

Australian/New Zealand Standard™

Intruder alarm systems—Road vehicles

Part 1: Performance requirements



AS/NZS 3749.1:2003

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EL-031, Intruder Alarm Equipment and Installations. It was approved on behalf of the Council of Standards Australia on 10 January 2003 and on behalf of the Council of Standards New Zealand on 20 February 2003. It was published on 18 March 2003.

The following are represented on Committee EL-031:

Australian Electrical and Electronic Manufacturers Association
Australian Industry Group
Australian Security Industry Association
Australian Security Intelligence Organization
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Institution of Engineers Australia
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Intruder alarm systems—Road vehicles

Part 1: Performance requirements

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-031, Intruder Alarm Equipment and Installation, to supersede AS 3749.1—1990, *Intruder alarm systems—Road vehicles, Part 1: Performance requirements*.

The objective of this Standard is to provide requirements for a high standard of safety, performance and reliability of vehicle security alarm systems (VSAS) for reference by manufacturers, installers and users.

During the development of the previous edition of this Standard the Federal Chamber of Automotive Industries (FCAI), representing the manufacturers of motor vehicles, did not support the publication of the Standard in its final form and sought to have reference to original equipment systems removed from its Scope.

The FCAI has expressed some concern that the minimum system requirements of this Standard may provide a higher level of security than is necessary for all types of road vehicles and may be too restrictive as to the choice of options available as a basis for setting the minimum system requirements. Also, FCAI has pointed out that interior movement sensors may be difficult to install and adjust in an original equipment fitment environment.

These concerns were duly noted. However, the Committee position has not changed and they believe that the minimum system requirements specified are necessary to achieve the purposes of this Standard.

In developing the Standard, cognizance has been made of the New South Wales Noise Control (Motor Vehicles and Motor Vehicles Accessories) Act 1995 and requirements stated herein have taken due regard of that regulation.

This Standard is based on the International Standard for passenger car alarm systems produced jointly by ISO and IEC as IEC 839-10-1:1995, *Alarm systems: Part 10: Alarm systems for road vehicles—Section 1: Passenger cars*.

This Standard is Part 1 of a series of Standards for road vehicle alarm systems, as follows:

Part 1: Performance requirements (this Standard)

Part 2: Installation and maintenance.

This Standard details the minimum performance requirements and associated test methods for a variety of vehicle alarm systems and will be a guide for consumers in their selection of equipment, which can be considered of high quality if complying with these requirements. This Standard, together with Part 2, will also assist in the reduction of the number of false alarms, noise pollution and improvement in installation practices.

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of a Standard.

CONTENTS

	<i>Page</i>
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE	4
1.2 REFERENCED DOCUMENTS	4
1.3 DEFINITIONS	5
SECTION 2 GENERAL REQUIREMENTS	
2.1 SYSTEM DESCRIPTION	8
2.2 SYSTEM DESIGN	9
2.3 OPTIONAL FEATURES	14
2.4 INSTALLATION	14
SECTION 3 TEST REQUIREMENTS	
3.1 GENERAL	15
3.2 TEST PROCEDURES	15
3.3 TESTS	16
3.4 VOLUMETRIC PROTECTION SENSORS	22
SECTION 4 PRODUCT INFORMATION AND MARKING	
4.1 MARKING	26
4.2 POINT OF SALE INFORMATION	26
4.3 INFORMATION FOR THE TESTING ORGANIZATION	26
SECTION 5 VARIATIONS FROM COMPLIANT EQUIPMENT	
5.1 MINOR VARIATIONS	28
5.2 SIGNIFICANT VARIATIONS	28
5.3 MAJOR VARIATIONS	28
APPENDICES	
A SOUND PRESSURE LEVEL TEST FOR SOUNDING DEVICE	29
B DETECTION RANGE TEST FOR ULTRASONIC MOVEMENT SENSORS	32

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Australian/New Zealand Standard
Intruder alarm systems—Road vehicles

Part 1: Performance requirements

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements and test methods for vehicle security alarm systems (VSAS) intended as original equipment and for post-delivery installation within vehicles.

The Standard covers VSAS designed to detect and locally annunciate the unauthorized opening of a vehicle in addition to the automatic immobilization of the vehicle by either the vehicle's original equipment immobilizer or the VSAS.

NOTE: The correct installation of a VSAS is essential to it functioning as designed. Guidance on the installation and maintenance of a VSAS is given in AS/NZS 3749.2.

1.2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

- 1217 Acoustics—Determination of sound power levels of noise sources
- 1217.5 Part 5: Engineering methods for free-field conditions over a reflecting plane
- 1259 Acoustics—Sound level meters
- 1259.1 Part 1: Non-integrating
- 1939 Degrees of protection provided by enclosures for electrical equipment (IP Code)
- 3350 Safety of household and similar electrical appliances
- 3350.1 Part 1: General requirements (IEC 60335-1:1991 MOD)
- 4268 Radio equipment and systems—Short range devices
- 4268.1 Part 1: Technical characteristics and test methods for radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz
- 4268.2 Part 2: Technical characteristics and test methods for radio equipment to be used in the 25 MHz to 25 GHz frequency range with power levels ranging up to 1 W

AS/NZS

- 3749 Intruder alarm systems—Road vehicles
- 3749.2 Part 2: Installation and maintenance
- 61000 Electromagnetic compatibility (EMC)
- 61000.4 Part 4: Testing and measurement techniques
- 61000.4.3 Part 4.3: Radiated radio-frequency electromagnetic field immunity test
- 61000.4.6 Part 4.6: Immunity to conducted disturbances induced by radio-frequency fields
- CISPR 22 Information technology equipment—Radio disturbance characteristics—Limits and methods of measurement

ASTM

- B117 Standard practice for operating salt spray (fog) apparatus

ISO

- 512 Road vehicles—Sound signalling devices—Technical specifications
- 7637 Road vehicles—Electrical disturbance by conduction and coupling
- 7637.1 Part 1: Passenger cars and light commercial vehicles with nominal 12 V supply voltage—Electrical transient conduction along supply lines only
- 7637.3 Part 3: Vehicles with nominal 12 V or 24 V supply voltage—Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines

IEC

- 61000 Electromagnetic compatibility (EMC)
- 61000.4 Part 4: Testing and measurement techniques
- 61000.4.2 Part 4.2: Electrostatic discharge immunity test

1.3 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

1.3.1 Alarm condition

The condition where a detected action has occurred and has been validated.

1.3.2 Class A VSAS

A Class A VSAS includes, control equipment including setting and unsetting facilities, all sensors, optical warning devices and provision for immobilization of the vehicle as required in a Class B VSAS as well as including at least one self-powered acoustic warning device and at least one volumetric protection device.

1.3.3 Class B VSAS

A Class B VSAS includes control equipment including setting and unsetting facilities, all sensors, warning devices and provision for immobilization of the vehicle.

1.3.4 Coded plug

A digital device that is used to unset the VSAS, which requires a plug with an electrical or electronic code having a minimum of 10 000 variants to be inserted in a receptacle.

1.3.5 Coded proximity device

A contactless device that is used to unset the VSAS having a minimum of 10 000 variants.

1.3.6 Control equipment

The component of the VSAS that processes the setting and unsetting commands and accepts the signals from the sensor/sensors to allow an alarm condition to be indicated.

1.3.7 Optical status indicator

A visible component of the VSAS that indicates the set/unset state of the VSAS.

1.3.8 Passive setting

A function that automatically sets the system.

1.3.9 Primary security wires

Immobilizer wires, supply line wires, ignition wires, door/boot/bonnet wires and indicator wires are considered primary security wires.

1.3.10 Randomly encrypted

A code that changes randomly whenever the VSAS is set or unset.

1.3.11 Remote unsetting

A method of remotely unsetting the VSAS.

1.3.12 Sensor

Component of the VSAS that detects an action and generates a signal to the control equipment or senses an alarm condition.

1.3.13 System override

A method of unsetting the VSAS in the event of malfunction of either the VSAS or its deactivation device.

1.3.14 Immobilizer

An electronic system intended to be installed in vehicles which when set, will immobilize the vehicle and prevent it from moving under its own power.

1.3.15 Key

A device that purposely and authoritatively provides a method of operating a system that is designed to be operated only by that device.

1.3.16 May

Indicates the existence of an option.

1.3.17 Panic alarm

A facility that can cause the warning devices to operate irrespective of whether the VSAS is in a set or unset state.

1.3.18 Perimeter protection device

A component of the VSAS designed to detect and signal the opening of, or intrusion into, the vehicle.

1.3.19 Quiescent condition

The VSAS is powered with normal operating voltage, in an unset state and non-alarm condition with all sensors and warning indicators connected.

1.3.20 Set

The state of the system whereby an alarm condition can be generated and the vehicle cannot be driven.

1.3.21 Setting/unsetting device

A component of the VSAS that is used to set or unset the VSAS.

1.3.22 Shall

Indicates that a statement is mandatory.

1.3.23 Should

Indicates a recommendation.

1.3.24 Unset

The state of the system whereby an alarm condition cannot be generated and the vehicle can be driven.

1.3.25 Upgrade

A system that adds an aftermarket alarm capability to an original equipment immobilizer and keyless entry system so that the total installed system meets the requirements of this Standard.

1.3.26 Vehicle security alarm systems (VSAS)

A system intended for installation on vehicles that, when set, will indicate actions such as attempted intrusion into, or interference with, the vehicle.

1.3.27 Volumetric protection device

A component of the VSAS designed to detect intrusion into, or movement within, the passenger compartment.

1.3.28 Warning device

A component of the VSAS that gives an indication of an alarm condition.

SECTION 2 GENERAL REQUIREMENTS

2.1 SYSTEM DESCRIPTION

Two classes of VSAS shall be defined, as follows:

- (i) Class B VSAS, which shall include all sensor(s)/detector(s), control equipment including setting and unsetting facilities, warning device(s) and provision for immobilization of the vehicle.
- (ii) Class A VSAS, which shall cover all the features of a Class B VSAS as well as including at least one self-powered acoustic warning device and at least one volumetric protection device.

The VSAS shall include at least one optical warning device. In addition, it may include other optical warning devices or remote wire-free signalling devices, or any combination of these.

The VSAS shall include optical indication. It may include acoustic indication to provide information on the set/unset status or change of status of the VSAS.

The VSAS may include other facilities. Where other facilities are included, they shall comply with the requirements of this Standard.

If the VSAS is an upgrade system, then in order for the total vehicle security system to comply with this Standard, the original equipment keyless entry system shall meet the requirements of Clause 2.2.5.4. Any upgrade shall be connected to the vehicle's electrical system such that it can only be unset by use of the OEM remote interface or the upgrade's override, if provided.

NOTE: The Commonwealth Department of Transport and Regional Services sets requirements for the OEM vehicle immobilization system (see ADR 82/00, *Engine immobilisers*).

The VSAS immobilizer function shall be designed to passively set and, when set, prevent the vehicle from moving under its own power. If the VSAS has an override facility, this facility shall override the immobilization for one cycle of turning the ignition on. The VSAS immobilizer shall revert to passive setting as soon as the ignition is turned off. Any function of the VSAS that indefinitely overrides the system is not permitted.

The design, manufacture and installation of the immobilizer function shall ensure that the removal of a power wire or a ground wire in the unset condition shall not affect the safe function of the vehicle.

NOTE: All relevant legislative requirements should be complied with e.g., the Australian Communications Authority sets requirements for power and frequency of radio transmitters.

The block diagram shown in Figure 2.1 illustrates the connections between the components present in the system and defines the optional and required components for Class A and Class B VSASs.

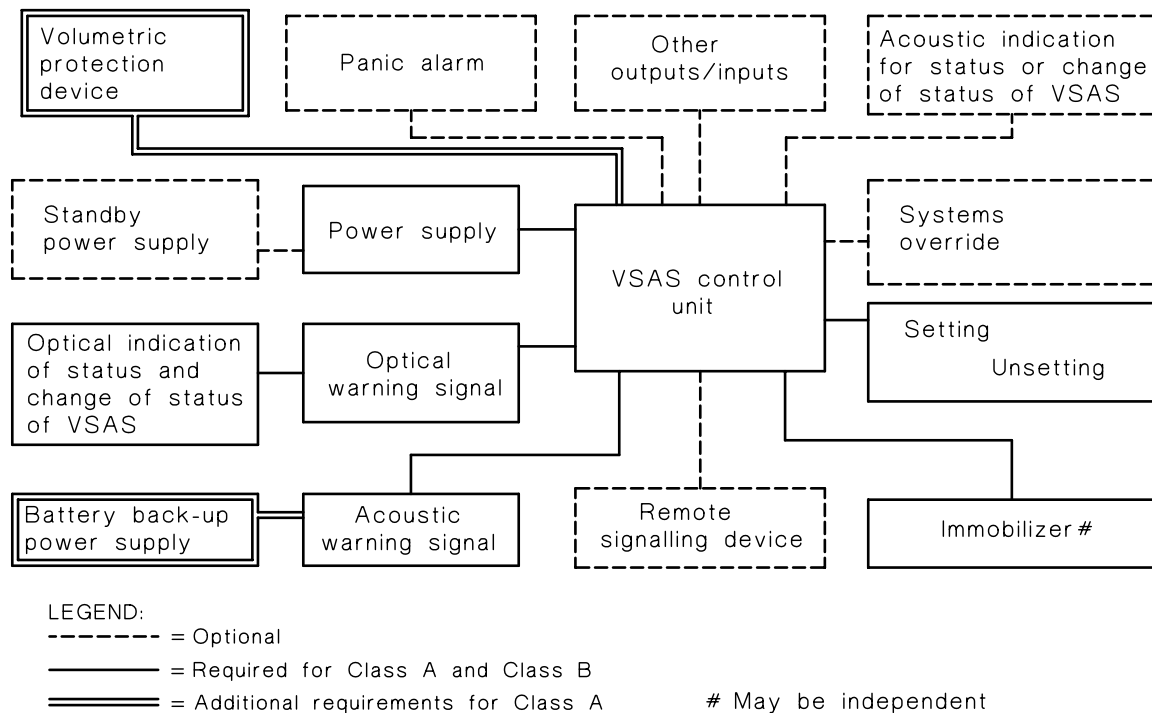


FIGURE 2.1 VSAS COMPONENTS

2.2 SYSTEM DESIGN

2.2.1 General

The VSAS in the set condition shall detect and signal any opening of the vehicle doors, boot/luggage compartment, bonnet/engine hood. The VSAS shall inhibit the movement of the vehicle by means of a passive setting engine immobilizer if this has not already been achieved by an independent immobilizing system.

The VSAS shall not, whether set or unset, inadvertently change its state or cause any warning device to operate or cease operation when subjected to any of the test conditions detailed in this Standard.

The design, manufacture and installation of a VSAS shall ensure that it cannot be easily rendered ineffective by the use of easily concealed tools or fabrications available to the public at large. It shall be difficult and time consuming to replace a major component or assembly in order to bypass the immobilizer function or the acoustic warning device.

The VSAS shall comply with the requirements of Clauses 2.1 to 2.4.

2.2.2 Optional panic alarm

The VSAS may include a deliberately activated device (panic alarm) which may be operated only when the ignition is off and the engine is not running. The panic alarm may be activated both from inside the vehicle or from outside the vehicle by the activation of a device. The device shall operate the acoustic and visible warning devices whether the system is set or unset.

The device may also operate an optical or radio warning signal independent of the set/unset state of the VSAS. Such an alarm shall not affect the state of the VSAS.

It shall be possible for the vehicle user to cancel the alarm.

2.2.3 Vehicle protection

2.2.3.1 Detection

The VSAS shall provide perimeter protection that detects—

- (a) opening of the vehicle doors;
- (b) opening of the boot/luggage compartment; and
- (c) opening of the bonnet/engine hood.

A Class A VSAS shall include at least one volumetric protection device. The operation of such a device may be disabled intentionally by the user. This disablement shall only be effective for one setting period of the VSAS.

2.2.3.2 Alarm initiating response

Control equipment shall provide for the connection of circuits capable of accepting the detection devices.

When the VSAS is set, the control equipment shall monitor the sensors. In the event of an alarm condition of less than 80 ms duration being presented, the control equipment shall not provide any outputs to the warning devices. In the event of alarm conditions of 120 ms and greater being presented, the control equipment shall provide outputs to the warning devices. The outputs to the warning devices shall occur within 1 s.

Unsetting the VSAS by the normal means shall cancel the alarm condition and the warning signals within 1 s.

2.2.3.3 Immunity to leakage currents

The VSAS using normally open or normally closed switches shall have immunity to leakage currents and shall be tested in accordance with Clause 3.3.1.1.

2.2.4 Construction

2.2.4.1 General

The VSAS and its components shall be designed, built and installed to withstand the environment within the vehicle.

2.2.4.2 Environmental conditions

Two classes of environmental temperature are defined as follows:

- (a) -20°C to $+85^{\circ}\text{C}$ for parts to be fitted in the passenger or luggage compartment.
- (b) -20°C to $+105^{\circ}\text{C}$ for parts to be fitted in the engine compartment, unless otherwise specified.

The VSAS shall be designed to withstand a humidity of up to 94% at 55°C .

2.2.4.3 Protection

The following degrees of protection, in accordance with AS 1939, shall be provided:

- (a) IP40—for parts to be fitted in the passenger compartment.
- (b) IP42—for parts to be fitted in the passenger compartment of roadsters/convertibles and cars with moveable roof panels if the installation location requires a higher degree of protection than IP40.
- (c) IP54—for all other parts.

The VSAS manufacturer shall specify in the installation instructions any restrictions on the positioning of any part of the equipment with respect to dust, water and temperature.

2.2.4.4 Compatibility

All components of the VSAS shall be compatible with each other and, when installed, shall not affect the performance of the vehicle when in the unset condition.

2.2.4.5 Wiring

All primary security wires emanating from and connecting to the VSAS control unit shall be black and of the same diameter. All installation wiring labels shall be removed after installation. The plugs and sockets concerned with the primary security wires shall be fully contained by the VSAS control unit housing.

2.2.5 Setting/unsetting

2.2.5.1 General

The VSAS shall include optical indication to provide information on the set/unset status of the VSAS.

The VSAS may also include acoustic indication to provide information on the change of the set/unset status of the VSAS.

The acoustic signal for the indication of the of the set/unset status of the VSAS shall not exceed 90 dB(A) measured 2 m from the device in accordance with Appendix A, and the duration of the signal shall not exceed 3 s.

2.2.5.2 Optical status indicator

The optical status indicator shall be clearly visible, when viewed in daylight, to the driver and from the outside of the vehicle.

The optical signal for the indication of the change of the set/unset status of the VSAS may also be produced by the hazard warning lamps, the passenger compartment lamp(s) or the vehicle position lamps (including all lamps in the same circuit) or any combination of the above.

2.2.5.3 Setting

Setting of the VSAS may be achieved by any suitable means.

The vehicle protection, as described in Clause 2.2.3, shall be in the set condition within 30 s after completing the setting procedure of the VSAS. Optional sensors shall be in the set condition within 60 s after completing the setting procedure.

The VSAS immobilizer function shall automatically set within 20 to 40 s after the ignition is switched off. The VSAS immobilizer function shall not set while the ignition is on.

Upon setting, the VSAS shall check that 'full seal' has been achieved. Should 'full seal' not be achieved, the VSAS shall activate either one or both of the following:

- (a) an acoustic warning signal not exceeding 90 dB(A) measured 2 m from the device in accordance with Appendix A;
- (b) optical warning signal.

The warning signal activated when 'full seal' is not achieved should operate no later than 15 s after setting, for no longer than 3 s.

2.2.5.4 Unsetting

The VSAS shall be unset by either one of the following:

- (a) A coded proximity device which has not less than 10 000 variants.
- (b) A remote controlled electrical/electronic device the coding of which is randomly encrypted with not less than 2 000 000 codes so that if the signal is code-grabbed, it should not unset the system.