

SERVICE VEHICLE ELECTRICAL SYSTEMS

UNIT CODE: ENG/OS/AUT/CR/8/5/A

UNIT DESCRIPTION:

This unit specifies competencies required to service vehicle electrical system. It involves, diagnosis electrical system, service vehicle ignition system, electrical accessories, service vehicle air conditioning, service vehicle charging systems, service vehicle auxiliary systems, service vehicle lighting system, service vehicle electrical motors and install vehicle safety systems

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA (<i>Bold and italicized terms are elaborated in the Range</i>)
1. Diagnose electrical systems	1.1 Electrical defect(s) are identified according to client's report. 1.2 Electrical diagnostic tools and equipment are used as per the service manual 1.3 Diagnostic procedures are used as per service manual 1.4 Cause and location of defects is identified as per service manual
2. Service vehicle ignition system	2.1 Battery <i>condition and functionality</i> is checked according to manufacturer's specification. 2.2 Ignition coil is checked/ replaced according to manufacturer's specification. 2.3 Ignition distributor and distributor cap is serviced according to manufacturer's specification. 2.4 Ignition spark plug and high tension (HT) cables are serviced as per manufacturer's manual. 2.5 Ignition switch/key is serviced/ replaced according to manufacturer's specification. 2.6 Ignition timing is carried out as per manufacturer's specification. 2.7 Electronic ignition fault diagnosis is performed as per manufacturer's manual.
3. Service vehicle electrical accessories	3.1 Electrical accessories are checked to confirm compatibility with the vehicle as per manufactures specifications 3.2 Electrical accessories are checked for compatibility with legal legislations as per state policies. 3.3 Location and fitting is identified in accordance with legislations and manufactures' specification 3.4 Accessories are installed in accordance with manufacturer's specification

ELEMENT	PERFORMANCE CRITERIA (<i>Bold and italicized terms are elaborated in the Range</i>)
	3.5 Accessories are tested for correct operation as per manufacturer's specification.
4. Service vehicle air-conditioning system	4.1 Air-con condenser and condenser cooling fans are checked/ serviced according to manufacturer's specifications. 4.2 Evaporator and heater blower fans are checked/ serviced according to manufacturer's specifications. 4.3 Compressor and pressure switch are checked/ serviced according to manufacturer's specifications. 4.4 Drier and expansion valve are checked/ serviced according to manufacturer's specification. 4.5 Air conditioner is recharged according to manufacturer's specification. 4.6 Air conditioner leakages are checked according to manufacturer's specification.
5. Service vehicle charging systems	5.1 Alternator is checked /serviced as per manufacturer's specification. 5.2 Alternator control box is checked/ serviced as per the manufacturer's specifications. 5.3 Charging system is tested according to manufacturer's specifications.
6. Service vehicle auxiliary systems	6.1 Vehicle alarms and horns are checked/ serviced according to manufacturer's specification. 6.2 Vehicle gauges are checked/ serviced according to manufacturer's specification. 6.3 Vehicle central locking is checked/ serviced according to manufacturer's specification. 6.4 Radio and television are checked/ serviced/ installed according to manufacturer's specification. 6.5 Power windows and power mirrors are checked/ serviced according to manufacturer's specifications. 6.6 Air bags are checked and replaced according to manufacturer's specifications.
7. Service vehicle lighting system	7.1 Main beam and dip beam switch is checked/ replaced according to manufacturer's specifications. 7.2 Connectors and wire harness are checked/ replaced according to manufacturer's specifications. 7.3 Main headlight , interior lights and reverse lights are checked/ serviced/ replaced according to manufacturer's specifications.

ELEMENT	PERFORMANCE CRITERIA <i>(Bold and italicized terms are elaborated in the Range)</i>
	7.4 Direction indicator lights and <i>flasher unit</i> are checked/ serviced/ replaced according to manufacturer's specifications. 7.5 Headlight beam setting is performed according to manufacturer's specifications.
8. Service vehicle electrical motors	8.1 Electrical <i>motor</i> faults are identified according to manufacturer's specifications. 8.2 Electrical motors are removed from the vehicle according to manufacturer's manual. 8.3 Electrical motors are serviced according to manufacturer's specifications. 8.4 Tests are performed on serviced electrical motors according to manufacturer's manual. 8.5 Electrical motors are installed as per manufacturer's specifications.
9. Install Vehicle safety systems	9.1 Install Airbags according to manufacturer's manual 9.2 Connect Safety belts according to workshop procedures 9.3 Mount electrical components related to vehicle safety according to manufacturer's manual 9.4 Fit anti-roll components according to manufacturer's manual 9.5 Fit vehicle tracker according to manufacturer's manual

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	Range
1. Electrical Diagnostic Tools and equipment may include but is not limited to:	<ul style="list-style-type: none"> • General workshop equipped for servicing vehicle electrical systems; • Electronic diagnostic equipment; • Multi-meters; • Ignition test equipment. • Hydrometer • High rate discharge tester • Feeler gauge

Variable	Range
2. auxiliary systems may include but is not limited to:	<ul style="list-style-type: none"> • Radio • Car track • Camera • Spot lights • Spoilers • Interior lightings
3. Service Manual may include but is not limited to:	<ul style="list-style-type: none"> • Instructions provided by the manufacturer on how to remove, disassemble, repair and refit components
4. Condition and functionality may include but is not limited to:	<ul style="list-style-type: none"> • Specific gravity/hydrometer test • High rate discharge test
5. Technical information may include but is not limited to:	<ul style="list-style-type: none"> • Vehicle technical data; • Manufacturers' online information; • On-board diagnostics (OBD) displays; • Accessory manufacturers technical data
6. Electrical systems may include but is not limited to:	<ul style="list-style-type: none"> • Starting system including motors and battery terminals; • Charging system including alternators; • Ignition system components including steering lock switches; • Audio systems including speakers; • Electrical wiring; • Lighting system including bulbs and sockets; • Electrical and electronic sensors; • Auxiliary motors including wipers, heater blowers, and window actuators.
7. Gauge may include but is not limited to:	<ul style="list-style-type: none"> • Speedometer • Temperature gauge • Fuel level gauge • Oil pressure gauge
8. Electrical motors may include but is not limited to:	<ul style="list-style-type: none"> • Starter motor • Wiper motor • Window motor

Variable	Range
9. Aftermarket accessories. may include but is not limited to:	<ul style="list-style-type: none"> • GPS systems; • Cameras; • Radios and speakers; • Auxiliary lights;
10. . Headlights may include but is not limited to:	<ul style="list-style-type: none"> • Sealed beam • Non-sealed beam
11. Flasher unit may include but is not limited to:	<ul style="list-style-type: none"> • Hazard warning • Electronic type

REQUIRED KNOWLEDGE AND SKILLS

Required knowledge

The individual needs to demonstrate knowledge of:

- Legislative and organizational requirements and procedures
- Workplace procedures for:
- assessment and rectification procedures
- The importance of documenting assessment and rectification information.
- Reporting
- use of identification codes
- Vehicle earthing principles and earthing methods
- Electrical and electronic principles
- Types of circuit protection and why these are necessary.
- Electrical safety procedures electric symbols, units and terms
- Electrical and electronic control system principles
- hazards associated with *high energy electrical component*.
- brake systems
- selection and use of sealants, seals, fittings and fasteners
- Operating specifications and any legal requirements
- appropriate test methods
- Electrical principles

Required Skills

The individual needs to demonstrate the following skills

- Proficient in ICT;
- Time management;
- Problem solving;
- Communications (verbal and written);
- Planning;
- Decision making;
- Multitasking;

- First aid;
- Report writing;
- Driving

EVIDENCE GUIDE

This provides advice on assessment and must be in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: <ol style="list-style-type: none"> 1.1 Worked in a safe and clean environment 1.2 Diagnosed vehicle electrical system 1.3 Rectified electrical defects 1.4 Installed aftermarket accessories
2. Resource Implications	The following resources must be provided: <ol style="list-style-type: none"> 2.1 General workshop equipped for servicing vehicle electrical systems; 2.2 Electronic diagnostic equipment; 2.3 Multi-meters; 2.4 Ignition test equipment.
3. Methods of Assessment	Competency may be assessed through: <ol style="list-style-type: none"> 3.1 Observation 3.2 Oral questioning 3.3 Written Test
4. Context of Assessment	Competency may be assessed individually in an actual workplace or in work-simulated conditions within accredited institutions or during Industrial Attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.