



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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NAIROBI

INSTALL ELECTRICAL MACHINE

UNIT CODE: ENG/OS/PO/CR/03/6/B

UNIT DESCRIPTION

This unit covers the competencies required to Install Electrical Machine. Competencies include; Designing Electrical machine layout, mounting electrical machine, mounting machine control panel, laying machine cables, termination of an installation of Electrical machine and testing of Electrical machine installation.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
These describe the key outcomes which make up workplace function.	These are assessable statements which specify the required level of performance for each of the elements. <i>(Bold and italicised terms are elaborated in the Range)</i>
1. Design Electrical Machine Layout	1.1 Machine cabling are installed in line with the IEE regulations 1.2 Machine sockets are installed in line with standard operating procedure 1.3 Design is performed in line with OSHA 1.4 Machine layout is design as per the expected load 1.5 Machine layout is designed in line with its standard operational procedure 1.6 Machine design layout is performed in line with its EHS regulations
2. Mounting Electrical machine	2.1 Machine is mounted as per its size 2.2 Machine is mounted as per its load 2.3 Machine is mounted in line with OSHA 2.4 Machine earthing is performed in line with the IEE regulation 2.5 Machine is mounted as per the manufacturer's manual
3. Mount Machine control panel	3.1 Control panel is mounted as per the load and functions of the machine 3.2 Components on the control panel are mounted as per standard operating procedure 3.3 Components on the control panel are spaced as per machine rating and environmental conditions

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	<p>3.4 Components on the control panel are labelled as per their functions.</p> <p>3.5 Components on the control panel are wired as per the design</p> <p>3.6 Control panel is aesthetically wired as per the standard operating procedure</p> <p>3.7 Control panel is enclosed as per the OSHA</p>
4. Lay machine cables	<p>4.1 Machine cables are laid as per the IEE regulations</p> <p>4.2 Cables laying system is as per the <i>EHS</i> regulations</p> <p>4.3 Cables are colour coded as per the IEE regulations</p> <p>4.4 Firmness of the cables are installed as per the standard operating procedure</p> <p>4.5 Cables are segregated as per the standard operating procedure</p>
5. Terminate Electrical machine Installation	<p>5.1 Cable lugging is performed as per the standards operating procedure.</p> <p>5.2 Cables are terminated as per the IEE regulations</p> <p>5.3 Cables are terminated in the connector as per the <i>load size</i></p>
6. Test Electrical machine installations	<p>6.1 Type of tests are identified</p> <p>6.2 Test is performed as per the IEE regulations</p> <p>6.3 Firmness of the installation is established</p> <p>6.4 Continuity test is performed</p> <p>6.5 Insulation resistance test is performed as per the IEE regulations</p> <p>6.6 Earth test is performed as per the IEE regulations</p> <p>6.7 On load and off load tests are performed</p>

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. Installation may include but is not limited to:	<ul style="list-style-type: none">• Machine installation• Commercial installation• Industrial Installation• Power Generator• Security• Power transmission and distribution
1. Load size may include but is not limited to:	<ul style="list-style-type: none">• 32A• 80A• 100A• 180A
2. Components may include but is not limited to:	<ul style="list-style-type: none">• Switches• Circuit breakers• Fuses• Termination blocks
3. EHS regulation (Environment, Health and Safety) regulation may include but is not limited to:	<ul style="list-style-type: none">• EMCA 1999 Act• OSHA

REQUIRED KNOWLEDGE AND UNDERSTANDING

The individual needs to demonstrate knowledge and understanding of:

- The manufacturer's warranty requirements relating to electrical installation systems and related components.
- The legal requirements relating to electrical installations
- Kenyan legislation and workplace procedures relevant to:
 - Health and safety;
 - Environment (including waste disposal);
 - Appropriate personal protective equipment (PPE).
- Work place communication;
- Time management
- Materials management
- The importance of documentation and keeping records
- The relationship between time and costs
- The importance of using the correct sources of technical information.
 - . Interpreting circuits, drawings, specifications and instructions
 - Preparing work plans in accordance with legislative and regulatory requirements and standard operating procedures and health and safety requirements
 - Importance of contractual agreements
 - Necessary insurance and policies including security bonds, performance bonds, contractors all risks
 - Insurance of contractors work
 - Keeping records of income
 - Financial statements

FOUNDATION SKILLS

- Communications (verbal and written);
- Proficient in logistic management;
- Time management;
- Meeting organization;
- Analytical
- Faults troubleshooting;
- Planning;
- Decision making;

- First aid;
- Report writing;
- Problem solving;
- Management

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	<p>Assessment requires evidence that the candidate:</p> <p>1.1 Applied and adhered to safety procedures</p> <p>1.2 Components on the control panel were wired as per the design</p> <p>1.3 Cable lugging was performed before termination of the machine cables</p> <p>1.4 Applied appropriate standards</p> <p>1.5 Demonstrated good communication and interpersonal skills</p> <p>1.6 Machine layout was designed in line with the standard operating procedure of the machine</p> <p>1.7 Machine load size was considered in the design of the machine layout</p> <p>1.8 Insulation, short circuit and continuity tests were performed after machine installation</p>
2. Resource Implications	<p>The following resources must be provided:</p> <p>2.1 Installation tools</p> <p>2.2 Electrical machine to be installed</p> <p>2.3 Designing tools</p> <p>2.4 Machine installation site</p> <p>2.5 Stationery</p>
3. Methods of Assessment	<p>Competency may be assessed through:</p> <p>3.1 Oral questioning</p> <p>3.2 Practical Tests</p> <p>3.3 Observation</p>

4. Context of Assessment	Competency may be assessed individually in 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.