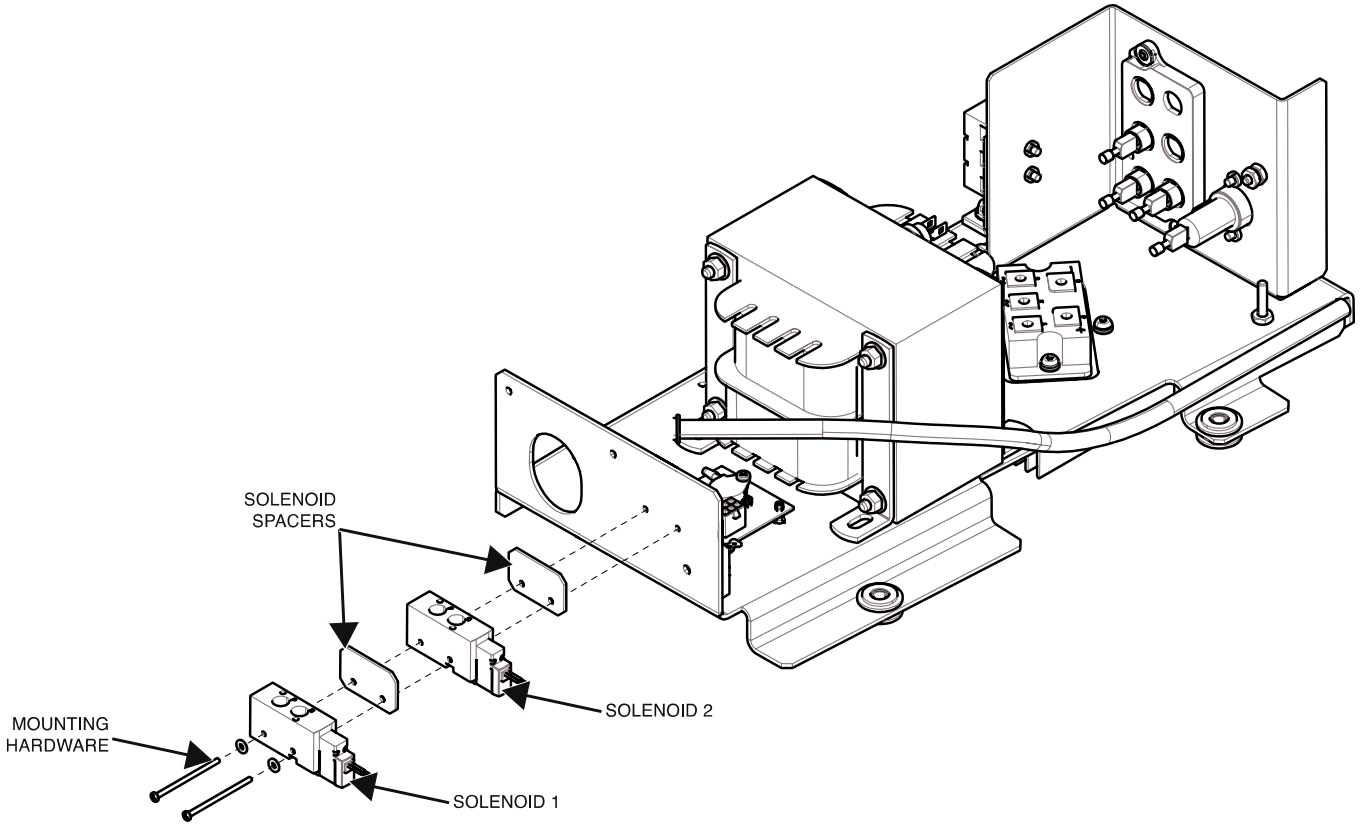
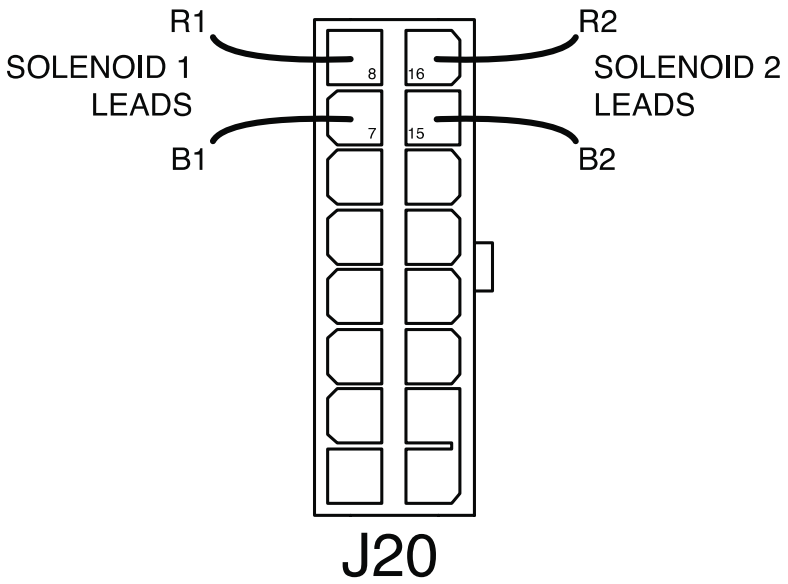


Figure F.62 – Solenoid lead locations



MAIN TRANSFORMER REMOVAL AND REPLACEMENT PROCEDURE

Service and repair should be performed by only 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 Main Transformer.

MATERIALS NEEDED

7/16” Nutdriver
3/8” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Carefully remove input power from the FlexCut 125 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Capacitor Discharge Procedure***.
4. Label and disconnect plugs J20, J21, J22, J23, J26, J28 and J29 from the switch board. See ***Figure F.63***. See Wiring Diagram.
5. Label and disconnect Ethernet cable from the switch board. See ***Figure F.63***. See Wiring Diagram.
6. Using a 7/16” nutdriver, remove the four screws, lock washers and flat washers securing leads 201, 204, 207 and 209 to the switch board. See ***Figure F.63***. See Wiring Diagram.
7. Using a 7/16” nutdriver, remove the two screws, lock washers and flat washers securing the heat sink to the top shelf. See ***Figure F.64***.
8. Using a 3/8” nutdriver, remove the two screws securing the heat sink bracket to the machine. See ***Figure F.64***.
9. Carefully remove the switch board and heat sink assembly from the machine.
10. Route leads thru the heat sink bracket. See ***Figure F.64***.
11. Using a 7/16” nutdriver, remove the two screws, lock washers and flat washers securing leads X11 and X13 to terminals B5 and B6 of the output board. See ***Figure F.65***. See Wiring Diagram.
12. Using a 3/8” nutdriver, remove the four screws securing the main transformer to the base of the machine. See ***Figure F.65***.
13. Route leads thru the air deflector. See ***Figure F.65***.
14. The main transformer (T1) can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position new main transformer (T1) into the machine.
2. Route leads thru the air deflector.
3. Using a 3/8” nutdriver, attach the four screws securing the main transformer to the base of the machine.
4. Using a 7/16” nutdriver, attach the two screws, lock washers and flat washers securing leads X11 and X13 to terminals B5 and B6 of the output board. See Wiring Diagram.
5. Route leads thru the heat sink bracket.
6. Carefully position the switch board and heat sink assembly into the machine.
7. Using a 3/8” nutdriver, attach the two screws securing the heat sink bracket to the machine.
8. Using a 7/16” nutdriver, attach the two screws, lock washers and flat washers securing the heat sink to the top shelf.
9. Using a 7/16” nutdriver, attach the four screws, lock washers and flat washers securing leads 201, 204, 207 and 209 to the switch board. See Wiring Diagram.
10. Connect Ethernet cable to the switch board. See Wiring Diagram.
11. Connect plugs J20, J21, J22, J23, J26, J28 and J29 to the switch board. See Wiring Diagram.
12. Perform the ***Case Cover Replacement Procedure***.
13. Perform the ***Retest After Repair Procedure***.

Figure F.63 – Switch board plug and lead locations

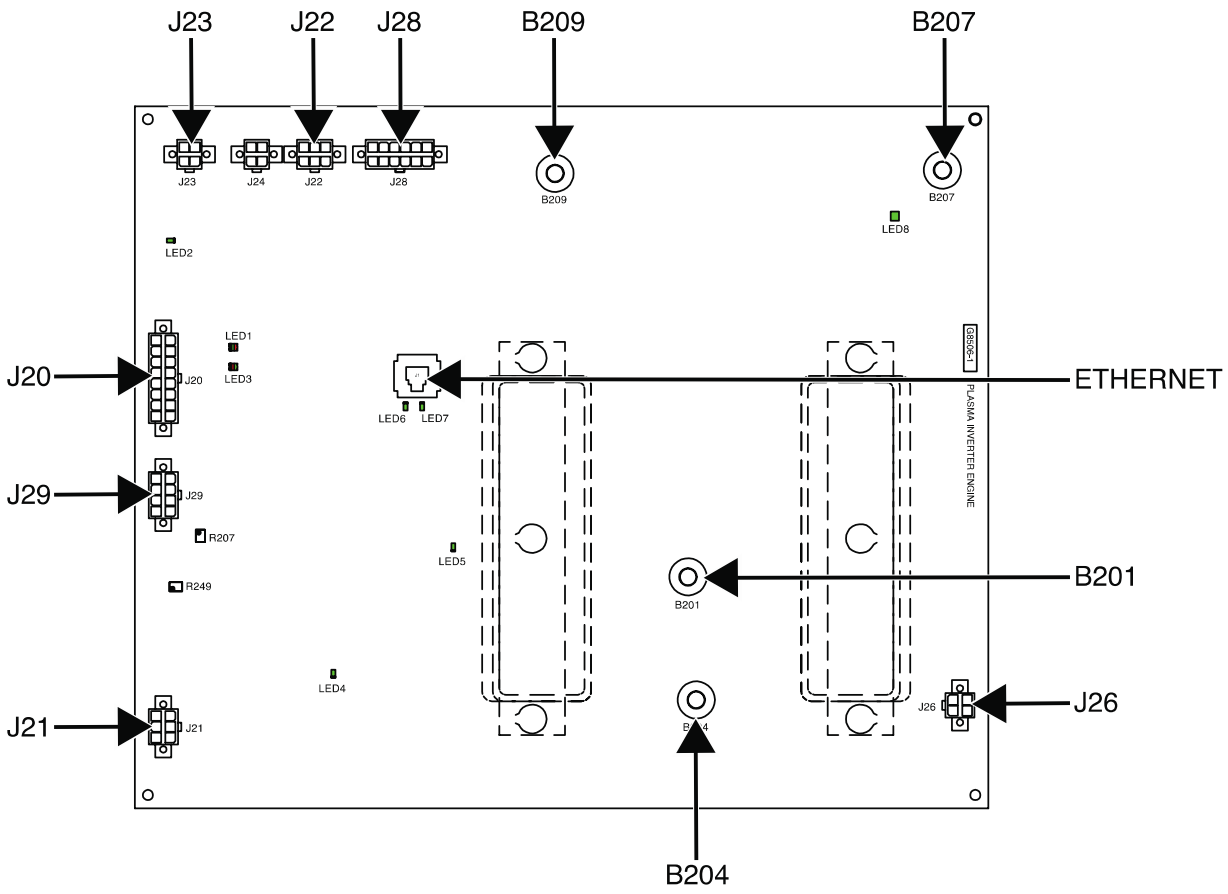


Figure F.64 – Switch board assembly mounting hardware locations

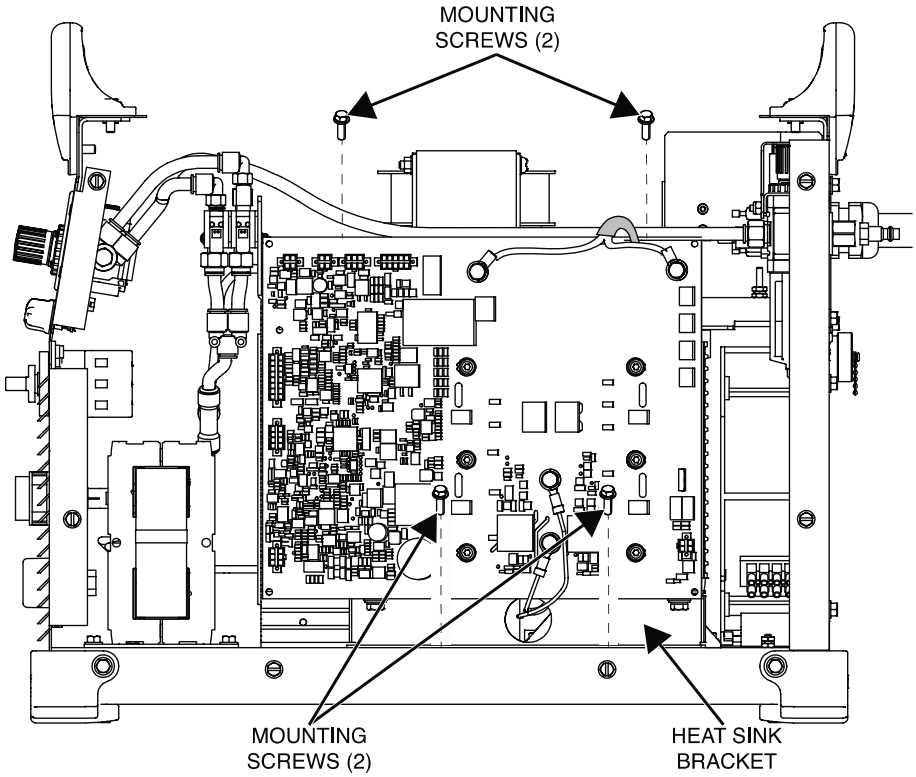
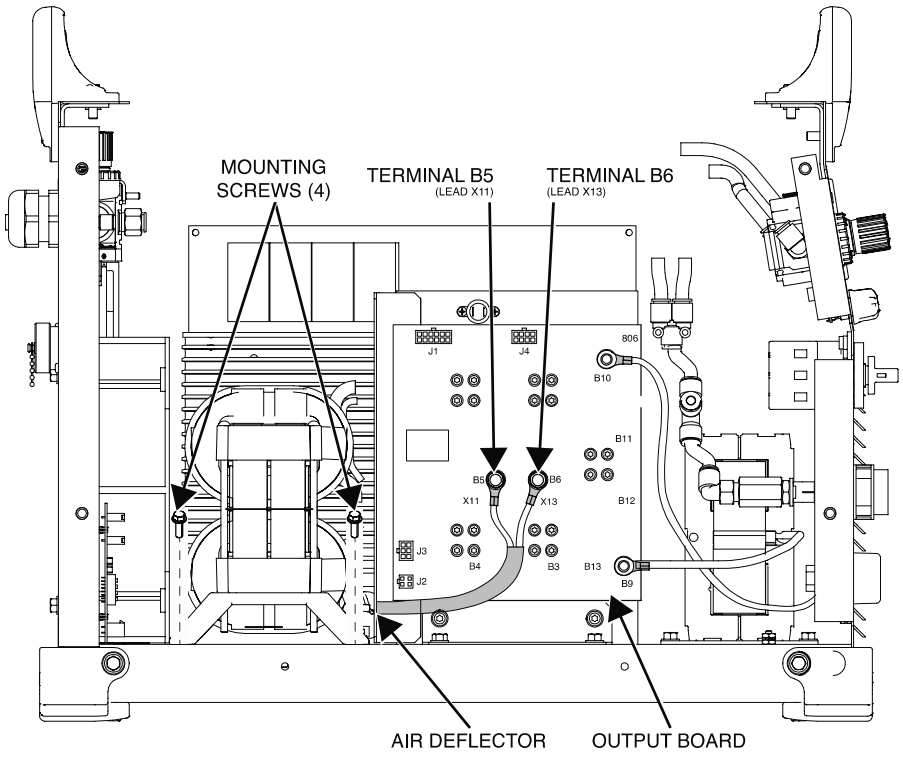


Figure F.65 – Output board lead and main transformer mounting screw locations



RETEST AFTER REPAIR

Should a machine under test be rejected for any reason requiring the removal of any mechanical part that could affect the machine's electrical characteristics, or if any electrical components are repaired or replaced, the machine must be retested.

MACHINE INPUT AND OUTPUT

INPUT VOLTS / HERTZ	INPUT CURRENT	RATED OUTPUT
460/3/60HZ ±10%	33.0 AMPS	125A @ 100% DUTY CYCLE

OUTPUT CURRENT RANGE	20 – 125 AMPS DC

MAXIMUM OPEN CIRCUIT RANGE	300 VOLTS DC

PILOT CURRENT	30 AMPS

1. Connect the machine to 460VAC three phase input power and an air supply (90psi minimum).
2. Turn on the machine and verify the following:
   - The fan is functional.
   - The user interface screen is illuminated.
3. Test cut with FlexCut 125 at its maximum recommended cut thickness with 1.5" steel max. Turn current dial to maximum.
4. Turn the machine off. Test complete.