

3. Security System Requirements

The requirements set for various system types may differ, depending on the application. For this reason, the system requirements have been divided into three categories:

- 3.1.** Original-Equipped (OE) systems
- 3.2** After-market systems

3.1. ORIGINAL-EQUIPPED (OE) SYSTEMS

3.1.1 Categories

M1

The M1 is a system that activates automatically and stops the engine from transporting itself, without detection or alarm:

- Disables the motor management system +
- Attack-proof for at least 3 minutes

M2

The M2 is a system that activates automatically and stops the engine from transporting itself, with an alarm that runs on emergency power, including tilting detection.

- Immobilisation in accordance with the M1 system, tamper-proof for at least 3 minutes +
- Visual alarm +
- Motion detection +
- Acoustic alarm via a siren that runs on emergency power

M3

- An M1 or M2 system, supplemented with a tracking system.

Extras

Engines that are already equipped with M1-class SCM-approved disabling can be fitted with an extra alarm that can be operated using the engine's original remote control.

This Z-alarm includes the following functions:

- Visual alarm +
- Motion detection +
- Acoustic alarm via a siren that runs on emergency power

3.1.2 Tamper-proofing

For a period of 3 minutes, it must not be possible for the system to be sabotaged or manipulated in such a way that allows the vehicle to transport itself independently. To this end, the Test House will carry out an evaluation on the tampering possibilities according to appendix 4.

If the emergency-power siren is tampered with, it must emit a full cycle (25-30 seconds).

The system may not malfunction or cease to operate due to a short circuit in the acoustic and/or visual alarm system, or other accessories to be fitted to the CCS.

During standby or alarm modes, it must not be possible to deactivate the system or the siren with inbuilt emergency power by making or breaking one or more connections to or from the siren.

During and after a minimum of five (5) interruptions to the system's ground connection (-31) or power supply (+30) during immobilisation, standby or alarm modes with disruption times between half (0.5) a second to twelve (12) hours, immobilisation must remain in effect.

For systems with emergency-power sirens, during standby or alarm modes it must not be possible for the fuses that protect the CCS and the siren to be removed without at least an acoustic alarm being sounded.

3.1.3 Technical specifications

During and after a 0.1-10 second interruption to the system's (single-wire) power supply (+30) or ground connection (-31) in driving mode, only the immobilisation circuit for disrupting the starter engine may change status.

The power required by the system must come from the engine's own battery.

Non-rechargeable batteries may be used for the emergency-power siren.

Energy consumption of the system's alarm component in standby mode may not exceed four (4.0) mA.

If a sleep mode is activated in order to save power, ignition disabling and tilt detection must remain active. In such cases, the LED may be turned off.

The system must have at least 2 separate and independently functioning detection networks.

At the end of an alarm cycle, the system must return automatically to standby mode, with a maximum reset time of fifteen (15) seconds.

The alarm component may not influence disabling in any way whatsoever.

The system's alarm component must include a visual alarm that indicates whether the system is in driving mode or standby mode.

3.1.4 Activation and deactivation procedures

3.1.4.1 Activation

The alarm system may be activated in any way.

The immobiliser must activate automatically within thirty (30) seconds of the ignition being turned off.

Within sixty (60) seconds of being activated, the alarm system must enter standby mode, counting from the moment when all actions have been performed to activate the system.

Activation and deactivation of the alarm system may not be visible outside the vehicle for more than 3 seconds.

If a mechanism is used to activate and deactivate the immobiliser that is linked directly to the key (e.g. a transponder key), the immobiliser must be activated upon removal of the physical key or when the ignition is turned off.

Other activation/deactivation methods must possess the same level of security.

3.1.4.2 Deactivation (general)

Immobiliser deactivation may only occur in an authorised fashion.

If after deactivation of the immobiliser circuit, the ignition circuit is not activated within two (2) minutes, immobilisation must activate once again automatically. This does not apply to systems whose switching mechanism is linked directly to the key.

3.1.4.3 Remote control

The remote control has an encrypted transmission signal allowing the use of at least one hundred thousand (100,000) different codes.

The likelihood of generating the correct code to disable the system within a 24-hour period must not exceed one in one thousand (0.1 per cent).

Each time the remote control is used, the deactivation code must be changed by means of a randomly selected code key of at least sixty-four (64) bits in size.

3.1.4.4 Numeric keypads

The number of possible codes must be at least 10,000. The likelihood of generating the correct code to disable the system within a 24-hour period must not exceed one in one thousand (0.1 per cent).

It must not be possible to deactivate the immobiliser by short-circuiting or otherwise manipulating (wires running to and from) the keypad.

If the system is supplied with a default delivery code that may be changed by the customer, this code must cease to work after ten (10) uses.

3.1.4.5 Electronic encryption keys

The number of possible codes must be at least 50,000. The likelihood of generating the correct code to disable the system within a 24-hour period must not exceed one in one thousand (0.1 per cent).

It must not be possible to deactivate the immobiliser by short-circuiting or otherwise manipulating (wires running to and from) the encryption key receiver.

Transponder keys are regarded as encryption keys, and must therefore fulfil the same statutory and other requirements.

Removing the transponder from the key must result in permanent visible damage to the key.

3.1.4.6 Secondary deactivation procedures

Deactivation procedures whose purpose is to deactivate the system in a manner other than the usual manner must fulfil the same security-level requirements as the standard methods.

3.1.5 **Immobilisation**

Immobilisation must be operational during immobilisation, standby and alarm modes, and should be activated automatically.

If the connections to the siren are severed during standby or alarm modes, immobilisation must remain in operation.

While being driven, variations of +/- 25 per cent in the nominal battery voltage may not cause the system components that effect immobilisation to change status.

The activation or deactivation of immobilisation must remain possible at battery voltages of between 6.5 and 7.5, and between 14.5 and 15.5 (for 12V nominal systems).

3.1.6 **Detection**

3.1.6.1 General

Acoustic and visual alarms must be activated via motion detection.

Additional detection by way of towing or flame detection is permitted.

Security detection by drop in voltage is not permitted. If the CCS offers this separately, it must be installed in deactivated status and may not be activated externally to the CCS.

The use of shock and vibration detection as a pre-alarm system is permitted.

3.1.6.2 Motion detection

Any detection by the sensor(s) during standby must activate alarm mode (see also 3.1.7.1).

The sensors must respond to any status changes that bring the engine out of parking mode. This applies both lengthwise and breadthwise.

The position of the engine may not influence motion detection in any way.

Slow changes to the status of the engine (max. 0.2 per cent per second) may not influence motion detection in any way.

3.1.6.3 Towing detection

Any detection by the towing module during standby must activate alarm mode (see also 3.1.7.1).

Towing detection must make use of sensors that respond to wheel rotations of at least one (1) and no more than two (2) revolutions.

3.1.6.4 Pre-alarm (optional)

Any detection by the pre-alarm module during standby must activate alarm mode (see also 3.1.7.1).

The pre-warning system is activated by small sensor movements that may be an indication of attempted theft.

If there is a pre-alarm module, the duration of the acoustic signal must not exceed five (5) seconds, at a maximum volume of seventy (70) dB(A).

3.1.7 Alarms

3.1.7.1 General

Alarm mode must be activated immediately from standby mode as soon as a detector registers input. This shall apply as of no later than sixty (60) seconds after activation of the alarm system.

During alarm mode, both acoustic and visual alarms must be activated immediately.

If the system is deactivated in an authorised fashion, alarm mode must switch immediately to driving mode.

3.1.7.2 Acoustic alarms

The acoustic alarm may only take the form of an electronic siren, which must commence immediately upon activation of alarm mode for a maximum period of five (5) minutes.

The electronic siren must satisfy EU 95/96, with a minimum volume of 105 dB(A) (measured after the duration test and the corrosion test).

The acoustic alarm must be activated during alarm mode with alarm cycles of between twenty-five (25) and thirty (30) seconds.

It must not be possible to deactivate the emergency-power siren without setting off the alarm.

The connection between the central and acoustic alarm systems must operate via an encrypted signal.

The capacity of the siren's emergency power supply must be sufficient to maintain an alarm for at least five (5) minutes with a volume drop of no more than fifteen (15) per cent.

3.1.7.3 Visual alarms

Visual alarms must activate immediately upon entering alarm mode, for a maximum period of five (5) minutes.

The minimum length of the visual alarm is determined by the length of the acoustic alarm(s) (25-30 sec. per alarm).

Visual alarms may only use the indicator lights connected to the engine.

3.1.7.4 Radiographic alarms

The acoustic and/or visual alarm may be combined with a silent alarm using radiographic communication.

This radiographic communication must satisfy the statutory requirements.

3.2. AFTER-MARKET SYSTEMS

3.2.1 Categories

M1

The M1 is a system that activates automatically and stops the vehicle from transporting itself, without detection or alarm:

- E.g. disabling the fuel supply +
- Interrupting the starter engine circuit +
- Tamper-proof for at least 3 minutes

M2

The M2 is a system that activates automatically and stops the vehicle from transporting itself, includes detection, with an alarm siren that runs on emergency power, including tilting detection:

- Immobilisation in accordance with the M1 system, tamper-proof for at least 3 minutes +
- Visual alarm +
- Motion detection +
- Acoustic alarm via a siren that runs on emergency power

M3

- An M1 or M2 system, supplemented with a vehicle tracking system.

Extras

Engines that are already equipped with M1-class SCM-approved disabling can be fitted with an extra alarm that can be operated using the engine's original remote control.

This Z-alarm includes the following functions:

- Visual alarm +
- Motion detection +
- Acoustic alarm via a siren that runs on emergency power.

3.2.2 Tamper-proofing

For a period of 3 minutes, it must not be possible for the system to be sabotaged or manipulated in such a way that allows the vehicle to transport itself independently. To this end, the Test House will carry out an evaluation on the tampering possibilities according to appendix 4.

If the emergency-power siren is tampered with, it must emit a full cycle (25-30 seconds).

The immobilisation component of the security system must be constructed in at least one of the following ways:

- be cast from resin or other material (**permanent**)
- be included in a metal casing and sealed using at least four (4) one-way screws or similar tamper-proof protection.

The CCS must include at least two installation possibilities.

The wiring for the immobilisation component (-31, +15, +30 and immobilisation wires) must be included in a single cable of identical thickness, with colour or numerical coding that is removed after installation.

The system may not malfunction or cease to operate due to a short circuit in the acoustic and/or visual alarm system, or other accessories to be fitted to the CCS.

During standby or alarm modes, it must not be possible to deactivate the system or the emergency-power siren by making or breaking one or more connections to or from the siren.

During and after a minimum of five (5) interruptions to the system's ground connection (-31) or power supply (+30) during immobilisation, standby or alarm modes with disruption times between half (0.5) a second to twelve (12) hours, immobilisation must remain in effect.

For systems with emergency-power sirens, during standby or alarm modes it must not be possible for the fuses that protect the CCS and the siren to be removed without at least an acoustic alarm being sounded.

3.2.3 Technical specifications

3.2.3.1 General

During and after a 0.1-10 second interruption to the system's (single-wire) +30 or -31 connection in driving mode, only the disabling circuit for disrupting the starter engine may change status.

The power supply to the system must come from the vehicle's own battery.

Non-rechargeable batteries may be used for the emergency-power siren.

Energy consumption of the system's alarm component in standby mode may not exceed four (4.0) mA. A maximum of three (3) mA applies to Z systems.

If a sleep mode is activated in order to save power, ignition disabling and tilt detection must remain active. In such cases, the LED may be turned off.

The system must have at least two (2) separate and independently functioning detection networks.

At the end of an alarm cycle, the system must return automatically to standby mode, with a maximum reset time of fifteen (15) seconds.

The alarm component may not influence immobilisation in any way whatsoever.

The system must include a visual signal that indicates whether the system is in driving mode, immobilisation mode or standby mode. This signal must either be visible from the outside of the engine, or it must be possible to install it so that it is.

3.2.3.2 Encrypted signal (wiring)

The number of different levels within a one-second period must be at least 10.

The number of possible codes must be at least 10,000.

In immobilisation/standby/alarm mode, programming, reprogramming or removal of the system (or parts thereof) must not lead to a change in system status.

3.2.3.3 Starter engine immobiliser

There must be at least one immobiliser that can cope with an energy load of at least ten (10) amperes for a period of at least three (3) seconds.

3.2.4 Activation and deactivation procedures

3.2.4.1 Activation

The alarm system may be activated by a lock, switch or remote control.

The immobiliser must activate automatically within sixty (60) seconds of the ignition being turned off.

Within sixty (60) seconds of being activated, the alarm system must enter standby mode, counting from the moment when all actions have been performed to activate the system.

Activation and deactivation of the alarm system may not be visible for more than 3 seconds.

If a mechanism is used to activate and deactivate the immobiliser that is linked directly to the key (e.g. a transponder key), the immobiliser must be activated upon removal of the physical key or when the ignition is turned off.

Other activation/deactivation methods must possess the same level of security.

3.2.4.2 Deactivation (general)

Immobiliser deactivation may only occur in an authorised fashion.

If after deactivation of the immobiliser circuit, the ignition circuit is not activated within two (2) minutes, immobilisation must activate once again automatically. This does not apply to systems whose switching mechanism is linked directly to the key.

3.2.4.3 Remote control

The remote control has an encrypted transmission signal allowing the use of at least one hundred thousand (100,000) different codes.

The likelihood of generating the correct code to disable the system within a 24-hour period must not exceed one in one thousand (0.1 per cent).

Each time the remote control is used, the deactivation code must be changed by means of a randomly selected code key of at least sixty-four (64) bits in size.

3.2.4.4 Numeric keypads

The number of possible codes must be at least 10,000. The likelihood of generating the correct code to disable the system within a 24-hour period must not exceed one in one thousand (0.1 per cent).

It must not be possible to deactivate the immobiliser by short-circuiting or otherwise manipulating (the wiring of) the keypad.

If the system is supplied with a default delivery code that must be changed by the customer, this code must cease to work after ten (10) uses.

3.2.4.5 Electronic encryption keys

The number of possible codes must be at least 50,000. The likelihood of generating the correct code to disable the system within a 24-hour period must not exceed one in one thousand (0.1 per cent).

It must not be possible to deactivate the immobiliser by short-circuiting or otherwise manipulating (wires running to and from) the encryption key receiver.

Transponder keys are regarded as encryption keys, and must therefore fulfil the same statutory and other requirements.

Removing the transponder from the key must result in permanent visible damage to the key.

3.2.4.6 Secondary deactivation procedures

Deactivation procedures whose purpose is to deactivate the system in a manner other than the usual manner must fulfil the same security-level requirements as the standard methods.

3.2.5 Immobilisation

There must be at least two (2) independently functioning immobilisers present.

Immobilisation must be operational during the immobilisation, standby and alarm modes, and must be activated automatically.

If the connections to the siren are severed during standby or alarm modes, immobilisation must remain in operation.

While being driven, variations of +/- 25 per cent in the nominal battery voltage may not cause the system components that effect immobilisation to change status.

The activation or deactivation of immobilisation must remain possible at battery voltages of between 6.5 and 7.5, and between 14.5 and 15.5 (for 12V nominal systems).

3.2.6 Detection

3.2.6.1 General

Acoustic and visual alarms must be activated via motion detection.

Additional detection by way of towing or flame detection is permitted.

Security detection by drop in voltage is not permitted. If the CCS offers this separately, it must be installed in deactivated status and may not be activated externally to the CCS.

The use of shock and vibration detection as a pre-alarm system is permitted.

3.2.6.2 Motion detection

Any detection by the sensor(s) during standby must activate alarm mode (see also 3.2.7.1).

The sensors must respond to any status changes that bring the engine out of parking mode. This applies both lengthwise and breadthwise.

The position of the engine may not influence motion detection in any way.

Slow changes to the status of the engine (max. 0.2 per cent per second) may not influence motion detection in any way.

3.2.6.3 Towing detection

Any detection by the towing module during standby must activate alarm mode (see also 3.2.7.1).

Towing detection must make use of sensors that respond to wheel rotations of at least one (1) and no more than two (2) revolutions.

3.2.6.4 Pre-warning

Any detection by the pre-alarm module during standby must activate alarm mode (see also 3.2.7.1).

The pre-warning system is activated by small sensor movements that may be an indication of attempted theft.

If there is a pre-alarm module, the duration of the acoustic signal must not exceed five (5) seconds, at a maximum volume of seventy (70) dB(A).

3.2.7 Alarms

3.2.7.1 General

Alarm mode must be activated immediately from standby mode as soon as a detector registers input. This shall apply as of no later than sixty (60) seconds after activation of the alarm system.

During alarm mode, both acoustic and visual alarms must be activated immediately.

If the system is deactivated in an authorised fashion, alarm mode must switch immediately to driving mode.

3.2.7.2 Acoustic alarms

The acoustic alarm may only take the form of an electronic siren, which must commence immediately upon activation of alarm mode for a maximum period of five (5) minutes.

The electronic siren must satisfy EU 95/96, with a minimum volume of 105 dB(A) (measured after the duration test and the corrosion test).

The acoustic alarm must be activated during alarm mode for between twenty-five (25) and thirty (30) seconds.

The connection between the central and acoustic alarm systems must operate via an encrypted signal.

In standby and alarm modes, it must not be possible to disable the emergency-power siren without the sabotage alarm being activated for five (5) minutes.

The capacity of the siren's emergency power supply must be sufficient to maintain an alarm for at least five (5) minutes with a volume drop of no more than two (2) per cent.

3.2.7.3 Visual alarms

Visual alarms must activate immediately upon entering alarm mode, for a maximum period of five (5) minutes.

The minimum length of the visual alarm is determined by the length of the acoustic alarm(s) (25-30 sec. per alarm).

Visual alarms may only use the vehicle's indicator lights.

3.2.7.4 Radiographic alarms

The acoustic and/or visual alarm may be combined with a silent alarm using radiographic communication.

This radiographic communication must satisfy the statutory requirements.

3.2.8 Wiring

The system must include wiring with connections. The following shall apply to the wiring of the security component:

- minimum length is two (2) metres;
- exceptions may apply to brand-specific cables;
- wiring for the immobiliser must be black and of identical thickness, with colour/numeric codes that can be removed after installation;
- The core diameter of the cables must be at least half (0.5) a square millimetre, or as big as necessary, depending on the application.