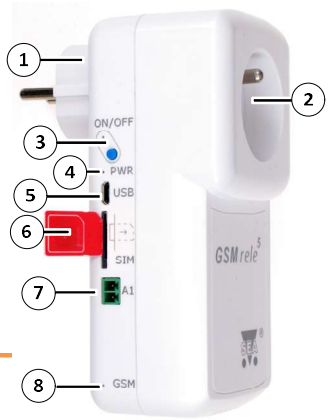
GSM-R5-ZAS, GSM-R5-ZAS-xxx

1. Introduction

The GSM-R5-ZAS (hereinafter referred to as ***GSM relay[5]***) is relay controlled remotely by SMS messages over GSM network. Other features include, for example, remote temperature control, „**ring-out**" control of the appliance, or an additional input for event and alarm reporting. The device remembers its status and parameters, so it doesn't have to be setup after every power-on. ***GSM relay[5]*** is equipped with a removable terminal block located on the side of the device designed to connect one analog input for temperature or logic value measurement. ***GSM relay[5]*** is tailored for easy connection, installation and control. It is connected to the existing power supply of the appliance. This supply can then be switched on, off, temporarily disconnected or used to automatically control the heating to the desired temperature. The state of the connected inputs can be detected by SMS messages or the ***GSM relay[5]*** can be set up to send SMS messages whenever state of the input is changed. In addition to the basic version with the terminal block on the side there are also variants with extensions and additional features.



1) Plug for insertion into the mains 230 V_{AC}.
2) Socket 230 V_{AC} for connecting the controlled device (10 A, 2300 W)
3) ON/OFF (yellow LED + button)
4) PWR (green LED for indication of power)
5) Micro USB for configuration
6) SIM card holder
7) Removable terminal for connecting external temperature sensor (the sensor must be ordered separately).
8) GSM (blue LED for indication of connection to GSM network)
   For the basic variation it is possible to order the connector for the external antenna GSM-R5-ANT.
9) For other variants, there is 6pin terminal form the underside. See chapter „**Variants with EXTENSIONS**".

2. Commercial packaging

1ks GSM relay[5]
1ks 2 pin connector, pitch 3,81mm
1ks 6 pin connector, pitch 3,81mm ...only variants with extensions
1ks Articulated antenna 2dB.....only variants with extensions
1ks screwdriver 2mm

3. Recommended accessories

GSM-C-T2 semiconductor temperature sensor in plastic enclosure, 1m cable.

4. First time startup

1. For proper device operation a SIM card is required. The SIM card have to be functional, activated and with disabled PIN code. Prepaid credit cards must have nonzero credit.

   Before inserting the SIM card into the GSM relay[5] device, you must first disable the "PIN code" !
   Insert activated SIM card into any working phone and disable PIN code. In most mobile phone devices this option is under Settings -> Security.

2. Insert the card into the Holder. Push the card inside, until you hear mechanical „click".
3. Now you can insert the device into the mains. If the socket is OK green LED PWR will turn on.
4. Now connect your electrical appliance into the **GSM relay[5]**.
5. First press the button on the **GSM relay[5]**. The relay will change its state and yellow LED ON/OFF should light up.
6. Send SMS message „1234 OFF" to the SIM card you've inserted into the **GSM relay[5]**. This will turn off the socket and add your telephone number into its list under name MASTER. The password **1234** can be later changed. The device will execute … to anyone with correct password.
7. ???
8. Test the temperature control, for example at 25° C. The socket will switch on and off according to the temperature input **A1**. Connect the temperature sensor to the temperature input **A1** and send the SMS **1234 TEMP 25**. The control is terminated by a **1234 OFF** message or by pressing the ON / OFF button.
9. Factory setting of GSM relay5 can be restored by sending a **1234 !FACTORY** message. 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).
10. 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 specification

Parameter		Symbol	MIN.	TYP.	MAX.	Unit
Dimensions	Width	W		65		mm
	Length	L		140		mm
	Depth	D		95		mm
Power Supply	Voltage	PWR	100	230	250	V_{AC}
	Consumption			1	3	W
Battery	Li-ION	Operation after main power failure			20	hours
Digital outputs	Mains socket - Y2 (switched relay)					
	Voltage	V_{OUT}	According to the supply voltage			
	Max. current - Resistive load	I_{OUT}			10	A
Analog input	External (removable) temperature sensor GSM-C-T2 distinction 0,1°C. accuracy in range 0 to 30 °C … 1 °C					
	Temperature measurement	A1	-30		+55	°C
Temperature	Storage	tSTG	-40		+85	°C
	Operational	Ta	-20		+40	°C
Humidity		RVmax			90	%

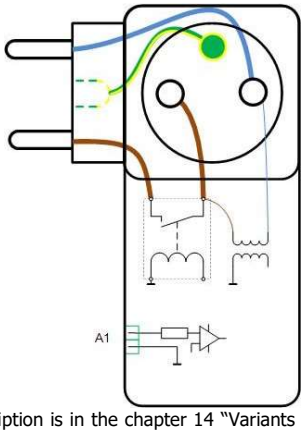
***GSM relay[5]* is intended for indoor use**!
For basic variant, it is possible to order Li-ION accumulator for reporting of power failure..... GSM-R5-BAT.
For more specification see chapter „Variants with extensions".

6. Hardware

6.1 Connectors

GSM relay5 has a plug, that plugs into the mains and a switched socket for connection of external appliance. the on / off switching is done by built-in relay.

It is possible to connect one external temperature sensor KTY81-210. The length of the wires to the connected external temperature sensor is not limited, but it should be considered that the longer conductor has a certain resistance that affects the measured value. 16 Ω equals approximately 1 ° C.



6-pin connector for variants with extensions (GSM-R5-ZAS-xxx) is located underside. The description is in the chapter 14 "Variants with extensions".

6.2 LED diodes

LED	Color	Meaning
GSM	Blue	Indicates device status. Possible states are: Flashing 1:1 … the device is setting up Short flash 1x in 4 sec … device is in operation.
PWR	Green	It is permanently lit when powered from an external source. Flashes while running on the internal battery.
ON/OFF socket (Y2)	Yellow	Shines continuously when the socket is switched ON

6.3 SIM card holder, button, USB and antenna

Insert SIM Card according to the picture. Push the card inside, until you hear mechanical „click".

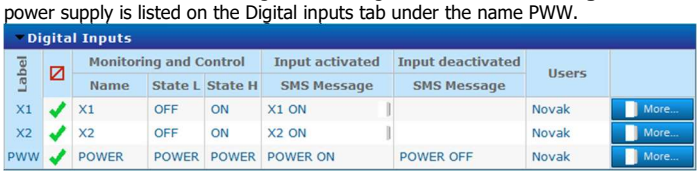
Press the ON / OFF button briefly to switch on or off the appliance connected in the socket. If the **GSM relay[5]** is not powered and the battery is installed, the **GSM relay[5]** switches off by pressing for a long time (>= 5 seconds).

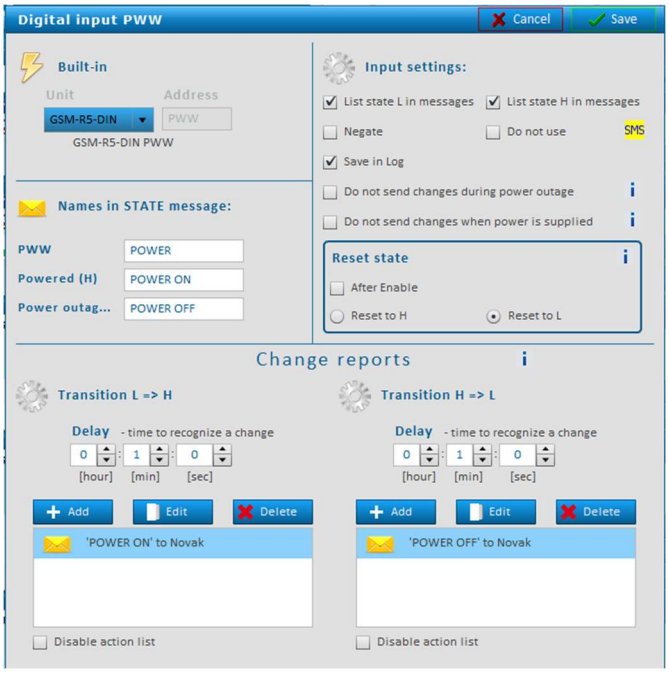
Micro USB connector is for offline configuration with SeaConfigurator.

If the device is equipped with an antenna connector, the antenna is connected via the SMA connector. The device is fitted with a SMA female connector, the connected antenna must have a male SMA connector. The impedance is 50 Ω. If there is no connector, the device is fitted with an internal antenna.

6.4 Battery

GSM relay[5] It can be equipped with a 3.7 V stand-by Li-Ion battery. 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.





7. Configuration

GSM relay⁵ is configured with SeaConfigurator either via the USB connector (microUSB cable no. HW-11.02) 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 relay⁵ 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 Ring control

GSM relay⁵ comes from the manufacturer set to turn on the socket for a pre-set time. This can be used, for example, to switch the heaters on. Since the factory default is 4 seconds, it is best to change it with SMS, for example, in the form of **1234 PULSE 14400**. To test this feature call ***GSM relay⁵*** from your telephone (The number must be in the list). ***GSM relay⁵*** rejects the call, and at the same time ensures that the socket is switched on for 14400 seconds (i.e. 4 hours).

8.2 Control with SMS Messages

GSM relay⁵ is controlled with SMS messages from GSM network. SMS must be in the 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 relay⁵*** . 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 relay⁵** 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")

Command	Parameter	Meaning
Y2 ON	-	Turns the socket ON (output Y2).
ON	-	If sent without parameters, the socket will be turned ON (output Y2).
Y2 OFF	-	Turns OFF Y2 (socket).
OFF	-	Turns the socket OFF (output Y2).
Y2 PULSE Y2 RESET	0 to 999999	Parameter is in seconds. Pulse command will switch the socket temporarily ON. Reset will switch the socket OFF 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.

Examples:

`1234 ON` ...Turns the socket ON (output Y2)

`1234 OFF` ...Turns the socket OFF (output Y2)

`1234 TEMP 20` ...Sets the desired temperature to 20 ° C

`1234 PULSE 43200` ...Turns the socket ON and after 12 hours (=43200 seconds) will turn the socket back OFF.

Note : if there was ongoing regulation it will be resumed after the period ends.

`1234 RESET 43200` ... Turns the socket OFF and after 12 hours (=43200 seconds) will turn the socket back ON

Confirmation

If *control message* contains valid password, ***GSM relay⁵*** will respond with message about success or fail of requested action. If this behavior is not desired, it is possible to disable the reply with **NOBACK** command.

Example:

`1234 ON NOBACK` ... ***GSM relay⁵*** will turn the socket on, but won't send any confirmation message

8.3 Attached report status

If you send a command containing a valid password, GSM relay5 will always respond to the execution of the command.

Example: `1234 OFF`

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

STATE message example	Info explanation
GSM RELAY5: OFF ACCEPTED	Command confirmation: outlet (Y2) will be turned off.
outlet=OFF	State of outlet (Y2)...OFF.
Temperature=28'C	Current temperature of sensor A1.
Power=Powered	State of power(from battery or from source).
sig=58%	State of GSM signal is 58%.

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

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=ON." 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

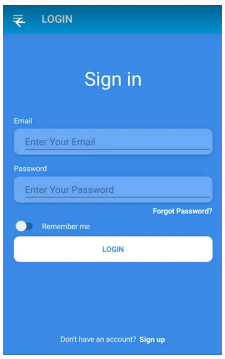
Označení	Význam	Příklad
Time Local	Local date and time	2015-04-01 15:32:14
type *1)	Type of saved log (number)	1
type2	Type of saved log (word)	perio
phone/ event	Telephone number / Event	+420123456789
text/ action	Text of SMS message / Action	GSM-R5-ZAS: Input turned ON.
A1[°C] *3)	State of analog input 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
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

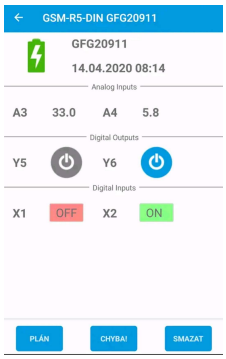
8.5 Control using CML (for Smart phones)

This application can use smartphones with Android or iOS. Application makes easier control of ***GSM relé*** [5] 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 relé*** [5] package.

GET IT ON Google Play

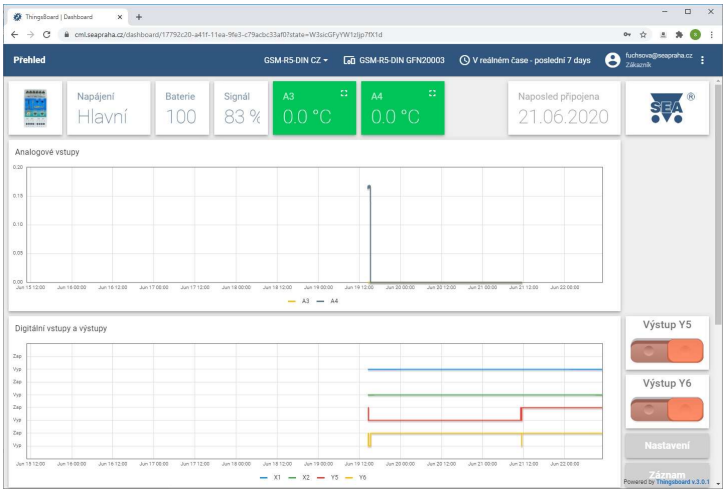
Download on the App Store





1.1 On-line data on a website

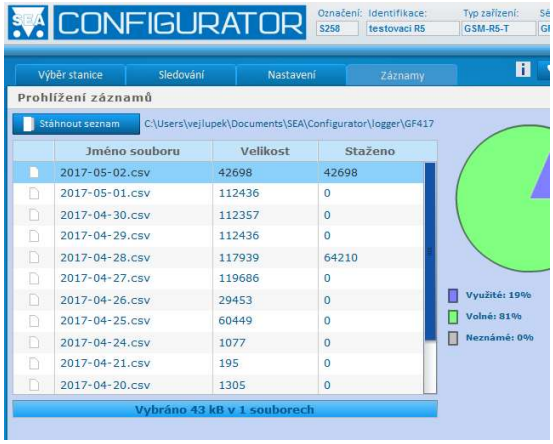
You can monitor the measured values, including the history, and display them clearly on the **cml.seapraha.cz** website. You can also control the outputs or set up e-mails with alarm messages directly from the website.



9. Data logger

GSM relay [5] 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 relay** [5]. 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.



*1) type (type2) - Types of records
- 1 (period) - 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) - debug information
- 8 (talk) - sound playback (not used)
- 9 (fault) - error
- 32(fw) - firmware upload

*3) A1:
- O ... disconnected;
- Z ... Short circuit;
- ? ... unknown;
- [°C] ...

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

10. 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.

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 1537/21, CZ 102 00 Praha 10, Czech Republic, **ID**: 47117931 (**manufacturer**)
declare under our sole responsibility, that product device for remote control and monitoring **type** GSM-R5-ZAS
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

SEA s.r.o. (2)
Společnost pro elektronické aplikace
Dolnoměcholupská 21/96
CZ - 102 00 PRAHA 10 - Hostivař
tel.: 2 727 [illegible] fax: 2 727 014 18
IČO: 47117931 DIČ: CZ47117931

Place of issue: Praha **Name:** Ing. Vladimír Rosůlek
Date of issue: 18.9.2019 **Grade:** Technical director

11. Frequently Asked Questions (FAQ)

Problem description	Possible reason	Solution
Blue LED doesn't flash in 3 minutes after start.	Functional SIM card is not inserted	Check the functionality of the SIM card on your mobile phone, ie call to another mobile phone, receive phone calls, send and receive SMS messages. You also need to turn off PIN code and turn off call forwarding. (The necessary procedures are described in the instructions for each mobile phone or a query can be made with a mobile operator)
	SIM card not activated	The newly purchased SIM card must first be activated (the method of activating the SIM card is determined by the mobile operator).
	Insufficient GSM signal strenght	Check the GSM signal level at the place of installation. Most preferably your own mobile phone with the SIM card inserted into your device. The mobile phone should be in the location where the device will be located and the GSM signal should have at least 2 lines..
Output pulse does not work by „ring-out" (eg opening the door)	Calls are redirected	Cancel all call forwarding for the SIM card used on your device.
The temperature measured by the temperature sensor does not correspond to reality	Too long lead to external temperature sensor	Use the SeaConfigurator to calibrate the temperature value. The accuracy of the temperature measurement is, inter alia, given by the length of the line to the connected temperature sensor. It is true that 16 ohms represents 1 ° C. Use a stronger wire or correct the setpoint by the difference.

12. Usage examples

12.1 Remote control of heating elements

The Heating element is connected via the control relay to the OUTPUT.
This SMS message will turn **ON** the device:

```
1234 ON
```

This SMS message will turn **OFF** the device:

```
1234 OFF
```

Note. If you changed the password 1234 to your own (e.g. 6543), then you need to send SMS with the new password: 6543 zap (6543 OFF).

12.2 Remote adjustment of temperature control

Heating element is plugged into **GSM relay**[5].
Following SMS message will set the regulation temperature to **25°C**:

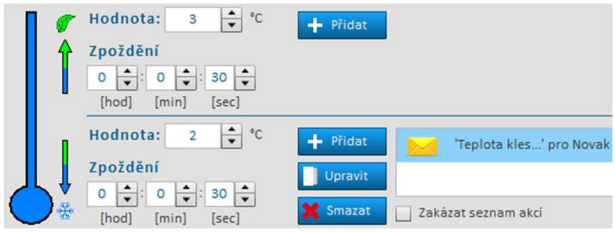
```
1234 reg 25
```

If you send command „reg" without parameters the regulated temperature will be same as was the last temperature:

```
1234 reg
```

12.3 Temperature alarm – e.g. Report about freezing

In **SeaConfigurator** on *Analog input A1* tab choose button *"more"*.
If you want report about temperature drop, for example, under **2°C**, then change the bottom value (factory: 5) to **2**. You can also change the upper limit value (factory: 6) to for example 3 (hysteresis). IF the temperature will drop under 2°C, then the pre-set action will happen (send SMS, command..). When the temperature rises above the upper limit and drops below again the action will happen. You have available three zones, so you can have three sets of commands.
TIP: If you want to receive notification only during first drop, set the upper limit high, e.g. 25°C.



13. Command list (there can be more commands in one SMS)

Command	Parameter	Example	Meaning
ZAP		1234 on	Turns on the output with the lowest sequence number and responds that the command has been executed – if it's not disabled in setting, then STATE message will be appended.
Y2 OFF		1234 y2 off	Turns off the output. The need to specify or not to specify the output is the same for all output commands. In the configuration you can change the name of the output and then use that name.
off		1234 off	Turns ON the output with the lowest sequence number.
REG TEMP	Degrees Celsius	1234 reg 25.5	Because the output name is not specified, the regulated output will be the one with the lowest sequence number, i.e. Y2.
Y2 PULSE	seconds	1234 y2 pulse 3600	Turns ON the output with the lowest sequence number for one hour. Then turns the output off.
RESET	Seconds	1234 reset 86400	Turns OFF the output with lowest sequence number for one day. Then turns the output ON.
STATE		1234 state	Replies with message about current state of the device.
NOBACK		1234 on noback	Executes a command, but does not send a confirmation status message.
!EN		1234 !en	Enables usage of the an output with the lowest sequence number.
X3 !DIS		1234 x3 !dis	Disables output X3. That means, it will not appear in STATE messages.
!STOP	hours	1234 !stop 12	Disables reporting of all events for 12 hours. Parameter 0 (=zero) will immediately enable reporting.
USER ADD	tel. number tel. Number	1234 user add +420123456789 +420987654321	Adds user with tel. number +420123456789 with same rights as the second number. The new user will also receive same event messages.
USER DEL	tel. Number	1234 user del +420123456789	Deletes user with tel. Number +420123456789.
USER CHANGE	tel. number tel. Number	1234 user change +420123456789 +420987654321	Changes tel. Number from +420123456789 to +420987654321.
CODE ADD	Number	1234 code add 12	Adds new password 12 (password is number long 1 – 20 characters).
CODE DEL	Number	1234 code del 12	Deletes password 12
CODE EDIT	Num. num.	1234 code edit 12 123456	Changes password 12 to 123456
REGISTER	number	1234 register 99887766	For GPRS connection, it's necessary to send this SMS so the device can register to SEA spol. s.r.o. server.
SET APN	APN name	1234 set apn „internet"	sets GPRS name APN to word "internet"
SET APNUSER	user name	1234 set apnuser „"	Sets GPRS username as an empty space.
SET APNPWD	password	1234 set apnpwd „"	Sets GPRS password as empty space.
!VERSION		1234 !version	Detailed information about the device (name, serial number, fw, etc.).
!UPDATE		1234 !update	Command for downloading new FW from SEA spol. s r.o. GPRS server; GPRS be enabled for inserted SIM card.
!FACTORY		1234 !factory	Restores all settings back in to factory default.

14. Variants with *EXTENSIONS*

GSM relay[5] on the base plate equipped with a connector for expansion. The following variants are now created. We can create custom extensions according to your requirements.

In these variants ***GSM relay[5]*** is equipped with built-in Li-ION battery and connector SMA(F) for external antenna. The commercial package includes 2dB articulated antenna. If you state, that you want to different antenna, we can exchange it for free with 5dB whip antenna and 3m cable (GSM-ANT01S)

Parameter		Symbol	Podmínky	MIN.	TYP.	MAX.	Jednotka
Digital inputs	INPUT X5 až X9						
	Voltage	V_{IN}		3	12	20	V_{ss}
	Current	I_{IN}		1	4	10	mA
Digital *) outputs	OUTPUT Y5 až Y7 – semiconducor switch OPTO-MOS						
	Voltage	V_{OUT}		0	12	60	V_{ss}
	Current	I_{OUT}				100	mA
Analog input	A1 a A2 – temperature sensor GSM-C-T2. Precision in range 0 až 30°C.....1°C						
	Temperature measurement			-30		+55	°C

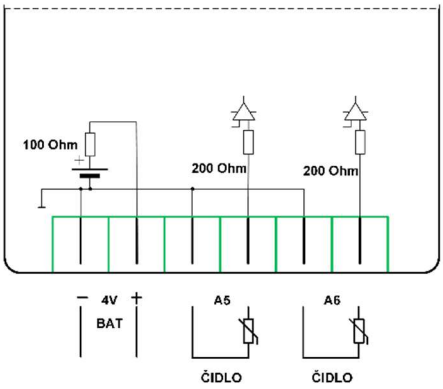
*) Max resistance of OPTO MOS switch is 16 Ohm

14.1 *EXTENSION* GSM-R5-2A (1DIn or 1temp, 2temp, 1Dout 10Amp, 230V, ext. ant, bat)

A5 and A6.. two inputs for temperature sensor GSM-C-T2.

LED near it's corresponding input indicates when the temperature sensor is connected.

The terminals with battery pictogram are connected to the battery.

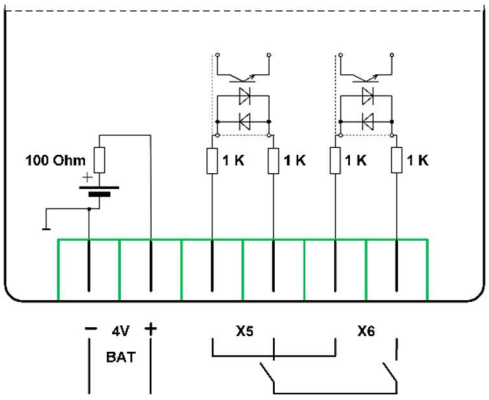


14.2 *EXTENSION* GSM-R5-2IN (1DIn or 1temp, 2DIn, 1Dout 10Amp, 230V, ext. ant, bat)

X5 a X6.. Two galvanically isolated digital inputs. They are closed when applied voltage is from 3V to 20 V_{DC}, open when the voltage drops under 2V

LED indicates, that the corresponding input is HIGH.

The terminals with battery pictogram are connected to the battery.

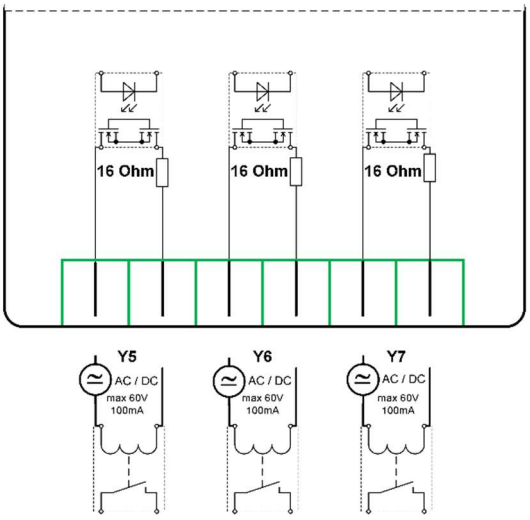


14.3 14.2 EXTENSION GSM-R5-3OUT (1DIn or 1 temp, 3DOUT, 1Dout 10Amp, 230V, ext. ant, bat)

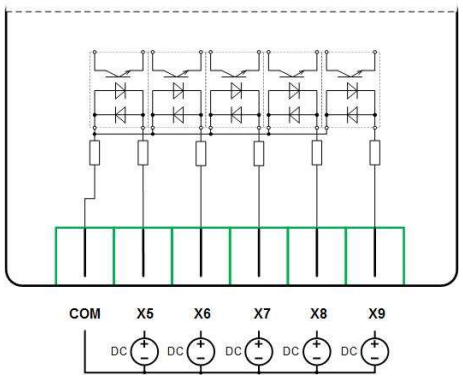
Y5 to Y7.. Three galvanically isolated digital inputs.

LED indicates, that the corresponding input is HIGH.

Example command: `1234 ON Y6 OFF Y7` …. Turns Y6 ON and Y7 OFF



14.4 *EXTENSION* GSM-R5-5IN (1DIn or 1temp, 5DIn, 1Dout 10Amp, 230V, ext. ant, bat)

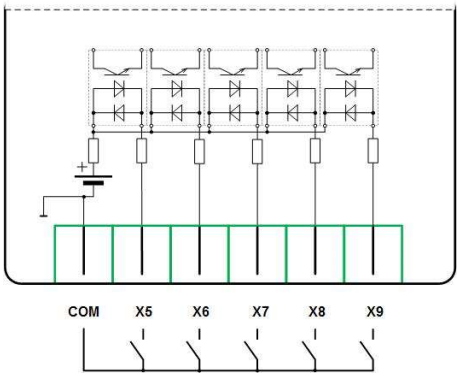


X5 to X9.. five digital inputs with one common terminal. They are closed when applied voltage is from 3V to 20 V_{DC}, open when the voltage drops under 2V

LED indicates, that the corresponding input is HIGH.

C is common terminal (can be either positive or negative).

14.5 *EXTENSION* GSM-R5-5INB (1DIn or 1temp, 5DIn, 1Dout 10Amp, 230V, ext. ant, bat)



X5 to X9.. five digital inputs with one common terminal. As the internal battery is connected inside the unit, the inputs switch on via connection of each contact.

LED indicates, that the corresponding input is HIGH.