



# Model Curriculum

**QP Name: Electrical Assembly Operator – Control Panel**

**QP Code: ELE/Q7306**

**QP Version: 3.0**

**NSQF Level: 3**

**Model Curriculum Version: 3.0**

Electronics Sector Skills Council of India || 155, 2nd Floor, ESC House, Okhla Industrial Area - Phase 3,  
New Delhi – 110020

# Table of Contents

Training Parameters .....	3
Program Overview .....	4
Training Outcomes .....	4
Compulsory Modules .....	4
Module Details .....	5
Module 1: Introduction the role of Electrical Assembly Operator – Control Panel .....	5
Module 2: Assemble Control Panel.....	6
Module 3: Soft Skills and Work Ethics .....	8
Module 4: Basic Health and Safety Practices .....	9
Module 5: Employability Skills (30 Hours).....	10
Module 6: On-the-Job Training .....	11
Annexure.....	12
Trainer Requirements .....	12
Assessor Requirements.....	13
Assessment Strategy .....	14
References .....	15
Glossary.....	15
Acronyms and Abbreviations .....	16

## Training Parameters

<b>Sector</b>	Electronics
<b>Sub-Sector</b>	Industrial Automation
<b>Occupation</b>	Assembly-I&A
<b>Country</b>	India
<b>NSQF Level</b>	3
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2004/7137.20
<b>Minimum Educational Qualification and Experience</b>	10th Grade Pass OR 8th Grade Pass + NTC (2 years after 8th) OR 8th Grade Pass + 2 years relevant experience and 18 Years
<b>Pre-Requisite License or Training</b>	NA
<b>Minimum Job Entry Age</b>	18 Years
<b>Last Reviewed On</b>	24/02/2022
<b>Next Review Date</b>	24/06/2025
<b>NSQC Approval Date</b>	24/02/2022
<b>QP Version</b>	3.0
<b>Model Curriculum Creation Date</b>	24/02/2022
<b>Model Curriculum Valid Up to Date</b>	24/06/2025
<b>Model Curriculum Version</b>	3.0
<b>Maximum Duration of the Course</b>	450 Hours

## Program Overview

This section summarizes the end objectives of the program along with its duration.

### Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Interpret assembly drawing/work instructions/SOPs for identification of material, tools and equipment required.
- Carry out preparatory activities such as arranging and inspection of tools and equipment etc.
- Carry out assembly of electrical panel and systems.
- Carry out post-work operations such as testing, cleaning, inspection etc.
- Interact and coordinate with the supervisor and colleagues etc.
- Follow safe and healthy work practices.

### Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
<b>Bridge Module</b>	<b>20:00</b>	<b>10:00</b>	<b>00:00</b>	<b>00:00</b>	<b>30:00</b>
Module 1: Introduction to the role of Electrical Assembly Operator – Control Panel	20:00	10:00	00:00	00:00	30:00
<b>ELE/N7307 - Assemble Control Panel</b>	<b>70:00</b>	<b>170:00</b>	<b>90:00</b>	<b>00:00</b>	<b>330:00</b>
Module 2: Assemble Control Panel	70:00	170:00	90:00	00:00	330:00
<b>ELE/N9972 – Work Effectively at the Workplace</b>	<b>15:00</b>	<b>15:00</b>	<b>00:00</b>	<b>00:00</b>	<b>30:00</b>
Module 3: Soft Skills and Work Ethics	15:00	15:00	00:00	00:00	30:00
<b>ELE/N1003 – Apply Health and Safety Practices at the Workplace</b>	<b>15:00</b>	<b>15:00</b>	<b>00:00</b>	<b>00:00</b>	<b>30:00</b>
Module 4: Basic Health and Safety Practices	15:00	15:00	00:00	00:00	30:00
<b>DGT/VSQ/N0101 - Employability Skills (30 Hours)</b>	<b>30:00</b>	<b>00:00</b>	<b>00:00</b>	<b>00:00</b>	<b>30:00</b>
Module 5: Employability Skills (30 Hours)	30:00	00:00	00:00	00:00	30:00
<b>Total Duration</b>	<b>150:00</b>	<b>210:00</b>	<b>90:00</b>	<b>00:00</b>	<b>450:00</b>

# Module Details

## Module 1: Introduction to the role of Electrical Assembly Operator – Control Panel

### Bridge module

#### Terminal Outcomes:

- List the role and responsibilities of an Electrical Assembly Operator – Control Panel.

<b>Duration:</b> 20:00	<b>Duration:</b> 10:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>Describe the size and scope of the electronics industry and its various sub-sectors.</li> <li>Discuss the various opportunities for an Electrical Assembly Operator – Control Panel in the industry.</li> <li>Define the basics of electronics and related concepts.</li> <li>Discuss the role and responsibilities of an Electrical Assembly Operator – Control Panel.</li> <li>Discuss organisational policies on incentives, delivery standards, personnel management and public relations (PR).</li> </ul>	<ul style="list-style-type: none"> <li>Familiarization with Control Panel</li> <li>Scope of Assembly Operator</li> <li>Working of Control Panel</li> </ul>
<b>Classroom Aids:</b>	
Laptop, white board, marker, projector	
<b>Tools, Equipment and Other Requirements</b>	
NA	

## Module 2: Assemble Control Panel

### Mapped to ELE/N7307

#### Terminal Outcomes:

- Carry out assembly and installation of electrical panels and its components.
- Perform post assembly activities like inspection, cleaning, storing etc.

Duration: 70:00	Duration: 170:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Describe basic fundamentals of electricity and circuits.</li> <li>• Illustrate current and voltage distribution in series and parallel circuits.</li> <li>• Describe organisational process or procedure for assembly and wiring.</li> <li>• Discuss the information derived from the engineering drawings, wiring diagrams, component symbols, blueprints, job sheet etc.</li> <li>• List the tools, measuring instruments, equipment and electrical components required during assembling work.</li> <li>• Describe functioning of electrical panel and control circuits.</li> <li>• Describe functioning and use of various electrical components such as MCB's, relay, contractor, fuse etc. used in machine, control panels and electrical circuits.</li> <li>• Describe the selection criteria of tools, measuring instruments, equipment and electrical components required during assembling work.</li> <li>• Discuss the organisational process of collecting and arranging the tools, measuring instruments, equipment and electrical components from the store.</li> <li>• Summarise the steps to be performed for checking the tools, measuring instruments, equipment and electrical components before use.</li> <li>• Discuss the necessary precautions to avoid any hazard and accident during assembling activities.</li> <li>• List the steps to be performed for preparing the foundation for installing the equipment.</li> </ul>	<ul style="list-style-type: none"> <li>• Read the drawing, component symbols and work orders for identifying work requirements, selecting and planning sequence of assembly operations.</li> <li>• Demonstrate the standard operating procedure to use tools, measuring instruments, equipment and electrical components required during assembling work.</li> <li>• Show how to select and arrange the required tools, measuring instruments, equipment and electrical components from the store.</li> <li>• Apply appropriate ways to check the tools, measuring instruments, equipment and electrical components before use.</li> <li>• Show how to calibrate the tools, measuring instruments and equipment before use.</li> <li>• Apply appropriate ways to check that electrical panels is cleaned and free from paint, grease, rust, or other contaminants.</li> <li>• Show how to prepare foundation for installing control cables, MCB's tec. as per the drawing requirement.</li> <li>• Show how to prepare control cables, electrical components like MCB's, contactors, relays etc. as per requirement.</li> <li>• Apply appropriate ways to mount, align and level all attachments and fixtures on electrical panels.</li> <li>• Demonstrate organisational procedure of assembling all the parts of electrical panels as mentioned in drawing/ blueprint.</li> <li>• Apply appropriate ways to fasten the mechanical components/ subassemblies together.</li> <li>• Show how to make the electrical connections of electrical panels by using</li> </ul>

<ul style="list-style-type: none"> <li>• Describe the standards and procedure for installation of electrical panels.</li> <li>• Explain the safety mechanism, do's and don'ts of manufacturing process as per SOP.</li> <li>• List the steps to be performed for installing the electrical panel, control circuits etc. in an electrical machine.</li> <li>• Explain the process of escalating the problems faced during installation and assembly activities to the supervisor or concerned authority.</li> <li>• Describe post-assembling processes like cleaning, quality check etc.</li> <li>• Explain methods of inspecting the quality of assembled control panels.</li> <li>• List the commonly occurring defects and their remedies in the electrical panels.</li> <li>• Elaborate the impact of non-conformities on final assembly and their causes to quality assurance standards.</li> <li>• Describe various checks that need to be made to ensure that equipment is safe and ready to use.</li> </ul>	<p>wires strippers, crippling tool and other insulated tools.</p> <ul style="list-style-type: none"> <li>• Perform steps to install electrical panel, control circuits etc.</li> <li>• Apply appropriate inspection methods to check the assembled components as per the WI.</li> <li>• Ensure that equipment is safe and ready to use (electrical connections, power return and earthing arrangements; equipment calibration, setting parameters).</li> <li>• Perform functional tests on the assembled electrical panels to identify any non-conformities and their causes in it.</li> <li>• Apply appropriate ways to change or repair the faulty electrical panels components as per the observations of tests.</li> <li>• Apply appropriate ways to implement the corrective actions to resolve problems in electric panels.</li> </ul>
--	--

**Classroom Aids:**

Whiteboard, marker pen, computer or laptop attached to LCD projector, scanner, computer speakers

**Tools, Equipment and Other Requirements**

Cable, Crimping Tool, Desktop, Digital Multimeter, Dot Matrix Printer, ESD Gloves, Ink Jet Printer, Insulation Tape, LanTester, Laptop, Lead Solder, Motherboard Diagnoser, Multi-Function Laser Printer, Network Switch, Post Cards, Router, Scanner, Screw Driver Set, Soldering Flux, Soldering Iron, job sheets, report formats

## Module 3: Soft Skills and Work Ethics

### Mapped to ELE/N9972

#### Terminal Outcomes:

- Work effectively at the workplace.
- Implement the practices related to gender and PwD sensitization.

<b>Duration: 15:00</b>	<b>Duration: 15:00</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• State the importance of work ethics and workplace etiquette</li> <li>• State the importance of effective communication and interpersonal skills.</li> <li>• Explain ways to maintain discipline at the workplace.</li> <li>• Discuss the common reasons for interpersonal conflict and ways of managing them effectively.</li> <li>• Discuss the importance of following organisational guidelines for dress code, time schedules, language usage and other behavioural aspects.</li> <li>• Explain the importance of working as per the workflow of the organisation to receive instructions and report problems.</li> <li>• Explain the importance of conveying information/instructions as per defined protocols to the authorised persons/team members.</li> <li>• Explain the common workplace guidelines and legal requirements on non-disclosure and confidentiality of business-sensitive information.</li> <li>• Describe the process of reporting grievances and unethical conduct such data breach, sexual harassment at the workplace, etc.</li> <li>• Explain the concept and importance of gender sensitivity and equality.</li> <li>• Discuss ways to create sensitivity for different genders and Persons with Disabilities (PwD).</li> <li>• Discuss ways of dealing with</li> </ul>	<ul style="list-style-type: none"> <li>• Develop a sample plan to achieve organisational goals and targets.</li> <li>• Create a sample feedback form to obtain feedback from customers, colleagues etc.</li> <li>• Roleplay to demonstrate the use of professional language and behaviour that is respectful of PwD and all genders.</li> <li>• Apply organisational protocol on data confidentiality and sharing only with the authorised personnel.</li> </ul>
<b>Classroom Aids</b>	
Training kit (Trainer guide, Presentations), White board, Marker, projector, laptop, flipchart.	
<b>Tools, Equipment and Other Requirements</b>	
Sample of escalation matrix, organisation structure.	



## Module 4: Basic Health and Safety Practices

### Mapped to ELE/N1003

#### Terminal Outcomes:

- Apply health and safety practices at the workplace.

<b>Duration: 15:00</b>	<b>Duration: 15:00</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Discuss job-site hazards, risks and accidents.</li> <li>• Explain the organizational safety procedures for maintaining electrical safety, handling tools and hazardous materials.</li> <li>• Elaborate electronic waste disposal procedures.</li> <li>• Describe the process of disposal of hazardous waste</li> <li>• List the name and location of concerned people, documents and equipment for maintaining health and safety in the workplace.</li> <li>• Describe how to interpret warning signs while accessing sensitive work areas.</li> <li>• Explain the importance of good housekeeping.</li> <li>• Describe the importance of maintaining appropriate postures while lifting heavy objects.</li> <li>• List the types of fire and fire extinguishers.</li> <li>• Explain the importance of efficient utilisation of water, electricity and other resources.</li> <li>• List the common sources of pollution and ways to minimize it.</li> <li>• Describe the concept of waste management and methods of disposing hazardous waste.</li> <li>• Explain various warning and safety signs.</li> <li>• Describe different ways of preventing accidents at the</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the use of protective equipment suitable as per tasks and work conditions.</li> <li>• Prepare a report to inform the relevant authorities about any abnormal situation/behaviour of any equipment/system.</li> <li>• Administer first aid in case of a minor accident.</li> <li>• Demonstrate the steps to free a person from electrocution safely.</li> <li>• Administer Cardiopulmonary Resuscitation (CPR).</li> <li>• Demonstrate the application of defined emergency procedures such as raising alarm, safe/efficient, evacuation, moving injured people, etc.</li> <li>• Prepare a sample incident report.</li> <li>• Use a fire extinguisher in case of a fire incident.</li> <li>• Demonstrate the correct method of lifting and handling heavy objects.</li> </ul>
<b>Classroom Aids</b>	
Training kit (Trainer guide, Presentations), White board, Marker, projector, laptop, flipchart.	
<b>Tools, Equipment and Other Requirements</b>	
Personal Protection Equipment: safety glasses, head protection, rubber gloves, safety footwear, warning signs and tapes, fire extinguisher, first aid kit, fire extinguishers and warning signs.	

## Module 5: Employability Skills (30 Hours) Mapped to DGT/VSQ/N0101

### Terminal Outcomes:

- Discuss about Employability Skills in meeting the job requirements
- Describe opportunities as an entrepreneur.
- Describe ways of preparing for apprenticeship & Jobs appropriately.

Duration: 30:00	Duration: 00:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Explain constitutional values, civic rights, responsibility towards society to become a responsible citizen</li> <li>• Discuss 21<sup>st</sup> century skills</li> <li>• Explain use of basic English phrases and sentences.</li> <li>• Demonstrate how to communicate in a well-behaved manner</li> <li>• Demonstrate how to work with others</li> <li>• Demonstrate how to operate digital devices</li> <li>• Discuss the significance of Internet and Computer/ Laptops</li> <li>• Discuss the need for identifying business opportunities</li> <li>• Discuss about types of customers.</li> <li>• Discuss on creation of biodata</li> <li>• Discuss about apprenticeship and opportunities related to it.</li> </ul>	
<b>Classroom Aids</b>	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
<b>Tools, Equipment and Other Requirements</b>	
Computer, UPS, Scanner, Computer Tables, LCD Projector, Computer Chairs, White Board OR Computer Lab	

## Module 6: On-the-Job Training

### Mapped to Electrical Assembly Operator – Control Panel

<b>Mandatory Duration:</b> 90:00	<b>Recommended Duration:</b> 00:00
<b>Location: On Site</b>	
<b>Terminal Outcomes</b>	
<ol style="list-style-type: none"> <li>1. Explain the fundamental concepts of electronics and electronics components</li> <li>2. Read the drawing, component symbols and work orders for identifying work requirements, selecting and planning sequence of assembly operations.</li> <li>3. Arrange tools, measuring instruments, equipment and required components from the store.</li> <li>4. Perform assembly and installation of electrical panels and its components.</li> <li>5. Place and connect various parts i.e. MCB, relay etc. in the panel.</li> <li>6. Make the electrical connections of components with electrical panels by using wires strippers, crippling tool and other insulated tools.</li> <li>7. Perform post-assembly activities like cleaning, functionality check etc.</li> <li>8. Interact and coordinate with supervisor and colleagues</li> <li>9. Work as per the given timeline and quality standards</li> <li>10. Maintain a safe, healthy and secure work environment</li> </ol>	

## Annexure

### Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma/ ITI/ Certified in relevant CITS Trade	Electronics	2	Electrical panel assembly	1	Trainer	

Trainer Certification	
Domain Certification	Platform Certification
“Electrical Assembly Operator – Control Panel, ELE/Q7306, version 3.0”. Minimum accepted score is 80%.	Recommended that the Trainer is certified for the <b>Electrical Assembly Operator – Control Panel “Trainer (VET and Skills)”</b> , mapped to the Qualification Pack: “MEP/Q2601, V2.0”, with minimum score of 80%

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma/ ITI/ Certified in relevant CITS Trade	Electronics/ Electrical	3	Electrical panel assembly	2	Assessor	

Assessor Certification	
Domain Certification	Platform Certification
“Electrical Assembly Operator – Control Panel, ELE/Q7306, version 3.0”. Minimum accepted score is 80%.	Recommended that the Assessor is certified for the <b>Electrical Assembly Operator – Control Panel</b> “Assessor (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2701, V2.0”, with minimum score of 80%

1. Assessment System Overview:
  - Batches assigned to the assessment agencies for conducting the assessment on SDMS/SIP or email
  - Assessment agencies send the assessment confirmation to VTP/TC looping SSC
  - Assessment agency deploys the ToA certified Assessor for executing the assessment
  - SSC monitors the assessment process & records
2. Testing Environment:
  - Confirm that the centre is available at the same address as mentioned on SDMS or SIP
  - Check the duration of the training.
  - Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
  - If the batch size is more than 30, then there should be 2 Assessors.
  - Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
  - Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
  - Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
  - Check the availability of the Lab Equipment for the particular Job Role.
3. Assessment Quality Assurance levels / Framework:
  - Question papers created by the Subject Matter Experts (SME)
  - Question papers created by the SME verified by the other subject Matter Experts
  - Questions are mapped with NOS and PC
  - Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
  - Assessor must be ToA certified & trainer must be ToT Certified
  - Assessment agency must follow the assessment guidelines to conduct the assessment
4. Types of evidence or evidence-gathering protocol:
  - Time-stamped & geotagged reporting of the assessor from assessment location
  - Centre photographs with signboards and scheme specific branding
  - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
  - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos
5. Method of verification or validation:
  - Surprise visit to the assessment location
  - Random audit of the batch
  - Random audit of any candidate
6. Method for assessment documentation, archiving, and access
  - Hard copies of the documents are stored
  - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
  - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

Glossary

<b>Sector</b>	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
<b>Sub-sector</b>	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
<b>Occupation</b>	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
<b>Job role</b>	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
<b>Occupational Standards (OS)</b>	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
<b>Performance Criteria (PC)</b>	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
<b>National Occupational Standards (NOS)</b>	NOS are occupational standards which apply uniquely in the Indian context.
<b>Qualifications Pack (QP)</b>	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
<b>Unit Code</b>	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
<b>Unit Title</b>	Unit title gives a clear overall statement about what the incumbent should be able to do.
<b>Description</b>	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
<b>Scope</b>	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

<b>Knowledge and Understanding (KU)</b>	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
<b>Organisational Context</b>	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
<b>Technical Knowledge</b>	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
<b>Core Skills/ Generic Skills (GS)</b>	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
<b>Electives</b>	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
<b>Options</b>	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.



## Acronyms and Abbreviations

<b>NOS</b>	National Occupational Standard(s)
<b>NSQF</b>	National Skills Qualifications Framework
<b>QP</b>	Qualifications Pack
<b>TVET</b>	Technical and Vocational Education and Training
<b>IPR</b>	Intellectual Property Rights