4 LEAD DEDICATED SINGLE PHASE LIMA ®MAC GENERATOR
MODELS 250MSL1185 AND 250MSL1152

SERVICE PROCEDURE – ELECTRICAL COMPONENT TESTING

HI POTENTIAL TETS

None of the windings, either rotating or stationary should be Hi-Potted while connected to the rectifier assemblies. Stationary windings should be disconnected from the stationary rectifier assembly, and rotors disconnected from the two full wave exciter rotor mounted rectifier bridges prior to performing Hi-Pot testing.

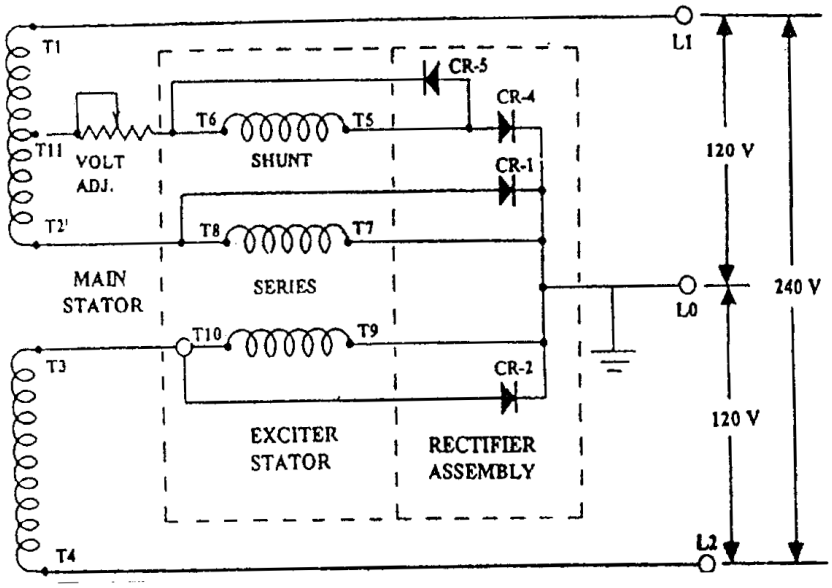
WINDING CONTINUITY TEST

The following lead connections should show continuity:

1. Generator (main) stator: 1, 2, and 11; 3 and 4.
2. Exciter stator: 5 and 6: 7 and 8; 9 and 10.
3. Exciter rotor: All three leads.
4. Generator (main) rotor: Both leads.

On a generator that already has the exciter stator and main stator inter-connected, generator stator and exciter stator continuity may be checked by disconnecting main stator leads T5 and exciter lead T10 from the terminal strip, exciter stator leads T7 and T9 from the ground lug, and unsoldering main stator lead T11 from the voltage adjust resistor. See Figure 1. In this case, the shunt winding should be checked with an ohmmeter in both polarities as CR-5 will show a circuit in one direction. Also, with one ohmmeter polarity, a circuit will show between the shunt winding (T5 and T6) and one series winding (T9 and T10).

Figure 1 **240/120 Volt Connection**



WINDING POLARITY TEST

The following tests will show proper winding polarities and lead tagging. Both the exciter stator and main stator windings can be checked without disconnecting and inter-connecting leads. Refer to Figure 1 above to assist in making these tests.

1. Exciter Stator

A. Shunt Windings (T5-T6): Connect a 12 volt DC power supply, positive to shunt lead T6, and negative to shunt lead T5. A compass should show all three shunt poles (small wire) with the same polarity.

B. Series windings (T7 – T8 and T9-T10);

a. Connect a 12 volt DC power supply, positive to series lead T7, and negative to series lead T8. A compass should show all three series poles (larger wire) with the same polarities, but these should have the opposite polarity to those shown by the shunt poles.

b. The other series winding should be checked in the same manner with the positive lead of the DC power supply applied to series lead T9, and the negative lead applied to series lead T10. A compass should show the same results in all three of these series poles, and of the opposite polarity of the shunt poles as detailed above.

2. Main Stator

A. Main Stator and Exciter Stator Inter- Connected. Connect the generator leads T1, T2, T3, and T4 to the terminal board for 240/120 volt operation. Apply a 12 volt DC supply to generator leads T1 and T4 – polarity of the DC supply is of no importance. A compass should show alternating north-south deflections as it is moved around the main stator – two norths and two souths.

B. Stator not Inter-Connected. Do not make connections of generator leads T1, T2, T3, and T4 to the terminal board. Tie together generator leads T2 and T3. Apply a 12 volt DC power supply to generator leads T1 and T4, and check the main stator as outlined above.

3. Main Rotor. Disconnect the two main rotor leads from the rotating rectifier assembly. (Figure 2) Applying a DC power supply to the main rotor leads should result in alternating north and south poles. Use an impedance test to determine shorted turns in the pole windings.

ROTATING RECTIFIR ASSEMBLY

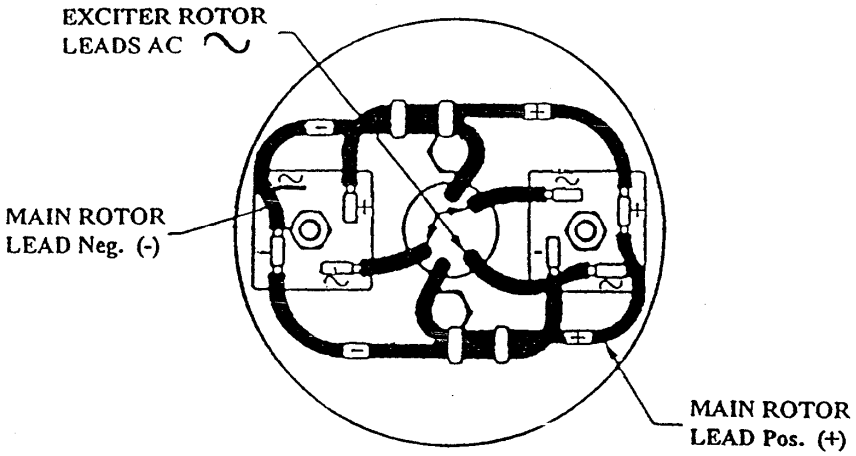
The rotating rectifier assembly consists of two full wave, single phase molded bridge rectifiers mounted on the exciter rotor core with cap screws. Each bridge consists of a Positive (+) terminal, a Negative (-) terminal and two AC terminals marked with an AC sine wave symbol. Test equipment can be an ohmmeter, a battery powered continuity

checker, or a multi meter with a diode checker mode. To test the bridge rectifiers: Remove all external leads from the bridge terminal posts.

1. Apply one probe of the tester to the Positive (+) terminal of the bridge, and the other probe to each of the two AC terminals in succession. The readings should be identical. That is; if a battery light tester is used, you should see either a light of no light with the second probe in contact with each AC terminal. If an ohmmeter or diode tester is used; ohmic values should be infinity, or very low (near zero) resistance with the second probe in contact with each AC terminal. Reverse the tester probes such that the probe that was affixed to the (-) terminal is now used to make contact with the AC terminals, and the probe that was used to contact the AC terminals is now affixed to the (=) terminal. The readings should be identical, but opposite from those observed in the first procedure. That is, if the battery-light checker showed a light the first time, it should show no light this time (or vice versa). The same will be true for an ohmmeter or diode checker. A low or near zero reading the first time should result in an infinity reading with the probes reversed. If these tests do not result in the proper readings, the bridge should be considered to be defective.

2. Repeat the above procedure using the Negative (-) bridge terminal as the reference. As in Step 1 above, if this procedure does not result in the proper readings, the bridge should be considered to be defective. Repeat both procedures on the second bridge. If either bridge tests defective, recommended practice is to replace both bridges, not just the defective bridge. The reasoning behind this is that both bridges are essentially the same circuit, and should have been exposed to the same stresses. If one bridge has been stressed to failure, the second bridge should be considered suspect.

Figure 2 Rotating Rectifier Assembly



STATIONARY RECTIFIER ASSEMBLY

1. Open or short diode.

A. Shunt Diodes CR-4 and CR-5 may be checked without being disconnected. When checking these diodes while still connected, they will not show infinity in the reverse direction as when disconnected, but they will indicate a definite difference in resistance when checked in each direction. Diode CR-5 must be unsoldered from the terminal strip to be checked as an individual diode.

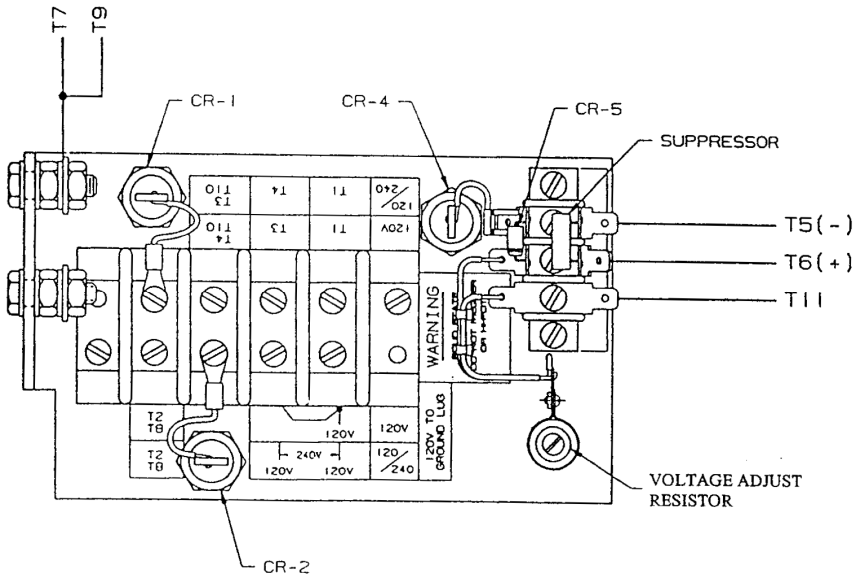
B. Diodes CR-1, CR-2, and CR-4 can be checked by disconnecting their leads from the terminal strip.

2. Diode Polarity.

A. Diodes CR-1, CR-2, and CR-4 are standard (forward) polarity stud type diodes with the cathode connected to the diode base.

B. Diode CR-5 is a “pigtail” type diode. The tapered end, or the end with a stripe, is connected to the voltage adjust resistor.

Figure 3 Stationary Rectifier Assembly



SERVICE PROCEDURE – RESTORING RESIDUAL MAGNETISM

The 4 lead single phase Lima ®MAC generator required approximately 12 volts DC to restore the residual magnetism (flash the field). This DC voltage is applied to generator leads T5 and T6 affixed to the small terminal strip on the stationary rectifier assembly. See Figure E above. Lead T6 is positive (+) and lead T5 is negative (-). These two leads are soldered to the terminal strip tabs of the small rectifier assembly. When flashing the field with leads T5 and T6 secured to the strip. **USE AN UNGROUNDED 12 VOLT DC SOURCE.** If the only source of 12 volts DC is a grounded source such as the set

cranking battery with the negative grounded, leads T5 and T6 must be lifted from the terminal strip prior to flashing. Apply the 12 volts directly to these two leads. Negative (-) to lead T5, and positive (-) to T6. Field flashing of the 4 lead single phase Lima ®MAC generator may be accomplished with the unit at rest or while running.

TROUBLESHOOTING – PROBLEMS AND POSSIBLE CAUSES

WILL NOT GENERATE A VOLTAGE

1. Loss of residual magnetism. Flash the field per instructions on pages 4 and 5 above.

2. Open main rotor circuit

A. Cut winding.
B. Open inter-pole connections
C. Leads not properly brazed
D. Main rotor lead(s) cut, or improperly crimped flag terminals.

3. Shunt rectifier (CR-4, CR-5) See Figures 1 and 3.

A. Open or shorted diode.
B. Diode CR-4 is of the wrong polarity.
C. CR-5 is connected backwards.

4. Open Exciter Stator Winding
5. Open Main Stator Winding
6. Exciter Rotor.
7. Open Voltage Adjust Resistor.

GENERATOR PRODUCES LOW VOLTAGE

1. Rotating Rectifier Assembly.

A. Open or shorted bridge.
B. Bridge connections not properly made. See Figure 2 page 3.
C. Loose crimps or loose connection of exciter rotor or main rotor leads.

2. Misalignment of main rotor with main stator.

A. Single bearing generators, wrong XG dimension
B. Main stator improperly positioned in generator frame. Usually seen after the main stator has been rewound.

3. Exciter rotor – rectifier assembly improperly connected.

4. Improperly rewound rotor or stator.

GENERATOR PRODUCES HIGH VOLTAGE

1. **Generator Improperly Rewound.**

A. Main Stator tap is improperly installed during rewind.
B. Wrong data used in rewinding.

VOLTAGE PROPER AT NO LOAD, COLLAPES UNDER LOAD

1. Improper Connections on Stationary Rectifier Assembly.

A. Shunt leads T5 and T6 are reversed on the small rectifier assembly terminal strip.

B. Series leads T7 and T8, and/or T9 and T10 are reversed on the terminal strip.

2. Series Diodes. CR-1 and/or CR-2 are shorted, or of the wrong polarity.

GENERATOR QUITS PRODUCING A VOLTAGE DURING TEST.

1. One or More Connections are opened.
2. Rotating or stationary diode is shorted.

VOLTAGE ADJUST RESISTOR BURNS OUT WHEN FLASHED, OR DURING TEST.

1. Defective resistor.
2. CR-5 shorted, or connected backwards.

EXTERNAL CONNECTIONS