**Solar Electric Technician (Level 2)**

**Module 3: Measurement of electrical and solar parameter**

**E9: Assignment - Measurement of earth resistance**

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| **E9: ASSIGNMENT MEMO** | |
| **Date** | …. |
| **To** | Participants |
| **From** | Trainers |
| **Subject** | Measurement of earth resistance. |
| **What** | Study the procedure to conduct earth resistance measurement of the system. |
| **Why** | The objective of the assignment is to measure the earth resistance, and understand and practice proper grounding system. |
| **How** | 1. Work in group of 2 or 4. 2. Gather the required tools and equipment. 3. Read and carefully follow the instructions for each task given. 4. Record the findings, measured values, and any observations during the test. 5. Some tasks include notes to assist participants for tallying the measured value or results. 6. After completing the assigned tasks, discuss your results within the class and answer any related questions. |
| **Time** | 60’ |

**Task 1: Measure ground resistance of solar PV system’s grounding.**

1. **Required tools/equipment**

* Earth resistance tester (3-point type, Megger)
* Two auxiliary ground rods (stakes)
* Connecting wires (test leads)

1. **Instructions**

* Position the ground rods:
* Insert the ground electrode rod (under test) into the earth near the solar PV system.
* Place one auxiliary ground rod (Current probe, C1) approximately 30 meters away from the ground electrode rod.
* Place the second auxiliary ground rod (Potential probe, P1) halfway between the ground rod under test and the current probe (around 15 meters away).
* Connect the test equipment
* Connect the "Earth" terminal on the earth tester to the ground rod under test.
* Connect the "Current" terminal to the C1 auxiliary ground rod.
* Connect the "Potential" terminal to the P1 auxiliary ground rod.
* Perform the test
* Power on the earth resistance tester and initiate the test.
* Record the resistance reading shown on the tester.

1. **Notes**

* If the reading is below 5 Ohms. The ground resistance is considered good. A reading above 10 Ohms may indicate poor grounding, and corrective action is required.
* Proper grounding is essential to dissipate fault currents and prevent damage to the solar PV system.

**Task 2: Test the ground resistance of solar system component’s (inverter, battery) grounding system.**

1. **Required tools/equipment**

* Earth resistance tester (3-point type, Megger)
* Two auxiliary ground rods (stakes)
* Connecting wires (test leads)

1. **Instructions**

* Disconnect the solar system component
* Turn off the inverter and isolate it from the electrical system to ensure no current is flowing through the ground system.
* Set up auxiliary ground rods.
* Drive the C1 ground rod 40 meters from the inverter ground rod.
* Insert the P1 rod 20 meters from the inverter ground rod.
* Connect earth tester
* Attach the "Earth" terminal to the inverter’s ground rod.
* Attach the "Current" terminal to the C1 ground rod.
* Attach the "Potential" terminal to the P1 rod.
* Measure resistance.
* Switch on the earth resistance tester and read the earth resistance value.

1. **Measured value: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Ohm**
2. **Notes**

* If the ground resistance exceeds the recommended threshold (usually 10 Ohms), evaluate the grounding system and take corrective action such as adding more grounding rods or improving the soil conductivity.

**Task 3: Verify earth resistance after lightning strike in the solar system.**

1. **Required tools/equipment**

* Earth resistance tester (3-point type, Megger)
* Two auxiliary ground rods (stakes)
* Ground enhancement materials (if needed)

1. **Instructions**

* Inspect grounding rods:
* Visually inspect the grounding rods to ensure there is no obvious damage from the lightning strike.
* Set Up ground rods:
* Place the C1 rod 60 meters away from the primary grounding rod of the solar farm.
* Place the P1 rod 30 meters from the primary grounding rod.
* Perform the earth resistance test:
* Use the earth resistance tester to measure the resistance after the lightning event.

1. **Measured value: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Ohm**
2. **Notes**

* If the resistance has increased significantly, consider improving the grounding by driving deeper rods or using soil enhancers.