

The GD-04K universal GSM communicator and controller

The GD-04K is a universal GSM communicator. It controls and / or reports status of different appliances remotely. Control can be performed by SMS instructions or dialling in. The module is equipped with 2 power outputs with a status or pulse reaction. For status monitoring the GD-04K module has four input terminals which react to grounding (connecting to the GND terminal). Activation / deactivation of an input terminal can be reported as an SMS, dialling in or a combination of both these options to up to 100 authorised telephone numbers. The GD-04K can also be supplemented by a GD-04A backup battery which ensures powering the module when the mains is disconnected. The module allows configuration using a PC with installed **GD-Link 2.0.0** software (or higher) locally via the USB cable or remotely. It can also be configured by programming SMS.

1. Using the GD-04K

The GD-04K module uses four inputs (A – D) for SMS reporting (optionally dialling) to predefined telephone numbers. It also offers 2 power relay outputs with options to control them by pre-defined SMS commands or by dialling in according to the settings from authorised numbers or from any (non-authorised) numbers.

Relay control:

- **by SMS instructions** which can be independently pre-set for switching ON / OFF of each relay output. Both relays can work in *status* or *pulse mode*, the mode is selectable in the settings. If *pulse mode* is selected then based on activation command the output will be switched for interval between 1 s to 10 hrs.
- **Dialling in.** Both relays (X and Y) can be controlled by dialling in from a known telephone number. Up to 100 numbers can be stored in the communicator. The GD-04K doesn't pick up an incoming call but verifies the caller's telephone number. If the caller's telephone number is authorised, the call is rejected and the relay is activated / deactivated as required (when the Impulse reaction is set then for predefined time).
- **Dialling in with limited use.** While entering authorised telephone numbers the limit of their use can also be defined for each of them. When the usage limit of a pre-defined number is reached then any other calls are ignored. Reactivation can only be allowed by an administrator (by SMS). This function is suitable as a subscription for entrance to garages and so on.

Input status reporting:

- **Sending an SMS report** when some of the inputs (A – D) are activated / deactivated (connected or disconnected to / from GND). Each input has an option to edit the texts which are reported. An SMS can be sent to all telephone numbers stored in the communicator. For higher alert notice SMS report can also be followed by calling to the numbers to which SMS reports have been sent.
- **Status monitoring.** By the SMS command "STATUS", the status of all inputs and outputs can be checked when needed. This way is for example possible to check status of connected devices which each status change is not required to report.

Caution: *The GD-04K is not meant and is not certified as a security device to protect premises.*

2. Device description

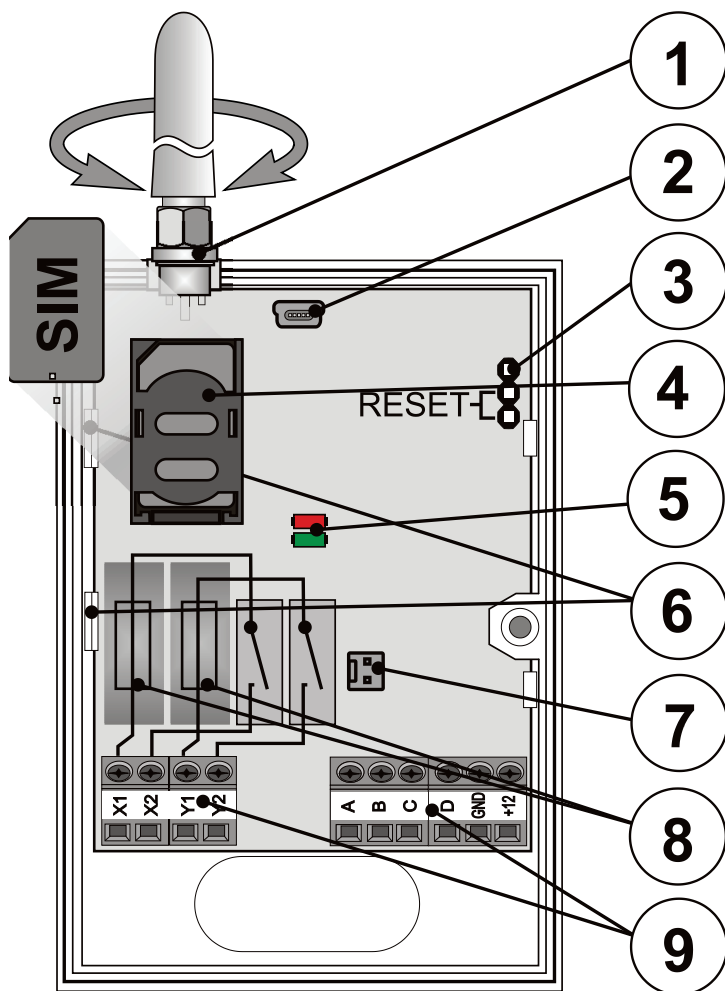


Figure 1: 1 – GSM antenna; 2 – Mini USB connector for PC connection; 3 – Reset jumper; 4 – SIM card slot; 5 – LED indicators; 6 – Flexible tabs; 7 – Connector for backup battery – the GD-04A cover; 8 – Output relay fuses; 9 – Input / output and power terminals

Terminal descriptions:

Low voltage terminals:

+12 V Terminal for 12 V DC connection from included adapter (or another external power supply which provides current of at least 0.5 A)

GND The common terminal for inputs A, B, C, D and GND for the 12 V

A, B, C, D input terminals:

– Inputs react to connection or disconnection to / from the GND terminal.

- All inputs have their own time filter (from 0.5 to 10 hrs)
- A maximum of 30 V can be connected from an external device to the input terminals (A – D).
- Each input can have its own name. Input activation / deactivation is reported to the pre-defined telephone numbers and also recorded in the event history. Up to 384 events can be stored with information about input or output activation / deactivation with the source of that event (who / what caused it).

Power terminals:

X1, X2 (RELAY X) NO contact of the power relay, 230 V / 2.5 A.

Y1,Y2 (RELAY Y) NO contact of the power relay, 230 V / 2.5 A.

LED indicators:

Red indicates GSM module incoming activity

Green indicates GSM module outgoing activity + RESET indication

Common properties:

- Both outputs (X and Y) can be switched ON independently for a pre-defined time in an interval from 1 s to 10 hrs (impulse) or permanently.
- Both relays are galvanically separated from the communicator circuits complying with 4kV safety isolation requirements.

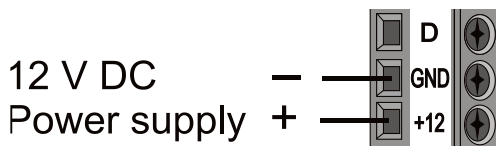
3. Installation and initial setup

1. Select an appropriate place for communicator installation considering the GSM signal strength.
2. The communicator's main board can be simply released by pressing the flexible tabs (6) when you open the front cover.
3. Attach the rear plastic part to the selected place.
4. Put the main PCB back onto the rear plastic part.
5. Insert the SIM card – orientation is indicated on the PCB (See also chapter 8. SIM card and its use)

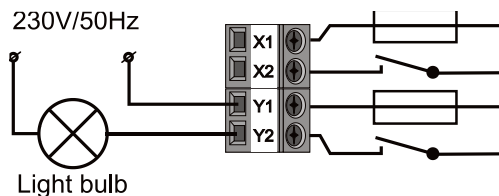
Note: *The GSM antenna mustn't be shielded by metal objects. The original antenna can be replaced by an external one meant for the GSM band 900/1800 MHz and equipped with an SMA connector, connected by a coax cable with a 50 Ω impedance if needed.*

6. Connect the input / output and power wires to the communicator's terminals.

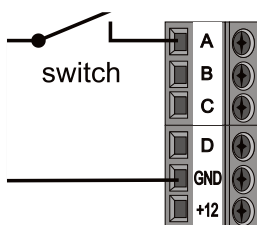
Power: Connect the supplied mains adapter to the +12 V and GND terminals (the wire with a grey stripe is for the +12 V terminal). When another power is used, it must provide 12 V DC and a current of at least 500 mA. Don't turn it on yet.



Relay output contacts: These are connected to the terminals labelled X1, X2 and Y1, Y2. Each output is protected by the 5 A fuse. Example: Bulb control by relay Y:



Input terminals: labelled as A - D react to (and send an SMS) connection / disconnection to / from the GND terminal. Example: switch connected to the A input terminal:



4. The GD-04A backup cover

In case of AC failure an optional GD-04A module (a backup battery is built inside the bigger cover) provides 12 to 24 hours back up time. The exact time depends on GSM signal strength (the stronger the signal is the lower consumption the device has).

- The 2-pin connector (7) on the GD-04K module serves for connection of the backup cover.
- The built-in battery is charged from the main unit and fully charged is in approximately 72 hours.
- The backup module only supplies the GD-04K communicator and its output relays. However it doesn't supply external devices connected to the +12 V terminal.
- GD-04K module sends SMS report "POWER FAIL" in case of mains failure or disconnection and "POWER RECOVERY" when the mains is recovered to all service telephone numbers (see the 6. Settings chapter). Both texts are editable.
- If the backup battery is discharged the module is shut down (both relays are switched off). When the mains power is recovered the relays' previous status is restored and the backup battery is charged.

5. Initial powering up

1. Turn the power on, the red LED starts flashing to indicate logging of the module on to the GSM network (if it doesn't, check the power supply proper connection).
2. The red LED indicator goes off when the device is logged into the GSM network (it takes typically 1 minute). When it keeps flashing, there is some obstacle blocking logging in (turn the power off and check if the SIM card is inserted properly, if it has been activated and if there is enough GSM signal strength).

3. Send the SMS command: **STATUS** from your cell phone to the SIM card inserted into the GSM communicator.
4. **The communicator answers by SMS** like this: **STATUS: A0,B0,C0,D0,X0,Y0, GSM:80%, Vcc:12.1 V** (which means that all inputs and both relay outputs are deactivated/switched off, the GSM signal strength is 80% and the power voltage is 12.1 V). The response speed depends on current GSM network traffic. With no response, check if the text "STATUS" has been written correctly and sent to the correct telephone number.

6. Settings

6.1. Local setting using PC

The most comfortable way of settings the GD-04K is by computer and **GD-Link 2.0.0** (or higher) software which allows saving the settings for the later use. Programming SW is free for download from www.jablotron.com. The software requires a Windows XP operating system or newer.

When connected to the Internet, GD-Link checks whether a new version of the GD-Link is available. In such case an update is offered immediately. The current FW which is part of the GD-Link package is also downloaded and once the GD-04K is connected to the PC automatic upgrade is offered. A FW upgrade can be performed also manually by clicking on the option *Device / Firmware update from the file*.

Connection procedure:

- Connect a PC using the supplied USB cable with the miniUSB connector (2) on the communicator's main board.
- Start the GD-Link 2.0.0 SW or higher.
- According to the settings, the required action in the initial window can be chosen or the communicator is connected automatically.
- If the setting is modified offline without connected GD-04K, then to go online press the button "Online" on the upper toolbar when the unit is connected.

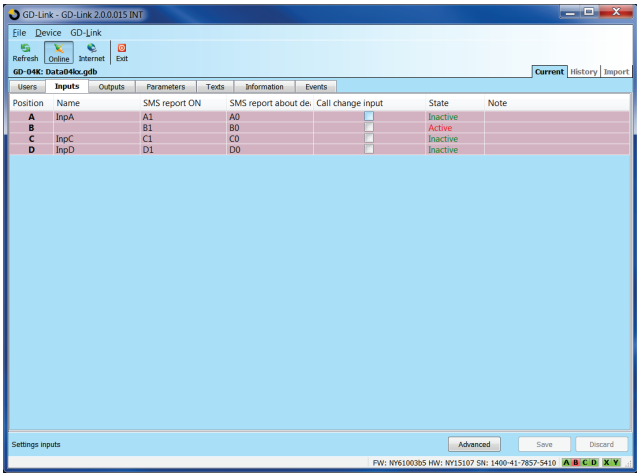


Figure 2

The software includes 7 tabs:

Users	A tap to set up to 100 users with telephone numbers, reports and authorisation to control.
Inputs	A tab where all parameters related to inputs A, B, C, D can be configured such as texts for reporting via SMS, etc.
Output	A tab where all parameters related to X and Y outputs can be configured such as texts for control the outputs, reactions, etc.
Settings	A tab which includes advanced settings of the communicator, for example service telephone numbers, pre-paid SIM card credit balance checking, etc.
Texts	A tab meant for editing system texts reported via SMS according to user requirements. Default texts are in the English language.
Information	A tab where production codes and the registration key are stored. The reg key is necessary to perform remote access via GD-Link 2.0.0 software.
Events	A displays event history with a date of creation and source of event.

Note: For detail description of all options the software has Tooltips. It is visible when you move the mouse cursor over any parameter.

6.2. Remote access using a PC

The GD-04K device can be also configured by a PC using **GD-Link 2.0.0** (or higher) software remotely through the Internet. For that it is necessary to know the registration code and telephone number of the SIM card used in the communicator (figure 3). To establish a remote connection with a device use the “Internet” button in the upper software toolbar.

Warning: During remote access GPRS data is used, which can be charged by your GSM provider. Therefore before performing remote access check GPRS data payments details with the GSM provider.

Remote programming allows all parameters to be set as if you are connected locally using a USB cable.

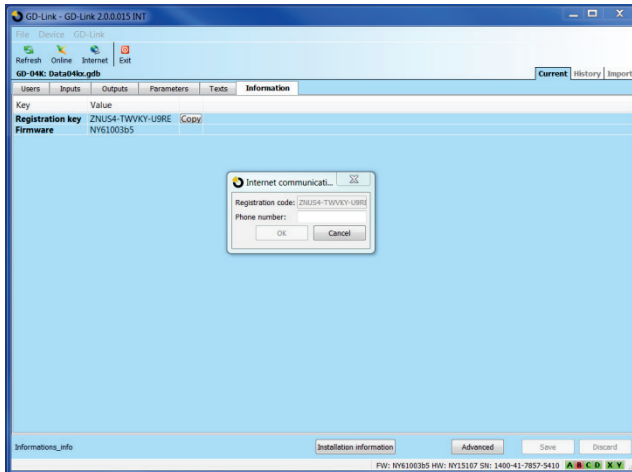


Figure 3

6.3. Remote setup using the setup webpage

The GD-04K module can also be programmed by the setup webpage david.jablotron.cz/gd-04/ where you can fill in the basic parameters and send those settings to the communicator (options marked in red are not supported by the GD-04K).

The setup page allows only to send new setting but it is not possible to read current setting from a device. That's why we strictly recommend to save the current settings ready to be sent to the GD-04K before leaving the web page ("Save the settings in your computer for future use -> Save").

When the communicator receives new setting then a factory RESET is performed and the setting is uploaded. All programming options which are not filled in will be erased. Therefore it is always necessary to fill in all the required options not only the one which is to be changed. The best way of programming the GD-04K remotely is by using **GD-Link 2.0.0** software and higher, see chapter 6.2.

6.4. Setup using SMS

The GD-04K basic functions can also be programmed by SMS instructions, see the example:

PC, ARX, heating ON, DRX, heating OFF

where:

- PC** is the password, every programming SMS has to begin with (default password is PC, it can be changed, maximum 2-30 characters, no diacritics)
- ,** is a comma which separates every instruction or command form
- ARX** is the instruction for relay X to be switched ON, followed by a comma
- DRX** is the instruction for relay X to be switched OFF, followed by a comma

This programming SMS sets up the X relay to be switched ON / OFF by the SMS commands "heating ON" and "heating OFF".

An overview of all programming instructions is given in **table 1** (at the end of this instruction manual).

Rules valid for configuration SMS instruction use:

1. If you want to send more than one programming SMS, then every SMS has to begin with a valid password.
2. More instructions can be included in one programming SMS. The device can manage a "long SMS" and it means that a programming SMS can include up to 2400 characters with no diacritics or 1050 characters with diacritics.
3. Every instruction has to be separated by a comma and none must be put at the end of the instruction command.
4. Spaces in the programming SMS are ignored except the spaces in programmed texts.
5. When a programming SMS is received and processed, the GSM communicator answers back with PROGRAM OK (this text can be edited).
6. If the GSM communicator detects a syntax error in the received programming SMS it answers with PROGRAM ERROR (this text can be edited) and forwards the invalid syntax back to the sender. All valid instructions are performed and the unrecognized part of the texts is ignored.
7. Capital and small letters are treated equally.

8. Diacritics are also not recognized.
9. After a programming SMS has been received the GD-04K switches off both relays (X and Y).

7. Remote control

7.1. Relay remote control using SMS instructions

Text commands for controlling (switching ON / OFF) the outputs by SMS can be customized. Up to 30 characters can be used. Pre-defined texts are used as commands with the following conditions:

- SMS command is without password and must exactly match the predefined text. Capital and small letters are treated equally.
- Using **GD-Link 2.0.0** software (or higher) can be set for SMS and for dialling-in independently for each relay whether it can be controlled by anybody or only from authorised numbers stored in the device.
- Multiple SMS commands can be written in one SMS, commands are separated by a comma.
- **Example: HEATING ON, LIGHTS OFF, STATUS**
- The communicator confirms command processing by a confirmation SMS.
- An unrecognized SMS can be forwarded to the service number (see Settings).
- **When using an SMS internet gate** an SMS can have other text added to the wanted command. It is then necessary to mark the beginning of the command by the symbol % and finish with %. For example an SMS with the text: **www: %heating on% -- SMS sent by your GSM provider.** – is processed by the communicator to be the command: **heating on.**

7.2. Relay remote control by dialling in

It is possible to set telephone numbers to control output relays by dialling in. If this authorised number calls, the relay reacts this way:

- If the relay has a pre-defined limited switching time (Impulse reaction) then on dialling in occurring it switches on for that time. If the switching time is set to zero, dialling in switches it ON until it is dialled in again then the relay switches OFF (or it can also be switched OFF by sending an SMS with a command meant for switching off).
- Using **GD-Link 2.0.0** software (or higher) can be set for SMS and for dialling-in independently for each relay whether it can be controlled by anybody or only from authorised numbers stored in the device.
- Up to 100 telephone numbers can control both relays if this option is enabled.
- For every telephone number you can set the maximum number of uses. When a pre-set limit has been reached, the telephone number can not be used to control more.
- Control by dialling in can only be realized by phone numbers with enabled caller ID visibility (telephone number is not hidden).
- Sending a confirmation SMS can be set to happen when the relay has been controlled by dialling in.

8. SIM card and its use

- A normal 2G SIM card from any provider can be used.
- Before you start using the SIM card with the GSM communicator, check the SIM card's functionality in your cell phone by making a call (not just dialling in) and send an SMS.
- Disable the PIN code requirement on the SIM card or pre-set its PIN code to 1234.
- Check the GSM signal strength at the installation place.

It is not recommended to use pre-paid SIM cards, because it increases the risk of failure because of exhaustion of credit or expiration of credit validity.

If you do decide to use a pre-paid SIM card, the device can check the credit balance automatically. The communicator checks (at a pre-defined frequency) the credit balance and if the credit is lower than the preset minimum, then the current credit balance is forwarded to the service telephone number. For correct functioning it has to be set according to the parameters given by your GSM provider. Setting is performed by the instruction:

PC, CRD, xxxx, dd, hhh, pp

where:

- | | |
|-------------|---|
| PC | is the programming password |
| CRD | is the command for getting the credit balance |
| xxxx | is the USSD command for credit balance requirement, depends on the GSM provider |
| dd | is the period, how often the credit balance is checked (in days) |
| hhh | is the minimum credit balance |
| pp | is the position of the credit info in the text in the GSM provider's answer |

Example: *To check for a minimum credit of 30 EUR once a week set like this:*

PC, CRD, *104*#, 7, 30, 1

To check the current credit balance use the SMS command:

PC, CRD

To erase automatic credit balance checking, program all options to 0, this way:

PC, CRD, *104*#, 0, 0, 0

Warning: *The examples mentioned here for credit balance checking might not work if the GSM provider changes their format. Check the way to get a credit balance and in which format the GSM provider answers to the request.*

9. Factory reset

Can be performed remotely by the SMS instruction **PC, RST**, where PC is the programming password – see table 1.

Another option is to perform it using the RESET jumper (placed next to the SIM card holder).

- Turn the power off (backup cover as well, if used).
- Put the jumper on the RESET pins
- Turn the power on (green LED starts flashing) and
- Wait until the LED indicates permanently (after approx. 5 sec), then take the jumper off the reset pins.

When a reset is performed all settings are erased, including telephone numbers and texts.

10. Technical specifications

Power	10.5 ÷ 15 V DC
Consumption in standby	approx. 25 mA (+17 mA per relay)
Max. device consumption during GSM communication	200 mA
GSM module operation band E-GSM	850 / 900 / 1800 / 1900 MHz
GSM RF output power	2 W for GSM 850 / 900 1 W for GSM 1800 / 1900
Triggering of inputs A, B, C, D	connection to GND
X and Y outputs load:	
- resistive load	max. 2.5 A / 250 V AC
- inductive (capacitive), bulb load	max. 0.5 A / 250 V AC
Can be operated according to	ERC REC 70-03
Safety	EN 60950-1
EMC	EN 301489-7, EN 55022 and EN 61000-6-3
Radio emissions	ETSI EN 301511
Operational environment	II. Indoor general (-10 °C to +40 °C)
Dimensions (no antenna)	76 x 110 x 33 mm
GSM antenna connection	by SMA connector



This product complies with the essential requirements of: RTTE Directive 1999/5/EC, 2011/65/EU, when used for its intended purpose. The original of the conformity assessment can be found at www.jablotron.com, Technical Support section.



Note: Although this product does not contain any harmful materials we suggest you return the product to the dealer or directly to the producer after use.



11. Table 1 – SMS programming instructions overview

A programming SMS always has to begin with the password (see 6.4).

Example: PC, ARX, heating ON, DRX, heating OFF

Purpose / function	Instruction	Description	Factory settings
X and Y relay control			
SMS to switch relay ON	ARX, xxx..x	For relay Y enter ARY, xxx..x = text up to 30 characters, Erase text by entering ARX , Example: ARY,ventilation ON	None
SMS to switch relay OFF	DRX, xxx..x	For relay Y enter DRY, xxx..x = text up to 30 characters, Erase text by entering DRX , Example: DRY, ventilation OFF	None
Relay switch-on period	TMX, t..t	For relay Y enter TMY, t..t = switch on time in seconds or minutes (m) or hours (h) from 1 to 10 hrs (3600 = 60 m = 1 h). When time is set then relay starts working as a timer switch, activated via switch-on SMSes or dialling-in, deactivated by time-limit expiration or via switch-off SMSes. When the time is set to 0 then relay behaves as a toggle contact: on, off, on, ... Example: TMX, 777123456, 5m	0 (no limit)
Telephone numbers authorised for relay control	ADX, x..x,x..x	For relay Y enter ADY, x..x = tel. number, can be entered up to 100 tel. numbers (in a single instruction or gradually). The numbers are added to the list of authorised numbers. Example: add new numbers for relay X control: ADX, 777123456, +420608503211	None
Telephone numbers authorised for relay control with a validity limit	LDX, x..x,n, x..x,n	For relay Y enter LDY, x..x, n where: x..x = tel. number (up to 100 tel. numbers can be added), numbers are added to the list of authorised numbers, n = limit in the number of calls (1 to 99), exceeding the limit removes the number from the list and reports this to the service number by SMS "number erased". Example: add the numbers for relay X control for a maximum of 31 calls: LDX, 777123457, 31	None

Erasing tel. numbers authorised for relay control	EDX, x..x, x..x	For relay Y enter EDY, x..x = tel. number (up to 100 number can be erased). Example: erase telephone number for controlled relay X by dialling in: EDX, 777123457	None
SMS reporting initiated by triggering of the A – D inputs			
Input activation text	ATA, xx..x	For B input enter ATB etc., xxx..x = text, up to 30 characters To erase text: ATA , , (no text = no activation reporting) Example: ATC, heating on	A1, B1, C1, D1
Input deactivation text	DTA, xx..x	For B input enter DTB etc., xxx..x = text, up to 30 characters To erase text enter: DTA , , (no text = no deactivation reporting) Example: DTC, heating off	A0, B0, C0, D0
Telephone numbers for input reports	TNA, x..x, x..x	For B input enter TNB etc., x..x = tel. number, up to 100 for each input. All previously stored numbers are erased. To erase all numbers for input enter: TNA ,,, Example: TND, 777123456, 608123456, 775145522 sets the GD-04K to report input D events to 2 numbers	None
Input – event calls	DNA, n	For B input enter DNB etc., n = 1 (ON), 0 (OFF). If set to ON, every SMS report is followed by a call. Example: DND, 1	Disabled
Other functions			
New programming password	NPC, xx...x	xx...x = new programming password, from 2 to up to 30 characters Example: NPC, MARTIN27	PC
SMS to get GD-04K status – text change	STS, xx..x	xxx..x = text, up to 30 characters* Example: STS, HOW ARE YOU	STATUS
Service telephone numbers	STN, x..x, x..x	xxx..x = tel. number, Up to 2 numbers can be set, previously set numbers are erased. Service numbers are used to report faults: POWER FAIL / POWER RECOVERY LINE OK (GSM signal recovery) Other events – see Optional functions To erase the service number enter: STN ,,,	žádné

Optional functions	DIP,a,b,c,d,e,f,g	Parameter a to f values can be: 1=ON, 0=OFF, x=unchanged. Description of the parameters: a Forward unrecognised SMSes to the service number b Periodic calls to the service number every 24 hours (from the moment of being set) c Forward all SMSes to the service number d Max. 10 SMSes within 15 minutes (all subsequent SMS requests ignored for the next 1 hr) e SMS reporting of relay control by dialling in f SMS reporting of relay control by SMS (e.g. „heating OFF“ OK) g Not used (always enter 0) Example: <i>DIP, 1,x,x,x,x, 1,x</i>	0000000 All disabled
GSM module restart	GSM	The GD-04K will log out and then log in to the GSM network. This can be useful after a blocked SIM card has been unblocked. A restart is also triggered by briefly connecting the RESET jumper while the GD-04K is being powered up.	
Reset	RST	Resets the GD-04K to the factory default settings – it can also be performed by connecting the RESET jumper during powering up - (disconnect the jumper after approx. 5 s)	

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