



Australian Government

Department of Education, Employment and Workplace Relations

ICTRFN3070A Install mobile telecommunications in motor vehicles

Release: 1

ICTRFN3070A Install mobile telecommunications in motor vehicles

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge to install radio transceivers and cellular mobile phone handsets with powered docking cradle in domestic, commercial or industrial motor vehicles. It also involves installing peripheral components such as external antenna, microphone, loudspeaker, mobile data terminals and global positioning systems (GPS). No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement but users should confirm requirements with the relevant federal, state or territory authority.
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Application of the Unit

Application of the unit	Installers or technicians engaged in fitting mobile communications equipment to motor vehicles apply the skills and knowledge in this unit. This unit applies to the fitting of telecommunications equipment in police, fire, ambulance, emergency vehicles and taxis that form a complex mobile network of communications and data equipment.
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Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan for installation of mobile telecommunications in motor vehicles	1.1. Obtain relevant legislation, codes, regulations and standards and follow occupational health and safety (OHS) and environmental requirements for the given work 1.2. Obtain mobile telecommunications equipment and manufacturer's installation documentation 1.3. Determine critical automotive electrical systems which need to be considered during the installation process to prevent any damage to the vehicle system 1.4. Verify installation requirements from customer and advise customer of issues affecting performance 1.5. Obtain tools and test equipment required for safe work practices
2. Install mobile equipment	2.1. Attach primary mobile telecommunications equipment to vehicle using fixing and fastening hardware clear of air bag deployment and according to customer, vehicle and equipment manufacturer and OHS requirements 2.2. Wire primary mobile telecommunications equipment to vehicle electrical system using industry wiring practices without impacting on other electrical systems 2.3. Attach and wire peripheral mobile telecommunications components of the installation to customer and manufacturer's requirements 2.4. Replace any existing fittings or vehicle components removed during installation and restore to original condition 2.5. Test the completed installation to verify that the operation of critical automotive electrical systems have not been affected and rectify if required
3. Complete installation	3.1. Restore vehicle and worksite to customer's satisfaction by disposing of waste materials according to environmental requirements 3.2. Note and document any damage which may have occurred during installation and report according to enterprise procedures 3.3. Instruct customer on operation of installed equipment 3.4. Complete all administrative tasks and file

ELEMENT	PERFORMANCE CRITERIA
	according to <i>enterprise requirements</i>

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to liaise and negotiate with customer and colleagues
- literacy skills to interpret technical documentation, specifications and service orders
- numeracy skills to take measurements and interpret results
- planning and organisational skills to organise and prepare installation resources
- problem solving skills to respond to typical installation challenges
- task management skills to adhere to all safety requirements and work systematically with required attention to detail
- technical skills to:
 - perform diagnostic procedures
 - use hand and power tools

Required knowledge

- customer service principles, particularly dealing with customers face to face
- electrical fundamentals
- electromagnetic radiation awareness
- enterprise or service-specific knowledge of products and services supplied
- objectives and methods of training for product use for customer education
- OHS principles and enterprise-specific job safety analysis (JSA) requirements
- overview knowledge of mobile radio and cellular radio product range and connection methods
- pre-installation enterprise-specific requirements
- quality assurance of enterprise requirements
- radio frequency (RF):
 - principles
 - safety
 - theory
- return path technology
- telephony principles to support return path awareness

REQUIRED SKILLS AND KNOWLEDGE

- test set-ups for final testing
- vehicle electrical, electronics and computer-managed systems

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the ability to:

- install cable loom, wiring mobile and peripheral equipment
- test the equipment to verify correct installation and operation.

Context of and specific resources for assessment

Assessment must ensure:

- sites on which installation may be conducted
- use of testing equipment currently used in industry
- relevant regulatory and equipment documentation.

Method of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the candidate undertaking installation
- review of installation documentation completed by the candidate
- oral or written questioning to assess knowledge of tests and types of systems.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplaces and job role is recommended, for example:

- ICTRFN3055A Install a radio communications antenna and feedline.

Aboriginal people and other people from a non-English speaking background may have second language issues.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally

EVIDENCE GUIDE

	appropriate, and appropriate to the oral communication skill level, and language and literacy capacity of the candidate and the work being performed. In all cases where practical assessment is used it will be combined with targeted questioning to assess required knowledge. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. Where applicable, physical resources should include equipment modified for people with special needs.
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Range Statement**RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Relevant legislation, codes, regulations and standards may include:

- Australian Communication Industry Forum (ACIF) standards and codes
- AS 3901:
- AS 3902:
- AS 4346:
- AS 2809.1:
- AS 2772.1:
- International Standards ISO 9000, ISO 9001
- OHS
- Environmental Protection Act
- Trade Practices legislation
- safety regulations for specialised vehicles, such as petrol tankers, public service vehicles, fire engines and gas driven vehicles.

RANGE STATEMENT	
<i>OHS and environmental requirements</i> may include:	• personal protective clothing: • earmuffs • gloves • safety glasses • safe working, practices such as the safe use and handling of: • materials • tools and equipment • environmental considerations: • clean-up protection • noise, dust and clean-up management.
<i>Mobile telecommunications equipment</i> may include:	• digital radio communications Association Public Safety Communications Officials standard (APCO-25) • GPS • mobile data terminal • powered cellular mobile equipment cradle incorporating: • Bluetooth device • charger • power and external antenna connections • speaker, microphone and external antenna • terrestrial trunked radio • two-way transceiver: • high frequency (HF) • ultra-high frequency (UHF) • very high frequency (VHF).
<i>Critical automotive electrical systems</i> may include:	• air bags • antilock braking system circuitry • engine management modules • mobile data systems for taxis • patient monitoring equipment • police communications computer network • vehicle alarm systems • vehicle computers.
<i>Installation requirements</i> may include:	• position of external speaker, microphone and external antenna • replacement or repositioning of existing equipment

RANGE STATEMENT	
	• type of equipment.
Issues affecting performance may include:	• excessive length of coaxial cable • external antenna mounted too close to metal surfaces • external antenna mounted too close to other antennas • external antenna mounted too low on vehicle • inappropriate or low efficiency antenna.
Tools may include:	• cable identification kit • hand tools: • crimping tools • hole punch • nibbling tool • pliers • reamer • screwdrivers • terminating tools • power tools: • drill • hole saw • soldering iron.
Test equipment may include:	• cellular phone tester • directional power meter • multimeter • site master cable and antenna analyser • standing wave ratio indicator • test lamp.
Primary mobile telecommunications equipment may include:	• powered equipment cradle for cellular handset • two-way radio transceiver.
Fixing and fastening hardware may include:	• adhesives: • double sided tape • injected polystyrene foam • cable ties • equipment brackets • expanding anchors suitable for sheet metal • heat shrink • plastic sheathing

RANGE STATEMENT	
	• screws and nuts • spiral wrap.
Industry wiring practices may include:	• avoiding running power leads and antenna cable in parallel with vehicle wiring over long distances • maintaining as great a distance as possible between radio power leads and vehicle's electronic modules and wiring • powering mobile unit directly from the battery using waterproof fuse holder • routing and securing under hood wiring from mechanical hazards, such as exhaust and moving parts • using caution when routing cables to avoid chafing and pinching of wires.
Peripheral mobile telecommunications components may include:	• external antenna • external speaker • microphone.
Test may include:	• functionality: • intended operation of all functions of the mobile equipment • operation of entertainment units.
Administrative tasks may include:	• completing job orders and submitting to appropriate enterprise organisational unit • completing test sheets as per specification and logging test instrument usage • completing warranty forms • following quality control procedures • handing over installation briefs, documents and equipment manuals to operational staff • recording test results.
Enterprise requirements may relate to:	• commercial vehicle • domestic vehicle • police and emergency vehicle • reporting • work procedures for implementing maintenance and installation work.

Unit Sector(s)

Unit sector	Telecommunications
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Co-requisite units

Co-requisite units		

Competency field

Competency field	Radio frequency networks
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