

Electric Vehicle Battery Diagnosis

Manufacturing and Technology

Show us that you know how to perform electronic diagnostic analysis on electric vehicle high voltage traction batteries, interpret data to determine the state of health of high voltage traction batteries and provide restorative recommendation options, including identifying components required and provide cost estimates for the client or service (garage) advisor.

Level **5**

Credits **10**

\$199 NZD (GST incl.)

Assessment

Electric Vehicle Battery Diagnosis

You are required to submit evidence of the following:

Perform diagnostic analyses on electric vehicle high voltage traction batteries.

Document restorative options to repair electric vehicle high voltage traction batteries.

All work for this EduBit must be your own.

Evidence Submission Options

Below are two (2) options to choose from to collect and submit evidence for this EduBit:

1. From evidence produced as a result of your normal work and validated with attestations from your qualified supervisor. Refer to acceptable evidence requirements below.

OR

2. Enrol in an Electric Vehicle Battery Diagnosis workshop* and provide evidence as per requirements below.

*If you are interested in attending a workshop, please register your interest by emailing ecladmin@op.ac.nz.

Instructions

Acceptable Evidence Requirements:

Photographs of three (3) electric vehicles for which you performed electronic high voltage traction battery diagnostics.

Copies of the three (3) job cards requiring you to perform electronic diagnostic analysis performed for each of the electric vehicles high voltage traction batteries.

Copies of the three (3) electronic diagnostic data print-outs for each of the three (3) batteries.

Copies of your documented interpretation and justification of issues identified from diagnostic data results for the three (3) batteries.

Copies of your documentation restorative option recommendations for each the three (3) batteries.

Attestations from your qualified supervisor.

Learning Recommendations

Nissan Leaf Service Factory Manuals

www.nicclub.com/archives/nissan-leaf-factory-service-manuals.html

EECA Electric Vehicle Battery Life

www.energywise.govt.nz/assets/Resources-Energywise/on-the-road/ev-battery-report.pdf

Factory Service Manuals - Leaf 2013 LEAF – EVB

www.nicclub.com/service-manual?fsm=Leaf/2013%20LEAF/EVB

Factory Service Manuals - Leaf 2013 LEAF – EVC

www.nicclub.com/service-manual?fsm=Leaf/2013%20LEAF/EVC

Tasks

Proof of Identity

Please include a scanned copy of photo identification (e.g. passport, drivers licence, work ID card).

Attestation Form(s)

An attestation is a declaration by a witness that the tasks and activities specified have been performed in their presence and that the evidence provided is true and correct. The Attestation form(s) relevant to this assessment is located in the Resources section above.

Please complete and scan a copy of the necessary form(s) then upload it here.

General Information

Please provide:

a) Name of your workplace.

b) Current list of your current qualifications.

(This information is not assessed but it provides context for the assessor).

Task 1: Perform diagnostic analyses on electric vehicle high voltage traction batteries.

I can:

1.1. Produce job cards for three (3) different electric vehicles I have performed high voltage traction battery electronic diagnostics.

By providing:

Copies of job cards for the three (3) different electric vehicles you have performed electronic diagnostics. The electric vehicles must be one of the following: electric vehicles, HEVs, PHEV.

I can:

1.2. Identify electric vehicles on which I have performed diagnostics.

By providing:

Photographs of the three (3) electric vehicles you performed the diagnostic analysis, as identified in Task 1.1. The photographs must include the make and model of each electric vehicle with you standing next to each.

I can:

1.3. Perform electronic diagnostics on high voltage traction batteries and produce data print-outs to interpret the health status of the batteries.

By providing:

A copy of the diagnostic electronic data printouts reporting on the state of health of the batteries identified in the three (3) electric vehicles Tasks 1.1. This must include each of the five (5) system high voltage traction battery system categories below and their sub-diagnostics:

Battery voltages are analysed - overall voltage, voltage per cell, maximum cell difference, charge and discharge voltages (slow, high and regenerative). Total current is analysed – current output and response curve (low, medium and high), charging current and response curve (slow charge, fast charge and regenerative braking).

Temperature control – temperature sensors, cooling systems, heating systems, fail-safe control, main relay operation.

Battery capacity – full discharge and full recharge monitored, battery capacity is measured and compared to specifications.

Physical condition – external case, connections (charge, main cable, 12V battery).

I can:

1.4. To ensure clarity, interpret data from electronic diagnostic printouts for high voltage traction batteries to identify issues and provide justification for the batteries state of health.

By providing:

A copy of the state of health results for the high voltage traction battery from your interpretation of the electronic diagnostics data, identifying all issues and providing justification.

This must include:

Identification of all issues found and the justification as to why each is an issue.

A full analysis of the battery systems and sub-systems using fault codes and/or live data to diagnose overall state of battery health and to ensure correct operation of battery sub-systems.

Please provide:

1.5. An attestation from your qualified supervisor and/or facilitator attesting to your having completed on your own:

Electronic diagnostics on the three (3) high voltage traction batteries.

Interpretation data from the electronic diagnostic printouts that establish for the three (3) high voltage batteries:

- State of health.
- Identification of issues.
- Justification of identified issues.

Please download the [Photo Evidence Guidelines](#).

Task 2: Document restorative options to repair electric vehicle high voltage traction batteries.

I can:

2.1. Evaluate the state of health of high voltage traction batteries and document recommendations for restorative repair options to repair high voltage traction batteries in a timely manner and in accordance with my workplace requirements.

By providing:

At least two (2) restorative repair option recommendations for each of the electric vehicles diagnosed in Task 1.1, to bring the battery back to manufacturer's specifications and include an estimate of costs.

These must include:

Overall health – voltage capacity, current capacity (Ahr), cell voltages, maximum charge voltage (combined and per cell), minimum charge voltage (combined and per cell).

Control sub-systems operation – temperature sensors, voltage monitoring, current monitoring, temperature control systems.

Safety systems – main relay, charge relay.

Each of the restorative repair option recommendations must:

Be presented in an acceptable format to the workplace/organisation to be given to clients or service (garage) advisor to give to clients.

Document timeframes for each of the restorative option recommendations.
Document an overall estimate of costs for each of the restorative option recommendations.

I can:

2.2. Identify and document components and cost estimates to carry out restorative repair options to high voltage traction batteries.

By providing:

Copies of the itemised list of components and their estimated costs for both of the restorative options provided for each of the electric vehicle high voltage traction batteries diagnosed in Tasks 1.1. - 1.3.

Please provide:

2.3. Attestation from qualified supervisor/facilitator attesting that you:

Have prepared all documentation yourself in a relation to high voltage battery diagnostic analysis in a timely manner and in accordance with the workplace/organisation's requirements.

Have documented restorative repair options including identification and itemising the components required, including cost estimates for all components, plus the overall cost estimate for each of the restorative repair options recommendations provided for three (3) electric vehicle high traction batteries diagnosed.