

## PLAN ELECTRICAL INSTALLATION WORKS

**UNIT CODE: ENG/OS/EI/CR/01/6**

### UNIT DESCRIPTION

This unit covers the competencies required to plan electrical installation works. It includes conducting site survey, system sizing, preparation of list of tools equipment and materials, arranging for logistics, preparation of installation work plan, establishing installation team, raise necessary work permit and finally preparation of work site.

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
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. Conduct site survey	1.1. The site is surveyed for suitability for the type of <i>installation</i> to be done as per the contract 1.2. Conditions of the site are evaluated according to the <i>established procedures</i> 1.3. The best location and route for the installation is identified as per <i>design</i> 1.4. Actual measurements are taken 1.5. Survey report is generated and shared with relevant parties according to the established procedures
2. Perform system sizing	2.1. Load estimation is conducted according to the set <i>standard</i> 2.2. Type and size of protective devices is determined according to <b>IEE regulations</b> 2.3. Cable sizes are calculated for the estimated loads according to <b>IEE regulations</b> 2.4. System sizes are recorded and shared as per <i>established procedures</i>
3. Prepare list of tools, equipment & materials.	3.1. The necessary tools and equipment needed for the work are determined and list prepared as per established procedure 3.2. Tools and equipment are checked for correct <i>specifications</i> and functionality and list prepared as per established procedure 3.3. Materials needed for the work are determined and list prepared as per established procedure

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4. Arrange logistics	4.1. Necessary <i>logistics</i> for the particular work and site is determined 4.2. Determined logistics are reported and arranged with the responsible party according to work schedule
5. Prepare installation work plan	5.1. Official request is made for installation drawings 5.2. Installation drawing is acquired and deposited in a safe place as per <i>established procedure</i> 5.3. The scope of installation work is identified 5.4. All work is undertaken safely and to workplace procedures, National/County <b>regulations and legislative requirements</b> 5.5. Working drawing is prepared in accordance with the design drawing 5.6. <i>Work schedule</i> is prepared based on the scope and the working drawing
6. Establish installation team	6.1. Team members are identified according to the task 6.2. Communication protocol is designed and distributed among the team members 6.3. Responsibilities are established and distributed among the team members 6.4. Team familiarization is done according to the established procedure
7. Obtain the necessary work permit.	7.1. Type of <i>permit to work</i> is identified where applicable 7.2. Permit to work issuing body is identified 7.3. Permit to work form is filled and submitted to the responsible body
8. Prepare work site	8.1. Special work, hazard and safety requirements are identified. 8.2. Identified hazards and safety issues are mitigated according to <i>OSHA</i> (Occupational Safety and Health Act) 8.3. Work plan is confirmed in accordance with legislative and regulatory requirements and standard operating procedures. 8.4. Work site is prepared for accessibility of <i>utilities</i>

## 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

<b>Variable</b>	<b>Range</b> <i>May include but is not limited to:</i>
1. Installation	1.1 Domestic installation 1.2 Commercial installation 1.3 Industrial Installation 1.4 Agriculture/ horticulture 1.5 Power Generator 1.6 Security 1.7 Water heating installations 1.8 Power transmission and distribution 1.9 IBMS (integrated building Management system)
2. Established Procedures	2.1 Company rules 2.2 Procedures mentioned in contract
3. Design	3.1 Electrical design for lighting and power 3.2 Electrical design for switchgear 3.3 Electrical design for alarm systems
4. Standard	4.1 IEE standard 4.2 British Standard 4.3 KEBS standard
5. IEE regulations	17 <sup>th</sup> Edition
6. Logistics includes but not limited to	6.1 Personnel, Finance and input materials 6.2 Transport and storage 6.3 Communications 6.4 Security
7. Specifications	7.1 Tolerance/ range 7.2 Make / model 7.3 Size 7.4 Class
8. Regulations and legislative requirements	8.1 KPLC bylaws 8.2 County bylaws 8.3 Energy Act, 2006 8.4 National Construction Authority Act 8.5 OSHA
9. Work schedule	9.1 Gant chart 9.2 Block
10. Permit to work	10.1 KPLC permit 10.2 Gate Pass 10.3 Daily work permit 10.4 Work Tag

Variable	Range <i>May include but is not limited to:</i>
11. Utilities	Water, electrical power, toilets and communication

### **REQUIRED KNOWLEDGE AND UNDERSTANDING**

The individual needs to demonstrate knowledge and understanding of:

<b>1. Organisational and legislative requirements including:</b>	
1.1	The manufacturer's warranty requirements relating to electrical installation systems and related components.
1.2	The legal requirements relating to electrical installations
1.3	Kenyan legislation and workplace procedures relevant to: 1.3.1 Health and safety; 1.3.2 Environment (including waste disposal); 1.3.3 Appropriate personal protective equipment (PPE).
1.4	Workplace procedures for: 1.4.1 Work place communication; 1.4.2 Time management 1.4.3 Materials management
1.5	The importance of documentation and keeping records
1.6	The relationship between time and costs
<b>2. The use of technical information including:</b>	
2.1	2.1.1 The importance of using the correct sources of technical information. 2.1.2. Interpreting circuits, drawings, specifications and instructions 2.1.3 Preparing work plans in accordance with legislative and regulatory requirements and standard operating procedures and health and safety requirements
<b>3. Contractual agreements</b>	
3.1	3.1.1 Importance of contractual agreements 3.1.2 Necessary insurance and policies including security bonds, performance bonds, contractors all risks 3.1.3 Insurance of contractors work 3.1.4 Keeping records of income 3.1.5 Financial statements

### **FOUNDATION SKILLS**

The individual needs to demonstrate the following foundation skills:	
<ul style="list-style-type: none"> <li>• Communications (verbal and written);</li> <li>• Proficient in ICT;</li> <li>• Time management;</li> <li>• Problem solving;</li> <li>• Negotiation;</li> </ul>	<ul style="list-style-type: none"> <li>• Decision making;</li> <li>• First aid;</li> <li>• Report writing;</li> <li>• Planning;</li> </ul>

## 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 Applied work health and safety procedures 1.2 Conducted site survey 1.3 Measurements were taken at the site 1.4 Site survey report was documented and shared with the relevant parties 1.5 IEE regulations were observed during installation 1.6 The list of materials required for installation was prepared 1.7 Working drawing was prepared 1.8 Applied appropriate standards 1.9 Organization structure and job description was designed and distributed to the members 1.10 Determined types and sizes of materials and equipment and protective devices 1.11 Demonstrated knowledge of logistics to the given task
2. Resource Implications	The following resources must be provided: Resources same as that of workplace are advised to be applied including Measuring tape, pegs, calculator, stationery
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Practical demonstration
4. Context of Assessment	Competency may be assessed individually in the actual workplace and simulated setting of the actual work place
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.