GSM-R5-T, GSM-R5-TI

1. Introduction

GSM-R5-T(TI) is a device designed **for DIN rail mounting**. GSM-R5-T(TI) can control one independent electrical circuit in a building, e.g. one circuit of an accumulator stove or circuit for entry gate or garage gate opening. The control is made via SMS messages or by ringing. The device is ready to operate immediately after connection to power supply and inserting of a SIM card of any GSM operator. The GSM-R5-T(TI) has one relay output, which can control a coil of a contactor. An electrical appliance e.g. electric heating system can be connected to this contactor. GSM-R5-TI has also one digital input for no potential contact and one analog input. The logical input can be activated by external voltage 8 to 30$V_{DC/AC}$. GSM-R5-T(TI) can react on input status change by ringing or sending and SMS on preset phone number. A It is also possible to readout the status of this input via status SMS from the GSM-R5-T(TI).
Analog input GSM-R5-T is designed for measuring the temperature. **Analog input GSM-R5-TI** is designed for measuring the temperature or current 0-20mA Analog input can be used for automatic regulation of output OUT and can control connected heating system to maintain the preset temperature. The temperature of a temperature sensor can be readout via SMS.

There is an internal **built in Li-POL accumulator** which allows 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 power failure.
All parameters are configured throught **SeaConfigurator**.
Internal **data logger** keeps records about events and valued of inputs.

2. Package content

1pcs GSM-R5-T(TI)
1pcs GSM antenna self-adhesive with 3m cable
1pcs 8 pin connector (3,5mm), 1pcs 2 pin connector (3,5mm)
1pcs 2 mm screwdriver

Recommended accessories:
GSM-C-T2 temperature sensor with cable 1m

3. Instalation

1. To operate the GSM RELAY 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 the Insert this prepared SIM card into the GSM-R5-TI device (cut corner first, contacts up – towards the inscription SIM). The correct insertion is indicated by mechanical click noise. Push gently and release to remove the SIM card.

> **Before inserting the SIM card into the GSM-R5-T(TI) device, it is necessary to turn off setting of the "PINcode"!**
> Insert the active SIM card (= at least one call was made) to any mobile phone 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".

2. Now it's possible to connect GSM antenna and power supply 12V or 24V to GSM-R5-TI. If the power supply is OK, the green LED (right from PWR connector) will light on. Cca **1 minute** later the blue LED diode **GSM** will start flashing with a period of 4 sec.
3. To make the first test of the GSM-R5-T(TI), press the button for local control of output Y2(OUT). The green LED (near Y2) will light on. Than use your mobile telephone which you want to use to control the appliance and send a SMS text message **1234 ON** to the telephone number of the SIM card inserted into the GSM-R5-T(TI). This will switch off the output Y2(OUT) and the green LED will light off. GSM-R5-T(TI) automatically sends a confirmation message on performing the operation. (You can change the password 1234 later in configuration)
4. Try "**ringing**" on device. You can make pulse on Y2(OUT) for cca. 4 seconds by calling on GSM-R5-T(TI) (with factory settings). The device hangs up the call and makes pulse on the output. This can be used for example for opening an entrance gate. You have to use the same phone number as was in the very first SMS sent to the device.
5. Try temperature regulation to 25°C. Output Y2(OUT) will be switched on and off depending on the temperature input A1(°C). Connect the temperature sensor into the temperature input A1(°C) and send SMS in form of 1234 TEMP25. Regulation can be canceled by SMS with command 1234 OFF or pressing the button BTN.
6. **GSM-R5-T(TI)** factory setting is possible to restore by sending SMS message 1234 !FACTORY. If you made a backup configuration of **SeaConfigurator** settings (Settings tab -> Files button -> File option), you can restore your settings from this backup (Settings tab -> Files button -> File option).
7. he names of the inputs, outputs (their states) and the command names can be modified according to your ideas using the **SeaConfigurator** configuration software. This configuration program can be downloaded free of charge from www.seapraha.cz (enter the word „Configurator" in the search) and install it on your PC.

4. Technical specifications

Parameter		Symbol	MIN.	TYP.	MAX.	Unit
Dimensions	Width	W		54		mm
	Height	H		24		mm
	Depth (w/o connectors)	D		86		mm
Supply	Voltage max. power supply	(during phone call, empty battery and relay ON)	8 V	12 V 2,8W	30 V	V_{DC} W
	Standby	(connected to GSM network)		12V_{DC} 90mA		
Digital output	"Y2(OUT)", signal relay					
	Voltage	U	3	12	60	V
	Current	I			2	A
Digital input	"X3 (IN)" – Potencial free contact					
Analog input	Temperature measuring		-20		+55	°C
	Current measuring only for GSM-R5-TI			0 to 20 mA		mA
Accumulator	Li-POL			3,7		V
Temperature	Storage	tSTG	-40		+85	°C
	Operational	tA	-20		+85	°C
	Actual measuring range	*) GSM-C-T2 (KTY 81-210)	-15		+50	°C

Use GSM-R5-T(TI) inside box with ingress protection at least IP44!
*) Temperature sensor GSM-C-T2 is not part of the package.

5. Hardware

5.1 Power supply, Input and Output

Power supply connector has two pins. I/O connector has 8 pins: digital output (relay contact), digital input (optocoupler), analog input for temperature sensor and +4V accumulator. Power supply is in a range +8 V_{DC} to 30 V_{DC}.
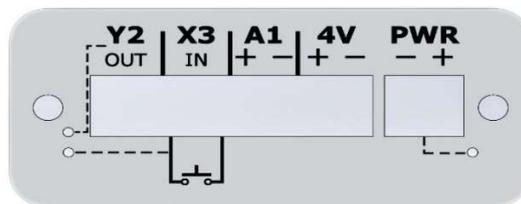
Connector	Description	Parameters
Y2(OUT)	Galvanically separated relay contacts	60 V / 2A
X3(IN)	Optocoupler with a resistor 1 kOhm	max 5V_{DC}
A1 (°C/mA)	version GSM-R5-T	KTY 81-210
	version GSM-R5-TI	KTY 81-210 or 0-20mA
4V	Internal Li-POL accumulator for input supply equipped by protective serial resistor 100 Ohm	4V, MAX 10 mA
PWR	Power supply	+8 Vdc to +30 Vdc

5.2 Recommended connection

GSM-R5-T

OUTPUT

Relay e.g.:
GSM-RELE-OUT1

INPUT
e.g. Button
or mag.
contact

Temp. sensor

GSM-PWR12
or
GSM-PWR1 ➡ Power supply
8 to 30 Vdc

GSM-R5-TI

OUTPUT

Relay e.g.:
GSM-RELE-OUT1

INPUT
e.g. Button
or mag.
contact

Current
sensor

GSM-PWR12
or
GSM-PWR1 ➡
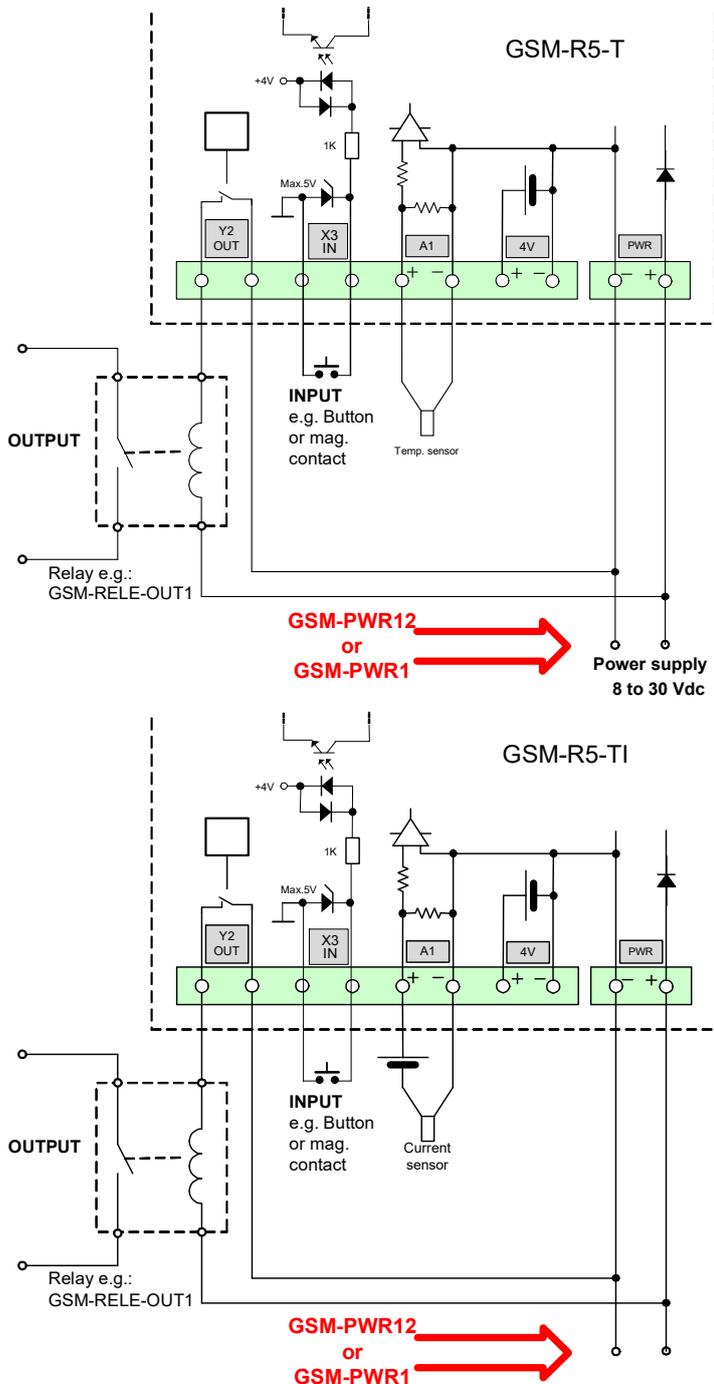
5.3 LED Diodes

LED	Color	Význam
GSM	blue	Indicates device status: *blinking 1:1*... device is starting up *short blink 1 per 4 seconds* ... device is ready and in operational state
PWR (supply)	green	*Permanent light* ... supplied from an external supply. *Blinking*...supplied from an internal Li-POL accum.
Y2 (OUT) (output)	green	*Permanent light ... output is ON*

5.4 Nano SIM card reader and push button, USB and antenna

Insert SIM card into GSM-R5-T(TI) (see the picture). Proper insertion is indicated by mechanical clicking noise. Push and release to remove the SIM card from GSM-R5-T(TI).

Press shortly the button to change the output Y2(OUT) status. Press the button for 5 seconds (or longer) to switch the GSM-R5-T(TI) to sleep mode (this feature is available when supplied from battery only). Sleep mode is canceled when GSM-R5-T(TI) is again supplied from power supply. When the main power supply is connected, press the button for 5 seconds (or longer) and the unit will restart.

Micro USB connector is used for a configuration with **SeaConfigurator**.
Antenna is connected using SMA connector. GSM-R2-T(TI) is equipped with SMA female connector. It means that antenna has to be equipped with SMA male connector. Impedance is 50 Ω.

5.5 Accumulator

GSM-R5-T(TI) has backup Li-POL accumulator 3,7 V. After power failure, the device is able to operate in normal mode for about a day (the duration depends on how much it is used).
In case of failure of the main power supply, the device can send an SMS message. The settings are made in **SeaConfigurator** – the power supply is listed on the Digital inputs tab under the name PWW.

6. Configuration

GSM-R5-T(TI) is configured with **SeaConfigurator** either via the USB connector (microUSB cable) or through the GPRS connection. This configuration program can be downloaded for free from http://www.seapraha.cz (search for „Configurator") and install it on your PC.
GSM-R5-T(TI) ois shipped with a factory configuration that meets the most common requirements, so it is possible to use the device even without **SeaConfigurator**. Simply send the first SMS from the main user's phone number under the "First time startup" chapter.
Some parameters be changed via SMS, see chapter „Command List".

7. Control

Command	Parameter	Meaning
Y2 ON	-	Turns ON the output Y2(OUT).
ON	-	If send without parameters, the output Y2(OUT) will be turned ON.
Y2 OFF	-	Turns OFF output Y2(OUT).
OFF	-	If send without parameters, the output Y2(OUT) will be turned OFF.
Y2 PULSE **Y2 RESET**	0 to 999999	Parameter is in seconds. Pulse command will switch ON the output for period of time. Reset will switch OFF the output for period of time
PULSE **RESET**		It will make a pulse or a reset for the same period as previous command. Factory default is 4 seconds.
TEMP	0 to 55	Sets the desired temperature for regulation. Value is in °C.
STATE	-	Request for message with information about state of outputs, inputs signal strength and remaining credit.

7.1 Control output by "ringing"

GSM-R5-TI is set by the manufacturer to switch ON an output Y2(OUT) for 4 seconds based on ringing from any phone number. This pulse is useful e.g. for opening of an entry gate. Test this function by a call to **GSM-R5-TI** from your mobile phone.**GSM-R5-TI** rejects a call and then immediately generates a pulse on an output Y2(OUT).
Only user stored in the user list can "ringing", the maximum number is 500 users.

7.2 Remote control via SMS

GSM-R5-T(TI) is controlled via SMS of the GMS network. Text SMS are in form:

PASSWORD space COMMAND space COMMAND

Commands are separated by a space and are not case sensitive.

Password

Password is the main security element in control of **GSM-R5-T(TI)**. SMS with commands will be accepted from anyone who knows the password. The password is a string of digits (it can be any length from 1 to 20), Which the SMS message must contain, or else it's ignored. Because the text before the password is ignored, SMS messages can also be sent from the SMS gateways. We recommend changing the password to something different. Password can be changed either through **SeaConfigurator** or with SMS message.

Default password is:

1234

Command

This part of the message defines the desired action of the device. Multiple commands separated by a space can be inserted into one SMS message.

The command can consist of multiple parts. For example, when it comes to output, it consists of its name „Y2" and an action (e.g. ON, OFF, etc.). If the naming of the output is not specified, the output with the lowest sequence number is used (for the **GSM-R5-T(TI)** it is the socket). The **ON** and **Y2 ON** commands are therefore equivalent.

In addition, a parameter (e.g. pulse length, required temperature, etc.) may be given behind the command. There must be space between the command and its parameter.

Most used commands (more in chapter "List of commands")

Examples:
`1234 ON`	an appliance connected to output Y2(OUT) will be switched on
`1234 Y2 ON`	an appliance connected to output Y2(OUT) will be switched on
`1234 OFF`	an appliance connected to output Y2(OUT) will be switched off
`1234 TEMP 5`	set and activate the temperature regulator function to +5 °C
`1234 PULSE 3600`	output Y2(OUT) will be switched ON and than after 1 hour will be switched OFF (Note: if an output is already switched on, it will be just switched off after 1 hour)

Confirmation

If a *command message* contains a valid password (access code) the GSM-R5-T(TI) sends back a confirmation message which informs if a command was accepted. If you don't want a confirmation message (e. g. when sending a command SMS from the Internet GSM gates) add a command "NOBACK".

Example:
`1234 Y2 ON NOBACK`   GSM-R5-T(TI) will switch on an appliance connected to output Y2(OUT) but no confirmation message will be sent back.

7.3 Status message

The status message is send whenever the command message contains a valid password.
Example: 1234 Y2 ZAP

If it is not disabled the STATE message will be appended to the message about execution. State message contains following information:

Status message example	Explanation
GSM-R5-TI: Y2 ON SUCCESS	Command confirmation: to switch ON Y2(OUT)
Power=Powered	State of power(from battery or from source).
Temp=28'C	Actual temperature on a temp. sensor T1 is 28°C.
OUT=on	State of output Y2(OUT) is ON.
IN=on	State of input X3(IN) is ON.
Sig=58%	GSM signal level is 58%.

7.4 Macros

Built-in macros with variables

You can use macros listed in the macro list in the event text. These macros are used when you want to create your own status message. In this case, be sure to cancel the „state message reply" option in the „General Settings" section.

Examples:

SMS with text: „Temperature is low, [Y2]." Will be sent as „Temperature is low, Y2=ZAP."

SMS with text „output is ON([A1N] is [A1V])." Will be sent as „output is ON (TEMPERATURE is 18,1 °C).", where „input name" A1 is TEMPERATURE and „units" are in °C.

Macros in incoming SMS

If you need to simplify a regular repeating command or a summary of commands (including even the parameters), create a macro. For example, create a macro: „FIRE" with text „Y2 TEMP 25". If you then send an SMS with the text „FIRE", output Y2 (OUT) will be regulated by the temp. Sensors at 25 ° C.

Macros in sent SMS

For example, you can define the macro „N1" with the text „My Station is Best in the World" to help you work on creating text in sent SMS. Then just use the text „[N1]" in the outgoing SMS.

Note.: Macros must always be in square brackets.

## 7.5 Control using CML (for Smart phones)

This application can use smartphones with Android or iOS. Application makes easier control of **GSM-R5-TI** and state monitoring. You can download this application from Google Play or Apple Store for free, type into search „**CML SEA**". After installing the application, make the first registration, take a photo of the QR code of the device into the "paring code". The QR code you find in the **GSM-R5-TI** package.

WARNING: For the functionality of the CML application, it is necessary to have an activated data tariff on the SIM card, which is inserted in the device. Transferred data can be charged by the operator according to the tariff agreed by you.

7.6 Enable CML

The CML function must be switched on in the GSM-Configurator in „Station settings", press the edit button in the „CML" line and check „Enable" in the CML window.
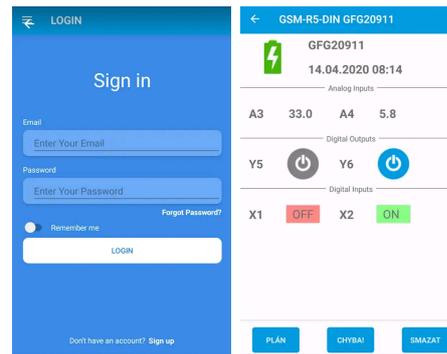
7.7 On-line data on a website

You can monitor the measured values, including the history, and display them clearly on the **cml.seapraha.cz** website. You can also control the outputs or set up e-mails with alarm messages directly from the website.
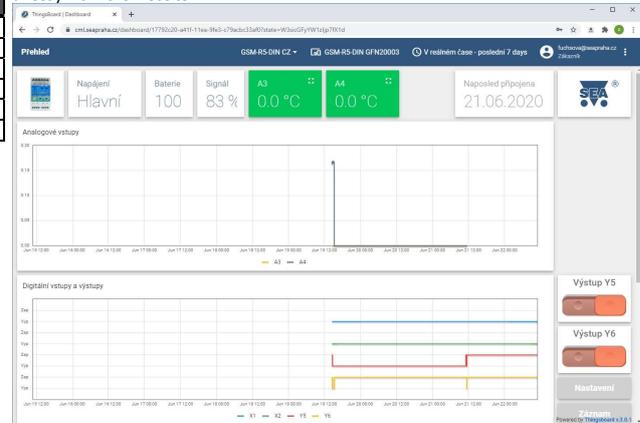
8. Data logger

GSM-R5-T(TI) provides saving(logging) of detailed information about activity of the device. Interval of saving is changed through **SeaConfigurator**. Saved log provides reverse analysis of device activity. Type of logged information are set by user during configuration of **GSM-R5-T(TI)**. It's possible to save information about state changes of each inputs and outputs, incoming outgoing SMS. Format of log file is .csv (= Comma Separated Values). Name of the file is same as the day it was created(datum.csv).

Saved logs are of two types: periodic and state-change. State-change log includes up to date analog values.

Type	Description	Example
Time Local	Local date and time	2015-04-01 15:32:14
type *1)	Type of saved log (number)	1
type2	Type of saved log (word)	period
phone/ event	Telephone number / Event	+420123456789
text/ action	Text of SMS message / Action	GSM-R5-TI: Input turned ON.
A1[°C] *3)	State of analog input A1	22,6
Y2	State of output Y2	0
Y2.cmd *2)	Output Y2 is regulated to value 28,0 (current value is 22,6)	,R22.6/28.0
X3	State of input X3	1
AP	Analog input "power" [V]	14,4
PWW	Digital input "power"	1
GSM.cell	Information about BTS	23002F,0404,047A_006E
GSM.sig	GSM signal strenght [%]	35

Note: If any input or output is disabled (by SMS or by SeaConfigurator), it won't be mentioned in STATE message.

*1)   type (type2) - Types of records
       1 (perio)   - regular period write
       2 (event)   - record caused by digital input or output state change
       3 (insms)   - received SMS
       4 (outsms)   - sent SMS
       5 (incall)   - incoming telephone call
       6 (outcall) - outgoing telephone call
       7 (debug)   - ldebug information
       8 (talkl)   - sound playback (not used)
       9 (fault)   - error
       32(firmware) - firmware upload

*3) A1:
       O … disconnected;
       Z … Short circuit;
       ? … unknown
       [°C] … Unit of measurment

*2) Y.cmd:
       ,R22.6/28.0 - means regulation; current temperature is 22,6°C
                                    / regulated temperature is 28,0°C
                      - P is pulse
                      - Q is reset

9. Warranty

General **warranty period is 24 months** after purchase, when eventual malfunction device will be repaired free of charge in SEA spol. s r.o. while shipping to SEA is paid by customer and SEA pays for shipping back to customer.

The warranty does not cover any damage caused by wrong use which does not comply the technical specifications and user instructions and any accidental damage (e.g. by water, lightening etc.).

SEA spol. s r.o. has NO RESPONSIBILITY for any damage, lost, costs and any other problems direct or inducted, caused by device malfunction from any reason.

In case of incompleteness or any damage in the packaging it is necessary to inform SEA spol. s r.o. immediately (within five days).

The manufacturer, seller or installation company is not responsible for the amount of transferred data, connections, telephone calls, sent SMS, MMS, or other charged services of GSM network operators and is not responsible for the amount of fees for GSM network operators of the installed SIM card. Nor is it liable for the energy consumed by the equipment it controls or for any other damage.

SEA spol. s r.o.
Dolnoměcholupská 1537/21
102 00 Praha 10, tel. 272700058

CE Declaration of conformity
in accordance with the Radio and Telecommunications Terminal Equipment Directive 1999/5/EC (R&TTE) and Directive 2011/65/EU (ROHS).

We SEA, spol. s r.o., Dolnoměcholupská 21, CZ 102 00 Praha 10, Czech Republic, **ID:** 47117931 (**manufacturer**) *declare under our sole responsibility, that product GSM RELE5 TEMP type GSM-R5-T(TI) is in conformity with the following standards:*

health and safety:	EN 62368-1:2004
EMC:	EN 61326-1:2013
radio frequency:	EN 301 511 v12.5.1, EN 301 489-7 v1.3.1
ROHS:	EN 50581:2012

The last two digits of year in which the CE marking was affixed: 17

Place of issue: Praha	**Name:**	Ing. Vladimír Rosůlek
Date of issue: 9.1.2017	**Grade:**	director
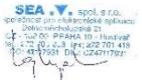
10. Frequently Asked Questions (FAQ)

Problem description	Possible cause	Solution
Blue LED diode GSM does not start blinking once per 3 seconds during 3 minutes after power on	No SIM card inserted or 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 which was not activated yet	New SIM card has to be activated. (Ask your mobile operator for help if necessary) Check credit on a prepaid SIM card
	Low credit on a pre-paid SIM card	Tip: in the Czech Republic the codes are: *22# Vodafone (Vodafone card) *101# T-Mobile (Twist) *104*# O2 (GO)
	Low quality GSM signal	Test the GSM signal level with your mobile phone in the same location where you will use the GSM RELAY 2. For a test use a SIM card from GSM RELAY 2 (it's important to test GSM signal of the same GSM operator). The mobile phone should show the signal level at least 2 bars.
The pulse on an output is not generated based on an incoming call (e. g. for a gate opening)	Phone calls are redirected for the SIM card	Cancel all phone calls redirection for the SIM card.
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.

11. Examples

11.1 Remote control of heating on a cottage

The electrical appliance is connected to output OUT of GSM-R5-TI using a contactor.
Following SMS message will **switch ON** the electric power to a heating:

    1234 ON

Following SMS message will **switch OFF** the electric power to a heating:

    1234 OFF

Note: If the password was changed from the „default" factory 1234 to another (e.g. 6543), the SMS has to be 6543 on (6543 off).

11.2 Remote control of heating regulation on a cottage

The electrical appliance is connected to output OUT of GSM-R5-TI using a contactor.
SMS message in the following format sets the requested temperature to 25 ° C for temperature regulator and activates the function "regulator":

    1234 temp25

The proper function depends on the following parameters on a SIM card:

11.3 Entry gate opening by phone call from a mobile phone (without confirmation)

The gate control is connected to output OUT of GSM-R5-T. After the first ringing from the phone number from which was sent the first valid SMS command GSM-R5-TI rejects a call and the entrance gate will open. The next call will close the entrance gate.
If you need to control the entry gate using different phone numbers, add these numbers in SeaConfigurator or viaSMS message.

11.4 Entry gate opening by call from a mobile phone (with confirmation)

After the first ringing from the phone number which is in the list of users (xRUser. ..) of the GSM-R5-TI, it rejects a call and calls back. When the calling user rejects the call within 29 seconds, the entrance gate will open.

12. List of commands (multiple commands can be in one SMS message)

Command	Parameter	Example	Description
ON		1234 on	Turns on output with lowest number and confirms it via SMS – Also attaches current state message if it isn´t turned off in configurator.
Y2 OFF		1234 y2 off	Turns off corresponding output. Output name or number must be specified in command. In configuration you can name the output and then use that name in command.
OFF		1234 off	Turns off output with lowest number.
REG TEPL	Degrees [°C]	1234 reg 25.5	If no output name is entered, Output with lowest number will be regulated.
Y2 PULSE	seconds	1234 y2 pulse 3600	Turns on output with lowest number for one hour then turns it off.
RESET	seconds	1234 reset 86400	Turns off output with lowest number for one day then turns it on.
STATE		1234 state	Sends SMS message with state of device and with state of all enabled inputs/outputs.
NOBACK		1234 on noback	Execute command and doesn´t confirm it.
!EN		1234 !en	Enables using output with lowest number.
X3 !DIS		1234 x3 !dis	Disables input X3. No state-change messages will be sent.
!STOP	time	1234 !stop 12	Disables sending all event messages for 12 hours. Command 0 (=zero) cancels this command.
USER ADD	Phone number Phone number	1234 user add +420123456789 +420987654321	Adds user with Phone number +420123456789and sets him same events as user +420987654321.If second number isn´t entered. This user can only „ring"(´pulse).
USER DIS	Phone number	1234 user dis +420123456789	Disables user with Phone number +420123456789.
USER CHANGE	Phone number Phone number	1234 user change +420123456789 +420987654321	Change Phone number +420123456789 to +420987654321.
CODE ADD	password	1234 code add 12	Add new password 12 (password must be long from one to twenty numbers).
CODE DIS	password	1234 code dis 12	Disable password 12
CODE CHANGE	password password	1234 code change 12 123456	Change password 12 to 123456
REGISTER	number	1234 register 99887766	For GPRS connection is necessary send this SMS, enables station to register to server SEA spol. s r.o.
SET APN	APN name	1234 set apn „internet"	Sets GPRS APN name on word internet
SET APNUSER	User name	1234 set apnuser „"	GPRS user name sets as empty field.
SET APNPWD	password	1234 set apnpwd „"	GPRS password sets as empty field.
!VERSION		1234 !version	Detail information about device(name, serial number, fw etc.).
!UPDATE		1234 !update	Command for downloading new fw from GPRS server SEA spol. s r.o.; GPRS must be enabled on SIM card.
!FACTORY		1234 !factory	Delete current configuration and set device to factory configuration. Who send valid SMS e.g. 1234 state will be user.