**Solar Electric Technician (Level 2)**

**Module 5: Installation and assembly**

**E9: Assignment- Read and comprehend the installation manuals for inverter, battery, charge controllers, water pumps**

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| **E9: ASSIGNMENT MEMO** | |
| **Date** | …. |
| **To** | Participants |
| **From** | Trainers |
| **Subject** | Read and comprehend the installation manuals for inverter, battery, charge controllers, water pumps. |
| **What** | Interpret the installation manual provided by the manufacturer of each component. |
| **Why** | To enable participants to read and follow the instructions as mentioned in the instruction manuals. |
| **How** | 1. Group of 2 or 4. 2. Gather the required tools/ equipment's and manuals. 3. As per the given installation manual, perform few tasks as mentioned below. 4. Answer the questions and discuss the results. |
| **Time** | 120’ |

**Create a comprehensive installation plan for a solar system consisting of a solar inverter, a battery bank (4 x 200Ah/12V), switch gears, a protection system, and Balance of System (BoS) components.**

**Required tools/equipment**

* Pen and paper
* Installation manuals
* Camera (smartphone) for documentation

**Instruction**

The focus should be on understanding the installation requirements from the manuals and ensuring all technical and safety steps are properly addressed. Review the importance of reading and understanding installation manuals for each component.

**Component list and their purpose (Instructor’s domain)**

* Solar inverter
* Battery bank (4 x 200Ah/12V)
* Switch gears (e.g., MCBs, MCCBs)
* Protection system (e.g., fuses, surge protection devices)
* Balance of System (BoS) components

**Gather the manuals and installation guidelines as mentioned below.**

* Solar inverter manual
* Battery bank manual
* Switch gear and protection system manuals
* BoS components (wiring, connectors, etc.)

Follow the steps as instructed below.

**Step 1: Each group/participant must read and comprehend the key sections of their assigned manual for each component.**

1. **Solar inverter**

* Safety parameters, mounting requirements, operating conditions (voltage, current, temperature), wiring connections, ventilation requirements, and compliance standards.

1. **Battery bank**

* Battery specifications, safety precautions, installation process, wiring connections, ventilation, and maintenance requirements.

1. **Switch gears & protection system**

* Safety features, operating conditions, wiring diagrams, installation steps, and compliance with standards (IEC/NEC) for each MCB, MCCB, SPD, LA, fuses, etc.

1. **BoS components**

* Cable sizes, connectors, installation accessories (MC4 connectors, cable trays, saddles), and layout planning.

1. Collaboratively discuss the installation steps for each component, share insights from the manuals and integrate the knowledge into a cohesive installation plan.
2. Discuss component locations (e.g., where the inverter and batteries will be placed for optimal performance and safety).
3. Plan the cable routes, ensuring proper distance between components and adequate airflow for cooling.

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| **Summary of findings** |
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**Step 2: Create a detailed step-by-step plan for installing each component, covering all technical aspects and safety considerations.**

1. **Solar inverter installation**

* Identify mounting location (wall or ground-mounted).
* Plan the wiring connections (DC from PV array, AC output to load).
* Ensure proper ventilation and protection from environmental factors.

1. **Battery bank installation**

* Determine the battery bank layout (series or parallel configuration).
* Plan wiring connections (ensure correct polarity and safe cabling).
* Ensure ventilation to prevent overheating and minimize gas buildup.

1. **Switch gears & protection system**

* Identify locations for MCBs, MCCBs, surge protection, and fuses.
* Plan wire routing for protection devices to and from the inverter and battery bank.
* Ensure that the system complies with safety standards (e.g., IEC for surge protection).

1. **BoS components**

* Determine cable sizes and routes (DC and AC cabling).
* Plan the use of installation accessories (cable trays, MC4 connectors, etc.).

**Step 3: Review the installation plan as a group to ensure that all aspects are covered.**

* Ensure all components are properly placed with attention to safety, ventilation, and ease of maintenance.
* Verify compliance with safety standards (grounding, surge protection, wire sizing, etc.)
* Ensure all tools and materials needed for installation are listed and prepared.

**Step 4: Group presentation and wrap-up (Instructor-led discussion)**

* Each participant briefly presents the installation steps for their assigned component.
* Reflect on any challenges encountered during the planning process and discuss how they would be addressed in a real-world installation.
* Highlight the importance of teamwork in creating a well-rounded installation plan.

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| **Summary of findings** |
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