

ELECTRICAL- ELECTRONIC ASSEMBLY

Competency Standards

National Vocational
Certificate Level 2

Version 1 - December 2014



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Competency Standards: Electrical & Electronic Assembler (Assistant) - Level 2

Competency Standard A: Maintain workplace safety

Overview: This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Follow safe work procedures; apply tools and equipment safety measures; and follow workplace emergency procedures.

Competency Unit	Performance Criteria	Knowledge and Understanding
A1: Follow safe work procedures	<p>P1- Organise and arrange duties, tools, equipment materials and work area</p> <p>P2- Use and store PPE</p> <p>P3- Perform tasks in a safe manner</p>	<p>K1- Company safety SOP/policy; Housekeeping practices; Factors that may influence safety at the workplace, such as anger and stress</p> <p>K2- Types of personal protective equipment</p> <p>K3- Safety signs and symbols; Isolation and lockout procedures</p>
A2: Apply tools & equipment safety measures	<p>P1- Check earthing for safety of equipment</p> <p>P2- Store tooling and equipment securely</p>	<p>K1- Method of earthing and its effects on safety</p> <p>K2- Storage and stacking methods of tools & equipment</p>
A3: Follow workplace emergency procedures	<p>P1- Follow safe workplace procedures for dealing with accidents, fires and emergencies within scope of responsibility</p>	<p>K- Scope of responsibility; First aid procedures; Fire safety and fire fighting procedures; Risk control measures</p>

Competency Standard B: Apply continuing professional development

Overview: This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Identify professional development needs; develop professional knowledge, skills and attitudes, and maintain professional proficiency.

Competency Unit	Performance Criteria	Knowledge and Understanding
B1: Identify professional development needs	P1- Discuss professional development needs P2- Identify professional development programmes	K1- Reasons for professional development K2- Access to programmes; Career guidance
B2- Develop professional knowledge, skills and attitudes	P1- Participate in training programmes P2- Document training outcome	K1- Outcomes and relevance of training K2- Report and portfolio writing
B3- Maintain professional proficiency	P1- Identify and use self-study sources P2- Implement self-study plan	K1- Research methods; Access to sources K2- Planning your career

Competency Standard C: Perform preventive maintenance as part of electrical operations

Overview: This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Plan and prepare for preventive maintenance; perform routine inspections; carry out preventive maintenance; and complete work.

Competency Unit	Performance Criteria	Knowledge and Understanding
C1: Plan and prepare for preventive maintenance	P1- Identify and obtain safety and other regulatory requirements for maintenance P2- Interpret circuit diagrams P3- Identify and select tools and equipment	K1- Safety requirements; Specifications; Hazard identification K2- Drawings and symbols specifications K3- Tools and equipment and calibration thereof
C2: Perform routine Inspection	P1- Check for safety hazards P2- Carry out procedures for routine checks P3- Document results	K1- Inspection requirements K2- Maintenance of electrical instruments and equipment K3- Types of common faults of wiring; Load balance; Safety precautions K4- Test and preventive reports
C3: Carry out preventive maintenance	P1- Perform basic measurements tests P2- Perform minor adjustments and calibrations P3- Replace worn out or damaged parts	K1- Measurement and calculation of electrical parameters K2- Basic operation of appliance and settings to adjust performance K3- Communication skills
C4: Complete work	P1- Complete work related documents and procedures P2- Perform final quality inspection P3- Clean up and store tools, equipment and materials	K1- Importance of documentation; Customer care procedures and techniques K2- Importance of quality; handing over to client K3- Waste disposal procedures; Care of tools and equipment

Competency Standard D: Perform corrective maintenance as part of electrical operations

Overview: This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Plan and prepare for corrective maintenance; perform troubleshooting; carry out corrective maintenance procedures; and complete work.

Competency Unit	Performance Criteria	Knowledge and Understanding
D1: Plan and prepare for corrective maintenance	P1- Identify and obtain safety and other regulatory requirements for maintenance P2- Interpret circuit diagrams P3- Identify and select tools and equipment	K1- Safety requirements; Specifications; Hazard identification K2- Drawings and symbols specifications K3- Tools and equipment and calibration thereof
D2: Perform troubleshooting	P1- Check for safety hazards P2- Carry out diagnostic procedures P3- Identify faulty parts and/or equipment P4- Analyse system fault	K1- Troubleshooting requirements K2- Identification of electrical faults by checking shape, size and colour of components and parts; Measurement of electrical parameters; Safety precautions K3- Methods of fault identification in electrical components K4- System operations in an electrical environment
D3: Carry out corrective maintenance procedures	P1- Dismantle faulty parts or components P2- Replace or repair faulty parts or components P3- Perform commissioning	K1- Dismantling procedures K2- Replacing and repairing procedures K3- Electrical load management; commissioning procedures
D4: Complete work	P1- Complete work related documents and procedures P2- Perform final quality inspection P3- Clean up and store tools, equipment and materials	K1- Importance of documentation; Customer care procedures and techniques K2- Importance of quality; handing over to client K3- Waste disposal procedures; Care of tools and equipment

Competency Standard E: Test electrical and electronic parameters

Overview: This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Perform testing; diagnose faults; and remove faults.

Competency Unit	Performance Criteria	Knowledge and Understanding
E1: Perform Testing	P1- Conduct visual inspection P2- Implement testing procedures	K1- Damage identification in terms of cracks, disorder in shape and structure, broken parts K2- Process of different tests; Electrical parameters
E2: Diagnose fault	P1- Interpret test results P2- Implement troubleshooting procedures and identify fault	K1- Interpretation of drawings and circuit diagrams K2- Troubleshooting procedures; Electrical and electronic parameters
E3: Remove faults	P1- Repair or replace component parts P2- Carry out operational testing	K1- Interpretation of drawings and circuit diagrams; product knowledge K2- Product knowledge; Testing procedures and equipment

Competency Standard F: Assemble electrical and electronic circuits

Overview: This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Plan and prepare for assembling; assemble electrical circuits; assemble electronic circuits; and complete work.

Competency Unit	Performance Criteria	Knowledge and Understanding
F1: Plan and prepare for assembling	P1- Draw wiring layout P2- Identify, obtain and confirm material requirements P3- Prepare tools, equipment and materials P4- Prepare circuit board	K1- Interpretation of drawings, symbols, cable number according to load, and colour coding K2- Material requirements K3- Tools, equipment and materials required for the job K4- Methods of preparing
F2: Assemble electrical circuits	P1- Interpret assembly manual and circuit diagram P2- Install components P3- Perform wiring and connect electrical circuits P4- Carry out operational testing	K1- Interpretation of drawings and circuit diagrams K2- Installation procedures K3- Types of wiring, cables and joints K4- Testing procedures and equipment
F3: Assemble electronic circuits	P1- Design layout P2- Prepare PCB P3- Connect electronic components in PCB P4- Carry out operational testing	K1- Methods of PCB design K2- HNO ₃ acid and chemical reactions; Drilling procedure K3- Interpretation of drawings and circuit diagrams; Soldering K4- Testing procedures and equipment
F4: Complete work	P1- Complete work related documents and procedures P2- Perform final quality inspection P3- Clean up and store tools, equipment and materials	K1- Importance of documentation; Customer care procedures and techniques K2- Importance of quality; handing over to client K3- Waste disposal procedures; Care of tools and equipment

Competency Standard G: Use and maintain electrical tools and equipment

Overview: This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Use electrical tools and equipment; maintain electrical tools, equipment and instruments; maintain batteries; and calibrate measuring equipment.

Competency Unit	Performance Criteria	Knowledge and Understanding
G1: Use electrical tools and equipment	P1- Identify and select tools, equipment and instruments P2- Demonstrate safe use of tools, equipment and instruments	K1- Purpose of electrical tools, equipment and instruments K2- Use of electrical tools, equipment and instruments
G2: Maintain electrical tools, equipment and instruments	P1- Describe preventive maintenance procedures P2- Maintain and/or replace tool insulation P3- Clean and store electrical tools, equipment and instruments	K1- Preventive maintenance; Types of maintenance schedules or programmes for: - Tools - Equipment - Instruments - Machinery - Facilities K2- Types of insulation and reports K3- Storage requirements
G3: Maintain batteries	P1- Determine state of charge P2- Maintain electrolyte level P3- Charge batteries	K1- Types of batteries K2- Role of electrolyte K3- Charging procedures
G4: Calibrate measuring instruments	P1- Check calibration of measuring instruments P2- Document and interpret calibration procedure P3- Calibrate measuring instrument	K1- Types and methods of calibration K2- Types of calibration reports K3- Types and methods of calibration

Documents, policies, guidelines:

- International Labour Organisation (ILO) Standards on Occupational Health and Safety
- Pakistan Electricity Act, 1910 and subsequent amendments
- Institute of Electrical and Electronics Engineers Standards Association (IEEE-SA)
- Industry code of practice

Tools and Equipment:

No.	Description	Quantity
1	Personal protective equipment	
2	Tools and equipment for cable works	
3	Hand tools and Powered handheld machine tools	
4	AC power supply 220/110 V	
5	Ampere meter	
6	Analogue and digital trainer	
7	Basic oscilloscope	
8	Blower	
9	Capacitor meter	
10	Clamp Meter (Digital)	

11	Crimping Tools	
12	DC Power Supply	
13	De-soldering gun	
14	Digital & Analogue Multi Meter	
15	Digital winding machine	
16	Drill Machine	
17	EHT probe meter	
18	File Set	
19	Fire extinguisher	
20	First Aid kit	
21	Frequency meter	
22	Gravity Meter	
23	Hacksaw	
24	Hammer set	
25	Heat Gun	
26	IC inserter / exertor kit	
27	Knife Cutter Set	
28	LCR meter	
29	Level meter	
30	L-key set	

31	Magnifier Lamp	
32	Measuring tape	
33	Mega meter	
34	Micro meter	
35	Mini drill machine	
36	Pack machine with strip	
37	PCB vice	
38	Plier set	
39	Project board	
40	Ratchet Set	
41	Screw driver set	
42	Signal generator	
43	Silicon Gun (Glue gun)	
44	Solder Sucker	
45	Soldering Iron with stand	
46	Sound system	
47	Spanner set	
48	Standard wire gauge	
49	Star set	
50	Tuner / watch maker set	
51	Volt meter	
52	Wrench set	

Consumables:

No.	Description		Quantity
1	wire	3/29	200m
2	Hock up wire	6 core	100
3	Single way switch	5 Amp	24
4	Two pin socket	5 Amp	24
5	Lamp Holder	Piano Type	24
6	Bulb	100W & 200W	24
7	Two pole main switch	10 Amp	03
8	Duck Putty	3*4 inch	01Bundle
9	Fuse	10 Amp	06
10	Insulation Tape		12
11	Samad Bound	Elfy	12
12	Board (Plastic)	4*4 inch	06
13	Board (Plastic)	4*7 inch	06
14	Resistance	Different value	500
15	Variable Resistance	Different value	100
16	Capacitors	Different value	300
17	Transistors	Different value	500
18	I.Cs	Different value	100
19	Diode	2 Amp & 4 Amp	500

20	Diode (L E Ds)	Different Colours	100
21	Soldering Iron	60 watts	20
22	Soldering Wire	Quanti Core (60*40)	12
23	Soldering Iron Stand		06
24	Soldering Iron Bitts	60 watts	20
25	Soldering Iron Elements	60 watts	20
26	Coper coated sheet	1*1 feet	05
27	Speakers	6,8,10 inch	06
28	De-Soldering Tools	Solder Sucker	20
29	DVD Mechanism		03
30	DVD Lenz		03
31	DVD Power Supply		03
32	DVD Card		03
33	TV Circuit	TV Kit	03
34	Picture tube (Monitor)	14,15 inch	02
35	Amplifier	LA 4440	06
36	Amplifier	D313,2N3055	06
37	Dack Mechanism	Soft Kit	06
38	Pree Amplifier	Dack Pree	06
39	Bass Tone or Equalizer	Dack Buffer Amplifier	06
40	Transformer	25+25+12 (6 Amp)	06

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