TECHNICAL
DESCRIPTION

# PRIZRAK 5S/BT

## IMMOBILIZER

PROTECTION AGAINST PROFESSIONAL CARJACKING

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# Immobilizer description

## Preliminary introduction

This technical guide is universal for the immobilizers of the following modifications: Prizrak 5S/BT, Prizrak 5S/BT/Slim, Prizrak 5S/BT/2Slim. The modifications differ from one another in complectation and in settings. The differences in settings are described in this manual.

The covert vehicle anti-theft system «Prizrak» (hereinafter — the Immobilizer system) — is designed to protect vehicles from theft while parked and from carjacking while operated on the road. An authorized vehicle owner should carry out an authentication procedure every time prior to driving. The authentication can be carried out by carrying a special tag within the vehicle and /or by entering a secret PIN code combination using the original vehicle buttons. The vehicle will be immobilized if the authentication is not carried out.

## Terminology

Programming button (PB) – one of the original vehicle buttons which is used for programming the immobilizer features (visit the Integrator website to find out the sandard programming button for your particular vehicle). The programming button is assigned during the installation process. It is impossible to change the programming button during exploitation. The integrated button (reset button) may be used as the programming button while installing the Immobilizer system if necessary (see «The immobilizer wiring diagram»).

PIN code — is a secret combination of presses on one or multiple original vehicle interior buttons. The PIN code «2» may be entered with the built-in (reset button) programming button during the installation.

Authentication — is a procedure which consists in verifying whether the driver is authorized to drive the vehicle or not. The authentication is carried out every time prior to driving by carrying a tag and/or by entering a secret PIN code combination using the standard vehicle buttons after switching ON the ignition or starting the engine.

Smartphone tag — is a mobile device (smartphone) with already installed mobile app Prizrak ID. It is possible to test this feature while installing the Immobilizer system by pairing a smartphone without using the user's secret Bluetooth code. The «Installer mode» of the application was specially designed for this purpose. The barcode located on the plastic card supplied with the device should be used to pair a smartphone in the «Installer mode».

Guard mode – is an active state of the Immobilizer and AntiHiJack features: an authentication procedure should be carried out to deactivate the «Guard» mode, otherwise the vehicle will be immobilised.

## Immobilizer (PINtoDrive®)

Immobilizer – the feature was designed to protect vehicles from thieving while parked. The «Guard» mode of the Immobilizer feature is automatically activated after switching off the ignition for more than 3 sec. Once the feature has switched into «Guard mode» — it is required to complete an authentication procedure (page 7 Table 1 «Authentication methods») otherwise the vehicle will be immobilized:

- the vehicle will be immobilized after attempting to drive away (if «Speed monitoring» feature is enabled and is supported by a particular vehicle. Find out whether this feature is supported by your vehicle in the Integrator);
- the vehicle will be immobilised 5 seconds after switching on the ignition if the «Speed monitoring» feature has been disabled or is not supported by a particular vehicle.

## AntiHiJack

AntiHiJack is a feature designed to protect vehicles from carjacking while operated on the road and from theft while parked. AntiHiJack enters the «Guard» mode in the following situations:

- The ignition has been off for more then 3 sec. (if Immobilizer feature is disabled, if Immobilizer is enabled — the alarm follows the Immobilizer feature algorithms).
- The driver's door has been opened.

After switching to «Guard» mode, AntiHiJack function sequentially passes through several phases, and if it is not deactivated by a tag and/or PIN code — the vehicle will be immobilized. Phases are changed just only while the ignition is ON. After switching OFF the ignition, the Immobilizer saves in its nonvolatile memory the last status of the AntiHiJack feature and the next time the ignition is switched back to the «ON» position, the Immobilizer continues the operation cycle of the AntiHiJack. The AntiHiJack may be deactivated in any phase by carrying out an authentication procedure.

The «Guard» mode is divided into the following phases:

- Waiting phase;
- Warning phase;
- Engine blocking phase.

*Waiting phase.* In this phase AntiHiJack follows two different algorithms depending on whether the «Speed monitoring» is available in a particular vehicle or not.

The AntiHiJack waits until the vehicle covers a set distance starting from the moment of «Guard» mode activation if the «Speed monitoring» has been enabled and/or is supported by a particular vehicle. If «Speed monitoring» is not supported by a particular vehicle (or it is disabled in the «Hardware functions configuration» menu) or is not supported by the vehicle, the «Waiting phase» is devided into three stages:

- Waiting for the driver's door to be closed.
- Waiting for a preset amount of brake pedal applications.
- Pause before shifting to «Warning» phase.

*Warning phase* incudes two stages.

- Vehicle's driver warning of necessity to enter PIN code.
- Warning the other drivers on the road of possible dangerous situation by flashing the vehicle's hazard lights (during 10 seconds) due to the upcoming vehicle immobilization.
- The warning beeps will keep informing the driver about the necessity of entering a PIN code combination.

*Engine blocking phase.* The engine blocking triggers, the hazard lights continue to flash. The warning beeps and hazard lights will switch off in 15 sec. AntiHiJack remains in the engine blocking phase until PIN code is entered.

If «Safe engine blocking mode» is enabled:

- the engine will only be blocked when the vehicle speed drops below 30 km/h;
- after the vehicle comes to a complete stop;
- upon the next engine start.

The «Safe engine blocking» feature reduces the possibility of road accidents when the engine blocking triggers. After switching OFF the vehicle's ignition, the immobilizer system disables hazard lights and the warning beeps. If Immobilizer function hasn't switched into the «Guard» mode (see the Immobilizer feature section) then next time after switching ON the ignition, the hazard lights and driver warning beeps will switch on for 15 seconds. Herewith, AntiHiJack allows to start the vehicle's engine but prevents driving the vehicle according to the same algorithms as the Immobilizer feature. If the Immobilizer feature switches into the «Guard» mode — then after turning the ignition off, AntiHiJack stops its operation and the module follows the Immobilizer feature algorithms.

### Deactivating AntiHiJAck with a tag

This feature allows combining vehicle protection at parking and comfortable driving when AntiHiJack function is active. Choose the authentication method «Tag and PIN code», enable the feature «AntiHiJack automatic deactivation with a tag». With such settings, to deactivate the immobilizer feature you will have to enter a PIN code prior to driving and wait until a tag is detected by the system. And if the AntiHiJack is triggered while the car is being operated — the tag will be detected automatically. This will allow you to keep your eyes on the road since you don't have to enter PIN code. If the tag can't be used for some reason ( e.g. discharged battery, a tag is lost or damaged) — you may disable AntiHiJack by PIN code. If the system is programmed this way then before driving the vehicle it is required to wait until the tag is detected by the system and then PIN code must be entered.

### Gas pedal blocking (forced stop)

The feature will immobilize the vehicle if AntiHiJack is triggered, adhering the «Safe engine blocking» feature settings. It is obligatory that the vehicle supports the «Speed monitoring» to implement this feature. At the end of the «Warning phase», if vehicle's speed hasn't increased within 5 seconds or brake pedal has been pressed within 3 seconds — the gas pedal blocking activates trigger for 2 sec. and then deactivates for 5 seconds.

This can be repeated for 5 times. Every time the gas pedal blocking triggers — the time gap for which the system deactivates the gas pedal blocking reduces by 1 second. After the 5-th time the gas pedal blocking activates permanently.

The mandatory condition for «Gas pedal blocking» function operation is that the «Safe engine blocking» mode must be enabled.

## Using a smartphone as a tag

The immobilizer system has a feature allowing to use a smartphone as a tag. The special mobile app «Prizrak ID» must be installed to start using your smartphone as a tag. The app may be uploaded from the official app store depending on the OS of your smartphone. The smartphone that is going to be used as a smartphone tag must be paired with the immobilizer system via the «Prizrak ID» app. You may use your smartphone as the primary authentication method or as a backup method, e.g., if a Slim tag is damaged, lost or forgotten somewhere. The authentication by the smartphone tag is carried out the same way as the authentication with a Slim tag.

The immobilizer has a feature: «Authentication only if the smartphone screen is unlocked» that has been designed to keep the vehicle protected in case the smartphone is stolen. If enabled, this feature doesn't allow to carry out authentication using a smartphone until the smartphone's screen is locked (e.g., graphical key, fingerprint, Face-ID).

### Pairing a smartphone with the immobilizer system

The pairing procedure is carried out in the mobile app «Prizrak ID» which is accompanied with helpful hints throughout the entire registration process.

A secret Bluetooth code is required in order to pair (register) a smartphone with the immobilizer system. The code is located under the protective film of the plastic card supplied with the Immobilizer device.

No one but the car owner is allowed to scratch off the protective film of the Bluetooth code, however it is possible to test the immobilizer performance after installing it by using a temporary code — the code to register a smartphone as the smartphone tag. The temporary code is valid until the vehicle hasn't travelled the distance of 10 km after installing the Immobilizer system. After that the app will remind the car owner to delete from the system's memory a smartphone that was registered with the temporary code.

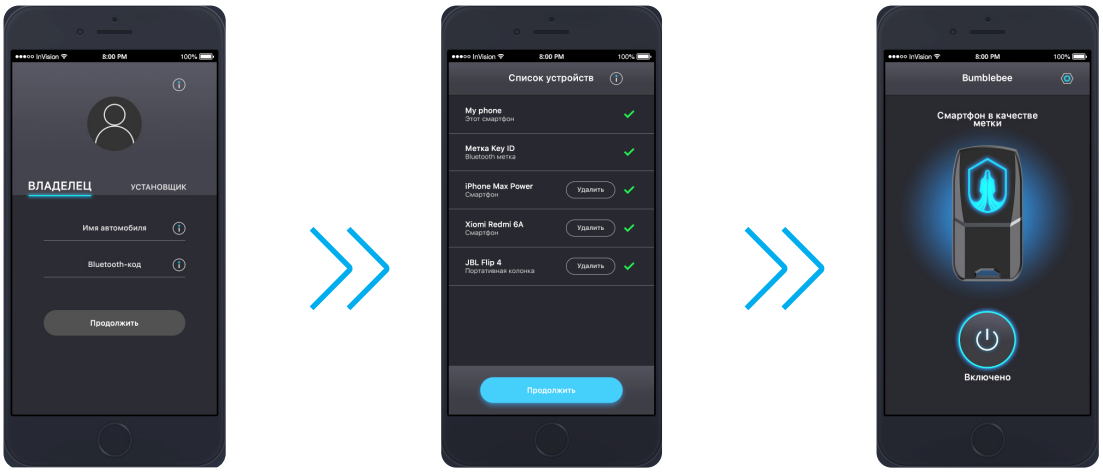
Bluetooth version of a smartphone shouldn't be lower then Bluetooth 4.2 with (BLE) technology. The OS version of the smartphone shouldn't be lower than 6.0 for Android and 12 for IOS.

The operating system of a smartphone may cancel activity of some applications (e.g. for energy saving reasons). In case if «Prizrak ID» has stopped for the same reasons — simply restart the application. This may be inconvenient when the AntiHiJack has triggered. Therefore, it is recommended that you always have a Slim tag with you.

## Pairing a smartphone with the immobilizer system

Download and install the mobile app “Prizrak ID” in your smartphone. All further actions have to be performed inside the car:

1. Carry out an authentication procedure.
2. Run the mobile app «Prizrak ID».
3. Enter a vehicle name (any name).
4. Enter the Bluetooth code located on the plastic card supplied with the system and tap the button “Continue”.




5. The list of all Slim-tags and smartphones paired with the immoblizer will display on the screen (e.g. with temporary access). You may delete all the smartphone tags you are not planning to use in the future and tap the button «Continue» after that.
6. The slim-tag logo appeared in your smartphone's screen means that the smartphone has been paired successfully.

## Slim-tag

Tag – is an electronic key allowing to authenticate an authorized vehicle driver. You must always carry a tag with you while operating a vehicle. The immobilizer system will automatically detect the tag before the vehicle motion begins. A confirmatory trill will sound when a tag is detected.

Any modification of Prizrak 5S immobilizer may be upgraded with tags (up to 8 tags in total, including no more than 4 smartphone tags). The default settings of Prizrak 5S/BT allow to utilize a tag for authentication as soon as it has been registered without having to change any settings even though tags are not included in the standard immobilizer set.

- One tag can't be registered into several immobilizer systems at the same time.
- You may use your smartphone for authentication as well.

### Replacing the tag battery

Five short beeps five short beeps following after authentication mean that the battery inside the tag must be replaced. The battery type is CR-2025. Visit a workshop to have the tag battery replaced by an installer or do it yourself.


### Registering new Slim tags

Register all desired tags within one procedure. The tags that are not taking part in the registration process will be erased form the immobilizer's memory.

Registration sequence:

1. Select one of the tags that will be used for authentication. Disassemble all the other tags and take the batteries out of them beforehand. Take the batteries out of each tag in case if a tag is not required for authentication (e.g. for authentication is used PIN code or PUK code).
2. Carry out an authentication procedure. The immobilizer will emit the confirmatory trill indicating that the authentication is successful.
3. Press and release the programming button 12 times, the immobilizer will emit 4 short beeps.
4. Press and release the programming button 10 times, the alarm will emit a series of 1 long beeps.
5. Press and hold the brake pedal, the immobilizer will indicate the number of already registered tags by series of beeps. The number of emitted beeps within one series indicates the total number of registered tags in the system's memory.
6. Place a battery into one of the tags. Wait for short intermittent beeps signifying that the tag registration procedure has started. After a tag has been successfully registered the immobilizer will indicate the total number of tags programmed into the system's memory by a series of buzzer beeps. Make sure the number of emitted beeps matches the number of all tags registered into the system.
7. Insert the battery into the next tag, wait until the tag is registered, repeat the steps described above if more tags are planned to be registered.
8. Release the brake pedal and turn the vehicle's ignition OFF after the last tag has been registered, the confirmatory trill will follow.

- It is allowed to enter the default PIN code «2» with the integrated programming button (reset button) for authentication if the vehicle hasn't travelled 10 km after the immobilizer installation and if the default PIN code hasn't been already changed.
- It is possible to register up to 8 tags into one immobilizer module.
- A tag will fail to register if the authentication method «PIN code» is set.

## Testing the detection quality of tags

Perform this procedure when the engine is running. It is recommended to slightly increase and decrease the engine's RPM while testing the tags.

Testing procedure:

1. Complete authentication. The immobilizer will emit the confirmatory trill indicating that the authentication is successful.
2. Press and release the programming button 12 times, the immobilizer's buzzer will emit 4 short beeps.
3. Press and release the programming button 11 times, the buzzer will emit 1 long and 1 short beep to indicate that the option №11 of the programming menu has been successfully selected.
4. Press and release the brake pedal during 10 seconds until a sonic signal is sounded. Release the brake pedal, the immobilizer will turn on the constant tag search mode.
5. Verify the tag detection quality by moving the tag to different places within the vehicle's interior. The confirmatory trill emitted every 3 seconds indicates the reliable tag detection.
6. To exit the option «Testing detection quality of tags» press the brake pedal or simply turn OFF the ignition.

## Authentication

Authentication Authentication is a procedure of verifying whether the driver is authorized to drive the vehicle or not. Every time prior to driving, the authorized vehicle driver should have a special tag within the vehicle and/or enter a secret PIN code combination using the dash buttons, or steering wheel buttons of the vehicle. The authentication is carried out either after turning the ignition ON or after starting the engine. The confirmatory trill will sound if the authentication is successful. A smartphone may be used for authentication instead of a Slim tag.

A preferred authentication method can be easily set during the installation process without having to enter a secret PUK code. As soon as the vehicle has travelled 10 km after installing the system, the authentication method can only be changed after entering the secret PUK code located on the plastic card supplied with the device.

Futhermore, a long warning beep will sound every time after completing the authentication if duaring installation of the system the authentication method has been changed to «PIN code or tag». To disable the long warning beep, enter PIN code to confirm that you are familiar with it and are able to use it when needed.

Table 1. Authentication methods

| Authentication method | Authentication procedure description | |
|---|---|---|
| **Tag**<br>(factory value for Prizrak-5S/BT/Slim and Prizrak-5S/BT/2Slim) | A tag must be in range | Wait for confirmatory trill |
| **PIN code*** | Enter PIN code | |
| **Tag or PIN code**<br>(factory values for Prizrak 5S/BT) | Tag must be in range | |
| | If a tag is absent — you may enter PIN code | |
| **Tag and PIN code**<br>(two-factor protection) | Tag must be in range and PIN code must be entered | There must be two confirmatory trills |

* The authentication method «PIN code» is helpful in case if it is necessary to exclude the possibility of using the tags (e.g. when they are stolen or lost) until new tags are purchased and registered.

If the authentication method is «Tag and PIN code» it is required to deactivate both security contours (wait until the tag is detected and enter PIN code). It will not be possible to drive a vehicle if at least one of the security contours is not deactivated.

Additional warning beeps (besides the confirmatory trill) followed after the authentication procedure mean that it is necessary to take particular actions.

Table 2. Warning beeps after authenticaton

| Warning beep | Reason | Recommended actions |
|---|---|---|
| Long | The default PIN code hasn't been changed | Change the default PIN code |
| | Serfvice/Valet mode is enabled | Deactivate the Valet/service mode off |
| | The authentication method «Tag» has been changed to «Tag or PIN code» | Enter PIN code (to confirm that the authentication method was changed under your will) |
| Five short | It is required to replace the tag battery | Replace the tag battery for a new one |

## PIN code

PIN code — is a secret combination of presses on one or multiple original vehicle interior buttons. The PIN code «2» can be entered with the built-in (reset button) programming button during the installation. Please refer to the Integrator files for the list of factory buttons that can be used in a particular vehicle to enter PIN code. PIN code must be entered every time the ignition is ON or the engine is started prior to driving.

PIN code is a one-, two-, three- or four-digit number. Each digit may consist of figures from 1 to 9.

PIN code may be easily changed as many times as needed either by an installer technician during installation or by an end alarm user at any convenient time.

In order to ensure the proper secrecy level-the factory-set (default) PIN code must be changed.

If it hasn't been changed then every time the factory-set PIN code is entered, the immobilizer emits a long warning beep to remind the alarm user about necessity to change the default PIN code. The default PIN code «2» is entered with the programming button.

PIN code entry sequence:

1. Switch the ignition ON or start up the engine.
2. Enter PIN code.
3. The confirmatory trill will sound to confirm the PIN code correctness.

The existing PIN code will reset to defaults in case if an existing authentication method is changed for the authentication method «Tag».

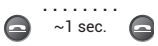
### PIN code examples

The buttons , , , , are shown as an example. Consult with your installation technician to find out the list of available buttons for your vehicle.

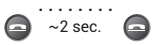
Enter PIN code. While entering one of the PIN digits, keep in mind that pressings duration and pauses between figures within one digit must not exceed 1 second. Pauses between digits have to be approximately 2 seconds.

PIN code entry with one button

One-digit PIN code «2»:



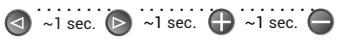

Two-digit PIN code «11»:



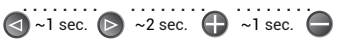

PIN code entry with multiple buttons

Obey the buttons pressing sequence while entering a PIN code.

One-digit PIN code «4»:




Two-digit PIN code «22»:




## PUK code

PUK code is a 4 digit number located under the protective film of the plastic card that is included in the alarm set. PUK code entry disables all the anti-theft features of the immobilizer, regardless off what authentication method is chosen.

It is required to enter PUK code:

- to changed an existing authentication method for a desired one (PUK code required if the vehicle has already travelled 10 km after installing the Immobilizer system).
- in case if PIN code combination is forgotten and/or a tag is lost or damaged.

PUK code is a 4 digit number located under the protective layer of the plastic card that is included in the alarm set. A PUK code is entered with a programming button keeping the two (2) second pause between the PUK code digits.

PUK code entry sequence:

1. Switch ON the ignition or start up the engine;
2. Enter PUK code;
3. Wait for the confirmatory trill;

If you made a mistake while entering the PUK code, take a break for more than 3 seconds and try again.

## Service/Valet mode

The mode is destined for maximum secrecy of the immobilizer system presence in a vehicle.

Service (valet) is the operating mode that temporarily disables all anti-theft and comfort functions (automatic windows closure, Immobilizer, AntiHiJack, control of an additional electro-mechanical hood lock, remote engine start, and etc.). Turning on the service mode allows to conceal the fact that a vehicle is equipped with an anti-theft system. When activated, the service mode temporarily disables all anti-theft and comfort features of the system (e.g. automatic windows closure, Immobilizer, AntiHiJack, control of an additional electro-mechanical hood lock, and etc.). The service mode allows the user of the immobilizer system leaving a vehicle in a service centre, at a dealership centre for maintenance, at a car wash station and etc., without notifying anybody that an immobilizer system is fitted to the vehicle. There is no need to tell anybody a secret PIN code combination or hand over a unique tag . The immobilizer reminds the driver to disable the «Service/ valet mode» by emitting a long beep every time after authentication.

In order to enable or disable the valet mode:

1. Switch ON the ignition.
2. Complete an authentication procedure.
3. No later than in 10 seconds, press the programming button 6 times.
4. Wait for the confirmation:
   - the mode has been enabled — 1 short beep and one confirmatory trill will follow;
   - the mode has been disabled — 2 short beeps and one confirmatory trill will follow.

### Service/valet mode automatic deactivation

This feature automatically turns off the service mode after the vehicle travels 10 kilometer's distance since it's been activated. The system will automatically deactivate the service mode and activate all anti-theft features, keeping the vehicle safe. Thanks to this feature car owners don't have to wary that their vehicles remain unprotected in case they forget to turn off the service mode.

## Quickly engaging maximum security

Two-circuit security mode increases the anti-theft possibilities of the immobilizer system in case if the tag is stolen or lost. Engage the second security circuit when parking your vehicle in a potentially dangerous place (e.g. at the hypermarket parking lot), thus the authentication method “Tag or PIN code” will change for “Tag and PIN code” just only for one armed cycle. This method provides maximum anti-theft protection as after the “Maximum security in dangerous places” is engaged you will have to enter PIN code and wait until the tag is acknowledged prior to driving.

This mode is engaged quickly without having to use the programming menus:

1. Switch the ignition to the “ON” position, wait until the tag is detected.
2. Thereafter within 20 sec:
   - open and close the driver's door;
   - enter PIN code, wait until the confirmatiory trill sounds,
   - switch OFF the ignition;
   - the immobilizer will emit two confirmatory trills to confirm that the authentication method «Tag and PIN code» has been engaged.

## Vehicle unlocking blockage if a tag is not in range

The feature allows to block access inside the vehicle in case if the OEM remote key has been stolen or lost and makes the immobilizer system capable to resist an «intellectual hacking» (relay attacks, code grabbing).

If this feature is implemented, the immobilizer will constantly search for a tag while the vehicle is armed. To get access inside the car, the owner must approach the vehicle carrying a tag and press the «unlock» button on the OEM remote or unlock the car using the keyless entry system — the vehicle's doors should immediately unlock.

The tag should be detected by the immobilizer before the «unlock command» is sent from the OEM remote key or keyless access system otherwise the doors will not unlock.

The tag search may operate in two modes: tag search is performed every time the vehicle is unlocked or just for one time — only if the «Maximum security in dangerous places» has been engaged.

It is always possible to unlock the car with the mechanical key or use a smartphone instead of a Slim tag (the smartphone must be paired with the immobilizer beforehand) if the tag is lost or damaged.

## Supplementary features

The Immobilizer system allows to implement additional features to increase the comfort level and anti-theft protection of a vehicle.

### Automatic windows closure («Comfort»)

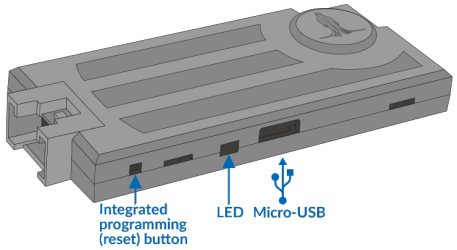
The system can be programmed to automatically roll up the vehicle's windows after arming (visit the Integrator to make sure the function is available for a specific vehicle).

### Electromechanical hood lock control

The system's anti-thieft capabilities may be improved by installing an additional electro-mechanical hood lock and programming the alarm to latch the hood when arming the vehicle and to unlatch it only after a vehicle's owner is authenticated.

### Automatic door lock/unlock

If a vehicle is not equipped at the factory with such features as latching the vehicle's doors as soon as the vehicle starts moving. and unlatching the doors right after the ignition is turned OFF, then it is possible to implement these functions on the vehicle. The feature is not available for some vehicles (visit the web data-base Integrator for details).




### Micro-USB port

The built-in micro-USB port allows configuring all settings and updating the integrated firmware by connecting to a PC via a micro-USB cable. All adjustments are made using the interface of a specially designed software which is called TECprog2. An up-to-date version of the software TECprog2 is available for download at https://tecel.ru/support/tecprog/

### Built-in programming (reset) button:

- This push-button can be used by an installer technician during the installation of the immobilizer. The button allows:
- to carry out authentication until the vehicle hasn't yet travelled 10 km after the installation.
- to program the factory vehicle buttons (positive/negative momentary push-buttons).
- to reset the immobilizer to default settings.

### Built-in LED light

It reflects some parameters that are obtained from the CAN-bus. Refer to the annex №2 at the end of this manual for detailed description.

## Immobilizer wire harness description

The Immobilizer inputs/outputs assignment is described in the Table 3. Connectors pin numeration is shown in figure 1. Inputs/outputs adjustment is carried out through the programming menu (see section «Hardware functions configuration»).


*Figure 1. Connector pin numeration, view from the wire harness side*

Table 3. The immobilizer pin out description

| Pin № | Wire color | Wire function<br>Default [optional] | Default value description |
|---|---|---|---|
| 1 | Grey/black | **Input (-)** | Reference ground of resistive buttons or the input for a negative button. The input was designed for connection to the vehicle's buttons that are going to be used for PIN code combination (PINToDrive®) |
| 2 | Pink/green | **Input (+)**<br>[Output (+) 150 mA] | Brake lights status control |
| 3 | Brown | **Data bus CAN2**<br>[Output (-) 150 mA] | Datra bus CAN2-L |
| 4 | Brown | **Data bus CAN1** | Data bus CAN1-L |
| 5 | Blue/red | **Output (-) 150 mA**<br>[Output (+) 150 mA] | Alternative Hazard lights control |
| 6 | Black | | Power source (-) |
| 7 | Grey/yellow | **Input (+) 150мА** | A possitive input of resistive buttons or a positive button. This wire is connected to OEM vehicle's buttons that are going to be used for PIN code combination (PINToDrive®) |
| 8 | Green/black | **Input (-)**<br>[Output (-) 150 mA] | Hood position monitoring |
| 9 | Brown/yellow | **Шина CAN2**<br>[Output (-) 150 mA] | Data bus CAN2-H |
| 10 | Brown/red | **Шина CAN1** | Data bus CAN1-H |
| 11 | White/черный | **Output (-) 150mA** | Wired engine locking |
| 12 | Red | | Power source (+) |

# Immobilizer adjustments

## 1st step. Interfacing the immobilizer with a vehicle

All vehicles compatible with the immobilizer system are devided into functional groups. Each group is devided into subgroup. Groups and subgroups are endowed with a special number (https://int.tecel.ru/). Interfacing the immobilizer with a vehicle means vehicle group and subgroup identification.

The interfacing procedure may be carried out as follows:

- via a laptop or a PC.
- automatically – by connecting the immobilizer to a vehicle's harness.
- manually – by using the programming menu of the immobilizer.

### Interfacing via a PC

A vehicle make, model and other settings of the Immobilizer system can be configured using a PC with the already installed software TECprog2. This intefacing method helps shorten the installation time and avoid possible mistakes in programming.

### Automatic interfacing

The immobilizer identifies an appropriate group and subgroup after connecting it to the vehicle's CAN-bus and power source, and performing some simple actions (the typical simple actions are: cycling the ignition on/off and locking/unlocking a vehicle using the original remote). An interfacing procedure for each vehicle make and model is described in the Integrator (https://int.tecel.ru). After carrying out all necessary actions you have to make sure that the group and subgroup have been identified correctly. The identified group and subgroup is indicated by beeps (a group number - pause, a subgroup number-pause).

If a vehicle group is a two-digit number – then every figure will be indicated separately. For example, the group 35 and the subgroup 2 will be indicated as follows: 3 long beeps – 1 sec pause, 5 long beeps – 2 sec. pause, 2 short beeps – 4 sec. The module will indicate the detected group and subgroup circularly 3 times.

### Manual interfacing

This interfacing method might be necessary only in exceptional cases. A group and subgroup programming is carried out with the built-in programming (reset) button. Make sure no group and subgroup is already programmed before you start the procedure, the CAN-bus must not be connected as well. If within 60 seconds the programming button is not pressed the module will automatically abort the programming process.

Manual interfacing is carried out as follows:

1. Power up the immobilizer, wait until it starts emitting intermittent beeps.
2. Not later than in ten seconds after that press the programming button 10 times to enter the «Menu 10». The module will emit 3 beeps to confirm that the appropriate programming menu has been successfully selected.
3. Press the programming button 1 time in order to enter the option №1 «Vehicle model». The immobilizer will indicate the selected option number by a repeating series of 1 beep.
4. Press and release the programming button the number of times that corresponds to a group number you wish to program (refer to the Integrator).
5. Then enter a subgroup number by pressing and releasing the programming button the appropriate number of times (refer to the integrator).

- In case if a vehicle group consists of a two-digit number, enter the first didgit of the group number, wait for two seconds and then enter the second digit of the group number. The immobilizer will emit a series of beeps which corresponds to a group number.

Make sure you have programmed the correct vehicle model by listening to the emitted beeps:

- press and release the programming button 1 time if everything is correct, The immoblizer will stop beeping the vehicle model is now programmed.
- press and release the programming button 2 times if there is a mistake. Repeat the programming process from the step №4.

## 2nd step. Selecting and programming vehicle buttons

At this step is carried out selection and programming of the vehicle's buttons that are going to be used for entering a PIN code and for configuring the immobilizer settings. There is no need to program the vehicle's buttons if the immobilizer is able to sense them via the CAN-bus (refer to the Integrator). You will need to connect to «wired buttons» and program them in case if a vehicle doesn't have buttons operating via CAN-bus (see description below).

It is allowed to use the «wired buttons» in addition to the «CAN buttons». The «wired buttons» must be programmed within 15 minutes after interfacing the immobilizer with a vehicle. You should reset the immobilizer to default settings and repeat the interfacing procedure if you fail to program the buttons within 15 minutes.

### Resistive buttons (are usually located on the steering wheel).

Connect the grey/yellow wire (output №7) to the resistive buttons circuit with positive polarity. Then connect the grey/black wire (output 17) to the resistive buttons with negative polarity (refference ground). Make sure the immobilizer is configured for operation with resistive buttons («Menu 10», option №6).

### Programming sequence:

1. Switch ON the ignition and wait not less then 5 seconds.
2. Press and hold one by one (for approximately 2 sec) all steering wheel buttons and understeering switches (cruise control and etc.). A button will not be programmed and it will not be possible to use it if the button is released before the immobilizer emits a short beep. A short beep emitted when a button is being pressed means that this button will be available for use as a PIN code button or one of the PIN code buttons.
3. Switch OFF the ignition, a confirmatory trill will sound.
4. Switch ON the ignition.
5. Assign one button as the programming button from the available ones by pressing that button and holding it for at least 5 seconds until you hear a beep.

### Positive or negative buttons (regular momentary-push buttons with NO terminals).

Connect any unused programmable inputs of the immobilizer to the vehicel's buttons of a corresponding polarity and assign the feature №6 (refer to the Table №7) to the programmable inputs. These buttons may be used as the programming button or for entering a PIN code, even if the resistive or CAN type of buttons are used as well.

If you are going to connect the grey/yellow wire (input №7) and the grey/black wire (input №1) to a positive and/or negative button, you will have to program them for operation with a positive and/or negative button (refer to the «Menu 10», option №6). It is possible to change the setting of the option №6 only with the built-in programming (reset) button until a PIN code is entered with a vehicle's button. Reset the module to default values, if you have already entered a PIN code with a vehicle's button, in order to make changes in the option №6. If you need to assign the programming button from among those buttons: turn ON the ignition, press and hold pressed the selected button for at least 5 seconds until you hear a beep.

## 3rd step. Configuring the Immobilizer features

At this point is carried out customization of the user features and adjustment of a new PIN code combination and the immobilizer hardware features. The programming button allows to carry out all necessary adjustments in accordance with the programming menu (the menus are shown below).

Table 4. Programming menu structure

| Menu number | Menu function | Code to enter the menu | Number of confirmatory beeps |
|---|---|---|---|
| Menu 10 | Hardware features configuration | 10 | 3 |
| Menu 11 | Programmable inputs/outputs configuration | 11 | 6 |
| Menu 12 | Immobilizer custom settings | 12 | 4 |
| Menu 20 | Hood comparment module HCU-230/BT configuration | 20 | 10 |

It is recommended to program the immobilizer using a specially developed software «TECprog2» allowing to save time for installation of the immobilizer and avoid accidental mistakes that may arise from manual programming. The up to date «TECprog2» software version is available for download at https://tecel.ru/en/tecprog/

Connect the immobilizer to a computer via a micro-USB cable and update the fimware of the immobilizer, set up a desired vehicle model, configure the immobilizer settings and features. The immobilizer may be connected to a computer via Bluetooth, but for this purpose is required a special TECprog USB Bluetooth adapter. The Bluetooth adapter allows configuring the settings and upgrading the firmware of the Immobilizer system.

## Configuring the immobilizer hardware functions (menu 10)

The code to enter the menu-10 (10 presses on the programming button). Default values are highlighted.

Table 5. The immobilizer hardware functions configuration

| № | Option name | Default values | Available values/commentary |
|---|---|---|---|
| 1 | Vehicle model | – | Is adjusted automatically, but a group and subgroup may be setup manually if necessary (refer to the Integrator) |
| 2 | Wired engine blocking type | **2** | 1 – Normally open (NO) relay;<br>**2 – Normally closed (NC) relay;**<br>3 – Hood compartment unit HCU-230 control via digital bus, output №11 (white/black) |
| 3 | Engine locking via CAN-bus | **2** | 1 – enabled in Prizrak; **2 – disabled;** 3 – enabled in CAN-relay |
| 4 | Engine blocking at safe speed | **1** | **1 – disabled (engine locking will trigger regrdless of speed);**<br>2 – at speed below 30 km/h;<br>3 – at a complete stop;<br>4 – prevent the next engine start |
| 5 | Ability to start up the engine before authentication is carried out | **1** | **1 – ON;** 2 – OFF |
| 6 | Inputs adjustment for connection to analog buttons (inputs №1 and №7) | **1** | The inputs are connected to:<br>**1 – to resistive buttons on the (steering wheel);** 2 – input №1 to a positive button, input №7 – to a negative button. It is also possible to assign to these inputs any feature listed in the Table 7 if the option №6 is configured for the value 2 |
| 7 | Hazard lights control method | **4** | 1 – by connecting to a pulse hazard lights control button;<br>2 – by connecting to a status hazard lights control button;<br>3 – by conencting to turn indicators lamps;<br>**4 – control via CAN-bus** |
| 8 | Central door locking system (CDL) control method | **4** | 1 — control via a single wire (considering the CDL status);<br>2 — control via a single wire (regardless of CDL status);<br>3 — double wire control;<br>**4 — control via CAN-bus** |
| 9 | Hood lock automatic latching | **1** | **1 – ON;** 2 – OFF |
| 10 | «Comfort» feature operation duration | **3** | Form 1 to 6. 1 — 10 sec;...3 — 30 sec;...6 — 60 sec. The default value is **3 — 30 sec.** |
| 11 | Vehicle's CDL unlocking blockage if a tag is not in range | **1** | **1 — OFF;** 2 — ON (constant tag search); 3 — ON, only if «Maximum protection in dangerous places» was engaged (constant tag search) |
| 12 | Vehicle's speed control for Immobilizer and AntiHiJack | **1** | **1 — ON;** 2 — OFF. The setting defines engine locking trigger algorithm for the Immobilizer and AntiHiJack features |
| 13 | Quantity of brake pedal presses before AntiHiJack feature is triggered | **3** | The value of this option doesn't effect anything if the option №4 «Vehicle's engine locking at a safe speed» is enabled |
| 14 | Type of built-in electromechanical relay in CAN-relay | **3** | 1 — normally open relay; 2 — normally closed; **3 — is not used** |

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|---|---|---|---|
| 15 | «CAN-relay Implant» diagnostics | – | 1 – ready for operation; 2 – not registered; 3 – registration procedure in progress; 4 – registration failed; 5 – no communication with CAN-relay; 6 – CAN-relay firmware update required; 7 – Error in connection to CAN-bus |
| 16 | Can-relay implant reset to default values | – | To reset CAN-relay to factory values:<br>• press the programming button one time;<br>• wait for the confirmatory trill. The module will inform about the option status by a series of 2 beeps and LED flashes.<br>1 — registered; 2 — not registered (reset to default values) |
| 17 | CAN-bus selection via which is carried out control over CAN relay Implant | **1** | **1 — CAN-relay is automatically searched on every available CAN-bus;** 2 — CAN-relay is searched on CAN1; 3 — CAN-relay is searched on CAN2 |
| 18 | Indication of successful authentication | **1** | **1 – audible indication with the built-in buzzer;**<br>2 – audible and/or light indication with the vehicle's factory systems (refer to the Integrator) |

## Hardware features programming sequence (menu 10)

The entire programming process is carried out through the programming button (hereinafter referred to as – PB). The immobilizer emits audible indication beeps (hereinafter – beeps) to notify on the current state of a setting being programmed. In case if the option number or the option value consists of two digits, the sonic indication will be as follows: the first digit is indicated by long beeps, the second – by short beeps. For example: the figure 12 - will be indicated by one long beep and two short beeps; 25 – two long and 5 short beeps. It is allowed to enter PIN code «2» with the programming button if a vehicle hasn't yet travelled 10 km after the installation and the default PIN code hasn't been changed. The immobilizer will exit the programming mode if at any programming step the ignition is switched OFF or if within 10 seconds after the last action is made the brake pedal is not pressed.

1. Switch ON the ignition. Carry out an authentication procedure.
2. Enter the programming manu no later than in 10 seconds:
   - press and relase the PB 10 times.
   - confirmation – 3 beeps. A different number of beeps signifies an error.
3. Select a desirted option within the menu:
   - press and release the programming button the number of times necessary to advance from the current option to a desired one. Each press on the PB encreases the option number by one. The option numbers are changed in a «circle» - after the last option number goes the first one.
4. To check the curreent status of the selected option:
   - press and hold the brake pedal;
   - the beeps emitted by the immobilizer will indicate the current value of the option.
5. To change the current value of the option:
   - hold down the brake pedal. Each press on the PB will encrease the option number by one. The option numbers are changed in a «circle» – after the last option number goes the first one.
6. If you need to configure another option within the menu — release the brake pedal — you will go back to the step №3 of the progrgamming sequence. To quit programming — switch OFF the vehicle's ignition.

## Configuring the programmable inputs/outputs (menu 11)

The code to enter the menu — 11, confirmation — 6 beeps. The default values are highlighted.

Table 6. Programmable inputs/outputs configuration

| № | Wire colour and description (wire № in the connector) | Available operation modes | Default value | The selected value. Commentary |
|---|---|---|---|---|
| 1 | Grey/black input configuration (1) | **Input (-)** | **6** | Depends on the option №6, menu 10. **Wired button.** May be assigned one of the features from the Table 7 «Programmable inputs features» |
| 2 | Pink/green wire configuration (2) | **Input (+)** or Output (+) | **1** | **1 — Programmable input (+);** 2 — Programmable output (+) |
| 3 | PInk/green wire function configuration (2) | | **1** | **Brake pedal position monitoring.** Any feature from the table «Programmable inputs features» may be assigned to this wire. The wire will be automatically configured for «Vehicle's CDL unlocking blockage if a tag is not in range (NO relay control)» feature (refer to the «Programmable outputs features», the feature №30), in case if the option №2 of this menu is setup for the value «2»; After this it is possible to assign any other feater to this output if desired |
| 4 | Brown (3) and brown/yellow (9) wires configuration | **CAN-bus** or Output (-) | **1** | **1 — data-bus CAN2;** 2 — programmable output (-) |
| 5 | Brown wire (3) function configuration | | **—** | This wire function is dependant on the value of the option №4. **Data bus CAN2 (L).** If the option №4 is setup for value «2» then the output will automatically configure for feature «The output is not used» (refer to the table «Programmable outputs features», the option №0). After that it will be possible to assign to this output any feature from the «Programmable outputs features» table 8 |
| 6 | Brown/yellow (9) wire function coinfiguration | | **—** | **Data-bus CAN2 (H).** Depends on the value of the option №4. If the option №4 is setup for value «2» then the output will automatically configure for feature «The output is not used» (refer to the table «Programmable outputs features», the option №0). After that it will be possible to assign to this output any feature from the «Programmable outputs» table |
| 7 | Blue/red wire (5) function configuration | **Output (-)** or Output (+) | **32** | **Hazard lights alternative control.** It is possible to assign any feature from the table «Programmable outputs features» |
| 8 | Blue/red wire (5) configuration | | **2** | 1 — Programmable output (+); **2 — Programmable output (-)** |
| 9 | Grey/yellow (7) wire function configuration | **Input (+)** | **6** | It is dependant on the value of the option №6, menu 10. **Wired button.** It is possible to assign any feature from the table «Programmable inputs features» |

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|---|---|---|---|---|
| 10 | Green/black (8) wire configuration | **Input (-)** or Output (-) | **1** | **1 — Programmable input (-);** 2 — Programmable output (-) |
| 11 | Green/black (8) wire function configuration | | **2** | **Hood position monitoring.** It's possible to assign any feature from the table «Programmable inputs features». If the option №10 is setup for value «2» — the wire will be automatically configured for «Vehicle's CDL unlocking blockage if a tag is not in range (NC relay control)» feature (refer to the «Programmable outputs features», the option №31) |
| 12 | White/black wire (11) configuration | **Output (-)** | **2** | 1 – hood module control via TP-BUS; **2 – programmable output.** |
| 13 | White/black wire (11) function configuration | | **35** | **Wired engine blocking.** Can be programmable any feature listed in the table of programmable outputs. |

Inputs/outputs programming sequence (menu 11)

The entire programming process is carried out through the programming button (hereinafter referred to as - PB). The immobilizer emits audible signals (hereinafter — beeps) to indicate the current state of a setting being programmed. In case if the option number or the option value consists of a two-digit number, the beeps will sound as follows: the first digits are indicated by long beeps, the second digit — by short beeps. For example: the figure 12 — will be indicated by one long beep and two short beeps; 25 — two long and 5 short beeps. It is allowed to enter PIN code «2» with the programming button if a vehicle hasn't yet travelled 10 km after the installation and the default PIN code hasn't been changed. The immobilizer system will automatically exit the programming mode if at any programming step the ignition is switched OFF or if within 10 seconds after the last action the brake pedal is not pressed.

1. Switch the vehicle's ignition ON. Carry out an authentication procedure.
2. Not later than in 10 seconds enter the programming menu:
- press and release the programming button 11 times.
- confirmation -6 beeps. A different number of beeps signifies an error.
3. Select a desired menu option:
- press and release the programming button the number of times that corresponds to the option number in the menu. Each time the button is pressed the option number is increased by one. The option numbers are changed in rotation, after the last option number goes the first one;
4. To find out the current option value:
- press and hold the brake pedal;
- the emitted beeps will indicate the current option value.
5. To change the value of the option:
- keep the brake pedal down. Each time the button is pressed the option number is increased by one. The option numbers are changed in rotation, after the last option number goes the first one.
6. To configure the value of another option-release the brake pedal. This will bring you back to the step 3 of the programming sequence. To exit the programming mode — switch the ignition OFF.

Table 7. The programmable inputs features

The programmable inputs and outputs of the immobilizer system might be configured for different features from the tables 7 and 8 respectively. Hence, the immobilizer functionality may be easily reconfigured according to specific needs of an installation technician. Furthermore, the programmable features of the immobilizer may be assigned to the inputs and outputs of the hood compartment unit HCU-230/BT. However, some of the features can't be implemented by the HCU-230/BT due to its hardware capabilities.

| № | Name of the feature and description | Possibility to implement the feature by HCU-230/BT |
|---|---|---|
| 1 | **Brake pedal position monitoring.**<br>Can be connected to the brake pedal pin switch output in case if there is no brake pedal position data running on the vehicle's CAN-bus (refer to the «Integrator») | Yes |
| 2 | **Hood position monitoring.**<br>Is connected to the hood pin switch wire in case if there is no hood position data running on the vehicle's CAN-bus | Yes |
| 3 | **Driver's door pin-switch input.**<br>Is connected to the driver's door pin-switch wire if the vehicle's CAN-bus doesn't contain data on the driver's door status (refer to the «Integrator») | Yes |
| 4 | **Hood lock latching via HCU-230.**<br>If a signal is applied to this pulse trigger impulse the immobilizer will send a command to the HCU-230 to latch an aftermarket electro-mechanical hood lock | Yes |
| 5 | **Ignition monitoring.**<br>If it is not possible to read the Ignition status data out of the vehicle's CAN-bus (for example, when a vehicle's specific electrical circuits are being interrupted) then this immobilizer input must be connected to the vehicle's wire with constant +12 volts when the Ignition is ON. After assigning this feature to any programmable input — the immobilizer stops analyzing such data on the CAN-bus.<br>In order to make the immobilizer analyze the ignition status data on the CAN-bus again, reprogram this input to any other feature or reset the immobilizer to the default settings | Yes |
| 6 | **Wired button (buttons).**<br>The feature is assigned to a programmable input(s) if it is necessary to connect the immobilizer to the vehicle's «wired» button(s) which are intended for use as the PIN code combination buttons in case if the are no «CAN-bus buttons» in a particular car. The programmable input that was configured as the «Wired button» input must be connected to the output of a positive or negative button (momentary push-button with NO contacts). Use the programmable inputs №1 (grey/black) and №7 (grey/yellow) if you need to connect to «resistive» buttons | No |

Table 8. Programmable outputs features

| № | Name of the feature and description | Possibility to implement the feature by HCU-230/BT |
|---|---|---|
| 0 | **The output is not used.** It doesn't generate any signals or pulses | Yes |
| 1 | **«Armed» status.**<br>The output provides a constant level signal after the vehicle is armed by the OEM remote key (keyless entry system) until it is disarmed | Yes |
| 2 | **Pulse after «Arming»**<br>The output provides a pulse of 0,8 seconds upon arming the vehicle by the OEM remote key (keyless entry system) | Yes |

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| 3 | **Pulse after «Disarming»**<br>The output provides a pulse of 0,8 seconds upon arming the vehicle by the OEM remote key (keyless entry system) | Yes |
| 4 | **Pulse after authentication**<br>The output generates a pulse signal of 0,8 seconds after the vehicle's owner completes an authentication procedure. Can be used for connection to a «lock» wire of an electro-mechanical hood lock and for other purposes. | Yes |
| 5 | **Vehicle's OEM alarm panic status**<br>The output generates a constant level signal while the vehicle's OEM alarm system is on alert | Yes |
| 6 | **Alert to a pager**<br>A constant level signal of 30 sec is formed while the vehicle is «armed» and if any vehicle compartment is violated (doors opened, hood, trunk). The signal disappears after the vehicle is disarmed | Yes |
| 7 | **Alert/warning pulses to the vehicle's klaxon**<br>A pulse signal is formed during 30 sec. if while in armed mode the vehicle's perimeter is violated (door/s opened, hood, trunk). The feature may be implemented on vehicle's without OEM alarm system. The potential disappears right after disarming the immobilizer. Is used for connection to a vehicle's klaxon | Yes |
| 8 | **Doors, hood and trunk**<br>A constant signal is formed when a pre-programmed door, hood or trunk is opened.<br>The programmig sequence is described above in chapter «Sequence for programming inputs/outputs (menu 11)» starting from the step 5.<br>After the brake pedal is pressed. the immobilizer will indicate the current option value twice in a row by the series of 8 beeps then short intermittent signals will follow. Release the brake pedal. The immobilizer will keep emitting short intermittent signals.<br>6. To configure the value of another option-release the brake pedal. This will bring you back to the step 3 of the programming sequence. To exit the programming mode - switch the ignition OFF.<br>Open only those doors (you may do it beforehand) that are supposed to be indicated on that output, the doors you don't want to be indicated should be closed. Apply the brake pedal again and keep it pressed, the immobilizer will emit 8 beeps — the doors are now assigned to the output. If you don't press the brake pedal and exit the programming menu then the immobilizer will save in its memory the previouse option value | Yes |
| 9 | **Sensors ignoring**<br>A constant level signal is formed during the «Comfort» feature operation and when the trunk is being released from the vehicle's OEM remote | Yes |
| 10 | **«Vehicle's OEM button pressure» programming algorithm**<br>A constant level signal signal is formed if a preprogrammed vehcle button is pressed.<br>Refer to the chapter «Sequence for programming inputs/outputs (menu 11)» starting from the step 5.<br>After the brake pedal is pressed the immobilizer will indicate the current option value twice in a row by a series of one long beep, and then will start emitting short intermittent audible signals. Holding the brake pedal, press a desired button (please refer to the Integrator to check the list of available buttons for a specific vehicle). If the the immobilizer recognizes the button, it will stop emitting intermittent signals and will return to a current option number indication by a series of 1 long beep. Release the brake pedal, the immobilizer will start indicating a current option number. If you release the brake pedal before the immobilizer has learned a button, it will exit this option, save previous option settings, and will go back to a current option number indication | Yes |
| 11 | **Ignition**<br>A constant level signal is generated while the vehicle's ignition is ON or the engine is started. The signal will vanish as soon as the ignition is switched OFF | Yes |
| 12 | **ACC**<br>A constant level signal is formed while the vehicle's accessories are ON (the first key position of the ignition switch may match with the ignition). The output stops generating a signal as soon as the accessories (ACC) are switched off | Yes |

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| 13 | **The engine is running**<br>A constant signal is formed while the engine is running, the signal will vanish as soon as the engine is shutdown | Yes |
| 14 | **Engine RPM**<br>A pulse signal is formed with frequency of 1 pulse per second which is proportional to 20 revolutions per minute of the engine velocity speed. The reflected RPM are approximate, not precised | No |
| 15 | **Gear lever position**<br>A constant signal is formed if the gear lever is shifted to a pre programmed position: for AT and robotic transmissions can be programmed any gear lever position; for manual transmission-only R position. Refer to the chapter «Sequence for programming inputs/outputs (menu 11)» starting from the step 5.<br>After the brake pedal is pressed the immobilizer will indicate the current option value twice in a series of 1 long beep and 5 short beeps, and then will start emitting short intermittent beeps. Holding the brake pedal, shift the gear lever to a desired position (you may shift the gear lever to a desired position beforehand). Release the brake pedal press it again, the immobilizer will stop emitting short beeps and will indicate the current option value (1 long beep and 5 short beeps). Release the brake pedal, the immobilizer will indicate the option number | Yes |
| 16 | **The vehicle is moving**<br>A constant level signal is formed if the vehicle's speed exceeds 5-10 km/h (the speed threshold depends on a vehicle model) | Yes |
| 17 | **Front parking sensors control (power supply)**<br>A constant level signal is formed if the engine is running and the vehicle's speed is less than 15 km/h | Yes |
| 18 | **Rear parking sensors control (power supply)**<br>A constant level signal is formed if the engine is running, the gear lever is shifted to «R» and the vehcle speed is less than 15 km/h | Yes |
| 19 | **Vehicle's speed**<br>A pulse signal is formed with frequency of 1 pulse per second which is proportional to vehicle's speed of 1 km/h. The reflected speed is approximate, not precised | No |
| 20 | **Brake pedal**<br>A constant level signal is formed when the brake pedal is down | Yes |
| 21 | **Parking brake**<br>A constant level signal is formed while the parking brake is engaged | Yes |
| 22 | **Parking (marker) lights**<br>A constant level signal is formed while the marker lights are ON | Yes |
| 23 | **Timer channel («Comfort»)**<br>A constant level signal is generated during a pre-selected time (10-60 sec.) after arming the vehicle from the OEM remote or keyless entry system. The time may be set up by intervals of 10 sec | Yes |
| 24 | **Starter or OBDII diagnostics bus blocking (NC relay control)**<br>A constant level signal is generated: while the CAN-bus is active before a vehicle owner authentication procedure is completed and also when AntiHiJack is triggered | Yes |
| 25 | **Pulse to latch an aftermarket hood lock**<br>A pulse signal is formed during 0,8 sec.: after the vehicle is armed; when immobilizer, AntiHiJack is triggered. The signal won't be formed if the hood is up | Yes |
| 26 | **Gas pedal locking (NC relay control)**<br>The signals are generated to control a NC relay, which interrupts the gas pedal signal wire allowing to decrease the vehicle speed and immobilize it at a safe speed if the AntiHiJack has triggered | Yes |
| 27 | **Service/valet mode status**<br>The output generated a constant level signal while the service mode is active | Yes |

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| 28 | **Pulse to latch aftermarket door pin locks**<br>A pulse of 0,8 seconds is generated after the vehicle is armed by the OEM remote | Yes |
| 29 | **Pulse to unlatch door pin locks**<br>A pulse of 0.8 sec duration is formed after the vehicle is disarmed by the OEM remote and the tag is detected | Yes |
| 30 | **Vehicle's CDL unlocking blockage if a tag is not in range (N.O. relay control)**<br>A constant level signal is formed after the tag is detected and the vehicle is unlocked by the OEM remote. The signal is present: while the CAN-bus is active; if the service mode is on; the authentication method is: «PIN code». The signal will vanish after arming the vehicle from OEM remote | Yes |
| 31 | **Vehicle's CDL unlocking blockage if a tag is not in range (N.C. relay control)**<br>A constant level signal is formed after arming the vehicle from the OEM remote. The signal will vanish after the tag is detected and the vehicle is unlocked from the OEM remote | Yes |
| 32 | **Hazard lights – alternative control**<br>Pulses are generated if there is no control over hazard lights via CAN-bus in a certain vehicle. The function is automatically configured to the output after the module is interfaced with a vehicle, but it can be configured manually if needed. This programmable output is connected to the output of hazard lights control button or to the hazard lights lamps (refer to the Integrator) | Yes |
| 33 | **CDL locking (lock/unlock) – alternative control**<br>A «lock» pulse is formed to latch the door locks with a double wire control scheme or to lock and unlock for a single wire control scheme. The function is used if it is impossible to control the power door locks in a vehicle via CAN-bus. The function is automatically configured to a programmable output after the immobilizer is interfaced with a vehicle, but also may be programmed manually if needed | Yes |
| 34 | **CDL unlocking – alternative control**<br>A pulse is formed to unlock the power door locks with a double wire control scheme. The function is used when there is no control over door locks via CAN-bus. The function is automatically configured to a programmable output after the immobilizer is interfaced with a vehicle., but also may be programmed manually if needed | Yes |
| 35 | **Wired engine locking**<br>The operating algroithm for the output is adjusted in the «Hardware features configutration» - the option №2.<br>Available settings:<br>• the output generates a signal to control a standard relay with N.C. or N.O. terminals for vehicle immobilization;<br>• the output №11 (white/black) can be configured to carry out the TP-BUS functions which will allow to control the hood compartment module HCU-230. In this case an engine locking relay will be controlled with the HCU-230 module | No |
| 36 | Is not used | — |
| 37 | **Engine locking (immobilization) by start/stop button push imitation.**<br>If the «AntiHiJack» function is triggered the output will generate a signal and the vehicle will be immobilized when it comes to a complete stop.<br>In case if the «Immobilizer» function is triggered the output will generate a signal when the gear selector is put to «R» or «D» (for vehicles equipped with an automatic transmission) or when the vehicle is driven off without carrying out an authentication procedure (for manual-shift vehicles). The output will stop generating a signal as soon as the vehicle is immobilized. In case if there is no vehicle speed data on the vehicle's CAN-bus — the output will generate a pulse signal the next time the engine is started — according to the «Immobilizer» function algorithms | No |
| 38 | **Extarnal buzzer control**<br>An output with the programmed function «Extarnal buzzer control» will generate pulses according to the built-in buzzer algorithms. After taht, the built in buzzer will stop operating | Yes |

## Configuring the custom settings (Menu 12)

Table 9. User settings (Menu 12)

The code to enter the menu — «12», twelve presses on the programming button, confirmation — 4 short beeps). The devault values are highlighted.

| № | Option descriptiom | Default values | Available values/ Notes |
|---|---|---|---|
| 1 | Immobilizer | **1** | **1 — ON;** 2 — OFF |
| 2 | AntiHiJack | **1** | **1 — ON;** 2 — OFF |
| 3 | Travel distance before AntiHiJack triggers | **1** | Range from **1** to 10. **The default setting is 1-means 100 meters, 3-300 meters** |
| 4 | Audible confirmation after authentication | **1** | **1 — ON;** 2 — OFF |
| 5 | Service (valet) mode automatic disabling | **1** | **1 — ON;** 2 — OFF |
| 6 | Automatic door lock | **2** | 1 — ON; **2 — OFF** |
| 7 | Automatic door unlock | **2** | 1 — ON; **2 — OFF** |
| 8 | Windows, side mirrors, sunroof automatic closure («Comfort») | **4** | 1 — Windows closure; 2 — windows and side mirrors closure; 3 — windows and sunroof closure; **4 — windows, sunroof closure, side morrors folding;** 5 — OFF (closure is not performed) |
| 9 | Authentication method (PUK code required) | **1 or 3** | **1 — Slim-tag (for Prizrak 5S/Slim and Prizrak 5S/2Slim);** 2 — PIN code; **3 — Slim-tag or PIN code (for Prizrak 5S);** 4 — Slim-tag and PIN code |
| 10 | New tag registration | **—** | The number of beeps (when the brake pedal is pressed) indicates the total number of registered Slim-tags (from 0 to 8) |
| 11 | Tags detection quality test | **—** | Allows to determine zones where a tag is detected better |
| 12 | AntiHiJack feature automatic deactivation with a tag | **2** | 1 — ON; **2 — OFF** |
| 13 | Removing smartphone-tags from memory | **—** | From 1 to 4. The number of beeps equals to the number of registered smartphone-tags (from 1 to 4) |
| 14 | Deleting all Slim-tags from memory | **—** | The number of beeps equals to the number of registered Slim-tags (from 1 to 8) |

### Programming sequence

The entire programming process is carried out through the programming button (hereinafter referred to as - PB). The immobilizer emits audible signals (hereinafter — beeps) to indicate the current state of a setting being programmed. In case if the option number or the option value consists of a two-digit number, the beeps will sound as follows: the first digits are indicated by long beeps, the second digit- by short beeps. For example: the figure 12 — will be indicated by one long beep and two short beeps; 25 — two long and 5 short beeps. It is allowed to enter PIN code «2» with the programming button if a vehicle hasn't yet travelled 10 km after the installation and the default PIN code hasn't been changed. The immobilizer system will automatically exit the programming mode if at any programming step the ignition is switched OFF or if within 10 seconds after the last action the brake pedal is not pressed.

1. Switch the vehicle's ignition ON. Carry out an authentication procedure.
2. Not later than in 10 seconds enter the programming menu:
   - press and release the programming button 12 times.
   - confirmation — 4 beeps. A different number of beeps signifies an error.
3. Select a desired menu option:
   - press and release the programming button the number of times corresponding to the option number in the menu. Each time the button is pressed the option number is increased by one. The option numbers are changed in rotation, after the last option number goes the first one;
4. To find out the current option value:
   - press and hold the brake pedal;
   - the emitted beeps will indicate the current option value.
5. To change the value of the option:
   - keep the brake pedal down. Each time the button is pressed the option number is increased by one. The option numbers are changed in rotation, after the last option number goes the first one.
6. To configure the value of another option-release the brake pedal. This will bring you back to the step 3 of the programming sequence. To exit the programming mode — switch the ignition OFF.

## Deleting smartphone tags from memory

This procedure may be required to remove previously registered smartphone tags from the immobilizer memory to prohibit their future use.

It is possible to carry out the procedure in three ways:

**1st way.** Install the mobile app Prizrak-ID on a smartphone and pair the smartphone with the immobilizer (refer to the chapter «Pairing a smartphone with the immobilizer system»). Remove all previously paired smartphones from the immobilizer memory in the special menu of the app «Registered tags list».

**2nd way.** Reset the immobilizer to default settings (refer to the chapter «Resetting to default settings»). After this hard reset the immobilizer will be able to detect only the tags programmed at the factory.

**3rd way.** It may be carried through the programming button. The procedure is the following:

1. Switch on the vehicle's ignition. Carry out and authentication procedure.
2. Not later then in ten seconds enter the programming menu. For this purpose:
   - press and release the programming button 12 times;
   - confirmation - 4 beeps. A different number of beeps signifies that a mistake was made while entering the code to access the menu.
3. Select the appropriate option in the menu:
   - press and release the programming button 13 times;
   - the confirmation is 1 long beep and 3 short beeps.
4. To verify the current value of the option:
   - press and hold the brake pedal down;
   - the number of beeps will indicate the total number of tags registered into system's memory.
5. To delete the smartphone tags from memory:
   - still hoding the brake pedal down, press and release the programming button 1 time.
   - the confirmation trill followed after that signifies that the tags have been deleted.
6. Turn off the ignition to exit the programming menu.

## Changing PIN code

1. Turn ON the vehicle's ignition.
2. Complete authentication.
3. Within 10 seconds after the authentication press and release the programming button 14 times. The immobilizer will emit one short beep to confirm that the «PIN code change» mode has been successfully entered.
4. Set up the new PIN code. Any button of the vehicle that responds by beep when being pressed can be used to set up the new PIN code combination.
5. Wait for confirmation: 1 short beep.
6. Repeat the new PIN code. Wait for confirmation:
   - two short beeps and the confirmation trill means – the PIN code has been successfully changed, the immobilizer will automatically exit the programming mode.
   - a long warning beep – PIN code hasn't been changed due to an error while setting the new PIN code combination. Repeat the PIN code change procedure starting from the step № 4.

- It is not possible to set up the new PIN code if the current authentication method is only «Slim-tag».
- It is not possible to set up PIN code «1» – one press on one button.

## Changing the programming button

Changing the programming button

1. Reset the module to default settings;
2. Interface the Immobilizer with a vehicle;
3. Program the analog buttons if they are planned to be used (the procedure is described above);
4. Assign any button as the programming button from among the available ones by pressing and holding the button pressed for longer then 5 seconds until a long beep sounds.

## Resetting to default values

There is a special procedure provided for resetting the immobilizer to default values, once the procedure is completed the system's nonvolatile memory is cleared of all non-default settings — such as a vehicle make and model, PIN code combination and etc.

If the Immobilizer is installed on a vehicle:

1. Unpower the immobilizer.
2. Press and hold pressed the built-in PB (see «Immobilizer connection diagram»).
3. Still holding the button pressed plug the device back into the connector (sypply power). There will be intermittent continuouse beeps.
4. Release the button (wait until the intermittent beeps are teminated).
5. Turn the ignition ON and complete an authentication procedure (Enter PIN code and/or wait until a Slim-tag is identified) — the confirmatory trill will sound.
6. Wait for the intermittent continuous beeps signifying that the immobilizer has been reset to the default settings. Unplug the device (unpower the immobilizer). This will reset all immobilizer features to the default settings.

In case if the immobilizer is not installed on a vehicle:

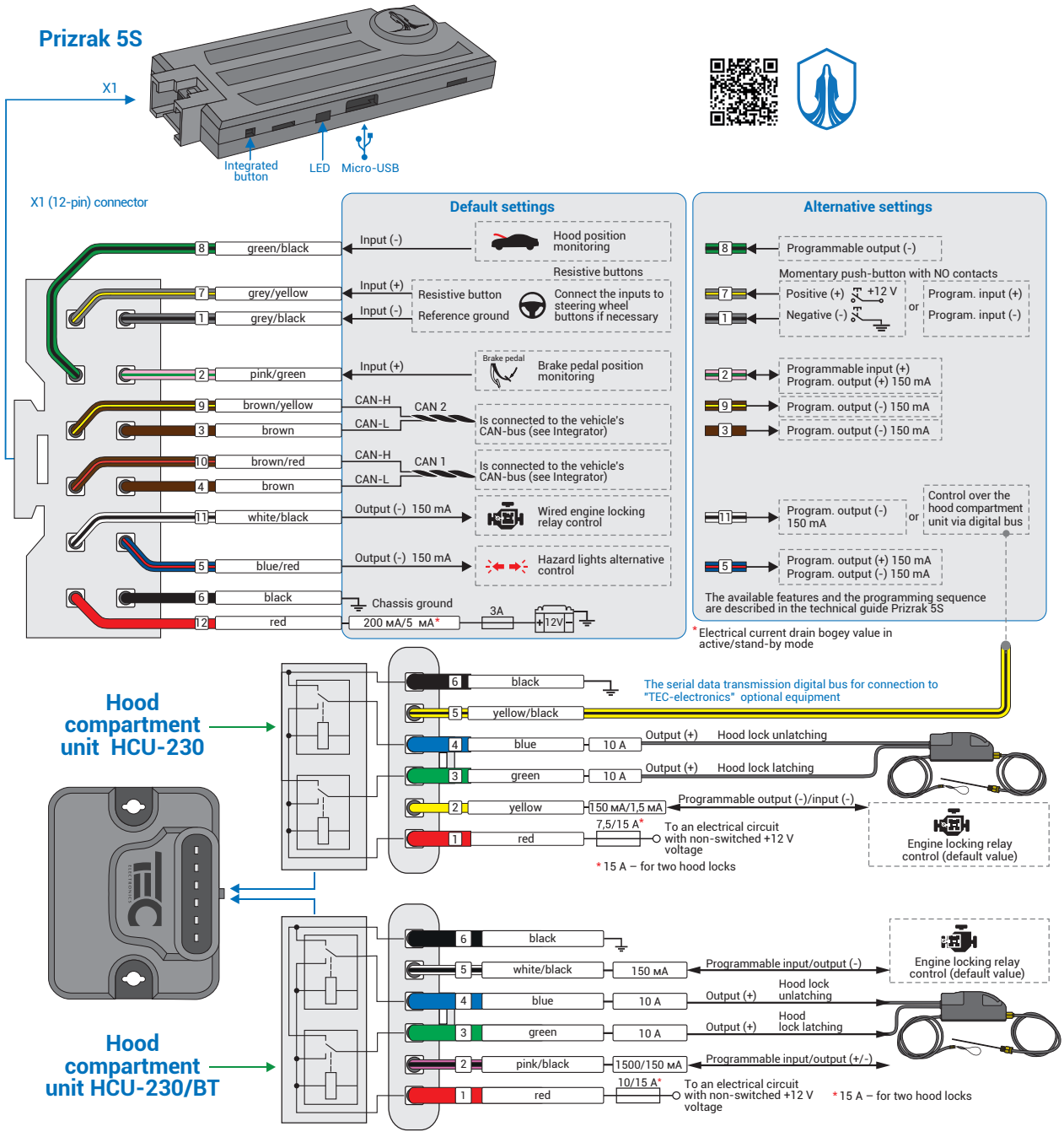
The reset can be carried out in 3 ways:

1. Using the built-in button provided that the factory PIN code hasn't been changed and the vehicle hasn't travelled 10 km after installing the Immobilizer system.
2. By entering PUK code with the built-in button.
3. By installing the immobilizer module on the same vehicle model. (considering that you know the PIN code and/or you have at least one Slim-tag).

The actions sequence for the first two ways:

1. Press and hold the built in progrmming button (see «Immobilizer connection diagram»).
2. Still holding the PB plug the device in (supply power to it). The immobilizer will start emiting intermittent beeps.
3. Release the button, wait until the short beeps are terminated.
4. Enter PIN code «2» using the built-in programming button if the vehicle hasn't travelled 10 km after installing the system or enter PUK code. The confirmation trill will sound if everything is done correctly.
5. Wait for intermittent beeps signifying that the module is now reset to the default settings.
6. Only an authorized user is permitted to scratch off the protective film of the plastic card and enter PUK code.

## Prizrak 5S/BT wiring diagram




The immobilizer installation sequence

1. Connect the immobilizer to the vehicle's wiring in accordance with the immobilizer wiring diagram.
2. Make sure all the vehicle's electronic modules and wire connectors are plugged in.
3. Supply power to the immobilizer, wait for intermittent beeps. Reset the immobilizer to default values if it doesn't emit any sound.
4. Interface the immobilizer with the vehicle by performing a special interfacing procedure which depends on a vehicle. Usually a vehicle group and subgroup is identified automatically after cycling the ignition ON and off, arming and disarming the vehicle from the factory remote. The interfacing procedure for a certain car may be found out in the Integrator (https://int.tecel.ru/).
5. Change the factory PIN code.
6. Inform the vehicle's owner which particular button has been assigned as the programming button and make a note in the user's guide.

- It is possible to perform all necessary settings in TECprog by connecting the immobilizer to a computer either before interfacing the module with a vehicle or after the interfacing procedure is complete.
- The immobilizer will pair with the HCU-230/BT module after a special registration procedure is complete (see the HCU-230/BT technical guide).

Resetting to defaults (if the immobilizer is installed on a vehicle)

1. Disconnect the immobilizer from power source.
2. Press and hold the integrated button. Holding the button connect the immobilizer to the power source, it will start beeping continuously.
3. Release the button, wait until the module stops beeping.
4. Switch the vehicle's ignition ON and enter PIN code, wait for the confirmato ry trill.
5. Intermittent beeps followed after the confirmatory trill indicate that the module has been reset to default values.
6. Disconnect the module from power.

Changing PIN-code

1. Turn the vehicle's ignition ON. Enter the existing PIN code combination (the default PIN code "2" is entered with the programming button), wait for the confirmatory trill.
2. Press and release the proigramming button 14 times. The module will emit one beep to confirm that the «PIN code change» mode has been successfully ente red.
3. Set up a PIN code. Any button of the vehicle that responds with beep when being pressed can be used to set up the new PIN code combination. Wait for confirmation with 1 short beep.
4. Repeat the new PIN code. Wait for confirmation:
- two beeps and trill: the PIN code has been changed, the immobiliz er will exit the programming mode.
- a long warning beep – the PIN code hasn't been changed due to an error while entering the new PIN-code, repeat the procedure starting from the step №4. If you'd like to exit the programming mode and leave the existing PIN code unchanged-just turn the ignition off.

It is impossible to setup PIN code "1"- a single p ress on one button.

Resetting to default values (the immobilizer is not installed on a vehicle).

1. Press and hold the built in progrmming button. Still holding the PB plug the device in (supply power to it). The immobilizer will be emitting continuous beeps.
2. Release the button, wait until the short beeps are terminated.
3. If the vehicle hasn't covered 10 km after the installation and the factory PIN code «2» hasn't been changed then enter the PIN code «2» with the built-in PB. Otherwise enter the PUK code with the integrated PB-trill will be heard.
4. Wait for continuous beeps signifying that the module is now reset to the factory default settings.
5. Disconnect the immobilizer from power.

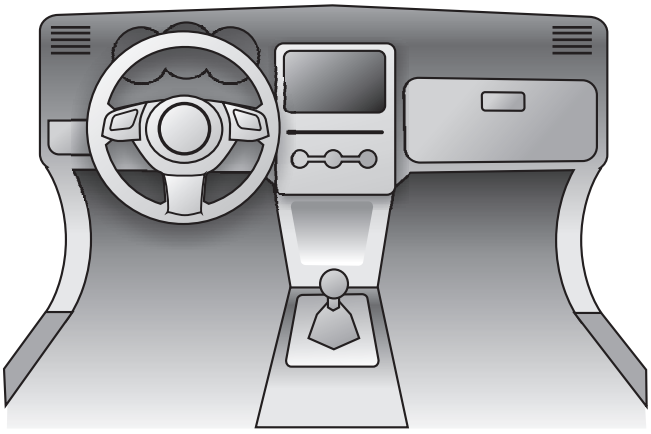
Only the vehicle owner is permitted to scratch off the protective layer on the plastic card and enter PUK code.

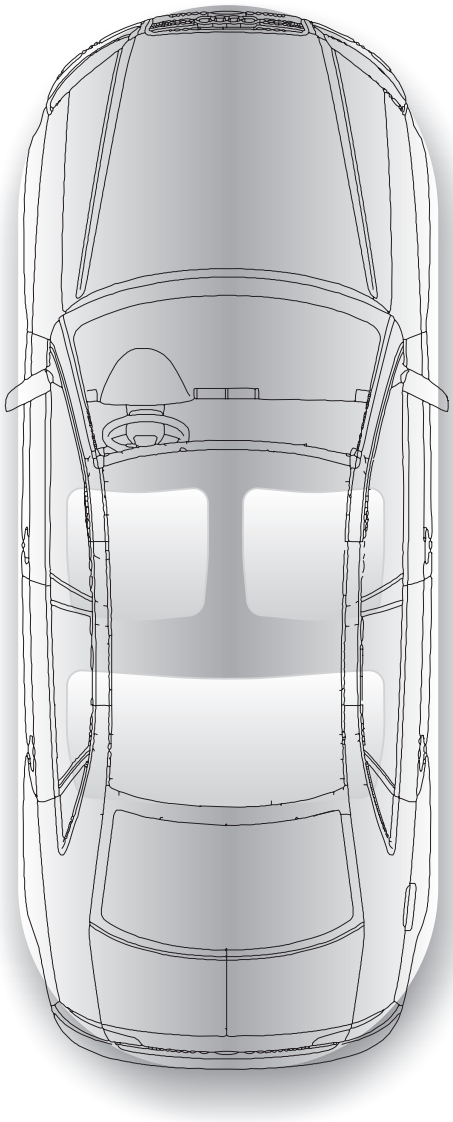
## Annex №2

### CAN-bus parameters indication through the built-in LED

1. The feature indicates the following parameters:
   - Hood, trunk, doors (each door individually).
   - Ignition switch state (key presence, ACC, IGN, Start).
   - Engine running state.
   - Gearbox position (for automatic – P, R, N, D; for manual – R).
   - Parking brake.
   - Brake lights.
   - Security.
   - Factory security system panic.
   - Central lock state.
   - Sensors ignore.
   - Engine RPM.
   - Engine temperature.
2. The feature allows to quickly analyze the data available on the vehicle's CAN-bus and adjust connection scheme if required. The built-in LED is used for indication (check «The immobilizer connection diagram»). The LED lights up if any parameter is activated and remains lit for 5 seconds or until the parameter is deactivated. «Engine RPM» and «Engine temperature» will be indicated if no other parameter is selected.
3. «Engine RPM» — LED flashes with frequency proportional to the engine RPM: 1 flash per second equals to 500 engine RPM. «Engine temperature» — LED flashes 1 time each time a new temperature data is received (with ignition ON or when the engine is running).

## The immobilizer elements installation scheme in a vehicle





Mark in the picture the immobilizer elements installation place. This may help to quickly find them later.

Keep this scheme out of reach of unauthorized persons.

## Annex №4

### Engine compartment unit HCU-230/BT adjustment (menu 20)

The HCU-230/BT module (hereinafter: the module) was designed for connection to an optional equipment which is mounted in the engine compartment. The communication between the HCU and the main immobilizer module is carried out via the channel allowing to avoid running the cables from the main immobilizer module into the engine compartment.

### Pairing the HCU-230/BT module

Registration consists in pairing the hood compartment unit with the immobilizer system. Once the HCU module has been paired it is not possible to register it into another immobilizer or alarm system until the previous registration is voided (refer to the «Cancelling registration of the HCU-230/BT module»).

#### Pairing the module using the TECprog2:

1. Install the immobilizer system and the HCU on a vehicle and supply power to the modules.
2. Run the TECprog2 and connect to the Immobilizer system via USB or Bluetooth (using the TEC-prog USB Bluetooth adapter), follow the instructions.

#### Pairing through the programming button and programming menu

If a hood compartment module has already been paired with the immobilizer system then after registering a new module — the previous registration will be deleted from the immobilizer's memory. After that the immobilizer system will only recognize and communicate with the newly registered HCU-230 module. All adjustments and configurations are carried out using the programming button (hereinafter — PB). During the programming process the immobilizer performs indication by audible beeps (hereinafter — beeps). It is allowed to enter PIN code «2» with the programming button if a vehicle hasn't yet travelled 10 km after installing the system and the default PIN code hasn't been changed. The immobilizer system will automatically exit the programming mode if at any programming step the ignition is switched OFF or if within 10 seconds after the last action the brake pedal is not pressed.

1. Supply power to both devices (pairing is available within 2 minutes after supplying power to the modules).
2. Switch the vehicle's ignition ON. Carry out an authentication procedure.
3. Within 10 seconds enter the programming menu:
   - press the programming button 20 times;
   - 10 beeps following after that confirm that the manu has been successfully entered. A different number of beeps signifies an error.
4. Select the menu option «Hood compartment unit HCU-230/BT registration»:
   - press the PB — 1 time.
   - confirmation — 1 beep.
5. To verify the module registration status:
   - press and hold the brake pedal;
   - confirmation: 1 beep — the HCU module is registered; no audible indication — the module is not registered.
6. To pair (register) the module:
   - press the PB one time.
   - the immobilizer system starts searching for an HCU-230 module, this will be accompanied by short intermittent beeps.
   - the registration will begin automatically as soon as the module is detected, the beeps frequency will change.
   - the immobilizer will emit a long warning beep in case if it detects two or more modules. The registration will cancel automatically. Wait at least 2 minutes. Repeat the procedure.
7. Successful registration is followed by the confirmation trill and a short single repeating beep indicating that one module has been registered.
8. To finish the registration process: release the brake pedal and switch OFF the ignition. Confirmation trill will sound.

Table 1. Hood compartment module adjustment HCU-230/BT (Menu 20)

The code to enter the menu — 20, confirmation — 10 beeps. The default settings are highlited.

| № | Option description (module pin №) [operating mode] | Default value | Description/notes |
|---|---|---|---|
| 1 | Engine compartment unit HCU-230/BT registration | — | Refer to chapter «Pairing the HCU-230/BT module» |
| 2 | Communication check with the HCU-230/BT module | — | — |
| 3 | Cancelling registration of the HCU-230/BT module | — | Refer to chapter «Void registration» |
| 4 | The pink/black wire №2 configuration adjustment (2) [input/**output]** | **1** | **1 — alert/warning signals to siren/ klaxon. You can assign any function from «Programmable outputs features».** 2 — engine locking (normally closed (NC) relay control); 3 — programmable output (refer to the option №5); 4 — programmable input (refer to the option №5) |
| 5 | The pink/black input function adjustment (2) [Input/**output]** | — | You can select the value 3 or 4 in the option №4 |
| 6 | The pink/black wire polarity adjustemnt (2) [Input/**output]** | **1** | **1 — positive polarity;** 2 — negative polarity |
| 7 | The green wire configuration adjustment (3) **[Output]** | **4** | 1 — alert/warning signals to siren; 2 — engine locking (normally closed (NC) relay control); 3 — programmable output (refer to the option №8); **4 — electromechanical hood lock latching** |
| 8 | The green wire function adjustment (3) **[Output]** | — | Select the value 3 in the option №7 to be able to assign a function from the «Programmable outputs features» table |
| 9 | The blue wire configuration adjustment (4) **[Output]** | **4** | 1— alert/warning signals to siren; 2 — engine locking (normally closed (NC) relay control); 3 — programmable output (refer to the option №10); **4 — electromechanical hood lock latching** |
| 10 | The blue wire function configuration (4) **[Output]** | — | Select the value 3 in the option №9 to be able to assign a desired function from the «Programmable outputs features» table |
| 11 | The white/black wire configuration (5) [Input/**output]** | **3** | 1 — not used; 2 — engine locking (NC relay control); 3 — programmable output; 4 — programmable input |
| 12 | The white/black wire function adjustment (5) [Input/**output]** | **2** | Select the value 3 or 4 in the option №11 to be able to assign one of the functions listed in the table of the programmable inputs or outputs functions |
| 13 | HCU-230 integrated accelerometer sensitivity adjustment | **4** | from 1 — minimum to 8 — maximum |
| 14 | Siren/klaxon control | **1** | **1 — Siren control;** 2 — Klaxon control |

### Programming sequence

The programming process is carried out through the programming button (hereinafter — PB). The immobilizer emits audible beeps during the programming process to indicate correctness of the actions being performed (hereinafter — beeps). If an option number or a value number consists of a two digit number it will be indicated as follows: the first digit — a long beep, the second digit — a short beep. As an example: 12 — one long beep, two short beeps; 25 — two long beeps, five short beeps. Do not allow more than 10 seconds to lapse between the steps when the brake pedal is not pressed or the programming mode will be automatically exited and you will have to start over. The programming mode will also be cancelled if at any step the ignition is switched off.

1. Switch the vehicle's ignition to the ON position. Complete authentication procedure.
2. Within 10 seconds press the programming button 20 times, the immobilizer system will indicate that the correct menu has been successfully entered by emitting 10 beeps and LED flashes.
3. Select a desired option within the menu by pressing and releasing the programming button the number of times corresponding to the option number. The immobilizer system will indicate the selected option number by a series of beeps and LED flashes.
4. Verify the current value of the selected option by pressing and holding the brake pedal, The system will indicate the current option value by a series of beeps and LED flashes, the beeps length will change.
5. To change the current value of the option: still holding the brake pedal down press the programming button a required number of times. The number of the option value increases by 1 each time the button is pressed.
6. If you'd like to program another option of the menu-release the brake pedal. You will get back to the step №3. If you'd like to exit the programming menu - simply switch OFF the ignition.

### Cancelling registration of the HCU-230/BT module

The procedure may be useful in case if the already installed HCU module is planned to be paired with another (new) immobilizer system. After the «Cancelling registration of the HCU-230 module» procedure has been completed, it is possible to re-register the module into another immobilizer system. This procedure doesn't reset the HCU module to defaults. To reset the HCU module to defaults — carry out the «Resetting to default values» procedure in the Prizrak system menu.

### Cancelling registration using the TECprog2

Launch the TECprog2 software on your PC, connect the immobilizer system to the computer via a USB cable or via Bluetooth (using an adapter TEC-prog USB Bluetooth) and follow the displayed instructions.

### Cancelling registration if the main Immobilizer module is not available

1. Disconnect the module from power.
2. Connect the input/output №2 and input/output №5 to the vehicle's «ground».
3. Supply power to the module.
4. Disconnect the input/output №2 and Input/output №5 from the vehicle's «ground».
5. Within the next 10 seconds supply 5 negative pulses to the module input/output №2 and Input/output №5.

### Cancelling registration of the HCU-230 module through the main module's programming menu

Both devices (the immobilzer module and the HCU-230) have to be installed on a vehicle and supplied with +12 V. The programming process is carried out through the programming button (hereinafter — PB). The immobilizer emits audible beeps during the programming process to indicate correctness of the actions being performed (hereinafter — beeps). In case if an option number or a value number consists of a two digit number then it will be indicated as follows: the first digit — a long beep, the second digit — a short beep. As an example: 12 — one long beep, two short beeps; 25 — two long beeps, five short beeps. Do not allow more than 10 seconds to lapse between the steps when the brake pedal is not pressed or the programming mode will be automatically exited and you will have to start over. The programming mode will also be cancelled if at any step the ignition is switched off.

The system emits a long warning beep if an error occurs during the registration void process. You will have to start over.

1. Turn the vehicle's ignition ON and complete an authentication procedure (enter PIN code and/or wait until a tag is detected) — confirmation trill will sound.
2. Enter the menu «Hood compartment unit HCU-230/BT adjustment» within 10 seconds after authentication is complete by pressing and releasing the programming button 20 times. The system will emit 11 beeps and flash the LED 11 times to confirm that the menu has been successfully entered.
3. Select the option №3 «Hood compartment unit HCU-230/BT registration» by pressing and releasing the programming button 3 times. The system will indicate the selected option number by a series of 3 beeps and 3 LED flashes.
4. Press and hold the brake pedal. The system will indicate if any hood compartment module has already been registered into the main immobilizer module:
   - one beep and one LED flash — an HCU module has already been registered;
   - silence — no module registered.
5. Press the programming button 1 time, the system will inform about the start of the void process by short intermittent beeps.
6. The confirmation beep will sound if the registration is successfully void. Hereafter you may exit the programming menu by switching the vehicle's ignition OFF.
7. To finish the procedure — release the brake pedal and switch OFF the ignition.

Annex №5

## Standart set

| Item name | Quantitiy |
|---|---|
| Main immobilizer module | 1 |
| Tag | Prizrak 5S — NO<br>Prizrak 5S/Slim — 1<br>Prizrak 5S/2Slim —2 |
| Wiring loom for connections | 1 |
| Quick reference card | 1 |
| Owner's guide | 1 |
| Warranty card | 1 |
| Wiring diagram | 1 |
| Packing | 1 |

## Technical specifications and operating conditions

| Parameter | Value |
|---|---|
| Power supply voltage, V | 9 … 15 |
| Maximum current drain during standby mode, mA (when the vehicle's CAN-bus is not active) | 5 |
| Maximum current consumption during active mode | 200 |
| Operating temperature, °C | –40 … +85 |
| Sorage temperature, °C | –40 … +85 |
| Maximum relative humedity, % | 95 |

ELECTRONICS

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