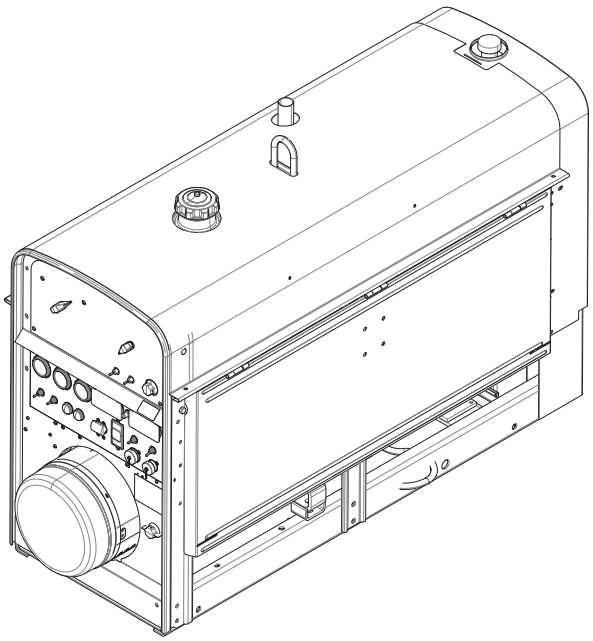
LINCOLN ELECTRIC

Classic® 300 MP

For use with machines having Code Numbers:

Classic 300 MP: 12546

SERVICE MANUAL



SVM273 | Issue Date 17-Feb

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

Diesel Engines

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

Gasoline Engines

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

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.

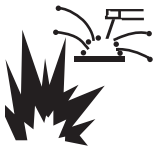
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

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.

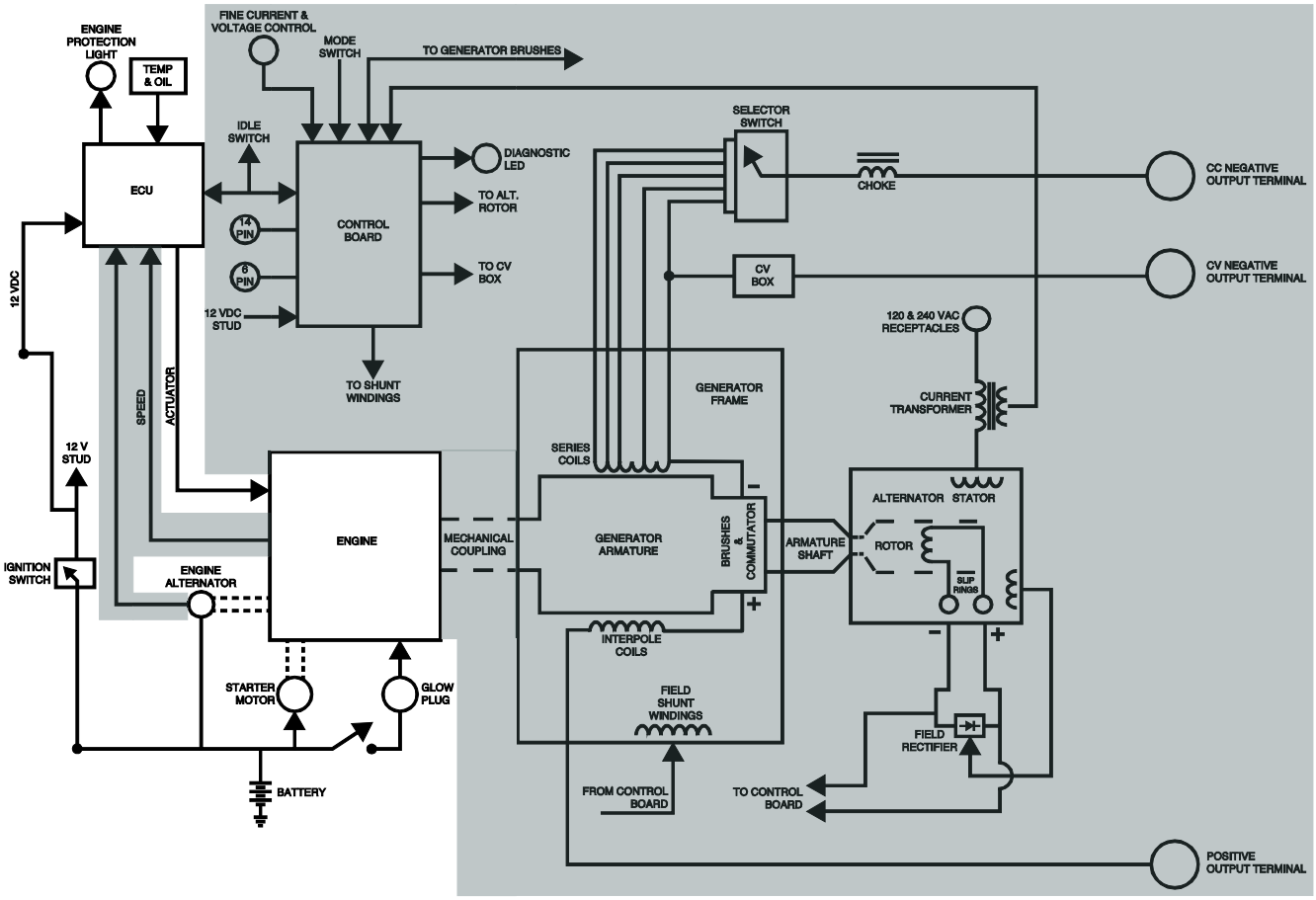
Classic® 300 MP

Service Manual

Last update: 2017/02/01

Theory of Operation

Figure E.1 – Engine starting, protection and engine control unit (ECU)

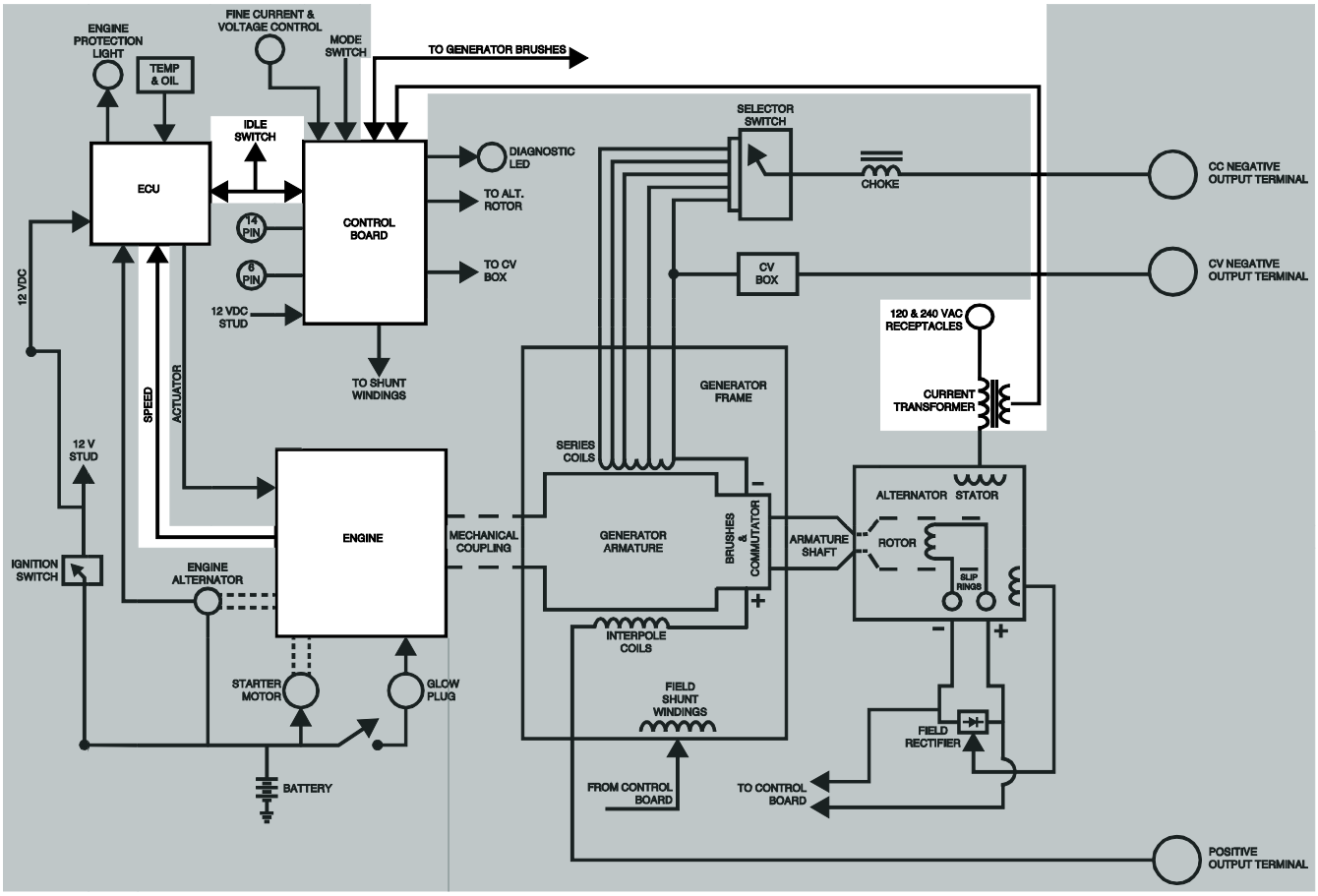


Engine Starting, Protection And Engine Control Unit (ECU)

The 12 VDC battery circuit is connected directly to the engine starter solenoid, the engine alternator, the glow plug switch and the ignition switch. When the ignition switch is closed the 12 VDC battery voltage is applied to several components and circuits. Among these is the engine control unit (ECU). Once voltage is applied to the ECU it sends a pulse width modulation signal (PWM) to the fuel actuator to open and supply fuel to the engine. When the start button is pressed the engine starter motor is activated and the engine cranks and starts.

There is a 60 second bypass time built into the engine protection systems to allow the engine to attain acceptable running conditions. After 60 seconds the ECU monitors the coolant temperature, the oil pressure and the engine speed (RPM). If any of the engine monitoring systems indicates a fault condition the ECU will terminate the PWM signal to the fuel actuator and the engine will shut down.

Figure E.2 – Engine speed control

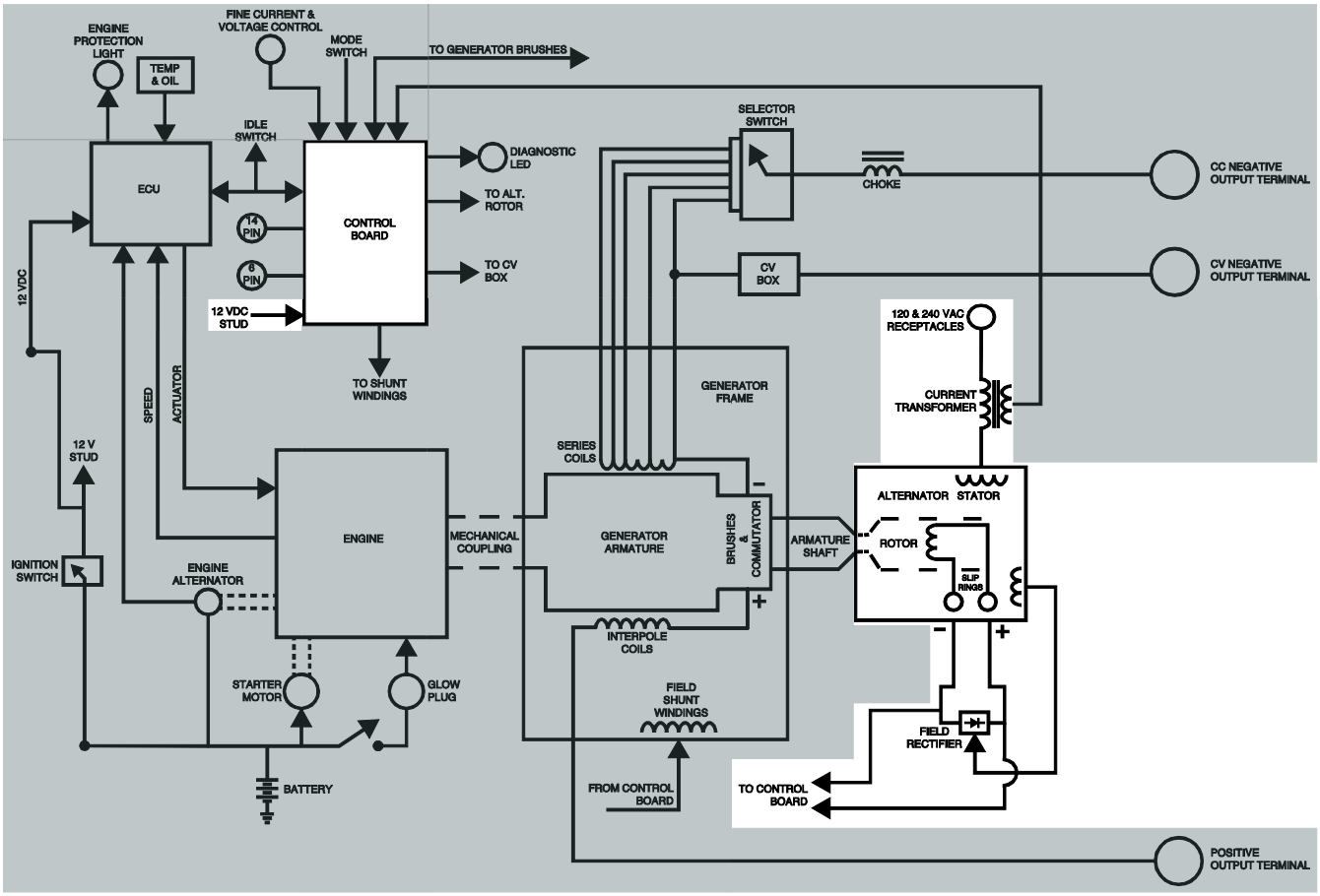


Engine Speed Control

The ECU monitors the engine speed and during high RPM conditions keeps the engine at a steady 1800 RPM regardless of the welding or auxiliary power loads. If the idle switch is set to the auto position the ECU will, under no load conditions, regulate the engine speed to 1440 RPM. When at low speed, if at least 100 watts is drawn from either the 120 VAC or 240 VAC receptacles the current transformer will send a signal to the control board and the control board will signal the ECU to put the engine into high speed.

The control board monitors the voltage across the DC generator brushes and if while at low speed a welding arc is struck the voltage will drop and the control board will signal the ECU to put the engine into high speed.

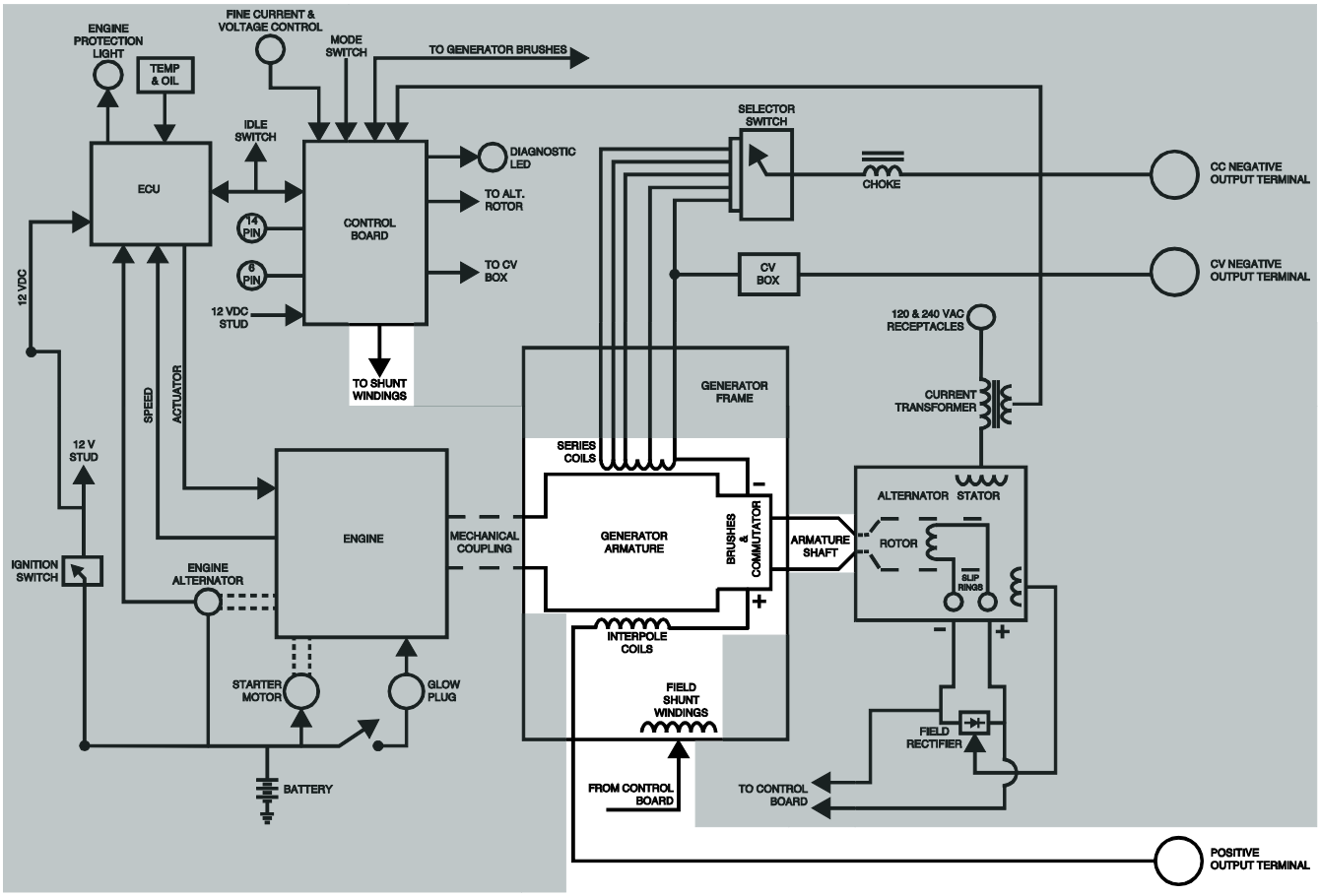
Figure E.3 – Exciter alternator



Exciter Alternator

The exciter alternator is attached to the end of the welding generator frame. The exciter is responsible for producing the auxiliary outputs and power for the control board. The alternator rotor, which is a revolving field, requires a DC voltage to energize (flash) it. The flashing voltage is provided by the control board via a brush and slip ring configuration. Once the flashing voltage is applied a magnetic field is established. This rotating field rotates within the stationary stator windings. Several AC voltages are established from these stator windings (120/240 VAC for the receptacles and 120 VAC for rotor feedback). The 120 VAC feedback voltage is rectified and feed back to the rotor. This voltage is also applied to the control board.

Figure E.4 – DC generator



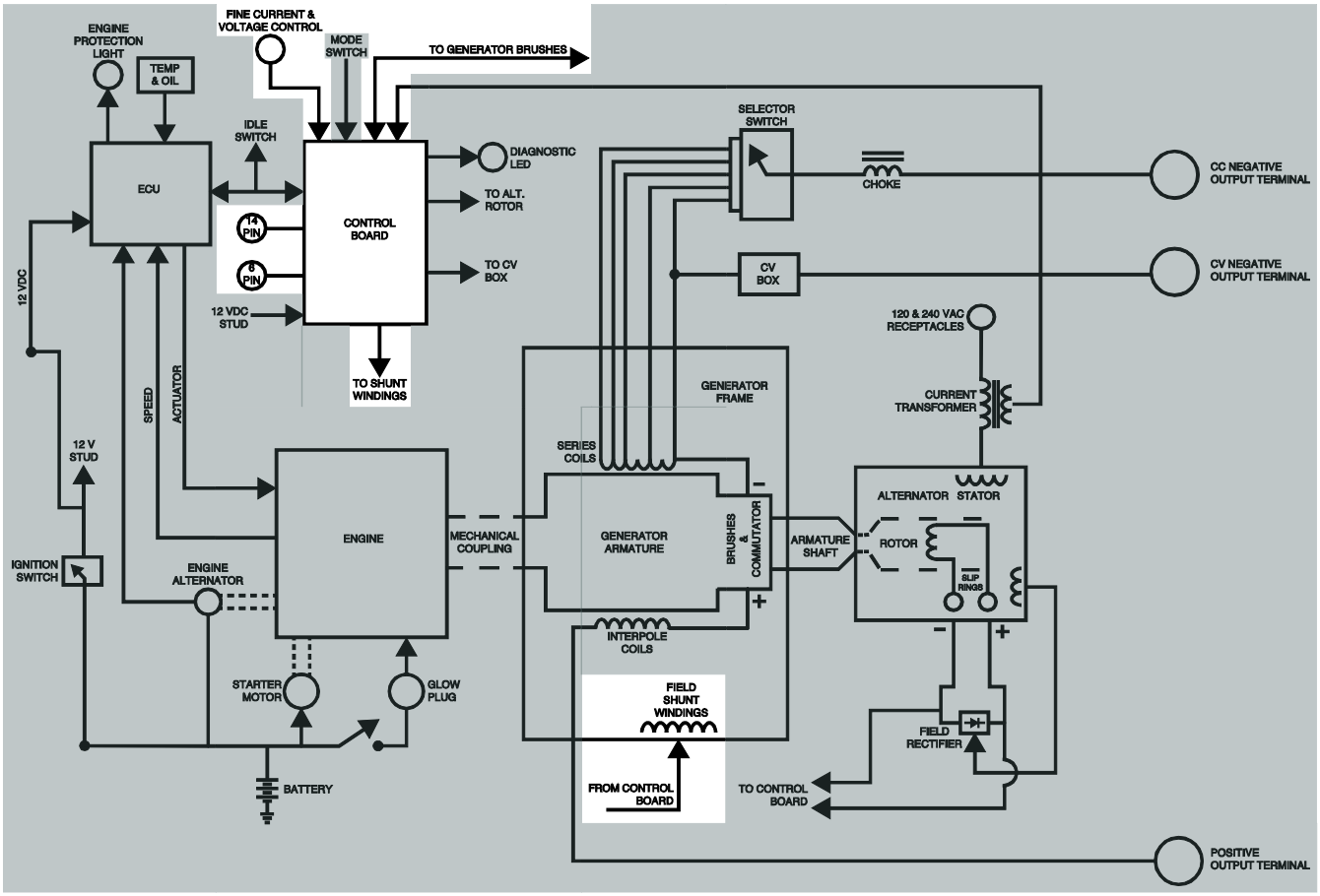
DC Generator

The two shunt windings are powered by the control board. When a DC voltage is applied to these two windings a magnetic field is established with two distinct poles.

The armature contains windings that are parallel to the shaft. The armature is rotated, by the engine, within the magnetic fields created by the shunt windings. This action creates an alternating current within the armature. This alternating current is rectified by the brush and commutator configuration. This DC power is applied to the series and interpole coils.

The interpole coils, which are connected in series with the positive brushes and the positive output terminal, are located so as to counteract any magnetic distortion in the rotating armature. The series coils are designed to oppose or “buck” the DC voltage that is generated in the armature.

Figure E.5 – Open circuit and voltage control

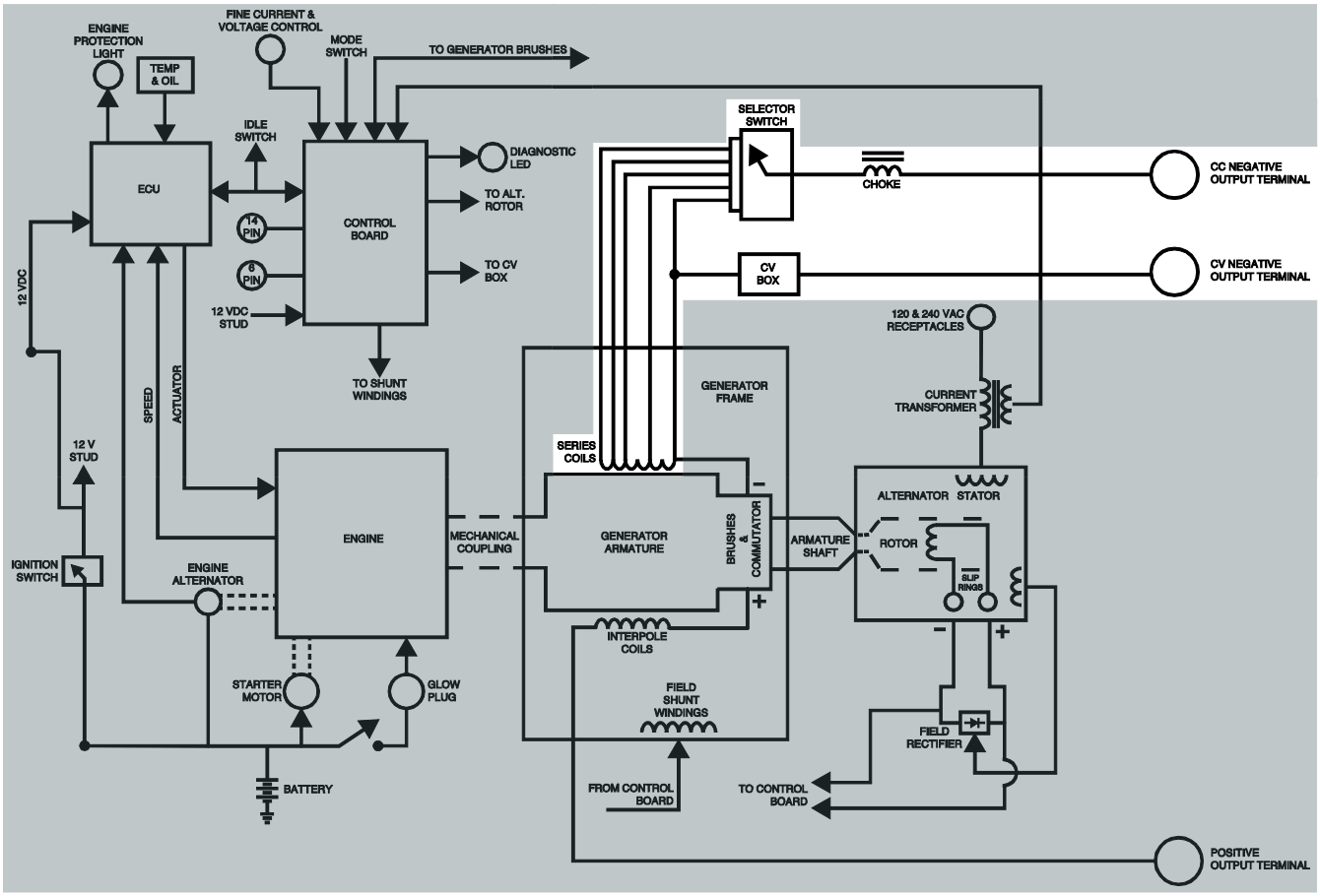


Open Circuit And Voltage Control

The control board receives feedback voltage information from the DC generator brushes. The control board monitors this feedback information and compares it to the user commands set forth from the Fine Current and Open Circuit Voltage potentiometer. The control board then regulates the voltage being applied to the generator shunt windings to compensate for losses due to heating. When in the constant voltage mode (CV) the welding voltage will be controlled and maintained.

The control board also monitors the 6-pin and 14-pin amphenols for any remote voltage controls and or wire feeder connections.

Figure E.6 – Welding current control

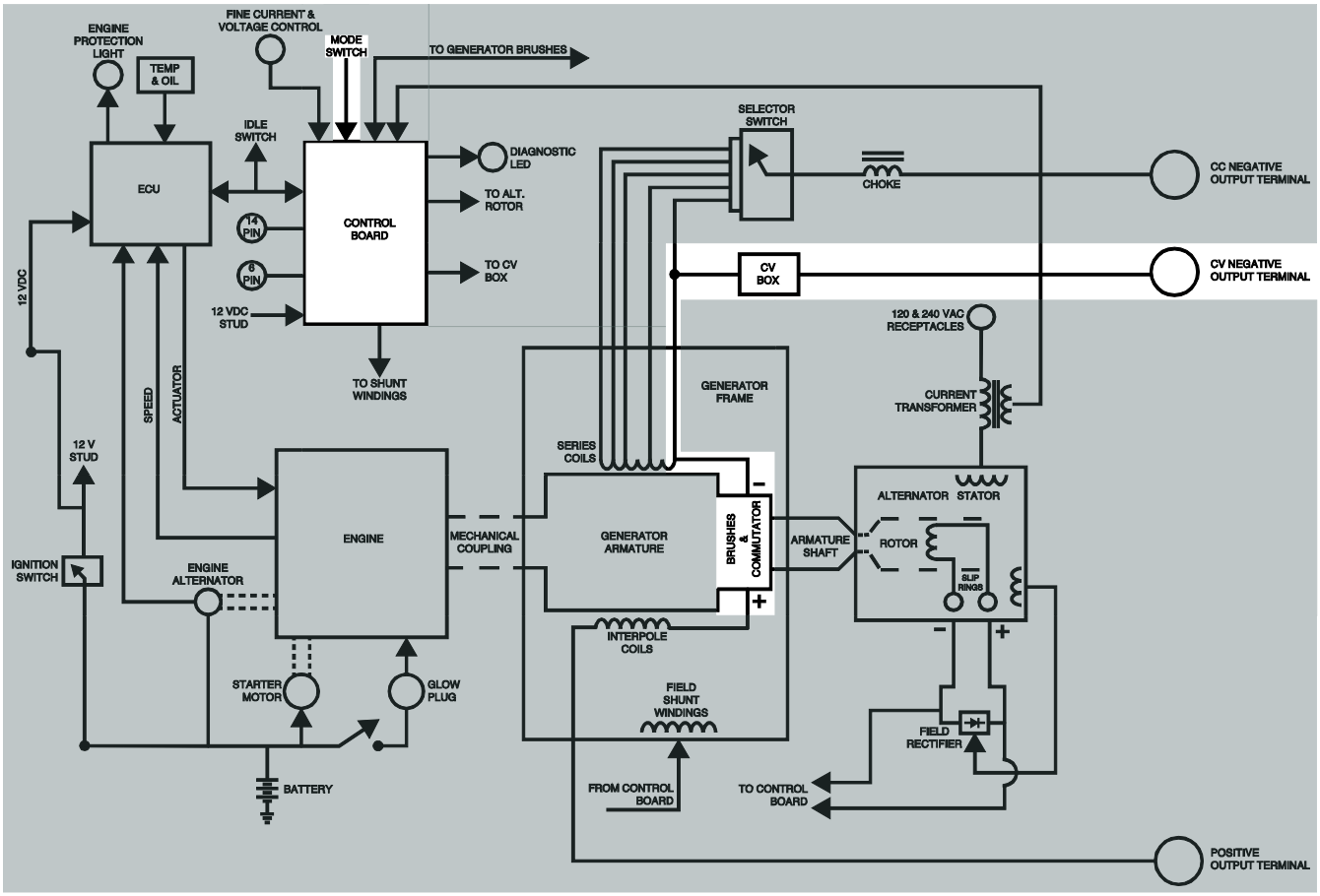


Welding Current Control

The coarse current control is handled by a selector switch that selects different portions of the series field coil. The series field is between the negative brushes and the constant current negative output stud. The current passing through the series coils creates a field that opposes the shunt field. The stronger the opposing field the lower the welding output current. The choke that is in series with the constant current negative output stud and the selector switch provides filtering for the welding current.

In the constant voltage mode the series coils are bypassed and the negative CV stud is connected to the negative brushes via the contactor in the CV box.

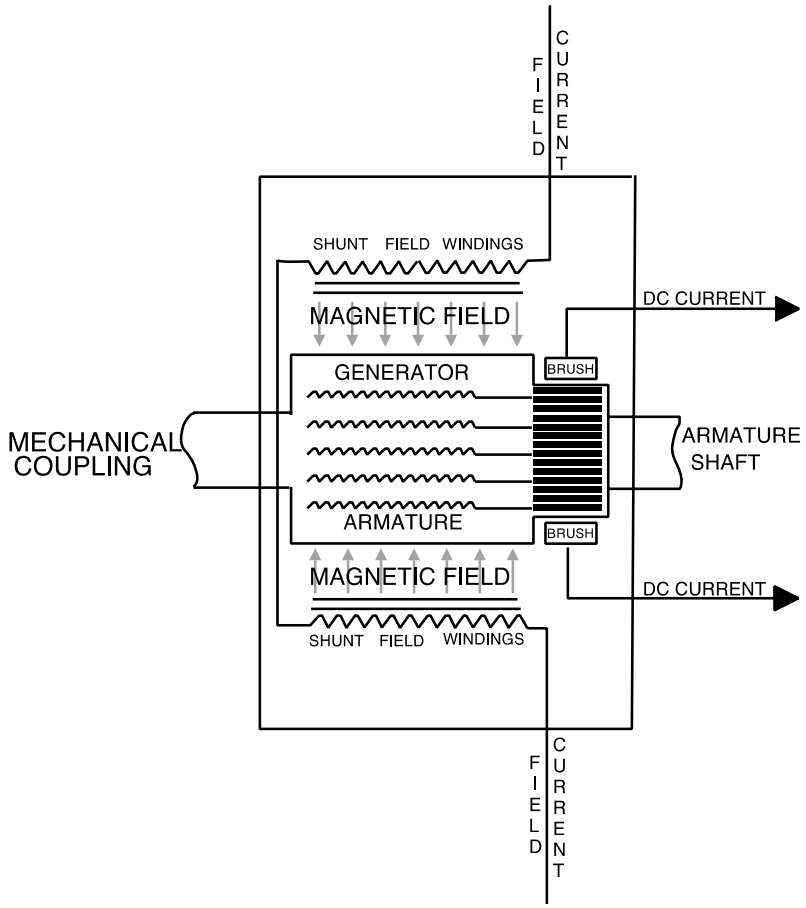
Figure E.7 – Constant voltage CV box



Constant Voltage CV Box

The CV box contains two contactors and several filter capacitors. When the mode switch is placed into the CV mode the CV box is activated. One of the contactors is energized and brings the filter capacitors into the CV welding circuit to provide a more constant DC output voltage for wire welding. The other contactor is in series with the negative CV output stud. When the control board receives a trigger command signal, from an external wire feeder, the output contactor is energized and the CV negative output stud now has continuity to the negative brushes.

Figure E.8 – DC generator machines



DC Generator Machines

The armature winding of a DC generator is located on the rotating member. Current is conducted from it by means of carbon brushes. The field winding is located in the stator, which is stationary and is excited by direct current.

The armature coil sides are placed at opposite points on the rotating shaft with the conductors parallel to the shaft. The armature assembly is normally turned at a constant speed by a source of mechanical power connected to the shaft. Rotation of the armature through the magnetic field produced by the stationary field winding induces a coil voltage in the armature winding. The voltage induced in an individual armature coil is an alternating (AC) voltage, which must be rectified. In a conventional DC generator, rectification is provided mechanically by means of a commutator. A commutator is a cylinder formed of copper segments insulated from each other and mounted on, but insulated from, the rotating shaft. Stationary carbon brushes held against the commutator surface connect the armature windings to external terminals. The commutator provides full-wave rectification, transforming the voltage waveform between brushes and making available a DC voltage to the external circuit.

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 four main categories: Function Problems, Output Problems, Engine Problems and Welding 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 engine will not return to low idle when the welding and auxiliary loads are removed.	1. Make sure the idler control switch is set to the "Auto" position. 2. Make sure both welding and auxiliary loads are removed.	1. Check the idler control switch and associated leads for loose or faulty connections. See the Wiring Diagram. 2. Perform the ***Engine Fuel System Voltage Test Procedure (ECU Test)***. 3. Perform the ***Control Board Test Procedure***.
The engine will NOT go to high speed when a load is applied to the welding output terminals. The engine does go to high speed when a load is applied to the AC auxiliary power receptacles.	1. Check welding cables for loose or faulty connections.	1. Check the yellow and white leads between the control board and the DC generator brushes. See Wiring Diagram. 2. Perform the ***Control 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**
FUNCTION PROBLEMS		
The engine will NOT go to high speed when a load is applied to the AC auxiliary receptacles. The engine does go to high speed when a load is applied to the welding output terminals.	1. Check the auxiliary power plug and associated leads for loose or faulty connections. 2. The load may be too small. The load must be above 150 watts.	1. Check the leads associated with the current transformer for loose or faulty connections. See Wiring Diagram. 2. Check the current transformer for "opens" in the windings. 3. Perform the ***Control Board Test Procedure***.
The engine will NOT go to high speed when either a welding load or an auxiliary load is connected. The machine has normal output and engine speed when the idler control switch is in the "High" position.	1. Check the welding cables and auxiliary load leads for loose or faulty connections.	1. Perform the ***Engine Fuel System Voltage Test Procedure (ECU Test)***. 2. Perform the ***Control Board Test Procedure***.
The engine will not shut down.	1. Make sure the ignition switch is turned off and operating correctly.	1. Perform the ***Engine Fuel System Voltage Test Procedure (ECU Test)***.

⚠ CAUTION

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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 engine starts and runs at correct speed, but there is no or very low, welder output voltage. There is no AC auxiliary output voltage.	1. Check the 15 amp fuse located on the inside of the front control panel. 2. If the welder output is zero volts, the fields may need to be flashed. 3. Check for loose or missing brushes in the exciter alternator and welding generator.	1. Perform the ***Exciter Flashing Voltage Test Procedure***. 2. Check the field diode bridge and associated leads and connections. 3. Perform the ***Exciter Rotor Resistance And Ground Test Procedure***. 4. Perform the ***Exciter Brush And Slip Ring Service Procedure***. 5. Perform the ***Exciter Rotor Voltage Test Procedure***. 6. Perform the ***Exciter Field Diode Test Procedure***. 7. Check for “opens” or shorted turns in the alternator stator windings. The coils must NOT be grounded to the stator lamination.

⚠ CAUTION

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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 engine starts and runs at correct speed, but there is no or very low, welder output voltage. The AC auxiliary output voltage is normal.	1. Check for loose or missing brushes in the welding generator. 2. Check the welding cables for loose or faulty connection.	1. Perform the ***Control Board Test Procedure***. 2. Perform the ***Shunt Field Coil Resistance And Ground Test Procedure***. 3. Perform the ***Weld Circuit Ground And Short Circuit Test Procedure***. 4. Check the continuity of the interpole coils. They should show continuity from the positive brush holders to the positive output terminal and should NOT be grounded to the generator frame. 5. Perform the ***Shunt Field Circuit Voltage Test Procedure***. 6. Perform the ***Rocker Adjustment Procedure***. 7. Check the continuity of the series coils. They should show continuity from the negative brush holders, through the current range selector switch, to the negative output terminal and should NOT be grounded. 8. Perform the ***Selector Switch Test Procedure***. 9. The main armature may be faulty. Check for grounds and/or shorts.

⚠ CAUTION

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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 welding output varies abnormally. The auxiliary output remains constant. The engine is operating properly.	1. Check for loose, worn, dirty or poorly seated DC generator brushes. 2. The armature commutator may need cleaned. 3. Check for loose or faulty welding cables.	1. Perform the ***Shunt Field Coil Resistance And Ground Test Procedure***. 2. Perform the ***Output Choke Test Procedure***. 3. Perform the ***Selector Switch Test Procedure***. 4. Perform the ***Shunt Field Circuit Voltage Test Procedure***. 5. Perform the ***Rocker Adjustment Procedure***. 6. Perform the ***Welding Generator Brush And Commutator Inspection And Service***. 7. Perform the ***Weld Circuit Ground And Short Circuit Test Procedure***. 8. While the machine is loaded, check the interpole and series coils for signs of "arcing". This condition would point to shorted turns in the "arcing" coil. 9. The main armature may be faulty. Check for grounds. 10. Perform the ***Control Board Test Procedure***.

⚠ CAUTION

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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 engine starts and runs at the correct speed, but there is no AC auxiliary output voltage. The DC welding generator is functioning properly.	1. Check the AC auxiliary output circuit breakers. Reset is necessary. 2. Check the 115 VAC and 230 VAC receptacles and plugs for loose or faulty connections.	1. Check for loose or faulty connections between the receptacles, the circuit breakers, the current transformer and the exciter alternator stator. See Wiring Diagram.
There is NO CV welding output. The auxiliary output voltage and constant current output is ok.	1. Make sure the mode switch is in the CV wire position.	1. Check the mode switch and associated wiring. See Wiring Diagram. 2. Perform the ***CV Box 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**
ENGINE PROBLEMS		
The engine "cranks" but will not start.	1. Check for adequate fuel supply. 2. Make sure the ignition switch is in the "Run" position.	1. Check the ignition switch for proper operation. Check the associated leads for loose or faulty connections. See Wiring Diagram. 2. Perform the ***Engine Fuel System Voltage Test Procedure (ECU Test)***. 3. The engine fuel injectors may need service.
The engine starts but shuts down after a short period of time.	1. Check for adequate fuel supply. 2. Check engine oil level. 3. Air may be entrapped in fuel system. Refer to Maintenance section of the Operators Manual for instructions to bleed fuel system.	1. The oil pressure switch or coolant temperature sensor may be causing the engine protection relay to shut off the fuel injection pump. Make sure oil pressure and coolant temperature are correct before replacing sensors. 2. The engine fuel injectors may need service. 3. Perform the ***Engine Fuel System Voltage Test Procedure (ECU Test)***.
The engine will not crank.	1. Check the start button and associated circuitry. 2. The battery may be low or dead.	1. The engine may be faulty.
The battery keeps loosing charge.	1. The battery may be faulty.	1. Perform the ***Engine Alternator Test Procedure***.

⚠ CAUTION

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Observe Safety Guidelines detailed in the beginning of this manual.		**TROUBLESHOOTING GUIDE**
PROBLEMS (SYMPTOMS)	**POSSIBLE AREAS OF MISADJUSTMENT(S)**	**RECOMMENDED COURSE OF ACTION**
WELDING PROBLEMS		
The welding arc is loud and spatters excessively.	1. The current setting may be too high for the electrode and process. 2. The polarity may be wrong for the electrode and process.	1. Check the engine speed. High idle speed should be 1800 RPM. 2. Check the DC generator brushes for good communication and alignment. Contact the Lincoln Electric Service Department 1-888-935-3877. 3. Perform the ***Welding Generator Brush And Commutator Inspection And Service***. 4. Perform the ***Rocker Adjustment Procedure***. 5. Perform the ***Output Choke Test Procedure***. 6. Check for shorted series coils.
The welding arc frequently "pops out".	1. The fine current control rheostat may be set too low for the process and electrode. 2. Check the welding cables for loose or faulty connections.	1. Check the engine speed. High idle speed should be 1800 RPM. 2. Perform the ***Selector Switch Test Procedure***. 3. Check the DC generator brushes for good commutation and alignment. Contact the Lincoln Electric Service Department 1-888-935-3877. 4. Perform the ***Rocker Adjustment 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.		

Test Procedures

CASE COVER REMOVAL AND REPLACEMENT PROCEDURE

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TEST DESCRIPTION

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

MATERIALS NEEDED

1/2” Nutdriver
1/2” Open-End Wrench
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Carefully remove the fuel cap and gasket from the machine. See ***Figure F.1***.
3. Using a 1/2” nutdriver, loosen the clamp securing the exhaust pipe to the machine. See ***Figure F.1***. Remove the exhaust pipe from the machine.
4. Open and secure the side door panels using the door support rods. See ***Figure F.1***.
5. Using a 1/2” open-end wrench and 1/2” nutdriver, remove the four bolts, nuts and roof mounting angle pieces securing the roof to the machine. See ***Figure F.2***.
6. Lower the door panels.
7. With the help of an assistant, carefully lift the roof panel off of the machine and place in secure location.
8. Attach the fuel cap to the machine.
9. Perform any tests / replacement procedure.

REPLACEMENT PROCEDURE

1. Remove the fuel cap from the machine.
2. With the help of an assistant, carefully position the roof panel onto the machine.
3. Open and secure the side door panels using the door support rods.
4. Using a 1/2” open-end wrench and 1/2” nutdriver, attach the four bolts, nuts and roof mounting angle pieces securing the roof to the machine.

5. Lower the door panels.
6. Place the exhaust pipe onto the machine.
7. Using a 1/2” nutdriver, tighten the clamp securing the exhaust pipe to the machine.
8. Carefully attach the fuel gasket and fuel cap to the machine.

Figure F.1 – Exhaust pipe, fuel cap and gasket locations

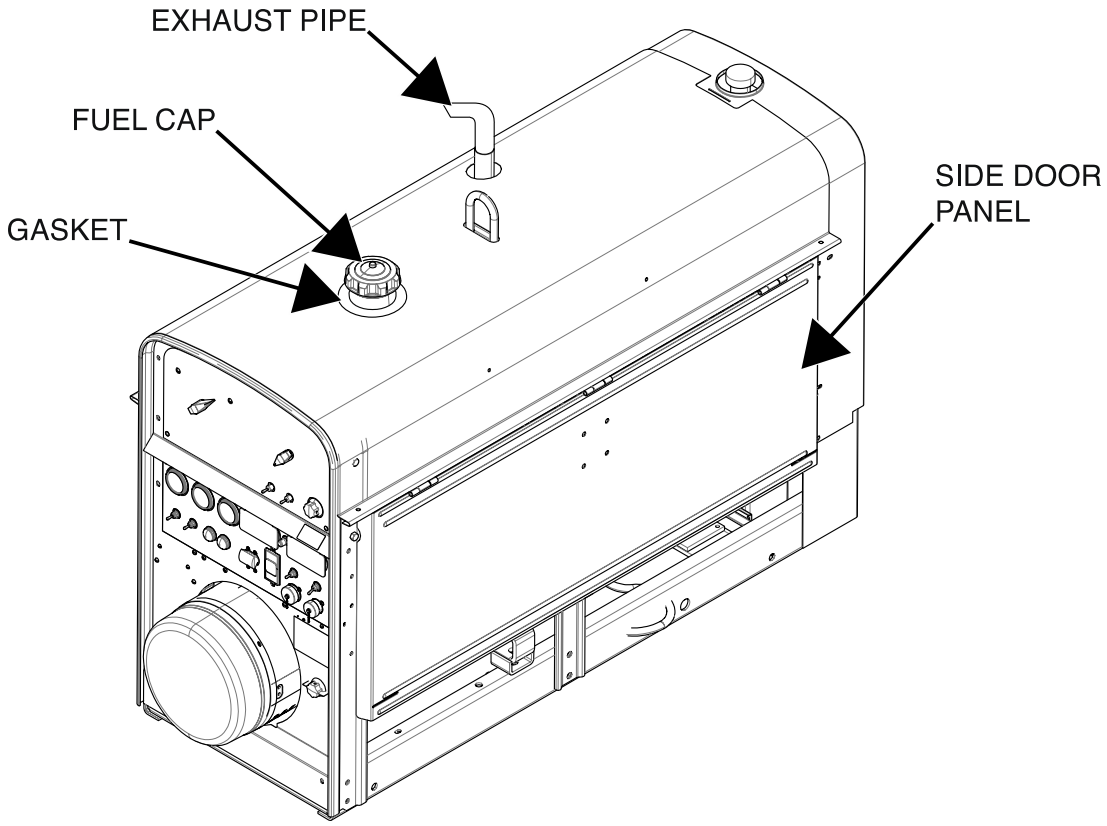
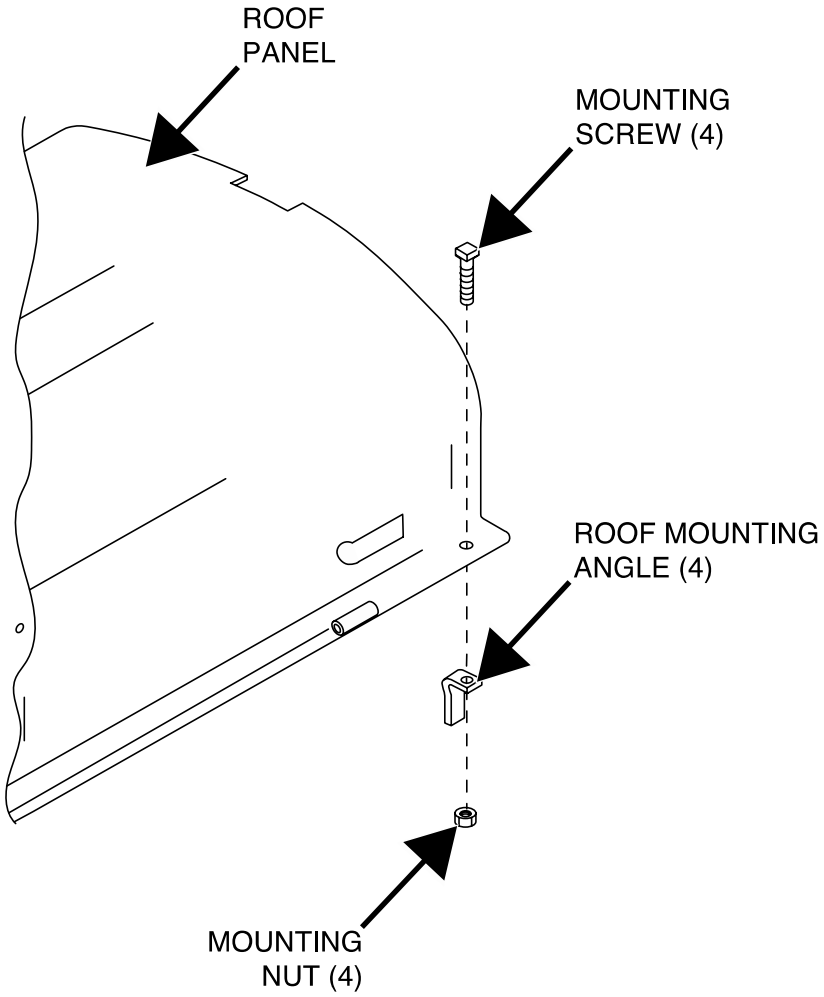


Figure F.2 – Case cover mounting hardware locations



ENGINE ALTERNATOR TEST PROCEDURE

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TEST DESCRIPTION

This test will determine if the Engine Alternator is operating normally.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Open and secure the left side door panel.
3. Locate the engine alternator. See ***Figure F.3***. See Wiring Diagram.
4. Using a volt/ohmmeter, perform the following voltage tests. See ***Figure F.4***. See Wiring Diagram.

Run/Stop switch off:

• Chassis ground to the B+ terminal (lead 51) of the alternator the meter should read battery voltage.
• Chassis ground to the alternator flash/sense lead (lead 212E). The meter should read 0 volts.

Run/Stop switch on:

• Chassis ground to the flash/sense lead, (lead 212E) the meter should read 11.5 to 12.9 VDC during first 30 seconds of operation. (This time may be 60 seconds on some models).

Engine running:

• Chassis ground to the B+ terminal (lead 51) of the alternator. The meter should read about 14.5 VDC.

5. If any of the tests fail, the engine alternator may be faulty.
6. When testing is complete, close the side door panel.

Figure F.3 – Engine alternator location

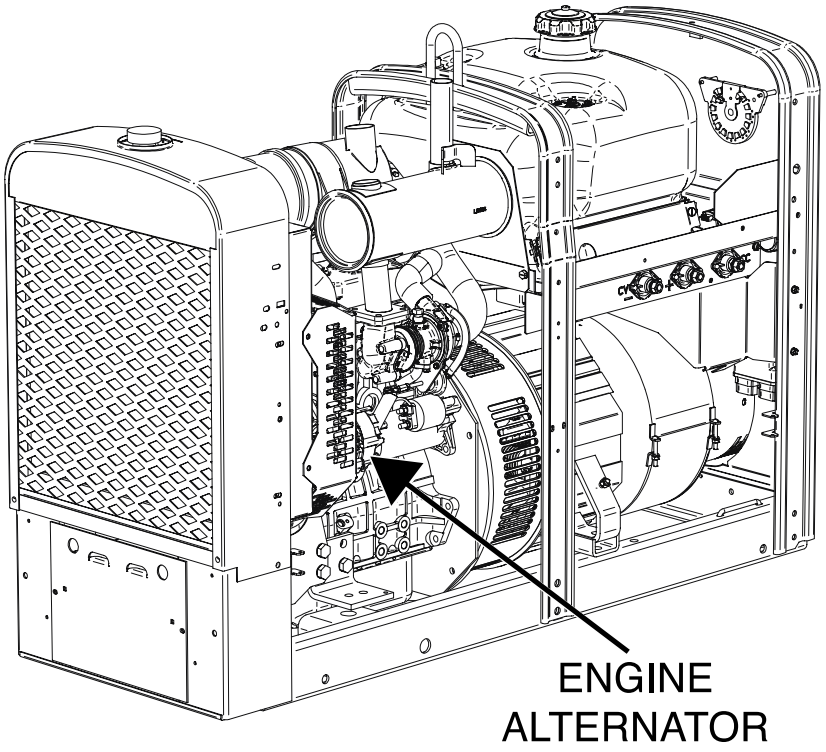
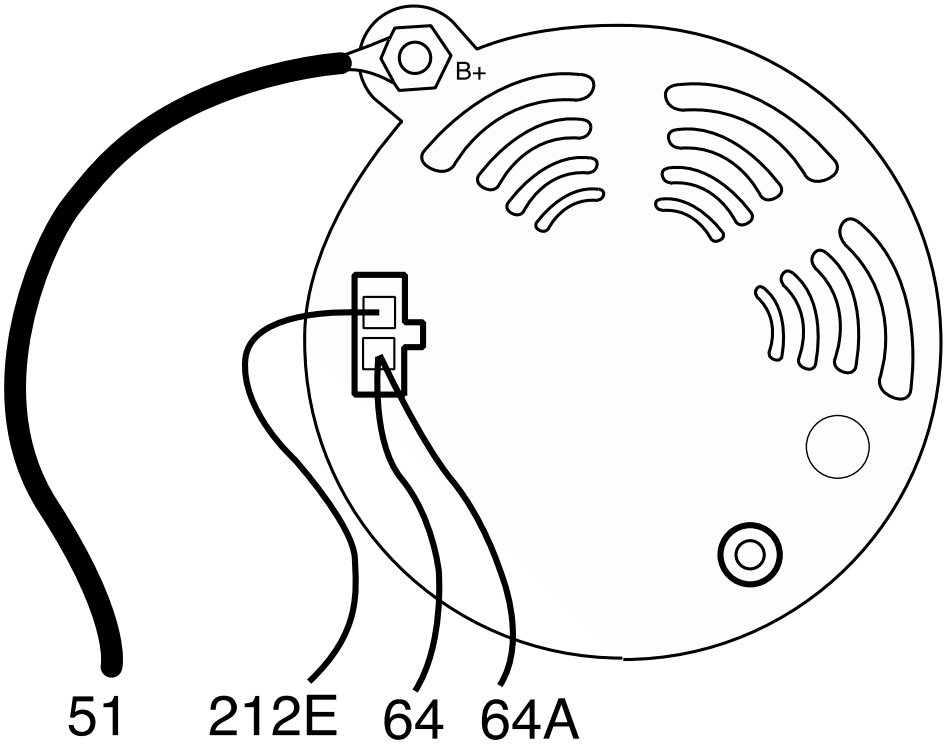


Figure F.4 – Engine alternator lead locations



ENGINE FUEL SYSTEM VOLTAGE TEST PROCEDURE (ECU TEST)

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 Fuel System is getting the electrical power needed to function correctly.

MATERIALS NEEDED

Wiring Diagram

TEST PROCEDURE

1. Place the 'Run/Stop' switch into the Run position.
2. Locate the engine fault indicator, on the Fuel/Hour/LED gauge. See ***Figure F.5***. See Wiring Diagram.
3. Observe the code indicated by the engine fault indicator and take the appropriate actions according to ***Table F.1***. See ***Figure F.6***. See Wiring Diagram.

Table F. 1 – Engine fault indicator codes

LIGHT CODE	FAILURE DETECTED	POSSIBLE CAUSE – CORRECTIVE MEASURE
LONG 1, SHORT 1	RPM IS OVER 115% OF RATED RPM (2070 RPM).	ACTUATOR IS STUCK – REMOVE ACTUATOR AND VERIFY PLUNGER PULLS IN WHEN ENERGIZED.
LONG 1, SHORT 2	LOW OIL PRESSURE DETECTED FOR 1 SECOND.	LOW OIL – CHECK OIL LEVEL ON DIPSTICK.
		FAULTY OIL PRESSURE SWITCH – CHECK THAT "WK" STUD IS OPEN WHEN ENGINE IS RUNNING.
		LEAD TO OIL PRESSURE SWITCH "WK" STUD MAY BE GROUNDED – CHECK.
LONG 1, SHORT 3	"L" TERMINAL IS GROUNDED ON ALTERNATOR FOR 1 SECOND.	BROKEN OR LOOSE BELT.
		LEAD TO "L" TERMINAL ON ALTERNATOR MAY BE SHORTED TO GROUND – CHECK.
		FAULTY ALTERNATOR – CHECK.
LONG 1, SHORT 4	HIGH WATER TEMPERATURE DETECTED FOR 1 SECOND.	AMMOUNT OR QUALITY OF COOLANT INCORRECT – CHECK.
		FAULTY WATER TEMPERATURE SWITCH –

		CHECK THAT "WK" STUD IS OPEN WHEN ENGINE IS NOT RUNNING.
		LEAD TO WATER TEMPERATURE SWITCH MAY BE GROUNDED – CHECK.
LONG 1, SHORT 5	NOT ENABLED FOR LINCOLN PRODUCTS.	
LONG 2, SHORT 1	0 RPM IS DETECTED AND 12V IS DETECTED FROM "L" TERMINAL ON ALTERNATOR.	FAULTY RPM SENSOR – CHECK FOR 12 VOLTS ON SUPPLY LEAD TO RPM SENSOR FROM ECU.
		FAULTY ECU – CHECK FOR 12 VOLTS ON SUPPLY LEAD TO RPM SENSOR FROM ECU.
LONG 2, SHORT 2	CURRENT TO ACTUATOR IS OUT OF LIMIT.	FAULTY ACTUATOR – CHECK FOR PROPER COIL RESISTANCE.
		LEADS TO ACTUATOR MAY BE OPEN OR GROUNDED – CHECK.
LONG 2, SHORT 3	NOT ENABLED FOR LINCOLN PARTS.	
LONG 2, SHORT 4	-50°C WATER TEMPERATURE DETECTED.	FAULTY WATER TEMPERATURE SENSOR – CHECK FOR PROPER RESISTANCE.
		LEAD TO WATER TEMPERATURE SENSOR MAY BE OPEN – CHECK FOR CONTINUITY.
LONG 2, SHORT 5	150°C WATER TEMPERATURE DETECTED.	FAULTY WATER TEMPERATURE SENSOR – CHECK FOR PROPER RESISTANCE.
		LEAD TO WATER TEMPERATURE SENSOR MAY BE GROUNDED – CHECK.
LONG 2, SHORT 6	0 VOLTS DETECTED FROM "L" TERMINAL ON ALTERNATOR FOR 1 SECOND.	LEAD TO "L" TERMINAL ON ALTERNATOR MAY BE OPEN – CHECK FOR CONTINUITY.
		BROKEN OR LOOSE BELT – INSPECT.
		FAULTY ALTERNATOR – CHECK.
LONG 2, SHORT 7	OVER 18 VOLTS DETECTED FROM ALTERNATOR.	INCORRECT BATTERY – INSPECT.
		FAULTY ALTERNATOR – CHECK.
LONG 2, SHORT 8	LESS THAN 4 VOLTS TO RPM SENSOR AND/OR ACTUATOR SENSED BY ECU.	FAULTY ECU – CHECK FOR 12 VOLTS ON LEADS TO RPM SENSOR AND ACTUATOR FROM ECU.

Figure F.5 – Fuel / hour / LED gauge location

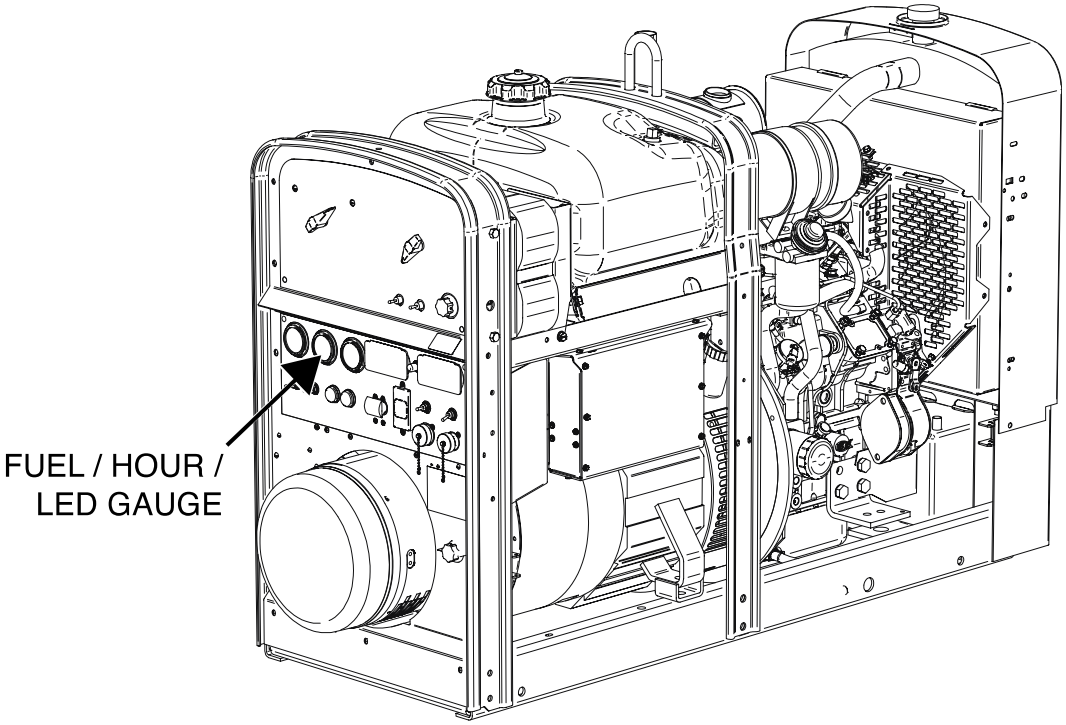
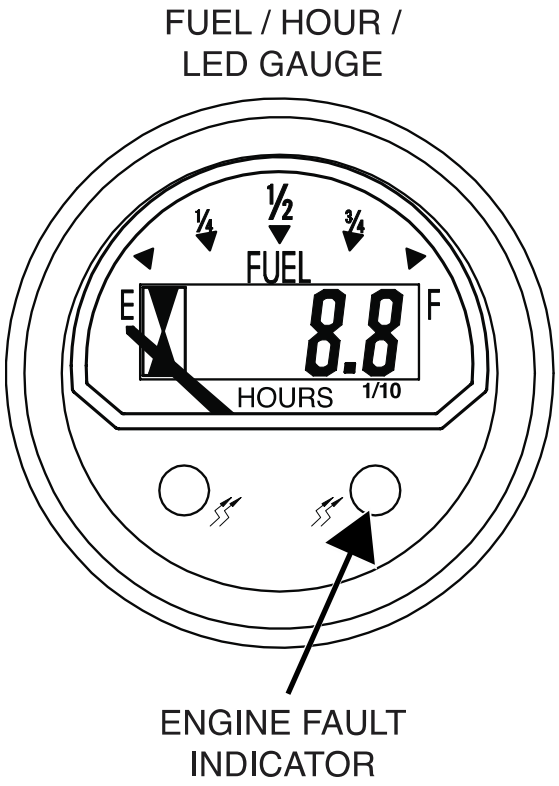


Figure F.6 – Engine fault indicator location



CONTROL BOARD TEST PROCEDURE

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TEST DESCRIPTION

This test will determine if the Control Board is functioning normally.

MATERIALS NEEDED

9/16" Open-End Wrench
9/16" Nutdriver
3/8" Nutdriver
Volt/ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a 9/16" open-end wrench and a 9/16" nutdriver, remove the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets). See ***Figure F.7***.
4. Carefully maneuver the CV box to allow access to the control board.
5. Using a 3/8" nutdriver, remove the two screws securing the finger guard panel to the machine. See ***Figure F.7***.
6. Locate the control board on the right lower side of the machine behind the CV box. See ***Figure F.7***. See Wiring Diagram.
7. Start the engine and observe the diagnostic LED in the wiring harness. Check for codes per ***Table F.2***. See Wiring Diagram.
8. Turn off the engine on the Classic 300 MP machine.
9. Using a volt/ohmmeter, perform the tests outlined in ***Table F.3***. See ***Figures F.8*** and ***F.9***. See Wiring Diagram.
10. If any of the tests fail the control board may be faulty.
11. If faulty, perform the ***Control Board Removal And Replacement Procedure***.
12. Using a 3/8" nutdriver, attach the two screws securing the finger guard panel to the machine.
13. Using a 9/16" open-end wrench and a 9/16" nutdriver, attach the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets).
14. Perform the ***Case Cover Replacement Procedure***.

Table F. 2 – LED flash codes

DIAGNOSTIC LED FLASH CODES (LED TIED IN HARNESS AT CONTROL BOARD)		
LONG FLASH	**SHORT FLASH**	**DESCRIPTION**
2	1	FIELD COIL SHORTED – FAULT CAN ONLY BE RESET BY RESTARTING WELDER.
2	3	WELDER OUTPUT SHORT CIRCUIT OR OVERLOAD, FAULT RESETS BY RESTARTING WELDER.
3	2	NEGATIVE ARMATURE IN CVMODE CODE.
3	3	VArm>90V IN CVMODE AFTER CR2ENABLE.
4	2	CONTROL BOARD 18V SUPPLY IS UNDER 16.2V.
4	1	CONTROL BOARD 36V SUPPLY IS UNDER 29.2V.
5	1	CONTROL BOARD SERIAL COMMUNICATION ERROR.
4	3	CONTROL BOARD 15V SUPPLY UNDER CODE.

Table F. 3 – Control board voltage tests

DESCRIPTION	TEST POINT (+)	TEST POINT (-)	EXPECTED READING	CONDITIONS
BATTERY VOLTAGE APPLIED TO BOARD	J12 PIN 1 (LEAD 841)	PLUG J12 PIN 2 (LEAD 842)	12 – 13 VDC	RUN STOP SWITCH IN 'RUN' POSITION. ENGINE NOT RUNNING.
REMOTE CONTROL CIRCUIT (6-PIN)	J2 PIN 11 (LEAD 77A)	J2 PIN 10 (LEAD 75A)	10 VDC	ENGINE RUNNING.
REMOTE CONTROL CIRCUIT (14-PIN)	J2 PIN 12 (LEAD 77B)	J2 PIN 9 (LEAD 75B)	10 VDC	ENGINE RUNNING.
LOCAL OUTPUT CONTROL CIRCUIT	J2 PIN 1 (LEAD 77)	J2 PIN 2 (LEAD 75)	10 VDC	ENGINE RUNNING.
FLASHING VOLTAGE	J1 PIN 6 (LEAD 610)	J1 PIN 7 (LEAD 600)	12 VDC	DURING FLASHING.
CV WELD TERMINAL SWITCH CIRCUIT	J2 PIN 5 (LEAD 2)	J2 PIN 6 (LEAD 4)	15 VDC	CV WELD TERMINAL SWITCH OPEN. ENGINE RUNNING.
IDLER SWITCH	J12 PIN 4 (LEAD 844)	J12 PIN 2 (LEAD 842)	12 VDC	NOT RUNNING.
CC/CV MODE SWITCH	J7 PIN 3 (LEAD 221)	J7 PIN 4 (LEAD 222)	36 VDC	MODE SWITCH IN CC MODE (OPEN). ENGINE RUNNING.
OCV BOOST SWITCH	J7 PIN 9 (LEAD 477)	J7 PIN 2 (LEAD 476)	36 VDC	BOOST SWITCH IN CLASSIC MODE (OPEN).
EXCITER ROTOR	J1 PIN 6	J1 PIN 7	12 VDC	INITIAL ENGINE

FLASHING	(LEAD 610)	(LEAD 600)		START-UP.
SUPPLY TO SHUNT COILS	J1 PIN 1 (LEAD 612)	J1 PIN 2 (LEAD 602)	110 VDC	ENGINE RUNNING.
SUPPLY TO CR2 IN CV BOX	J2 PIN 5 (LEAD 631)	J1 PIN 3 (LEAD 630)	115 VDC	ENGINE RUNNING. MODE SWITCH IN CV WIRE POSITION.
SUPPLY TO CR1 IN CV BOX	J1 PIN 8 (LEAD 634)	J1 PIN 4 (LEAD 633)	3 VDC	ENGINE RUNNING. MODE SWITCH IN CV WIRE POSITION AND WELD TERMINALS SWITCH ON.

Figure F.7 – CV box mounting hardware location

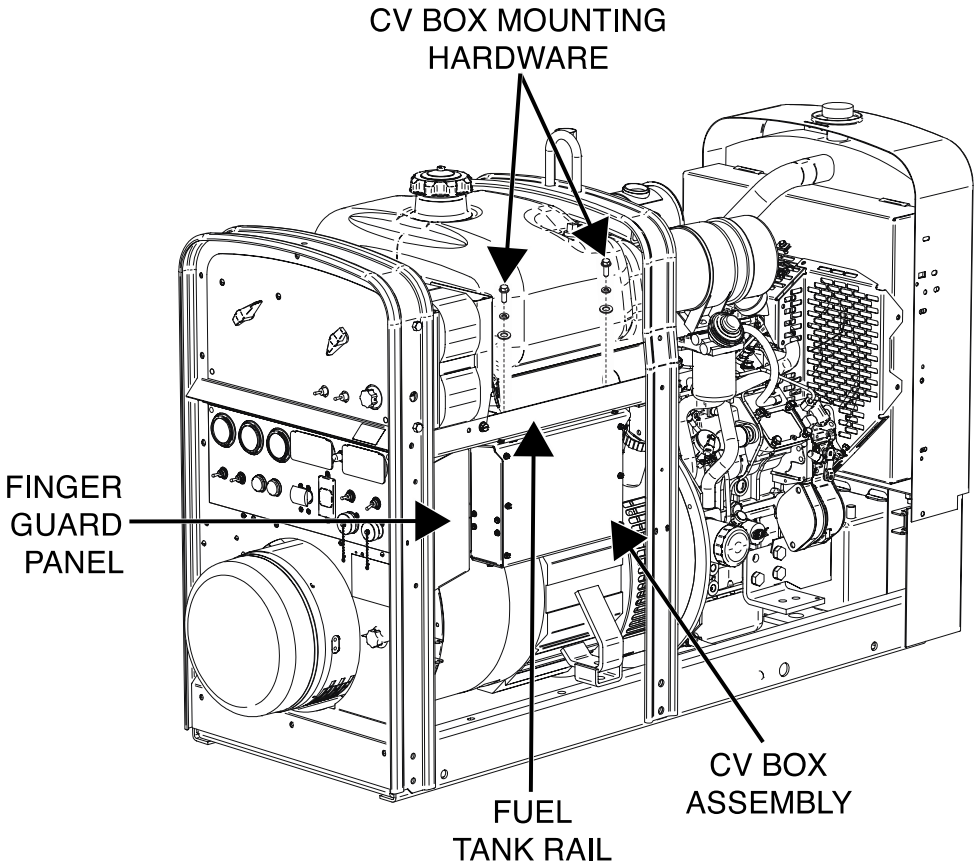


Figure F.8 – CV box mounting hardware location

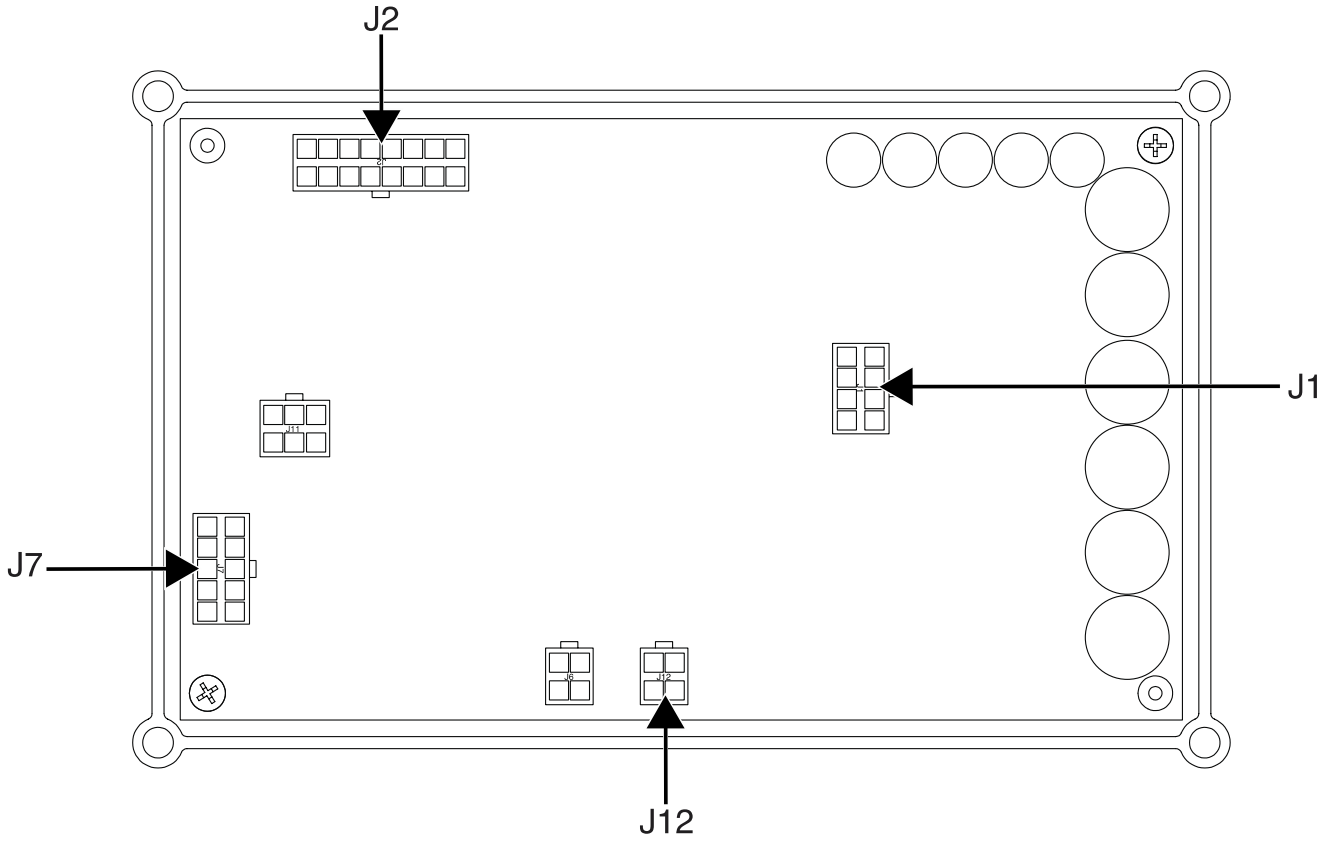
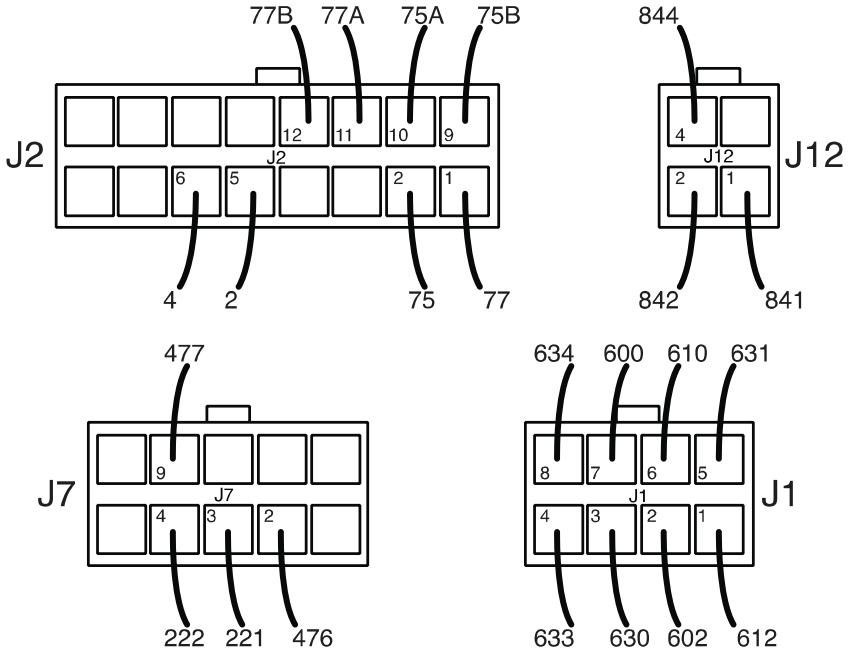


Figure F.9 – CV box mounting hardware location



CV BOX TEST PROCEDURE

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TEST DESCRIPTION

This test will determine if the CV Box Components are functioning normally.

MATERIALS NEEDED

9/16” Open-End Wrench
9/16” Nutdriver
5/16” Nutdriver
120 VDC Power Supply
12 VDC Power Supply
Volt/ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the CV box assembly. See ***Figure F.10***.
4. Using a 9/16” open-end wrench and a 9/16” nutdriver, remove the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets). See ***Figure F.10***.
5. Using a 5/16” nutdriver, remove the thirteen screws securing the CV box support to the CV box base. See ***Figure F.10***.

Contactor CR2:

6. Using a volt/ohmmeter, measure the contacts resistance from terminal 631 to terminals 630 of the contactor CR2. See ***Figure F.11***. See Wiring Diagram. Normal resistance should be approximately 234 ohms.
7. Label and disconnect leads 631 and 630 from top terminals of contactor CR2. See ***Figure F.11***. See Wiring Diagram.
8. Using a 120 VDC power supply, apply 120 VDC to the top terminals of contactor CR2. There should be an audible click as the contacts close. Using a volt/ohmmeter, measure the resistance from terminal L1 to terminals T1, T2 or T3. Normal resistance should be less than 2 ohms (low resistance). See ***Figure F.11***. See Wiring Diagram.
9. When testing of contactor CR2 is complete, connect all previously disconnected leads.
10. If any of the tests fail, the contactor CR2 may be faulty.

11. If faulty, perform the ***Contactor CR2 Removal And Replacement Procedure***.

Contactor CR1:

12. Label and disconnect leads 633 and 634 from contactor CR1 quick-connects. See ***Figure F.11***. See Wiring Diagram.
13. Using a volt/ohmmeter, measure the contacts resistance of contactor CR1. See ***Figure F.11***. See Wiring Diagram. Normal resistance should be approximately 500k ohms.
14. Using a 12 VDC power supply, apply 12 VDC to the contactor terminals. There should be an audible click as the contactor closes. Using a volt/ohmmeter, measure the resistance across the terminals of contactor CR1. See ***Figure F.11***. See Wiring Diagram. Normal resistance is less than one ohm.
15. When testing is complete, connect the previously disconnected leads. See Wiring Diagram.
16. If any of the tests fail, the contactor CR1 may be faulty.
17. If faulty, perform the ***Contactor CR1 Removal And Replacement Procedure***.
18. Using a 5/16" nutdriver, attach the thirteen screws securing the CV box support to the CV box base.
19. Using a 9/16" open-end wrench and a 9/16" nutdriver, attach the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets).
20. Perform the ***Case Cover Replacement Procedure***.

Figure F.10 – CV box and mounting hardware location

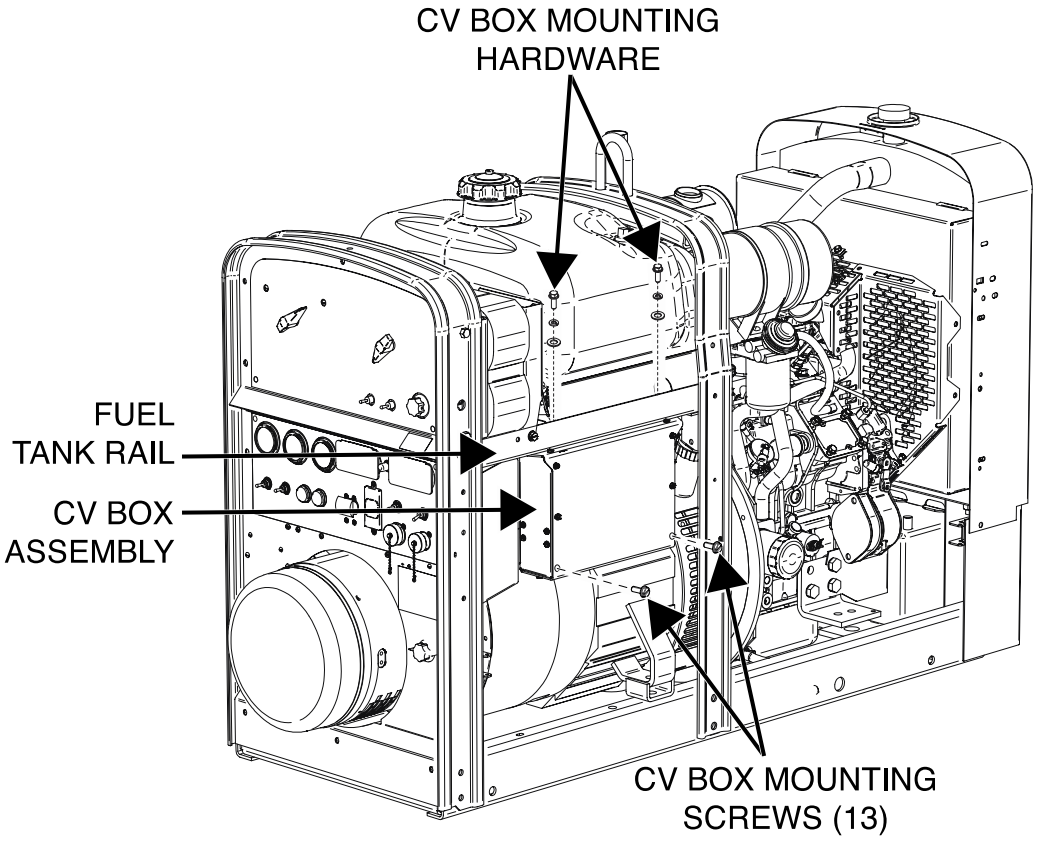
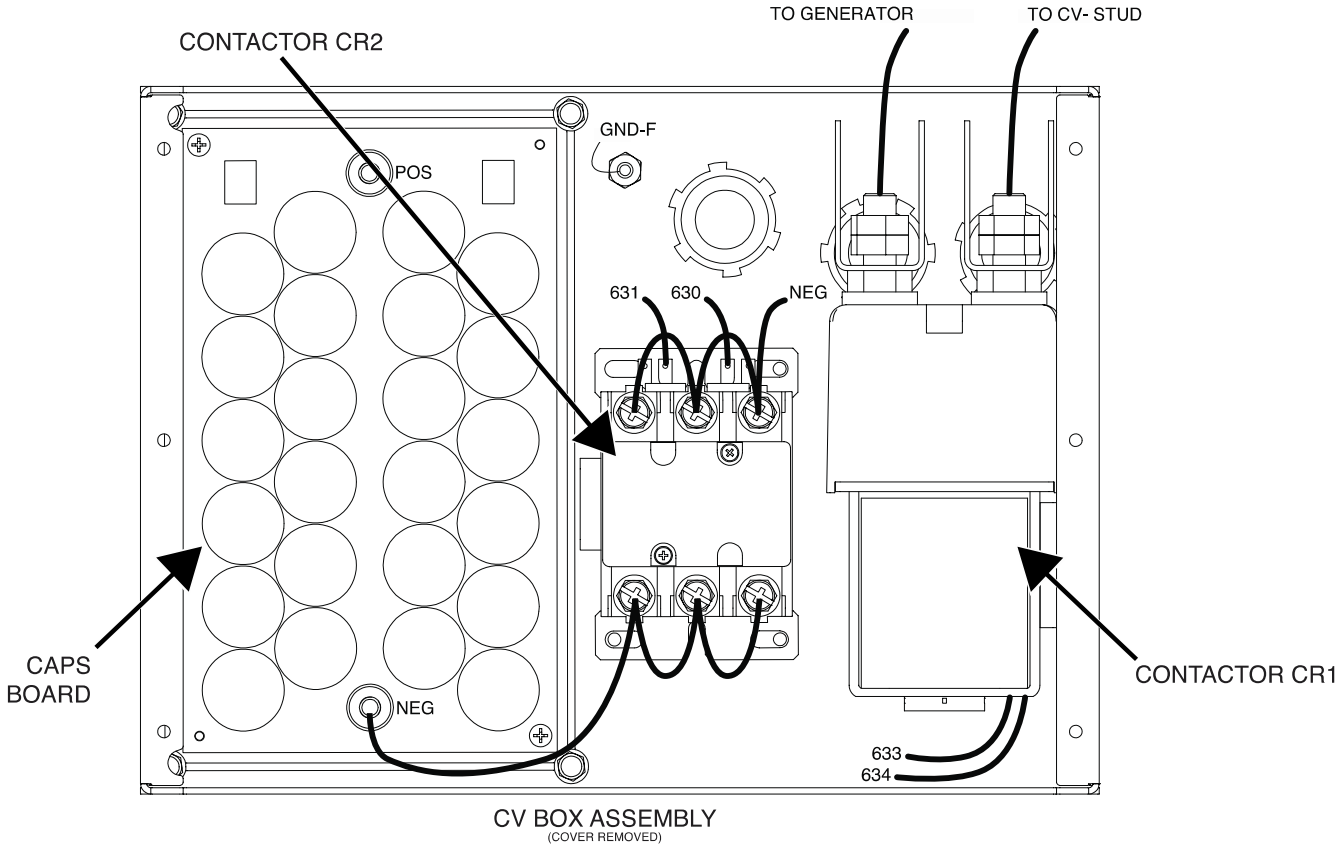


Figure F.11 – CV box components and test point locations



SELECTOR SWITCH 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 Selector Switch is functioning normally.

MATERIALS NEEDED

1/2” Open-End Wrench
1/2” Nutdriver
Volt/ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the selector switch. See ***Figure F.12***. See Wiring Diagram.
4. Using a 1/2” nutdriver and a 1/2” open-end wrench, remove the five nuts securing the five heavy leads to the terminals of the selector switch. Label and disconnect the five heavy leads. See ***Figure F.13***. See Wiring Diagram.
5. Using a volt/ohmmeter, perform the resistance test outlined in ***Table F.4***. See ***Figure F.13***. See Wiring Diagram.
6. If any of the tests fail, the selector switch may be faulty.
7. If faulty, perform the ***Selector Switch Removal And Replacement***.
8. When testing is complete, connect any previously disconnected leads to the selector switch.
9. Perform the ***Case Cover Replacement Procedure***.

Table F. 4 – Selector switch resistance tests

TEST POINT	TEST POINT	EXPECTED READING	SELECTOR SWITCH POSITION
TERMINAL 1 (90-MIN)	NEG TERMINAL	LESS THAN 1 OHM (LOW RESISTANCE)	SET TO 90-MIN POSITION
TERMINAL 2 (130-180)	NEG TERMINAL	LESS THAN 1 OHM (LOW RESISTANCE)	SET TO 130-180 POSITION
TERMINAL 3 (190-120)	NEG TERMINAL	LESS THAN 1 OHM (LOW RESISTANCE)	SET TO 190-120 POSITION
TERMINAL 4 (240-160)	NEG TERMINAL	LESS THAN 1 OHM (LOW RESISTANCE)	SET TO 240-160 POSITION
TERMINAL 5 (220-MAX)	NEG TERMINAL	LESS THAN 1 OHM (LOW RESISTANCE)	SET TO 220-MAX POSITION
TERMINAL 1 (90-MIN)	NEG TERMINAL	AT LEAST 500K OHMS (HIGH RESISTANCE)	SET TO ANY POSITION EXCEPT 90-MIN POSITION
TERMINAL 2 (130-180)	NEG TERMINAL	AT LEAST 500K OHMS (HIGH RESISTANCE)	SET TO ANY POSITION EXCEPT 130-180 POSITION
TERMINAL 3 (190-120)	NEG TERMINAL	AT LEAST 500K OHMS (HIGH RESISTANCE)	SET TO ANY POSITION EXCEPT 190-120 POSITION
TERMINAL 4 (240-160)	NEG TERMINAL	AT LEAST 500K OHMS (HIGH RESISTANCE)	SET TO ANY POSITION EXCEPT 240-160 POSITION
TERMINAL 5 (220-MAX)	NEG TERMINAL	AT LEAST 500K OHMS (HIGH RESISTANCE)	SET TO ANY POSITION EXCEPT 220-MAX POSITION
ANY TERMINAL 1-5	ANY OTHER TERMINAL 1-5	AT LEAST 500K OHMS (HIGH RESISTANCE)	ANY POSITION

Figure F.12 – Selector switch location

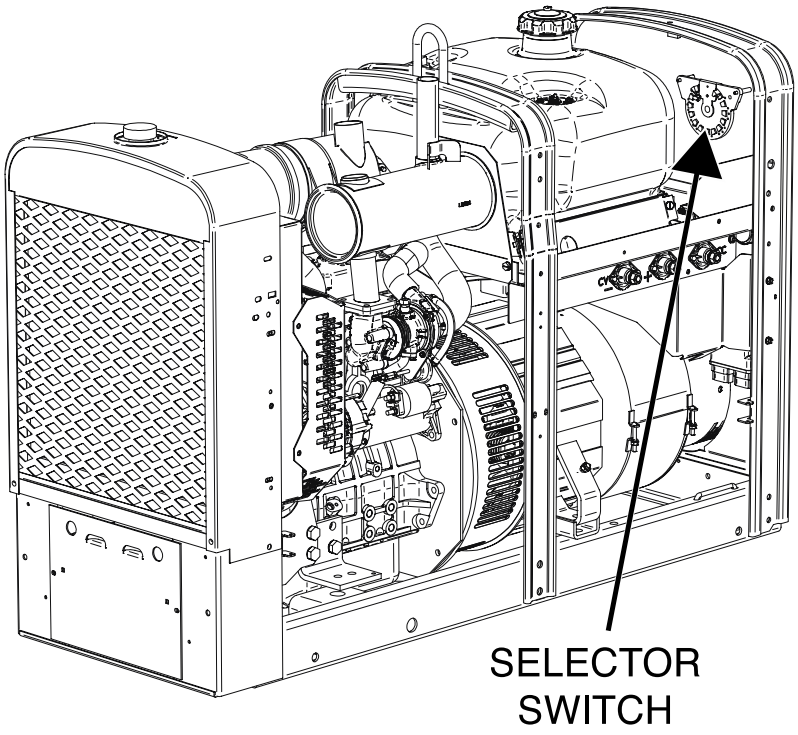
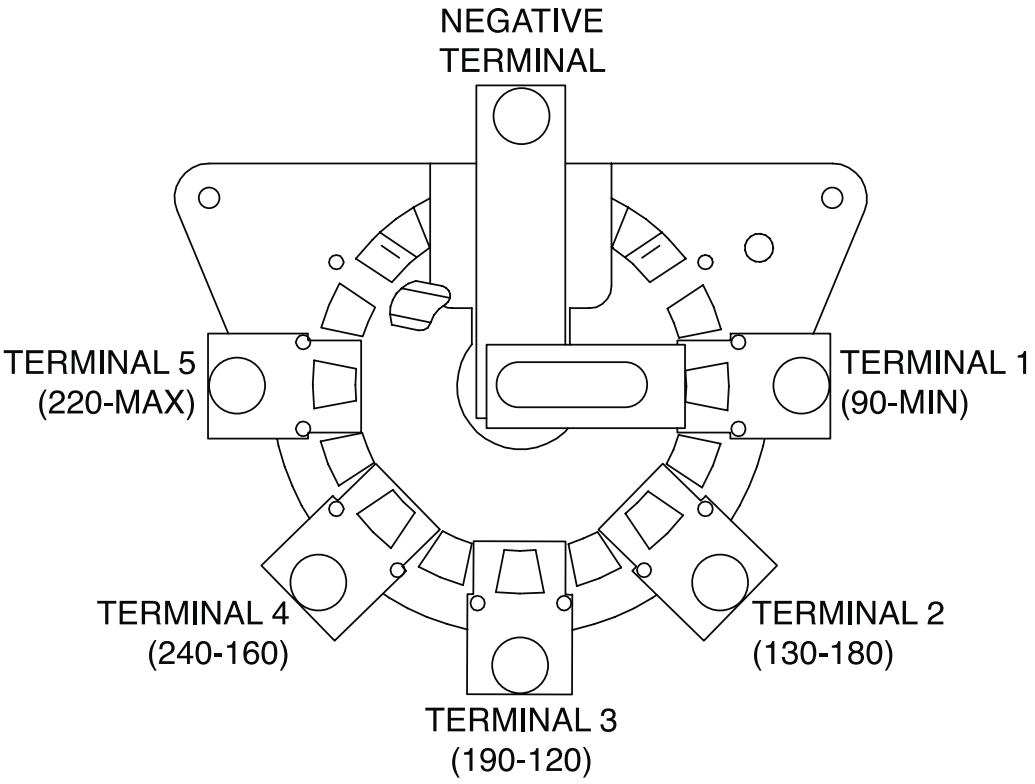


Figure F.13 – Selector switch terminal locations



OUTPUT 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 Output Choke is functioning normally.

MATERIALS NEEDED

1/2” Open-End Wrench
1/2” Nutdriver
Volt/ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Locate the output choke. See ***Figure F.14***. See Wiring Diagram.
4. Inspect the windings and connections for signs of burning or overheating.
5. Using a 1/2” open-end wrench and 1/2” nutdriver, remove the nut, washer and bolt securing the heavy leads to the top and bottom output choke terminals. Label and disconnect leads from the terminals. See ***Figure F.15***. See Wiring Diagram.
6. Using a volt/ohmmeter, measure the resistance of the choke windings. Normal resistance should be less than one ohm. See Wiring Diagram.
7. Using a volt/ohmmeter, measure the resistance from the windings to ground. Normal resistance should be greater than 500k ohms (high resistance).
8. If any of the tests fail, the output choke may be faulty.
9. If faulty, perform the ***Output Choke Removal And Replacement Procedure***.
10. When testing is complete, connect the previously disconnected leads to the choke terminals.
11. Perform the ***Case Cover Replacement Procedure***.

Figure F.14 – Output choke location

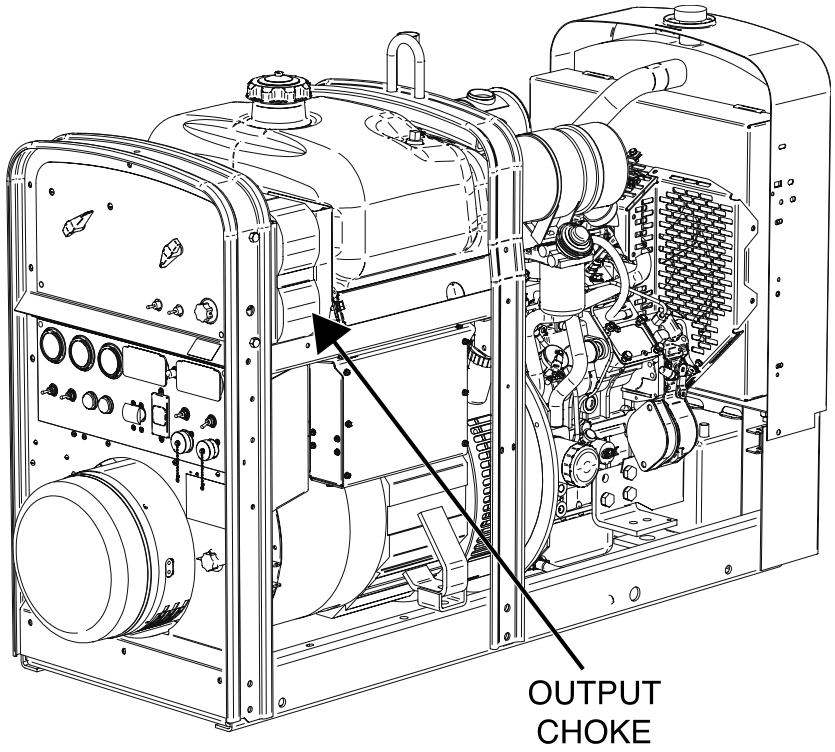
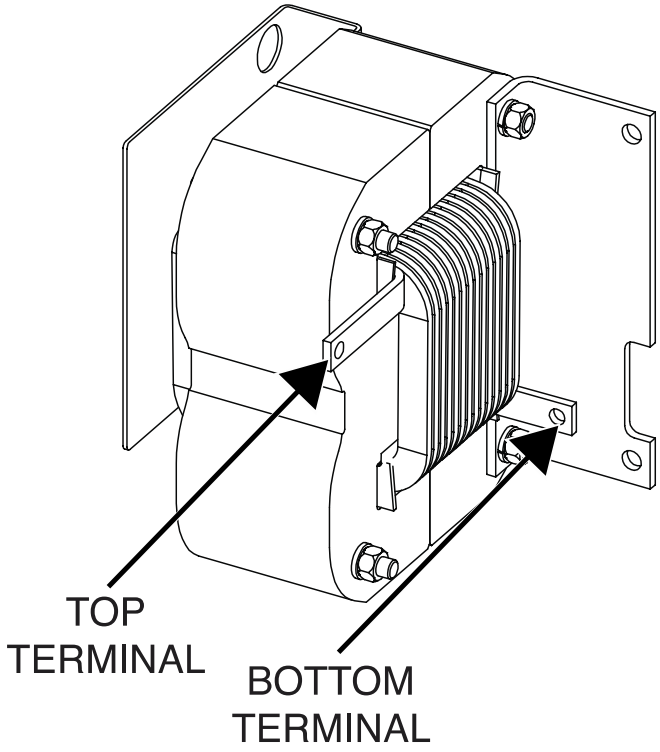


Figure F.15 – Output choke terminal locations



EXCITER FIELD DIODE 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 Exciter Field Diode is functioning normally.

MATERIALS NEEDED

3/8” Nutdriver
Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a 3/8” nutdriver, remove the two screws securing the finger guard panel to the machine. See ***Figure F.16***.
4. Locate the exciter field diode. See ***Figure F.17***. See Wiring Diagram.
5. Label and disconnect leads 610, 610A, 21, 600, 600C and 602C from the exciter field diode. See ***Figure F.18***. See Wiring Diagram.
6. Using a volt/ohmmeter, perform the forward voltage drop tests outlined in ***Table F.5***. See ***Figure F.18***. See Wiring Diagram.
7. If any of the tests fail, the exciter field diode may be faulty.
8. If faulty, perform the ***Exciter Field Diode Removal And Replacement Procedure***.
9. When testing is complete, connect the previously disconnected leads 610, 610A, 21, 600, 600C and 602C to the exciter field diode terminals.
10. Using a 3/8” nutdriver, attach the two screws securing the finger guard panel to the machine.
11. Perform the ***Case Cover Replacement Procedure***.

Table F. 5 – Exciter Field Diode test points

TEST POINT (POS)	TEST POINT (NEG)	EXPECTED READING
TOP AC TERMINAL	POSITIVE TERMINAL	0.2 VDC – 0.7 VDC
BOTTOM AC TERMINAL	POSITIVE TERMINAL	0.2 VDC – 0.7 VDC
NEGATIVE TERMINAL	TOP AC TERMINAL	0.2 VDC – 0.7 VDC
NEGATIVE TERMINAL	BOTTOM AC TERMINAL	0.2 VDC – 0.7 VDC

Figure F.16 – CV box mounting hardware and finger guard locations

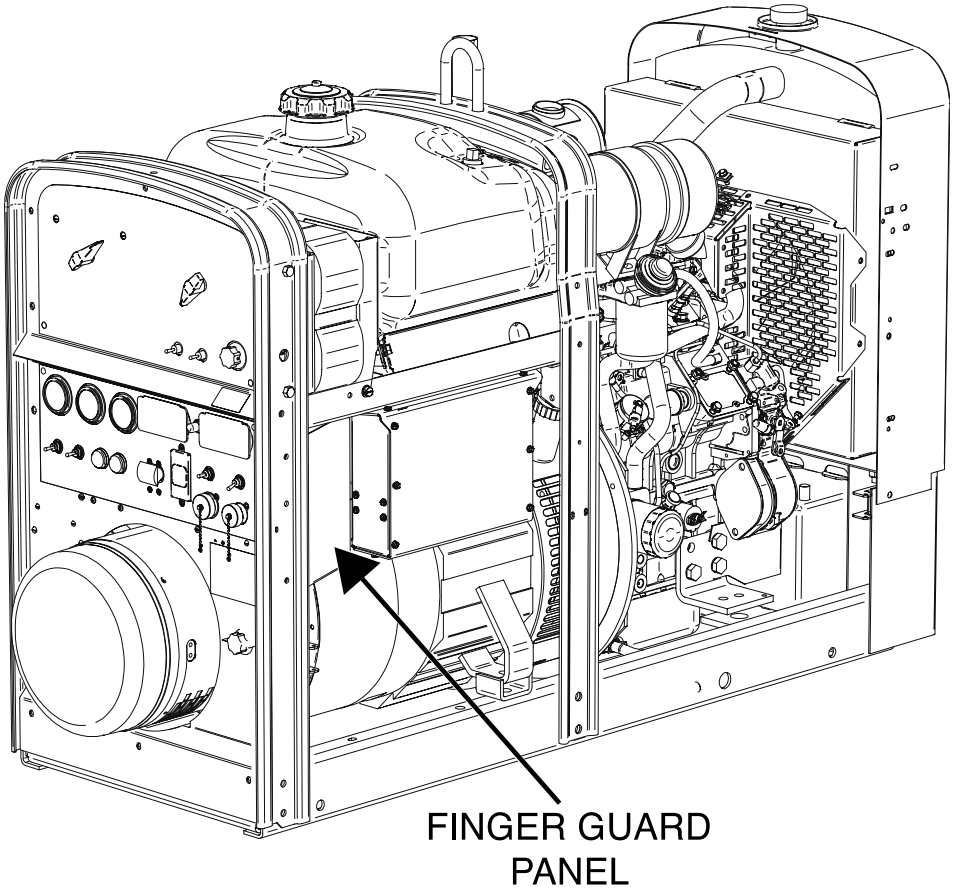


Figure F.17 – Exciter Field Diode location

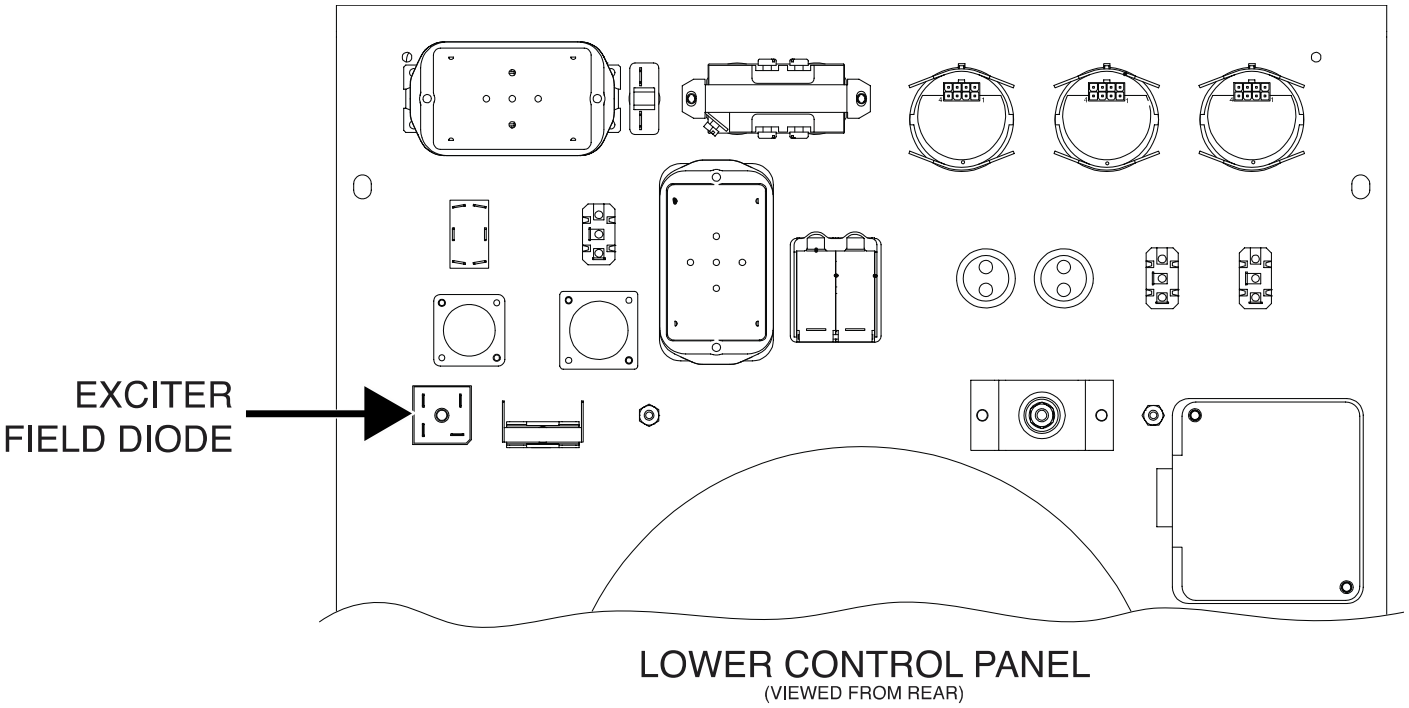
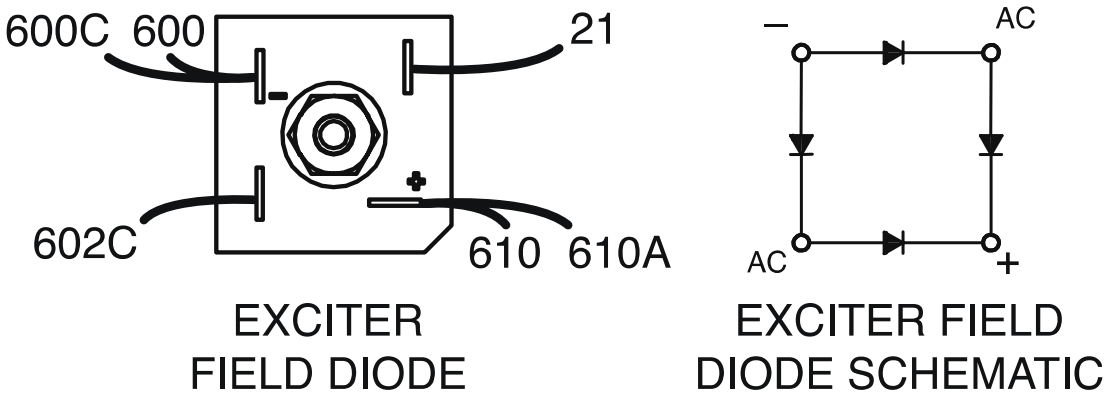


Figure F.18 – Exciter Field Diode terminal and locations



EXCITER BRUSH AND SLIP RING SERVICE PROCEDURE

(Exciter / Auxiliary Power Alternator)

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 provides guidance in testing and maintaining the Brush and Slip Ring System of the Exciter / Auxiliary Power Alternator.

MATERIALS NEEDED

5/16” Nutdriver
Very Fine Grit Emory Cloth
180 Grit Sandpaper

TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Using a 5/16” nutdriver, remove the four screws securing the exciter cover to the machine. See ***Figure F.19***.
3. Examine brushes, slip rings and brush holder. See ***Figure F.20***.

• Brushes should be clean and free from oil or grease.
• Brushes should be of sufficient length and have adequate spring tension.
• Brushes should be making good, continuous contact with the slip rings and should be riding near the center of the slip rings. (The brush holder bracket may need to be slightly bent to achieve acceptable alignment.)
(Generally, the brushes should be replaced if either brush has less than 1/4” remaining before it reaches the end of its travel.)

4. If the slip rings are very dark in color, display evidence of excessive arcing or have worn prematurely, these may be signs of a grounded or shorted rotor. Perform the Test Procedure.
5. Check for evidence of sticking brushes. Sticking brushes will normally result in the slip rings being pitted and discolored from excessive arcing. Another sign of sticking brushes is instability or loss of both weld and auxiliary output, but the machine may begin to work properly, for a short time, after being jarred or moved.
6. If there is any evidence that the brushes may have been sticking in the brush holders, a new brush and brush holder assembly should be installed.

Cleaning slip rings

7. In the event that the slip rings have become dirty, discolored or mildly pitted, it will be necessary to clean them, using very fine emery cloth.

Seating brushes

8. If brushes have been replaced, repositioned or are not making full contact with the slip rings, it will be necessary to re-seat them. This can be done by placing a strip of 180 grit sandpaper between the slip rings and the brushes, with the abrasive side against the brushes. Pull the sandpaper strip around the circumference of the slip rings in the direction of rotor rotation only. Repeat this procedure until the surface of each brush is in full contact with its matching slip ring.
9. Using low pressure compressed air to thoroughly blow the carbon, commutator stone and sandpaper dust from the machine before operating.
10. Securely connect the leads to the brush terminals. See Wiring Diagram.
11. Using a 5/16” nutdriver, attach the four screws securing the exciter cover to the machine.

Figure F.19 – Exciter cover locations

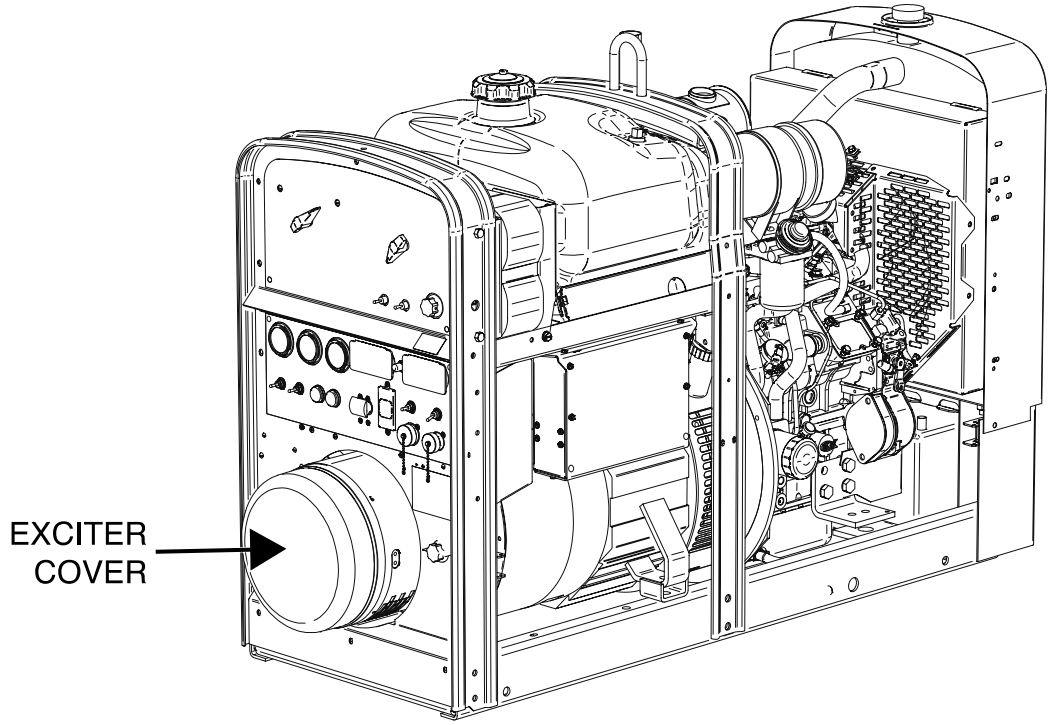
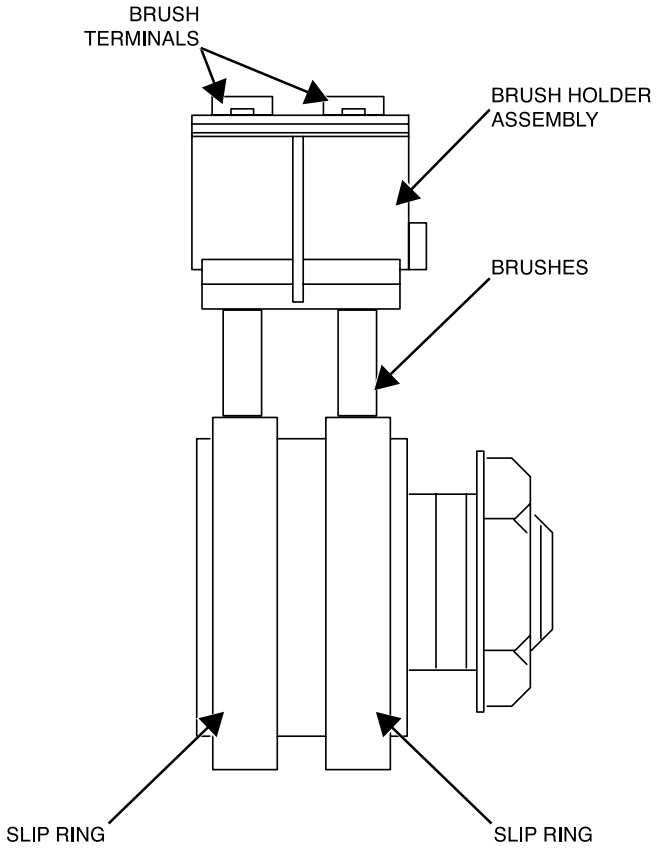


Figure F.20 – Exciter brush and slip ring locations



WELDING GENERATOR BRUSH AND COMMUTATOR INSPECTION AND SERVICE

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 provides guidelines for checking and servicing the Welding Generator Commutator and Brushes.

MATERIALS NEEDED

3/8” Nutdriver
Miscellaneous Hand Tools
120-150 Grit Commutator Stone
220-230 Grit Commutator Stone

IMPORTANT: Do not use emory cloth or paper to clean the commutator. Use only sand paper or a commutator stone.
CAUTION: Stoning the commutator involves pressing an abrasive stone against a spinning commutator. This procedure can be hazardous if done without proper training, tools and protective equipment. Consult the commutator stone manufacturer’s instructions before attempting this procedure.

TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Open either or both of the doors and secure with the hooks provided.
3. Disconnect the negative battery cable.
4. Using a 3/8” nutdriver, remove the two bolts and washers securing the cover to the machine. See ***Figure F.21***.
5. Examine the commutator.
   Normal appearance:
   The commutator should appear smooth and have an even brown color where the brushes ride.
   Blackened Commutator:
   A commutator that appears to have an even black color all around may indicate a grounded armature, shorted weld circuit, a serious overload condition or out-of-adjustment rocker. It could also indicate the use of poor quality brushes or brushes that have been contaminated with oil or some other foreign substance.
   • Check the rocker position. Be certain that it is aligned with or very close to the factory drill mark.
   IMPORTANT: If the rocker position requires adjustment, do not over tighten the rocker clamping

screw. This screw should be tightened to a torque of 70 to 75 inch-lbs. Over tightening can destroy the rocker.

• Perform the Test Procedure.

• If the weld circuit is not grounded or shorted and poor brush quality or contamination is suspected, replace the brushes and seat them with a commutator stone or sand paper.

• If brush quality or contamination is not suspected, clean the commutator by lightly stoning the surface.

⚠ CAUTION

Stoning the commutator involves pressing an abrasive stone against a spinning commutator. This procedure can be hazardous if done without proper training, tools and protective equipment. Consult the commutator stone manufacturer's instructions before attempting this procedure.

Pitted and Arc Damaged Commutator:

If pitting and arc damage to the commutator is evident, the machine may have been used with badly worn brushes. The brush spring tension may have been too low or the brushes may have been sticking in the holders. An out-of-adjustment rocker or a serious overload may also cause this condition.

• Examine the inside of the brush covers and other parts that are close to the commutator. If there is a significant amount of solder and debris that has been thrown from the commutator, the armature will need to be replaced and the stator coils must be carefully examined and tested for damage.

• Perform the Test Procedure.

• If the brushes are worn out, replace them and resurface or clean the commutator as needed. If the brush springs appear weak, discolored or damaged in any way, replace them as well. The brush holder plates and retainers should be clean, smooth and undamaged so the brushes can move freely as they wear.

• Check the rocker position. Be certain that it is aligned with or very close to the factory drill mark.

IMPORTANT: If the rocker position requires adjustment, do not over tighten the rocker clamping screw. This screw should be tightened to a torque of 70 to 75 inch-lbs. Over tightening can destroy the rocker.

Uneven Commutator appearance:

If the commutator appears to have some normal colored bars and some blackened bars, the armature may be shorted.

• If excessive sparking is observed and/or the weld output is abnormal, the armature should be replaced.

• If the commutator has uneven color, but there is no sign of serious generator performance problems, the commutator may only need to be cleaned by lightly stoning the surface. See caution note on commutator stone usage.

Examine the brushes:

The brushes and springs should all be in place and not be excessively worn. Brushes should be replaced if they are worn to within 1/4" of the pigtail lead.

The pigtail lead of each brush should be positioned so it allows free movement of the brush while it wears.

The brushes should be seated so that the face of each brush makes 95% minimum contact with the commutator. Lightly stone the commutator to seat the brushes. See caution note on commutator stone usage.

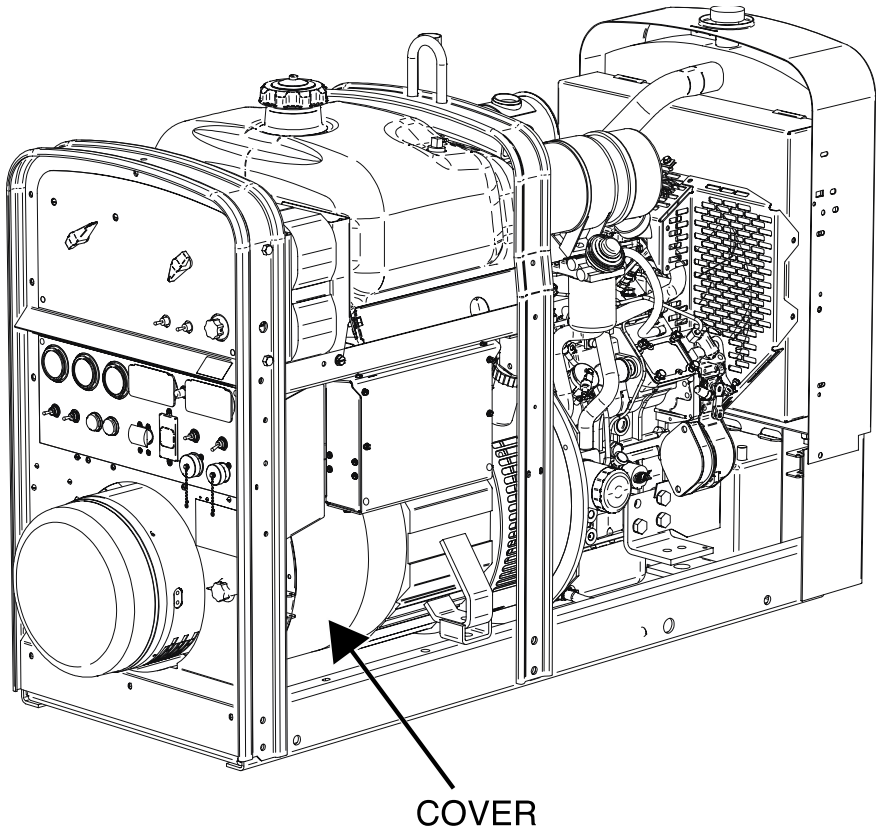
Examine the brush holders:

The brush holder insulators must be clean and in good condition and all of the hardware must be in place. Replace any insulators that are cracked or damaged in any way.

When installing the brush holders, they should be rotated toward the brush retainer (clockwise rotation when facing the brush holder mounting screw.) until they stop. The edge of the brush holder plate should be parallel with the surface of the commutator and positioned .030 to .090 from the surface of the commutator. The brush holder mounting screw tightened to a torque of 24 to 28 Ft/lbs.

The brush holder plate and retainer assembly must be clean and smooth; nothing should prevent free movement of the brushes. All electrical connections to the brush holders must be clean and tight.

Figure F.21 – Generator cover location



ROCKER ADJUSTMENT 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

The Rocker is the part of the Welding Generator that supports and positions the 4 sets of Brushes. Its position can be adjusted to fine tune the weld output and influence the weld characteristics.
IMPORTANT: The Rocker is set at the factory for the best overall performance and long Generator and Brush life. Altering this adjustment is normally not recommended unless one or more of the Welding Generator components affecting this setting have been replaced. In very unusual situations, very small adjustments of the Rocker may be beneficial if the machine is operating within the specified limits, but the arc characteristics are unsatisfactory for the desired application.
CAUTION: Improper Rocker adjustment can result in poor performance, reduced Brush life and damage to the Welding Generator. This adjustment should only be attempted by an experienced professional.

MATERIALS NEEDED

Resistive Load Bank, Capable Of Absorbing At Least A 300 Amp Load
Voltmeter
Ammeter, Able To Read At Least 300 Amps
Miscellaneous Hand Tools
Drill with 1/8” Bit
Tachometer Or Frequency Meter
Wiring Diagram

TEST PROCEDURE

The factory set point drill marks:

1. Perform the ***Case Cover Removal Procedure***.
2. When the rocker is set for the first time at the factory, a 1/8” drill is used to mark the position of both the rocker and the exciter bracket.
3. If a machine is not operating within the specified limits and nothing else appears to be faulty, the rocker position should be checked. If the drill marks are not aligned, the rocker and/or the exciter bracket should be reset to the original factory position.
4. If it has been determined that a rocker adjustment is necessary on an unaltered machine; the rocker should only be moved in very small increments and the total movement should be no more than 1/2 the diameter of the drill mark.
5. Setting the rocker – if the factory drill mark is missing or invalid due to component replacement.

IMPORTANT: The following procedures should only be attempted if all the other systems have been thoroughly checked and are functioning normally.

6. A tachometer will be required for this phase of the test.

PROCEDURE

Initial rocker placement:

7. The rocker should be initially positioned so the center of brushes visually lines up with the center of the main poles. Lining up the four brush holder studs with the four exciter bracket mounting bolts is acceptable for initial placement. The rocker should be tight against the shoulder of the hub and the clamping screw should be tightened only enough to assure the rocker cannot move.
   IMPORTANT: DO NOT OVER TIGHTEN. Over tightening the rocker clamp screw can destroy the rocker.
8. Check that the brush holders are properly installed and positioned correctly. See the ***Welding Generator Brush and Commutator Inspection and Service Procedure***.
9. Start the engine, place the idle switch in the high idle position and seat the brushes using a commutator stone. See the ***Welding Generator Brush and Commutator Inspection and Service Procedure***.
10. Use a load bank to apply a 100% duty cycle load (250 amps @ 30 volts). Look at the brushes while the load is applied. If excessive sparking is observed, adjust the rocker position to minimize sparking. Generally, moving the rocker slightly in the direction of the armature rotation will reduce sparking.
11. Continue running the machine under load for at least 30 minutes to bring the machine up to normal operating temperature and to fully seat the brushes.

Check for max output:

12. Remove the load, set the output control and rheostat to maximum, re-apply the load and adjust the load bank to apply a 300 amp load to the machine.
    WARNING: Do not move the selector switch while the machine is under load.
13. Measure the output voltage, it should read at least 32 VDC.
14. Measure the engine RPM, it should measure between 1650 and 1750 RPM.
15. If the weld output voltage is lower than specified above, the rocker position will need to be adjusted. Generally, moving the rocker opposite the armature rotation direction will increase output voltage. When making this adjustment, the rocker should only be moved in very small increments. The adjustment may need to be repeated several times to achieve the desired result.
16. Remove the load and check the voltage at the output studs (OCV). The voltage should measure approximately 90 VDC.
17. After the rocker has been adjusted and the machine is operating normally, the rocker locking screw should be tightened to 70 – 75 inch-lbs.
18. If new parts had been installed, the new rocker and/or exciter bracket location should be marked with a 1/8” drill mark.
19. Perform the ***Case Cover Replacement Procedure***.

EXCITER ROTOR VOLTAGE 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 procedure will help determine if the Exciter Rotor Winding is operating at normal voltage.

MATERIALS NEEDED

5/16” Nutdriver
Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine. The engine should be at normal operating temperature for this test. If the machine is cold, the voltage readings may be slightly higher than specified.
2. Using a 5/16” nutdriver, remove the four screws securing the exciter cover to the machine. See ***Figure F.22***.
3. Using a volt/ohmmeter, connect the probes to the brush terminals. See ***Figure F.23***. See Wiring Diagram.
4. Start the engine and place the idle switch in the “High” position. Read the voltage at the brush terminals. The voltage should be approximately 140 VDC*.
5. Set the RUN/STOP switch to “STOP”.
   If the meter reading is normal, this test is complete.
   If the voltage measures zero or very near zero, perform the ***Exciter Flashing Voltage Test Procedure*** and the ***Exciter Rotor Resistance And Ground Test Procedure***.
   If voltage is higher than specified, the engine RPM may be too high, or there may be voltage intrusion from one of the higher voltage stator windings to the stator exciter winding. Perform the ***Exciter Stator Short Circuit and Ground Test Procedure***.
   If the voltage is lower than 140, the engine RPM may be too low or there may be problems in the windings or other exciter circuit components or connections.
6. Perform the ***Exciter Field Diode Test Procedure***.
7. Check the wiring, fuse and terminals connecting the exciter field diode to the exciter stator winding. See Wiring Diagram.
8. Reconnect the leads to the AC terminals of the exciter field diode.

9. Be sure that there are no loads of any kind across any of the stator windings. The exciter winding should be the only stator winding connected at this time. Examine stator wiring for damage, pinched leads, chaffed insulation, etc. If necessary, disconnect and insulate the stator output leads, secure them so they cannot be damaged by moving parts. See Wiring Diagram.
10. Re-start the machine and measure the rotor voltage.
    If the rotor voltage continues to read significantly lower than 140 VDC, the stator is probably defective and should be replaced.
    * Voltages shown in this document are for a machine operating at normal temperature. Voltage readings may be slightly higher if the machine is cold.
11. Using a 5/16" nutdriver, remove the four screws securing the exciter cover to the machine.

Figure F.22 – Exciter cover location

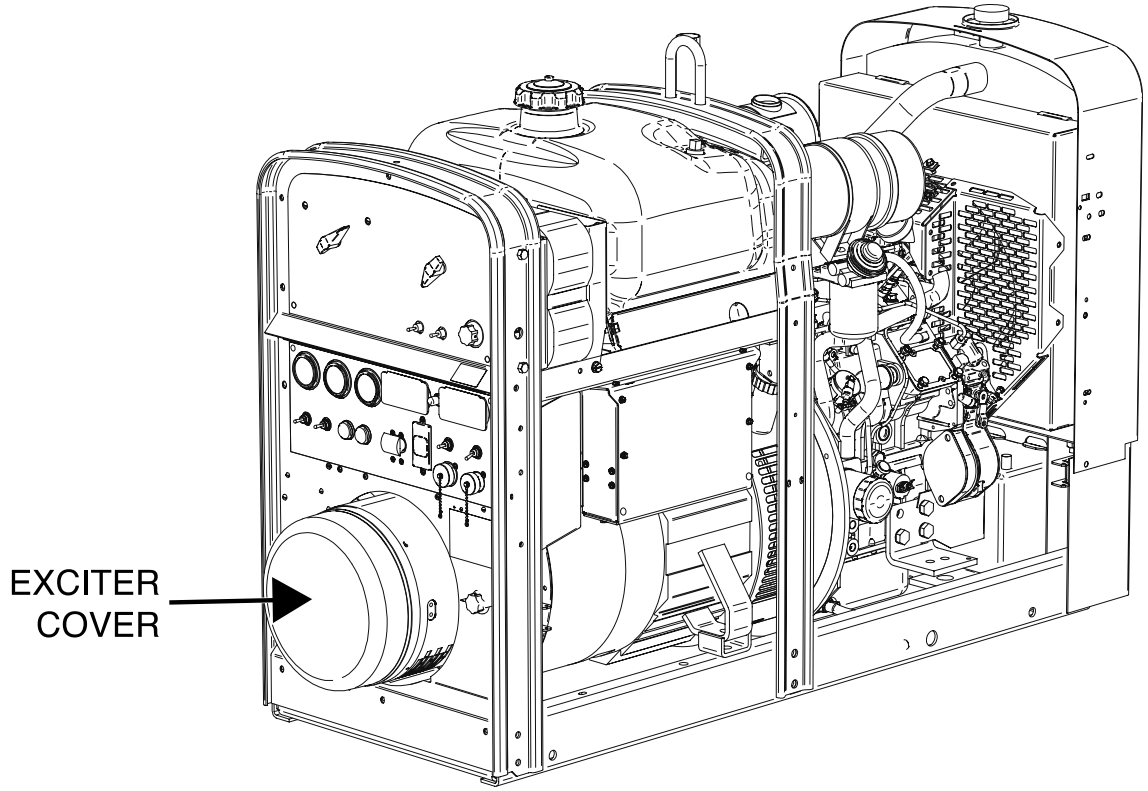
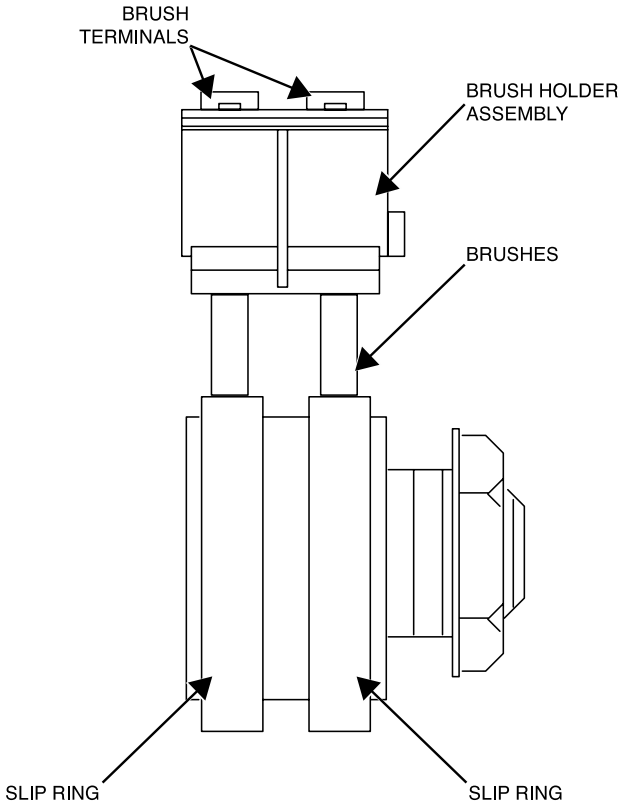


Figure F.23 – Brush terminal location



EXCITER ROTOR RESISTANCE AND GROUND TEST

(Exciter / Auxiliary Power Alternator)

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 will help determine if the Exciter / Auxiliary Power Alternator Rotor Winding is open, shorted or grounded.

MATERIALS NEEDED

5/16” Nutdriver
Volt/Ohmmeter (Analog Type Meter Required For Dynamic Resistance Test)
Wiring Diagram

TEST PROCEDURE

“Static” Tests:

1. Turn off the engine on the Classic 300 MP machine.
2. Open and secure the side doors of the machine.
3. Using a 5/16” nutdriver, remove the four screws securing the exciter cover to the machine. See ***Figure F.24***.
4. Label and disconnect the leads connected to the brush holder assembly. See ***Figure F.25***. See Wiring Diagram.
5. Using a volt/ohmmeter, check the rotor winding resistance across the slip rings. Normal resistance is approximately 42* ohms, at 77° F. (25° C.) See ***Figure F.25***.
6. Using a volt/ohmmeter, measure the resistance to ground by placing one meter probe on either of the slip rings. Place the other probe on any good, unpainted chassis ground. The resistance should be very high, at least 500,000 (500k) ohms. See ***Figure F.25***.
7. If the resistance measurements are not as specified the exciter rotor may be faulty.
8. If faulty, perform the ***Exciter Rotor Removal And Replacement Procedure***.
9. If these resistance values are normal, continue testing, using the dynamic rotor resistance and ground test.

“Dynamic” Tests:
(Also referred to as flying resistance test)
This test checks for faults in the rotor winding, while these windings are being stressed by the mechanical forces encountered during normal operation.

NOTE: This test must be performed with a good quality analog type ohmmeter. Many digital meters will not provide stable or accurate resistance readings while the rotor is spinning.
This test requires that the brushes and slip rings are clean, in good condition and are properly seated.
Perform the ***Exciter Brush And Slip Ring Service Procedure***.

10. Insulate the lead wires that had been disconnected during the static rotor resistance test. Position them so they cannot become damaged by the spinning rotor.
11. It is recommended that the ohmmeter leads be securely attached to the brush terminals, using clips or terminals BEFORE starting the engine. See ***Figure F.25***.
12. Start the engine and run it at high idle speed (1800 RPM). The resistance should read approximately 42 ohms* at 77° F. (25° C.)
13. Shut off engine and move one of the ohmmeter leads to a good clean chassis ground connection.
14. Restart the engine and run it at high idle speed (1800 RPM). The resistance should be very high, at least 500,00 (500k) ohms.
15. If the resistance readings differ significantly from the values indicated, re-check the brushes and the brush spring tension. If the brushes and slip rings are good, perform the ***Exciter Rotor Replacement Procedure***.
16. Securely connect the leads to the brush terminals (See Wiring Diagram) and replace the exciter cover if testing and service is complete.
17. Using a 5/16" nutdriver, attach the four screws securing the exciter cover to the machine.

*** NOTE:** The resistance of the copper windings will change with temperature. Higher temperatures will produce higher resistance and lower temperatures will produce lower resistance.

Figure F.24 – Exciter cover locations

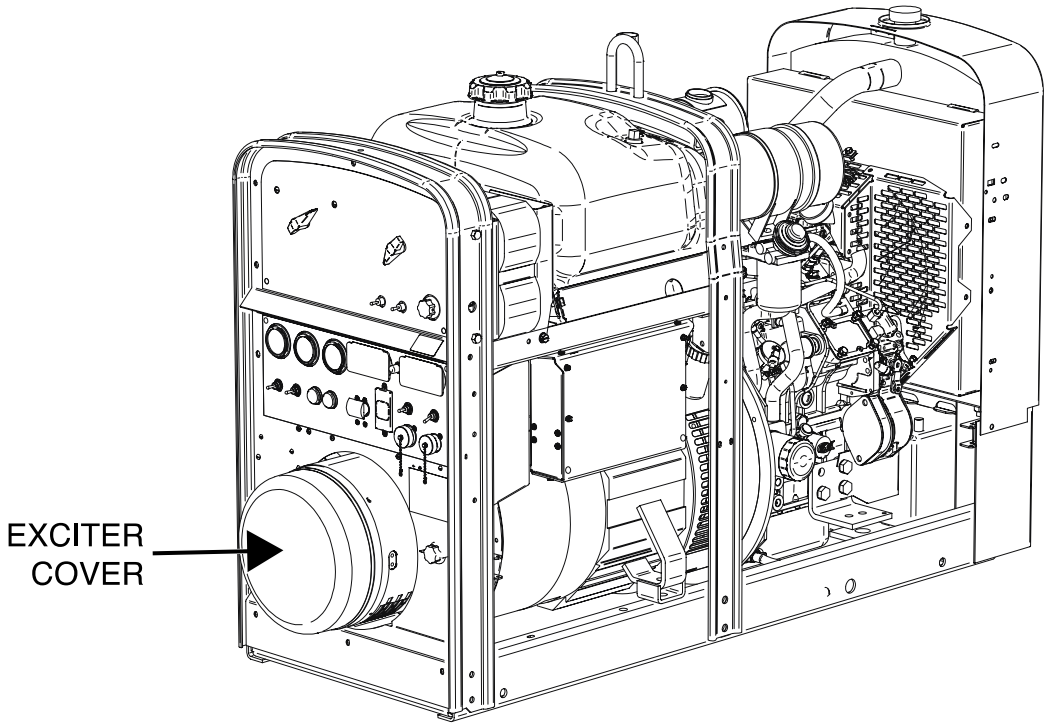
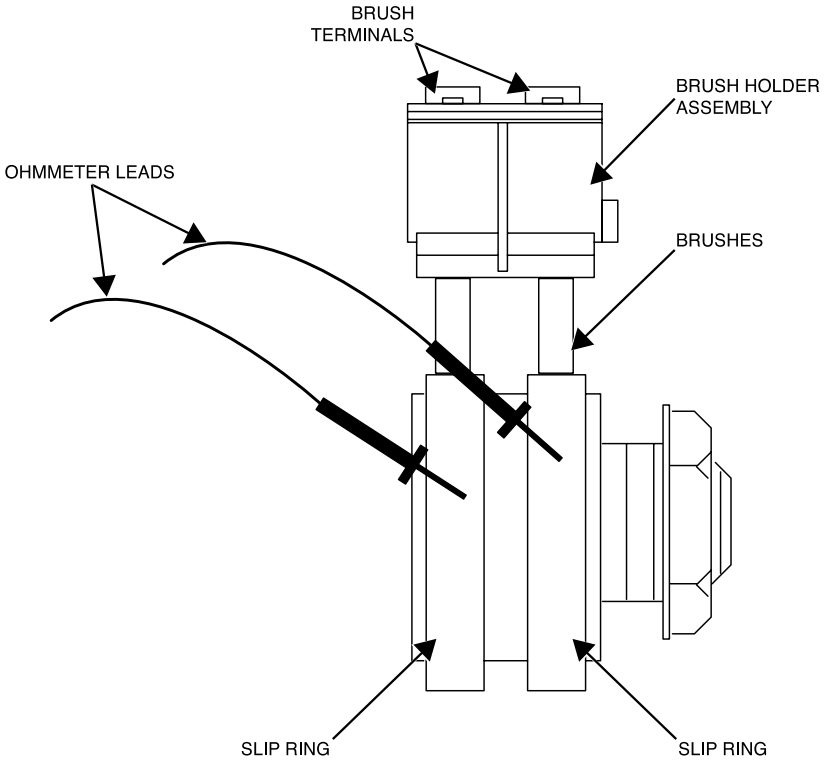


Figure F.25 – Slip ring and brush terminal locations



EXCITER FLASHING VOLTAGE 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 checks the Exciter Rotor Flashing Voltage.

MATERIALS NEEDED

5/16” Nutdriver
3/8” Nutdriver
Volt/ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Disconnect any weld cables or power cords.
3. Lift the left and right side covers and secure them with the hooks provided.
4. Using a 5/16” nutdriver, remove the four screws securing the exciter cover to the machine. See ***Figure F.26***.
5. Label and disconnect one of the leads from the exciter brush holder. See ***Figure F.27***. See Wiring Diagram.
6. Using a volt/ohmmeter (set for DC volts), attach the probes to the brush terminals. See ***Figure F.27***. See Wiring Diagram.
7. Place the idle switch in the “High” idle position, start the engine and read the voltage.
8. If the voltage measures approximately 12 volts, the flashing is normal and the test is complete.
9. Using a 3/8” nutdriver, remove the two screws securing the finger guard panel to the machine. See ***Figure F.26***.
10. If the meter measures zero or very near zero, check leads 610 and 600 between the control board, exciter field diode and the exciter brushes.
11. Perform the ***Control Board Test Procedure***.
12. Connect any previously disconnected leads.
13. Using a 3/8” nutdriver, attach the two screws securing the finger guard panel to the machine.
14. Using a 5/16” nutdriver, attach the four screws securing the exciter cover to the machine.

Figure F.26 – Exciter cover locations

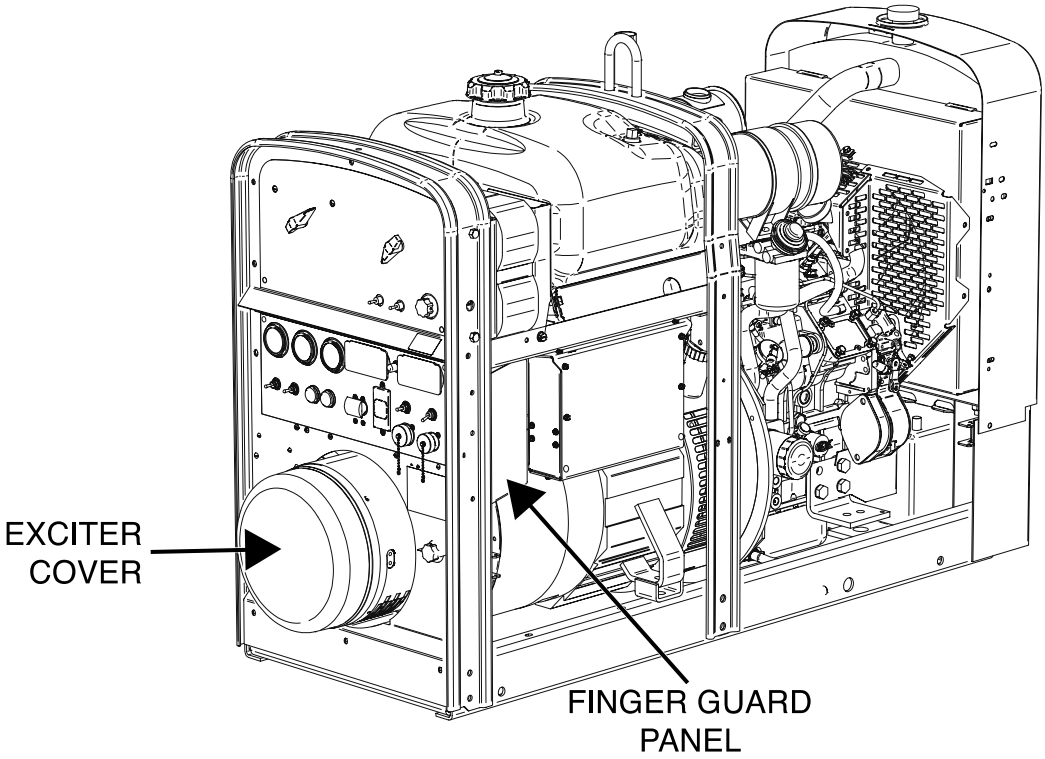
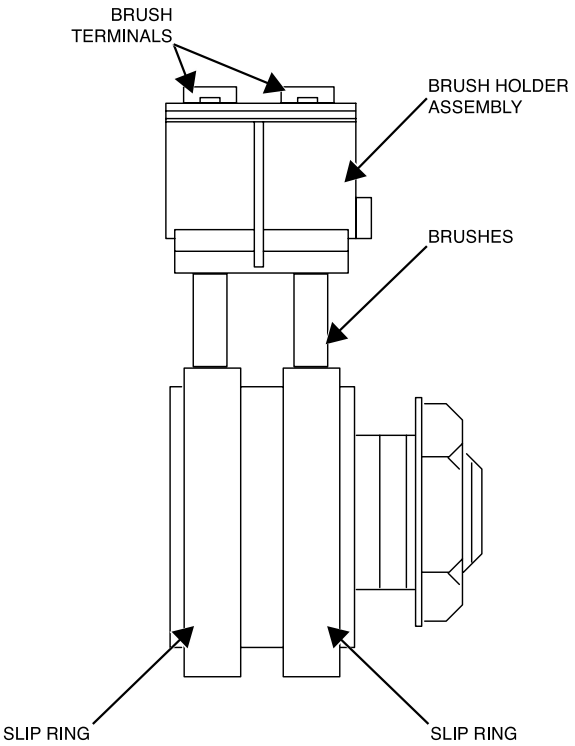


Figure F.27 – Brush terminal location



EXCITER STATOR SHORT CIRCUIT & GROUND 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 help determine if there are undesirable electrical connections between the Exciter Stator Windings and Chassis Ground or between individual Windings within the Exciter Stator.
This test should be performed if the Exciter Stator output voltage fails to build-up to normal levels. Or, if the Rotor resistance test is ok and the Exciter Field Diode and associated wiring is good and the correct flashing voltage is present at the Rotor Slip Rings.

MATERIALS NEEDED

9/16” Open-End Wrench
9/16” Nutdriver
3/8” Nutdriver
Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Disconnect anything plugged into the auxiliary receptacles.
4. Using a 9/16” open-end wrench and a 9/16” nutdriver, remove the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets). See ***Figure F.28***. See Wiring Diagram. Carefully move the CV box to allow access to components on lower control panel assembly.
5. Using a 3/8” nutdriver, remove the two screws securing the finger guard panel to the machine. See ***Figure F.28***.
6. Label and disconnect leads 602C and 21 from the AC terminals of the exciter field diode. See ***Figure F.29***. See Wiring Diagram.
7. Label and disconnect lead 810 from CB2. See ***Figure F.29***. See Wiring Diagram.
8. Label and disconnect lead 11B from CB1. See ***Figure F.29***. See Wiring Diagram.
9. Using a 3/8” nutdriver, remove the nut securing the lead 820 to the ground stud. Label and disconnect lead 820 from the ground stud. See ***Figure F.29***. See Wiring Diagram.
10. Using a volt/ohmmeter, perform the test outlined in ***Table F.6***. See ***Figure F.29***. See Wiring Diagram.

11. If any of these readings are less than 500,000 (500k) ohms, be certain that the windings are completely dry and check for grounded components or wiring that remain connected to the stator, such as circuit breakers, receptacles, etc. See Wiring Diagram. If necessary, disconnect and isolate the stator leads as close to the stator winding as possible.
12. If the low resistance to ground or between individual stator windings is determined to be within the stator, the stator may be faulty.
13. When testing is complete, connect any previously disconnected leads. See Wiring Diagram.
14. Using a 9/16" open-end wrench and a 9/16" nutdriver, attach the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets).
15. Using a 3/8" nutdriver, attach the two screws securing the finger guard panel to the machine.
16. If faulty, perform the ***Exciter Stator Removal And Replacement Procedure***.
17. Perform the ***Case Cover Replacement Procedure***.

Table F. 6 – Exciter stator resistance tests

TEST POINT A	TEST POINT B	EXPECTED READING
LEAD 810	LEAD 11B	LESS THAN 1 OHM (LOW RESISTANCE)
LEAD 602C	LEAD 21	LESS THAN 1 OHM (LOW RESISTANCE)
LEAD 810 OR 11B	CHASSIS GROUND	AT LEAST 500K OHMS (HIGH RESISTANCE)
LEAD 602C OR 21	CHASSIS GROUND	AT LEAST 500K OHMS (HIGH RESISTANCE)

Figure F.28 – CV box mounting hardware location

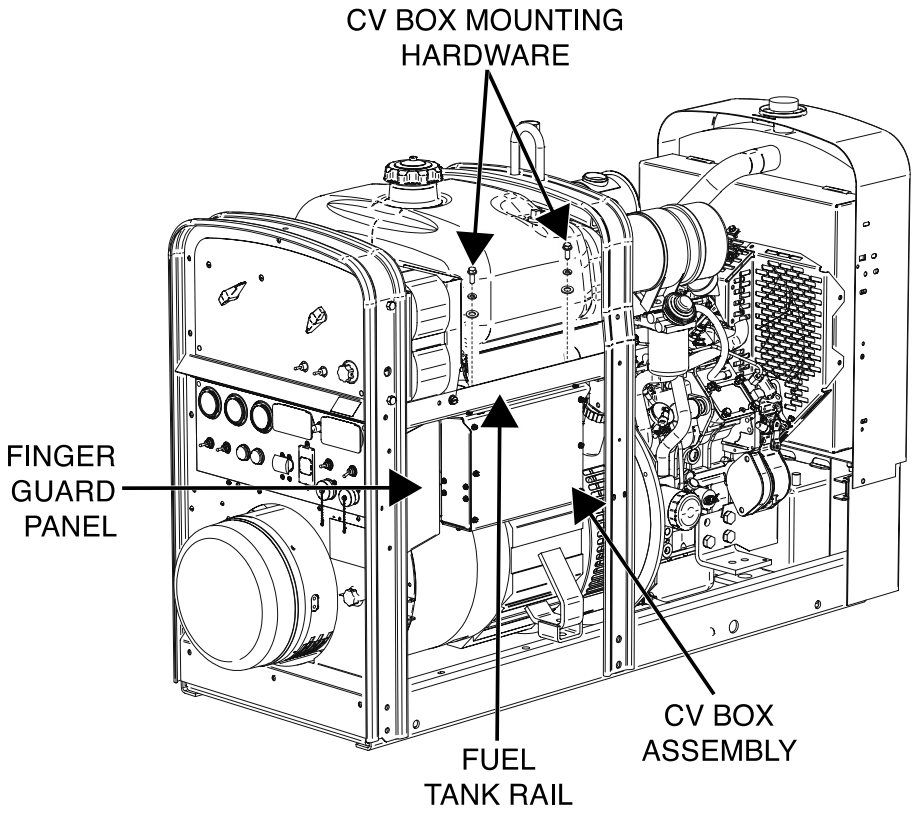
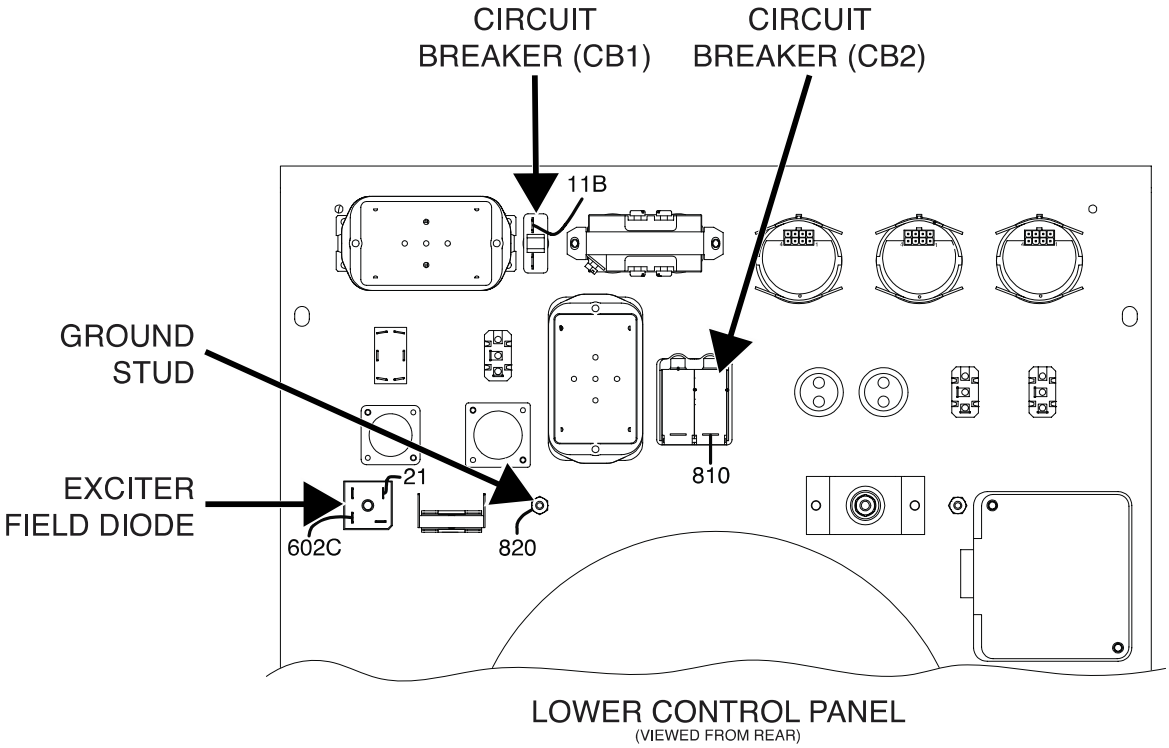


Figure F.29 – Exciter stator test point locations



WELD CIRCUIT GROUND AND SHORT 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 procedure checks for grounded components in the Weld Circuit. It also checks for a Short Circuit condition between the positive and negative components of the Weld Circuit. This test cannot detect a Short Circuit within the Armature or a turn to turn Short Circuit within a Coil or Coil Set.
IMPORTANT: The machine must be clean and completely dry before this test is done.

MATERIALS NEEDED

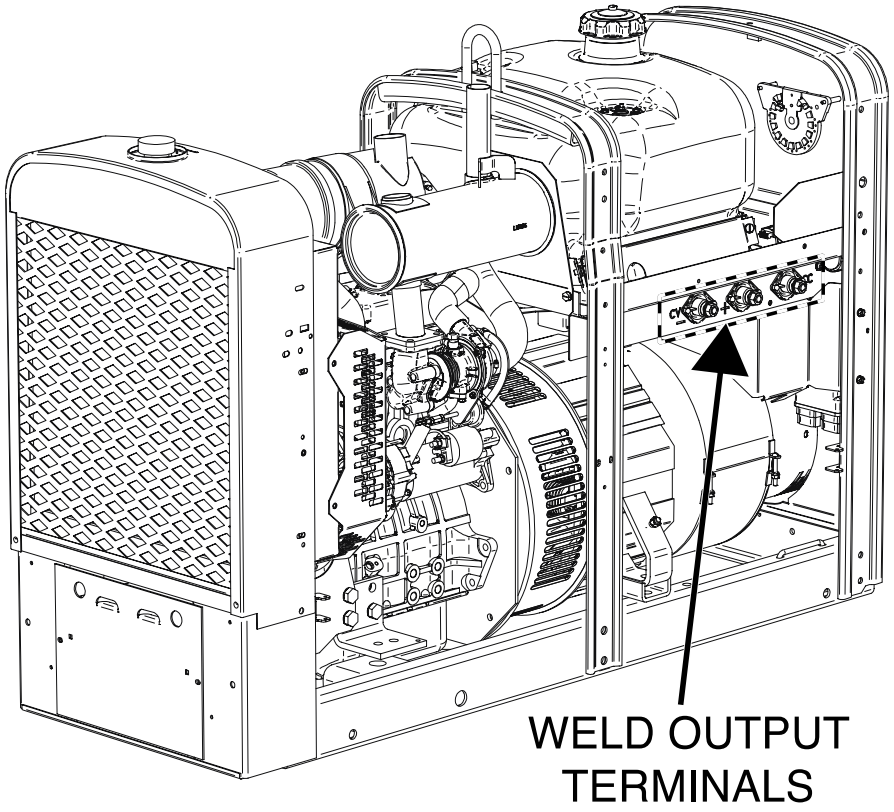
Miscellaneous Hand Tools
Voltmeter/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
   Weld circuit ground test:
2. Using a volt/ohmmeter, measure the resistance between either of the two weld output terminals and a clean chassis ground connection. See ***Figure F.30***. See Wiring Diagram.
3. The resistance should be very high 500,00 (500k) ohms minimum.
   If the resistance is lower than 500k Ohms:
4. If the resistance is less than 500k Ohms, remove the welding generator brushes or pull them away from the commutator and isolate them so they cannot come in contact with anything except the brush holder where they are attached.
5. Check the resistance between chassis ground and each output terminal and between chassis ground and the commutator. See ***Figure F.30***. See Wiring Diagram.
   If the commutator has low resistance to chassis ground, the armature is defective.
6. If the resistance measured at the positive terminal is low, carefully examine the interpole coils and the heavy leads and the brush holders connected to the interpole coils. Check for damaged, dirty or missing brush holder insulators. Check for a damaged or dirty weld output positive terminal.
7. If the resistance measured at the negative terminal is low, examine the selector switch, the series coils and the heavy leads and brush holders connected to them. Check for damaged, dirty or missing brush holder insulators. Check for a damaged or dirty weld output negative terminal. If necessary, disconnect the selector switch and test separately. See the ***Selector Switch Test Procedure***.

8. Test for a short circuit condition between the positive and negative circuits.
9. With the brushes still isolated as described above, check the resistance between the two of the weld terminals. The resistance should be very high, 500,000 (500k) Ohms minimum.
10. If the resistance measurement is too low, check the heavy weld current carrying leads and connections for damaged insulation or dirt buildup between the negative series coils circuits. If the low resistance point is between the stator coils, the coils will require replacement or repair.

Figure F.30 – Weld output terminal location



SHUNT FIELD COIL RESISTANCE AND GROUND 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 procedure will help determine if the Welding Generator Shunt Field Coils are open, shorted or grounded.
IMPORTANT: The machine should be clean and windings must be completely dry before this test is done.

MATERIALS NEEDED

9/16” Open-End Wrench
9/16” Nutdriver
Volt/Ohmmeter
Wiring Diagram

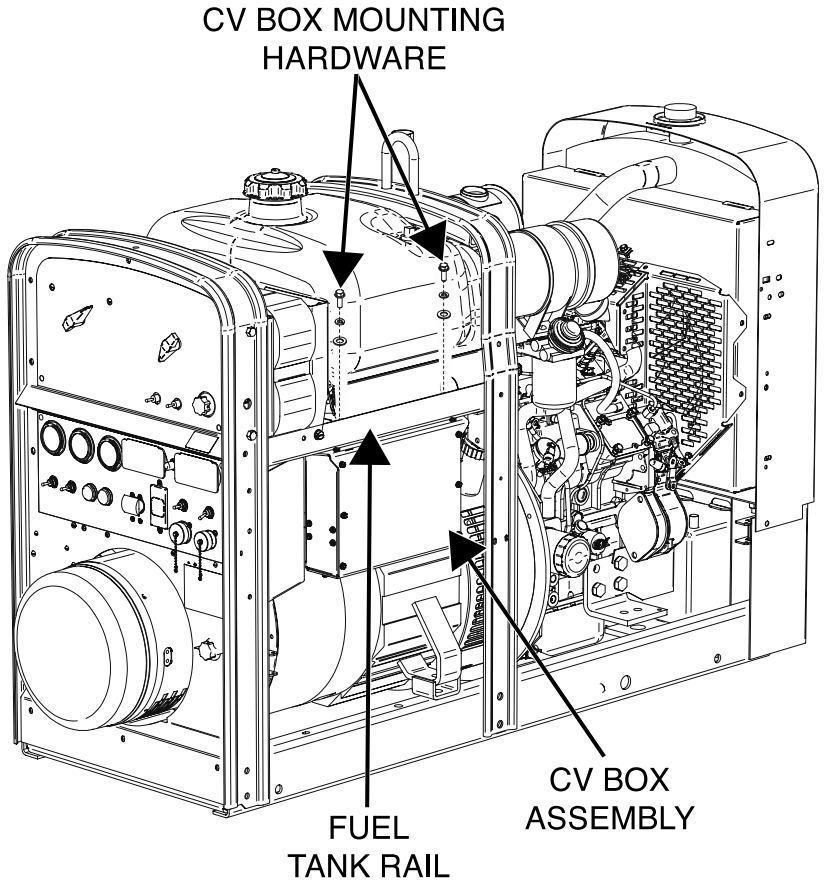
TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a 9/16” open-end wrench and a 9/16” nutdriver, remove the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets). See ***Figure F.31***. See Wiring Diagram.
4. Locate the brown and blue wires in the lead bundle exiting at the top of the welding generator frame and disconnect them. See Wiring Diagram.
5. Using a volt/ohmmeter, measure the resistance between the brown and blue wires that connect the shunt coils inside the generator frame. The resistance should measure about 50 to 54 Ohms* at 77° F (25° C). See Wiring Diagram.
6. If the resistance reading is correct, proceed to the Shunt Coil Ground Test.
7. If the resistance is significantly higher or lower than specified, examine the leads connecting the shunt coils and the jumper lead connecting the two coils together. If the leads and connections are undamaged, the shunt coils should be replaced.
   Shunt Coil Ground Test:
8. Using a volt/ohmmeter, measure the resistance between either the brown or blue wires and a good clean chassis ground. The resistance should be very high 500,000 (500k) Ohms minimum. See Wiring Diagram.

9. If the resistance is low, check the lead wires connected to the shunt coils and the jumper lead wire connecting the two coils together. If these leads are in good condition and the low resistance is determined to be a defective coil. The shunt coils should be replaced.
10. Reconnect the brown and blue wires.
11. Using a 9/16” open-end wrench and a 9/16” nutdriver, attach the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets). See Wiring Diagram
12. Close and secure the side door panels.

***NOTE:** The resistance of the copper windings will change with temperature. Higher temperatures will produce slightly higher resistance and lower temperatures will produce slightly lower resistance.

Figure F.31 – CV box mounting hardware location



SHUNT FIELD CIRCUIT VOLTAGE 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 procedure will help determine if the Shunt Field Coils are receiving the necessary power to operate correctly. This test should be done if there is little or no output from the welding generator, but auxiliary output is normal.

MATERIALS NEEDED

9/16” Open-End Wrench
9/16” Nutdriver
Volt/ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a 9/16” open-end wrench and a 9/16” nutdriver, remove the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets). See ***Figure F.32***.
4. Locate the brown and blue wires in the lead bundle exiting at the top of the welding generator frame. See Wiring Diagram.
5. Using a volt/ohmmeter (set the voltmeter for DC voltage), probe the blue and brown wires at the quick-connects. See Wiring Diagram.
6. Set the fine current / OCV control to maximum. See ***Figure F.33***.
7. Remove and external remote control devices.
8. Start the engine.
9. The voltage should read about 110 VDC. (Voltage will be a bit higher if machine is not warmed to normal operating temperature.)
10. If normal DC voltage is present, perform the ***Shunt Field Coil Resistance and Ground Test Procedure***.
11. If voltage is not present, check the potentiometer and leads to the control board. See Wiring Diagram.
12. Perform the ***Control Board Test Procedure***.
13. Using a 9/16” open-end wrench and a 9/16” nutdriver, attach the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets).
14. Perform the ***Case Cover Replacement Procedure***.

Figure F.32 – CV box mounting hardware location

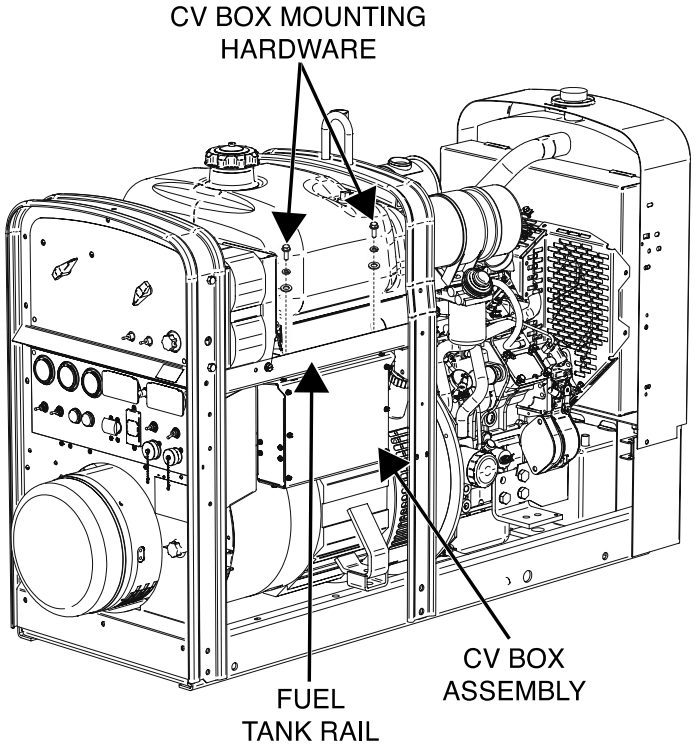
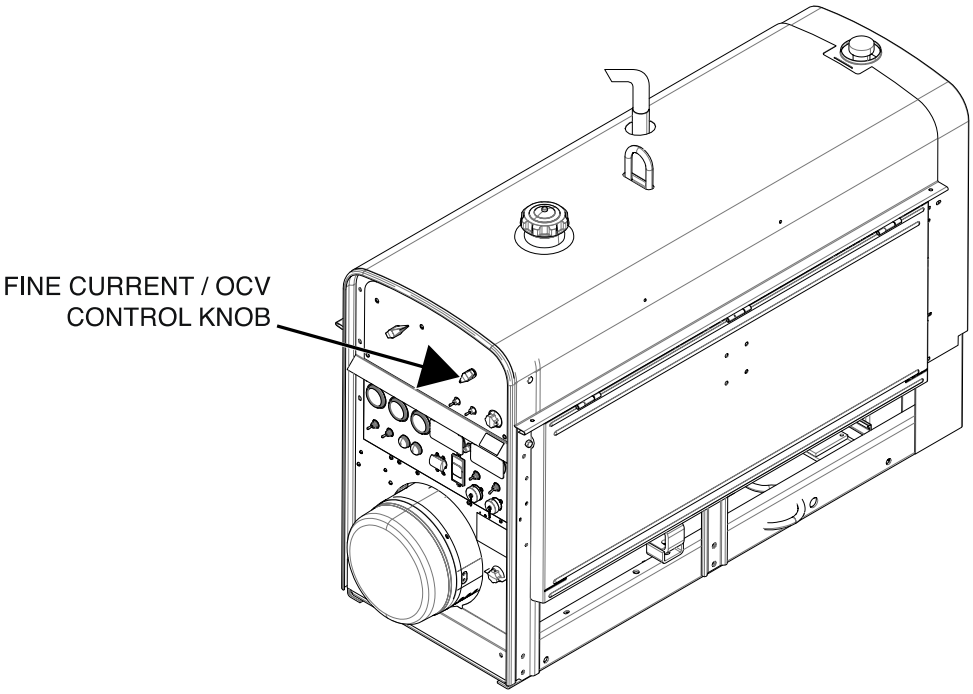


Figure F.33 – Fine current / OCV control knob location



Removal And Replacement Procedures

ENGINE CONTROL UNIT (ECU) 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 Engine Control Unit (ECU).

MATERIALS NEEDED

3/8” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Carefully open the right side door panel to gain access to the engine control unit (ECU).
3. Using a 3/8” nutdriver, remove the three screws securing the finger guard panel to the machine. See ***Figure F.34***. Remove the finger guard panel to gain access to the engine control unit.
4. Label and disconnect the engine control unit connector from the engine control unit. See ***Figure F.35***. See Wiring Diagram.
5. Using a 3/8” nutdriver and a slotted screwdriver, remove the two screws, nuts, lock washers and flat washers securing the engine control unit to the lower control panel assembly. See ***Figure F.36***.
6. The engine control unit can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position new engine control unit into the machine.
2. Using a 3/8” nutdriver and a slotted screwdriver, attach the two screws, nuts, lock washers and flat washers securing the engine control unit to the lower control panel assembly.
3. Connect the engine control unit connector to the engine control unit. See Wiring Diagram.
4. Using a 3/8” nutdriver, attach the three screws securing the finger guard panel to the machine.
5. Perform the ***Retest After Repair Procedure***.

Figure F.34 – Finger guard panel mounting screw locations

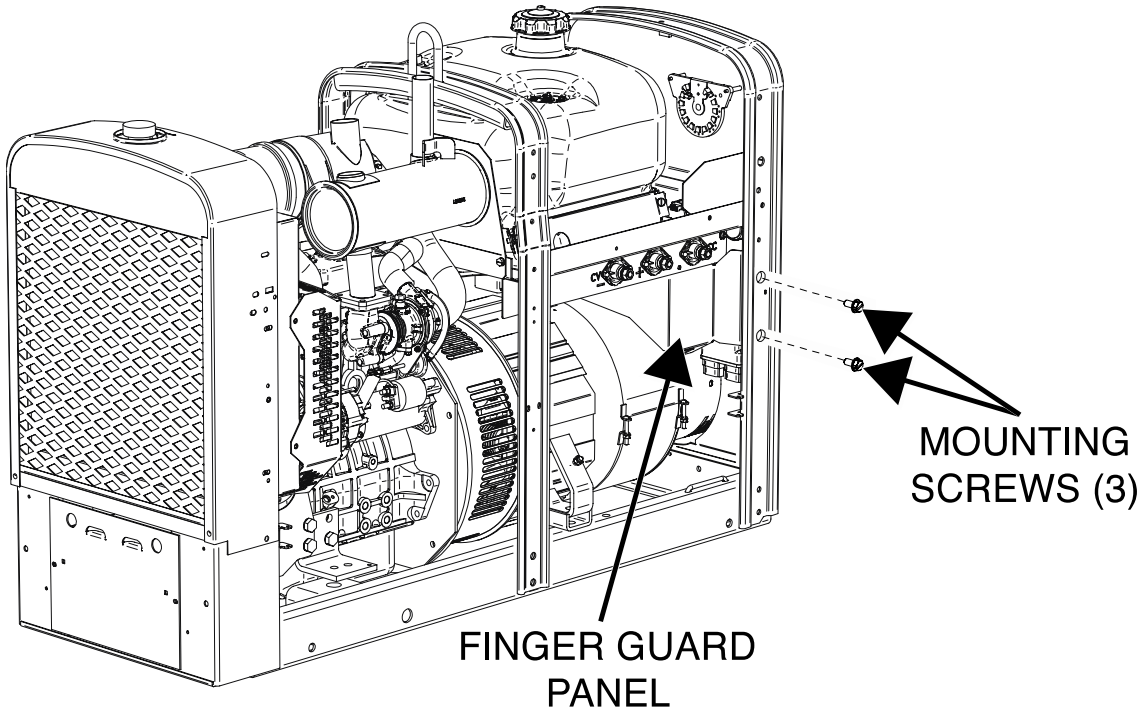


Figure F.35 – Engine control unit connector location

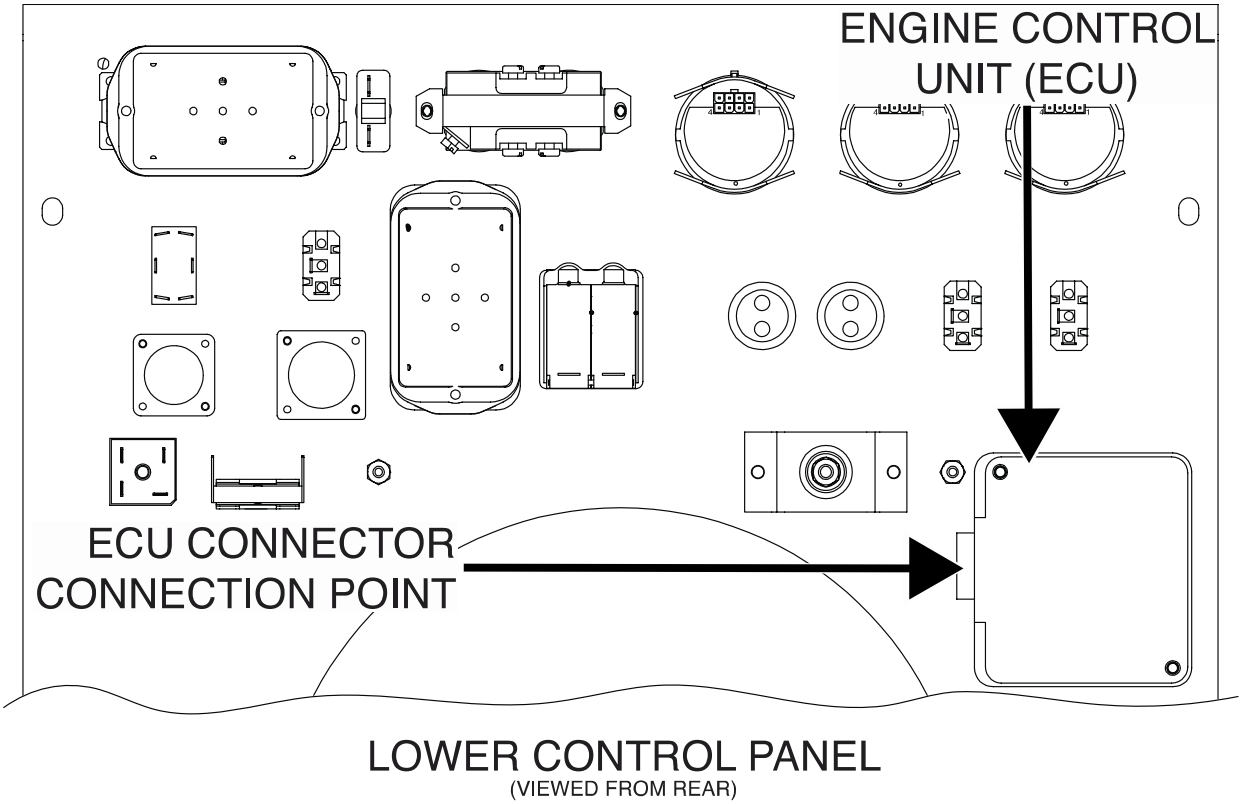
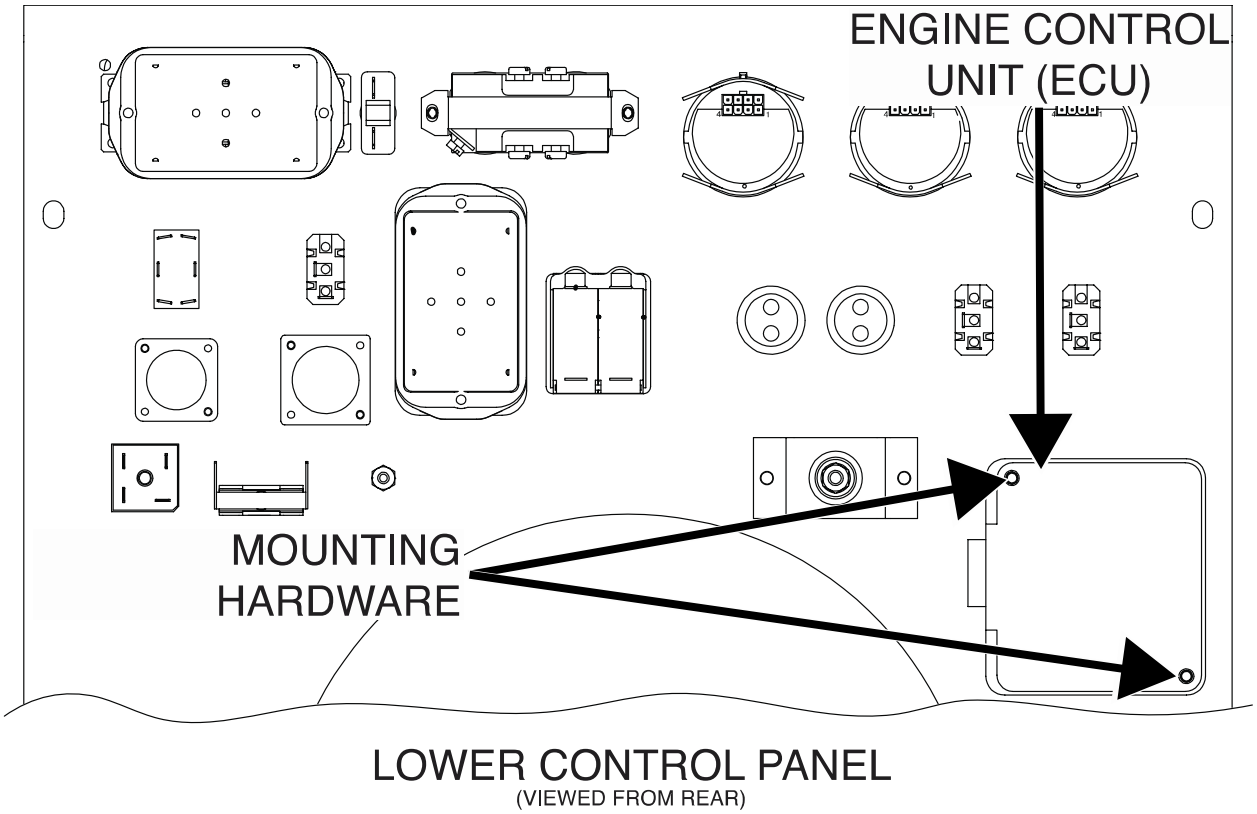


Figure F.36 – Engine control unit mounting hardware location



CONTROL 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 Control Board.

MATERIALS NEEDED

9/16” Open-End Wrench
9/16” Nutdriver
3/8” Nutdriver
5/16” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a 9/16” open-end wrench and a 9/16” nutdriver, remove the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets). See ***Figure F.37***.
4. Using a 3/8” nutdriver, remove the two screws securing the finger guard panel to the machine. See ***Figure F.37***.
5. Label and disconnect plugs J12, J6, J7, J1 and J2 from the control board. See ***Figure F.38***. See Wiring Diagram.
6. Using a 5/16” nutdriver, remove the four screws securing the control board to the mounting bracket. See ***Figure F.3X***.
7. The control board can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position new control board into the machine.
2. Using a 5/16” nutdriver, attach the four screws securing the control board to the mounting bracket.
3. Connect plugs J12, J6, J7, J1 and J2 to the control board. See Wiring Diagram.
4. Using a 3/8” nutdriver, attach the two screws securing the finger guard panel to the machine.
5. Using a 9/16” open-end wrench and a 9/16” nutdriver, attach the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets).
6. Perform the ***Case Cover Replacement Procedure***.
7. Perform the ***Retest After Repair Procedure***.

Figure F.37 – CV box mounting hardware location

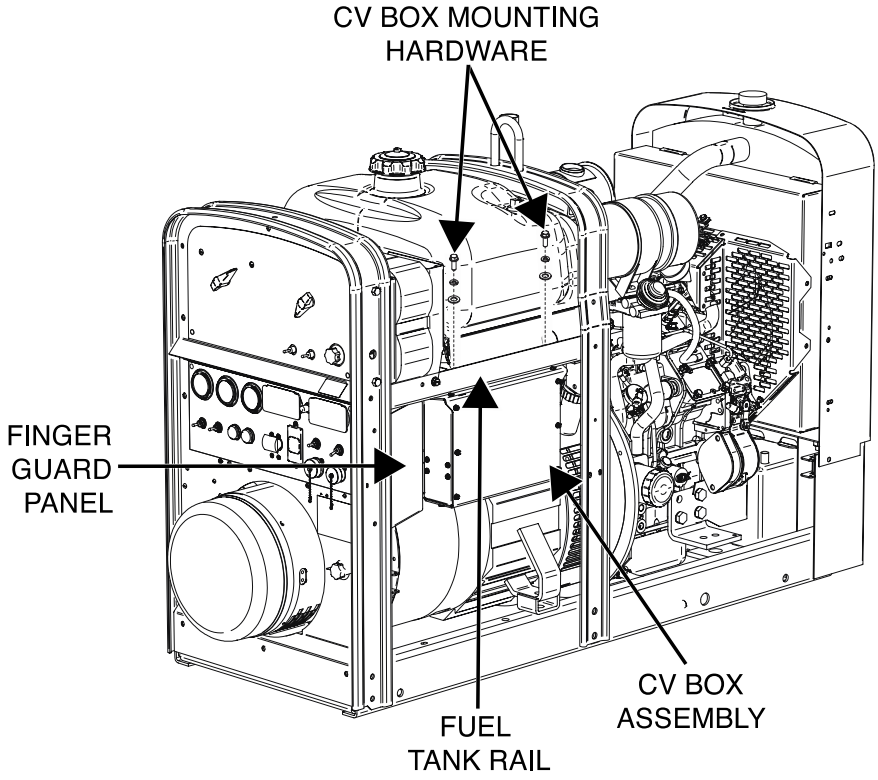


Figure F.38 – Control board plug locations

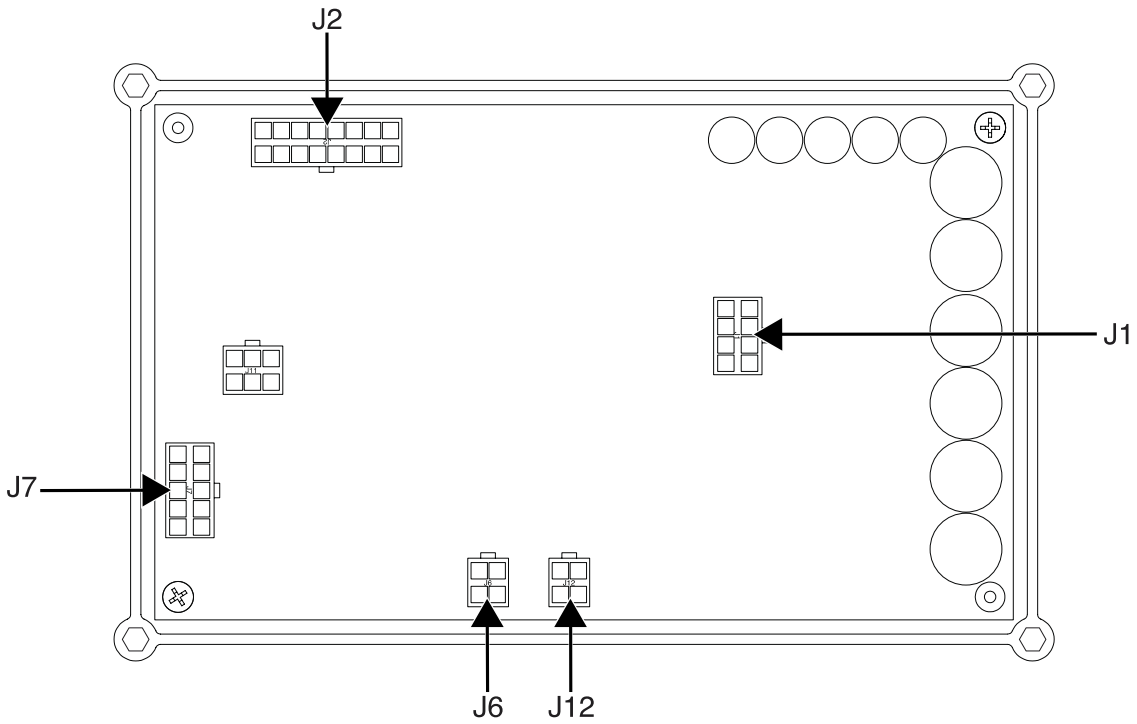
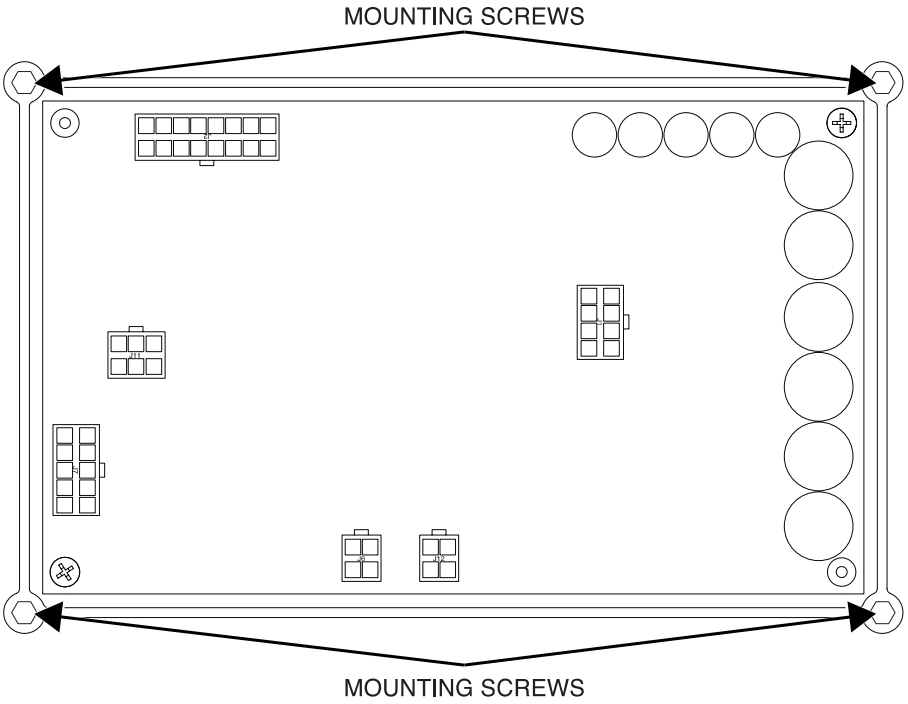


Figure F.39 – Control board mounting screw locations



CONTACTOR CR1 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 Contactor CR1.

MATERIALS NEEDED

9/16” Open-End Wrench
9/16” Nutdriver
5/16” Nutdriver
11/16” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a 9/16” open-end wrench and a 9/16” nutdriver, remove the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets). See ***Figure F.40***. See Wiring Diagram.
4. Using a 5/16” nutdriver, remove the thirteen screws securing the CV box support to the CV box base. See ***Figure F.40***.
5. Label and disconnect the leads 633 and 634 from the quick connects of contactor CR1. See ***Figure F.41***. See Wiring Diagram.
6. Using a 11/16” nutdriver, remove the four nuts (two for each lead) securing the heavy leads to the terminals on contactor CR1. See ***Figure F.42***. See Wiring Diagram. Remove the nuts on at a time.
7. Using a 5/16” nutdriver, remove the four screws securing the contactor mounting plate to the CV box assembly. See ***Figure F.42***.
8. Carefully slide the contactor away from the two heavy leads and out of the CV box.
9. The contactor CR1 can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position new contactor CR1 into the machine.
2. Using a 5/16” nutdriver, attach the four screws securing the contactor mounting plate to the CV box assembly.

3. Using a 11/16” nutdriver, attach the four nuts (two for each lead) securing the heavy leads to the terminals on contactor CR1. See Wiring Diagram.
4. Connect the leads 633 and 634 to the quick connects of contactor CR1. See Wiring Diagram.
5. Using a 5/16” nutdriver, attach the thirteen screws securing the CV box support to the CV box base.
6. Using a 9/16” open-end wrench and a 9/16” nutdriver, attach the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets). See Wiring Diagram
7. Perform the ***Case Cover Replacement Procedure***.
8. Perform the ***Retest After Repair Procedure***.

Figure F.40 – CV box mounting hardware location

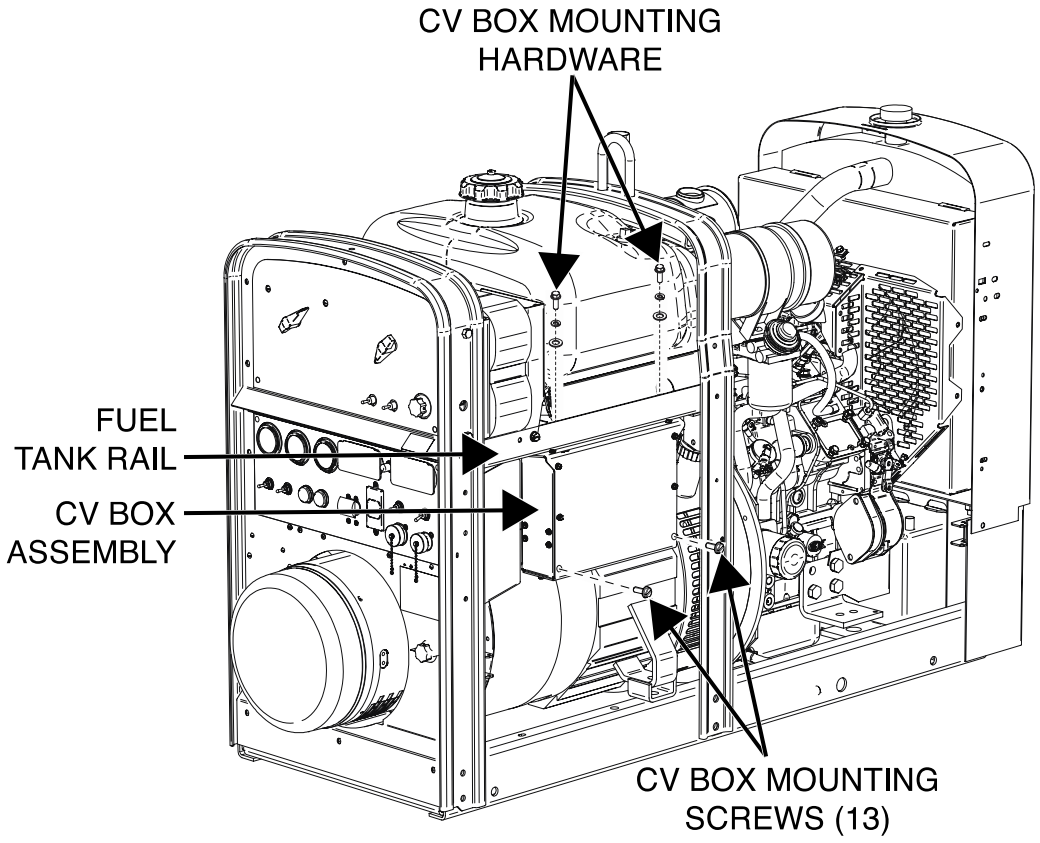


Figure F.41 – Contactor CR1 lead 633 and 634 locations

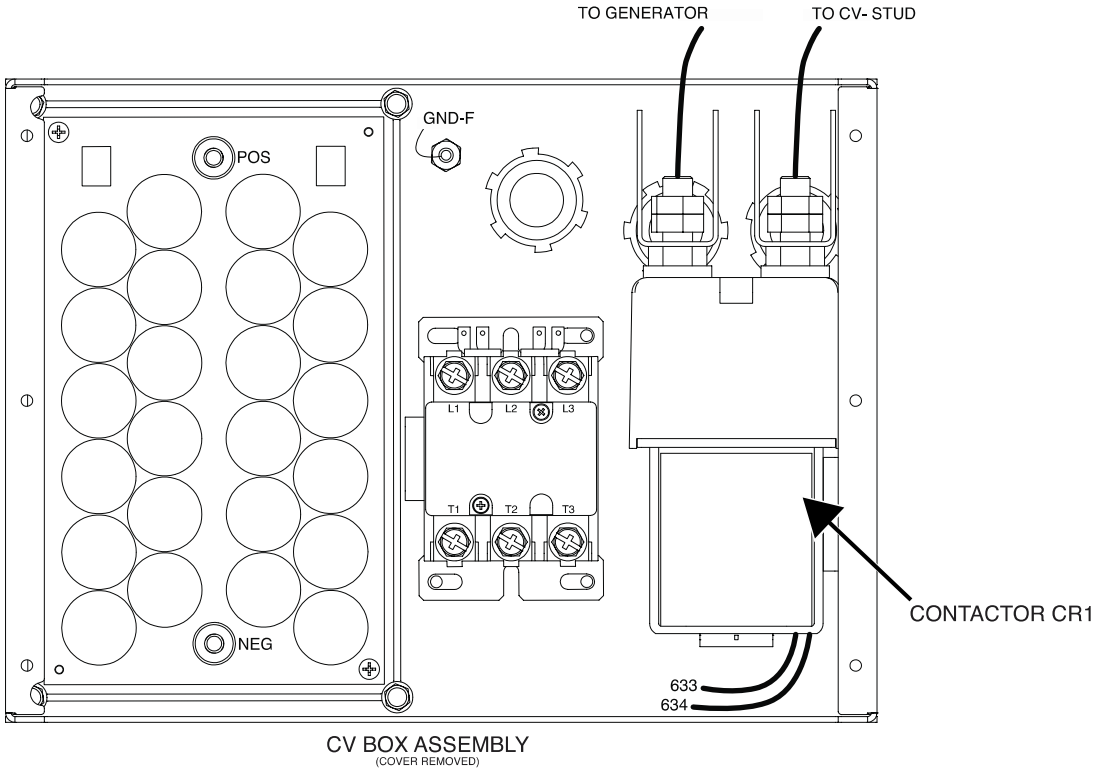
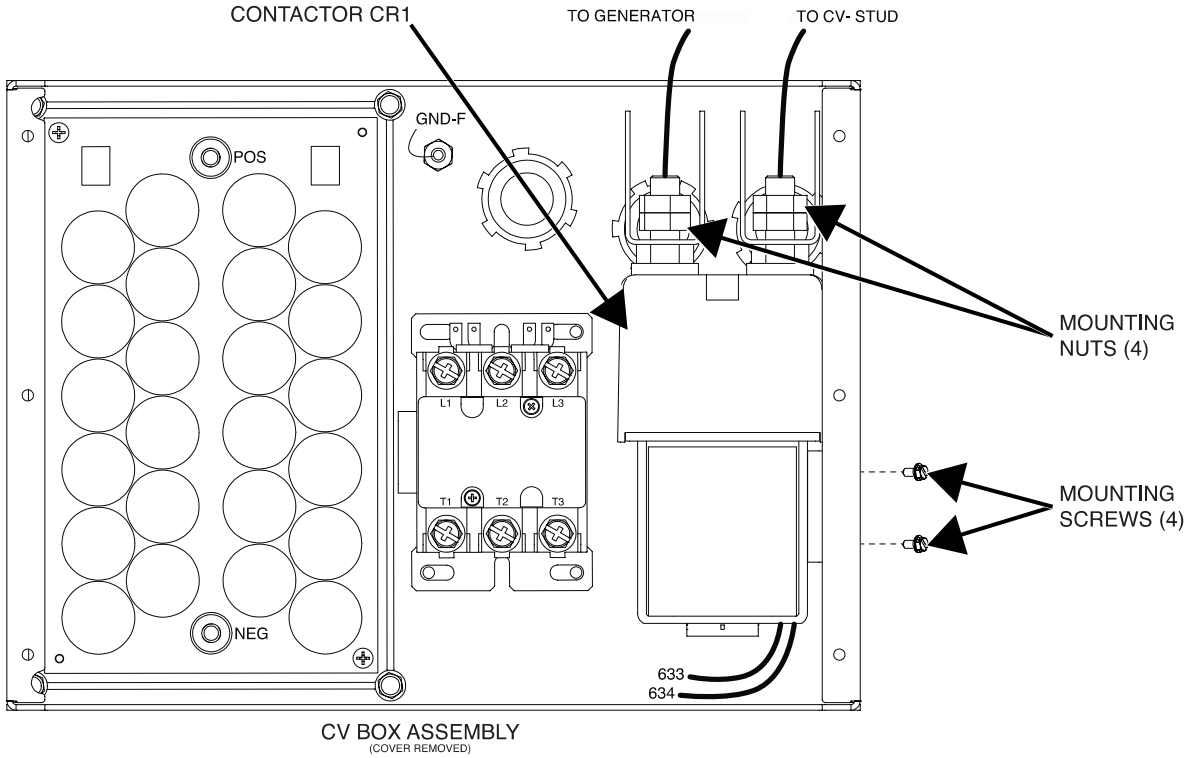


Figure F.42 – Contactor CR1 lead and mounting hardware locations



CONTACTOR CR2 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 Contactor CR2.

MATERIALS NEEDED

9/16” Open-End Wrench
9/16” Nutdriver
5/16” Nutdriver
Slotted Screwdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a 9/16” open-end wrench and a 9/16” nutdriver, remove the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets). See ***Figure F.43***. See Wiring Diagram.
4. Using a 5/16” nutdriver, remove the thirteen screws securing the CV box support to the CV box base. See ***Figure F.43***.
5. Label and disconnect leads 630 and 631 from the top terminals of contactor CR2. See ***Figure F.44***. See Wiring Diagram.
6. Using a slotted screwdriver, remove the six screws securing the six heavy leads to terminals L1, L2, L3, T1, T2 and T3 of contactor CR2. See ***Figure F.44***. See Wiring Diagram.
7. Using a slotted screwdriver, remove the three screws securing the contactor CR2 to the CV box assembly. See ***Figure F.45***.
8. The contactor CR2 can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position new contactor CR2 into the machine.
2. Using a slotted screwdriver, attach the three screws securing the contactor CR2 to the machine.
3. Using a slotted screwdriver, attach the six screws securing the six heavy leads to terminals L1, L2, L3, T1, T2 and T3 of contactor CR2. See Wiring Diagram.

4. Connect leads 630 and 631 to the top terminals of contactor CR2. See Wiring Diagram.
5. Using a 5/16” nutdriver, attach the thirteen screws securing the CV box support to the CV box base.
6. Using a 9/16” open-end wrench and a 9/16” nutdriver, attach the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets). See Wiring Diagram.
7. Perform the ***Case Cover Replacement Procedure***.
8. Perform the ***Retest After Repair Procedure***.

Figure F.43 – CV box mounting hardware location

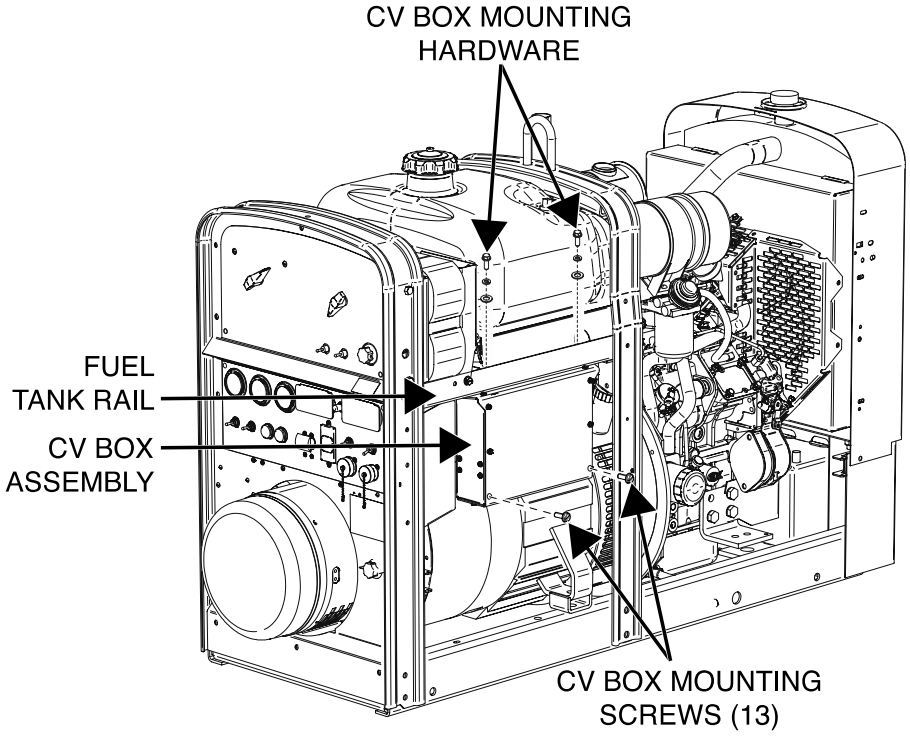


Figure F.44 – Contactor CR2 lead and terminal locations

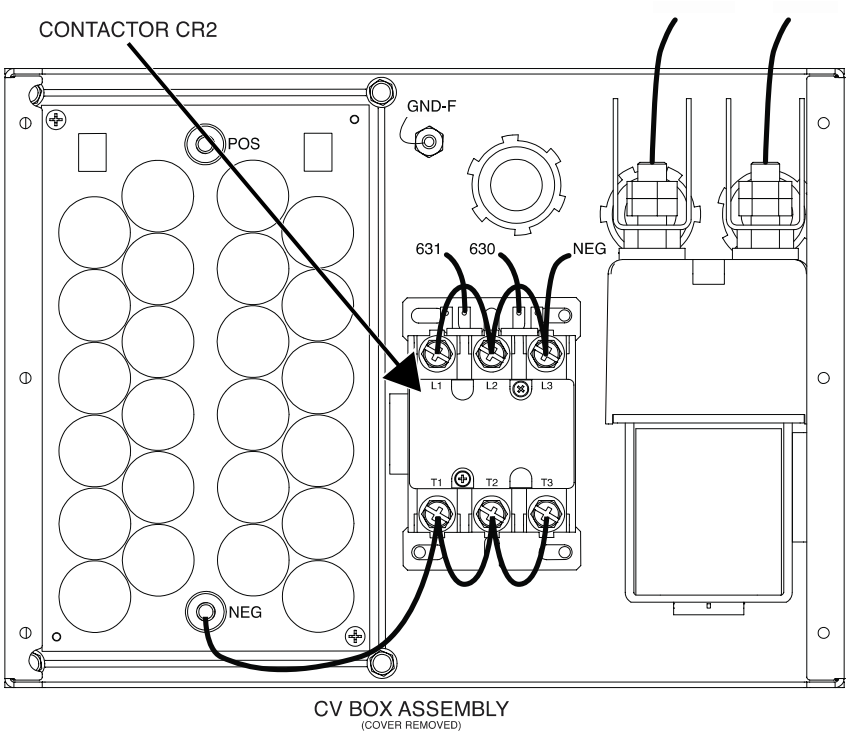
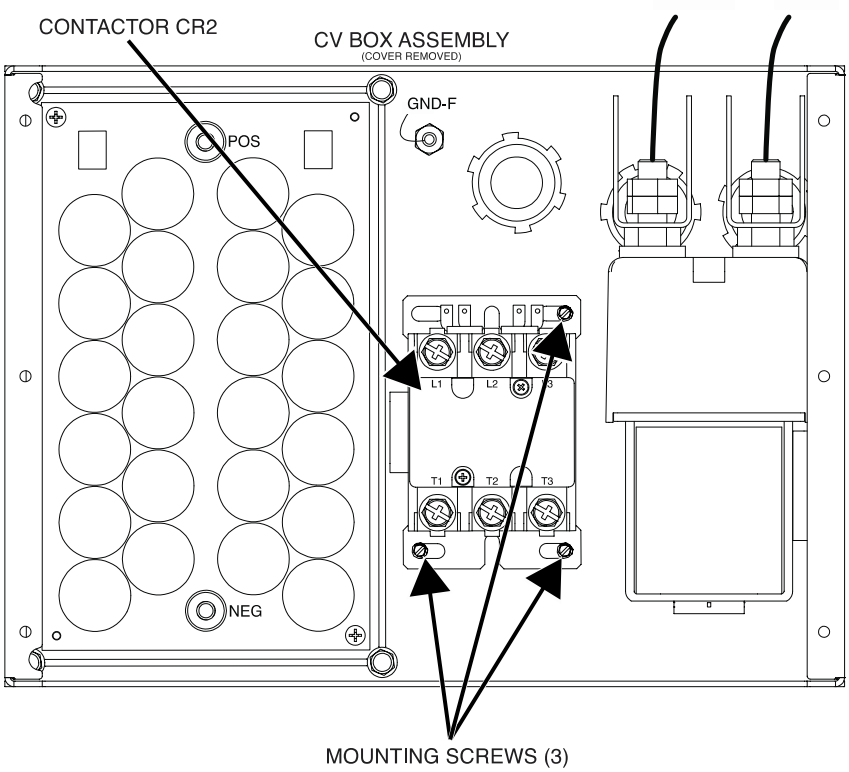


Figure F.45 – Contactor CR2 mounting screw locations



SELECTOR 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 Selector Switch.

MATERIALS NEEDED

1/2” Open-End Wrench
1/2” Nutdriver
Slotted Screwdriver
3/8” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a 1/2” open-end wrench and 1/2” nutdriver, remove the five nuts securing the heavy leads to terminals 1-5 of the selector switch. See ***Figure F.46***. See Wiring Diagram.
4. Using a 1/2” open-end wrench and 1/2” nutdriver, remove the nut securing the two leads to the negative terminal of the selector switch. See ***Figure F.46***. See Wiring Diagram.
5. Using a slotted screwdriver, remove the screw securing the control knob to the upper control panel assembly. See ***Figure F.47***.
6. Using a 3/8” nutdriver and a slotted screwdriver, remove the two screws, nuts, lock washers and flat washers securing the selector switch to the upper control panel. See ***Figure F.46***.
7. The selector switch can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position new selector switch into the machine.
2. Using a 3/8” nutdriver and a slotted screwdriver, attach the screw, nut, lock washer and flat washer securing the selector switch to the upper control panel.
3. Using a slotted screwdriver, attach the screw securing the control knob to the upper control panel assembly.
4. Using a 1/2” open-end wrench and 1/2” nutdriver, attach the nut securing the two leads to the negative terminal of the selector switch. See Wiring Diagram.

5. Using a 1/2” open-end wrench and 1/2” nutdriver, attach the five nuts securing the heavy leads to terminals 1-5 of the selector switch. See Wiring Diagram.
6. Perform the ***Case Cover Replacement Procedure***.
7. Perform the ***Retest After Repair Procedure***.

Figure F.46 – Selector switch mounting nut locations

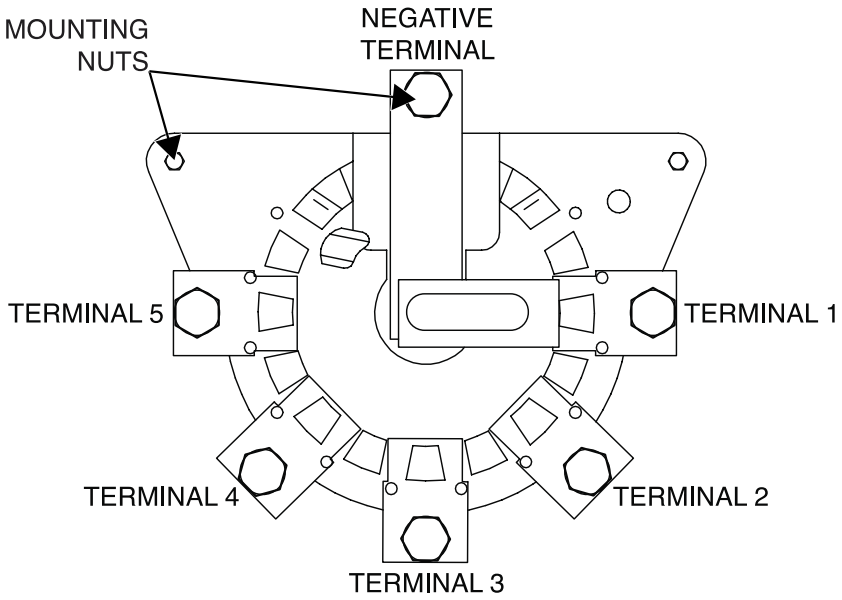
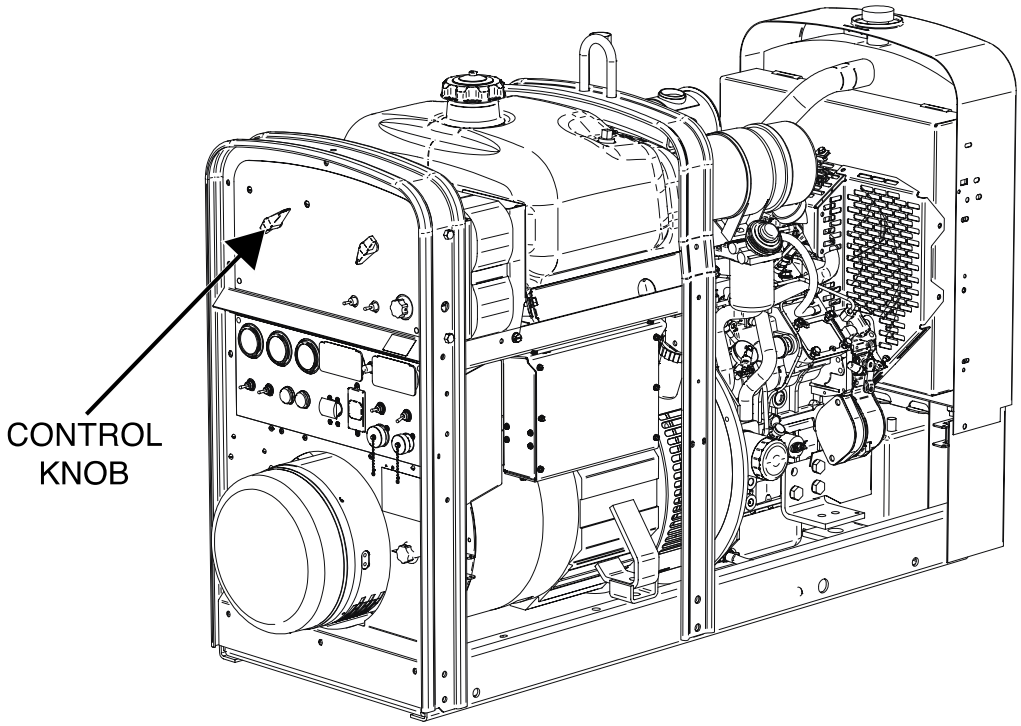


Figure F.47 – Control knob location



OUTPUT 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 Output Choke Assembly.

MATERIALS NEEDED

9/16” Nutdriver
1/2” Open-End Wrench
1/2” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a 9/16” nutdriver, remove the two bolts and nuts securing the output choke to the rear support assembly. See ***Figure F.48***.
4. Using a 1/2” open-end wrench and a 1/2” nutdriver, remove the bolt and nut securing the output choke to the fuel tank rail. See ***Figure F.49***.
5. Using a 1/2” open-end wrench and a 1/2” nutdriver, remove the bolt, nut and washer securing the heavy lead to the top terminal of the output choke. Label and disconnect the lead. See ***Figure F.50***. See Wiring Diagram.
6. Using a 1/2” open-end wrench and a 1/2” nutdriver, remove the bolt, nut and washer securing the heavy lead to the bottom terminal of the output choke. Label and disconnect the lead. See ***Figure F.50***. See Wiring Diagram.
7. The output choke can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the new output choke into the machine.
2. Using a 1/2” open-end wrench and a 1/2” nutdriver, attach the bolt, nut and washer securing the heavy lead to the bottom terminal of the output choke. See Wiring Diagram.
3. Using a 1/2” open-end wrench and a 1/2” nutdriver, attach the bolt, nut and washer securing the heavy lead to the top terminal of the output choke. See Wiring Diagram.

4. Using a 9/16” nutdriver, attach the two bolts and nuts securing the output choke to the rear support assembly.
5. Using a 1/2” open-end wrench and a 1/2” nutdriver, attach the bolt and nut securing the output choke to the fuel tank rail.
6. Perform the ***Case Cover Replacement Procedure***.
7. Perform the ***Retest After Repair Procedure***.

Figure F.48 – Output choke mounting screw location

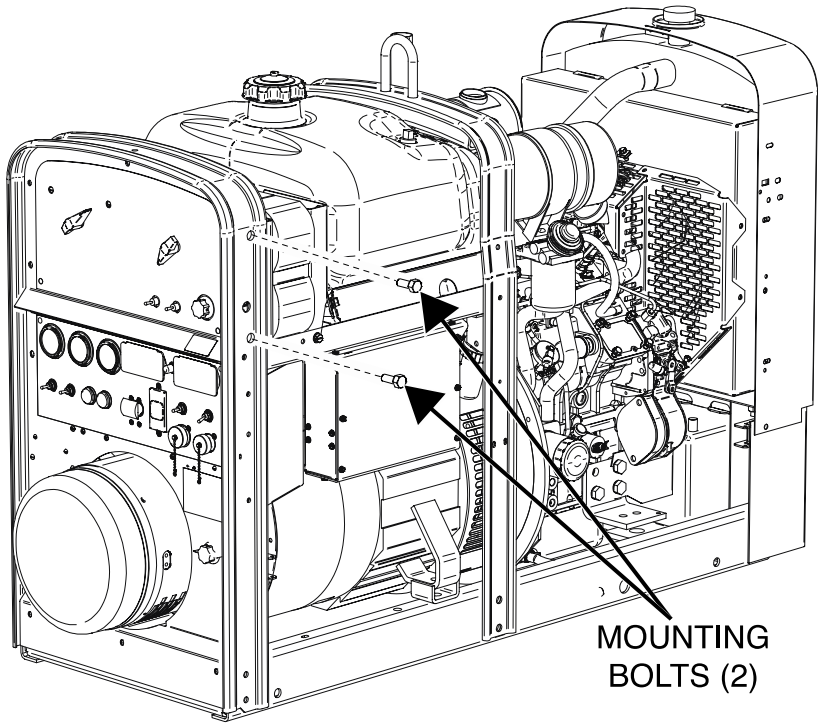


Figure F.49 – Output choke mounting screw location

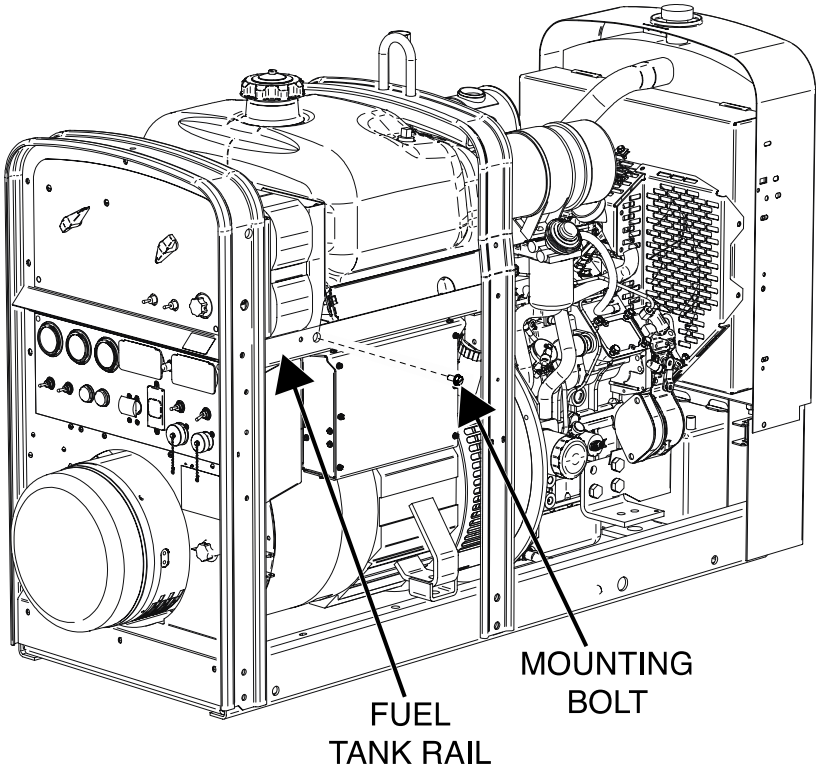
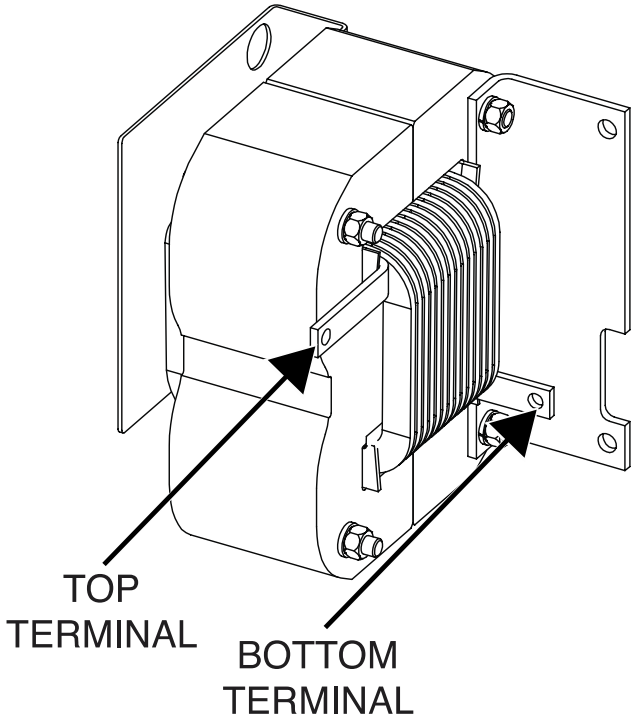


Figure F.50 –Output choke terminal locations



EXCITER FIELD DIODE 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 Exciter Field Diode.

MATERIALS NEEDED

3/8” Nutdriver
11/32” Nutdriver
Dow Corning 340 Heat Sink Compound (Lincoln Part #T12837)
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Using a 3/8” nutdriver, remove the two screws securing the finger guard panel to the machine. See ***Figure F.51***.
3. Label and disconnect leads 610, 610A, 602C, 600, 600C, and 21 from the exciter field diode terminals. See ***Figure F.52***. See Wiring Diagram.
4. Using an 11/32” nutdriver, remove the nut, lock washer and flat washer securing the exciter field diode to the machine. See ***Figure F.53***.
5. The exciter field diode can now be removed.

REPLACEMENT PROCEDURE

1. Clean the mounting surface and apply a coating of Dow Corning 340 heat sink compound to the rear of the mating surface of the exciter field diode.
2. Carefully position the new exciter field diode onto its mounting stud.
3. Using a 11/32” nutdriver, attach the nut, lock washer and flat washer securing the exciter field diode to the machine.
4. Connect leads 610, 610A, 602C, 600, 600C, and 21 to the exciter field diode terminals. See Wiring Diagram.
5. Using a 3/8” nutdriver, attach the two screws securing the finger guard panel to the machine.
6. Perform the ***Retest After Repair Procedure***.

Figure F.51 – CV box mounting hardware location

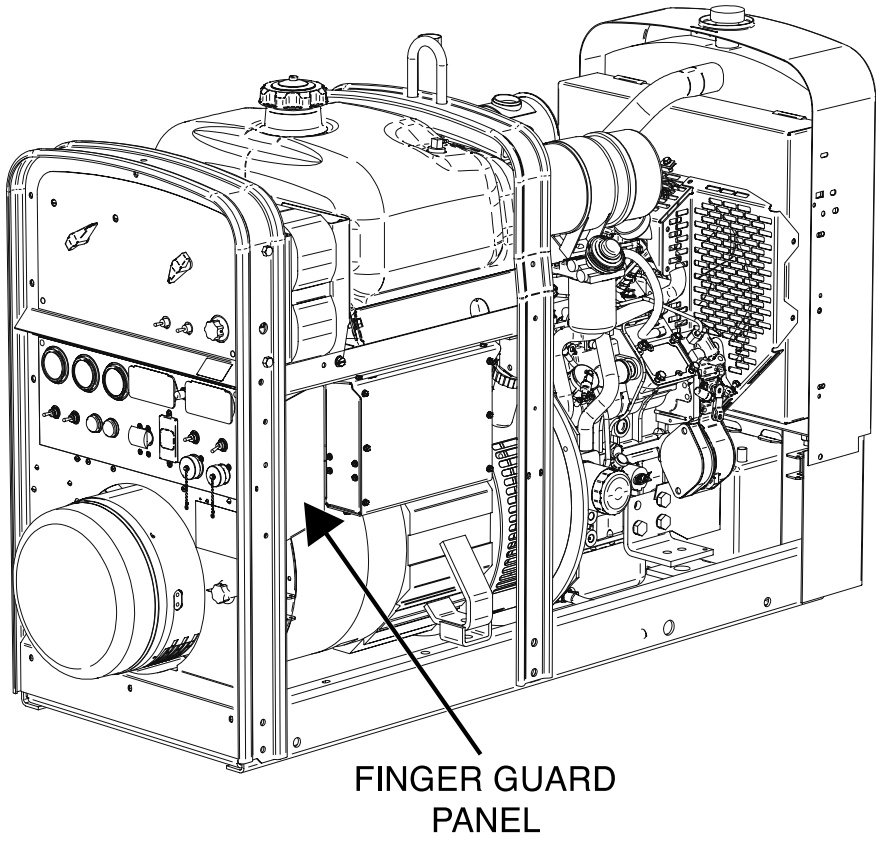


Figure F.52 – Exciter field diode lead locations

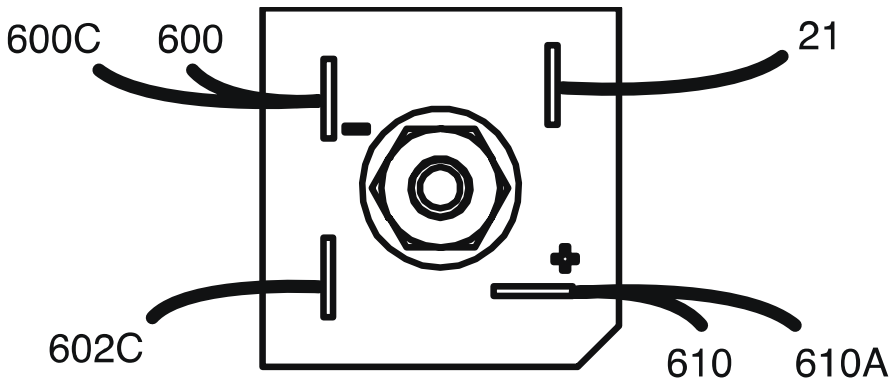
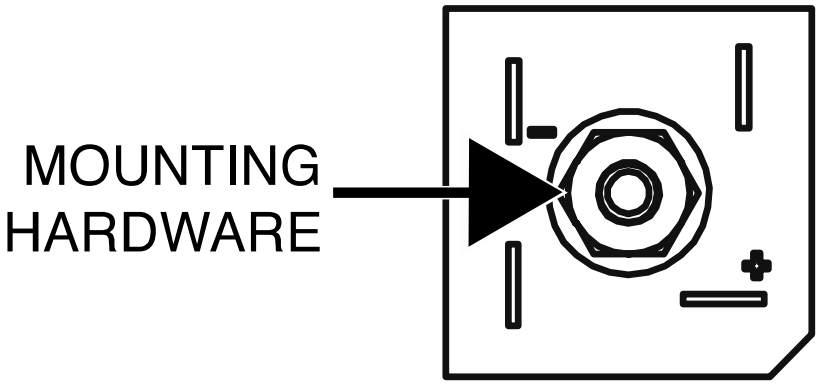


Figure F.53 – Exciter field diode mounting hardware location



FUEL TANK 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 Fuel Tank Assembly.

MATERIALS NEEDED

1/2” Nutdriver
Fuel Siphon
Fuel Container
Needle Nose Pliers
9/16” Open-End Wrench
9/16” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Using a 1/2” nutdriver, loosen the nut securing the negative battery cable to the battery. See Wiring Diagram.
4. Perform the ***Output Choke Removal Procedure***.
5. Label and disconnect leads 229 and 5J from the fuel level sensor. See ***Figure F.54***. See Wiring Diagram.
6. Using a fuel siphon, drain the fuel from the tank into an appropriate container.
7. Using needle nose pliers, label and disconnect the fuel line from the top of the fuel tank. See ***Figure F.55***. NOTE: The fuel line may still contain a small amount of fuel, take the necessary precautions to prevent fuel spills.
8. Using needle nose pliers, label and disconnect the fuel line from the bottom of the fuel tank. NOTE: The fuel line may still contain a small amount of fuel, take the necessary precautions to prevent fuel spills.
9. Using a 9/16” open-end wrench and a 9/16” nutdriver, remove the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets). See ***Figure F.56***. See Wiring Diagram. NOTE: Support the CV box to relieve strain on the cables coming out of the CV box.

10. Using a 9/16” open-end wrench and a 9/16” nutdriver, remove the two nuts, bolts, lock washers and three flat washers (one set in the front and one set in the rear) securing the fuel tank to the fuel tank rail. See ***Figure F.57***.
11. Carefully slide the fuel tank assembly forward and lift it out of the machine.
12. The fuel tank assembly can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the fuel tank assembly into the machine.
2. Using a 9/16” open-end wrench and a 9/16” nutdriver, attach the two nuts, bolts, lock washers and three flat washers (one set in the front and one set in the rear) securing the fuel tank to the fuel tank rail.
3. Using a 9/16” open-end wrench and a 9/16” nutdriver, attach the nut, bolt, lock washer and three flat washers securing each side of the CV box to the fuel tank rail (two sets).
4. Using needle nose pliers, connect the fuel line to the bottom of the fuel tank.
5. Using needle nose pliers, connect the fuel line to the top of the fuel tank.
6. Fill the fuel tank with clean fuel.
7. Connect leads 229 and 5J to the fuel level sensor. See Wiring Diagram.
8. Perform the ***Output Choke Replacement Procedure***.
9. Using a 1/2” nutdriver, tighten the nut securing the negative battery cable to the battery. See Wiring Diagram.
10. Perform the ***Case Cover Replacement Procedure***.
11. Perform the ***Retest After Repair Procedure***.

Figure F.54 – Fuel level sensor location

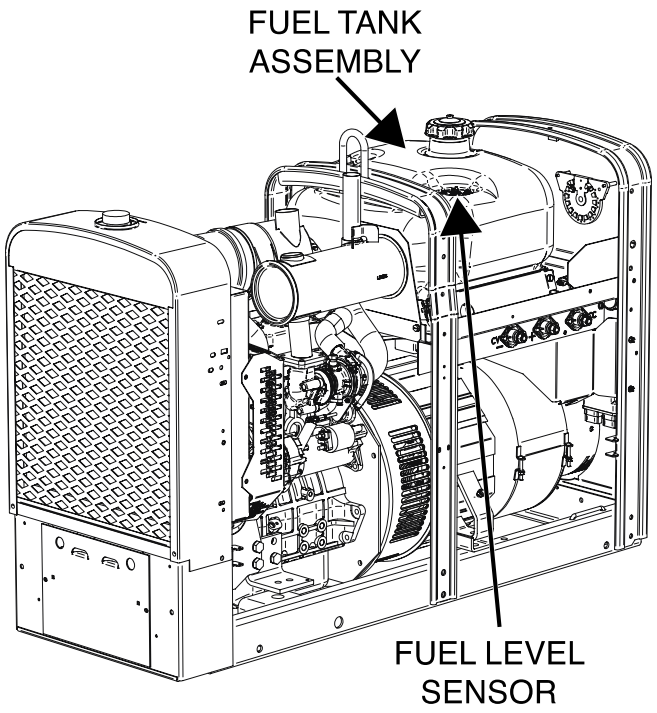


Figure F.55 – Fuel line connection location

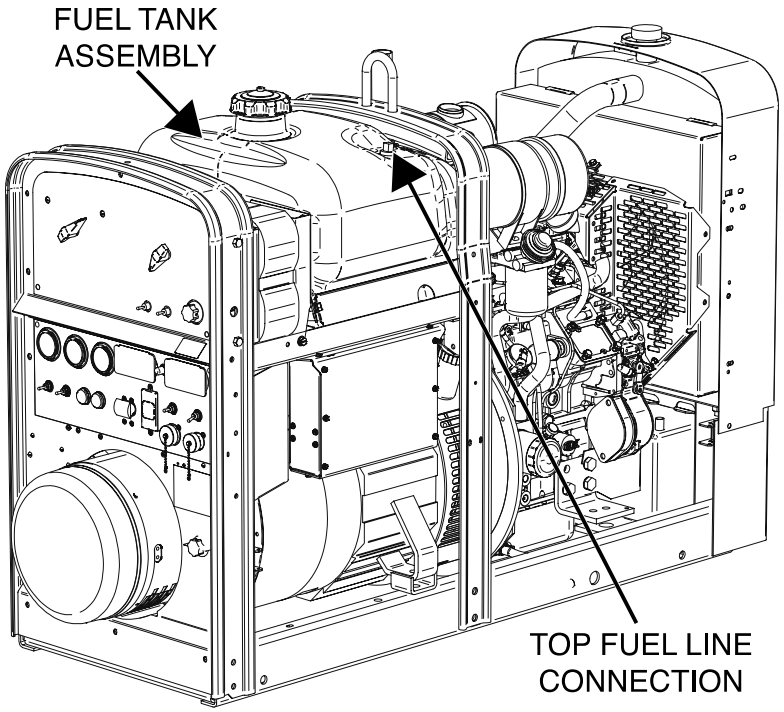


Figure F.56 – CV box mounting hardware location

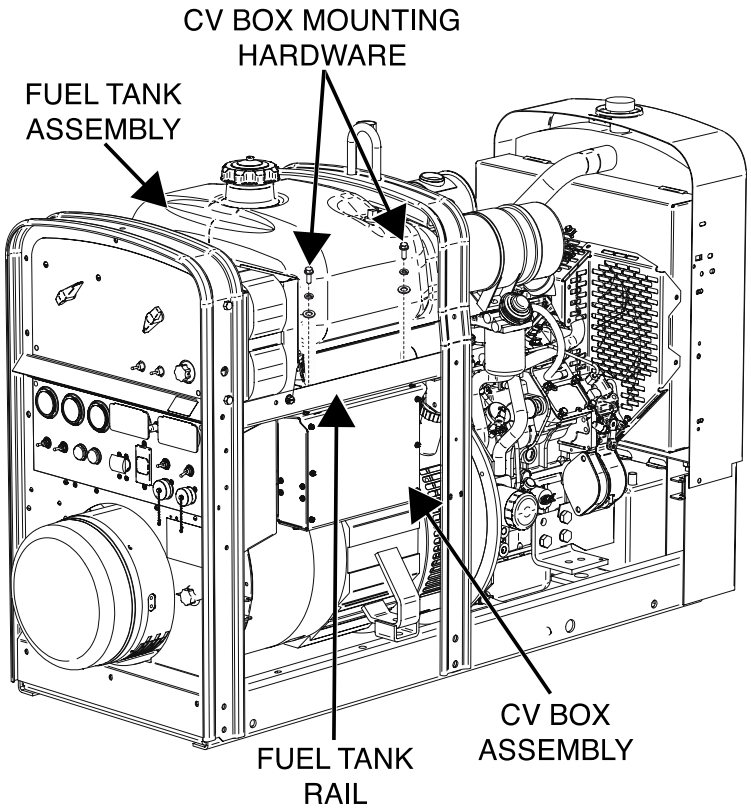
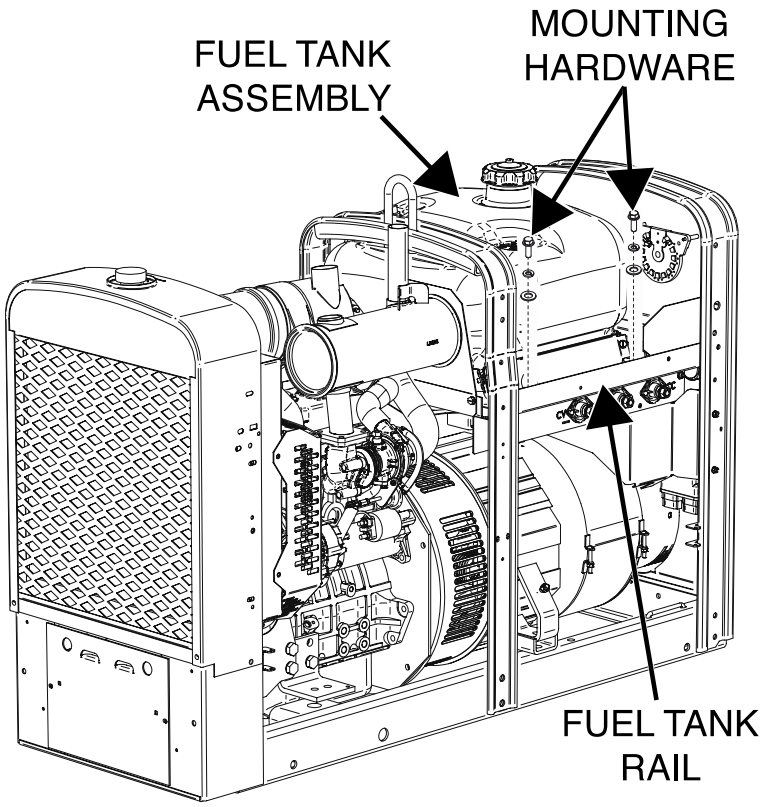


Figure F.57 – Fuel tank mounting hardware location



EXCITER BRUSH 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 Exciter Brush and Brush Holder Assembly.

MATERIALS NEEDED

5/16” Nutdriver
180 Grit Sandpaper
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Using a 5/16” nutdriver, remove the four screws securing the exciter cover to the machine. See ***Figure F.58***.
3. Using a 5/16” nutdriver, remove the two screws securing the brush and brush holder assembly to the brush holder bracket. See ***Figure F.59***.
4. Label and disconnect the leads from the brush holder terminals. See ***Figure F.59***. See Wiring Diagram.
5. Carefully slide the brush holder assembly out of the brush holder bracket. See ***Figure F.59***. Use caution when removing the brush holder assembly and do not damage the brushes.
6. The brush and brush holder assembly can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Make sure the slip rings are clean and free from oil and grease.
2. Carefully position the new brush and brush holder assembly into the brush holder bracket. Use caution when installing the brush holder assembly and do not damage the brushes.
3. Connect the previously disconnected leads to the brush holder terminals. See Wiring Diagram.
4. Using a 5/16” nutdriver, attach the two screws securing the brush and brush holder assembly to the brush holder bracket.
5. With the brushes in place, insert one end of a minimum 24” long piece of 180 grit sandpaper between the slip rings and brushes (abrasive against brushes). With slight additional finger pressure on top of brushes, pull the paper around the circumference of the rings in the direction of rotation

only. Repeat this procedure until the entire face of the brush is contoured to the radius of the slip ring.

6. Check the brushes to be certain that there is spring tension holding them firmly against the slip rings.
7. Using a 5/16” nutdriver, attach the four screws securing the exciter cover to the machine.
8. Perform the ***Retest After Repair Procedure***.

Figure F.58 – Exciter cover location

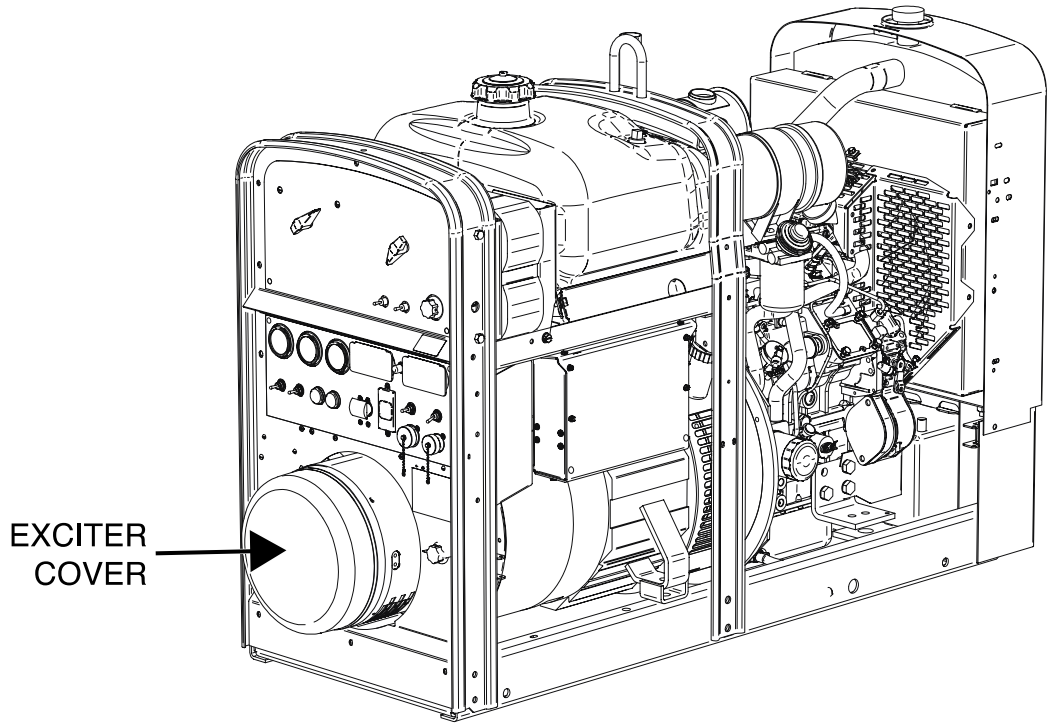
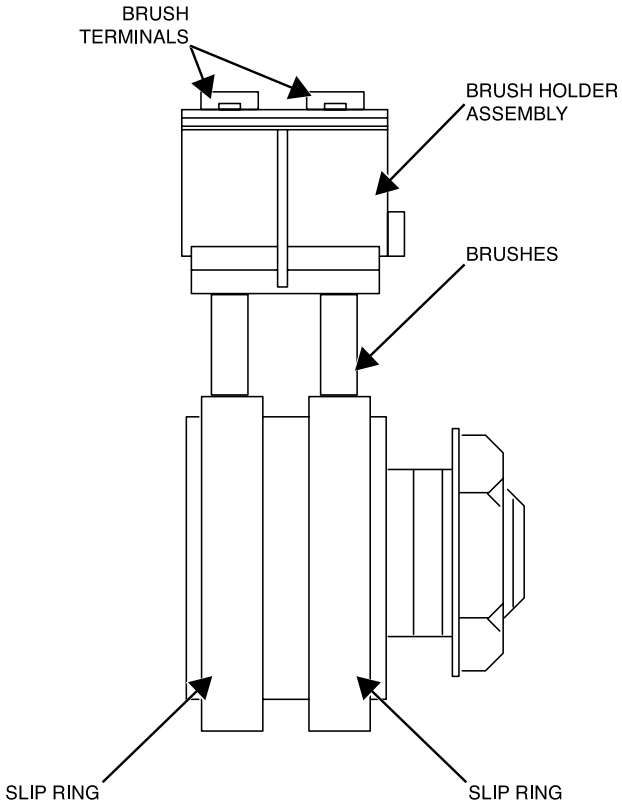


Figure F.59 – Brush holder assembly location



EXCITER ROTOR 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 Exciter Rotor Assembly.

MATERIALS NEEDED

1/2” Nutdriver
7/16” Nutdriver
7/16” Open-End Wrench
1 5/8” Open-End Wrench
Gear Puller
Wiring Diagram

REMOVAL PROCEDURE

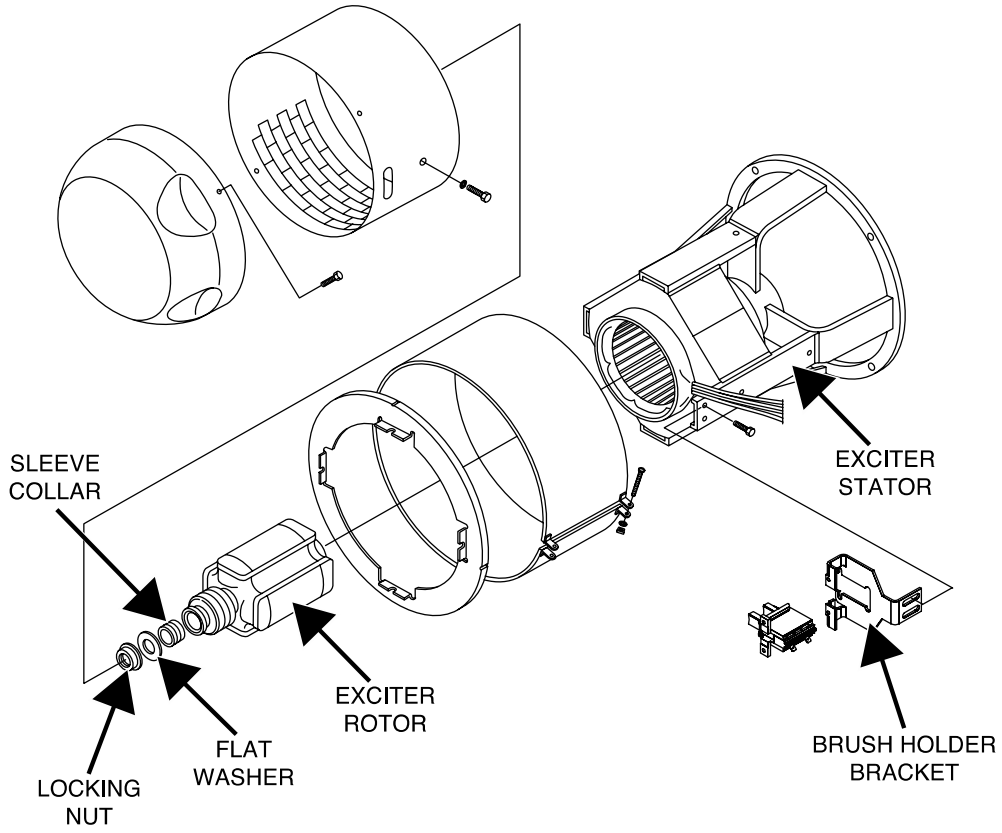
1. Turn off the engine on the Classic 300 MP machine.
2. Using a 1/2” nutdriver, loosen the nut securing the negative battery cable to the battery. See Wiring Diagram.
3. Perform the ***Exciter Brush Removal Procedure***.
4. Using a 7/16” nutdriver and a 7/16” open-end wrench, remove the two bolts, nuts, lock washers and flat washers securing the brush holder bracket to the exciter stator frame. See ***Figure F.60***.
5. Bend the flat washer away from the rotor locking nut.
6. Using a 1 5/8” open-end wrench, remove the rotor locking nut and washer. See ***Figure F.60***.
7. Using a gear puller (if necessary), remove the sleeve collar. See ***Figure F.60***. Be careful not to damage the rotor slip ring assembly.
8. Carefully slide the rotor assembly off of the generator shaft.
9. The exciter rotor can now be replaced.

REPLACEMENT PROCEDURE

1. Carefully slide the rotor assembly onto the generator shaft.
2. Using a gear puller, attach the sleeve collar. Be careful not to damage the rotor slip ring assembly.
3. Using a 1 5/8” open-end wrench, attach the rotor locking nut and washer. Torque the locking nut to 175 ft./lbs.
4. Bend the washer down over the locking nut.

5. Check the rotor air gap, .017” minimum is allowed.
6. Using a 7/16” nutdriver and a 7/16” open-end wrench, attach the two bolts, nuts, lock washers and flat washers securing the brush holder bracket to the exciter stator frame.
7. Perform the ***Exciter Brush Replacement Procedure***.
8. Using a 1/2” nutdriver, loosen the nut securing the negative battery cable to the battery. See Wiring Diagram.
9. Perform the ***Retest After Repair Procedure***.

Figure F.60 – Exciter rotor mounting hardware locations



EXCITER STATOR 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 Exciter Stator.

MATERIALS NEEDED

7/16” Nutdriver
3/8” Nutdriver
Slotted Screwdriver
11/16” Nutdriver
Hammer
1/2” Nutdriver
1/2” Open-End Wrench
3/4” Nutdriver
3/4” Open-End Wrench
9/16” Nutdriver
9/16” Open-End Wrench
5/8” Wrench
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Exciter Rotor Removal Procedure***.
4. Perform the ***Fuel Tank Removal Procedure***.
5. Using a 7/16” nutdriver and a slotted screwdriver, remove the two nuts and screws securing the cover to the stator frame. See ***Figure F.61***.
6. Using a 3/8” nutdriver, remove the four screws, nuts and washers securing the exciter wraparound cover to the machine. See ***Figure F.61***.
7. Using a 7/16” Nutdriver, remove the bolt, lock washer and flat washer securing the positive lead to the POS terminal on the caps board. See ***Figure F.62***. See Wiring Diagram. Label and disconnect the positive lead.
8. Using a 3/8” nutdriver, remove the nut securing lead GND-F to the CV box. See ***Figure F.62***. See Wiring Diagram. Label and disconnect lead GND-F.

9. Using a slotted screwdriver, remove the screw securing the negative lead to contactor CR2. See ***Figure F.62***. See Wiring Diagram. Label and disconnect the negative lead.
10. Label and disconnect leads 630 and 631 from the top terminals of contactor CR2. See ***Figure F.62***. See Wiring Diagram.
11. Label and disconnect leads 633 and 634 from the quick-connects of contactor CR1. See ***Figure F.62***. See Wiring Diagram.
12. Using a slotted screwdriver, remove the four screws securing contactor CR1 to the CV box. See ***Figure F.63***.
13. Using a 11/16" nutdriver, remove the two nuts securing each of the heavy leads to the top terminals of contactor CR1. Remove the nuts one at a time. See ***Figure F.62***. See Wiring Diagram.
14. Carefully lift the contactor away from the CV box and slide the leads off of the top terminals of contactor CR1.
15. Using a hammer and slotted screwdriver, loosen the three nuts securing the cord grip connectors to the CV box. See ***Figure F.62***.
16. Carefully route the leads and cables thru the cord grip connector and out of the CV box. See Wiring Diagram. The CV box can now be removed.
17. Using a 3/8" nutdriver, remove the two screws securing the finger guard panel to the machine. See ***Figure F.64***.
18. Label and disconnect plugs J12, J6, J7, J1 and J2 from the control board. See ***Figure F.65***. See Wiring Diagram.
19. Using a 3/8" nutdriver, remove the two screws and washers securing the control PCB mounting bracket to the fuel tank rail.
20. Cut cable ties as necessary to remove the control board assembly.
21. Carefully remove the control board assembly out of the machine.
22. Using a 1/2" nutdriver and 1/2" open-end wrench, remove the six nuts securing the heavy leads to the terminals of the selector switch. See ***Figure F.66***. See Wiring Diagram. Label and disconnect the leads from the selector switch.
23. Using a 3/4" nutdriver and 3/4" open-end wrench, remove the bolt and nut securing the three leads to the positive output terminal. See ***Figure F.67***. See Wiring Diagram.
24. Using a 3/8" nutdriver, remove the three screws securing the finger guard panel to the machine. See ***Figure F.67***.
25. Label and disconnect the engine control unit (ECU) connector from the engine control unit (ECU). See ***Figure F.68***. See Wiring Diagram.
26. Label and disconnect plug J51 from the coolant temperature gauge. See ***Figure F.68***. See Wiring Diagram.
27. Label and disconnect plug J52 from the fuel/hour meter/LED gauge. See ***Figure F.68***. See Wiring Diagram.
28. Label and disconnect plug J53 from the oil pressure gauge. See ***Figure F.68***. See Wiring Diagram.
29. Label and disconnect lead 203A from the 15 amp fuse holder on the lower control panel. See ***Figure F.68***. See Wiring Diagram.
30. Label and disconnect lead 602C from the exciter field diode on the lower control panel. See ***Figure F.68***. See Wiring Diagram.
31. Label and disconnect lead 810 from the circuit breaker CB2 on the lower control panel. See ***Figure F.68***. See Wiring Diagram.

32. Label and disconnect lead 820 from the ground stud on the lower control panel. See ***Figure F.68***. See Wiring Diagram.
33. Label and Disconnect lead 11B from circuit breaker CB1 on the lower control panel. See ***Figure F.68***. See Wiring Diagram. **NOTE:** Lead 11B passes thru the current transformer.
34. Label, disconnect and clear any other leads in preparation for removing of the front panel to allow for the removal of the exciter stator. Cut any cable ties as necessary.
35. Using a 1/2" nutdriver and 1/2" open-end wrench, remove the bolt, nut and washers securing each side of the front panel to the fuel tank rail. See ***Figure F.69***.
36. Using a 9/16" nutdriver and 9/16" open-end wrench remove the two bolts, nuts and lock washers securing each side of the front panel to the base assembly. See ***Figure F.69***.
37. Carefully slide the front panel assembly to the side of the machine to allow for the removal of the exciter stator. Cut any cable ties as necessary.
38. Lift the eight brushes from the commutator. Note the position of the brushes for reassembly.
39. Using a 1/2" nutdriver, disconnect and clear the four heavy cables and the white and yellow voltage sense leads from the generator brush holders to the coils in the generator frame. See Wiring Diagram. Note the locations of the white and yellow voltage sense leads.
40. Using a 5/8" wrench, remove the four bolts securing the stator frame to the generator frame. Note the "drill spot" for reassembly. See ***Figure F.70***.
41. Using a 7/16" nutdriver, loosen (do not remove) the generator brush holder clamping bolt. Note the drill spot for reassembly. See ***Figure F.70***.
42. Carefully pry the stator end bracket away from the generator frame assembly. NOTE: The generator brush holder assembly will also be removed.
43. The exciter stator can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position new stator assembly into the machine. Align the mating parts with the drill spot.
2. Using a 5/8" nutdriver, attach the four bolts securing the stator frame to the generator frame.
3. Check the armature air gap. Minimum gap is .035". Loosen the four mounting bolts; adjust and re-tighten if necessary.
4. Using a 7/16" nutdriver, tighten the generator brush holder clamping bolt.
5. Using a 1/2" nutdriver, connect the four heavy cables and the white and yellow voltage sense leads from the generator brush holders to the coils in the generator frame. See Wiring Diagram.
6. Place the eight commutator brushes back into the proper positions.
7. Carefully position the front panel assembly on the machine.
8. Using a 9/16" nutdriver and 9/16" open-end wrench attach the two bolts, nuts and lock washers securing each side of the front panel to the base assembly.
9. Using a 1/2" nutdriver and 1/2" open-end wrench, attach the bolt, nut and washers securing each side of the front panel to the fuel tank rail.
10. Connect and route any additional leads previously disconnected. Replace any cable ties as necessary.
11. Connect lead 11B to circuit breaker CB1 on the lower control panel. See Wiring Diagram. **NOTE:** Lead 11B passes thru the current transformer.
12. Connect lead 820 to the ground stud on the lower control panel. See Wiring Diagram.
13. Connect lead 810 to the circuit breaker CB2 on the lower control panel. See Wiring Diagram.

14. Connect lead 602C to the exciter field diode on the lower control panel. See Wiring Diagram.
15. Connect lead 203A to the 15 amp fuse holder on the lower control panel. See Wiring Diagram.
16. Connect plug J53 to the oil pressure gauge. See Wiring Diagram.
17. Connect plug J52 to the fuel/hour meter/LED gauge. See Wiring Diagram.
18. Connect plug J51 to the coolant temperature gauge. See Wiring Diagram.
19. Connect the engine control unit (ECU) connector to the engine control unit (ECU). See Wiring Diagram.
20. Using a 3/4" nutdriver and 3/4" open-end wrench, attach the bolt and nut securing the three leads to the positive output terminal. See Wiring Diagram.
21. Using a 1/2" nutdriver and 1/2" open-end wrench, attach the six nuts securing the heavy leads to the terminals of the selector switch. See Wiring Diagram.
22. Carefully position the control board assembly into the machine.
23. Using a 3/8" nutdriver, attach the two screws and washers securing the control PCB mounting bracket to the fuel tank rail.
24. Connect plugs J12, J6, J7, J1 and J2 to the control board. See Wiring Diagram.
25. Replace cable ties as necessary.
26. Carefully route the cables for the caps board, contactor CR1 and CR2 into the cord grip connectors on the CV box.
27. Using a hammer and slotted screwdriver, tighten the three nuts securing the cord grip connectors to the CV box.
28. Carefully position contactor CR1 into the CV box and slide the leads off onto the top terminals.
29. Using a 11/16" nutdriver, attach the two nuts securing each of the heavy leads to the top terminals of contactor CR1. Attach the nuts one at a time. See Wiring Diagram.
30. Using a slotted screwdriver, attach the four screws securing contactor CR1 to the CV box.
31. Connect leads 633 and 634 to the quick-connects of contactor CR1. See Wiring Diagram.
32. Connect leads 630 and 631 to the top terminals of contactor CR2. See Wiring Diagram.
33. Using a slotted screwdriver, attach the screw securing the negative lead to contactor CR2. See Wiring Diagram.
34. Using a 3/8" nutdriver, attach the nut securing lead GND-F to the CV box. See Wiring Diagram.
35. Using a 7/16" Nutdriver, attach the bolt, lock washer and flat washer securing the positive lead to the POS terminal of the caps board. See Wiring Diagram.
36. Using a 3/8" nutdriver, attach the four screws, nuts and washers securing the exciter wraparound cover to the machine.
37. Using a 7/16" nutdriver and a slotted screwdriver, attach the two nuts and screws securing the cover to the stator frame.
38. Perform the ***Fuel Tank Replacement Procedure***.
39. Perform the ***Exciter Rotor Replacement Procedure***.
40. Perform the ***Case Cover Replacement Procedure***.
41. Perform the ***Retest After Repair Procedure***.

Figure F.61 – Cover and exciter wraparound cover locations

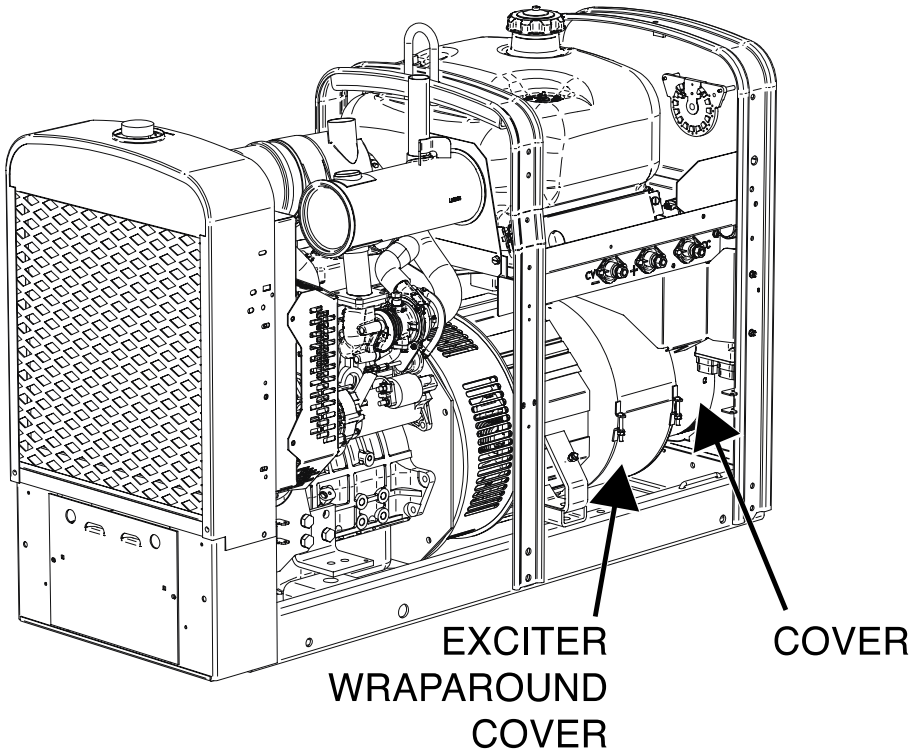


Figure F.62 – CV box lead locations

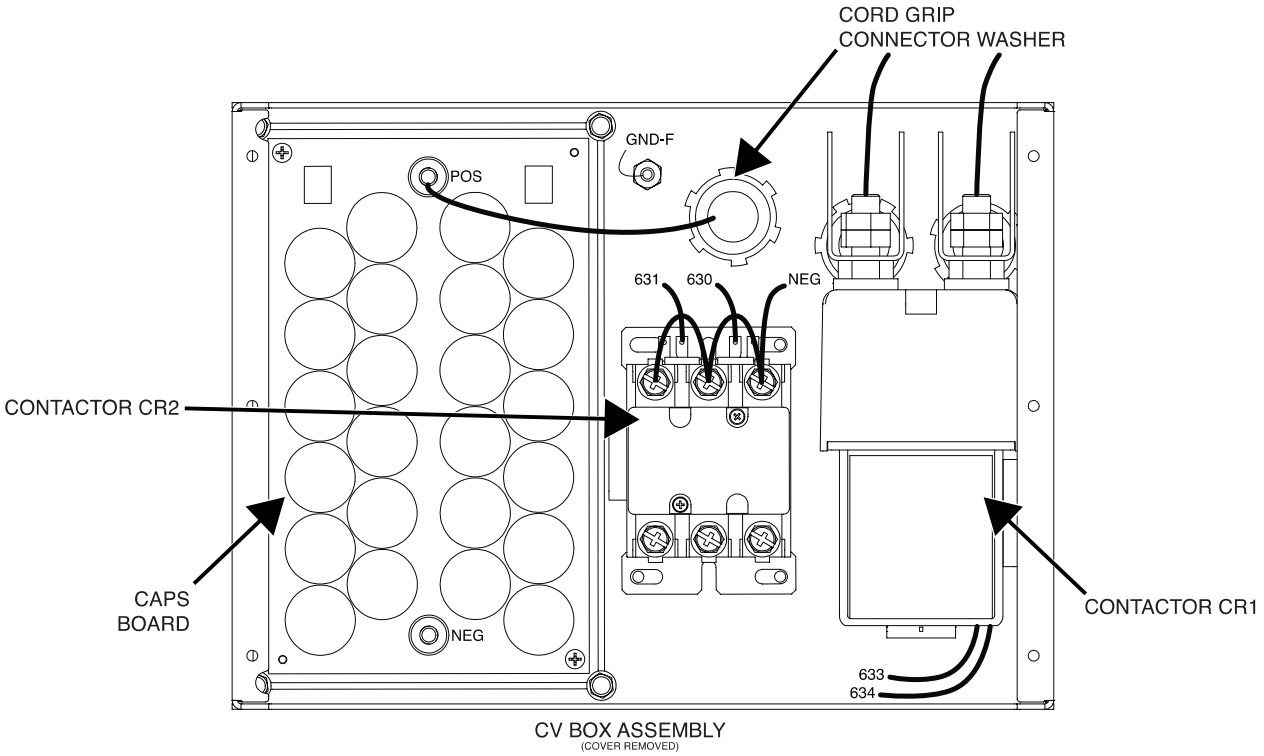


Figure F.63 – CV box component mounting hardware locations

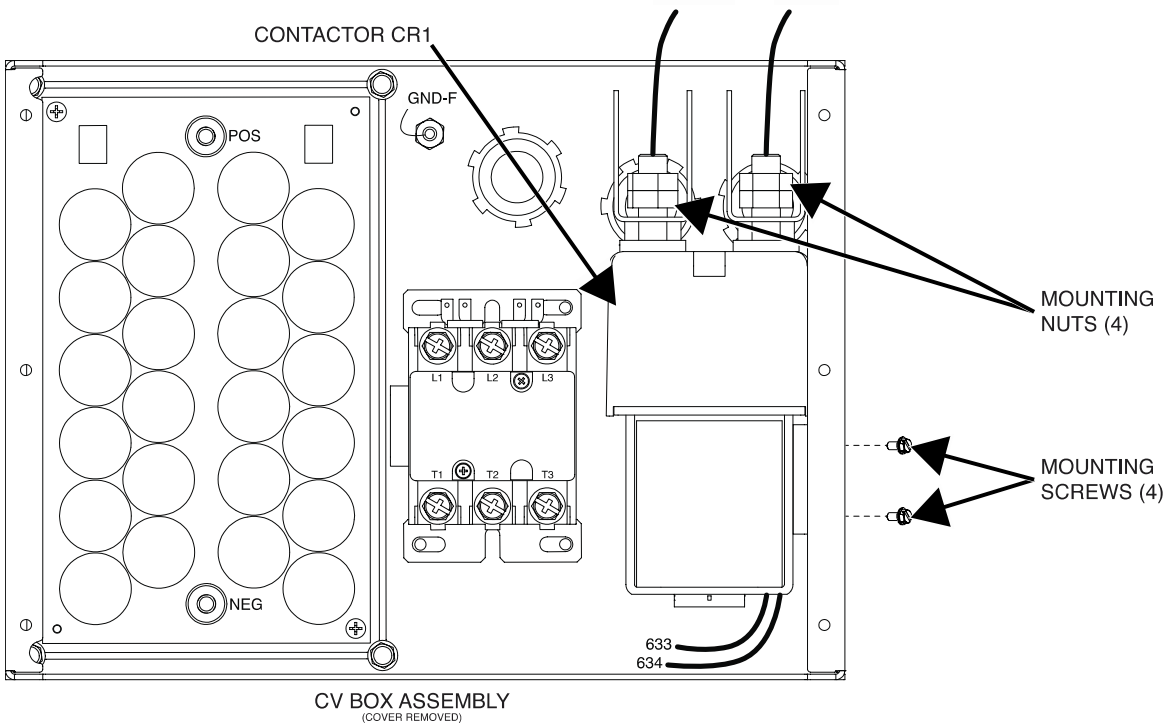


Figure F.64 – Finger guard panel location

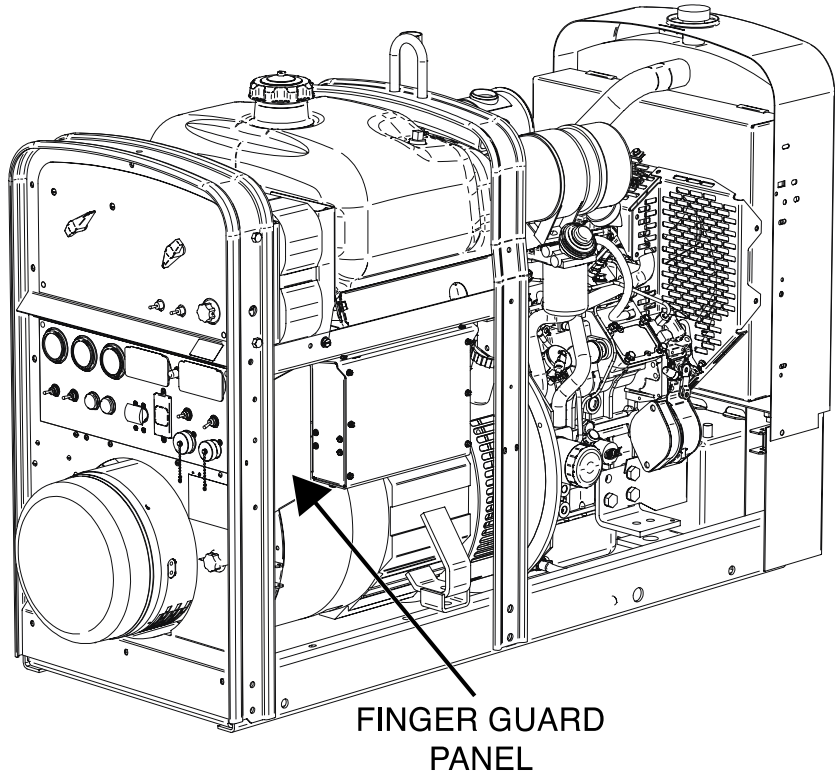


Figure F.65 – Control board plug locations

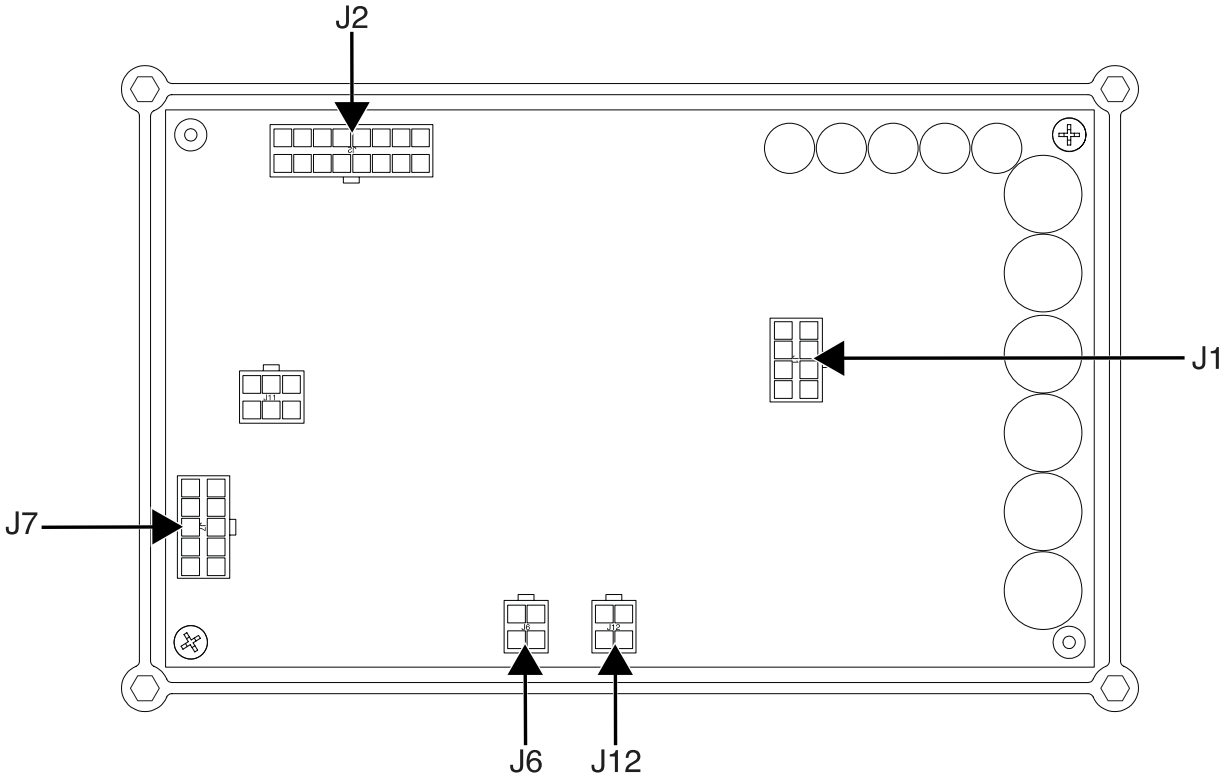


Figure F.66 – Selector switch lead locations

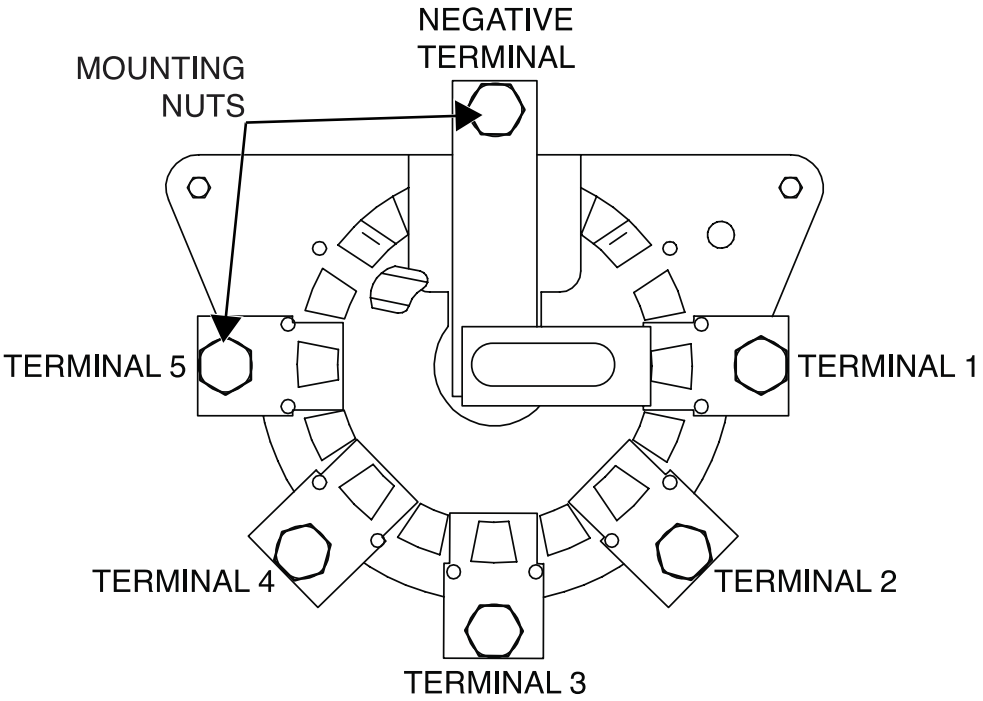


Figure F.67 – Positive output terminal and finger guard panel location

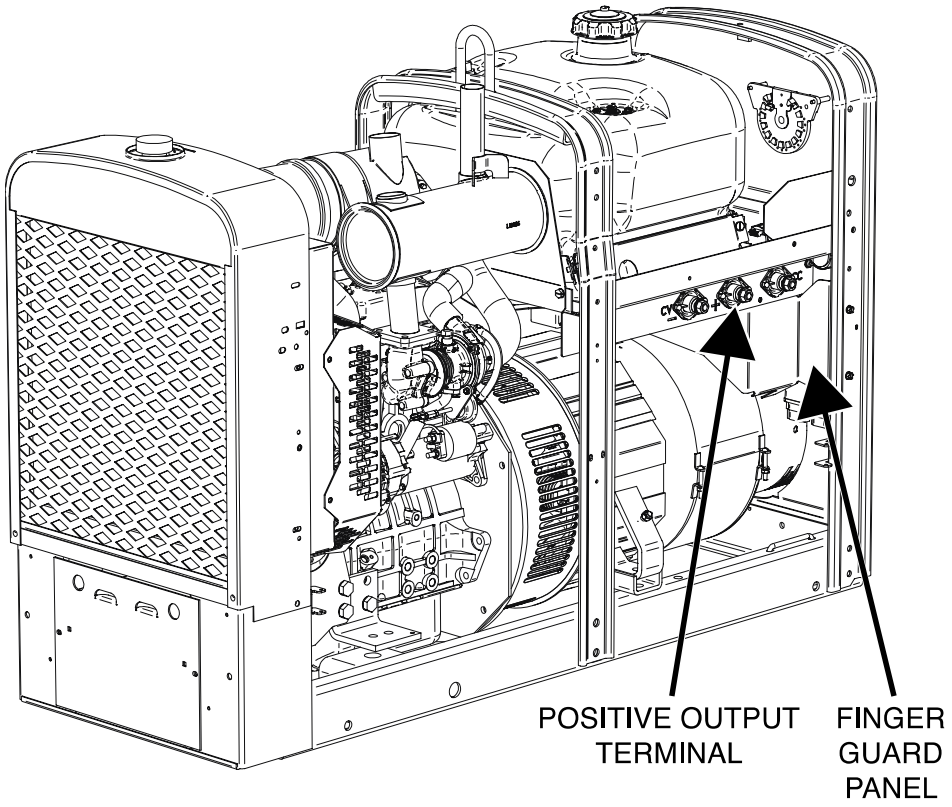


Figure F.68 – Lower control panel plug and lead locations

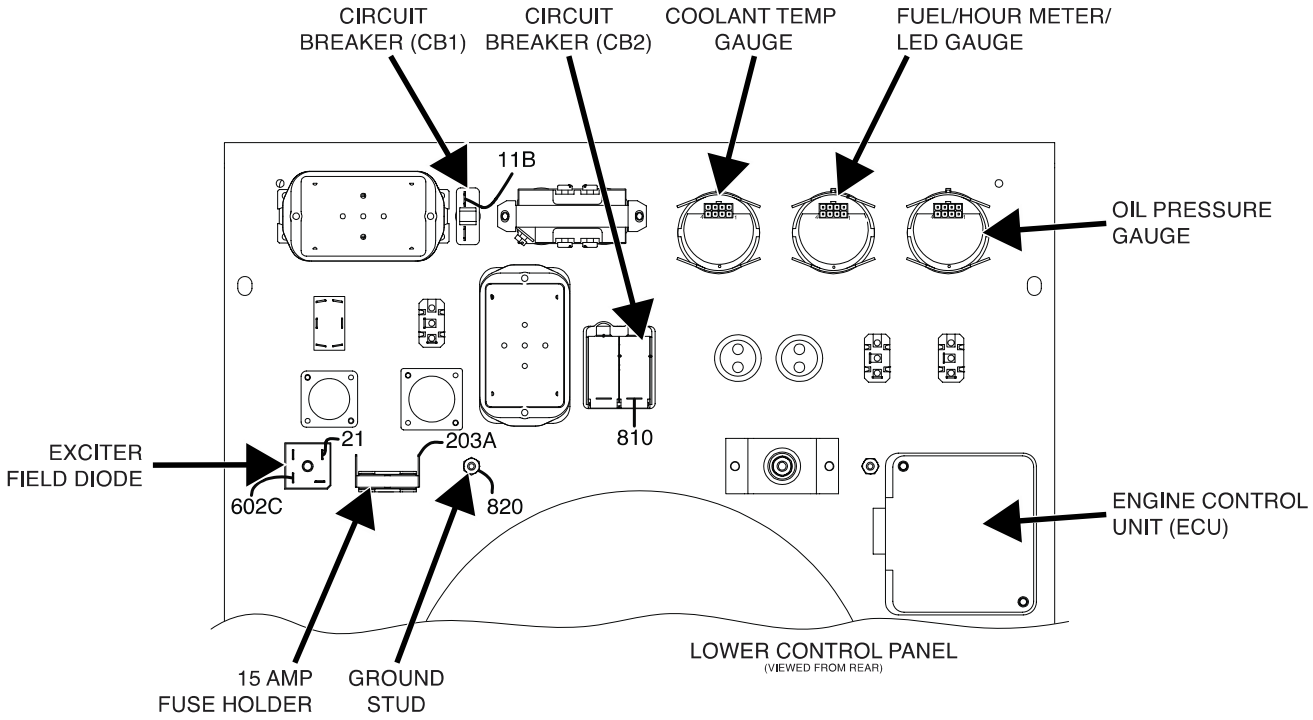


Figure F.69 – Front panel mounting screw locations

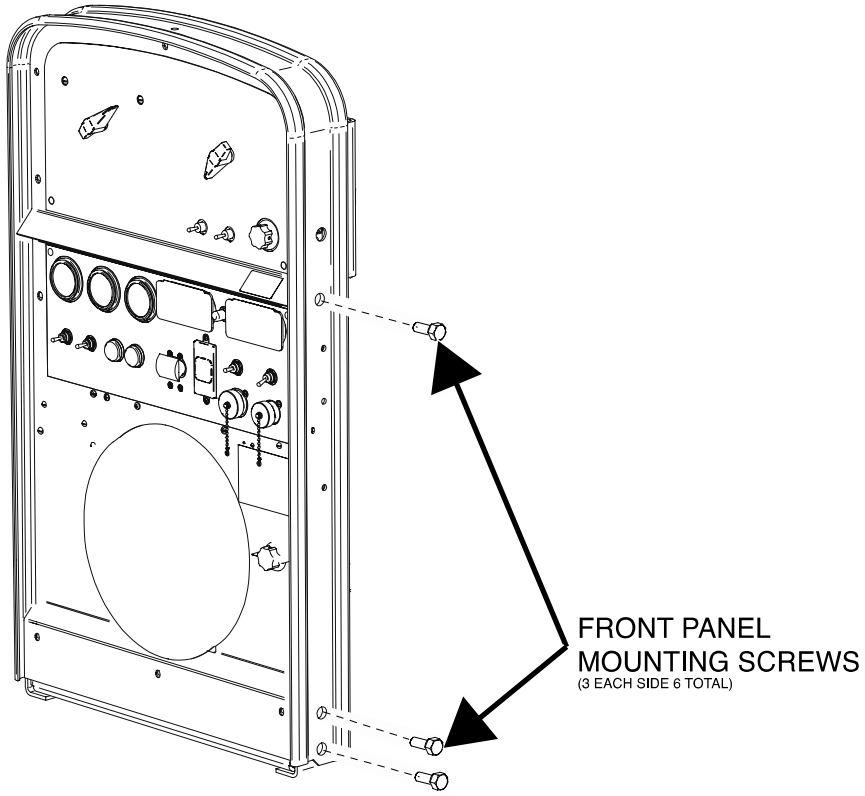
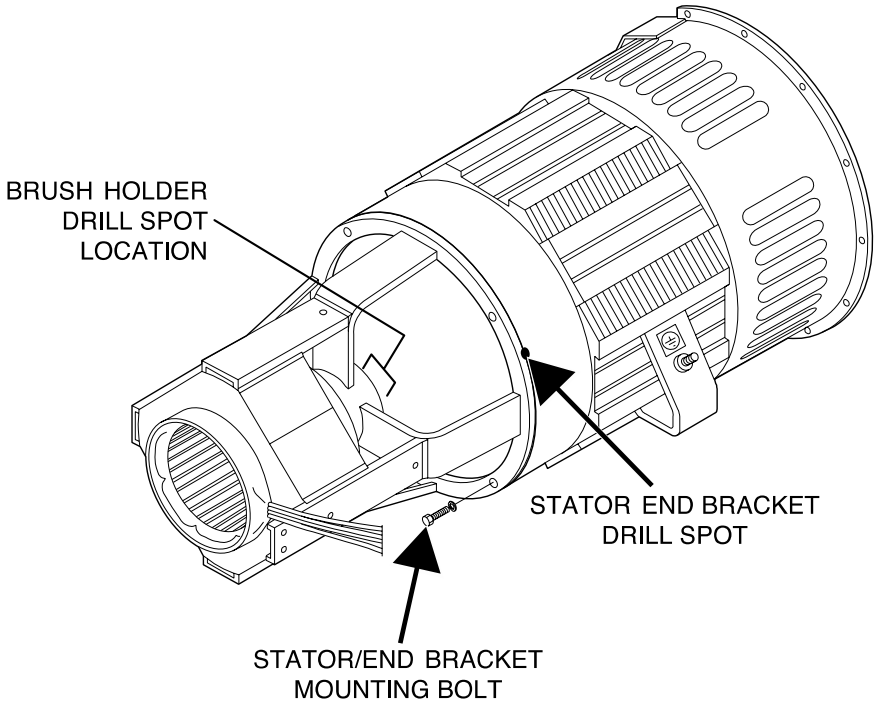


Figure F.70 – Exciter stator mounting hardware locations



GENERATOR FRAME 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 Generator Frame.

MATERIALS NEEDED

3/4” Wrench
Rope Sling
Wood Or Steel Blocking
9/16” Wrench

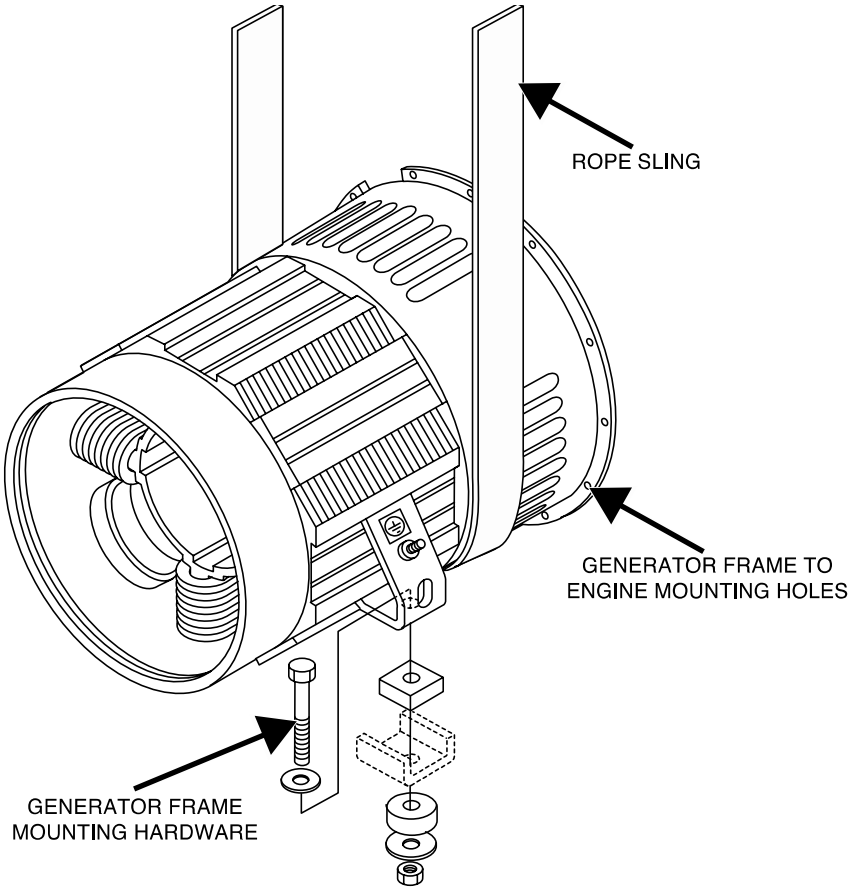
REMOVAL PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Exciter Stator Removal Procedure***.
4. Using a 3/4” wrench, remove the frame mounting bolts, nuts and spacers from the feet of the generator frame. See ***Figure F.71***.
5. Using a rope sling around the generator frame, carefully lift the frame and engine assembly a small distance. Place wood or steel block under the engine adapter plate.
6. Using a 9/16” wrench, remove the five bolts securing the generator frame to the engine. See ***Figure F.71***.
7. The generator frame can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Using a rope sling, support the generator frame. Carefully mount the generator frame to the engine and armature assembly. Before removing the rope sling, be sure to support the generator frame with the wood or steel block under the engine adapter plate.
2. Using a 9/16” wrench, attach the five bolts securing the generator frame to the engine.
3. Using a 3/4” wrench, attach the frame mounting bolts, nuts and spacers securing the feet of the generator frame to the machine base assembly.
4. Perform the ***Exciter Stator Replacement Procedure***.
5. Perform the ***Case Cover Replacement Procedure***.
6. Perform the ***Retest After Repair Procedure***.

Figure F.71 – Generator frame mounting hardware locations



GENERATOR ARMATURE 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 Generator Armature.

MATERIALS NEEDED

Rope Sling
Wood Or Steel Blocks
5/8” Wrench
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the engine on the Classic 300 MP machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Generator Frame Removal Procedure***.
4. Using a rope sling, support the generator armature assembly. See ***Figure F.72***.
5. Using wood or steel blocks, support the engine.
6. Using a 5/8” wrench, remove the bolts and lock washers securing the blower paddles and the armature to the engine flywheel. See ***Figure F.72***.
7. With the armature supported and “balanced” in the rope sling, carefully rotate the armature 1/8 turn in either direction to release. The armature is free of the machine.
8. The armature can now be removed and replaced.

REPLACEMENT PROCEDURE

1. With the armature supported and “balanced” in the rope sling, carefully rotate the armature 1/8 turn in either direction to mate the armature with the engine flywheel.
2. Using a 5/8” wrench, attach the bolts and lock washers securing the blower paddles and the armature to the engine flywheel.
3. Perform the ***Generator Frame Replacement Procedure***.
4. Perform the ***Case Cover Replacement Procedure***.
5. Perform the ***Retest After Repair Procedure***.

Figure F.72 – Generator armature mounting bolt and rope sling attachment locations

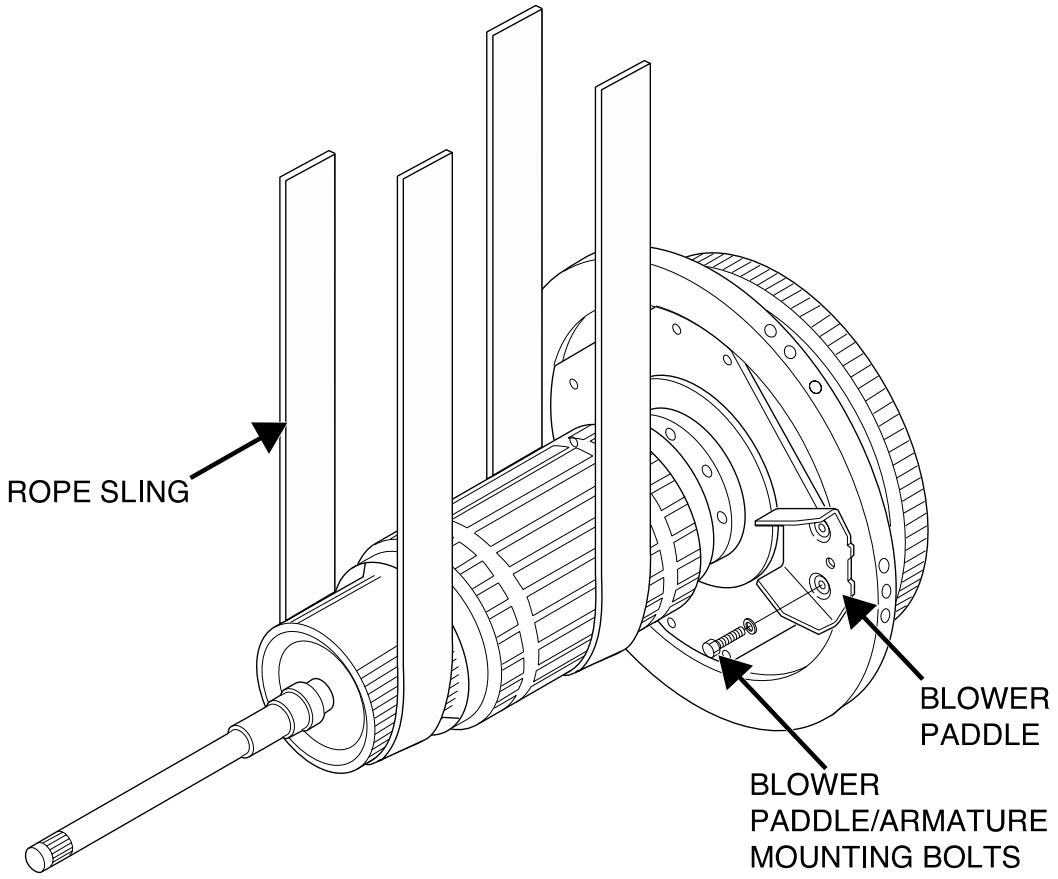
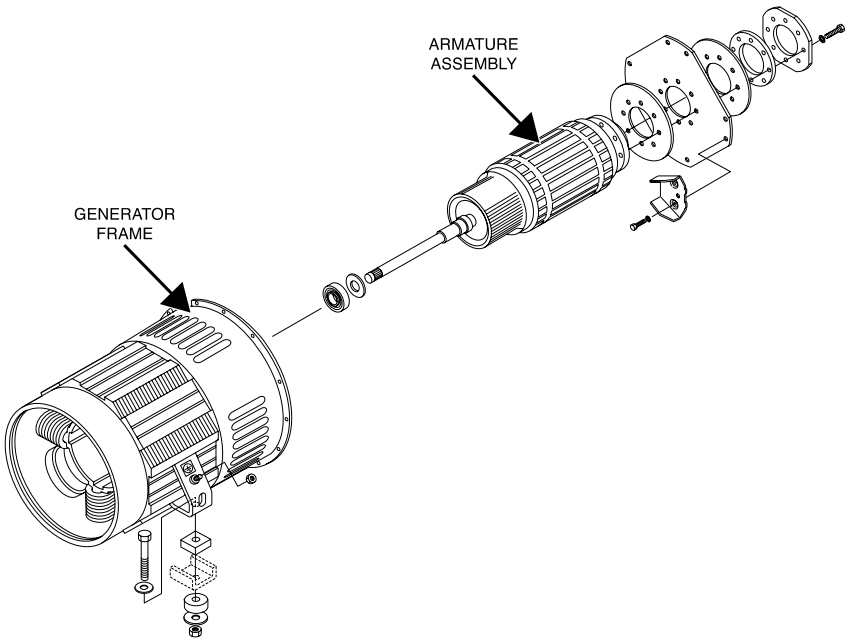


Figure F.73 – Generator armature mounting bolt and rope sling attachment locations



RETEST AFTER REPAIR

Retest a machine:

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

OR

• If you repair or replace any electrical components.

ENGINE OUTPUT

MODE	NO LOAD RPM	LOAD RPM
LOW IDLE	1400 - 1475	NA
HIGH IDLE	1780 - 1810	1800

WELDER DC OUTPUT

FINE CURRENT CONTROL	COARSE CURRENT CONTROL	OPEN CIRCUIT VOLTAGE	LOAD VOLTS	LOAD AMPS
MAXIMUM	MAXIMUM	91 – 98.5	32	300

AC AUXILIARY POWER RECEPTACLE OUTPUT

230 VOLT RECEPTACLE			115 VOLT RECEPTACLE		
OPEN CIRCUIT VOLTAGE	LOAD VOLTS	LOAD AMPS	OPEN CIRCUIT VOLTAGE	LOAD VOLTS	LOAD AMPS
240 - 254	240	13.0	118 - 128	120	2.6