

<b>Domain</b>	<b>ELECTROTECHNOLOGY</b>	<b>Unit ID: 878</b>
<b>Title:</b>	<b>Draw and interpret basic electrotechnology drawings and symbols</b>	
<b>Level: 2</b>		<b>Credits: 3</b>

### Purpose

This unit standard specifies the competencies required to draw and interpret basic electrotechnology drawings and symbols. It includes knowledge of electrical symbols, components, sub-circuits and terminology, purpose and features of electrical diagrams, drawing and explaining electrical circuit diagrams for a given electrical product and/or equipment and preparing drawings for an electrical installation. This unit standard is intended for those who work in electrotechnology environment.

### Special Notes

1. Entry information:
  - Prerequisite
    - Unit 878 - *Apply safety rules and regulations in an electrotechnology environment* or demonstrated equivalent knowledge and skills.
2. The assessment of this unit standard should concentrate not so much on draughtsman-ship, but on the understanding of circuitry and the ability to use and sketch electrically and logically correct drawings.
3. To demonstrate competence, at a minimum, evidence is required of reading and interpreting electrotechnology circuits, comprising of a minimum of any four of the following circuit symbols: direct and/or alternating current, positive and/or negative voltage, power source, levers and buttons operated by pushing, switches operated by turning, boundary line, filament of a lamp, signal lamp, capacitor, transistor, diode, gauges, fuse or other circuit protection devices, heating element, solid-state circuits, variable and resistors.
4. Assessment evidence may be collected from a real workplace or an appropriate simulated realistic environment in which electrotechnology operations are carried out.
5. Glossary of terms:
  - 'SANS' refers to South Africa National Standards
  - 'IEC' refers to International Electrotechnical Commission
  - 'IEEE' refers to Institute of Electrical and Electronics Engineers.
6. Performance of all elements in this unit standard must comply with manufacturers' specifications, workplace specific requirements and reasonable flat rate time
7. Regulations and legislation relevant to this unit standard include the following:
  - Labour Act, No. 11, 2007.
  - Occupational Health and Safety Regulations No. 18, 1997.
  - SANS 10142-1.
  - SANS 10142-2.

- IEC 60061.
- IEC 61360.
- IEEE standards

### **Quality Assurance Requirements**

This unit standard and others within this subfield may be awarded by institutions which meet the accreditation requirements set by the Namibia Qualifications Authority and the Namibia Training Authority and which comply with the national assessment and moderation requirements. Details of specific accreditation requirements and the national assessment arrangements are available from the Namibia Qualifications Authority and the Namibia Training Authority. All approved unit standards, qualifications and national assessment arrangements are available on the Namibia Training Authority website [www.nta.com.na](http://www.nta.com.na).

### **Elements and Performance Criteria**

#### **Element 1: Identify and interpret circuits and symbols.**

##### **Range**

Electrical symbols may include but are not limited to symbols for connecting devices, contacts, normally-open and normally-closed push-buttons, circuit-breakers and contactors, relays meters and switches.

Devices and components may include but are not limited to cables, conductors connecting devices, resistors, inductors, capacitors; solenoid, coils, motors, motor windings, transformer windings, contacts, push-buttons, protective devices, lamps and displays, switches, fan, pump, mechanical drives and links and valves;

Control circuit terminologies may include but are not limited to normal position, de-energized (de-activated), energized position (activated), holding contacts, overload contacts, make contacts (normally open), break contacts (normally closed), manual, automatic and semi-automatic.

##### **Performance Criteria**

- 1.1 Electrical drawing symbols, components and sub-circuits are identified from diagrams.
- 1.2 The use of letter codes in circuit diagram is identified and stated.
- 1.3 Different circuit diagrams and their features are distinguished.
- 1.4 Control circuit terminology is defined according to industry practice.
- 1.5 The function and operation of basic circuit's main (power) and control (auxiliary) are explained.

## **Element 2: Identify the purpose and features of electrotechnology diagrams.**

### **Performance Criteria**

- 2.1 Purpose and key features of schematic diagrams are identified in accordance with industry practice.
- 2.2 Purpose and key features of wiring diagrams are identified in accordance with industry practice.
- 2.3 Purpose and key features of block diagrams are identified in accordance with industry practice.
- 2.4 Purpose and key features of one-line diagrams are identified in accordance with industry practice.

## **Element 3: Draw and explain electrical circuit diagrams for a given electrical product or equipment.**

### **Range**

Electrical circuit diagrams may include but are not limited to location diagrams, one-line diagrams, schematic circuit diagrams, block diagrams and wiring diagrams.

Product may be an electrical appliance and/or any process, machine and/or equipment featuring electrical control.

### **Performance Criteria**

- 3.1 Circuit diagrams are drawn (to scale where necessary) using standard symbols.
- 3.2 Circuit is electrically functional.
- 3.3 Operation of circuits is explained logically with reference to current paths, purpose of each component, sub-circuit and the sequence of events for full cycle of operation of the appliance.
- 3.4 Standard symbols are used and a legend of symbols is included, where necessary.
- 3.5 Equipment ratings and cable sizes are shown.

## **Element 4: Prepare basic drawings for electrotechnology installation.**

### **Range**

The diagram for electrotechnology installation drawn to include at least meter board, switch board, distribution board if specified, mains entry point, main earth location, mains cable route location diagrams, and power distribution line diagram.

### **Performance Criteria**

- 4.1 Diagrams are electrically functional and in accordance with current regulations, standards and industry practice.
- 4.2 Site plan is drawn according to current regulations and standards.
- 4.3 Location diagram is drawn according to industry practice.
- 4.4 Power distribution line diagram is drawn according to industry practice.
- 4.5 A legend of symbols is provided in accordance with industry practice.
- 4.6 Specification requirements are satisfied according to industry practice.

### **Registration Data**

<b>Subfield:</b>	Electrical Engineering
<b>Date first registered:</b>	18 November 2010
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<b>Body responsible for review:</b>	Namibia Training Authority