



Model Curriculum

QP Name: Motor & Controller Repairing Technician

QP Code: ELE/Q7002

QP Version: 2.0

NSQF Level: 4

Model Curriculum Version: 2.0

Electronics Sector Skills Council of India || 155, 2nd Floor, ESC House, Okhla Industrial Area - Phase
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Training Parameters

Sector	Electronics
Sub-Sector	E-Mobility & Battery
Occupation	After Sale Support – EM&B
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO - 2015/3122.5300
Minimum Educational Qualification and Experience	8th grade pass with 2 years of NTC (plus 2 year of NAC/relevant experience) OR 10th grade pass (plus 2 year of NTC/NAC/relevant experience) OR 12th Class OR Certificate-NSQF (Level-3 in Maintenance Technician) with 2 Years of experience
Pre-Requirement License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	30/12/2021
Next Review Date	30/12/2026
NSQC Approval Date	30/12/2021
QP Version	2.0
Model Curriculum Creation Date	30/12/2021
Model Curriculum Valid Up to Date	30/12/2026
Model Curriculum Version	2.0
Maximum Duration of the Course	450 Hours

Program Overview

This section summarises 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:

- State the role and responsibilities of a Motor & Controller Repairing Technician
- Explain the process of understanding issues through discussion with the customer
- Describe the process of determining the type of repair to be performed i.e. front-end repair or technical-level repair
- Prepare sample documents to initiate repair and maintenance of an Motor & Controller System
- Demonstrate the process of inspecting various components of a Motor & Controller System to detect faults in its component(s)
- Explain the importance of carrying out repair and maintenance activity as per the Service Level Agreement (SLA)
- Demonstrate the process of testing the Motor & Controller system against various performance parameters
- Explain how to find the cause of the problem, if test results diverge from specifications
- Demonstrate the use of correct techniques to rectify malfunctions with the Motor & Controller System
- Explain the importance of following inclusive practices for all genders and Persons with Disabilities (PwD) at work
- Demonstrate the use of various health and safety equipment at work

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
Bridge Module	16:00	14:00	00:00	00:00	30:00
Module 1: Introduction and Orientation to the role of a Motor & Controller Repairing Technician	16:00	14:00	00:00	00:00	30:00
ELE/N7006 Identify service-related issues of the customer	10:00	20:00	30:00	00:00	60:00
Module 2: Identification of service-related issues	10:00	20:00	30:00	00:00	60:00
ELE/N7004 Repair faulty parts in the Motor and Controller System	20:00	40:00	60:00	00:00	120:00

Module 3: Repair of faulty parts in the Motor and Controller System	20:00	40:00	60:00	00:00	120:00
ELE/N7003 Test the Motor and Controller after service and repair	20:00	40:00	60:00	00:00	120:00
Module 4: Testing the Motor and Controller System	20:00	40:00	60:00	00:00	120:00
ELE/N9905 Work effectively at the workplace	15:00	15:00	00:00	00:00	30:00
Module 5: Soft Skills and Work Ethics	15:00	15:00	00:00	00:00	30:00
ELE/N1002 Apply health and safety practices at workplace	15:00	15:00	00:00	00:00	30:00
Module 6: Basic Health and Safety Practice	15:00	15:00	00:00	00:00	30:00
DGT/VSQ/N0102- Employability Skills (60 Hours)	24:00	36:00	00:00	00:00	60:00
Module 7: Employability Skills (60 Hours)	24:00	36:00	00:00	00:00	60:00
Total Duration	120:00	180:00	150:00	00:00	450:00

Module Details

Module 1: Introduction and orientation to the role of a Motor & Controller Repairing Technician

Terminal Outcomes:

- Describe the role and responsibilities of a Motor & Controller Repairing Technician

Duration: 16:00	Duration: 14:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Describe the size and scope of the Electronics industry and its sub-sectors Discuss the role and responsibilities of a Motor & Controller Repairing Technician Discuss various employment opportunities for a Motor & Controller Repairing Technician in the Electronics industry State the organisational policies on incentives, personnel management, reporting structure, etc. 	<ul style="list-style-type: none"> Awareness about Motor & Controller System Describe the applications and functions of the Motor & Controller system
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
NA	

Module 2: Identification of service-related issues

Mapped to ELE/N7006

Terminal Outcomes:

- Describe the process of detecting issues with the Motor & Controller System
- Explain the process of determining the type of repair to be carried out i.e. front-end repair or technical-level repair
- Prepare sample documents to initiate the repair and maintenance of the Motor & Controller System

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the behavioural aspects and etiquette to be followed during interaction with customers • Describe various issues that may arise with the Motor & Controller • Describe the method to diagnose the cause of technical problems with the Motor & Controller System of an • Explain various types of repairing methods such as front-end repair and technical-level repair • Explain how to use an interactive system such as an Enterprise Resource Planning (ERP) to manage stock • Explain the importance of initiating repair and maintenance activities after informing the customer about the warranty policy and the estimated cost 	<ul style="list-style-type: none"> • Demonstrate the process of testing the Motor & Controller system of an to detect issues with it • Show how to determine the type of repair required i.e. front-end repair or technical-level repair • Prepare a sample worksheet and other necessary documents required to initiate the repair and maintenance activities • Demonstrate the use of the relevant interactive system to manage the stock
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Various tools and equipment such as Soldering Station, Digital Multimeter, ESD Gloves, Line Tester, Power Supply, Precision Screw Driver, Screw Driver Set, Shear Cutters, Universal Crimp Tool, Wire Stripper, ESD Mat, Ac Power Source, Allen Key Set, Connecting Wire, Safety Helmet, Safety Shoes, Jigs, Fixture, Screw Guns, Torque Wrench etc., organizational documents.	

Module 3: Repair of faulty parts in the Motor and Controller System

Mapped to ELE/N7004

Terminal Outcomes:

- Describe the process of inspecting various components of the Motor & Controller System to detect faults with its component(s)
- Demonstrate the process of carrying out repair and maintenance as per the agreed Service Level Agreement (SLA)

Duration: 20:00	Duration: 40:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the basic principles governing Alternating Current (AC)/ Direct Current (DC) and electronic circuits • Explain the functions of various components of a motor and the interaction between them • Explain the ways to minimise electricity hazards • Explain different techniques of diagnosing problems with electrical connections, wiring, charging relays, charging resistance box and motor and controller • Describe various methods of troubleshooting different types of issues with different types of batteries • Explain the use of relevant tools and equipment • Describe the process of replacing the faulty components • Explain the importance of following safety and quality standards during the repair and maintenance process 	<ul style="list-style-type: none"> • Demonstrate the applicable safety and anti-static practices to be followed • Demonstrate the process of assembling various electrical components and connecting them as per the wiring diagram • Demonstrate the process of testing the Motor & Controller system for the correct functioning • Show how to detect various issues with a Motor & Controller System • Demonstrate the process of repairing/ replacing the faulty components in a Motor & Controller System • Prepare a sample service and maintenance report
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Digital Multimeter, IC Chip Extractor, Insulation Tape, Line Tester, Power Supply, Precision Screw Driver, Screw Driver Set, Shear Cutters, Soldering Flux, Soldering Iron, Torque Screwdriver Set, Universal Crimp Tool, Wire Stripper, Ac Power Source, Allen Key Set, Connecting Wire, Safety Helmet, Safety Shoes	

Module 4: Testing the Motor and Controller System

Mapped to ELE/N7003

Terminal Outcomes:

- Demonstrate the process of testing the Motor & Controller system against various performance parameters
- Explain how to detect the cause of the problem, if test results diverge from specifications
- Demonstrate the use of the applicable techniques to rectify malfunctions with the Motor and Controller System

Duration: 20:00	Duration: 40:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the globally-accepted protocols for testing Battery Systems • Explain the standard performance parameters for Motor & Controller systems • Explain the use of various tools and equipment such as multimeter to test the performance of a Motor & Controller system • Describe the process of conducting various tests on a Motor and Controller System to detect malfunctions 	<ul style="list-style-type: none"> • Demonstrate the process of testing the Motor & Controller System against various performance parameters • Show how to evaluate the test results to identify the root cause of the problem • Demonstrate the use of approved techniques to rectify faults • Prepare a sample report detailing the testing of Motor & Controller System
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Tools and various testing equipment such as Hydrometer, Soldering Gun, Power Supply, Wire Stripper, Ac Power Source, Allen Key Set, Connecting Wire, Safety Helmet, Safety Shoes etc. organizational documents.	

Module 5: Soft Skills and Work Ethics

Mapped to ELE/N9905

Terminal Outcomes:

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

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

heightened emotions of self and others.	
Classroom Aids	
Training Kit (Trainer Guide, Presentations)	
Tools, Equipment and Other Requirements	
Sample of Escalation Matrix, Organization Structure.	

Module 6: Basic Health and Safety Practice

Mapped to ELE/N1002

Terminal Outcomes:

- Apply health and safety practices at the workplace.

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

Classroom Aids
Training Kit (Trainer Guide, Presentations)
Tools, Equipment and Other Requirements
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 7: Employability Skills (60 Hours)

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

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

Duration: 24:00	Duration: 36:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain constitutional values, civic rights, responsibility towards society to become a responsible citizen • Discuss 21st century skills • Explain use of basic English phrases and sentences. • Demonstrate how to communicate in a well-behaved manner • Demonstrate how to work with others • Demonstrate how to operate digital devices • Discuss the significance of Internet and Computer/ Laptops • Discuss the need for identifying business opportunities • Discuss about types of customers. • Discuss on creation of biodata • Discuss about apprenticeship and opportunities related to it. 	<ul style="list-style-type: none"> • List different learning and employability related GOI and private portals and their usage • Show how to practice different environmentally sustainable practices. • Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, etc. • Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone • Demonstrate how to communicate in a well-mannered way with others. • Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette • Utilize virtual collaboration tools to work effectively • Demonstrate how to maintain hygiene and dressing appropriately. • Perform a mock interview
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Computer, UPS, Scanner, Computer Tables, LCD Projector, Computer Chairs, White Board OR Computer Lab	

Module 8: On-the-Job Training

Mapped to Motor & Controller Repairing Technician

Mandatory Duration: 150:00	Recommended Duration: 00:00
Location: On-Site	
<p>Terminal Outcomes</p> <ol style="list-style-type: none"> 4. Explain the functioning of a Motor & Controller System 5. Explain the application of a Motor & Controller System 6. Identify various issues and repair needs in the Motor & Controller System 7. Inspect various components and connections of the Motor & Controller System to identify the defective component(s) 8. Carry out service/ repair activities as per the Service Level Agreement (SLA) 9. Test Motor & Controller system against various performance parameters 10. Use the relevant techniques to rectify faults in a Motor & Controller System 11. Interact and co-ordinate with the supervisor and colleagues 12. Carry out the assigned work as per the defined quality standards and within the time limit 13. Maintain a healthy, safe and secure working environment 	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma/ Certified in relevant CITS Trade	Electrical / Electronic Engineering	2	Motor & Controller Repairing Technician	1	Electronics	

Trainer Certification	
Domain Certification	Platform Certification
“Motor & Controller Repairing Technician”, “ELE/Q7002, v2.0”, Minimum accepted score is 80%	Recommended that the Trainer is certified for the Motor & Controller Repairing Technician “Trainer (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2601, V2.0”, with minimum score of 80%

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma/ Certified in relevant CITS Trade	Electrical / Electronic Engineering	3	Motor & Controller Repairing Technician	2	Electronics	

Assessor Certification	
Domain Certification	Platform Certification
<p>“Motor & Controller Repairing Technician”, “ELE/Q7002, v2.0”, Minimum accepted score is 80%</p>	<p>Recommended that the Assessor is certified for the Motor & Controller Repairing Technician “Assessor (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2701, V2.0”, with minimum score of 80%</p>

Assessment Strategy

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
- The assessment agency deploys the ToA certified Assessor for executing the assessment
- SSC monitors the assessment process & records

2. Testing Environment

To ensure a conducive environment for conducting a test, the trainer will:

- 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 10 a.m. and 5 p.m. respectively
- Ensure there are two Assessors if the batch size is more than 30.
- 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 levels 1 to 3 are for the unskilled & semi-skilled individuals, and levels 4 and above are for the skilled, supervisor & higher management
- The assessor must be ToA certified & the trainer must be ToT Certified
- The 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:

To verify the details submitted by the training centre, the assessor will undertake:

- A surprise visit to the assessment location
- A random audit of the batch
- A random audit of any candidate

6. Method for assessment documentation, archiving, and access

To protect the assessment papers and information, the assessor will ensure:

- 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 drive

References

Glossary

Term	Description
Declarative knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning	A key learning outcome is a statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on-site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on-site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
Terminal Outcome	The terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
DC	Direct Current
EM&B	E-Mobility & Battery
IC	Integrated Circuit
ITI	Industrial Training Institute
MCU	MicroController Unit
NCO	National Occupational Standards
NOS	National Skills Qualification Committee
NSQF	National Skills Qualification Framework
OJT	On-the-Job Training
OMR	Optical Mark Recognition
PC	Performance Criteria
PwD	Persons with Disabilities
QP	Qualification Pack
SDMS	Skill Development & Management System
SIP	Skill India Portal
SME	Small and Medium Enterprises
SOP	Standard Operating Procedure
SSC	Sector Skill Council
TC	Trainer Certificate
ToA	Training of Assessors
ToT	Training of Trainers
TP	Training Provider
UL	Underwriter Laboratories
VTP	Vocational Training Provider