

# NOCC-A21 Electrician: Competence Package

Relevant Occupation/trade title: Electrician			SAQA ID: 91761		
Learning Area 11: Install, maintain and troubleshoot low voltage <u>alternative</u> power supply systems and associated equipment			Total Hours:		64
Learning Project 1: Install power generators and transfer switches			Total Hours:		16
Requisite learning areas/projects to be in place (Pre-requisite and co-requisite):		• Phase 1 completed			
Learning project description: Apprentices learn to install power generators and transfer switches.					
Activity phase	Practical Skills Modules Content	Underpinning Knowledge Module Content	Work Experience Module Content (Exposure to be given)	Didactical-methodological advice	Learning materials/Tools and Equipment
Reference to QCTO Curriculum	PM-01 (PS-01, 02, 03) PM-02 (PS 01, 02, 03) PM-03 (PS01, 02, 03) PM-04 (PS01, 02, 03) PM-05 (PS 01 – 06) PM-06 (PS 1-2) PM-07 (PS 01 – 03)	KM-06-KT03 KM-07 (KT02, 05) KM-09 (KT01)	WM-01 (WE1-3) WM-02 (WE1-3) WM-03 (WE1-3) WM-04 (WE01-03)		
Planning/Preparation	<p><b><u>Provide access to (Given):</u></b> Motor driven generators, Automatic Mains Failure, change over switch, cables, conductors, wire-ways, protection, metering, trunking, cable tray, power skirting and materials and equipment as per last column;</p> <p><b><u>Apprentices must be able to do/perform the following (hard and soft) skills:</u></b></p> <ul style="list-style-type: none"><li>Wear correct PPE</li><li>Complete work permit</li><li>Conduct risk assessment</li><li>Select the correct tools and equipment</li><li>Transport all materials and equipment safely to</li></ul>	<p><b><u>Knowledge of:</u></b></p> <ul style="list-style-type: none"><li>Basic operating principles of generator systems</li><li>Company’s standard operating procedures</li><li>Electrical earthing requirements according to SANS 10142-1</li><li>Installation procedures SANS 10142-1 Annex S Example of emergency power installations configurations;<ul style="list-style-type: none"><li>Changeover switch connections where a standby power generator feeds in at main supply</li><li>Changeover switch connections where a standby power generator feeds into a</li></ul></li></ul>	<p><b><u>Under supervision:</u></b> <i>If workplace allows for this exposure:</i></p> <ul style="list-style-type: none"><li>Perform lockout procedures</li><li>Design, install and wire an MG set according to statutory requirements</li><li>Conduct power-off and power-on tests on MG set</li><li>Commission the motor generator system and check operation of alternative supply and utility supply</li></ul>	Lecture, presentations DVDs, audio-visual Group and individual work Training models Internet	<p><b>Print materials, electronic files, software applications incl.:</b></p> <ul style="list-style-type: none"><li>Training manuals for trainers and apprentices incl. multimedia software</li><li>Set of presentation aids (videos, slides) for overhead or LED/LCD projectors</li></ul> <p><b>Tools, equipment and materials incl.:</b></p> <p><b>Electricians toolbox</b></p> <p><b>Materials</b></p> <ul style="list-style-type: none"><li>OHS Act</li></ul>

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	<ul style="list-style-type: none"> <li>workstation</li> <li>Design the electrical circuit</li> <li>Draw a single line diagram</li> <li>Design the layout of electrical installation</li> <li>Lockout electrical installation</li> <li>Display notice board</li> </ul>	<ul style="list-style-type: none"> <li>section of the mains distribution board.</li> <li>Electrical cabling and current carrying capacities of conductors</li> <li>Work procedures and work documents related to installations and wiring and manufacturer's specifications</li> <li>Read and interpret electrical drawings and sketches with regards to motor generators</li> <li>Terminology regarding MG sets (refer to annex S)</li> <li>Working principles of MG sets and its components/protection devices.</li> <li>Change over switches and different configurations as per annex S</li> </ul>			<ul style="list-style-type: none"> <li>SANS 10142-1</li> <li>Local Authority requirements</li> <li>Manufactures specifications</li> <li>Work-site procedures</li> </ul>
<b>Implementation/ Execution <u>Repair</u></b>	<ul style="list-style-type: none"> <li>Wire a motor generator set according to circuit diagram and manufactures specification.</li> <li>Install and wire a changeover/AMF (automatic main failure) switch to the main distribution board</li> <li>Conduct a power-off test to ensure that the installation adheres to statutory requirements</li> <li>Conduct a power-on test to check the operation of the system by changing it over to alternative supply (motor generator) or utility supply (municipal supply)</li> </ul>				<ul style="list-style-type: none"> <li><b>Electrical drawings include but is not limited to:</b> <ul style="list-style-type: none"> <li>Schematic diagrams</li> <li>Wiring diagrams</li> <li>Connection / terminal schedules</li> <li>Cable schedules</li> <li>Layout drawings</li> </ul> </li> <li><b>Electrical equipment</b> <ul style="list-style-type: none"> <li>Single phase generator</li> <li>Three phase generator</li> <li>Contactors</li> <li>Timers</li> <li>Relays</li> <li>Indication lights</li> <li>Switches</li> <li>Protective devices (fuses, circuit breakers, earth leakage units, etc.)</li> <li>Connection terminals</li> <li>Manual change over switch</li> <li>Pre-wired AMF panel (Automatic Mains Failure)</li> <li>Variety of conductors</li> <li>Manual change over switch</li> <li>Controllers</li> <li>Labelling and notice boards</li> </ul> </li> </ul>
<b>Evaluation/ Documentation</b>	<ul style="list-style-type: none"> <li>Evaluates the correct usage of the electrical equipment according to set criteria</li> <li>Report work progress to appropriate personnel</li> <li>Inspect and clean tools</li> <li>Store and secure tools and materials</li> <li>Complete applicable work documentation</li> <li>Perform housekeeping</li> </ul>				

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					<b>PPE:</b> <ul style="list-style-type: none"><li>• Safety overall</li><li>• Safety boots</li></ul>
<b>Total</b>	Hours: 16				
<b>Specialisation additions</b>	Equipment that requires authorisation				
<b>Assessment guidance</b>					
<ul style="list-style-type: none"><li>• Self assessment</li><li>• Group assessment</li><li>• Theory test</li></ul>					
<b>Criteria for assessment:</b>					
<ul style="list-style-type: none"><li>• Correct use of PPE and tools/equipment</li><li>• Safety procedures are followed</li><li>• The circuit is designed and wired correctly</li><li>• The circuit functions correctly</li><li>• Power-on and off test is undertaken</li><li>• Over-current devices selected are at the correct rating</li><li>• Commission the system to ensure functionality</li><li>• Settings on AMF controller are set according to generators requirements</li><li>• Housekeeping is performed</li></ul>					