

## PRODUCT DESCRIPTION

Skybrake DD5 is a state of the art car security system replacing the previous Skybrake product generation Skybrake DD2. The new generation Skybrake DD5 products combine modern technologies and a wide range of settings and employ one of the most secure data coding algorithms AES 128. Detailed regarding the operation can be found in the Skybrake DD5 instructions for use, but this document describes the product installation in your car and everything related to it.

## SAFETY INSTRUCTIONS

The installation involves interference with the car's electronics, therefore, it is recommended to check whether it can affect your car warranty. Please note that to prevent damaging any electrical units, only qualified auto electricians can perform the installation of the product.

## NOTE

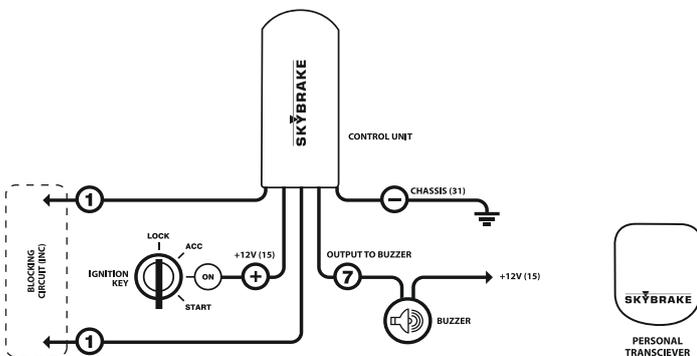
Skybrake DD5 manufacturer does not assume any responsibility and cannot be held liable for any damage to a car caused by any incorrect installation of the system.

## INSTALLATION OF MAIN SKYBRAKE DD5 UNIT

This section describes the main steps of the product installation in a car.

## CONNECTION DIAGRAM

Skybrake DD5 connection diagram is given below.



## WIRE LABELLING AND CONNECTION

Wire number	Designation/connection	Notes
1	Skybrake DD5 unit has two wires labelled with numeral 1. These wires are the internal relay for engine disabling. All electrical circuits with consumption of up to 10 A can be connected.	Internal relay contacts are normally closed (NC), which means that when the power supply is off the relay contacts are closed.
+	Skybrake DD5 power supply cable connectable to the car ignition wire. For the correct work of the product the power supply unit should receive power when the car ignition is switched on and not lose it when the car started is working.	Power supply voltage is 8...30 V DC.
-	Skybrake DD5 ground wire connectable to the negative terminal of the battery or car body.	When installing Skybrake DD5 system it is recommended to connect this wire first and then the remaining wires.
7	Multipurpose open collector output, which can be used for: • tweeter connection • LED connections • additional blocking circuit (for relay control) <b>Maximum allowed output load is 800 mA.</b>	By default the output is set up for the tweeter connection, see <b>Changing settings.</b>

## CONNECTION DIAGRAM FOR ADDITIONAL DISABLING UNIT (FOR 520200)

The additional disabling unit connection diagram is identical to the main unit connection diagram with the only difference being the tweeter wire (No. 7), which is available only for the Main Unit, and the additional unit does not have it.

## CHOOSING ENGINE DISABLE CIRCUIT

One of the most important installation steps is the selection of the engine disabling circuit.

It is crucial to ensure that the chosen disabling circuit does not cause any obstructions in the work of the engine and any errors in the electronic control units of the car. The second criterion for the circuit selection is the current: is it exceeds 10 A, an additional external relay with contact capacity of 30% higher than the actual current in the disabling circuit should be used.

The most popular engine disabling circuits are fuel pump (for petrol engines), fuel valve (for diesel engines) and common ignition circuit (for all types of engines). Note that the choice of the engine disabling circuit depends on the make, model and year of manufacture of your car and knowledge of the electronic system of a particular car is required for the correct circuit choice.

## CHOOSING PLACE OF INSTALLATION

Most frequently the choice of the Skybrake DD5 unit installation depends on the selected disabling circuit. To avoid the necessity to extend the unit wires, the unit should be installed 0–40 cm away from the circuit connection point. Please note that the quality of the installation is determined not only by the choice of the disabling circuit and correct connection, but also by the installation position of the Skybrake DD5 unit, as the better it is hidden, the more difficult it is to find and disable. Also please note that the working distance of the unit and the Personal Transceiver is about 5 metres, therefore, when choosing the installation place make sure that the distance from the driver's seat to the unit does not exceed 5 m.

In some cases the unit can be installed in the engine compartment or boot of the car, however, metal parts between the engine compartment and the driver's seat can affect the communication between the unit and the Personal Transceiver.

## FIXING THE UNIT

Before fixing the unit in the chosen location, make sure that there are no heating units nearby, it is not wet and the chosen surface does not move (glove compartment lid, levers, etc.).

It is recommended to use two-sided adhesive tape or plastic ties for fixing the unit in place.

## CHOOSING PLACE OF TWEETER INSTALLATION

The Skybrake DD5 tweeter is provided to inform the driver of the system operation modes, so it is important that the tweeter is installed inside the car otherwise the signals will be inaudible. It is recommended to place the tweeter as far from the main unit as possible, since it would make it more difficult to locate the unit in case of a car theft attempt.

## BUILT-IN CIRCUIT BREAKER

An important advantage of Skybrake DD5 is an automatic circuit breaker built in the units, which protects the system from overvoltage, reverse polarity connection and short circuit. In case of overvoltage or incorrect power supply polarity, the circuit breaker will automatically disconnect the power supply to the unit and reconnect when the mistake has been corrected. Installation of an additional circuit breaker is not required.

## WIRE CONNECTION

When the car is used, it vibrates constantly and we recommend using soldered connections, as they ensure good contact conductivity and reliability. Electrical tape should be used for the contact insulation and each connection shall be individually insulated. Pressed connections can be used for the connection of the wires and in this case the electrical tape is not necessary.

We recommend connecting the grounding wire first and there is no any particular connection sequence for the rest of the wires. To avoid incorrect installation, please use the connection diagram and wire labelling table provided in this document.

## CHECKING THE SYSTEM OPERATION

After completing the installation, the operation of the system should be checked. We recommend the following sequence:

### 1. Visual inspection of the electrical connections.

We recommend to perform visual inspection and check whether all the wires are connected and all connections are insulated.

### 2. Engine start.

Before starting the engine make sure that there are no batteries in both Personal Transceivers. Start the engine and leave it running. In 20 seconds an alarm signal shall sound and shortly after that the engine shall stop, as the system will disable it. If this is the case, place the battery in one of the Personal Transceivers, wait until LED on the Personal Transceiver board flashes twice and try to start the engine again. If everything works, check the car dashboard for any error indicators. If the system's behaviour differs from the described above or there is any other problem, see **Troubleshooting** section.

## CHANGING SYSTEM SETTINGS

### TABLE OF SETTINGS

Using special service equipment you can change the Skybrake DD5 system settings. In the table below all adjustable settings are described:

Setting	Possible values	Description/notes
Use of multipurpose output	Tweeter	In this mode the digital output works in the sound mode and generates sound confirmation and alarm signals. For connection of 12 V tweeter.
	LED	In this mode the digital output works in the light indication mode and is used for the connection of LED. Unlike the Tweeter Mode the signal impulses are longer.
	Disabling relays	In this mode the digital output works as an additional disabling unit and is used for the connection of external relay. There are two possible configurations: standard (if normally closed contacts of the external relay are used) and reverse (if normally open relay contacts are used).
	Identification	In this mode the output works as an indicator of the Personal Transceiver proximity: if the Personal Transceiver is inside the reception area, the output is active, and if not, the output is disabled.
Internal disabling relay configuration	standard	In this mode the contacts of the internal disabling relay are permanently closed, and if any condition of engine disabling occurs, the relay contacts open.
	reverse	In this mode the contacts of the internal disabling relay are permanently open (except when the ignition is off), and if any condition of engine disabling occurs, the relay contacts close.
Antitheft function	ON	If the Antitheft function is ON, the presence of the Personal Transceiver is controlled throughout the travel. For more information on this function see the Skybrake DD5 operation manual.
	OFF	If the Antitheft function is OFF, the presence of the Personal Transceiver is controlled only at the moment of the ignition.
ALLOW START function	ON	If the ALLOW START function is ON, the system allows starting the engine before the Personal Transceiver authorisation takes place.
	OFF	If the ALLOW START function is OFF, the engine can be started only after the Personal Transceiver authorisation.
Movement sensor (for 521100 range)	ON	In this mode the movement sensor is ON: the engine is disabled only in case of movement without the Personal Transceiver. For more information see the operation manual.
	Excluded	In this mode the movement sensor is OFF: if the engine is started without the Personal Transceiver, the engine is disabled after a set time interval. For more information see the operation manual.
Personal Transceiver transmission time	4...20 s	A particular parameter determines how frequently the system performs the Personal Transceiver authorisation in the auto mode. By increasing the value of this parameter battery life of the Personal Transceiver can be prolonged, but at the same time the interval between the authorisations will be increased: in case of systems with movement sensors the driver will have to wait longer before the authorisation takes place and the car can start moving.
Alarm signals	<b>ON</b> <b>OFF</b>	
INFO signals	ON	In this mode, after the ignition the system will inform the driver of the successful authorisation by sounding double sound signal.
	OFF	In this mode the system will not inform the driver of the successful authorisation. For the systems with built-in movement sensor the INFO systems <b>cannot be disabled</b> .
System time intervals	5....59 s	<b>Time interval 1.</b> This parameter sets the period after which the driver is warned (initial alarm signal) that during the travel it will no longer be possible to perform authorisation of the Personal Transceiver. This interval is used if Antitheft is ON.
	5....59 s	<b>Time interval 2.</b> This parameter sets how long the initial alarm signals should sound, after which the system will activate the final alarm signals. This interval is used if Antitheft is ON.

System time intervals	5....59 s	<b>Time interval 3.</b> This parameter sets how long the final alarm signals should sound, after which the system will go into engine disable mode. This interval is used if Antitheft is ON.
	5....59 s	<b>Time interval 4.</b> This parameter sets in what time the driver will be warned about the start of the engine without the Personal Transceiver. This interval is used only in systems with the movement sensor ( <b>521100</b> ).
	5....59 s	<b>Time interval 5.</b> This parameter sets after how long the alarm signal sounds (if the engine is started without the Personal Transceiver), after with the engine disabling will follow. This interval is used only in systems with the movement sensor ( <b>521100</b> ).

## TROUBLESHOOTING

In table below the most common problems are identified and solutions are provided.

Problem	Possible cause	Solution
After Skybrake DD5 installation car engine cannot be started	Disabling circuit is incorrect	Reconnect the engine disabling circuit and try starting the engine. If it works, it means that all wires are connected in accordance with the connection diagram.
	Skybrake DD5 has disabled the engine	If when you try to start the engine regular beeps are sounded, it means that the system has disabled the engine. Make sure the battery is placed in the Personal Transceiver unit and it is inside the reception zone.
	One of the car circuit breakers is damaged	Make sure all car circuit breakers are intact and replace, if necessary.
After the system installation the car can be started, but Skybrake DD5 does not disable the engine	Car battery is discharged	Make sure that the car battery has not discharged during the system installation. Charge, if necessary.
	Personal Transceiver is inside the reception zone	To check whether Skybrake DD5 disables the car engine, make sure the Personal Transceiver is outside the reception zone. Remove the battery from the Personal Transceiver and try again.
	The installed product has built-in movement sensor	If the product has the built-in movement sensor (and it is ON), the engine is disabled only after the car has started movement. Remove the battery from the Personal Transceiver, start the engine again and begin movement – the engine will be disabled.
	The chosen disabling circuit does not work and does not disable the engine	Choose another disabling circuit.
	Incorrect connection of the disabling circuit	Make sure all the wires are connected in accordance with the connection diagram.
After the installation of the system an error indicator lights on the car dashboard	No power to the Skybrake DD5 unit	Make sure all the wires are connected in accordance with the connection diagram.
	Wrong disabling circuit has been chosen	Engine control unit of the car controls the disabling circuit and identifies circuit breaking, lighting the error indicator. In such case the selected disabling circuit cannot be used and another circuit should be chosen.
	One of the car circuit breakers is damaged	Make sure all car circuit breakers are intact and replace, if necessary.
	One of the car plugs is not connected	During the installation a plug may have been disconnected. Check all electrical connections and try again.
No sound confirmation/ alarm signal	Other reason	Use OBD error reader to find out the reason.
	Wrong connection of the tweeter	Make sure the tweeter is connected in accordance with the connection diagram.
	The tweeter connection output is set to another mode	Using the Skybrake service equipment make sure the output is set to the tweeter mode.

### SPECIFICATION

Parameter	Value
Working voltage	7–30 V
Current consumption at 12 V: In enabled state	5 mA
In disabled state	50 mA
Disabling circuit current capacity: Permanent:	10 A
Short-term:	20 A
Maximum universal output load	1 A
Built-in automatic circuit breaker	200 mA
Working frequency	2,4–2,4835 GHz
Modulation type	GFSK
Number of communication channels	125
Data exchange rate	2 Mbit/s
Working distance	5 m
Battery type in Personal Transceiver	CR2430
Battery life	12 months
Working temperature	-40...+85 °C
Size:	
Main Unit:	68x29x9,5 mm
Personal Transceiver:	49x41x5,8 mm

### CONFIGURATION

The following parts are included with the product:

Part	520100, 521100 range	520200 range
Main Unit	1 pcs	1 pcs
Additional unit	-	1 pcs
Personal Transceiver	2 pcs	2 pcs
Battery CR2430	2 pcs	2 pcs
Tweeter	1 pcs	1 pcs
PIN card	1 pcs	1 pcs