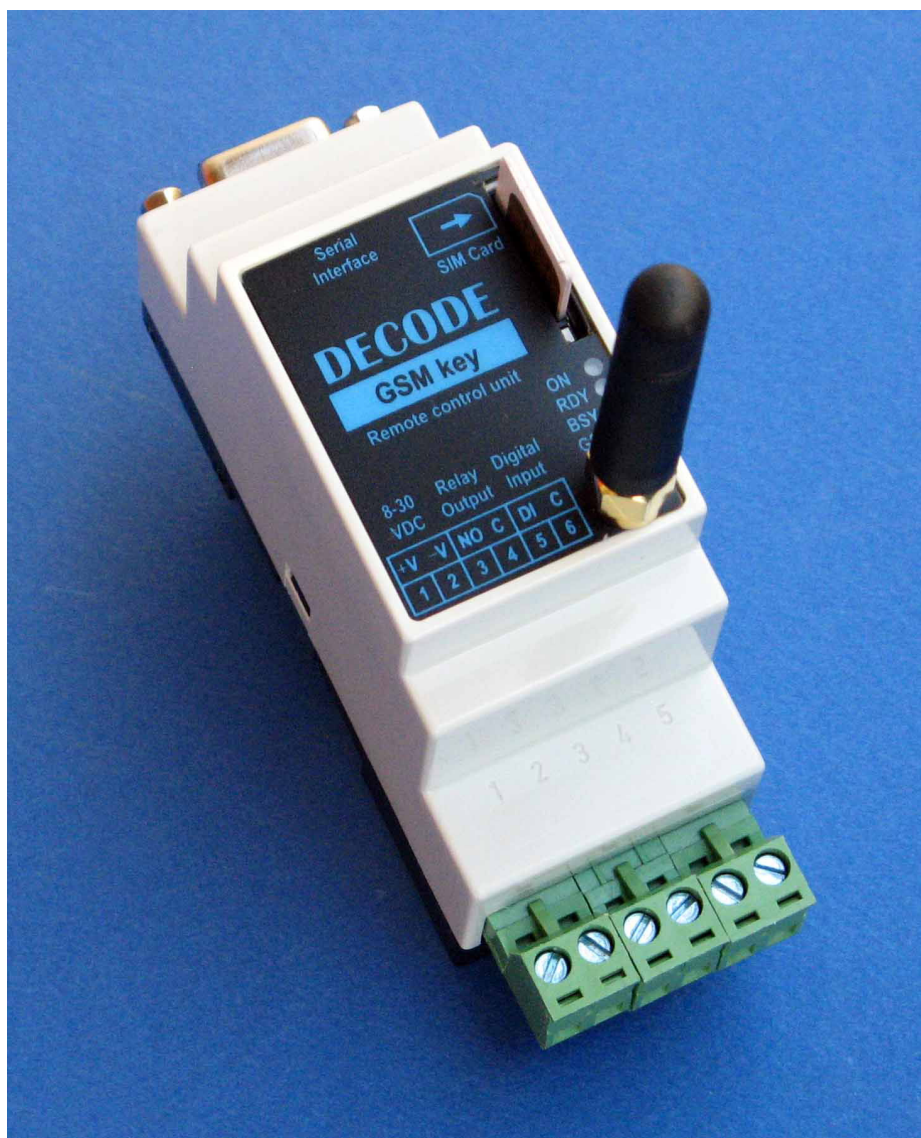


# Decode Data Communications

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## GSM Key - User's Manual -

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Belgrade, November 2010.

**Document name: User's Manual**

**Device: GSM Key**

**Revisions history:**

<b>Version</b>	<b>Date</b>	<b>Comment</b>	<b>Corresponding device firmware</b>
1.0	10.11.2010.	Starting document	v4.7 26.04.2011
1.1	22.03.2012.	Init commands moved to production procedures	

1. Device description
2. Device installation
3. Device settings
4. Commands reference
5. Technical specifications

# 1. Device description

GSM Key is remote control and management device that uses GSM mobile network. Quad GSM band 850/900/1800/1900MHz is supported in order to be recognized by major operators worldwide.

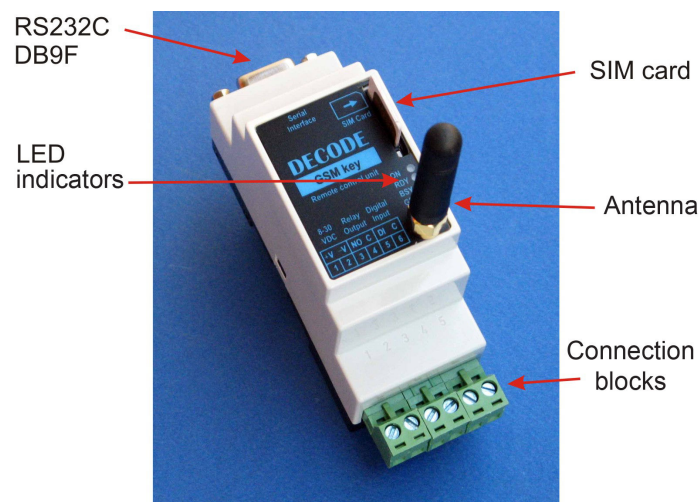
## BASIC FUNCTIONS

- Management of GSM Key's relay output by free call, using subscriber Caller Identification (CLID). After the GSM Key receives a call from subscriber belonging to approved users list, it activates the relay output for preset time. Call is rejected at the same time, - no data or voice connection is made.
- Management of the relay output by SMS messages.
- Automated sending of preset SMS messages to list of GSM subscribers, based on events detected by GSM Key's discrete input.
- Device settings over RS232 interface and through SMS messages.

## AREAS OF APPLICATION

- Control of electric driven gates, doors, ramps and other electric devices via GSM mobile network.
- SMS (text) alarming with states of house intrusion/alarm systems, thermostats, level sensors, etc.

GSM Key is contained within plastic enclosure, providing easy attachment to DIN 35mm rail. Faceplate has antenna (female) SMA connector, push-push SIM card holder and four indicator LEDs. Lower part features 6-pin connection block for wiring of power supply, discrete input and relay output. Upper side has standard RS-232c port with DB9F connector.



*GSM Key interfaces*

GSM Key has to be powered by DC supply (adapter) ranging from 8V to 30V, with 5-6W power rating.

## 2. Device installation

### Attention!



- Please read the complete manual before installation
- Take care that device remain disconnected from the power during the wiring and SIM card loading
- When choosing the location of GSM Key and it's antenna, checking the GSM signal quality is necessary, - it can be done with mobile phone

### Important



Before installation place the provided SIM card to any mobile phone to check if card is functioning OK and what credit was purchased. At the same time ensure that following features are disabled: PIN/PUK security passwords, voice mail and call forwarding.

### Loading the SIM card to GSM Key

Please load the subscriber SIM card to "push-push" holder, directed as shown by following picture. Press the card effortlessly into the holder until mechanical "click" is heard. It locks the card securely in its place. Unloading is done in the same manner, by pushing down the card until "click" that releases it from the holder.



*Push-Push SIM holder and antenna connector*

### Connecting the antenna

Connect and secure the antenna to the front plate SMA screw connector. Connection is secured by slightly turning connector clockwise to the end (no free movement is possible). The same connector is used for antennas having extension cable.

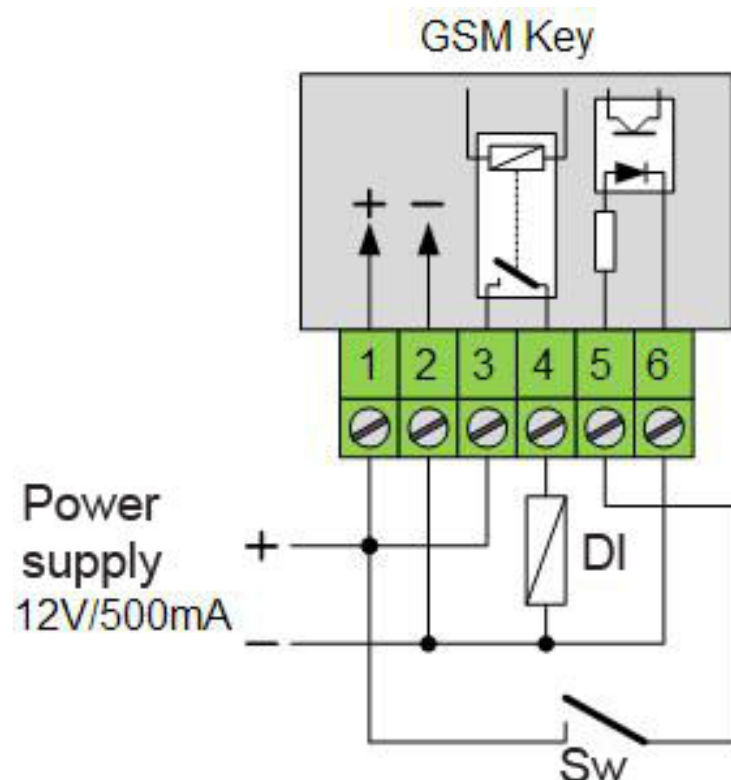
Best results are attained when antenna is placed on the spot with good GSM signal reception. If GSM Key is to be installed inside of metallic cabinet/enclosure use the antenna with coaxial extension cable of suitable length, placed outside of the cabinet.

### Connecting power supply, input and output

Lower part of GSM Key feature 6-pin connection block that accepts wire conductors of up to 2,5mm diameter. Signal layout is following:

Pin No.	Signal	Description
1	DC power +	For DC supply in range from 8 to 30VDC. Maximal power consumption is less than 6W.
2	DC power -	
3	Relay output	No-voltage relay contacts, up to 5A/250VAC with resistance loading. Normally Open type.
4	Relay output	
5	Discrete input +	No-voltage optocoupler isolated input. Input resistance is 10K, accepting up to 30V. Requires >3V on pins to become closed.
6	Discrete input -	

Example scheme with 12V/500mA power supply, coil actuated door lock (DI) and alarming switch (Sw) is shown by following picture.



### GSM Key connection example

*DI=coil actuated door lock (by Output Relay), Sw=monitored alarming Switch (by Input)*

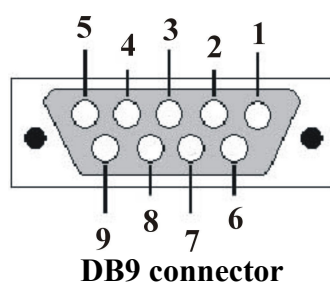
Meanings of the front plate LED indicators are following:

LED indicator	Colour	Description
ON	Green	<b>GSM Key operation indicator:</b> ON - during powering phase and during device setup Flashing with 1 second intervals - normal operation
RDY	Green	<b>GSM Key operation READY state, idle</b>
BSY	Red	<b>GSM Key BUSY state, usually during commands execution</b>
GSM	Red	<b>GSM network indicator:</b> ON - scanning for network Flashing every 1s - network or SIM card ERROR Flashing every 3s - network connected OK

Serial RS-232c interface, DCE (Data Communication Equipment) version, is realised as DB9 female connector. Signal layout is following:

Pin No.	Name	Signal direction	Description
1	DCD	out	Data Carrier Detect
2	RD	out	Received Data
3	TD	in	Transmit Data
4	DTR	in	Data Terminal Ready
5	GND	-	Signal Ground
6	DSR	out	Data Set Ready
7	RTS	in	Request to Send
8	CTS	out	Clear to Send
9	RI	out	Ring Indicator

Next picture shows the layout of the DB9 connector with pin numbers and layout.



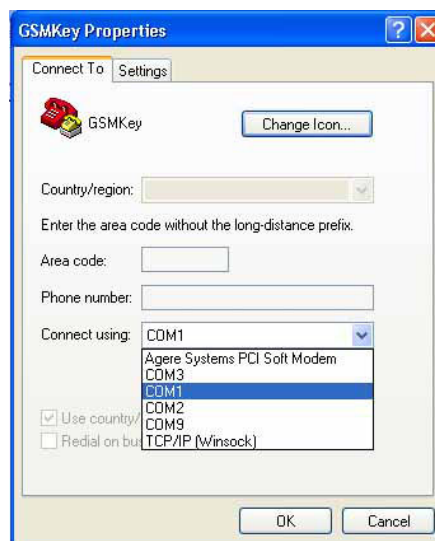
### 3. GSM Key setup

Access to GSM Key setup can be made through RS-232c port or via SMS text. Both ways are using the same command set made of alpha-numeric characters.

#### Setting the GSM Key through serial RS-232c port

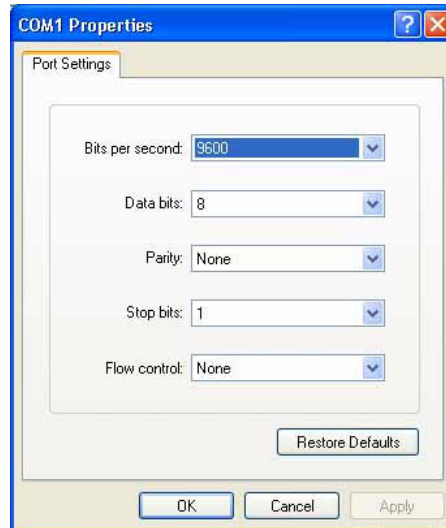
Requirements: computer having one unused serial COM port or otherwise for USB connection, USB/RS-232c adapter, serial cable with DB9 female/male connectors and terminal emulation software such as HyperTerminal running on Windows XP. For newer Windows versions (Vista, Win7, Win8) we recommend the **Terminal.exe** application, simply but mighty freeware that can be obtained from our Support/Download section of [www.decode.rs](http://www.decode.rs) or elsewhere on Web.

- Connect GSM Key to computer serial port with serial cable, power up both. Check if SIM card is present and loaded before that.
- Start the HyperTerminal, usually located at Start/All Programs/Accessories/Communications Menu of Windows OS. Or any other terminal application.
- Set terminal application to use serial COM port to which GSM Key was connected. Example Properties window shows COM1 as selected port.

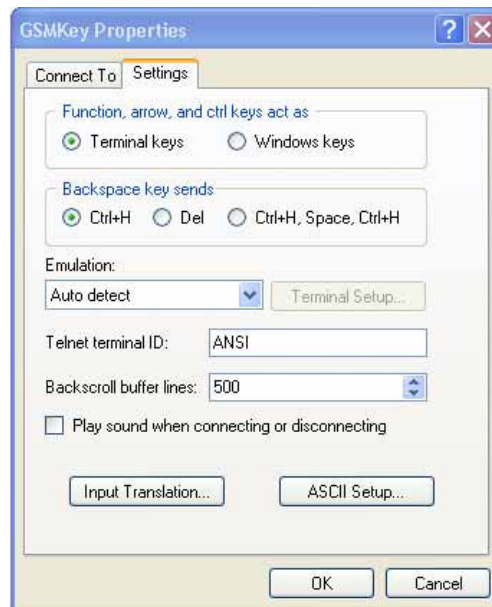


- Click the Configure button and set speed and data format to **9600bps, 8 data bit, No Parity, 1 Stop bit, and None for Flow control.**

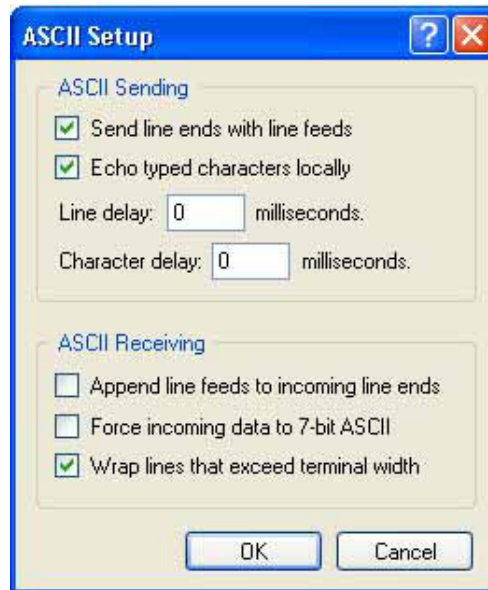





- Check the Settings Tab for following settings



- While in Settings Tab, click the ASCII setup button and make the parameters as follows



- Use the menu option, usually "Call", to establish connection from computer to GSM Key
- Power up the GSM Key and wait half of minute for initialization, until terminal application display **REPORTER READY** message. If the message is missing, re-check the physical connection to serial port as well as port settings.
- After successful initialization device is in **Normal mode** for receiving calls and SMS commands. To switch over to **Configuration mode** please type in the sequence **+++** quickly, with a brief pause before and after typing.
- After the GSM Key turns to **Configuration mode**, terminal app. will show **COMMAND READY** message and will be ready to receive setting messages through serial port.
- Returning to **Normal mode** is done by switching off the GSM Key from power supply and turning back on, resulting in **REPORTER READY** message.
- Mode of operation can be observed from GSM Key front plate, by checking the state of LED indicator ON.
- Commands sent via serial port should be confirmed by ENTER or RETURN taste on the keyboard. Confirming with above mentioned taste will be shown by  symbol for the rest of manual. It is the way for the terminal app. to send CR and LF combination needed for GSM Key to recognize end of command line.
- Several commands can be sent with single line if they are separated by character ; and having prevented that total line is no longer than 150 chars.
- Commands for reading parameter values start with ? followed by parameter name.
- Commands for setting parameter values consist of: parameter name followed by assigning character = and value being assigned to the parameter.
- Non numeric parameter values, mainly text, will sometimes require delimiting them with " characters as quoting signs.
- Command that have been successfully executed return echo message **OK**.
- Command that have been unsuccessful return **ERROR** echo message.

**Setting the GSM Key through received SMS text**

To enable device settings through received SMS, RS-232c port should be used first to define Administrator's telephone numbers (best way) or alternatively, disable the security parameter (less secure way). Command formats are the same as of commands send via terminal application, except for line terminating character ↵ that musn't be included at the end of messages. Depending on other parameters, GSM Key may send return messages as the confirmation of good SMS command execution.

## 4. Commands reference

This commands reference includes notation with < and > characters. Inside of them, description of parameter that has to be passed is contained. Container characters < and > are not be used inside of parameter values or typed together with parameters.

Command	Description
<b>C.Sxxx.N=&lt;number&gt;</b>	Writes one telephone subscriber number to memory position xxx, where xxx can be any number ranging from 001 to 200. Maximal telephone number length is 15 characters. Number has to be written in international format, like this: <b>C.S002.N="+38161233456"</b>
<b>?C.Sxxx.N</b>	Displays the telephone subscriber number previously written to memory position xxx, where xxx can be any number ranging from 001 to 200. An example: <b>?C.S122.N</b>
<b>S.SE=&lt;value&gt;</b>	Security parameter. If the value is equal to 0 (null) GSM Key 110 is opened for configuring by SMS sent from any telephone. If this parameter has value of 1 (one) configuring the GSM Key can be made from Administrators' telephone numbers only. List of Administrators' is kept inside of GSM Key memory positions.
<b>?S.SE</b>	Display of current security parameter value.
<b>S.SME=&lt;value&gt;</b>	Disabling the sending of return SMS to tel. number used for issuing commands. Value 0 (null) will make the GSM Key sending return messages, otherwise the value 1 (one) will disable sending the return messages. Example: <b>S.SME=0</b>
<b>?S.SME</b>	Displays the <b>S.SME</b> current value.
<b>S.Sxx.N=&lt;number&gt;</b>	Writes the Administrator's telephone subscriber number to memory position xx, where xx can be any number ranging from 01 to 16. Maximal telephone number length is 15 characters. Number has to be written in international format, like this: <b>S.S02.N="+38161233456"</b>
<b>?S.Sxx.N</b>	Displays the Administrator's telephone number previously written to memory position xx, where xx can be any number ranging from 01 to 16. Example: <b>?S.S12.N</b>
<b>O1.S=&lt;value&gt;</b>	Setting the relay output to 0 or 1 value, under condition that O1.PD is equal to 0. If O1.PD is higher than 0, value 1 set to <b>O1.S</b> will send close impulse to the relay, but lasting only for predefined time. Example: <b>O1.S=1</b> <b>O1.S=1</b>
<b>?O1.S</b>	Displays the state of relay output.

<b>O1.PD=&lt;value&gt;</b>	(Output x Pulse Duration) Predefined time for relay closure state, after the state is activated. If this parameter contains 0 value, relay output will remain permanently closed until next activation happen.
<b>?I1.S</b>	Reads and displays the state of discrete input.
<b>?I1.C</b>	Reads the counter from impulse input.
<b>I1.CT=&lt;value&gt;</b>	Setting the alarm limit for impulse input counter. After the alarm limit is reached, predefined SMS text will be sent to list of telephone numbers. Allowed range for alarm limit is from 0 to 32767.
<b>?I1.CT</b>	Displays the value set to counter alarm limit.
<b>I1.FL=&lt;time&gt;</b>	Setting the time delay that should elapse from opening input to sending of SMS. Allowed range for time delay is from 0 to 32767, while the unit is 10ms. Example: <b>I1.FL=1000</b>
<b>?I1.FL</b>	Displays the value set for SMS delay (opened input).
<b>I1.FH=&lt;time&gt;</b>	Setting the time delay that should elapse from closing input to sending of SMS. Allowed range for time delay is from 0 to 32767, while the unit is 10ms. Example: <b>I1.FH=200</b>
<b>?I1.FH</b>	Displays the value set for SMS delay (closed input).
<b>I1.MH="&lt;message&gt;"</b>	Setting the predefined text for SMS in case of input closure. Length of SMS is limited to 15 characters. Example: <b>I1.MH="Door Opened"</b>
<b>?I1.MH</b>	Displays predefined SMS text for closed input.
<b>I1.ML="&lt;message&gt;"</b>	Setting the predefined text for SMS in case of input opening. Length of SMS is limited to 15 characters. Example: <b>I1.ML="Door Closed"</b>
<b>?I1.ML</b>	Displays predefined SMS text for opened input.
<b>I1.MCT="&lt;message&gt;"</b>	Setting the predefined text for SMS in case of alarm limit for impulse counter is reached. Length of SMS is limited to 15 characters. Example: <b>I1.MCT="1000th arrived"</b>
<b>?I1.MCT</b>	Displays predefined SMS text for reached counter limit.
<b>I1.WBM=&lt;value&gt;</b>	Setting the time between repeated alarm SMS. In case the SMS acceptance is confirmed during this period, GSM Key will cancel sending of SMS for current alarm situation. Confirming the SMS is made by calling the GSM Key number from any of telephones that have received the SMS. Unit for time value is minute and can range from 0 to 255 minutes. Example: <b>I1.WBM=5</b>
<b>?I1.WBM</b>	Displays the time preset for repeating alarm SMS.

<b>I1.Dn="&lt;number&gt;"</b>	Writes the telephone number subscribed to alarm SMS to memory position n, where n can be any number ranging from 1 to 8. Maximal telephone number length is 15 characters. Number has to be written in international format. Example: <b>I1.D1="+38161233456"</b>
<b>?I1.Dn</b>	Reads telephone number subscribed to alarm SMS from memory position n, where n can be any number ranging from 1 to 8.
<b>?CSQ</b>	Reading of receiving signal level and connection quality. GSM Key should reply with text <b>+CSQ:x,y</b> where <b>x</b> indicates level of received signal and <b>y</b> indicates errors probability as BER - Bit Error Rate. Following tables explain values received by digits <b>x</b> and <b>y</b> .

Receiving signal <b>x</b>	Values of receiving level	Description
0	-113dBm or less	Bad
1	-111dBm	Good
2..30	from -109 to -53dBm	Very good
31	-51dBm or more	Excellent
99	Not available or level can't be determined.	No reception

BER <b>y</b>	Description
0	0 < BER < 0.2% excellent
1	0.2% < BER < 0.4%
2	0.4% < BER < 0.8%
3	0.8% < BER < 1.6%
4	1.6% < BER < 3.2%
5	3.2% < BER < 6.4%
6	6.4% < BER < 12.8%
7	12.8% or more
99	Not available or can't be determined.

### Important



In case the security parameter **S.SE** is deactivated, and return SMS is enabled by **S.SME** parameter, there will be returning SMS sent for each SMS text received to GSM Key. These settings can lead to large amount of SMS sent from GSM Key as response to commercial and promotional messages, game offers, etc. To prevent your GSM Key from making big SMS expenses in that manner, we recommend secure mode that can be enabled with security parameter set to 1 (one), like this:

**S.SE=1** ↵

## 5. Main technical specifications

Power supply:	DC power supply, from 8 to 30V
Nominal current:	120mA with 12VDC
Maximal current:	500mA with 12VDC, 250mA with 24VDC
Operating temperature:	-20°C to +70°C
Operating frequency:	GSM 850/900/1800/1900MHz
Relay maximal rating:	5A with 250VAC (resistance)
Input impedance:	10K $\Omega$
Maximal input voltage:	30VDC
Input activating voltage:	more than 3VDC
Antenna connector	SMA female
Dimensions	110 x 35 x 60 mm

