Type Approval Test Regulations for Passenger Vehicle Security

VERSION 2.0 (7 April 2014)

Requirements and test methods for immobilisers and alarm systems (AA04)

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1 ADMINISTRATIVE STIPULATIONS

The administrative stipulations are valid for this Test Regulation as described in “Administrative Stipulations AB04” version 1.1. of Stichting VbV.

1.1 *Transition period*

A transition period has been set until 1 January 2015. Approvals previously granted will therefore expire on 1 January 2015 at the latest. Certificates relating to the installation of products for which approval has previously been granted will no longer be issued after 1 January 2015.
As far as the new requirements relating to the resistance of security systems against attack (chapter 5) are concerned, this procedure will come into force from 1 January 2015.

1.2 *Items that must be supplied for a Product Test*

Before considering a product approval the following documents must be made available to the test institute through the Certification Institute. In so far as applicable for the product this concerns:

1.2.1 A filled in en signed Request Form that requests that the tests be performed.

1.2.2 Documentation provided with all options of the product

1.2.3 Installation instructions in Dutch provided with:

- a plan of the system components
- installation and connection diagrams
- tests with checklist
- trouble shooting
- periodic maintenance with checklist
- an overview of the approved system components

The installation instructions (when applicable) for ex-factory systems may be supplied in another language than Dutch.

1.2.4 User instructions in Dutch provided with:

- operating conditions
- operating instructions
- the prevention of unnecessary warnings
- how to act in the event of malfunctions/defects
- overview of the user-relevant system components

The user instructions for ex-factory systems may be supplied in another language than Dutch.

1.2.5 Full technical documentation of the product, being:

- printed circuit board lay-outs of all components
- electrical diagrams of all components
- mechanical drawings of all components
- assembly drawing of all components

1.2.6 Two complete products. These must be supplied in the condition in which they will emerge from the production line. The use of prototypes is not allowed here.

1.2.7 Statements concerning the following items:

- Coding of the switching on and off signal, as well as the coding of obligatory coded signals, including those of the following components:
  - remote control handsets
  - transponder
  - code panel
  - electronic key
  - mechanical key

1.2.8 Statements (for after-market systems) to the effect that:

- the system does not write to the DATA-BUS of vehicles;
- no uncertified remote control handsets (as referred to in these Test Regulations) are used to switch the system on or off.

1.2.9 Description of the assembly of the system per class.

1.2.10 For ex-factory systems, an indication must be given of which system components of the vehicle will be involved and interrupted in the operation of the security system.

The documents, including drawings and commercial documentation, may be submitted on an electronic data carrier. The Certification Institute has access to the items mentioned at the Test Institute at all times. Of course, the Certification Institute will handle the information confidentially.

2 TECHNICAL DEFINITIONS

2.1 *Technical definitions*

Ex-factory: a system that is built in in the factory or in a factory environment.

After-market: a system, or part of a system, that is installed after the vehicle has been delivered.

Acoustic warning: an audible warning produced by a siren.

Alarm mode: a condition in which the security system's acoustic and optical warnings are operating.

Alarm system: an electronic security system for passenger cars with a maximum battery voltage of 24 V DC, at least consisting of a Central Control Unit (CCU), a siren, perimeter and interior detection, and a switching on and off system, switch(es) suitable for bonnet/ boot lid/ hatchback, a cable loom and an optical indicator of the system condition. In addition, the user instructions and (if not installed ex-factory) the installation instructions.

Immobilising mode: a condition in which the isolator circuits of a system are engaged.

Immobiliser system: an electronic immobiliser system for passenger cars with a battery voltage of max. 24 V DC, at least consisting of a CCU, a switching on and off system, a cable loom and an

optical indication of the system condition (only AM systems). In addition, the user instructions and (if not installed ex-factory) the installation instructions.

CCU: Central Control Unit of an alarm or immobiliser system.

DATA BUS: a digital system in a vehicle through which various messages can be sent. There can be various types of DATA BUS signal, such as Low speed CAN-BUS, High-speed CANBUS and Single wire CAN-BUS.

Detection: technical method for detecting theft, or an attempt to sabotage the vehicle, with the objective being to steal it or to steal something from it.

Inclination detection: a system that detects changes in the inclination of the car.

MO: Modus Operandi: manner in which a vehicle is sabotaged/stolen.

Perimeter detection: detection that is activated by switches as soon as one of the doors, the bonnet, the boot lid or the hatchback is opened.

Unlocking: pressing a key on the handset / key or contact in door handle for keyless entry so as to disengage the central door lock.

Opening: physically opening the door, boot lid or bonnet.

Driving mode: the condition in which the entire system is switched off and the vehicle can be driven.

Interior detection: detection in the interior that reacts if access is gained to the interior, or when there is movement in the interior in the manner described in these regulations.

Warning: optical and acoustic alarm.

Status change: when the system passes from monitoring mode into, for example, alarm mode. All mode changes are status changes.

Trigger: any form of input to the alarm which would lead directly to the alarm condition when the system is activated.

Monitoring mode: condition in which the entire alarm system including isolator circuits is switched on. A change in status of one of the detection inputs will cause an alarm.

3 SECURITY SYSTEM CLASSIFICATION

3.1 ***Immobiliser (Class 1)***

Consisting of a system with two automatically engaged isolator circuits that both ensure that the vehicle cannot move under its own power:

- at least two isolator circuits

If the motor management system is isolated ex-factory, this is seen as a double isolator circuit. Please refer to table 1 with regard to the application of isolator circuits during system installation/registration.

3.2 Alarm system (Class 2)

Consisting of a Class 1 immobiliser, double detection and alarm:

- immobiliser in accordance with Class 1
- perimeter detection
- interior detection
- acoustic warning from a siren with a coded battery back-up power supply
- optical warning

The automatic engagement of the alarm system is allowed. Please refer to table 1 with regard to the application of isolator circuits during system installation/registration.

3.3 Alarm system with inclination detection (Class 3)

Consisting of a Class 1 immobiliser, threefold detection and alarm:

- immobiliser in accordance with Class 1
- perimeter detection
- interior detection
- inclination detection
- acoustic warning from a siren with a coded battery back-up power supply
- optical warning

The automatic engagement of the alarm system is allowed. Please refer to table 1 with regard to the application of isolator circuits during system installation/registration.

Table 1: Application of isolator circuits

	Ex-factory VbV/SCM	**Ex-factory EU approval**	**After-market**
Unapproved analogue vehicle (e.g. Volvo Amazon) or Vehicle unapproved in EU (e.g. BMW 3 series from US)	No	No	Install 2 x isolator circuits
Vehicle only approved in Europe (e.g. Ferrari)	No	Yes	Install 1 x isolator circuit
VbV/SCM without own authorisation (old class 1) and European approval (e.g. VW Golf 6)	Yes (old)	Yes	Install 1 x isolator circuit
VbV/SCM (with own authorisation) new class 1 and European approval (e.g. VW Golf 8 in the future)	Yes (new)	Yes	Install no additional isolator circuits

4 REQUIREMENTS FOR THE SWITCHING OFF OF AFTER-MARKET SYSTEMS

These type approval test regulations mean that it will no longer be permitted to submit for type approval an After-Market security system which is switched off by listening to the DATA BUS signal from the vehicle.

This change is intended to eliminate the possibility of vehicle manipulation by means of new modus operandi. This includes:

1. Manipulation via the DATA BUS outside the vehicle (via the wiring) or inside the vehicle (e.g. via the OBD).

2. Extension of the signal from the remote control handset for the vehicle. The latter applies to vehicles equipped with “keyless entry”, “keyless go” and “start/stop” functions. The extension of the signal from the remote control handset is applicable to remote control handsets (so-called “smart keys”) which do not have to be actively operated in order to be able to unlock and/or start the vehicle.

After-market security systems which meet the requirements laid down are allowed to carry the **“own authorisation”** qualifier. The text **“own authorisation”** will be stated on the type approval certificate for the system concerned and on the (installation) certificate of the vehicle to be certified.

4.1 ***Requirements for the switching off of after-market systems***

4.1.1 Each after-market security system must be deactivated through own authorisation.

4.1.2 A 15-second trigger delay is permitted under the following conditions:

4.1.2.1 This delay is activated by the OE unlocking command (possibly via the DATA BUS). No maximum duration applies to the subsequent status.

a. Renewed locking via OE remote will cancel this status; own authorisation is not required.

4.1.2.2 Both the opening of the vehicle and any other trigger will move the system to a second status.

a. The maximum duration of this status is 15 seconds.
b. Before the end of this period, “own authorisation” must be effected via “own authorisation” of the alarm system (not via the DATA BUS).
c. If **no** “own authorisation” is obtained at the end of this period, the alarm mode will be activated.
d. The start block may not be lifted until “own authorisation” has been granted. The block must be designed in such a way as to make it impossible for the vehicle to move under its own power.
e. This process must be irreversible. Renewed locking will no longer eliminate the “own authorisation” requirement.
f. This also applies to attempts to open the bonnet separately/exclusively.

4.1.3 Following “own authorisation” the alarm system will be switched off and the block can be lifted.

4.1.4 If a passive method such as a driver card, transponder or code key is used to switch off the After-Market system through “own authorisation”, then the following stipulations must be met:

4.1.4.1 The security system must not be switched off through “own authorisation” until the OE unlocking command has been received by the vehicle (and therefore the After-Market system).

4.1.4.2 If the “own authorisation” device is left behind in the vehicle while a cycle (of switching off and locking vehicle – unlocking vehicle and switching on) is being completed, the security system must be able to register that.

4.1.4.3 If contact between the system and “own authorisation” has not been broken for 3 cycles, the system must disregard “own authorisation” until contact with the “own authorisation” device has been broken for at least 1 minute or “own authorisation” is confirmed by means of a user action. This is to prevent the “own authorisation” device (such as a driver card, transponder or code key) from being left in the vehicle.

4.1.4.4 If one of the above-mentioned passive methods is used to switch off the after-market system, the maximum distance between it and the vehicle concerned is three metres.

4.1.4.5 The wireless “own authorisation” signal is to be protected against relay attack (the extension of the signal).

5 REQUIREMENTS RELATING TO THE RESISTANCE OF SECURITY SYSTEMS AGAINST ATTACK

As a result of a number of developments relating to the modus operandi, additional requirements now apply to security systems. If it is found that all or part of the security system can be deactivated or bypassed by (new) methods of attack, then the security system will have its approval revoked or will not be granted approval.

In order to be able to establish whether or not a certain security system still meets the requirements laid down, the Board of Experts has drawn up a procedure to be implemented by the Certification Body. That procedure has been attached to these type approval test regulations as an appendix and will come into force on 1 January 2015.

The following requirements apply based on the methods of attack currently known about:

5.1 It must not be possible for the security system to be deactivated or bypassed by a method of attack which involves extending the signal from the remote control handset. That method of attack, which is also known as relay attack or “relaying”, is used on vehicles with a so-called smart key, keyless entry/keyless go functionality or vehicles with start/stop systems.

5.2 An attack via the Data Bus, the OBD plug (from outside or inside) or a wireless connection to the vehicle must never result in the unauthorised deactivation or bypassing of all or part of the security system.

6 USE OF THE EX-FACTORY CLASS 1 IMMOBILISER 1

6.1 *Conditions*

6.1.1 It is allowed to use the present Class 1 ex-factory immobiliser as an isolator circuit for the security system under the following conditions:

6.1.2 The ex-factory Class 1 immobiliser must be approved in accordance with these Test Regulations.

6.1.3 If a Class 3 system must be obtained, if the starter motor is not isolated ex-factory, the after-market alarm system must provide an additional isolator circuit that prevents the vehicle from moving under its own power (for instance by isolating the starter motor).

6.2 *Start/stop systems*

6.2.1 Start/stop systems are understood to mean systems where the vehicle stops the engine after it has been idling for a certain time. The start/ stop system must only be able to be restarted when the clutch is fully depressed. This is understood to include the brake pedal in automatic or semi-automatic gearboxes.

6.3 *Hybrid vehicles*

6.3.1 If the vehicle cannot move under its own power when the starter motor is operated, it is unnecessary to separately isolate an additional circuit to obtain Class 3.

6.3.2 For an isolator circuit for these vehicles, it is allowed to isolate the signal wire that operates the gearbox from the brake pedal.

6.4 *Full Electric vehicles*

6.4.1 If full electric vehicles have a Type Approval for the Class 1 immobiliser, it is unnecessary to separately isolate an additional circuit to obtain Class 3.

6.4.2 For an isolator circuit for these vehicles, it is allowed to isolate the signal wire from the brake pedal to the gearbox that releases the gearbox.

7 REQUIREMENTS FOR IMMOBILISERS AND ALARM SYSTEMS

7.1 ***General***

7.1.1 The requirements set in these regulations apply to security systems that are built in (both during manufacture and after delivery of the vehicle) to vehicles of Categories M1, or N1, as defined in Annex II A of Directive 70/156/EEC, intended for the transport of people or goods with a maximum mass of 3500 kg, and fitted with a 12 or 24 Volt battery.

7.1.2 Components of passenger cars that indirectly or directly form part of the security system are considered to be system components and must also be supplied for the Approval Test. Components that are already covered by the vehicle Type Approval do not need to be retested.

7.1.3 If the system or a system component is integrated with equipment intended for other purposes, then this equipment, in so as far as it influences the operation of the system, must meet the test requirements.

7.1.4 If Dutch or European legislation imposes requirements on the system or a system component, then the system or component must also be tested to ensure that they meet or conform to these requirements.

7.1.5 If the security system uses radio waves, for instance for switching the security system on and off, it must comply with the relevant European standards.

7.1.6 The security system must be designed and installed in such a way that every vehicle equipped with it still meets the technical regulations (Type Approval).

7.1.7 The security system must in no way whatsoever be able to jeopardise road safety, in either the activated or de-activated state.

7.1.8 A wireless siren is permitted subject to the following conditions:

7.1.8.1 Communication via two separate frequencies which must be different from the frequencies of the handset.

7.1.8.2 The communication frequency of the wireless siren must be different from the handset frequency.

7.1.8.3 In the event of a wireless communication failure or sabotage while the system is in operation, the system should send out an alarm by means of acoustic and optical signals.

(Note: If a specific attack on the wireless siren (e.g. by jamming) is found to be part of a modus operandi linked to vehicle break-in or theft, the VbV Board of Experts reserves the right to take the necessary prevention measures which may include modifying or tightening this proposal).

7.1.9 The use of systems where the central control unit is integrated in the siren (so-called compact systems) is permitted.

7.1.10 If a siren is not installed in the safe area (e.g. in a wheel arch), the following requirements will apply:

7.1.10.1 The system is to send out an alarm if the siren can be reached by hand with a tool or

7.1.10.2 The siren must be fixed in such a way that the siren cannot be deactivated within 5 minutes without an alarm sounding.

7.2 ***General design requirements***

7.2.1 The wiring of the following connections must emerge from the central unit of the system in one strand and must have the same thickness and colour: +30, -31, +15 and the cabling for the isolator circuits. (This does not apply to Ex-factory systems).

7.2.2 This housing when closed must screen the connector of the +30, -31, +15 and the isolator circuits. This connector must not be accessible from the outside and must not be readable from the outside.

7.2.3 Casting in instead of a steel housing is also allowed under the same conditions as mentioned in the sections above.

7.2.4 The use of an external relay to realise isolator circuits is allowed, as long as it has a coded link to the central unit.

7.2.5 All system components must meet the Approval test requirements and must only be delivered complete. The type markings and/or the brand name under which the Approval has been issued must be clearly stated on the main, not externally visible, component(s) while the externally visible parts (e.g. sensors) must not be visibly marked.

7.2.6 The printed circuit board or the housing of the CCU and the siren must be marked with a production code. This can also be done in the software.

7.2.7 The system must be supplied with user instructions and installation instructions, tailored to the delivered system and must at least be in Dutch.

7.2.7.1 The user instructions should at least include:

- operating conditions
- operating instructions
- the prevention of unnecessary warnings
- how to act in the event of malfunction/defects
- overview of the user-relevant system components

7.2.7.2 The installation instructions should at least include:

- a plan of the system components
- installation and connection diagrams
- tests with checklist
- troubleshooting
- an overview of the system components

7.2.8 The CCU must be designed such that it meets the installation requirements of the VbV. For the latest version of the installation requirements, see the VbV website.

7.2.9 The design requirements mentioned above as stated in sections 7.2.1 to 7.2.8 inclusive only apply in part to ex-factory systems. The Certification Institute will determine what does and what does not apply, in consultation with the supplier of the system.

7.2.10 The use of an anti-kidnap or anti-panic button, to operate the optical and/or acoustic warnings when in the driving, immobilising or monitoring mode is only allowed if it is fitted in the vehicle. This function may also be used to operate the horn.

7.3 ***General performance requirements***

7.3.1 Components and functionality that are connected to or used on the security system and that are not described in these Test Regulations, do **not** form part of the Approval of the product.

7.3.2 The security system is only allowed to write signals to the DATA BUS of the vehicle if a written statement is supplied from the official importer or the manufacturer of the vehicle that states that the supplier of the alarm system concerned is allowed to write such signals to the DATA BUS. In no other case is a system allowed to write onto the vehicle's DATA BUS. If this stipulation is not adhered to and data is written, this can lead to the withdrawal of the security system's approval.

7.3.3 Sabotage of the interior detection system must result in an alarm.

7.3.4 In the immobilising, monitoring or alarm mode, the (re)programming or replacement of (parts of) the system must not lead to a change in the status of the system.

8 SWITCHING ON/OFF

8.1 ***Design requirements for switching on/off***

8.1.1 All security systems must be able to be switched off by a second (permitted) method, which is connected by wiring and mounted in the vehicle. This does not apply to ex-factory systems including transponders in vehicles for which the manufacturer guarantees a mobility system that works in Europe.

8.1.2 The isolator circuits of the security system must switch on automatically.

8.1.3 The alarm section of the system may switch on automatically, or be switched on by means of the same operating system as that of the switching off method.

8.1.4 The alarm system must be fitted with an optical indicator (e.g. LED) that indicates whether the system is in the driving, immobilising or monitoring mode. This indicator is designed or can be installed in such a way that it is clearly visible from outside and from the driver's seat of the vehicle.

8.2 ***Performance requirements for switching on/off***

8.2.1 It must be impossible to switch the system into the immobilising, monitoring or alarm mode when the engine is running or when the ignition switch of the vehicle is on.

8.2.2 The isolator circuits must switch on automatically within sixty (60) seconds of the engine being switched off.

It is also allowed for the isolator circuits to switch on 10 minutes after the engine has been switched off. This applies on condition that the isolating circuits switch on within 60 seconds after the door is opened when the engine is switched off.

8.2.3 If after switching off the isolator circuit the starting circuit is not activated within two (2) minutes, the isolator circuit should automatically switch on again immediately.

8.2.4 Within sixty (60) seconds after switching on the alarm system it must be in the monitoring mode, calculated from the moment that all actions have been taken to switch on the system.

8.2.5 Switching the alarm system on and off can be made visible from outside of the vehicle for a maximum of three seconds via the existing direction indicators of the vehicle. (95/56/EU section 9.9.2)

8.2.6 The security system may only be switched off in an authorised manner.

8.2.7 If the interior detection and/or the inclination detection can be switched off separately by the user, this may only be done before or within 60 seconds after the system is switched on.

8.2.8 If the alarm system can be partially switched off within 60 seconds by opening a door or boot lid (in an unauthorised manner), then this part of the alarm system must be fully switched on again after the door or boot lid concerned is closed.

8.2.9 It must be impossible to generate the correct code to switch off the system within twenty-four (24) hours with a higher probability than one tenth (0.1)%.

8.2.10 After each use of the remote control handset, the code used to switch off the system must change. For this purpose, a randomly chosen code key, with a minimum size of sixty-four (64) bits, must be used.

8.2.11 Transponder keys are considered to be remote controls and therefore they must meet the same (statutory) requirements. Removing the transponder from the key must result in permanently visible damage.

8.2.12 A code panel must offer at least 10,000 codes. It must be impossible to generate the correct code to switch off the system within twenty four (24) hours with a higher probability than one tenth (0.1)%.

8.2.13 Short circuiting or other interference with the (wiring to the) code panel must not result in the isolator circuits being switched off.

8.2.14 If the system is supplied with a standard delivery code for the code panel that must be changed by the customer, this delivery code may only be able to be used ten (10) times.

8.2.15 The number of codes available on electronic code keys must be at least 50,000 to make it impossible to generate the correct code to switch off the system within twenty-four (24) hours with a higher probability than a tenth (0.1)%.

8.2.16 Short circuiting or other interference with (the wiring from and to) the code key receiver must not result in the isolator circuits being switched off.

8.2.17 Switching off procedures that are designed to switch off the system in any way other than the usual manner must meet the same requirements related to the security value as the standard methods of switching off.

9 WARNING SYSTEMS

9.1 ***Design requirements for warning systems***

9.1.1 The electronic siren must meet EU 95/56 with a minimum level of 105 dB(A), whereby the sound level must be measured at the end of the durability test and the corrosion test.

9.1.2 The connection between the central unit and the acoustic warning device must be made through a coded signal. In addition, for ex-factory systems, if the siren is located in an unprotected zone, every interruption of the +30, -31 wires and the code wire of the siren in the monitoring mode must lead to an alarm.

9.1.3 For the optical warning, use must only be made of the direction indicators / flashlights already present on the vehicle.

9.2 ***Performance requirements for warning systems***

9.2.1 Interference with the (additional) inputs or outputs of the security system that are present on the outside of the vehicle must not lead to more than one alarm cycle (consider an additional detection loop linked to a caravan that can then only give 1x alarm at most).

9.2.2 In the monitoring or alarm mode it must not be possible to switch off the system and/or the battery backed-up siren by shunting or interrupting one or more wires from or to the siren.

9.2.3 In the monitoring and alarm modes it must not be possible in a system with a battery backed-up siren to remove the fuses that protect the CCU and the siren without at least an acoustic warning being given.

9.2.4 If the wiring to the siren is interrupted during monitoring or alarm mode, the isolator circuits must remain in operation.

9.2.5 The warning section must in no way whatsoever influence the isolator circuits. During monitoring mode, the alarm mode is immediately triggered as soon as a detector detects something. This applies from sixty (60) seconds at most after the alarm system is switched on.

9.2.6 In the alarm mode, both the acoustic and the optical warnings should immediately start to operate.

9.2.7 With the exception of detection by the perimeter detectors, the alarm signal must not operate less than eight (8) times within the same period that the system is switched on.

9.2.8 When the authorised user switches off the system, the alarm mode must immediately switch to the driving mode.

9.2.9 The acoustic warning must at least be created by an approved electronic siren with a battery back-up power supply.

9.2.10 The acoustic warning is immediately activated in the alarm mode for a minimum of twenty-five (25) and a maximum of thirty (30) seconds.

9.2.11 At the end of an alarm cycle, the system must automatically return to the monitoring mode with the reset time not being more than fifteen (15) seconds.

9.2.12 In the monitoring and alarm modes it must not be possible to take the battery backed-up siren out of operation without it being activated for a minimum of five (5) minutes or for a minimum of ten (10) cycles of twenty-five (25) seconds.

9.2.13 If the status of one and the same input of the CCU does not change, the acoustic warning is limited to one (1) cycle of at least twenty-five (25) and at most thirty (30) seconds.

9.2.14 The capacity of the battery back-up power supply for the siren must be sufficient to allow the siren to operate for at least five (5) minutes with the maximum drop in sound level being two (2)%.

9.2.15 In the alarm mode, the optical warning is triggered immediately for at most five (5) minutes.

9.2.16 The minimum duration of the optical warning is determined by the duration of the acoustic warning(s) (25 - 30 seconds per warning).

9.2.17 Warning overview table:

	Duration	**Frequency**	**Total number**	**Number per status**	**Strength**
Optical	25-300 s	1-3 Hz	1 cycle of 300 sec, or 10 of 30 sec	1 if status of the input does not change	Using original direction indicators
Acoustic	25-30 s	1-3 Hz	Max 10 cycles except for perimeter protection	1 if status of the input does not change	105 – 118 DbA at 1 metre
Interval	0-15 s	N/A	N/A	N/A	N/A

10 ISOLATOR CIRCUITS

10.1 ***Performance requirements for isolator circuits***

10.1.1 During and after the 01 to 10 s interruption of the +30 or +15 connection to the system in the driving mode, only the isolator circuit of the immobiliser can change in status.

10.1.2 If the system is in the monitoring mode, it must be impossible to change the status of the isolator circuits by interrupting the +30 and/or +15 and/or -31.

10.1.3 In the driving condition, it must be impossible for the system components that realise the isolator circuits to change status in the event of variations in the nominal battery voltage of +/- 25%.

10.1.4 It must remain possible to switch the isolator circuits on and off at battery voltages between seven (7) and fifteen (15) V (for 12 V nominal systems), respectively between eighteen (18) and thirty (30) V (for 24 V nominal systems).

11 POWER SUPPLY AND WIRING

11.1 ***Design requirements for the power supply and wiring***

11.1.1 The power supply of the system must be provided by the vehicle's battery.

11.1.2 The system must have wiring that allows it to be soundly installed in the vehicle.

- the diameter of the wiring for the isolator component (+30, -31, +15 and 4 isolator wires) must be at least 1 mm^2
- the wiring of the isolator component (+30, -31, +15, and 4 isolator wires) must be of the same length, diameter and colour.

The wiring design requirements mentioned above do not apply to ex-factory systems or to systems that supply a specific wiring loom for a certain brand and type of vehicle.

11.2 ***Performance requirements for the power supply and wiring***

11.2.1 The power consumption of the entire security system when in the immobilising and monitoring modes must be limited to a maximum of thirty (30.0) mA.

11.2.2 For immobilisers (Class 1), the power consumption must be limited to a maximum of twenty (20 mA).

11.2.3 The system must not become defective or stop working in the event of a short circuit of the acoustic and/or optical warning or other accessories to be connected to the CCU.

11.2.4 The system's status must not change after or during the earth connection (-31) or the power supply (+30) to the system being interrupted for a minimum of five (5) times in the immobilising, monitoring or alarm mode with the interruption times varying between a half (0.5) second to at least one (1) minute.

12 DETECTION

12.1 ***Design requirements for detection***

12.1.1 The perimeter and interior detection must operate independently of each other and must not influence each other's operation.

12.1.2 The perimeter detection must have two detection inputs that work independently of each other.

12.1.3 Inclination detection is effected through sensors that respond to the change in inclination of the vehicle with respect to the parked position. This applies to changes in both the longitudinal and transverse direction.

12.1.4 Interior detection must be effected through sensors to be installed in the interior.

12.1.5 Perimeter detection is implemented using the (original) switch contacts of doors, boot lid and bonnet. If the original switches cannot be used, switches must be used that are approved in accordance with these Test Regulations. The supplier of the security system must supply these switches.

12.1.6 At least one bonnet switch must be tested for the perimeter detection.

12.2 ***Performance requirements for detection***

12.2.1 Voltage drop, shock and vibration detection are not allowed.

12.2.2 Every event detected by the perimeter detection when in the monitoring mode must trigger the alarm mode, with a minimum of 8 times.

12.2.3 Every disruption of the interior detection when in the monitoring mode must trigger an alarm, up to a maximum of 10 times.

12.2.4 The use of adjustable sensors is only allowed if they are not simple to adjust and if they can only be adjusted using tools.

12.2.5 Every event detected by the inclination sensor(s) when in the monitoring mode must trigger the alarm mode, up to a maximum of 10 times.

12.2.6 The change in inclination of the vehicle to be detected must be at least four (4)% = 4 cm difference per metre (2.3 °). The position of the vehicle must not influence the inclination detection.

12.2.7 Inclination detection only needs to be switched on after the vehicle has come to a complete standstill (hydroactive suspension), up to a maximum of 10 minutes.

12.2.8 Every event detected by the glass break sensor(s) when in the monitoring mode must trigger the alarm mode, up to maximum of 10 times.

12.2.9 Glass break sensors must not cause unnecessary alarms.

13 DESCRIPTION OF THE TESTS

13.1 ***General***

13.1.1 The sequence of the tests to be performed is determined by the Test Institute.

13.1.2 The system components will be tested in the form in which they are fitted and supplied.

13.1.3 The positioning of the system components during the tests to be carried out is determined by the Test Institute and, if possible, in accordance with the installation instructions. If the manufacturer has special wishes, it must be demonstrated that when installing, the position in which the tests have been carried out is retained.

13.1.4 System components will be tested in accordance with the test matrix.

13.1.5 During each test, no unnecessary alarms must be caused and the system must not change status other than in the usual or intended manner.

13.1.6 At the completion of each test, the system components must operate in accordance with the manufacturer's specifications and no deformations and/or changes must have occurred that can negatively influence the operation of the system components at that moment or in the course of time.

13.2 ***13.2 Test descriptions***

13.2.1 **T1** Vibration and shock test:

The frequency shall be variable from 10 Hz to 500 Hz with a maximum amplitude of ± 5 mm and a maximum acceleration of 3 g (peak value). EU 95/56, section 5.2.8.2.1

For components fitted to the engine:
The frequency shall be variable from 20 Hz to 300 Hz with a maximum amplitude of ± 2 mm and a maximum acceleration of 15 g (peak value). EU 95/56, section 5.2.8.2.2

13.2.2 **T2** Cold test

Temperature	T = - 40 °C ± 2 °C	
Voltage	U = 9 V ± 0.2 V	
Acclimatisation time	t = 4 hours	EU 95/56, Section 5.2.2.1

13.2.3 **T3** Heat test

For components that are installed in the passenger or luggage compartment:

Temperature	T = 85 °C ± 2 °C	
Voltage	U = 15 V ± 0.2 V	
Acclimatisation time	t = 4 hours	EU 95/56, Section 5.2.2.2

13.2.4 **T4** Heat test with condensation

Resistance to weather conditions
Seven days in accordance with IEC 68-2-30-1980 EU 95/56, section 5.1.3

13.2.5 **T5** High heat test (for components under the bonnet)

Temperature T = 125 °C ± 2 °C

Voltage U = 15 V ± 0.2 V
Acclimatisation time t = 4 hours EU 95/56, Section 5.2.2.3

13.2.6 **T6** Voltage reduction

It shall be verified that slow reduction of the main battery voltage by continuous discharge of 0.5 V/h down to 3 V does not cause false alarms. EU 95/56, section 5.2.14

13.2.7 **T7** Power supply voltage test

Power supply voltage tests in accordance with ISO 7637-2 (2004).
For the description see Chapter 21. ISO 7637-1

13.2.8 **T8** HF radiation (EMC)

High-frequency emission tests in accordance with 2004/104/EC, latest version 2009/19/EC.

The test levels have been amended:
For Current Injection tests the test level is 100 mA
For Radiated Immunity the test level is 100 V/m
For the description see Chapter 22. EU 2004/104/EC
as last amended by EU 2009/19/EC

13.2.9 **T9** Durability test:

Test method per cycle: 20 times on and off
Number of cycles: 250
Warning condition: driving, immobilising, monitoring and alarm mode
Test conditions: 1 alarm per cycle

13.2.10 **T10** Corrosion test:

Test method per cycle: conditioned test room
System components: intended to be fitted outside of the interior
Time per cycle: 144 hours
Number of cycles: 1
Test conditions: NEN-EN-ISO9227

13.2.11 **T11** Sound level test:

Measure in accordance with EU 95/56, after corrosion and duration test.
Min. 105 dB(A), max. 118 at a distance of 2 metres from separate siren.
(85% at 1 metre for installed systems) EU 95/56, section 9.2.3.2

13.2.12 **T12** Drop test:

Test method per cycle: free fall on to concrete floor
Number of cycles: 50
Test conditions: falling height 1 metre

13.2.13 **T13** Interior detection:

The alarm must 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 ° relative to the longitudinal median plane of the vehicle EU 95/56, Section 5.2.11

It must be verified that an impact of up to 4.5 Joules of a hemispherical body with 165 mm in diameter and a hardness of (70 ± 10) Shore A applied anywhere to the vehicle bodywork or glazing with this curved surface does not cause false alarms. EU 95/56, section 5.2.13

The system, installed according to the manufacturer's instructions, must not be triggered when subjected 5 times to the test described in item 5.2.13 at intervals of 0.5 s.

The presence of a person touching or moving around the outside of the vehicle (windows closed) must not cause any false alarm. EU 95/56, section 5.2.15

13.2.14 **T14** Inclination test:

Up to the Test Institute

14 TYPE APPROVAL TEST MATRIX

Component	Test module													
	T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**T10**	**T11**	**T12**	**T13**	**T14**
	Vibration and shock test	Cold test	Heat test	Heat test with condensation	High heat test	Voltage reduction	Supply voltage test	HF-radiation test (EMC)	Durability test	Corrosion test	Volume test	Impact damage test	Interior detection	Inclination test
Entire system	X	X	X	X		X	X	X	X				X	
Bonnet switch										X				
Remote control handset		X							X			X		
Siren	X	X	X	X	X	X	X	X	X	X	X			
Inclination sensor	X	X	X	X		X	X	X						X
Components in the motor	X	X	X	X	X	X	X	X	X	X				

15 RE-APPROVAL TEST MATRIX

Component	Test module													
	T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**T10**	**T11**	**T12**	**T13**	**T14**
	Vibration and shock test	Cold test	Heat test	Heat test with condensation	High heat test	Voltage reduction	Supply voltage test	HF radiation test (EMC)	Durability test	Corrosion test	Volume test	Impact damage test	Interior detection	Inclination test
Block 1		X	X	X										
Block 2					X					X	X			
Block 3									X					X
Block 4						X							X	
Block 5							X							
Block 6								X						
Block 7	X											X		

All Re-approval tests must be preceded by a functional test and a power consumption measurement. After performing the above tests, the system must still meet the functional requirements of these regulations, with the exception of the T7 Supply voltage test.

16 POWER SUPPLY VOLTAGE TESTS (T7)

Electrical transient conduction along supply lines only

The Electrical transient conduction along supply lines only tests shall be carried out in accordance with the standard ISO 7637-2 (2004). For the Electrical transient conduction along supply lines only tests, the following test specifications apply:

Requirements

Test pulse number

Test pulse number	Immunity test level IV		Functional status classification
	12V systems	24V systems	
1	-100	-600	C
2a	+50	+50	B
2b	+10	+20	C
3a	-150	-200	A
3b	+100	+200	A
4	-7	-16	B (for EUT which must be operational during engine start phase) C (for other EUTs)
5b	+87	+173	C

General classification of functional status

Class A: all functions of a device/system perform as designed during and after exposure to disturbance.
Class B: all functions of a device/system perform as designed during exposure. However, one or more of them may exceed specified tolerance. All functions return automatically to within normal limits after exposure is removed. Memory functions shall remain class A.
Class C: one or more functions of a device/system do not perform as designed during exposure but return automatically to normal operation after exposure is removed.

17 EMC TESTPROCEDURE (T8)

Based on 2004/104/EC, as last amended by 2009/19/EC.

Method of measurement of the susceptibility of security systems passenger cars to electromagnetic radiation and the susceptibility of electrical transient conduction along supply lines only.

General

The system shall comply to the following test methods:

1. Bulk current injection testing in the frequency range 20 MHz - 200 MHz

2. Radiated electromagnetic field testing in the frequency range 200 MHz - 2000 MHz

3. Electrical transient conduction along supply lines only

State of system under test

Bulk current injection / Radiated electromagnetic field: The system shall be tested both in activated condition and rest condition, being a simulation of both normal operating conditions.

Electrical transient conduction along supply lines only: The system shall be tested in rest condition, being a simulation of the driving conditions.

Connection of the wiring

The system under test shall be arranged and connected according to its requirements and no additional grounding connections are allowed. The test wiring should simulate, as closely as possible, the real vehicle wiring. All wires should be terminated as realistically as possible.

A special cable for testing purposes (without extra shielding) will be connected between the system and its terminations. This special cable will have a length of about 1.7 m and will be connected directly to the system. For the Electrical transient conduction along supply lines only tests a power supply cable with a length of 0.5 m will be used.

Test signal characteristics susceptibility to electromagnetic radiation

Tests shall be performed using the following modulation:

20 – 800MHz: a continuous wave signal, modulated with a 1 kHz sinus wave at 80% modulation depth.
800 – 2000MHz: Pulse Modulation, t_{on} = 577µs, period = 4600µs.

1. Bulk current injection testing

The bulk current injection tests shall be carried out in accordance with the standards ISO 11452-1 (2005) and ISO 11452-4 (2005). For the bulk current injection tests, the following test specifications apply:

Test method	• Substitution method (calibrated injection probe method)
Test level	• 100 mA (in a 50 Ohm system)
Frequency band	• 20 MHz to 200 MHz
Frequency step size	• 5% of the previous frequency
Frequency mode	• Ramp method (-2 dB)
Dwell time	• Minimal 2 seconds
Modulation type	• 80% AM, 1 kHz sine-wave
Peak conservation	• Yes, peak power conservation
Injection probe distance to EUT	• 150 mm
Calibration mode	• Forward power
Supply voltage	• 12 VDC or 24 VDC
Ambient temperature	• 23 (+/-5) degrees Celsius

2. Radiated electromagnetic field testing

The radiated electromagnetic field tests shall be carried out in accordance with the standards ISO 11452-1 (2005) and ISO 11452-2 (2004). For the radiated electromagnetic field test, the following test specifications apply:

Test method	• Substitution method
Test level	• 50 V/m
Frequency band	• 200 MHz to 2000 MHz
Frequency step size	• 200 – 400MHz: 5% of the previous frequency
	• 400 – 2000MHz: 2% of the previous frequency
Antenna Polarisation	• Vertical
Frequency mode	• Ramp method (-2 dB)
Dwell time	• Minimal 2 seconds
Modulation type	• 80% AM, 1 kHz sine-wave
Peak conservation	• Yes, peak power conservation
Height of EUT above ground plane	• 50 mm
Antenna distance to wiring harness	• 1 m
Calibration mode	• Forward power
Supply voltage	• 12 VDC or 24 VDC
Ambient temperature	• 23 (+/-5) degrees Celsius

APPENDIX: Certification Agreement

The undersigned declare this agreement to be applicable with the intention to guarantee the quality of security systems supplied under the approval label in conformity with the requirements as laid down in the Homologation Directive AA04.

To that end the Certification Institute (NAME CERTIFICATION INSTITUTE) and the supplier/approval holder lay down the following arrangements:

Both parties shall adhere to what is stated in this Directive AA04 with reference to Directive AB04, more specifically the Administrative Stipulations and Approval Conditions.
The supplier shall keep records of all complaints made known to the supplier relating to the compliance of the products with requirements laid down in the relevant standards. These records shall be accessible upon request to the Certification Institute and contain the actions taken by the supplier.

On behalf of maintenance, inspection and publications per approval number a yearly fee is mandatory.

In the event of non-fulfilment of one or more of the above-mentioned obligations, the following sanctions may be imposed:

Withdrawal of the type approval
Mandatory recall of the denounced products from the market.
Removal of the product from the List of approved products.

This agreement is governed by Dutch law.

Legal disputes that cannot be settled amicably shall be submitted to the relevant court in Rotterdam.

Stated and signed in triplicate,

	On behalf of NAME of CERTIFICATION INSTITUTE	On behalf of the supplier	On behalf of the approval holder
Date	. . . . .	. . . . .	. . . . .
Place	. . . . .	. . . . .	. . . . .
Name	. . . . .	. . . . .	. . . . .
Job title	. . . . .	. . . . .	. . . . .
Signature	. . . . .	. . . . .	. . . . .
Company name	. . . . .	. . . . .	. . . . .

APPENDIX: Procedure for assessing resistance against attack

Organisation

The Board of Experts has delegated the task of establishing whether or not a security system still meets the requirements laid down with regard to resistance against attack to the committee for the assessment of resistance against attack (CBA).

That committee is made up of the following parties:
- representatives from the Police
- representatives from Stichting VbV
- representatives from Kiwa SCM

If the committee considers it necessary, experts can be brought in on an ad hoc basis from the Board of Experts and external national or international parties such as investigation bureaus or test bodies.

Decisions made by the CBA must be unanimous. If a unanimous decision cannot be reached, the case in question must be presented to the Board of Experts.

Determination, follow-up actions and deadlines

In order to establish that a security system no longer meets the requirements for resistance against attack (the requirements as referred to in chapter 5 of the Type Approval Test Regulations AA04), the following conditions must be met:

- The police must have established that the method of attack has been used to steal vehicles and must have reported this to the CBA.

- If tools have been used for the method of attack, these must also have been seized, investigated further and identified by the police.

- If tools have been used for the method of attack, these must be freely available or it must be possible for them to be developed.

- The CBA will establish the vehicles on which this method has been used and if necessary detail the Make, model, type, year of manufacture, etc.

- If the method has been used on a specific make/model/type of vehicle, further implementation of this procedure shall only take place if there is a high risk of theft of those (secure) vehicles. The criteria relating to the level of the risk of theft in such a case will be established by the Board of Experts.

- The CBA will verify whether or not that method of attack is also practically feasible and can be used on a large scale.

If the method of attack meets the requirements laid down, the Certification Body will draw up a report confirming the above-mentioned points. That report will be sent to the manufacturer(s) and/or importer(s) of the relevant vehicles.

The 3-month period within which the manufacturer and importer will be required to develop and implement a solution in respect of the method of attack found will start when this report is issued.

The manufacturer or importer must submit a report detailing the solution for the method of attack in question within 3 months. That report must also specify the vehicles (make, type and possibly model) for which the solution is being offered. In the process, the date on which the modification will come into force must be specified, along with the chassis number and date of production from which that modification will be included in production.

That report will be submitted for assessment to the Certification Institute which will then make a decision regarding approval.

An example of the above-mentioned report is shown below:

Established MO		
Method		
The lock of the driver's door is manipulated and access is then gained to the vehicle. Once inside the vehicle, a laptop is connected to the OBD connector. Once this has been connected, a blank key is read in which the vehicle recognises as an original key after programming. This blank key is used to start the vehicle.		
Name of the tools used	Make	Type
Master key	*Gedore*	*Key 1*
Laptop	*HP*	*ACP2025*
Edilock software	*Edilock*	*Programming tool 1.1 for BMW, Mercedes and Audi.*
Blank key	*Edilock*	*BMW 5 series blank*
Vehicle for which the MO was established		
Make	Type	Chassis number (from/to)
BMW	*525 touring (E61)*	*WBD12325gft11111111*
Vehicles to which this MO still applies (to be filled in by the importer/manufacturer)		
BMW	*1 series from 2007 (E71)* *3 series from 2000 (E46, E47)*	*WDBA12345KL12345 to WDBA12345KL99999 inclusive*
Manufacturer's solution (to be filled in by the importer/manufacturer)		