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## Troubleshooting

### EMCP 3

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## Generator Undervoltage Warning

SMCS - 4490

### System Operation Description:

If the voltage drops below the Generator Undervoltage Percentage Threshold and Automatic Voltage Regulator (AVR) Request setpoint value, the undervoltage timer will begin timing. When the timer expires, the Generator Undervoltage event is made active (if the frequency has been below the threshold level continuously while timing). If the voltage rises above the Generator Undervoltage Percentage Threshold, the Generator Undervoltage event will be made inactive and the timer will be reset.

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

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

### Conditions Which Generate This Code:

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

### Test Step 1. TALK TO THE OPERATOR

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

### Expected Result:

An undervoltage was caused by an occurrence 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 undervoltage 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 undervoltage 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 Undervoltage, Automatic Voltage Regulator (AVR) Desired Voltage Request and Generator AC Monitor 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
- **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 VOLTAGE CAN BE ADJUSTED**

Verify the generator output voltage can be adjusted from the EMCP 3 Display Screen.

#### **Expected Result:**

The generator output voltage can be adjusted from the EMCP 3 Display Screen.

#### **Results:**

- **OK** - The generator output voltage can be changed from the EMCP 3 Display Screen.

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

### **STOP**

- **NOT OK** - The generator output voltage cannot be adjusted. Proceed to test step 4

#### **Test Step 4. CHECK CAT DATA LINK BETWEEN THE EMCP 3 AND THE VOLTAGE REGULATOR**

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

##### **Results:**

- **OK** - The Data Link wiring is correct. Proceed to test step 5
- **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 5. VERIFY VOLTAGE SENSING CIRCUITS**

Verify all three phases of generator output voltage are shown on the EMCP 3 Display Screen.

##### **Expected Result:**

All three phases of generator output voltage are shown on the EMCP 3 Display Screen

##### **Results:**

- **OK** - All three phases of generator output voltage are shown on the EMCP 3 Display Screen

**Repair:** Refer to appropriate voltage regulator service manual and perform an operational check of the voltage regulator. Resume normal operation and verify that the problem has been corrected.

**STOP**

- **NOT OK** - All phases of voltage are not shown on display. Proceed to test step 6

#### **Test Step 6. 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 7
- **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 7. 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 8.
- **NOT OK** - One or more of the voltages are NOT correct.

**Repair:** The wiring or the connections 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 that the problem has been corrected.

**STOP**

#### **Test Step 8. 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**