Relevant Occupation/trade title: Electrician	**SAQA ID:** 91761	
Learning Area 7: Install wire, test and maintain electrical motors and associated control systems - Basic	**Total Hours:**	**56**
Learning Project 1: Test and maintain electrical motor and associated control systems (single phase)	**Total Hours:**	**20**
Requisite learning areas/projects to be in place (Pre-requisite and co-requisite):	• LA6	
Learning project description: Test and maintain electrical motor and associated control systems (single phase)		

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 (PS01, 02,03) PM-02 (PS01, 02,03) PM-06-PS02 PM-08 (PS01, 02,03,04,05)	KM-06 (KT01, 02,03) KM-07 (KT01, 02,03,04,05,06) KM-08 (KT01) KM-09 (KT01)	WM-03 (WE01-03) WM-05 (WE01-03)		
Planning/ Preparation	**Provide access to (Given):** Fault finding panels, faulty switches, blown fuses, broken circuit breakers, open circuit coils, short circuited coils (single phase) **Apprentices must be able to do/perform the following (hard and soft) skills:** • Select and wear PPE • Read and interpret task instructions • Conduct risk assessment • Select the correct tools and equipment • Transport tools and equipment to workstation safely	**Knowledge of:** **Preventative Maintenance** • Work permits and lockout procedures • Preventative maintenance on motors and control systems. (Activities include: inspecting, cleaning, repairing and replacing components if required. Tightening loose connections, conducting mechanical inspections and electrical tests. • **Troubleshooting** • Work permits and lockout procedures • Diagnostic methodologies of the following: power on/off, continuity, open and short circuits, motor tests and control system tests	**Under supervision:** **Preventative maintenance (single phase)** • Complete work permit and lockout procedure for motors and control systems • Perform preventative maintenance on motors and control systems as specified on job card. • Clean, repair or replace components that are in a poor condition **Trouble shooting (single phase)** • Clarify with supervisor what the nature of the fault is • Inspect motors and control systems and diagnose nature of the problem using the following methods: ○ by testing the power supply ○ Operating/testing motors and	Lecture, presentations DVDs, audio-visual Group/Individual work Internet research Practical simulation work	**Print materials, electronic files, software applications incl.:** • Training manuals for trainers and apprentices incl. multimedia software • Set of presentation aids (videos, slides) for overhead or LED/LCD projectors **Tools, equipment and materials incl.:** Range of materials and tools to be covered (minimum): **Electrical toolbox**
Implementation/ Execution	• Perform lock-out procedures • Service and maintain motors				

Repair	and control systems • Trace faults on electric motors and control systems (troubleshooting) • Test motors and control systems	• Measuring equipment • Wiring diagrams • Typical motor faults. **Range:** (Reasons for motor faults include: high noise levels, overheating of bearings, intense vibration on bearings, motor windings overheating, brush sparking, slip ring motor operate at low speed with external resistance disconnected) • Typical control system faults. **Range** (blown fuses, circuit breaker trips, overload trips, contactor coil burn out, contactor points fused or open circuits, emergency stop button is pushed in, faulty sensors, limit switch, pressure switch).	control systems to localise fault ○ Reading and interpreting wiring diagram ○ Conducting power on and power off test ○ Testing control circuit • Trace fault on control and main circuit of electrical motors and control systems by using measuring instruments and wiring diagrams • Repair or replace faulty components, switches, over-load devices, over-current protection devices, conductors and motors • Test motors and control systems for correct operation • Complete job card		**Materials:** • Fuses • Fuse wire • Switches, limits, pressure switches, sensors • overload protection • over-current protection • contactors • circuit breakers **Equipment:** • Installation resistance tester • Mutli meter- buzzer • Voltage line tester
Evaluation/ Documentation	• Evaluate the correctness of the completed task according to instructions • Report work progress to appropriate personnel • Inspect and clean tools • Store and secure tools and materials • Complete applicable work documentation • Perform housekeeping				
Total	Hours: 20				
Specialisation additions	Equipment that requires authorisation				

Assessment guidance

- **Self assessment**
- **Group assessment**
- **Theory test**

Criteria for assessment:

- Correct PPE is worn
- Risk assessment undertaken
- Work permit completed
- Lock out and safety procedures are followed
- Motor and/or control system tested to ensure functionality
- Task is completed as per job card
- Housekeeping undertaken