GSM REMOTE CONTROL AND TELEMETRY DEVICE 5 I/O GSM-C652



Installation and user handbook

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1. Introduction

The device allows to remotely activate, via a mobile 'phone, up to five electric supplies (relay outputs 10A 250Vac) by means of correct SMS messages preceded by a 4 digits password. The relays can be switched for a chosen time (from 1 to 9 seconds) or permanently or up to a reset command. In case of permanent switching, if desired, the status of the relays is stored and reset after a power off and a power on of the device. After it has been switched a relay, the GSM Remote Control replies to the mobile which sent the command with a SMS or making a voice call lasting some ring tone; in the last case the user gets, at no cost (only the ring), the information that the command has been executed. The C652 includes a 'Phone Directory containing 200 entries; the mobile numbers existing in the Directory can activate for two seconds the relay 1 with a plain ring to the device without the engagement of the line and, then, at no cost (Opengate function).

Furthermore, the GSM Remote Control has five digital optocoupled inputs controllable by means a continuous voltage ranging between 10V and 30V or with clean contacts. The state of the inputs can be sensed at every time sending a SMS message. One by one, every input can be set up to raise a warning when it detects the presence or the absence of the tension or it opens or closes a controlled contact. When an input changes state, the C652 sends by its own a warning SMS, including a text customizable for every input, up to a maximum of five mobile numbers. After it has sent the warning SMS, if required, the C652 makes even a voice call, lasting some ring, in order to draw the user attention on the arrival of the message.



2. Information

This handbook contains important information for the installation and the use of the GSM Remote Control C652; please read the handbook before to install or to put in use the device. The guarantee is no more valid if the instructions hereafter described are not observed. We cannot be kept as responsible for any damage to people or goods caused by the missed observance of the safety instructions. The card may be damaged by electrostatic discharges; hold the device by the borders and avoid to touch the components.

2.1 Notice

During use of the C652 Short Messages (SMS) can be generated automatically. Costs may occur for you by this SMS traffic. Devices which are made out of modules have to be considered as an industrial product from the safe-ty perspective.

2.2 Instruction regarding the safety

- Before opening of a device always pull the mains adaptor or make sure that the device is disconnected from the power supply.

- Components, modules or devices have to be build into a housing before they are put into operation. During installation they should not be connected to any power supply .

- You should only use tools on components, modules or devices if they are disconnected from the power supply and the electric charge, which may still be stored in some components, inside the device has been discharged.

- All cables and wires which are energised and connected to the device, the module or components have to be checked regularly for any damage of the isolation shield or fractures of the cables. If the supply cables are visibly damaged the device has to be taken out of operation immediately until the faulty cable has been exchanged.

- When using components or modules it is necessary to strictly observe the specification given in the corresponding description of these components.

- Devices which operate with >35 Volt have to be connected by a specialist.

- Before putting a device into operation, it has to be clarified, whether this device or module is meant for the field of application. In case of doubt ask specialists or the manufacturer of the device.

- Do not install this unit near medical device like pacemakers or hearing aids.

- Switch off the unit when flying.

- Do not place near the body, used in portable application is prohibited.

- Do not install near petrol station, fuel depots, chemical plants.



- Information relating to reducing the use of hazardous substances in electrical and electronic equipment, and disposal of waste. The symbol of bins crossed reported to the equipment or the packaging indicates that the product at the end of its useful life should be collected separately from other waste. The proper collection for the start of the next disused for recycling, treatment and disposal environmentally compatible helps to avoid possible negative effects on the environment and health and promotes reuse and / or

recycling of materials which is composed the equipment. The improper disposal of the product by the keeper includes the application of administrative sanctions provided for by current legislation.

2.3 Allowed applications

The device is built for the remote switching, via GSM network, of electrical devices and for the remote retrieval of the information regarding the inputs. Furthermore, the device can automatically generate SMS messages after one or more inputs have changed the state. Different uses from those here described are not allowed.

3. SIM setup

Get an active SIM card by a mobile GSM phone supplier. Insert the SIM in any mobile phone and disable the PIN request procedure. Verify that the command has been executed: turn the phone off and then on, verify that the phone gains the GSM network without need to insert any SIM unlock code. Erase the SMS messages that could exist in the SIM. Erase the numbers that could exist in the SIM directory. Verify that the function of ID send is enabled. Take away the SIM from the mobile and install it in the C652 according the corresponding notch. In order to withdraw the SIM, lightly push inward with a finger the SIM, remove the finger, the SIM is now unlocked, remove it.

4. Signal LED

The green LED indicates the state of the GSM connection with the net (mobile phone provider):

LED off: it means that the device is off.

LED fast blinking: the LED turns on for 0,5 sec with a period of 1sec: it displays the phase of network research,

LED slow blinking: the LED turns on for 0,3 sec with a period of 3 sec: it displays that the C652 is connected to the Network; it will, then, be able to send and receive SMS or to receive voice calls. LED turned on: it displays that a call is running or the incoming or the sending of a SMS.

The yellow LED indicates the state of RUN; during the regular work it emits a blink on about 3 seconds

5. Programming (Setup) and Command SMS

The programming of the device and the request of specific operations to be done on the C652 side occurs sending to the GSM remote control (to the phone number of the inserted SIM) SMS messages. All the programming parameters and the phone numbers of the Users are saved in the non volatile memory of the device (they remain stored even cutting the power supply). The phone numbers programmed in the Phone Directory are stored in non volatile mode in the SIM inserted in the GSM remote control.

- Type with the maximum care the setup and command SMS (Setup) on a mobile phone and send them to the phone number corresponding to the SIM card inserted in the device.

- The device requests a four digit password (initially: "0000" [four zeros]); the password should be present at the beginning of every SMS message; please modify the password only after you came in familiarity with the device. If a SMS is sent with a wrong password, the remote control doesn't send any SMS of reply but makes the yellow LED blink three times.

- Make sure to add the "country code" when the phone numbers are inserted in the C652 (e.g. +39 for Italy).

- The reply messages to the SMS of setup and command are sent to the mobile phone which sent the SMS with the command.

- The C652 distinguishes between the uppercase and lowercase letters: so, e.g., the Q command is different from the q command.

- The C652 expects to read the caller code identifier (caller ID). Either when the voice calls are used (e.g. the Opengate call) or when are sent the Setup or Command SMS it is essential that the calling phone sends its own ID as well. In the mobile device verify that the setting "hide ID" is not set.

- When a SMS is sent, always wait that the C652 sends the reply SMS before to send a new SMS.



6. Setup SMS

These SMS commands are very useful during the installation step: they allow to program the Password of the device, to know the Firmware level and the IMEI code, the strength of the GSM field and to choose the behaviour of the GSM remote control during the startup phase.

6.1 Command P (Password) - Password programming

Use this command to program a new password for the device. Every setup and command SMS must begin with the password.

Sample: 0000P12341234

Text of the SMS	Description
0000	Current password of the device
Р	Command identifier
1234	New password
1234	Repetition of the new password

If the set up is correct, the device replies with the following SMS: **Setup command OK Password Updated**

Otherwise, the device will reply with the following SMS message: **Password Update Fail**

Note:

- The initial password of the device is 0000 (four zeros)
- The password can be setup of digits only and should have a fixed length of 4 digits
- Take carefully note of the new password of the device

6.2 Command F (Firmware) - Read firmware level

This command allows to read the firmware level.

Sample: 0000F

Text of the SMS	Description
0000	Password of the device
F	Command identifier

If the command is correctly received, the C652 replies with the following SMS: GSM-C652 R13, PS:5.02.003/AL:6.03.200, 357541000172165

Text of the SMS	Description
GSM-C652 R13	Device code and software version
PS:5.02.003/AL:6.03.200	Microprocessor firmware version
357541000172165	GSM IMEI code

6.3 Command E (Network) - Request network status

This command can be used during the installation of the device or, more in general, at any time in order to check the quality of the GSM signal.

Sample: 0000E

Text of the SMS	Description
0000	Password of the device
E	Command identifier

If the command is correctly received, the C652 replies with the following SMS: I TIM BSIC:23 RxQual:7 LAC:AEAD Id:5265 ARFCN:59 PWR:-80dBm

Text of the SMS	Description
ΙΤΙΜ	Name of the Network operator or code of the
	Network operator preceded by the Country code
BSIC:23	Identifier of the base station
RxQual:7	Quality of the reception of the signal (0 to 7)
LAC:AEAD	Local area code
ld:5265	Cell identification code
ARFCN:59	Radio channel assigned
PWR:-80dBm	Quality of the radio signal, it can vary from -113 dBM to -51 dBm.
	In general, comparing with the usual mobile scale: -113 dBm: very weak signal,
	-111 to -103 dBm: 1 notch, -101 to -95 dBm: 2 notches, -93 to -85 dBm: 3 notches,
	-83 to -53 dBm; 4 notches, -51 dBm; 5 notches,

6.4 Command S (Power Up SMS) - SMS of power up

Every time the device is powered up, it can automatically send a SMS message or to make a voice call to the user mobile displaying the power up event. The message or the call are sent to every user number stored, if no user is stored the SMS is not sent or the call is not made. The sending of the power up message if initially enabled.

Sample: 0000S1

Text of the SMS	Description	
0000	Password of	the device
S	Command ide	entifier
1	Command:	0 disables the sending of power up SMS1 enables the sending of power up SMS2 enables the voice call of power up

If the command is correctly received, the C652 replies with the following SMS: **Setup SMS Power Up ON** Or

Setup Call Power Up ON

If number 0 is sent in order to disable this function, the C652 replies with the following SMS: **Setup SMS or Call Power Up OFF**

7. Management of the five relay outputs

7.1 Command O (Output) - Remote switching of the outputs

The C652 has 5 digital output lines connected to 5 power relays which have the contacts normally open available on a clamp board (see the below figure). With the relays, it is possible to remotely control the state of every electric supply.

Sending the ON parameter, the relay is activated, the related LED is switched on and the contact closes. Sending the OFF parameter, the relay is deactivated, the related LED is switched off and the contact opens.

Sample: 0000010N5

Text of the SMS	Description
0000	Password of the device
0	Command identifier
1	Digital line exit the command refers to (digit from 1 to 5)
ON	Command type (ON or OFF)
5	Time of stay in seconds (number from 1 to 9)

If the command is correctly received, the device replies with the following SMS: **OUT 1 ON 5 sec** Otherwise, the device replies with the following SMS message: **Output Fail**

The output lines can be switched for a preset time (from 1 to 9 seconds) or in a permanent way or up to when an opposite command is issued. In this case, the state of the exit lines is stored in a non volatile storage and reset after a power off and on of the device or in case of a temporary break of the power to the device; this feature can be disabled with the command **OR (Outputs Restore)**.

In order to permanently switch an output it suffices to omit the amount of the stay time in the command SMS. E.g., in order to permanently activate the relay n. 3, send

the following command:

Sample: 0000030N

The device replies with the following SMS: **OUT 3 ON** Otherwise, the reply can even be issued

with the ring; see the W command.



7.2 Command OR (Output Restore) - Enables / Disables the output reset

The state of the outputs is stored in a non volatile storage and reset after a power off and on of the device or in case of a temporary break of the power to the device; this feature of automatic reset of the state of outputs can be disabled with the following SMS command:

Sample: 0000OR0

Text of the SMS	Description
0000	Password of the device
OR	Command identifier
0	0 =disables the automatic output reset;
	1=enables the automatic outputs reset

If the command is correctly received, the device replies with the following SMS: **Setup: Outputs Restore OFF**

If, on the contrary, the function is enabled, the device replies with the following SMS: **Setup: Outputs Restore ON**

7.3 Command W (Answer) - Activates / Deactivates the reply with the ring

The C652 sends a **SMS reply message** every time it receives and executes an output switching command (command O Outputs). Enabling the function "**ring reply**" the C652, after it has received a valid switching command and performed it, makes a voice call addressed to the mobile which has sent the message lasting some ring to which the user will not answer. In such a way, the user will get at null cost (only ring) the information of the successfully executed command. The function of answer with the ring is initially disabled. In order to activate or deactivate such a function, send a SMS with the command W followed by the digit 1 or 0.

Sample: 0000W1

Text of the SMS	Description
0000	Password of the device
W	Command identifier
1	1 = activates the reply ring; 0 = deactivates the reply ring

If the command is correctly received, the device replies with the following SMS: **Setup Answer with Ring ON**

If, on the contrary, the function is disabled, the device will reply with the following SMS message: **Setup Answer with Ring OFF**

8. The Opengate function

8.1 Command M (Memory) - Management of the Telephone Directory

The GSM remote control C652 includes a **Telephone Directory** having a capacity of 200 numbers. The numbers of the mobile 'phones inserted in the Directory can activate the output 1 in monostable or bistable mode, with a voice call only (without the engagement of the line and, then, at no cost). The C652 reads the ID of the caller and, if it's present in the active memory, activates the relay of the output 1; the function is named **Opengate**. To add or delete a number of the Directory, send the following SMS command:

Sample: 0000MA+393939002523*

Text of the SMS	Description
0000	Password of the device
Μ	Command identifier
Α	A to add a number or B to withdraw the number
+393939002523	Mobile phone number to add including the country code
*	End of message sign

If the command is correctly received, the device replies with the following SMS: Command OK ID Phone Add in Memory: +393939002523

or

Command OK ID Phone Remove in Memory: +393939002523 or

ID Phone not present in Memory: +393939002523

In order to know the status of the Directory, send the command **M**? preceded by the password: **0000M**? If the command is correctly received, the device replies with the following SMS: **Memory Status Used, Total: 15,250**

8.2 Command D - Activate / Deactivate the Opengate function

The mobile numbers inserted in the **Telephone Directory** can activate the OUT 1, in monostable or bistable mode, with a voice call only (without the engagement of the line and, then, at no cost) using the Opengate function. The C652 reads the ID of the caller and, if it's present in the active memory, activates the relay of the OUT 1 for 2 seconds in **monostable**, or switches (changes the state from active to inactive and viceversa) into **bistable**. The function Opengate is initially disabled. In order to activate and enable/disable the Opengate function, send the following SMS message:

Sample: 0000D1B

Text of the SMS	Description
0000	Password of the device
Μ	Command identifier
1	1 = enables the Opengate function; 0 = disables the Opengate function (initial set)
В	\mathbf{B} = sets the bistable mode; \mathbf{M} = sets the monostable mode (initial set)

If the command is correctly received, the device replies with the following SMS: Setup: Out1 Gate Opener ON Bistable or

Setup: Out1 Gate Opener ON Monostable

Otherwise, if the function is disabled, the device replies with the following SMS: **Setup: Out1 Gate Opener OFF**

9. Setup up of the users phone numbers - Command U (Users)

Up to 5 **user phone numbers** can be inserted in the device; it's necessary to insert at least one mobile phone number. The SMS messages sent by C652 on its own following a particular event (Power UP SMS or an SMS generated by an alarm on the inputs) will be sent to the named 'phone numbers.

Sample: 0000U1+393939002523*

Text of the SMS	Description
0000	Password of the device
U	Command identifier
1	Identifier of the number to set (a digit from 1 to 5)
+393939002523	Mobile phone to be inserted including the country code
*	End of message sign

If the set up is correctly performed, the device replies with the following SMS: **Setup command OK Phone 1 Updated: +393939002523**

Otherwise, the device replies with the following SMS: **Phone update fail**

Note:

- The amount of 'phone number stored can be from 1 to 5
- It's necessary to insert one user mobile number, at least
- In order to erase, for instance, the mobile number in the 3rd position, please send the SMS: 0000U3*
- The maximum length of every number is 16 digits
- Remember to always insert before the number the international prefix; for Italy it's +39

- Read carefully the SMS message sent back and verify that either the memory position and the phone number are correct.

10. Management of the five inputs

10.1 Command R (Read) - Reading of the state of the I/O's

It's always possible to remotely know the state of the digital and analogical outputs and inputs sending the SMS command R:

0000R

Text of the SMS	Description
0000	Password of the device
R	Command identifier

If the command is correctly received, the device replies with the following SMS: Sample: OUT: 1=ON 2=OFF 3=ON 4=OFF 5=OFF, IN: 1=H 2=H 3=L 4=L 5=L

Where:

ON = relay is active, red LED on, contact closed OFF = deactivated relay, red LED off, contact open H = tension on, yellow LED on L = tension off, yellow LED off

10.2 Command C (Call) - Activates / Deactivates the Alert ring

The C652 sends by its own Alert SMS messages to the **user mobile numbers** present in memory. The device sends **one SMS only** to each mobile. To draw the attention on such messages, it is possible to order to the C652 to make, after the SMS sending, even a voice call which lasts some ring (the receiver will not reply to) to notify the user of the arrival of the message. The function of the alert ring is initially disabled.

Sample: 0000C1

Text of the SMS	Description
0000	Password of the device
C	Command identifier
1	1 = enables the Alert ring; 0 = disables the Alert ring

If the command is correctly received, the device replies with the following SMS: **Setup call After SMS Alert ON**

If, on the contrary, the function is disabled, the device replies with the following SMS: **Setup call After SMS Alert OFF**

10.3 Command I (Input) - Programming the working mode of the inputs

The C652 has 5 digital input lines connected to as many optocouplers; the led internals to the optocouplers are connected by means of a signal led and a limiting resistor to the input clamps (see the figure below). Setting a continuous tension ranging between 10 and 30 volts to the named clamps, the corresponding LED turns on and the input changes state. The C652 can detect these changes of state of the inputs and send, by its own, to the existing user mobile numbers a warning SMS (Alert).

Every input can be set to work with a existing or missing tension:

- A (Absent) Indicates that the input senses, in normal operation, the tension missing. Raising to the input a tension for the set time, an alarm is generated.
- **P** (Present) Indicates that the input senses, in normal operation, a tension.
 - Withdrawing the tension to the input for the set time, an alarm is generated.

Sample: 0000I1A#AllarmInput1*

Text of the SMS	Description
0000	Password of the device
I	Command identifier (Digital Input)
1	Line of digital input the command refers to (number from 1 to 5)
Α	Normal run mode (A = missing tension; P = existing tension)
#	Beginning of message symbol
AllarmInput1 *	Text to be associated to the event of the input; maximum of 80 characters End of message symbol

If the command is correctly received, the device replies with the following SMS: Setup IN1 : Normal V Absent - Event Text IN1: AllarmInput1

In the opposite case, the device replies with the following SMS message: **Setup Input Fail**

Regarding the above example, if a tension is set on the input 1, the C652 sends the following message: Alarm IN 1 V Present: AllarmInput1



10.4 Command A (Activate Inputs) - Inputs management reactivation

According to the type of application, the digital inputs reactivation can be set in Automatic or in SMS mode.

Reactivation with SMS

In this mode, in case of active input, the C652 sends a SMS to every user mobile number and, if enabled, makes even a voice call to every user mobile number; then it disables the input management. No more SMS (and no ring) will be sent to the Users even though the input again switches status. To notify the C652 to reactivate the management of that input it's necessary to send a SMS command.

Automatic reactivation

In this mode, the reactivation of the digital input management occurs automatically when the input itself returns to still state. For example, let's suppose to set the input 1 to work in normal state without tension (command: **000011A#TestInput1***). Applying a tension to the input 1, this will be activated and the remote control will start the Alarm procedure: the C652 sends SMS (and rings) to the User mobile and after it disables the input management up to when the tension lasts. When the tension drops and the input comes back in the normal state, the input management is automatically reactivated. The remote control will be able again to send a warning sequence if the input becomes active or if the tension is again applied. The same principle is true, reversing the tension condition, for the input set as usually with tension (command: **000011P#TestInput1**).

To select the mode of reactivation, please send the following SMS command:

Sample: 0000A6

Text of the SMS	Description
0000	Password of the device
Α	Command identifier
6	Reactivation mode: 6 automatic; 7 with SMS (default condition)

If the command is correctly received, the device replies with the following SMS:

Setup: Automatic Inputs Reactivation ON

Or

Setup: SMS Inputs Reactivation ON

In the SMS mode, to reactivate the management of the input, it's necessary to send the Command A followed by the input to be reactivated:

Sample: 0000A1

Text of the SMS	Description
0000	Password of the device
Α	Command identifier
1	Input to be reactivated (number from 1 to 5) or number 0 to reactivate all the inputs

If the command is correctly received, the device replies with the following SMS: **Setup: IN1 Reactivated**

Or

Setup: All inputs Reactivated

Note:

All the inputs are automatically reactivated after a power off and a power on.

11. Clamp layout of inputs / outputs



- K6 OUT4 Contact normally open of RL4 (Output 4) **K7 OUT5** Contact normally open of RL5 (Output 5)
- K14 VAL+ Positive output auxiliary power (coincides with the power positive) **K14 VAL-**Ground output auxiliary power (coincides with the power ground) K8 IN1+ Positive input 1 K8 IN1-Ground input 1 K9 IN2+ Positive input 2 Ground input 2 K9 IN2-K10 IN3+ Positive Input 3 K10 IN3-Ground Input 3
- K11 IN4+ Positive Input 4 K11 IN4-Ground Input 4 K12 IN5+ Positive Input 5
- K13 IN5-Ground Input 5

turns on with powered IN1 D13 yellow turns on with powered IN1 D14 yellow turns on with powered IN1 D15 yellow turns on with powered IN1

12. Technical characteristics

GSM section

- Quad-Band modem
- GSM/GPRS 850 / 900 / 1800 / 1900 MHz
- Output power Class 4 (2W) @ 850 / 900 MHz
- Output power Class 1 (1W) @ 1800 / 1900 MHz
- Sensitivity -107 dBm @ 850 / 900 MHz
- Sensitivity -106 dBm @ 1800 / 1900 MHz

Logic of control

- RISC Microcontroller in nanoWatt technology
- External oscillator 20 MHz
- 64 Kbyte of programmable memory
- 3986 byte of data memory

General data

- Password protection on every command
- Customizable device name
- 1 relay out managed by voice ring call at no cost

- 5 relay out managed by SMS
- Command reply with SMS or ring
- Time or duration controllable exits
- Outputs automatic reset (excludable)
- Telephone Directory with 200 entries
- Relays connection power 10A 250Vac
- 5 programmable user mobile numbers
- 5 digital inputs optocoupled managed with tension (10 to 30 Vdc)
- Management of inputs with N.C. or N.O. connections
- Sending of warning SMS with customizable text
- Sending of voice ring after a warning SMS
- Sending of Power Up SMS
- 12 Vdc power supply (max 500 mA)
- Working temperature: -10°C to +55°C
- Dimensions 190 x 140 x h 70 mm

The specifications can change without notice.

13. Warranty

This product is guaranteed from defects of components and assembly as stated by the Law for the duration of two year from the date of purchase. The warranty is valid only if the user has an original purchase copy as the invoice or the fiscal receipt.

The producer responsibility is limited to the defect repair or, if necessary, to the substitution or repair of the defective component. The costs and the risks connected to the transportation, the removal or the reposition of the product and whatever further cost directly or indirectly connected to the repair cannot be charged to the producer. The producer cannot be kept as responsible of whatever damage caused by a malfunction of the product.

13.1 Technical support

For the technical support related to the product and the repair you can contact us at the following address: **support@evr-electronics.com**

The producer reserves the right to change the product specifications or to cease the production of the products without warning and to have to add or give the new functionalities or the new instructions in the products already sold. The producer cannot be kept as responsible for losses or damages, either direct or indirect that may come by the product use. The products are not suitable for the use as parts of systems of life support or systems which can create dangerous situation of whatever type.

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