

| | | |
|---|-------------------------------------|---|
| g <i>GE Industrial Systems</i> | Test and Operating Procedure | |
| | DATE : 07/20/00 | PAGE 1 OF 6 |
| QUALITY REP: | | |
| TITLE: Test Procedure for Alternator Regulator Assembly | | PROCEDURE: LOU – GED – 331X372BCG01 - A |

1. INTRODUCTORY DESCRIPTION

- A. This procedure establishes the methods for testing a
- B. Environmental ranges: 70 +/- 10 Deg. F. with 20-75% R.H.
- C. Unit warm-up/stabilization period requirement: None
- D. Personnel using this procedure are expected to have a high degree of confidence and expertise in related testing and calibration procedures.
- E. Procedures not explained here are considered to be understood as common practice.

2. TEST EQUIPMENT VERIFICATION

- A. Verify the accuracy of the standard(s) used in the repair/calibration process by evidence of recent calibration labeling affixed to the test equipment.
- B. All measurement standards used in this procedure shall be traceable to the NATIONAL INSTITUTE of STANDARDS and TECHNOLOGY (N.I.S.T.) and shall have the accuracy, stability, range and resolution required for the intended use.
- C. Unless otherwise specified, the collective uncertainty of the Measurement Standard(s) shall not exceed twenty five percent of the acceptable tolerance for each characteristic being calibrated.
- D. All deviations shall be documented.

3. EQUIPMENT CLEANING

- A. All equipment clean will be performed as instructed in the GE Renewal Services SOP Sec. 14.0

4. EQUIPMENT INSPECTION

- A. The following criteria should be used as a guideline or basis for the inspection process of the this unit:
 - 1. Wires broken or cracked.
 - 2. Terminal strips / connectors broken or cracked.
 - 3. Loose wires.
 - 4. Components visually damaged.
 - 5. Capacitors leaking.
 - 6. Solder joint, cold or otherwise inadequate.
 - 7. Circuit board discolored or burned.
 - 8. Printed wire runs burned or damaged.

| | | |
|---|-------------------------------------|---|
| g <i>GE Industrial Systems</i> | Test and Operating Procedure | |
| | DATE : 07/20/00 | PAGE 2 OF 6 |
| QUALITY REP: | | |
| TITLE: Test Procedure for Alternator Regulator Assembly | | PROCEDURE: LOU – GED – 331X372BCG01 - A |

5. REVISION HISTORY

| Revision | Date | Reason for Revision |
|----------|----------------|---|
| A | 7-20-00 | Initial Procedure – After Verification |
| B | | |
| C | | |
| D | | |
| E | | |
| F | | |
| G | | |
| H | | |
| I | | |
| J | | |
| K | | |

| | | |
|--|-------------------------------------|--|
| g <i>GE Industrial Systems</i> | Test and Operating Procedure | |
| | DATE : 07/20/00 | PAGE 3 OF 6 |
| QUALITY REP: | | |
| TITLE: Test Procedure for Alternator Regulator Assembly | | PROCEDURE: LOU – GED – 331X372BCG01 - A |

6. **REFERENCE DOCUMENTATION**

- 331X372BCG01 shop manual

7. **THEORY OF OPERATION**

- The purpose of the 331X372BCG01 Alternator Regulator Assembly is to regulate the output voltage of a diesel-driven 3 phase 240vac alternator by controlling current through the alternator field. The assembly also provides over-voltage, over-frequency and under-frequency protection by cutting field current to the alternator under any of these conditions.
- DIP switch SW1 and pots P1 (Volt Adjust) and P2 (Gain) program the unit for the levels needed for a particular application. We program the unit for 200-240vac (60hz) with an over-voltage trip level of 250vac and with over and under-frequency settings that are the most sensitive.
- Normal operation of the unit is tested by applying 220vac 60hz to the unit under test using an adjustable 3 phase Variac while verifying that the field output level can be controlled with Voltage Adjust pot P1.
- Over-voltage protection is simply tested by increasing the input voltage from the Variac beyond the 250vac trip level to kill the field output.
- The over-frequency trip level is tested using a bench power supply to over-ride a DC control level which forces the unit to expect less than 60hz with 60hz coming in.
- The under-frequency trip level is tested in a like manner by forcing the unit to expect more than 60hz with only 60hz coming in.

8. **TEST EQUIPMENT TO BE USED**

- (1) Adjustable 3 Phase AC Variac (cart)
- (1) Regular 100w 120vac light bulb (for use as load)
- (1) 0-30vdc bench power supply.

| | | |
|--|-------------------------------------|--|
| g <i>GE Industrial Systems</i> | Test and Operating Procedure | |
| | DATE : 07/20/00 | PAGE 4 OF 6 |
| QUALITY REP: | | |
| TITLE: Test Procedure for Alternator Regulator Assembly | | PROCEDURE: LOU – GED – 331X372BCG01 - A |

- (3) Fluke 85 digital multi-meters (or equivalent).
- (1) Small momentary push-button switch (SPST)
- Assorted test leads and jumpers.

9. FINAL TEST AND OPERATION PROCESS

- Make sure no power is applied to the Variac and set it Fully Counterclockwise for zero output voltage.
- Connect Terminal 5 to Terminal 12 of the TB terminal strip on the upper board of the unit under test,
- Connect Terminal 6 to Terminal 7.
- Connect Phase 1 of the Variac to Terminal 7, Phase 2 to Terminal 8 and Phase 3 to Terminal 9. Connect Neutral of the Variac to Terminal 5.
- Connect a Fluke meter set to measure AC voltage across Phases 1 and 2.
- Connect a momentary push button switch between terminals 1 and 5 for RESET purposes.
- Connect the light bulb load and a Fluke meter set for DC voltage across terminals 10(+) and 11(-).
- Set the Voltage Adjust pot P1 Fully CW and the Gain pot P2 Fully CCW.
- Set DIP switch SW1 positions 1 through 5 in the ON position.
- Turn ON the 3 Phase 240vac power feeding the Variac.
- Slowly increase the output of the Variac to 220VAC.
- Verify +14 vdc across C24 on the upper board.
- Push the Reset button (FOR AT LEAST 5 SECONDS).
- Slowly turn the Voltage Adjust pot (P1) through it's range to verify you can adjust the voltage to the load between 0 and approx +25vdc. It may be occasionally necessary to perform a RESET if you trip the unit out from adjusting P1 too quickly. (Note: the light bulb will never get very bright)

| | | |
|--|-------------------------------------|--|
| g GE Industrial Systems | Test and Operating Procedure | |
| | DATE : 07/20/00 | PAGE 5 OF 6 |
| QUALITY REP: | | |
| TITLE: Test Procedure for Alternator Regulator Assembly | | PROCEDURE: LOU – GED – 331X372BCG01 - A |

- Set the Voltage Adjust pot (P1) Fully Clockwise for maximum output.
- Slowly increase the output of the Variac until the light bulb trips OFF due to an Over-Voltage Condition at approx 250VAC (+/-20vac).
- Reduce the Variac back down to 220VAC.
- Push the Reset button (FOR AT LEAST 5 SECONDS).
- Verify the light bulb is back fully ON.
- Reduce the Variac to 0 volts and turn OFF power to the Variac.
- Set DIP switch SW1-1 in the OFF (50hz) position.
- Connect the negative side of the bench power supply to Terminal 5 (common) and the positive side to the junction of R36 and R37 on the bottom board.
- Attach a Fluke meter across the power supply and set the power supply to output +14vdc.
- Turn ON power to the Variac and set it to output 220VAC.
- Push the Reset button (FOR AT LEAST 5 SECONDS) if the light bulb is not back fully ON.
- Slowly reduce the output of the bench supply until the light bulb trips OFF due to an Over-Frequency Condition at aprox +13.5vdc. (opposite of what you might think)
- Increase the bench supply back up to +14vdc.
- Push the Reset button (FOR AT LEAST 5 SECONDS).
- Verify the light bulb is back fully ON.
- Now slowly increase the output of the bench supply until the light bulb trips OFF due to an Under-Frequency Condition at aprox +17.5vdc. (opposite of what you might think)
- Decrease the bench supply back down to +14vdc.
- Push the Reset button (FOR AT LEAST 5 SECONDS).
- Verify the light bulb is back fully ON.
- Reduce the Variac to 0 volts and turn OFF all power.
- **YOU ARE FINISHED!**

| | | | | |
|---|--|--------------------|--|--|
| g <i>GE Industrial Systems</i> | Test and Operating Procedure | | | |
| QUALITY REP: | DATE : 07/20/00 | PAGE 6 OF 6 | | |
| <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> TITLE: Test Procedure for Alternator Regulator Assembly </td> <td style="width: 50%; vertical-align: top;"> PROCEDURE: LOU – GED – 331X372BCG01 - A </td> </tr> </table> | | | TITLE: Test Procedure for Alternator Regulator Assembly | PROCEDURE: LOU – GED – 331X372BCG01 - A |
| TITLE: Test Procedure for Alternator Regulator Assembly | PROCEDURE: LOU – GED – 331X372BCG01 - A | | | |

10. SPECIAL INFORMATION

TEST WRITTEN BY: Eric W. Rouse

DATE: 7-20-00

TEST VERIFIED BY: Paul Kelley

DATE: 7-20-00