GSM-R5-AA

1. Introduction

GSM-R5-AA is a device designed **for DIN rail mounting**. GSM-R5-AA is designed for monitoring, regulation and measurement via **2 analog sensors**. Type of analog input can be changed in SW SeaConfigurator - temperature KTY, Pt100, Pt1000 or current sensors 0 to 20 mA or voltage sensors 0 to 10V. GSM-R5-AA has also **one relay output**, which can control a coil of a contactor or can regulate according to analog inputs or make a pulse or reset after "ringing".
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. It is also possible to readout the status of this input via status SMS from the GSM-R5-AA. Parameters are configured through **SeaConfigurator**.

2. Package content

1) 1pcs GSM-R5-AA
2) 1pcs GSM antenna self-adhesive with 3m cable
3) 1pcs 8 pin connector (3,5mm), 1pcs 2 pin connector (3,5mm)
4) 1pcs 2 mm screwdriver
5) 1pcs micro USB cable

3. Recommended accessories

GSM-C-T2 temperature sensor with cable 1m

4. 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-AA device (cut corner first, contacts up – towards the inscription SIM). The correct insertion is indicated by mechanical click noise. Push gently and

> **Before inserting the SIM card into the GSM-R5-AA 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".

 release to remove the SIM card.
2. Now it's possible to connect GSM antenna and power supply 12V or 24V to GSM-R5-AA. If the power supply is OK, the green LED (right from PWR connector) will light on. Apr. **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-AA, 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-AA. This will switch off the output Y2(OUT) and the green LED will light off. GSM-R5-AA automatically sends a confirmation message on performing the operation. (You can change the password 1234 later in configuration.) The device respond to each phone number if the password is correct. The first user, who send a valid SMS, will get SMS about events and can control the device via "ringing".
4. Try "**ringing**" on device. You can make pulse on Y2(OUT) for apr. 4 seconds by calling on GSM-R5-AA (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 A3(°C). Connect the temperature sensor into the temperature input A3(°C) and send SMS in form of 1234 TEMP 25. Regulation can be canceled by SMS with command 1234 OFF or pressing the button BTN.
6. **GSM-R5-AA** 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. The 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.

5. Technical specifications

| Parameter		Symbol	MIN.	TYP.	MAX.	Unit
Dimensions	Width	W		54		mm
	Height	H		24		mm
	Depth	D (w/o connectors)		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
Analog input	Temperature measuring		-30		+55	°C
	Current measuring		0 to 20 mA			mA
	Voltage measuring		0 to 10 V			V
Accumulator	Li-ION			3,7		V
Temperature	Storage	tSTG	-40		+85	°C
	Operational	tA	-20		+65	°C

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

6. Hardware

6.1 Power supply, Input and Output

Power supply connector has two pins. I/O connector has 8 pins: digital output (relay contact), and 2 analog input. Power supply is in a range +8 V_{DC} to 30 V_{DC}.
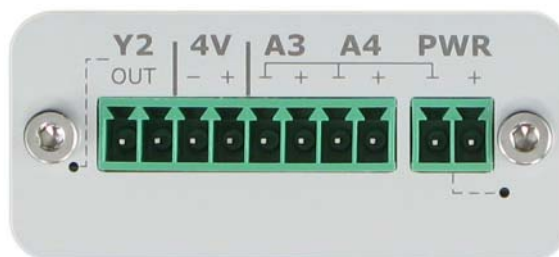
Connector	Description	Parameters
Y2(OUT)	Galvanically separated relay contacts	60 V / 2A
A3, A4	Type of analog input can be changed in SW SeaConfigurator	KTY 81-210 or Pt100 or Pt1000 or 0-20mA (4-20mA) or 0-10V
4V	Internal Li-ION accumulator for input supply equipped by protective serial resistor 50 Ohm	4V, MAX 10 mA
PWR	Power supply	+8 Vdc to +30 Vdc

6.2 Recommended connection
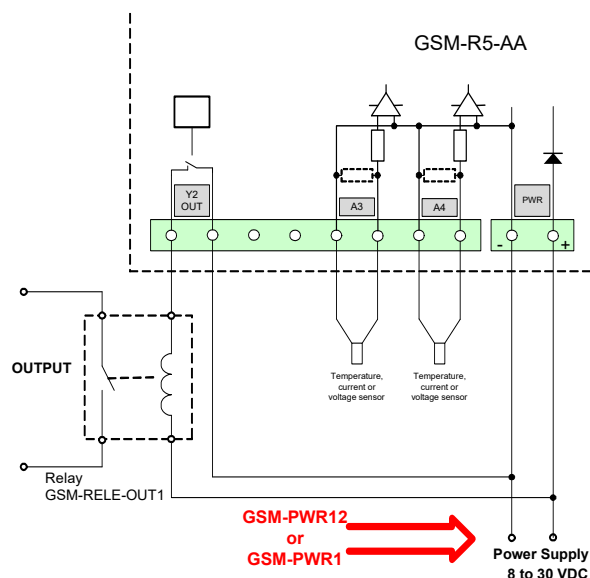
6.3 LED Diodes

LED	Color	Význam
GSM	blue	Indicates device status: *blinking 1:1 slowly*… device is starting up *blinking 1:1 quickly*… device is sending SMS *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-ION accum.
Y2 (OUT) (output)	green	Permanent light … output is ON

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

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

Press shortly the button to change the output Y2(OUT) status. Press the button for 5 seconds (or longer) to switch the GSM-R5-AA to sleep mode (this feature is available when supplied from battery only). Sleep mode is canceled when GSM-R5-AA 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-R5-AA is equipped with SMA female connector. It means that antenna has to be equipped with SMA male connector. Impedance is 50 Ω.

6.5 Accumulator

GSM-R5-AA has backup Li-Ion 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).The accumulator can be used for supply of inputs – see Recommended connection.

7. Configuration

GSM-R5-AA 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-AA is 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".

8. Control

8.1 Control output by "ringing"

GSM-R5-AA 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-AA** from your mobile phone.**GSM-R5-AA** rejects a call and then immediately generates a pulse on an output Y2(OUT).

8.2 Remote control via SMS

GSM-R5-AA 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-AA**. 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-AA 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.

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. Factory default for regulation is according to input A3.
STATE	-	Request for message with information about state of outputs, inputs signal strength and remaining credit.

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-AA 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-AA will switch on an appliance connected to
                           output Y2(OUT) but no confirmation message will be sent back.
```

8.3 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-AA: Y2 ON SUCCESS	Command confirmation: to switch ON Y2(OUT)
Power=Powered	State of power(from battery or from source).
Temp A3=25.7'C	Actual temperature on a temp. sensor A3 is 25.7°C.
Temp A4=15.2'C	Actual temperature on a temp. sensor A4 is 15.2°C.
OUT=on	State of output Y2(OUT) is ON.
Sig=58%	GSM signal level is 58%.

8.4 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([A3N] is [A3V])." Will be sent as „output is ON (TEMPERATURE is 18,1 °C).", where „input name" A3 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.

8.5 OControl via application SeaControl for OS android

For control and monitoring of **GSM-R5-AA** it's possible to use application for device with OS Android, which is available for FREE - https://www.seapraha.cz/wp-content/uploads/2019/02/GSM-Control.apk.
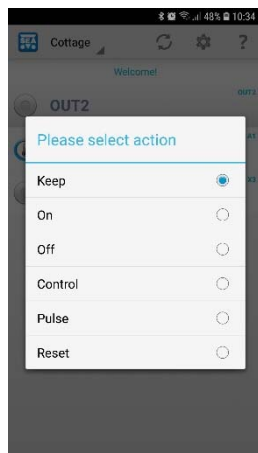
Application communicates to **GSM-R5-AA** with SMS messages. Application control is intuitive - see enclosed pictures.
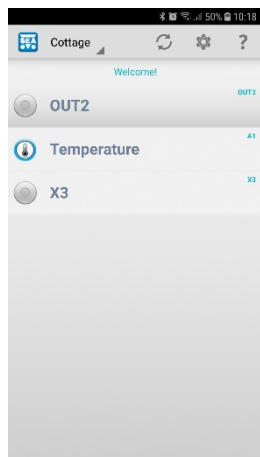
Switch between each device by swiping left or right.
Pulse settings.
Reset settings
Temperature control setting, for some time interval
In history, there are always stored two previous values.

pulse length settings:

9.

10. Data logger

GSM-R5-AA 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-AA**. 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-AA: Input turned ON.
A3[°C] *3)	State of analog input A3	25.7
A4[°C] *3)	State of analog input A4	15.2
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
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 strength [%]	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) A3:

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
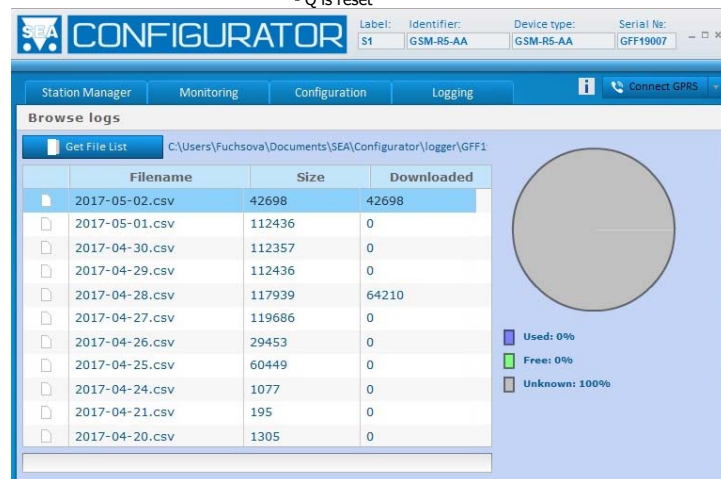
11. Warranty

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

12. 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 has to be activated. (Ask your mobile operator for help if necessary)
	New SIM card which was not activated yet	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-R5-AA. For a test use a SIM card from GSM-R5-AA (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.

13. Examples

13.1 Remote control of heating on a cottage

The electrical appliance is connected to output OUT of GSM-R5-AA 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).

13.2 Remote control of heating regulation on a cottage

The electrical appliance is connected to output OUT of GSM-R5-AA 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:

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

The gate control is connected to output OUT of GSM-R5-AA. After the first ringing from the phone number from which was sent the first valid SMS command GSM-R5-AA 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 via SMS message.

13.4 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-AA, it rejects a call and calls back. When the calling user rejects the call within 29 seconds, the entrance gate will open.

14. 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.
!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 a user.