REPUBLIC OF KENYA

NATIONAL OCCUPATIONAL STANDARDS

FOR

ELECTRICAL ENGINEERING TECHNICIAN (POWER OPTION)

KNQF LEVEL: 6

ISCED OCCUPATIONAL STANDARD CODE: 0713 554B

TVET CDACC
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INSTALL SOLAR SYSTEMS

UNIT CODE: ENG/OS/PO/CR/07/6/B

UNIT DESCRIPTION

This unit covers the competencies required to install solar system. Competencies includes; Designing solar system installation, fixing solar system components, mounting solar panel, laying cables, terminating electrical and testing of a solar installation system.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***(Bold and italicised terms are elaborated in the Range)***
1. Design solar system installation	1.1 Solar panel rating is determined in line with the size of the load 1.2 Mounting position is determined in line with the expected output 1.3 Charge controller is determined as per the size of the load and panel output. 1.4 Power storage system is designed as per the load size. 1.5 Inverter size is selected as per the load size 1.6 Cable sizing is performed in line with the IEE regulations
2. Fix solar system components	2.1 Charger controller is mounted as per the design 2.2 Solar batteries are installed as per the design 2.3 Power diodes are fixed as per the design 2.4 Inverter is installed as per the design
3. Mount solar Panel	3.1 ***Slanting angle*** is adhered to in solar panel installation 3.2 Solar panel positioning is determined by the expected output 3.3 Solar panel connections are determined by the expected output.
4. Lay Electrical cables	4.1 Cable draw- in tools are identified

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	4.2 Cables are drawn-in in line with standard operating procedures. 4.3 Number and size of cables laid in a conduit is as per the IEE regulations 4.4 Labelling of the cables is performed as per the complexity of the job.
5. Terminate Electrical cables	5.1 Cable lugging is performed as per the standards operating procedure. 5.2 Cables are terminated as per the IEE regulations
6. Test solar system installation	6.1 Type of ***tests*** are identified 6.2 Test is performed as per the IEE regulations 6.3 Firmness of the installation is established 6.4 Continuity test is performed 6.5 Insulation resistance test is performed as per the IEE regulations 6.6 Ring circuit test is performed as per the standard operating procedure 6.7 Earth continuity test is performed as per the IEE regulations

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	Range
1. Slanting angle may include but is not limited to:	• Panel installation angle • Mounting position
2. Testing may include but is not limited to:	• Insulation test • Ring circuit test • Short circuit test

Variable	Range
	• Firmness • Earth continuity

REQUIRED KNOWLEDGE AND UNDERSTANDING

The individual needs to demonstrate knowledge and understanding of:

- The manufacturer's warranty requirements relating to solar system installation and components.
- The legal and statutory requirements relating to solar installation activities.
- workplace procedures relevant to:
    - Health and safety;
    - The environment (including waste disposal);
    - Appropriate personal and protective equipment;
    - Appropriate use of service and maintenance manuals
- Workplace procedures for:
    - Solar panel installation
    - Installation of Solar components
    - Batteries installation
    - Reporting of technical challenges
- The importance of documenting installation information.
- The importance of working within agreed timelines and sharing progress reports.
- The relationship between time and costs.
- The importance of reporting anticipated delays to relevant parties promptly.
- How to find, interpret and use sources of technical information for solar installation activities
- The importance of using the correct sources of technical information.
- The purpose of and how to use identification codes.

FOUNDATION SKILLS

The individual needs to demonstrate the following foundation skills:

- Communications (verbal and written);
- Proficient in ICT;
- Time management;
- Analytical
- Faults troubleshooting;
- Problem solving;
- Planning; Decision making;
- First aid;

- Report writing;

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and understanding and range.

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Solar panel designed in line with expected load 1.2 Panel installed in maximum output slanting angle 1.3 Charger controller mounted as per the design 1.4 Power storage system designed in line with the expected output. 1.5 Cable were lugged after installation 1.6 Safely used testing equipment and tools 1.7 Obtained, recorded and interpreted test results 1.8 Repaired and maintained a system
2. Resource Implications	***The following resources must be provided:*** 2.1 Solar installation tool kit 2.2 Testing equipment 2.3 Measuring equipment Resources the same as that of workplace are advised to be applied
3. Methods of Assessment	**Competency may be assessed through:** 3.1 Oral test 3.2 Observation 3.3 Practical demonstration
4. Context of Assessment	Competency may be assessed 4.1 On job 4.2 Off job 4.3 During Industrial Attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.