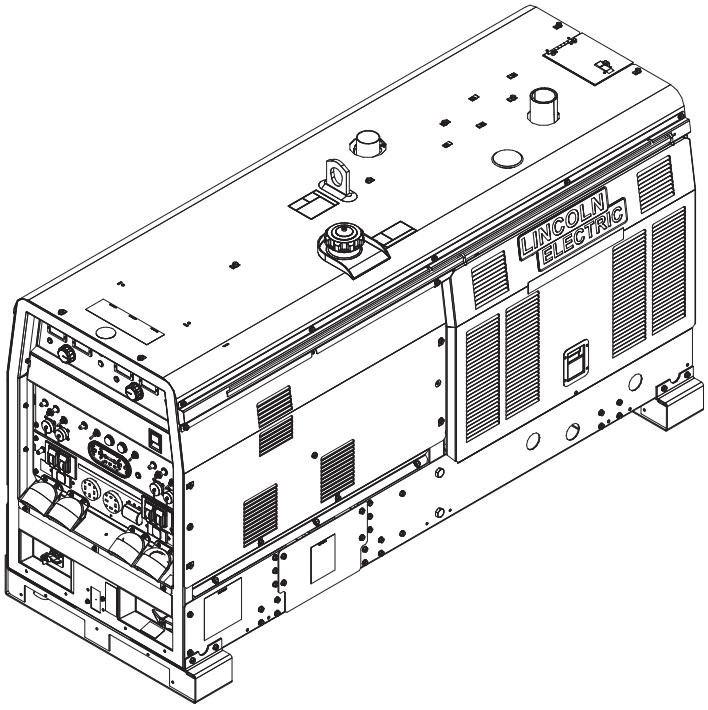
LINCOLN ELECTRIC

Dual Vantage® 700

For use with machines having Code Numbers:
Dual Vantage® 700: 12320

SERVICE MANUAL



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THE LINCOLN ELECTRIC COMPANY
22801 St. Clair Avenue • Cleveland, OH • 44117-1199 • U.S.A.
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THANK YOU FOR SELECTING A QUALITY PRODUCT BY LINCOLN ELECTRIC.

PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

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

SAFETY DEPENDS ON YOU

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

⚠ WARNING

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

⚠ CAUTION

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

KEEP YOUR HEAD OUT OF THE FUMES.

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

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

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

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

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

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

WEAR CORRECT EYE, EAR & BODY PROTECTION

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

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

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

IN SOME AREAS, protection from noise may be appropriate.

BE SURE protective equipment is in good condition.

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

SPECIAL SITUATIONS

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

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

Additional precautionary measures

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

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

REMOVE all potential fire hazards from welding area.

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

SECTION A: WARNINGS

CALIFORNIA PROPOSITION 65 WARNINGS

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

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

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

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

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

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

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

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

FOR ENGINE POWERED EQUIPMENT.

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

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

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

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

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

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

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

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

ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS

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

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

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

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

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

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

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

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

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

ELECTRIC SHOCK CAN KILL.

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

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

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

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

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

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

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

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

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

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

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

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

ARC RAYS CAN BURN.

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

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

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

FUMES AND GASES CAN BE DANGEROUS.

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

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

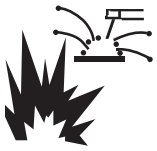
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

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

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

5.f. Also see item 1.b.

WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION.



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

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

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

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

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

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

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

6.h. Also see item 1.c.

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

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

CYLINDER MAY EXPLODE IF DAMAGED.

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

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

7.c. Cylinders should be located:

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

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

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

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

7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-I, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association, 14501 George Carter Way Chantilly, VA 20151.

FOR ELECTRICALLY POWERED EQUIPMENT.

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

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

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

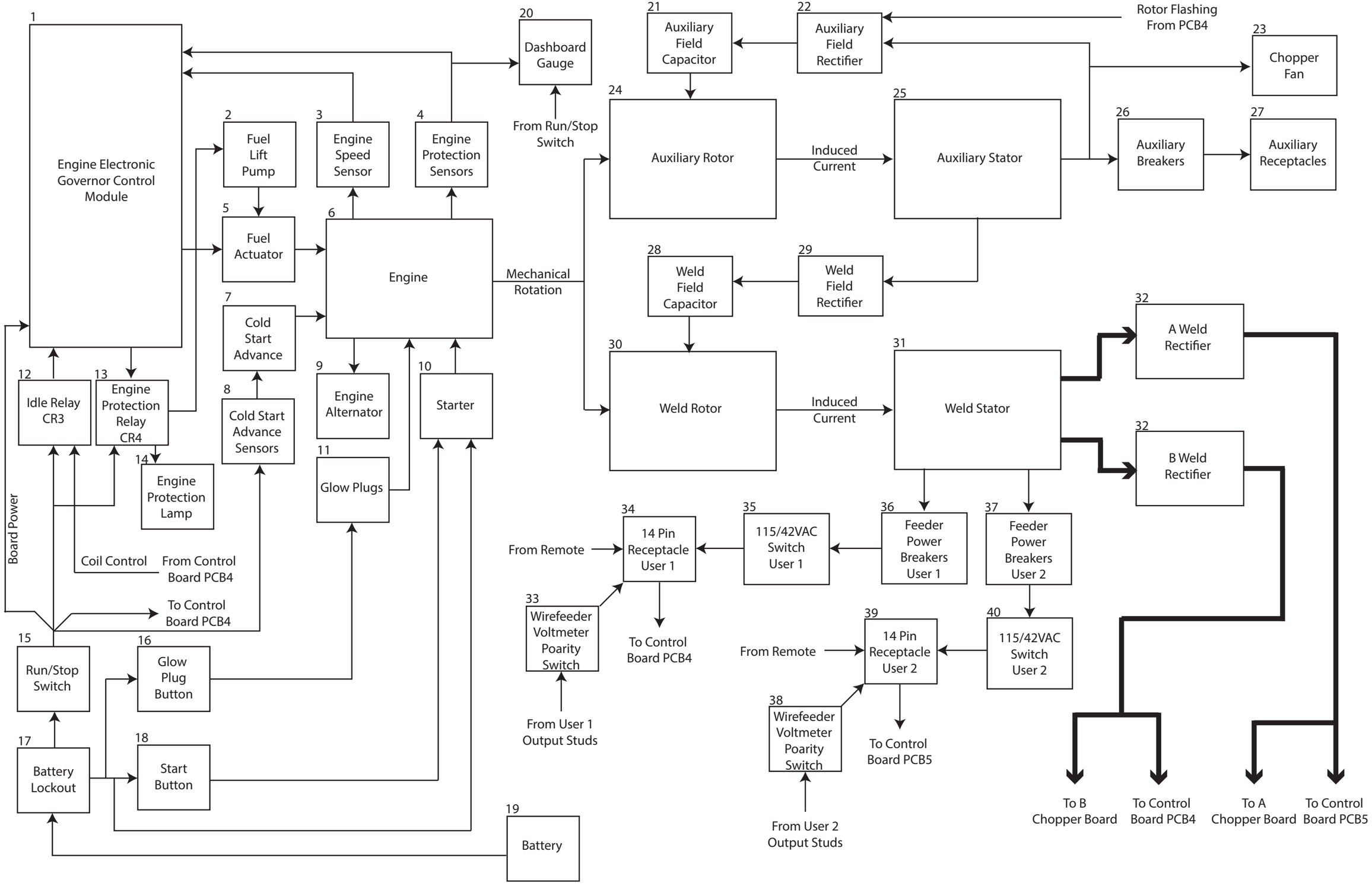
Refer to http://www.lincolnelectric.com/safety for additional safety information.

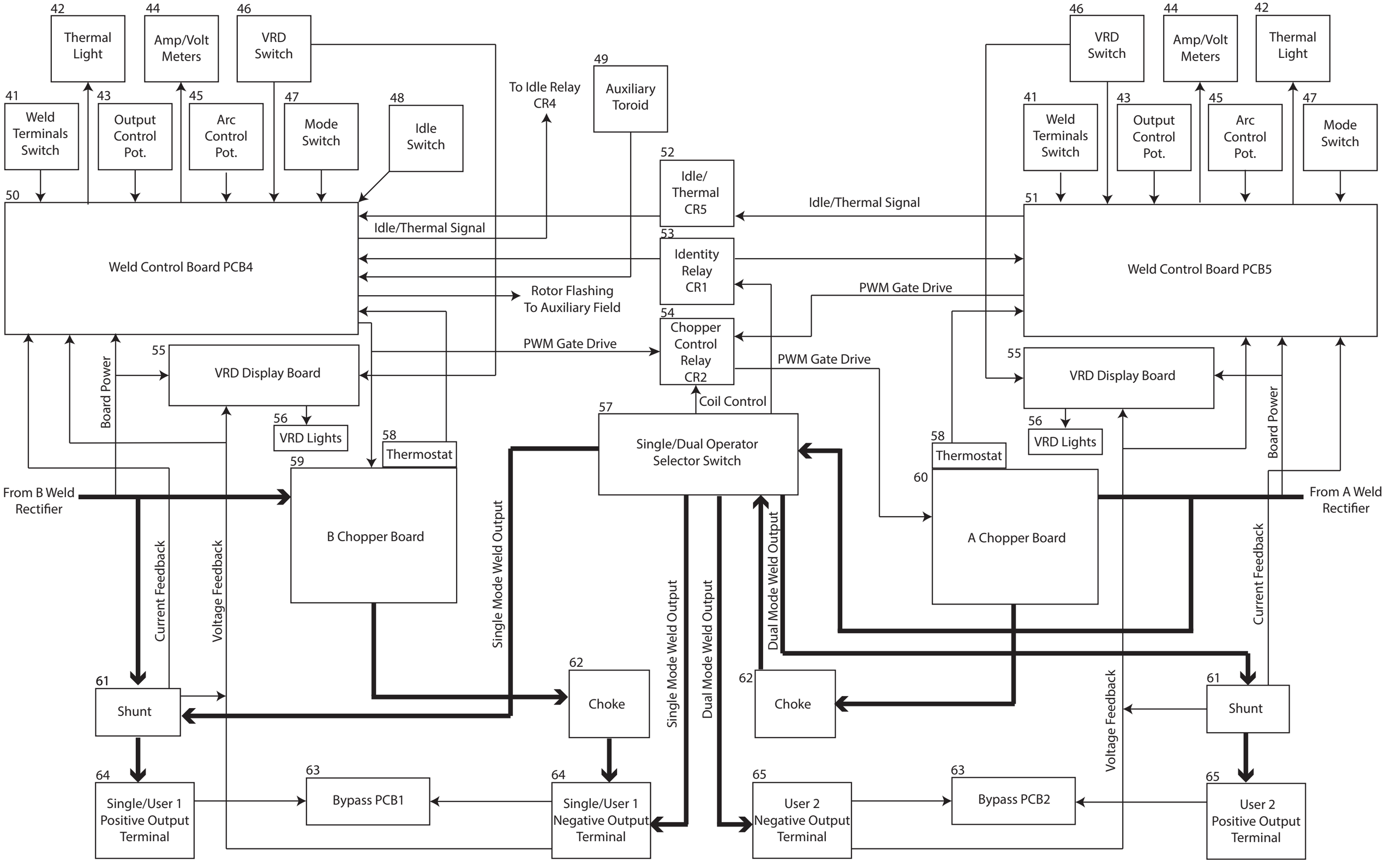
Dual Vantage® 700

Service Manual

Last update: 2018/10/01

Dual Vantage 700 Block Diagram

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User 2 Positive Output Terminal

1. Engine Electronic Governor Control Module
Receives power from the run/stop switch. It controls the engine with the fuel actuator. It monitors the engine speed sensor and the protection sensors.

2. Fuel Lift Pump
Delivers fuel to the actuator

3. Engine Speed Sensor
Sends a signal to the EGC to monitor engine speed.

4. Engine Protection Sensors
Ground out the EGC if there is low oil pressure or high engine temp.

5. Fuel Actuator
Allows fuel into the engine. Controlled by the EGC

6. Engine
Provides mechanical energy to rotate the rotor fields.

7. Cold Start Advance
Advances the ignition timing when cold, for better starting.

8. Cold Start Advance Sensors
Monitors engine temp and CSA pressure. Remove power from the CSA unit.

9. Engine Alternator
Charges the battery.

10. Starter
Cranks the engine flywheel to start.

11. Glow Plugs
Warm up the engine block.

12. Idle Relay CR3
Receives low idle signal from the Weld Control. Relays that to the EGC.

13. Engine Protection Relay CR4
When the EGC senses a fault it activates the CR4. This remove power from the fuel lift pump and lights the engine protection lamp.

14. Engine Protection Lamp
Lights when the EGC is in a fault mode.

15. Run/Stop Switch
Provides power to the 12VDC circuitry.

16. Glow Plug Button
Provides power to the glow plugs.

17. Battery Lockout
Electrically isolates the battery from the rest of the machine.

18. Start Button
Provides power to the starter solenoid coil.

19. Battery
Power supply for the 12VDC circuitry.

20. Dashboard Gauge
Displays engine hours, fuel level, oil pressure, temperature, and battery voltage.

21. Auxiliary Field Capacitor
Filters the voltage for the auxiliary rotor field.

22. Auxiliary Field Rectifier
Rectifies the AC voltage from the auxiliary stator for the auxiliary rotor field.

23. Chopper Fan
Cools the Chopper heatsinks.

24. Auxiliary Rotor
Rotating field for the auxiliary generator

25. Auxiliary Stator
Produces power for the auxiliary rotor field, the weld rotor field, and the auxiliary outputs.

26. Auxiliary Breakers
Overcurrent protection for the auxiliary outlets.

27. Auxiliary Receptacles
Auxiliary power supply.

28. Weld Field Capacitor
Filters the voltage for the weld rotor field.

29. Weld Field Rectifier
Rectifies the AC voltage from the auxiliary stator for the weld rotor field.

30. Weld Rotor
Rotating field for the weld generator

31. Weld Stator
Produces power for the weld output, weld control boards, and feeder power.

32. Weld Rectifiers
Rectify the AC voltage from the weld stator for the welding output.

33. Wire feeder Voltmeter Polarity Switch
Changes the sensing location of the 21 lead for wire feeders.

34. 14 Pin Receptacle User 1
Remote control and feeder power connection for User 1.

35. 115/42VAC Switch User 1
Switches the power in the 14 pin receptacle between 115VAC and 42VAC.

36. Feeder Power Breakers User 1
Overcurrent protection for the 14 pin receptacle.

37. Feeder Power Breakers User 2
Overcurrent protection for the 14 pin receptacle.

38. Wire feeder Voltmeter Polarity Switch
Changes the sensing location of the 21 lead for wire feeders.

39. 14 Pin Receptacle User 2
Remote control and feeder power connection for User 2.

40. 115/42VAC Switch User 2
Switches the power in the 14 pin receptacle between 115VAC and 42VAC.

41. Weld Terminals Switch
Tells the Weld control board to enable the output.

42. Thermal Light
Indicates a thermal fault on the Chopper board.

43. Output Control Pot
User control of the output amperage/voltage.

44. Amp/Volt Meters
Display preset and actual amperage and voltage.

45. Arc Control Pot
User input to make the arc crisper or softer.

46. VRD Switch
Turns VRD on or off.

47. Mode Switch
User input for desired welding process.

48. Idle switch
Sets the engine speed to high or auto.

49. Auxiliary Toroid
Senses auxiliary current. 100W will kick the machine into high idle from low.

50. Weld Control Board PCB4
Controls the welding parameters, monitors welding feedback, and adjusts output (both Choppers) when the machine is in single mode. Also controls B Chopper in Dual mode. Flashes auxiliary rotor field.

51. Weld Control Board PCB5
Controls the welding parameters, monitors welding feedback, and adjusts output (A Chopper Board) when the machine is in dual mode.

52. Idle/Thermal Relay
Relays the idle signal from PCB5 to PCB4 in dual mode, relays the thermal signal for the A Chopper in single mode.

53. Identity Relay
Changes the identity jumpers in the weld control boards, this lets them know if they are in single or dual mode.

54. Chopper Control Relay
Changes the source of control for the A Chopper board (PCB4 in single PCB5 in dual).

55. VRD Display Board
Controls the VRD lights depending on the output voltage.

56. VRD Lights
On during VRD operation. (Green = Under 32 Volts / Red = Over 32 Volts).

57. Single/Dual Operator Selector Switch
Reroutes weld power from the A side to the single user output studs. Also controls CR1 and CR2.

58. Thermostat
Opens if the Chopper heat sinks overheat.

59. B Chopper Board
Controlled by PCB4, filters and bucks the 90VDC bus from B weld rectifier.

60. A Chopper Board
Filters and bucks the 90VDC output from A weld rectifier.

61. Shunt
Provides current feedback to the weld control board.

62. Choke
Keeps arc lit during the IGBT's off cycle.

63. Bypass PCB
Protects the machine from transient spikes and high frequency.

64. Single/User 1 Output Terminals
Welding output connections for single mode, or for user 1 in dual mode.

65. User 2 Output Terminals
Welding output connections for user 2 in dual mode.

Troubleshooting & Repair

HOW TO USE TROUBLESHOOTING GUIDE

⚠ WARNING

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

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

Step 1. LOCATE PROBLEM (SYMPTOM). Look under the column labeled "PROBLEM" (SYMPTOMS). This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting. Symptoms are grouped into two main categories: Output Problems, Function 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**
OUTPUT PROBLEMS		
Major physical and electrical damage is evident.	1. Contact the Lincoln Electric Service Department at 1-888-935-3877.	1. Contact the Lincoln Electric Service Department at 1-888-935-3877.
No welding output in either Stick or CV modes. The engine operates normally. The auxiliary output is normal. Determine if weld output is not present on side “A” or “B”.	1. Place the welding terminals switch in the “ALWAYS ON” position. If the problem is solved, the fault may be in the external control cable (if used), leads #2 and #4. See the Wiring Diagram. 2. With the engine at high idle 1860 RPM, the machine in the stick mode and the OUTPUT CONTROL at maximum, check for the presence of approximately 58 VDC (open circuit voltage) at the output terminals. 3. If the correct OCV is present at the welding output terminals check the welding cables, clamps and electrode holder for loose or faulty connections.	1. Check for loose or faulty connections on the heavy current carrying leads between the output bridge, the power modules, the choke and the output terminals. 2. Check the welding terminals switch and associated leads. See the Wiring Diagram. 3. Perform the ***Output Selector Switch Test Procedure***. 4. Check gate leads #23, #23C, #25 and #25C for loose or faulty connections. See the Wiring Diagram. 5. Perform the ***Weld Rotor Voltage Test Procedure***. 6. Perform the ***Weld Rotor Resistance Test Procedures (Static and Dynamic).*** 7. Perform the ***Weld Stator Voltage Test Procedure***. 8. Perform the ***Output Rectifier Bridge Test Procedure***. 9. Perform the ***Chopper Module LEDs And Test Procedure***. 10. The weld control board(s) may be faulty. Perform the ***Weld Control Board(s) Test Procedure***.
⚠ CAUTION If for any reason you do not understand the test procedures or are unable to perform the test/repairs safely, contact the Lincoln Electric Service Department for electrical troubleshooting assistance before you proceed. Call 1-888-935-3877.		

Observe Safety Guidelines detailed in the beginning of this manual.		**TROUBLESHOOTING GUIDE**
PROBLEMS (SYMPTOMS)	**POSSIBLE AREAS OF MISADJUSTMENT(S)**	**RECOMMENDED COURSE OF ACTION**
OUTPUT PROBLEMS		
Weld output not normal when machine is in the Dual operator mode. Auxiliary output OK.	1. Make sure the output selector switch is in the dual (350A) position.	1. Perform the ***Output Selector Switch Test Procedure***. 2. Perform the ***Chopper Control (CR2) Relay Test Procedure***. 3. Perform the ***Identity Control (CR1) Relay Test Procedure***. 4. Perform the ***Weld Control Board(s) Test Procedure***.
No welding output in either Stick or CV modes. Also no auxiliary power. The engine operates normally.	1. Check the brushes for wear and proper contact to both rotor slip rings. 2. Make sure the engine is operating at the correct high idle speed 1860 RPM. 3. Check for loose or faulty connections or leads on the auxiliary power studs in the control box. See the wiring diagram.	1. Perform the ***Auxiliary Rotor Voltage Test Procedure***. 2. Perform the ***Auxiliary Rotor Resistance Test Procedures (Static And Dynamic).*** 3. Perform the ***Auxiliary Rotor Flashing Voltage Test Procedure***. If the "flashing" voltage is not present, leads 200N, 200, 200B, 201 and 6A may be faulty. Check R5 resistor. See Wiring Diagram. 4. Check the auxiliary rotor field bridge and capacitor. Replace if necessary. 5. Perform the ***Auxiliary Stator Voltage Test Procedure***.

⚠ CAUTION

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

Observe Safety Guidelines detailed in the beginning of this manual.		**TROUBLESHOOTING GUIDE**
PROBLEMS (SYMPTOMS)	**POSSIBLE AREAS OF MISADJUSTMENT(S)**	**RECOMMENDED COURSE OF ACTION**
OUTPUT PROBLEMS		
No auxiliary power at the receptacles. The welding output is normal and the engine operates normally.	1. The circuit breakers may be tripped. Reset if necessary. 2. Check for loose or faulty connections at the auxiliary receptacles.	1. Check the wiring between the auxiliary receptacles, the connection studs in the control box and the main stator. See the Wiring Diagram. 2. Perform the ***Auxiliary Stator Voltage Test Procedure***. 3. Check GFCI receptacles. **NOTE:** The machine must be at high idle to reset the GFCI receptacles.
The machine has welding output but no control of output. The auxiliary power is normal.	1. If a remote control unit is connected to the machine, check the remote control and related cable. 2. Check the welding and work cables for loose or faulty connections.	1. Check the OUTPUT control potentiometer and related leads. See the Wiring Diagram. 2. Check the shunt and associated feedback leads. See the Wiring Diagram. 3. Check the voltage feedback leads for loose or faulty connections. See the Wiring Diagram. 4. Perform the ***Chopper Module LEDs And Test Procedure***. 5. The weld control board(s) may be faulty. Perform the ***Weld Control Board(s) Test Procedure***.

⚠ CAUTION

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

Observe Safety Guidelines detailed in the beginning of this manual.		**TROUBLESHOOTING GUIDE**
PROBLEMS (SYMPTOMS)	**POSSIBLE AREAS OF MISADJUSTMENT(S)**	**RECOMMENDED COURSE OF ACTION**
OUTPUT PROBLEMS		
The machine has low welding output and low auxiliary output.	1. Check both sets of brushes for wear and proper contact with slip rings. 2. The engine RPM may be too low. 3. If the engine high idle RPM is OK, then the engine may have lost horsepower and be in need of major repair.	1. If the engine high idle speed is low, perform the ***Engine RPM Test Procedure***. 2. Perform the ***Auxiliary Rotor Voltage Test Procedure***. 3. Perform the ***Auxiliary Rotor Resistance Tests (Static And Dynamic).*** 4. Perform the ***Auxiliary Stator Voltage 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 voltage reduction device (VRD) is not functioning correctly.	1. See the Operator's Manual for the correct functionality.	1. Perform the ***VRD / OCV Indicator PCB Test Procedure***.
The weld output control is still active when the remote control unit is attached.	1. This is normal when in TIG, CC Stick or Downhill Pipe modes. 2. The remote control unit may be defective. 3. Check the amphenol connections and associated wiring.	1. Check Plug J1 on the weld control board for loose or faulty connections. 2. The weld control board may be faulty. Perform the ***Weld Control Board(s) Test Procedure***.
The machine seems locked into the CC mode of operation (Stick mode).	1. Check the position of the MODE SELECTOR switch. It must be in the correct position for the process being used.	1. Check the MODE SELECTOR switch and associated leads. See the Wiring Diagram. 2. The weld control board(s) may be faulty. Perform the ***Weld Control Board(s) Test Procedure***.
The wire feeder does not work when connected to the welder amphenol.	1. Check the position of the 42V / 115V wire feed voltage switch. 2. Check the appropriate circuit breaker (CB9 or CB10). Reset if tripped. 3. The wire feeder control cable may be faulty.	1. With the wire feeder voltage switch in the desired position, check for the appropriate source voltage at the 14 pin amphenol receptacle (42 VAC at pins I and K) (115 VAC at pins A and J). 2. Perform the ***Weld Stator Voltage Test Procedures***.
The battery does not stay charged.	1. Check for loose or faulty connections at the battery and engine charging system. 2. The battery may be faulty. Check or replace. 3. The fan belt may be loose.	1. The battery charging circuit may be faulty. Perform the ***Battery Charging Circuit 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 will not crank when the start button is pushed.	1. Check that the battery lockout switch is in the ON position. 2. Check for loose or faulty battery cable connections. 3. Check for faulty start button and for faulty connections in the start button wiring. See the Wiring Diagram. 4. The battery may be low or faulty.	1. The starter motor or starter solenoid may be faulty. 2. The engine may be hard to crank due to a mechanical failure in the engine.
The engine cranks but will not start.	1. Check for adequate fuel supply (check fuel filters). 2. Make sure the fuel shutoff valve is in the open position. 3. If the ON/OFF switch has been on for more than 60 seconds before starting (cycle switch OFF then ON). 4. The engine glow plugs may not be working. Check CB5 circuit breaker. See the Wiring Diagram.	1. Check that the engine governor control unit is getting 12 VDC battery voltage. See the Wiring Diagram. 2. There may be a faulty connection between the engine governor control unit and the magnetic pickup speed sensor or the fuel actuator. See the Wiring Diagram. 3. There may be a failure in the engine or engine control system. Contact the engine manufacturer for testing and service engine components. 4. Perform the ***CR3, CR4, CR5 and CR6 Relay Test Procedure***, for the Engine Protection (CR4) Relay.

⚠ 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 shuts down shortly after starting.	1. Check for adequate fuel supply. 2. Be certain the engine is not overheated. Check coolant level. CAUTION hot coolant under pressure can be very dangerous. Do not remove radiator cap until the engine has cooled. 3. Oil pressure may be low. Check oil level. 4. Check the fuel filters.	1. Check the RUN/STOP switch and associated leads for loose or faulty connections. 2. There may be a grounded wire between the engine governor control unit and the coolant temperature switch or the oil pressure switch. See the Wiring Diagram. 3. The coolant temperature switch or the oil pressure switch may be faulty. 4. The engine oil pressure may be low due to a failure within the engine. 5. The engine governor control unit may be faulty. Perform the ***Electronic Engine Governor Module Test Procedure***. 6. Perform the ***CR3, CR4, CR5 and CR6 Relay Test Procedure***, for the Temp (CR6) relay.
The engine shuts down while under a load.	1. Make sure the engine is not overheated. 2. Check the fuel filters.	1. Perform the ***Electronic Engine Governor Module 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 will not idle down to low speed. The machine has normal weld output and auxiliary power.	1. Make sure the IDLER switch is in the "Auto" position. 2. Make sure there is NOT an external load on the weld terminals or the auxiliary power terminals.	1. Check the CR3 idle relay and associated wiring. Ensure the relay is getting 12 VDC at lead 232L. See the Wiring Diagram. 2. Check for faulty idle switch or associated wiring. 3. Unplug the shunt, plug J6 (weld control board "B"). If the engine idles down after about 12 seconds current is being detected in the weld output. Check for dirt buildup around weld output terminals or a very dirty or defective bypass assembly. 4. With the idle switch in the high position lead #405 should measure 12 VDC battery voltage all the time. If the 12 VDC battery voltage is not present, check for faulty connections in lead #405. 5. With idle switch in the auto idle position, voltage on lead #405 should drop to zero after about 12 seconds. 6. If voltage on lead #405 does drop to zero but the engine does not go to low idle, the CR3 relay or the engine governor control unit is likely defective. Perform the ***Electronic Engine Governor Module Test Procedure***. 7. If voltage on lead #405 does not drop to zero, weld control board "B" is likely faulty. Perform the ***Weld Control Board(s) Test Procedure***.

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 will not go to high idle when using the auxiliary power. Auxiliary power is normal when the IDLER switch is in the "HIGH" position. Automatic idle function works properly when the welding terminals are loaded.	1. Make sure the auxiliary power leads are tight. 2. The automatic idler may not function if the auxiliary power is loaded to less than 150 watts.	1. Check the current sensing toroid for loose or faulty connections. See the Wiring Diagram. 2. Check that the lead wires are passing through the toroidal current sensor in the proper direction and have the correct number or turns. See the Wiring Diagram. 3. The current sensing toroid may be faulty. 4. The weld control board(s) may be faulty. Perform the ***Weld Control Board(s) Test Procedure***, for board "B". See Wiring Diagram.
The engine will not go to high idle when attempting to weld or when the auxiliary power is loaded. Welding output and auxiliary power outputs are normal when IDLER switch is in the "HIGH" position.	1. Make sure the welding cables and auxiliary power lead connections are tight.	1. The weld control board(s) may be faulty. Perform the ***Weld Control Board(s) Test Procedure***, for board "B". See Wiring 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.		

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 machine goes to low idle but does not stay at low idle.	1. Make sure there is NOT an external load (auxiliary or weld) connected to the Dual Vantage 700.	1. The CR3 Idle relay may be defective. 2. There may be faulty electrical connections at the CR3 relay or the wiring connected to that relay. 3. The engine governor control unit may be defective. Perform the ***Electronic Engine Governor Module Test Procedure***. 4. The weld control board(s) may be faulty. Perform the ***Weld Control Board(s) Test Procedure***. See Wiring 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.

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 “cold”. The engine runs normally. The auxiliary power is normal.	1. Check for loose or faulty connections at the weld output terminals and welding cable connections. 2. The welding cable may be too long or coiled, causing an excessive voltage drop. 3. Make sure the electrode (wire, gas, voltage, current etc.) are correct for the process being used.	1. Check for the correct OCV at the welding output terminals. If the correct voltage is present at the output terminals, check for loose connection on the heavy current carrying leads inside the Dual Vantage 700. See the Wiring Diagram. 2. If the OCV is low at the welder output terminals, perform the ***Engine RPM Test Procedure***. 3. Test the potentiometers and mode switch for correct function and be certain that these components are not grounded. 4. Perform the ***Output Rectifier Bridge Test Procedure***. 5. Perform the ***Weld Rotor Voltage Test Procedure***. 6. Perform the ***Weld Rotor Resistance Test Procedures (Static And Dynamic).*** 7. Perform the ***Weld Stator Voltage Test Procedure***. 8. Perform the ***Chopper Module LEDs and Test Procedure***. 9. The weld control board(s) may be faulty. Perform the ***Weld Control Board(s) Test Procedure***. See Wiring Diagram. 10. Perform the ***Output Selector Switch Test Procedure***.

Test Procedures

CASE COVER REMOVAL AND REPLACEMENT PROCEDURE

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

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the case sheet metal covers.

MATERIALS NEEDED

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

REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Using a 1/2” nutdriver, remove the four bolts securing the battery tray to the machine. See ***Figure F.1***.
3. Slide out battery tray and using a 1/2” nutdriver, disconnect the negative battery cable. See Wiring Diagram.
   NOTE: Be sure to electrically isolate the negative battery cable. The battery tray adds strength to the base of the machine and should be bolted back in place if the machine will be moved during repairs.

AIR CLEANER AND ENGINE EXHAUST PIPE REMOVAL

1. Locate the engine air cleaner. See ***Figure F.1***.
2. Using a slotted screwdriver, loosen the hose clamp securing the engine air cleaner to the hose. See ***Figure F.2***.
3. Using a 1/2” nutdriver, remove the two mounting screws securing the engine air cleaner to the machine. Note washer placement for reassembly. See ***Figure F.2***.
4. The engine air cleaner can now removed.
5. Using a 1/2” nutdriver and 1/2” wrench, loosen the hose clamp securing the engine exhaust pipe and remove the engine exhaust pipe. See ***Figure F.3***.

RIGHT SIDE PANEL REMOVAL

1. Unlatch and open the engine service access door. Align the hooks at the top of the door with the notches in the door slide rail. Lift the door up and out to remove. See ***Figure F.1***.
2. Using a 1/2" nutdriver, remove the seven (of the nine) bolts securing the door slide rail to the machine. See ***Figure F.1***.
3. Using a 1/2" nutdriver and a 1/2" wrench, remove the two remaining bolts, nuts and washers securing the door slide rail to the machine. See ***Figure F.1***. The door slide rail can now be removed.
4. Using a 1/2" nutdriver, loosen the three bolts on the bottom of the right side front panel. The panel is slotted therefore it is not necessary to completely remove the bottom bolts. See ***Figure F.3***.
5. Using a 1/2" nutdriver, remove the eight bolts securing the right front side panel. Lift the panel up and away from the machine to remove the panel. See ***Figure F.3***.

ROOF PANEL REMOVAL

1. Remove the fuel tank cap. See ***Figure F.1***.
2. Remove the lift bale cover seal. See ***Figure F.1***.
3. Using a 1/2" nutdriver, remove the thirteen bolts securing the roof panel to the machine. See ***Figure F.4***.
4. With the help of an assistant carefully lift the roof panel off of the machine.
   NOTE: The fuel tank filler gasket fits snugly around the tank fill tube and may need to be worked a bit to allow the roof panel to be removed.
5. Replace the previously removed fuel tank cap.

LEFT SIDE PANEL REMOVAL

1. Using a 1/2" nutdriver, loosen the six bolts on the bottom of the left case side panels. The panel is slotted therefore it is not necessary to completely remove the bottom bolts. See ***Figure F.5***.
2. Using a 1/2" nutdriver, remove the nine bolts securing the left front side panel. Lift the panel up and away from the machine to remove the panel. See ***Figure F.5***.
3. Using a 1/2" nutdriver, remove the two bolts securing the left rear side panel. Lift the panel up and away from the machine to remove the panel. See ***Figure F.5***.

CONTROL PANEL ASSEMBLY REMOVAL

1. Using a 3/8" nutdriver, remove the six bolts securing the control panel assembly. The front panel hinged cover will need to be open to access two of the bolts. Note shield placement for reassembly. See ***Figure F.6***.
2. The control panel can now be tilted forward to gain access to internal components.

REPLACEMENT PROCEDURE

CONTROL PANEL ASSEMBLY REPLACEMENT

1. Carefully place the control panel in the closed position.
2. Using a 3/8" nutdriver, attach the six bolts securing the control panel assembly. The front panel hinged cover will need to be open to access two of the bolts. Note shield placement for reassembly.

LEFT SIDE PANEL REPLACEMENT

1. Carefully position the left rear side panel onto the previously loosened bolts.
2. Using a 1/2” nutdriver, attach the two bolts securing the left rear side panel.
3. Carefully position the left front side panel onto the previously loosened bolts.
4. Using a 1/2” nutdriver, attach the nine bolts securing the left front side panel.
5. Using a 1/2” nutdriver, tighten the six bolts on the bottom of the left case side panels.

ROOF PANEL REPLACEMENT

1. Remove the fuel tank cap.
2. With the help of an assistant carefully lower the roof panel onto the machine.
   NOTE: The fuel tank filler gasket fits snugly around the tank fill tube and may need to be worked a bit to allow the roof panel to be replaced.
3. Using a 1/2” nutdriver, attach the thirteen bolts securing the roof panel to the machine.
4. Attach the lift bale cover seal.
5. Attach the fuel tank cap.

RIGHT SIDE PANEL REPLACEMENT

1. Carefully position the right side front panel onto the previously loosened bolts.
2. Using a 1/2” nutdriver, attach the eight bolts securing the right side front panel.
3. Using a 1/2” nutdriver, tighten the three bolts on the bottom of the right side front panel.
4. Carefully position the door slide rail on the machine.
5. Using a 1/2” nutdriver, attach the seven (of the nine) bolts securing the door slide rail to the machine.
6. Using a 1/2” nutdriver and 1/2” wrench, attach the remaining two bolts, nuts and washers securing the door slide rail to the machine.
7. Carefully align the hooks at the top of the service door with the notches in the door slide rail. Lower the door and secure it closed with the latch.

AIR CLEANER AND ENGINE EXHAUST PIPE REPLACEMENT

1. Carefully position the engine exhaust pipe onto the machine.
2. Using a 1/2” nutdriver and a 1/2” wrench, tighten the clamp securing the engine exhaust outlet pipe.
3. Properly position the engine air cleaner on to the machine. See ***Figure F.7***.
4. Using a 1/2” nutdriver, attach the two mounting screws and washers securing the engine air cleaner to the machine.
5. Using a slotted screwdriver, tighten the hose clamp securing the engine air cleaner to the hose.

BATTERY RECONNECTION

1. Using a 1/2” nutdriver, connect the negative battery cable. See Wiring Diagram.
2. Carefully position the battery tray into the machine.
3. Using a 1/2” nutdriver, attach the four bolts securing the battery tray to the machine.

Figure F.1 – Battery tray mounting bolt location

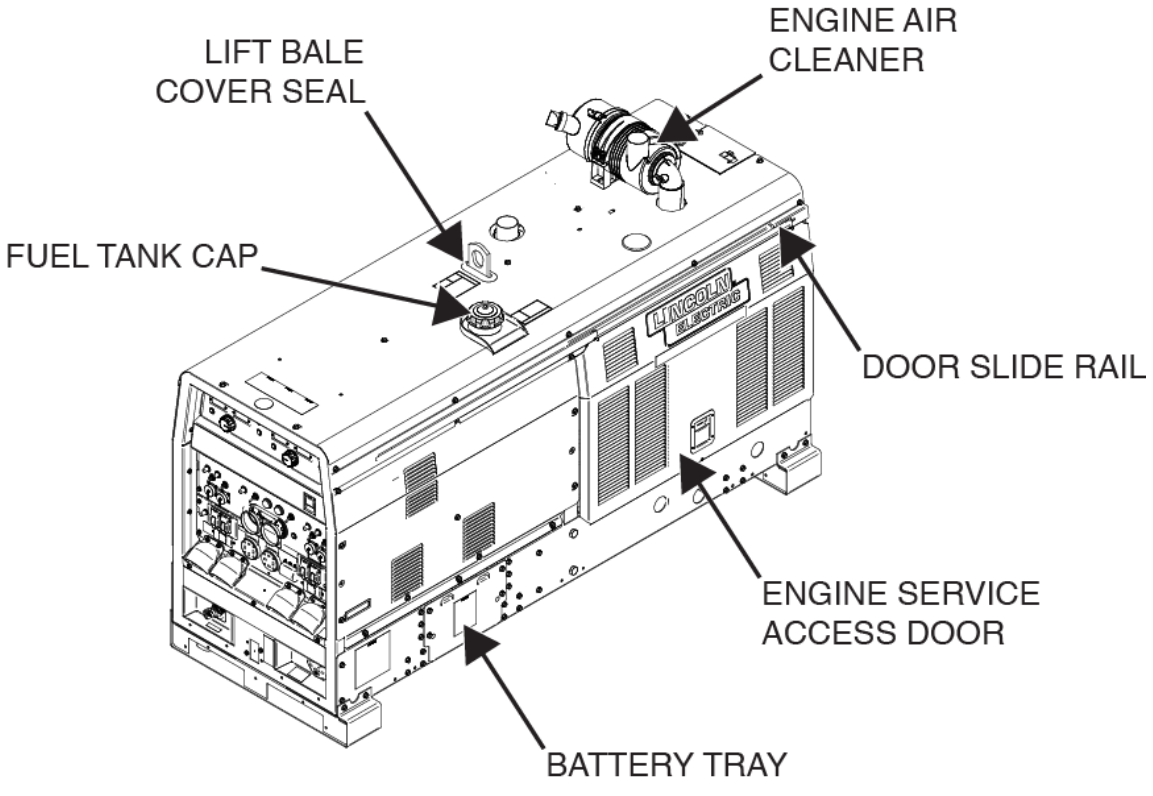


Figure F.2 – Engine air cleaner mounting bolt location

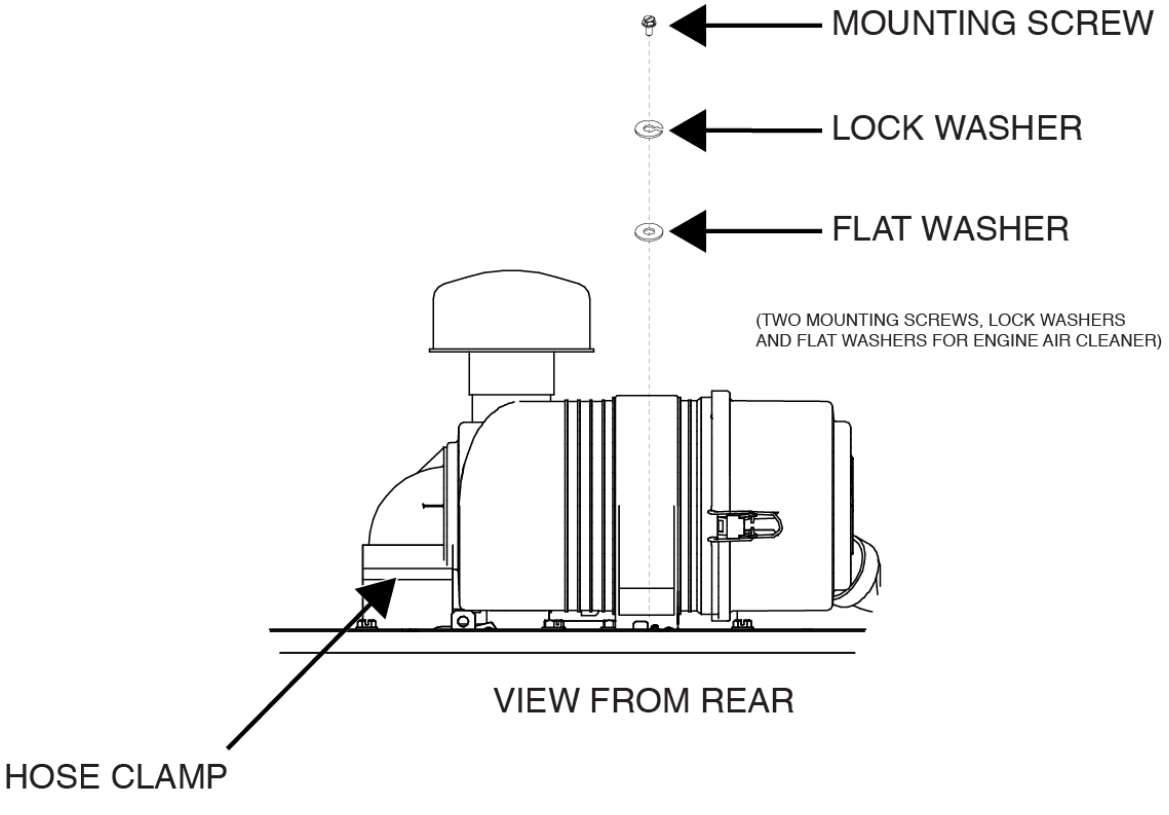


Figure F.3 – Right side panel removal

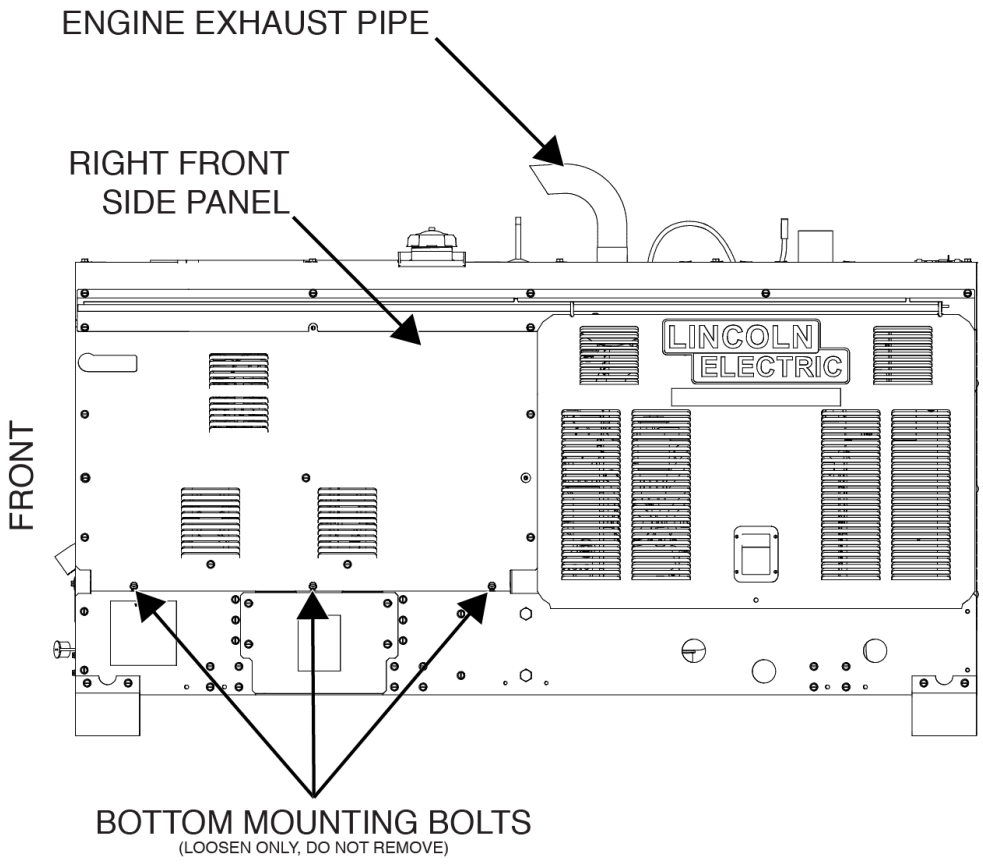


Figure F.4 – Roof panel removal

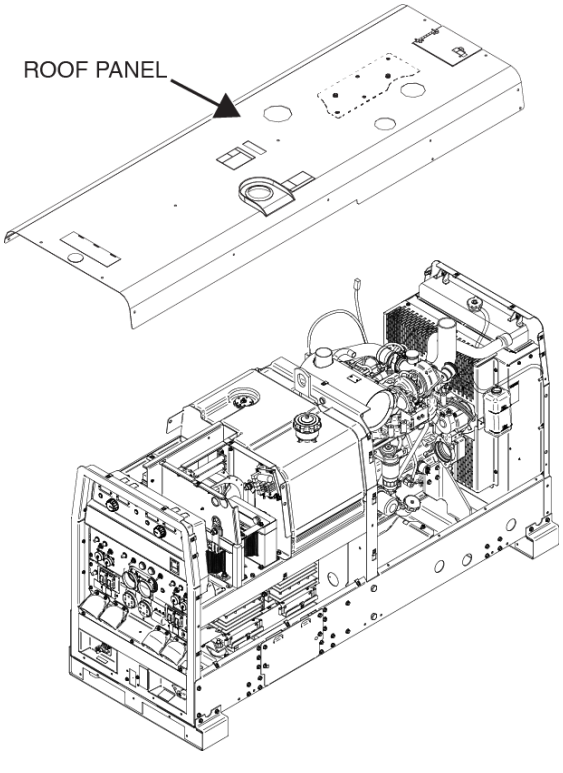


Figure F.5 – Left side panel mounting screw locations

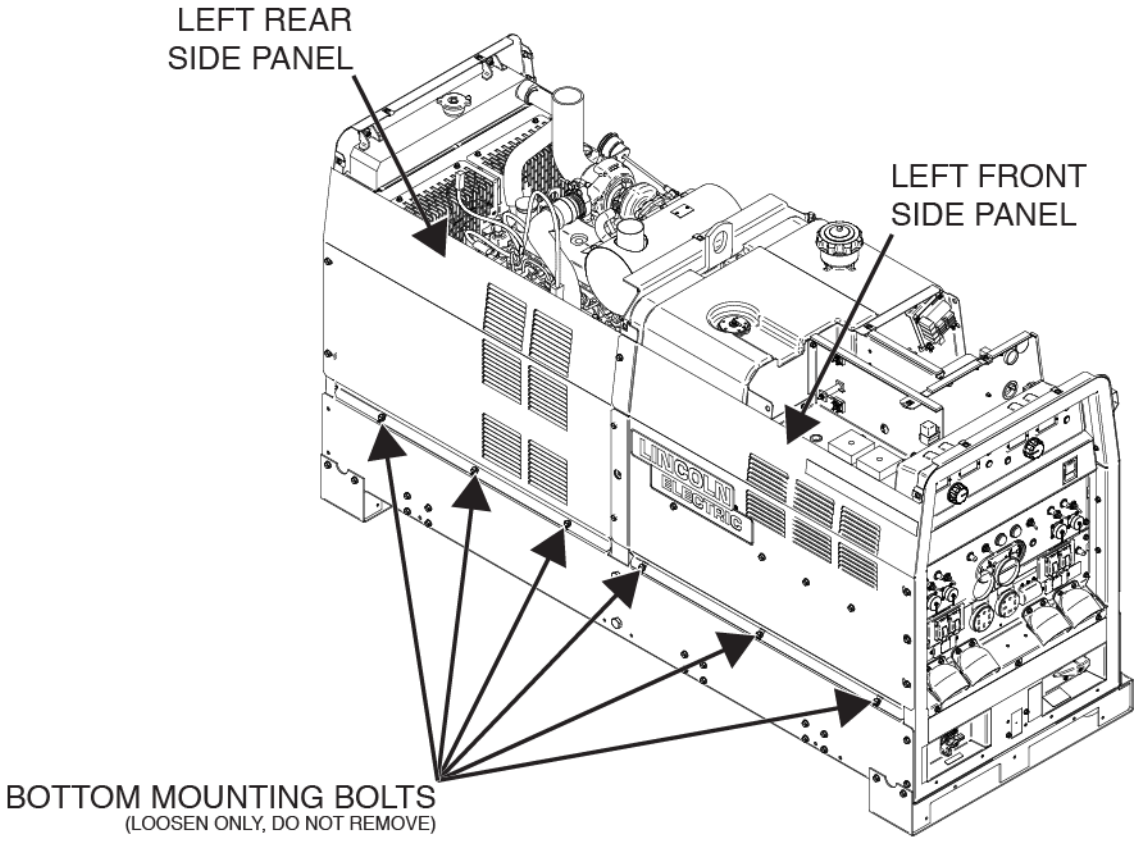


Figure F.6 – Control panel mounting screw locations

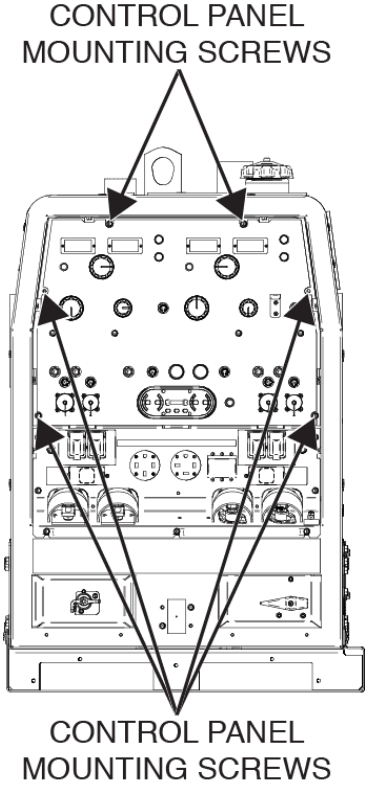
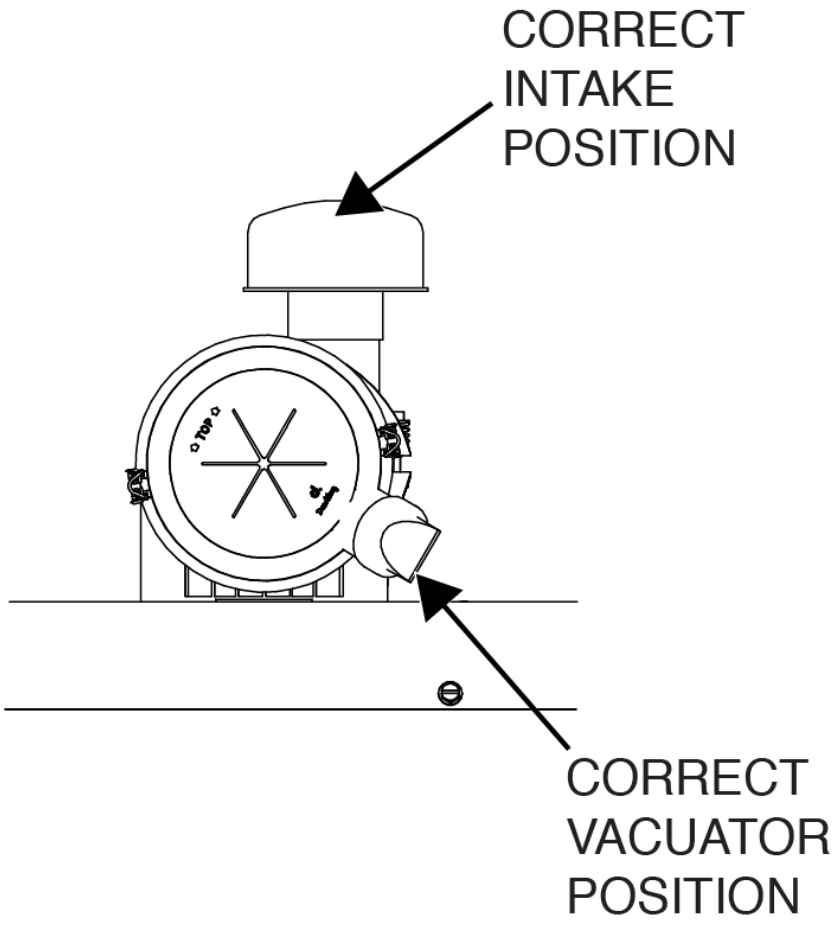


Figure F.7 – Correct vacuator and intake positions



CHOPPER MODULE CAPACITOR DISCHARGE PROCEDURE

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

TEST DESCRIPTION

This procedure will insure that the large capacitors in the Chopper Modules have been discharged. This procedure should be performed whenever work is to be attempted on or near any internal components.

MATERIALS NEEDED

Volt/Ohmmeter
Resistor (25 - 1000 ohms and 25 watts minimum)
Jumper Leads
Wiring Diagram

PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Place the output selector switch into the dual operator position. See ***Figure F.8***.
4. Locate the positive output terminals on the front of the machine. See ***Figure F.8***.
5. Locate the negative output rectifier terminals. See ***Figure F.8*** and ***Figure F.9***. See Wiring Diagram.
6. Using a voltmeter, test for DC voltage between the left positive output terminal and the negative output rectifier terminal on rectifier bridge “B”. See ***Figure F.9***. See Wiring Diagram. If the voltage is zero, the capacitor is discharged and no further action is required.
   NOTE: Chopper modules are designed to discharge the capacitors on their own but should be manually discharged if voltage is present.
7. Using a voltmeter, test for DC voltage between the right positive output terminal and the negative output rectifier terminal on rectifier bridge “A”. See ***Figure F.9***. See Wiring Diagram. If the voltage is zero, the capacitor is discharged and no further action is required.
   NOTE: Chopper modules are designed to discharge the capacitors on their own but should be manually discharged if voltage is present.
8. If voltage is present, discharge the capacitors by carefully placing a resistor (25-1000 Ohms and 25 watt minimum) between the positive output terminal and negative output rectifier terminal. Jumper leads may be necessary. Apply resistor for at least 10 seconds.
9. Check for presence of DC voltage. If voltage is present, repeat step 8 until no voltage remains.
10. Perform desired test(s) / repair procedure(s).
11. When testing is complete, perform the ***Case Cover Replacement Procedure***.

Figure F.8 – Positive output terminal, output selector switch and output rectifier bridge locations

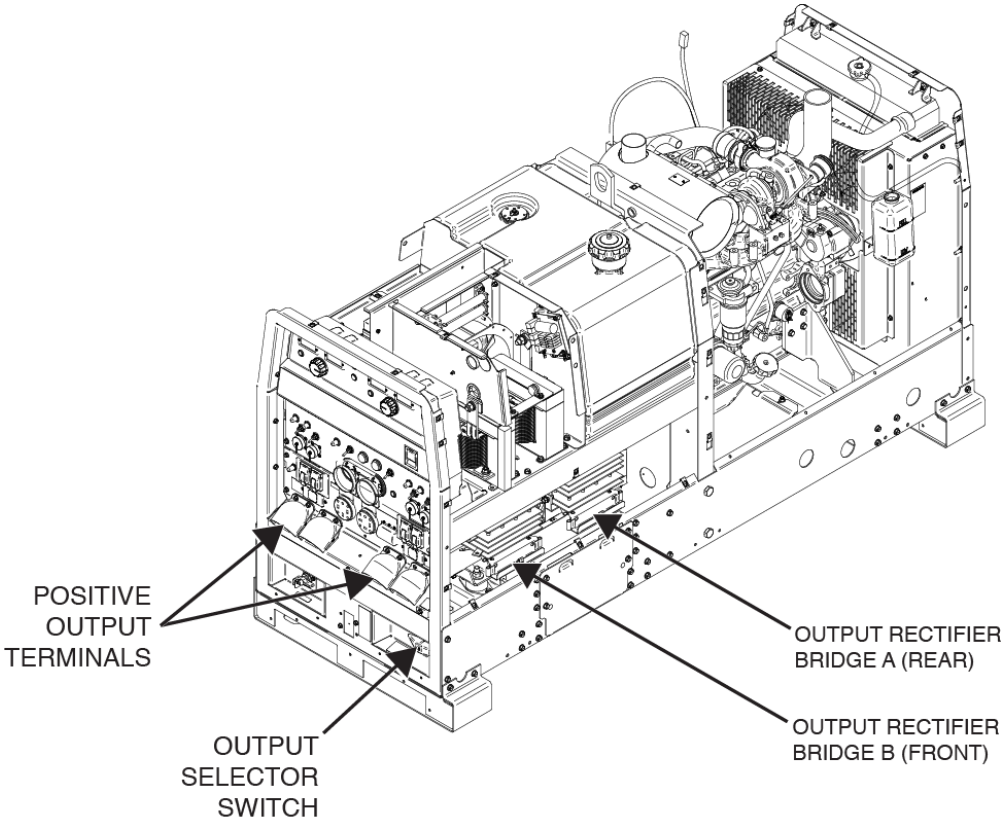
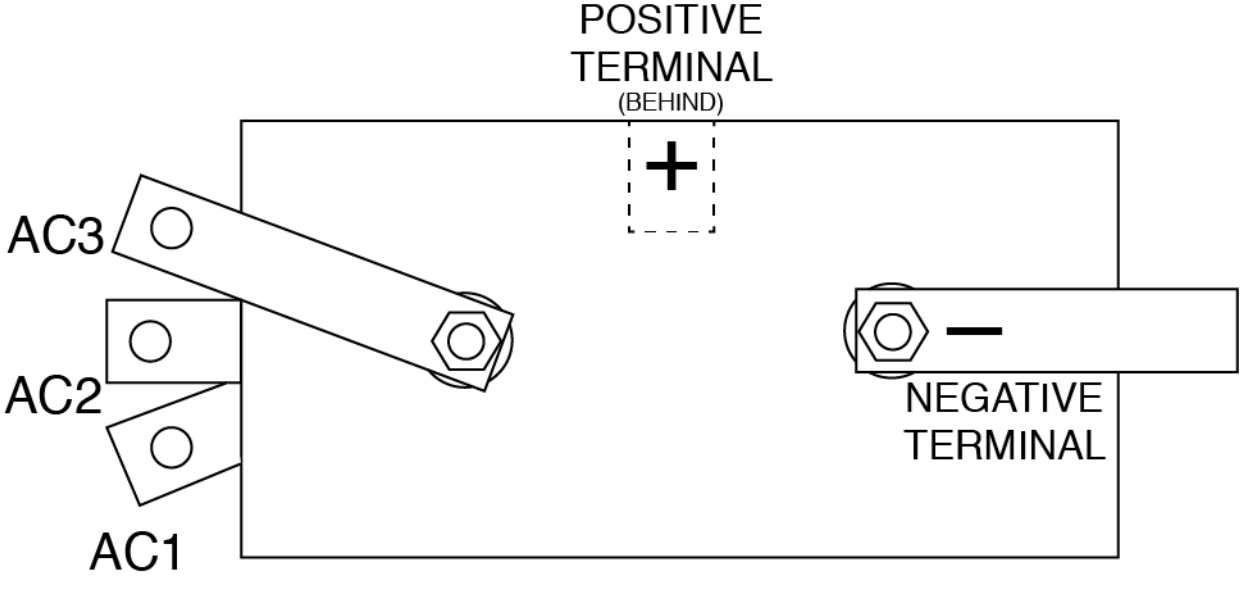


Figure F.9 – Negative terminal location



CHOPPER MODULE LEDs AND 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 the Chopper Module is receiving correct input voltage and gate signals and is able to supply power to the Weld Circuit.

MATERIALS NEEDED

3/8" Nutdriver
7/16" Nutdriver
Volt/Ohmmeter
Wiring Diagram

PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Label and disconnect leads 250, 250A, 250B and 250C from the thermostats. See Wiring Diagram. See ***Figure F.10***.
5. Label and disconnect leads 229 and 5J from the fuel sender. See ***Figure F.10***. See Wiring Diagram.
6. Using a 3/8" nutdriver, remove the four screws from the idler PCB mount bracket assembly. See ***Figure F.10***.
7. Using a 7/16" nutdriver, remove the three nuts and washers from idler PCB mount bracket assembly. See ***Figure F.10***.
8. Lower the control panel, see the ***Case Cover Removal Procedure***.
9. Remove the shield, located behind the control panel. See ***Figure F.10***.
10. Carefully maneuver the idler PCB mount bracket assembly off of its three mounting studs.
11. Temporarily insulate (with a non-conductive material) the idler PCB mount bracket assembly from the chopper module heat sinks.
12. **For Testing Purposes Only**, jumper each set of thermostat leads.
13. Carefully position the idler PCB mount bracket assembly to gain access to the rearmost chopper board for testing.
14. Visually examine chopper modules for damage.
15. Place idler switch in the high idle position.
16. Place the weld mode switch in the SMAW stick position.
17. Place the weld terminals switch in the always on position.

18. Turn off the VRD switch.
19. Reconnect leads 229 and 5J to the fuel sender. See Wiring Diagram.
20. Start the engine and observe the LEDs on each chopper PC board. All four LEDs should be illuminated. See ***Figure F.11***.
21. LED 1 indicates output is present from B2 to B3. See ***Figure F.11***.
22. LED 2 indicates that the chopper module is receiving power from the output rectifier through terminals B1 to B2 and through terminals B4 to B5. See ***Figure F.11***.
23. LED 3 indicates output is present from terminals B5 to B6. See ***Figure F.11***.
24. LED 4 indicates that a gate signal is being received from the weld control board through flex leads B7 and B8. See ***Figure F.11***.
25. Move the weld terminal switch to the remote control position and observe that LEDs 1, 3 and 4 turn off. Return the weld terminal switch to the always on position.
26. If the chopper is getting proper input voltage from the rectifier and a gate signal from the weld control board but does not have output, the chopper may be defective and need to be replaced. Perform the ***Chopper Module Removal And Replacement Procedure***.
    NOTE: The LEDs will indicate that a voltage or gate signal is present but these values can be measured to determine if the values are correct. See the following list of test points and expected measurements.
    • Input voltage from rectifier – (LED 2) Measured from B1 to B2 and B4 to B5. Should measure 80 to 100 Volts DC when engine is operating at high idle.
    • Gate signal from weld control board – (LED 4) Pulse Width Modulated (PWM) signal. Measured between B7 and B8 Flex leads - 15 Volts DC square wave pulsing at approximately 20 kHz. It is best to use the Hz function of the meter to check frequency rather than voltage.
    NOTE: Due to the on/off pulsing of the PWM signal, a typical voltmeter will always read less than 15 VDC.
    • Chopper output from terminals B2 to B3 (LED 1) and from terminals B5 to B6 (LED 3). Measurement should be about 58 Volts DC with mode switch in CC stick position and VRD turned off.
27. Turn off the Dual Vantage 700 machine.
28. Label and disconnect leads 229 and 5J from the fuel sender. See Wiring Diagram.
29. Carefully remove the material used to insulate the idler PCB mount bracket assembly.
30. Carefully position the idler PCB mount bracket assembly onto its three mounting studs.
31. Using a 3/8” nutdriver, attach the four screws securing the idler PCB mount bracket assembly to the power module assembly.
32. Using a 7/16” nutdriver, attach the three nuts and washers securing the idler PCB mount bracket assembly to the power module assembly.
33. Connect leads 229 and 5J to the fuel sender. See Wiring Diagram.
34. Connect leads 250, 250A, 250B and 250C to the thermostats. See Wiring Diagram.
35. Attach the shield to the rear of the control panel.
36. Perform the ***Case Cover Replacement Procedure***.

Figure F.10 – Fuel sender, idler PCB mount bracket assembly, shield and thermostat lead locations

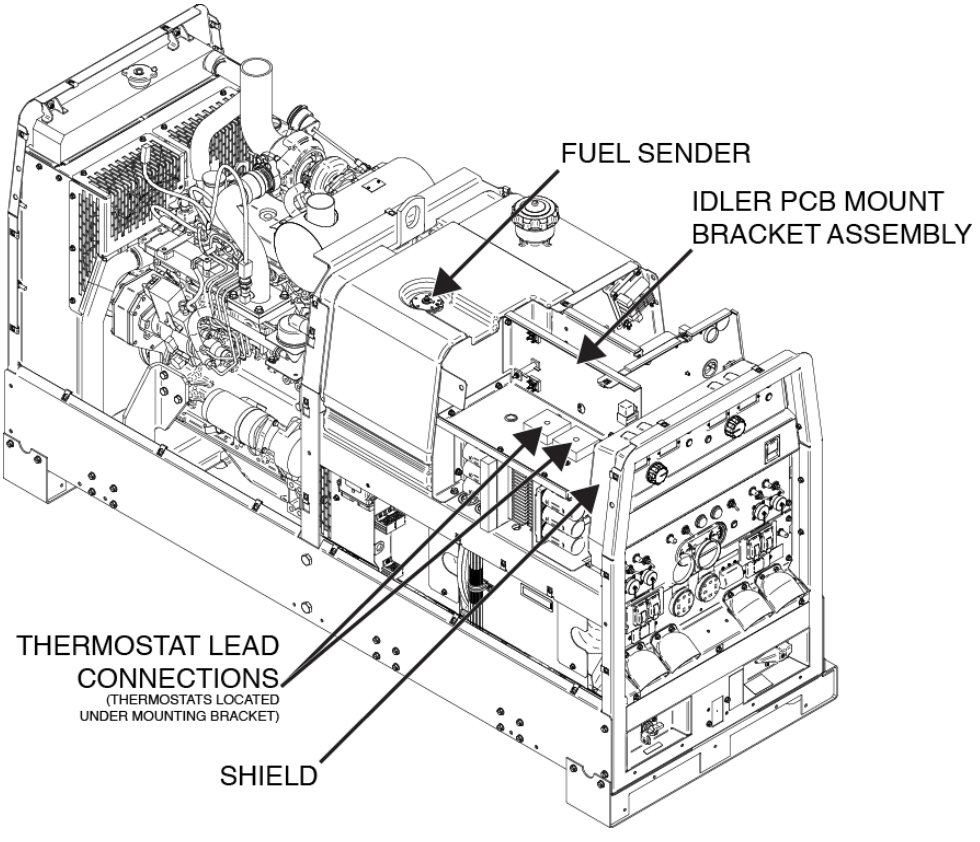
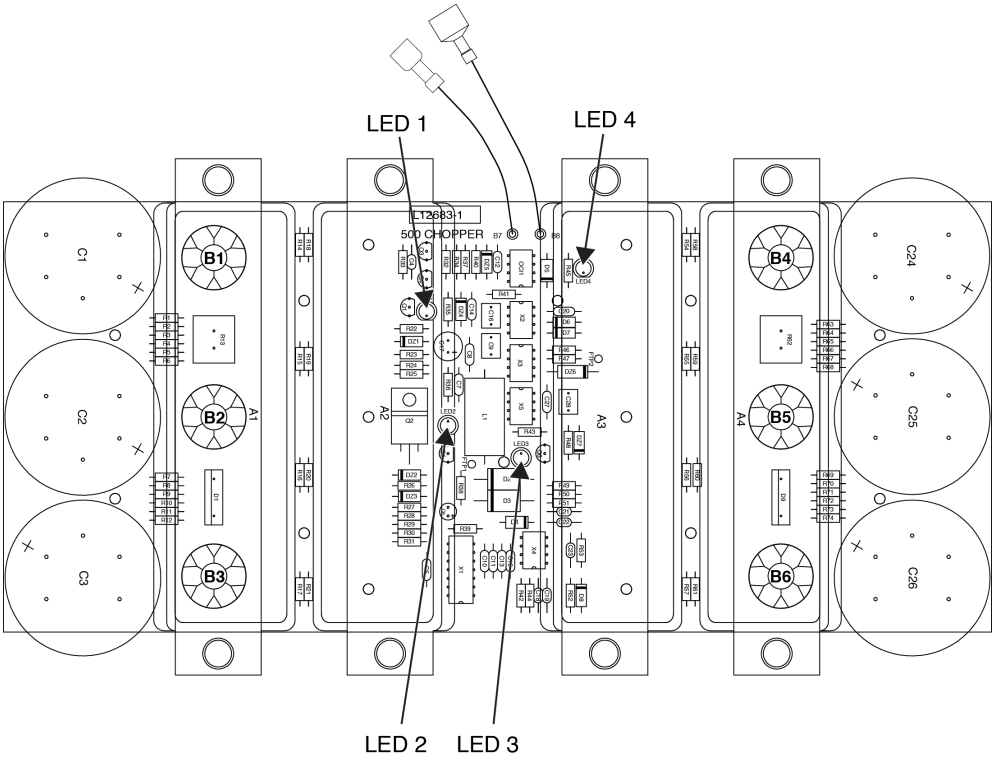


Figure F.11 – Chopper module LED locations



ENGINE RPM 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 whether the Engine is operating at the correct speed (RPM) during both high and low idle conditions.
NOTE: This test can only determine if the RPM is within specifications. The RPM is programmed into the Electronic Engine Governor Module and cannot be adjusted.

MATERIALS NEEDED

High Visibility Marking Pencil (For strobe-tach method only)
Strobe Tach, Frequency Counter or Multi-Meter with HZ Function

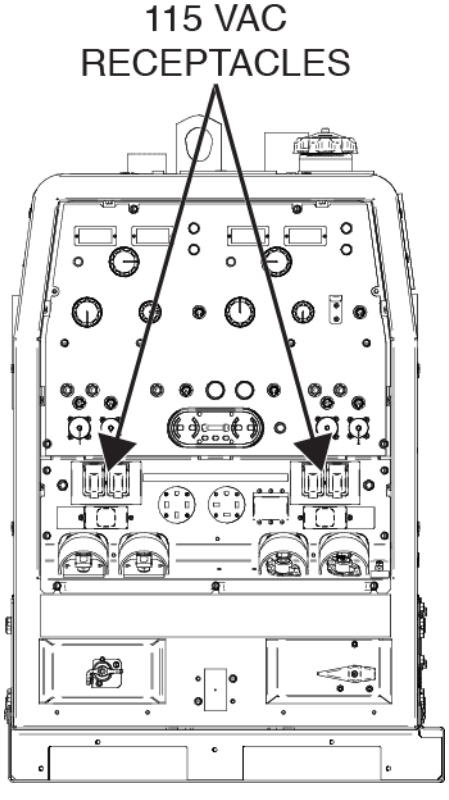
TEST PROCEDURE
STROBE-TACH METHOD

1. Turn off the Dual Vantage 700 machine.
2. Be certain there is no load on either the weld or auxiliary outputs.
3. Remove the side cover from the non-service side of the engine. See the ***Case Cover Removal Procedure***. This only needs to be removed for the strobe-tach method.
4. Place a mark on the engine crankshaft pulley or on the rotating ring between engine crankshaft pulley and the engine block.
5. Connect the strobe-tach according to the manufacturer's instructions.
6. Place the idle switch in the high idle position.
7. Start the engine and direct the strobe-tach light to the mark placed in step 4. Synchronize the light to the rotating mark.
8. The tach should read between 1840 and 1870 RPM.
9. Place the idle switch in the auto idle position and wait for the engine RPM to drop and stabilize. This may take about 12 to 15 seconds. Synchronize the strobe-tach light with the rotating mark.
10. The tach should read between 1490 and 1540 RPM.
11. If either of the readings are incorrect, a problem exists with the electronic governor control system. An authorized engine technician should be contacted to repair, replace or reprogram the electronic governor system.
12. When testing is complete, perform the ***Case Cover Replacement Procedure***.

FREQUENCY METER / MULTI-METER METHOD

1. If using a frequency counter or a multi-meter, set it to the AC HZ function. Plug the frequency counter or multi-meter into one of the 115 VAC auxiliary power receptacles. See ***Figure F.12***.
2. Place the idle switch in the high idle position.
3. Start the engine, allow the engine RPM to stabilize, then observe the frequency. The frequency should measure between 61.3 and 62.3 HZ (1869 and 1840 RPM).
4. Place the idle switch in the "Auto" position and wait for the RPM to drop and stabilize.
5. The frequency should measure between 49.7 and 51.3 HZ (1490 and 1540 RPM).
   NOTE: RPM can be calculated from the frequency by multiplying the frequency by 30. (Example : 62 HZ X 30 = 1860 RPM).
   This formula works for any 4 pole Lincoln Electric welding machine with AC auxiliary power.

Figure F.12 - 115 VAC receptacle locations



ELECTRONIC ENGINE GOVERNOR MODULE TEST PROCEDURE (ENGINE SPEED CONTROL)

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 the Electronic Engine Governor System is working properly. It should be performed if the Engine will not start and it has been determined that there is no air in the Diesel Fuel System. See the Engine Operators Manual for fuel system bleeding instructions.

MATERIALS NEEDED

RMS Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***, for the case sides on the left side of machine (operators left when facing the control panel).
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Locate the electronic engine governor module. See ***Figure F.13***.
5. Turn on the run/stop switch and observe that the light on the electronic engine governor module is illuminated. See ***Figure F.14***.
6. If the light is not illuminated, using a volt/ohmmeter check for battery voltage between pins 9 and 4 on plug J31 (leads #232N and lead 5S). See ***Figure F.14*** and ***Figure F.15***. See the Wiring Diagram.
7. If battery voltage is present and the light is not illuminated the electronic engine governor module may be faulty, perform the ***Electronic Engine Governor Module Removal And Replacement Procedure***.
8. Locate the fuel actuator. It is mounted on the injection pump, which is on the non-service side of the engine. See ***Figure F.16***.
9. Disconnect one of the leads from the fuel actuator. See Wiring Diagram.
10. Using a volt/ohmmeter, test the resistance of the fuel actuator. It should measure about 2.0 Ohms. See Wiring Diagram.
11. If the resistance reading is significantly different from 2.0 Ohms, the fuel actuator may be faulty. See the Engine manufacturers service manual.
12. Locate the magnetic pickup sensor. It is located on the service side of the engine. See ***Figure F.17***.
13. Unplug the magnetic sensor leads. See Wiring Diagram.
14. Using a volt/ohmmeter, test the resistance of the magnetic pickup sensor. The sensor resistance should be 180 to 210 Ohms.

15. If the resistance reading is significantly different than expected, the magnetic pickup sensor is faulty, perform the ***Magnetic Pickup Sensor Replacement And Adjustment Procedure***.
16. Connect the RMS AC voltmeter to the magnetic pickup leads. Crank the engine and check for at least 2 volts RMS. See Wiring Diagram.
17. If the expected voltage is not present, perform the ***Magnetic Pickup Sensor Replacement and Adjustment Procedure***.
18. If the voltage is low, adjust the magnetic pickup. See the ***Magnetic Pickup Sensor Replacement and Adjustment Procedure*** and retest.
19. Check the appropriate leads for loose or faulty connections. See Wiring Diagram.
20. If the electronic governor module is getting power and the magnetic pickup and actuator test good, perform the ***Electronic Engine Governor Module Removal And Replacement Procedure***.
21. Connect any previously disconnected leads and plugs.
22. Perform the ***Case Cover Replacement Procedure***.

Figure F.13 – Electronic engine governor module location

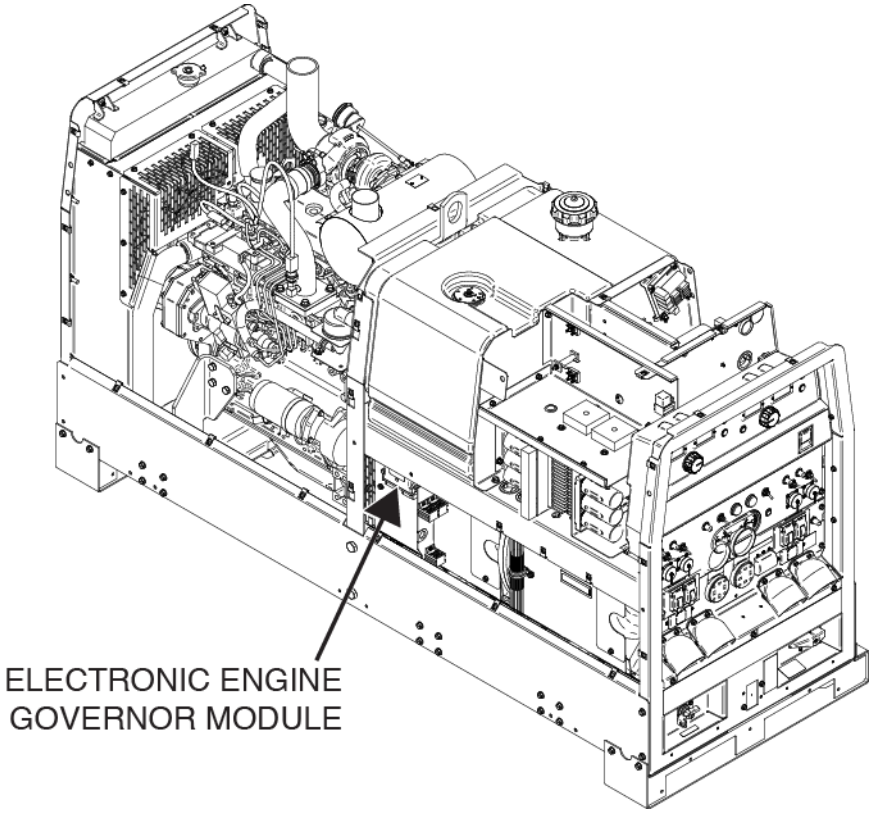


Figure F.14 – Electronic engine governor light and plug J31 locations

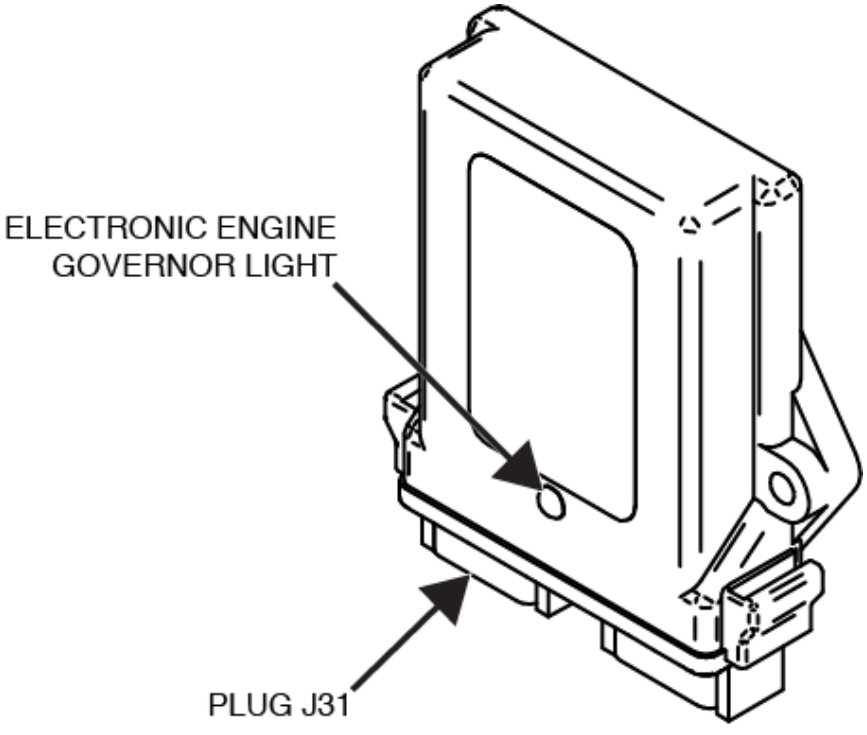


Figure F.15 – Lead 232N and 5S locations

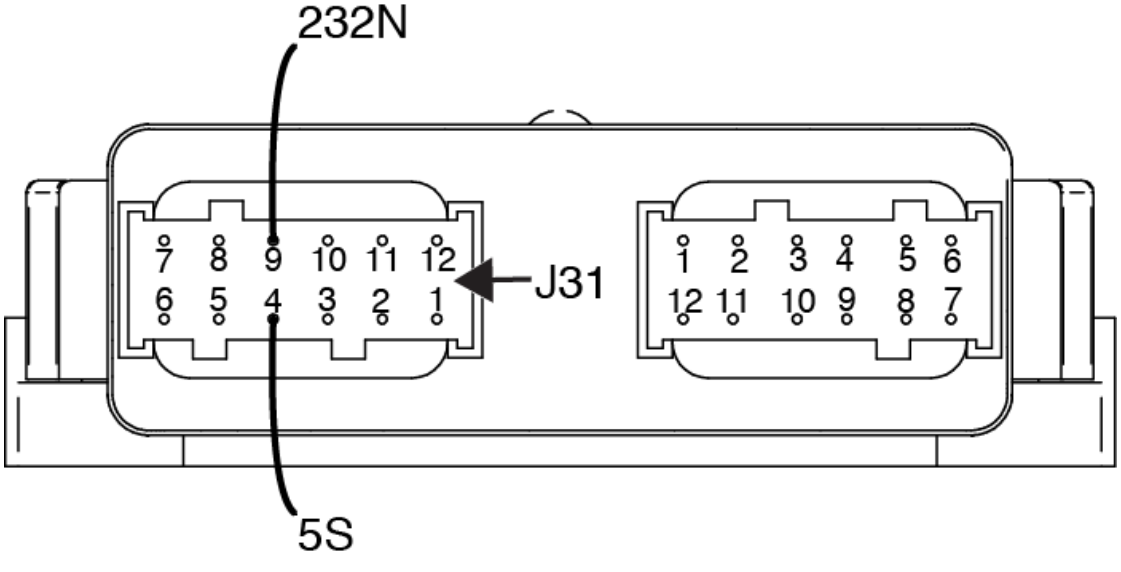


Figure F.16 – Fuel actuator location

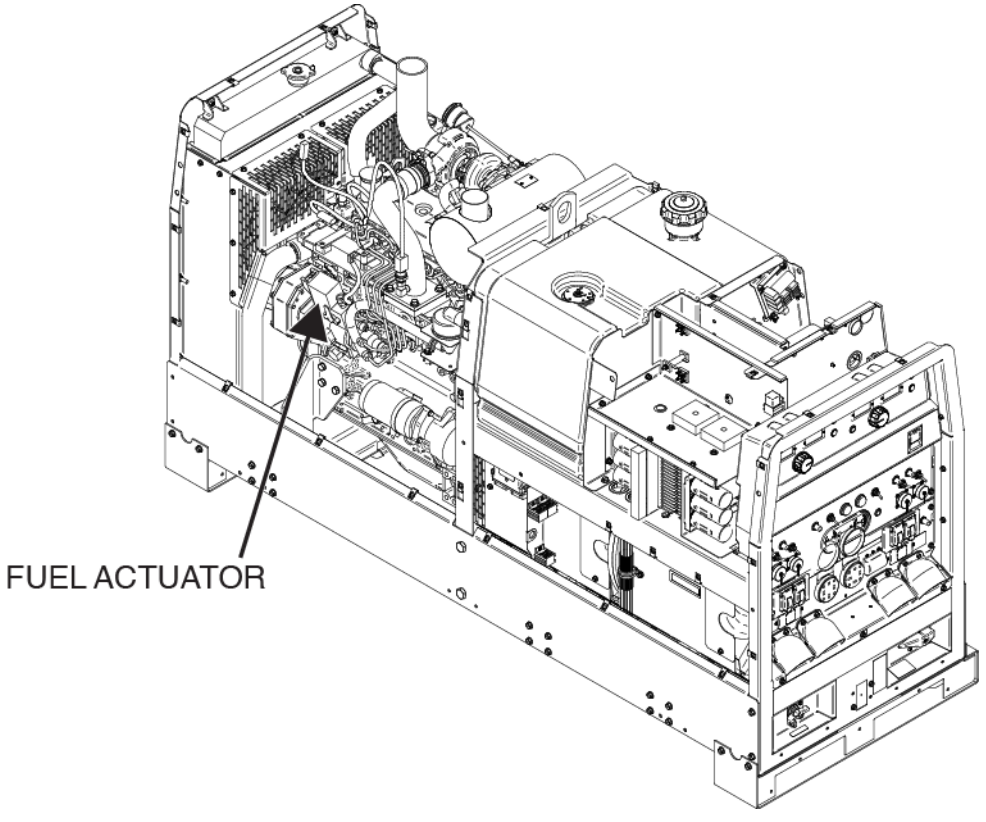
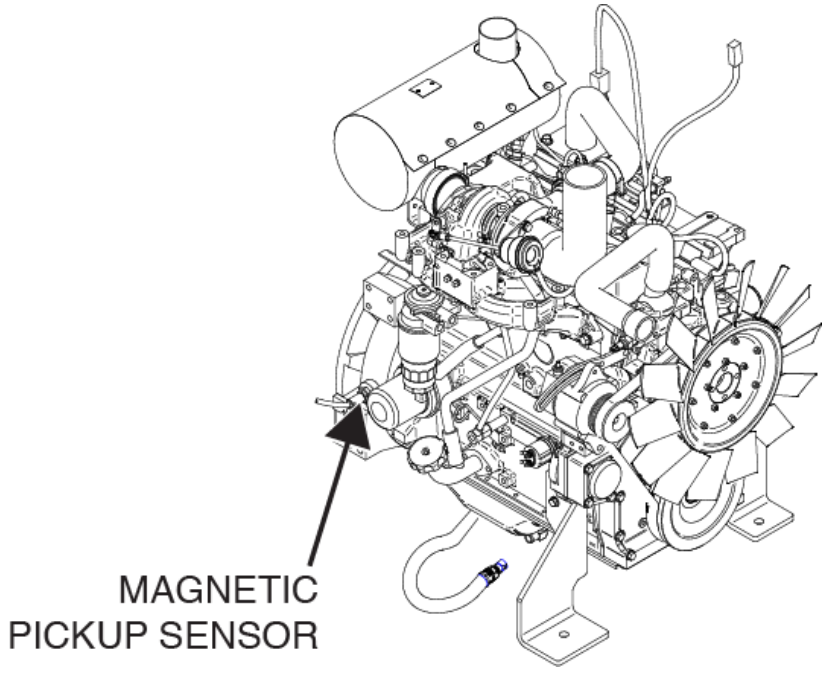


Figure F.17 – Magnetic pickup sensor location



BATTERY CHARGING CIRCUIT TEST PROCEDURE

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

TEST DESCRIPTION

This test will help determine if the Engine Battery Charging Alternator and supporting Circuitry is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Open the engine service access door. See ***Figure F.18***.
3. Locate the engine alternator. See ***Figure F.19***.
4. Examine the alternator drive belt and verify that the belt is tight and in good condition.
5. Start the engine and place the idle switch in the high position.
6. Using a volt/ohmmeter, test for DC voltage between lead #238 and chassis ground. Voltage should be 13.2 to 14.5 VDC. See ***Figure F.20***. See Wiring Diagram.
7. Using a volt/ohmmeter, test for DC voltage between lead #232 and chassis ground. Voltage should be 13.2 to 14.5 VDC. See ***Figure F.20***. See Wiring Diagram.
8. When the engine is running, if battery voltage is present at lead #232 and the voltage at lead #238 is significantly lower than expected, the alternator may be faulty. See the Engine manufacturers service manual.
9. Close and secure the engine service access door.

Figure F.18 – Engine service access door location

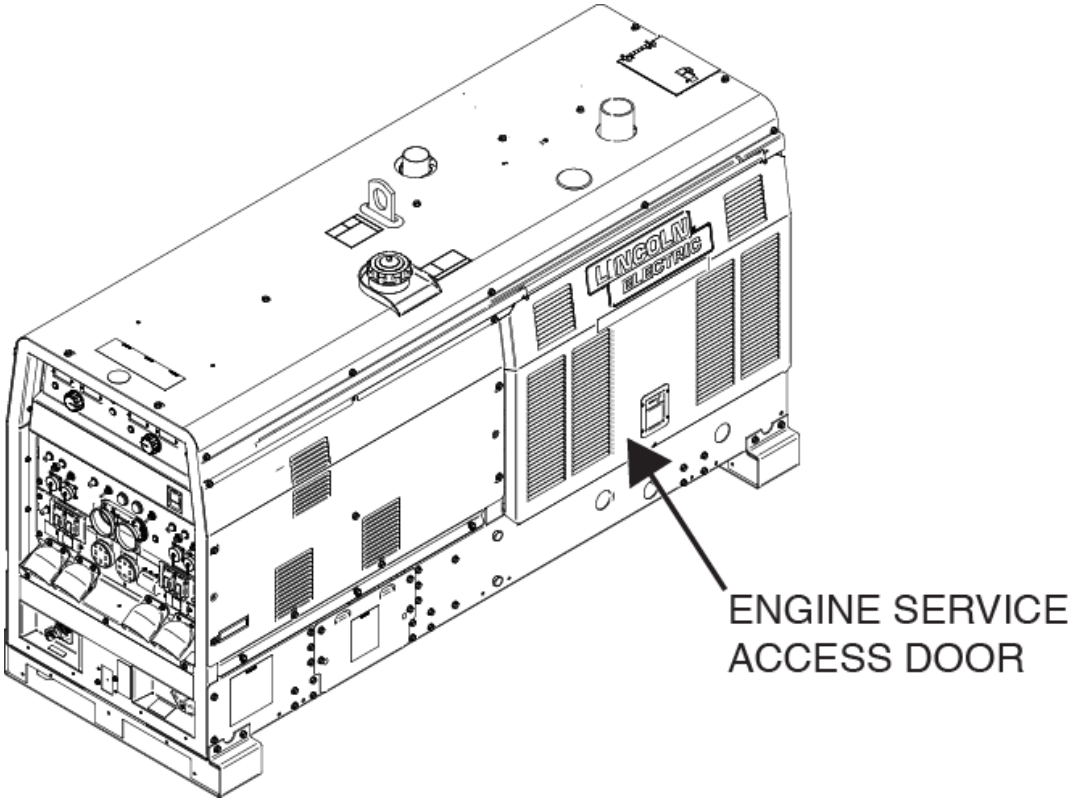


Figure F.19 – Engine alternator location

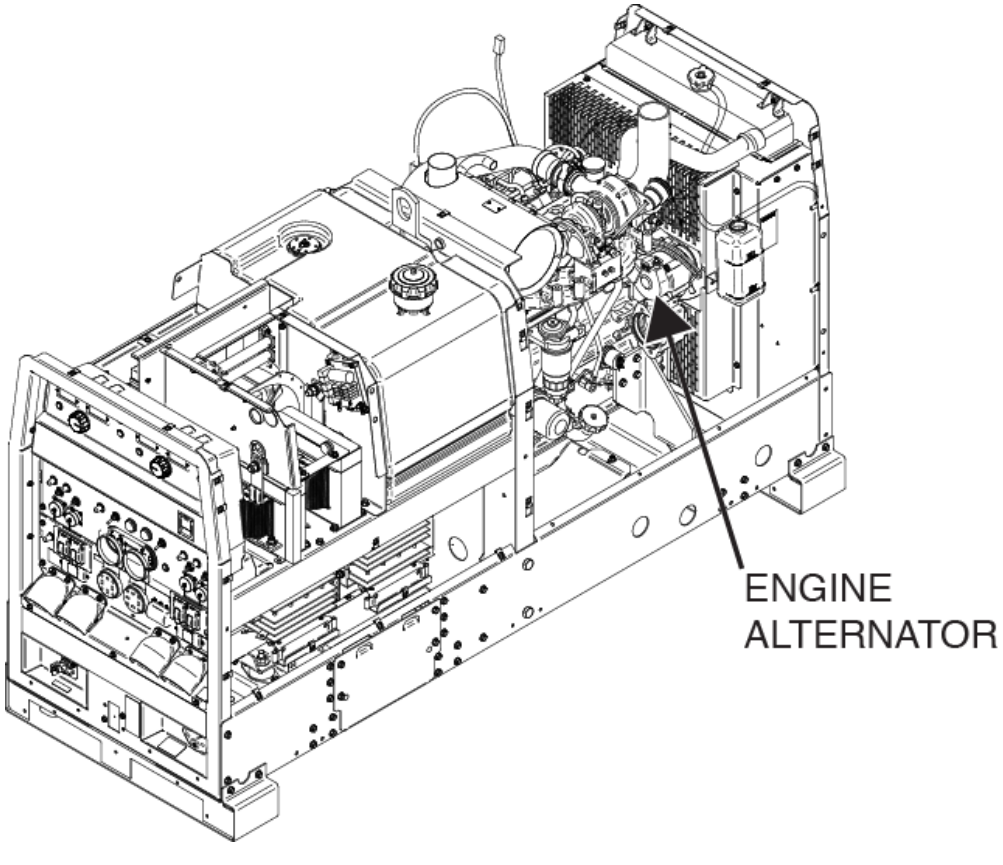
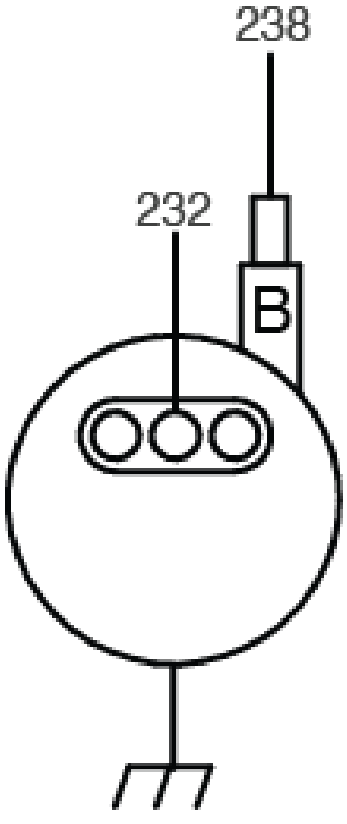


Figure F.20 – Alternator lead locations



WELD CONTROL BOARD(S) 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 the Weld Control Board(s) are functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Lower the control panel. See the ***Case Cover Removal Procedure***.
3. Locate the weld control boards attached to the bracket on the back of the control panel. See ***Figure F.21***.
4. Using a volt/ohmmeter, perform the voltage and resistance tests outlined in ***Tables F.1***, ***F.2***, ***F.3*** and ***F.4***. See ***Figures F.22*** and ***F.23***. See Wiring Diagram.
5. If any of the tests fail the weld control board(s) may be faulty.
6. If faulty, perform the ***Weld Control Board(s) Removal And Replacement Procedure***, for the faulty board.
7. Perform the ***Case Cover Replacement Procedure***.

Table F.1 – Weld control board voltage tests (board 1 side "B")

DESCRIPTION	TEST POINTS (+)	TEST POINTS (-)	EXPECTED READING	CONDITIONS
BATTERY VOLTAGE APPLIED TO BOARD	PLUG J2 PIN 7 (LEAD 232F)	PLUG J2 PIN 3 (LEAD 5G)	12 – 13 VDC	RUN STOP SWITCH IN 'RUN' POSITION. ENGINE NOT RUNNING.
REMOTE CONTROL CIRCUIT	PLUG J1 PIN 11 (LEAD 77A)	PLUG J1 PIN 10 (LEAD 75A)	10 VDC	ENGINE RUNNING.
OUTPUT CONTROL CIRCUIT	PLUG J7 PIN 1 (LEAD 77)	PLUG J7 PIN 5 (LEAD 75)	10 VDC	ENGINE RUNNING.
FLASHING VOLTAGE	PLUG J2 PIN 1 (LEAD 200N)	PLUG J2 PIN 3 (LEAD 5G)	12 VDC	DURING FLASHING.
LOW ENGINE IDLE COMMAND	PLUG J2 PIN 5 (LEAD 405A)	PLUG J2 PIN 3 (LEAD 5G)	12 – 13 VDC	ENGINE RUNNING AT HIGH SPEED.
LOW ENGINE IDLE COMMAND	PLUG J2 PIN 5 (LEAD 405A)	PLUG J2 PIN 3 (LEAD 5G)	0 VDC	ENGINE AT LOW IDLE RPM.
WELD TERMINAL SWITCH CIRCUIT	PLUG J1 PIN 4 (LEAD 2)	PLUG J1 PIN 3 (LEAD 4)	15 VDC	WELD TERMINAL SWITCH OPEN. ENGINE RUNNING.
IDLER SWITCH	PLUG J3 PIN 7 (LEAD 256)	PLUG J3 PIN 14 (LEAD 257)	15 VDC	IDLER SWITCH OPEN. ENGINE RUNNING.

Table F.2 – Weld control board resistance test (board 1 side "B")

DESCRIPTION	TEST POINT (+)	TEST POINT (-)	EXPECTED READING	CONDITIONS
CHECKING NORMALLY CLOSED CHOPPER HEAT SINK THERMOSTATS	PLUG J3 PIN 5 (LEAD 250A)	PLUG J3 PIN 1 (LEAD 250)	0 OHMS	ENGINE NOT RUNNING.
WELD TERMINAL SWITCH CIRCUIT	PLUG J1 PIN 4 (LEAD 2)	PLUG J1 PIN 3 (LEAD 4)	LESS THAN 1 OHM	WELD TERMINAL SWITCH CLOSED.
IDLER SWITCH	PLUG J3 PIN 7 (LEAD 256)	PLUG J3 PIN 14 (LEAD 257)	LESS THAN 1 OHM	IDLER SWITCH CLOSED.

Table F.3 – Weld control board voltage tests (board 2 side "A")

DESCRIPTION	TEST POINTS (+)	TEST POINTS (-)	EXPECTED READING	CONDITIONS
BATTERY VOLTAGE APPLIED TO BOARD	PLUG J2 PIN 7 (LEAD 232G)	PLUG J2 PIN 3 (LEAD 5R)	12 – 13 VDC	RUN STOP SWITCH IN 'RUN' POSITION. ENGINE NOT RUNNING.
REMOTE CONTROL CIRCUIT	PLUG J1 PIN 11 (LEAD 77D)	PLUG J1 PIN 10 (LEAD 75D)	10 VDC	ENGINE RUNNING.
OUTPUT CONTROL CIRCUIT	PLUG J7 PIN 1 (LEAD 77C)	PLUG J7 PIN 5 (LEAD 75C)	10 VDC	ENGINE RUNNING.
LOW ENGINE IDLE COMMAND	PLUG J2 PIN 5 (LEAD 405)	PLUG J2 PIN 3 (LEAD 5R)	12 – 13 VDC	ENGINE RUNNING AT HIGH SPEED.
LOW ENGINE IDLE COMMAND	PLUG J2 PIN 5 (LEAD 405)	PLUG J2 PIN 3 (LEAD 5R)	0 VDC	ENGINE AT LOW IDLE RPM.
WELD TERMINAL SWITCH CIRCUIT	PLUG J1 PIN 4 (LEAD 2C)	PLUG J1 PIN 3 (LEAD 4C)	15 VDC	WELD TERMINAL SWITCH OPEN. ENGINE RUNNING.

Table F.4 – Weld control board resistance tests (board 2 side "A")

WELD CONTROL BOARD RESISTANCE TESTS (BOARD 2 SIDE "A")				
DESCRIPTION	TEST POINT (+)	TEST POINT (-)	EXPECTED READING	CONDITIONS
CHECKING NORMALLY CLOSED CHOPPER HEAT SINK THERMOSTATS	PLUG J3 PIN 5 (LEAD 250B)	PLUG J3 PIN 1 (LEAD 250C)	0 OHMS	ENGINE NOT RUNNING.
WELD TERMINAL SWITCH CIRCUIT	PLUG J1 PIN 4 (LEAD 2C)	PLUG J1 PIN 3 (LEAD 4C)	LESS THAN 1 OHM	WELD TERMINAL SWITCH CLOSED.

Figure F.21 – Weld control board locations

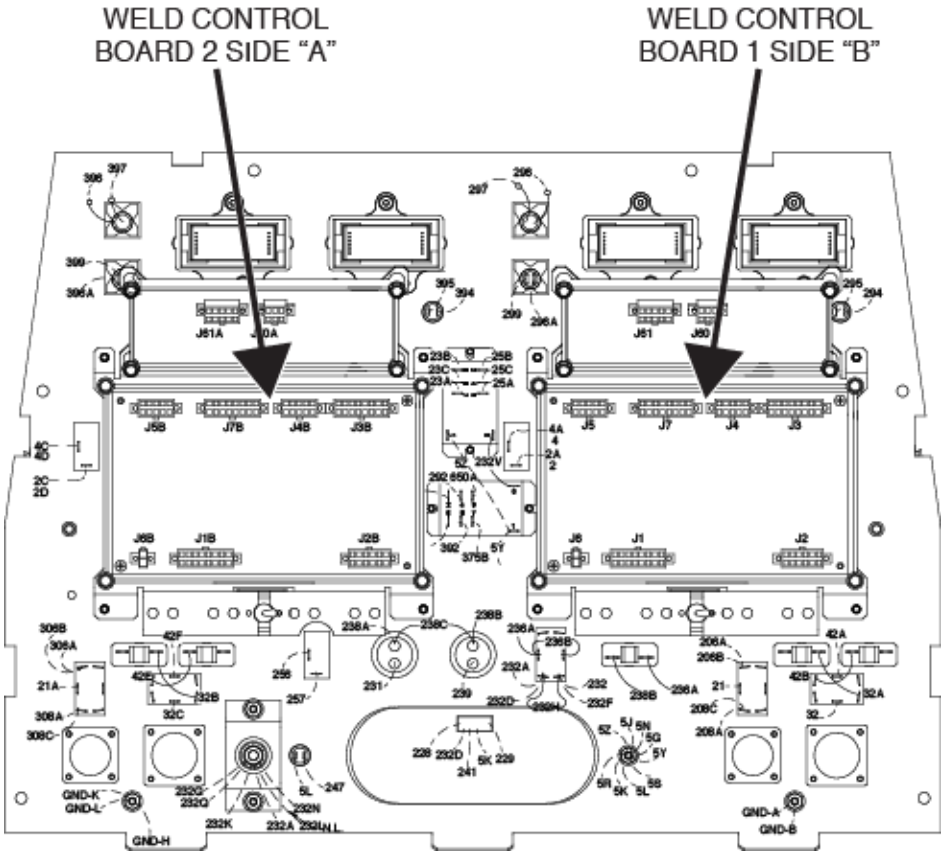


Figure F.22 – Weld control board 1 side "B" lead locations

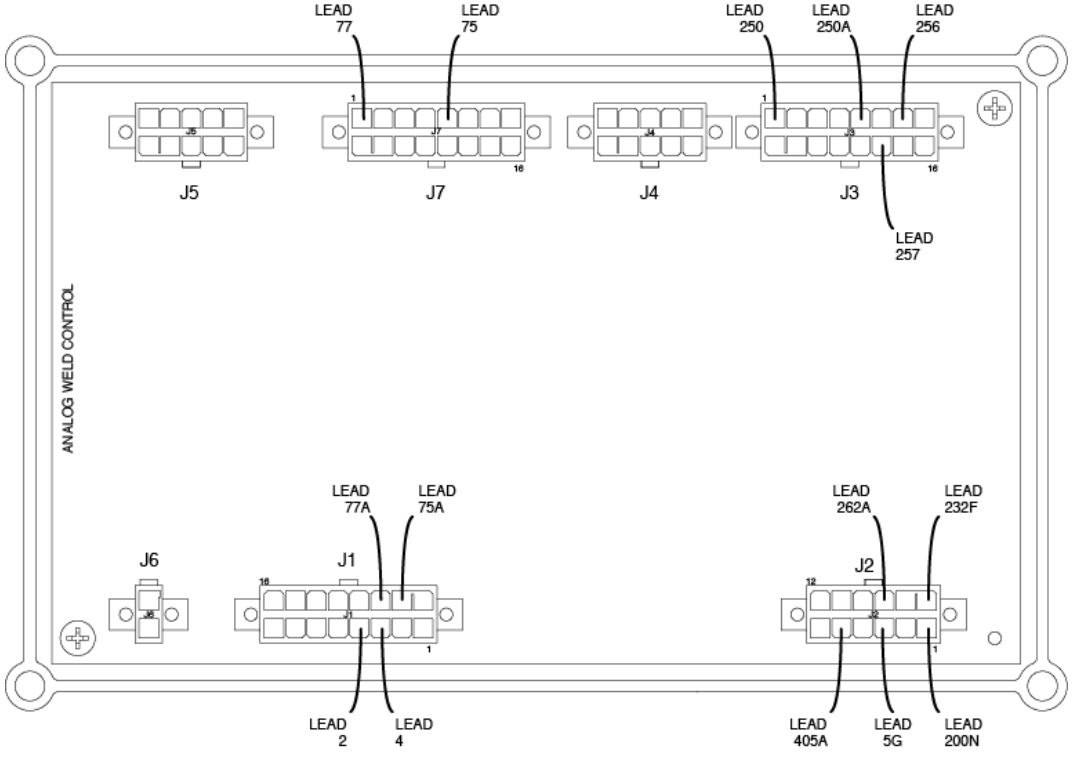
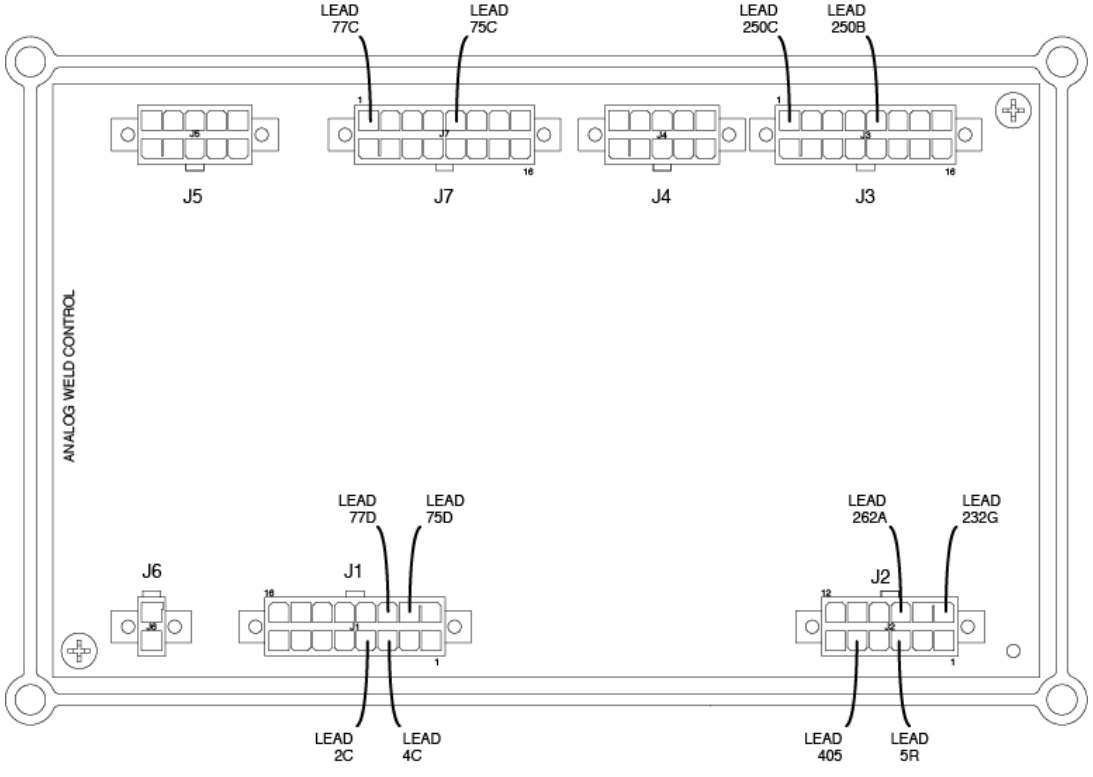


Figure F.23 – Weld control board 2 side "A" lead locations



OUTPUT RECTIFIER BRIDGE TEST PROCEDURE

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TEST DESCRIPTION

This test will help determine if one or more of the Diode Sets in the Weld Output Rectifiers is shorted or open. This test cannot determine if a Single Diode within a set is open.

MATERIALS NEEDED

7/16” Wrench
1/2” Open End Wrench
Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Locate the two output rectifiers on the right side of the machine below the fuel tank and output chokes (operator right when facing control panel). See ***Figure F.24***.

OUTPUT RECTIFIER BRIDGE B

5. Using a 7/16” wrench, label and disconnect the WB2 and WB3 cables from the rectifier terminal. See ***Figure F.25***. See Wiring Diagram.
6. Using a 7/16” wrench, label and disconnect the WB1 and WB6 cables from the rectifier terminal. See ***Figure F.25***. See Wiring Diagram.
7. Using a 7/16” wrench, label and disconnect the WB4 and WB5 cables from the rectifier terminal. See ***Figure F.25***. See Wiring Diagram.
8. Using a 1/2” wrench, label and disconnect the NEG B cable from the negative terminal of the rectifier. See ***Figure F.25***. See Wiring Diagram.
9. Using an ohmmeter, perform the tests in ***Table F.5***.
   NOTE: The positive terminal of the rectifier is located between the rectifier and the generator. There is no need to disconnect the leads from this terminal. It can be accessed by using a probe inserted between the rectifier plates. When inserting the probe, be careful not to damage the thin diodes leads.
10. If the Ohm readings are significantly higher or lower than specified in ***Table F.5***, the rectifier is faulty.
11. If faulty, perform the ***Power Module / Output Rectifier Removal And Replacement Procedure***.

12. Using a 7/16” wrench, connect the WB2 and WB3 cables to the rectifier terminal. See Wiring Diagram.
13. Using a 7/16” wrench, connect the WB1 and WB6 cables to the rectifier terminal. See Wiring Diagram.
14. Using a 7/16” wrench, connect the WB4 and WB5 cables to the rectifier terminal. See Wiring Diagram.
15. Using a 1/2” wrench, connect the NEG B cable to the negative terminal of the rectifier. See Wiring Diagram.

OUTPUT RECTIFIER BRIDGE A

16. Using a 7/16” wrench, label and disconnect the WA2 and WA3 cables from the rectifier terminal. See ***Figure F.26***. See Wiring Diagram.
17. Using a 7/16” wrench, label and disconnect the WA1 and WA6 cables from the rectifier terminal. See ***Figure F.26***. See Wiring Diagram.
18. Using a 7/16” wrench, label and disconnect the WA4 and WA5 cables from the rectifier terminal. See ***Figure F.26***. See Wiring Diagram.
19. Using a 1/2” wrench, label and disconnect the NEG A cable from the negative terminal of the rectifier. See ***Figure F.26***. See Wiring Diagram.
20. Using an ohmmeter, perform the tests in ***Table F.5***.
    NOTE: The positive terminal of the rectifier is located between the rectifier and the generator. There is no need to disconnect the leads from this terminal. It can be accessed by using an probe inserted between the rectifier plates. When inserting the probe, be careful not to damage the thin diodes leads.
21. If the Ohm readings are significantly higher or lower than specified in ***Table F.5***, the rectifier is faulty.
22. If faulty, perform the ***Power Module / Output Rectifier Removal And Replacement Procedure***.
23. Using a 7/16” wrench, connect the WA2 and WA3 cables to the rectifier terminal. See Wiring Diagram.
24. Using a 7/16” wrench, connect the WA1 and WA6 cables to the rectifier terminal. See Wiring Diagram.
25. Using a 7/16” wrench, connect the WA4 and WA5 cables to the rectifier terminal. See Wiring Diagram.
26. Using a 1/2” wrench, connect the NEG A cable to the negative terminal of the rectifier. See Wiring Diagram.
27. Perform the ***Case Cover Replacement Procedure***.

Table F.5 – Output rectifier bridge diode test

RECTIFIER TERMINAL CONNECTIONS		DIODE BIAS & EXPECTED TEST RESULT
TEST INSTRUMENT (+) LEAD	TEST INSTRUMENT (-) LEAD	
NEGATIVE TERMINAL	AC1	FORWARD BIAS (LOW RESISTANCE)
NEGATIVE TERMINAL	AC2	FORWARD BIAS (LOW RESISTANCE)
NEGATIVE TERMINAL	AC3	FORWARD BIAS (LOW RESISTANCE)
AC1	NEGATIVE TERMINAL	REVERSE BIAS (HIGH RESISTANCE)
AC2	NEGATIVE TERMINAL	REVERSE BIAS (HIGH RESISTANCE)
AC3	NEGATIVE TERMINAL	REVERSE BIAS (HIGH RESISTANCE)
AC1	POSITIVE TERMINAL	FORWARD BIAS (LOW RESISTANCE)
AC2	POSITIVE TERMINAL	FORWARD BIAS (LOW RESISTANCE)
AC3	POSITIVE TERMINAL	FORWARD BIAS (LOW RESISTANCE)
POSITIVE TERMINAL	AC1	REVERSE BIAS (HIGH RESISTANCE)
POSITIVE TERMINAL	AC2	REVERSE BIAS (HIGH RESISTANCE)
POSITIVE TERMINAL	AC3	REVERSE BIAS (HIGH RESISTANCE)

Figure F.24 – Output rectifier bridge locations

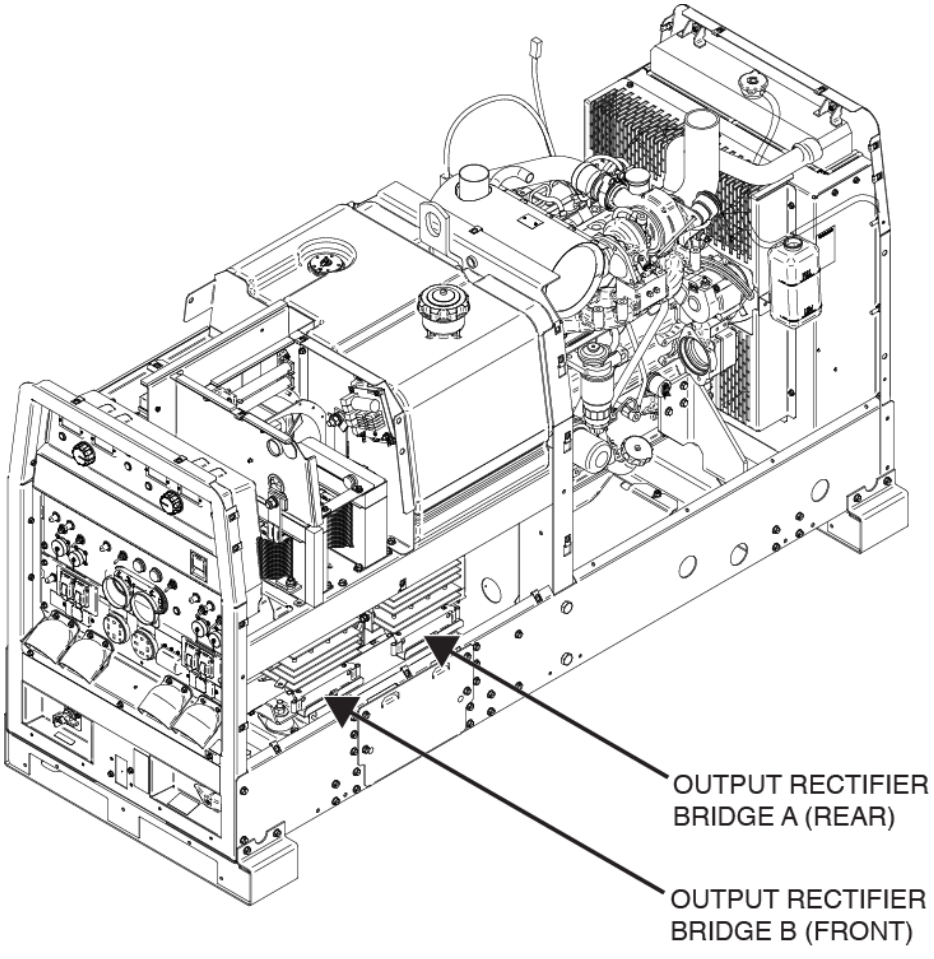


Figure F.25 – Output rectifier bridge B lead locations

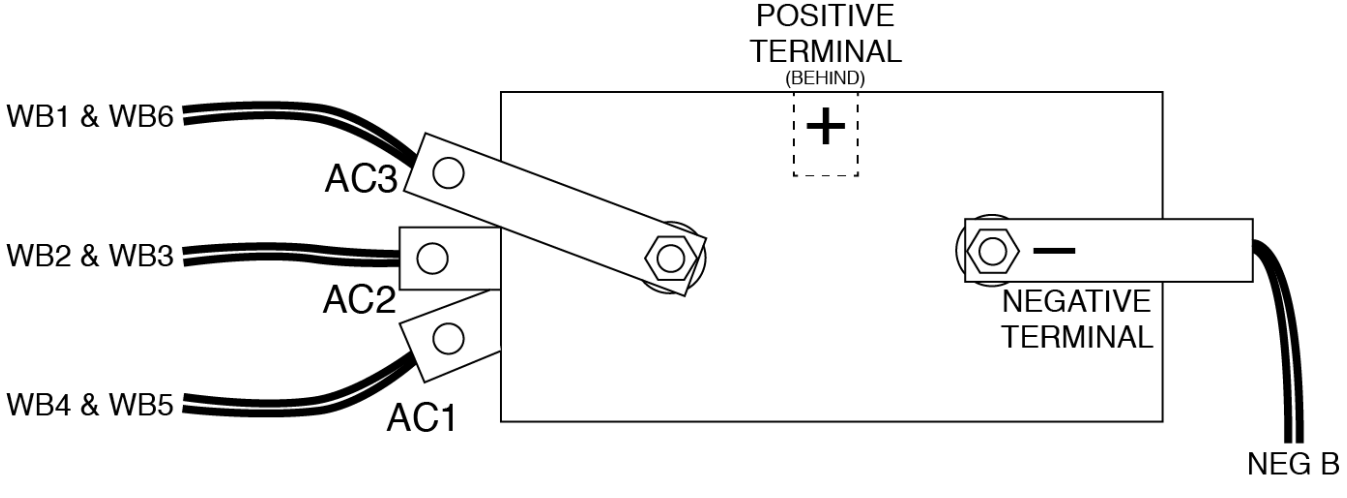
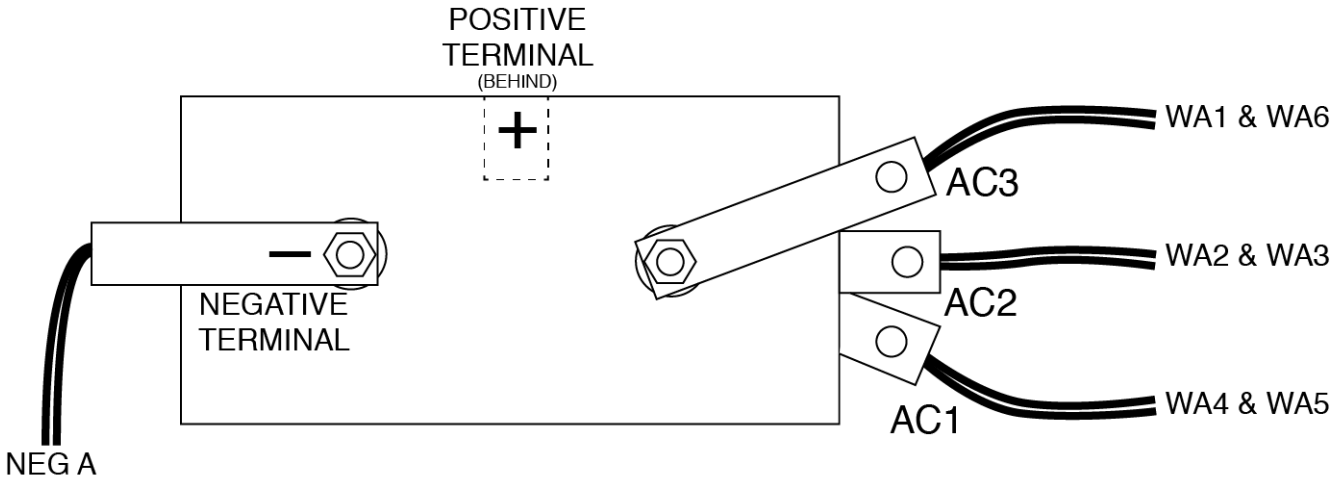


Figure F.26 – Output rectifier bridge A lead locations



AUXILIARY 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 test will determine if the correct DC voltage is being applied to the Auxiliary Rotor.
NOTE: The Auxiliary Rotor is the one farthest from the Engine and closest to the case front.

MATERIALS NEEDED

3/8" Nutdriver
Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***, for left side of machine.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Using a 3/8" nutdriver, remove the two screws securing the brush cover to the auxiliary stator cover (the brush cover farthest from the engine). See ***Figure F.27***.
5. Using a volt/ohmmeter, set the meter for DC volts and attach the probes to the brush leads of the auxiliary rotor. Start the engine and operate it at high RPM. See Wiring Diagram.
6. Observe the voltage on the meter. Normal voltage is about 160 VDC.
7. If the voltage is normal, this test is complete.
8. If the voltage is low, check the C2 capacitor. See ***Figure F.28***.
9. If the voltage is zero or very near zero, perform the ***Auxiliary Rotor Resistance Test Procedures (Static And Dynamic)***.
10. If the rotor resistance is normal, proceed to the ***Auxiliary Rotor Flashing Voltage Test Procedure***.
11. If the voltage is between 3 and 5 Volts DC:
    • Test or replace the D2 field bridge rectifier, it may be defective. See ***Figure F.29***.
    • Check for damaged leads or a faulty connection at leads 5FA, 6A, 200, 200A and 201A. Check the connection at the insulated neutral stud on the bottom of the output panel and the ground stud on the control panel. See the Wiring Diagram.
    • The auxiliary alternator may be under a heavy electrical load. Disconnect any loads from the machine's receptacles and shut off the 3-pole circuit breaker CB1.
    • The auxiliary stator may be defective.
12. If the voltage measures about 11 to 14 VDC, check for dirty or defective brushes or slip rings and perform the ***Auxiliary Rotor Resistance Test Procedures (Static And Dynamic)***.
13. Using a 3/8" nutdriver, attach the two screws securing the brush cover.
14. Perform the ***Case Cover Replacement Procedure***.

Figure F.27 – Auxiliary rotor brush cover mounting screw locations

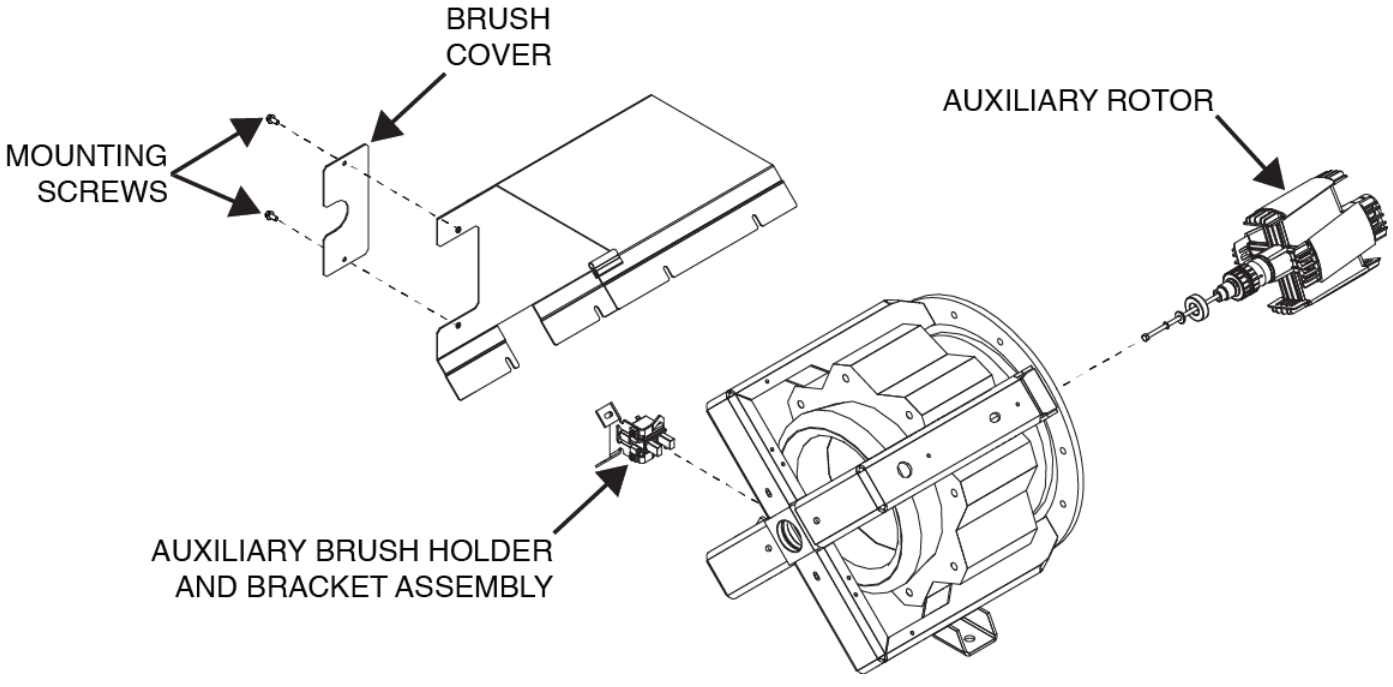
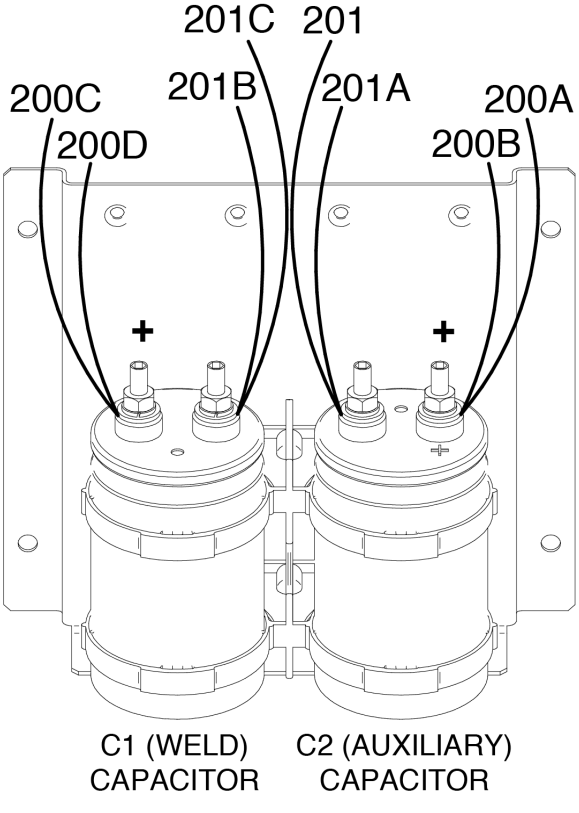
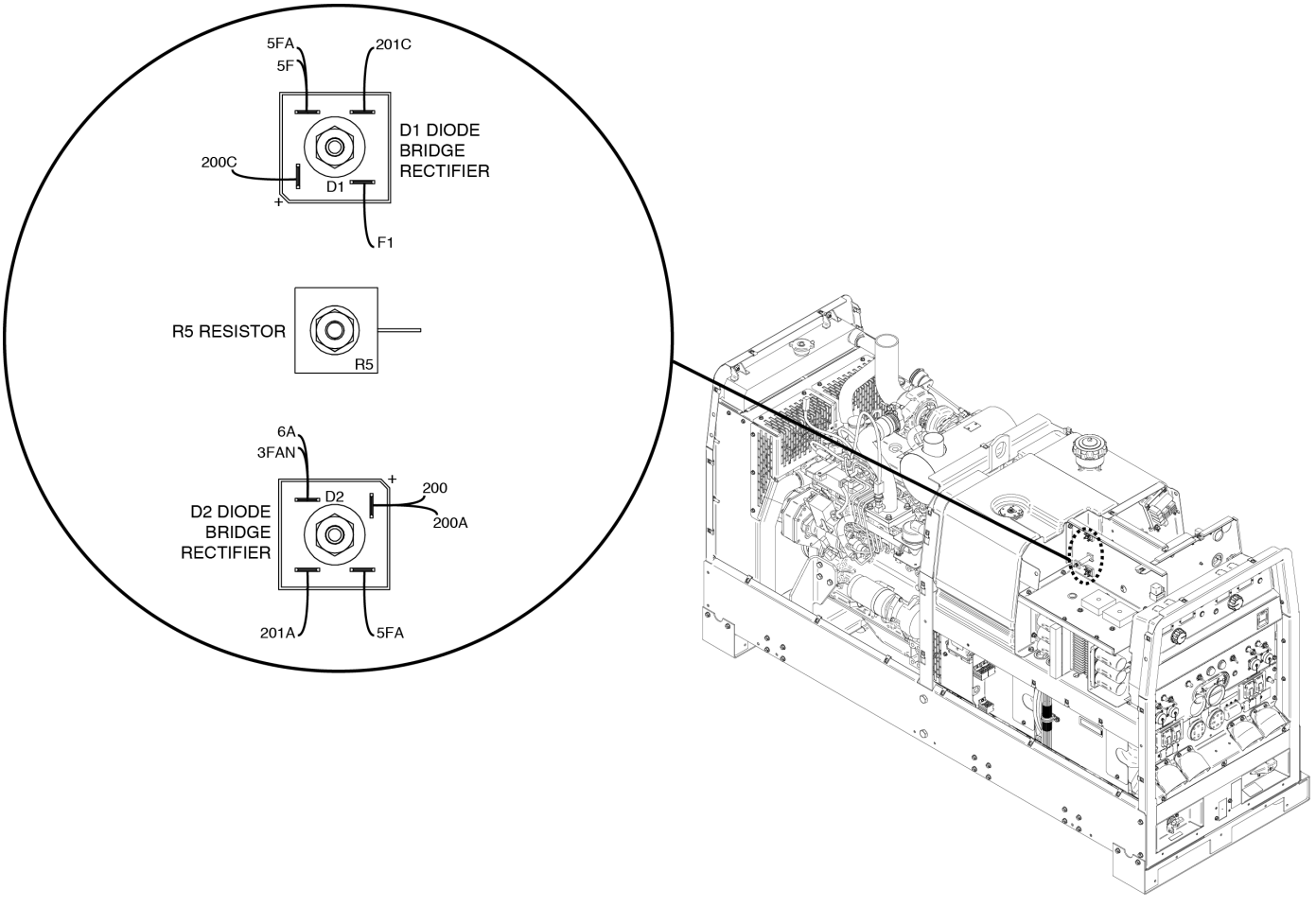


Figure F.28 – C2 (auxiliary) capacitor lead locations



CAPACITORS ARE LOCATED ON THE LEFT SIDE OF THE MACHINE
BEHIND CHOPPER BOARD ATTACHED TO THE FUEL TANK BAFFLE.

Figure F.29 – D2 field bridge rectifier lead locations



AUXILIARY ROTOR 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 will help determine if the Auxiliary Rotor is receiving "FLASHING" voltage. This test should be performed if no voltage is detected when performing the ***Auxiliary Rotor Voltage Test Procedure***.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Lower the control panel. See the ***Case Cover Removal Procedure***.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Locate the weld control board B attached to the bracket on the back left side of the control panel. See ***Figure F.30***.
5. Locate leads 5G (J2-3) and 200N (J2-1). See ***Figure F.31***. See Wiring Diagram.
6. Start the engine.
7. Using a voltmeter, test for battery voltage (12 - 13.5VDC) between leads 5G (J2-3) and 200N (J2-1). See ***Figure F.31***. See Wiring Diagram.
8. If battery voltage is present:
   • Check for defective R5 resistor. See ***Figure F.32***.
   • Check for damaged leads or connections at leads #200 and #200N. See Wiring Diagram.
   • Test or replace the D2 bridge rectifier. See ***Figure F.32***.
   • Check that lead 5FA is making good connection with the neutral stud.
9. If battery voltage is not present:
   • Check that the 5FA lead is getting good connection with the negative battery terminal. See Wiring Diagram.
   • Using a voltmeter, test for battery voltage between leads 5G (J2-3) and lead #232F (J2-7). See ***Figure F.31***. See Wiring Diagram.
   • If battery voltage is not present, check lead #232F between the weld control board and the run/stop switch. See Wiring Diagram.
   • Using a voltmeter, test for battery voltage between lead 5G (J2-3) and lead #262A (J2-9). See ***Figure F.31***. See Wiring Diagram. If battery voltage is not present, check lead #262A and the CR-4 engine protection relay. Check that the relay is getting 12 Volt DC power and is being activated by the engine governor control module.

• The CR-4 engine protection relay may be defective. Perform the ***CR3, CR4, CR5 and CR6 Relay Test Procedure***, for the CR4 relay.
• The engine governor control module may be defective.

10. If battery voltage is present between leads 5G (J2-3) and lead #232F (J2-7) and between 5G (J2-3) and lead #262A (J2-9), but voltage is not present between leads 5G (J2-3) and lead #200N (J2-1) the weld control board may be defective.
11. Perform the ***Case Cover Replacement Procedure***.

Figure F.30 – Weld control board B location

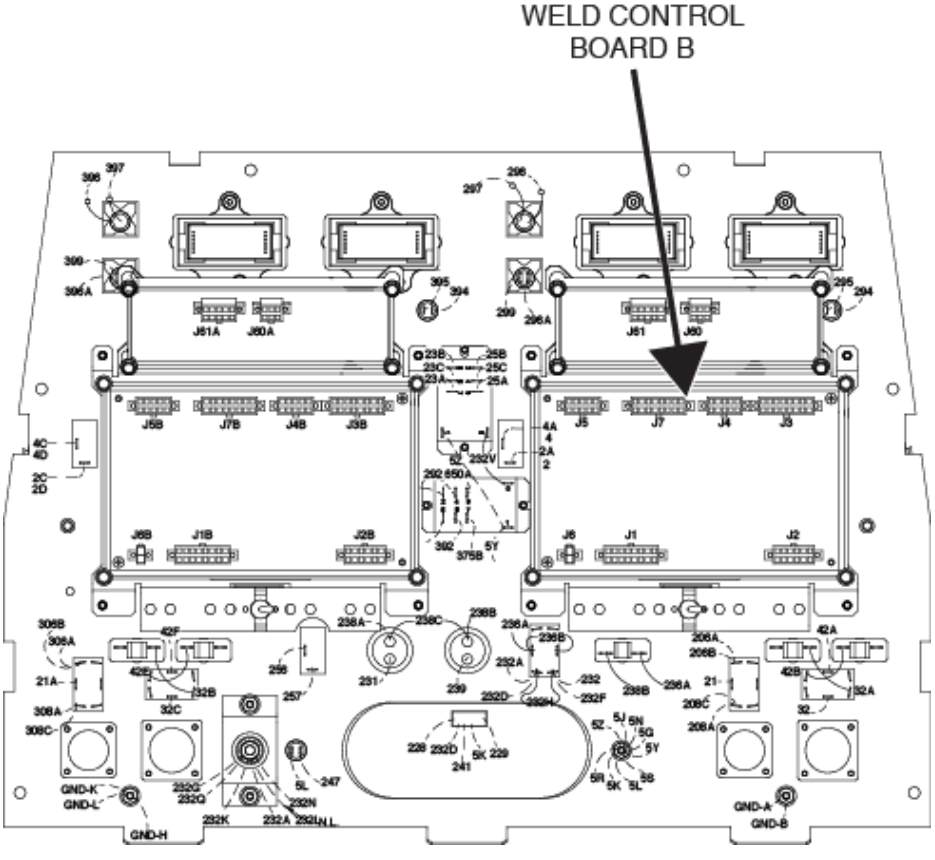


Figure F.31 – Weld control board B lead locations

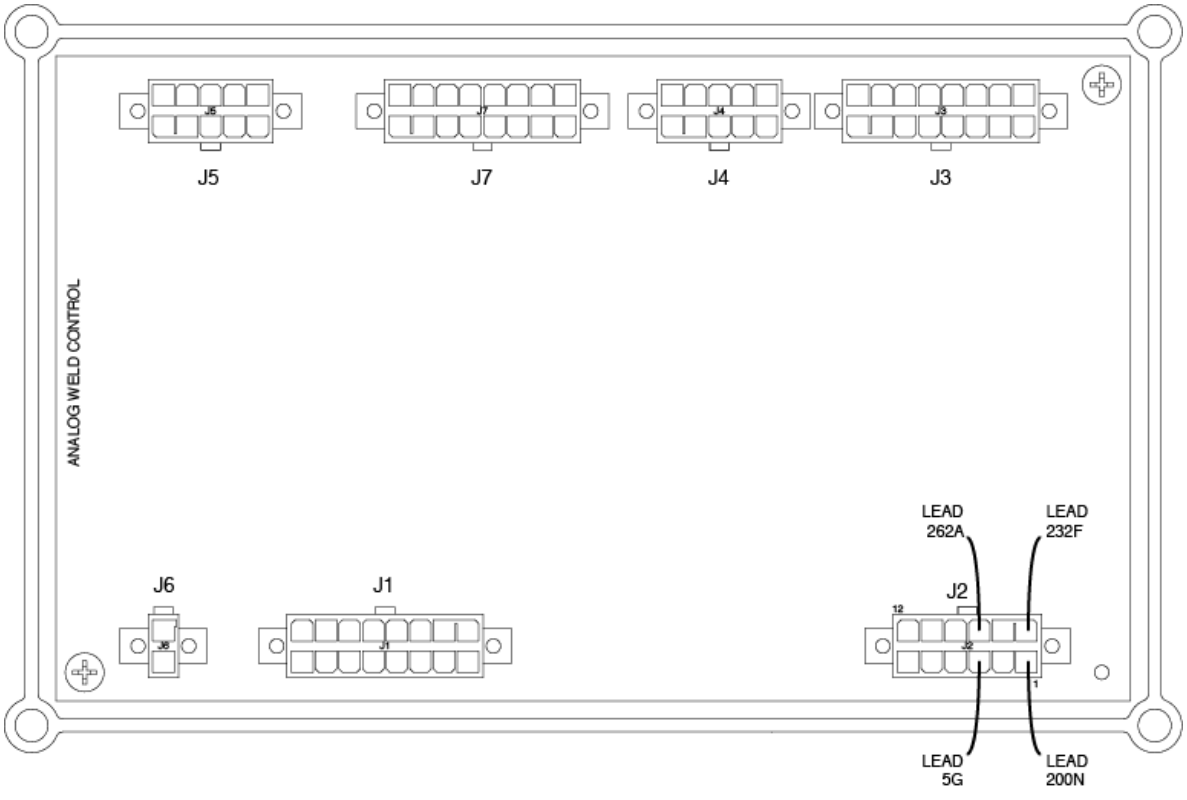
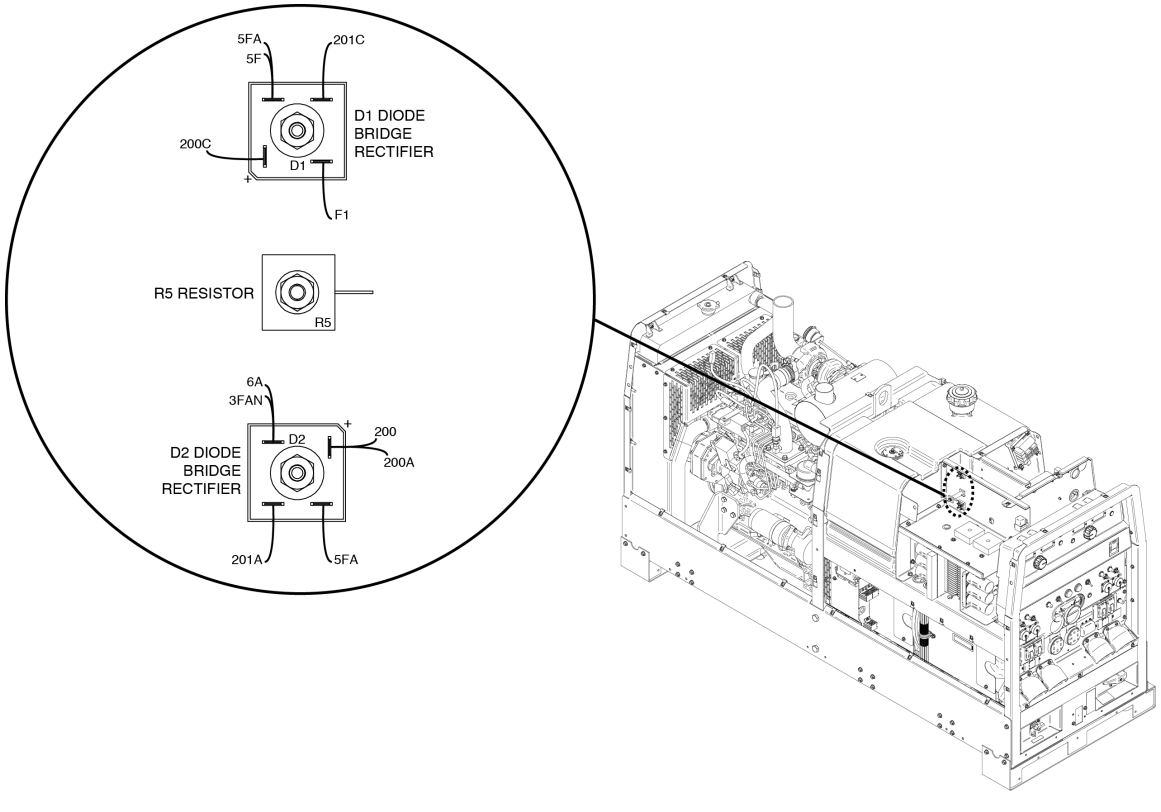


Figure F.32 – D2 bridge rectifier lead locations



AUXILIARY STATOR 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 will help determine if the Auxiliary Stator is putting out the required voltage. This test should be performed if it has been established that the Auxiliary Rotor voltage is normal.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Lower the control panel. See the ***Case Cover Removal Procedure***.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Place the idle switch in the high idle position.
5. Make certain the three pole CB-1 circuit breaker is in the ON position.
6. Locate leads 5FA and 6A on the AC terminals of the D2 bridge rectifier. See ***Figure F.33***.
7. Start the engine and using a volt/ohmmeter, measure the AC voltage between leads 5FA and 6A. Voltage should be approximately 120 VAC. See ***Figure F.33***. See Wiring Diagram.
8. Locate the 240 Volt three phase receptacles and the 120/240 Volt receptacles on the output panel. See ***Figure F.34***.
9. Using a volt/ohmmeter, test the AC voltage between terminals X to Y, X to Z and Y to Z. Voltage should be approximately 240 VAC. See ***Figure F.35***. See the Wiring Diagram.
10. Using a volt/ohmmeter, test for AC voltage at 120/240 VAC receptacle. Terminals X to Y should measure about 240 VAC. Terminals X to W and Y to W should measure about 120 VAC. See ***Figure F.35***. See Wiring Diagram.
11. If the expected voltage is not present at the above test points, check for faulty wiring between the receptacle terminals, circuit breakers and the stator windings. See the Wiring Diagram.
12. If all of the voltages are missing perform the ***Auxiliary Rotor Voltage Test Procedure***, ***Auxiliary Rotor Flashing Voltage Test Procedure*** and the ***Auxiliary Rotor Resistance Test Procedures (Static and Dynamic)***.
13. If only some of the voltages are low or missing, the auxiliary stator may be faulty.
14. Perform the ***Case Cover Replacement Procedure***.

Figure F.33 – D2 bridge rectifier lead locations

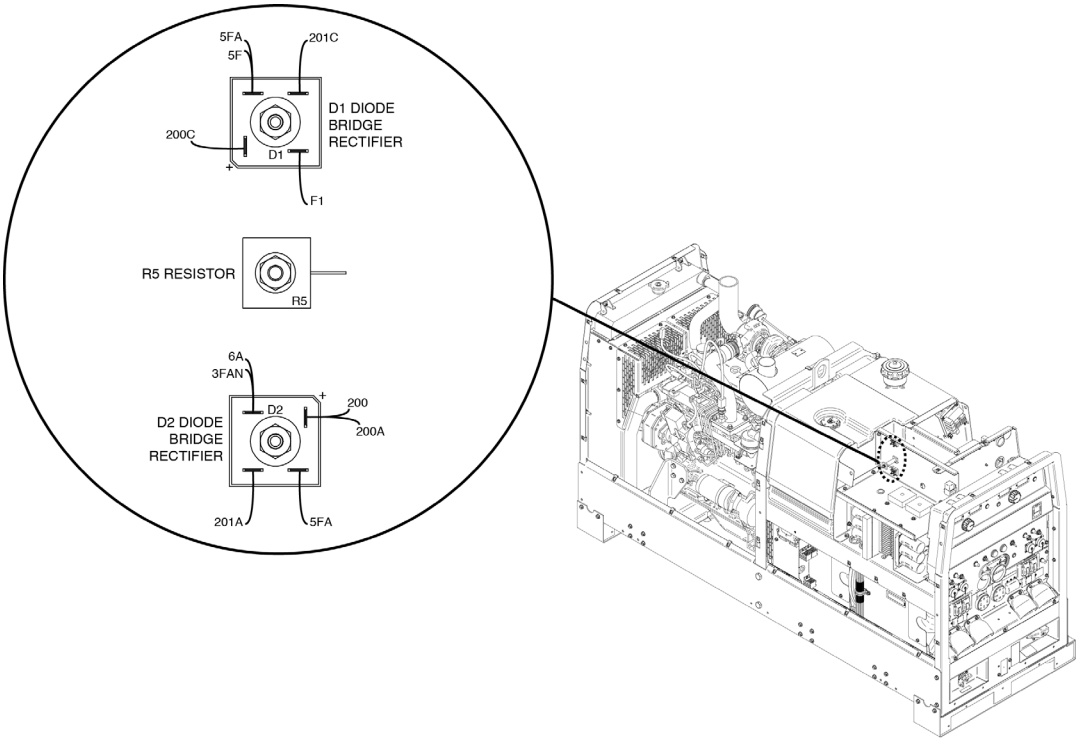


Figure F.34 – 120 & 240 VAC receptacles locations

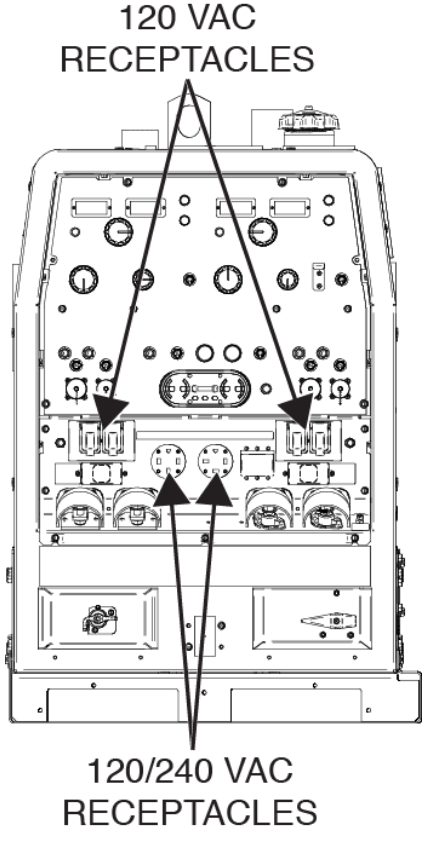
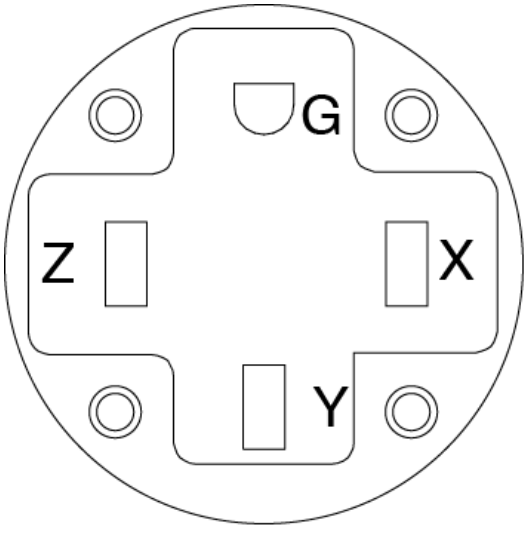
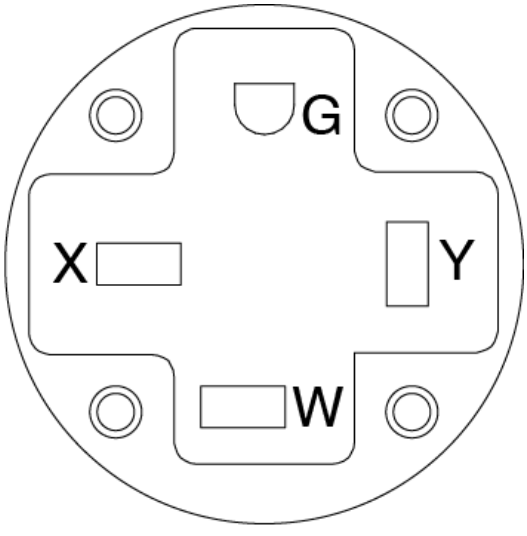


Figure F.35 – 120 & 240 VAC receptacle terminal locations



240 VAC THREE-PHASE RECEPTACLE



120 VAC / 240 VAC RECEPTACLE

AUXILIARY ROTOR RESISTANCE TEST PROCEDURE (STATIC)

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 there is a shorted, open or grounded Winding in the Auxiliary Rotor.

MATERIALS NEEDED

3/8" Nutdriver
Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***, for left side of machine.
   NOTE: This test will be performed with the engine OFF and the battery disconnected.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Using a 3/8" nutdriver, remove the two screws securing the brush cover. See ***Figure F.36***.
5. Using a 3/8" nutdriver, remove the brush holder and bracket assembly. See ***Figure F.36***.
6. Using a volt/ohmmeter, measure the resistance across the slip rings of the auxiliary rotor. The auxiliary rotor resistance should measure 25 Ohms at 75 deg. F*.
   A. If the rotor resistance is significantly higher or lower than specified above, the rotor is defective and should be replaced.
   ***NOTE:** The resistance of the copper windings changes with temperature. Higher temperatures will slightly increase resistance while cooler temperatures will decrease resistance.
7. Using an ohmmeter, measure the resistance from one of the slip rings of the auxiliary rotor to a good, clean chassis ground. The resistance should be very high. Normal resistance to ground should be at least 500,000 ohms.
8. Examine the brushes and brush holders. See ***Figure F.37***. Replace the brushes if they exhibit excessive wear or visible damage or any kind.
9. When testing is complete, using a 3/8" nutdriver, attach the brush holder and bracket assembly. Make sure the brushes and holders are in good condition and centered on the slip rings.
10. Connect the brush leads and replace any wire ties that had been removed. See Wiring Diagram.
11. Using a 3/8" nutdriver, attach the two screws securing the brush cover.
12. Perform the ***Case Cover Replacement Procedure***.

Figure F.36 – Auxiliary brush holder and bracket assembly location

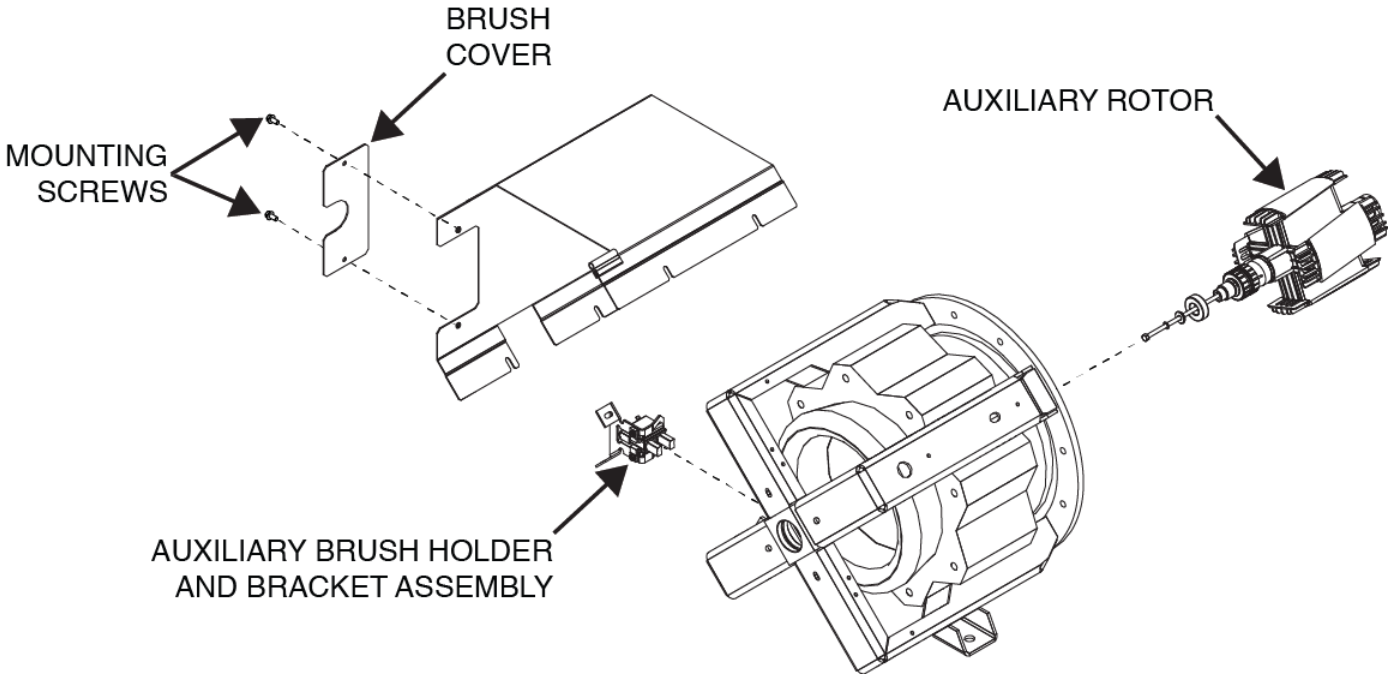
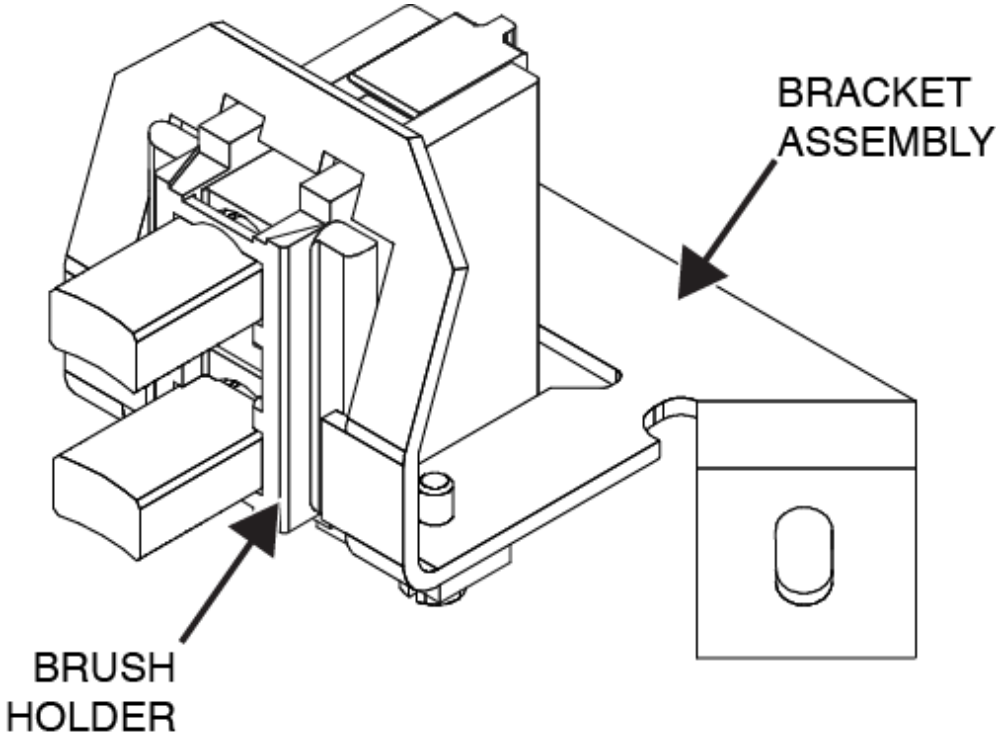


Figure F.37 – Brush and brush holder detail



AUXILIARY ROTOR RESISTANCE TEST PROCEDURE (DYNAMIC)

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

TEST DESCRIPTION

This test will determine if the Auxiliary Rotor Winding is shorted, open or grounded while under the stress of centrifugal force.

MATERIALS NEEDED

3/8" Nutdriver
Analog Ohmmeter (digital meters typically will not perform properly for this test)
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***, for left side of machine.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Using a 3/8" nutdriver, remove the two screws securing the brush cover. See ***Figure F.38***.
5. Label, disconnect and insulate the wires from the brushes. See Wiring Diagram.
6. Check that the slip rings are clean and the brushes are in good condition, properly centered and seated on the rings.
7. Using an analog ohmmeter fitted with clips or terminals, attach them to the brush terminals on the auxiliary rotor. See ***Figure F.39***.
8. Place the idle switch in the high position and start the engine.
9. The ohmmeter should read approximately 25 ohms.
10. Turn off the engine.
11. Remove one of the ohmmeter leads and attach it to a good clean chassis ground connection.
12. Start the engine and read the ohms. The resistance should be very high. 500,000 Ohms or higher is acceptable.
13. If ohmmeter reading is significantly different the rotor may be faulty. Perform the ***Rotors And Stators Removal And Replacement Procedure***, for the auxiliary rotor.
14. Turn off the Dual Vantage 700 machine.
15. Connect the brush leads and replace any cable ties that had been removed. See Wiring Diagram.
16. Using a 3/8" nutdriver, attach the two screws securing the brush cover.
17. Perform the ***Case Cover Replacement Procedure***.

Figure F.38 – Auxiliary brush cover mounting screw locations

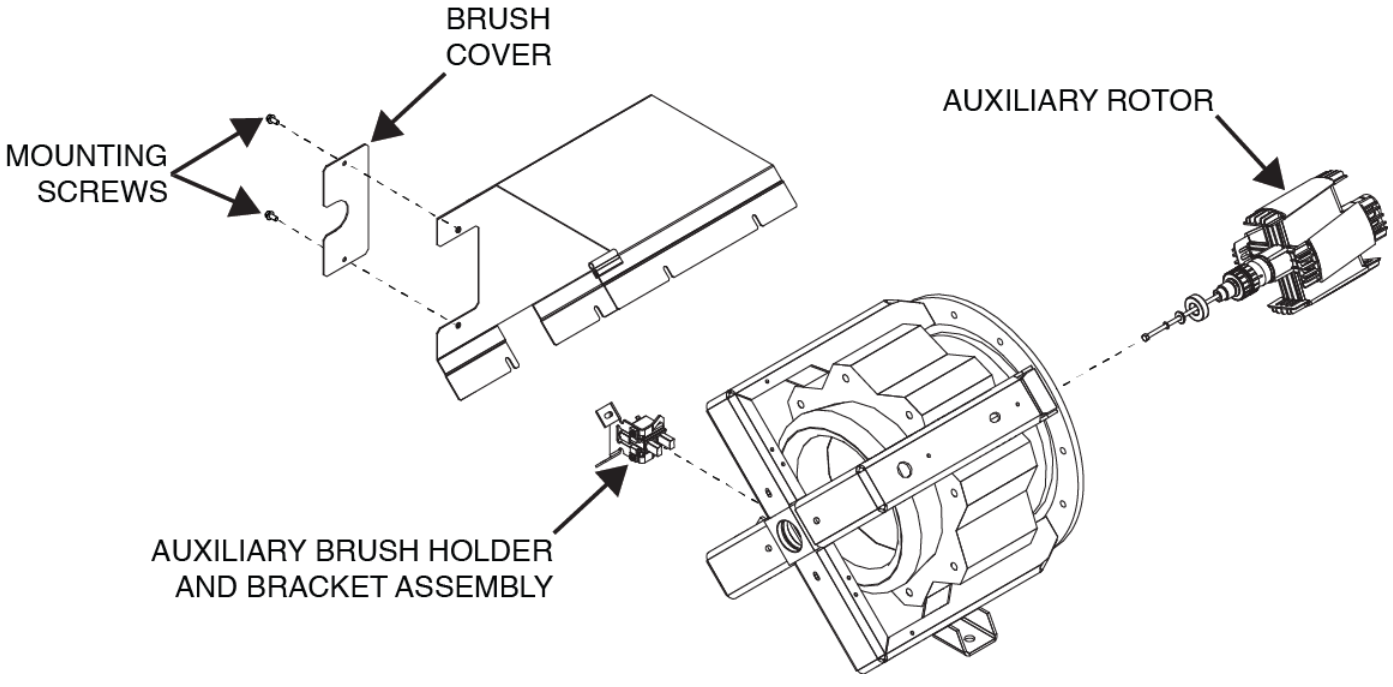
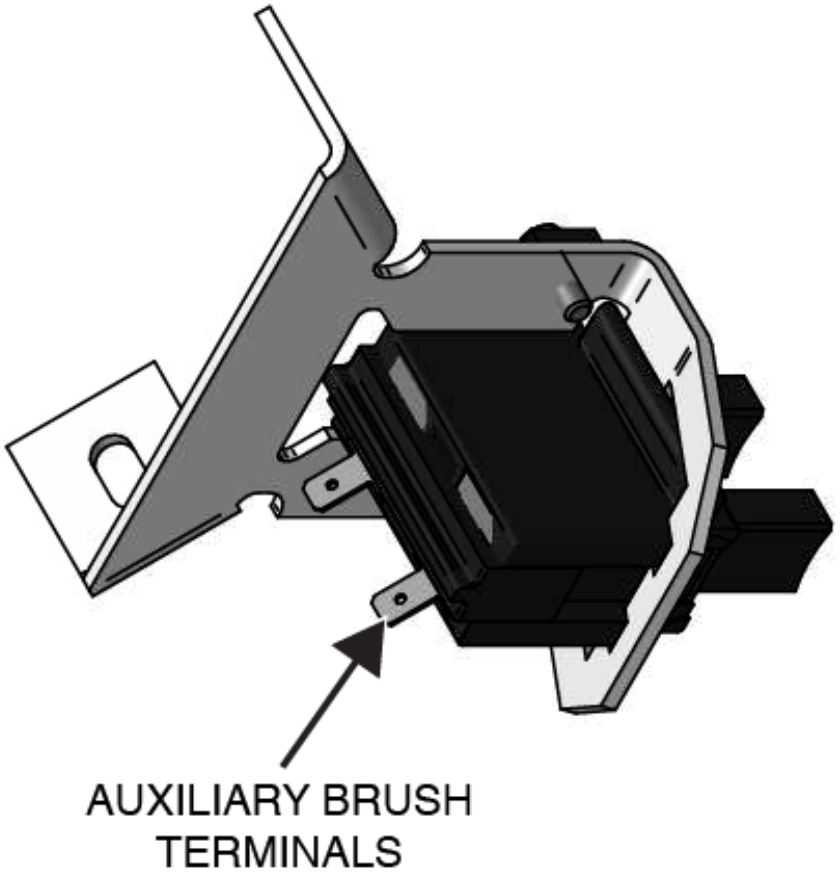


Figure F.39 – Auxiliary brush terminal location



WELD 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 test will help determine if the Weld Rotor (The Rotor closest to the Engine) is receiving the correct voltage from the Auxiliary Alternator.

MATERIALS NEEDED

3/8” Nutdriver
Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Remove the side panels from the left side of the machine. See the ***Case Cover Removal Procedure***.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Using a 3/8” nutdriver, remove the two screws securing the brush cover from the brushes closest to the engine. See ***Figure F.40***.
5. Using a volt/ohmmeter set for DC volts, attach the probes to the brush leads of the weld rotor (the brush set closest to the engine). See ***Figure F.41***. See Wiring Diagram.
6. Start the engine and operate it at high RPM.
7. Observe the voltage on the meter. Normal voltage is about 170 VDC.
8. If normal voltage is not present:
   • The D1 field bridge rectifier may be defective. See ***Figure F.42***.
   • Check for damaged leads or poor connections at leads 200C, 5F, 5FA, F1 and 201C. See ***Figure F.42***. See Wiring Diagram.
   • Check connections at D1 diode bridge. See ***Figure F.42***. See Wiring Diagram. Make certain lead 5F has continuity to frame ground.
   • Check connections at C1 capacitor. See ***Figure F.43***. See Wiring Diagram.
   • If voltage is low, perform the ***Engine RPM Test Procedure***, check or replace D1 diode bridge, check capacitor C1.
9. Using a 3/8” nutdriver, attach the two screws securing the brush cover. See ***Figure F.40***.
10. Perform the ***Case Cover Replacement Procedure***.

Figure F.40 – Weld rotor brush cover mounting screw location

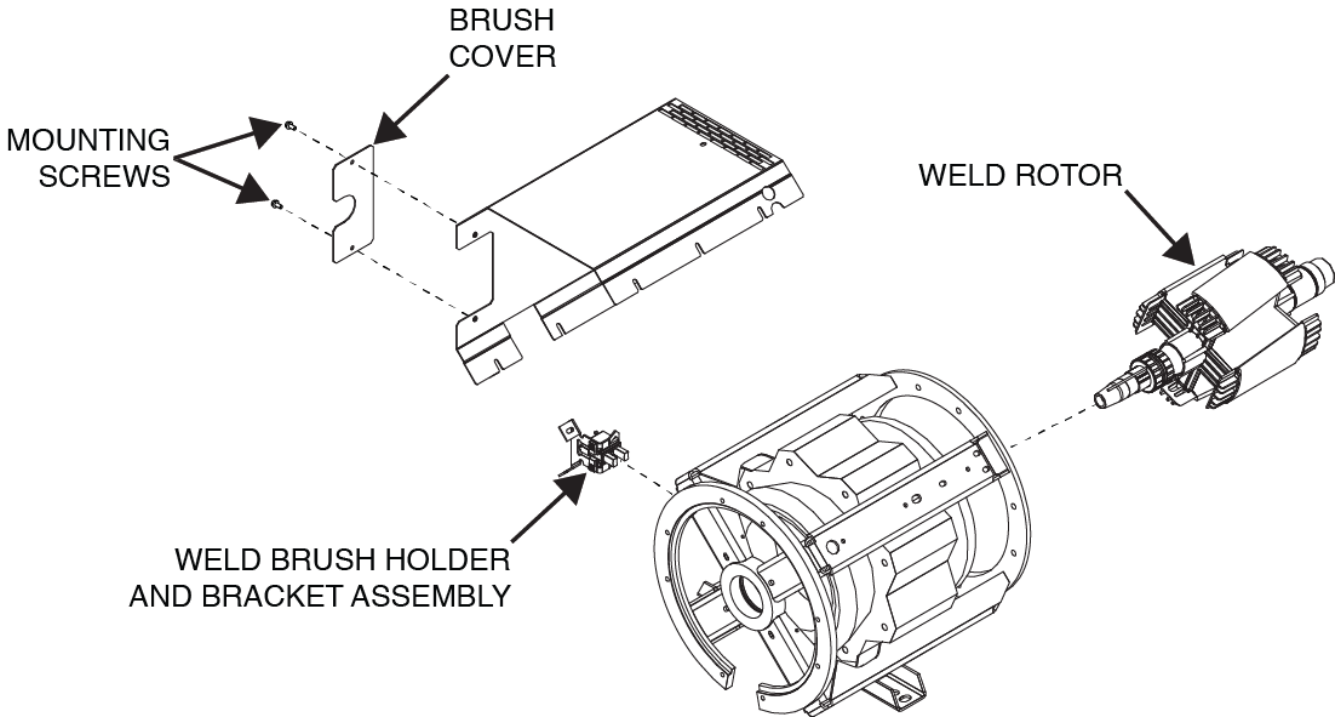


Figure F.41 – Weld rotor brush terminals location

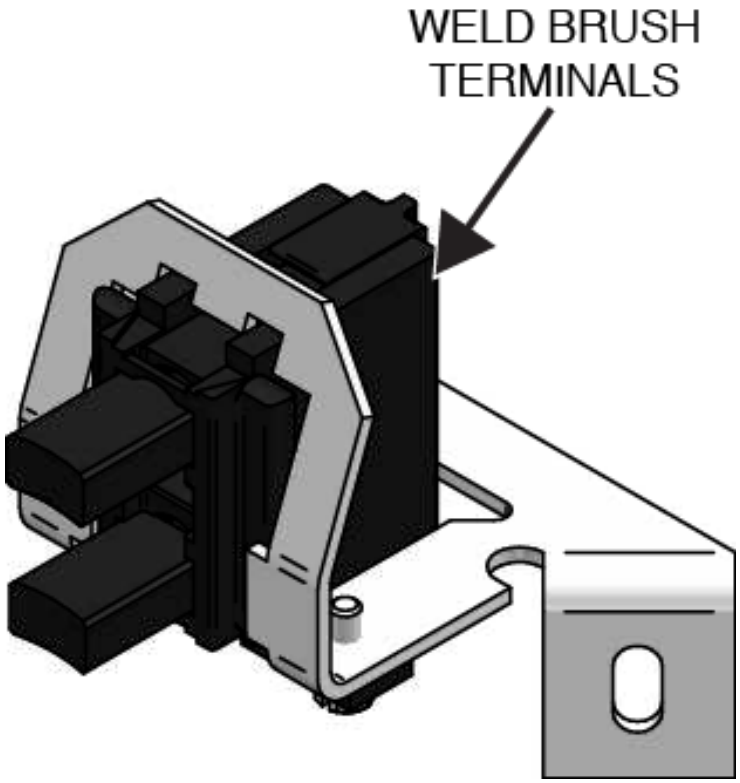


Figure F.42 – D1 diode bridge rectifier lead locations

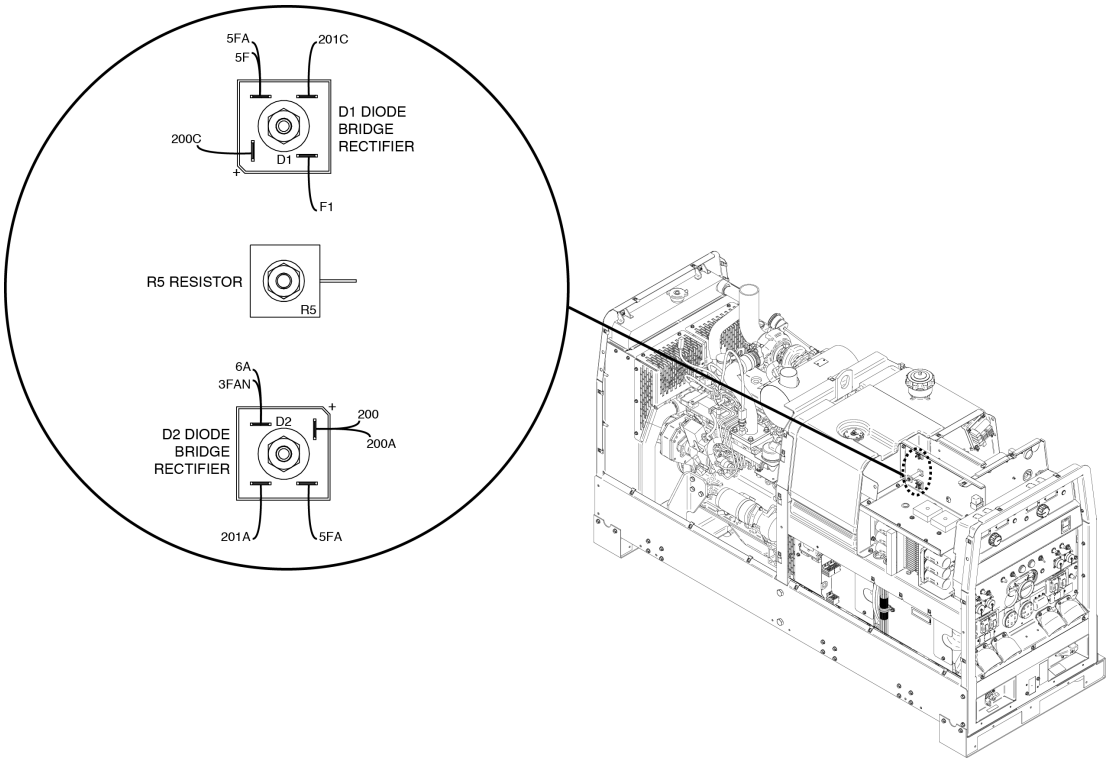
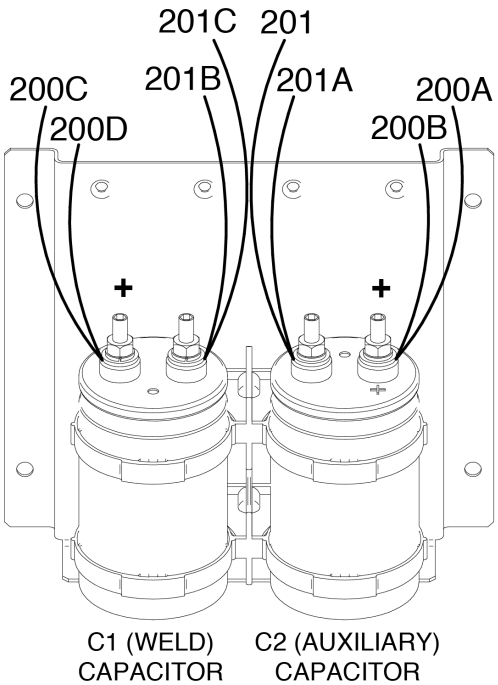


Figure F.43 – C1 (weld) capacitor lead locations



CAPACITORS ARE LOCATED ON THE LEFT SIDE OF THE MACHINE
BEHIND CHOPPER BOARD ATTACHED TO THE FUEL TANK BAFFLE.

WELD STATOR 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 will help determine if the correct AC voltages are being generated from the Weld Stator Windings. This test should only be done after it has been determined that Rotor voltages are normal for both Rotors.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Locate the weld output rectifiers on the right side of the machine below fuel tank and output chokes (operators right when facing the control panel). See ***Figure F.44***.
5. Start the engine and place the idle switch in the high idle position.
6. Test for AC voltage at the AC input terminals (AC1, AC2, AC3) of one of the output rectifiers. Voltage should be 60 to 65 VAC for each of the three phases. **Repeat the test for the other rectifier**. See ***Figure F.45***. See Wiring Diagram.
7. Locate the 14-pin Amphenol receptacles on the control panel. See ***Figure F.46***.
8. Place the wire feeder supply voltage switches into the 115 Volt position.
9. Using a volt/ohmmeter, test for approximately 120 VAC between pins “A” and “J” on both receptacles. See ***Figure F.47***.
10. Place the wire feeder voltage supply switches into the 42 Volt position.
11. Using a volt/ohmmeter, test for approximately 42 VAC between pins “I” and “K” on both receptacles. See ***Figure F.47***.
12. If voltage is not present at any of these locations, make sure the weld rotor voltage and resistance is normal. Perform the ***Weld Rotor Voltage Test Procedure*** and ***Weld Rotor Resistance Test Procedures (Static And Dynamic)***.
13. If the rotor voltage and resistance values are normal and correct voltage is not present at one or more test points on the stator, check wiring, switches and circuit breakers between (42/115 V switches and CB9 & CB10) the windings and the test points. See Wiring Diagram.
14. If wiring, switches and breakers are all good, the weld stator may be faulty.
15. Perform the ***Case Cover Replacement Procedure***.

Figure F.44 – Output rectifier bridge locations

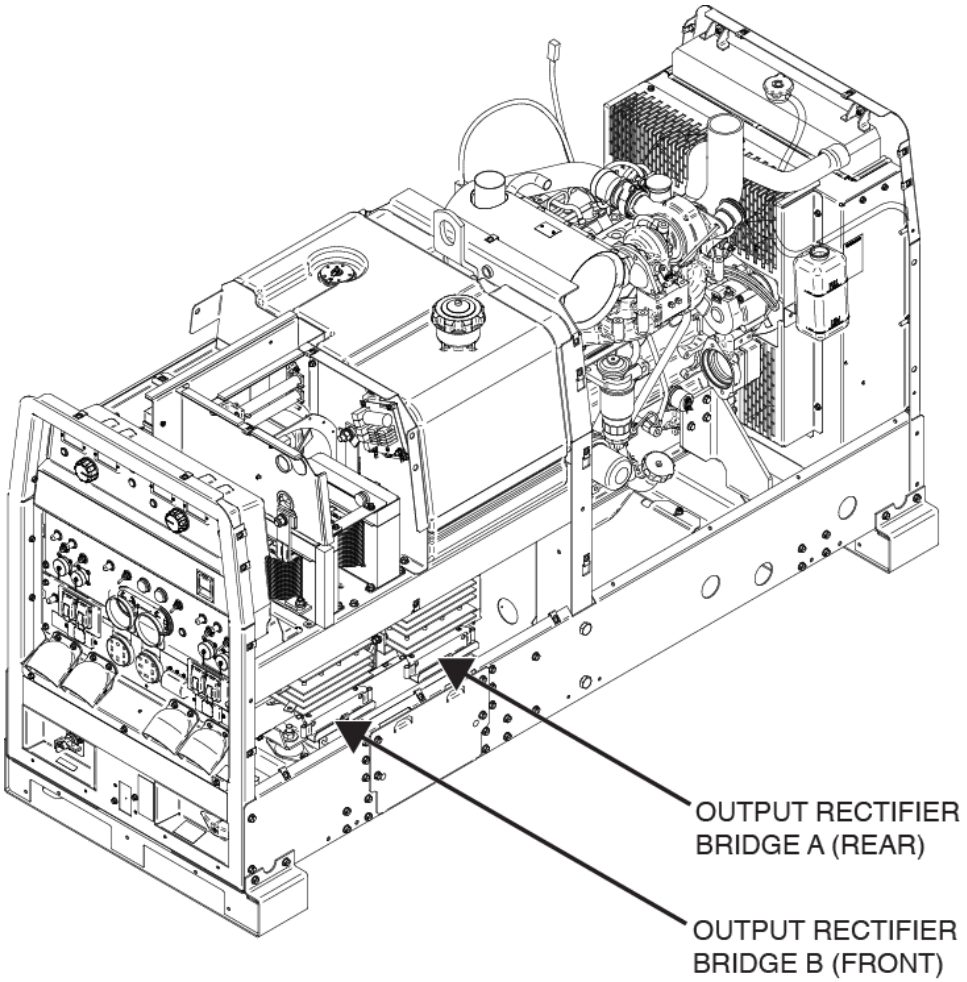


Figure F.45 – Output rectifier terminal locations

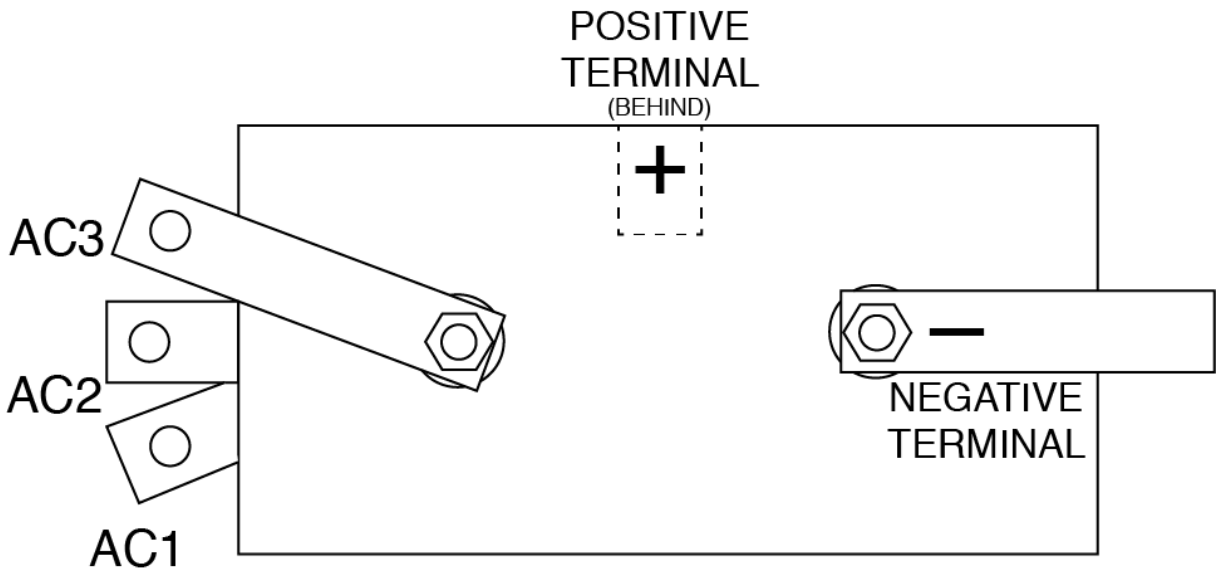


Figure F.46 – 14 Pin Amphenol locations

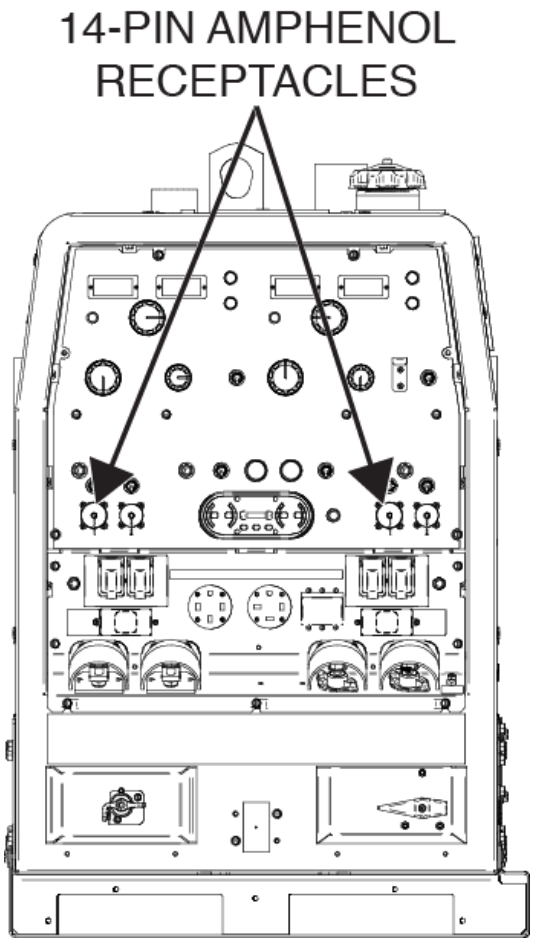
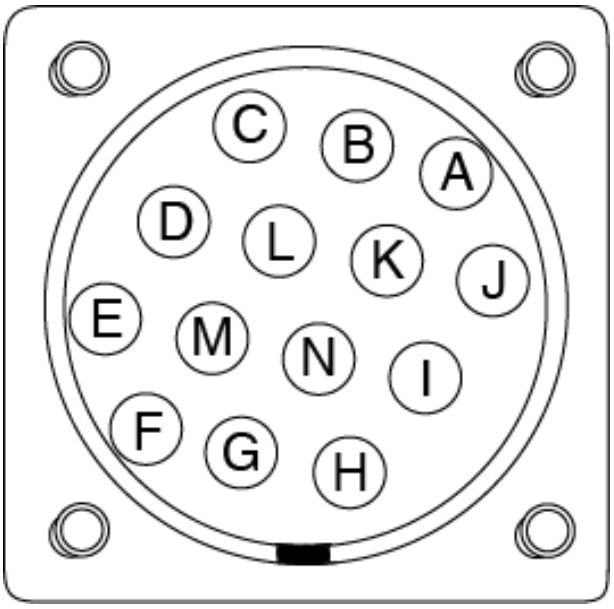


Figure F.47 – 14 pin Amphenol pin locations



WELD ROTOR RESISTANCE TEST PROCEDURE (STATIC)

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 there is a shorted, open or grounded Winding in the Weld Rotor.

MATERIALS NEEDED

3/8” Nutdriver
Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***, for left side of machine.
   NOTE: This test will be performed with the engine OFF and the battery disconnected.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Using a 3/8” nutdriver, remove the two screws securing the brush cover. See ***Figure F.48***.
5. Using a 3/8” nutdriver, remove the brush holder and bracket assembly. See ***Figure F.48***.
6. Using an ohmmeter, measure the resistance across the slip rings of the weld rotor. The weld rotor resistance should measure about 25 Ohms at 75 deg. F*.
   A. If the rotor resistance is significantly higher or lower than specified above, the rotor is defective and should be replaced.
   *** NOTE:** The resistance of the copper windings changes with temperature. Higher temperatures will slightly increase resistance while cooler temperatures will decrease resistance.
7. Using an ohmmeter, measure the resistance from one of the slip rings of the weld rotor to a good, clean chassis ground. The resistance should be very high. Normal resistance to ground should be at least 500,000 ohms.
8. Examine the brushes and brush holders. See ***Figure F.49***. Replace the brushes if they exhibit excessive wear or visible damage of any kind.
9. When testing is complete, using a 3/8” nutdriver, attach the brush holder and bracket assemblies. Make sure the brushes and holders are in good condition and centered on the slip rings.
10. Connect the brush leads and replace any cable ties that had been removed. See Wiring Diagram.
11. Using a 3/8” nutdriver, attach the two screws securing the brush cover.
12. Perform the ***Case Cover Replacement Procedure***.

Figure F.48 – Brush cover mounting screw locations

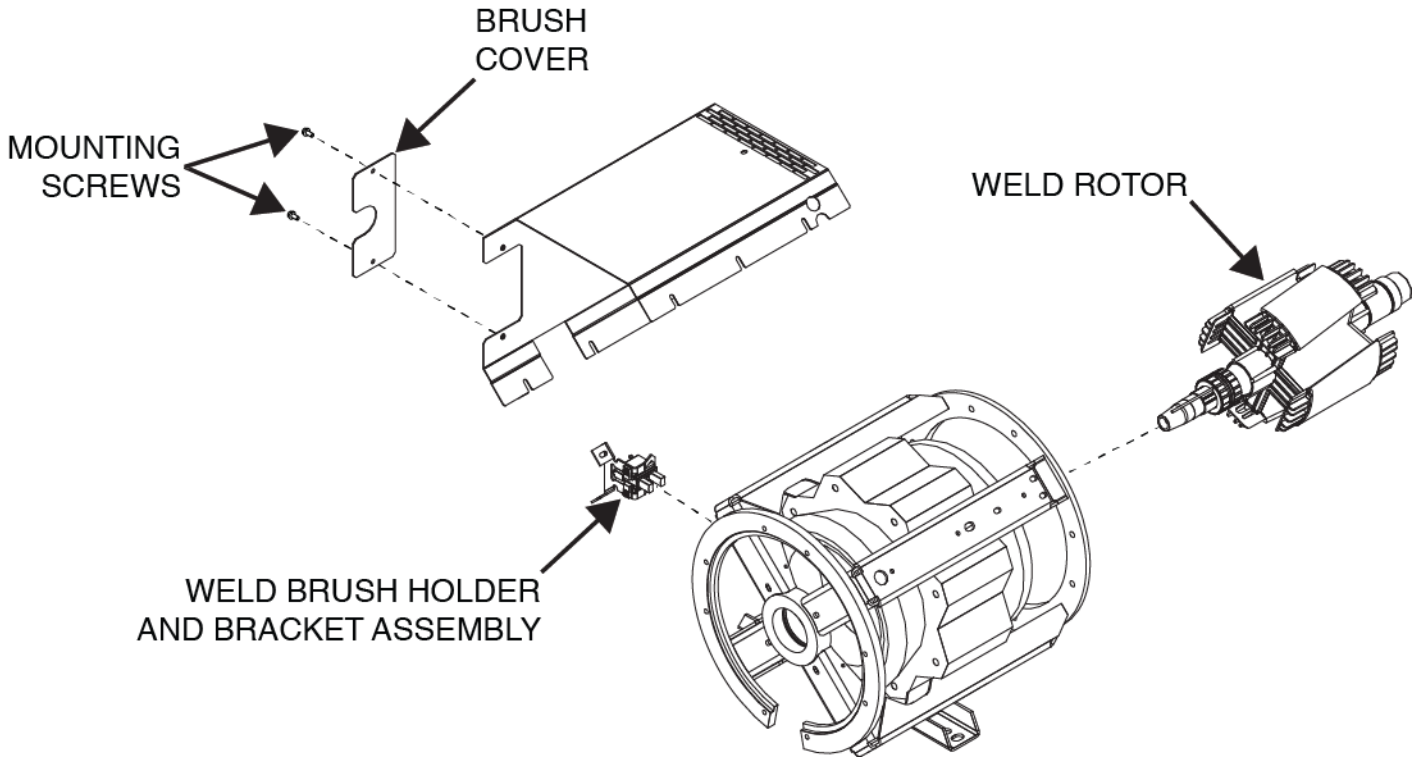
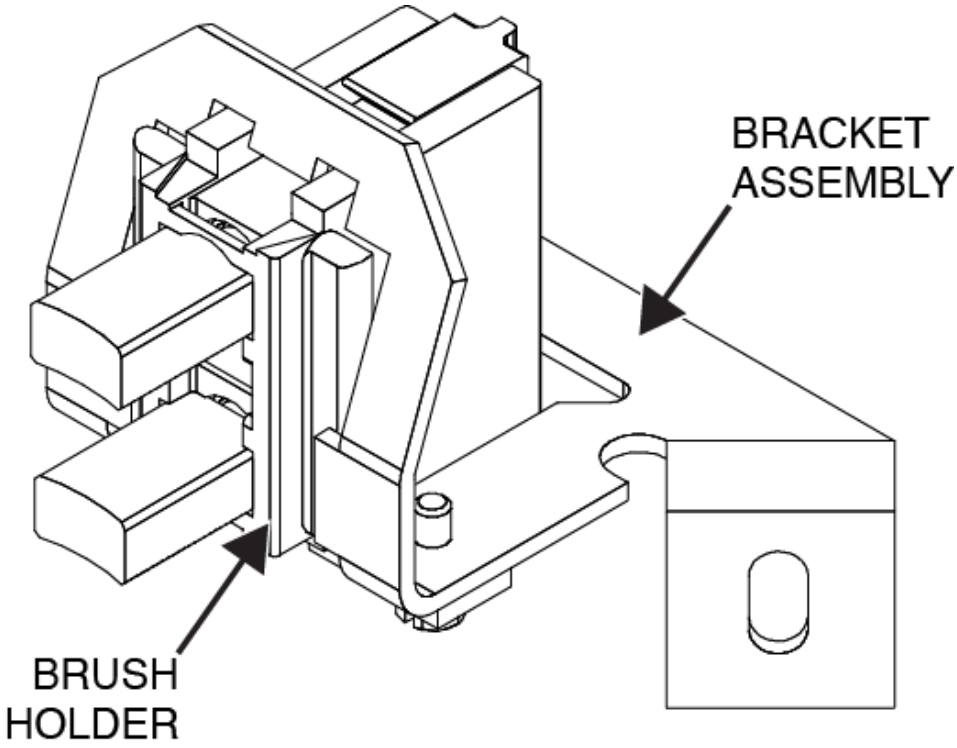


Figure F.49 – Brush holder and bracket assembly



WELD ROTOR RESISTANCE TEST PROCEDURE (DYNAMIC)

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 Weld Rotor is shorted, open or grounded while under the stress of centrifugal force.

MATERIALS NEEDED

3/8” Nutdriver
Analog Ohmmeter (digital meters typically will not perform properly for this test)
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***, for left side of machine.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Using a 3/8” nutdriver, remove the two screws securing the brush covers. See ***Figure F.50***.
5. Label, disconnect and insulate the wires from both sets of brushes. See Wiring Diagram.
6. Check that the slip rings are clean and the brushes are in good condition, properly centered and seated on the rings.
7. Using an analog ohmmeter fitted with clips or terminals, attach them to the brush terminals on the weld rotor. See ***Figure F.51***.
8. Place the idle switch in the high position and start the engine.
9. The ohmmeter should read approximately 25 ohms.
10. Turn off the engine.
11. Remove one of the ohmmeter leads and attach it to a good clean chassis ground connection.
12. Start the engine and read the ohms. The resistance should be very high. 500,000 Ohms or higher is acceptable.
13. If ohmmeter reading is significantly different the rotor may be faulty. Perform the ***Rotors And Stators Removal And Replacement Procedure***, for the weld rotor.
14. Turn off the Dual Vantage 700 machine.
15. Connect the brush leads and replace any cable ties that had been removed. See Wiring Diagram.
16. Using a 3/8” nutdriver, attach the two screws securing the brush cover.
17. Perform the ***Case Cover Replacement Procedure***.

Figure F.50 – Brush cover mounting screw locations

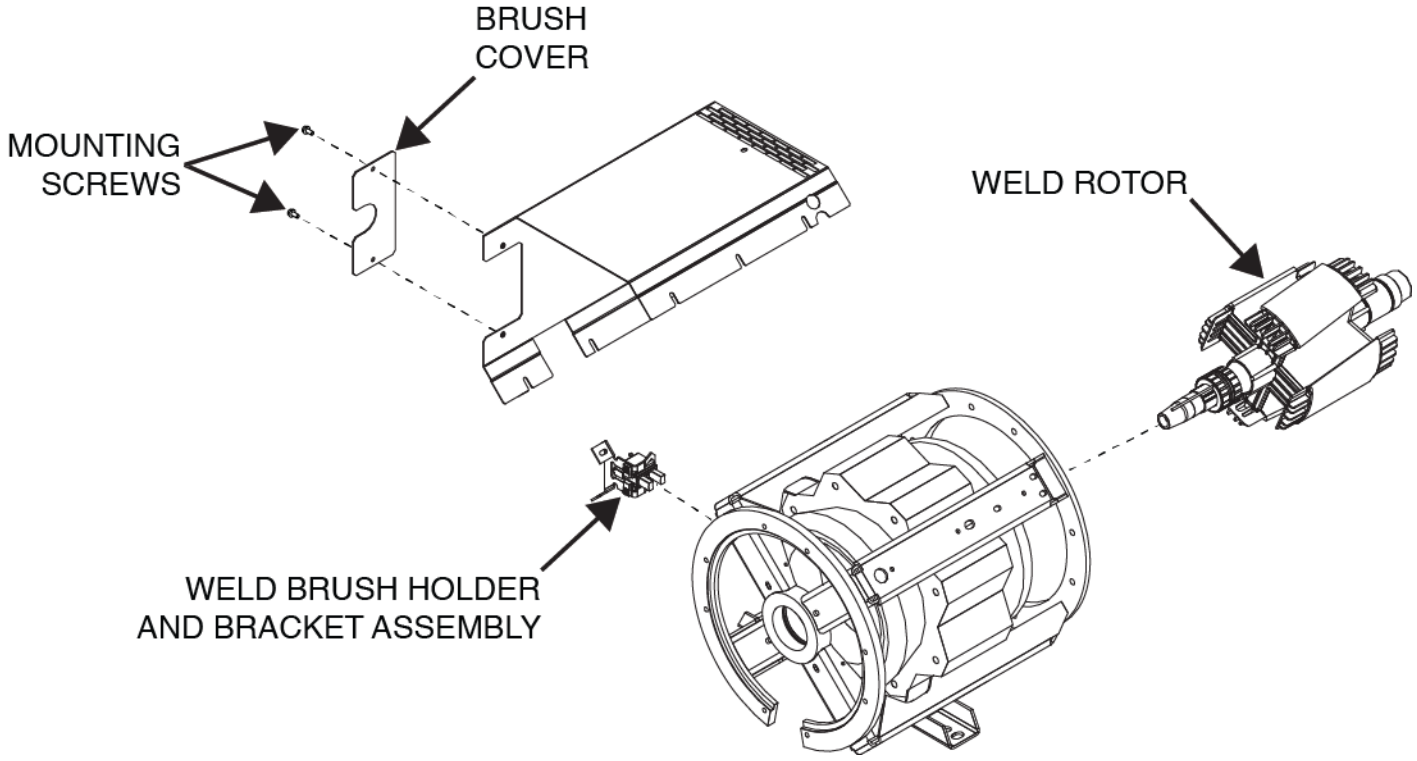
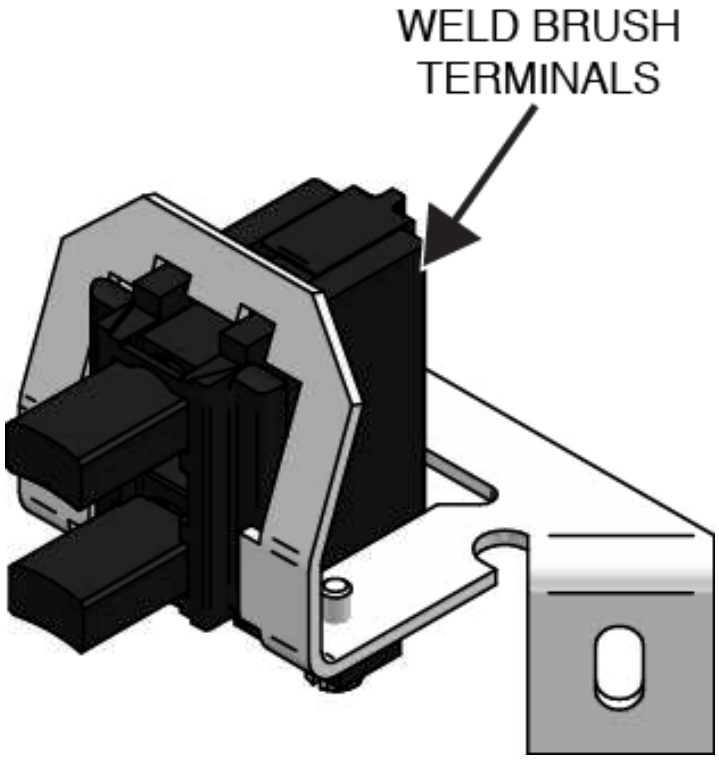


Figure F.51 – Weld brush terminal location



IDENTITY CONTROL (CR1) RELAY 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 the Identity Control (CR1) Relay is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
12 VDC Power Supply
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Lower the control panel. See the ***Case Cover Removal Procedure***.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Locate the identity control (CR1) relay. See ***Figure F.52***.
5. Label and disconnect leads 232V, 232U and 5Z from the relay. See ***Figure F.53***. See Wiring Diagram.
6. Using an ohmmeter, measure the resistance of the relay coil from terminal 0 to terminal 1. See ***Figure F.53***. See Wiring Diagram. Normal resistance should be approximately 80 ohms.
7. Label and disconnect the remaining leads from the relay. See ***Figure F.53***. See Wiring Diagram.
8. Using a volt/ohmmeter and a 12 VDC power supply, perform the tests outlined in ***Table F.6***. See ***Figure F.53***. See Wiring Diagram.
9. If any of the tests fail, the relay may be faulty.
10. Connect all previously removed leads to the relay.
11. If faulty, perform the ***Identity Control (CR1) Relay Removal And Replacement Procedure***.

Table F.6 – Identity control (CR1) relay resistance tests

TEST POINT	TEST POINT	EXPECTED READING	MACHINE CONDITION
TERMINAL 4	TERMINAL 3	CLOSED (LOW RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 4	TERMINAL 2	OPEN (HIGH RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 8	TERMINAL 7	CLOSED (LOW RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 8	TERMINAL 6	OPEN (HIGH RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 4	TERMINAL 3	OPEN (HIGH RESISTANCE)	12 VDC APPLIED TO RELAY COILS.
TERMINAL 4	TERMINAL 2	CLOSED (LOW RESISTANCE)	12 VDC APPLIED TO RELAY COILS.
TERMINAL 8	TERMINAL 7	OPEN (HIGH RESISTANCE)	12 VDC APPLIED TO RELAY COILS.
TERMINAL 8	TERMINAL 6	CLOSED (LOW RESISTANCE)	12 VDC APPLIED TO RELAY COILS.

Figure F.52 – Identity control (CR1) relay location

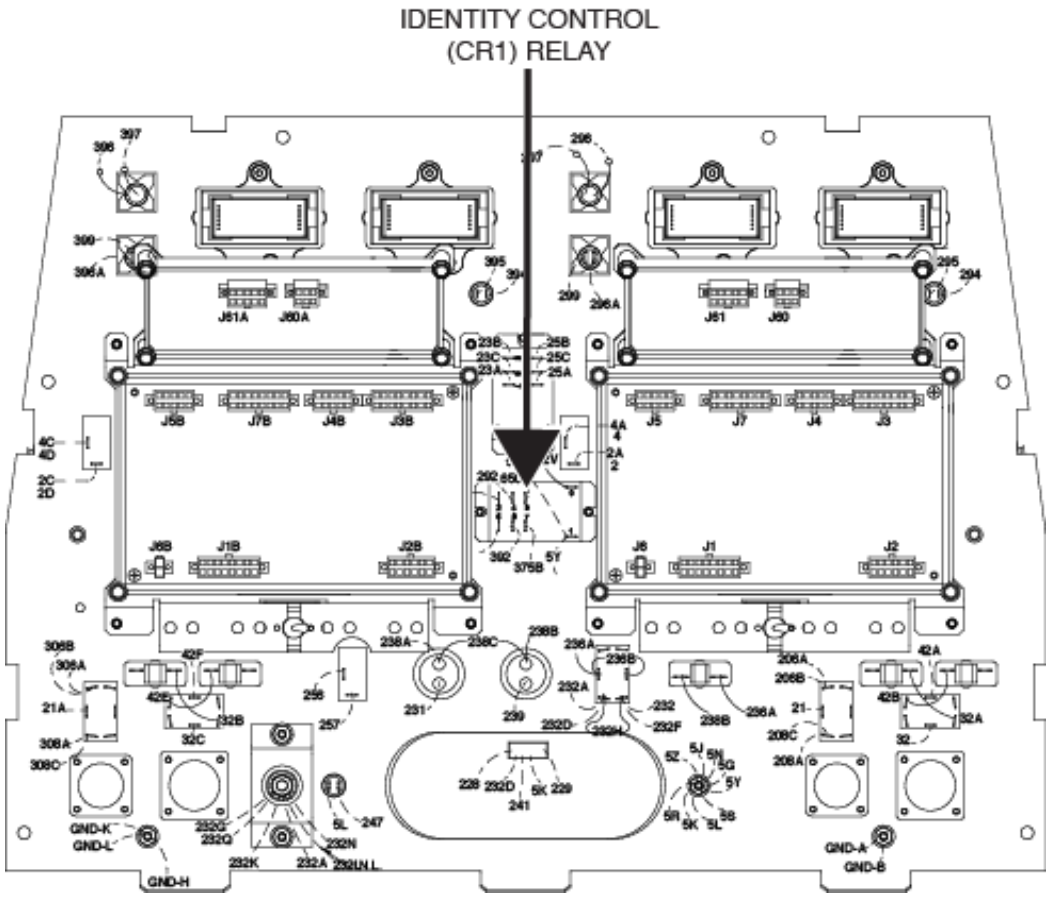
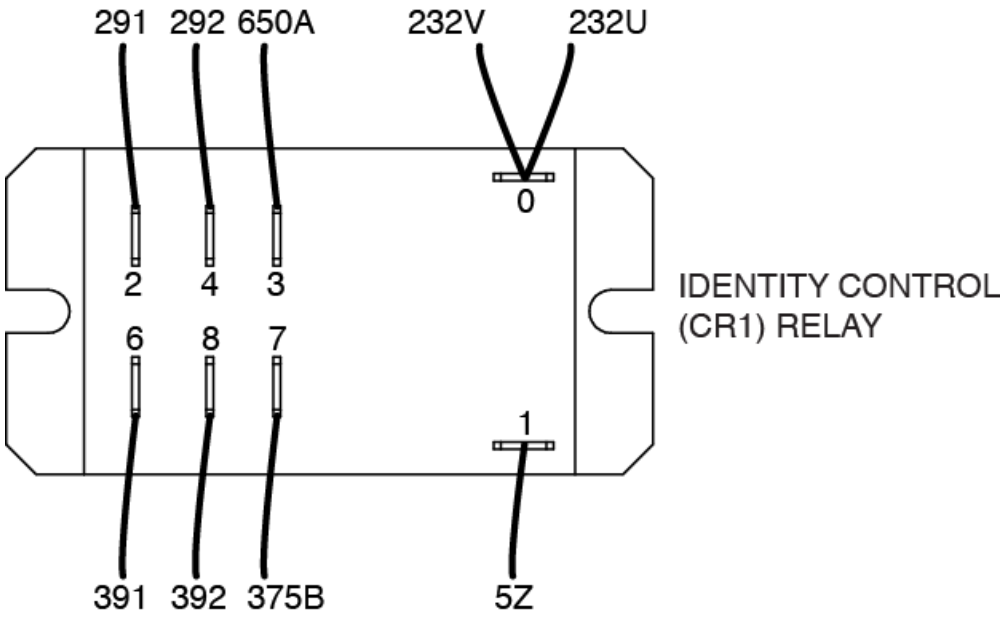


Figure F.53 – Identity control (CR1) relay terminal location



CHOPPER CONTROL (CR2) RELAY 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 the Chopper Control (CR2) Relay is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
12 VDC Power Supply
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Lower the control panel. See the ***Case Cover Removal Procedure***.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Locate the chopper control (CR2) relay. See ***Figure F.54***.
5. Label and disconnect leads 232V and 5Z from the relay. See ***Figure F.55***. See Wiring Diagram.
6. Using an ohmmeter, measure the resistance of the relay coil from terminal 0 to terminal 1. See ***Figure F.55***. See Wiring Diagram. Normal resistance should be approximately 80 ohms.
7. Label and disconnect the remaining leads from the relay. See ***Figure F.55***. See Wiring Diagram.
8. Using a volt/ohmmeter and a 12 VDC power supply, perform the tests outlined in ***Table F.7***. See ***Figure F.55***. See Wiring Diagram.
9. If any of the tests fail, the relay may be faulty.
10. Connect all previously removed leads to the relay.
11. If faulty, perform the ***Chopper Control (CR2) Relay Removal And Replacement Procedure***.

Table F.7 – Chopper control (CR2) relay resistance tests

CHOPPER CONTROL (CR2) RELAY RESISTANCE TESTS			
TEST POINT	TEST POINT	EXPECTED READING	MACHINE CONDITION
TERMINAL 4	TERMINAL 3	CLOSED (LOW RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 4	TERMINAL 2	OPEN (HIGH RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 8	TERMINAL 7	CLOSED (LOW RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 8	TERMINAL 6	OPEN (HIGH RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 4	TERMINAL 3	OPEN (HIGH RESISTANCE)	12 VDC APPLIED TO RELAY COILS.
TERMINAL 4	TERMINAL 2	CLOSED (LOW RESISTANCE)	12 VDC APPLIED TO RELAY COILS.
TERMINAL 8	TERMINAL 7	OPEN (HIGH RESISTANCE)	12 VDC APPLIED TO RELAY COILS.
TERMINAL 8	TERMINAL 6	CLOSED (LOW RESISTANCE)	12 VDC APPLIED TO RELAY COILS.

Figure F.54 – Chopper control (CR2) relay location

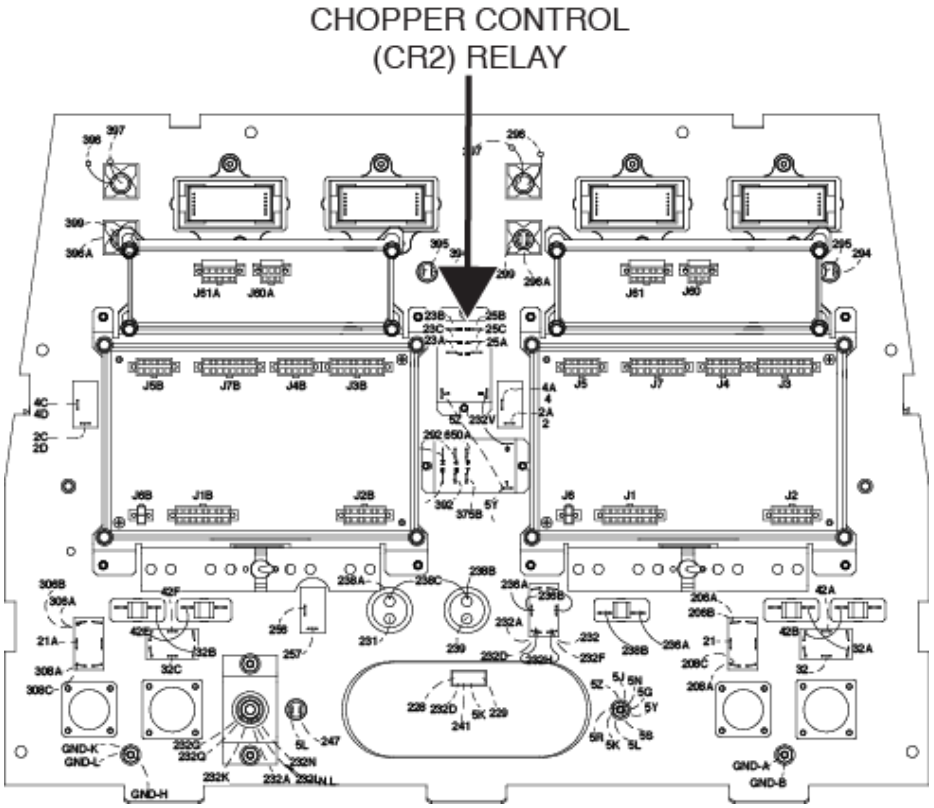
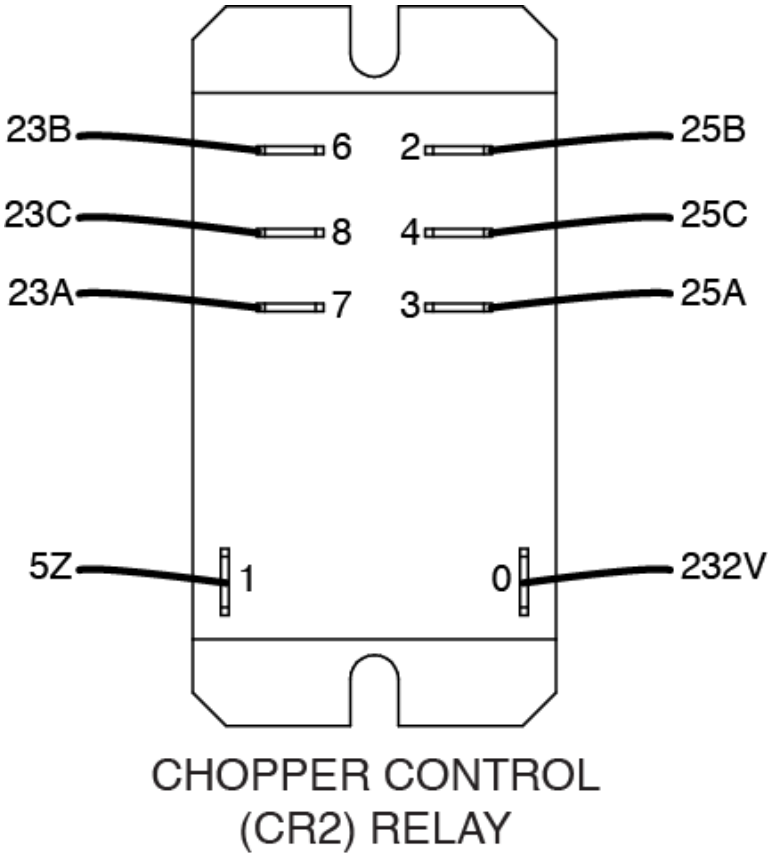


Figure F.55 – Chopper control (CR2) relay terminal location



OUTPUT 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 help determine if the Output Selector Switch is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Locate the output selector switch. See ***Figure F.56***.
5. Place the output selector switch into the dual operator (350A) operator position. See ***Figure F.57***.
6. Using a volt/ohmmeter, measure the resistance from the negative output terminal on the front right side (350A) to the choke “A” terminal lead 308D. See ***Figure F.58***. See Wiring Diagram. Normal resistance should be less than 1 ohm.
7. Using a volt/ohmmeter, measure the resistance from the positive output terminal on the front right side (350A) to the positive terminal of the rectifier bridge “A” lead 306D. See ***Figure F.58***. See Wiring Diagram. Normal resistance should be less than 1 ohm.
8. Place the output selector switch into the single operator (700A) position. See ***Figure F.57***.
9. Using a volt/ohmmeter, measure the resistance from the positive output terminal of the rectifier bridge “A” lead 306D to the positive output terminal on the left front side (700A). See ***Figure F.58***. See Wiring Diagram. Normal resistance should be less than 1 ohm.
10. Using a volt/ohmmeter, measure the resistance from the negative output terminal on the left front side (700A) to the choke “A” terminal lead 308D. See ***Figure F.58***. See Wiring Diagram. Normal resistance should be less than 1 ohm.
11. Place the output selector switch into the dual (350A) operator position. See ***Figure F.57***.
12. Using a volt/ohmmeter, measure the resistance from lead 232V located on terminal 0 of the chopper control (CR2) relay to the 12VDC insulated stud on the inside of the control panel. See ***Figure F.59***. See Wiring Diagram. Normal resistance should be less than 1 ohm.
13. If any of the tests fail, perform the ***Output Selector Switch Removal And Replacement Procedure***.

Figure F.56 – Output selector switch location

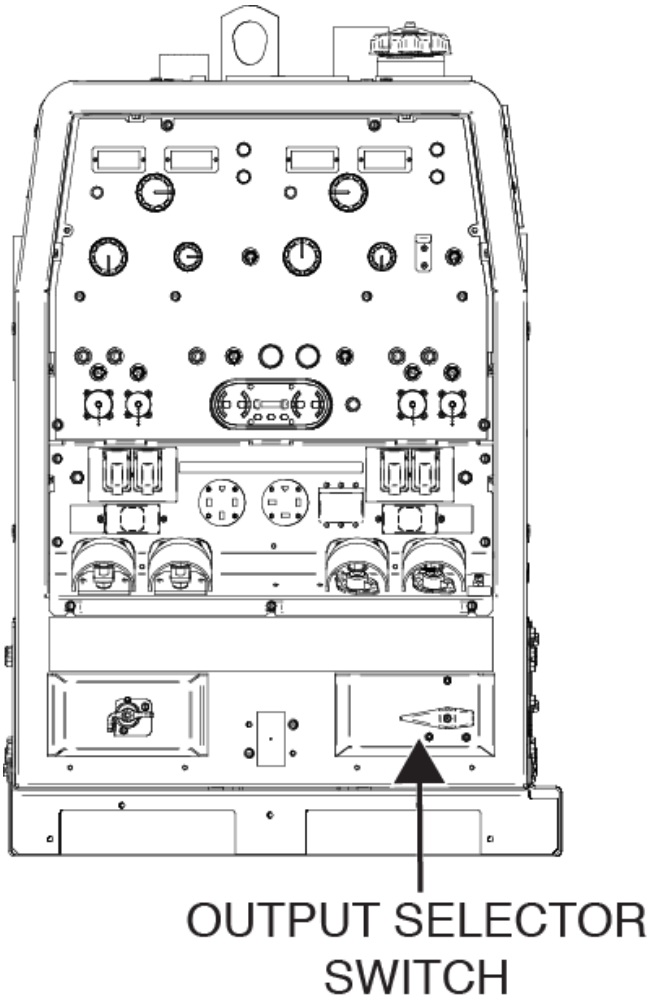


Figure F.57 – Output selector switch positions

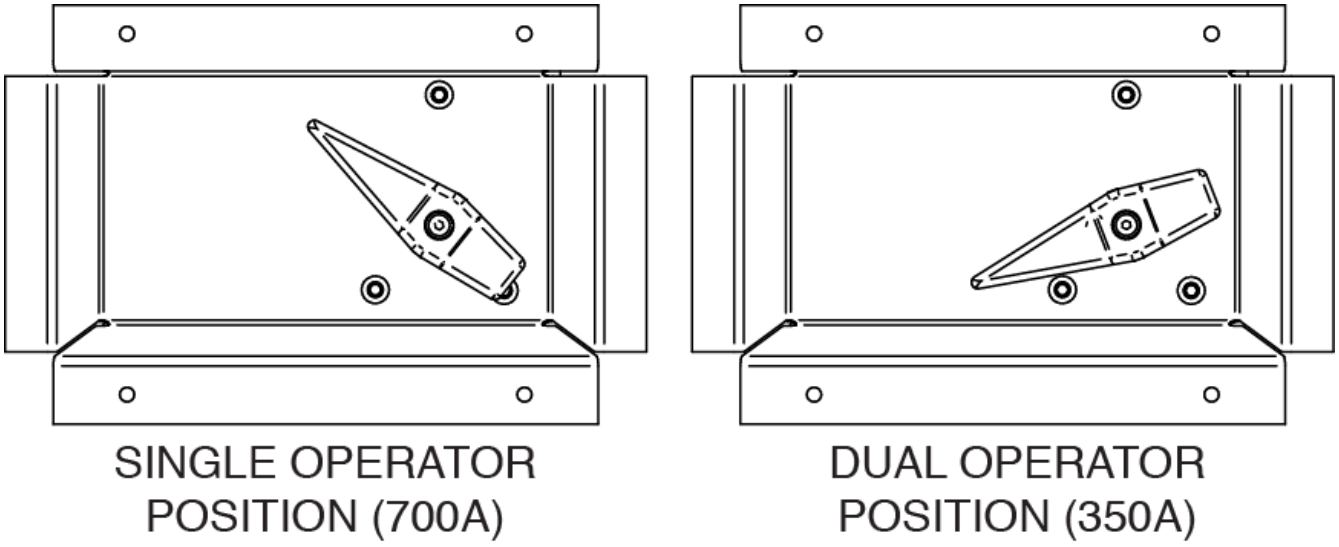


Figure F.58 – Output terminal, lead 306D and lead 308D locations

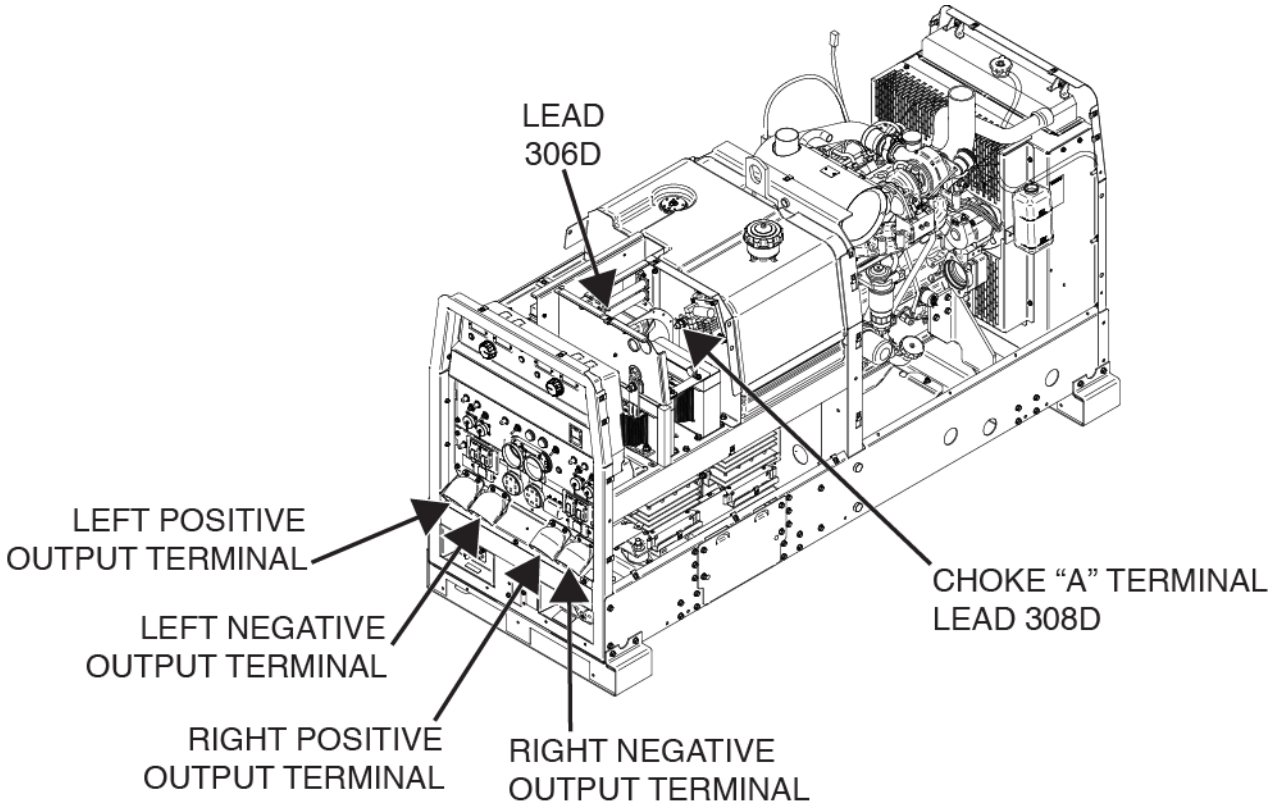
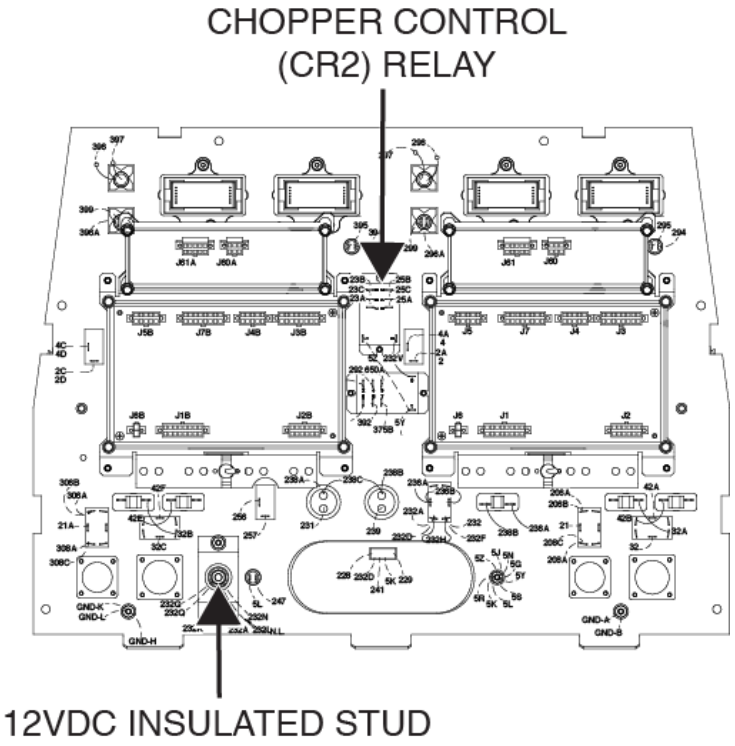


Figure F.59 – Chopper control (CR2) relay and 12VDC insulated stud location



VRD / OCV INDICATOR PCB 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 the OCV Indicator PCB is functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Place the idler switch into the High position. See ***Figure F.60***.
3. Place the output selector switch into the dual operator position. See ***Figure F.60***.
4. Place the VRD on/off switch into the ON position. See ***Figure F.61***.
5. When the open circuit voltage at the output terminals is above 30 VDC the red light should be illuminated. When the open circuit voltage at the output terminals is below 30 VDC the green light should be illuminated. See ***Table F.8***.
6. Lower the control panel. See the ***Case Cover Removal Procedure***.
7. Locate the OCV indicator PCB to be tested. See ***Figure F.61***.
8. Start the Dual Vantage 700 machine.
9. Using a volt/ohmmeter, test for 90 VDC at plug J60 Pin 1 (+) to plug J60 Pin 6 (-). See ***Figure F.62***. See Wiring Diagram.
10. Place the weld terminals switch into the ON position. See ***Figure F.60***.
11. Using a volt/ohmmeter, test for weld terminals open circuit voltage at plug J61 Pin 8 (+) to plug J61 Pin 1 (-). See ***Figure F.62***. See Wiring Diagram.
12. Visually inspect the OCV indicator board being tested to ensure the internal power supplies on the board are functioning properly. See ***Table F.9***. See ***Figure F.62***. These supplies are derived from the 90 VDC at plug J60 Pins 1 and 6.
13. Check the operation of the VRD switch. See Wiring Diagram.
14. Turn off the Dual Vantage 700 machine.
15. If any of the tests fail, the OCV indicator PCB may be faulty.
16. If faulty, perform the ***VRD / OCV Indicator PCB Removal and Replacement Procedure***.
17. Perform the ***Case Cover Replacement Procedure***.

Table F.8 – VRD indicator lights

MODE		VRD "ON"	VRD "OFF"
CC-STICK	OCV	GREEN (OCV REDUCED)	NO LIGHTS
	WHILE WELDING	RED OR GREEN (DEPENDS ON WELD VOLTAGE)*	
CV-WIRE	OCV	GREEN (OCV REDUCED)	
		GREEN (NO OCV) WELD TERMINALS REMOTELY CONTROLLED GUN TRIGGER OPEN	
	WHILE WELDING	RED OR GREEN (DEPENDS ON WELD VOLTAGE)*	
PIPE	OCV	GREEN (NO OUTPUT)	
	WHILE WELDING	NOT APPLICABLE (NO OUTPUT)	
ARC GOUGING	OCV	GREEN (OCV REDUCED)	
	WHILE WELDING	(DEPENDS ON WELD VOLTAGE)*	
TIG	OCV	GREEN (PROCESS IS LOW VOLTAGE)	
	WHILE WELDING	GREEN (PROCESS IS LOW VOLTAGE)	

*It is normal for the lights to alternate between colors while welding.

Table F.9 – OCV indicator PCB power supply LEDs

OCV INDICATOR PCB POWER SUPPLY LEDs	
LED 1	-15 VDC
LED 2	+5 VDC
LED 3	+ 15 VDC

Figure F.60 – Weld terminals switch, idler switch and output selector switch location

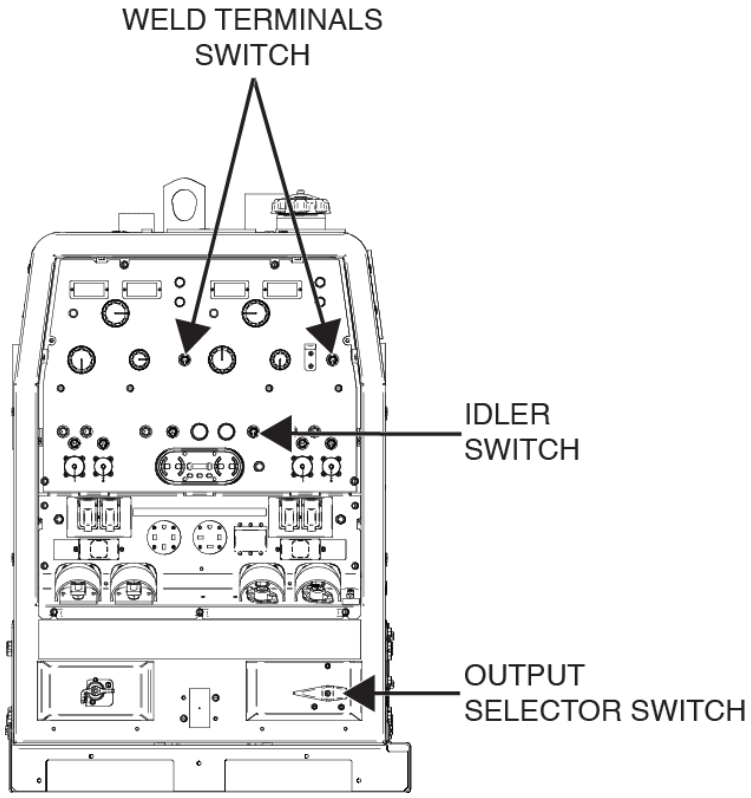


Figure F.61 – OCV indicator PCB and VRD on/off switch locations

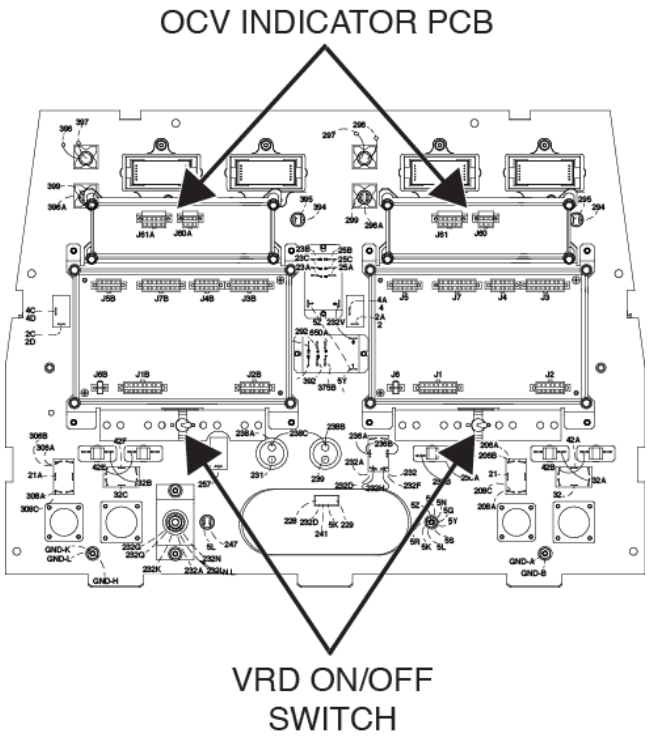
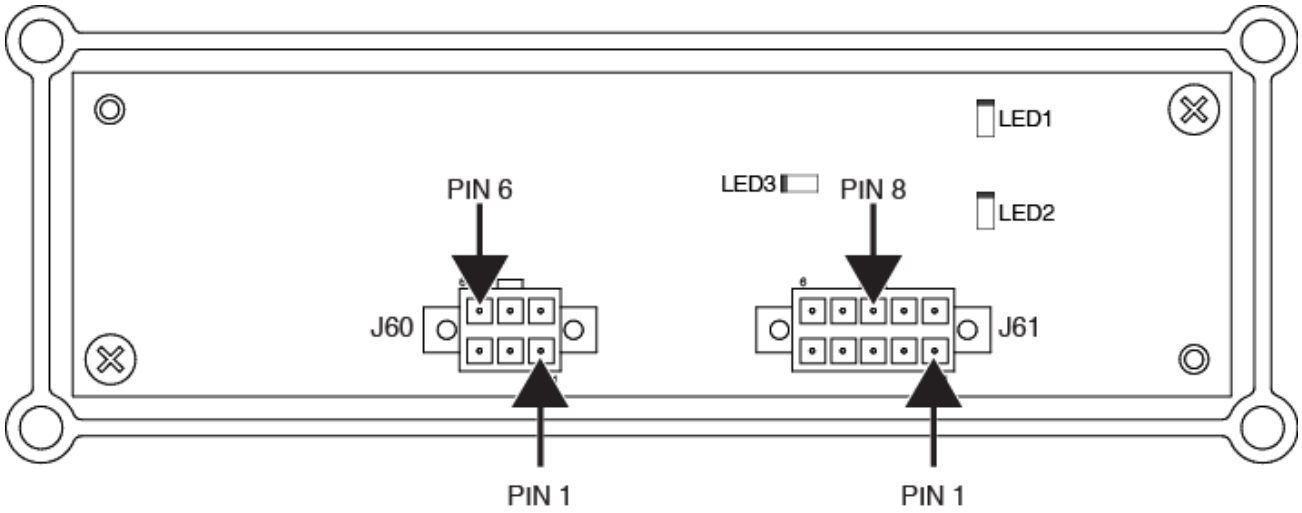


Figure F.62 – OCV indicator PCB test point locations



CR3, CR4, CR5 AND CR6 RELAY 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 the Idle Relay (CR3), Engine Protection Relay (CR4), Arc/Thermal Detect Relay (CR5) and Temp Relay (CR6) are functioning properly.

MATERIALS NEEDED

Volt/Ohmmeter
12 VDC Power Supply
Wiring Diagram

TEST PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Chopper Module Capacitor Discharge Procedure***.
4. Locate the idle relay (CR3), engine protection relay (CR4), arc/thermal detect relay (CR5) or temp relay (CR6) to be tested. See ***Figure F.63***.
5. Remove the relay to be tested from its mount. To remove relay lift up and out of it's mounting/wiring bracket.
6. Using an ohmmeter, measure the resistance of the relay coil from terminal 86(+) to terminal 85(-). See ***Figure F.64***. See Wiring Diagram. Normal resistance should be approximately 90 ohms.
7. Using a volt/ohmmeter and a 12 VDC power supply, perform the tests outlined in ***Table F.10***. See ***Figure F.64***. See Wiring Diagram. **Apply positive 12 VDC to terminal 86 and negative to terminal 85**.
8. If any of the tests fail, the relay may be faulty.
9. If faulty, replace the relay.
10. Perform the ***Case Cover Replacement Procedure***.

Table F.10 – CR3, CR4, CR5 and CR6 relay resistance tests

TEST POINT	TEST POINT	EXPECTED READING	MACHINE CONDITION
TERMINAL 87	TERMINAL 30	OPEN (HIGH RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 87A	TERMINAL 30	CLOSED (LOW RESISTANCE)	NO POWER APPLIED TO RELAY COILS.
TERMINAL 87	TERMINAL 30	CLOSED (LOW RESISTANCE)	12 VDC APPLIED TO RELAY COILS. POSITIVE TO TERMINAL 86.
TERMINAL 87A	TERMINAL 30	OPEN (HIGH RESISTANCE)	12 VDC APPLIED TO RELAY COILS. POSITIVE TO TERMINAL 86.

Figure F.63 – CR3, CR4, CR5 and CR6 relay locations

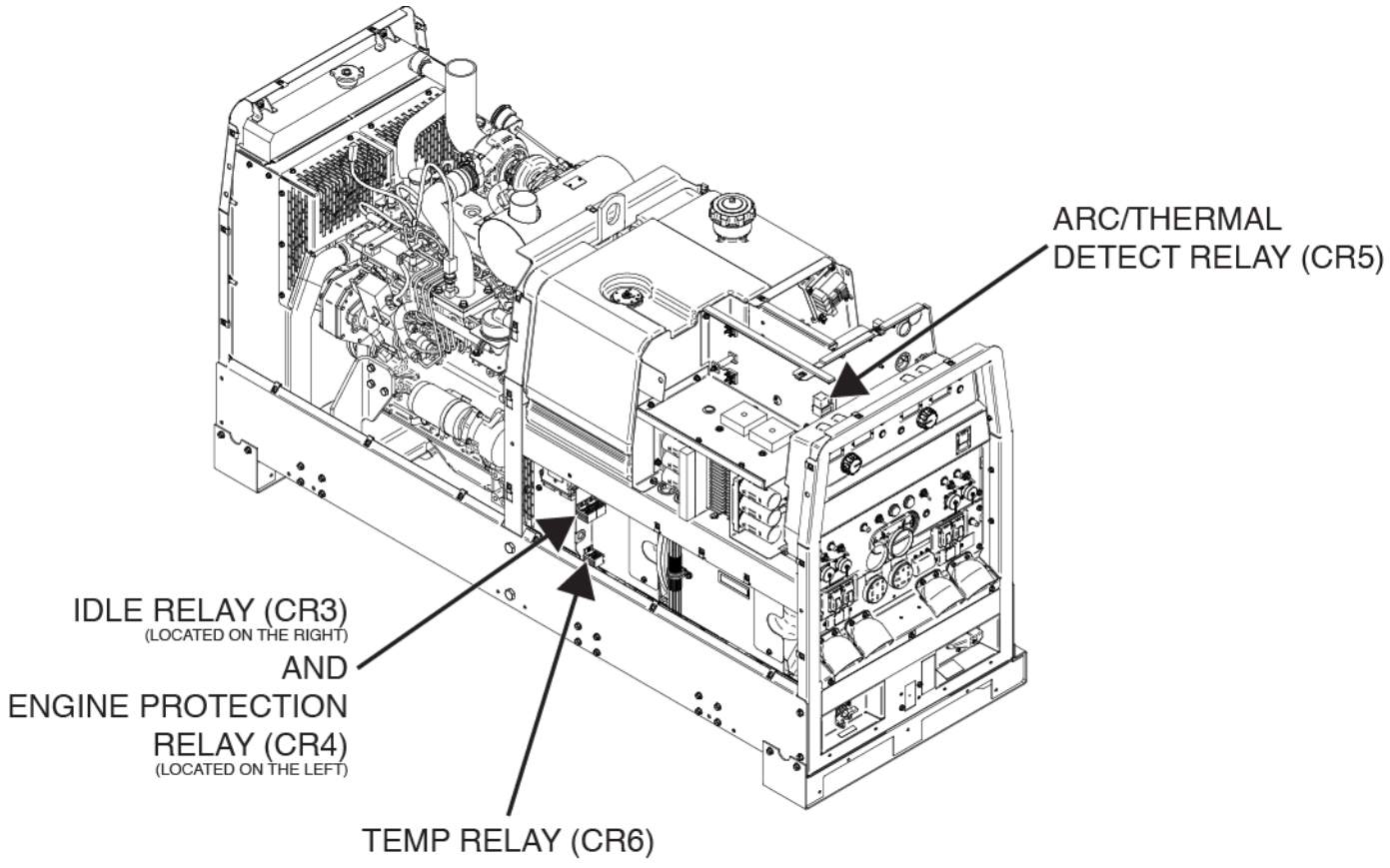
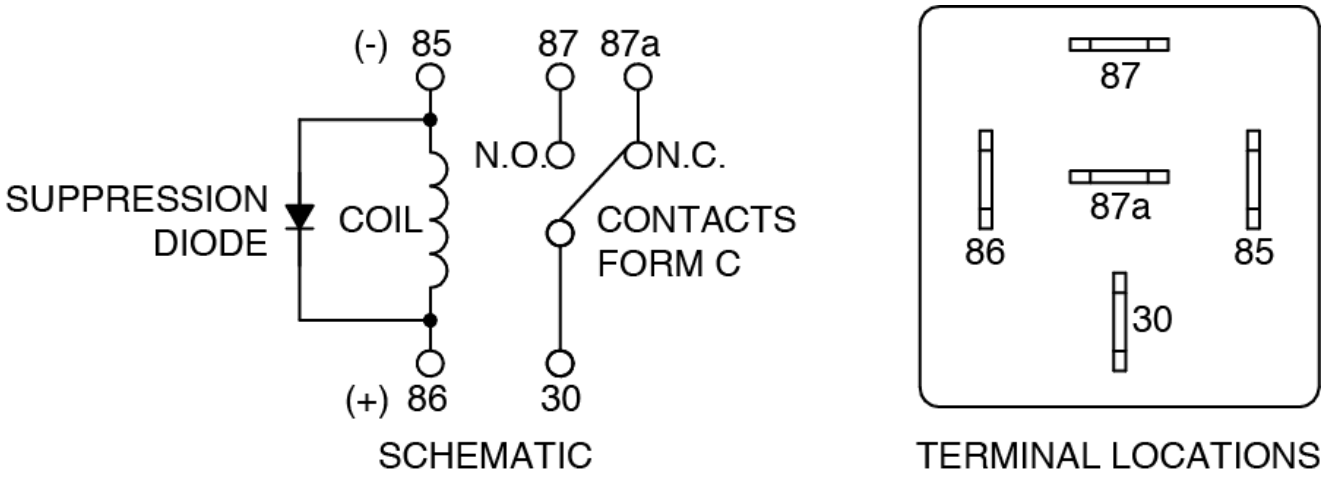
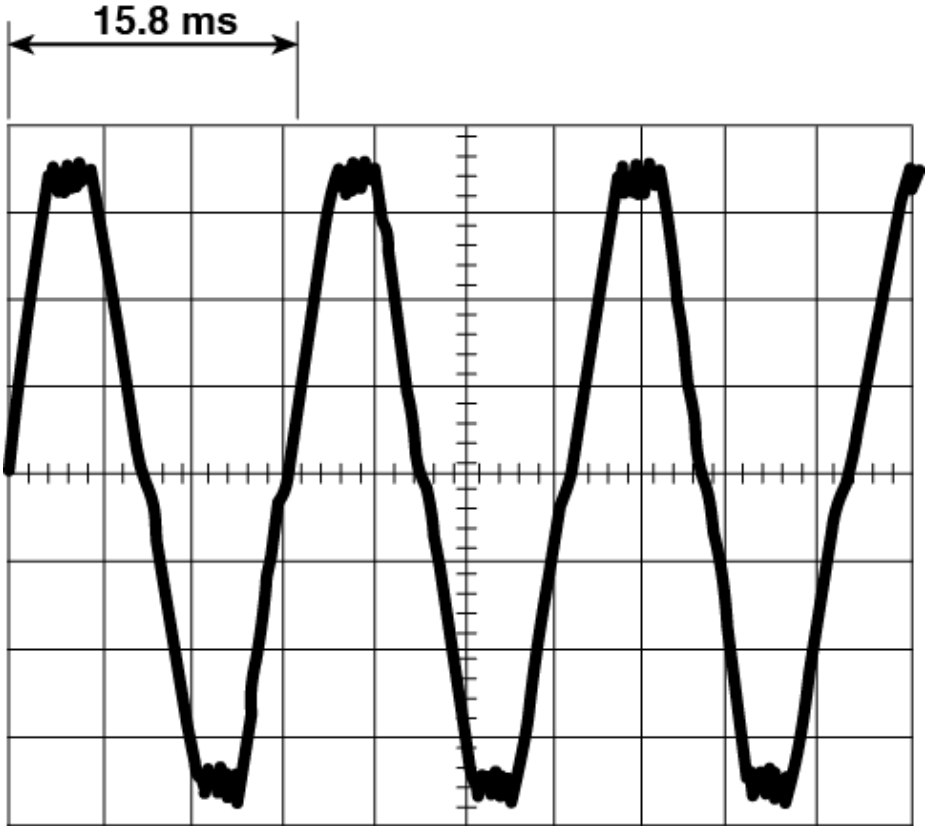


Figure F.64 – Relay terminal locations and schematic



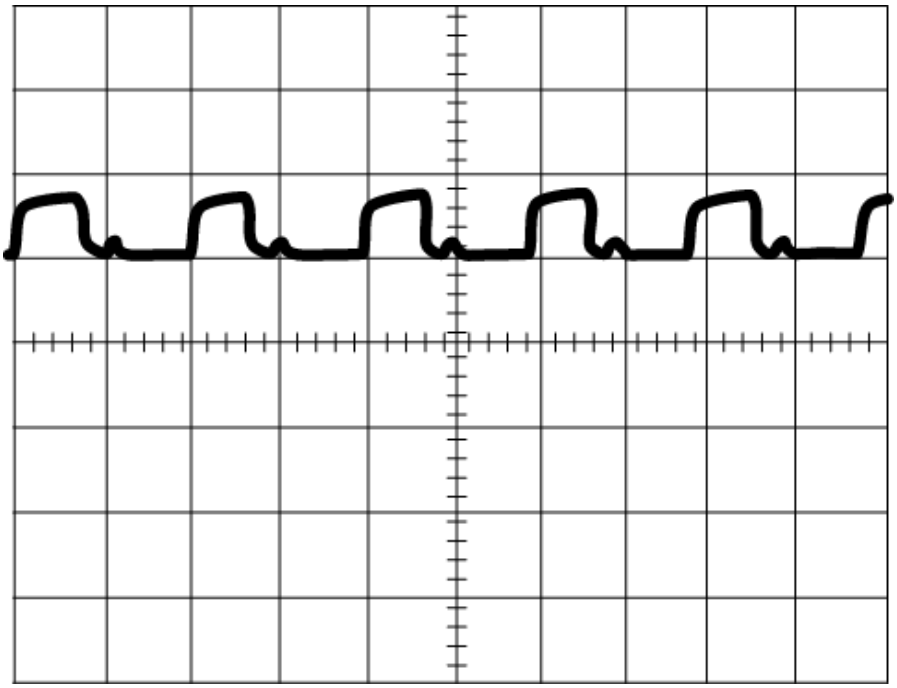
NORMAL OPEN CIRCUIT VOLTAGE WAVEFORM (115VAC SUPPLY)
HIGH IDLE – NO LOAD



This is the typical auxiliary output voltage generated from a properly operating machine. Note that each vertical division represents 50 volts and that each horizontal division represents 5 milliseconds in time.
NOTE: Scope probes are connected at 115VAC receptacle.

SCOPE SETTINGS
Volts/Div ..... 50V/Div.
Horizontal Sweep ..... 5 ms/Div.
Coupling ..... DC
Trigger ..... Internal

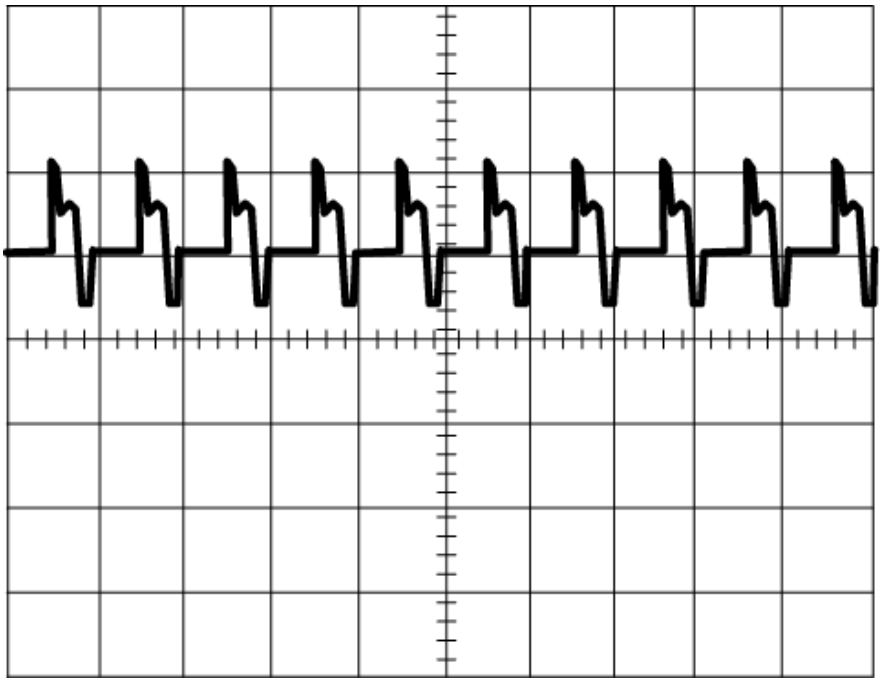
NORMAL OPEN CIRCUIT VOLTAGE WAVEFORM (STICK)
MAX CONTROL POT - HIGH IDLE - NO LOAD



This is the typical DC open circuit output voltage generated from a properly operating machine in the Constant Current (CC) mode.
Note that each vertical division represents 50 volts and that each horizontal division represents 50 microseconds in time.

SCOPE SETTINGS
Volts/Div ..... 50V/Div.
Horizontal Sweep ..... 50 µs/Div.
Coupling ..... DC
Trigger ..... Internal

NORMAL WELD VOLTAGE WAVEFORM (STICK CC)
MACHINE LOADED TO 200 AMPS AT 22 VOLTS

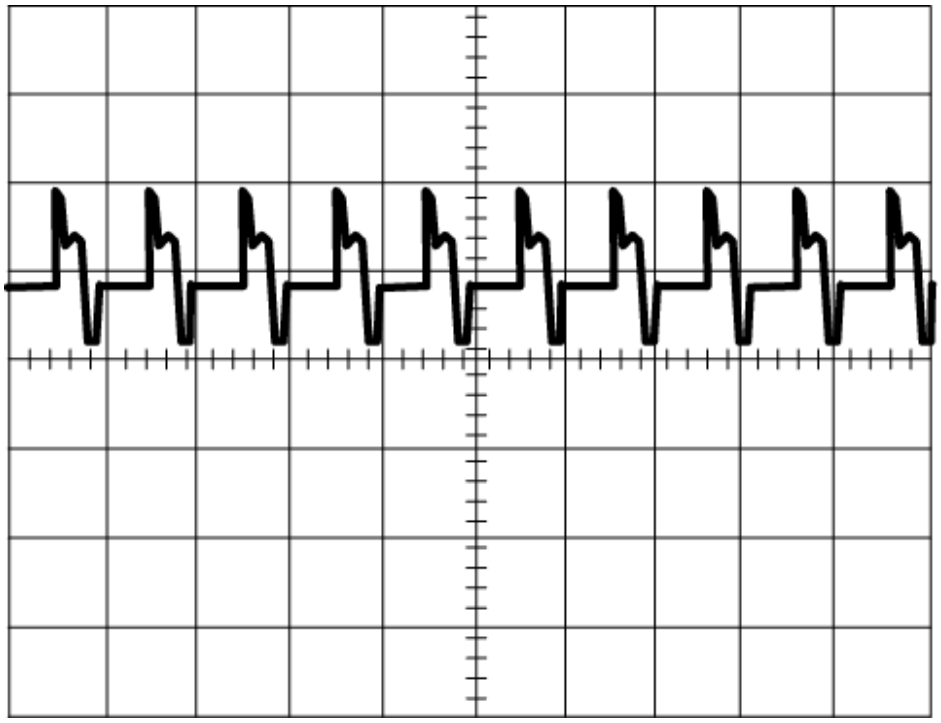


20V 50µs

This is the typical DC output voltage generated from a properly operating machine in the Constant Current (CC) mode.
Note that each vertical division represents 20 volts and that each horizontal division represents 50 microseconds in time.
The machine was loaded with a resistance grid bank to 200 amps at 22 volts.

SCOPE SETTINGS
Volts/Div ..... 20V/Div.
Horizontal Sweep ..... 50 µs/Div.
Coupling ..... DC
Trigger ..... Internal

NORMAL WELD VOLTAGE WAVEFORM (WIRE CV)
MACHINE LOADED TO 150 AMPS AT 17 VOLTS



This is the typical DC output voltage generated from a properly operating machine in the Constant Voltage (CV) mode.
Note that each vertical division represents 20 volts and that each horizontal division represents 50 microseconds in time.
The machine was loaded with a resistance grid bank to 150 amps at 17 volts.

SCOPE SETTINGS
Volts/Div ..... 20V/Div.
Horizontal Sweep ..... 50 µs/Div.
Coupling ..... DC
Trigger ..... Internal

Removal And Replacement Procedures

DIODE BRIDGE RECTIFIER REMOVAL AND REPLACEMENT PROCEDURE

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

TEST DESCRIPTION

This procedure will aid the technician in the removal and replacement of the D1 and D2 Diode Bridge Rectifiers.

MATERIALS NEEDED

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

REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Label and disconnect leads F1, 200C, 5F, 5FA and 201C from the D1 diode bridge rectifier or leads 200, 200A, 5FA, 201A, 6A and 3FAN from the D2 diode bridge rectifier. See ***Figure F.65***. See Wiring Diagram.
4. Using a 3/8” nutdriver, remove the hex nut, lock washer, plain washer and insulating washer securing the diode bridge rectifier to the control panel. See ***Figure F.66***. Note washer placement for reassembly.
5. The diode bridge rectifier can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Apply a thin coating of Dow Corning 340 heat sink compound (Lincoln part #T12837) to the rear of the new diode bridge rectifier.
2. Carefully position the new diode bridge rectifier on to the mounting post on the rear of the control panel.
3. Using a 3/8” nutdriver, attach the insulating washer, plain washer, lock washer and hex nut securing the diode bridge rectifier to the machine.
4. Connect leads F1, 200C, 5F, 5FA and 201C to the D1 diode bridge rectifier or leads 200, 200A, 5FA, 201A, 6A and 3FAN to the D2 diode bridge rectifier. See Wiring Diagram.

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

Figure F.65 – Diode bridge rectifier lead locations

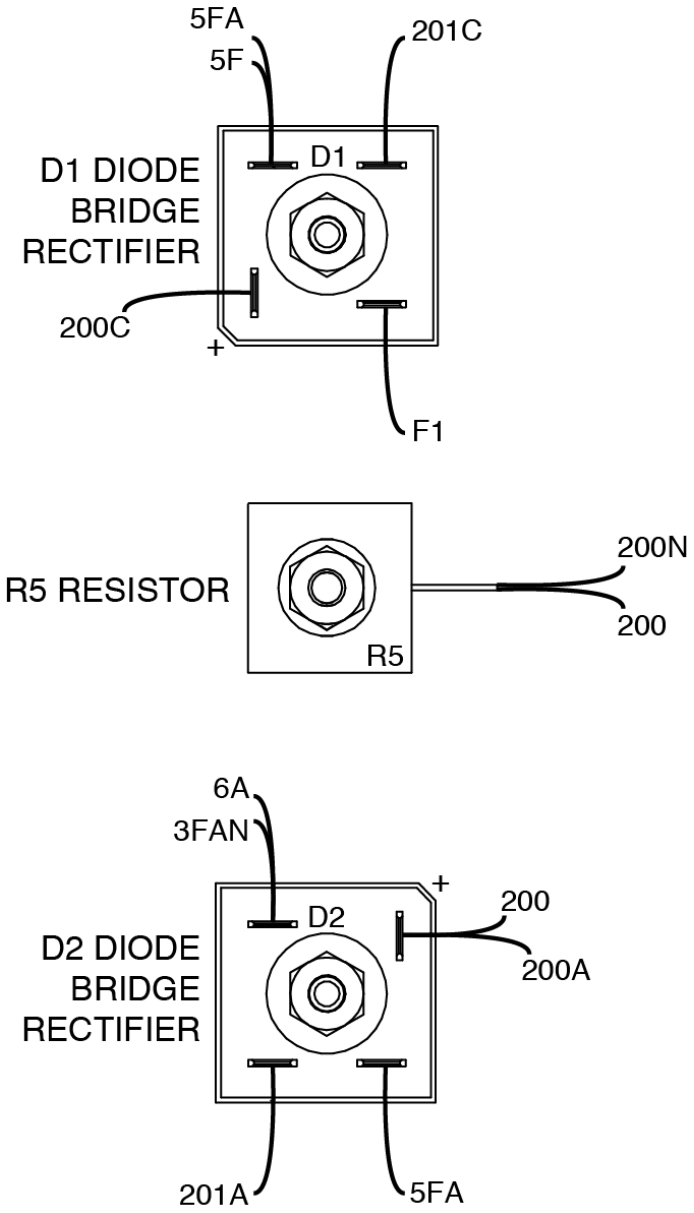
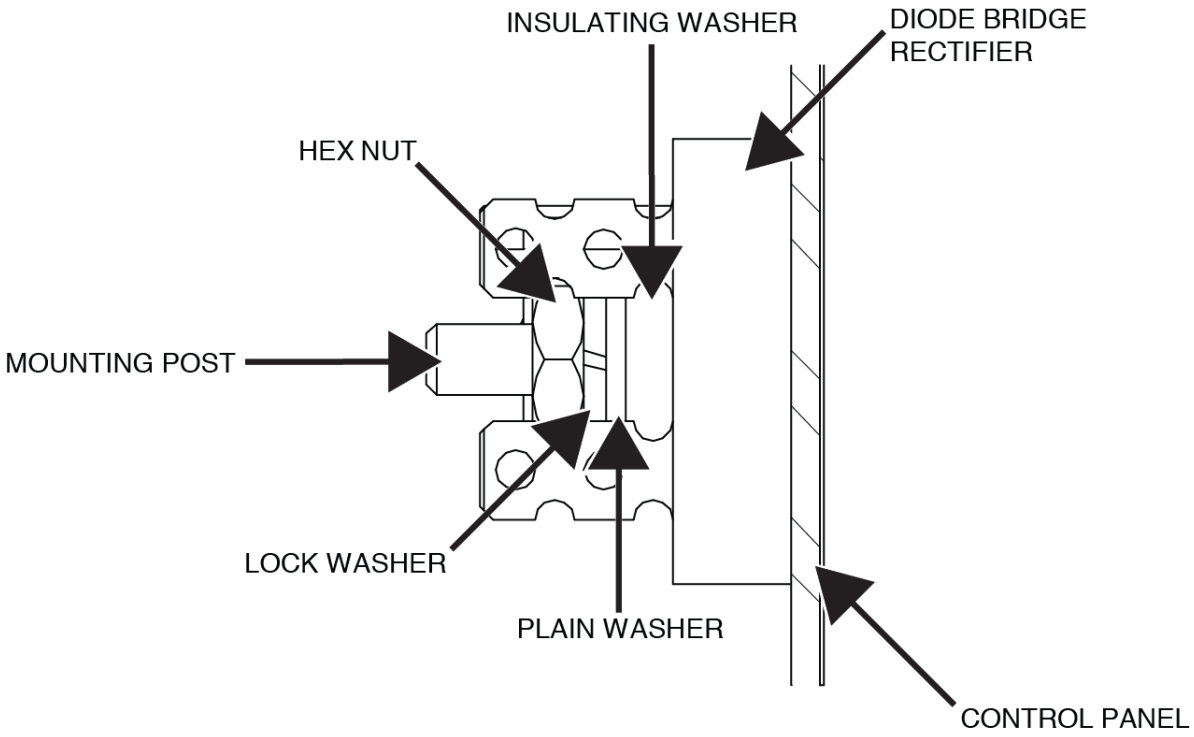


Figure F.66 – Diode bridge rectifier mounting detail



WELD CONTROL BOARD(S) 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 Weld Control Board(s).

MATERIALS NEEDED

Phillips Screwdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Lower the control panel, see the ***Case Cover Removal Procedure***.
3. Label and disconnect plugs J1, J2, J3, J4, J5, J6 and J7 from weld control board 1 side “B” or plugs J1A, J2A, J3A, J4A, J5A, J6A and J7A from weld control board 2 side “A”. See ***Figure F.67***. See Wiring Diagram.
4. Using a Phillips screwdriver, remove the four screws securing the weld control board to the PCB mounting bracket. See ***Figure F.68***.
5. The weld control board(s) can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the new weld control board onto the PCB mounting bracket.
2. Using a Phillips screwdriver, attach the four screws securing the weld control board to the PCB mounting bracket.
3. Connect plugs J1, J2, J3, J4, J5, J6 and J7 from weld control board 1 side “B” or plugs J1A, J2A, J3A, J4A, J5A, J6A and J7A from weld control board 2 side “A”. See Wiring Diagram.
4. Perform the ***Case Cover Replacement Procedure***.
5. Perform the ***Retest After Repair Procedure***.

Figure F.67 – Weld control board plug locations

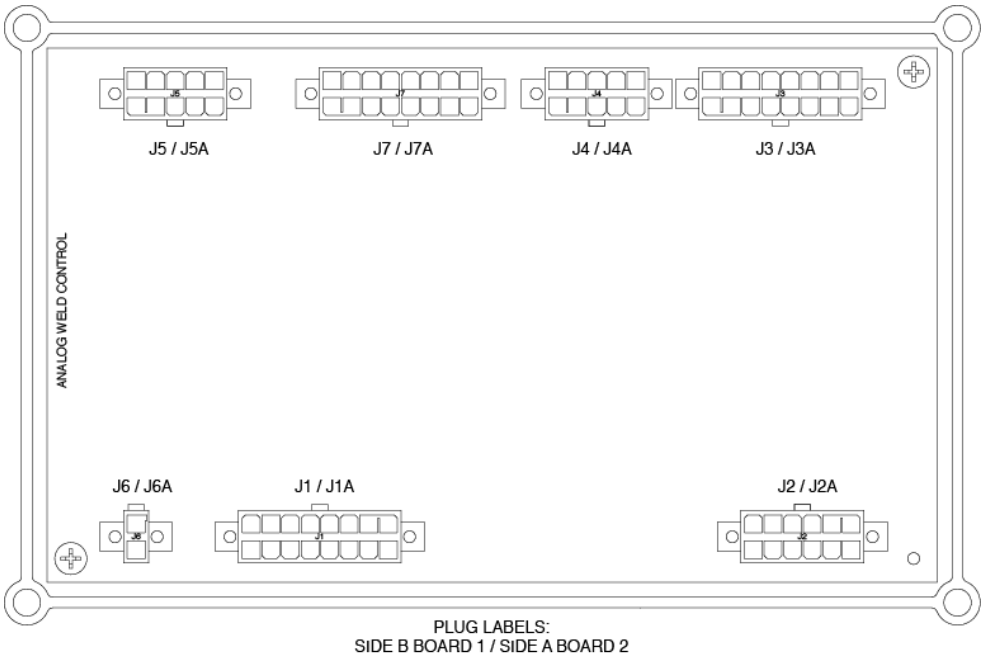
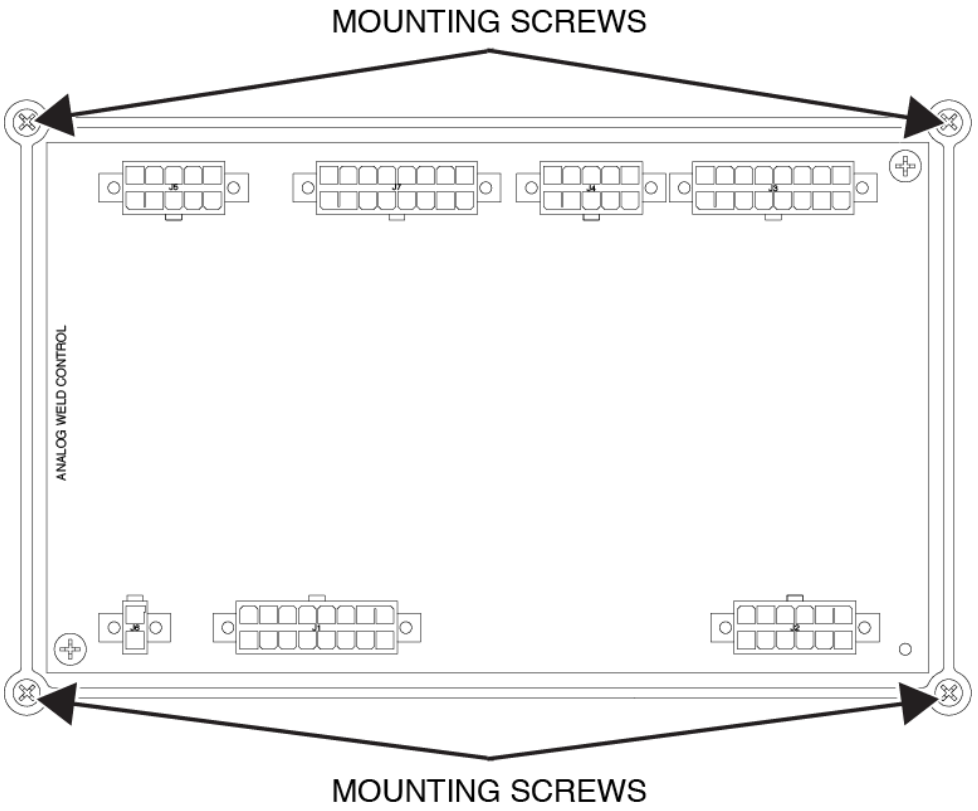


Figure F.68 – Weld control board mounting screw locations



VRD / OCV INDICATOR BOARD(S) 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 OCV Indicator Board(s).

MATERIALS NEEDED

Phillips Screwdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Lower the control panel, see the ***Case Cover Removal Procedure***.
3. Label and disconnect plugs J60 and J61 from OCV indicator board “B” (left side) or plugs J60A and J61A from OCV indicator board “A” (right side). See ***Figure F.69***. See Wiring Diagram.
4. Using a Phillips screwdriver, remove the four screws securing the OCV indicator board to the PCB mounting bracket. See ***Figure F.70***.
5. The OCV indicator board(s) can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the new OCV indicator board onto the PCB mounting bracket.
2. Using a Phillips screwdriver, attach the four screws securing the OCV indicator board to the PCB mounting bracket.
3. Connect plugs J60 and J61 to OCV indicator board “B” (left side) or plugs J60A and J61A to OCV indicator board “A” (right side). See Wiring Diagram.
4. Perform the ***Case Cover Replacement Procedure***.
5. Perform the ***Retest After Repair Procedure***.

Figure F.69 – VRD / OCV indicator board plug locations

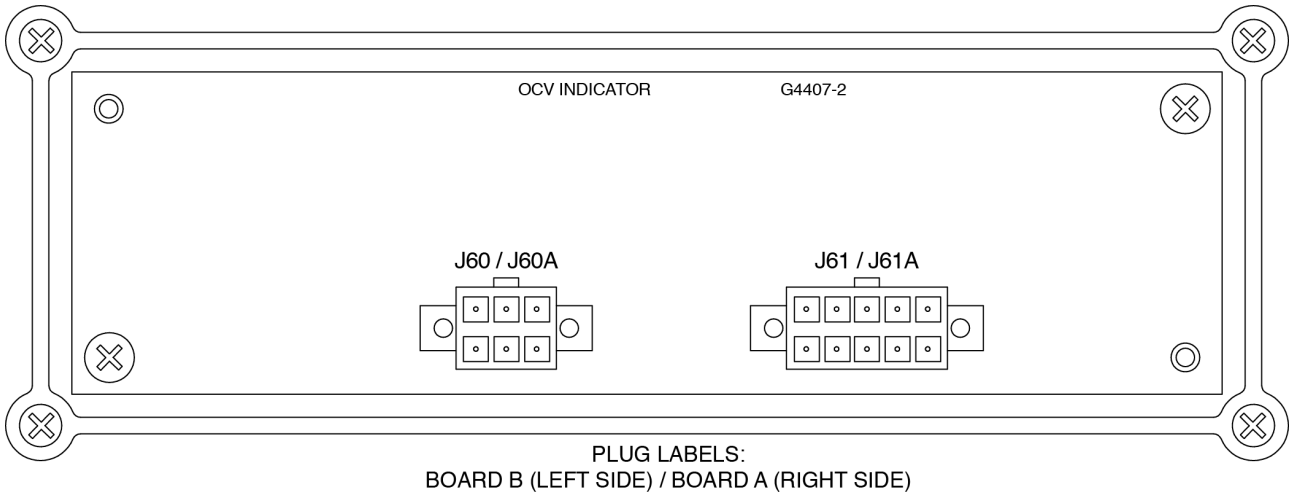
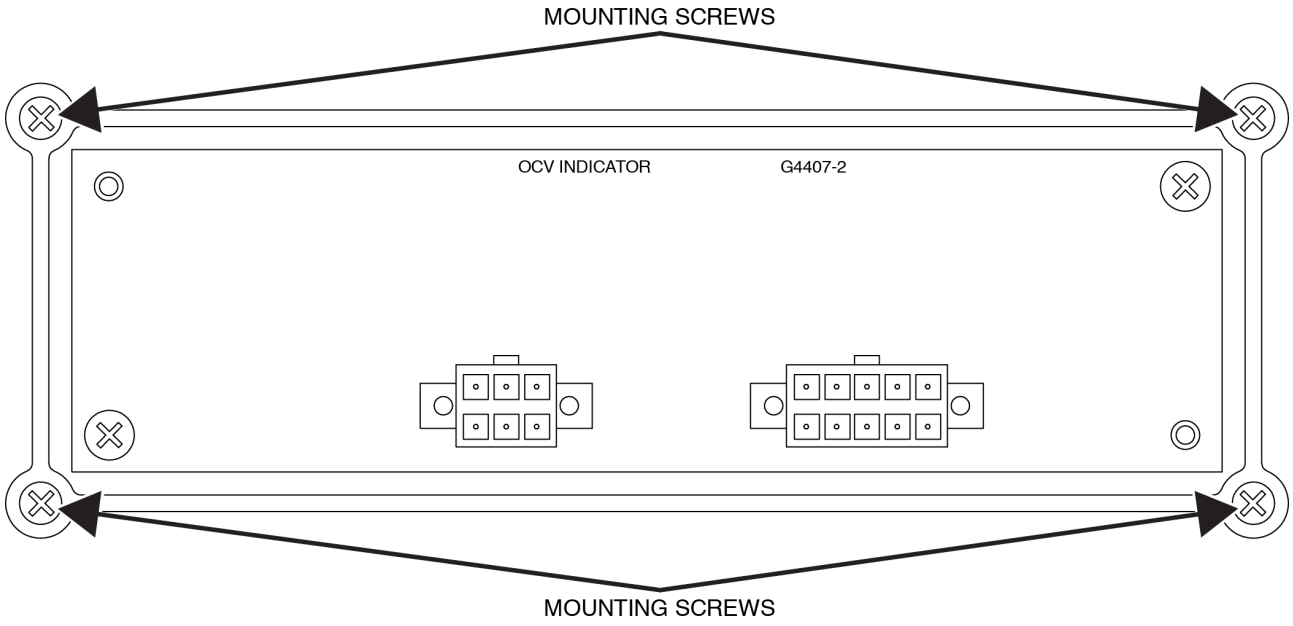


Figure F.70 – VRD / OCV indicator board mounting screw location



ELECTRONIC ENGINE GOVERNOR MODULE 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 Electronic Engine Governor Module (Engine Speed Control).

MATERIALS NEEDED

3/8” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Label and disconnect plugs J31 and J32 from the electronic engine governor module. See ***Figure F.71***. See Wiring Diagram.
4. Using a 3/8” nutdriver, remove the two screws securing the electronic engine governor to the machine. See ***Figure F.72***.
5. The electronic engine governor module can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the new electronic engine governor module on the machine.
2. Using a 3/8” nutdriver, attach the two screws securing the electronic engine governor to the machine.
3. Connect the previously removed plugs J31 and J32 to the electronic engine governor module. See Wiring Diagram.
4. Perform the ***Case Cover Replacement Procedure***.
5. Perform the ***Retest After Repair Procedure***.

Figure F.71 – Electronic engine governor module plug locations

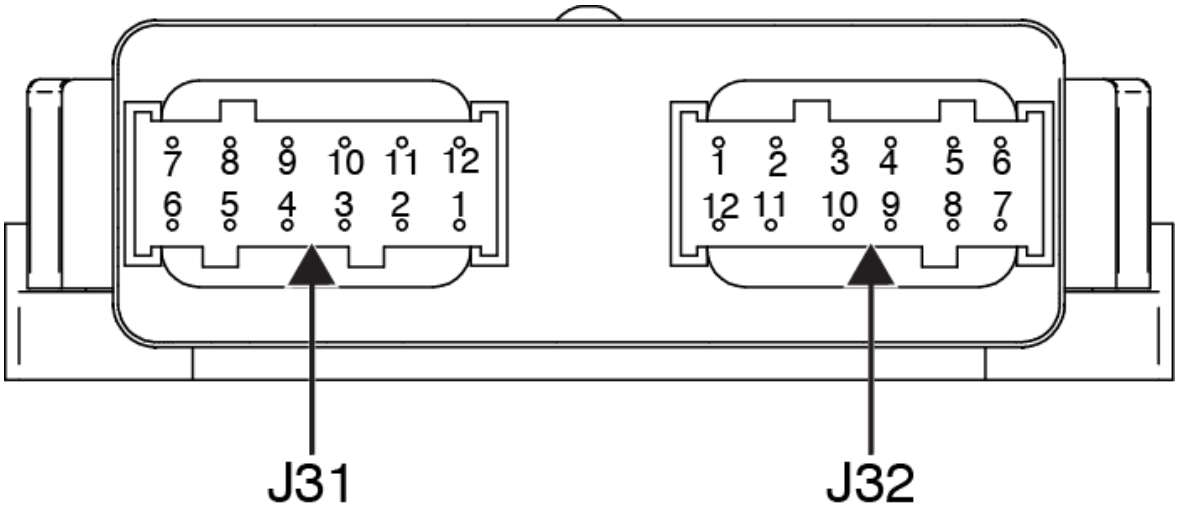
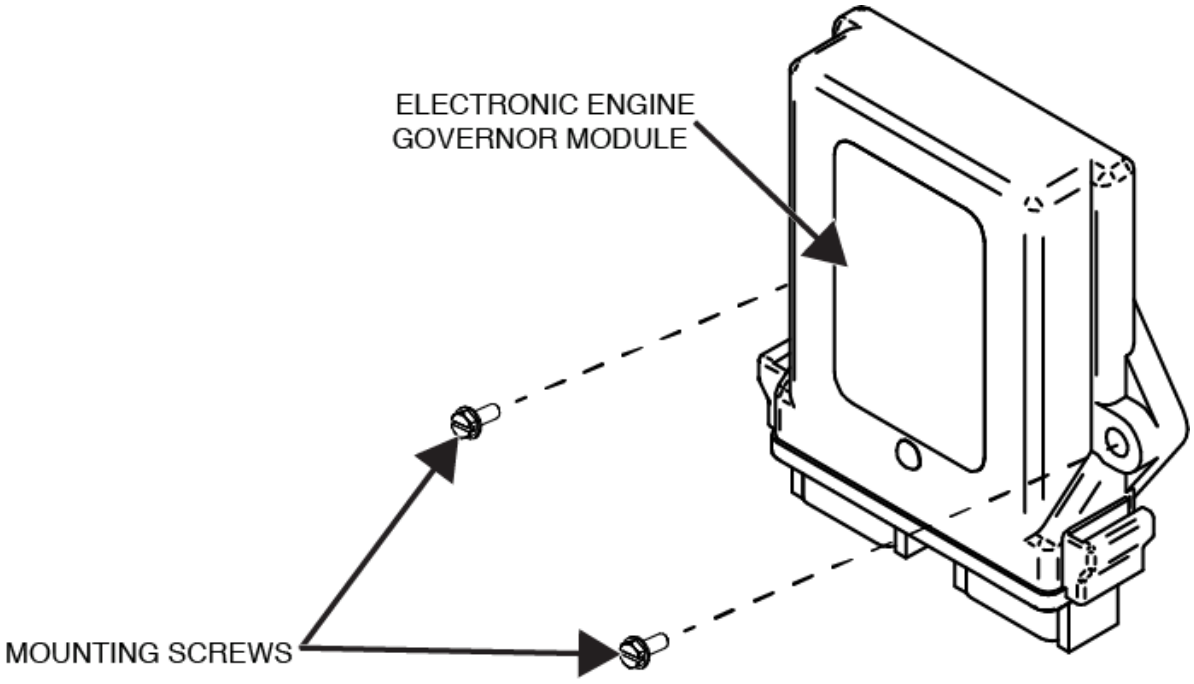


Figure F.72 – Electronic engine governor module mounting screw locations



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.

MATERIALS NEEDED

Slotted Screwdriver
Length of 3/8” Fuel Tubing
Two 3/4” Wrenches
Needle Nose Pliers
Container Suitable To Catch Fuel From Lines
Approved Fuel Storage Container(s)
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 and wait for the engine to cool.
2. Perform the ***Case Cover Removal Procedure***.
3. Label and disconnect leads 5J and 229 from the fuel level sending unit. See ***Figure F.73***. See Wiring Diagram.
4. Turn off the red fuel shutoff valve. The fuel shutoff valve is located on the fuel outlet line at the bottom of the fuel tank and is accessed on the service side (right) of the machine.
5. Using a slotted screwdriver or a 1/4” nutdriver, loosen the hose clamp securing the fuel line and remove the fuel line from the outlet end of the fuel shutoff valve. Catch any fuel that may spill when the line is disconnected and deposit this fuel in an approved container.
6. Obtain a length of 3/8” fuel tubing and connect one end to the valve. Place the other end into an approved fuel container and open the valve to drain the tank.
7. After tank is empty, disconnect the fuel outlet line from the elbow nearest to the fuel tank.
8. Using two 3/4” wrenches, remove the four nuts and washers securing the lift bale to the lift frame assembly and remove the lift bale. See ***Figure F.74***.
9. Using needle nose pliers, label and disconnect the fuel tank vent line from the top of the fuel tank. See ***Figure F.75***.
10. With the help of an assistant, the fuel tank can now be lifted straight up and out of the machine.

REPLACEMENT PROCEDURE

1. Carefully position the new fuel tank into the machine.
2. When replacing the fuel tank be sure the fuel outlet line is securely attached to the tank and is protruding through the hole in the lift frame.
3. Using needle nose pliers, tighten hose clamp securing the vent line.
4. Using two 3/4” wrenches, attach the four nuts and washers securing the lift bale.
5. Using a slotted screwdriver or 1/4” nutdriver, attach the previously removed fuel lines.
6. Attach leads 5J and 229 to the fuel level sender. See Wiring Diagram.
7. Refill the fuel tank and check for any leakage.
8. Open the fuel shutoff valve.
9. Perform the ***Case Cover Replacement Procedure***.
10. Perform the ***Retest After Repair Procedure***.

Figure F.73 – Fuel level sending unit lead locations

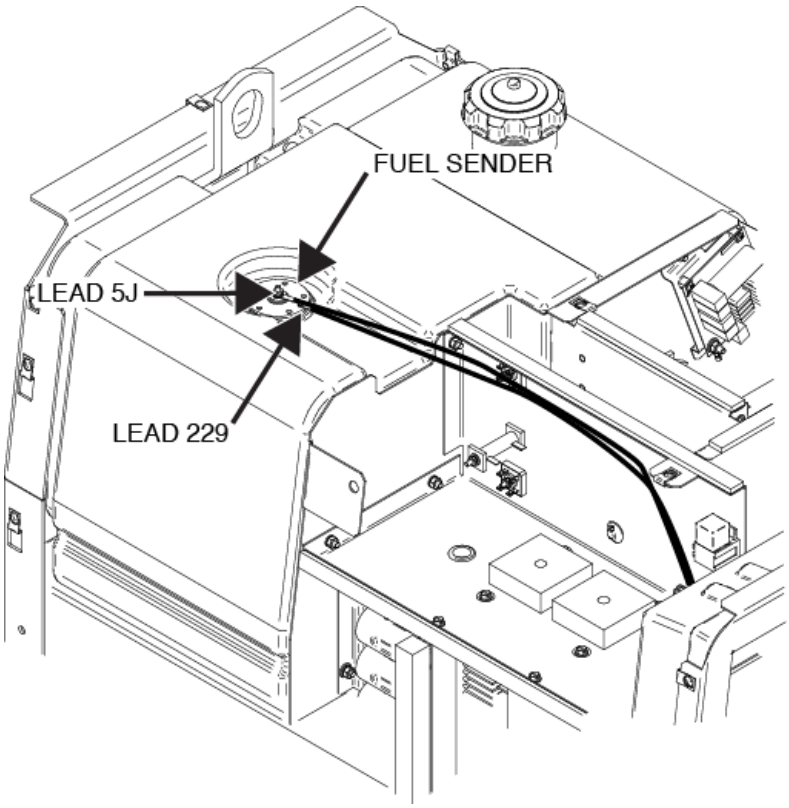


Figure F.74 – Lift bale removal

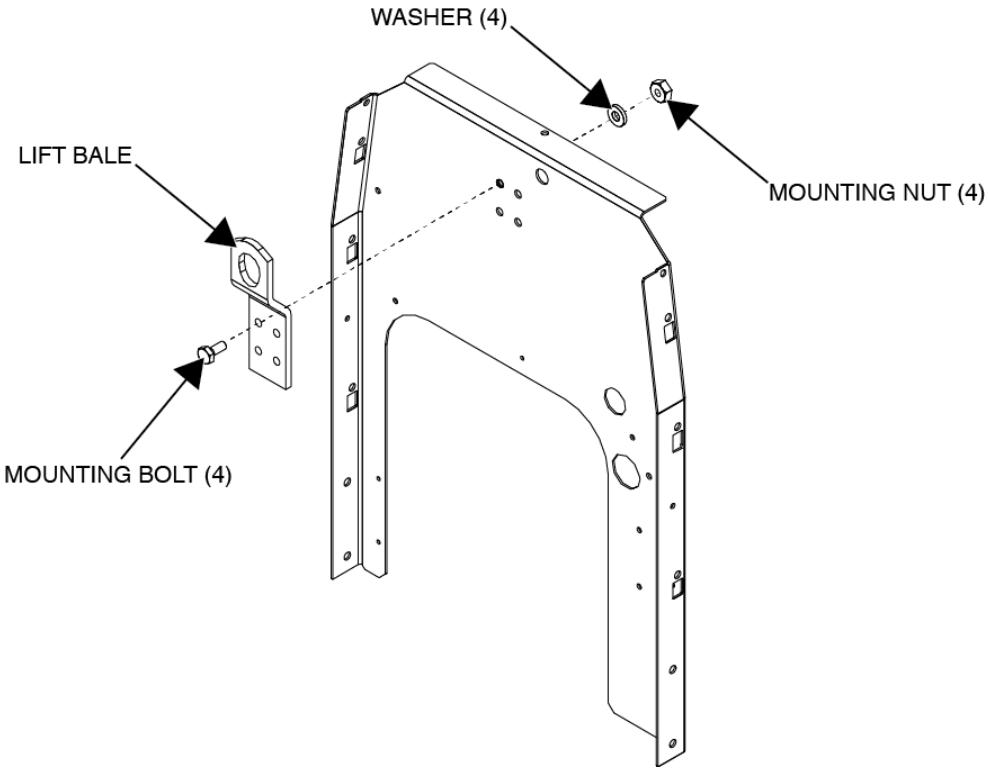
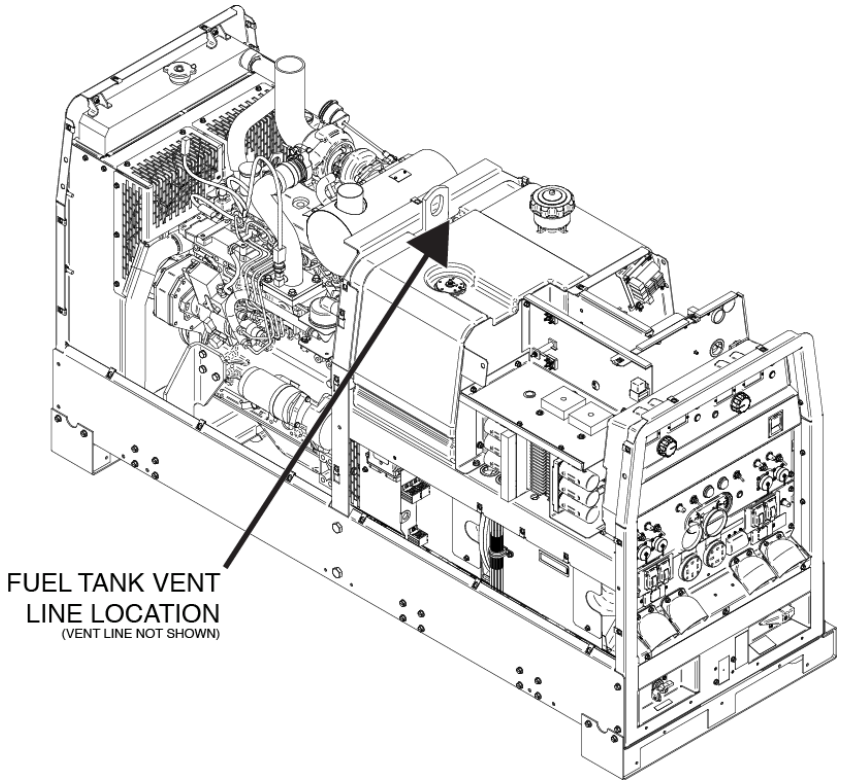


Figure F.75 – Fuel tank vent line location



CHOPPER MODULE(S) 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 Chopper Module(s).

MATERIALS NEEDED

3/8” Nutdriver
7/16” Nutdriver
1/2” Socket with Extension
1/2” Nutdriver
Phillips Screwdriver
Torque Wrench (in./lbs.)
Dow Corning 340 Heat Sink Compound (Lincoln Part #T12837)
Penetrox Heat Sink Compound (Lincoln Part #T12837-1)
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Perform the ***Chopper Module Discharge Procedure***.
4. Label and disconnect leads 250A, 250, 250C and 250B from the chopper thermostats. See ***Figure F.76***. See Wiring Diagram.
5. Label and disconnect leads F1, 200C, 5F, 5FA and 201C from the D1 diode bridge rectifier and leads 200, 200A, 5FA, 201A, 6A and 3FAN from the D2 diode bridge rectifier. See ***Figure F.77***. See Wiring Diagram.
6. Label and disconnect leads 200N and 200 from the R5 resistor. See ***Figure F.77***. See Wiring Diagram.
7. Remove the arc/thermal detect relay (CR5) from its mounting bracket. See ***Figure F.76***.
8. Using a 3/8” nutdriver, remove the screw securing the relay mounting harness to the idler PCB mount bracket assembly. See ***Figure F.76***.
9. Using a 3/8” nutdriver, remove the four screws from the idler PCB mount bracket assembly. See ***Figure F.76***.
10. Using a 7/16” nutdriver, remove the three nuts and washers from idler PCB mount bracket assembly. See ***Figure F.76***.
11. The idler PCB mount bracket assembly can now be removed and set aside.

12. Using a 7/16” nutdriver, label and disconnect all leads from chopper A (rear). See ***Figure F.76*** and ***Figure F.78***. See Wiring Diagram.
13. Using a 7/16” nutdriver, label and disconnect all leads from chopper B (front). See ***Figure F.76*** and ***Figure F.79***. See Wiring Diagram.
14. Using a 1/2” socket with an extension, remove the two mounting bolts securing the chopper PC board mount to the fuel tank shelf. Repeat this step for the other chopper module assembly. See ***Figure F.80***. The chopper module assemblies can now be removed from the machine.
15. Using a Phillips screwdriver, remove the two screws securing the thermostat to the chopper module assembly. Repeat this step for the other chopper module assembly. See ***Figure F.80***.
16. Using a 3/8” nutdriver, remove the four bolts securing the chopper PC board mount to the chopper module assembly. See ***Figure F.80***. Repeat this step for each chopper module assembly.
17. The chopper module(s) can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the new chopper module board assembly into the chopper PC board mount.
2. Using a 3/8” nutdriver, attach the four bolts securing the chopper PC board mount to the chopper module board assembly. Repeat this step for each chopper module assembly.
3. Apply a thin coating of Dow Corning 340 heat sink compound (Lincoln part #T12837) to the rear of the thermostats.
4. Using a Phillips screwdriver, attach the two screws securing the thermostats to each chopper module assembly.
5. Using a 1/2” socket with an extension, attach the two mounting bolts securing each chopper PC board mount to the fuel tank shelf (four bolts total).
6. Using a 7/16” nutdriver, connect all previously removed leads to chopper A and B. See Wiring Diagram. When connecting leads to the chopper modules be sure to adhere to the following directions:
    A. Apply a thin coat of Penetrox heat sink compound (Lincoln part #T12837-1) to the six large terminals of the chopper module(s).
    B. Be certain the wires are connected and arranged exactly as they had been on the original chopper module(s).
    C. Be certain each connection screw has a lock washer and flat washer.
    D. **Torque the chopper connection screws to 50 to 60 in./lbs**.
7. Carefully position the idler PCB mount bracket assembly onto the machine.
8. Using a 7/16” nutdriver, attach the three nuts and washers securing the idler PCB mount bracket assembly.
9. Using a 3/8” nutdriver, attach the four screws securing the idler PCB mount bracket assembly.
10. Using a 3/8” nutdriver, attach the screw securing the relay mounting harness to the idler PCB mount bracket assembly.
11. Connect the arc/thermal detect relay (CR5) to it’s mounting bracket.
12. Connect leads 200N and 200 to the R5 resistor. See Wiring Diagram.
13. Connect leads F1, 200C, 5F, 5FA and 201C to the D1 diode bridge rectifier and leads 200, 200A, 5FA, 201A, 6A and 3FAN to the D2 diode bridge rectifier. See Wiring Diagram.
14. Connect leads 250A, 250, 250C and 250B to the chopper thermostats. See Wiring Diagram.
15. Perform the ***Case Cover Replacement Procedure***.
16. Perform the ***Retest After Repair Procedure***.

Figure F.76 – Idler PCB mount bracket, arc/thermal detect relay (CR5) and thermostat leads location

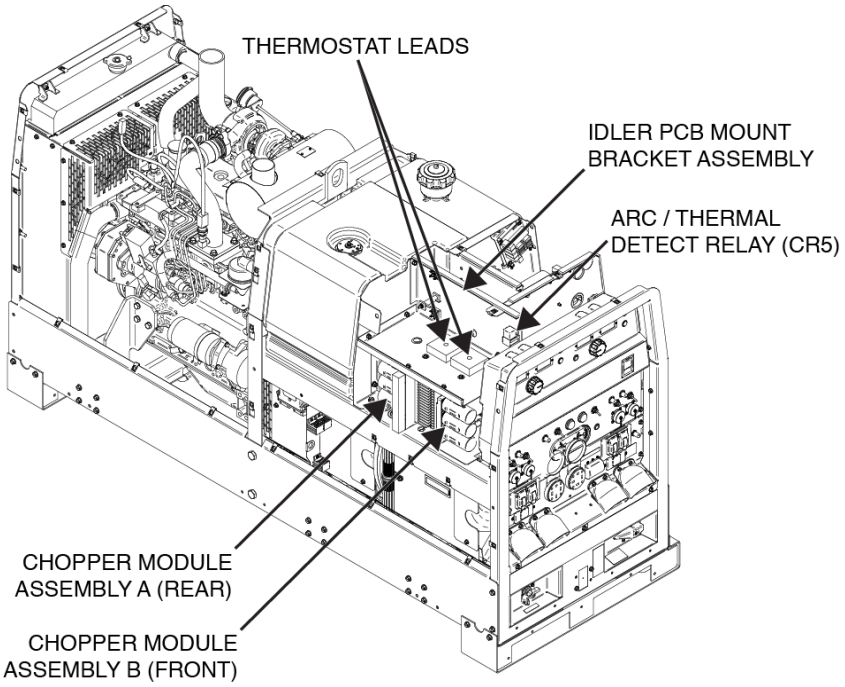


Figure F.77 – D1 diode bridge rectifier, D2 diode bridge rectifier and R5 resistor lead locations

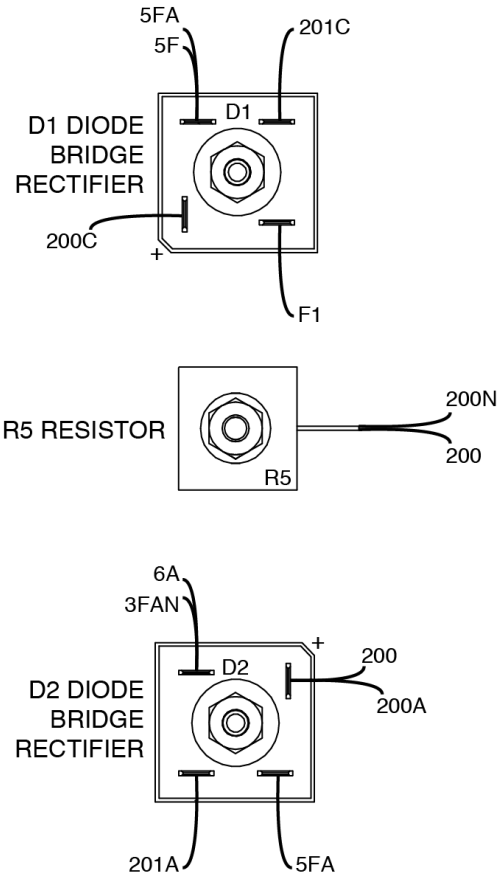


Figure F.78 – Chopper module A lead locations

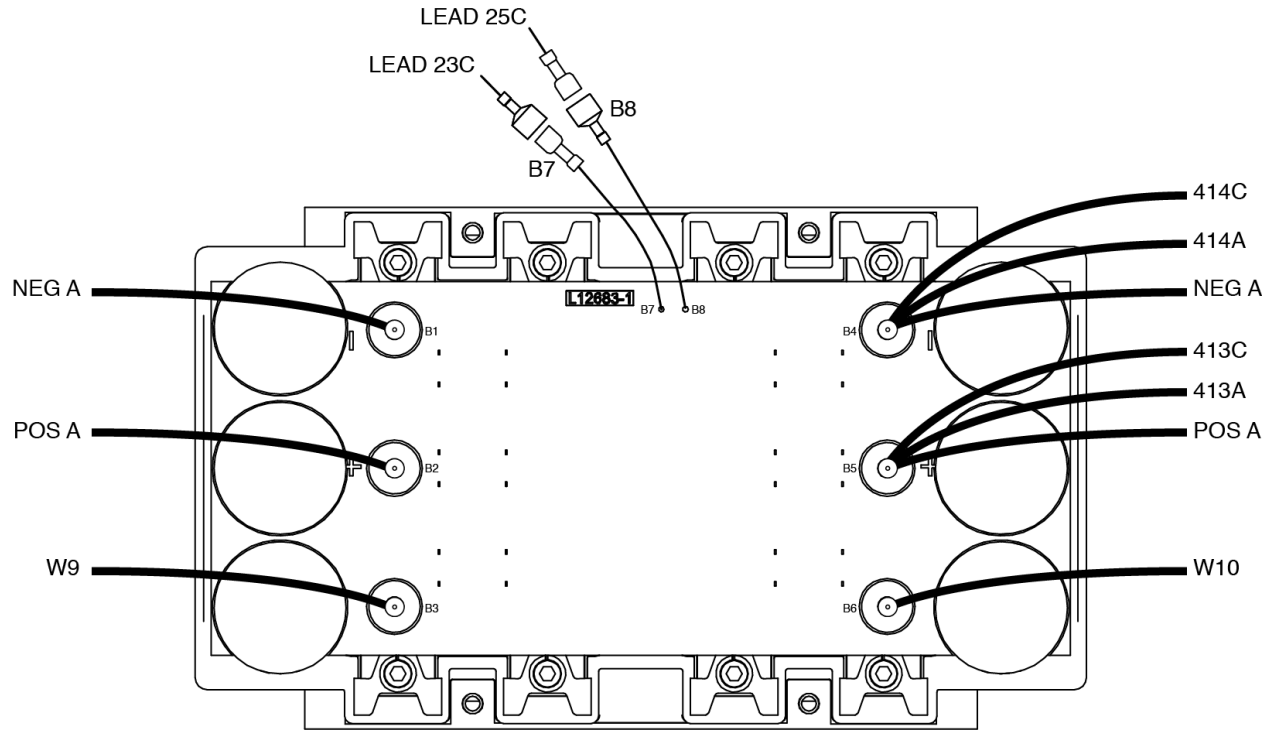


Figure F.79 – Chopper module B lead locations

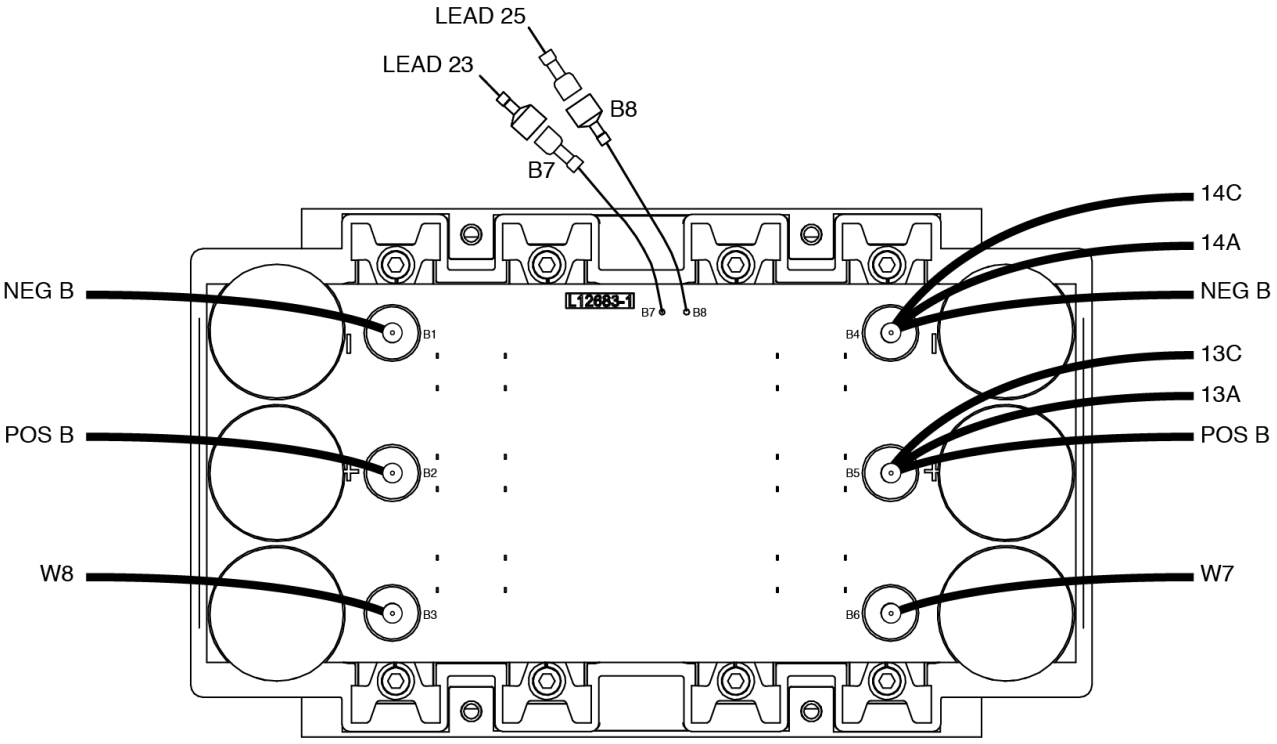
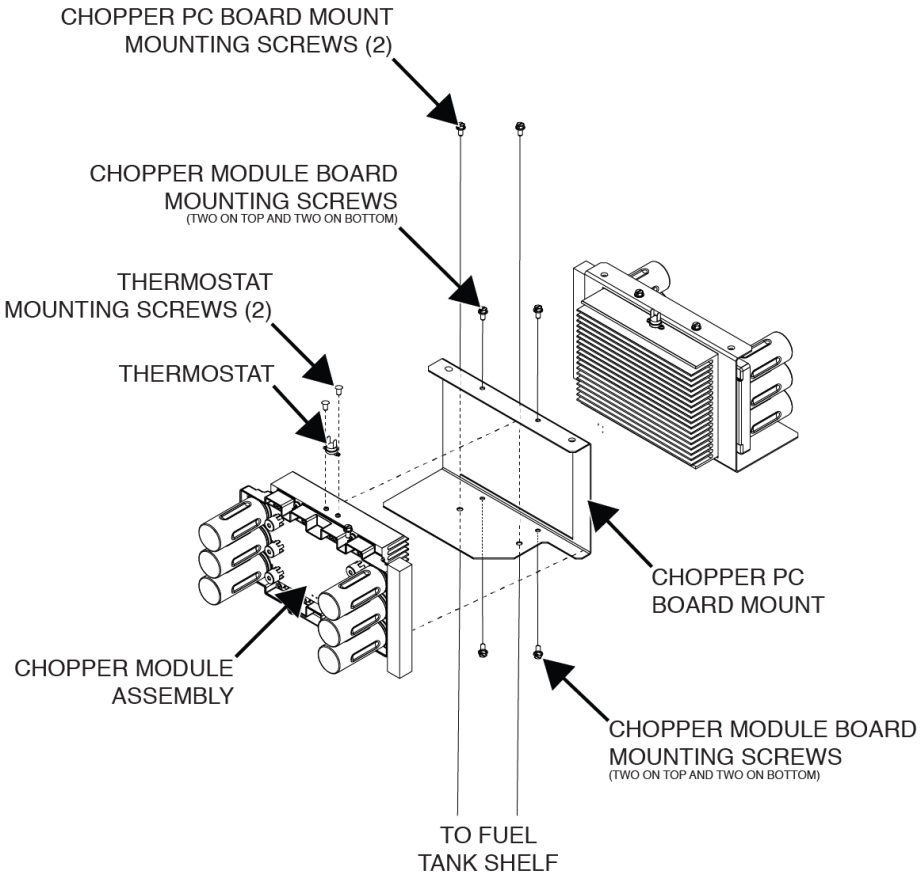


Figure F.80 – Chopper module assembly mounting screw locations



IDENTITY CONTROL (CR1) RELAY 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 Identity Control (CR1) Relay.

MATERIALS NEEDED

9mm Nutdriver
Wiring Diagram

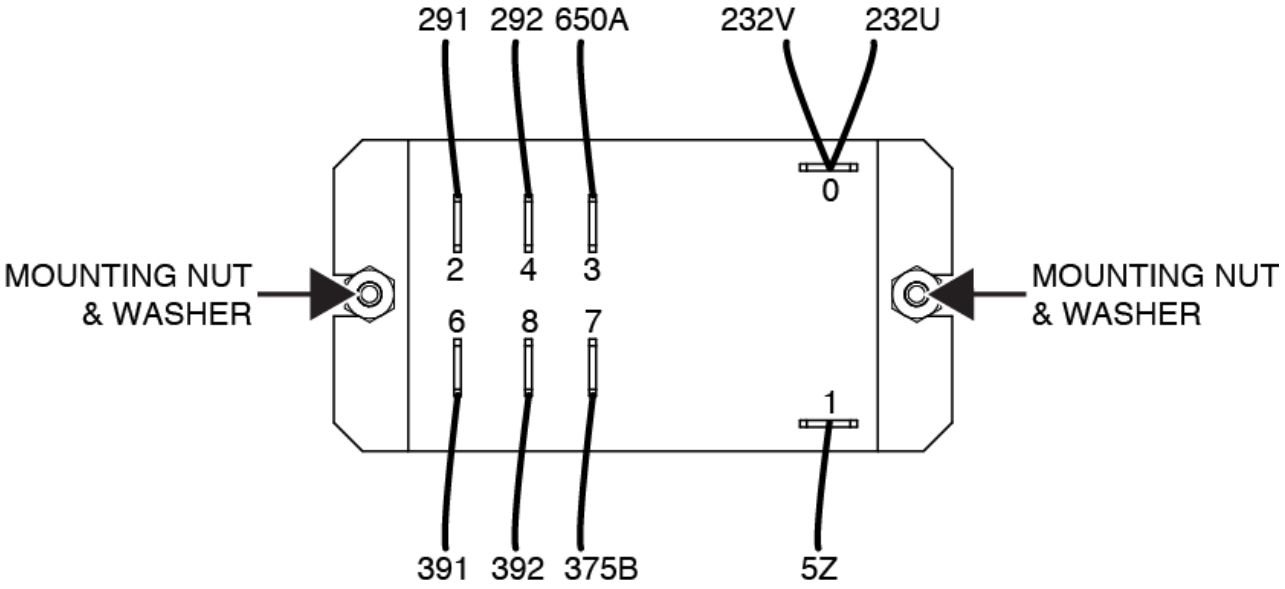
REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Lower the control panel, see the ***Case Cover Removal Procedure***.
3. Label and disconnect leads 291, 292, 650A, 232V, 232U, 391, 392, 375B and 5Z from the identity control (CR1) relay. See ***Figure F.81***. See Wiring Diagram.
4. Using a 9mm nutdriver, remove the two nuts and washers securing the identity control (CR1) relay to the control panel. See ***Figure F.81***.
   NOTE: It may be necessary to perform the ***Weld Control Board(s) Removal Procedure*** to gain access to the mounting nuts of the identity control (CR1) relay.
5. Carefully lift the identity control (CR1) relay off of it's mounting posts.
6. The identity control (CR1) relay can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the new identity control (CR1) relay onto it's mounting posts on the control panel.
2. Using a 9mm nutdriver, attach the two nuts and washers securing the identity control (CR1) relay to the control panel.
   NOTE: If necessary, perform the ***Weld Control Board(s) Replacement Procedure***.
3. Connect leads 291, 292, 650A, 232V, 232U, 391, 392, 375B and 5Z to the identity control (CR1) relay. See Wiring Diagram.
4. Perform the ***Case Cover Replacement Procedure***.
5. Perform the ***Retest After Repair Procedure***.

Figure F.81 – Identity control (CR1) relay lead and mounting nut locations



CHOPPER CONTROL (CR2) RELAY 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 Chopper Control (CR2) Relay.

MATERIALS NEEDED

9mm Nutdriver
Wiring Diagram

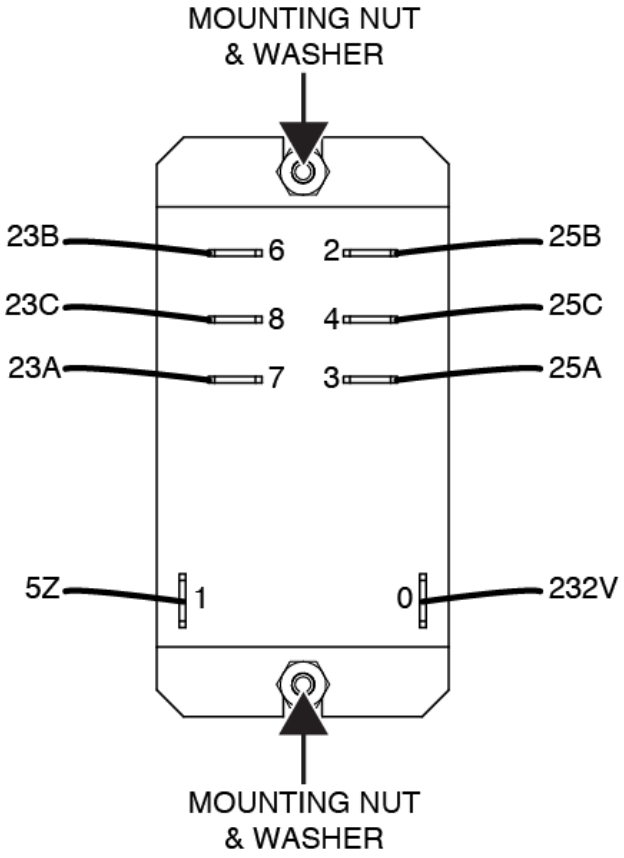
REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Lower the control panel, see the ***Case Cover Removal Procedure***.
3. Label and disconnect leads 25B, 25C, 25A, 232V, 5Z, 23A, 23C and 23B from the chopper control (CR2) relay. See ***Figure F.82***. See Wiring Diagram.
4. Using a 9mm nutdriver, remove the two nuts and washers securing the chopper control (CR2) relay to the control panel. See ***Figure F.82***.
5. Carefully lift the chopper control (CR2) relay off of it's mounting posts.
6. The chopper control (CR2) relay can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the new chopper control (CR2) relay onto it's mounting posts on the control panel.
2. Using a 9mm nutdriver, attach the two nuts and washers securing the chopper control (CR2) relay to the control panel.
3. Connect leads 25B, 25C, 25A, 232V, 5Z, 23A, 23C and 23B to the chopper control (CR2) relay. See Wiring Diagram.
4. Perform the ***Case Cover Replacement Procedure***.
5. Perform the ***Retest After Repair Procedure***.

Figure F.82 – Chopper control (CR2) relay lead and mounting screw locations



POWER MODULE FAN 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 Power Module Fan.

MATERIALS NEEDED

Small Slotted Screwdriver
1/2” Nutdriver
3/8” Nutdriver
7/16” Nutdriver
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***, including lowering the control panel.
3. Remove the shield from behind the control panel to gain access to power module fan components. See ***Figure F.83***.
4. Using a small slotted screwdriver, label and disconnect lead 3FAN and lead 5FAN from the fan terminal strip. See ***Figure F.84***. See Wiring Diagram.
5. Label and disconnect the leads 306D (left) and 308D (right) from the R4 resistor. See ***Figure F.85***. See Wiring Diagram.
6. Label and disconnect the leads 206D (left) and 208D (right) from the R6 resistor. See ***Figure F.85***. See Wiring Diagram.
7. Using a 1/2” nutdriver, remove the two screws securing the fan mounting bracket to the fuel tank shelf. See ***Figure F.86***.
8. Using a 3/8” nutdriver, remove the two screws securing the bypass PC board bracket assembly to the fan mounting bracket. See ***Figure F.87***.
9. Using a 3/8” nutdriver, remove the two screws securing the bypass PC board bracket assembly to the module adapter plate. See ***Figure F.87***.
10. Using a 7/16” nutdriver, remove the hex nut, lock washer and flat washer securing the fan bracket to the fuel tank baffle. See ***Figure F.88***. Note washer placement for reassembly.
11. Carefully slide the bypass PC board bracket assembly free of the fan mounting bracket.
12. Carefully slide the fan mounting bracket away from the fuel tank baffle and out of the machine.
13. Using a 3/8” nutdriver, remove the four screws securing the fan to the fan mounting bracket. See ***Figure F.89***.

14. The fan can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Position new fan on the fan mounting bracket.
2. Using a 3/8” nutdriver, attach the four screws securing the fan to the fan mounting bracket.
3. Carefully position fan assembly into the machine.
4. Carefully slide the bypass PC board bracket assembly towards the fan mounting bracket.
5. Using a 7/16” nutdriver, attach the hex nut, lock washer and flat washer securing the fan bracket to the fuel tank baffle.
6. Using a 3/8” nutdriver, attach the two screws securing the bypass PC board bracket to the module adapter plate.
7. Using a 3/8” nutdriver, attach the two screws securing the bypass PC board bracket assembly to the fan mounting bracket.
8. Using a 1/2” nutdriver, attach the two screws securing the fan mounting bracket to the fuel tank shelf.
9. Connect the leads 206D (left) and 208D (right) to the R6 resistor. See Wiring Diagram.
10. Connect the leads 306D (left) and 308D (right) to the R4 resistor. See Wiring Diagram.
11. Using a small slotted screwdriver, connect lead 3FAN and lead 5FAN to the fan terminal strip. See Wiring Diagram.
12. Place the previously removed shield into position behind the control panel.
13. Perform the ***Case Cover Replacement Procedure***.
14. Perform the ***Retest After Repair Procedure***.

Figure F.83 – Shield location

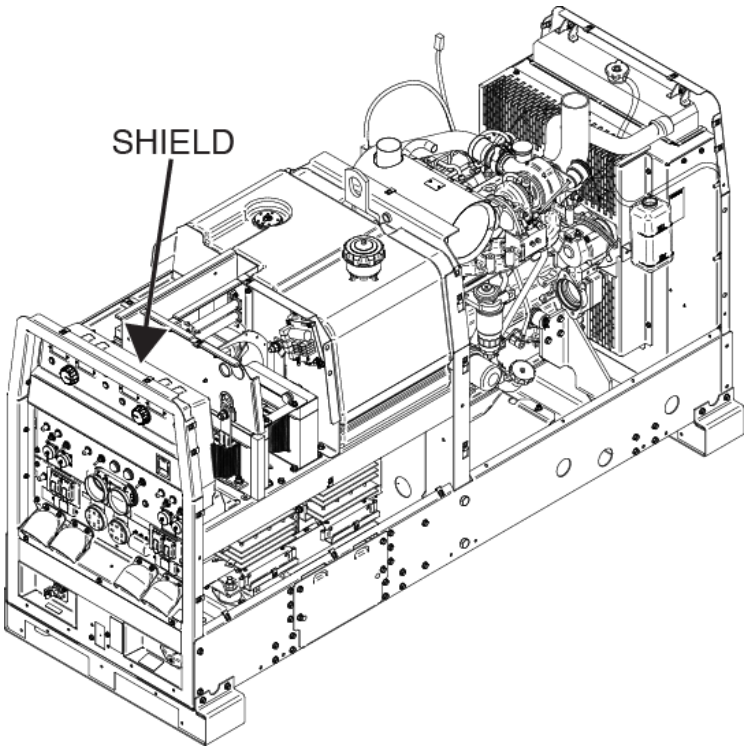


Figure F.84 – Fan lead locations

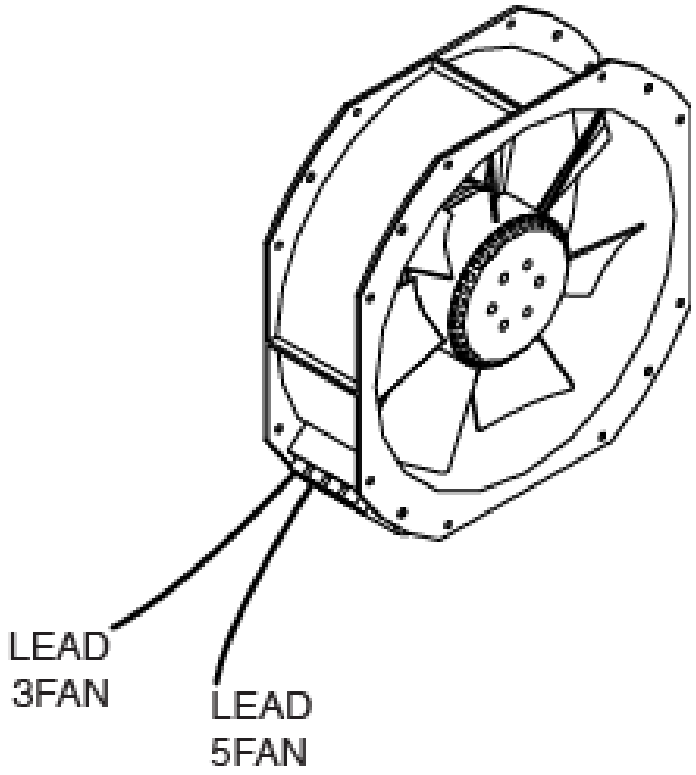


Figure F.85 – R4 and R6 resistor lead locations

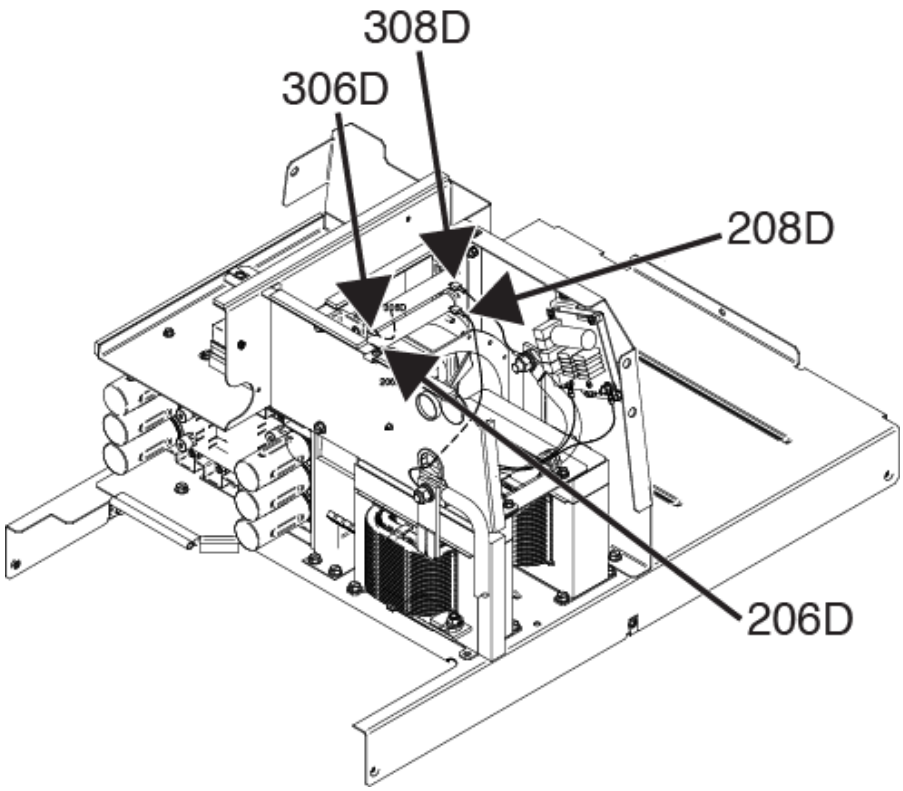


Figure F.86 – Mounting screw location

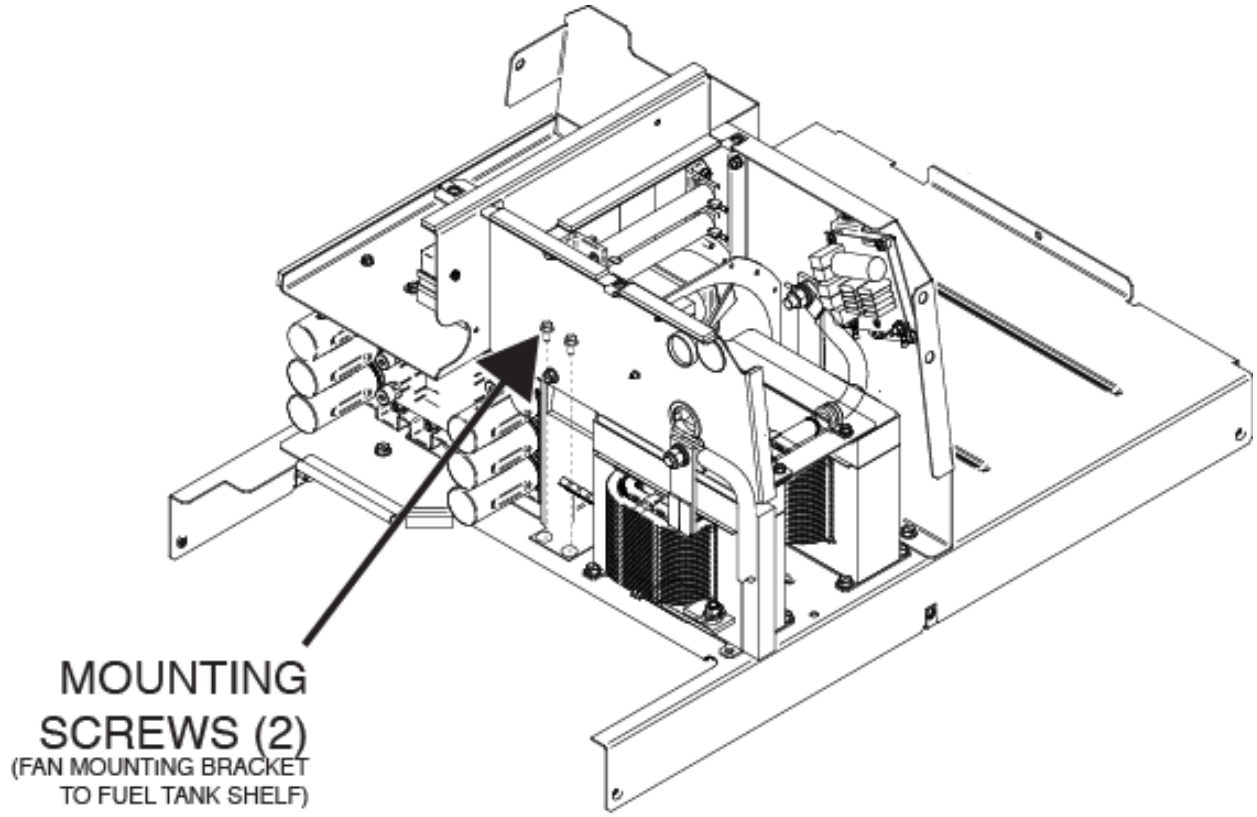


Figure F.87 – Power module fan bracket assembly removal

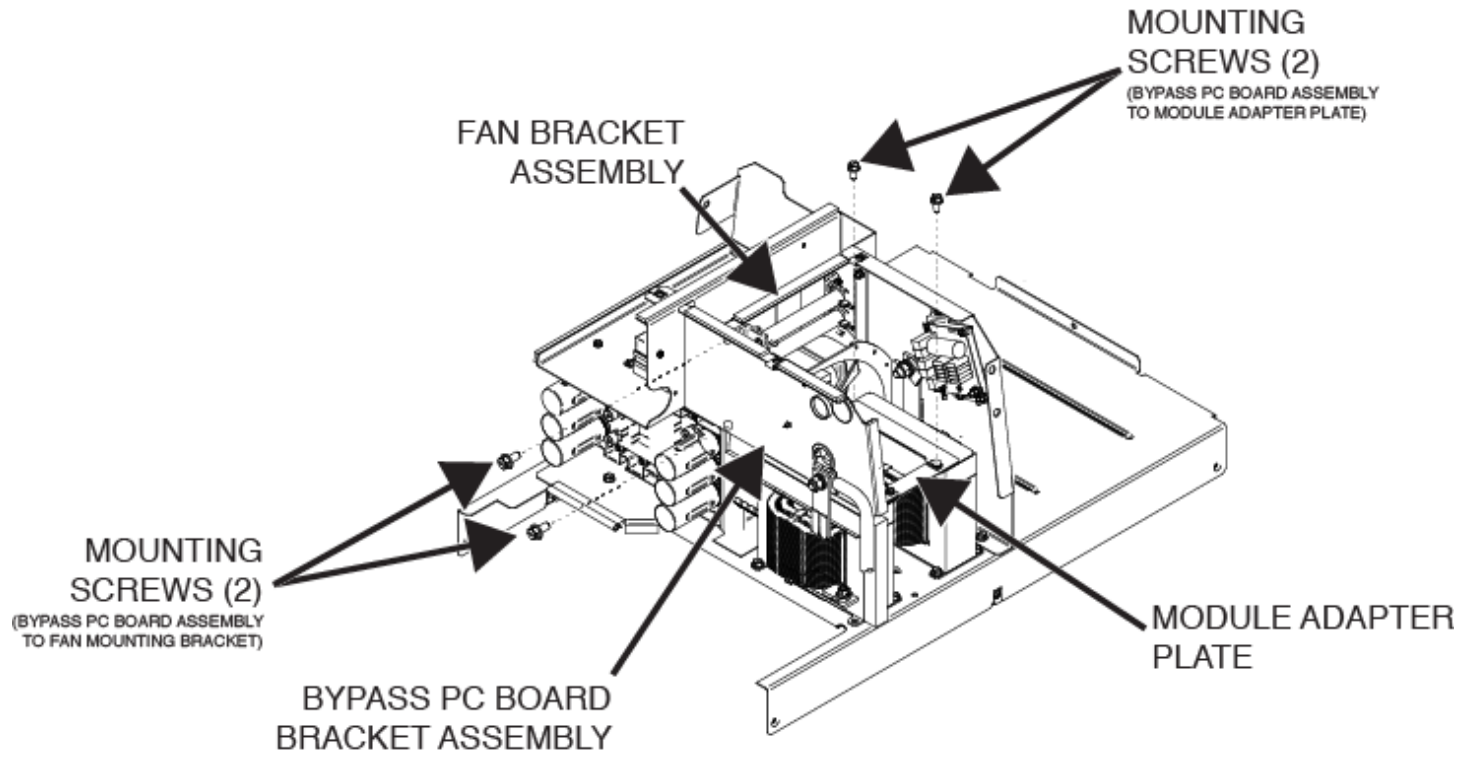


Figure F.88 – Fuel tank baffle mounting nut and washer location

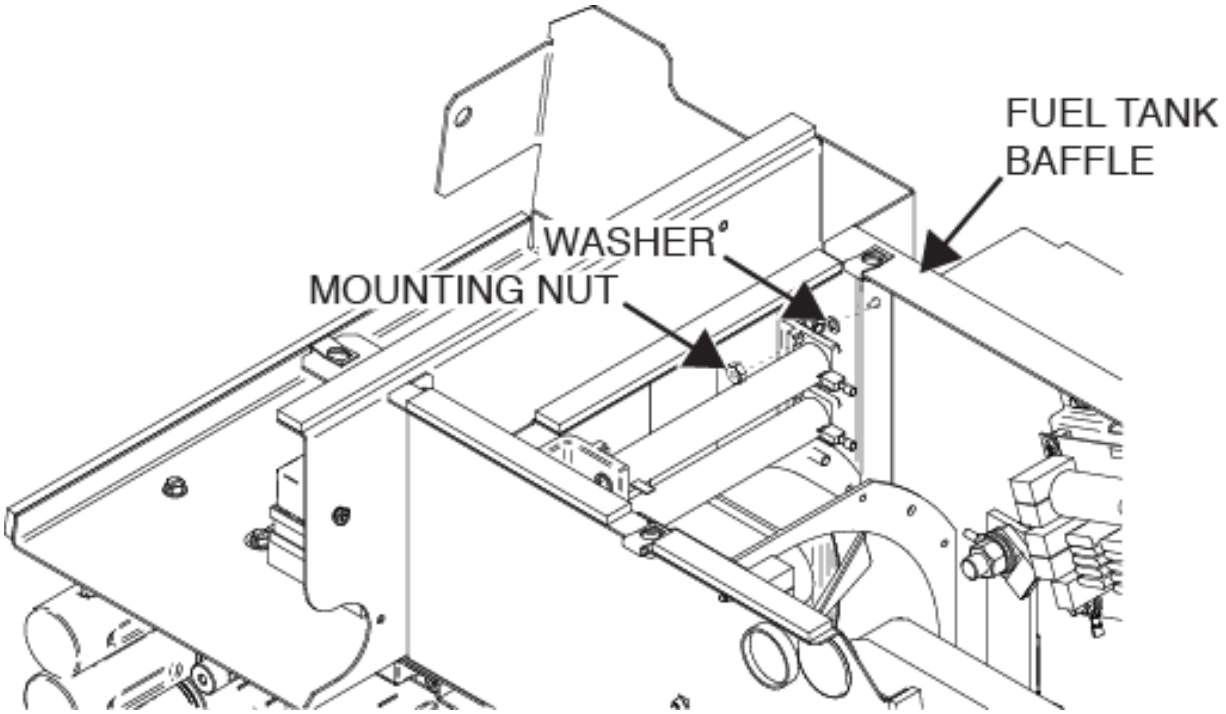
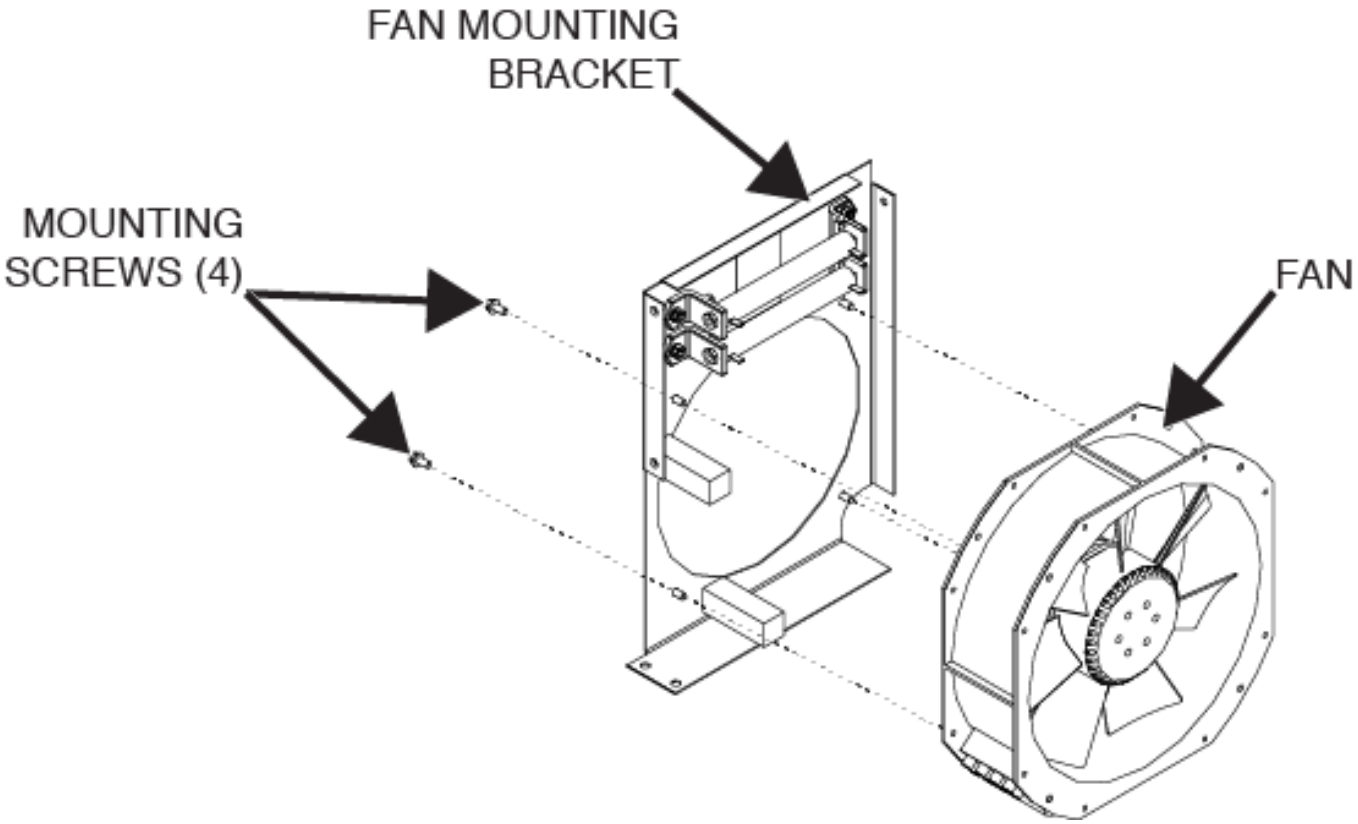


Figure F.89 – Fan removal



MAGNETIC PICKUP SENSOR REPLACEMENT AND 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

This procedure should be followed if a new Magnetic Pickup Sensor is installed or if the existing Magnetic Pickup Sensor requires adjustment.

MATERIALS NEEDED

3/4” Open End Wrench
1” Open End Wrench
Adjustable Wrench
Thread Locking Compound (Loctite #242 or equivalent)
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Open the engine service door. See ***Case Cover Removal Procedure***.
3. Locate the magnetic pickup sensor, in the flywheel housing of the engine. See ***Figure F.90***.
4. Label and disconnect the two wires coming out of the rear of the magnetic pickup sensor. See ***Figure F.91***. See Wiring Diagram.
5. Using a 3/4” open-end wrench and a 1” open-end wrench to hold the bushing in place, loosen the jam nut on the magnetic pickup sensor. See ***Figure F.92***.
6. Using a 1” open-end wrench, remove the bushing from the flywheel housing. See ***Figure F.92***.
7. The magnetic pickup sensor and bushing can now be removed from the machine.

REPLACEMENT PROCEDURE

1. Before installing a new magnetic pickup sensor, clean the threads thoroughly so the magnetic pickup sensor and bushing can be screwed in easily by hand.
2. Carefully apply thread locking compound (Loctite #242 or equivalent) to the bushing and tighten it securely into the flywheel housing opening.
3. Carefully apply thread locking compound (Loctite #242 or equivalent) on the threads of the pickup and place the jam nut on the pickup body, positioning it near the end where the leads exit.
4. Carefully thread the magnetic pickup sensor body into the bushing by hand. Keep turning the magnetic pickup sensor clockwise until it just touches the flywheel.
5. Back the magnetic pickup sensor out 1/4 turn.
6. Using an adjustable wrench, hold the magnetic pickup sensor in place.

7. Using a 3/4” open-end wrench, tighten the jam nut.
8. Connect the two lead wires on the magnetic pickup sensor and replace any cable ties as necessary. See Wiring Diagram.
9. Secure the engine service door. See the ***Case Cover Replacement Procedure***.
10. Perform the ***Retest After Repair Procedure***.

Figure F.90 – Magnetic pickup sensor location

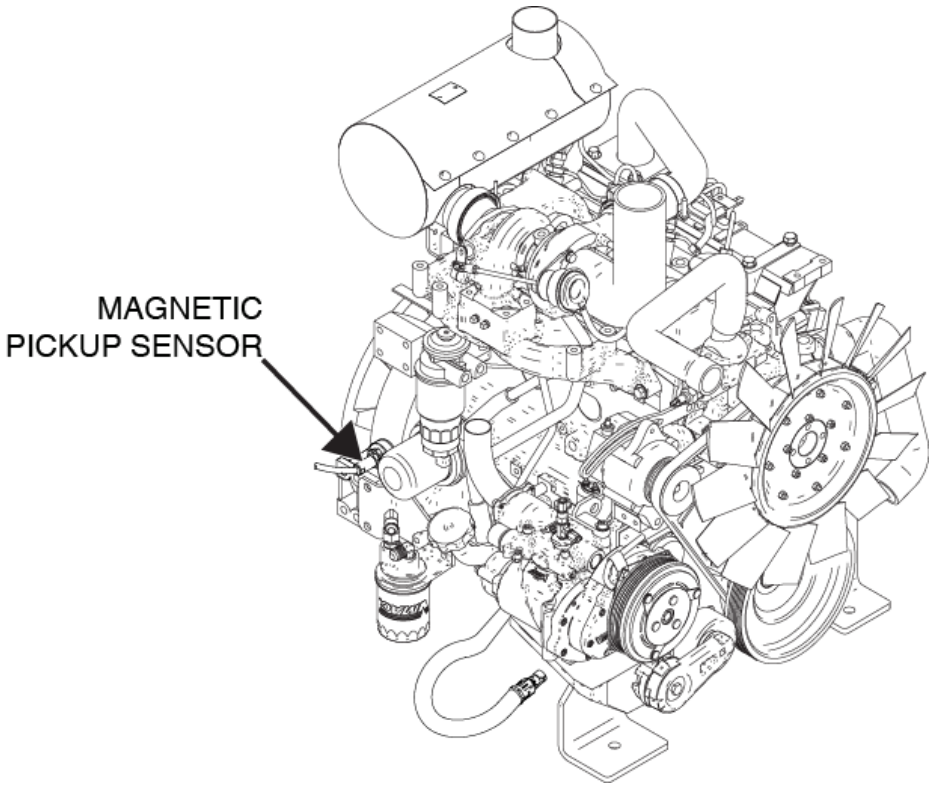


Figure F.91 – Magnetic pickup sensor leads

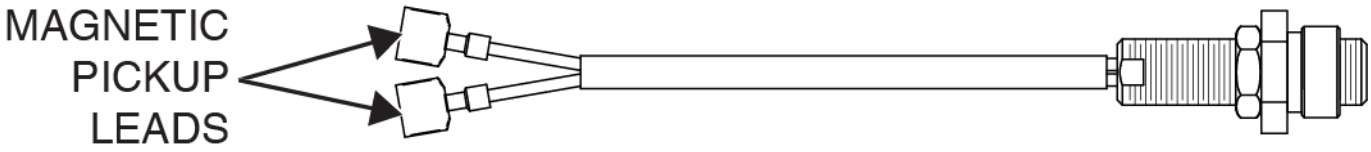
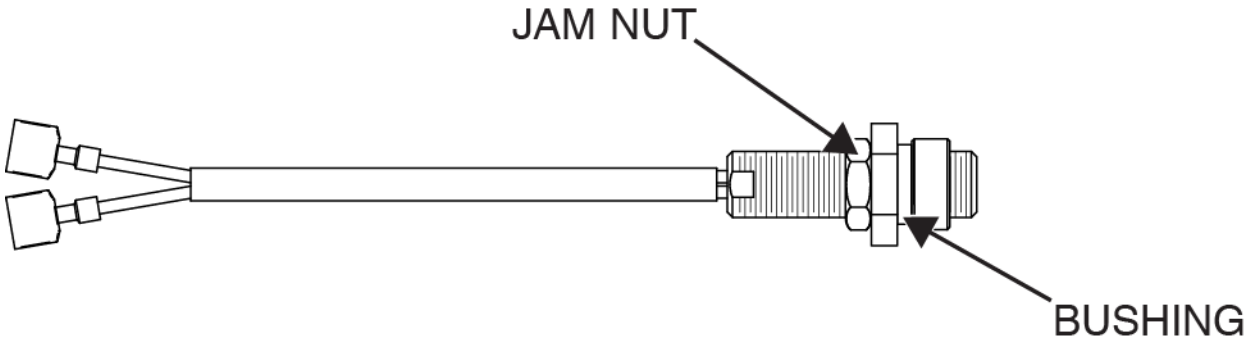


Figure F.92 – Jam nut and bushing location



POWER MODULE / OUTPUT RECTIFIER REMOVAL AND REPLACEMENT PROCEDURE

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

TEST DESCRIPTION

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

NOTE: A number of wires will need to be disconnected and several cable ties will need to be cut to perform this procedure. Carefully check that all wires are clearly marked so they can be correctly reconnected and replace all cable ties when reassembling the machine.

MATERIALS NEEDED

Two 3/4” Open End Wrenches
Two 7/16” Open End Wrenches
3/8” Nutdriver
Utility Knife
Two 9/16” Open End Wrenches
1/2” Nutdriver
7/16” Nutdriver
Slotted Screwdriver
1/2” Socket
Two 1/2” Open End Wrenches
1/2” Wrench
Heat Shrink Wrapping
Cable Ties
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Remove the battery tray and battery from the machine.
4. Perform the ***Chopper Module Capacitor Discharge Procedure***.
5. Perform the ***Chopper Module Removal Procedure***, to remove the two chopper module board assemblies.
6. Perform the ***Fuel Tank Removal Procedure***.

7. Using two 3/4” open-end wrenches, label and disconnect lead 208D and NEG B choke from the top terminal of the front choke assembly. See ***Figure F.93*** and ***Figure F.94***. See Wiring Diagram. Note washer placement for reassembly.
8. Using two 3/4” open-end wrenches, label and disconnect lead 308D and NEG A choke from the top terminal of the rear choke assembly. See ***Figure F.93*** and ***Figure F.95***. See Wiring Diagram. Note washer placement for reassembly.
9. Using two 7/16” open-end wrenches, remove leads 206E and 208E from the bypass PC board assembly 1 (front). See ***Figure F.96*** and ***Figure F.97***. See Wiring Diagram. Note washer placement for reassembly (nut, lock washer, flat washer, lead).
10. Using two 7/16” open-end wrenches, remove leads 306E and 308E from the bypass PC board assembly 2 (rear). See ***Figure F.93*** and ***Figure F.97***. See Wiring Diagram. Note washer placement for reassembly (nut, lock washer, flat washer).
11. Perform the ***Power Module Fan Removal Procedure***.
12. Using a 3/8” nutdriver, remove the four screws securing the module adapter plate from the top of the choke assemblies. See ***Figure F.98***.
13. Using a utility knife, cut away the heat shrink wrapping around the heavy leads at the lower terminals of each choke. See ***Figure F.99***. See Wiring Diagram.
14. Using two 9/16” open-end wrenches, label and disconnect the heavy leads connected to the lower terminal of each choke assembly. See ***Figure F.99***. See Wiring Diagram. Note washer placement for reassembly (bolt, lead, terminal, flat washer, lock washer, nut).
15. Due to variations in design, additional wiring may need to be disconnected and cleared. Carefully check for any additional leads that connect to or run through the power module. Label, disconnect and clear them. See Wiring Diagram.
16. Using a 1/2” nutdriver, remove the three screws securing each choke assembly to the fuel tank shelf. See ***Figure F.100***.
17. The choke assemblies can now be removed from the fuel tank shelf.
    NOTE: The choke assemblies are heavy, use caution when lifting and moving.
18. Using a 7/16” nutdriver, label and disconnect leads 200C, 200D, 201B and 201C from the C1 (Weld) capacitor. See ***Figure F.101***. See Wiring Diagram. Note washer placement for reassembly (nut, lock washer, flat washer, lead).
19. Using a 7/16” nutdriver, label and disconnect leads 201, 201A, 200A and 200B from the C2 (Auxiliary) capacitor. See ***Figure F.101***. See Wiring Diagram. Note washer placement for reassembly (nut, lock washer, flat washer, lead).
20. Using a 1/2” nutdriver, remove the three screws securing the fuel tank baffle to the fuel tank shelf and remove fuel tank baffle. See ***Figure F.100***.
21. Carefully route all wiring through the bottom of the fuel tank shelf to allow for removal of the fuel tank shelf.
22. Cut cable ties as necessary to clear all wiring from the bottom of the fuel tank shelf.
23. Using a slotted screwdriver, remove speed nuts as necessary to allow clearance for the removal of the fuel tank shelf.
24. Using a 1/2” nutdriver, remove the nine screws securing the fuel tank shelf to the machine. See ***Figure F.102***.
25. Remove the fuel tank shelf by lifting the front end upwards and out of the machine.
26. Using a 1/2” socket, remove the two screws securing the upper rectifier mounting bracket to the right baffle. See ***Figure F.105***.

27. Cut any cable ties attached to the rectifier wiring.
28. Using a 7/16” wrench, label and disconnect leads WB4, WB5, WB2, WB3, WB1 and WB6 from the terminals of output rectifier B (front). See ***Figure F.103***. See Wiring Diagram.
29. Using a 1/2” wrench, label and disconnect NEG B lead from the negative terminal of the output rectifier B (front). See ***Figure F.103***. See Wiring Diagram.
30. Using two 1/2” open-end wrenches, label and disconnect lead 206D, POS B and POS B shunt from the positive terminal of output rectifier B (front). See ***Figure F.103***. See Wiring Diagram. Note washer placement for reassembly (nut, lock washer, flat washer, leads, terminal, bolt).
31. Using a 7/16” wrench, label and disconnect leads WA1, WA6, WA2, WA3, WA4 and WA5 from the terminals of output rectifier A (rear). See ***Figure F.104***. See Wiring Diagram.
32. Using a 1/2” wrench, label and disconnect NEG A lead from the negative terminal of the output rectifier A (rear). See ***Figure F.104***. See Wiring Diagram.
33. Using two 1/2” open-end wrenches, label and disconnect lead 306D, POS A and POS A switch from the positive terminal of output rectifier A (rear). See ***Figure F.104***. See Wiring Diagram. Note washer placement for reassembly (nut, lock washer, flat washer, leads, terminal, bolt).
34. Carefully remove the output rectifier assemblies from the machine.
35. Using a 1/2” nutdriver, remove the two nuts and lock washers securing the output rectifier assemblies to the rectifier mounting bracket. See ***Figure F.103***.
36. The output rectifier assemblies can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Using a 1/2” nutdriver, attach the two nuts and lock washers securing each of the output rectifier assemblies to the upper rectifier mounting bracket.
2. Carefully position the rectifier assembly in the machine.
3. Using two 1/2” open-end wrenches, connect leads 306D, POS A and POS A switch to the positive terminal of output rectifier A (rear). See Wiring Diagram. Note washer placement for reassembly (nut, lock washer, flat washer, leads, terminal, bolt).
4. Using a 1/2” wrench, connect NEG A lead to the negative terminal of the output rectifier A (rear). See Wiring Diagram.
5. Using a 7/16” wrench, connect leads WA1, WA6, WA2, WA3, WA4 and WA5 to the terminals of output rectifier A (rear). See Wiring Diagram.
6. Using two 1/2” open-end wrenches, connect leads 206D, POS B and POS B shunt to the positive terminal of the output rectifier B (front). See Wiring Diagram. Note washer placement for reassembly (nut, lock washer, flat washer, leads, terminal, bolt).
7. Using a 1/2” wrench, connect NEG B lead to the negative terminal of the output rectifier B (front). See Wiring Diagram.
8. Using a 7/16” wrench, connect leads WB4, WB5, WB2, WB3, WB1 and WB6 to the terminals of output rectifier B (front). See Wiring Diagram.
9. Replace cable ties as necessary to the rectifier wiring.
10. Using a 1/2” socket, attach the two screws securing the upper rectifier mounting bracket to the right baffle.
11. Carefully position the fuel tank shelf into the machine.
12. Using a 1/2” nutdriver, attach the nine screws securing the fuel tank shelf to the machine.
13. Using a slotted screwdriver, attach the previously removed speed nuts.
14. Carefully route all wiring through the bottom of the fuel tank shelf.

15. Replace cable ties as necessary to secure the wiring to the fuel tank shelf.
16. Carefully position the fuel tank baffle onto the fuel tank shelf.
17. Using a 1/2” nutdriver, attach the three screws securing the fuel tank baffle to the fuel tank shelf.
18. Using a 7/16” nutdriver, connect leads 201, 201A, 200A and 200B to the C2 (Auxiliary) capacitor. See Wiring Diagram. Note washer placement for reassembly (nut, lock washer, flat washer, lead).
19. Using a 7/16” nutdriver, connect leads 200C, 200D, 201B and 201C to the C1 (Weld) capacitor. See Wiring Diagram. Note washer placement for reassembly (nut, lock washer, flat washer, lead).
20. Carefully position the choke assemblies onto the fuel tank shelf.
    NOTE: The choke assemblies are heavy, use caution when lifting and moving.
21. Using a 1/2” nutdriver, attach the three screws securing each choke assembly to the fuel tank shelf.
22. Using two 9/16” open-end wrenches, connect the heavy leads to the lower terminal of each choke assembly. See Wiring Diagram. Note washer placement for reassembly (bolt, lead, terminal, flat washer, lock washer, nut).
23. Replace the heat shrink wrapping around the heavy leads at the lower terminals of each choke. See Wiring Diagram.
24. Using a 3/8” nutdriver, attach the four screws securing the module adapter plate to the top of the choke assemblies.
25. Perform the ***Power Module Fan Replacement Procedure***.
26. Using two 7/16” open-end wrenches, attach leads 306E and 308E to the bypass PC board assembly 2 (rear). See Wiring Diagram. Note washer placement for reassembly (nut, lock washer, flat washer).
27. Using two 7/16” open-end wrenches, attach leads 206E and 208E to the bypass PC board assembly 1 (front). See Wiring Diagram. Note washer placement for reassembly (nut, lead, nut, lock washer, flat washer, lead).
28. Using two 3/4” open-end wrenches, connect lead 308D and the heavy lead to the top terminal of the rear choke assembly. See Wiring Diagram. Note washer placement for reassembly.
29. Using two 3/4” open-end wrenches, connect the lead 208D and NEG B choke to the top terminal of the front choke assembly. See Wiring Diagram. Note washer placement for reassembly.
30. Due to variations in design, additional wiring may need to be connected. Carefully check for any additional leads previously removed that connect to or run through the power module and connect them to the appropriate locations. See Wiring Diagram.
31. Perform the ***Fuel Tank Replacement Procedure***.
32. Perform the ***Chopper Module Replacement Procedure***, to replace the two chopper module boards assemblies.
33. Place the battery tray and battery into the machine.
34. Perform the ***Case Cover Replacement Procedure***.
35. Perform the ***Retest After Repair Procedure***.

Figure F.93 – Choke top terminal and bypass PC board assembly 2 locations

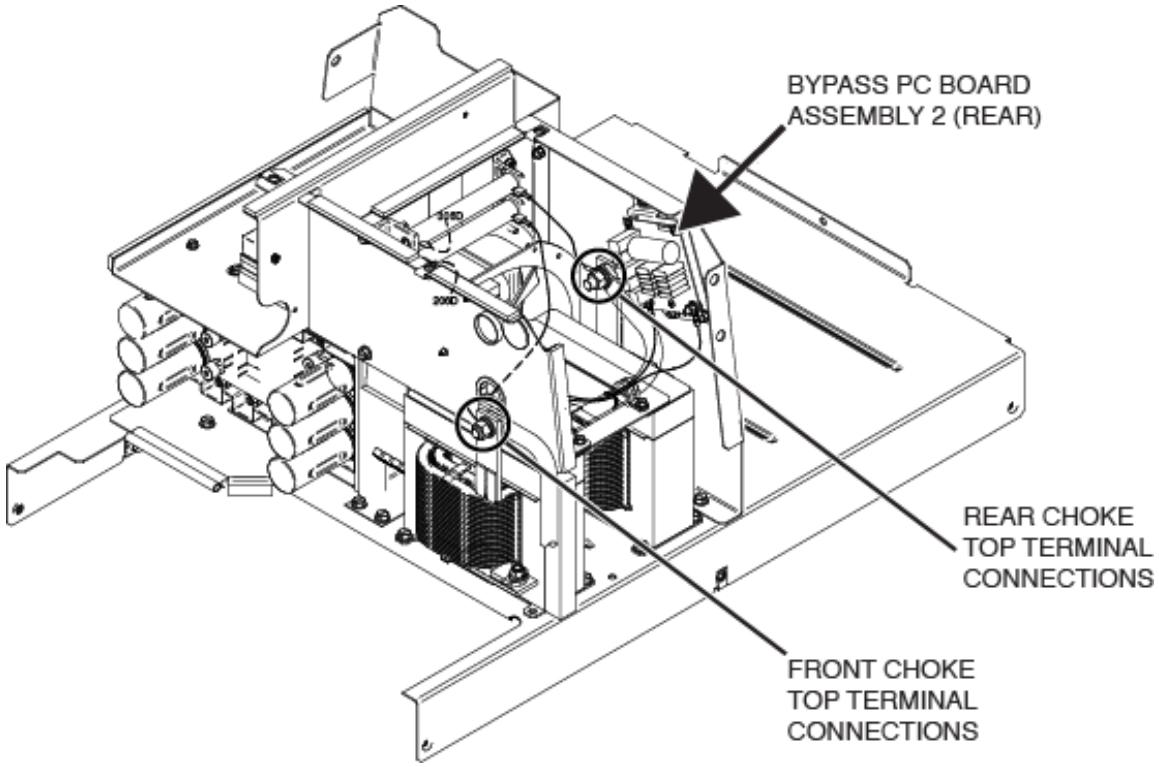


Figure F.94 – Front top choke terminal lead and washer placement

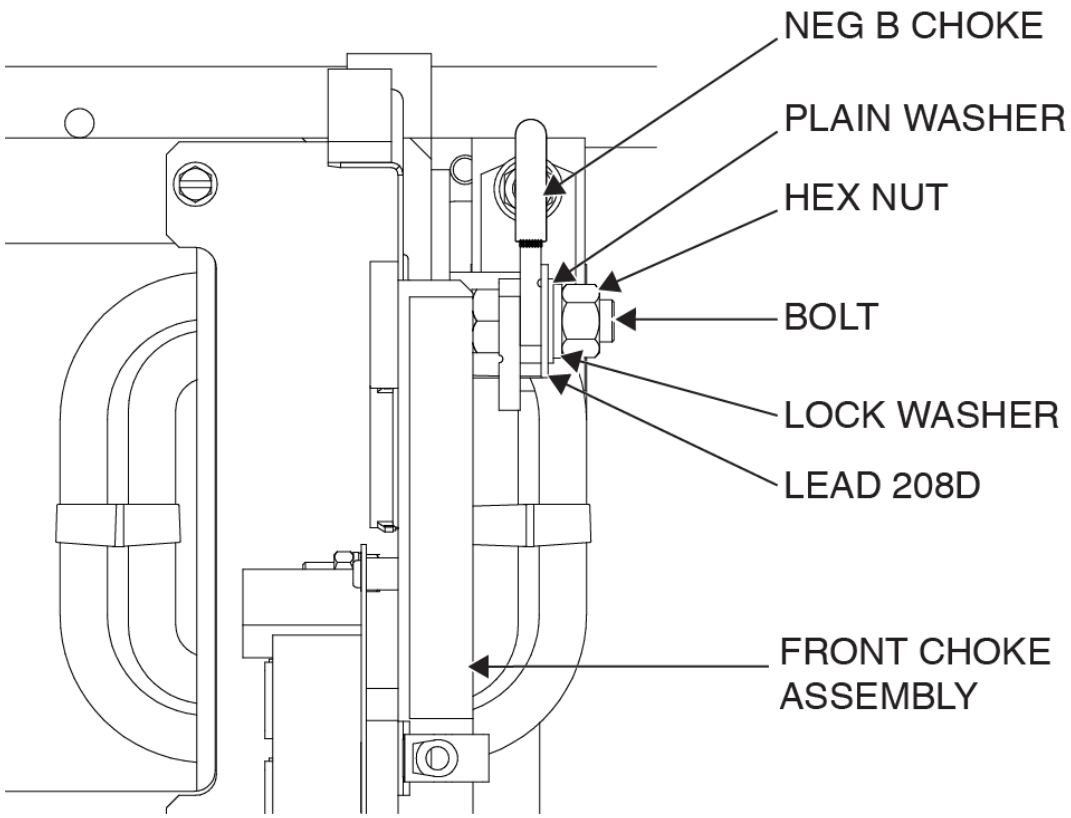


Figure F.95 – Rear top choke lead and washer placement

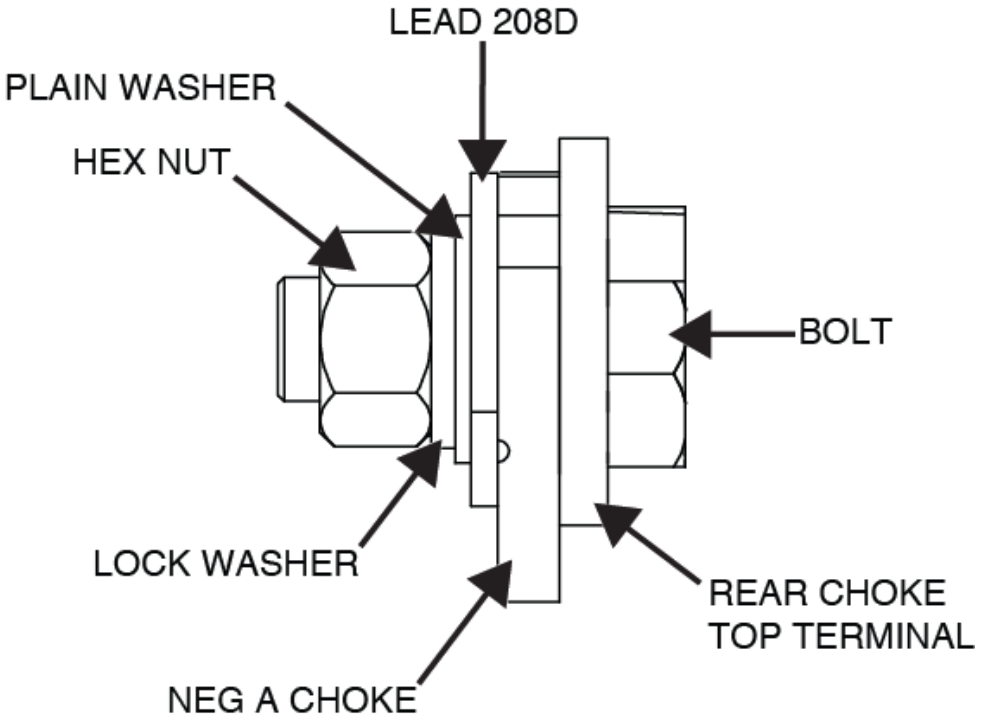


Figure F.96 – Bypass PC board assembly 1 location

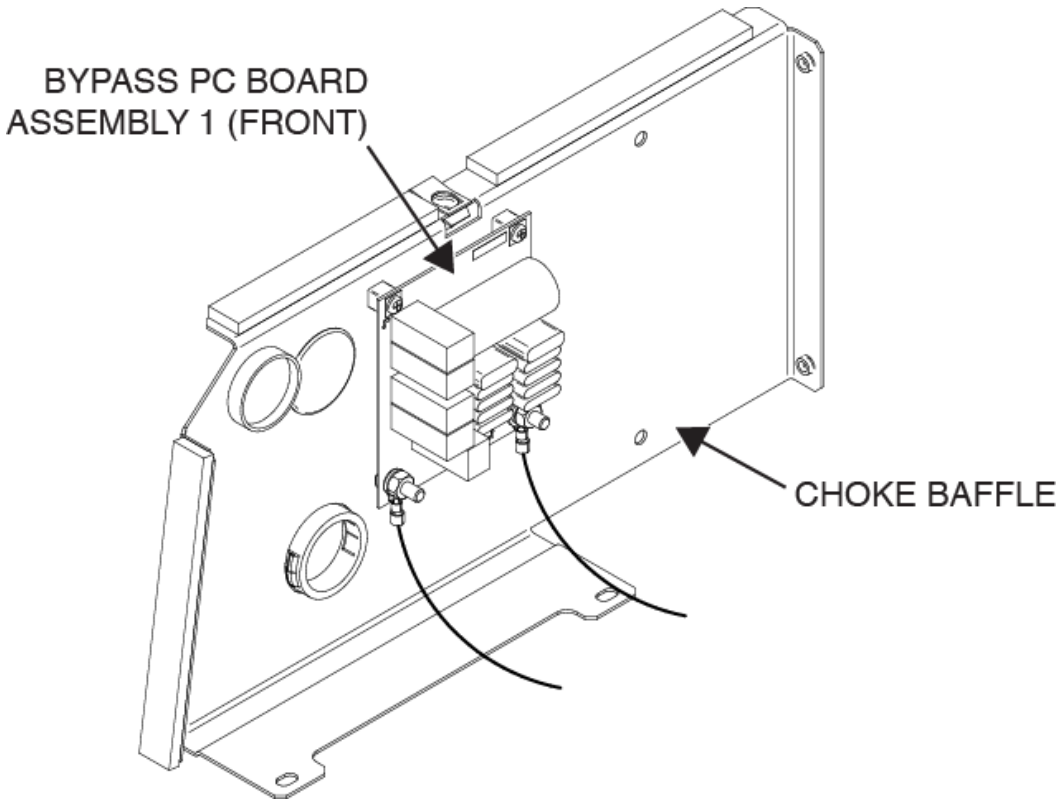


Figure F.97 – Bypass PC board lead locations

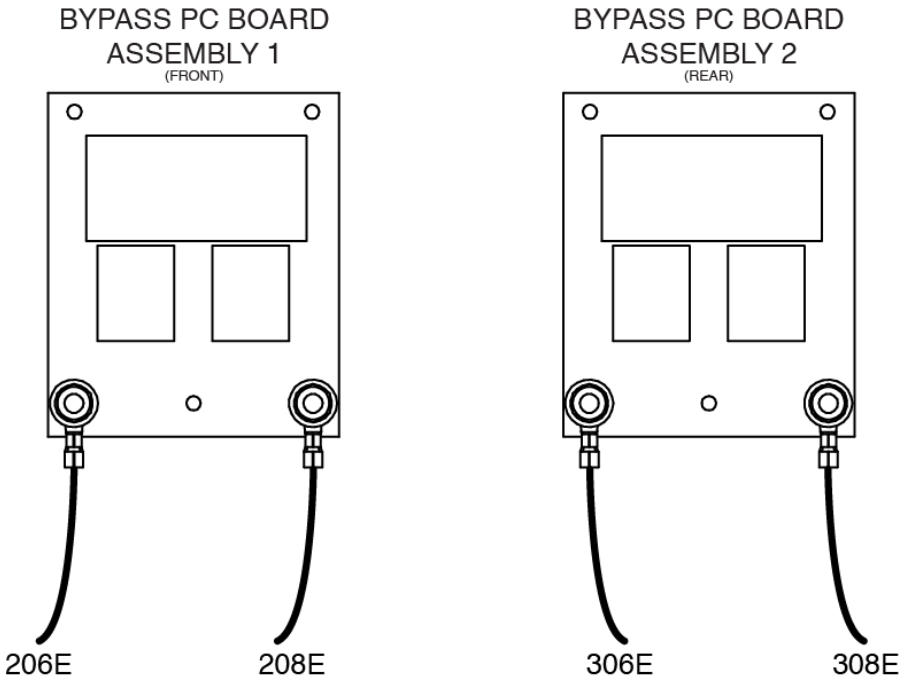


Figure F.98 – Module adapter plate removal

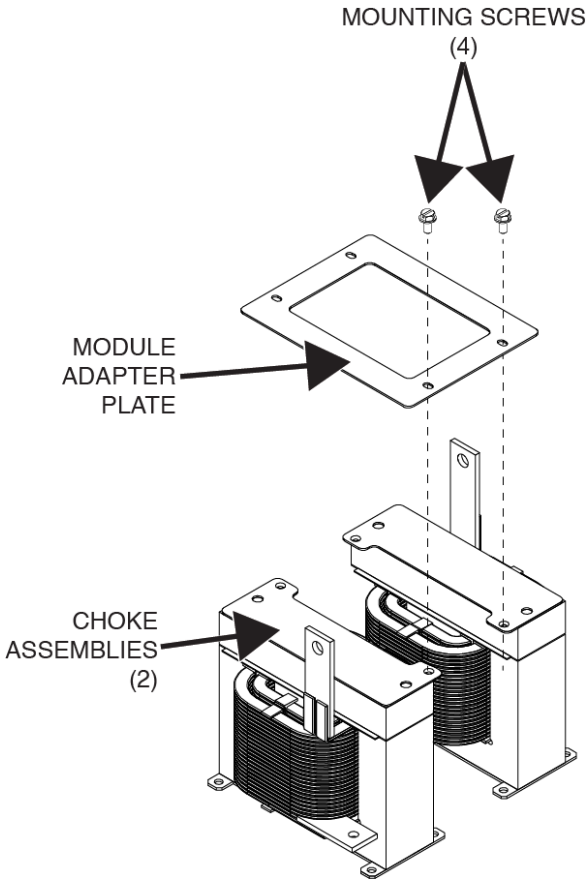


Figure F.99 – Lower choke terminal location

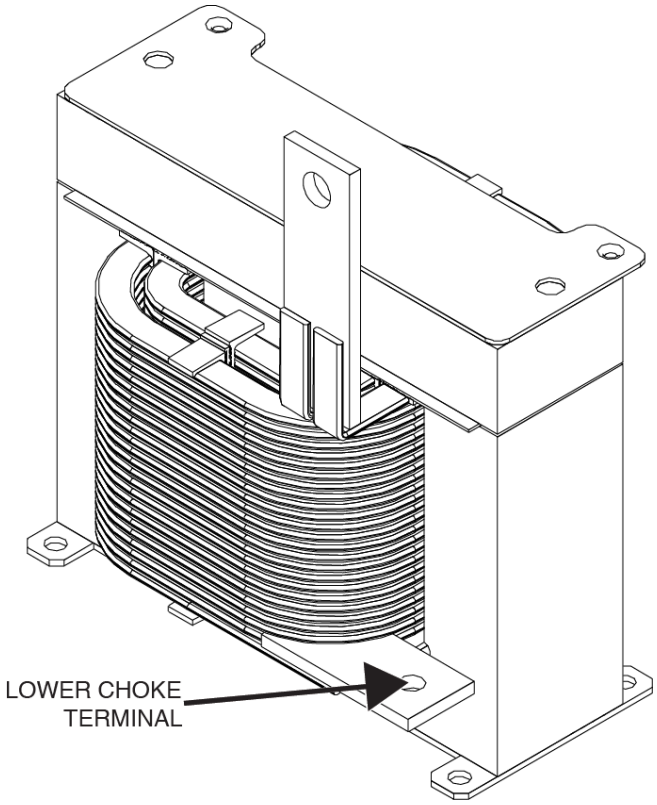


Figure F.100 – Choke and fuel tank baffle removal

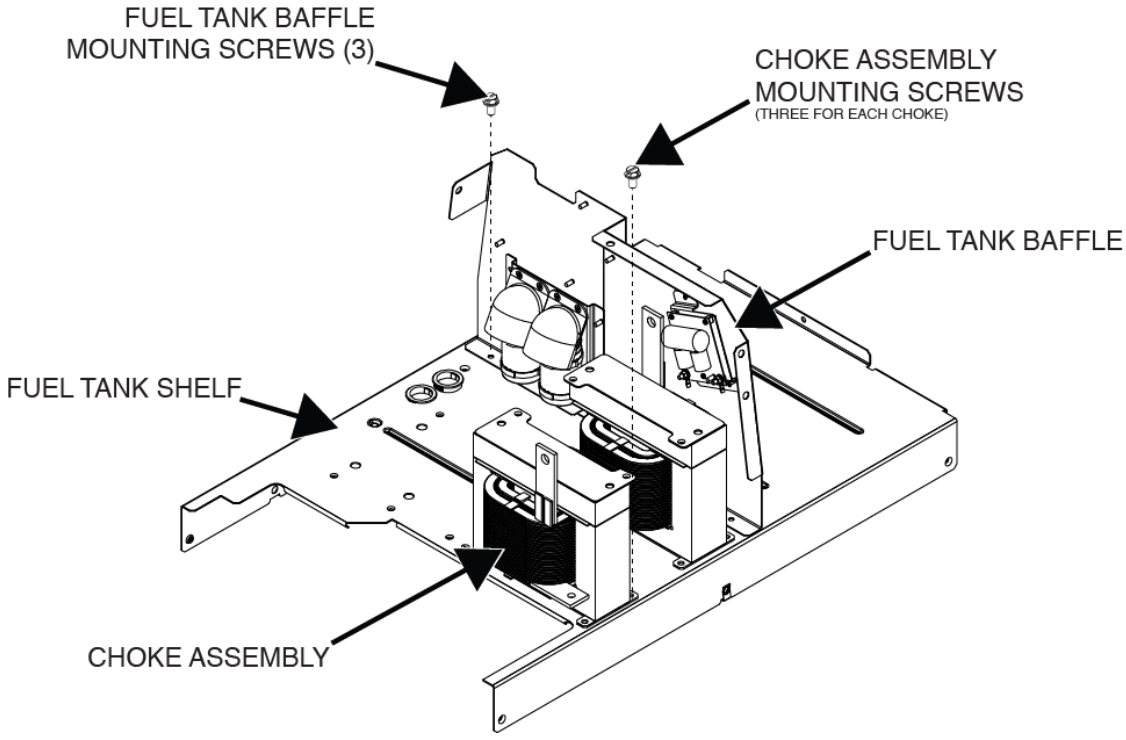


Figure F.101 – Capacitor lead locations

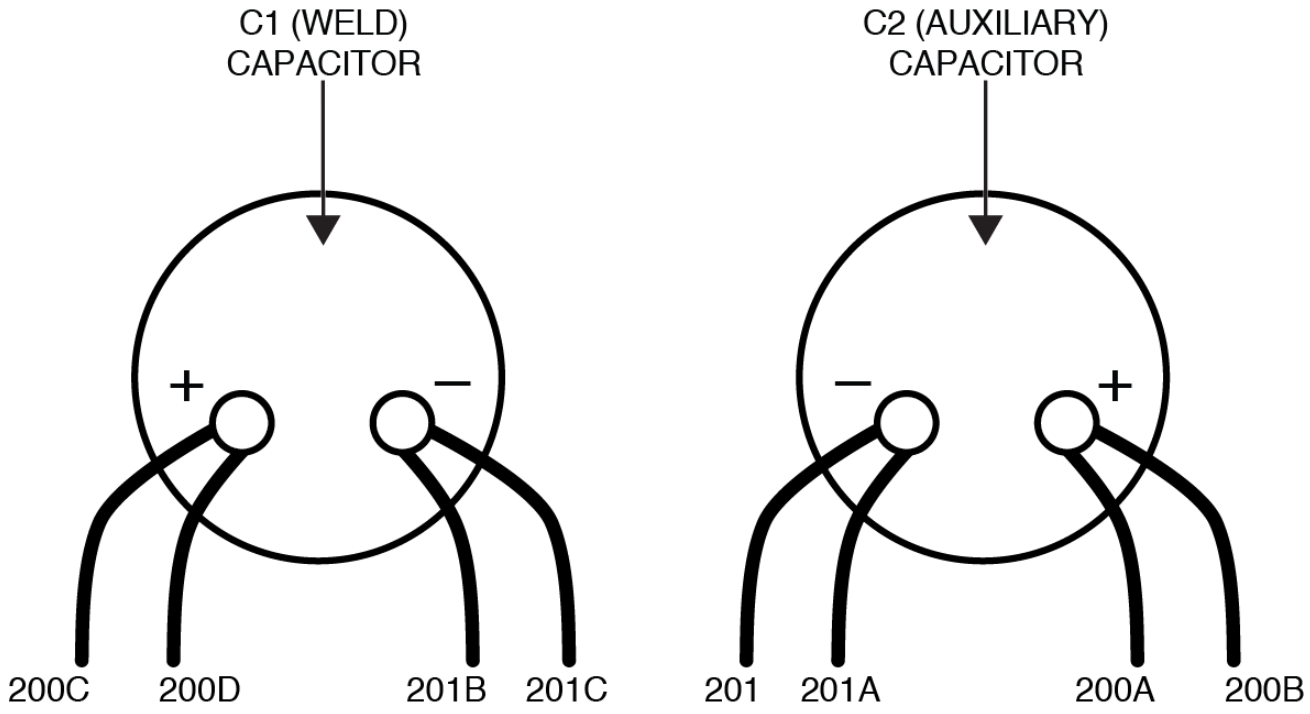


Figure F.102 – Fuel tank shelf location

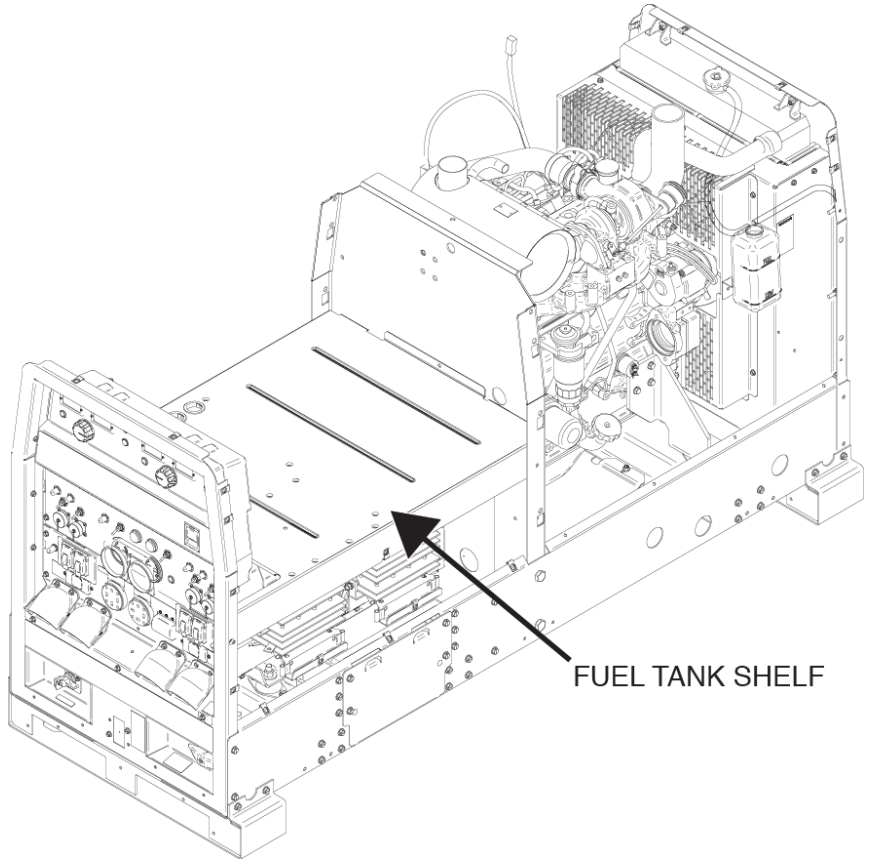


Figure F.103 – Output rectifier B lead locations

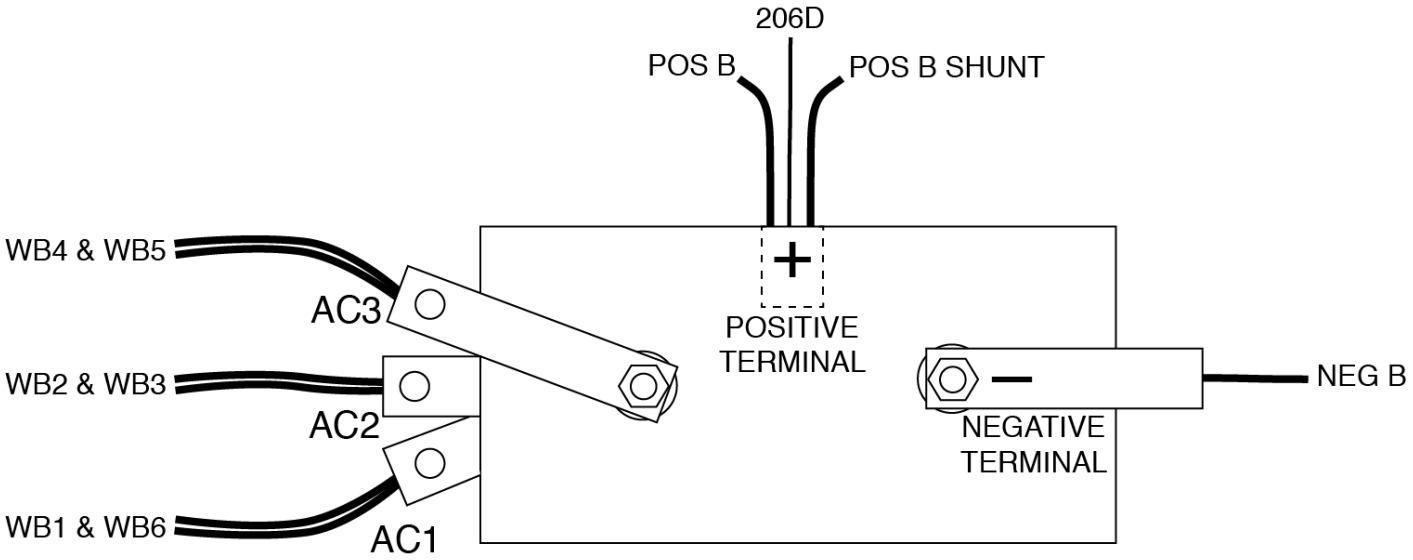


Figure F.104 – Output rectifier A lead locations

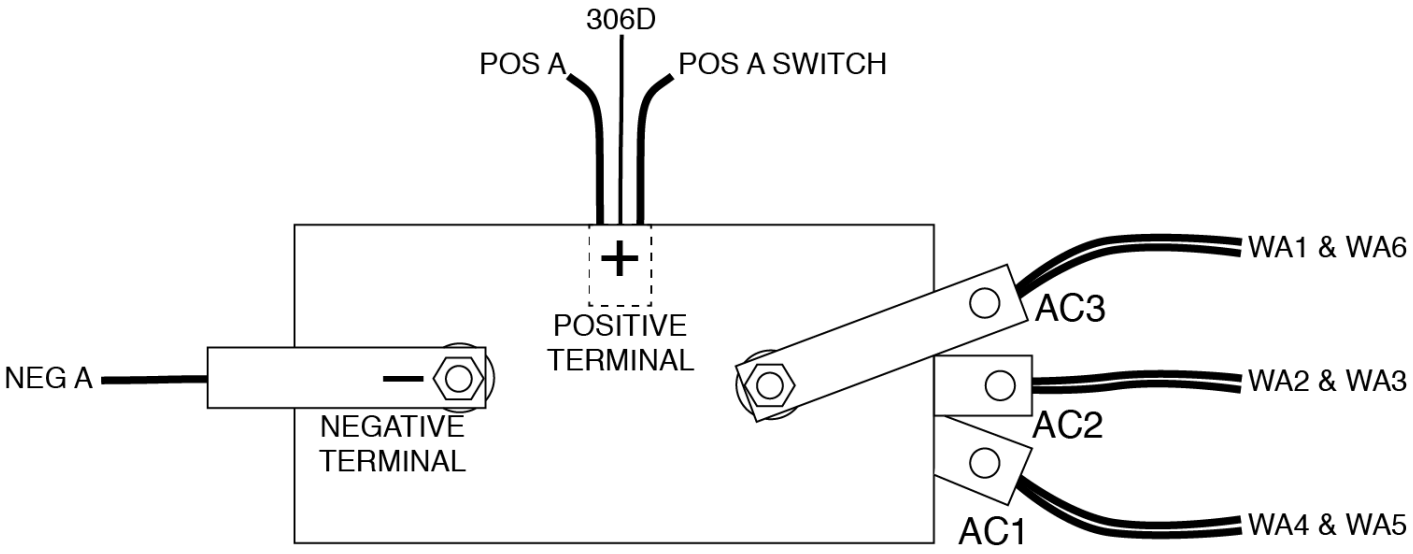
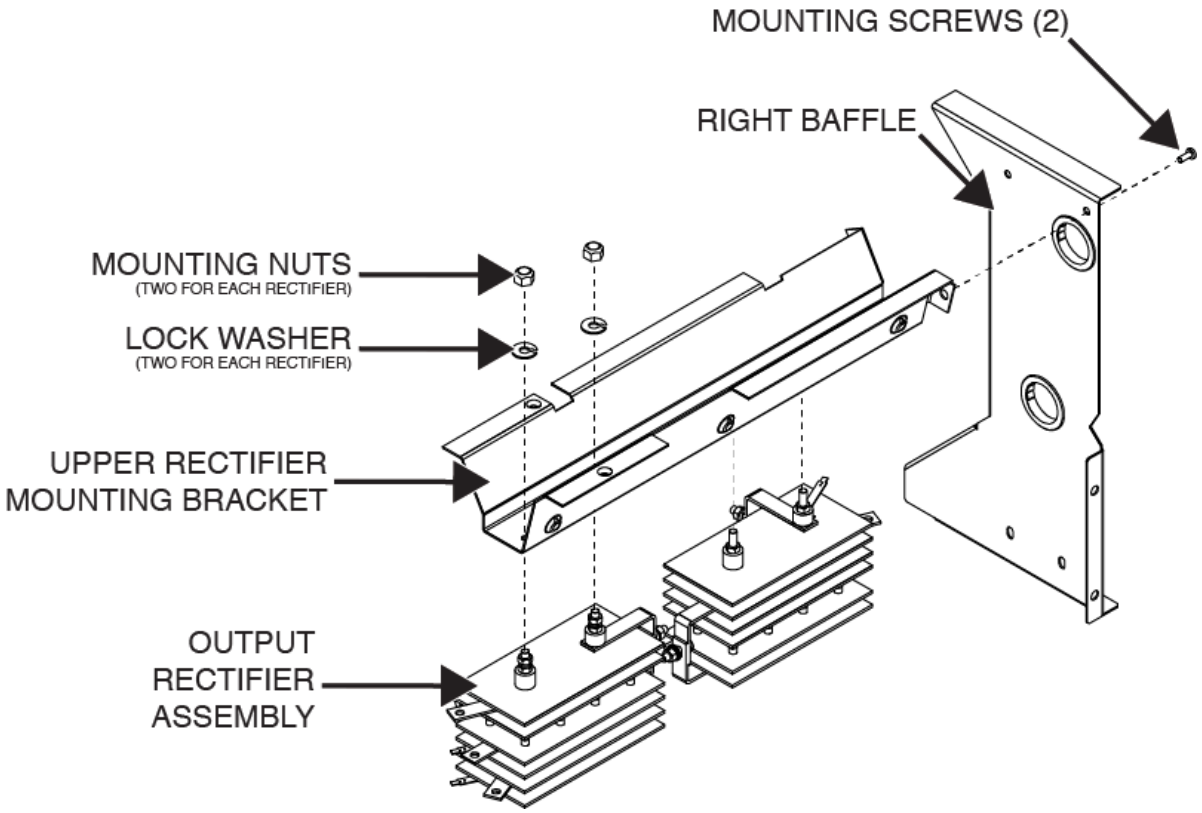


Figure F.105 – Output rectifier removal



OUTPUT 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 Output Selector Switch.

MATERIALS NEEDED

1/2” Nutdriver
Four Pieces of Wood Blocking
1/8” Torx Nutdriver
10mm Nutdriver
Pliers
Two 1/2” Open End Wrenches
Wiring Diagram

REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Perform the ***Case Cover Removal Procedure***.
3. Carefully position two pieces of wood blocking to support the fuel tank shelf during the removal and replacement of the output selector switch. See ***Figure F.106***. **Caution:** the fuel tank shelf will now only be supported by the two wood blocks.
4. Using a 1/2” nutdriver, remove the six screws securing the front panel to the machine. See ***Figure F.106***.
5. Carefully slide the front panel assembly forward off of the machine just enough to allow access to the output selector switch. The front panel assembly will only need to be moved a couple of inches. **NOTE:** Placing two pieces of wood blocking under the front panel will provide support and relieve stress on cables and leads connected to the front panel assembly.
6. Using a 1/8” Torx nutdriver, remove the screw securing the knob to the front of the output selector switch. See ***Figure F.107***.
7. Using a 10mm nutdriver, remove the three screws securing the output selector switch to the front panel. See ***Figure F.107***.
8. Using pliers, remove the roll pin from the shaft of the output selector switch. See ***Figure F.108***.
9. Using two 1/2” open end wrenches, remove the nut and lock washer securing the NEG A choke and POS A switch leads to the right side of output selector switch. Label leads for reassembly. See ***Figure F.109***. See Wiring Diagram.

10. Depress the tabs on the on the output selector switch housing to gain access to the micro switch leads. See ***Figure F.109***. See Wiring Diagram.
11. Label and disconnect leads 232E and 232U from the micro switch. See ***Figure F.110***. See Wiring Diagram.
12. Using two 1/2" open end wrenches, remove the nut and lock washer securing the POS B switch, NEG B switch, POS A shunt, NEG A switch leads to the left side of output selector switch. Label leads for reassembly. See ***Figure F.111***. See Wiring Diagram.
13. The output selector switch can now be removed and replaced.

REPLACEMENT PROCEDURE

1. Carefully position the new output selector switch in the front panel assembly.
2. Using two 1/2" open end wrenches, attach the nut and lock washer securing the POS B switch, NEG B switch, POS A shunt, NEG A switch leads to the left side of output selector switch. See Wiring Diagram.
3. Depress the tabs on the on the output selector switch housing to gain access to the micro switch.
4. Connect leads 232E and 232U to the micro switch. See Wiring Diagram.
5. Using two 1/2" open end wrenches, attach the nut and lock washer securing the NEG A choke and POS A switch leads to the right side of output selector switch. See Wiring Diagram.
6. Using pliers, place the roll pin into the shaft of the output selector switch.
7. Using a 10mm nutdriver, attach the three screws securing the output selector switch to the front panel.
8. Using a 1/8" Torx nutdriver, attach the screw securing the knob to the front of the output selector switch.
9. Carefully place the front panel assembly into position on the machine.
10. Using a 1/2" nutdriver, attach the six screws securing the front panel to the machine.
11. Perform the ***Case Cover Replacement Procedure***.
12. Perform the ***Retest After Repair Procedure***.

Figure F.106 – Front panel mounting screws location and wood blocking position

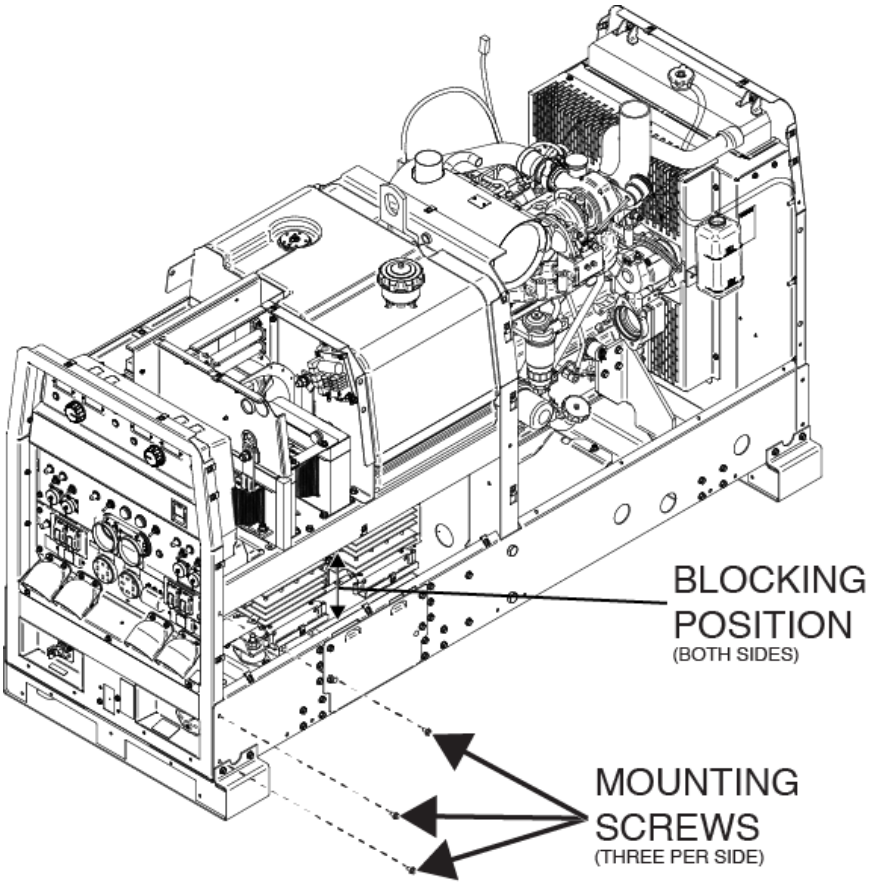


Figure F.107 – Handle and output selector switch mounting screw locations

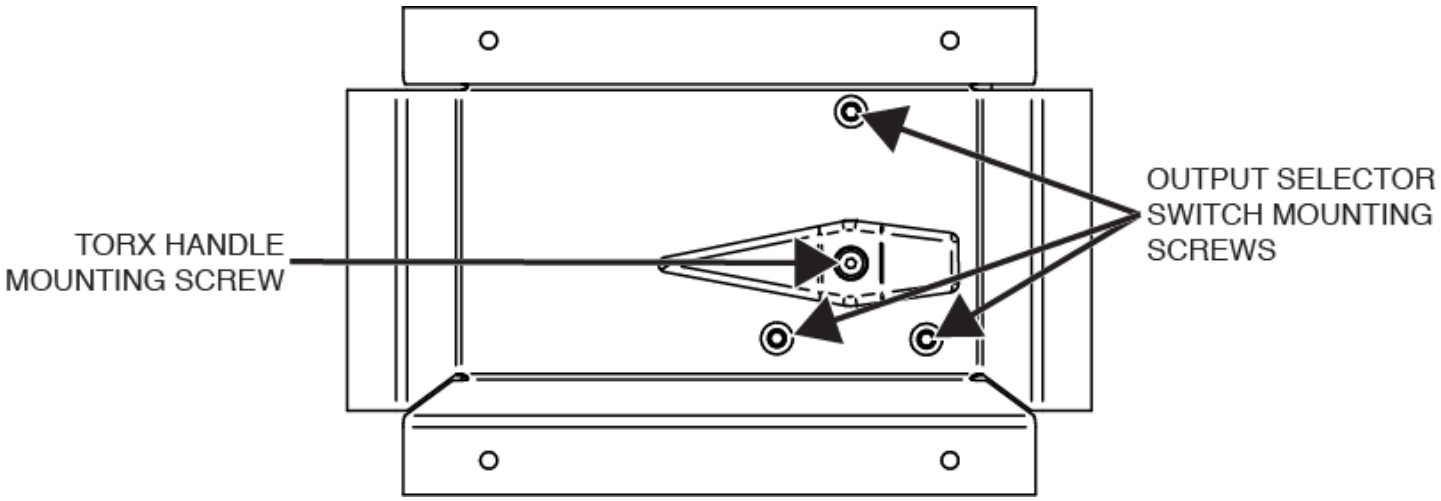


Figure F.108 – Roll pin location

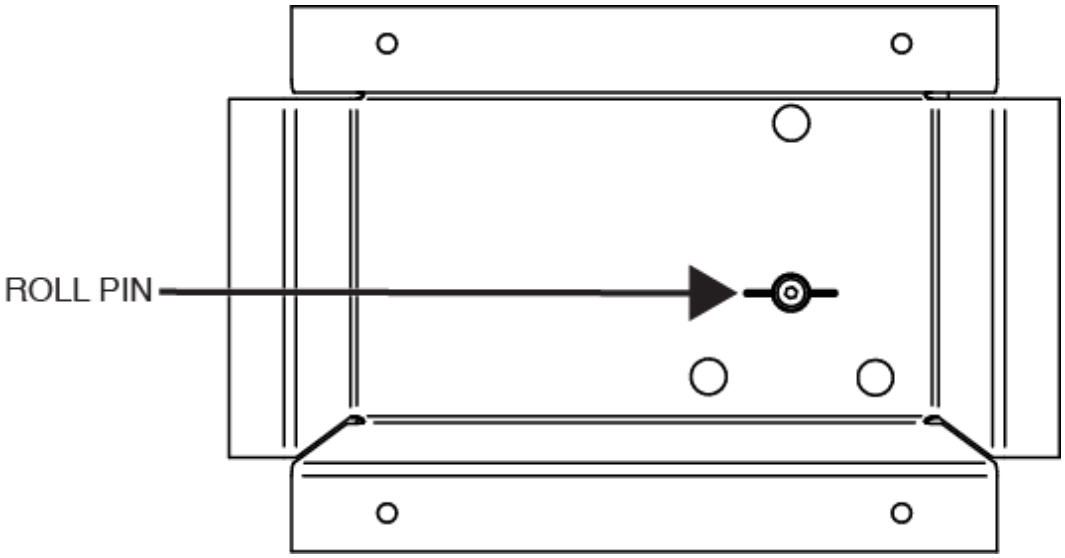


Figure F.109 – Right side lead and housing tab locations

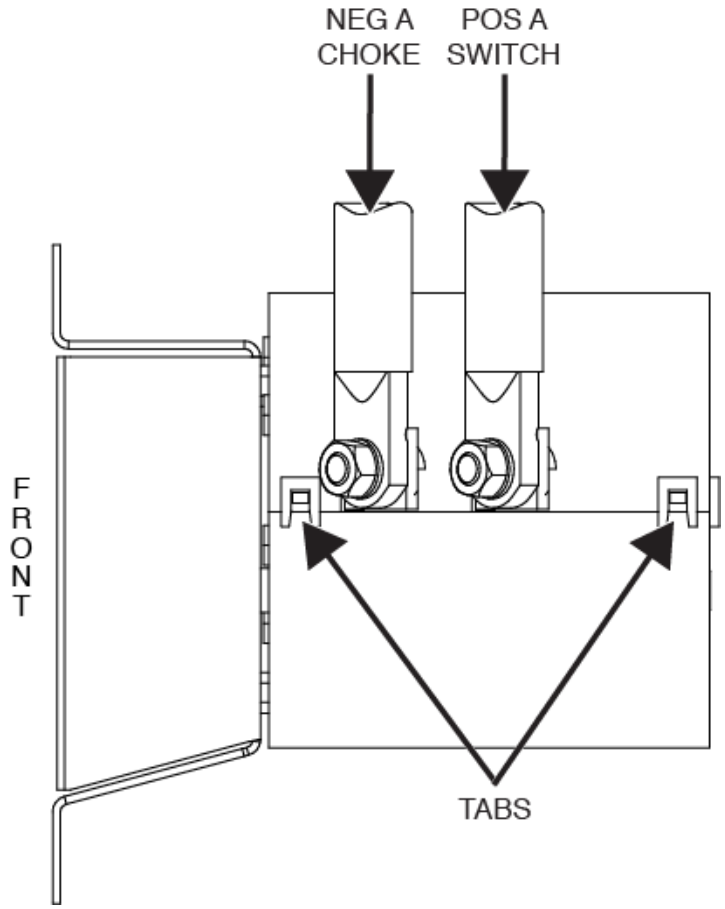


Figure F.110 – Micro switch lead locations

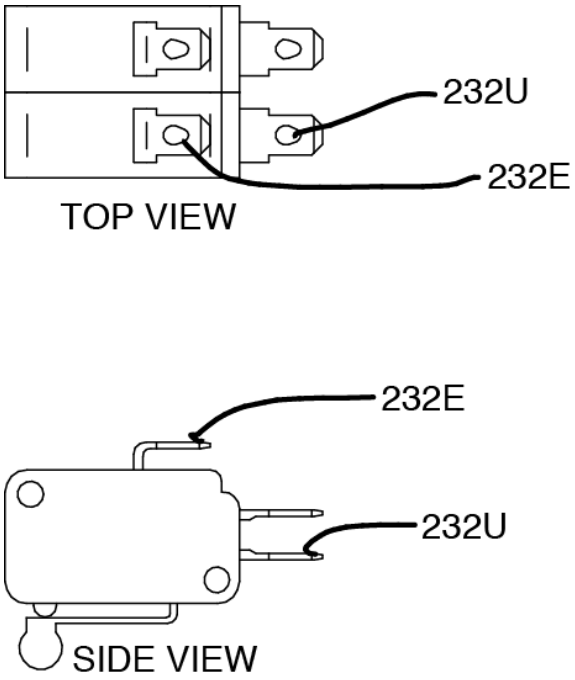
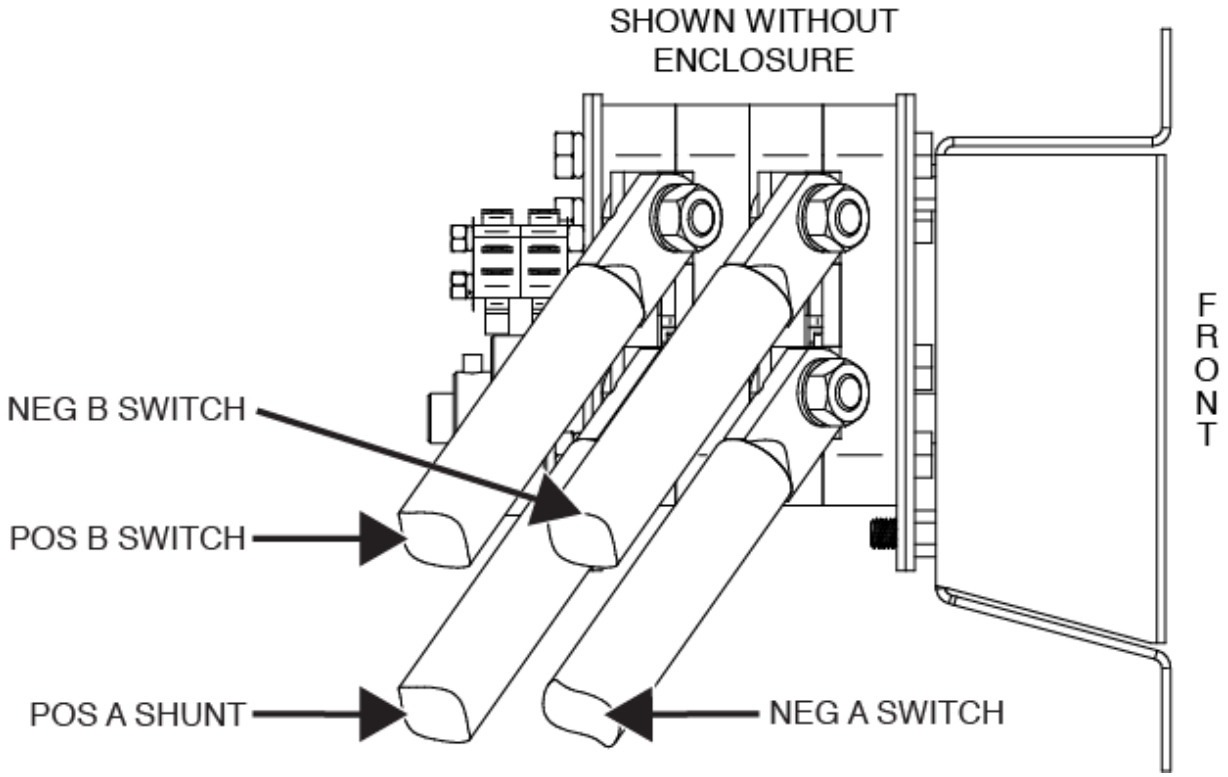


Figure F.111 – Left side lead locations



ROTORS AND STATORS 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 Rotors and Stators. This procedure requires that a substantial number of wires and cables be removed. Be certain all leads and cables are clearly marked before removal so they can be quickly and accurately reconnected. Also note the arrangement of the hardware and cables. The heavy cables and hardware will need to be arranged exactly as they were before they were disconnected.

Torque Specifications:

Screws for the blower paddle assemblies, coupling to engine flywheel, weld stator to engine and auxiliary stator to weld stator: **28 Ft Lbs.** (Tighten bolts in an alternating pattern).
Auxiliary rotor through bolt: **58 to 62 ft-lbs.** (use high strength thread locking compound).
Shaft coupling to weld rotor shaft: **201 to 210 ft-lbs.** (use high strength thread locking compound).
Stator and engine mounting nuts (1/2-13): **38 ft-lbs.**

MATERIALS NEEDED

Wood or Metal Blocks
7/16” Nutdriver
1/2” Nutdriver
3/8” Nutdriver
Two 1/2” Open End Wrenches
Two 3/4” Open End Wrenches
Slotted Screwdriver
1” Wrench
9/16” Nutdriver
5/16” Nutdriver
3/4” Socket
Hoist and rigging
11/16” Socket
Rotor removal tool, Lincoln Electric part number: S20925
Heavy-duty snap ring tool with 90 deg. tips.
Two jaw or bolt on type Gear Puller
1/2” Allen Wrench
Torque Wrench
High Strength Thread Locking Compound

Grease (Chevron SRI or Equivalent)
Feeler gage .010” thick, .50” wide, 12” long (for checking rotor/stator air gap)

REMOVAL PROCEDURE

1. Turn off the Dual Vantage 700 machine.
2. Place the machine on a flat surface and use wood or metal blocks to fully and evenly support the base and permit access to the large holes in the bottom of the base, just below the alternator rubber mounts.
3. Perform the ***Case Cover Removal Procedure***.
4. Remove the battery assembly out of the machine.
5. Using a 7/16” nutdriver, remove the two nuts from the carriage bolts securing the battery bracket. See ***Figure F.112***.
6. Using a 1/2” nutdriver, label and disconnect the positive battery leads from the positive battery terminals. See ***Figure F.112***. See Wiring Diagram.
7. Remove the battery from the battery tray. See ***Figure F.112***.
8. Using a 1/2” nutdriver, attach the four screws securing the battery tray to the machine. See ***Figure F.112***. The battery tray provides additional support to the machine base.
9. Perform the ***Chopper Module Capacitor Discharge Procedure***.
10. Perform the ***Fuel Tank Removal Procedure***.
11. Perform the ***Power Module / Output Rectifier Removal Procedure***.
12. Using a 3/8” nutdriver, remove the two screws securing the brush cover from the weld alternator rotor (closest to the engine). See ***Figure F.113***.
13. Using a 3/8” nutdriver, remove the two screws securing the brush cover from the auxiliary alternator rotor (farthest from the engine). See ***Figure F.114***.
14. To allow for the removal of the stator and rotor assemblies the case front assembly must be removed from the machine.
15. Using two 1/2” open-end wrenches, label and disconnect leads POS B shunt and POS B switch from the shunt on the rear of the left positive output terminal. See ***Figure F.115***. See Wiring Diagram. Note washer placement for reassembly (nut, lock washer, flat washer, lead, mounting point, bolt).
16. Using two 1/2” open-end wrenches, label and disconnect leads NEG B choke, NEG B switch, 208B and 208A from the left negative output terminal. See ***Figure F.115***. See Wiring Diagram.
17. Using two 1/2” open-end wrenches, label and disconnect leads POS A shunt, 304S and 306S from the shunt on the rear of the right side positive output terminal. See ***Figure F.115***. See Wiring Diagram.
18. Using two 3/4” open-end wrenches, label and disconnect NEG A switch, 308, 308D and 308A from the rear of the right negative output terminal. See ***Figure F.115***. See Wiring Diagram.
19. Using a slotted screwdriver, remove the screw and washer securing the lockout switch handle and remove the handle. See ***Figure F.115***.
20. Using a 1” wrench, remove the nut and washer securing the master disconnect to the front panel assembly. See ***Figure F.115***.
21. Carefully slide master disconnect assembly off of its mounting plate.
22. Using a 9/16” nutdriver, label and disconnect the #5 chassis ground lead, both #238 leads, positive and negative battery leads from the rear of the master disconnect. See ***Figure F.116***. See Wiring Diagram.

23. Using two 1/2” open-end wrenches remove the nut and lock washer securing each of the six leads attached to the output selector switch. See ***Figure F.117*** and ***Figure F.118***. See Wiring Diagram.
24. Label and disconnect leads NEG A choke and POS A switch from the right side of the output selector switch. See ***Figure F.117***. See Wiring Diagram.
25. Label and disconnect leads POS B switch, NEG B switch, POS A shunt and NEG A switch from the left side of the output selector switch. See ***Figure F.118***. See Wiring Diagram.
26. Label and disconnect leads connected to the control panel and case front assembly to allow for the removal of the case front assembly. Cut cable ties as necessary. See Wiring Diagram. There are a large number of leads and it is crucial that all leads are reconnected and routed in the same manner as they were originally installed.
    NOTE: Leads mounted to the posts on the rear of the control panel must be reattached in the same order as they were removed.
27. Using a 1/2” nutdriver, remove the four screws securing the case front assembly. See ***Figure F.119***.
28. The case front assembly can now be carefully removed and set aside.
29. Carefully route all wiring to the sides of the machine so it does not get damaged when removing components from the machine.
30. Unplug the CR3 idle relay to gain access to the mounting screw. See ***Figure F.120***. See Wiring Diagram.
31. Using a 5/16” nutdriver, remove the screw securing the CR3 idle relay to the left baffle. See ***Figure F.120***.
32. Plug the CR3 idle relay back into the mounting harness.
33. Unplug the CR4 engine protection relay to gain access to the mounting screw. See ***Figure F.120***. See Wiring Diagram.
34. Using a 5/16” nutdriver, remove the screw securing the CR4 engine protection relay to the left baffle. See ***Figure F.120***.
35. Plug the CR4 engine protection relay back into the mounting harness.
36. Unplug the CR6 temp relay to gain access to the mounting screw. See ***Figure F.120***. See Wiring Diagram.
37. Using a 5/16” nutdriver, remove the screw securing the CR6 temp relay to the left baffle. See ***Figure F.120***.
38. Plug the CR6 temp relay back into the mounting harness.
39. Route any wiring running through the left and right baffles to allow the baffles to be removed. Cut cable ties as necessary.
40. Using a 1/2” nutdriver, remove the four screws securing the left baffle to the machine. See ***Figure F.121***.
41. Using a 1/2” nutdriver, remove the two screws securing the right baffle to the machine. See ***Figure F.121***.
42. The left and right baffles can now be removed and set aside.
43. Route any cables and wiring through the lift frame assembly to allow for removal of the lift frame assembly.
44. Using two 3/4” open-end wrenches, remove the four bolts securing the lift frame assembly to the machine. See ***Figure F.121***. Note washer placement for reassembly (nut, lock washer, panel, bolt).
45. The lift frame assembly can now be carefully removed and set aside.
46. Label and disconnect plugs J31 and J32 from the electronic engine speed governor. See ***Figure F.122***. See Wiring Diagram.

47. Using a 3/8” nutdriver, remove the two screws securing the electronic engine speed governor to the machine and remove the electronic engine speed governor. See ***Figure F.122***.
48. Label and disconnect leads 200D and 201B from the weld brush terminals. See ***Figure F.123***. See Wiring Diagram.
49. Label and disconnect leads 200B and 201 from the auxiliary brush terminals. See ***Figure F.124***. See Wiring Diagram.
50. Using a 3/8” nutdriver, remove the two screws securing the weld brush holder to the machine. See ***Figure F.125***.
51. Using a 3/8” nutdriver, remove the two screws securing the auxiliary brush holder to the machine. See ***Figure F.125***.
52. Using a 3/8” nutdriver, remove the seven screws securing the top auxiliary stator cowling. See ***Figure F.126***.
53. Carefully move any cables or wiring as necessary to allow for the removal of the top auxiliary stator cowling.
54. Carefully remove the top auxiliary stator cowling and set aside.
55. Using a 1/2” nutdriver, remove the nine screws securing the top weld stator cowling. See ***Figure F.126***.
56. Using a 3/8” nutdriver, remove the three screws securing the top weld stator cowling. See ***Figure F.126***.
57. Carefully move any cables or wiring as necessary to allow for the removal of the top weld stator cowling.
58. Carefully remove the top weld stator cowling and set aside.
59. Using a 3/8” nutdriver, remove the two screws securing the bottom auxiliary stator cowling. See ***Figure F.126***.
60. Using a 1/2” nutdriver, remove the three screws securing the bottom weld stator cowling. See ***Figure F.126***.
61. Using a 3/8” nutdriver, remove the three screws securing the bottom weld stator cowling. See ***Figure F.126***.
62. Using a 3/4” socket and a 3/4” open end wrench, remove the four lock nuts, bolts, flat washers and engine support washers securing the generator assembly to the rubber mounts. See ***Figure F.127***. These bolts can be accessed through the large holes in the base of the machine. Note washer placement for reassembly.
63. Using a hoist and appropriate rigging, carefully lift the generator assembly slightly above the rubber mounts to allow for the removal of the bottom stator cowlings. See ***Figure F.127***.
    NOTE: When lifting the generator assembly do not lift any higher than necessary as this may cause damage to the components on the rear of the engine assembly.
64. With the generator assembly lifted, carefully route any cables and/or wiring to allow for the removal of the bottom stator cowlings.
65. Carefully remove the auxiliary and weld bottom stator cowlings and set aside.
66. Using wood or metal blocks, support the end of the engine. The blocks only need to be high enough to take the weight off of the rubber mounts.
67. Using a hoist and appropriate rigging, carefully lower the generator assembly so it is resting just above the rubber mounts.

AUXILIARY STATOR REMOVAL

68. Using a hoist and appropriate rigging, securely support the auxiliary stator tie bar assembly.
69. Using a 11/16" socket, remove the eight bolts and lock washers securing the auxiliary stator tie bar assembly mounting flange to mating flange on the weld stator tie bar assembly. See ***Figure F.128***.
70. Using the hoist adjusted to support the weight of the auxiliary stator tie bar assembly, use a gear puller to remove the auxiliary stator tie bar assembly off of the auxiliary rotor bearing. See ***Figure F.128***.
71. Using the hoist, raise or lower the stator tie bar assembly as necessary while gently pulling it off of the auxiliary rotor assembly and away from the weld stator tie bar assembly. Be very careful not to damage either the stator or rotor windings while separating the two parts. See ***Figure F.128***.
72. Using the hoist, carefully place the auxiliary stator tie bar assembly in a safe location.

AUXILIARY ROTOR REMOVAL

73. Using the hoist and appropriate rigging, support the auxiliary rotor assembly. See ***Figure F.129***.
74. Using a 9/16" socket, remove the through bolt, lock washer and centering washer from the auxiliary rotor. See ***Figure F.129***.
75. Using the rotor removal tool, following the instructions supplied with the rotor removal tool, separate the auxiliary rotor shaft from the weld rotor shaft. See ***Figure F.129***.
76. Using the hoist, place the auxiliary rotor assembly in a safe location.

WELD STATOR REMOVAL

77. Using the hoist and appropriate rigging, support the weight of the weld stator tie bar assembly. See ***Figure F.130***.
78. Using a heavy-duty angled snap ring tool, remove the retaining ring from the rear side (closest to the engine) of the weld stator bearing housing. The retaining ring will remain on the shaft of the weld alternator rotor. See ***Figure F.130***.
79. Using a 11/16" socket, loosen the eight bolts and washers securing the weld stator tie bar assembly to the engine mounting flange. Do not fully remove the mounting bolt at this point. See ***Figure F.130***.
80. Using a gear puller, carefully pull the weld alternator stator tie bar assembly off of the bearing. See ***Figure F.130***.
81. Using a hoist, raise or lower the weld stator tie bar assembly while gently pulling it off of the weld rotor assembly and away from the engine. Be very careful not to damage either the stator or rotor windings while separating the two parts. See ***Figure F.130***.
82. Using the hoist, place the weld stator tie bar assembly in a safe location.

WELD ROTOR REMOVAL

83. Using the hoist and appropriate rigging, securely support the weld rotor assembly. See ***Figure F.131***.
84. Using the hoist, carefully pull the weld rotor and shaft hub assembly out of the shaft coupling. See ***Figure F.131***.

COUPLING REMOVAL

85. Using an 11/16” socket, remove the eight bolts and lock washers securing the four blower paddle assemblies and shaft coupling to the engine flywheel. See ***Figure F.131***.
86. Carefully secure the rotor so it cannot turn.
87. Using a 1/2” Allen wrench, remove the large Allen bolt securing the coupling hub to the rotor. The hub can now be pulled off of the rotor shaft. See ***Figure F.131***.

REPLACEMENT PROCEDURE

INSTALLING SHAFT COUPLING TO THE ENGINE FLYWHEEL

1. Thoroughly clean and inspect the surfaces of the engine flywheel and the shaft coupling. There should be no dirt or imperfections on the mating surfaces that could prevent proper seating and alignment of the shaft coupling to the engine flywheel.
2. Carefully place the shaft coupling on the engine flywheel, being certain that it is fully seated in the machined recess area.
3. Using an 11/16” torque wrench, attach the eight bolts and lock washers securing the four blower paddle assemblies to the shaft coupling and the engine flywheel. Tighten these eight bolts and lock washers evenly and in an alternating pattern. Torque to 28 ft./lbs. as specified in the ***Torque Specifications*** at the beginning of this procedure.

INSTALLING THE SHAFT HUB TO THE WELD ALTERNATOR ROTOR

4. Thoroughly clean and inspect the mating surfaces of the rotor shaft and the shaft hub assembly.
5. Secure the rotor assembly so it cannot turn when the mounting screw is tightened.
6. Carefully place the shaft hub on the end of the weld rotor shaft.
7. Carefully apply high strength thread locking compound to the threads of the mounting screw.
8. Using a 1/2” Allen wrench, attach the bolt and lock washer securing the shaft hub to the weld rotor assembly. Using a 1/2” torque wrench, torque the screw to between 201 and 210 ft./lbs. as specified in the ***Torque Specifications*** at the beginning of this procedure.

INSTALLING THE WELD ROTOR

9. It is highly recommended that a new bearing be installed whenever the rotor or stator is disassembled. When installing the new bearing be certain the bearing retaining ring is placed on the shaft before the bearing is installed.
10. Apply a thin coating of grease (Chevron SRI or equivalent) to the end of the shaft hub.
11. Using a hoist and appropriate rigging, carefully position the weld rotor and shaft hub assembly fully into the flywheel mounted portion of the shaft coupling.

INSTALLING THE WELD STATOR

12. Prepare the weld stator by thoroughly cleaning and inspecting the machined surfaces on the engine and stator mounting flange. These surfaces should be free of dirt and defects that could prevent proper seating and alignment.
13. Clean the bearing seat in the stator. Be certain the "O" ring and retaining ring grooves are clean and undamaged. Install a new "O" ring and install the outboard retaining ring.
14. Apply a thin coating of grease (Chevron SRI or equivalent) to the inside diameter of the bearing bore.
15. Using the hoist and appropriate rigging, carefully position the weld stator tie bar assembly over the rotor and onto the bearing. Be careful not to damage the rotor or stator windings.
16. Make certain the flange is fully seated and bolt holes are properly aligned.
17. Attach the eight mounting bolts and lock washers securing the stator tie bar assembly to the engine mounting flange. Hand-tighten these screws at this time.
18. Using the hoist and appropriate rigging, carefully lift the weld stator assembly enough to remove the blocks supporting the engine and then lower the weld stator onto the rubber mounts. Be certain the stator mounting feet are resting evenly on both mounts.
19. Using an 11/16" torque wrench, tighten the eights screws and lock washers evenly in an alternating pattern. Torque to 28 ft./lbs. as specified in the ***Torque Specifications*** at the beginning of this procedure.
20. Carefully move the rotor away from the engine so the bearing is firmly against the outer retaining ring.
21. Using a heavy duty angled snap ring tool, install the inner retaining ring being certain that it is fully seated in the groove.
22. Using the feeler gage, check the air gap between the rotor and stator. The feeler gage dimensions are shown in the ***Materials Needed*** list in the beginning of this procedure.
    • The rotor should be positioned so the gap between the rotor poles and the stator can be checked at four locations 90 degrees apart without turning the rotor.
    • The gage should pass completely through the gap between the rotor and stator at all four locations.
    • The edges of the gage must not fall into the stator slots.

INSTALLING THE AUXILIARY ROTOR

23. Thoroughly clean and inspect the tapered area and the threaded hole in the end of the weld rotor shaft. Clean and inspect the internal tapered area of the auxiliary rotor. These mating tapers must be clean, dry and be free of any scratches and imperfections.
24. It is recommended that a new bearing be installed on the auxiliary rotor.
25. Using the hoist and appropriate rigging, carefully position the auxiliary rotor onto the tapered end of the weld rotor.
26. Place the lock washer and centering washer onto the through bolt.
27. Carefully apply high strength thread locking compound to the through bolt threads.
28. Using a 9/16" torque wrench, torque the through bolt to between 50 to 62 ft./lbs. as specified in the ***Torque Specifications*** at the beginning of this procedure.

INSTALLING THE AUXILIARY STATOR

29. Prepare the bearing surface and mounting flanges by thoroughly cleaning and inspecting the machined mating surfaces on the auxiliary and weld stator mounting flanges. These surfaces should be free of dirt and defects that could prevent proper seating and alignment.
30. Clean the bearing seat in the stator. Be certain the "O" ring groove is clean and undamaged. Install a new "O" ring.
31. Apply a thin coating of grease (Chevron SRI or equivalent) to the inside diameter of the bearing bore.
32. Use the hoist and appropriate rigging, carefully place the stator tie bar assembly over the auxiliary rotor. Be sure the mating flanges are properly aligned and fully seated. The feet should be resting evenly on the rubber mounts.
33. Using an 11/16" torque wrench, attach the eight screws and lock washers securing the auxiliary stator assembly to the weld stator assembly. Tighten these screws evenly and in an alternating pattern. Torque to 28 ft./lbs. as specified in the ***Torque Specifications*** at the beginning of this procedure.
34. Using the feeler gage, check the air gap between the rotor and stator. The feeler gage dimensions are shown in the ***Materials Needed*** list in the beginning of this procedure.
    • The rotor should be positioned so the gap between the rotor poles and the stator can be checked at four locations 90 degrees apart without turning the rotor.
    • The gage should pass completely through the gap between the rotor and stator at all four locations.
    • The edges of the gage must not fall into the stator slots.

COMPLETING THE REASSEMBLY

35. Using the hoist and appropriate rigging, lift the stator assemblies off of the rubber mounts and position the bottom sheet metal cowlings on both stators.
36. With the generator assembly lifted, carefully route any previously removed cables and/or wiring under the stator cowlings.
37. Lower the weld and auxiliary stator assemblies down onto the rubber mounts and align the holes.
38. Using a 3/4" socket and a 3/4" open end wrench, secure the four lock nuts, bolts, flat washers and engine support washers securing the generator assembly to the rubber mounts.
39. Using a 3/8" nutdriver, attach the three screws securing the bottom weld stator cowling.
40. Using a 1/2" nutdriver, attach the three screws securing the bottom weld stator cowling.
41. Using a 3/8" nutdriver, attach the two screws securing the bottom auxiliary stator cowling.
42. Carefully route any cables and/or wiring to allow for the proper installation of the top weld stator cowling.
43. Carefully position the top weld stator cowling onto the weld stator tie bar assembly.
44. Using a 3/8" nutdriver, attach the three screws securing the top weld stator cowling.
45. Using a 1/2" nutdriver, attach the nine screws securing the top weld stator cowling.
46. Carefully route any cables and/or wiring to allow for the proper installation of the top auxiliary stator cowling.
47. Carefully position the top auxiliary stator cowling onto the auxiliary stator tie bar assembly.
48. Using a 3/8" nutdriver, attach the seven screws securing the top auxiliary stator cowling.

49. Using a 3/8” nutdriver, attach the two screws securing the auxiliary brush holder to the machine.
50. Using a 3/8” nutdriver, attach the two screws securing the weld brush holder to the machine.
51. Connect leads 200B and 201 to the auxiliary brush terminals. See Wiring Diagram.
52. Connect leads 200D and 201B to the weld brush terminals. See Wiring Diagram.
53. Using a 3/8” nutdriver, attach the two screws securing the electronic engine speed governor to the machine.
54. Connect plugs J31 and J32 to the electronic engine speed governor. See Wiring Diagram.
55. Carefully position the lift frame assembly into the machine.
56. Using two 3/4” open-end wrenches, attach the four bolts, lock washers and nuts securing the lift frame assembly to the machine.
57. Carefully route any cables and/or wiring through the lift frame assembly as necessary.
58. Carefully position the right baffle into the machine.
59. Using a 1/2” nutdriver, attach the two screws securing the right baffle to the machine.
60. Carefully position the left baffle to the machine.
61. Using a 1/2” nutdriver, attach the four screws securing the left baffle to the machine.
62. Carefully route any cables and/or wiring running through the left and right baffles. Replace any cable ties as necessary.
63. Unplug the CR6 temp relay from the mounting harness. See Wiring Diagram.
64. Using a 5/16” nutdriver, attach the screw securing the CR6 temp relay to the left baffle.
65. Plug the CR6 temp relay back into the mounting harness.
66. Unplug the CR4 engine protection relay from the mounting harness. See Wiring Diagram.
67. Using a 5/16” nutdriver, attach the screw securing the CR4 engine protection relay to the left baffle.
68. Plug the CR4 engine protection relay back into the mounting harness.
69. Unplug the CR3 idle relay from the mounting harness. See Wiring Diagram.
70. Using a 5/16” nutdriver, attach the screw securing the CR3 idle relay to the left baffle.
71. Plug the CR3 idle relay back into the mounting harness.
72. Carefully position the case front assembly at the front of the machine.
73. Using a 1/2” nutdriver, attach the four screws securing the case front assembly to the machine.
74. Connect all previously removed leads to the control panel and case front assembly. Replace any cable ties as necessary. See Wiring Diagram. There are a large number of leads and it is crucial that all leads are reconnected and routed in the same manner as they were originally installed.
    NOTE: Leads mounted to the posts on the rear of the control panel must be reattached in the same order as they were removed.
75. Using two 1/2” open end wrenches, attach the nut and lock washer securing leads POS B switch, NEG B switch, POS A shunt and NEG A switch to the left side of the output selector switch. See Wiring Diagram.
76. Using two 1/2” open end wrenches, attach the nut and lock washer securing leads NEG A choke and POS A switch to the right side of the output selector switch. See Wiring Diagram.
77. Using a 9/16” nutdriver, connect the #5 chassis ground lead, both #238 leads, positive and negative battery leads to the rear of the master disconnect. See Wiring Diagram.
78. Carefully position the master disconnect onto its mounting plate.
79. Using a 1” wrench, attach the nut and washer securing the master disconnect to the front panel assembly.
80. Using a slotted screwdriver, attach the screw and washer securing the lockout switch handle to the master disconnect.

81. Using two 3/4” open-end wrenches, connect leads NEG A switch, 308, 308D and 308A to the rear of the right negative output terminal. See Wiring Diagram.
82. Using two 1/2” open-end wrenches, connect leads POS A shunt, 304S and 306S to the shunt on the rear of the right side positive output terminal. See Wiring Diagram.
83. Using two 1/2” open-end wrenches, connect leads NEG B choke, NEG B switch, 208B and 208A to the left negative terminal. See Wiring Diagram.
84. Using two 1/2” open-end wrenches, connect leads POS B shunt and POS B switch to shunt on the rear of the left positive output terminal. See Wiring Diagram.
85. Using a 3/8” nutdriver, attach the two screws securing the brush cover to the auxiliary alternator rotor (farthest from the engine).
86. Perform the ***Power Module / Output Rectifier Replacement Procedure***.
87. Perform the ***Fuel Tank Replacement Procedure***.
88. Using a 1/2” nutdriver, remove the four screws securing the battery tray to the machine and remove the battery tray from the machine.
89. Carefully place the battery into the battery tray.
90. Using a 7/16” nutdriver, attach the two nuts to the two carriage bolts securing the battery bracket to the battery tray.
91. Using a 1/2” nutdriver, connect the positive battery lead to the positive battery terminal. See Wiring Diagram. Do not connect the negative battery terminal at this time.
92. Carefully place the battery tray into the machine.
93. Using a 1/2” nutdriver, attach the four screws securing the battery tray to the machine.
94. Perform the ***Case Cover Replacement Procedure***.
95. Using the hoist and appropriate rigging, lift the machine, remove the wood blocks and place the machine on a flat surface.
96. Perform the ***Retest After Repair Procedure***.

Figure F.112 – Battery removal

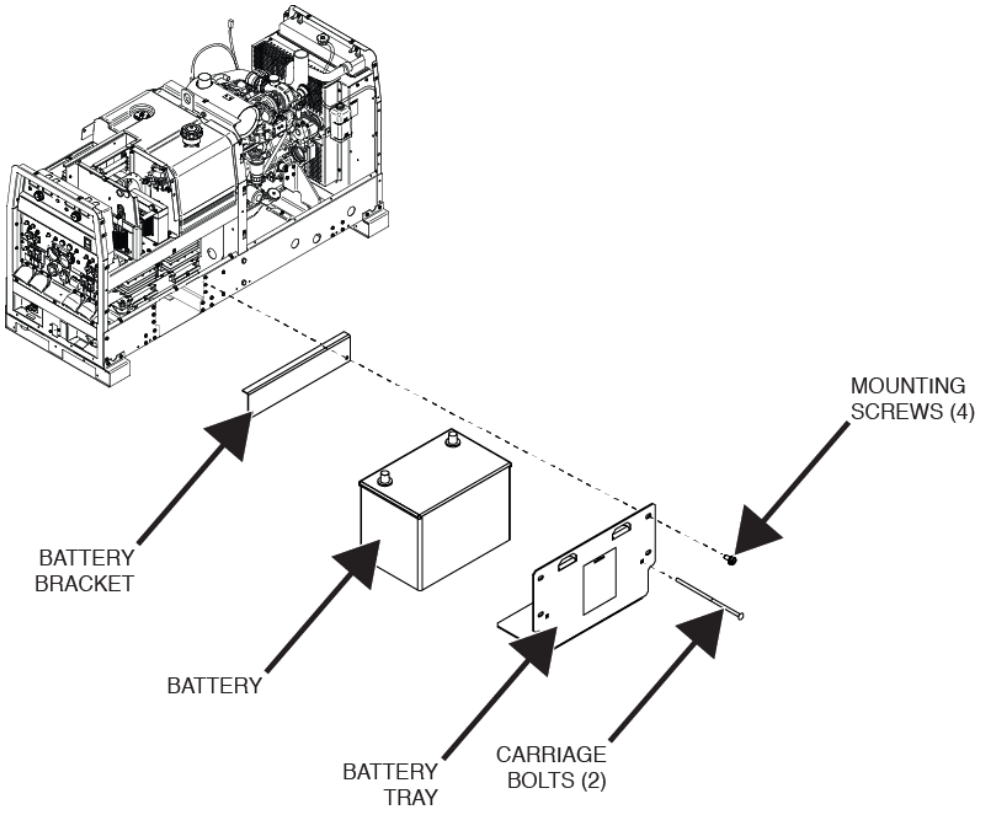


Figure F.113 – Weld brush cover removal

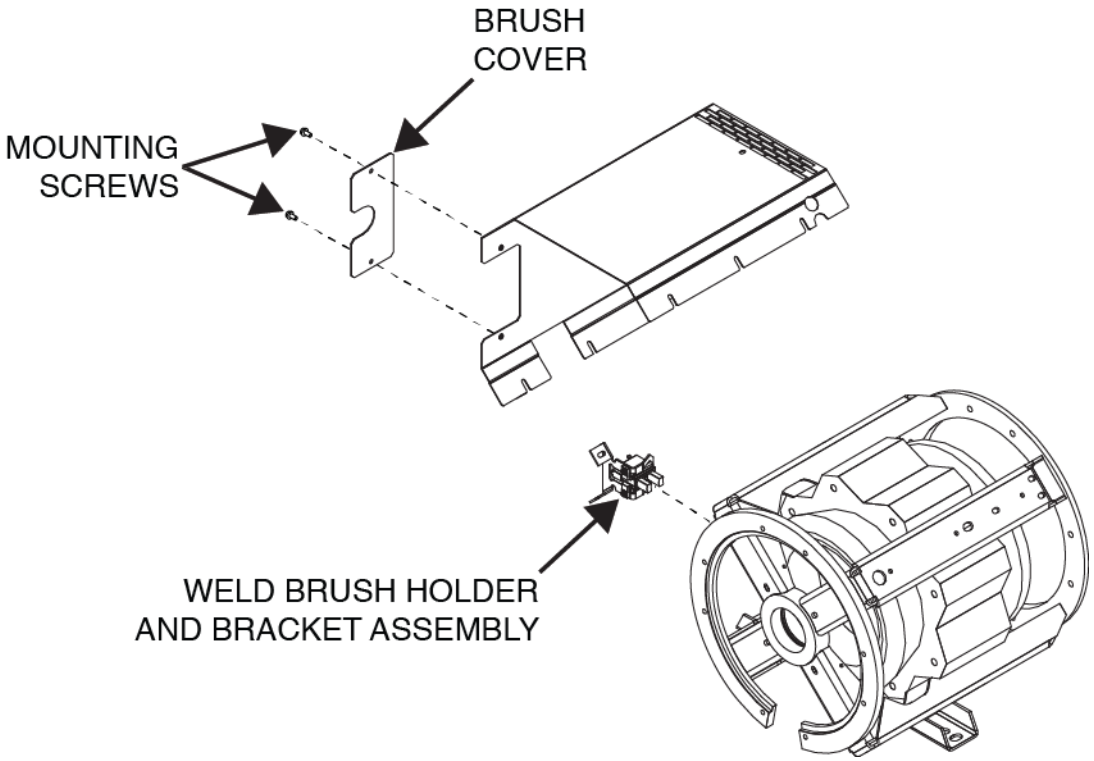


Figure F.114 – Auxiliary brush cover removal

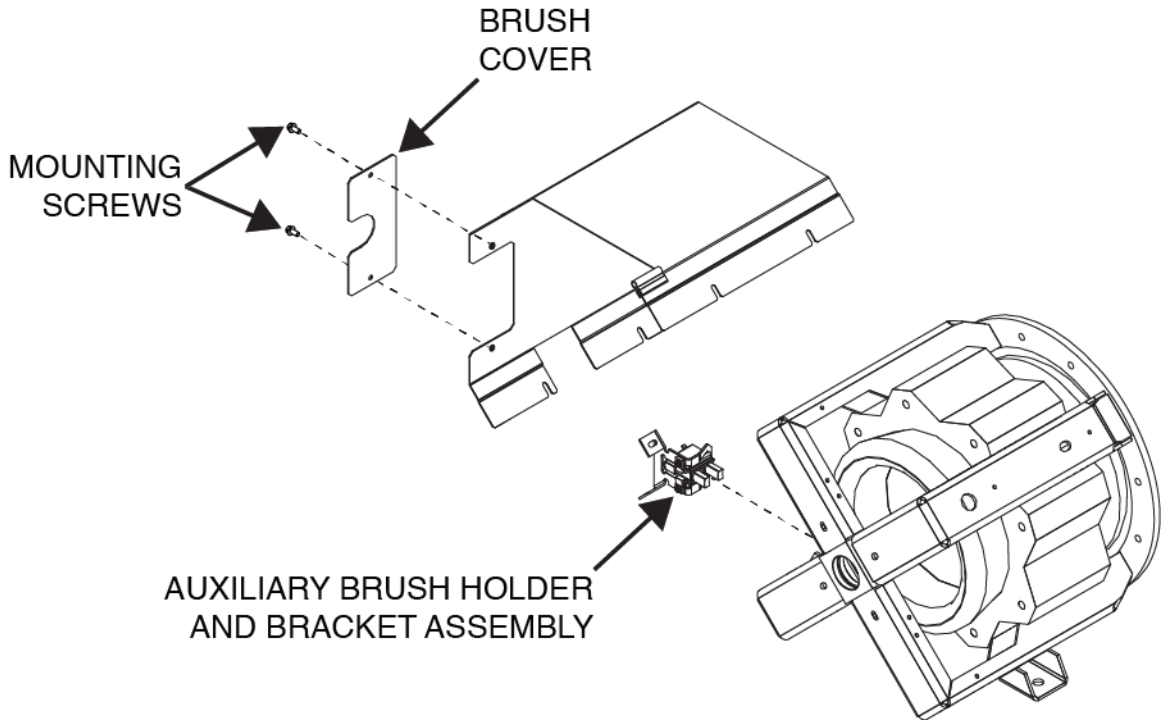


Figure F.115 – Output selector switch, lockout switch and output terminal locations

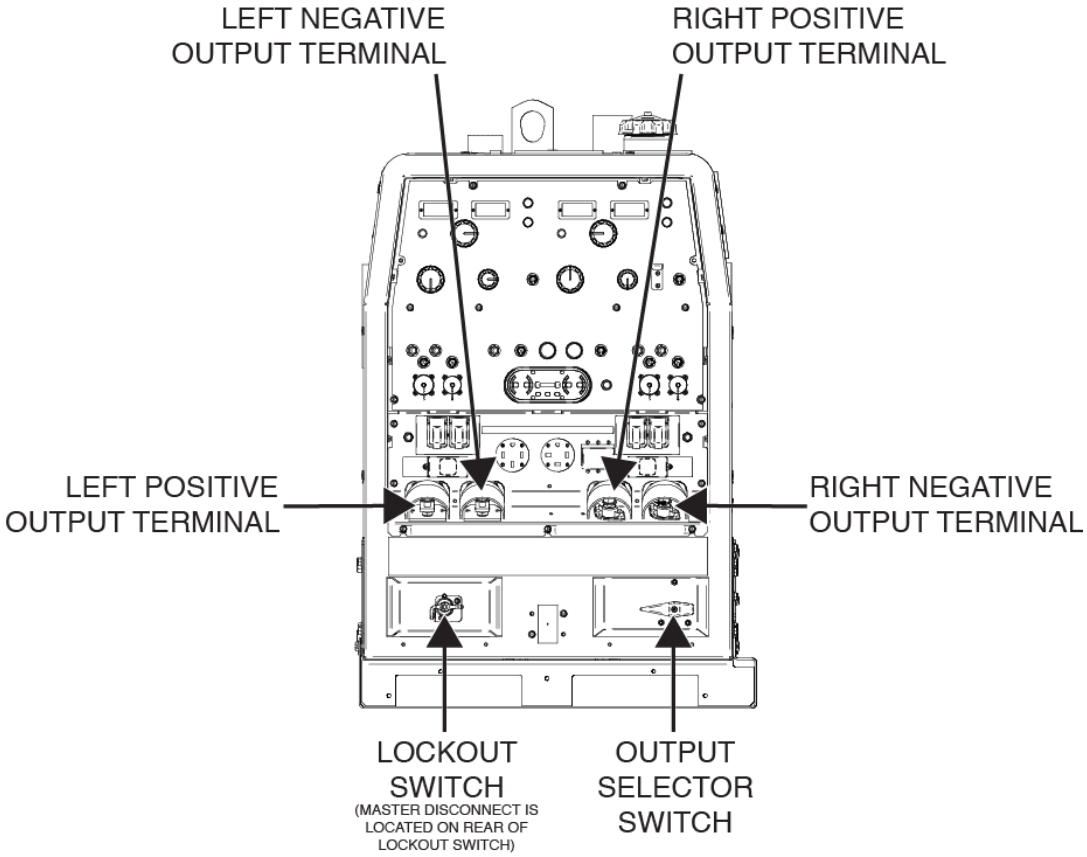


Figure F.116 – Master disconnect lead locations

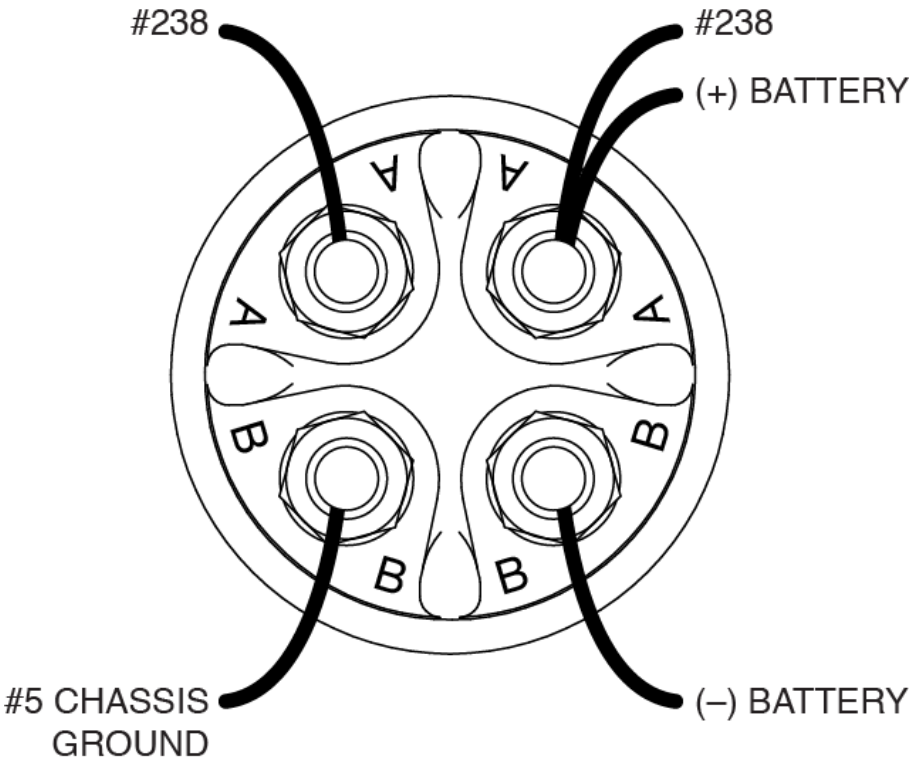


Figure F.117 – Output selector switch right side lead locations

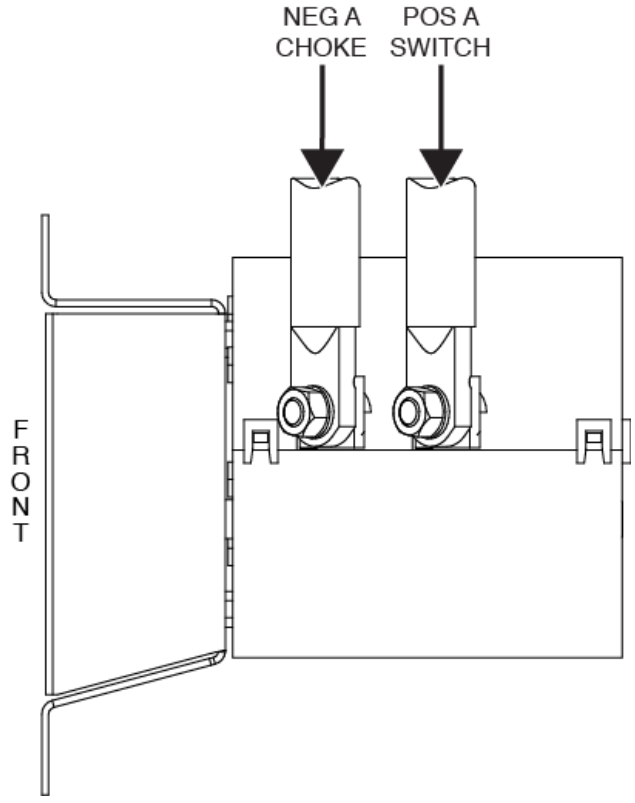


Figure F.118 – Output selector switch left side lead locations

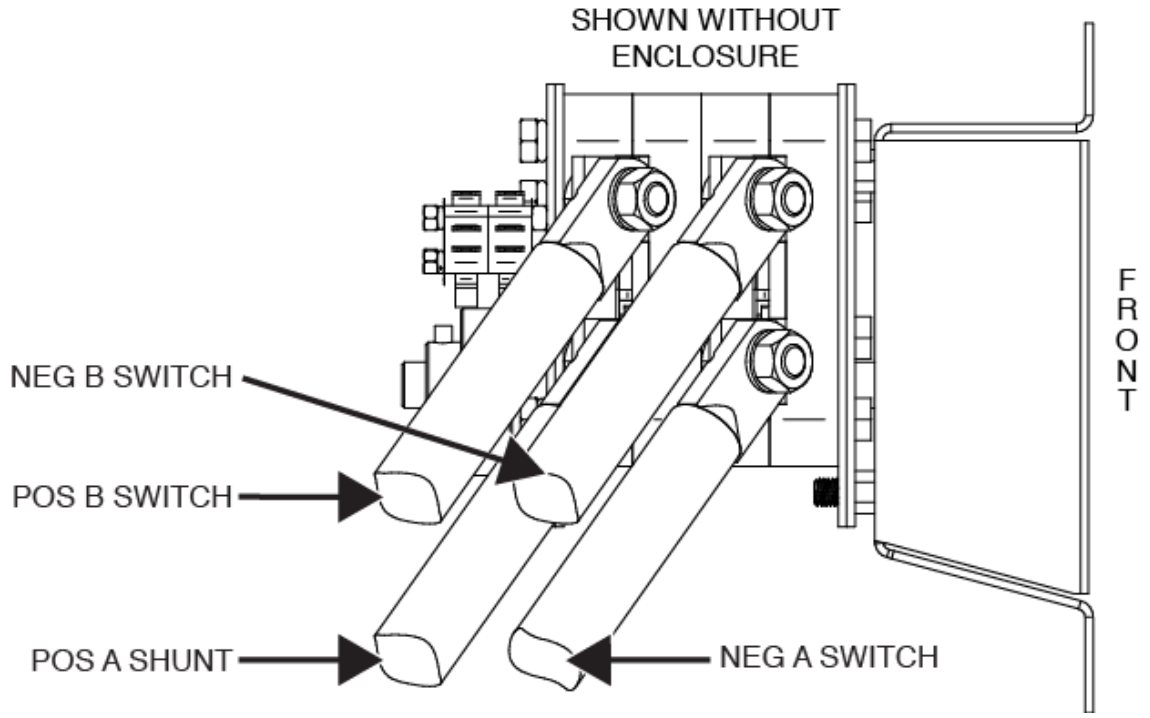


Figure F.119 – Front panel mounting screw locations

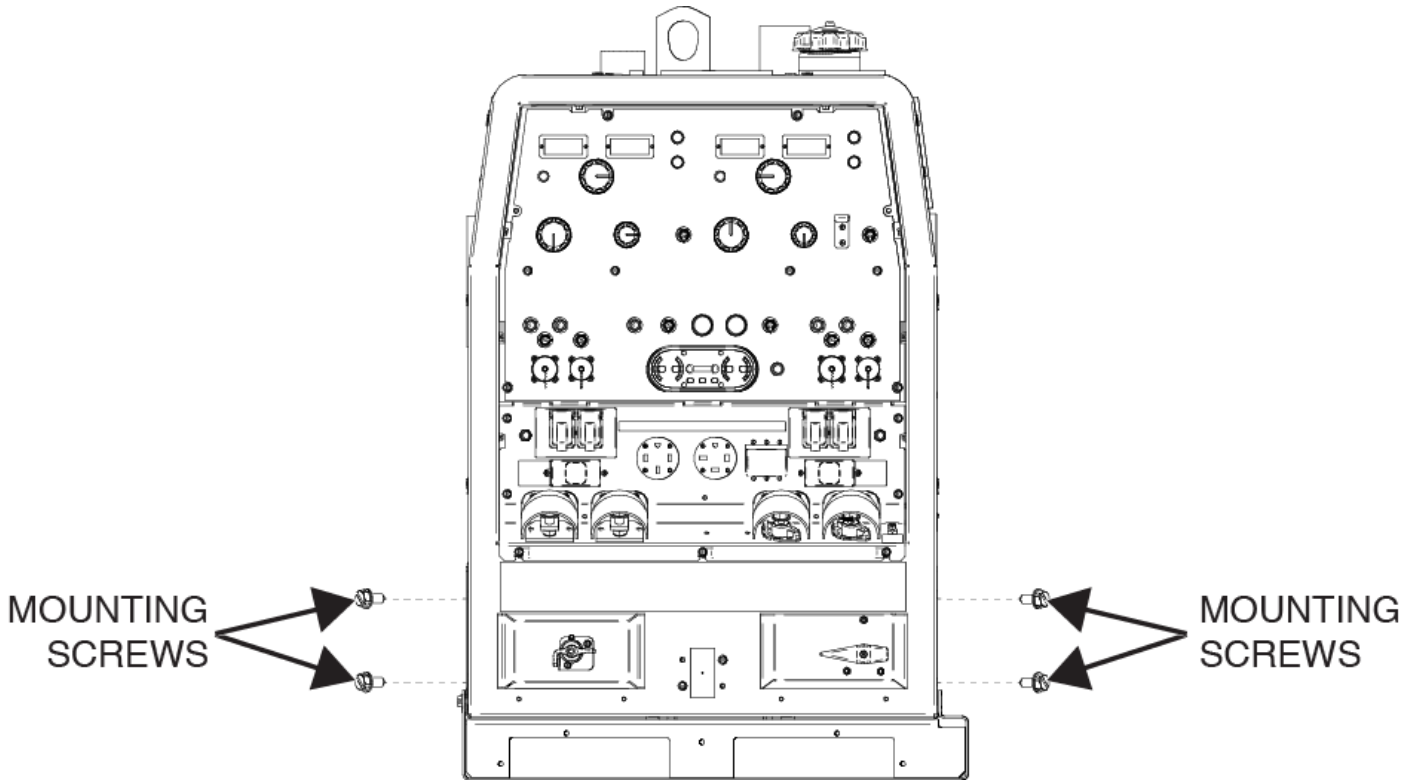


Figure F.120 – CR3, CR4 and CR6 relay locations

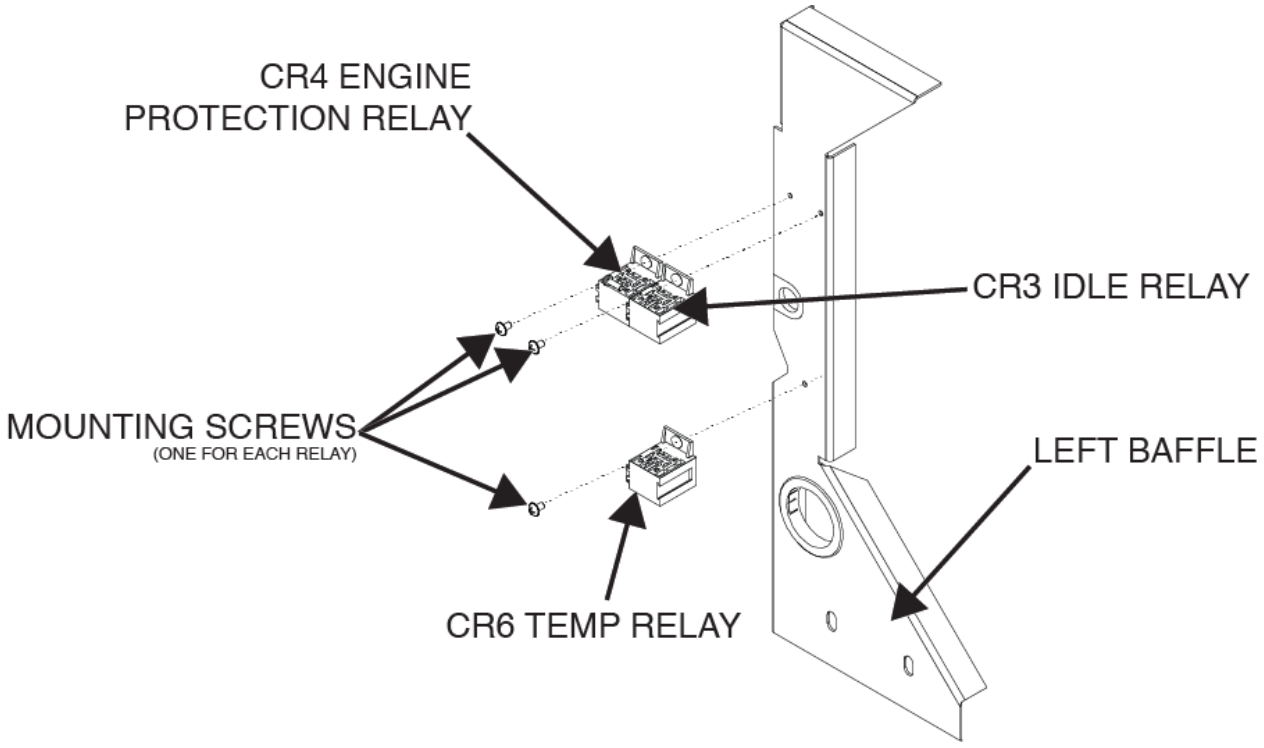


Figure F.121 – Lift frame assembly, left and right baffle removal

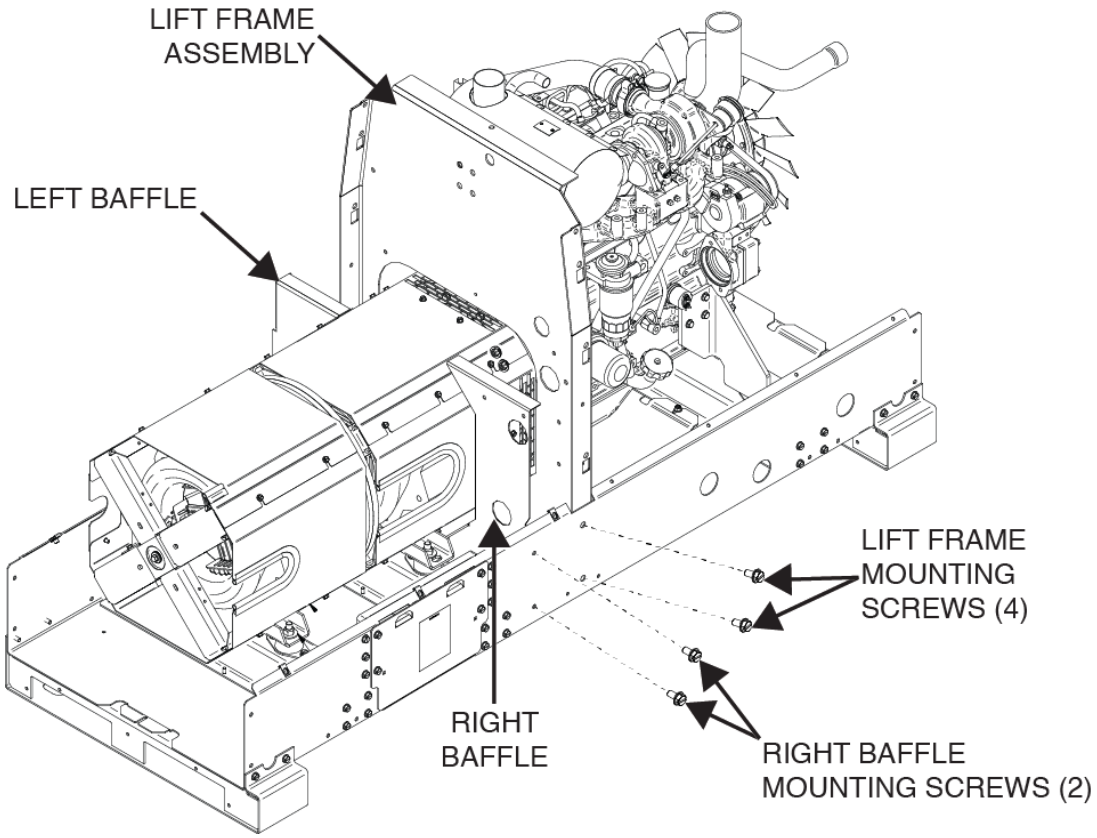


Figure F.122 – Electronic engine governor plugs and mounting screw locations

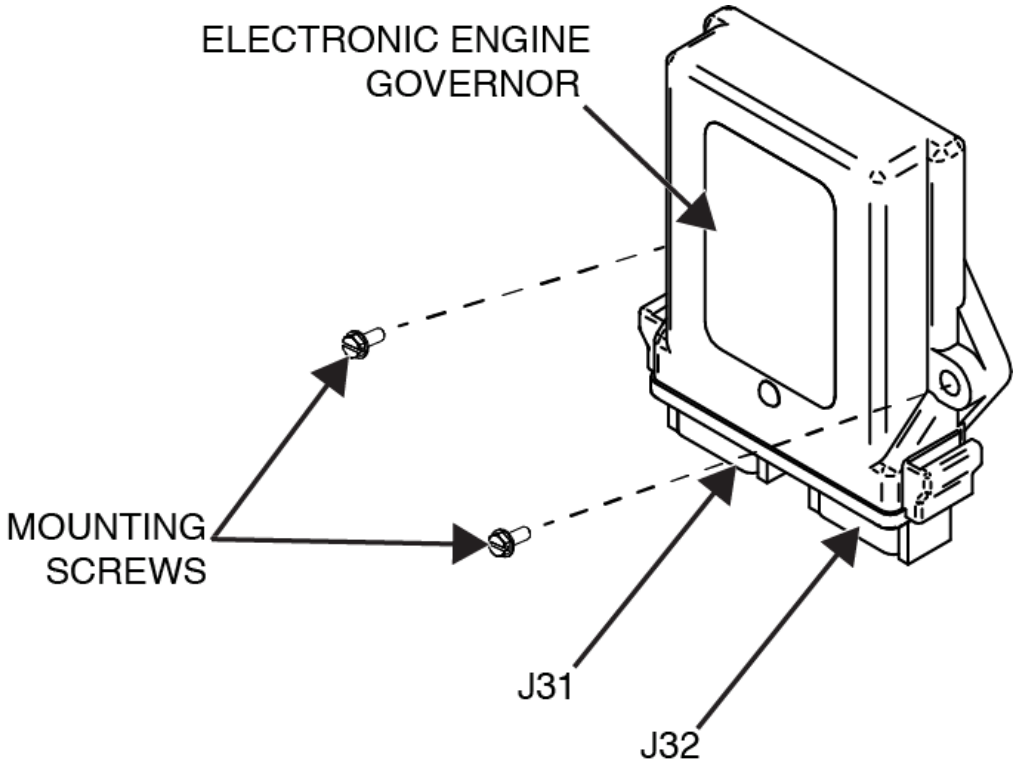


Figure F.123 – Weld brush terminal locations

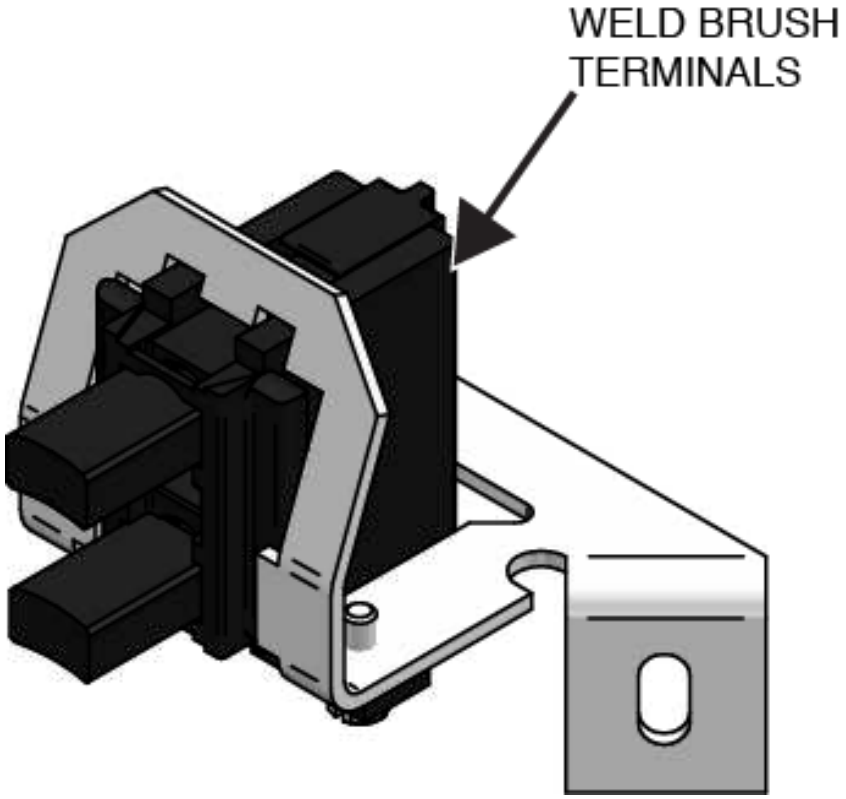


Figure F.124 – Auxiliary brush terminal location

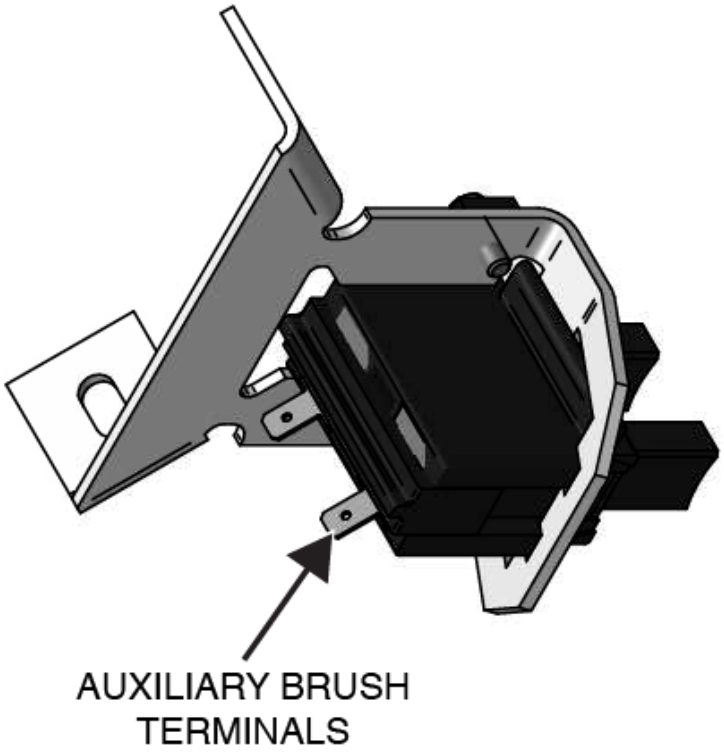


Figure F.125 – Auxiliary and weld brush holder removal

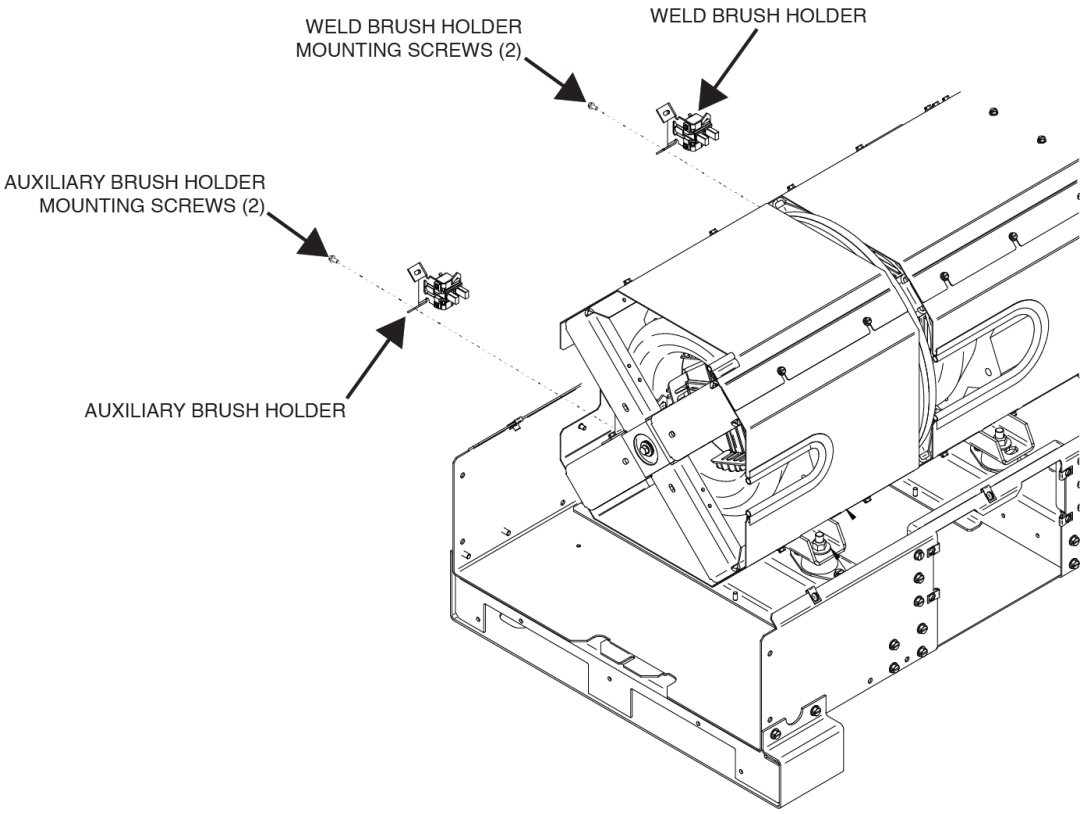


Figure F.126 – Stator cowling locations

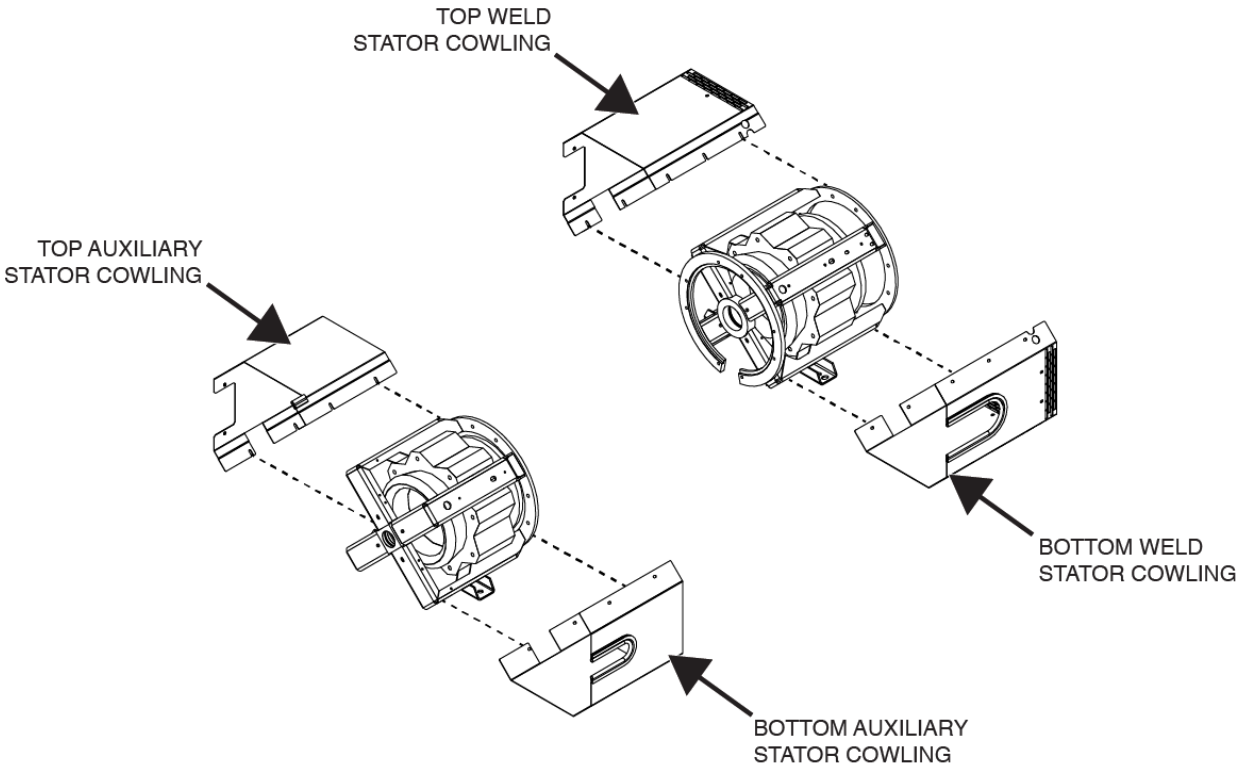


Figure F.127 – Generator assembly mounting bolts

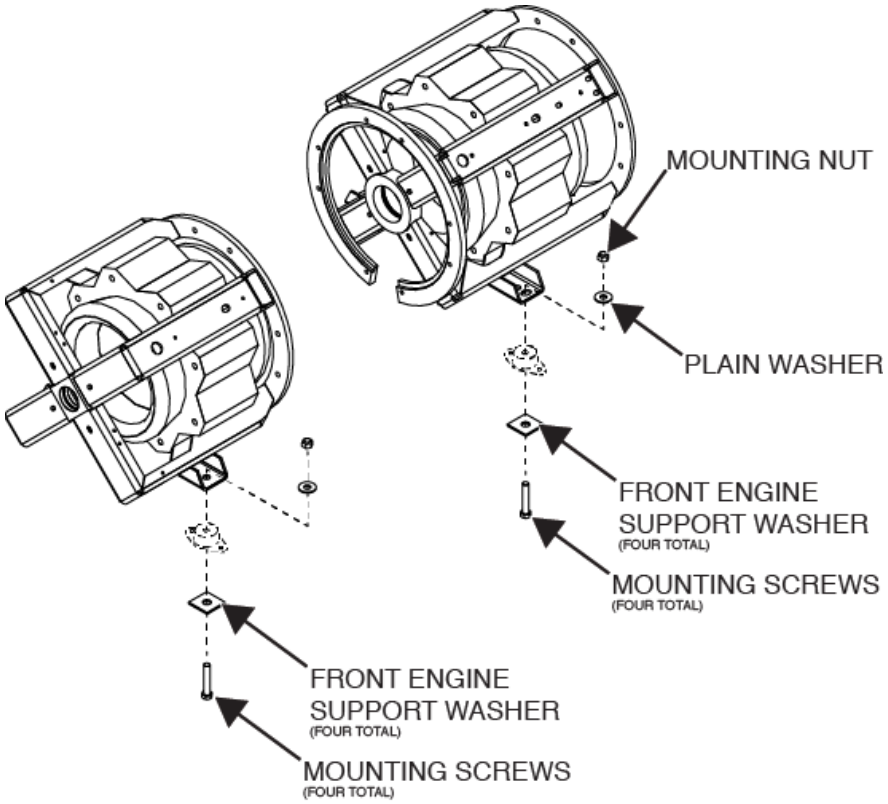


Figure F.128 – Auxiliary stator tie bar assembly removal

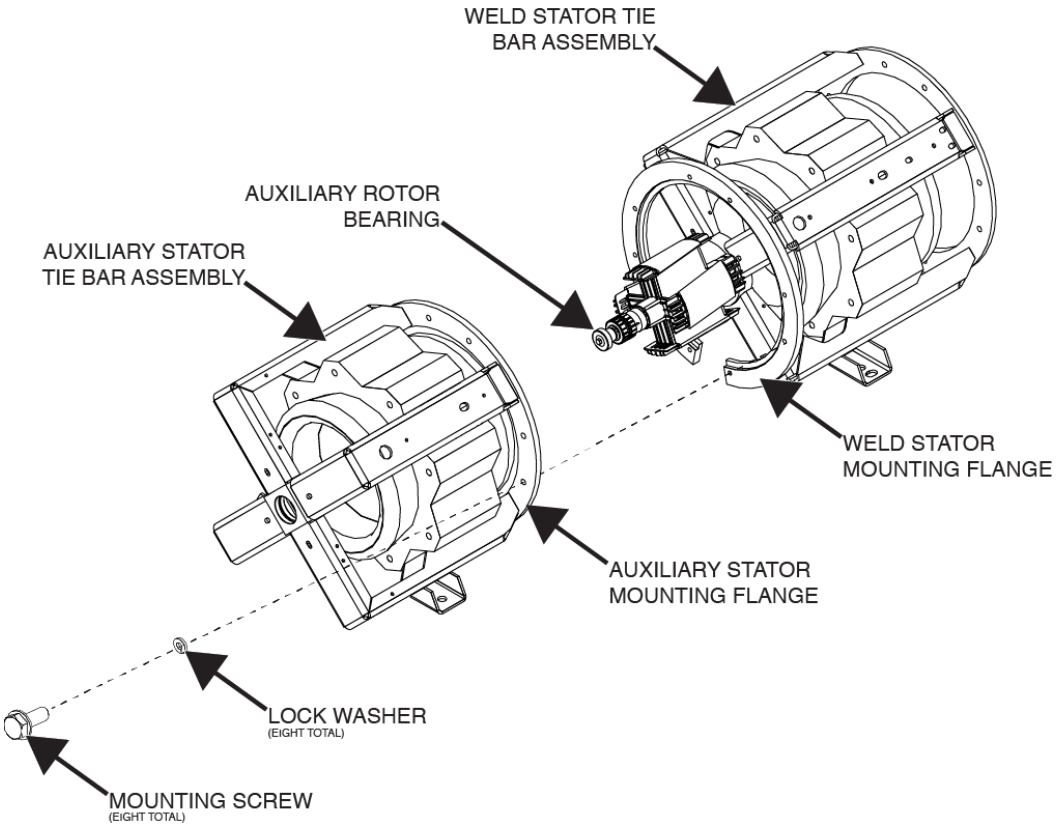


Figure F.129 – Auxiliary rotor removal

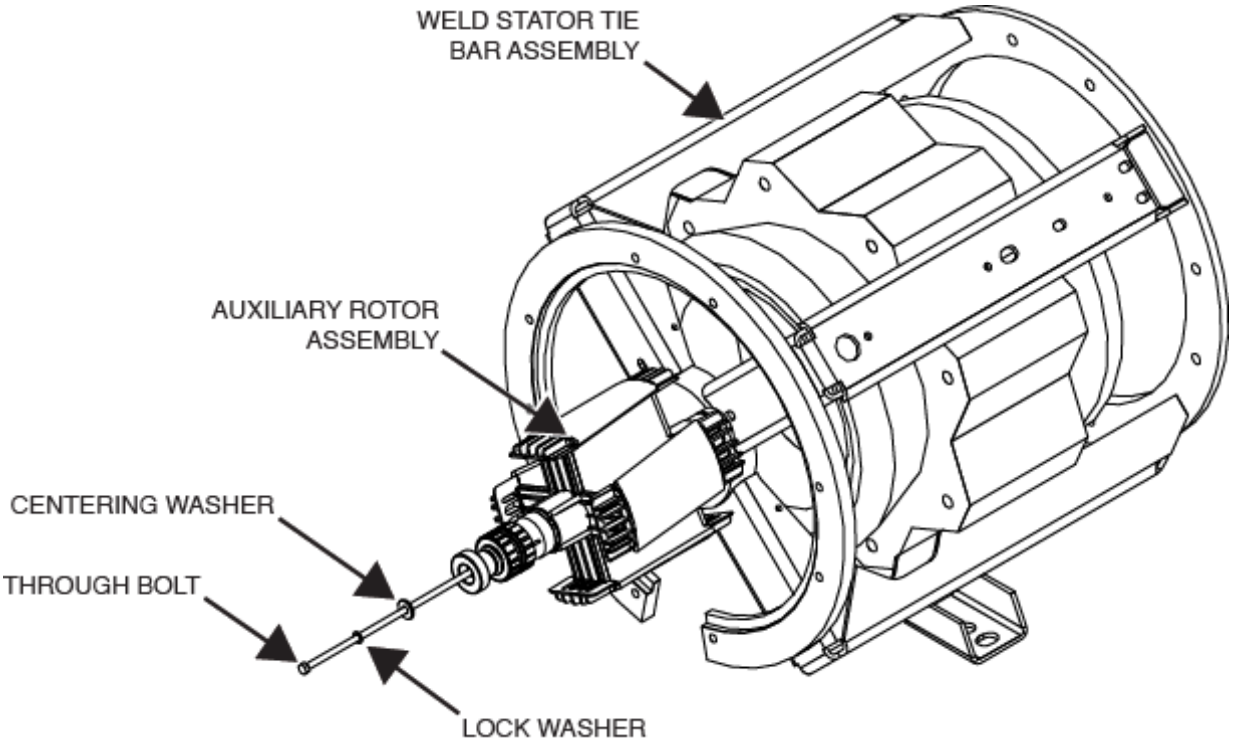


Figure F.130 – Weld stator tie bar assembly removal

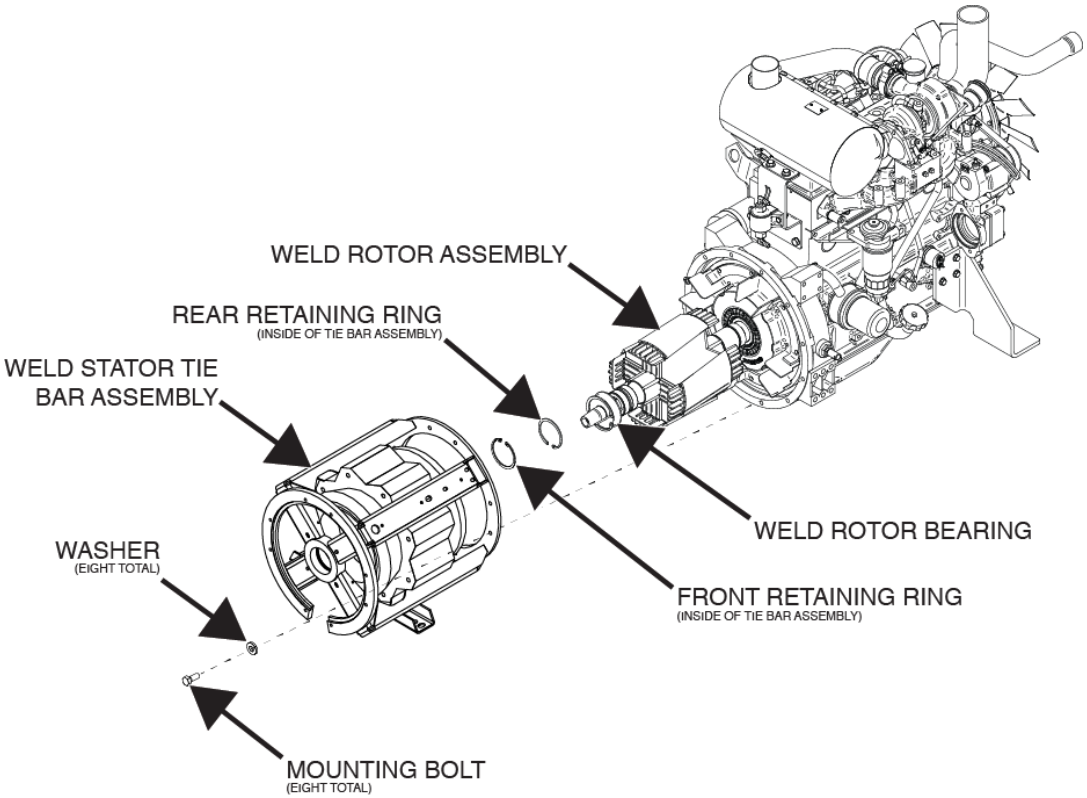
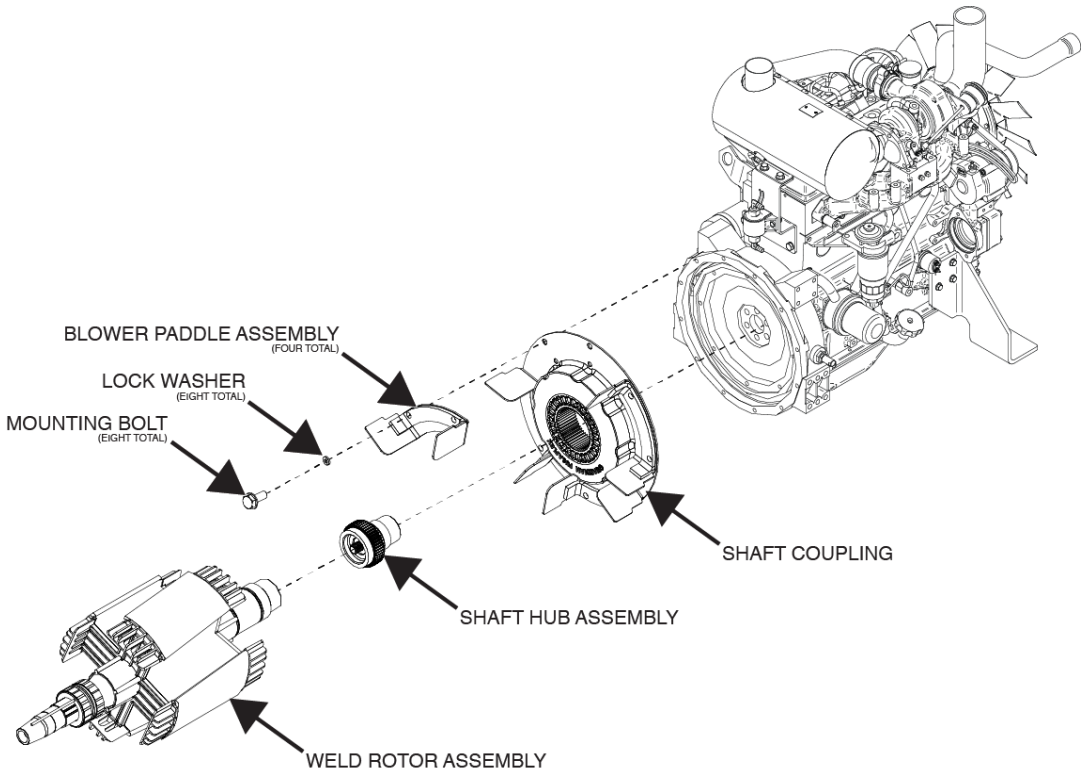


Figure F.131 – Weld rotor and shaft coupling removal



RETEST AFTER REPAIR

SINGLE OPERATOR MODE TESTS (SIDE "B")

ENGINE RPM		
MODE	**NO LOAD RPM**	**FULL LOAD RPM**
LOW IDLE	1490 / 1540	N/A
HIGH IDLE	1840 / 1870	1750 MIN.

OUTPUT TESTS (CONSTANT CURRENT) CC STICK MODE		
OCV (OPEN CIRCUIT VOLTAGE)	55 / 60 VDC @ 1860 RPM	
WELD OUTPUT LOAD TEST		
PRESET AMPS TO 600, ADJUST LOAD BANK TO OBTAIN VOLTAGE SHOWN		
VOLTS	**AMPS**	**RPM**
43.5 / 45	590 / 610	1750 MIN.
ARC CONTROL TEST		
PRESET AMPS TO 150 AND SHORT CIRCUIT WELD OUTPUT TERMINALS		
ARC CONTROL MINIMUM	**ARC CONTROL MAXIMUM**	
140 / 165 AMPS	225 / 255 AMPS	

OUTPUT TESTS (CONSTANT VOLTAGE) CV WIRE MODE		
OCV (OPEN CIRCUIT VOLTAGE)		
OUTPUT CONTROL MINIMUM	**OUTPUT CONTROL MAXIMUM**	
55 / 60 VDC	55 / 60 AMPS	
WELD OUTPUT LOAD TEST		
OUTPUT CONTROL SET TO MAXIMUM, LOAD BANK SET TO OBTAIN 590 / 610 AMPS		
44 / 46 VOLTS		

TOUCH START TIG TESTS			
OCV (OPEN CIRCUIT VOLTAGE)	**SHORT CIRCUIT AMPS**	**MINIMUM @ 18 – 22 VOLTS**	**MAXIMUM @ 18 – 22 VOLTS**
MIN OR MAX: 10 / 15 VDC	MIN OR MAX: 18 / 28 AMPS	15 / 30 AMPS	240 / 260 AMPS

AUXILIARY POWER (AUXILIARY ALTERNATOR AT NORMAL OPERATING TEMPERATURE)	
240 VOLT SINGLE PHASE RECEPTACLE	
OCV (OPEN CIRCUIT VOLTAGE)	**VOLTS @ 45 / 50 AMP LOAD**
230 / 264	216 / 252
240 VOLT THREE PHASE RECEPTACLE	
OCV (OPEN CIRCUIT VOLTAGE)	**VOLTS @ 40 / 46 AMPS (PHASE TO PHASE)**
230 / 264	216 / 252
120 VOLT RECEPTACLES	
OCV (OPEN CIRCUIT VOLTAGE)	**VOLTS @ 20 AMP LOAD**
115 / 132	108 / 126

DUAL OPERATOR MODE TESTS (SIDE "A" OR "B")

ENGINE RPM		
MODE	**NO LOAD RPM**	**FULL LOAD RPM**
LOW IDLE	1490 / 1540	N/A
HIGH IDLE	1840 / 1870	1750 MIN.

TESTS FOR SIDE "A" OR SIDE"B"

OUTPUT TESTS (CONSTANT CURRENT) CC STICK MODE		
OCV (OPEN CIRCUIT VOLTAGE)	55 / 60 VDC @ 1860 RPM	
WELD OUTPUT LOAD TEST		
PRESET AMPS TO 300, ADJUST LOAD BANK TO OBTAIN VOLTAGE SHOWN		
VOLTS	**AMPS**	**RPM**
31.5 / 33	290 / 310	1750 MIN.
ARC CONTROL TEST		
PRESET AMPS TO 150 AND SHORT CIRCUIT WELD OUTPUT TERMINALS		
ARC CONTROL MINIMUM	**ARC CONTROL MAXIMUM**	
140 / 165 AMPS	225 / 255 AMPS	

OUTPUT TESTS (CONSTANT VOLTAGE) CV WIRE MODE		
OCV (OPEN CIRCUIT VOLTAGE)		
OUTPUT CONTROL MINIMUM	**OUTPUT CONTROL MAXIMUM**	
55 / 60 VDC	55 / 60 AMPS	
WELD OUTPUT LOAD TEST		
OUTPUT CONTROL SET TO MAXIMUM, LOAD BANK SET TO OBTAIN 290 / 310 AMPS		
29 / 31 VOLTS		

TOUCH START TIG TESTS			
OCV (OPEN CIRCUIT VOLTAGE)	**SHORT CIRCUIT AMPS**	**MINIMUM @ 18 – 22 VOLTS**	**MAXIMUM @ 18 – 22 VOLTS**
MIN OR MAX: 10 / 15 VDC	MIN OR MAX: 18 / 28 AMPS	15 / 30 AMPS	240 / 260 AMPS

AUXILIARY POWER (AUXILIARY ALTERNATOR AT NORMAL OPERATING TEMPERATURE)	
240 VOLT SINGLE PHASE RECEPTACLE	
OCV (OPEN CIRCUIT VOLTAGE)	**VOLTS @ 45 / 50 AMP LOAD**
230 / 264	216 / 252
240 VOLT THREE PHASE RECEPTACLE	
OCV (OPEN CIRCUIT VOLTAGE)	**VOLTS @ 40 / 46 AMPS (PHASE TO PHASE)**
230 / 264	216 / 252
120 VOLT RECEPTACLES	
OCV (OPEN CIRCUIT VOLTAGE)	**VOLTS @ 20 AMP LOAD**
115 / 132	108 / 126