

TECHNICAL MANUAL

PRIZBAK



Comfort and innovation —
no remote controls



For modern day vehicles and drivers



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Description of the security system

Introduction

Differences between security systems:

Prizrak-810 – basic system.

Prizrak-830 – RFID tag and second circuit of protection.

Functions of the Alarm:

- Protecting the vehicle from being stolen or hijacked
- Alert if the vehicle was tampered with
- Remote engine start(optional, may require ESM-250 remote start module
- Heater control (factory or aftermarket heater)
- Location tracking of the vehicle (GPS/GLONASS-270 unit is required).

The Alarm has an integrated GSM module, to control security and the vehicle. The system can be operated via mobile phone with a user-friendly voice interface (only Russian and English languages icurrently available) or via Android\iOS application or text messages.

Identity of the user is verified by the RFID tag (DDI technology) and/or PIN code entered by standard push buttons in the vehicle.

The alarm has motion, tilt and shock sensors built in. Optional sensors can be connected via built in IO.

2CAN technology makes it possible to work with two CAN buses simultaneously, expanding the functions of the Alarm in some vehicles.

Integrator (www.tec-integrator.com) contains information about compatibility of the Alarm with a specific vehicle, and a list of vehicles compatible with the Alarm and specific features of the alarm.

Terms

Programming button - one of the factory (default) buttons, with which the Alarm can be programmed (buttons specific to the vehicle can be found in the Integrator). Programmable button can be changed only within short time after installation of the Alarm. Also built in button can be used as programming button. (Fig. 2).

Security — is a state of the Alarm, which is turned on after locking the doors in any way provided by the manufacturer of the vehicle (keyless entry system, remote control, rearming the alarm etc) and turning factory security system. Secure state can be left by unlocking the doors with the original remote control or vehicles keyless access system or by entering the PIN code.

Speed control allows setting the locking activation algorithm for Immobilizer and AntiHiJack features. Speed control can be activated and de-activated in user settings programming menu. Certain vehicles may not support this feature (please see Integrator files for details).

Guard mode — active state of the PINtoDrive® and AntiHiJack: if one of these functions has entered guard mode, to leave it it is required to enter PIN-code, otherwise engine will be locked.

Comfort feature — feature allowing not only to lock doors from the factory remote, but also to raise windows (sunroof also can be closed).



Control via mobile phone

It is possible to control the Alarm via mobile phone, for example: arm and disarm the Alarm, schedule tasks, start the heater, etc.

Options of the phone control include the smart voice menu (Russian and English languages are available, please contact your shop to change the language of the system) or application "TEC" (you may download it from application store on your device) and text messaging.

Getting started

To start using the phone application you need to dial the phone number of the Alarm and follow voice prompts.

- ! After the Alarm is installed:
 - 1 Assign your mobile phone as User 1.
 - 2 Change the factory access code.
- ! Default access code is "1111".

Control via text messages

It is possible to control your Alarm via text messages:

Access code * CommandNº # Parameter

Access code – a code to access the system.

CommandNº – number of a command in the voice menu.

Parameter – it is used as an option for some commands. Please see details at www.canbus-alarm.com

For example: **1111*822#** (this is a command to disarm the alarm; in this example the access code is the factory code "1111").

iOS



Android



Structure of the smart voice menu



Online Data Unit

Quickly provides online critical information about the state of the Alarm and the vehicle. The unit contents can be changed.



Quick Access Commands

2 3 4 5 6

These commands can be customized.

- 7 **System Information**
- 8 **Control Commands**
- 9 **Settings**

1 Help

General information about the system



System Information

- 7 2 Information about vehicle state
- 7 3 Trigger log
- 7 4 Event log
- 7 5 List of deactivated features and functions
- 7 6 Task manager contents
- 7 Help



Control Commands

- 8 2 Commands to control the Alarm
- 8 3 Activation and extra channels
- 8 4 Checking account balance etc.
- 8 Help



Settings

- 9 2 Task manager
- 9 3 Remote launches and optional channels
- 9 4 Sensors
- 9 5 Online data unit
- 9 6 Quick access commands
- 9 7 Users and access permissions
- 9 8 Notification settings
- 9 9 Advanced settings
- 9 Help



Alarm operation algorithms

Arming/disarming

To arm the alarm press the lock button of the remote, or close the doors with keyless system or lock the door with the key. Alarm will warn you that it is armed with audible signal and LED flashes. After some time interval between flashes will decrease.

To disarm the alarm press unlock button of the remote, or open vehicle with keyless system. Alarm will warn you with 2 audible signals. LED will go off.

Arming and disarming can be done by the voice menu or the mobile application

Warning about open door

If you left an open door, hood or trunk and armed the Alarm, the system will warn you with 3 audible signals. LED will inform you about open compartment:

- Two – the hood is open
- Three – the trunk is open
- Four – the door is open.



The Alarm cannot monitor entry through unlocked door. It is possible to close the doors (hood, trunk) while still in Security mode, then the Alarm will automatically continue monitoring

Triggering the Alarm

The alarm has 2 built-in sensors: shock sensor and tilt/movement sensor. Because of these sensors the alarm is able to differentiate

different influences on the vehicle. Optional sensor can be connected if required. The alarm can be connected to multiplex sensors and standard sensors.

In secure state alarm can react to external action by warning or by triggering. Warning will be made if small force was applied to the shock sensor. In this case alarm will make short audio signals.

Alarm will be triggered, if any door, hood, or trunk is open, if tilt/movement sensor is triggered, and if excessive force was applied to the shock sensor. Siren will be on for 30 seconds and hazard lights will blink.



You can adjust sensors sensitivity.

Function of protecting public order

After three triggers in armed mode from one sensor in one hour alarm will stop responding to this sensor for one hour. Alarm will continue working with this sensor if there were no triggers for one hour. This function will cancel alerts but warnings will stay

Trigger check

Alarm remembers causes of alerts for security period. Memory will be cleared after ignition switched on.

If alarm was triggered, after disarming the alarm four audible signals will be made and indication of cause will start (check table 1).

Table 1. Trigger indication

LED flashes	Note
x1	Public order feature
x2	Hood was opened
x3	Trunk was opened
x4	Door(s) was (were) opened
x5	Triggering of the shock sensor (alarm)
x6	Triggering of the shock sensor (warning)
x7	Triggering of the tilt/displacement sensor
x8	Triggering of an extra sensor (alarm)
x9	Triggering of an extra sensor (warning)



Detailed **information** about **events** can be found in the trigger log which can be accessed from the voice menu.

Arming with sensor deactivation

There are situations when you need to arm the Alarm with sensor input deactivation.

To deactivate the alarm:

- Arm the alarm
- Press the remote control button for 3 seconds. The siren will emit one long intermittent sound, then a short sound after a pause. Now the warning is off. The Alarm will not respond to mild impact to the vehicle
- Within the next 3 seconds press the remote control button again: the siren will emit one long intermittent sound, then two more signals after a pause. Now all sensors are deactivated.

Trunk opening without leaving the security mode

You can open the trunk with remote or keyless system. While trunk is open alarm will stop reacting to sensor input, but will control doors so the vehicle will stay secured from intrusion. After trunk is closed, the system will secure it and turn all sensors back on.

Hands-free function

When the engine was started remotely, hands-free function will check that the RFID tag is within the coverage. The Alarm will automatically unlock the vehicle upon owners approach, and will lock it back when owner left the vehicle.

RFID check when disarming

In this mode when you unlock the vehicle via remote control or keyless access system, the Alarm will search for the RFID tag. Only after the RFID tag is detected, the vehicle will be disarmed.



The RFID tag is looked for only if the Alarm was armed for more than 30 seconds. While searching the system will emit intermittent sound. If you don't have the RFID tag with you, then within 10 seconds after a door, hood or trunk is opened, an alarm will go off. To deactivate the alarm signal, turn on the ignition and authenticate yourself.

Factory remote door lock control

This function does not allow opening doors by using signal imitation equipment, and also will lock access into vehicle in case if the remote was stolen (if electromechanical locks were installed).

After receiving a signal to open from the factory remote, the alarm will search for RFID tag, and only after authentication, doors will open.

There are three methods to use this feature. Each method can be used on its own or together with other methods:

Feature can operate permanently – RFID tag will be required every disarming of the alarm, and temporary in places where you need maximum safety(see. Quick engaging of the second circuit for higher risk locations). Toggling and selection of the operational mode is done in the alarm hardware features menu.



Installing electromechanical door locks

Electromechanical locks are controlled with "Close electromechanical door locks" and "Open electromechanical door locks" outputs. Pulse to close locks will be formed after arming the alarm (condition being: doors, trunk and hood are closed). Pulse to open – after receiving signal from factory remote and RFID authentication.

CAN bus lock

No additional connections required. For support of a specific vehicle check "Integrator".

Commutation of central lock control circuits, with output "Control of central lock normally open relay"

Signal is formed on the output after receiving signal from factory remote and RFID authentication, and stays until alarm is armed. Signal is constantly present (if CAN bus is active), if maintenance mode is active or PIN Code authentication was chosen.



If the vehicle is opened by phone, RFID tag is not required.

Immobilizer feature

Immobilizer is a feature designed to prevent vehicle from being stolen from parking space. PINtoDrive® goes into effect if ignition was switched off for more than 3 seconds. If PINtoDrive® feature is enabled and active it requires PIN code to be deactivated, otherwise engine will be locked:

- Engine will be switched off on attempt to move if speed control is enabled and supported by the vehicle
- The engine will be turned off within 5 seconds after the ignition has been turned on if the Speed control is disabled or not supported by the vehicle.

AntiHiJack feature

AntiHiJack is the function that prevents the vehicle from being hijacked or stolen from the parking area. AntiHiJack enters the Guard mode in the following cases:

- The ignition was turned off for longer than 3 seconds (including a case when Immobilizer is off; if the Immobilizer was switched on, the Alarm will follow its algorithms)
- The driver's door was opened.

Upon entering the Guard mode, AntiHiJack feature goes through a series of phases, and in case if the Guard mode was not deactivated, the feature will activate the engine lock.

Phases change only when the ignition is on. When the ignition has been turned off, the Alarm saves the current condition, and will continue the feature operation when the ignition is back on.

The Guard mode of the AntiHiJack feature can be deactivated at any step by entering the PIN code.

The Guard mode phases are as follows:

- *Idle phase*
- *Warning phase*
- *Locking phase*

Idle phase. In this phase AntiHiJack follows two different algorithms depending on the availability of Speed control. If the Speed control is available, AntiHiJack waits until the vehicle covers a set distance from the moment of Guard mode activation. Upon that, AntiHiJack goes into the Warning phase. If the Speed

control is not available, Idle phase consists of three stages:

- Waiting for the driver's door to be closed
- Waiting for preset amount of brake presses to be made
- Pause before going to warning phase.

Accelerator pedal lock (force to stop)

Feature will stop the vehicle if AntiHiJack was triggered minding safe lock settings. Vehicle has to support "speed control". At the end of the warning phase, if speed of the vehicle didn't increase within 5 seconds or brake pedal was pressed within 3 seconds, lock will

Warning phase consists of two steps:

- Warning the driver with the trill that they have to enter PIN code.
- Warning other drivers on the road of the possible hazardous situation due to the upcoming engine locking (10 seconds). It is carried out by vehicle hazard lights. Driver warning is still on.

Locking phase. The engine lock is activated, the siren is turned on, and the hazard lights are activated. The siren and hazard lights will switch off in 15 seconds. AntiHiJack will be in locking phase until a new PIN code verification.



If "Safe stop" is enabled engine will be locked only if speed is lower than 30 km/h or on complete stop (depends on the settings of the safe stop).

The safe locking option reduces probability of accidents when the Engine Lock feature is used.

When the ignition is off, AntiHiJack turns off the hazard lights and audio warning signals for the driver. If the Immobilizer feature has not entered the Guard mode (see the Immobilizer feature section) then, upon the next ignition, AntiHiJack will do an audio warning for the driver and switch on hazard lights for 15 seconds. AntiHiJack will not prevent the ignition but will interfere with driving as per the same algorithms as the Immobilizer feature.

If Immobilizer is in the Guard mode, then when the ignition switched off, AntiHiJack will be deactivated, and the Alarm will follow algorithms of the Immobilizer feature.

activate for 2 seconds, then it will be lifted for 5 seconds. This will be repeated 5 times. Every repetition lock lift will be reduced for 1 second. On fifth repetition lock will be permanent.

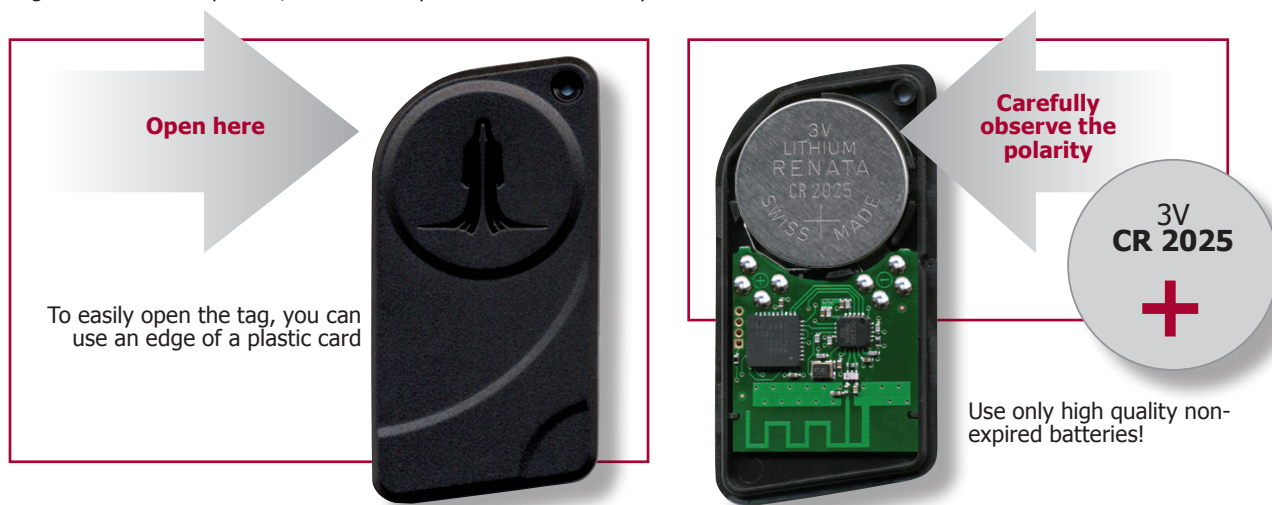


RFID tag

RFID tag is an electronic key that must be with the driver at all times during the vehicle operation. Before the vehicle starts moving, the system will automatically identify the RFID tag and deactivate all security functions. When the RFID tag is identified, the system will emit a trill.

Battery replacement

If the battery needs to be replaced, the system will trigger 5 short audio signals after the RFID tag is identified. The battery type for the RFID tag is CR 2025. To replace it, contact the system installer or do it yourself.



If the ambient temperature is below zero, batteries can perform worse due to slower rate of chemical reaction. It can make identification of the RFID tag more difficult, especially if it was exposed to low temperature environment for a long time. To restore performance of the battery just warm up the RFID tag.

Dual authentication

Authentication locates and identifies the RFID tag and/or entered PIN code. This procedure is carried out when the ignition is on or the engine is started. After successful verification, LED will be switched off and a trill is emitted.

Table 2. Methods of authentication

Method of authentication	Verification procedure	
RFID tag (factory default)	RFID tag is with you	Wait for a trill. LED will go out
PIN code*	Enter PIN code	
RFID tag or PIN code	RFID tag is with you	
	RFID tag is not available. Enter PIN code	
RFID tag and PIN code (dual authentication)	RFID tag is with you. Enter PIN code	Wait for two trills. LED will go out.



If you use the RFID tag and PIN code authentication, both security circuits have to be deactivated before the vehicle starts moving. If one or more circuits are still active (i.e. there is no RFID tag, or PIN code is not entered), the vehicle will not move.



Authentication method can be selected when installing the Alarm without using the PUK code. As a result, the PUK code remains secret.

Authentication method can be changed without using the PUK code if:

- The vehicle did not travel more than 10 km after the Alarm was installed (the Speed control is available)
- The ignition was not active for more than 20 minutes after the Alarm was installed (the Speed control is not available).

If during the installation the verification method was switched to "RFID tag or PIN code" after the vehicle was driven for 10 kilometers (if the Speed control is unavailable: after the ignition was on for 20 minutes) at the end of each verification an alarm signal will sound. It will inform that verification method was changed. To deactivate the signal, enter the PIN code.

Quick engaging of the second circuit for high risk locations

The RFID tag authentication is very easy to use. In most cases this verification method is enough to protect the vehicle. However, when leaving the vehicle in high risk locations (for example, at public parking lots) you can provide maximum hijack protection by engaging second circuit for one security cycle. Authentication method can be quickly changed from "RFID tag or PIN code" to "RFID tag and PIN code" without need to use the settings menu.

To quickly engage maximum security:

- Turn on the ignition
- Wait for RFID identification

In the next 10 seconds:

- Open and then close the driver's door
- Enter the PIN code, wait for confirmation
- Turn off the ignition
- Wait for two trills which mean that "RFID tag and PIN code" verification method is activated.



PIN code

PIN code is a secret combination of presses on one or more original buttons in the vehicle. Please refer to the Integrator files for the list of original buttons that can be recognized by the system in a specific vehicle. PIN code is entered before driving the vehicle.

PIN code is a one-, two-, three- or four-digit number.

PIN code can be easily changed many times by both technical specialists during installation of the system or by user during day-to-day use of the vehicle.

To ensure a proper security level, the factory default PIN code should be changed. If you don't do it, an alarm will sound after entering the PIN code, which reminds you to change the PIN code.



The factory default PIN code is "2"; it is entered by using the Programming button (please see the Integrator).

Entering the PIN code

PIN code is entered with the ignition (or engine) turned on by pressing original buttons. When entering one of the PIN digits, please make sure that pressing time or pause are no longer than 1 second. Please keep a pause of approximately 2 seconds in between digits. If you made a mistake while entering the PIN code, a warning will sound in about 3 seconds, then you can re-enter the PIN code.

PIN code entry sequence

- Turn on the ignition or start the engine
- Enter PIN code
- Wait for the confirming trill.

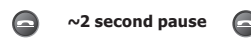
Available PIN options

Buttons , , , , are used here as an example. Request the list of available buttons in your vehicle at your shop.

One-digit PIN:



Two-digit PIN:



Single-button PIN entry

When entering the PIN code keep in mind the entering sequence.

One-digit PIN:



Two-digit PIN:



PUK code

PUK code is required if:

- You have lost the RFID tag or lost/forgot the PIN code
- You want to change identity verification method.

After PUK code is entered, all security functions of the Alarm will be deactivated regardless the selected authentication method. PUK code can be found under the scratch layer on the plastic card.



The factory set PIN code is "2"; it is entered by using the Programming button (please check the Integrator).

PUK-code entry

PUK code is entered by the Programming button with a 2 second pause in between keystrokes.

Entering sequence:

- Turn on the ignition or start the engine
- Enter PUK code
- Wait for the confirming trill.

Maintenance mode

Maintenance is an operation mode when all hijack protection and service functions of the Alarm are temporarily disabled.

The Alarm will notify of activation of the Maintenance mode as follows:

- When disarming, LED will turn on
- When the ignition is turned on, LED will go out
- After identity verification an alarm will sound
- After the ignition is turned off, LED will light up and will be on for a while.

To activate or deactivate the Maintenance mode follow these steps:

1. Turn off the ignition.
2. Follow through with identity verification.
3. Press the Programming button 6 times (you should start within 10 seconds after verification).
4. Wait for confirmation of your actions:
 - If the Maintenance mode is on, the system will emit 1 audio signal, 1 light signal and a trill
 - If the Maintenance mode is off, the system will emit 2 audio signals, 2 light signals and a trill.

Automatic deactivation of the Maintenance mode

This function automatically disables the Maintenance mode after a 10 km run. So even if you forget to disable this mode in the service station, it will still be automatically disabled.

If Maintenance mode is activated by PUK code, it cannot be automatically disabled.

If the vehicle does not support Speed control, automatic deactivation of this feature will not be available.



Warning signals after authentication

Additional sound signals after verification usually call for certain actions.

Table 3. Warning signals after authentication

Warning signal	Source of a signal	Actions to take
Long audio signal	The default PIN code was not changed	Change the default PIN code
	The maintenance mode is on	Disable the Maintenance mode
	When installing the system, verification method was switched to "RFID tag or PIN code"	Enter PIN code (this confirms that verification method was changed)
Five short audio signals	Battery in the RFID tag should be replaced	Replace RFID tag battery

Other options

The system has several options to make your vehicle more comfortable and secure.

Geolocation of the vehicle

The system can show the vehicle position on the map at any moment. It requires installation of a GPS/GLONASS-270 unit. To locate the vehicle, you need to send a text message command or via voice menu or using your mobile application.

Automatic window roll up

The system can be programmed so that the vehicle windows are rolled up when engaging the lock.

Setting the electromechanical hood lock

You can install an additional hood lock and program the Alarm to lock the hood when locking the vehicle, and open it only after identity verification.

Central lock control

If your vehicle does not have an integrated door lock activated when driving (locking) or turning off the ignition (unlocking), this option can be provided by the Alarm system.

Microphone

A microphone provided with the Alarm system enables the driver at any point to hear sounds inside the vehicle or in the vicinity. This requires only one call to the Alarm system.

Optional parking system control

The Alarm system has flexible algorithms to control additional parking sensors. There are three control modes available, and the system can be controlled by using original buttons in the vehicle.



Connection

Inputs/outputs of the Alarm

Inputs/outputs of the Alarm are described in the following tables. Contact numbers are shown in Fig. 1. Configuration of inputs/outputs is programmed (see Programming the Alarm hardware features).

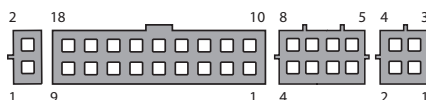


Fig. 1. Numbers of port connector pins from wiring viewpoint

Table 4. Description of the systems main (18-pin) connector

Connector	#	Color	Type	Note	Current, mA
18-pin	1	–	Ground	Power for additional devices (TP-BUS)	–
	2	Blue/Yellow	–	Heater WBUS(Webasto, Ebersacher)	–
	3	Brown	CAN 2	CAN2-L bus	–
	4	Brown	CAN 1	CAN1-L bus	–
	5	Pink/Green	(+) programmable input	Stop signal control	1,5
	6	White/Black	(-) output	Wired engine lock	150
	7	Gray/Black	(-) programmable input	Reference ground/Negative button	0,5
	8	Yellow/Red	Data link	Connection between main unit and lock relay	–
	9	Black	Ground	Power	–
	10	–	+12 V	Power for additional devices (TP-BUS)	–
	11	–	–	TP-BUS (control bus for additional devices)	–
	12	Brown/Yellow	CAN 2	CAN2-H bus	–
	13	Brown/Red	CAN 1	CAN1-H bus	–
	14	Green/Black	(-) programmable input	Hood position control	1,5
	15	Blue/Red	(+/-) programmable output	Turn signals alternate control	±150
	16	Gray/Yellow	(+) programmable input	Analog buttons/Positive button	0,5
	17	Pink/Black	(+/-) output	Siren control(+)/Horn control(-)	1,300/150
	18	Red	+12 V	Power supply	1,500/10*
8-pin	1	Orange/Green	(-) Programmable input	Engine shutdown in remote start	1,5
	2	Orange/White	(+) Programmable input	Disable alert if trunk is open	1,5
	3	Yellow	(+) microphone	Microphone	–
	4	Black	(-) microphone	Microphone	–
	5	Yellow/White	(-) Programmable output	Front parking sensors control	150
	6	Green/White	(-) Programmable output	Rear parking sensors control	150
	7	Green	(-) Programmable output	Impulse to close the hood/Alternate Central Lock control (Lock for twin-wire control. Lock/Unlock for one-wire central lock control)	150
	8	Blue	(-) Programmable output	Authentication pulse/Alternate Central Lock control (Unlock for twin-wire Central Lock control)	150
4-pin	1	Red/White	Power supply	+12 V power supply for Fortin or iDatalink unit	
	2	Black/Yellow	Power supply	Ground for Fortin or iDatalink unit	
	3	Gray/Blue	DATA(RX) connect to the blue wire (Fortin) or black/white (iDatalink) wire	Control of a Fortin or iDatalink unit	
	4	Gray/Green	DATA(TX) connect to the white wire (Fortin) or black/white (iDatalink) wire	Control of a Fortin or iDatalink unit	
2-pin(LED)	1	Red	(+) output	+12 V power supply	
	2	Blue	(-) output	Ground	

*Given is the average current value in operating and idle modes. It is subject to change according to positive outputs demand.

Useful current of output #9 depends on demand connected to negative outputs.

Outputs #6, 15, and 17 are protected from short-circuit, inductive eruptions, overheating, and overload.



Description of pins in the Alarm main port

Pins #1, 10, 11. Used only for additional (optional) modules connected via TP-BUS (such as HCU-230 hood module, ESM-250 remotestart module, etc.).

Pin #2. Heater control (Webasto, Eberspacher)

Pins #3, 12. CAN2 vehicle data bus. Connected in particular cases (please see the Integrator files).

Pins #4, 13. CAN-L, CAN-H vehicle data buses. Connected to the vehicle CAN bus (please see the Integrator files).

Pin #5. Brake lights state. Used if the vehicle CAN bus does not contain brake pedal position data (please see the Integrator files). In such cases Pin #5 is connected to the output of brake pedal terminal switch.

Pin #6. Engine lock. Connected to one of the relay coil contacts, which is used to lock or startup the engine.

Pin #7. Reference ground/Negative button. Subject to selected type of a control button, one of the following functions is used:

- Reference ground: when an analog control button is selected, pin is connected to the appropriate wire of the vehicle (please see the Integrator files)
- Negative button: is connected to the negative (controlled by making contact with the ground) button. It is used when there are no original buttons recognized by the Alarm.

If the vehicle has original buttons operated via CAN bus and recognized by the Alarm, this input can be vacant.

Pin #8. Data. Connects to positive terminal of switched or non-switched circuit. +12 V signal has to be present when the engine is running. This connection is used to connect lock relay and the main unit

Pin #9. Ground. Connected to the vehicle body via connection point designated by the vehicle's manufacturer for ground connections with factory equipment.

Pin #14. Hood position state. Used only when the vehicle CAN bus lacks information about hood position.

Pin #15. (+/-) output. Alternative hazard lights control. Controls hazard lights for the vehicles where CAN bus is not used. For more details on how to use it in a specific vehicle please refer to the Integrator.

Pin #16. Analog button/Positive button.

Subject to selected type of a control button, one of the following functions is used:

- Analog button is connected to the relevant wire of the vehicle at the steering wheel "helix" port (please see the Integrator files)
- Positive button is connected to the positive button (controlled by +12V voltage). Used when original buttons are not recognized by the Alarm.

If there are available original CAN buttons, and they are recognized by the Alarm, this input can be left unused.

Pin #17. Siren control/Horn control. Appropriate algorithm is set when the Alarm is installed (see Programming the Alarm hardware features).

Pin #18. Power supply of the Alarm. Connected via 3A fuse to one of the non-switched +12 V circuits.



Do not connect Data output to the cigarette lighter circuit.

pLine-221 description and installation guidelines

Table 5. Relay outputs description

Color	Type	Note	Current
Red	Communication and power	+12 V	1 A/10 mA*
Black	Power source	"Ground"	—
Yellow	Common contact	Lock output	10 A
Yellow/Red	Normally closed contact	Lock output	10 A
Yellow/Black (Yellow/White)	Normally open contact	Lock output	10 A**

* While transmitting data (pulses) up to 1 A. When receiving data up to 10 mA ** Limited by cross section of the wire.

"Communication and power" has to be connected to the positive switched circuit of the vehicle. This circuit has to be enabled if the Ignition is enabled (for example: ignition, injectors, ignition coils).

You may lock any circuit in the vehicle.

After installation it is recommended to check link between relay and Alarm.

Relay has a built-in accelerometer for vehicles that have no information about speed in the CANbus, and enables extra features for vehicles that have information about speed present in the CANbus:

- Lock the engine even if there is no speed information in the CAN bus

- Accelerometer allows starting the engine and locking it if the vehicle began movement.

It is not recommended to install the relay in places that vibrate heavily during engine starting or launching. This can prevent movement detection due to excessive noise passed to accelerometer.

Factory default sensitivity settings mean that there are almost no vibrations transferred from the engine.

After installing the alarm it is recommended to check sensitivity settings and adjust them if required.



- You may install only one pLine-221 relay in the vehicle.
- Relay works as normally locked relay.
- If same circuit that is used for connection with the alarm is locked, "Communication and power" has to be connected higher than lock point.

CAN bus parameters indication

Feature shown following parameters:

- Hood, trunk, doors (each door individually)
- Ignition switch state (key presence, ACC, IGN, Start)
- Engine is running
- Gearbox state (for automatic – P, R, N, D; for manual – R)
- Parking brake
- Stop-signal
- Security
- Factory security system alert
- Central lock state
- Sensors ignore
- Engine RPM
- Engine temperature

Feature allow quickly check vehicle state and adjust connection if required. Built-in LED is used for indication (check "Connection scheme"). LED lights up if any parameter is selected and stays for 5 seconds or until other parameter is chosen.

"Engine RPM" and "Engine temperature" will be indicated if no other parameters are chosen:

"*Engine RPM*" — LED flashes with frequency proportional to the RPM: 1 flash per second equals 500 RPM of the engine.

"*Engine temperature*" — LED flashes 1 time every time new data received (with ignition or the engine running).

The Alarm is programmed by using the Programming button.

Identifying the vehicle model

Vehicles supported by the system are divided into groups, each of which is divided into subgroups. All groups and subgroups are assigned with a number (see the Integrator). Identification is the procedure of detecting group and subgroup of the vehicle by the system.

There are two ways to identify the vehicle:

1. Automatic identification.

After connecting with the vehicle CAN bus, supplying power, and performing a few simple actions (for most vehicles those are the ignition on/off and close/open the central lock via original remote control) group and subgroup will be detected automatically. The user verifies identified group and subgroup by listening to the sound signals (group number – pause, subgroup number – pause).

Identification procedure for all supported vehicles can be found in the Integrator.

! If the group number is a two-digit number, each digit will be identified individually. For example, group 35 and subgroup 2 will produce the following sequence of sound signals:
3 long signals – pause (1 sec), 5 long signals – pause (2 sec), 2 short signals – pause (4 sec), etc.

2. Forced interfacing.

This is used in extraordinary cases. Programming is carried out with the integrated button. Before interfacing the vehicle group must not be identified and the CAN bus must not be connected. The Alarm will leave the programming mode if the Programming button is not pressed for longer than 60 seconds.

Programming sequence:

1. Power the Alarm, wait for an intermittent sound.
2. Enter "Menu 1": press and release the Programming button 10 times (this has to be done within 10 seconds after the system has been powered). If all actions were performed correctly, the Alarm will make three audio signals.
3. Enter Menu option 1 (Vehicle model) by pressing the Programming button once. The Alarm will notify of the selection of this option by repeating single audio signal.
4. Enter the vehicle group number by pressing the Programming button corresponding number of times (see the Integrator).
5. Enter the vehicle subgroup number by pressing the Programming button a relevant number of times (please see the Integrator files).

! If the group number is a two-digit number, enter the first digit, wait for 2 seconds, and then enter the second digit. The Alarm system will emit a sequence of audio signals indicating the group number.

By listening to audio signals, verify that the vehicle model was selected correctly:

- If the model was selected correctly, press the Programming button once. Signal sequence will stop, and the vehicle model will be saved
- If the vehicle was identified incorrectly, press the Programming button twice. Repeat programming starting from step 4.

Analog steering wheel buttons programming

To program analog steering wheel buttons:

1. Right after the Alarm identifies the model, turn the ignition on and wait for at least 5 seconds
2. Press all the steering wheel and steering wheel column joysticks buttons (cruise control, central unit control, etc.) sequentially (one after another). Sound after button press means that this button was recognized.

3. Turn the ignition off; a trill will sound
4. Turn the ignition on
5. To assign the Programming button from available buttons, push it and hold for at least 5 seconds (until you hear an audio signal).

Digital button programming

To use digital button (positive and/or negative):

- Set the Alarm to operate with digital buttons (Menu 1. Option 4) note that this menu option can be modified only by using a built in button and before the PIN code was entered for the first time via using analog or digital buttons. Any further modifications will possible only after system reset)

- Assign activated button as the Programming button: turn the ignition on, push the button and hold it for at least 5 seconds (until you hear an audio signal).

! Button have to be programmed within 15 minutes after interfacing the Alarm. If these 15 minutes have passed, initiate the reset sequence, and perform programming steps again.

Connection check between main unit and relay

1. Turn the ignition on.
2. Enter PIN code, wait for confirmation.
3. Press and release the Programming button 10 times (this has to be done within 10 seconds after entering the PIN code). The Alarm will confirm menu entry with three audio signals.
4. Choose Menu 1 option 19 by pressing and releasing the Programming button 19 times. The Alarm will notify of this option by a sequence of 19 audio signals.
5. Push brake pedal and hold for at least 10 seconds. After the Menu option has been accessed, the system will indicate it audibly (if the communication has been established – short two-tone signals each 0.5 second; no communication – steady two-tone signal).

Operation of all main systems of the vehicle should be tested in all available modes (ideally, the system operation should be checked with various combinations of electric equipment):

- Turn the on climate control in various modes
- Changing the speed of the heater fan

- Changing the operating modes of heating systems (seat heater in different power modes, window and mirror heating)
- Changing the operating modes of lighting (low beam, marker lights, fog lights).

Special attention should be paid to communication testing for high engine rpm. The engine speed should be changed very smoothly, while constantly monitoring the system. Communication errors can occur in a very narrow range of the engine rpm. Occasional communication errors (occasional short-term jams, indicated by variable two-tone signals) are allowed. If under any condition communication errors are frequent (dual-tone signal is on for longer than 2 seconds), choose another connection circuit, since tested connection does not guarantee a fail-safe operation of the system.

To exit this Menu item, tap the brake pedal. To exit the programming mode, turn the ignition off.

! Any pLine-221 relay (even previously installed on another vehicle with a different main unit) can be used for communication testing, but the Alarm will function only with a pLine-221 relay tied with a specific main unit.

Accelerometer sensitivity adjustment

1. Turn the ignition on.
2. Enter PIN code, wait for confirmation.
3. Press and release the Programming button 10 times (this has to be done within 10 seconds after entering the PIN code). The Alarm will confirm menu entry with three audio signals.
4. Choose Menu 1 option 20 by pressing and releasing the Programming button 20 times. The Alarm will notify of this option by a sequence of 20 audio signals.
4. Depress brake pedal and hold it for more than 10 seconds. The alarm will indicate current sensitivity settings (factory default "1" — maximum sensitivity).

5. Start the engine and check sensitivity in the range within idle - 2000 RPM). If lock triggers immediately after accelerometer press, reduce sensitivity by pressing button 1 time. Start the engine at least 3 times to be sure that lock will not happen.

! After starting the engine let it run for at least 10 seconds.

To leave the programming mode turn off the ignition and wait for at least 3 seconds.



Programming – Stage two

Programming the Alarm configuration

At stage two the Alarm hardware functions and user settings are changed, and a new PIN code is programmed.

Table 6. Programming menu

Name of the menu	Menu code	Number of audio signals	Designation
Hardware features configuration (Menu 1)	10	3	Configuration of the Alarm hardware settings
Configuration of programmable inputs/outputs (Menu 1.1)	11	6	Configuration of programmable inputs/outputs
User functions configuration (Menu 2)	12	4	Configuration of the user settings
Set up shock sensors and tilt/movement sensor	8	5	Adjustment of sensitivity of additional shock sensor; switching on/off the tilt/displacement sensor
Remote start configuration	16	7	Menu is active only with ESM module installed or with remote start digital output active
Heater configuration	17	8	Configuration of heater operating modes

Programming the Alarm hardware

The Alarm is programmed in accordance with "Hardware features configuration" table.

Table 7. Hardware features configuration

#	Option	Range	Factory default settings	Notes
1	Vehicle model	–	–	–
2	Engine lock	1-4	2	1 – control of a normally open relay; 2 – control of a normally closed relay; 3 – accelerator pedal lock (force to stop); 4 – starter motor lock
3	Safe lock	1-3	1	1 – Engine will be locked regardless of speed; 2 – if speed is 30km/h or lower; 3 – on complete stop
4	Type of external buttons	1-2	–	1 – analogue buttons; 2 – digital buttons. Inputs #7 and #16 (connector X1,18-pin)
5	Control of the factory security system	1-2	On	1 – on 2 – off
6	Sequential door opening	1-2	Off	1 – on 2 – off
7	Hazard lights control algorithm	1-5	–	1 – pulse negative; 2 – status negative; 3 – pulse positive; 4 – status positive; 5 – lights control (negative)
8	Central lock alternative control algorithm	1-3	–	1 – single wire pulse negative; 2 – single wire pulse negative (if central lock state is unavailable); 3 – two wire pulse negative
9	Siren control/Horn control	1-2	1	Selecting operating mode and polarity of output #17. 1 – Siren control. Emitting of a constant level signal (+12V). 2 – Horn control. Emitting of an intermittent negative signal. Controls the original horn of the vehicle
10	Time interval of Timer Channel (Comfort) feature	1-6	3	One unit equals 10 seconds.
11	External sensors multiplex mode	1-2	1	1 – multiplex operating mode of external sensors 2 – standard operating mode of external sensors
12	Engine start lock	1-2	2	1 – on 2 – off
13	Parking system control algorithm (activation)	1-3	1	1 – by reverse gear; 2 – by speed; 3 – by reverse gear with an override
14	Parking system control button	–	–	It is possible to assign CAN bus recognized button, analog button or digital button (positive/negative)
15	Speed control	1-2	1	1 – on 2 – off
16	Brake presses	1-7	3	–
17	GSM lock	1-2	2	1 – on (GSM interlock disabled) 2 – off (GSM interlock enabled)
18	Car battery warning threshold	1-15	8 (11,3)	1 – 10.6 V ... 15 – 12 V
19	–	–	–	–
20	–	–	–	–
21	RFID tag	1-4	1	1 – not in use; 2 – RFID check when disarming; 3 – factory remote lock; 4 – factory remote lock in high risk locations

22	Fuel tank volume	1-30	1	Used to convert fuel level from percent to liters. 1 – not defined. Fuel is measured in percent 2 - 10 liters..30-150 liters. Step is five liters
23	Alert delay if perimeter was breached	1-5	1	1 - disabled; 2 - 0.5s; 3 - 1.0-s; 4 - 2.0s; 5 - 3.0s;
24	Engine lock via CAN	1-2	2	1 - enabled; 2 - disabled. If feature is enabled and supported by the vehicle(check Integrator) - engine can be locked via CAN bus (without additional connections)
25	Perimeter control pause(30s)	1-2	2	1 - on; 2 - off;
26	Beach mode	–	-	–
27	Immobilizer bypass unit	1-2	-	Set automatically. 1 - Fortin; 2 - iDataLink;

Option #13. "Parking system operation algorithm":

- "Activation by reverse gear". Front and rear parking sensors are switched on when gearbox is in R position or by using a control button. They are switched off when the speed exceeds 15 km/h or by using the parking system control button
- "Activation by speed". Front parking sensors are switched on if the vehicle speed is under 15 km/h. Rear parking sensors are switched on if the vehicle moves backwards with a speed under 15 km/h.

In this mode all parking sensors can be disabled by using a control button until the next ignition sequence or command from a control button

- "Activation by reverse gear with a shutdown override". Here algorithm is similar to "Activation by reverse gear". However, when parking sensors are disabled by using a control button, they will not be activated when gearbox is in R position up to the next ignition or command from a control button.

Table 8. Configuration of programmable configuration of inputs/outputs

#	Connector	Function	Setting range	Factory default settings
1	X1 18-pin	(+/-) output #15 (18-pin port)	1-41/Alternate hazard lights control	Hazard lights alternate control
2		Polarity of output #15	1-2	Negative polarity
3	X2 8-pin	(-) output #5 (8-pin port)	1-41	17
4		(-) output #6 (8-pin port)	1-41	18
5		(-) output #7 (8-pin port)	1-41	25/alter. Central Lock
6		(-) output #8 (8-pin port)	1-41	4/alter. Central Lock
7		(-) input #1 (8-pin port)	1-24	12
8		(+) input #2 (8-pin port)	1-24	7
9	X1 18-pin	(+) input #5 (18-pin port)	1-24	1
10		(-) input #7 (18-pin port)	1-24	–
11		(-) input #14 (18-pin port)	1-24	2
12		(+) input #16 (18-pin port)	1-24	–

Options 1, 3-6. Designed to customize the Alarm outputs by assigning a function to a specific output (see "Programmable output functions" table).

Option 2. Defines the polarity of the Alarm output #17.

The polarity can be defined only if this output is assigned one of the functions (see "Programmable output functions").

Option 5 Arming pulse or lock Central Lock/lock/unlock Central Lock

Option 6 Identity verification pulse or unlock Central Lock

Options 7, 12 To be able to program this pin "Digital buttons" option has to be chosen

Options 7-14. Designed to customize the Alarm inputs by assigning a function to a specific input (see "Programmable input functions" table).



Table 9. Functions of programmable outputs

#	Function	Description
1	Security state	Emitting a constant level signal while the Alarm is in Security mode
2	Arming pulse	Emitting 0.8 sec pulse when entering the Security mode or triggering AntiHiJack feature.
3	Disarming pulse	Emitting 0.8 sec pulse when leaving the Security mode.
4	Authentication pulse	Emitting 0.8 sec pulse after PIN code is entered or in Maintenance mode (1 second after the ignition has been turned on).
5	Factory alarm panic	Emitting of a constant level signal while the original alarm system (if installed) is in alarm condition.
6	Beeper panic	Emitting a 30 sec constant level signal in Security mode if one of the main zones (doors, hood, trunk) is triggered or any sensor is triggered. The signal stops after exiting the Security mode.
7	Horn panic	Emitting a 30 sec pulse signal in Security mode if one of the main zones (doors, hood, trunk) is triggered. Signal is also emitted when arming/disarming. This function can be used for the vehicles without any integrated original alarm system. The signal stops when exiting the Security mode. This function can send an alarm signal to original horn of the vehicle.
8	Doors, hood and trunk	Emitting a constant level signal if any of the preset doors, hood or trunk is triggered.
9	Sensor ignore	Emitting a constant level signal in the Security mode if the trunk is opened via original remote control. The signal is also emitted for the purposes of Comfort feature. This function can disable sensors to prevent false alarms.
10	Factory buttons	Emitting a constant level signal when pressing a preset button of the vehicle.
11	Ignition	Emitting a constant level signal when the ignition is turned on (including the engine startup).
12	ACC	Emitting a constant level signal when ACCs of the vehicle (1st key position; for some vehicles it matches the ignition position) are on. The signal stops only after the key is out of the ignition lock. This function can help to correctly manage power supply to an accessory alarm system of multimedia system.
13	Engine is running	Emitting a constant level signal when the engine is on.
14	Engine RPM	Emitting an pulse with a pulse frequency in proportion with the engine crankshaft rpm. 1 pulse per second corresponds with 20 rpm of the crankshaft. The signal helps to evaluate the rpm rather than give an exact value.
15	Gearbox state	Emitting a constant level signal if transmission handle is in preset position (P, R, N, D1)). For semi-automatic transmission positions R, N, D 1); for manual transmission only position R.
16	Vehicle is moving	Emitting a constant level signal if the speed exceeds some threshold value (the speed value is different for each vehicle, but generally it is in the range of 5 to 10 km/h).
17	Front parking sensors control	Emitting a constant signal level in accordance with the preset algorithm of the parking system.
18	Rear parking sensors control	Emitting a constant signal level in accordance with the preset algorithm of the parking system.
19	Movement speed	Emitting a pulse with a pulse frequency in proportion with the vehicle's speed. 1 pulse per second corresponds to 1 km/h. The signal helps to evaluate the speed rather than give an exact value.
20	Brake	Emitting a constant level signal when the brake pedal is pressed.
21	Hand brake	Emitting a constant level signal when the vehicle is on hand brake.
22	External lights	Emitting a constant level signal when external lights are on.
23	Timer channel (Comfort)	Timer control channel; 10 to 60 seconds.
24	Diagnostic bus lock	Control of a normally closed locking relay, which is cut into the vehicle diagnostics bus. This function is enabled in Security mode and active CAN bus.
25	Hood is closed pulse	Emitting of 0.8 sec pulse after activation of Security mode provided that the hood is closed (terminal switch is OFF or not assigned).
26	Parking system LED	This function indicates the parking system status. If parking sensors are operated by "reverse gear" algorithm or "by reverse gear with an override" algorithm, LED is on when sensors are on. If parking sensors follow "activated by speed level" algorithm, the LED is on while sensors are disabled
27	External heater control	This function has to be assigned to any digital output. It is a prerequisite to access GSM module menu and gain control of the preheater.
28	Pulse to imitate closing of drives door for remote start	Emitting of 1.5 sec pulse simulating the driver leaving the vehicle to switch ACC off.
29	Trunk is open	Emitting of 0.8 sec pulse. This function has to be assigned to any digital output. It is a prerequisite to access GSM module menu and gain control of the trunk.
30	Control of an aftermarket remote start module	Used only with aftermarket remote start module. Emitting a constant level signal to remote start the engine on engine launch until engine stop. Signal will be shaped with or without the ESM-250 unit or ignition lock or start/stop button connection. Function has to be assigned to digital output, afterwards the remote start menu and commands to control launches in the voice menu will be enabled
31	Accelerator pedal lock (force to stop)	Stops the vehicle if AntiHiJack was triggered (according to the "safe lock" settings). Controls a normally open relay.
32	Close electromechanical door locks	Emitting a 0.8 sec pulse to close electromechanical door locks
33	Open electromechanical door locks	Emitting a 0.8 sec pulse to open electromechanical door locks
34	Control of a normally open relay to control central lock	Used to control circuits that control central lock.
35	Dual wire control of a Fortin module – "Ground while running"	Function is used to control a remote start module made by Fortin. Tied with Dual wire control of a Fortin module – "Start" function. Attention! Assigning this function to a programmable input will disable ESM-250 and functions #37,38,39. To reenale ESM-250 and disabled features - reprogram this function
36	Dual wire control of a Fortin module – "Start"	Function is used to control unit made by Fortin. Tied with Dual wire control of a Fortin module – "Ground while running". Attention! Assigning this function to a programmable input will disable ESM-250 and functions #37,38,39. To reenale ESM-250 and disabled features - reprogram this function



#	Function	Description
37	Immobilizer bypass module (remote start)	Function to enable remote launch on vehicles equipped with start/stop button (without remote start module) Output operates exactly as corresponding output of ESM-250
38	Start/Stop button control (remote start)	Function to enable remote launch on vehicles equipped with start/stop button (without remote start module) Output operates exactly as corresponding output of ESM-250
39	Brake pedal press (remote start)	Function to enable remote launch on vehicles equipped with start/stop button (without remote start module) Output operates exactly as corresponding output of ESM-250
40	Single wire iDataLink module control	Function is used to control unit made by iDataLink. Attention! Assigning this function to a programmable input will disable ESM-250 and functions #37,38,39. To reenale ESM-250 and disabled features - reprogram this function
41	LED to show heater state	If the heater was launched by the system, the LEDs will stay on for heater operation
42	Dashcam activation	Signal is formed: if ignition is on; for 5 minutes after alarm was triggered(warning or alert); if alert was triggered by phone. If alarm was triggered again while dashcam is active dashcam will work for 5 more minutes.

¹⁾ All handle positions used for forward movement of the vehicle (D, S, M, L, etc.).

Table 10. Programmable input functions

#	Designation	Description of the function
1	Brake lights state	This function is used only if the vehicle CAN bus does not contain data on brake pedal position. In this case brake light control input is to be connected with brake pedal terminal switch output.
2	Hood state	This function is used if the vehicle CAN bus does not contain data on hood position. In this case hood control is to be connected with hood terminal switch.
3	Door state	This function is used in exceptional cases, when CAN bus does not contain data on door position (please see the Integrator files).
4	Central Lock is closed (status)	This function is used in exceptional cases, when CAN bus does not contain data on Central Lock status (please see the Integrator files).
5	Central Lock is open (status)	This function is used in exceptional cases, when CAN bus does not contain data on Central Lock status (please see the Integrator files).
6	Ignition	The function is used only in cases when the correct data from CAN bus is not available. This situation may occur when some circuits of the vehicle are blocked. In this case the Ignition control input is to be connected to the vehicle wire that has a constant level signal when the ignition is on. Connecting this input does not cancel the ignition analysis via CAN bus. The ignition is considered on when data is received by any informational channel (CAN bus or analog input)
7	Trunk state control	The function is used in case an alarm is triggered when the trunk is opened via original remote control and/or keyless access system. In this case Trunk opening control input is to be connected to trunk opening feed control wire. Input control is available only in Security mode. When a command to open the trunk is detected, the Alarm ignores external sensor inputs and trunk terminal switch for 5 seconds until the actual opening of the trunk. In 5 seconds after the trunk lid has been closed, sensor inputs and the trunk will be secured.
8	Parking system button	The function controls parking sensors by using accessory button (this may be required if there are no buttons in the vehicle detected by CAN bus)
9	Heater state	When signal is fed to this input, it means that external preheater is on. Assigning this function to any digital output is a prerequisite for accessing the GSM module menu and preheater control.
10	Wipers control	The function monitors wipers and makes sure they are disabled. Monitoring is fulfilled if the software neutral is enabled. The driver is notified by a long audio signal. The signal here means that wipers are enabled.
11	Ignore brake pedal in remote start (with alternative remote start module)	Used with alternative remote start module
12	Shutdown the engine in remote start	Pulse on input stops or disables remote start
13	Parking brake	The function is used when CAN bus does not contain data on hand brake position.
14	Wake CAN bus	This function is used in exceptional cases (please see Integrator)
15	Hazard lights status	This function is used in exceptional cases (please see Integrator)
16	Trunk state	The function is used when CAN bus does not contain data on trunk status. In this case "Trunk" input has to be connected to trunk terminal switch output.
17	Digital button	Used to enter PIN code or for other tasks
18	Close central lock	This function is used in exceptional cases (please see Integrator)
19	Open central lock	This function is used in exceptional cases (please see Integrator)
20	Additional sensor input 1	Used to connect additional sensor
21	Additional sensor input 2	Used to connect additional sensor
22	Engine state in remote start	Pulse to this input will identify engine state – only in turbo timer, "keep running" or auto launch mode. In other modes signal from this input is not used, and engine state is taken from the CAN bus (if it is available). Input has a priority over "Engine was started" signal from CAN bus: system responses only signals from this input. Input can recognize continuous signals as well as pulse signals.
23	Input to launch the heater	Signal to this input will launch factory or aftermarket heater. Heater will run as long as the signal is present
24	Input for drivers door switch	The function is used when CAN bus does not contain data on door position state(please see the Integrator files)
25	Factory security system alert	Signal to this input allows to get information about alert state of the factory security system of the vehicle. If signal is present – Factory security system is in alert state
26	Look for RFID tag	Signal on this input will engage RFID tag search (1min) and authentication. After authentication alarm will disarm and central lock will open. RFID tag will be looked for 1 minute or until alarm is armed (whichever comes first) Feature enabled, if "Menu 1" №21 "RFID tag" set to "factory remote lock" или "factory remote lock in high risk locations"; in "Menu 2" option №12 "Authentication" – set to any state except "PIN-code".
27	"Beach mode" code	Used to set "Beach mode".



Programming sequence

1. Turn on the ignition.
2. Enter PIN-code, wait for confirmation.
3. To enter Menu 1 press the Programming button 10 times, the Alarm will emit three audio and three LED signals. To enter Menu 1.2 press the Programming button 11 times: the Alarm will emit six audio and light signals.
4. Select menu option by pressing and releasing the Programming button the number of times matching the number of option. The Alarm will confirm the option number by a series of audio signals.
5. Go to option setting by pressing and holding the brake pedal. The Alarm will notify of the option status by a series of audio signals of a changing duration.
6. Adjust option settings by pressing the Programming button the number of times matching the number of steps from the current status to the required one (for example, to go from function #2 (Arming pulse) to function #16 (Vehicle is moving), press the Programming button 14 times). The Alarm will confirm the selected function by audio and visual signals. Please remember that from the last function the program will go to the first one. Release brake pedal to switch indication from status to the number of current menu option. Now you can move to programming the next function or exit the programming mode.
7. **Programming algorithm for function #8 – Doors, hood and trunk.**
 - 7.1 Set any combination of doors, hood and trunk, which when opening will emit a signal at a programmable output. In this description, doors, hood and trunk are referred to as doors.
 - 7.2 With the brake pedal pressed go to option 8. The Alarm will emit 2 successive series of 8 audio signals, and then will emit irregular audio signals. After hearing the latter release the brake pedal. The Alarm will continue to emit irregular signals. Open those doors, which are to be indicated by this output. Other doors should be kept closed (doors can be opened in advance). Press the brake pedal again. The Alarm will inform of the status by series of 8 signals, and the doors will be assigned to this output. If you do not press the brake pedal and abort programming, the Alarm will save previous settings. Release the brake pedal, and the Alarm goes back to displaying the option number.
8. **Programming algorithm for function #10 – Factory buttons**
With the brake pedal pressed go to option 10. The Alarm will emit 2 successive series of 10 audio signals, and then will emit irregular signals. While still holding the brake pedal, press the required button (please refer to Integrator for the list of buttons for each vehicle). If the Alarm recognized the button, it will stop emitting irregular signals and go back to indicating option status by series of 10 signals. Release the brake pedal, and the Alarm goes back to displaying the menu option number. If you release the brake pedal before assigning a button, the Alarm will exit this option, save previous option settings, and go back to indication of the option number.
9. **Programming algorithm for function #15 – Gearbox state"**
With the brake pedal pressed go to option 15. The Alarm will emit 2 successive series of 15 audio signals, and then will emit irregular audio signals. While still holding the brake pedal, switch the transmission to required position: P, N, D* or R (transmission selector can be set in the necessary position in advance). For automated transmission switch to R, N, D*, and for manual transmission you can only switch to R. Release, then press again the brake pedal. The Alarm will stop emitting irregular signals and go back to displaying the option status by series of 15 signals. Release the brake pedal, and the Alarm goes back to displaying the menu option number. If you do not press the brake pedal and abort programming of this option, the Alarm will save previous settings.
10. **Programming algorithm for assigning a parking control button**
With the brake pedal pressed go to option 14 – Menu 1. The Alarm will start emitting irregular audio and light signals. Press and hold the selected button for a certain amount of time (if the Alarm recognizes the button, the system will stop emitting signals while the button is pressed):
Short button press – hold the button for at least 2 seconds.
Long button press (2.5 sec) – hold the button for 2 to 5 seconds.
Status control – hold the button for at least 5 seconds. Release the button, and the Alarm will emit one audio and light signal and stop the displaying. Release the brake pedal, and the Alarm goes back to displaying the option number.
11. In order to move to programming next menu option press and release the Programming button for the number of times necessary for navigation from the required option (for example, in order to navigate from option #2 to option #8 press and release the Programming button 6 times). Please note that when navigating menu options, the first option follows the last one.

Exiting the programming mode. The Alarm will exit programming mode and save all configuration settings in energy independent memory when the ignition is turned off or within 60 seconds after last menu action if the brake pedal is released.

Configuration of integrated sensors

Table 11. Configuration of shock sensors and tilt/movement sensor

#	Function	Range	Factory default	Notes
1	Shock sensor warning perimeter	0-8	4	0 – perimeter switched off 8 – maximum sensitivity
2	Shock sensor trigger perimeter	0-8	4	0 – perimeter switched off 8 – maximum sensitivity
3	Tilt/Movement sensor	0-8	4	0 – perimeter switched off 8 – maximum sensitivity

Programming sequence

1. Turn on the ignition.
2. Enter PIN code, wait for confirmation.
3. Press and release the Programming button 8 times. The Alarm will emit five audio and light signals;
4. Choose required option by pressing and releasing the Programming button a number of times matching a number of option. The Alarm will indicate the number of option by series of audio and light signals.
5. To program the selected option press and hold the brake pedal. The Alarm will notify of the option status by a series of audio and light signals of a changing duration.
6. Adjust option settings by pressing the Programming button the number of times matching the number of steps from the current status to the required one. The Alarm will confirm the selected function by audio and visual signals. From the Last function the program will cycle to the first one.

The Alarm will leave programming mode and save all settings when the ignition is turned off while brake pedal is released or within 10 seconds after last menu action if the brake pedal is released.



For efficient and convenient built-in shock sensor test, it is possible to temporarily exit the configuration mode. To do this, press and hold the brake pedal and turn off the ignition while configuring any of the zones. When the ignition is off no trill sound will be made. Check the sensor in operational mode. When you temporarily exit the configuration mode, windows are not closed automatically; otherwise the Alarm is operated in standard mode. When the ignition is on, the system automatically goes back to the point in configuration process before the exit. If you do not go back to configuration mode within 10 minutes (by turning on the ignition), the Alarm system will save the previously set sensitivity of the sensor and exit automatically. You will hear a trill.



Heater configuration

Table 12. Heater configuration

#	Function	Setting range	Factory default settings	Description
1	Accept/Decline operation of an aftermarket heater	1-2	1	1 – on 2 – off
2	Heater operation in preheating mode	1-2	2	1 – on 2 – off
3	Heater management protocol	1-3	–	1 – Webasto 2 – Eberspacher 3* – not preset (automatic)
4	Heater shutdown conditions	1-3	1	1 – time only 2 – engine temperature only 3 – time and temperature
5	Heater operation time	1-12	3	One unit equals 10 minutes (10 to 120 minutes)
6	Engine temperature level to turn off the heater	1-7	5 (50 °C)	1 – 0°C ... 7 – 70°C
7	Battery power level to turn off the heater	1-11	9 (11.3 V)	1 – 10.5 V ... 11 – 11.5 V
8	Accept/Decline operation of a factory heater via CAN bus	1-2	1	1 – on 2 – off
9	Code to switch heater on with factory buttons	–	–	You can program a code to switch on or off heater with factory buttons. Programming is done the same way as PIN code. Code can be entered only when the ignition is on.
10	Heater control with the factory remote	1-2	2	1 – on 2 – off
11	Control of an aftermarket heater algorithm	1-2	1	1 – status control 2 – impulse control

Programming sequence

1. Turn the ignition on.
2. Follow through with identity verification sequence.
3. Press the Programming button 17 times: the Alarm will emit 8 audio and light signals;
4. Select menu option by pressing and releasing the Programming button the number of times matching the number of option. The Alarm will confirm the option number by a series of audio and light signals.
5. Go to option setting by pressing and holding the brake pedal. The Alarm will notify of the option status by a series of audio and light signals of a changing duration.
6. Adjust option settings by pressing the Programming button the number of times matching the number of steps from the current status to the required one. The Alarm will confirm the selected function by audio and visual signals. Please remember that from the last function the program will go to the first one.
7. The Alarm will exit the settings mode and save all configuration settings in energy independent memory when the ignition is turned off while brake pedal is released or within 10 seconds after last menu action if the brake pedal is released.

Remote start configuration

Table 13. Engine remote start configuration

Nº	Function	Range	Factory default	Note
1	"Hands free" in remote start mode	1 – 2	2	1 – enabled; 2 – disabled
2	ESM-250 configuration	1 – 16	–	Detected automatically. Set up manually if required
3	"Keep running" feature	1 – 2	2	1 – enabled; 2 – disabled
4	"Keep running" feature operation time	1 – 12	2	1 – 10 min.; ... 12 – 120 min.
5	"Turbotimer" feature	1 – 2	2	1 – enabled; 2 – disabled
6	External temperature sensor	1 – 2	2	1 – temperature sensor; 2 – interior temperature sensor
7	Ignore brake on engine start	1 – 2	2	1 – brake pedal will be ignored ; 2 – pressed brake pedal will prevent the engine from launching
8	Shut down engine by releasing brake pedal (in remote start)	1 – 2	2	1 – enabled; 2 – disabled
9	Brake state in CAN	1 – 2	2	1 – enabled; 2 – disabled
10	Turn off the engine of disarming	1 – 2	2	1 – enabled; 2 – disabled
11	Engine shutdown conditions	1 – 3	1	1 – by time; 2 – by engine temperature; 3 – by time or engine temperature
12	Engine type	1 – 3	1	1 – diesel; 2 – gasoline; 3 – hybrid
13	Starter delay (only for diesel engines)	1 – 4	1	1 – 5 sec; ... 4 – 20 sec
14	Idle RPM	1 – 6	–	1 – 600 rpm.; ... 6 – 1100 rpm. Detected automatically. Set up manually if required
15	Engine runtime in remote start	1 – 12	3	1 – 10 min.; ... 3 – 30 min.; ... 12 – 120 min.
16	Engine shutdown temperature in remote start	1 – 14	12	1 – "15 °C"; 2 – "20 °C"; ... 12 – "70 °C"; ... 14 – "80 °C"
17	Temperature to launch the engine by temperature	1 – 8	1	1 – "-30 °C"; 2 – "-20 °C"; 3 – "-15 °C"; 4 – "-10 °C"; 5 – "-5 °C"; 6 – "0 °C"; 7 – "5 °C"; 8 – "10 °C"



18	Battery voltage to launch engine by voltage	1 – 15	8	1 – 10.6 V; 2 – 10.7 V; ... 8 – 11.3 V; 15 – 12 V
19	Engine runtime to charge the battery	1 – 6	3	1 – 10 min.; ... 3 – 30 min.; ... 6 – 60 min.
20	Gearbox type	1 – 2	–	1 – Automatic; 2 – Manual. Detected automatically. Set up manually if required
21	"Remote start" feature	1 – 2	1	1 – enabled; 2 – disabled
22	Time to ignore door switch (Only for remote start)	1 – 5	1	1 – disabled; 2 – 1,0 s; 3 – 3,0 s; 4 – 5,0 s; 5 – ignoring all doors from receiving the command, to engine launch, and for 5 s after ignition was switched off
23	Imitate drivers door switch after remote start	1 – 5	1	1 – by CAN and impulse 0,4 s; 2 – impulse. 0,4 s; 3 – impulse. 1,0 s; 4 – impulse. 1,5 s; 5 – impulse 3,5 s
24	Automatic central lock close after remote start	1 – 2	1	1 – enabled; 2 – disabled
25	Enable rearming the alarm after remote start shut down	1 – 4	1	1 – enabled; 2 – disabled
26	Time of preheating with the heater the engine before remote start	1 – 4	2	1 – 10 min.; ... 2 – 20 min.; ... 4 – 40 min.
27	Temperature of preheating with the heater the engine before remote start	1 – 10	3	1 – "-10 °C"; 2 – "-5°C"; 3 – "0 °C"; ... 10 – "50°C"
28	Delay of the remote start after preheating	1 – 4	1	1 – disabled; 2 – 5 min.; 3 – 10 min.; 4 – 15 min.
29	Remote start with the factory remote	1 - 2	2	1 - on 2 - off

Programming sequence

1. Turn the ignition on
2. Follow through with identity verification sequence
3. Press the Programming button 16 times, the Alarm will emit 7 audio and light signals.
4. Select menu option by pressing and releasing the Programming button the number of times matching the number of option. The Alarm will confirm the option number by a series of audio and light signals.
5. Go to option setting by pressing and holding the brake pedal. The Alarm will notify of the option status by a series of audio and light signals of a changing duration.
6. Adjust option settings by pressing the Programming button the number of times matching the number of steps from the current status to the required one. The Alarm will confirm the selected function by audio and visual signals. Please remember that from the last function the program will go to the first one.
7. The Alarm will exit the setting mode and save all configuration settings in energy independent memory when the ignition is turned off while brake pedal is released or within 10 seconds after last menu action if the brake pedal is released.

Programming user functions configuration

Table 14. Configuration of the Alarm user functions

#	Description	Current option setting				
		Factory default settings	On		Off	
			LED	Number of audio signals	LED	Number of audio signals
1	"Immobilizer"/"PINtoDrive®" feature	On	On	1	Off	2
2	"AntiHiJack" feature	On	On	1	Off	2
3	Distance for enabling "AntiHiJack"	1	Range 1 to 10			
4	Siren operation when alarm is triggered	4	Range from 1 to 4: 1 – siren is disabled; 2 – siren won't be enabled on warning; 3 – warning signal volume equals arming/disarming volume (refer to function #11); 4 – siren is enabled (Maximum volume)			
5	Audio notification that RFID tag is being looked for after disarming	On	On	1	Off	2
6	Audio confirmation of authentication by RFID tag and/or PIN-code	On	On	1	Off	2
7	Automatic deactivation of maintenance mode	On	On	1	Off	2
8	Close central lock while driving	Off	On	1	Off	2
9	Open central lock if ignition is off	Off	On	1	Off	2
10	Automatically close windows when ignition switched off	On	On	1	Off	2
11	Volume of arm/disarm notifications	4	Range 1 to 4			
12	Authentication (PUK-code is required to change)	1	Range 1 to 3			
13	Speed threshold	4	Range 1 to 10 1 - Speeding will not be detected. 2 - 110 km\h... 4 - 130 km\h; 10 - 190 km\h;			
14	Register new RFID tags	2	Range 0 to 6			
15	Check RFID link quality		–			



Programming sequence

1. Turn the ignition on.
2. Enter PIN code, wait for confirmation.
3. To enter the Alarm configuration menu press the Programming button 12 times (do it not later than 10 seconds after entering the PIN code). If your actions are correct, the Alarm will confirm it by 4 audio and light signals.
4. Select menu option by pressing and releasing the Programming button the number of times matching the number of option. The Alarm will confirm the option number by a series of audio and light signals.
5. Go to option setting by pressing and holding the brake pedal. The Alarm will notify of the option status by a series of audio signals of a changing duration.
6. Adjust option settings by pressing the Programming button the number of times matching the number of steps from the current status to the required one. Please remember that from the last function the program will go to the first one.
7. Release brake pedal. Now you can move to programming the next function or exit the programming mode.
8. Go to configuring another option by pressing the Programming button the number of times matching the number of steps from the current status to the required one. For example, to go from option 2 (AntiHiJack feature) to option 8 (Activation of Central Lock while driving), press the Programming button 6 times.
9. You can exit programming mode at any moment by turning off the ignition. If no actions were taken within 60 seconds and brake pedal was released, the Alarm will exit programming mode. A trill will sound.

Registration of new RFID tags

All RFID tags for the Alarm system should be registered all together. RFID tags that were not registered with others will be removed from the memory of the Alarm system.

Registration sequence

1. Choose one RFID tag, which will be used for identity verification. Remove batteries of all others. If you use PIN or PUK verification, remove batteries from all of the RFID tags.
2. Follow through with identity verification.
3. Press the Programming button 12 times; the Alarm will emit 4 audio and light signals.
4. Press the Programming button 14 times; the Alarm will emit repeated series of 14 audio and light signals.
5. Press and hold the brake pedal. The Alarm will identify the number of registered RFID tags by series of audio and light signals. Number of signals per series is a number of registered RFID tags.
6. Put the battery back into one of the RFID tags. The Alarm will register this RFID tag (while emitting audio signal). After registration is complete, the Alarm will emit series of audio and light signals indicating a number of all registered RFID tags. Make sure that the number of signals equals the number of registered RFIDs. If while registering an error occurs, the Alarm will emit a warning signal and go back to indicating registered RFID tags.
7. Put the battery back into the next RFID tag; wait until registration is completed. Repeat the same steps for other RFID tags.
8. After the last RFID is registered, release the brake pedal and turn the ignition off. A trill will sound.

Check RFID link quality

This check is performed when the vehicle engine is started. While performing this check, it is recommended to smoothly increase and decrease the engine rpm.

1. Follow through with identity verification.
2. Press the Programming button 12 times; the Alarm will emit 4 audio and light signals.
3. Press the Programming button 15 times; the Alarm will emit repeated series of 15 audio and light signals.
4. Press and hold the brake pedal for 10 seconds until you hear an audio signal. Release the brake pedal. The Alarm will enable constant RFID tag search mode.
5. Check the quality of RFID detection by moving it around the vehicle. Good reception is confirmed by a trill every 3 seconds.
6. To exit this option – Check RFID link quality – press the brake pedal or exit programming mode by turning the ignition off.

Changing the PIN code

1. Turn the ignition on.
 2. Enter PIN code, wait for confirmation.
 3. Press the Programming button 14 times. Wait for confirmation of the Alarm by 1 audio and 1 light signals.
 4. Set the new PIN code by using any combination of buttons. Pressing is confirmed by the audio and light signals.
 5. Wait for confirmation by 1 audio and 1 light signal.
 6. Re-enter the new PIN code.
 7. Wait for confirmation:
- 2 audio and light signals and a trill mean that the PIN code has been changed and the Alarm has left the PIN code changing mode.
 - Sound alert means that the PIN code has not been changed: a mistake has been made when entering the new PIN code, and it is necessary to repeat the procedure of changing the PIN code starting from step 4.
- You can exit the PIN code changing mode anytime by turning the ignition off.

Reassigning the Programming button

1. Reset all settings to factory defaults.
2. Interface the Alarm with the vehicle.
3. If analog steering wheel buttons are used, please define them (see above for the description of this procedure).
4. In order to assign any of the buttons perceived by the Alarm as the Programming button, press the selected button and hold it for longer than 5 seconds until a long audio signal will be heard.
5. The Programming button can be assigned within 15 minutes after interfacing the Alarm with the vehicle



Programming example

Example 1

Objective: You would like to change the factory settings of the Alarm and set output #2 Engine lock to control the normally open relay.

Sequence:

1. Turn the ignition on.
2. Enter PIN code and wait for confirmation.
3. Enter Menu 1 by pressing and releasing the Programming button 10 times. If you have performed all the actions correctly, the Alarm will notify you with 3 audio and light signals.
4. According to "Menu 1", select option 2 – Engine lock – by pressing the Programming button 2 times. The Alarm will inform you about chosen menu option number by a series of 2 audio and light signals.
5. Enter option 2 by pressing and holding the brake pedal. The Alarm will show option setting by a repeated double audio and light signals because the current (factory set) option setting is normally closed relay control.
6. Select the normally open relay control by pressing and releasing the Programming button 3 times. The Alarm will inform you about chosen menu option with series of 1 audio signal.
7. Exit programming mode by turning the ignition off.

Example 2

Objective: You would like to change the factory settings of the Alarm and increase AntiHiJack distance from 100 to 300 meters

Sequence:

1. Turn the ignition on.
2. Enter PIN code and wait for confirmation.
3. Enter Menu 2 by pressing and releasing the Programming button 12 times. If you have performed all the actions correctly, the Alarm will notify you with 4 audio and light signals.
4. According to "Menu 2", select option #3 "Distance for enabling "AntiHiJack", by pressing the Programming button 3 times. The Alarm will inform you about chosen menu option number by a series of 3 audio and light signals.
5. Enter option 2 by pressing and holding the brake pedal. The Alarm will show option setting by a repeated double audio and light signals because the current (factory set) option setting — "1" (100 meters).
6. Change option #3, to do so press programming button 2 times, i.e. increase setting by 2 (1 + 2 = 3). The Alarm will inform you about chosen menu setting with by a series of 3 audio and light signals (300 meters).
7. Exit programming mode by turning the ignition off.

Reset to the factory default settings

The Alarm has a procedure of resetting the programmable settings, when all settings of the vehicle model are removed from the Alarm permanent memory, and PIN code and all other programming options are returned to factory set values.

To reset to the factory default settings if the Alarm is installed:

6. Disconnect power supply from the Alarm.
7. Press and hold the built-in button (see "Connection scheme").
8. Connect the power supply while holding the button. The Alarm will emit dashed audio signal.
9. Release the button and wait until the dashed signal stops.
10. Turn on the ignition. Enter PIN-code, a trill will be made.
11. A signal will notify you that the Alarm was reset to factory default settings.
12. Disconnect the power source and CAN bus from the alarm.

If the Alarm was not installed in the vehicle:

There are 3 ways to reset the alarm:

1. With built-in button, if factory PIN-code ("2") was not changed and vehicle was driven for less then 10 kilometers.
2. With built-in button and PIN-code.

3. By installing the Alarm in the same vehicle as it was installed before (if you know the PIN-code).

Sequence (for the first two ways):

1. Press and hold the built-in button.
2. Connect the power supply while holding the button. The Alarm will emit dashed audio signal.
3. Release the button and wait until the dashed signal stops.
4. If the vehicle was not driven for more then 10 kilometers, enter PIN-code "2" with built-in button. Otherwise enter PUK-code with the built-in button. A trill will be made.
5. A signal will notify you that the Alarm was reset to factory default settings.
6. Disconnect the power source.



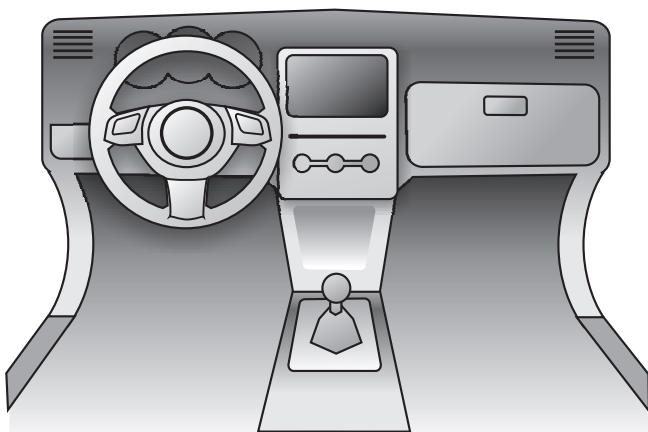
Only owner of the system should scratch PUK-code and enter it .



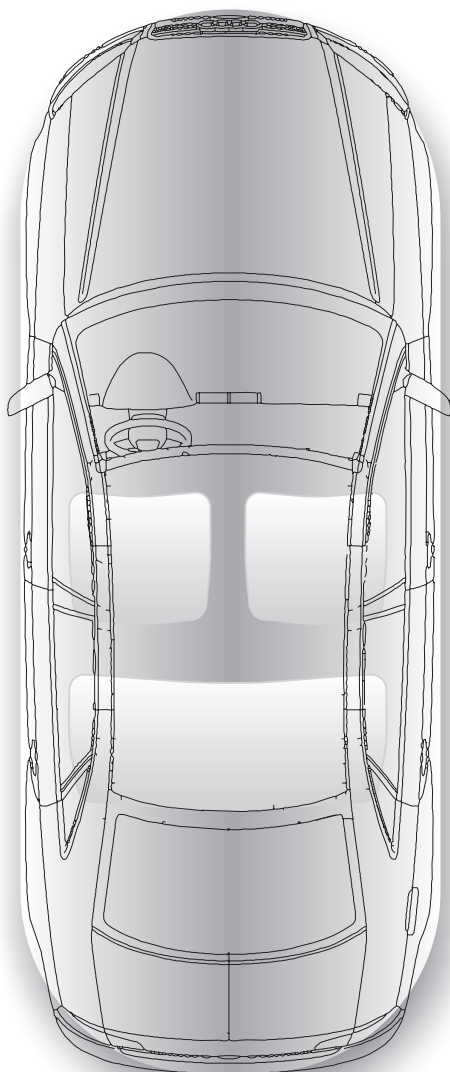
Figure 2



Arranging the Alarm units in the vehicle



Use the picture to draw arrangement of the Alarm units. This can help to find the alarm units.



Keep this sketch out of the reach of third parties.



Standard delivery package

Designation	Quantity, pc
Central unit	1
RFID Tag	2
A set of wiring harness	1
Siren	1
CD	1
Reminder card	1
User manual	1
Warranty certificate	1
Connection diagram	1
Unit package	1

Specifications and operating conditions

Parameter	Value
Power supply voltage, V	9 ... 15
Maximum current draw in standby mode, mA	10
Maximum current draw in operating mode, A	1.5
Operating temperature, °C	– 40 ... + 85
Storage temperature, °C	– 40 ... + 85
Maximum relative air humidity, %	95



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