

AMENDMENT NO. 3 (12/2023)
To
AIS-076:2007: Approval of Vehicle Alarm Systems (VAS) for M1 and
N1 Category of Vehicles and of these Vehicles with regard to their
Alarm Systems (AS)

1. Page 1/34, Add a new Clause 1.6 after Clause 1.5. as below,

“1.6 In addition, digital keys shall comply with the provisions of Annex 6.”

Note: Digital solutions which cannot be used to operate the ‘alarm system’ and/or the ‘immobilizer’ for the purpose of normal driving away of a vehicle under its own motive power are not covered under Digital Key requirements.”

2. Page 3/34, Replace Clause 2.7 as below,

“2.7 **"Key"** means any mechanical and/or electronic solution designed and constructed to provide a method of operating a locking system which is designed and constructed to be operated by that mechanical and/or electronic solution.”

3. Page 3/34, Add a new clauses 2.12. to 2.14 as below,

“2.12. **"Primary user"** is a user who is able to authorize digital keys. There can be more than one primary users.

2.13. **"Digital key"** means a key designed to be transferred to multiple devices by the primary user(s) through dedicated processes.

2.14. **"Close proximity"** means a distance of less than 6 m.”

4. Page 21/34, Replace Clause 15.6 as below,

“15.6. **"Key"** means any mechanical and/or electronic solution designed and constructed to provide a method of operating a locking system which is designed and constructed to be operated by that mechanical and/or electronic solution.”

5. Page 21/34, Add a new clause 15.11. to 15.13 as below,

“15.11. **"Primary user"** is a user who is able to authorize digital keys. There can be more than one primary users.

15.12. **"Digital key"** means a key designed to be transferred to multiple devices by the primary user(s) through dedicated processes.”

15.13. **"Close proximity"** means a distance of less than 6 m.”

ANNEX 6
(See 1.6)
Safety provisions for digital keys

1. **General**

The purpose of this annex is to specify the requirements for documentation and verification for digital keys used to operate the ‘device to prevent unauthorized use’ and/or the ‘alarm system’ and/or the ‘immobilizer’ of the vehicle.

2. **Definitions**

2.1. **"Authorization process"** means any method to provide the digital key which can operate the ‘device to prevent unauthorized use’ and/or the ‘alarm system’ and/or the ‘immobilizer’ of the vehicle.

2.2. **"Revocation process"** means any method to prevent the digital key to operate the ‘device to prevent unauthorized use’ and/or the ‘alarm system’ and/or the ‘immobilizer’ of the vehicle.

2.3. **"Boundary of functional operation"** defines the boundaries of the external physical limits (e.g. distance) within which the digital key is able to operate the ‘device to prevent unauthorized use’ and/or the ‘immobilizer’ of the vehicle.

3. **Documentation**

The vehicle manufacturer shall provide the following documentation for type approval:

3.1. A description of the authorization process.

3.2. A description of the revocation process.

3.3. A description of the boundary of functional operation.

3.4. A description of the safety measures designed within the digital key revocation process to ensure safe operation of the vehicle.

4. **Requirements for Safe Operation**

4.1. A digital key shall only be transferred to a device via the authorization process.

4.2. There shall be a revocation process.

4.2.1. Revocation of a digital key shall not result in an unsafe condition.

A risk reduction analysis using functional safety standard such as ISO 26262 and safety of the intended functionality standard such as ISO/PAS 21448, which documents the risk to vehicle occupants caused by revocation of a digital key and documents the reduction of risk resulting from implementation of the identified risk mitigation functions or characteristics.

4.2.2. It shall be possible for the primary user(s) to identify the number of authorized registered digital keys.

4.3. Boundary of functional operation for the device to prevent unauthorized use and the immobilizer:

4.3.1. Unlocking of the device to prevent unauthorized use shall require that an authorized registered digital key is detected in the interior of the vehicle, or in close proximity of the vehicle.

- 4.3.2. Unsetting of the immobilizer shall require that an authorized registered digital key is detected in the interior of the vehicle, or that an actuation is triggered by user intent in close proximity of the vehicle.

The limitation of the distance for unsetting of the immobilizer by detection in the interior of the vehicle shall be verified using the following procedure including a tolerance of 2000 mm around the vehicle perimeter:

- (a) The vehicle shall be parked in a secure condition in unobstructed free field condition, this means engine off and all windows, doors and roof shall be closed.
 - (b) The vehicle manufacturer will provide a typical user device for test in agreement with the test agency. The digital key device battery state of charge shall be at maximum.
 - (c) The test agency will define four test points around the vehicle perimeter at a distance not less than 2000 mm. Distance means the distance between the nearest point of the motor vehicle and the user device.
 - (d) The user device is placed at each of the test points. During the attempt to operate the vehicle under its own power, the vehicle door shall be closed. If at one of the test points the vehicle can be operated under its own power, the requirement is not met.
- 4.3.3. The requirements in paragraph 4.3.1. and paragraph 4.3.2. shall not apply during a remote-control manoeuvring and remote-control parking as defined in AIS-193.
- 4.4. Detailed information shall be contained in the owner's manual of the vehicle, or by any other communication means in the vehicle; as a minimum, this information shall include:
- (a) The method(s) for authorization of the digital key
 - (b) The method(s) for revocation of the digital key
5. The effectiveness of the system shall not be adversely affected by cyber-attacks, cyber threats and vulnerabilities. The effectiveness of the security measures shall be demonstrated by compliance with AIS-189. Till the implementation of AIS-189 for complete vehicle level Cyber security requirements, vehicle manufacturer shall, at least comply with system level requirements for digital key system as per paragraph 5.1.
- 5.1 The vehicle Manufacture shall identify threats associated with digital key operation and its external interfaces (like GSM, GPS, Bluetooth, RF, etc.). Proportionate mitigations shall be implemented to protect the vehicle type in which digital key is implemented. The vehicle manufacturer shall demonstrate that the processes used to ensure cyber security for Digital key is adequately considered, including risk and mitigations listed in Annex D of AIS-189 as applicable.

6. **Verification**

Verification of the functionality of the digital key shall be conducted with support of manufacturer's documentation as specified in paragraph 3.

7. **Assessment Authority:** The assessments under this Annex shall only be conducted by test agencies as specified in CMV Rule No 126.

7. Page 34/34, Renumber existing ANNEX 6 as ANNEX 7.

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P. B. NO. 832, PUNE 411 004
ON BEHALF OF

AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE
UNDER

CENTRAL MOTOR VEHICLES RULES - TECHNICAL STANDING COMMITTEE
SET-UP BY

MINISTRY OF ROAD TRANSPORT & HIGHWAYS
(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)
GOVERNMENT OF INDIA

20th December 2023

Amendment No.2 4th May 2016

To

**AIS 076:2007 : Approval of Vehicle Alarm Systems (VAS) for M1 and
N1 Category of Vehicles and of these Vehicles with regard to their
Alarm Systems (AS)**

1. Page 5/34, Clause 5.1.1,

Substitute following text for existing text:

Some kinds of additional sensors, e.g. passenger compartment control (ultrasonic, infrared) or inclination sensor, etc., may be intentionally deactivated. It must not be possible to deactivate the sensors while the alarm system is in a set state.

2. Page 14/34, Part II, First para,

Substitute following text for existing text:

PART II

APPROVAL OF A VEHICLE WITH REGARD TO ITS ALARM SYSTEM

When a VAS approved to Part I of this standard is being used in a vehicle submitted for approval to Part II of this standard, tests required to be passed by a VAS in order to obtain approval to Part II of this standard shall not be repeated.

3. Page 24/34, Clause 18.4.2,

Substitute following text for existing text:

If the immobilizer can enter the set state when the ignition key is in the engine running mode as provided for in paragraph 17.4., the immobilizer may also be set by the opening of the driver's door and/or the authorised user carrying out a deliberate action.

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SET-UP BY

MINISTRY OF ROAD TRANSPORT & HIGHWAYS
(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)
GOVERNMENT OF INDIA

4th May 2016

AMENDMENT NO.1 12 August 2014

TO

**AIS-076: 2007 - Approval of Vehicle Alarm Systems (VAS) for M1 and N1
Category of Vehicles and of these Vehicles with regard to their Alarm Systems (AS)**

1. Page 8/34, Clause 5.10:

Substitute the following text for exiting text:

"5.10 Power supply: The source of power for the VAS shall either be the vehicle battery or a rechargeable battery. Where provided, an additional rechargeable or non-rechargeable battery may be used. These batteries shall by no means supply energy to other parts of the vehicle electrical system."

2. Page 19/34, Clause 11.10:

Substitute the following text for exiting text:

"11.10 Power supply : The source of power for the AS shall either be the vehicle battery or a rechargeable battery. Where provided, an additional rechargeable or non-rechargeable battery may be used. These batteries shall by no means supply energy to other parts of the vehicle electrical system."

3. Page 12/34, Clause 6.2.13:

Substitute the following text for exiting text:

"6.2.13 Safety against false alarm in the event of an impact on the vehicle: It shall be verified that an impact of up to 4.5 Joules of a hemispherical body with 165 mm in diameter and 70 ± 10 Shore A applied anywhere to the vehicle bodywork or safety glass with its curved surface does not cause false alarms. However a warning signal of duration less than 5s is allowed as an optional feature for an impact of up to 4.5 Joules applied anywhere to the vehicle bodywork or safety glass."

4. Page 31/34, ANNEX 4:

Substitute following Annex 4 for exiting Annex 4:

ANNEX 4

(see 6.2.12)

ELECTROMAGNETIC COMPATIBILITY

Note: To test the electromagnetic compatibility, either paragraph 1. or paragraph 2. shall be used, depending on the test facilities.

1. METHOD ISO

1.1 Immunity against disturbances conducted along supply lines

Apply the test pulses 1, 2a/2b, 3a, 3b, 4 and 5a/5b according to the International standard ISO 7637-2:2004 to the supply lines as well as to other

connections of VAS/AS which may be operationally connected to supply lines.

Concerning pulse 5, pulse 5b shall be applied on vehicles which include an alternator with internal limitation diode and pulse 5a shall be applied for others cases.

Concerning the pulse 2, pulse 2a shall always be applied and pulse 2b could be performed with the agreement between the vehicle manufacturer and the test agency.

With the agreement of the Test Agency, Test pulse 5a/5b need not be applied for Type Approval of a VAS which is intended for the fitment to vehicles without any alternators
VAS/AS in unset state and set state

The test pulses 1 through 5 shall be applied. The required functional status for all applied test pulses is given in table 1.

Table 1 – Severity/functional status (for supply lines)

Test pulse number	Test level	Functional status
1	III	C
2a	III	B
2b	III	C
3a	III	A
3b	III	A
4	III	B
5a/5b	III	A

1.2 Immunity against disturbance coupled on signal lines

Leads which are not connected to supply lines (e.g. special signal lines) shall be tested in accordance with the International Standard ISO 7637-3:1995 (Corr.1). The required functional status, for all applied test pulses are given in Table 2.

Table 2 – Test level / functional status (for signal lines)

Test pulse number	Test level	Functional status
3a	III	C
3b	III	A

1.3 Immunity against radiated high frequency disturbances

Testing of the immunity of a VAS/AS in a vehicle or as a separate technical unit may be performed according to the technical prescriptions of AIS 004 Part 3 and test methods described in Annex 4 for the vehicles and Annex 7 for a separate technical unit.

1.4 Electrical disturbance from electrostatic discharges

Immunity against electrical disturbances shall be tested in accordance with Technical Report ISO/TR 10605-1993.

1.5 Radiated emission

Tests shall be performed according to the technical prescriptions of AIS 004 Part 3 and according to the test methods described in Annexes 2 and 3 for vehicles or Annexes 5 and 6 for a separate technical unit."

2.0 METHOD IEC

Electromagnetic field

The VAS/AS shall undergo the basic test. It shall be subjected to the electromagnetic field test described in IEC Publication 839-1-3-1998 test A-13 with a frequency range from 20 to 2000 MHz, and for a field strength level of 30 V/m.

In addition, the VAS/AS shall be subjected to the electrical transient conducted and coupled tests described in the International standard ISO 7637 Parts 1:1990, 2:1990 and 3:1995, as appropriate.

Electrical disturbance from electrostatic discharges

The VAS/AS shall undergo the basic test. It shall be subjected to testing for immunity against electrostatic discharge as described in either EN 61000-4-2, or ISO/TR 10605-1993, at the manufacturer's choice.

Radiated emissions

Tests shall be performed according to the technical prescriptions of AIS 004 Part 3 and according to the test methods described in Annexes 2 and 3 for vehicles or Annexes 5 and 6 for a separate technical unit."

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SET-UP BY

MINISTRY OF ROAD TRANSPORT & HIGHWAYS
(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)
GOVERNMENT OF INDIA

12 August 2014

AUTOMOTIVE INDUSTRY STANDARD

**Approval of Vehicle Alarm Systems (VAS)
for M1 and N1 Category of Vehicles and
of these Vehicles with regard to their
Alarm Systems (AS)**

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THE AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA

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AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE

UNDER

CENTRAL MOTOR VEHICLE RULES – TECHNICAL STANDING COMMITTEE

SET-UP BY

MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS

(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)

GOVERNMENT OF INDIA

March 2007

Status chart of the standard to be used by the purchaser
for updating the record

Sr. No.	Corr- igenda	Amend- ment	Revision	Date	Remark	Misc.

General remarks:

INTRODUCTION

The Government of India felt the need for a permanent agency to expedite the publication of standards and development of test facilities in parallel when the work on the preparation of the standards is going on, as the development of improved safety critical parts can be undertaken only after the publication of the standard and commissioning of test facilities. To this end, the erstwhile Ministry of Surface Transport (MOST) has constituted a permanent Automotive Industry Standard Committee (AISC) vide order No. RT-11028/11/97-MVL dated September 15, 1997. The standards prepared by AISC will be approved by the permanent CMVR Technical Standing Committee (CTSC). After approval, the Automotive Research Association of India, (ARAI), Pune, being the secretariat of the AIS Committee, has published this standard. For better dissemination of this information ARAI may publish this document on their web site.

Protection of 4 wheeled vehicles from unauthorized use is a safety aspect. Uniform provisions are required to be established for approval of such devices as fitted on the 4 wheeler vehicles. Vehicle Alarm Systems and Immobilizers provides protection against unauthorized entry into the vehicle. The committee felt the need to standardize the testing and approval requirements of such devices. International provisions were studied in details. The Committee reviewed the requirements specific to India and finalized the standard.

Accordingly,

- Part I of the standard covers requirements for approval of Vehicle Alarm Systems and it is based on Part II of ECE R116.
- Part II of the standard covers requirements for approval of vehicles as regards their alarm systems and it is based on Part III of ECE R 116.
- Part III of the standard covers requirements for approval of immobilizers and it is based on Part IV of ECE R116.

While preparing this standard, guidance has been taken from the following National / International Standards.

ECE R 97	Uniform Provisions Concerning the approval of Vehicle Alarm Systems and Motor Vehicles with regard to their Alarm Systems (AS) (Amd.5, Supp. 3 to the 01 series of amd. Date of entry into force Aug. 12, 2002)
ECE R116 (6 April 2005)	Uniform Technical Prescription concerning protection of motor vehicles against unauthorized use (Parts II, III and IV) (Original Version, Date of entry into force April 6, 2005)

The Automotive Industry Standards Committee (AISC) responsible for preparation of this standard is given in Annex : 6

Approval of Vehicle Alarm Systems (VAS) for M1 and N1 Category of Vehicles and of these Vehicles with regard to their Alarm Systems (AS)

1. SCOPE

This standard applies to:

- 1.1 PART I : Approval of Vehicle Alarm Systems (VAS) which are intended to be permanently fitted to vehicles of category M1 and those of category N1 with a maximum mass of not more than 2 t.
- 1.2(*) PART II : Approval of Vehicles of category M1 and those of category N1 with a maximum mass of not more than 2 t, with regard to their alarm system(s) (AS).
- 1.3(*) PART III: Approval of immobilizers and vehicles of category M1 and vehicles of category N1 with a maximum mass of not more than 2 t with regard to immobilizers.
- 1.4 If such devices are fitted on other 4 wheeler vehicles than those specified in Para 1.2 and 1.3 above, then such vehicles should comply with all relevant provisions of this standard.
- 1.5 The fitment of such devices on the vehicles of categories as referred in clauses 1.1, 1.2 and 1.3 above is optional. However, if fitted, these vehicles shall comply with the relevant portions of this standard.

(*) Note: Only vehicles with 12 Volt system are considered.

1 A. REFERENCES

1.	AIS-075	Approval of Vehicles with regard to their Protection against unauthorized use – Four Wheeled Vehicles
2.	IS 1884 : 1993	Automotive vehicles - Electric Horns – Specification
3.	IS 13947 : Part 1 : 1993 (IEC Pub 947-1 : 1988)	Specification for Low-voltage Switchgear and Controlgear - Part 1 : General Rules
4.	IS 9000 : Part V : Sec 1 and 2 : 1981	Basic Environmental Testing Procedures for Electronic and Electrical items: Part V Damp Heat (Cyclic) Test
5.	IS 9000 : Part XI : 1983	Basic Environmental Testing Procedures for Electronic and Electrical items: Part XI Salt Mist Test
6.	ISO 7637-1: 1990	Road Vehicles- Electrical Disturbances by Conduction and Coupling Part 1: Passenger Car and Light Commercial Vehicles with Nominal 12 V supply Voltage-Electrical Transient Conduction along Supply Lines only

7.	ISO 7637-2 :1990	Road Vehicles- Electrical Disturbances by Conduction and Coupling Part 2: Commercial Vehicles with Nominal 24 V Supply Voltage – Electrical Transient Conduction along Supply Lines only
8.	ISO 7637-3 :1995 (Corr.1)	Road Vehicles- Electrical Disturbances by Conduction and Coupling Part 3: Vehicles with Nominal 12 V and 24 V Supply Voltage – Electrical Transient Transmission by Capacitive and Inductive Coupling via Lines other than Supply Lines
9.	AIS-004 (Part 2)	Electromagnetic Radiated Immunity of Automotive Vehicles – Requirements and Methods of Tests
10.	AIS-004	Electromagnetic Radiation from Automotive Vehicle - Permissible Levels and Methods of Tests.
11.	ISO/ TR 10605-1993	Road Vehicles-Test Methods for Electrical Disturbances from Electrostatic Discharge

PART I**APPROVAL OF VEHICLE ALARM SYSTEMS****2. DEFINITIONS**

For the purpose of Part I of this standard,

- 2.1 **"Vehicle Alarm System"** (VAS) means a system intended for installation on (a) type(s) of vehicle(s), designed to indicate intrusion into or interference with the vehicle; these systems may provide additional protection against unauthorised use of the vehicle.
- 2.2 **"Sensor"** means a device, which senses a change, which could be caused by intrusion into or interference with a vehicle.
- 2.3 **"Warning Device"** means a device indicating that intrusion into or interference has occurred.
- 2.4 **"Control Equipment"** means equipment necessary for the setting, unsetting and testing of a VAS and for sending an alarm condition to warning devices.
- 2.5 **"Set"** means the state of a VAS in which an alarm condition can be transmitted to warning devices.
- 2.6 **"Unset"** means the state of a VAS in which an alarm condition cannot be transmitted to warning devices.
- 2.7 **"Key"** means any device designed and constructed to provide a method of operating a locking system, which is designed and constructed to be operated only by that device.
- 2.8 **"Type of Vehicle Alarm System"** means systems, which do not differ significantly in such essential aspects as:
- (a) The manufacturer's trade name or mark,
 - (b) The kind of sensor,
 - (c) The kind of warning device,
 - (d) The kind of control equipment;
- 2.9 **"Approval of a Vehicle Alarm System"** means the approval of a type of VAS with respect to the requirements laid down in paragraphs 4, 5, 6 and 7 below.
- 2.10 **"Immobilizer"** means a device, which is intended to prevent the vehicle being driven away, powered by its own engine.
- 2.11 **"Panic Alarm"** means a device that enables a person to use an alarm, installed on the vehicle, to summon assistance in an emergency.

3. APPLICATION FOR TYPE APPROVAL

- 3.1 The application for type approval shall contain information as specified in Annex 1 - Part I
- 3.2 Every functional modification in technical specifications declared in accordance with 3.1 shall be intimated to testing agency
- 3.3 If felt necessary, Type Approval Certificate to be issued by testing agency after verifying the parameter(s) affected by the modifications.

4. GENERAL SPECIFICATIONS

- 4.1 VAS shall, in the event of intrusion into or interference with a vehicle, provide a warning signal. The warning signal shall be audible and in addition may include optical warning devices, or be a radio alarm or any combination of the above.
- 4.2 VASs shall be designed, constructed and installed in such a way that the vehicle when equipped shall continue to comply with the relevant technical requirements, especially with regard to electromagnetic compatibility (EMC).
- 4.3 If the VAS includes the possibility of a radio transmission, e.g. for setting or unsetting of the alarm or for alarm transmission, it shall comply with the relevant provisions of National Frequency Allocation Plan of Department of Telecommunication, Ministry of Communication & IT, Government of India. The frequency and maximum radiated power of radio transmissions for the setting and unsetting of the alarm system must comply with the NFAP relating to the use of short range devices.
- 4.4 The installation of a VAS in a vehicle shall not be capable of influencing the vehicle's performance (in the unset state), or its safe operation.
- 4.5 The VAS and components thereof shall not activate inadvertently, particularly whilst the engine is in its running mode.
- 4.6 Failure of the VAS, or failure of its electrical supply shall not affect the safe operation of the vehicle.
- 4.7 The VAS, its components and the parts controlled by them shall be designed, built and installed in such a way as to minimize the risk for anyone to make them inoperable or to destroy them rapidly and without calling attention, e.g. using low-cost, easily-concealed tools, equipment or fabrications readily available to the public at large.
- 4.8 The means of setting and unsetting of the VAS shall be designed in such a way that it does not invalidate the requirements of AIS-075. Electrical connections to components covered by AIS-075 are allowed.
- 4.9 The system shall be so arranged that the shorting out of any warning signal circuit shall not render inoperative any aspects of the alarm system, other than the circuit which is shorted out.
- 4.10 VAS may include an immobilizer, which shall comply with the requirements of part III of this standard.

5. PARTICULAR SPECIFICATIONS

5.1. Protection range

5.1.1 Specific requirements

The VAS shall at least detect and signal the opening of any vehicle door, engine bonnet and luggage compartment. The failure or switching off of light sources, e.g. passenger compartment light, shall not impair the control operation.

Additional efficient sensors for information/display, e.g.:

- i) of intrusions into the vehicle, e.g. passenger compartment control, window glass control, breakage of any safety glass, or
- ii) of attempted vehicle theft, e.g. inclination sensor

are allowed, taking account of measures to prevent any unnecessary sounding of the alarm (= false alarm, see paragraph 5.1.2. below).

Insofar as these additional sensors generate an alarm signal even after an intrusion has occurred (e.g. by breakage of safety glass) or under external influences (e.g. wind), the alarm signal, activated by one of the above-mentioned sensors, shall be activated not more than 10 times within the same activation period of the VAS.

In this case the activation period shall be limited by the authorized unsetting of the system as a result of the vehicle user's action.

Some kinds of additional sensors, e.g. passenger compartment control (ultrasonic, infrared) or inclination sensor, etc., may be intentionally deactivated. In this case, separate deliberate action must be taken each time before the VAS is set. It must not be possible to deactivate the sensors while the alarm system is in a set state.

5.1.2 Safety against false alarm.

5.1.2.1 By adequate measures, e.g.

- i) Mechanical design and design of the electrical circuit according to condition specific to motor vehicles,
- ii) Selection and application of operation and control principles for the alarm system and components thereof,

It shall be ensured that the VAS both in set and unset conditions, cannot cause the alarm signal to sound unnecessarily, at least in the event of:

- a) An impact on the vehicle : test specified in paragraph 6.2.13.;
- b) Electromagnetic compatibility : tests specified in paragraph 6.2.12.;
- c) Reduction of battery voltage by continuous discharge : test specified in paragraph 6.2.14.;
- d) False alarm of the passenger compartment control : test specified in paragraph 6.2.15.

5.1.2.2 If the applicant for approval can demonstrate, e.g. by technical data, that safety against false alarm is satisfactorily ensured testing agency may not require some of the above tests.

5.2. Audible alarm

5.2.1 General

The warning signal shall be clearly audible and recognizable and shall differ significantly from the other audible signals used in road traffic.

In addition to the original equipment audible warning device, a separate audible warning device may be fitted in the area of the vehicle, which is controlled by the VAS, where it shall be protected against easy, rapid access by persons.

If a separate audible warning device according to paragraph 5.2.3.1. below is used, the original equipment standard audible warning device may additionally be actuated by the VAS, provided that any tampering with the standard audible warning device (generally more easily accessible) does not affect the operation of the additional audible warning device.

5.2.2 Duration of the Audible signal

Minimum : 25 s

Maximum : 30 s

The audible signal may sound again only after the next interference with the vehicle, i.e. after the above mentioned time span. (Restrictions: see paragraphs 5.1.1 and 5.1.2 above)

Unsetting of the alarm system shall immediately cut the signal.

5.2.3 Specifications concerning the audible signal

5.2.3.1 Constant tone signal device (constant frequency spectrum), e.g. horns :
acoustical, etc.. should be as per clause 8.6 of IS 1884.

Intermittent signal (ON/ OFF) :

Trigger frequency.....(2 ± 1) Hz

ON time = OFF time ± 10 %

5.2.3.2 Audible signal device with frequency modulation :
acoustical, etc. should be as per clause 8.6 of IS 1884 but equal passage of
a significant frequency range within the above-mentioned range
(1,800 through 3,550 Hz) in both directions.

Passage frequency (2 ± 1) Hz

5.2.3.3 Sound level

The sound source shall be :

- i) either an audible warning device approved under IS 1884
- ii) or a device meeting the requirements of clause 8.6 of IS 1884

However, in the case of a different sound source from the original equipment audible warning device, the minimum sound level may be reduced to 100 dBA, measured under the conditions of IS 1884.

5.3 Optical alarm - if fitted

5.3.1 General

In the event of intrusion into or interference with the vehicle, the device shall activate an optical signal as specified in paragraphs 5.3.2. and 5.3.3. below.

5.3.2 Duration of the optical signal

The optical signal shall have a duration between 25 s and 5 minutes after the alarm has been activated. The unsetting of the alarm system shall immediately stop the signal.

5.3.3 Type of optical signal

Flashing of all direction indicators and/or passenger compartment light of the vehicle, including all lamps in the same electrical circuit.

Trigger frequency..... (2 ± 1) Hz

In relation to the audible signal, also asynchronous signals are allowed.

ON time = OFF time ± 10 %

5.4 Radio alarm (pager) - if fitted

The VAS may include a facility generating an alarm signal by radio transmission.

5.5 Alarm system setting lock

5.5.1 When the engine is in its running mode, deliberate or inadvertent setting of the alarm system shall be impossible.

5.6 Setting and unsetting of the VAS

5.6.1.1 Setting

Any suitable means of setting of the VAS is allowed, provided that such means does not inadvertently cause false alarms.

5.6.1.2 Unsetting

Unsetting of the VAS shall be achieved by one or a combination of the following devices. Other devices giving an equivalent performance are permitted.

5.6.2.1 A mechanical key (complying with the requirements of Annex 5 to this standard) which can be coupled with a centralised vehicle locking system comprising at least 1,000 variants, operated from the outside.

5.6.2.2 Electrical / electronic device, e.g. remote control, with at least 50,000 variants and shall incorporate rolling codes and/or have a minimum scan time of ten days, e.g. a maximum of 5,000 variants per 24 hours for 50,000 variants minimum.

- 5.6.2.3 A mechanical key or an electrical/electronic device within the protected passenger compartment, with timed exit/entry delay.

5.7 Exit delay

If the switching device for setting the VAS is fitted within the protected area, an exit delay shall be provided. It shall be possible for the exit delay to be set to between 15 seconds and 45 seconds after the switch has been operated. The delay period may be adjustable to suit individual operators' circumstances.

5.8 Entry delay

If the device for unsetting the VAS is fitted within the protected area, a delay of 5 seconds minimum and 15 seconds maximum shall be allowed before the activation of the audible and optical signals. The delay period may be adjustable to suit individual operators' circumstances.

5.9 Status display

- 5.9.1 To provide information on the status of the VAS (set, unset, alarm setting period, alarm has been activated), optical displays inside and outside the passenger compartment are allowed. The light intensity of optical signals installed outside the passenger compartment shall not exceed 0.5 cd.

- 5.9.2 If an indication of short-term "dynamic" processes such as changes from "set" to "unset" and vice versa is provided, it shall be optical, according to paragraph 5.9.1. Such optical indication may also be produced by the simultaneous operation of the direction indicators and/or passenger compartment lamp(s), provided that the duration of the optical indication by the direction indicators does not exceed 3 seconds.

5.10 Power supply

The source of power for the VAS may be the vehicle battery. Where provided, an additional battery shall be rechargeable and it shall by no means supply energy to the other parts of the vehicle electrical system.

5.11 Specifications for optional functions

5.11.1 Self Check, Automatic Failure Indication

On setting the VAS, irregular situations, e.g. open doors, etc., can be detected by a self-check function (plausibility control), and this situation is indicated.

5.11.2 Panic alarm

An optical and/or audible and/or radio alarm is allowed independent of the state (set or unset) and/or function of the VAS. Such an alarm shall be triggered from within the vehicle and shall not affect the state (set or unset) of the VAS. Also it must be possible for the vehicle user to switch off the panic alarm. In the case of an audible alarm, its sounding duration per activation shall not be restricted. A panic alarm shall not immobilise the engine or stop it if it is running.

6 OPERATION PARAMETERS AND TEST CONDITIONS

6.1 Operation parameters

All components of the VAS shall operate without any failure under the following conditions.

6.1.1 Climatic conditions

Two classes of environmental temperature are defined as follows :

- a) -40° C to +85° C for parts to be fitted in the passenger or luggage compartment;
- b) -40° C to +125° C for parts to be fitted in the engine compartment unless otherwise specified.

6.1.2 Degree of protection for installation

The following degrees of protection in accordance with IS 13947-1993 Part I Appendix C shall be provided:

- i) IP 4X for parts to be fitted in the passenger compartment;
- ii) IP 42 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 IP 4X;
- iii) IP 54 for all other parts.

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

6.1.3. Weatherability

7 days according to IS 9000-1981 Part V

6.1.4 Electrical conditions

Rated supply voltage : 12 V

Operation supply voltage range : from 9 V to 15 V in the temperature range according to paragraph 6.1.1.

Time allowance for excess voltages at 23°C: U = 18 V, max. 1 h

U = 24 V, max. 1 min.

6.2 Test conditions

6.2.1 Operation tests

6.2.1.1 Compliance of the VAS with the following specifications shall be checked :

Alarm duration according to paragraphs 5.2.2 and 5.3.2.;

Frequency and ON/ OFF ratio according to paragraphs 5.3.3 and 5.2.3.1 or 5.2.3.2 respectively;

Number of alarm cycles according to paragraph 5.1.1 if applicable;

Alarm system setting lock check according to paragraph 5.5.

6.2.1.2 Normal test conditions

Voltage..... U = (12 ± 0.2) V
 Temperature..... T = (23 ± 5)°C

6.2.2 Resistance to temperature and voltage changes:

Compliance with the specifications defined under paragraph 6.2.1.1 shall also be checked under the following conditions :

6.2.2.1 Test temperature T = (-40 ± 2)° C
 Test voltage U = (9 ± 0.2) V
 Storage duration 4 hours

6.2.2.2 For parts to be fitted in the passenger or luggage compartment

Test temperature T = (+85 ± 2)° C
 Test voltage U = (15 ± 0.2) V
 Storage duration 4 hours

6.2.2.3 For parts to be fitted in the engine compartment unless otherwise specified

Test temperature T = (+125 ± 2)° C
 Test voltage U = (15 ± 0.2) V
 Storage duration 4 hours

6.2.2.4 The VAS, in both set and unset state, shall be submitted to an excess voltage equal to (18 ± 0.2) V for 1 hour.

6.2.2.5 The VAS, in both set and unset state, shall be submitted to an excess voltage equal to (24 ± 0.2) V for 1 min.

6.2.3 Safe operation after foreign body and water-tightness testing

After the test for tightness to foreign body and water according to IS 13947-1993 Appendix C, for degrees of protection as in paragraph 6.1.2 the operation tests according to paragraph 6.2.1 shall be repeated.

6.2.4 Safe operation after condensed water test

After a resistance-to-humidity test to be carried out according to IS 9000-1981 Part V the operation tests according to paragraph 6.2.1 shall be repeated.

6.2.5 Test for safety against Reversed Polarity

The VAS and components thereof shall not be destroyed by reversed polarity up to 13 V during 2 min. After this test the operation tests according to paragraph 6.2.1 shall be repeated with fuses changed if necessary.

6.2.6 Test for safety against short-circuits

All electrical connections of the VAS must be short-circuit proof against earth, max. 13 V and/or fused. After this test the operation tests according to paragraph 6.2.1 shall be repeated, with fuses changed if necessary.

6.2.7 Energy consumption in the set condition

The energy consumption in set condition under the conditions given in paragraph 6.2.1.2 shall not exceed 20 mA in average for the complete alarm system including status display.

6.2.8 Safe operation after vibration test

6.2.8.1 For this test, the components are subdivided into two types :

Type 1: components normally mounted on the vehicle

Type 2: components intended for attachment to the engine.

6.2.8.2 The components/VAS shall be submitted to a sinusoidal vibration mode whose characteristics are as follows:

6.2.8.2.1 For type 1

The frequency shall be variable from 10 Hz to 500 Hz with a maximum amplitude of ± 5 mm and maximum acceleration of 3 g (0-peak).

6.2.8.2.2 For type 2

The frequency shall be variable from 20 Hz to 300 Hz with a maximum amplitude of ± 2 mm and maximum acceleration of 15 g (0-peak).

6.2.8.2.3 For both type 1 and type 2 :

The frequency variation is 1 octave/min.

The number of cycles is 10, the test shall be performed along each of the 3 axes.

The vibrations are applied at low frequencies at a maximum constant amplitude and at a maximum constant acceleration at high frequencies.

6.2.8.3 During the test, the VAS shall be electrically connected and the cable shall be supported after 200 mm.

6.2.8.4 After the vibration test the operation tests according to paragraph 6.2.1 shall be repeated.

6.2.9 Durability test

Under the test conditions specified in paragraph 6.2.1.2, triggering of 300 complete alarm cycles (audible and/or optical) with a rest time of the audible device of 5 min.

6.2.10 Tests for external key switch (installed on the outside of the vehicle)

The following tests shall only be performed if the locking cylinder of the original equipment door lock is not used.

6.2.10.1 The key switch shall be so designed and constructed that it remains fully effective even after 2,500 set/unset cycles in each direction, followed by 96 hours minimum of exposure to salt spray test according to IS 9000-1981 Part XI, corrosion resistance test.

6.2.11 Test of systems for the protection of the passenger compartment

The alarm shall be activated, when a vertical panel of 0.2 x 0.15 m is inserted for 0.3 m (measured from the centre of the vertical panel) through an open front door window into the passenger compartment, towards the front and parallel to the road at a speed of 0.4 m/s and at an angle of 45° with the longitudinal median plane of the vehicle. (See drawings in Annex 3 to this standard).

6.2.12 Electromagnetic compatibility

The VAS shall be submitted to the tests described in Annex 4.

6.2.13 Safety against false alarm in the event of an impact on the vehicle

It shall be verified that an impact of up to 4.5 Joules of a hemispherical body with 165 mm in diameter and 70 ± 10 Shore A applied anywhere to the vehicle bodywork or safety glass with its curved surface does not cause false alarms.

6.2.14 Safety against false alarm in the event of a voltage reduction

It shall be verified that slow reduction of the main battery voltage by continuous discharge of 0.5 V per hour down to 3 V does not cause false alarms.

Test conditions: see paragraph 6.2.1.2 above.

6.2.15 Test for safety against false alarm of the passenger compartment control

Systems intended for the protection of the passenger compartment according to paragraph 5.1.1 above shall be tested together with a vehicle under normal conditions (para. 6.2.1.2).

The system, installed according to the manufacturer's instructions, shall not be triggered when subjected 5 times to the test described in paragraph 6.2.13 above at intervals of 0.5 s.

The presence of a person touching or moving around the outside of the vehicle (windows closed) shall not cause any false alarm.

7. INSTRUCTIONS

Each VAS shall be accompanied by:

- 7.1 Instructions for installation :
 - 7.1.1 The list of vehicles and vehicle models for which the device is intended. This list may be specific or generic, e.g. "all cars with petrol engines and 12 V negative earth batteries".
 - 7.1.2 The method of installation illustrated by photographs and/or very clear drawings.
 - 7.1.3 In the case of VAS which includes an immobilizer, additional instructions regarding compliance with the requirements of Part III of this standard.
- 7.2 A blank installation certificate, an example of which is given in Annex 2.
- 7.3 A general statement to the VAS purchaser calling his attention to the following points:

The VAS should be installed in accordance with the manufacturer's instructions;

The selection of a good installer is recommended (the VAS manufacturer may be contacted to indicate appropriate installers);

The installation certificate supplied with the VAS should be completed by the installer.
- 7.4 Instructions for use
- 7.5 Instructions for maintenance
- 7.6 A general warning regarding the danger of making any alterations or additions to the system; such alterations or additions would automatically invalidate the certificate of installation referred to in paragraph 7.2 above.

PART II

APPROVAL OF A VEHICLE WITH REGARD TO ITS ALARM SYSTEM

When a VAS approved to Part II of this standard is being used in a vehicle submitted for approval to Part III of this standard, tests required to be passed by a VAS in order to obtain approval to Part II of this standard shall not be repeated.

8. DEFINITIONS

For the purpose of Part II of this standard,

- 8.1 **"Alarm system(s)"** (AS) means an arrangement of components fitted as original equipment in a vehicle type, designed to indicate intrusion into or interference with the vehicle; these systems may provide additional protection against unauthorized use of the vehicle.
- 8.2 **"Vehicle type with regard to its alarm system"** means vehicles which do not differ significantly in such essential aspects as:
- (a) The manufacturer's trade name or mark;
 - (b) Vehicle features which significantly influence the performances of the AS;
 - (c) The type and design of the AS or VAS.
- 8.3 **"Approval of a vehicle"** means the approval of a vehicle type with regard to the requirements laid down in paragraphs 10, 11 and 12 below.
- 8.4 Other definitions applicable to Part II are contained in paragraph 2 of this standard.

9. APPLICATION FOR APPROVAL

- 9.1 The application for approval of a vehicle type with regard to its AS shall be submitted by the vehicle manufacturer or by his duly authorized representative.
- 9.2 It shall be accompanied by the documents as given in Annex 1, Part-I.
- 9.3 Every functional modification in technical specifications declared in accordance with para 9.2 shall be intimated to the test agency.
- 9.4 If felt necessary, Certificate of compliance to be issued by the test agency after verifying the parameter(s) affected by the modification(s).

10. GENERAL SPECIFICATIONS

- 10.1 ASs shall be designed and built in such a way that they, in the event of intrusion into or interference with a vehicle, provide a warning signal, and may include an immobilizer.
- The warning signal shall be audible and in addition may include optical warning devices, or be a radio alarm, or any combination of the above.
- 10.2 Vehicles which are equipped with alarm systems shall comply with the relevant technical requirements, especially with regard to electromagnetic compatibility (EMC).

- 10.3 If the AS includes the possibility of a radio transmission, e.g. for setting or unsetting of the alarm or for alarm transmission, it shall comply with the relevant provisions of National Frequency Allocation Plan of Department of Telecommunication, Ministry of Communication & IT, Government of India. The frequency and maximum radiated power of radio transmissions for the setting and unsetting of the alarm system must comply with the NFAP relating to the use of short range devices.
- 10.4 The AS and components thereof shall not activate inadvertently, particularly whilst the engine is in its running mode.
- 10.5 Failure of the AS, or failure of its electrical supply shall not affect the safe operation of the vehicle.
- 10.6 The alarm system, its components and the parts controlled by them shall be so installed as to minimize the risk for anyone to make them inoperable or to destroy them rapidly and without calling attention, e.g. using low-cost, easily-concealed tools, equipment or fabrications readily available to the public at large.
- 10.7 The system shall be so arranged that the shorting out of any warning signal circuit shall not render inoperative any aspects of the alarm system, other than the circuit which is shorted out.

11. PARTICULAR SPECIFICATIONS

11.1 Protection range

11.1.1 Specific requirements

The AS shall at least detect and signal the opening of any vehicle door, engine bonnet and luggage compartment. The failure or switching off of light sources, e.g. passenger compartment light, shall not impair the control operation.

The installation of additional efficient sensors for information/display, e.g. :

- (i) of intrusions into the vehicle, e.g. passenger compartment control, window glass control, breakage of any safety glass, or
- (ii) of attempted vehicle theft, e.g. inclination sensor

Are allowed, taking account of measures to prevent any unnecessary sounding of the alarm (= false alarm, see paragraph 11.1.2. below).

Insofar as these additional sensors generate an alarm signal even after an intrusion has occurred (e.g. by breakage of a safety glass) or under external influences (e.g. wind), the alarm signal, activated by one of the above-mentioned sensors, shall be activated not more than 10 times within the same activation period of the AS.

In this case the activation period shall be limited by the authorised unsetting of the system as a result of the vehicle user's action.

Some kinds of additional sensors, e.g. passenger compartment control (ultrasonic, infrared) or inclination sensor, etc. may be intentionally deactivated. In this case, separate deliberate action must be taken each time before the AS is set. It must not be possible to deactivate the sensors while the alarm system is in a set state.

11.1.2 Safety against false alarm:

11.1.2.1 It shall be ensured that the AS both in set and unset conditions, cannot cause the alarm signal to sound unnecessarily, in the event of :

- (a) an impact on the vehicle : test specified in paragraph 6.2.13.;
- (b) electromagnetic compatibility : tests specified in paragraph 6.2.12.;
- (c) reduction of battery voltage by continuous discharge : test specified in paragraph 6.2.14.;
- (d) false alarm of the passenger compartment control : test specified in paragraph 6.2.15.

11.1.2.2 If the applicant for approval can demonstrate, e.g. by technical data, that safety against false alarm is satisfactorily ensured, the technical service responsible for conducting approval tests may not require some of the above tests.

11.2 Audible alarm

11.2.1 General

The warning signal shall be clearly audible and recognizable and shall differ significantly from the other audible signals used in road traffic.

In addition to the original equipment audible warning device, a separate audible warning device may be fitted in the area of the vehicle which is controlled by the AS, where it shall be protected against easy, rapid access by persons.

If a separate audible warning device according to paragraph 11.2.3.1 below is used, the original equipment standard audible warning device may additionally be actuated by the AS, provided that any tampering with the standard audible warning device (generally more accessible) does not affect the operation of the additional audible warning device.

11.2.2 Duration of the audible signal

Minimum : 25 s

Maximum : 30 s

The audible signal may sound again only after the next interference with the vehicle, i.e. after the above mentioned time span. (Restrictions: see paragraphs 11.1.1 and 11.1.2)

Unsetting of the alarm system shall immediately cut the signal.

11.2.3 Specifications concerning the audible signal:

11.2.3.1 Constant tone signal device (constant frequency spectrum), e.g. horns: acoustical, etc. should be as per clause 8.6 of IS 1884.

Intermittent signal (ON / OFF):

Trigger frequency.....(2 ± 1) Hz

ON time = OFF time ± 10 %

11.2.3.2 Audible signal device with frequency modulation : acoustical, etc should be as per clause 8.6 of IS 1884 but equal passage of a significant frequency range within the above-mentioned range (1,800 through 3,550 Hz) in both directions.

Passage frequency(2 ± 1) Hz

11.2.3.3 Sound level

The sound source shall be :

- (i) either an audible warning device approved as per IS 1884
- (ii) or a device meeting the requirements of clause 8.6 of IS 1884.

However, in the case of a different sound source from the original equipment audible warning device, the minimum sound level may be reduced to 100 dB(A), measured under the conditions of IS 1884.

11.3 Optical alarm - if fitted

11.3.1 General

In the event of intrusion into or interference with the vehicle the device shall activate an optical signal as specified in paragraphs 11.3.2 and 11.3.3 below.

11.3.2 Duration of the optical signal

The optical signal shall have a duration between 25 s and 5 min after the alarm has been activated. The unsetting of the alarm system shall immediately stop the signal.

11.3.3 Type of optical signal

Flashing of all direction indicators and/or passenger compartment light of the vehicle, including all lamps in the same electrical circuit.

Trigger frequency..... (2 ± 1) Hz

In relation to the audible signal, also asynchronous signals are allowed.

ON time = OFF time ± 10 %

11.4 Radio alarm (pager) - if fitted

The AS may include a facility generating an alarm signal by radio transmission.

11.5 Alarm system setting lock

11.5.1 When the engine is in its running mode, deliberate or inadvertent setting of the alarm system shall be impossible.

11.6 Setting and unsetting of the AS

11.6.1 Setting

Any suitable means of setting of the AS is allowed, provided that such means does not inadvertently cause false alarms.

11.6.2 Unsetting

Unsetting of the AS shall be achieved by one or a combination of the following devices. Other devices giving equivalent performance are permitted.

11.6.2.1 A mechanical key (complying with requirements of Annex 5 to this standard) which can be coupled with a centralized vehicle locking system comprising of at least 1,000 variants, operated from the outside.

11.6.2.2 Electrical / electronic device, e.g. remote control, with at least 50,000 variants and shall incorporate rolling codes and/or have a minimum scan time of ten days, e.g. a maximum of 5,000 variants per 24 hours for 50,000 variants minimum.

11.6.2.3 A mechanical key or an electrical/electronic device within the protected passenger compartment, with timed exit/entry delay.

11.7 Exit delay

If the switching device for setting the AS is fitted within the protected area, an exit delay shall be provided. It shall be possible for the exit delay to be set to between 15 seconds and 45 seconds after the switch has been operated. The delay period may be adjustable to suit individual operators' circumstances.

11.8 Entry delay

If the device for unsetting the VAS is fitted within the protected area, a delay of 5 seconds minimum and 15 seconds maximum shall be allowed before the activation of the audible and optical signals. The delay period may be adjustable to suit individual operators' circumstances.

11.9 Status display

11.9.1 To provide information on the status of the AS (set, unset, alarm setting period, alarm has been activated), the installation of optical displays is allowed inside and outside the passenger compartment. The light intensity of optical signals installed outside the passenger compartment shall not exceed 0.5 cd.

11.9.2 If an indication of short-term "dynamic" processes such as changes from "set" to "unset" and vice versa is provided, it shall be optical, according to paragraph 11.9.1. Such optical indication may also be produced by the simultaneous operation of the direction indicators and/or passenger compartment lamp(s), provided that the duration of the optical indication by the direction indicators does not exceed 3 seconds.

11.10 Power supply

The source of power for the AS may be the vehicle battery. Where provided, an additional battery shall be rechargeable and it shall by no means supply energy to the other parts of the vehicle electrical system.

11.11 Specifications for optional functions

11.11.1 Self check, automatic failure indication

On setting the AS, irregular situations, e.g. open doors, etc., can be detected by a self-check function (plausibility control), and this situation is indicated.

11.11.2 Panic alarm

An optical and/or audible and/or radio alarm is allowed independent of the state (set or unset) and/or function of the AS. Such an alarm shall be triggered from within the vehicle and shall not affect the state (set or unset) of the AS. Also it must be possible for the vehicle user to switch off the panic alarm. In the case of an audible alarm, its sounding duration per activation shall not be restricted. A panic alarm shall not immobilise the engine or stop it if it is running.

12. TEST CONDITIONS

All components of the VAS or AS shall be tested in accordance with procedures described in paragraph 6.

This requirement does not apply to:

- 12.1 Those components that are fitted and tested as part of the vehicle, whether or not a VAS/ AS is fitted (e.g. lamps); or,
- 12.2 Those components that have previously been tested as part of the vehicle and documentary evidence has been provided.

13. INSTRUCTIONS

Each vehicle shall be accompanied by :

- 13.1 Instructions for use :
- 13.2 Instructions for maintenance
- 13.3 A general warning regarding the danger of making any alterations or additions to the system.

14. CONFIRMITY OF PRODUCTION REQUIREMENTS :

Whole vehicle COP and component COP procedures laid down by the Ministry of Road Transport and Highways shall be applicable .For the purpose of COP verification of all the tests shall be carried out.

PART III**APPROVAL OF IMMOBILIZERS AND APPROVAL OF A VEHICLE
WITH REGARD TO ITS IMMOBILIZER****15. DEFINITIONS**

For the purpose of Part III of this standard:

- 15.1. **"Immobilizer"** means a device which is intended to prevent normal driving away of a vehicle under its own power (prevention of unauthorized use).
- 15.2. **"Control equipment"** means equipment necessary for the setting and/or unsetting of an immobilizer.
- 15.3. **"Status display"** means any device intended to indicate the status of the immobilizer (set/unset, change of set to unset and vice versa).
- 15.4. **"Set state"** means the state in which the vehicle cannot be driven normally under its own power.
- 15.5. **"Unset state"** means the state, in which the vehicle can be driven normally
- 15.6. **"Key"** means any device designed and constructed to provide a method of operating a locking system, which is designed and constructed to be operated only by that device.
- 15.7. **"Override"** means a design feature which locks the immobilizer in the unset condition.
- 15.8. **"Rolling code"** means an electronic code consisting of several elements the combination of which changes at random after each operation of the transmitting unit.
- 15.9. **"Type of immobilizer"** means systems which do not differ significantly in such essential aspects as:
 - a) The manufacturer's trade name or mark;
 - b) The kind of control equipment;
 - c) The design of their operation on the relevant vehicle system(s) (as referred to in paragraph 18.1. below).
- 15.10. **"Vehicle type with regard to its immobilizer"** means vehicles which do not differ significantly in such essential aspects as:
 - a) The manufacturer's trade name or mark;
 - b) Vehicle features which significantly influence the performances of the immobilizer;
 - c) The type and design of the immobilizer.

16 APPLICATION FOR TYPE APPROVAL

- 16.1 The application for type approval shall contain information as specified in Annex 1 Part II

- 16.2 Every functional modification in technical specifications declared in accordance with 16.1 shall be intimated to testing agency
- 16.3 If felt necessary, Certificate of compliance to be issued by testing agency after verifying the parameter(s) affected by the modifications

17. GENERAL SPECIFICATIONS

- 17.1 It must be possible to set and unset the immobilizer in accordance with these requirements.
- 17.2 If the immobilizer includes the possibility of a radio transmission, e.g. for setting or unsetting, it shall comply with the relevant provisions of National Frequency Allocation Plan of Department of Telecommunication, Ministry of Communication & IT, Government of India. The frequency and maximum radiated power of radio transmissions for the setting and unsetting of the alarm system must comply with the NFAP relating to the use of short range devices.
- 17.3 An immobilizer and its installation shall be so designed that any equipped vehicle continues to meet the technical requirements.
- 17.4 It shall not be possible for an immobilizer to enter the set state when the ignition key is in the engine running mode, except when:
- (a) the vehicle is equipped or intended to be equipped for ambulance, fire brigade or police purposes; or
 - (b) the engine is required to:
 - (i) Drive machinery forming part of, or mounted on, the vehicle for purposes other than driving the vehicle; or
 - (ii) Maintain the electrical power of the batteries of the vehicle at a level required for driving that machinery or apparatus;

And the vehicle is stationary with the parking brake applied. When this exception is used, this fact shall be stated in the Type Approval Certificate.

- 17.5 It shall not be possible to permanently override an immobilizer
- 17.6 The immobilizer shall be designed and built such that when installed it shall not adversely affect the designed function and the safe operation of the vehicle, even in the case of malfunction.
- 17.7 An immobilizer shall be designed and built such that, when installed on a vehicle, according to the manufacturer's instructions, it cannot rapidly and without attracting attention be rendered ineffective or destroyed by, e.g. the use of low cost easily concealed tools, equipment or fabrications readily 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.

- 17.8 An immobilizer shall be so designed and built such that when installed as specified by the manufacturer it is able to withstand the environment within the vehicle for a reasonable lifetime (for testing see paragraph 19). More particularly the electrical properties of the on-board circuitry shall not be adversely affected by the addition of the immobilizer (lead cross-sections, contact safety, etc.).
- 17.9 An immobilizer may be combined with other vehicle systems or may be integrated into them (e.g. engine management, alarm systems).
- 17.10 It shall not be possible for an immobilizer to prevent the release of the brakes of the vehicle, except in the case of an immobilizer which prevents the release of pneumatically released spring brakes and functions in such a way that in normal operation, or in failure conditions, the technical requirements of IS 11852 in force at the time of application for type approval under this standard are satisfied.

Compliance with this paragraph does not exempt an immobilizer which prevents the release of pneumatically released spring brakes from the technical requirements set out in this standard.

- 17.11 It shall not be possible for an immobilizer to operate in such a manner as to apply the brakes of the vehicle.

18. PARTICULAR SPECIFICATIONS

18.1 Extent of disablement

- 18.1.1 An immobilizer shall be designed so as to prevent the operation of the vehicle under its own power by at least one of the following means:

18.1.1.1 Disable, in the case of after-market fitting, or vehicle equipped with diesel engine, at least two separate vehicle circuits that are needed for vehicle operation under its own power (e.g. starter motor, ignition, fuel supply, etc.);

18.1.1.2 Interference by code of at least one control unit required for the operation of the vehicle;

18.1.2 An immobilizer for fitment to a vehicle equipped with a catalytic converter shall not cause un burnt fuel to enter the exhaust.

18.2 Operating reliability

Operating reliability shall be achieved by suitable design of the immobilizer, account being taken of specific environmental conditions in the vehicle (see paragraphs 17.8. and 19).

18.3 Operating safety

It shall be ensured that the immobilizer does not change its state (set/ unset) as a result of any of the tests in paragraph 19.

18.4 Setting of the immobilizer

18.4.1 The immobilizer must be set without supplementary action from the driver by at least one of the following means:

- a) At rotation of the ignition key into the "0" position in the ignition lock and activation of a door; in addition, immobilizers which unset immediately before or during the normal starting procedure of the vehicle are permitted to set on turning the ignition OFF.
- b) A maximum of 5 minutes after removing the key of the ignition lock.

18.4.2 If the immobilizer can enter the set state when the ignition key is in the engine running mode as provided for in paragraph 18.4., the immobilizer may also be set by the opening of the driver's door and/or the authorised user carrying out a deliberate action.

18.5 Unsetting

18.5.1 Unsetting shall be achieved by using one or a combination of the following devices. Other devices with an equivalent level of security giving equivalent performance are permitted.

18.5.1.1 A key pad for inputting an individually selectable code having at least 10,000 variants.

18.5.1.2 Electrical / electronic device, e.g. remote control, with at least 50,000 variants and shall incorporate rolling codes and/or have a minimum scan time of ten days, e.g. a maximum of 5,000 variants per 24 hours for 50,000 variants minimum.

18.5.1.3 If unsetting can be achieved via a remote control, the immobilizer must return to the set condition within 5 minutes after unsetting if no supplementary action on the starter circuit has been undertaken.

18.6 Status display

18.6.1 To provide information on the status of the immobilizer (set/unset, change of set to unset and vice versa), optical displays inside and outside the passenger compartment are allowed. The light intensity of optical signals installed outside the passenger compartment shall not exceed 0.5 cd.

18.6.2 If an indication of short-term "dynamic" processes such as changes from "set" to "unset" and vice versa is provided, it shall be optical, according to paragraph 18.6.1. Such optical indication may also be produced by the simultaneous operation of the direction indicators and/or passenger compartment lamp(s), provided that the duration of the optical indication by the direction indicators does not exceed 3 seconds.

19. OPERATION PARAMETERS AND TEST CONDITIONS

19.1 Operation parameters

All components of the immobilizer shall comply with prescriptions given in paragraph 6 of this standard.

This requirement does not apply to:

- i) Those components that are fitted and tested as part of the vehicle, whether or not an immobilizer is fitted (e.g. lamps); or,
- ii) Those components that have previously been tested as part of the vehicle and documentary evidence has been provided.

19.2 Test conditions

All the tests shall be carried out in sequence on a single immobilizer. However, at the discretion of the test authority, other samples may be used if this is not considered to affect the results of the other tests.

19.3 Operation test

Upon completion of all the tests specified below, the immobilizer shall be tested under the normal test conditions specified in paragraph 6.2.1.2. of this standard to check that it continues to function normally. Where necessary, fuses may be replaced prior to the test.

All components of the immobilizer shall comply with prescriptions given in paragraphs 6.2.2. to 6.2.8 and 6.2.12 of this standard.

20. INSTRUCTIONS

(Paragraphs 20.1 to 20.3 for the purposes of aftermarket installation only).

Each immobilizer shall be accompanied by:

20.1 Instructions for installation

- 20.1.1 The list of vehicles and vehicle models for which the device is intended. This list may be specific or generic, e.g. "all cars with petrol engines and 12 V negative earth batteries".

- 20.1.2 The method of installation illustrated by photographs and/or very clear drawings.
- 20.1.3 Detailed installation instructions provided by the supplier shall be such that when correctly followed by a competent installer, the safety and reliability of the vehicle is not affected.
- 20.1.4 The supplied installation instructions shall identify the electrical power requirements of the immobilizer and, where relevant, shall advise an increasing of battery size.
- 20.1.5 The supplier shall provide post installation procedures for checking the vehicle. Particular attention shall be drawn to safety related features.
- 20.2 A blank installation certificate, an example of which is given in Annex 2.
- 20.3 A general statement to the immobilizer purchaser calling his attention to the following points:
 - 20.3.1 the immobilizer should be installed in accordance with the manufacturer's instructions;
 - 20.3.2 the selection of a good installer is recommended (the immobilizer manufacturer may be contacted to indicate appropriate installers);
 - 20.3.3 The installation certificate supplied with the immobilizer should be completed by the installer.
- 20.4 Instructions for use
- 20.5 Instructions for maintenance
- 20.6 A general warning regarding the dangers of making any alterations or additions to the immobilizer; such alterations and additions would automatically invalidate the certificate of installation referred to in paragraph 20.2 above.

21. CONFIRMITY OF PRODUCTION REQUIREMENTS :

Whole vehicle COP and component COP procedures laid down by the Ministry of Road Transport and Highways shall be applicable. For the purpose of COP verification of all the tests shall be carried out.

ANNEX 1
Part I
(see 3.1 and 9.2)

**INFORMATION TO BE SUBMITTED FOR
TYPE APPROVAL OF ALARM SYSTEM**

1. General
 - a. Make
 - b. Type
 - c. Serial Number
 - d. Name and Address of manufacture
2. Description of the device
 - a. A detailed description of the alarm system and of the vehicle parts related to alarm system installed
 - b. A list of main components comprising the alarm system
 - c. The measures taken against false alarm
 - d. Range of protection offered by the device
 - e. Method of setting/ unsetting the device
 - f. Number of interchangeable codes, if applicable
 - g. List of main components comprising the device
3. Drawings:

Drawings of the main components of the device
4. Instructions
 - a. List of vehicles to which the device is intended to be fitted
 - b. Description of the method of installation illustrated by photographs and/ or drawings.
 - c. Instructions for use
 - d. Instructions for maintenance (if any)

ANNEX 1
Part II
(see 16.1)

**INFORMATION TO BE SUBMITTED FOR
TYPE APPROVAL OF AN IMMOBILIZER SYSTEM**

- 1 General
 - a. Make
 - b. Type
 - c. Serial Number
 - d. Name and Address of manufacture

- 2 Description of the device
 - a. A detailed description of the vehicle immobilizer and of the vehicle and the measures taken against inadvertent activation.
 - b. The vehicle system(s) on which the immobilizer acts
 - c. Method of setting/ unsetting the device
 - d. Number of interchangeable codes, if applicable
 - e. A list of main components comprising the device

- 3 Drawings:

Drawings of the main components of the device

- 4 Instructions
 - a. List of vehicles to which the device is intended to be fitted
 - b. Description of the method of installation illustrated by photographs and/ or drawings.
 - c. Instructions for use
 - d. Instructions for maintenance (if any)

ANNEX 2
(see 7.2 and 20.2)

FORMAT OF INSTALLATION CERTIFICATE

I the undersigned-----
Professional installer, certify that the installation of vehicle alarm system/
immobilizer described below has been carried out by myself as per the
mounting instructions supplied by the manufacturer of the system.

Description of the vehicle:

Make -----

Type -----

Engine number/ chassis number-----

Registration number -----

Description of the vehicle alarm system/ immobilizer

Make -----

Type -----

Model number/ Serial number -----

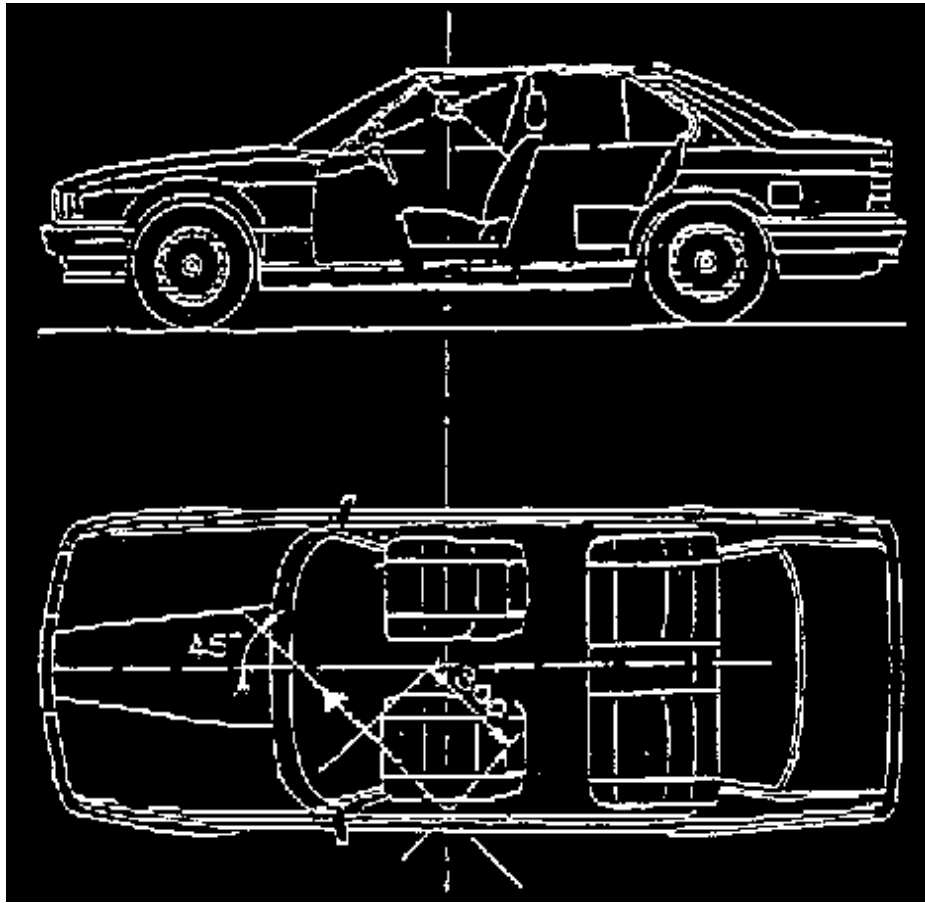
Installation done at----- on-----

Installers' address and stamp -----

Signature -----

ANNEX 3
(see 6.2.11)

**TEST OF SYSTEMS FOR THE PROTECTION OF THE
PASSENGER COMPARTMENT**



ANNEX 4
(see 6.2.12)

ELECTROMAGNETIC COMPATIBILITY

Note: To test the electromagnetic compatibility, either paragraph 1. or paragraph 2. shall be used, depending on the test facilities.

1. METHOD ISO

Immunity against disturbances conducted along supply lines

Apply the test pulses 1, 2, 3a, 3b, 4 and 5 according to the International standard ISO 7637-1: 1990 to the supply lines as well as to other connections of VAS/AS which may be operationally connected to supply lines.

VAS/AS in unset state

The test pulses 1 through 5, shall be applied with a degree of severity III. The required functional status for all applied test pulses shall be A.

VAS/AS in set state

The test pulses 1 through 5 shall be applied. The required functional status for all applied test pulses are given in Table 1.

Table 1 – Severity/functional status (for supply lines)

Test pulse number	Test level	Functional status
1	III	C
2	III	A
3a	III	C
3b	III	A
4	III	B
4	I	A
5	III	A

Immunity against disturbance coupled on signal lines

Leads which are not connected to supply lines (e.g. special signal lines) shall be tested in accordance with the International Standard ISO 7637-3:1995 (Corr.1). The required functional status for all applied test pulses are given in Table 2.

Table 2 – Test level / functional status (for signal lines)

Test pulse number	Test level	Functional status
3a	III	C
3b	III	A

Immunity against radiated high frequency disturbances

Testing of the immunity of a VAS/AS in a vehicle or as a separate technical unit may be performed according to the prescriptions in AIS 004 (Part 2) (under formulation) and test methods described therein.

Electrical disturbance from electrostatic discharges

Immunity against electrical disturbances shall be tested in accordance with Technical Report ISO/TR 10605-1993.

Radiated emission

Tests shall be performed according to AIS 004, according to the test methods described therein for vehicles or for a separate technical unit.

1. METHOD IEC

Electromagnetic field

The VAS/AS shall undergo the basic test. It shall be subjected to the electromagnetic field test described in IEC Publication 839-1-3-1998 test A-13 with a frequency range from 20 to 1000 MHz, and for a field strength level of 30 V/m.

In addition, the VAS/AS shall be subjected to the electrical transient conducted and coupled tests described in the International standard ISO 7637 Parts 1:1990, 2:1990 and 3:1995, as appropriate.

Electrical disturbance from electrostatic discharges

The VAS/AS shall undergo the basic test. It shall be subjected to testing for immunity against electrostatic discharge as described in either EN 61000-4-2, or ISO/TR 10605-1993, at the manufacturer's choice.

Radiated emissions

The VAS/AS shall be subjected to testing for the suppression of radio frequency interference according to AIS 004 for vehicles and separate technical unit."

ANNEX 5
(see 5.6.2.1 and 11.6.2.1)

SPECIFICATIONS FOR MECHANICAL KEY SWITCHES

1. The cylinder of the key switch shall not protrude by more than 1 mm from the cowling, and the protruding part shall be conical.
2. The joint between the cylinder core and the cylinder casing shall be capable of withstanding a tensile force of 600 N and a torque of 25 Nm.
3. The key switch shall be provided with a cylinder drill obstruction.
4. The key profile shall have at least 1,000 effective permutations.
5. The key switch shall not be operable by a key which differs by only one permutation from the key matching the key switch.
6. The key aperture to an external key switch shall be shuttered or otherwise protected against the penetration of dirt and/or water.

ANNEX 6
(See Introduction)
COMMITTEE COMPOSITION *
Automotive Industry Standards Committee

Chairman	
Shri Shrikant R. Marathe	Director The Automotive Research Association of India, Pune
Members	Representing
Representative from	Ministry of Shipping, Road Transport & Highways (Dept. of Road Transport & Highways), New Delhi
Shri Sushil Kumar	Ministry of Heavy Industries & Public Enterprises (Department of Heavy Industry), New Delhi
Shri J. K. Arya	Office of the Development Commissioner, Small Scale Industries, Ministry of Small Scale Industries, New Delhi
Shri S. K. Chaudhari Shri Rakesh Kumar (Alternate)	Bureau of Indian Standards, New Delhi
Dr. G. K. Sharma Shri D. P. Saste (Alternate)	Central Institute of Road Transport, Pune
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Shri Dilip Chenoy	Society of Indian Automobile Manufacturers
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Shri K.N.D. Nambudiripad	Automotive Components Manufacturers Association, New Delhi
Shri G. P. Banerji	Automotive Components Manufacturers Association, New Delhi

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The Automotive Research Association of India, Pune

* At the time of approval of this Automotive Industry Standard (AIS)