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Troubleshooting

EMCP 3

Media Number -RENR7902-01

Publication Date -01/01/2006

Date Updated -27/01/2006

I02464681

Generator Underfrequency Warning

SMCS - 4490

System Operation Description:

If the frequency drops below the Generator Underfrequency Percentage Threshold setpoint value, then the underfrequency timer will begin timing. When the timer expires, then the Generator Underfrequency event is made active (if the frequency has been below the threshold level continuously while timing). If the frequency rises above the Generator Underfrequency Percentage Threshold, then the Generator Underfrequency event will be made inactive and the timer will be reset.

If an underfrequency condition is detected, then "GEN UNDERFREQUENCY SHUTDOWN" or "GEN UNDERFREQUENCY WARNING" will be displayed on the EMCP 3 in order to inform the operator of an underfrequency condition.

Note: The severity of the underfrequency condition will determine if a warning or shutdown event occurs.

Conditions Which Generate This Code:

The code for generator underfrequency is generated when the EMCP 3 determines that a generator underfrequency condition has occurred.

Test Step 1. TALK TO THE OPERATOR

- A. Determine the conditions that caused the underfrequency condition.

Expected Result:

An underfrequency condition was caused by an occurrence that is known to the operator and the operator would like to put the genset back into service.

Results:

- **OK** - The operator can determine the cause for the underfrequency condition, the condition has been repaired and the operator wants to put the genset back into service.

Repair: Reset the genset. Resume normal operation and verify that the problem has been corrected.

STOP

- **NOT OK** - The underfrequency condition was not caused by an occurrence known to the operator. Proceed to Test Step 2

Test Step 2. CHECK THE SETPOINTS.

- A. View the Generator Underfrequency and Generator Desired Engine Speed Request setpoints. Make a note of the setpoints. See Testing and Adjusting, "Electronic Control Module (Generator Set) - Configure". Compare the setpoints against the default setpoints of the particular generator set.

Expected Result:

The setpoints are correct.

Results:

- **OK** - The setpoints are correct for your particular genset. Proceed to test step 3 for EUI engines. Proceed to test step 4 for MUI engines
- **NOT OK** - The setpoints are NOT correct.

Repair: Reprogram the setpoints. Reset the genset. Resume normal operation and verify that the problem has been corrected.

STOP

Test Step 3. VERIFY FREQUENCY CAN BE VIEWED AND ADJUSTED FROM THE EMCP 3 (EUI ENGINES ONLY)

Verify the generator output frequency can be viewed and adjusted from the EMCP 3 Display Screen.

Expected Result:

The generator output frequency can be viewed and adjusted from the EMCP 3 Display Screen.

Results:

- **OK** - The generator output frequency can be viewed and adjusted from the EMCP 3 Display Screen.

Repair: Adjust the generator output frequency to meet site requirements. Resume normal operation and verify that the problem has been corrected.

STOP

- **NOT OK** - The generator output frequency cannot be adjusted. Proceed to test step 7
- **NOT OK** - The generator frequency reads zero on the EMCP Display Screen. Proceed to test step 8

Test Step 4. CHECK THE SYSTEM BY USING THE SPEED POTENTIOMETER. (MUI ENGINES ONLY)

- A. With the engine running, adjust the generator output frequency by turning the speed potentiometer.

Expected Result:

The generator output can be adjusted to the desired frequency.

Results:

- **OK** - The generator output frequency can be adjusted.

Repair: Adjust the generator output frequency to meet site requirements. Resume normal operation and verify that the problem has been corrected.

STOP

- **NOT OK** - The generator output frequency cannot be adjusted with the speed potentiometer. Proceed to test step 5

Test Step 5. CHECK THE RESISTANCE OF THE ENGINE SPEED POTENTIOMETER. (MUI ENGINES ONLY)

- A. Disconnect the speed potentiometer from the terminals "11" and "12" on the 2301A Governor.
- B. At the speed potentiometer, measure the resistance of the speed potentiometer.

Expected Result:

The resistance should be adjustable between 0 and 100 ohms.

Results:

- **OK** - The resistance of the sensor is correct. Proceed to Test Step 6.
- **NOT OK** - The resistance of the speed potentiometer is not correct.

Repair: Replace the speed potentiometer. Resume normal operation and verify that the problem has been corrected.

STOP**Test Step 6. CHECK THE SPEED POTENTIOMETER HARNESS FOR AN OPEN CIRCUIT.
(MUI ENGINES ONLY)**

- A. Disconnect the speed potentiometer harness from the 2301A governor.
- B. Check for an open circuit. Check the resistance from the wire connected to terminal "11" of the 2301A governor to the same wire number at the speed potentiometer. The resistance should be 5 ohms or less.
- C. Check for an open circuit. Check the resistance from the wire connected to terminal "12" of the 2301A governor to the same wire number at the speed potentiometer. The resistance should be 5 ohms or less

Expected Result:

When the resistance is measured between the wire connected to terminal "11" of the 2301A governor to the same wire number at the speed potentiometer connector, the resistance should be 5 ohms or less.

When the resistance is measured between the wire connected to terminal "12" of the 2301A governor to the same wire number at the speed potentiometer connector, the resistance should be 5 ohms or less.

Results:

- **OK** - The harness functions properly. Proceed to test step 8
- **NOT OK** - The harness wiring with the incorrect resistance measurement has failed. Replace the failed harness from the 2301A governor to the speed potentiometer or repair the failed harness from the 2301A governor to the speed potentiometer. Resume normal operation and verify that the problem has been corrected.**STOP**

**Test Step 7. CHECK J1939 DATA LINK BETWEEN THE EMCP 3 AND THE ENGINE ECM
(EUI ENGINES ONLY)**

Refer to the Genset Electrical System Schematic in the Service Manual and check the Data Link wiring between the EMCP 3 and the Engine ECM. For more information on troubleshooting the Data Link, see Troubleshooting , "Data Link Circuit Fault ".

Results:

- **OK** - The J1939 Data Link wiring is correct. Proceed to test step 8
- **NOT OK** - The wiring is not correct

Repair: Repair the Data Link wiring or Replace the Data Link wiring. Resume normal operation and verify the problem has been corrected.

STOP

Test Step 8. CHECK THE VOLTAGE INPUT FUSES.

- A. Check the three fuses on the AC voltage inputs of the EMCP 3.

Expected Result:

The fuses should not be open.

Results:

- **OK** - The fuses are not open. Proceed to test step 9
- **NOT OK** - One or more of the fuses are open.

Repair: Check for a shorted component or damaged wiring. Troubleshoot and repair the problem. See the Generator Set Wiring Diagram for your particular genset. After the problem has been repaired, replace the fuses.

STOP

Test Step 9. CHECK THE GENERATOR VOLTAGE OUTPUT.

- A. Open the circuit breaker or remove the load.
- B. Start the engine and run the genset.
- C. Measure the voltage between all three AC input fuses.

Expected Result:

The line to line voltage should measure the rated voltage of the genset.

Results:

- **OK** - The voltages are correct and the problem remains. Proceed to Test Step 10.
- **NOT OK** - One or more of the voltages are NOT correct.

Repair: The wiring or the connections the are damaged. Check for damaged wiring between the fuses and the generator output bus. See the Generator Set Wiring Diagram for your particular genset. Repair the wiring or replace the wiring. Resume normal operation and verify the problem has been corrected.

STOP

Test Step 10. CHECK THE VOLTAGE INPUT CONNECTIONS

- A. Shut down the engine.

- B. Remove the EMCP 3 harness connector from the EMCP 3.
- C. Check the EMCP 3 harness connector. See Testing And Adjusting, "Electrical Connector - Inspect".
- D. Check for one or more damaged wires between the EMCP 3 voltage inputs and the voltage input fuses. See the Generator Set Wiring Diagram for your particular genset.

Expected Result:

The wiring and the connectors should have been good.

Results:

- **OK** - NO problem was found with the connectors or with the wiring.

Repair: The EMCP 3 may have failed. It is unlikely that the EMCP 3 has failed. Exit this procedure and perform this entire procedure again. If the problem remains, replace the EMCP 3. See Testing And Adjusting, " Electronic Control Module (Generator Set) - Replace".

STOP

- **NOT OK** - The problem was with the connectors or with the wiring.

Repair: Repair the connectors or replace the wiring harness. Resume normal operation and verify that the problem has been corrected.

STOP