Technical Support

Subject
Testing AC and DC Circuits in Multifunction with 100 V / 200 V ac

SYSTEM OR PARTS AFFECTED

- Multifunction Power Systems (MF) with ac / dc generator, equipped with 100 V ac and 200 V ac receptacles.

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Bridge rectifier test **11**

APPENDIX A **13**

OVERVIEW

The following tests will assist in diagnosing generator output issues.

Re-assemble the genset precisely as it was disassembled, making effort to bundle and restrain loose wire lengths. Be mindful of wire strain and clearance from surrounding components/bodies. Incorrectly routed harnesses present a risk of generator damage and personal injury.

☐ Please fill in the information below *prior to sending this test sheet to VMAC Technical Support.*

Customer name	
Contact information – phone number	
Contact information – email address	
System ID number	
Service Ticket number (if issued)	
Engine Hours	
Compressor Hours	

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TEST PROCEDURES

The ac voltage test must be performed before testing the dc circuits. Without ac output from the generator, there will be no dc output.

TESTING AC CIRCUITS

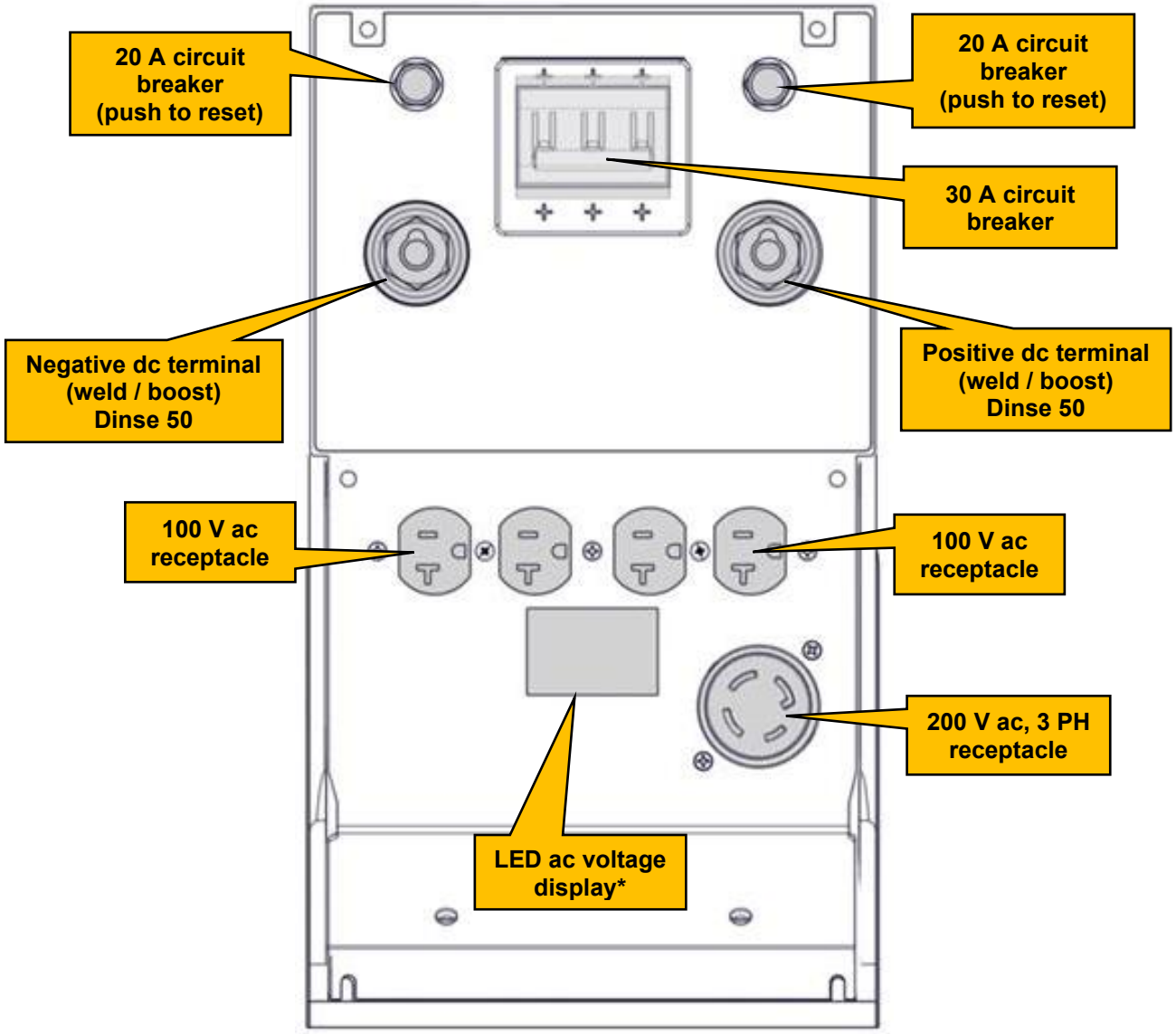

Figure 1

NOTE

**** The generator's LED voltage display (Figure 1) has 5 LEDs that indicate a voltage range between 180 V and 220 V. A flashing 180 V LED is a "low signal indication", meaning generator output is significantly less than 180 V ac.***

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200 V AC CIRCUIT TESTING

- ☐ Start the Multifunction engine and allow it to warm up for 1 minute. The engine should rev up and then idle down.
- ☐ Turn the generator on at the control panel. The engine should increase to high idle (rpm: 3,650 – 3,750). *If the engine does not increase to high idle, see "Pull Hold Relay and Throttle Solenoid Testing" on the knowledge base prior to proceeding with the test.*
- ☐ Take note of the reading on the LED ac voltage display.
- ☐ Using a multimeter, measure the voltage at the 200 V ac receptacles (Figure 2).

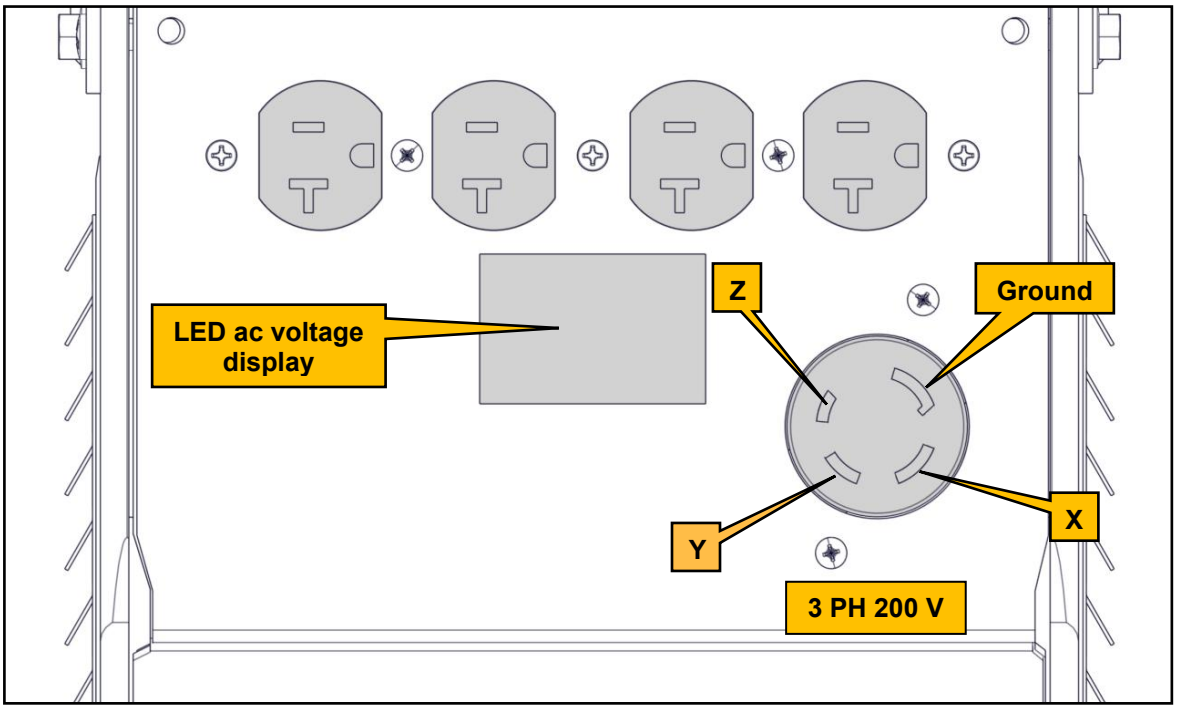

Figure 2

- ☐ Record the results in Table 1 below and compare them to the specifications provided. **If the results are out of specification, turn to page 11 (bridge rectifier test).**

Circuit	Specification	Measured Voltage
X to Y	Min. 180 V ac, Max 220 V ac	
X to Z	Min. 180 V ac, Max 220 V ac	
Y to Z	Min. 180 V ac, Max 220 V ac	

Table 1

- ☐ If the results of the test in Table 1 differ from the value indicated on the LED ac voltage display, the display is faulty.

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100 V AC CIRCUIT TESTING

- ☐ With the Multifunction running, ensure the main breaker is in the ON position, and neither of the 20 A breakers have been tripped (Figure 1).
- ☐ Using a multimeter, measure the voltage at the 100 V ac receptacles between the small slot and large (T-shaped) slot in each of the four 100 V ac outlets (Figure 3).

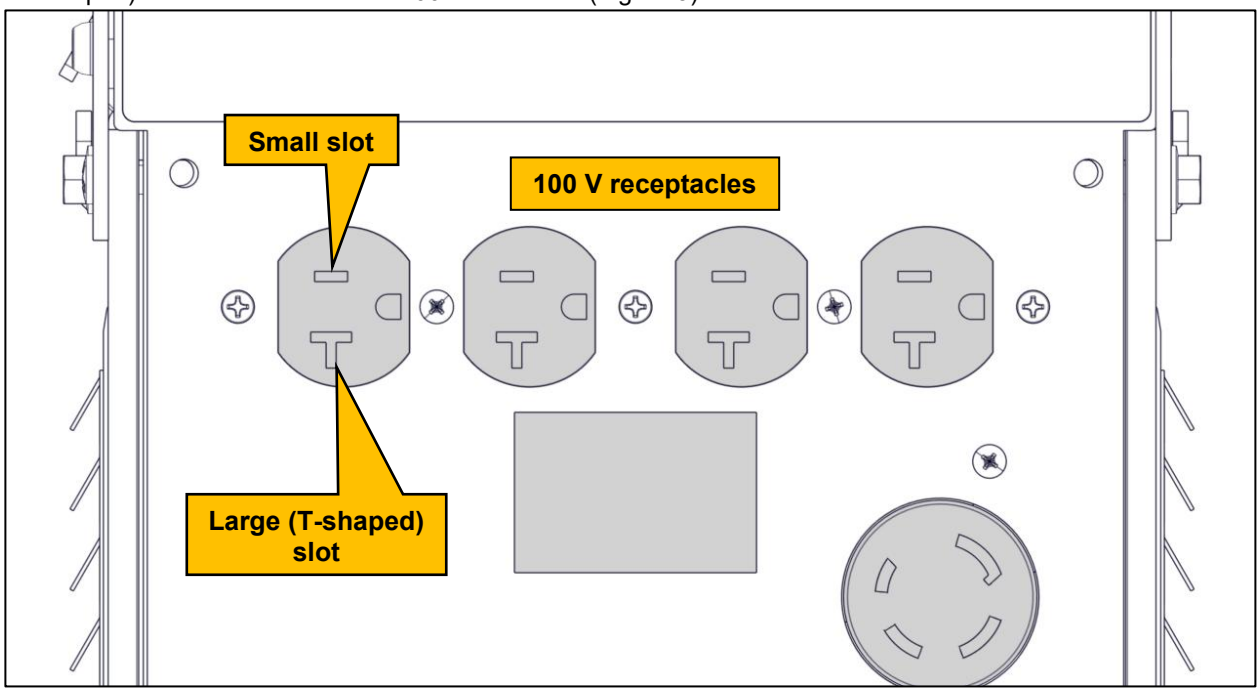

Figure 3

- ☐ Record the results in Table 2 below and compare them to the specifications provided.
- ☐ With the Multifunction running, ensure the main breaker is in the ON position, and neither of the 20 A breakers have been tripped (Figure 1).

Circuit	Specification	Large slot – Small slot
Left Outlet, Left side	Min. 92 V ac, Max. 108 V ac	
Left Outlet, Right side	Min. 92 V ac, Max. 108 V ac	
Right Outlet, Left side	Min. 92 V ac, Max. 108 V ac	
Right Outlet, Right side	Min. 92 V ac, Max. 108 V ac	

Table 2

- ☐ **If the unit fails the ac tests, perform the bridge rectifier test page 11. Otherwise, turn to page 5 for dc testing instructions**.

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TESTING DC CIRCUITS

It is possible for a faulty dc printed circuit (pc) board to damage the welder control box! It is not possible to test the welder control box without first ensuring a good dc pc board is installed.

- ☐ **Ensure the system has passed the ac circuit testing prior to testing the dc circuit.**
- ☐ Measure the open circuit dc voltage using multimeter probes between the positive and negative Dinse 50 weld terminals in each of the weld settings listed in Table *3* (Figure 4)

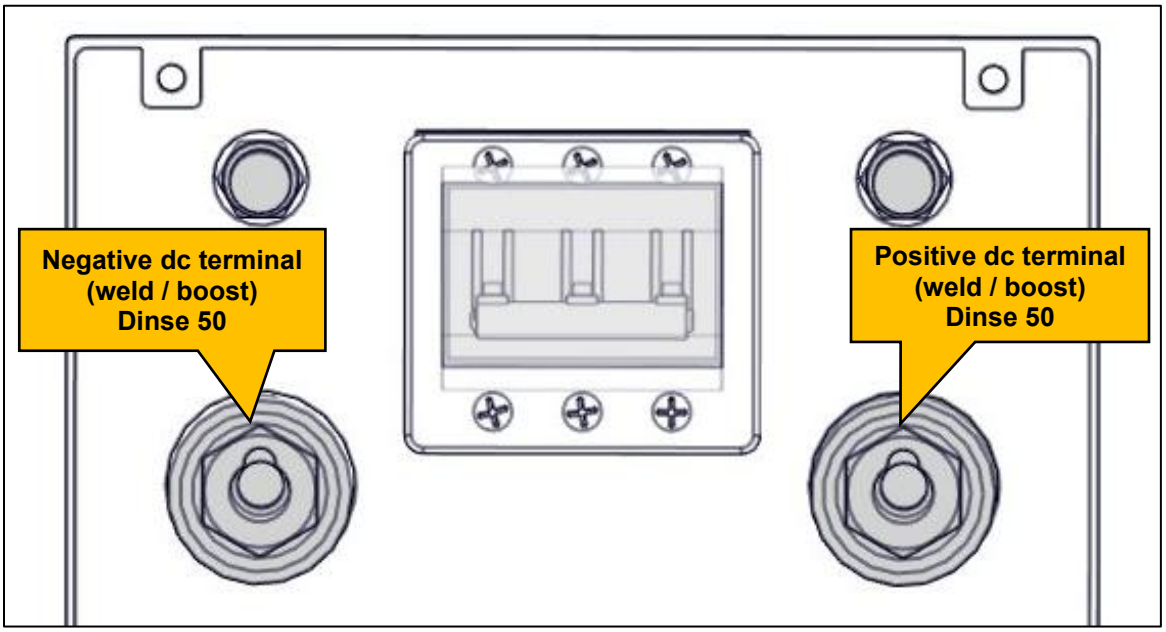

Figure 4

The order of operations for connecting batteries or switching the system into weld mode must be followed exactly to satisfy the boosting or welding interlock. If the steps are not followed correctly, the system will disable itself; there will be no dc output, and the generator must be reset. Consult the A500246 manual or your Multifunction owner's manual at VMAC Manuals & Illustrated Parts Lists for detailed instruction.

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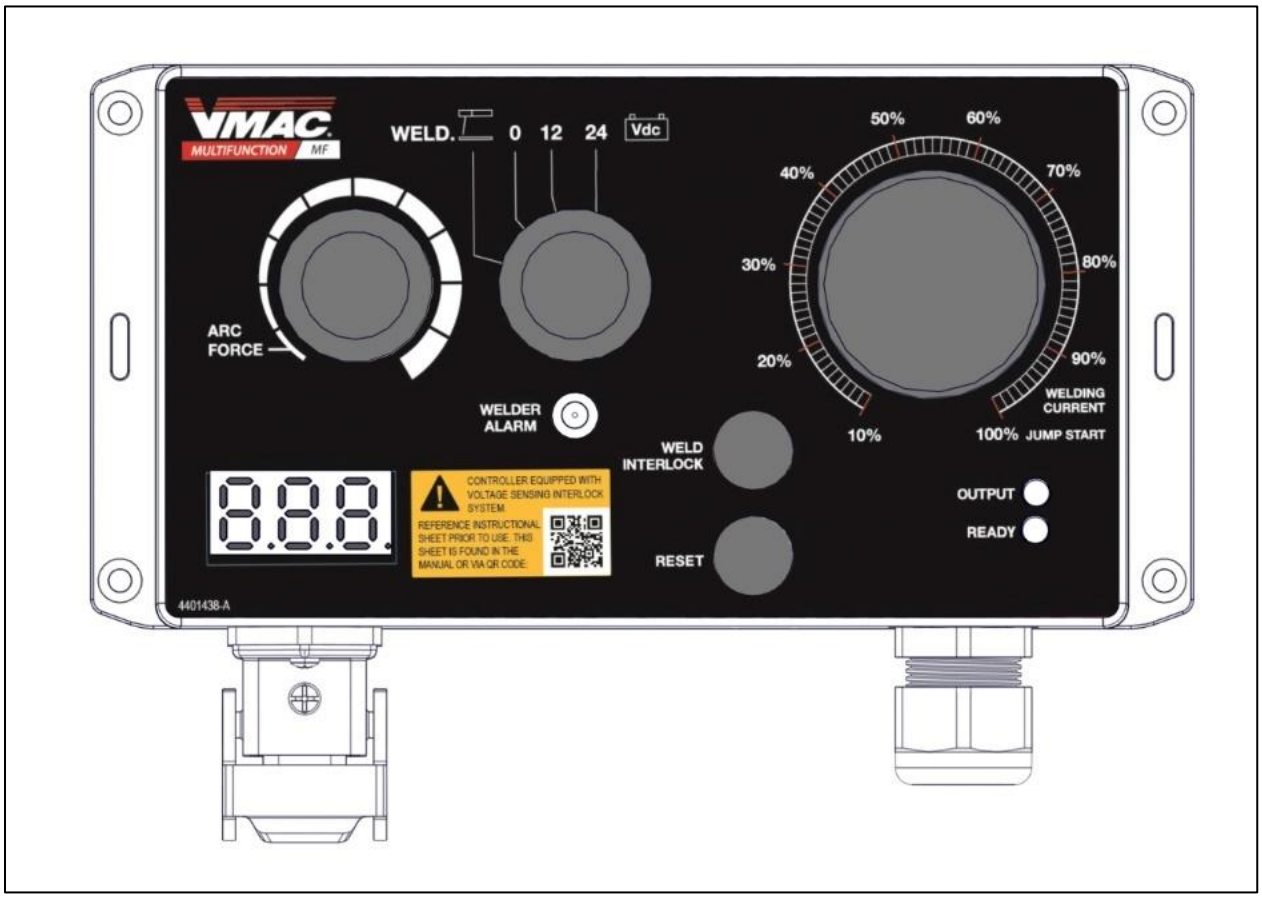

Figure 5

NOTE ***If an error occurs, record the error code displayed on the voltmeter display. Return the weld/charge selection knob to "0" position, press & hold the RESET button to reset the system before continuing tests.***

- ☐ Ensure nothing is connected to the Dinse 50 dc output terminals.
- ☐ Set the ARC FORCE to minimum (*Figure 5*).
- ☐ Set the WELDING CURRENT knob to 100%.
- ☐ **Ensure that the WELD/charge knob is in the 0 position.**
- ☐ Start the Multifunction and allow the engine to warm up for 1 minute.
- ☐ Engage the generator by switching on the toggle switch on the display panel.
- ☐ Invoke "battery detect override" by pressing and holding both RESET & WELD INTERLOCK buttons for 5 seconds before switching to 12V/24V modes. The red Output LED will repeat a 2-flash pattern, and the green Ready LED will illuminate full time.
- ☐ Measure the dc voltage in the 0, 12, and 24 settings.
- ☐ Record the results and compare them to the specifications provided (Table 3).
- ☐ Press & hold WELD INTERLOCK button while turning the weld/charge selection knob to WELD position. Both the red Output LED, and the Ready LED will illuminate full time.
- ☐ Measure the voltage in the WELD position and record the result and compare it to the specification provided (Table 3).

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Weld Selection Knob Setting	Specification	Measured Voltage
WELD	55-70 V dc	
0 V	0 V	
12 V	12-17 V dc	
24 V	24-32 V dc	

Table 3

- If the measured voltage values recorded in Table 3 are ***outside*** of the specifications, or the VSI control box is registering an Er 0 message, inspection of the connections to the dc pc board (see pages 9-10) and/or replacement of the generator dc pc board is required (P/N: A500199). Once the connections have been confirmed/corrected, or the dc pc board is replaced, retest the dc circuit.

- If the values recorded in Table 3 are outside of the specifications after confirming/correcting dc pc board connections and/or replacing the dc pc board, replacement of the welder control box is required (P/N: A500246).

- If the values recorded in Table 3 are ***within*** the specifications but the unit will not weld or charge properly, the generator has experienced a failure of one or more of its internal components. The generator must be replaced.

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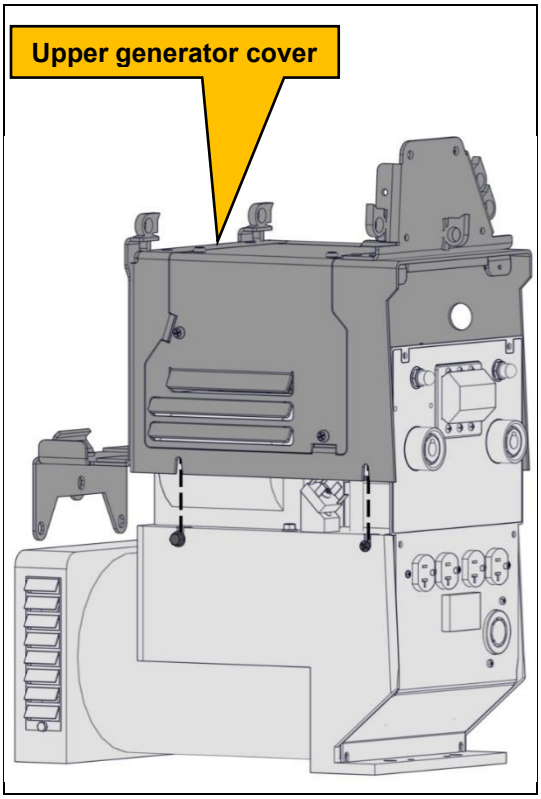
WELD VOLTAGES HIGH AND NON-ADJUSTABLE, OR ERROR MESSAGE “ER 0”.

- VSI weld control boxes may display “ER 0” (overvoltage event) and there will be no dc output (Figure 5).

Potential causes of this condition:

- Faulty dc pc board.
- Connectors are not positively engaged with the dc pc board.
- Damaged terminals within the harness connectors to the dc pc board.
- Damage to internal generator components.

Access the dc pc board, located on top of the generator, beneath the upper generator cover (Figure 6). See the A500199 Installation Manual at VMAC Manuals & Illustrated Parts Lists for detailed access instruction.



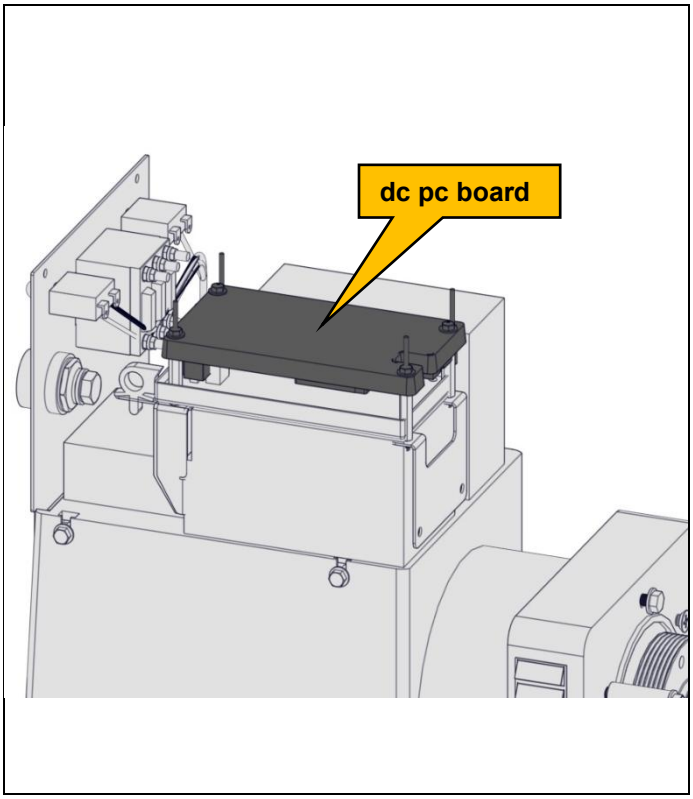


Figure 6

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INSPECT CONNECTORS:

☐ Inspect the 4 connectors that mate to the dc control board (4pin, 8pin, 14pin, 18pin), confirming that they are fully engaged with the dc pc board and that the locking tabs & levers are engaged to hold the connectors firmly in place (Figure 7).

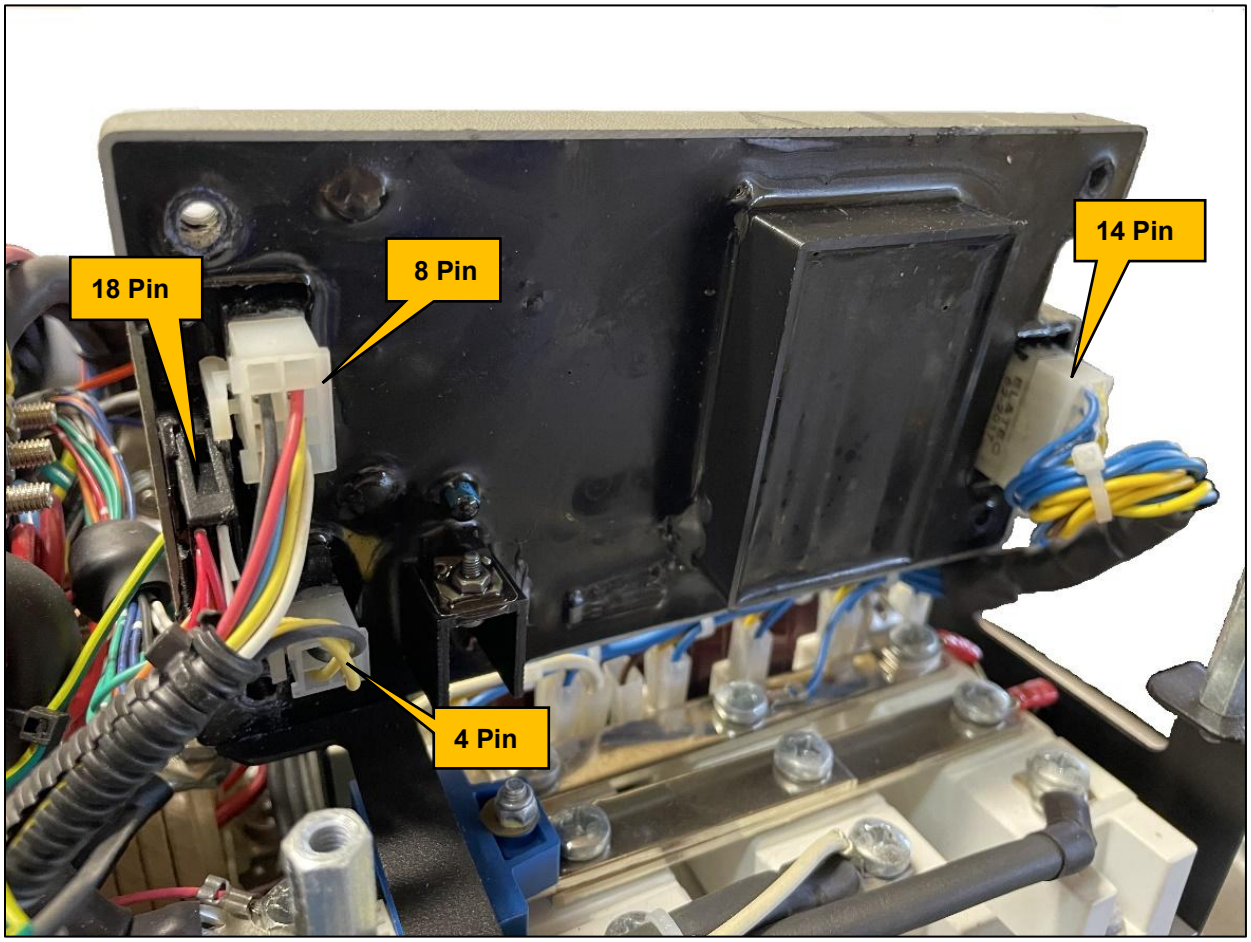

Figure 7

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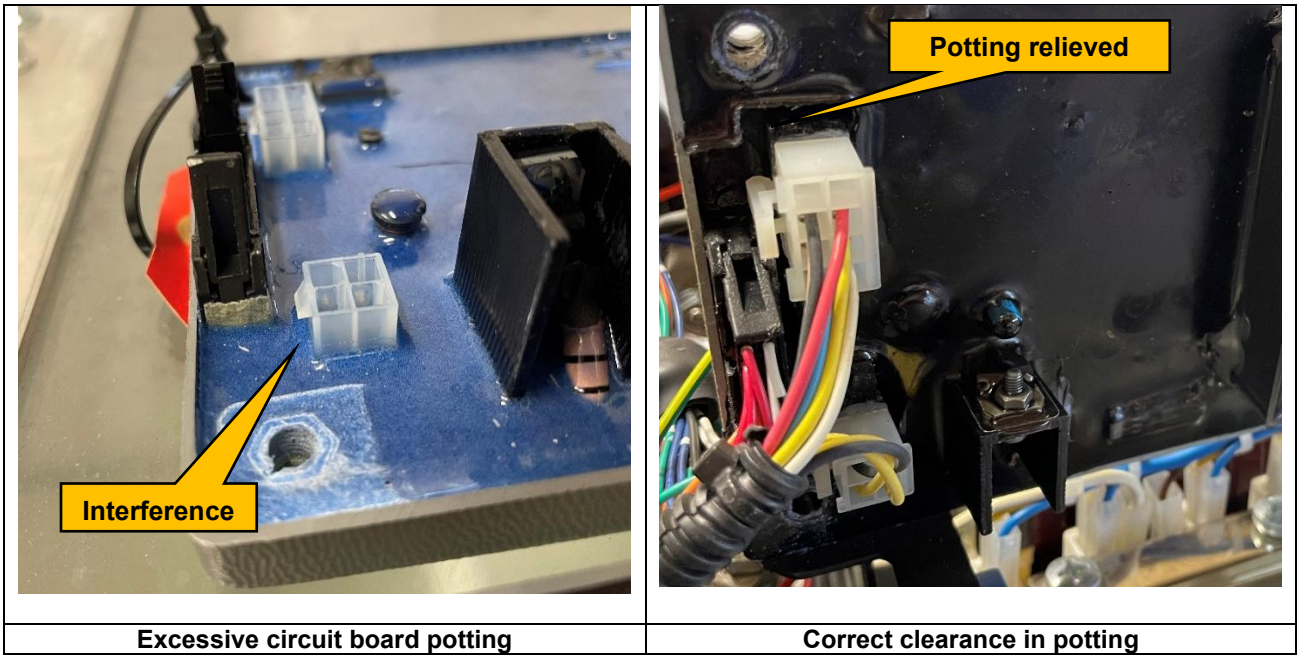
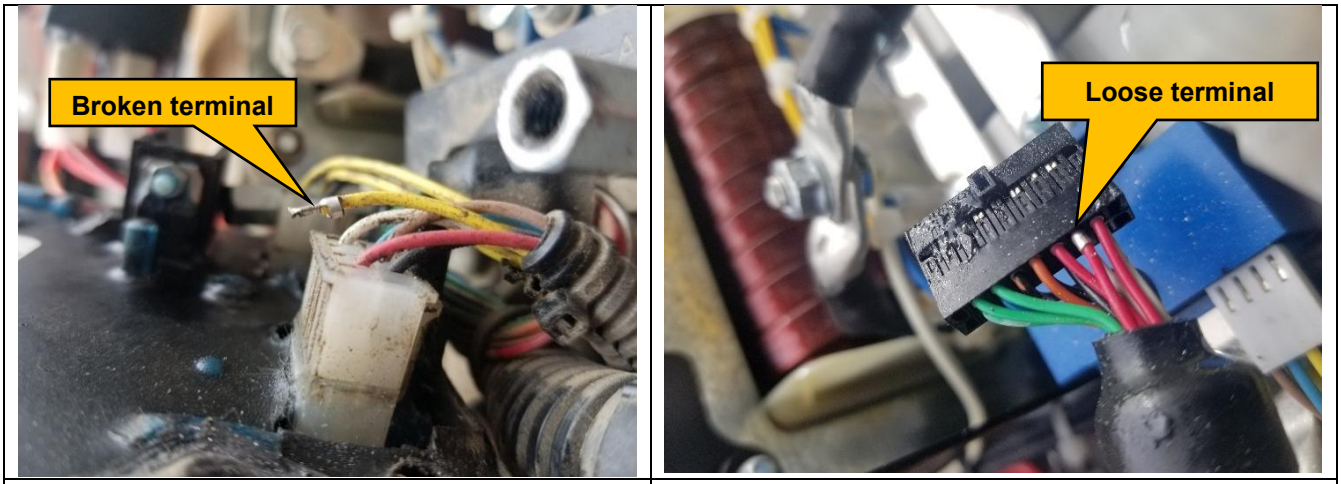
☐ If the connectors are not fully engaging with the dc pc board, inspect the circuit board potting surrounding the connector (Figure 8).



Excessive circuit board potting	Correct clearance in potting

Figure 8

☐ If the dc pc board potting surrounding the connectors is not relieved, and is preventing the locking tabs from engaging, contact VMAC Technical Support for assistance.
☐ Unplug the connectors from the dc pc board.
☐ Inspect the connectors for broken or loose terminals (Figure 9).



Broken pin in 8 pin connector	Loose pin in 18 pin connector

Figure 9

☐ Give each wire a gentle tug and see if any pull out of the connector (Figure 9)
☐ **If damaged connectors or terminals are found, see Appendix A on page 13.**

Version	Document	Department	Revision Details	Revised by	Tech	Engineering	Implemented
A	EXT-MF-020	Tech	Document release	BDJ	MSP	LUB	4 DEC 2025

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BRIDGE RECTIFIER TEST

NOTE ***This test is only required if the system has failed any of the ac voltage tests.***

- ☐ Turn the Multifunction off and disconnect the battery.
- ☐ With the generator cover off (see A500199 Installation Manual at VMAC Manuals & Illustrated Parts Lists for disassembly instructions), locate the bridge rectifier (**Figure *10***)

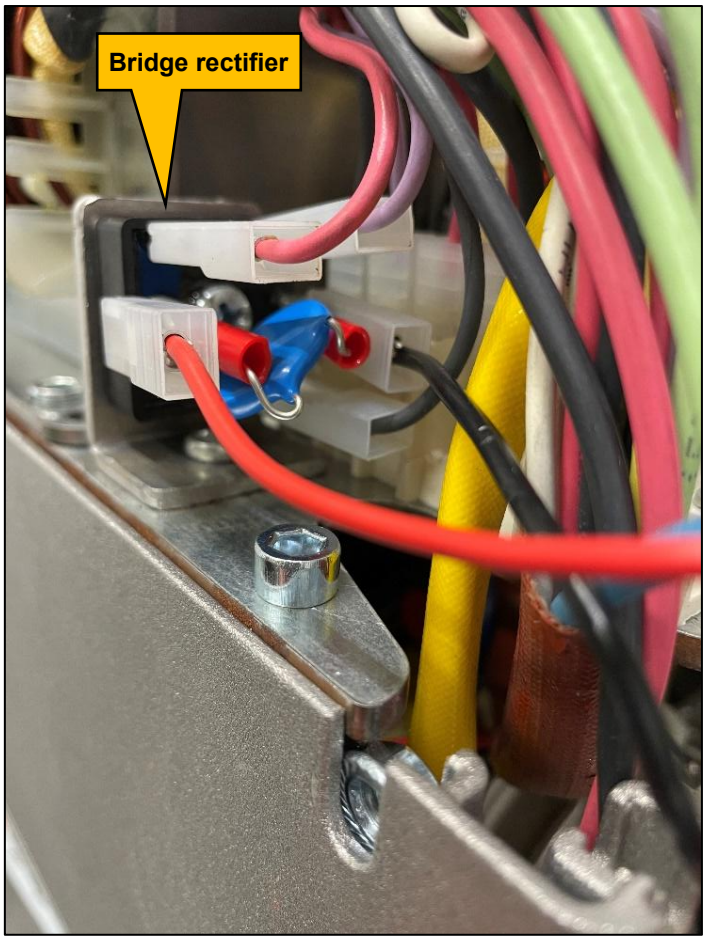

Figure 10

Carefully make note of the position of each wire colour on the bridge rectifier prior to disconnecting them, to ensure correct reassembly.

- ☐ Disconnect the wires from the bridge rectifier.
- ☐ Set the multimeter to “diode check” with the leads connected for voltage measurement.

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☐ With the ground lead of the multimeter connected to pin 5, connect the positive lead to the pins below and verify the voltages are within the specified range (If any pin produces a short or open circuit, the bridge rectifier has failed) (Figure 11)

- Probe pin 1: 0.4 V - 0.5 V
- Probe pin 2: 0.4 V - 0.5 V
- Probe pin 3: 0.4 V - 0.5 V

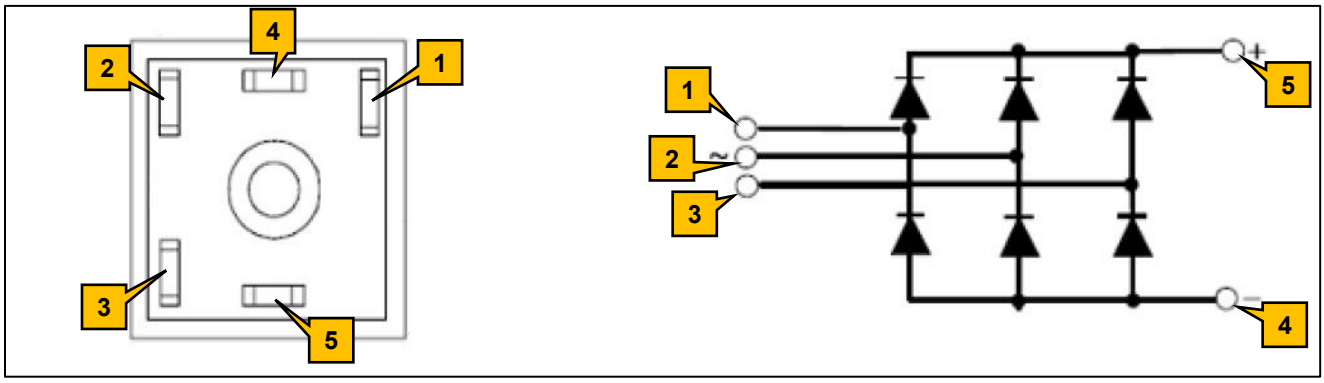

Figure 11

☐ With the positive lead of the multimeter connected to pin 4, connect the negative lead to the pins below and verify the voltages are within the specified range (If any pin produces a short or open circuit, the bridge rectifier has failed) (Figure 11).

- Probe pin 1: 0.4 V - 0.5 V
- Probe pin 2: 0.4 V - 0.5 V
- Probe pin 3: 0.4 V - 0.5 V

If the bridge rectifier fails the above tests: Replace the bridge rectifier, reassemble the generator, and re-test the system.

If the bridge rectifier passes the above tests: The exciter field in the generator may have lost its magnetism. See knowledge base article EXT-MF-011 Flash Multifunction Exciter Field (vmacair.com) for instructions to magnetize the exciter field.

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APPENDIX A

The following information is for the benefit of qualified technicians trained to perform repairs to high powered electrical equipment.
Improper repair presents the risk of damage to equipment, fire, and personal injury or death.

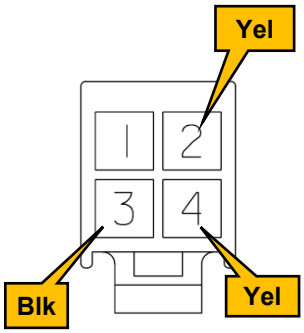
The information that follows was accurate as of 27 November 2025.
VMAC is not affiliated in any way with the vendor or the manufacturers of the referenced items below, and cannot be held responsible for changes in the design or for availability of these items.

VMAC does not supply pin or harness manufacturing components.

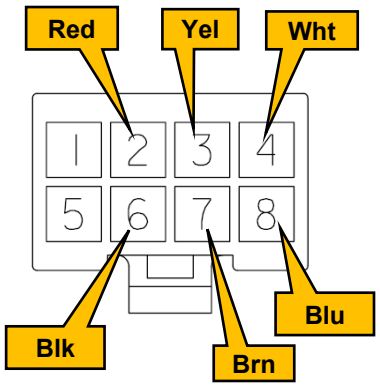
Parts for the connectors below are available for purchase from select electronics distributors.
The following information is intended to assist technicians who are qualified and able to make repairs to these harnesses.

☐ The 4 pin, 8 pin, and 14 pin connectors cannot be serviced without re-crimping (harness is non-removable).

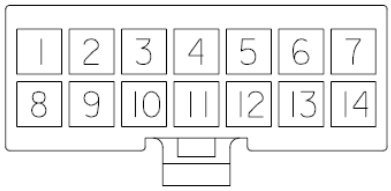
4pin Connector*
- Housing: 0039012045
- Terminals: 0039000039
- Pinout:



8pin Connector*
- Housing: 0039012085
- Terminals: 0039000039
- Pinout:



14pin Connector*
- Housing: 0039012145
- Terminals: 0039000039
- Pinout: multiple wire colours are duplicated in this connector, making pinout impractical. *Label wires carefully if removing.*



****Connectors Viewed from wire entry side****

Pin removal tool (works for all the above): 0011030044
Hand crimper (works for all the above): 0638190901 -> recommended OR 0638111000

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A	EXT-MF-020	Tech	Document release	BDJ	MSP	LUB	4 DEC 2025

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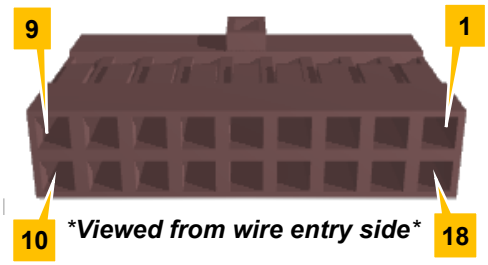
☐ The 18 Pin connector cannot be serviced without re-crimping. Although the harness is removable, removal presents risk and is not recommended.

18-pin connector
Housing: 69176-018LF
Terminals: 47217-000LF



PIN	WIRE COLOUR
1	EMPTY
2	RED
3	RED/BLACK
4	RED/WHITE
5	ORANGE
6	ORANGE/BLACK
7	GREEN
8	GREEN/BLACK
9	EMPTY

PIN	WIRE COLOUR
10	EMPTY
11	GREEN/WHITE
12	BLUE
13	BLUE/WHITE
14	BLACK
15	BLACK/WHITE
16	WHITE
17	WHITE/BLACK
18	EMPTY

Pin removal tool for 18 pin: HT-0080 (micro flat head screwdriver will also serve the purpose)
Hand crimper: 10162309-001

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