



**REPUBLIC OF KENYA**

**COMPETENCY BASED CURRICULUM**

**FOR**

**ELECTRICAL OPERATION (POWER OPTION)**

**KNQF LEVEL 5**

**ISCED CODE: 07130554 B**



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## **SOLAR SYSTEM INSTALLATION**

**UNIT CODE:** ENG/CU/PO/CR/06/5/B

### **Relationship to Occupational Standards**

This unit addresses the unit of competency: Install Solar System

**Duration of Unit:** 30 hours

### **Unit Description**

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

### **Summary of Learning Outcomes**

1. Mount solar Panel
2. Fix solar system accessories
3. Lay out Electrical cables
4. Terminate Electrical cables
5. Test and inspect solar system installation

### **Learning Outcomes, Content and Suggested Assessment Methods**

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
1. Mount Solar panel	<ul style="list-style-type: none"><li>• Meaning of Terms e.g.<ul style="list-style-type: none"><li>✓ Slanting angle</li><li>✓ Panel Ratings</li></ul></li><li>• Solar panel positioning</li><li>• Types of Solar panels e.g.<ul style="list-style-type: none"><li>✓ PV Solar</li></ul></li><li>• Vacuum tube</li><li>• Monocrystalline</li><li>• Polycrystalline</li></ul>	<ul style="list-style-type: none"><li>• Observation</li><li>• Oral questioning</li><li>• Practical tests</li><li>• Written tests</li></ul>

	<ul style="list-style-type: none"> <li>• Factors to consider in solar panel Selection and installation</li> </ul>	
2. Fix solar system components	<ul style="list-style-type: none"> <li>• Methods of solar panel connection <ul style="list-style-type: none"> <li>✓ Parallel and series</li> </ul> </li> <li>• Solar panel components <ul style="list-style-type: none"> <li>✓ Charger controller</li> <li>✓ Inverters</li> <li>✓ Solar batteries</li> <li>✓ Cables</li> </ul> </li> <li>• Types of charge controllers e.g. <ul style="list-style-type: none"> <li>✓ Pulse width Modulated</li> <li>✓ Maximum power point tracking.</li> <li>✓ Simple one or two stage controls</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Oral questioning</li> <li>• Written tests</li> </ul>
3. Lay Electrical cables	<ul style="list-style-type: none"> <li>• Cable laying tools</li> <li>• Cable segregation</li> <li>• Cable labelling</li> </ul>	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Oral questioning</li> <li>• Practical tests</li> <li>• Written tests</li> </ul>
4. Terminate Electrical cables	<ul style="list-style-type: none"> <li>• Meaning of terms</li> <li>• Cable lugging</li> <li>• Cable connectors</li> </ul>	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Oral questioning</li> <li>• Practical tests</li> <li>• Written tests</li> </ul>
5. Test Solar system installation	<ul style="list-style-type: none"> <li>• Meaning of test</li> <li>• Types of tests <ul style="list-style-type: none"> <li>✓ Insulation resistant test</li> <li>✓ Short circuit test</li> <li>✓ Ring circuit test</li> <li>✓ Continuity test</li> <li>✓ Earth continuity test</li> <li>✓ Firmness test</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Oral questioning</li> <li>• Practical tests</li> <li>• Written tests</li> </ul>

#### **Suggested Methods of instruction**

- Demonstration by trainer
- Practice by the trainee
- Field trips
- On-job-training
- Discussions

## **Recommended Resources**

- Set of screw drivers
- Set of spanners and wrenches
- Power tools
- Cutting tools
- Pliers
- Lifting and tensioning tools
- Tool box
- Phase tester
- PPE –hand gloves, dust coat, dust masks
- Multimeter
- Clamp meter
- Earth electrode resistance meter
- Phase sequence meter
- Stationery
- Cables
- Lubricants
- Service parts