GSM RELAY 3 - DINB

1. Introduction

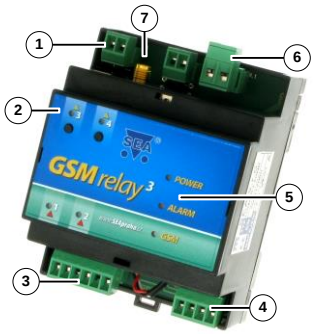
The **GSM RELAY 3 - DINB** (GSM RELAY 3 for short) **is designed to be mounted on a DIN rail into a switchboard.** GSM RELAY 3 can control two independent electrical circuits in a building e.g. circuit of an accumulator stove and circuit for garage gate control. The control is made via SMS messages or by ringing. After installation into an electrical box insert a SIM card of any GSM operator and the device is ready to operate.

GSM RELAY 3 has **2 galvanically isolated logical outputs** with a semiconductor switch, which can control directly low power circuits up to 230V_{AC}/90mA. It's possible to control directly e.g. a thermoregulator circuit of a gas boiler or a coil of one phase contactor 230V AC. The contact of the contactor can then control either one phase high power appliance (e.g. electrical radiator) or a coil of three phase contactor of an accumulation stove.

GSM RELAY 3 has also **2 analog inputs** for temperature measuring and **2 logical inputs** which can be activated by a contact from 4V power provided by GSM RELAY 3 or by an external voltage 3 to 30V DC. GSM RELAY 3 has built in two **automatic regulators** which use analog inputs from temperature sensors to maintain preset temperature. The temperature of sensors can be readout via SMS.

There is an internal **built in Li-Ion accumulator** which enables to send an SMS in case of a power failure and to restore the output status after a power failure. It's also possible to monitor the status of inputs and temperatures via SMS during 230 V AC power failure.

(1) OUTPUT 3, 4 connectors (Y3, Y4)
(2) Pushbuttons + LED
(3) INPUT 1, 2 connectors (X1, X2)
(4) Temperat. sensors connector (T5, T6)
(5) Indication LED diodes
(6) 230V_{AC} Power supply connector
(7) External GSM antenna connector
(8) 1x Temperature sensor GSM-C-T2



2. Package Content

1 pc GSM RELAY 3 - DINB
1 pc GSM antenna ANT05S
1 pc temperature sensor GSM-C-T2 (based on KTY81-210)
1 pc cable A-miniUSB
1 pc connector ETB8102G00
2 pcs connector ETB4702G00
1 pc connector ETB4704G00
1 pc connector ETB4706G00
1 pc screwdriver BERNSTEIN
1 pc printed documentation

3. Installation

1. To operate the GSM RELAY 3 a SIM card of any GSM operator is necessary. SIM card must be functional, active and must have PIN code turned off. Also some credit is necessary if SIM card is pre-paid.

Before inserting the SIM card into the GSM RELAY 3 device, it is necessary to turn off setting of the "PIN code"!
Insert the active SIM card (= at least one call was made) to any mobile telephone and turn off the requirement of setting the PIN. On most mobile telephones, this option can be found in menu "Setting the telephone protection". or "Setup -> Security -> PIN control".
ATTENTION:
GSM RELAY 3 - DIN can be mounted by qualified personnel only!

2. Insert this prepared SIM card (cut off corner first) into a slot on the side of the GSM RELAY 3. The SIM card holder is located in a slot on side of GSM RELAY 3 (close to GSM antenna connector). The proper insertion is indicated by a slight mechanical click noise. To remove the SIM card - press the SIM card in direction into the GSM RELAY 3 until mechanical click. The SIM card can be the freely removed.
3. Now it's possible to connect the device to 230V AC power supply. If the power supply is correct, green LED diode **POWER SUPPLY** goes on. After about 20 seconds, blue LED diode GSM starts flashing with a period 1 per 3 sec.
4. For the first tests of GSM RELAY 3 the connection of inputs and outputs is not important. Please keep in mind that the devices connected to OUTPUTS will be switched on during tests!
5. To test the GSM RELAY 3 press the pushbutton bellow OUTPUT 3. The green LED diode for OUTPUT 3 lights ON. Send an SMS from mobile phone (which will be mainly used to control the GSM RELAY 3) in form **1234 Y3 OFF** to the telephone number of the SIM card inserted into the GSM RELAY 3. This will switch off the plugged appliance. The green status LED for OUTPUT3 goes OFF. Simultaneously, the device automatically sends a confirmation SMS message on performing the operation. The password 1234 can be changed later in configuration. The GSM RELAY 3 reacts on the SMS text message from any telephone as long as the access password matches. The very first one (the sender of the first valid SMS message) will be remembered as master and will receive messages about events on GSM RELAY 3. This user can also control OUTPUT 4 by "ringing" on the device.
6. Try "ringing" on device. You can make pulse on OUTPUT 4 for approx. 4 seconds by calling to GSM RELAY 3 (with default factory setting). The device hangs up the call and makes pulse on the OUTPUT 4. This pulse can be used for example for opening entrance gate. To test this function call from the phone (which was used to send the first test SMS to switch off the OUTPUT 3). The pulse is indicated by green LED.
7. Try regulation. You can send SMS in form of **1234 Y3 REG 25** to command the device to maintain temperature to 25°C. The range of regulation is between 0°C and +55°C. Regulation can be canceled by SMS with command **1234 Y3 OFF**. By default the regulation of OUTPUT 3 depends on temperature sensor connected to analog INPUT T5 (OUTPUT 4 depends on INPUT T6).
8. A default factory setting of the GSM RELAY 3 can be recovered by an SMS in form **1234 FACTORY.** Your setting can be then restored from backup configuration of **SeaConfigurator** program.

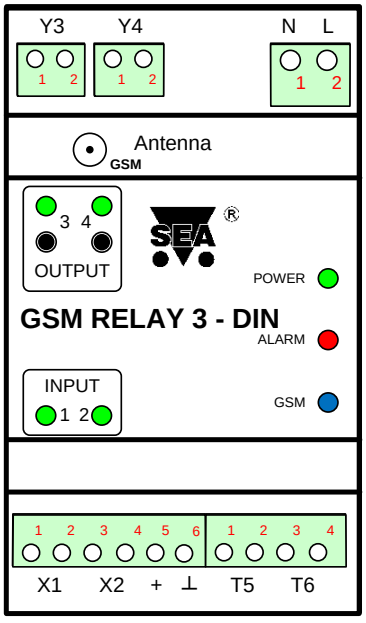
4. Technical specifications

Parameter		Symbol	MIN.	TYP.	MAX.	Unit
Dimensions	Width	Š		71		mm
	Height	V		90		mm
	Depth	H		58		mm
Power supply	Voltage	V	180	230	250	V AC
	Current			11	30	mA
Digital inputs	INPUT1, INPUT2					
	Voltage	V_{IN}	3	12	30	V DC
	Current	I_{IN}		3,5		mA DC
Digital outputs	OUTPUT3, OUTPUT4 - Semiconductor switch OPTO-MOS					
	Voltage	V_{OUT}	5	230	260 (400)	V AC (V DC)
	Current	I_{OUT}			90 (120)	mA AC (mA DC)
Analog inputs	2 x temperature sensor GSM-C-T2, Accuracy in range 0 to 30°C ... 1°C					
	Temperature	-	-30		+55	°C
Temperature	Storage	tSTG	-40		+85	°C
	Operational	tA	-20		+40	°C

Use GSM RELAY 3 - DIN inside the rack with IP44 or better!!
Use breaker max. 10 A before GSM RELAY 3. For power supply 230 V AC use lines min. 1 mm^2.

5. Hardware

The front panel of the GSM RELAY 3 contains a set of status indicating LED diodes located, pushbuttons for local control of outputs, connectors for connecting power supply, input signals, output signals and temperature sensors.



5.1 Connectors

GSM RELAY 3 enables to connect 2 external logical inputs, 2 external logical outputs and 2 external temperature sensors GSM-C-T2 with temperature range from -30°C to +55°C.

The line length of a connected external temperature sensor is not limited but the wire has a certain resistance which influences the measured temperature (16 Ω means 1 °C).

The recommended type of relay for connection of more appliances is GSM-RELE-OUT.

When using the GSM RELAY 3 for a gate control by a phone ring, it's possible to connect output 3 and COM directly with a pushbutton of the gate control.

Read **Technical specifications** before connecting external devices! Don't overload inputs and outputs.

Examples of connection of GSM RELAY 3 are placed later in this text.

5.2 Pushbuttons

The GSM RELAY 3 has two pushbuttons for local control of outputs. Every press of the pushbutton changes the state of output.

5.3 LED diodes

The front panel of GSM RELAY 3 contains indication LED diodes SUPPLY, ALARM, GSM and LED diodes which indicates status of logical inputs (INPUT1, INPUT2) a outputs (OUTPUT3, OUTPUT4).

LED	COLOR	Meaning			
		Dark	Light	Blink 1 per 3sec	Fast 1:1
SUPPLY	green	Device switched off	Supplied from 230VAC	Supplied from battery, NO 230VAC	-
ALARM	red	Function "Alarm" NOT active	Any sensor activated ALARM!	Function "Alarm" active	Function "Alarm" preparation
GSM	blue	no GSM signal	Other GSM error	operational	SIM card problem
INPUT1 INPUT2	green	Input not activated	Input is activated	-	-
OUTPUT3 OUTPUT4	green	Output switched off	Output switched on	Inverse blinking during regulation mode	-

5.4 Battery

GSM RELAY 3 is equipped with backup 3.7V Li-Ion battery which enables to operate the GSM RELAY 3 for several hours in normal mode in case of a 230V power failure. (the battery life time depends on mode of usage). During the battery supply mode the GSM RELAY 3 the **LED POWER** blinks at an interval of 1 for 3 seconds.

*) When the battery falls below a certain voltage, the device switches to "Sleeping mode", in which it can stay up to a month. The GSM RELAY 3 wakes up of the sleeping mode, either by applying 230V AC power supply or by change of the logic INPUT 1 or 2. *) Not used in this version

5.5 External antenna connector

GSM RELAY 3 is supplied with an external antenna GSM-ANT05S. It is not recommended to put this type of antenna on metal surface (the signal quality will degrade).

If a GSM RELAY 3 is used in area with a low GSM signal, it's possible to use another type of the antenna with higher gain.

6. Configuration

- **GSM RELAY 3 - default factory configuration**

When the signal on INPUT 3 or INPUT 4 changes, the GSM RELAY 3 sends an SMS message to the main users (to the telephone number from which it received the first valid command). The input signal must be stable for certain time (approx. 1 sec) to avoid sending unwanted SMS messages in case of interference on the input.

Temperature regulators are set up so that the OUTPUT 3 is regulated by temperature sensor on INPUT T5 and OUTPUT 4 from the temperature sensor on INPUT T6.

- **Configuration of GSM RELAY 3 from PC via USB**

The configuration (parameter setting) can be done using program **SeaConfigurator**.

E.g. GSM RELAY 3 can be set to inform of the 230V AC power failure or restoration via SMS or by ringing.

- **Configuration of GSM RELAY 3 via SMS**

Some parameters of GSM RELAY 3 can be configured via SMS:

Command	Parameter	Meaning
FACTORY	-	All parameters are setup to factory default.
USER ADD	Phone number e.g.: +420777777447	New user with specified phone number is added. If the phone number already exists an error is indicated. If the phone number already exists and the user is disabled, the user is activated and no error is indicated.
USER DIS	Phone number e.g.: +420777777447	A "disabled" flag for the user is set. If and user is not in the list an error is indicated.
USER CHANGE	Phone numbers e.g.: +420777777447 +420123456789	The first phone number in the list is replaced by the second number. If the first phone number does not exist in the list or the second is already in the list an error is indicated.
CODE ADD	Password e.g. 1234	New user with specified password is added (password max. 30 characters - no symbols allowed). If the password already exists an error is indicated. If the password already exists and the user is disabled, the user is activated and no error is indicated.
CODE DIS	Phone number e.g.: +420777777447	A "disabled" flag for the user is set. If the user is not in the list an error is indicated.
CODE CHANGE	Passwords e.g. 1234 9876	The first password in the list is replaced by the second password. If the first password does not exist in the list or the second is already in the list an error is indicated.

Examples:

`1234 FACTORY` … All parameters of GSM RELAY 3 will be setup up to factory default

`1234 USER ADD +420777777497`

… the new user with phone number +420777777497 is added

`1234 USER DIS +420777777497`

… the user with phone number +420777777497 is disabled

`1234 USER CHANGE +420777777497 +420777777451`

… the phone user's number is changed from +420777777497 to +420777777451

`1234 CODE ADD 9876` … the new password 9876 is added

`1234 CODE DIS 9876` … the password 9876 is disabled

`1234 CODE CHANGE 1234 9876`

… the first password 1234 is changed to new second password 9876

7. GSM RELAY 3 - Control

7.1 Output control by "ringing"

GSM RELAY 3 is set by the manufacturer to switch ON an OUTPUT 4 for 4 seconds when any user from the list of users calls to GSM RELAY 3 phone number. This pulse is useful for an opening of an entry gate. Test this function by a call to GSM RELAY 3 from your mobile phone (it's important to send a valid command SMS to GSM RELAY 3 from your mobile phone if have inserted a "new" SIM card to GSM RELAY 3).

GSM RELAY 3 rejects a call and at the same time generates a pulse on an OUTPUT 4.

7.2 Remote control of GSM RELAY 3 via SMS

GSM RELAY 3 is controlled via SMS of the GMS network. Text SMS are in form:

<PASSWORD> <COMMAND> [<COMMAND >]

Each command is preceded by Yn, where n is the number of controlled output. If output is not specified, the OUTPUT 3 (Y3) is used as default. Commands **ON** and **Y3 ON** and **Y3ON** has the same meaning.

Example:

`1234 Y3 ON` … an appliance connected to OUTPUT 3 will be switched on, confirmation message will be sent back

`1234 Y4 OFF NOBACK` … an appliance connected to OUTPUT 4 will be switched off, NO confirmation message will be sent back

Password (access code)

Password is a main security item for GSM RELAY 3 control. Command SMS are accepted from any phone number. It means anybody who knows the password and the phone number can control the GSM RELAY 3. The password is a string of digits (1 to 20) which must be on the beginning of any command SMS. Otherwise the SMS will be ignored. A text before the password is automatically ignored. It is useful when command SMS are sent from Internet GSM gates.

Factory setting of a password is:

1234

Command

This part of a message specifies a requested action. See the following table for available commands. GSM RELAY 3 commands are not a case sensitive, it's possible to use upper letters as well as lower letters.

Command	Parameter	Meaning
Y3 ON	-	An OUTPUT 3 will be switched on. (Use Y4 ON for OUTPUT 4)
ON	-	This command acts in exactly the same way as command ON3
Y3 OFF	3 or 4	An OUTPUT 3 will be switched off. (Use V4 OFF for OUTPUT 4)
OFF		This command acts in exactly the same way as command OFF3
Y3 PULSE Y3 RESET	4	Generates 4 sec pulse on OUTPUT 3 Generates 4 sec reset on OUTPUT 3
PULSE RESET		These commands act in exactly the same way as command PULSE3 / RESET3.
REG	0 to 55	Setting of requested temperature and starts regulation mode.
STATE	-	Request of status SMS (state of inputs, outputs, temperatures, signal quality and credit).

Tip: It's possible to use more commands in one SMS. Commands are separated by a space (see an example).

Examples:

`1234 ON` … an appliance connected to OUTPUT3 will be switched on

`1234 Y3 ON` … an appliance connected to OUTPUT3 will be switched on

`1234 Y4 ON` … an appliance connected to OUTPUT4 will be switched off

`1234 Y4 PULSE 5` … an OUTPUT 4 will be switched on and then after 5 seconds will be switched off (Notes: if an output is already switched on, it will be just switched off after 5 seconds)

`1234 Y4 REG 5` … requested temperature for the function temperature regulation of OUTPUT 4 will be set to + 5°C

an example of more commands in one SMS:

`1234 Y3 OFF Y4 REG 25` … An OUTPUT 3 will be switched off and the requested temperature will be set to 25°C

Confirmation

If a command message contains a valid password (access code) the GSM RELAY 3 returns a confirmation message which informs if a command was accepted (see chapter Status SMS). If you don't want a confirmation message (e. g. when sending a command SMS from the Internet GSM gates) add a command "NOBACK".

Command	Meaning
NOBACK	No confirmation SMS will be sent

Example:

`1234 Y3 ON NOBACK` … an appliance connected to OUTPUT3 will be switched on. NO status message will be sent back

7.3 Local control using pushbuttons

GSM RELAY 3 has 2 pushbuttons for local control of outputs (see. Chapter 5.2)

7.4 Status SMS message

Whenever the command SMS contains valid password the GSM RELAY 3 send back Status message.

Parameter Credit is sent only in case of pre-paid SIM cards. If the actual value of Credit cannot be readout from operator, the last known value is listed in parentheses e.g. Credit=(243.15 Kc).

Example of status SMS	Explanation
Base station: Y3 REG 25/27'C OK;	Device name: Command confirmation: Y3 REG27
X1=ON	INPUT 1 state
X2=ON	INPUT 2 state
Y3=ON(REG 25/27'C)	OUTPUT 3 state
Y4=OFF	OUTPUT 4 state
T5=25'C	INPUT T5 actual temperature
T6=26'C	INPUT T6 actual temperature
Power=Failure	Power supply from 230V_{AC} / (from battery)
Signal=38%	GSM signal level
Credit=243.15 Kc	Credit on pre-paid SIM card

7.5 Remote Control via the application for OS Android

The application for OS Android called SeaControl is used for control and monitoring of GSM RELAY, you can download it for free. For detailed information and downloading the application, go to www.seapraha.cz and write GSM-CONTROL into the searchbox. This application communicates with a GSM relay via SMS.

8. Warranty

General warranty period is 12 months after purchase, when eventual malfunction device will be repaired free of charge in SEA company while shipping to SEA is paid by customer and SEA pays for shipping back to customer. For SW there is 24 months warranty under following conditions:

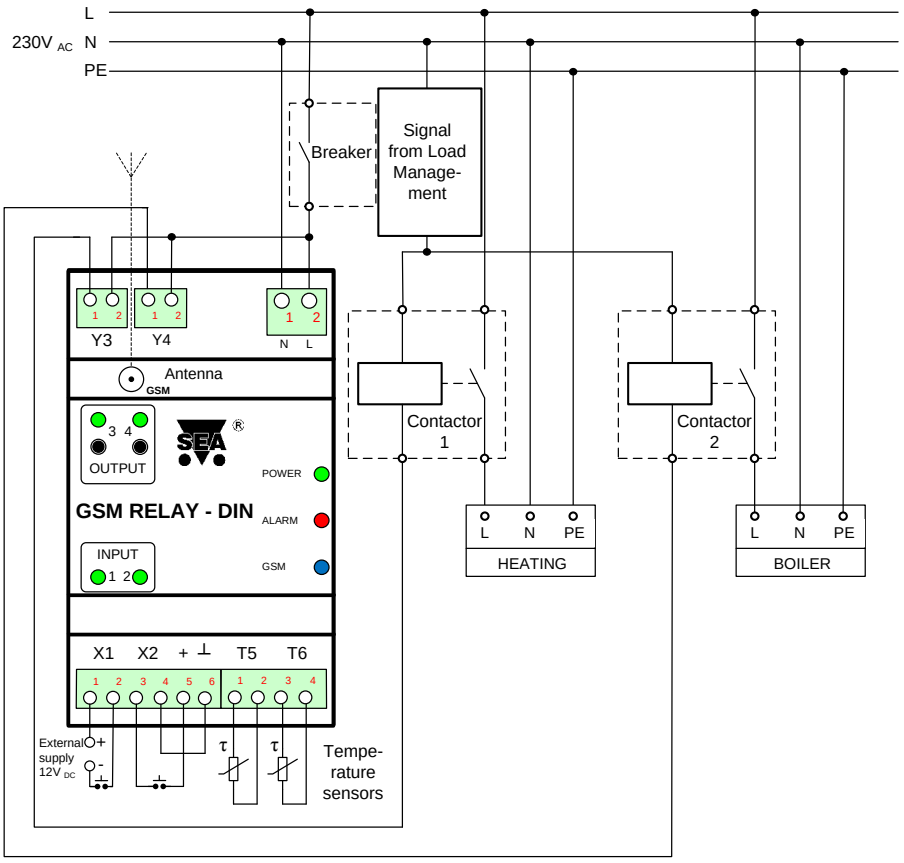
Both CPU and PC software is sold "as is". The software was created by the best software engineers in SEA and was carefully tested both in SEA and also by SEA customers using GSM applications products made in SEA. In spite of making all possible to get error free software it can happen, that the software in CPU or PC programming SW or their mutual interaction has some error under some specific conditions. If such error is found and the description of the problem including configuration file is sent by E-mail to SEA ltd., the error is removed free of charge and SEA will send new SW by E-mail to customer.

SEA ltd. has NO RESPONSIBILITY for any damage, lost, costs and any other problems direct or inducted, caused by such SW error, by eventual device malfunction from any reason or by undelivered SMS from the device.

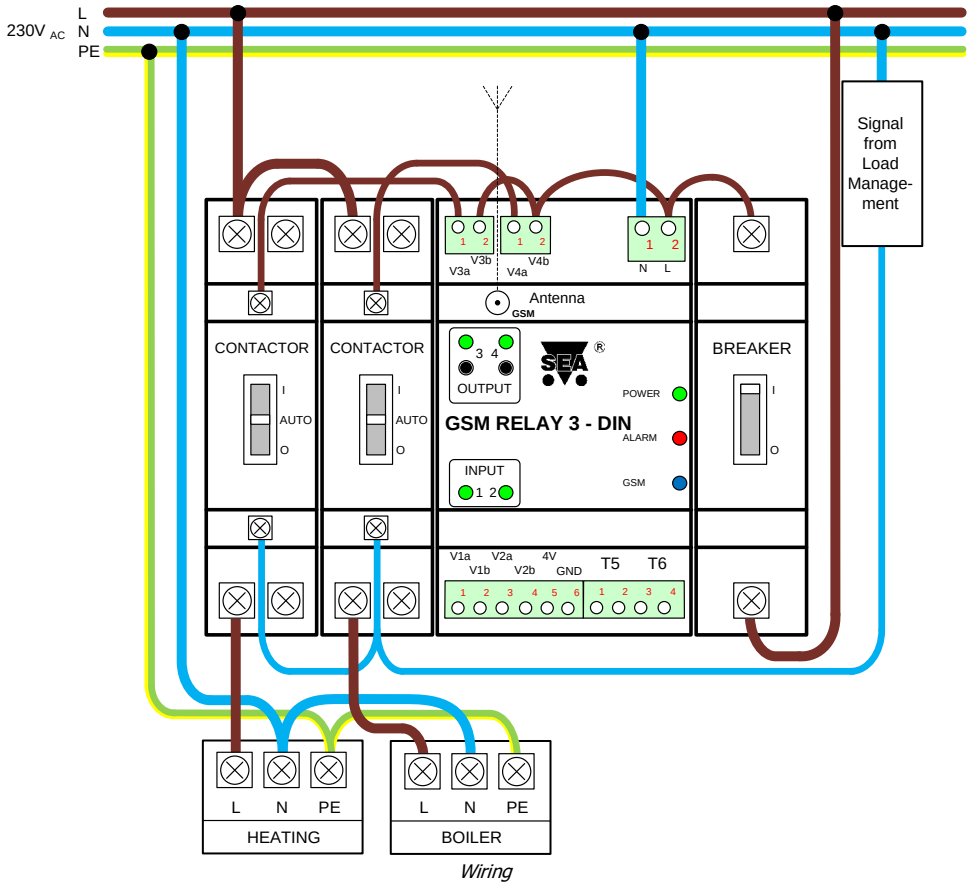
9. Examples of connection

An example of usage GSM RELAY 3. With two power outputs are controlled two electrical appliances such as heating and boiler with contactors, logical inputs detect voltage on switching / opening a door contact and two analog inputs T5, T6 measure temperatures.

The schematics calculate with usage of the "Load Management Signal". Logic input No. 1 is activated by supplying an external 12V DC logic input and input 2 uses internal 4V DC and connects directly to the terminal door contact. The 2 analog inputs T5, T6 connect the temperature sensors. Outputs of the GSM RELAY 3 control contactors of heater and boiler.



Electrical schematics



Wiring

10. Frequently Asked Questions (FAQ)

What is necessary to use the GSM RELAY 3

- **Good quality GSM signal in a place where GSM RELAY 3 will be used (at least 2 bars on your mobile phone)**
- **Sufficient credit on a pre-paid SIM card**
- **No phone call redirection**
- **The user has to know to operate his mobile phone (PIN usage deactivation)**
- **Note: Users who knows to operate older version of GSM RELAY version 2 can use older SMS command form: E.g. 1234 ON3 OFF4**

Problem description	Possible reason	Solution
LED GSM is lights permanently	SIM card is not functional	Test the SIM card in your mobile phone. Try to make a call and receive a call from another mobile phone. Try to send a receive SMS message. Switch off using PIN on a SIM card. Cancel all call redirection for a SIM card. (Ask your mobile operator for help if necessary)
	New SIM card is not activated yet	New SIM card has to be activated. (Ask your mobile operator for help if necessary)
	Low credit on a pre-paid SIM card	Check credit on a pre-paid SIM card (Ask your mobile operator for help if necessary)
LED GSM does not light at all	Poor GSM signal	Test the SIM card in your mobile phone. Try to make a call and receive a call from another mobile phone. Try to send a receive SMS message. Your mobile phone should show the signal level at least 2 bars
The pulse on an output is not generated based on a incoming ring signal (e. g. for a gate opening)	The incoming phone calls for a SIM card are redirected	Cancel all phone call redirections
The temperature from an external temperature sensor is wrong	Too long lines to an external temperature sensor	The accuracy of temperature depends on a line length to an external temperature sensor (16 Ohms means 1°C). Use thicker wires to temperature sensor