

-SQA- SCOTTISH QUALIFICATIONS AUTHORITY

**Hanover House
24 Douglas Street
GLASGOW G2 7NQ**

NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number-	2210112	-Session-1992-93
-Superclass-	XS	

-Title-	VEHICLE ELECTRONIC SYSTEMS: MODIFICATIONS (x 1/2)
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-DESCRIPTION-

Purpose This half module is designed to enable the student to develop the skills and knowledge required to carry out modifications to modern vehicles using electronic circuits and components.

It is intended for experienced persons employed in the servicing and repair of road vehicles, who may be required to fit additional electrical/electronic components or alter existing wiring or components.

Preferred Entry Level	2210091	Introduction to Vehicle Electrical/ Electronic Principles: Testing and Measurement
	2210380	Electrical System Auxiliary Circuits: Condition Assessment and Fault Diagnosis.

Outcomes	The candidate should: 1. outline the hazards inherent in modifying the wiring system of a vehicle fitted with electronic components; 2. connect additional electrical/electronic units to a vehicle fitted with electronic components.
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Assessment Procedures	Acceptable performance in this module will be satisfactory achievement of all the Performance Criteria specified for each Outcome.
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The following abbreviations are used below:

PC Performance Criteria
IA Instrument of Assessment

Note: The Outcomes and PCs are mandatory and cannot be altered. The IA may be altered by arrangement with SQA. (Where a range of performance is indicated, this should be regarded as an extension of the PCs and is therefore mandatory.)

OUTCOME 1 OUTLINE THE HAZARDS INHERENT IN MODIFYING THE WIRING SYSTEM OF A VEHICLE FITTED WITH ELECTRONIC COMPONENTS

- PCs
- (a) The identification of hazards that may arise when modifying wiring is correct in terms of the operation of the systems.
 - (b) The identification of methods of reducing risks is correct in terms of ensuring correct operation of the system.

IA Objective Test

The candidate will be presented with an objective exercise consisting of short answer questions to test the application of knowledge and skills to the problems which may arise when working on or modifying the wiring of a vehicle fitted with electronic components.

The test should take the form of:

8 short answer questions on possible problems selected from the following list:

- locating cable runs separately;
- avoiding "bunching" of cables;
- screening cables and electronic units;
- use of screened cable;
- use of suppressed cables;
- use of relays;
- use of correct fuse ratings;
- use of smoothing capacitors;
- use of heat dissipating devices;
- avoidance of corrosion at connectors.

8 short answer questions on solutions to problems selected from the following list:

- excessive voltage drop;
- induced voltage drop;
- radio reception interference;
- telephone reception/transmission interference;
- overloading of relays;
- overloading of circuits;
- triggering of driver warning indicators;
- voltage surges in circuits;

voltage ripple from rectified ac currents;
 lack of cooling for components;
 excessive resistance at connectors;
 damage to multi pin (DIN) plugs and sockets.

All the questions should be associated with practical examples presented to the candidate in a workshop environment.

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met. This will be demonstrated by the student producing correct responses to all the questions presented in the assessment.

**OUTCOME 2 CONNECT ADDITIONAL ELECTRICAL/ELECTRONIC
 UNITS TO VEHICLES FITTED WITH ELECTRONIC
 COMPONENTS**

- PCs
- (a) Reference publications selected are appropriate in terms of providing the information required to install and wire a given electrical unit.
 - (b) The extraction of information from the selected publications permits the selection of materials and components required to correctly install and wire a given component.
 - (c) The location and physical mounting of a given component is safe and secure.
 - (d) The wiring harness manufactured for a given component ensures correct and safe operation of the components connected to it.
 - (e) The selection and fitting of protective devices ensures that there is no damage to the component, wiring or vehicle in the event of a fault occurring.

IA Practical Assignment

The candidate will be presented with a practical assignment to test the application of skills and knowledge to the fitting of an additional electrical unit to a vehicle fitted with electronic components.

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met. This will be demonstrated by the candidate fitting a working unit with all wiring and protection devices complying with the PCs.

**The following sections of the descriptor are offered as guidance.
They are not mandatory.**

CONTENT/CONTEXT

Safety regulations and safe working practices must be emphasised at all times, including the risks of damage to electrical and electronic components by incorrect polarity, overloading and high temperatures.

SUGGESTED LEARNING AND TEACHING APPROACHES

All Outcomes should be taught in a workshop environment with access to a range of up-to-date vehicles, equipment and technical publications.

The selection of practical tasks and assessments should reflect the types of vehicle the candidate will most commonly deal with in the workplace.

The requirements of any Industry Body such as the RTITB Transkill Scheme should be investigated for inclusion and assessment in the module.

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