



Ⓒ Operating Instructions
**GSM Remote Control /
Alarm Module “GX107 LTE”**
Item No. 2345538

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1. Introduction

Dear customer,

Thank you for purchasing this product.

This product complies with the statutory national and European requirements. To maintain this status and to ensure safe operation, you as the user must observe these operating instructions!

To maintain this status and to ensure safe operation, you as the user must observe these operating instructions!



Read the complete operating instructions before taking the product into operation; observe all operating notes and safety information.

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If there are any technical questions, please contact:

International: www.conrad.com/contact

United Kingdom: www.conrad-electronic.co.uk/contact

2. Explanation of symbols



The symbol with the lightning in the triangle is used if there is a risk to your health, e.g. due to an electric shock.



The symbol with the exclamation mark in the triangle is used to indicate important information in these operating instructions. Always read this information carefully.



The arrow symbol indicates special information and advice on operation.

3. Intended use

The GSM remote control/alarm module has 2 switching outputs that can be switched either via text message or via call (INCALL).

An analogue input (ADC) can measure both an external voltage and be reconfigured to use an optional temperature sensor (Conrad item no. 198896).

The device has an additional input with the Molex socket for the temperature sensor (Conrad order no. 2481783). So two temperature sensors can be used at the same time.

The optocoupler input (IN1) is used to supervise switching signals.

Accessories available include a GPS receiver (Conrad item no. 1629152) to determine the current GPS position as well as to indicate when leaving determined areas. The optional GPS receiver also enables monitoring of moving objects.

The configuration, communication and alarms are sent via text message in the "GX107". Alarms can be sent to an email address if the GSM provider used supports this function.

Typical applications are switching of door openers, garage door openers, lighting and alarm systems, inspecting door sensors, motion detectors, fire alarms or fill level sensors, as well as generation of alarm messages.

All connections are approved for line lengths of no more than 1 m. Designated accessories are not affected by this.

Read these operating instructions thoroughly and carefully, they contain a lot of important information for assembly, commissioning and operation.

Any use other than that described above is not permitted. Misuse may not only damage the device, but also leads to risks such as short circuit, fire, electric shock. The product must not be modified or converted. The safety information and the maximum permissible operational and ambient conditions stated in the chapter "Technical Data" must be observed at all times.

This product complies with the statutory national and European requirements. All company names and product names are trademarks of their respective owners. All rights reserved.

4. Delivery content

- GSM remote control / alarm module for "GX 107"
- Cable feedthroughs and closing plugs
- Operating instructions

Up-to-date operating instructions

Download the latest operating instructions at www.conrad.com/downloads or scan the QR code shown. Follow the instructions on the website.



5. Safety instructions



The guarantee/warranty will expire if damage is incurred resulting from non-compliance with the operating instructions! We do not assume any liability for consequential damage!



We do not assume any liability for damage to property or personal injury caused by improper use or the failure to observe the safety instructions! In such cases the guarantee/warranty will expire!

- This module left the factory in perfect condition in terms of safety engineering. To maintain this condition and to ensure safe operation, the user must observe the safety information and warning notes in these operating instructions.
- This module is equipped with highly integrated components. Electronic components are very sensitive to static electricity discharge. Only touch the module by the edges and avoid contact with the pins of the components on the circuit board.
- Unauthorised conversion and/or modification of the module switching is inadmissible for safety and approval reasons.
- When handling products that may come into contact with electric voltage, observe the valid VDE regulations, especially VDE 0100, VDE 0550/0551, VDE 0700, VDE 0711 and VDE 0860.
- Consult an expert if you are unsure as to the function, safety or connection of the module.
- The module must only be operated after it has been installed in the casing protected from touch. The power must be switched off when installing the module. All wiring work must be performed with the power switched off.
- Direct contact of the circuit board with water must be avoided at all times.
- Do not operate the module in rooms or under unfavourable conditions where combustible gases, vapours or dust are or may be present.
- Before taking the module into operation, always check it and its cables for damage.

If you have reason to believe that the device can no longer be operated safely, disconnect it immediately and make sure it is not unintentionally operated.

It can be assumed that safe operation is no longer possible if:

- the device shows visible damage
- the device no longer functions
- the device was stored under unfavourable conditions for an extended period of time
- if it was subjected to heavy stress during transport



- Do not switch on the device immediately after it was taken from a cold to a warm environment. The condensation that forms might destroy your device. Allow the device to reach room temperature before switching it on.

- Do not leave the packaging material lying around carelessly since such materials can become dangerous toys in the hands of children.

- In schools, training centres, computer and self-help workshops, handling of technical devices must be supervised by trained personnel in a responsible manner

At industrial sites, the accident prevention regulations of the association of the industrial workers' societies for electrical equipment and utilities must be followed.

- Use other than that described can lead to damage to the product and may involve additional risks such as, for example, short circuit, fire, electric shock, etc.

- The relay must only be connected by a specialist! Only open the "GX107" when powered down!

6. General Notes on Rechargeable Batteries

- Keep the rechargeable battery out of reach of children.
- Leaking or damaged batteries/rechargeable batteries can cause chemical burns to skin when touched without the use of adequate protective gloves.
- The rechargeable battery must never be short-circuited or thrown into fire. There is a risk of fire and explosion!
- Never open or disassemble the rechargeable battery!
- If the rechargeable battery heats up strongly when charging, interrupt the charging process!
- Never charge the battery unsupervised.
- For reasons of safety, only charge the rechargeable battery on a heat-resistant surface.
- If the rechargeable battery shows any deformation, holes or other obvious defects, no longer use the rechargeable battery and do not try to charge it.
- Dispose of the rechargeable battery environmentally compatibly.

7. Operating Conditions

Operate the module only with an operating voltage between 5 and 32 V/DC and observe polarity. The power source must be able to deliver at least 700 mA.

The maximum switching output of the relay (OUT1) is 5 A at 30 V/DC or 8 A at 250 V/AC.

The maximum switching output of the relay (OUT2) is 5 A at 30 V/DC or 8 A at 250 V/AC.

When installing the module, ensure a sufficient cable cross-section of the connection lines.

The module can be installed in any position.

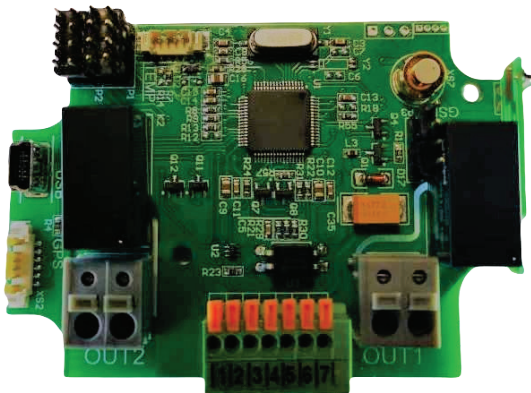
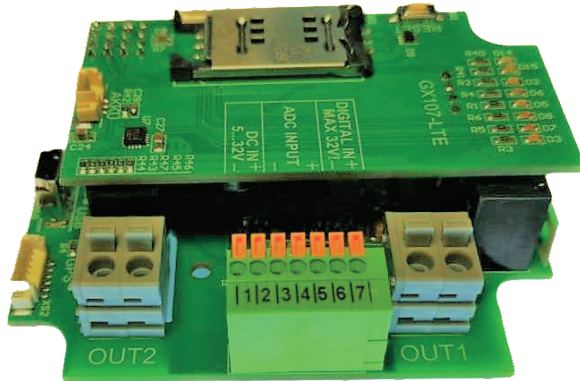
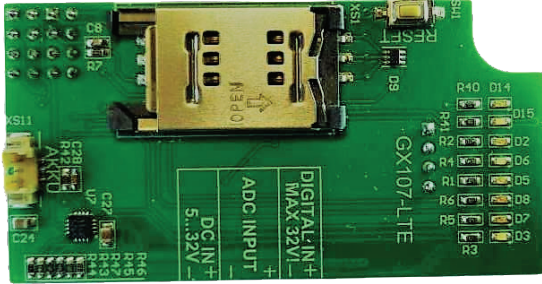
To warrant the "GX107" function, select an assembly site where the GSM network can be received. This means that the site must not be shielded by reinforced concrete walls, metallised mirrors, plate shelves, etc.

There is the option of using an external antenna (Conrad order no. 199399).

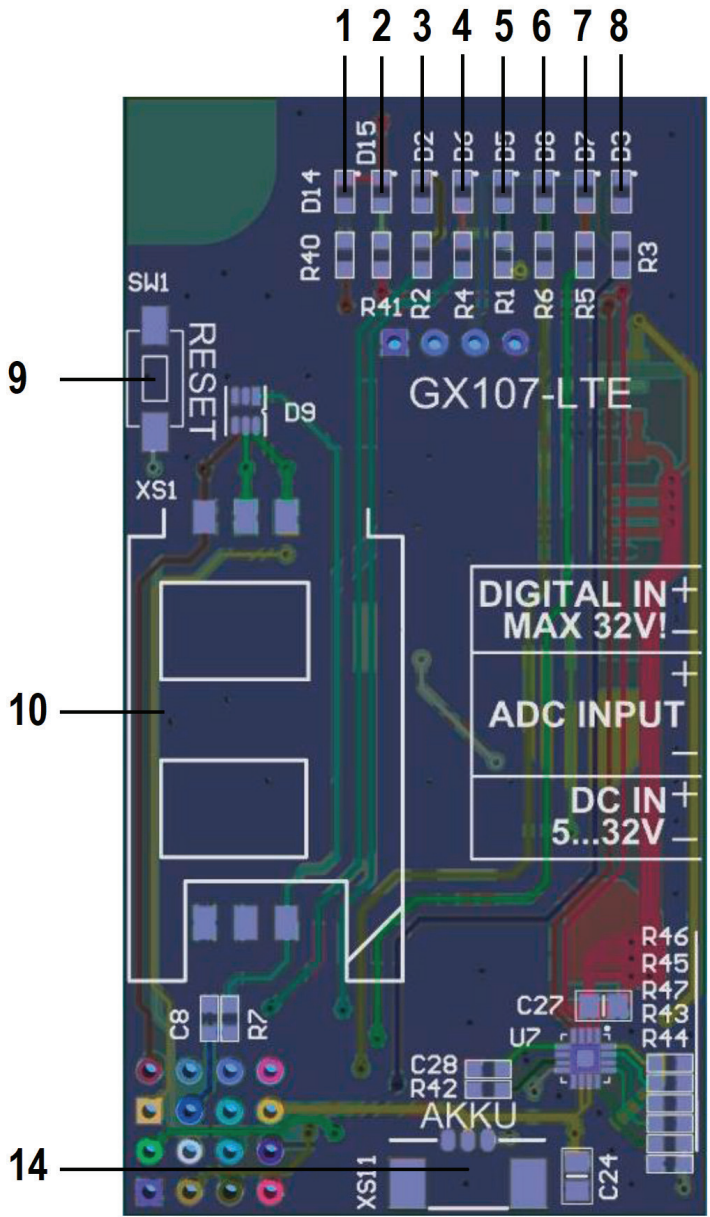
No devices with strong electric fields, such as mobile phones, radio devices, electric engines, etc., should be in the proximity of the camera.

8. Connections and LEDs

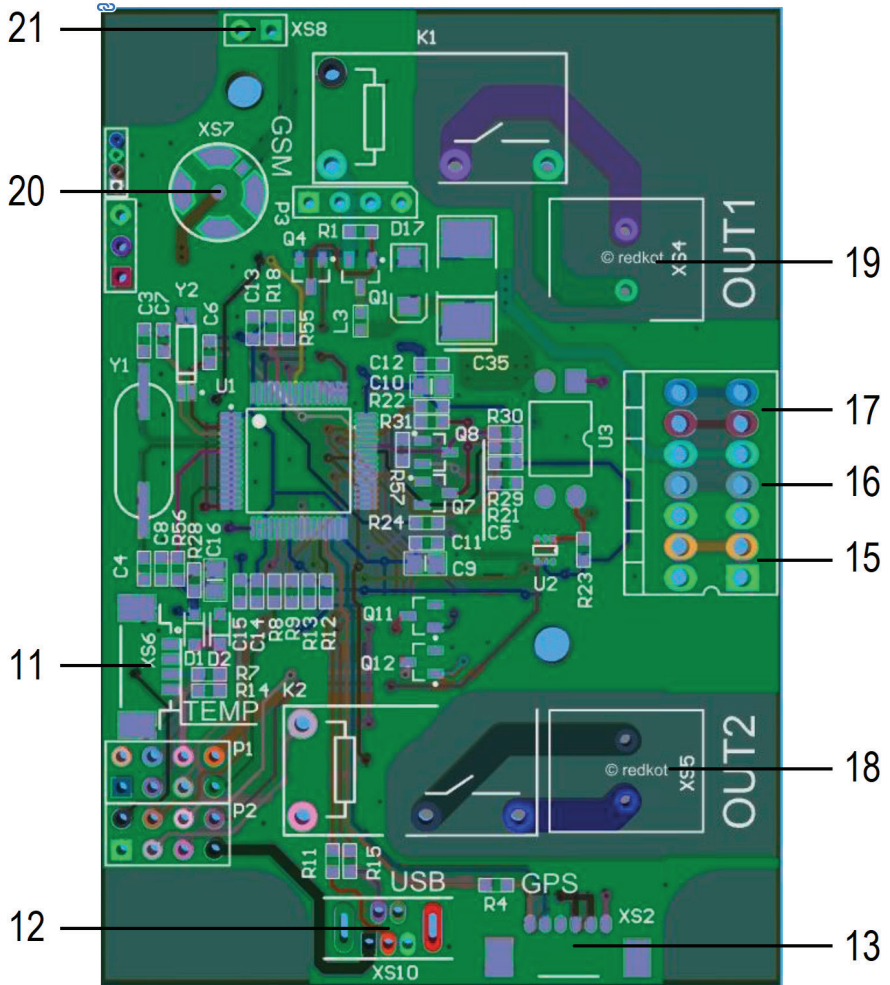
The GX107 4G unit consists of two boards connected by PIN holders. Upper board - PCB TOP and lower board - PCB BOTTOM.



PCB Top



PCB Bottom



- 1 LED (red) = Charge battery
- 2 LED (green) = Battery charged
LED 1 and LED 2 light up together = battery fault
- 3 LED (red) = Error and information display
Lit: Wrong PIN
Flashes briefly 3x: Factory reset (in connection with S1)
Flashes 1x in operation: Text message received
- 4 LED (green) = GSM status
Flashes: GX107 registered on the network (flashes 1 * per second if 2G or 3G; flashes 2 * per second in 4G)
Lit: Network search, no network connection
- 5 LED (blue) = GPS status
Flashes: Current GPS position determined
Lit: GPS activated, position not determined (receiver position?)
- 6 LED (orange) OUT2 (relay)
- 7 LED (orange) OUT1 (relay)
- 8 LED (green) IN1 (optocoupler)
- 9 Button S1, to reset to factory settings
- 10 SIM card holder
- 11 Connection of temperature sensor to the Molex socket
- 12 Connection for USB
- 13 Connection for GPS receiver
- 14 Connection for LiPo battery
- 15 Connection operating voltage
- 16 ADC- or temperature sensor
- 17 Opto input (IN1)
- 18 Relay switching output OUT2
- 19 Relay switching output OUT1
- 20 Connection for GSM antenna (MMCX)
- 21 Internal GSM antenna

Inputs

There is an input for operating voltage (15), an input for connection of a rechargeable battery (Lilon, 14), an analogue input (16) and an optocoupler (17).



Observe the maximum input voltage of 2.8 V at the ADC and a maximum input voltage of 32 V/DC at the optocoupler input and operating voltage!

Outputs

Each output has its own LED to display the current status.



A relay is already connected to both outputs. Observe the connection data of the relay (5 A at 30V/DC or 8 A at 250 V/AC).

Antenna

The "GX107" has an installed antenna. If the reception is too bad or the "GX107" must be set up in a place with bad reception conditions, you may connect an external antenna (Conrad item no. 199399).

A connection option for an antenna with MMCX plug is provided in the casing (20). Check the reception quality at the intended site of use with a mobile phone first.

SIM card

The SIM card is inserted in the holder on the front of the PCD (see section "preparation of the SIM card").

GPS

An external GPS module can be connected to the 6-pin connection (13) on the PCB (Conrad item no. 1629152). The GPS module is used for simple place determination of the "GX107" but can also be used for object monitoring (see section "GPS Application and Settings").

Rechargeable Battery

The rechargeable battery is located in the casing lid and is attached with a metal bracket. The connection to the GX107 is made via a three-wire cable with a plug that is protected against polarity reversal. Do not use any force for connection!

Before closing the casing, ensure that the battery cable is connected to the socket (14) on the front of the PCB. A connection error is signalled by the two LEDs (1 & 2) being lit after connection of the operating voltage (15).

LED description

- 1 Red LED: The battery is being charged
- 2 Green LED: The battery is charged
- 3 Red LED: Error (e.g. wrong PIN of the SIM card)
→ The red LED (3) lights up briefly when a text message is received.
- 4 Green LED: GSM status
Flashes: "GX107" logged on to the network
Lit: Searching for network, no reception
- 5 Blue LED: GPS Status (flashes: current GPS position determined)
- 6 orange LED: OUT 2 (relay)
- 7 orange LED: OUT 1 (relay)
- 8 Green LED: IN 1 (optocoupler)

9. Commissioning - First Steps



The module may only be commissioned after it has been installed contact-free in a casing. Prior to commissioning the module group, check whether it is suited for the intended application!

In case of doubt, you must contact an expert or the manufacturer!

Operating voltage

Open the casing, i.e. turn out the 4 screws and remove the casing lid. Direct voltage of 5 to 32 V/DC is required at the input clamps (15). Observe correct polarity (plus/+ and minus/-).

The following are lit when the operating voltage is connected correctly:

LED (1) or LED (2) = Battery is connected

LED (1) and LED (2) = Battery is not connected

No LED = No operating voltage (battery and external) present; check connections

SIM card preparation

The following is needed for operation and configuration of the "GX107":

- A common mobile phone with SIM card for configuration of the "GX107"
- An additional SIM card (prepaid or contract) for the "GX107"

Changing the PIN code

For operation of the "GX107", you need a separate SIM card, as for any other mobile phone. It is inessential whether you use a prepaid or contract card.

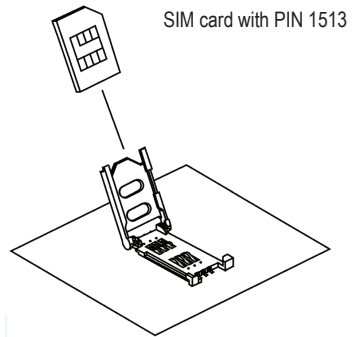
Every SIM card has a PIN code. This PIN code must be changed to "1513".

Insert the SIM card you want to use for the "GX107" in any module phone first and change the PIN code of the SIM card to "1513". For this, observe the operating instructions of your mobile phone.

After changing your SIM card's PIN code, you can remove it from your mobile phone and put it in the "GX107". The SIM insert is on the front of the "GX107"'s PCB, below the casing lid.

For clarification - proceed as follows:

1. Insert the SIM card intended for the "GX107" in your mobile phone.
2. Change the PIN code to 1513 according to your mobile phone's operating instructions.
3. Remove the SIM card with the changed PIN code from your mobile phone.
4. Insert the SIM card with the changed PIN code into the "GX107". The SIM insert is on the front of the "GX107"'s PCB, below the casing lid.



→ To protect from unauthorised access to your "GX107" and its SIM card, change the PIN again after commissioning of the "GX107". It is described in more detail in chapter "Protection of the "GX107" by PIN Code".

Switching on the Devices

Once the SIM card is inserted, the "GX107" switches on automatically. This is signalled by the green LED (status GSM (4)):

First, the LED remains lit (network search); after a few seconds, the LED should start flashing (network found, "GX107" ready for operation). If the green status LED does not start to flash, there is an error in the connection with the GSM provider.

In this case, check the following:

- SIM card set to correct PIN ("1513")?
- SIM card locked (PUK)?
- Check reception with another mobile phone
- SIM holder arrested properly?
- Battery connected correctly?
- External voltage present (at least 1 battery LED is lit)?
- Checking connection of an external GSM antenna (if present)

If the "GX107" still does not register in the GSM network, reset the device to default (see chapter 11) and use an external voltage supply (no battery operation).



If the red LED is lit (3), access to the SIM card is not possible!

Check that the SIM card was activated, inserted correctly and/or set to the correct PIN.

If the "GX107" was used with a different SIM card before, the PIN in the "GX107" may have to be changed. In this case, reset the "GX107" to factory settings (section "Factory Reset") and check the SIM card PIN in your mobile phone.

10. Introduction Command Format

Before you can use the "GX107", you have to configure it. Configuration is performed by simple text message commands you send to the "GX107" (the phone number of the SIM card in the "GX107") from your mobile phone.

This method makes it possible to activate, deactivate or change the settings of your "GX107" from anywhere.

The text messages to programme the "GX107" have the following structure:

<1. word> <2nd word> <Parameter 1> <Parameter 2> <...> <#PIN>



Important!

Every text message sent to the "GX107" must end with the set PIN, appended with "#", for reasons of safety. If you do not include <#PIN> at the end of the text message, it will be discarded! No answering text message will be generated without the correct PIN number!

The individual words and parameters must be separated by a space each.

General overview:

1. word determines what you want to do, e.g.:
 - SET** = switch on/activate
 - RESET** = switch off/deactivate
 - TEST** = test/check
2. word determines the function, e.g.:
 - OUT1** = Output 1 (relay)
 - IN1** = Input (optocoupler)
 - ADC** = Analogue input
3. Parameter 1, e.g.:
 - DE** or **EN** = language DE = German, EN = English
4. Parameter 2, e.g.:
 - 010** = Negative temperature
5. Pin number
 - #1513** = PIN number at basic setting (can be changed)

Examples:

Switch on output 1 (if the PIN of the "GX107" is 1513):

SET OUT1 #1513

Set language (German):

SET LANGUAGE DE #1513

Note on the RESET command:

If you want to switch off a function or reset it due to an error, send a RESET text message command with the matching function word (2nd word):

RESET <Function> #PIN

This command works universally for all functions/text message commands! Example: Switching off output 1:

RESET OUT1 #1513

More information:

- Uppercase or lowercase letters are not relevant; you may use capital and small letters as you wish.
- Every new command of the same type (2nd word) will overwrite the previous settings.
- After each SMS command, the "GX107" will send you an SMS response to your mobile phone to confirm programming (if the PIN in the text message command was correct).

Button for manual reset:

If the device no longer reacts, you can manually reset it. Press the "RESET" button (11).

→ The settings made before are not deleted.

11. General Commands

In the following examples, it is assumed that the PIN of the SIM card in the "GX107" is "1513". According to the PIN set by you, you have to replace the "1513" by your own PIN, of course.

11.1 Status Request

You have the option of checking the status of the "GX107" and the parameters. You will receive an SMS informing you of battery condition, GSM reception, out-/input status, voltage, etc.

Command:

STATUS #1513

Answer:

GX107 1.XX Name, Version SW

Alarm: off Alarm mode on/off

GSM: 90% GSM signal strength

Rechargeable Battery: 50% Status of the rechargeable battery

Area: off Zone monitoring on/off

Voltage: 12.2V Voltage of the power supply, less than 5 V means battery mode!

ADC: 0.02V Voltage at the analogue input or temperature

TEMP: --C Value of the temperature at the input of the Molex sensor

IN1: low Condition at input IN1 "low"/"high"

OUT1: off Output 1 on/off (relay)

OUT2: on Output 2 on/off (relay)

INCALL: OUT1 0s INCALL connected to OUT1, 0=toggle

11.2 Alarm Mode

The "GX107" has several trigger options to alarm the user by text message and email. The following command permits central control of the alarm functions.

Only "ENABLE" will permit the "GX107" to independently send a text message and email to the numbers/addresses saved for set and recognized events.

With "DISABLE", the "GX107" will only generate a text message to the phone number that previously sent a text message with the correct PIN.

Command to activate the alarm mode:

ALARM ENABLE #1513

Command to deactivate the alarm mode:

ALARM DISABLE #1513

After deactivating the alarm mode ("DISABLE"), the "GX107" will no longer send any alarm messages. You will then

only receive the answering text message to your sent command.

If the alarm mode is activated ("ENABLE"), the "GX107" will transmit independently again.

11.3 Saving Phone Numbers

Up to 6 phone numbers can be programmed into the "GX107".

In case of alarm, a notification text message is sent to each of these phone numbers.

Additionally, only these phone numbers are accepted for the INCALL function.

If the same number is in the list several times, it will receive the same text message as many times.

The "GX107" generally can only process phone numbers in the international format.

Example: 0177/12131415 -> +4917712131415

Sent the corresponding text message command to the "GX107":

SET TEL1 +49111... #1513

SET TEL2 +49222... #1513

...

SET TEL6 +49666... #1513

The "GX107" offers the option of programming several phone numbers in a single command. If

you want to programme 3 phone numbers, for example (TEL1 to TEL3):

SET TEL1 +49111... +49222... + 49333... #1513

After sending the command "SET TEL.", you will receive a text message answer with a list of the phone numbers saved:

GX107 1.xx

TEL1

+49111...

TEL2

+49222...

..... etc.

Phone areas (only affects function INCALL):

You can define telephone areas that are allowed for the "INCALL" function.

Example: If you want to release the following numbers for INCALL:

+491555512345

+491555523456

+491555534567

you can programme, e.g., the following phone number:

+4915555*****

The * are placeholders for any numbers.

→ Ensure that you have entered enough placeholders (*). The calling phone number is compared to these place holders.



Important!

This also permits other combinations of phone numbers! You accept this risk when using this function.

Deleting the phone numbers saved

To delete a phone number, send the following commands:

Example: To delete the 1st and 3rd phone numbers, you have to send 2 text messages:

RESET TEL1 #1513

RESET TEL3 #1513

To delete all phone numbers, send the following text message commands:

RESET TELALL #1513

After sending the command "RESET TEL...", you will receive a text message answer.

Testing phone number

To test the phone number stored in the "GX107", send the following text message command:

TEST TEL #1513

→ Always enter the complete phone number in international format (including country code), e.g. +49... for Germany.

The text message commands (TEL1, TEL2, TEL3,...) change only the phone number of the corresponding memory. The numbers of the other memories are retained.

You may change the phone numbers saved at any time.

11.4 Changing the Device Name

If several "GX107" devices are operated at the same time, it is recommended to assign a different name to each device. This makes it possible to assign alarm messages to the correct device.

To change the name of your "GX107" device, send the following text message command.

SET NAME <new name> #1513

Example: Renaming "GX107" to "NEWNAME"

SET NAME NEWNAME #1513

You will receive the following confirmation text message:

NEWNAME 1.xx

...

...

→ The device name has a maximum length of 15 characters.
Do not use any spaces.

To reset to factory settings ("GX107"), send the following command:

RESET NAME #1513

11.5 Setting the Language

The "GX107" will answer with an answering or report text message in German to all of your text message commands. If you wish the answers to be sent in English, send the following text message command to the "GX107":

SET LANGUAGE EN #1513

If you want to reset to German, send the following text message command:

SET LANGUAGE DE #1513

Note: The commands must always be entered in English, only the SMS response can be received in English or in German.

11.6 Changing the SIM-PIN

Changing the PIN code:

You may efficiently protect your "GX107" from unauthorised access by generating an individual PIN code for the SIM card that must be appended to every text message command in future. The SIM card PIN code is changed with the following text message command:

SET PIN <new PIN> #<old PIN>

Example: Changing old PIN 1513 to new PIN 1234:

SET PIN 1234 #1513

For every new text message command, the new PIN code now has to be appended preceded by a # sign (space before the #). If the wrong PIN code is entered or the PIN code is not sent, you will not receive an answering text message.

Example:

SET OUT1 #1234

→ Changing of the PIN code will change both the settings of the "GX107" and the PIN code of the SIM card! The PIN code always has 4 figures.

If you lose or forget your PIN code, you can reset the "GX107" (see Chapter "Factory Reset").

Your programming will be lost when resetting! Then you have to programme the

"GX107" again as described in the chapter "Programming (Setting) of the GX107". Resetting the "GX107" to factory settings will not affect the SIM card. Its PIN is retained.

11.7 Email

In case of alarm, you may also be reported by email. To store an email address, proceed as follows:

SET EMAIL <email address>#Subject# <Service-Center number> #1513

Example:

SET EMAIL hans.muster@provider.net#Alarm# 5555 #1513

→ The maximum length of the email address and #subject# together is 35 characters. Contact your provider about the service centre number.

A text message is set to the service centre number, which will pass on the message as an email to the address. The "GX107" cannot send any email directly.

Please observe the spaces. The software distinguishes the different elements of the text message by the spaces!

The function of sending emails cannot be warranted due to the great number of providers.

Deleting the email address:

Delete any email address set with the command:

RESET EMAIL #1513

Checking the email address:

To test the email address stored in the "GX107", send the following text message command:

TEST EMAIL #1513

12. Interface Commands



This is an autonomously working alarm messaging device.

Wrong settings or connections may cause undesired text messages to be sent! Never enter the phone number that belongs to the SIM card that is inserted in the module!

Also never enter any phone numbers from any other "GX107" or reporting devices.

12.1 Switching Outputs On/Off (OUT1, OUT2)

These are the two outputs OUT1 and OUT2 that can be switched on and off by sending a text message to the module. A relay is already connected to the output OUT1 and OUT2.

To switch on output 1 OUT1, use the command:

SET OUT1 #1513

To switch off output 1 OUT1, use the command:

RESET OUT1 #1513

To switch on output 2 OUT2, use the command:

SET OUT2 #1513

To switch off output 2 OUT2, use the command:

RESET OUT2 #1513



When using a voltage in excess of 25 V/AC or 60 V/DC, the installation must only be performed by the corresponding specialist.

Power down the device before opening the casing lid!

12.2 Optocoupler Input (IN1)

The input IN1 is an optocoupler and used, e.g., for smoke detectors or burglary alarms (current loops that are interrupted).

A voltage of 0 to 32 V can be connected to the input potential-free against the remaining circuit. Observe correct polarity (plus/+ and minus/-)!

Without any external voltage (i.e. open) or with a voltage of less than 2 V, this input (IN1) is recognized as a low level. If an external voltage in excess of 3.5 V is connected, the input (IN1) is recognized as high. You can select when an alarm message is to be sent by text message command. The corresponding LED is controlled directly by the hardware and indicates the currently recognized condition.

Alarm message when changing from LOW=L to HIGH=H

SET IN1 LH #1513

Alarm message when changing from HIGH=H to LOW=L

SET IN1 HL #1513

Alarm message at any level change:

SET IN1 LHL #1513

Deactivate alarm via IN1:

SET IN1 OFF #1513

Reset to factory settings (LH):

RESET IN1 #1513

To test the input (IN1) stored in the "GX107", send the following text message command:

TEST IN1 #1513

An optional second parameter can be used to set how long a signal must be pending without interruption before an alarm is triggered.

SET IN1 <LH/HL/LHL> <TIME> #1513

The parameter <TIME> indicates the time in seconds before an alarm is triggered. The value range is at:

0 = Off (default) or 1 to 90 (in seconds)

→ Observe that not using a 2nd parameter will not change the time.

SET IN1 LH 5 #1513 Activation of alarm at HIGH after 5 s

SET IN1 HL #1513 Activation of alarm at LOW and continued at 5 s

The time is displayed in the status text message. The internal time measurement may be delayed by up to 1 second, so that a set time of 30 s may take up to 31 s to activate.

12.3 Analogue Input (ADC)

This is an analogue ADC input. This input can measure a voltage of 0 V to 2.8 V.

It can also be used for the temperature sensors. When an adjustable threshold value (in mV or °C) is exceeded or undercut, the module can automatically send an alarm message.

Please observe that the maximum voltage of 2.8 V may lead to measuring errors. Threshold values are input in mV; e.g., a threshold voltage of 1.2 V requires sending a value of 1200 to the "GX107".

This function is intended, e.g. for analogue fill level sensors; the module can send a warning before the tank is empty or flows over.

The threshold value is entered with the following command:

SET ADC <voltage1> <voltage2> #1513

Voltage1 = upper limit

Voltage2 = lower limit

→ The value of "Voltage1" must exceed "Voltage2"!

Example:

SET ADC 2300 1100 #1513

For voltage at the ADC of less than 1.100 V or more than 2.300 V, the "GX107" will trigger an alarm.

→ The area of the threshold settings reaches from 0 to 2800.

If voltage1 is set to "2800", the top threshold is deactivated. If voltage2 is set to "0", the lower threshold is deactivated.

In the threshold area, multiple alarms can occur depending on the input signal fluctuation.

Deleting the set thresholds

The set thresholds can be deleted with the command:

RESET ADC #1513

Checking the ADC settings

To verify the desired settings of the ADC, use the command:

TEST ADC #1513

To use the analogue input for the temperature sensor, use the command:

SET ADCMODE TEMP #1513

Then the temperature sensor (e.g. Conrad item no. 198896) is assessed accordingly at the analogue input.

To switch off the temperature measurement at the analogue input (ADC) and to reset to voltage measurement, the following command must be sent:

SET ADCMODE VOLT #1513

To verify the present settings, use the command:

TEST ADCMODE #1513

TEST ADC shows the voltage range that you have set.

TEST ADCMODE shows what is measured at the ADC input: either the temperature or the voltage.

ADC in temperature mode

The temperature range of the sensor ranges from -40 °C to +125 °C. If no sensor is connected, "-40°C" is output. You can set a MAX and MIN temperature value for the temperature sensor. If the MIN value is undercut or the MAX value exceeded, an alarm message is sent to the total stored phone numbers and the email.

Use the following command for setting:

SET TEMPERATURE <temp1> <temp2> #1513

Temp1 = upper threshold

Temp2 = lower threshold

→ The value of "Temp1" must exceed "Temp2"!

Example:

SET TEMPERATURE +250 -050 #1513

For a temperature of less than -5.0 °C or more than +25.0 °C, the "GX107" will trigger an alarm.

The threshold setting area can be set from -400 to +1250.

If "Temp1" is set to = +1250, the top threshold is deactivated.

If "Temp2" is set to = -400, the lower threshold is deactivated.

→ Indication of prefixes "+" and "-" before the figures is mandatory. Without the corresponding prefix, and error will be output.

An error will also be output if the value of "Temp2" is larger than "Temp1".

Deleting the set thresholds

To delete the set thresholds, use the command:

```
RESET TEMPERATURE #1513
```

Checking settings

To verify the present settings, use the command:

```
TEST TEMPERATURE #1513
```

Hysteresis function

Every analogue measurement (ADC, TEMPERATURE, VOLTAGE) has a hysteresis to prevent multiple alarms in case of measured value fluctuations around the alarm value. Please observe the corresponding chapter "Hysteresis".

12.4 Analog input from temperature sensor (TEMP)

The temperature can be measured on the ADC input, but the GX107 LTE device also has a separate input with a Molex connector. It is possible to use the two temperature sensors at the same time, they work independently of each other. The temperature sensor is evaluated accordingly.

The temperature range of the sensor extends from -40 ° C to +125 ° C. If no sensor is connected, "--°C" is output. A MAX and a MIN temperature value can be set for the temperature sensor. If the value falls below the MIN value or the MAX value is exceeded, an alarm message is sent to all stored Telephone numbers and the email sent.

Use the following command to set:

```
SET TEMP <temp1> <temp2> # 1513
```

Temp1 = upper limit

Temp2 = lower limit

→ The value of "Temp1" must be greater than "Temp2"!

Example:

```
SET TEMP +250 -050 # 1513
```

If the temperature is lower than -5.0°C or higher than +25.0°C, the "GX107" triggers an alarm. The setting range is from -400 to +1250.

If "Temp1" = +1250 is set, the upper limit is switched off. If "Temp2" = -400 is set, the lower limit is switched off.

→ The indication of the signs "+" and "-" in front of the numbers is mandatory. An error is displayed without the corresponding sign.

An error is also output if the value of "Temp2" is greater than "Temp1".

Deletion of the set limits

Use the command to delete the set limits:

```
RESET TEMP # 1513
```

Check settings

To check the existing settings, use the command:

TEST TEMP # 1513

→ A temperature sensor on the ADC (Conrad order no. 198896) is configured with the "TEMPERATURE" command.

A temperature sensor on the Molex connector (Conrad order no. 2481783) is configured with the "TEMP" command.

12.5 Call (INCALL)

The "INCALL" function can be connected to any output ("OUT1"=relay, "OUT2"= relay). This function can be used in two modes:

Mode "Toggle": The output is switched at call

Mode "Time": Output is activated for an adjustable time

→ Only the phone numbers previously stored with the command SET TEL may use this function.

Just call the "GX107" and let it ring a few times to be safe. Observe that the phone number from which the "GX107" is called is not unknown (suppression of caller ID) and was stored in the correct format in the "GX107". Otherwise, the "GX107" will ignore the call and not switch any output.

INCALL setting:

SET INCALL <OUT1/OUT2> <activation time> #1513

Example:

SET INCALL OUT1 23 #1513

After this command, output1 will activate for 23 seconds if receiving a call.

→ The time can be set from 1 to 43200 seconds (12 hours).

If the time is set to "0", the "INCALL" is in mode "Toggle", i.e. if the "GX107" is called for the first time, the output is activated; at the second time, it is deactivated, etc.

Reset to factory settings

Send the following command to reset to factory settings:

RESET INCALL #1513

Checking settings

To verify the desired settings, use the command:

TEST INCALL #1513

→ If the caller is recognized correctly and the action (switching) is performed correctly, this call is rejected. This serves as confirmation. If the "GX107" does not reject the call, either the phone number was not recognized correctly, or does not match any number in the "Set Tel" list (did you forget the international format?), the function is not activated and/or an error has occurred in performance.

Please observe that the "toggle" mode will cause increased power consumption, which will cause reduction of the battery runtime.

The phone number areas can also be configured by the placeholder *. Please observe the corresponding chapter to the command SET TEL.

12.6 Operating Voltage Monitoring

The correct voltage of the power supply for the "GX107" is between 5 V and 32 V. The "GX107" can verify the voltage of the power supply and inform you (i.e. send an alarm text message) if the voltage is too low or no voltage is present.

This function is required, e.g. if the "GX107" is supplied by a car battery. If the car battery is discharged too far or the car's power supply is manipulated, the "GX107" will automatically send an alarm message.

The "GX107" is equipped with an internal Lilon battery to ensure the device's function for a certain time and thus to enable continuation, e.g. of the GPS function. Command to set the min. voltage:

SET VOLTAGE <Voltage> #1513

→ The voltage can be set from 500 to 2700 (from 5 V to 27 V).

If the voltage is set to 500, the alarm is switched off.

Reset to factory settings

Send the following command to reset to factory settings (off):

RESET VOLTAGE #1513

Checking settings

To verify the desired settings, use the command:

TEST VOLTAGE #1513

Hysteresis function

Every analogue measurement (ADC, TEMPERATURE, VOLTAGE) has a hysteresis to prevent multiple alarms in case of measured value fluctuations around the alarm value. Please observe the corresponding chapter "Hysteresis".

13. System Commands

With the following commands, you can change important protective functions of the "GX107". If you have the default settings, you thereby accept the resulting changed behaviour of the "GX107".

13.1 Alarm Timer

In case of an alarm, the "GX107" will send an alarm message. Further messages of the same type are only sent if the corresponding alarm situation was left for a specified period (factory settings: 5 minutes). This period can be changed.

Use the following text message command:

SET IDLEALARM <Time> #1513

The time can be set between 0 and 240 minutes. At a value of 0, the idle alarm is switched off.

Example:

SET IDLEALARM 15 #1513

The period between alarm messages is now 15 minutes.

Reset to factory settings

Send the following command to reset to factory settings (10 minutes):

RESET IDLEALARM #1513

Checking settings

To verify the desired settings, use the command:

TEST IDLEALARM #1513

If you have set the idle alarm time to e.g.: 10 minutes, you can reset this time at any time by sending the following command:

ALARM CLEAR #1513

With this command you reset the set time of the idle alarm, i.e. the 10 minutes start again from zero.

Example:

The switching input was configured to trigger an alarm at HIGH. The idle countdown starts when IN1 has reached the LOW condition again. If the alarm condition of IN1 is reached again during the IDLE time (HIGH), the countdown is reset but no alarm is triggered (idle time did not elapse). Only when IN1 retained the LOW condition without interruption for at least the set IDLE time IN1 will be able to trigger an alarm SMS again.

This does not affect any other alarm such as ADC or GPS.

Background: This function protects the customer from immense SMS costs.

13.2 GSM Cell Information

If the "GX107" does not have any GPS receiver or cannot find any site, you can have the current GSM zone designation and a cell information sent to you at any time. Use the following text message command for this:

TEST CELL #1513

→ To break down the radio cell codes, contact your mobile phone provider.

Observe that the query about the current site is not supported by all providers.

Example: Text message report

GX107 1.xx

Batt: 90%

GSM: 50%

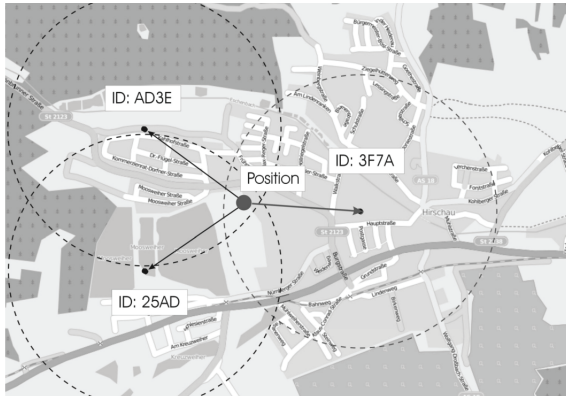
Zone: 3F7A

Time: 1

Cell info: Hirschau

Adjacent cells:

AD3E 25AD

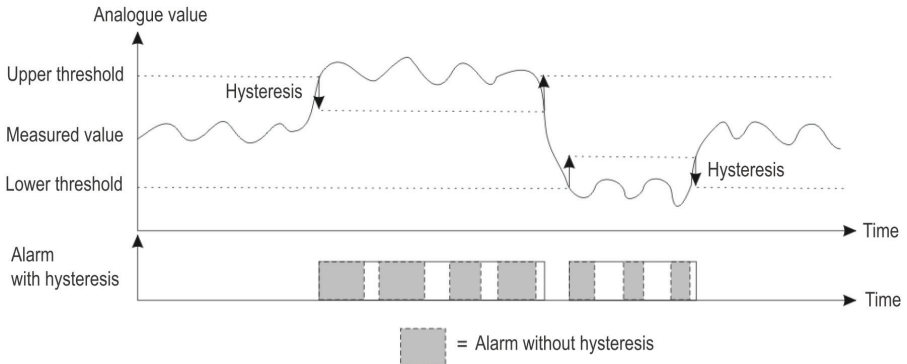


Note: The map is taken from the OpenStreetMap project!

13.3 Hysteresis Function

The default settings were already chosen to be suitable for most applications. Changes are only necessary in exceptions.

To prevent undesired alarms, the new "hysteresis" function was programmed. Hysteresis will cause the alarm threshold to change after the hysteresis value is exceeded. This requires the analogue value to enter the permitted area further before the alarm condition stops.



This hysteresis values are set independently of the alarm value with the following commands:

SET HYSADC <Value> #1513 Refers to function: ADC
SET HYSVOLT <Value> #1513 Refers to function: VOLTAGE
SET HYSTEMP <Value> #1513 Refers to function: TEMPERATURE

The value range for the individual commands is:

HYSADC: 0 ... 99 1 = 0.01 V Default: 0.01 V
HYSTEMP: 0 ... 99 1 = 0.1 °C Default: 0.2 °C
HYSVOLT: 0 ... 99 1 = 0.1 V Default: 0.1 V

The value 0 deactivates this function.

The action **TEST** for any function displays the current status of all hysteresis values. **RESET** resets to the default settings.

The commands are: TEST HYSADC #1513, TEST HYSVOLT #1513 and TEST HYSTEMP #1513.

With the commands: RESET HYSADC #1513, RESET HYSVOLT #1513 and RESET HYSTEMP #1513 the default settings are restored.

14. GPS Application and Commands

The "GX107" can be equipped with an external GPS module (Conrad item no. 1629152). The GPS module enables determination of position of the device around the world by satellite (sight contact to a sufficient number of GPS satellites required!).

The "GX107" with GPS module can send you the site per text message. You can verify the device site from any position with your mobile phone. A precise site can be displayed, e.g. in a route planner.

14.1 GPS Connection

To connect the GPS module, the plug should be placed through the larger M16 cable feedthrough and then plugged into the corresponding socket on the PCB.

Then the reset button of the "GX107" must be restarted.

The blue LED will start to flash after a few seconds if the GPS receiver receives the GPS satellites.

The GPS receiver must have visible free and unlimited access to the satellites (see operation instructions on the GPS receiver).

→ If the blue LED does not start to flash, check the connection and alignment of the GPS receiver again and restart the device (reset button).

Changing zoom and map provider:

You may change the zoom factor of the link as well as the provider. For this, use the following parameters and values:

SET GPSMAP <NR> #1513

The parameter NR has the following meaning:

- 0 OSM map, standard zoom (default)
- 1-6 OSM map, 1-6 different zoom values
- 100 GoogleMaps with updated link format
- 101-106 GoogleMaps with different zoom values

Your answer will be a text message with a new link.

→ This command can be simplified to two commands: the SET GPSMAP 0 #1513 command directs GPS tracking to the OPEN STREET MAP system and the SET GPSMAP 100 #1513 command directs tracking to the OPEN STREET MAP system and the command SET GPSMAP 100 #1513 will track to GOOGLE MAPS. After sending the command TEST GPSMAP #1513 you will get a link to Google Maps or to Open Street Maps.

→ For GoogleMaps, only the map image is displayed, but no control options. This makes it possible to display this page on older mobile phones as well.



The linked-to OpenStreetMap.org website requires a current browser to display and control the map material. Therefore, a current Smartphone is needed.

Both versions require an internet connection from your mobile phone.

14.3 Automatic Position Transmission

Sometimes in alarm situations you need the information about the location several times in short time intervals (when following the device). In this case, send the following command:

TEST GPS <Time> <Quantity> #1513

or

TEST GPSMAP <Time> <Quantity> #1513

Time = time in minutes between the messages (1-249)

250: 30 seconds

251: 15 seconds

Quantity: Max. number of text messages to be sent (1-1000)

If you want to interrupt before the entire programmed number of text messages from the "GX107" was reviewed, send the command:

RESET GPS #1513

or

RESET GPSMAP #1513

14.4 Saving Power

To save power and increase the battery runtime, the GPS receiver is deactivated most of the time in battery operation (without external operating voltage).

If the "GX107" changes position (change of the GSM radio cell) or the "GX107" receives a GPS command, the current GPS site is updated at once.

Otherwise, the GPS receiver is reactivated for a few minutes after a set time. The following command sets this period:

SET GPSSAVE <time in minutes> #1513

Time = 0 - 250 minutes (0 = GPS is not deactivated)

→ The battery runtime with a connected GPS receiver directly depends on this setting.

If, e.g., deactivation of the GPS receiver is switched off ("GPSSAVE = 0"), the battery runtime reduces to a few hours (depending on the battery condition and ambient temperature).

Reset to factory settings

Send the following command to reset to the factory settings (60 min):

RESET GPSSAVE #1513

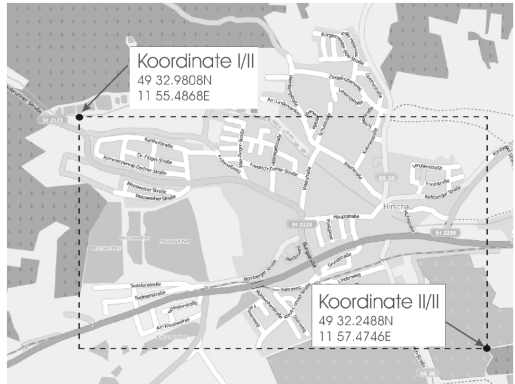
Checking settings

To verify the settings, use the command:

TEST GPSSAVE #1513

14.5 GPS Zone

The "GX107" with a connected GPS module can be used to monitor zones. After programming of the permitted zone(s) (max. 10) and after activation of the alarm mode ("ENABLE"), every time the permitted zone(s) are exceeded will cause an alarm message with the current GPS coordinate to be sent to all saved phone numbers and emails.



Note: The map is taken from the OpenStreetMap project.

➔ If the input voltage is connected, the current site is verified every second. If the "GX107" is supplied by the internal battery, the current site is only updated at intervals to save power. This time can be changed with the GPSSAVE command.

Programming the zones

The following command is used to programme the zones:

```
SET GPSZONE <latitude1> <longitude1> <latitude2> <longitude2> #1513
```

Latitude1 = upper threshold (towards North)

Latitude2 = lower threshold (towards South)

Longitude1 = left threshold (towards West)

Longitude2 = right threshold (towards East)

Data input format:

Coordinates are given in degrees with 6 fractional digits. This is the same format used by GoogleMaps after right click – "What is this?".

Latitude – gg.ggggggN (degrees) e.g.: 49° 59.5058' N -> 49.991763N

Longitude – ggg.ggggggE (degrees) e.g. 11° 57.0399' E -> 011.950665E

GPS coordinates are given in degrees with 6 fractional digits by the "GX107". Accordingly, the information can be in the following range:

XX.000000° to XX.999999°

→ Missing digits must be filled up with "0". Example: E.g. 11.532°E = 011.532000

Example:

If you want to monitor a specific zone, enter the data as in the following example:

SET GPSZONE 49.549680N 011.924780E 49.537480N 011.957910E #1513

The response will be:

GX107 1.XX

GPS zone: 1/1 ← Zone number

Latitude: 49.549680N - 49.537480N

Longitude: 011.924780E - 011.957910E

→ Observe that every command "SET GPSZONE" will add a new zone. When the storage limit is reached, an error message is returned.

Deleting all saved zones

The following command deletes all saved zones:

RESET GPSZONE ALL #1513

Deleting one zone

The following command deletes a single zone:

RESET GPSZONE <Zone no.> #1513

→ After deletion, all remaining zones will advance by one. For example, if zones 1-3 are programmed and zone 2 is deleted, zone 3 is now on memory space 2 and is thus displayed as zone 2.

Switching zone alarm on and off

SET/RESET GPSZONE #1513

You can control the alarm for GPS zones separately. This way, you can switch off the zone functions without having to delete the data.

Checking a programmed zone

To check the programmed zone in the specified site, use the command:

TEST GPSZONE <Site no.> #1513

Site no. = values from 1 to 10

Example:

TEST GPSZONE 3 #1513

Answering text message:

GX107 1.XX

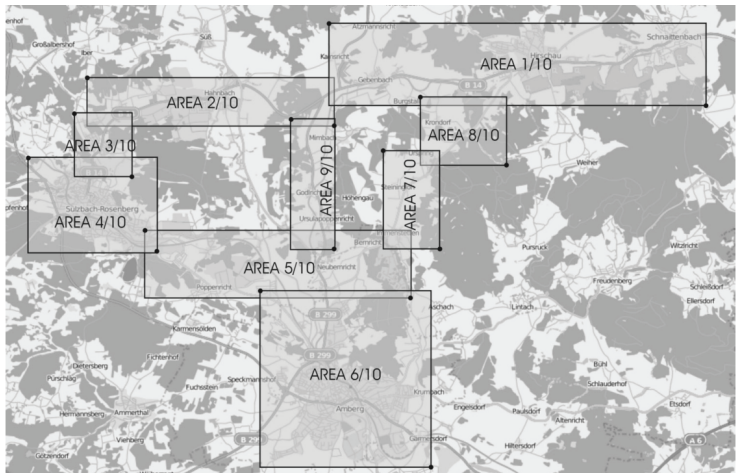
GPS zone: 3/7

Latitude: 49.549680N - 49.537480N

Longitude: 011.924780E - 011.957910E

→ You may combine several zones to one corridor. The zone thresholds are along the indicated longitudes and latitudes. Diagonal zones cannot be indicated.

The zones must overlap if they belong to one corridor.



Note: The map is taken from the OpenStreetMap project!

15. USB Socket

The device has a USB socket. You can connect the device to the PC using a USB - mini USB cable (order no.: 678060). Then you have to switch on the device and wait until the driver of the port is installed automatically and check in the settings of the Windows system to which COM port the driver has been installed to.

To operate the device, you need to download and install a free terminal program that enables operation from a serial port, e.g. B. Hyperterminal, puTTY or others.

In the program you have to select this installed port number. Other settings in the program are: Baud rate - 9600, Data bits - 8, Stop bit - 1. After the correct configuration of the device in the program you can communicate with the device.

If you send an SMS from a mobile phone to the device, in the program window you will have a preview of the device's response of the sent SMS. If you send the command STATUS #1513 from the mobile phone to the device, you can get the following answer in the program, as in the SMS:

You can also configure the device using the PC. The commands must be entered in the program window exactly as they are sent via SMS. For example, if you send the command TEST TEL #1513 in response you will receive information about the telephone numbers that have been stored.

You can update the software yourself for the GX107LTE device. The basic version is version 1.0. A newer firmware, as soon as it appears, can be downloaded from the website www.conrad.de in the "Documents & Downloads" section and can be uploaded to your GX107 LTE via the USB socket.

16. Factory Reset

To do this, press the SW1 button. After approx. 6 seconds the red diode ERR (Error) will light up, after a further 6 seconds the diode will flash once. You can now release the button. The device is reset to the factory settings.

Another possibility to reset the device is to send the following SMS command to the device:

RESET SETUP 12345678 #1513

The entire programming of the system must then be carried out again (see chapter "First steps").

Resetting to factory settings changes the PIN code of the "GX107" to "1513". The PIN code of the SIM card itself is not changed!

If the PIN code of the "GX107" differs from that of the SIM card, the red LED lights up (error). So that the SIM card can now be used again in the "GX107", you must change the PIN back to "1513" as described in the chapter "Preparing the SIM card".

17. Error Display

- Red LED (error)

The device's and SIM card's PIN numbers are different, the SIM card is not active or the SIM card is inserted incorrectly (see chapter "Factory Reset")

- Battery condition indicator is lit in red and green

Check battery connection (plug connected correctly or mechanical damage). Possible remedies: Remove and reconnect the battery

18. Care and cleaning



Do not use any aggressive cleaning agents, rubbing alcohol or other chemical solutions as they can cause damage to the housing and malfunctioning.

- Disconnect the product from the mains before each cleaning.
- Clean the product with a dry, fibre-free cloth.

19. Declaration of Conformity (DOC)

Conrad Electronic SE, Klaus-Conrad-Straße 1, D-92240 Hirschau hereby declares that this product conforms to the 2014/53/EU directive.

—→ Click on the following link to read the full text of the EU declaration of conformity:

www.conrad.com/downloads

Enter the product item number in the search box. You can then download the EU declaration of conformity in the available languages.

20. Disposal

19.1 Product



At the end of its service life, dispose of the product according to the relevant statutory regulations.

19.2 Batteries and Rechargeable Batteries



You as the end user are required by law (Battery Ordinance) to return all used (rechargeable) batteries. Disposing of them in the household waste is prohibited.

Batteries and rechargeable batteries containing hazardous substances are marked with adjacent symbol to indicate that disposal in the household waste is prohibited. The descriptions for the respective heavy metal are: Cd = cadmium, Hg = mercury, Pb = lead (the names are indicated on the battery/rechargeable battery e.g. below the rubbish bin symbol shown to the left).

You may return used batteries/rechargeable batteries free of charge at the official collection points of your community, in our stores, or wherever batteries/rechargeable batteries are sold.

You thus fulfil your statutory obligations and contribute to the protection of the environment.

21. Technical data

Operating voltage	5 to 32 V/DC, min. 700 mA
Module	Simcom SIM7600CE-L
Frequency bands	GSM/GPRS/EDGE 900/1800 MHz
Transmission power	-102 dBm
GSM classes	Quad-Band TDD-LTE B38/B39/B40/B41 Tri-Band FDD-LTE B1/B3/B8 Dual-Band TD-SCDMA B34/B39 Dual-Band UMTS/HSDPA/HSPA+ B1/B8 CDMA 1X/EVDO BC0
SIM	3 V SIM card
External GSM antenna	Conrad item no. 199399
External GPS antenna	Conrad item no. 1629152
Power consumption (at 12 V)	in standby: approx. 40 mA with 1 relay: approx. 70 mA with 2 relay: approx. 100 mA max. approx. 430 mA (everything active and battery is charging)
IN1 input	logical L at 0 V to 2 V logical H at 3.5 V to max. 32 V 3 mA at 10 V/DC
ADC Input	0 V to 2.8 V (resolution 10 bit)
Output voltage ADC-Pin	3.6 V to 4.5 V supply voltage
Matching temperature sensor for analogue input ADC.....	Conrad item no. 198896
Matching temperature sensor for Molex input	Conrad item no. 2481783
Relay switching power	5 A, 30 V/DC or 8 A, 250 V/AC
Rechargeable Battery	LiPo/Lilon 2200 mAh, 3.7 V
Charging time	minimum 5 hours
Standby time	up to 70 hours (without active outputs, no GPS) up to 40 hours (without active outputs, with GPS)
Casing	IP66
Operating temperature	-20 °C to +75 °C
Dimensions.....	bottom pcb (L x W x H): 80 x 56 x 21 mm top pcb (L x W x H): 71 x 37 x 24 mm casing (L x W x H): 88 x 64 x 43 mm
Weight	approx. 190 g
Data service	text message

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