Installation manual

Mobeye

Power Failure Detector

MS100

SW version 3.n

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Attention! Very important

This user manual contains important guidelines for the installation and usage of the Mobeye® device as described in this manual. Please read these thoroughly before you start using the Mobeye® device!
In case of damage caused by disregarding the guidelines, the warranty expires.
The user must regularly check the proper functioning of the device. The manufacturer cannot be held liable for any damage caused by any incorrect use or incorrect functioning of the Mobeye® device.

Safety guidelines
• The permitted ambient temperature during operation may not be exceeded (not lower than -10°C and not higher than 55°C).
• The device is intended for use in dry and clean places.
• Protect the device from moisture, heat and water splashing.
• The guidelines for the battery usage must be regarded.
• Do not expose the device to strong vibrations.
• Do not let it fall from height.
• Do not use in an environment where any inflammable gases, vapours or dust are present or could be present.
• Reparation of the device may only be carried out by people, trained for Mobeye® repair.
• In case the device must be repaired, only original replacement components may be used. The use of different parts may lead to damage of the Mobeye® device .

Use in accordance with the regulation
The use of this device in accordance with the regulation is initiating SMS messages and telephone calls and/or switching outputs in case power failure or after triggering one of the inputs. Other usages are not permitted.

Battery recycling
CR123 batteries, as used in the Mobeye Mobiles Sensors, are classified as non-hazardous waste and can be recycled. Please take empty batteries to a nearest collection point.

1. GENERAL DESCRIPTION

The Mobeye MS100 is GSM module with back-up batteries, used to send out an alarm after a power failure or after a triggered input. The MS100 is able to switch devices via its outputs relays.

1.1 STANDARD BEHAVIOUR

The Mobeye MS100 is pre-programmed with settings that provide a standard behaviour. This behaviour can be changed by the user, following the instructions in chapter 3   .

The factory settings of the Mobeye MS100 cause following reactions:

- In case of a power failure, the Mobeye MS100 will instantly send out an alarm SMS message to the phone numbers as programmed by the user and call them consequently.
- In case of power restoration, the Mobeye MS100 will instantly send an SMS message to the phone numbers as programmed by the user.
- In case the back-up batteries need to be replaced, the Mobeye MS100 will instantly send out a 'battery low' SMS text message to the administrator (first telephone number).

2. GETTING STARTED

To get started with the Mobeye MS100, at least the following steps need to be taken. Please take in consideration the sequence:

1. Place a SIM card (with PIN code 0000 or without PIN code)
2. Place batteries and connect to the power
3. Program the alarm numbers
4. Arm the system

These steps are further explained in this chapter. After these steps, the module will be operational, using the standard behaviour as described in 1.1.

In chapter 3 the more extended configuration is explained.

2.1 PLACE A SIM CARD

Insert a SIM card into the GSM module. Push the black cover slightly outward to open the holder. Before installing the SIM card should have PIN code "0000", or be free of a PIN code.

(A PIN code can be changed or removed by putting the SIM card in a mobile phone and change or remove the PIN in the security menu.)
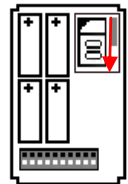
NB: make sure the SIM card is inserted before the batteries are placed. In case of a SIM card change, first remove the batteries.

2.2 PLACE BATTERIES AND CONNECT TO THE POWER

1) Place the four batteries (CR123). Without the batteries the system cannot start-up.
2) Connect the external power adapter to the connector:
   - The black/white wire (+12V) to Vext +
   - The black wire (ground) to Vext –
3) Plug the adapter into the mains.

The keypad LED will flash red, to indicate that the module is not configured. At least one telephone number should be programmed (as described in next step).

Inside the module, LEDs on the PCB also indicate the status. As long as the connection with the GSM network has not been made, the GSM status LED will blink rapidly. Once this connection is made it will

+ 12 V
- Vext

Status LED GSM
Status LED
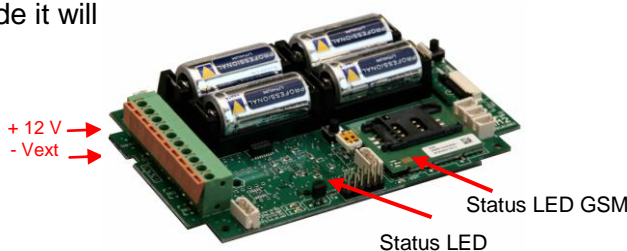
2.3 PROGRAM THE ALARM TELEPHONE NUMBER(S)

The Mobeye MS100 can send messages up to 5 telephone numbers. These numbers can be programmed into the Mobeye MS100 using the keypad or via SMS text messages.

Before explaining how to enter the telephone numbers, the security code is explained.

2.3.1 Security code

For all programming actions the security code of the Mobeye MS100 is used. The initial security code is equal to the last four digits of the IMEI number. This number is located in the module in the place as shown in the picture.
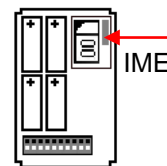This code is further referred to as CODE.

2.3.2 Program the alarm telephone numbers

Programming of the first number - the administrators telephone number - is done in following way:
•   Enter the CODE
•   Press "Menu" (the green LED on the display will turn on)
•   Enter "101" (to enter the first phone number)
•   Press "OK"
•   Enter the phone number
•   Press "OK"

A short melody will sound to indicate a successful configuration. As confirmation an SMS message is sent to this first –administrator- number.

Additional alarm telephone numbers can be programmed at the positions 102..105.
The telephone number programmed as 101 (TEL1) is the administrators number. To this number not only alarm messages are sent, but also technical messages like 'battery low'.

NOTE: If international phone numbers are entered via the keypad, please use "00" instead of "+" (0031612345678 to set the phone number +31612345678).
It is also possible to program the telephone numbers by SMS commands; please refer to chapter 3.

2.3.3 Delete alarm telephone numbers

To delete a telephone number:
•   Enter the CODE
•   Press "Menu" (the green LED on the display will turn on)
•   Enter "101" (to delete the first phone number)
•   Press "OK"
•   Enter "0"
•   Press "OK"

The numbers 2..5 can be deleted in the same way (102…105).

2.4 ARMING (AND DISARMING) THE SYSTEM

To get alarm messages from the Mobeye GSM sensor, the unit needs to be armed.

To arm the Mobeye GSM sensor :

-    Enter the CODE
-    Press " OK"
-    A success melody followed by 4 short beeps will be heard and the green LED will flash.

When the Mobeye MS100 is armed, the green indicator light will flash shortly every 4 seconds.

To disarm the Mobeye GSM sensor :

-    Enter the CODE
-    Press " OK"
A short melody will be heard. At the same time the red LED will flash once.

3. EXTENDED CONFIGURATION

In this chapter more extended configuration is explained.

The Mobeye MS100 is an event driven module. Certain triggers can lead to actions. For instance, in case of an alarm the Mobeye MS100 could send an SMS text message, phone the programmed numbers and switch an output.

These actions shall be programmed in so-called action rules (please refer to 3.6). General settings as explained in 3.3 are to be set to determine the behaviour of the inputs, outputs and messages.

3.1 SECURITY CODE

For all programming actions the security code of the Mobeye MS100 is used. The initial security code is equal to the last four digits of the IMEI number. This number is located in the module in the place as shown in the picture.
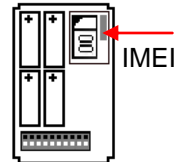
The security code is also included in the confirmation SMS as received by the administrator.

In this manual this code is further referred to as CODE.

3.2 CONNECTING ADDITIONAL INPUT AND OUTPUTS

The Mobeye MS100 is equipped with two inputs and two outputs. The user may use the input as extra trigger and output for connecting devices. The behaviour of the in- and outputs needs to be programmed in the general settings and in the action rules.

3.2.1 Connecting the inputs

Connect the 2 wires of an external sensor to one of the inputs (input 1: IN1+ and IN1-). It does not matter which wire is connected to what connector per input.

In case necessary the wires can be extended up to 5 meters if using appropriate wire material.

As default the inputs are programmed as NO contact. This means the input is triggered in case the input is closed during at least 1 second. In case the contact should be NC, please refer to chapter 3.
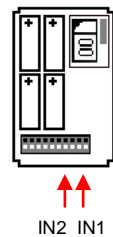
3.2.2 Connecting the outputs

The Mobeye MS100 has two outputs (O1 and O2).These relay outputs can switch external devices. The maximum load is 2A/30V per output.

The outputs can be switched by SMS commands, incoming phone calls or via an action like a triggered input. In next chapters this is described.
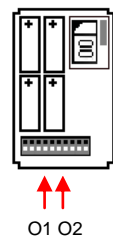
3.3 GENERAL SETTINGS

The general settings describe the generic behaviour of the Mobeye MS100.
To program the settings by SMS commands, the module needs to be powered by the mains adapter (or any other 9-24VDC power supply). The GSM modules must have network connection. All settings are stored and will be kept in the unit, even in case the power is off and the batteries are removed.

3.3.1 Change the security code

The security code can be changed to any four-digit code. In case the code is unknown the unit can be reset. The code will be the factory default (the last four digits of the IMEI number).

SMS command change security code: **CODE INSTCODE:<new code>**

Example: 1234 INSTCODE:8756

3.3.2 Phone numbers for alarm messages

The Mobeye MS100 is able to send alarm messages up to 5 phone numbers. The first programmed telephone number is the administrator. Only the administrator will get all system messages (like "battery low"). The alarm messages will be send to all programmed phone numbers (including the administrator).
If international phone numbers are entered via the keypad, please use "00" instead of "+" (so enter 0031612345678 to set the phone number +31612345678).

SMS command 1st tel. number: **CODE TEL1:<telephone-number>**
SMS command 2nd tel. number: **CODE TEL2:<telephone number>**
.... similar for TEL3...TEL5

Example: 1234 TEL1:0612345678

3.3.3 Identification text

It is possible to add a standard identification text (name) to every message sent out by the Mobeye MS100 . The alarm messages will be a combination of the name and the alarm message.
The "Name" has a length of max 20 characters and shall not contain any spaces.

SMS command Identification text: **CODE NAME:<free text>**

3.3.4 Power failure delay time

The power failure delay time defines the time that the power fails before an alarm is initiated. If the power is restored within the delay time, no alarm is sent. The time can be set between 0 and 999 minutes. As default, the delay time is set to 0.

SMS command power failure delay time: **CODE DELAYPOW:xxx**

3.3.5 Input type

The input type defines the character of the input IN1 and IN2. This can be Normally Open (NO) or Normally Closed (NC). In case the input is set to NO, the alarm will be triggered as soon as the terminals of the input are connected. If the input is set to NC, the alarm will be triggered in case the connection between the input terminals is broken.
In the factory settings the input types are set to NO.

SMS command input type input 1:   **CODE TYPEIN1:xx**
SMS command input type input 2:   **CODE TYPEIN2:xx**

3.3.6 Inactive time

The "inactive time" defines the time that the input I1 and I2 are inactive after a trigger. The time can be set between 0 and 60 minutes. If this time is set to "0", the input will be active again as soon as the input returned to its non-alarm status.

If the time is set to e.g. 30 minutes, the input will remain inactive for the next 30 minutes. If after 30 minutes the input is still (or again) in an alarm status, the alarm message will be sent again (the action rule will be executed again).

In the factory settings the inactive time is set to "0".

SMS command inactive time input 1:   **CODE INACTIVEIN1:xx**
SMS command inactive time input 2:   **CODE INACTIVEIN2:xx**

3.3.7 Input delay time

The input delay time defines the time that the input shall be triggered before an alarm is initiated. If the input I1 or I2 returns to the non-alarm status within the delay time, no alarm will be sent. The time can be set between 0 and 60 seconds. In the factory settings the input delay time is set to 1 second.

SMS command alarm delay input 1:   **CODE DELAY1:xxx**
SMS command alarm delay input 2:   **CODE DELAY2:xxx**

3.3.8 Pulse time output

If an output is used, the time this output is activated can be set between 1 and 999 sec. If the setting is set to 0, the output does not return to its previous state automatically. In this case, it can be switched back by a new action rule.

In the factory settings the pulse time is set to 1 second.

SMS command pulse time output 1:   **CODE TO1:xxx**
SMS command pulse time output 2:   **CODE TO2:xxx**

3.3.9 Test SMS text message

If desired, the Mobeye MS100 can send a regular test message (´keep alive´) to the administrator (first telephone number). By receiving this message, the administrator is ensured of a proper functioning of the Mobeye MS100. This function is only active in case the unit is armed.

The interval between the test messages can be set between 0 days (no test message) and 30 days. In the factory settings the test interval is set to 0 (no test message).

SMS command interval test message: **CODE TEST:xx**

3.4 PROGRAMMING GENERAL SETTINGS VIA THE KEYPAD

Several configuration settings can be programmed via the keypad.
Additional settings need to be done via SMS commands.

In order to change a setting:
- Enter the CODE
- Press "Menu" (the keypad LED turns green)
- Enter the menu number
- Press "OK"
- Enter the new settings
- Press "OK"

Following settings can be entered via the keypad. Please refer to chapter 3 for the explanation of the settings:

Settings	Menu nr	Possible value
Security code	00	4 digit number
Telephone number 1	101	Tel. numbers, 0 means 'empty'
Telephone number 2	102	
Telephone number 3	103	
Telephone number 4	104	
Telephone number 5	105	

Note: after changing the telephone number 1 (administrator's number), a confirmation SMS message will be sent to the new administrator.

3.4.1 Reset of system by keypad

The Mobeye MS100 can be reset, in order to get back to the factory settings:

- Enter the CODE
- Press "Menu" (the LED will turn green)
- Enter '99'
- Enter "OK"

After a successful rest, the red LED will flash to indicate that the module is not configured. The security code is reset to factory settings as well.

3.5 PROGRAMMING GENERAL SETTINGS BY SMS COMMANDS

Setting	SMS Command	Range	Default value
Change security code	INSTCODE:<newcode>	0000..9999	Last 4 digits IMEI no.
Set telephone number for alarm messages	TEL1:<tel number> …. TEL5:<tel number>		Empty
Delete telephone number	DEL1 …. DEL5		
Identification text	NAME: <text>		Mobeye
Input type	TYPEIN1:<type> TYPEIN2:<type>	NO, NC	NO
Time before input is re-activated after an alarm	INACTIVEIN1:<min> INACTIVEIN2:<min>	0..60	0
Delay on input	DELAY1:<sec> DELAY2:<sec>	0..60 (sec)	1
Pulse time of output	TO1:<sec> or TO2:<sec>	1..999	1
Set 'test SMS' interval	TEST:<days>	0..30	0
Delay on power failure	DELAYPOW:<min>	00-60	00

3.5.1 Program by sending SMS commands

Settings are programmed by sending SMS commands to the unit.

Make sure the Mobeye MS100 is powered and the connection with the GSM network is established.
Send following SMS commands in following format:

CODE <command1> <command2> <command3>

- Do not forget the space character between CODE and <commands> and between each <command>.
- The order of commands doesn't matter.
- Several commands can be combined in one SMS message. Do not exceed the length of one SMS message (160 characters).
- The Mobeye MS100 will play a short melody to indicate a successful configuration. In case of a wrong command, a long beep will sound.

Examples:
Set phone number 1 *and* identification text:
1234 TEL1:0612345678 NAME:Powerunit1
(space before TEL1 and before NAME)
Delete phone number 1:
1234 DEL1

3.5.2 List of programmed settings

To get a summary of the programmed settings, the Mobeye MS100 can send SMS messages to sender of the request, containing the settings as programmed in the unit.

To get an overview of the settings, send the following SMS message to the Mobeye MS100 :
CODE SET?   To get an SMS with the programmed general settings
CODE CALL?   To get an SMS with the list of programmed telephone numbers.

3.6 ACTION RULES

The alarm message and behaviour of the outputs of the Mobeye MS100 can be programmed by action-reaction patterns. In so-called Action Rules, the user defines the reaction to a trigger. This reaction may consists of several actions. For instance, triggering an input can lead to an alarm SMS text message to be sent. The same trigger could also switch an output, for example to switch a device.

| Trigger | | Action | ⊹ | Action | ⊹ | Action |
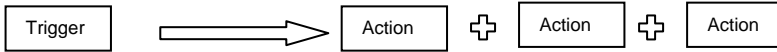
The trigger + related actions are called an "action rule". Each action rule may contain 3 actions. A maximum of 10 action rules can be programmed.

Triggers

As trigger the following events can be used:

Trigger	Command
Input 1 triggered	IN1
Input 2 triggered	IN2
Input 1 restored	IN1RESET
Input 2 restored	IN2RESET
Power failure	POWERFAIL
Power restore	POWERRESET

Actions

Each trigger can initiate a maximum of 3 actions out of the following list :

Action	Command	Remark
Switch Output 1	O1ON, O1OFF	
Switch Output 2	O2ON, O2OFF	
Send SMS	SEND:<text>	Max. length of 20 characters. An alarm SMS contains the identification text and the text as defined here.
Call	CALL	The unit calls the set alarm numbers. The receiver will hear a 2-tone signal.

Programming action rules is done by following SMS command:

CODE <trigger>:<action1>,<action2>,<action3>

- Do not forget the space between CODE and <trigger>.
- The order of commands does not matter.
- Each action rule needs to be programmed by one SMS message..
- The Mobeye MS100 will play a short melody to indicate a successful configuration. In case of a wrong command, a long beep will sound.
- The action rules are saved in a so-called Action Rules List (ARL).

Examples:

Switch output 1 after a triggered input1:
1234 IN1:O1ON
(space before IN1)

Switch output 2, call and send SMS text 'Pump failure' after a triggered input2
1234 IN2:O2ON,CALL,SEND:Pump failure

List of programmed action rules
A list of programmed action rules can be requested by sending following SMS to the unit.

CODE ARLREPORT?   To receive an SMS list with all programmed action rules

3.6.1 Delete action rules

To delete action rules, send the following SMS to the unit:

CODE DELARL: <indexnumber> To delete a programmed action list. The index number is the sequence number of the action rule as displayed in the ARLREPORT.

Remark: a rule will keep its index number, even if a rule with a previous number is deleted. This will result in "gap" in the index list. If a new Action Rule is added, this rule will get the index number of the first empty position.

3.7 RESET OF SYSTEM

To reset the Mobeye MS100 to its factory settings, follow following steps:
- Remove the batteries and external power
- Press the program button while replacing the batteries.
- Keep the program button pressed during 15 seconds until first a short melody and next 3 short beeps are heard
- Release the program button
- Restore the external power

Alternatively use the keypad
• Enter the <CODE>
• Press "Menu" (the LED will turn green)
• Enter '99'
• Enter "OK"

After a successful reset, the red LED will flash to indicate that the module is not configured. The security code is reset to factory settings as well.

4. REMOTE CONTROL VIA INCOMING CALL OR SMS MESSAGE

The outputs of the Mobeye MS100 module can be switched remotely via incoming call or SMS command.

First the authorised numbers need to be entered in the system. Only calls or SMS messages from authorised numbers will lead to an action. In case of an SMS commands to switch the output, no action rule need to be entered. In case of an incoming call leading to an action, the action needs to be defined first.

NOTE: in the sender's telephone the number recognition needs to be switched on.

4.1 AUTHORISING TELEPHONE NUMBERS

The authorised numbers can be set in the module via keypad or via an SMS command.

4.1.1 Authorising numbers via the keypad

To add a number:

- Enter the CODE
- Press "Menu" (the keypad LED turns green)
- Enter the menu number
- Press "OK"
- Enter the telephone number that needs to be authorised
- Press "OK"

Settings	Menu nr	Possible value
Authorised telephone number 1	1001	Tel. numbers, 0 means 'empty'
Authorised telephone number 2..10	1002..1010	Tel. numbers, 0 means 'empty'

If international phone numbers are entered via the keypad, please use "00" instead of "+" (0031612345678 to set the phone number +31612345678).

4.1.2 Authorising numbers via SMS commands

Settings	SMS Command	Remark
Authorised numbers for remote control	ADDTELA:<tel>	Max. 10 number s can be authorised for switching the relays. NOTE: the number must be exactly like equal number sent. Most local numbers are sent in the international format e.g. +31611223344 or 0031611223344)
Delete authorised numbers	DELA: <indexnumber>	Choose the index number of the number to be deleted. The index numbers are displayed in the list, which can be requested by SMS command ACLREPORT?

To program authorised numbers is done by following SMS command:

 CODE ADDTELA:<tel>

- Do not forget the space between CODE and ADDTELA:
- A maximum of 10 numbers can be programmed.

- Per number a separate SMS message needs to be sent. The new number will be entered at the first empty position.
- The number must be exactly like equal number sent. Most local numbers are sent in the international format e.g. +31611223344 or 0031611223344.
- The Mobeye MS100 will play a short melody to indicate a successful configuration. In case of a wrong command, a long beep will sound.

List of authorised numbers
For receiving the list of authorised numbers, send following SMS command:

CODE ACLREPORT?   To receive an SMS message with the list of authorised telephone numbers.

Delete a number
To delete an authorised number, send following SMS command:

DELA: <index number>   To delete the index number of the authorised number. The index number is listed in ACLREPORT.

Examples:

To authorise telephone number (0031) (0)6 12345678:
1234 ADDTELA:+31612345678
 (space before ADDTELA:)

To delete the authorised telephone number at position 2:
1234 DELA:2
     (space before DELA:)

4.2 SETTING THE ACTION RULE FOR AN INCOMING CALL

The Mobeye MS100 can execute actions after receiving an incoming call. No phone charges will be made. In case the calling telephone is listed in the authorised number list, the unit will recognize the number.

The module will react to the incoming call according to pre-programmed action as set in one of the following action rules. By combining an action for output 1 and 2, both outputs can be switched. In the general settings the behaviour of the output switch (pulse/switch) can be set.

Action rule	Trigger	ACTION
Switch on output 1 after incoming call	CALL	O1ON
Switch off output 1 after incoming call	CALL	O1OFF
Switch on output 2 after incoming call	CALL	O1ON
Switch off output 2 after incoming call	CALL	O1OFF

Programming action rules is done similar to other action rules, by following SMS command:

CODE <trigger>:<action>

- Do not forget the space between CODE and <trigger>.
- The order of commands does not matter.
- Each action rule needs to be programmed by one SMS message..
- The Mobeye MS100 will play a short melody to indicate a successful configuration. In case of a wrong command, a long beep will sound.

Examples:

To set action rule to switch output 1 after incoming call from authorised number:
1234 CALL:O1ON
 (space before CALL:)

4.3 SMS COMMANDS FOR REMOTE CONTROL

From any authorised telephone an SMS message can be sent to the Mobeye MS100 .

Using one of the following commands, the outputs can be switched. In the general settings the behaviour of the output switch (pulse/switch) can be set.

Action	SMS Command
Switch on output 1 after sending SMS	O1ON
Switch off output 1 after sending SMS	O1OFF
Switch on output 2 after sending SMS	O2ON
Switch off output 2 after sending SMS	O2OFF

In case the SMS command was accepted a short confirmation tone will sound. In case the command was incorrect, or the command was sent from an unauthorised telephone number, no sound is heard.

5. REPORTING TOOLS: SETTINGS AND STATUS

The programmed settings and status of the GSM detector can be received per SMS message. Five different SMS messages can be sent as request.

5.1 STATUS REQUEST

The status of the Mobeye MS100 can be requested by sending an SMS with the content:

CODE STATUS?   To receive the status by SMS message, sent to the originator of the request. The status message includes
- ARMED / DISARMED status of the unit
- Status of the power
- Status of the outputs

5.2 LIST OF SETTINGS

The general settings of the Mobeye MS100 can be requested by sending an SMS with the content:

CODE SET?   To receive an SMS list with the general settings, sent to the originator of the request. The message includes all general settings as described in chapter 3 (excluding the phone numbers. They can be requested separately).

5.3 CALL LIST

The list of programmed alarm phone numbers of the Mobeye MS100 can be requested by sending an SMS with the content :

CODE CALL?   To receive an SMS list with the programmed telephone numbers, sent to the originator of the request.

5.4 ACTION RULES

The list of programmed action rules of the Mobeye MS100 can be requested by sending an SMS with the content :

CODE ARLREPORT?   To receive an SMS list with the programmed action rules, sent to the originator of the request.

5.5 AUTHORISED TELEPHONE NUMBERS

The list of programmed authorised telephone numbers for remote control of the outputs can be requested by sending an SMS with the content :

CODE ACLREPORT?   To receive an SMS list with the programmed authorised numbers, sent to the originator of the request.

6. TECHNICAL MESSAGES

In case of a technical issue, the administrator will get an SMS message. There might be a delay of approx. 1 minute before a technical message is sent out.

Possible technical messages are:

Message	Reason
Battery low	Batteries almost empty
All supplies fail	Power failure and low batteries
Power supply failure	Power failure

In case you need any additional information, please contact info@mobeye.eu

Technical specifications

GSM	: Quad band EGSM 900/1800 - 850/1900MHz
Antenna connector	: 50 Ohm MMCX coaxial female RF connector
Power connection	: 9-24 VDC / min. 500 mA.
Power consumption	: ca 50 mA. average / max ca 500 mA
Battery life in normal mode	: >2 years (dependent on use)
Dimensions	: 80 x 127 x 25 mm
Output	: 2x relays (2A/30V)
Messages	: User defined alarm messages, Power failure, low battery, test message.
Ambient temperature GSM unit	: -10℃ until +50℃

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