

*Roger Access Control System*

## OSR88M-IO Reader

### Operating Manual

*Hardware version: v1.0*

*Firmware version: 1.0.8.205 or newer*

*Document version: Rev.F*



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## 1. DESIGN AND APPLICATION

The OSR88M-IO is an identification terminal dedicated to work with an access controller that supports the OSDP v2.2 protocol. The terminal is equipped with colour graphic display, sensor type keypad, 4 function keys and MIFARE Ultralight/Classic/DESFire (EV1, EV2, EV3)/Plus/ reader. Users can identify at the terminal with PINs, MIFARE cards or mobile devices equipped with NFC (Near Field Communication) and BLE (Bluetooth Low Energy) interfaces. OSR88M-IO can be connected to RS485 bus of MC16 access controller using the additional MCI-3-LCD interface. When connected to MC16 controller it can be operated as access control terminal, Time&Attendance terminal and additionally it can be used to control the system especially in regard of building automation offered by RACS 5.

### Characteristics

- Access terminal supporting OSDP v2.2
- Colour graphic display
- MIFARE Ultralight/Classic/DESFire (EV1, EV2, EV3)/Plus cards reader
- NFC and BLE mobile identification
- Touch type keypad
- 4 function keys
- 3 inputs
- 2 transistor outputs
- 1 relay output
- RS485 interface
- Dimensions: 155,5 x 85,0 21,5
- CE, RoHS

### Power supply

The terminal requires power supply voltage in range of 11-15VDC. It can be supplied from MCX2D/MCX4D expander of MC16-PAC-KIT, from MC16 access controller (e.g. TML output) or from dedicated power supply unit. The supply wire diameter must be selected in such way that the voltage drop between supply output and the device would be lower than 1V. The proper wire diameter is especially critical when device is located in long distance from the supply source. In such a case the use of dedicated power supply unit located close to the device should be considered. When separate power supply unit is used then its minus should be connected to controller's GND by means of signal wire with any diameter. It is recommended to use UTP cable for connection of device to controller. The table below shows maximal UTP cable lengths in relation to the number of wires used for power supply.

| <b>Table 1. Power supply cabling</b>      |                                      |
|-------------------------------------------|--------------------------------------|
| Number of UTP wire pairs for power supply | Maximal length of power supply cable |
| 1                                         | 150m                                 |
| 2                                         | 300m                                 |
| 3                                         | 450m                                 |
| 4                                         | 600m                                 |

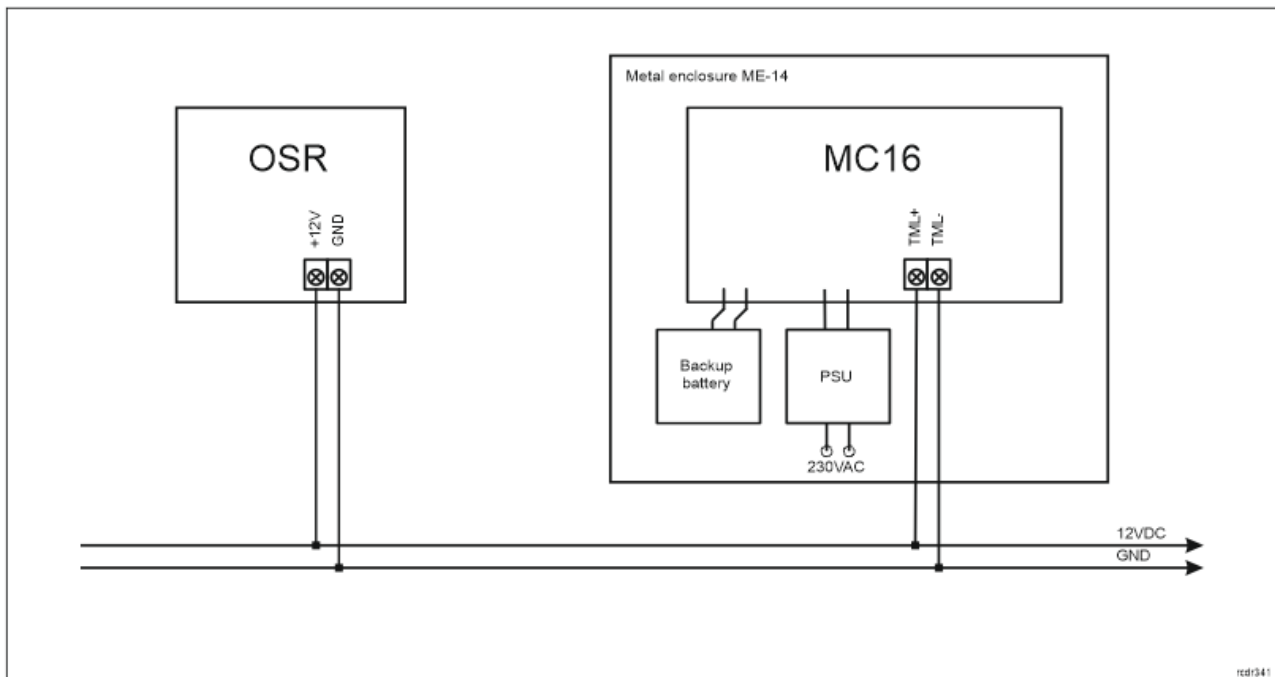


Fig. 1 OSR supply from MC16 access controller

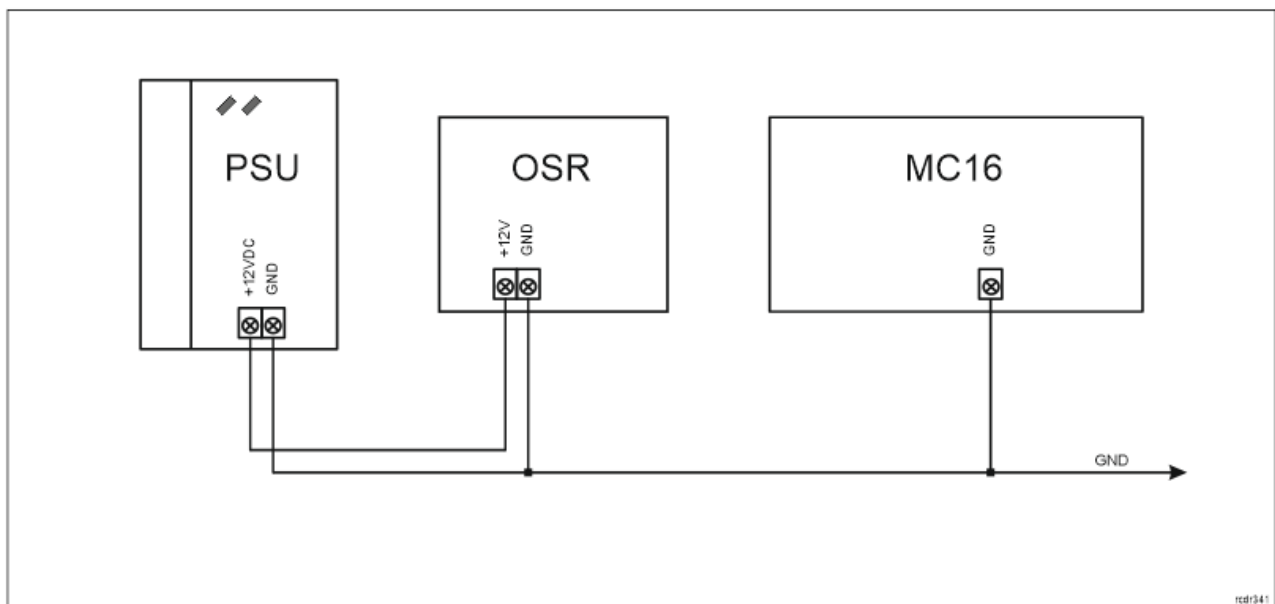


Fig. 2 OSR supply from dedicated power supply unit

### OSDP bus

The communication method with access controller is provided via the OSDP protocol on the RS485 bus. The device can be connected directly to access controllers supporting this bus. However, for the MC16 controller, it is additionally necessary to use the MCI-3-LCD interface. The bus topology can be freely arranged as star, tree or any combination of them except for loop. The matching resistors (terminators) connected at the ends of transmitting lines are not required. In most cases communication works with any cable type (standard telephone cable, shielded or unshielded twisted pair etc.) but the recommended cable is unshielded twisted pair (U/UTP cat.5). Shielded cables should be limited to installations subject to strong electromagnetic interferences. The RS485 communication standard used in the RACS 5 system guarantees proper communication in a distance of up to 1200 meters as well as high resistance to interferences.

Note: Do not use more than single pair in UTP cable for RS485 communication bus.

## Display

The terminal is equipped with colour display (4 lines, 16 characters each). The display can be configured in regard of background and font colours within low level configuration (RogerVDM) and in regard of displayed information within high level configuration by means of Display command in VISO software navigation tree which is explained in AN011 application note.

Moreover, default functions key icons, splash screen and screensaver can be replaced using device memory card. Four new icons must be copied to ICONS folder on memory card (fig. 6), and they must be named as icon\_001.bmp, icon\_002.bmp, icon\_003.bmp and icon\_004.bmp. Splash screen file in the same folder must be named as icon\_000.bmp. Screensaver graphics must be named as scrnsvr.bmp and it must be copied to the main folder of memory card. Icons, splash screen and screen saver must in bmp format (without alpha channel) and with 24bit colour depth (can be saved with MS Paint). Icon size must be 60x60pixels while splash screen size and screen saver size must be 320x240pixels.

## Keypad

The terminal is equipped with numeric touch keypad and backlight. The keypad can be used for user identification with PIN and for various keypad commands. By default, the key [#] is used for PIN confirming.

## Function keys

The terminal is equipped with four touch function keys (fig. 3). Various functions can be assigned to these keys within high level configuration (VISO) e.g. door bell, Set T&A Mode, Register Guard Tour Event, Set Automation Node On, etc. Within low level configuration (RogerVDM) function buttons can be enabled.

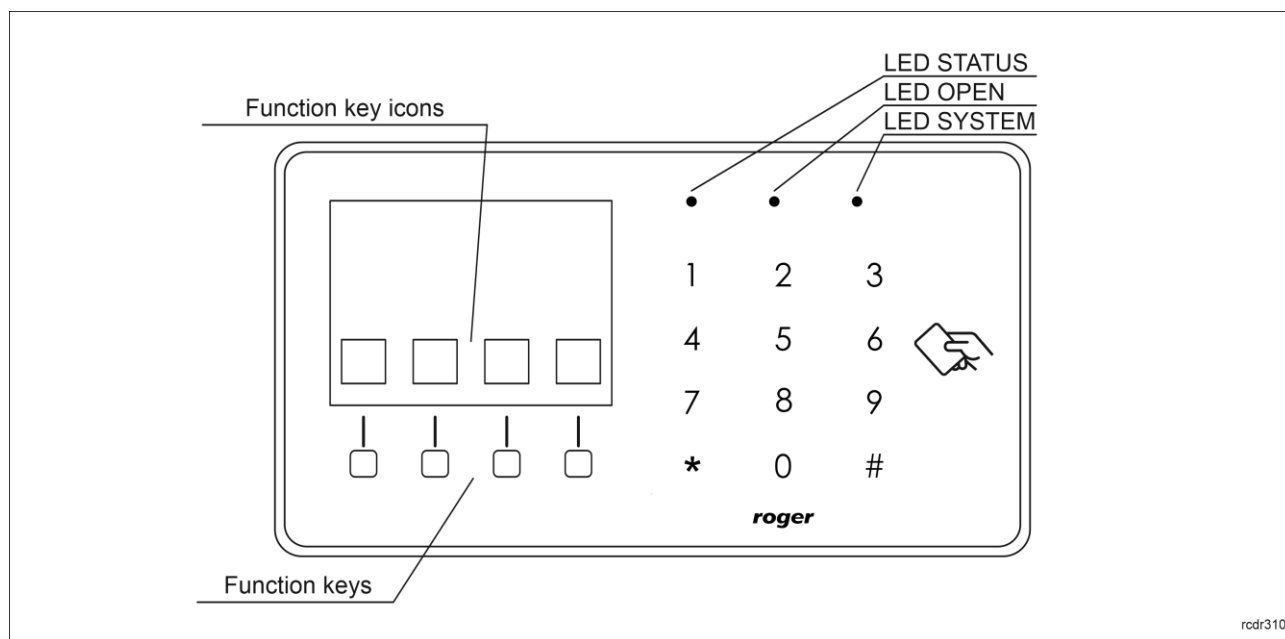


Fig. 3 LED indicators and function keys

## LED indicators

The terminal is equipped with three LED indicators (fig. 3) which are used to signal integral functions and they can be additionally programmed with other available functions within high level configuration (VISO).

| Table 2. LED indicators |        |                    |
|-------------------------|--------|--------------------|
| Indicator               | Colour | Integral functions |

|            |           |                                                                                                                                                   |
|------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| LED STATUS | Red/green | Default colour of the indicator is red. If the terminal is assigned to Alarm Zone, then the LED indicates zone arming (red) or disarming (green). |
| LED OPEN   | Green     | LED indicates access granting.                                                                                                                    |
| LED SYSTEM | Orange    | LED indicates card reading and can signal other system functions including device malfunction.                                                    |

Note: Synchronic pulsing of LED indicators signifies lost communication with MC16 controller.

## Buzzer

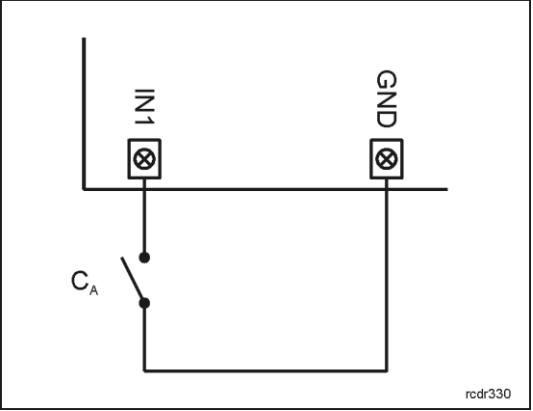
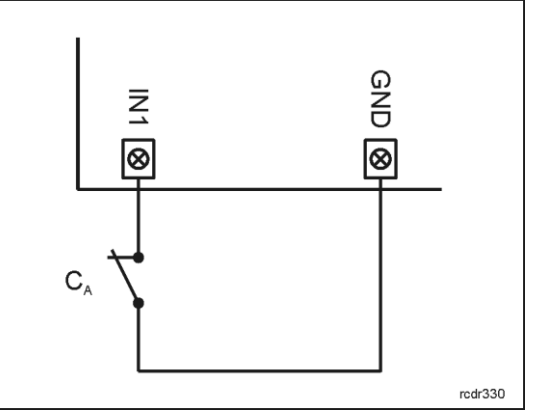
The terminal is equipped with buzzer which is used to signal integral functions and it can be additionally programmed with other available functions within high level configuration (VISO).

Note: LED indicators, speaker and output lines in high-level configuration (VISO) can only be controlled as on/off. Unlike MCT readers, flashing or cyclic activation is not supported.

## Inputs

The terminal offers 3 general purpose inputs of NO, NC and 1 input internally connected to tamper contact. Input types and electric parameters such as response time and parametric resistors are defined within low level configuration (RogerVDM). Input functions are assigned within high level configuration (VISO). Multiple functions can be assigned to the same input at the same time.

**Table 3. Input types**

| NO input                                                                                                                                                                                                                               | NC input                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>NO input can be in normal or in triggered state. In normal state CA contacts are opened. Input triggering is caused by CA contacts closing.</p> |  <p>NC input can be in normal or in triggered state. In normal state CA contacts are closed. Input triggering is caused by CA contacts opening.</p> |

## Response time

Response time parameter defines minimal impulse time on the input which triggers the input. Each input can be configured individually in range of 50 to 5000 ms within low level configuration (RogerVDM).

## Tamper detector

Built-in tamper (sabotage) detector enables detection of unauthorized opening of device's enclosure as well as detachment of the enclosure from wall. The detector is internally connected to the terminal's input. It does not require low level configuration (RogerVDM) or any additional installation arrangements, but it is essential to mount front panel in such way as the tamper detector (fig. 6) would firmly press the back panel. The detector requires high level configuration which consists in assignment

of the function [133] Tamper Toggle on the level of a Main Board of a controller in VISO software navigation tree.

## Outputs

The terminal offers 2 transistor open collector type outputs (15V/150mA rated) and 1 relay output with NO/NC contacts (30V/1.5A DC/AC rated). Electric parameters such as polarity are configured within low level configuration (RogerVDM). Function are assigned to outputs within high level configuration (VISO). Multiple functions with different priorities can be assigned to the same output at the same time.

## Identification

Following user identification methods are offered by the terminal:

- MIFARE Ultralight/Classic/Plus/DESFire (EV1, EV2, EV3) proximity cards
- PINs
- Mobile devices (NFC and BLE)

### MIFARE cards

By default, the terminal reads serial numbers (CSN) of MIFARE cards, but it is possible to program cards with own numbers (PCN) in selected and encrypted sectors of card memory. The use of PCN prevents card cloning and consequently it significantly increases security in the system. More information on MIFARE card programming is given in AN024 application note which is available at [www.roger.pl](http://www.roger.pl).

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The technical characteristics of the device are guaranteed for RFID cards supplied by Roger. Cards from other sources may be used, but they are not covered by the manufactures warranty. Before deciding to use specific Roger products with third-party contactless cards, it is recommended to conduct tests that will confirm satisfactory operation with the specific Roger device and software in which it operates.

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### PINs

The terminal accepts variable length PINs (by default 4-8 digits concluded with [#] key).

### Mobile devices (NFC and BLE)

The terminal OSR88M-IO enables user identification with mobile device using NFC (Android) or Bluetooth (Android, iOS) communication. Prior to use of BLE/NFC identification on the terminal, within its low level configuration (see section 4) configure own NFC/BLE authentication factor encryption key and NFC/BLE communication encryption key while in case of Bluetooth additionally verify if the parameter BLE activated is enabled. Install Roger Mobile Key (RMK) app on mobile device and configure the same parameters as in the terminal. Create key (authentication factor) in RMK defining its type and number, then create the same authentication factor in VISO software (fig. 4) and assign it to the user with adequate Authorisation(s) at the terminal. When user wants to identify at the terminal using mobile device then key (authentication factor) can be selected from the screen or with gesture.

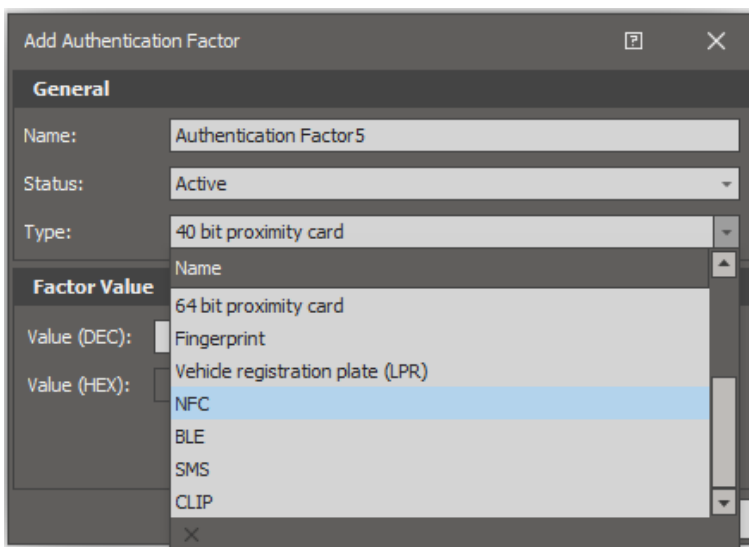
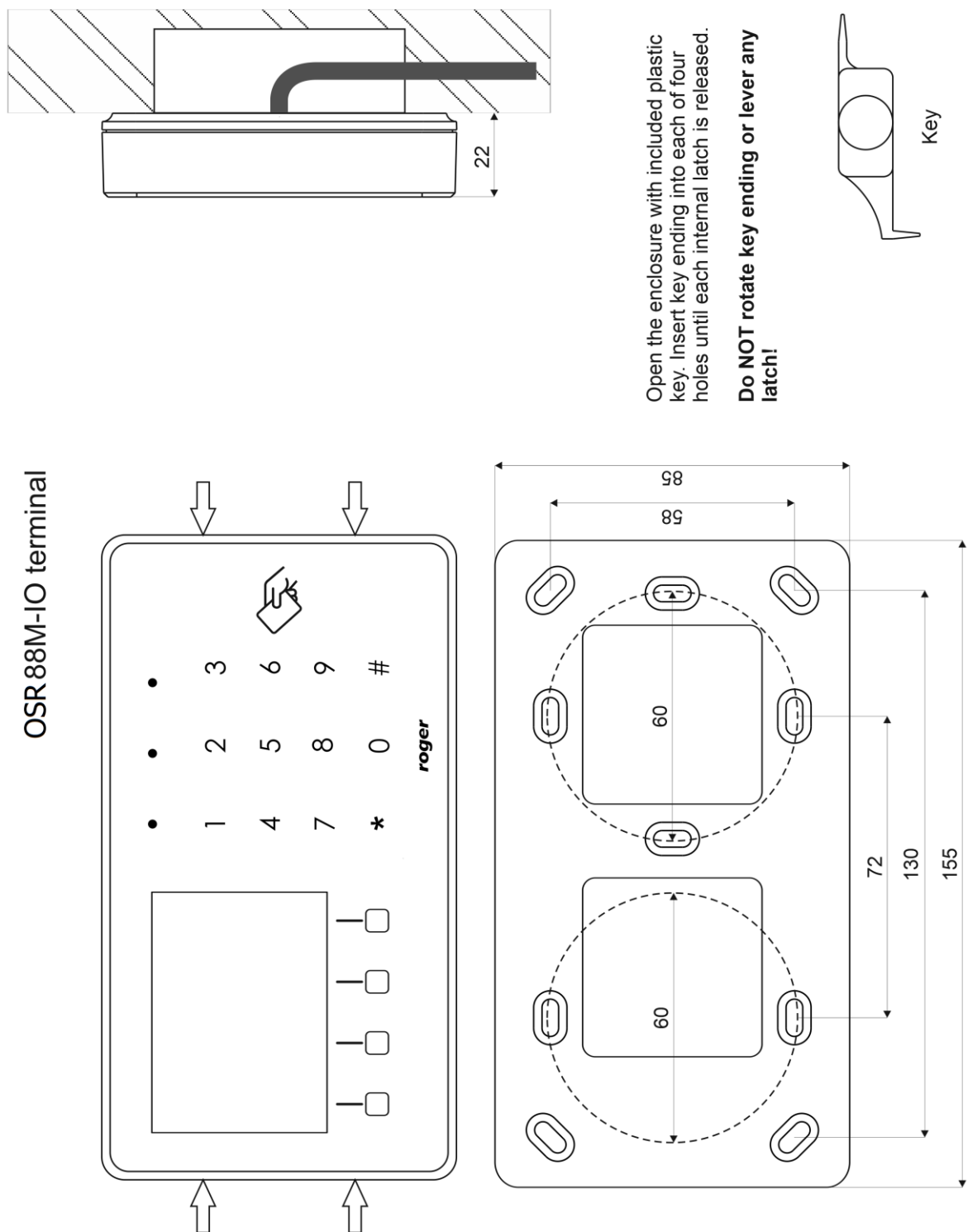


Fig. 4 Authentication factor type in VISO software

## 2. INSTALLATION

| <b>Table 4. Screw terminals</b> |                                    |
|---------------------------------|------------------------------------|
| Name                            | Description                        |
| OUT2                            | OUT2 output line                   |
| OUT1                            | OUT1 output line                   |
| IN3                             | IN3 input line                     |
| IN2                             | IN2 input line                     |
| IN1                             | IN1 input line                     |
| NO                              | REL1 relay normally opened contact |
| NC                              | REL1 relay normally closed contact |
| COM                             | REL1 relay common contact          |
| B                               | OSDP bus, line B                   |
| A                               | OSDP bus, line A                   |
| GND                             | Ground                             |
| +12V                            | 12VDC power supply                 |
| 1,2,3,4,5,6,7,8                 | Ethernet port                      |



rcdf310

Fig. 5 OSR88M-IO installation



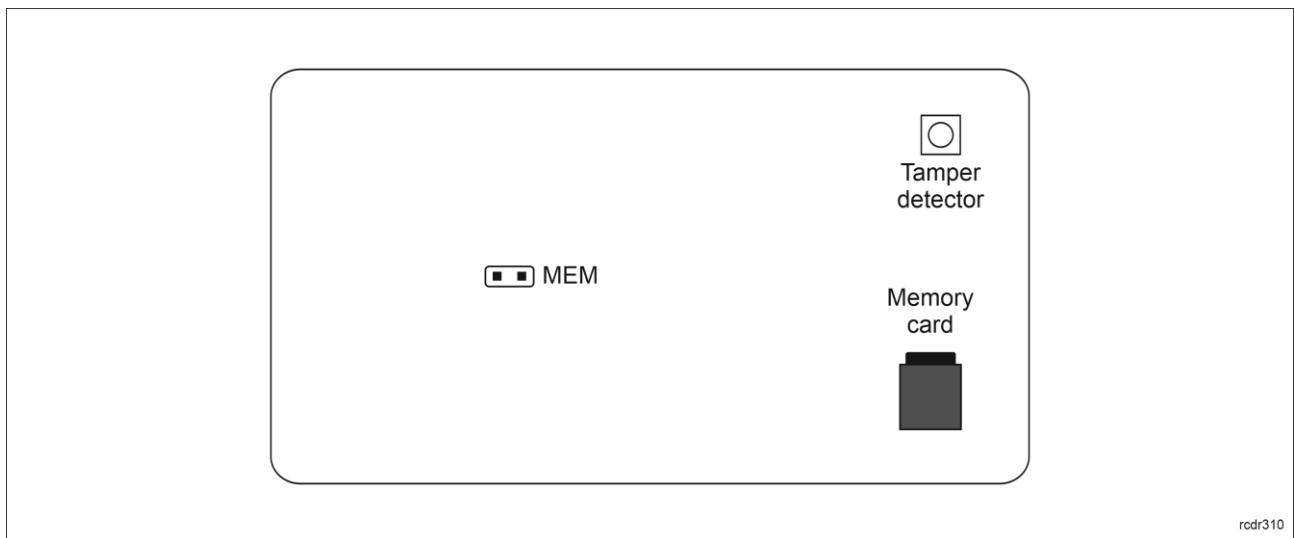


Fig. 6 Internal side of the front panel

### Installation guidelines

- The terminal should be mounted on a vertical structure (wall) away from sources of heat and moisture.
- In particular, it is not allowed to install the reader in places with high humidity such as saunas, swimming pools, car washes, etc.
- Front panel should be attached in such way as the tamper detector (fig. 6) would firmly press the back panel.
- All electrical connections should be done with disconnected power supply.
- If the terminal and controller are not supplied from the same PSU, then GND terminals of both devices must be connected with any wire.
- Device can be cleaned by means of wet cloth and mild detergent without abrasive components. In particular do not clean with alcohols, solvents, petrol, disinfectants, acids, rust removers, etc. Damages resulting from improper maintenance and usage are not covered by manufacturer warranty.

## 3. OPERATION SCENARIOS

### Connection vis MCI-3-LCD interface

The terminal when connected to MC16 access controller via the MCI-3-LCD interface, can be at the same time used for access control, Time&Attendance and to control external devices with function keys. The example of connection diagram for such scenario is shown in fig. 7 where the terminal is connected via the MCI-3-LCD interface to the MC16 controller. The terminal with MCI-3-LCD interface can also operate with MC16 controller using MCX2D/MCX4D expanders as in case of M16-PAC-x-KIT series.

In order to support OSDP terminals, it is necessary to run the automatic terminal detection procedure via the MCI interface. The OSDP terminal detection procedure is described in a separate manual for the MCI-3-LCD interface.

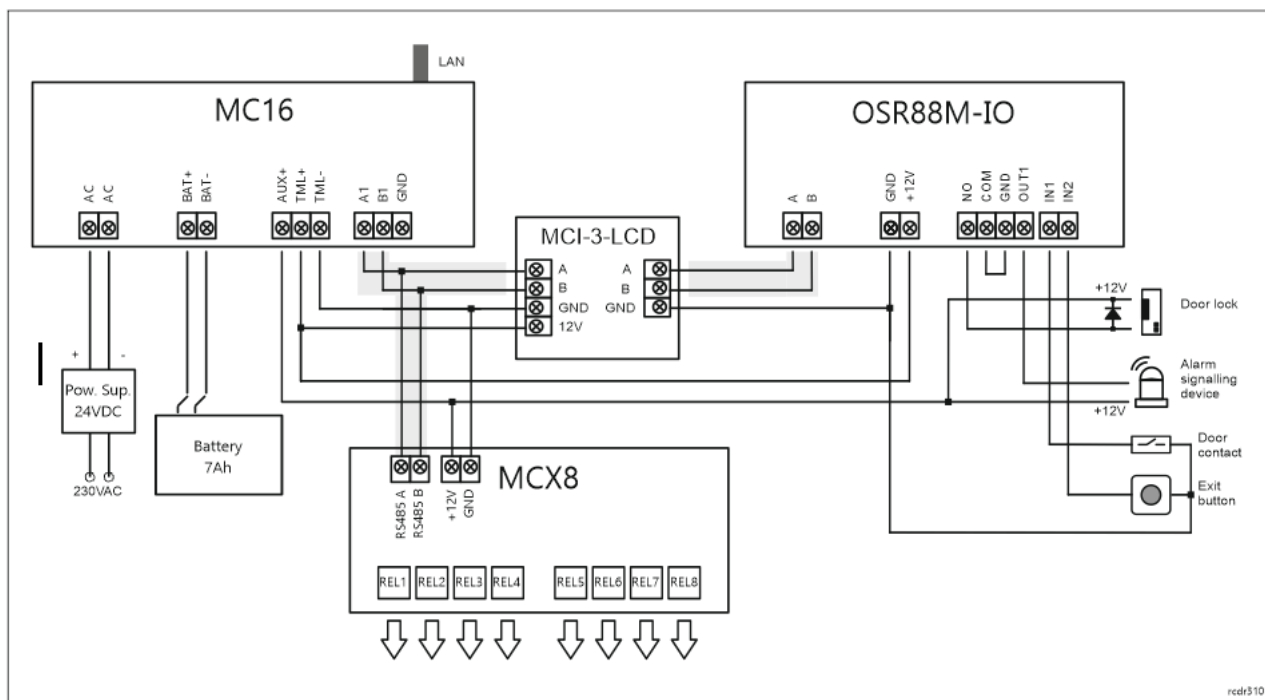


Fig. 7 Typical connection diagram for the terminal and MC16 access controller via the MCI-3-LCD interface.

### Direct connection to the OSDP controller

It is possible to make a direct connection of the OSR reader directly to the OSDP controller. An exemplary connection diagram is shown below.

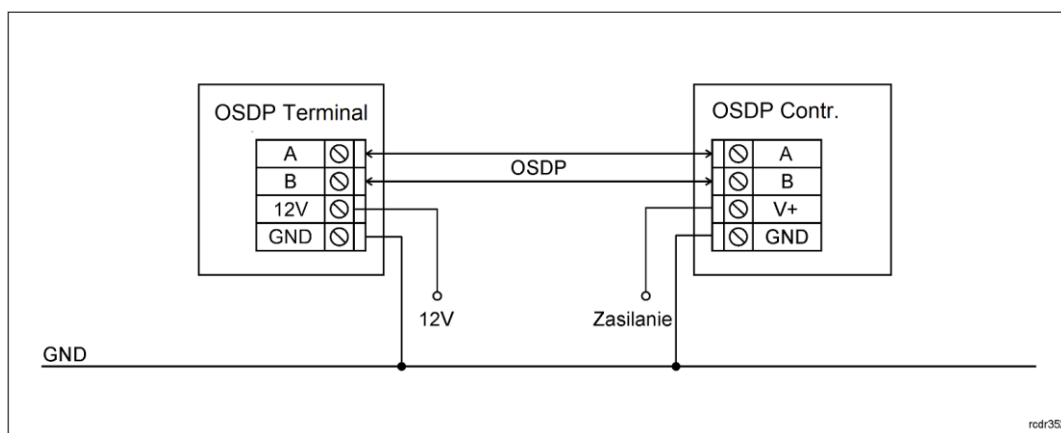


Fig. 8 Connecting the OSR reader directly to the OSDP controller.

## 4. CONFIGURATION

The purpose of low level configuration is to prepare device for operation in RACS 5 system. In case of RACS 5 v1 or RACS5 v2 system the address of device must be configured by means of RogerVDM software or by manual addressing before connection to MC16 controller.

## Low level configuration (RogerVDM)

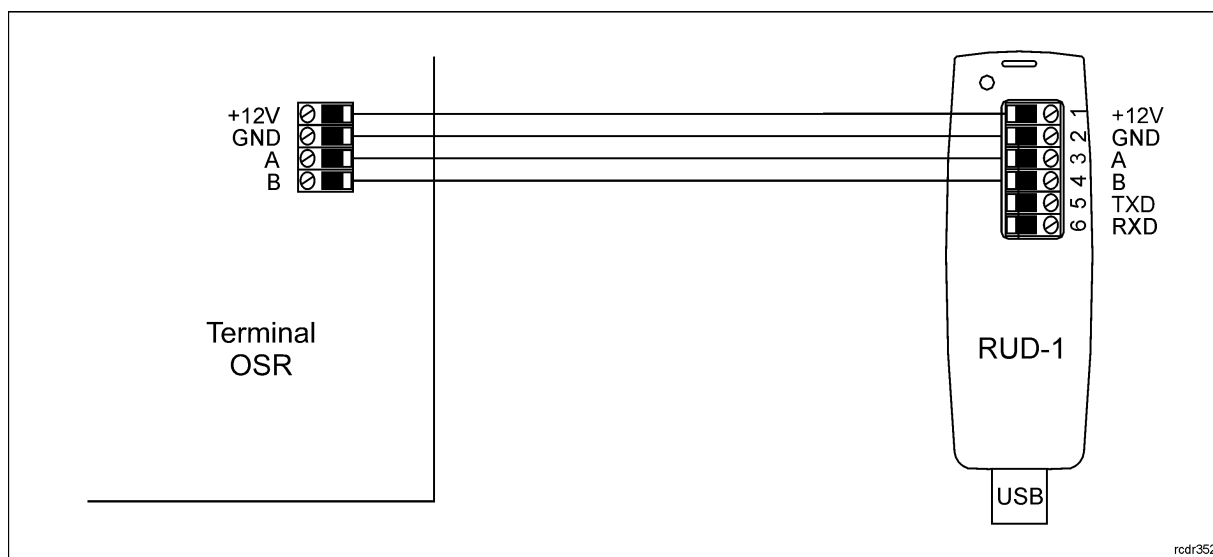


Fig. 9 Connection to RUD-1 interface.

### Programming procedure with RogerVDM software:

1. Connect the device to RUD-1 interface (fig. 9) and connect the RUD-1 to computer's USB port.
2. Remove jumper from MEM contacts (fig. 6) if it is placed there.
3. Restart the device (switch power supply off and on) and orange LED SYSTEM will pulsate. Then within 5 seconds place jumper on MEM contacts and the terminal will display CONFIG MODE text.
4. Start RogerVDM program, select *OSR* device, v1.0 firmware version, *RS485* communication channel and serial port with RUD-1 interface.
5. Click *Connect*, the program will establish connection and will automatically display *Configuration* tab.
6. Select RS485 communication interface and specify unoccupied RS485 address in range of 0-126. Configure other low level configuration parameters as needed.
7. Click *Send to Device* to update the configuration of device.
8. Optionally make a backup by clicking *Send to File...* and saving settings to file on disk.
9. Remove jumper from MEM contacts and disconnect device from RUD-1 interface.

Note: If the USB port does not offer enough power output, then supply the terminal from external PSU with min. 12VDC/200mA power output.

Note: Do not read any cards nor press keypad when device is configured with RogerVDM.

| Table 5. List of low level parameters |                                                                                                                                                                                                                                                                                              |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Communication settings                |                                                                                                                                                                                                                                                                                              |
| OSDP address                          | Parameter defines device address on OSDP bus. Range: 0-126. Default value: 0.                                                                                                                                                                                                                |
| Factor conversion                     | Parameter defines method of converting the read factor. Value range: [0]: RS485 (EPSO3), [1]: Media only. Default value: [0]: RS485 (EPSO3)                                                                                                                                                  |
| LED control                           | Parameter defines method of controlling the terminal's LED indicators. Range of values: [0]: 4 monochrome indicators [1]: RGB tricolor indicator. Default value: [0]: 4 monochrome indicators                                                                                                |
| Communication encryption              | Parameter defines the encryption conditions for communication between the controller (CP) and the reader (PD). Encryption can be unconditional at all times or managed by a controller. Range of values: [0]: Controller initiated, [1]: Constant. Default value: [0]: Controller initiated. |

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OSDP password                                | Password for encrypting communication on the OSDP bus. Value range: 4-16 ASCII characters.                                                                                                                                                                                                                                                                                                                |
| <b>Mobile authentication</b>                 |                                                                                                                                                                                                                                                                                                                                                                                                           |
| NFC/BLE authentication factor encryption key | Parameter defines key for encryption of NFC/BLE communication. Range: 4-16 ASCII characters.                                                                                                                                                                                                                                                                                                              |
| NFC/BLE communication encryption key         | Parameter defines key for encryption of NFC/BLE communication. Range: 4-16 ASCII characters.                                                                                                                                                                                                                                                                                                              |
| BLE authentication factor class              | Parameter defines acceptable type of keys (authentication factors) created in Roger Mobile Key app for Bluetooth (BLE) communication. UCE means lower security and quicker identification while REK means higher security and slower identification. It is necessary to apply classes in RMK which are acceptable for terminal. Range: [1]: REK, [2]: UCE, [3]: UCE + REK. Default value: [3]: UCE + REK. |
| NFC authentication factor class              | Parameter defines acceptable type of keys (authentication factors) created in Roger Mobile Key app for NFC communication. UCE means lower security and quicker identification while REK means higher security and slower identification. It is necessary to apply classes in RMK which are acceptable for terminal. Range: [1]: REK, [2]: UCE, [3]: UCE + REK. Default value: [2]: UCE.                   |
| <b>Optical signalisation</b>                 |                                                                                                                                                                                                                                                                                                                                                                                                           |
| RS485 communication timeout [s]              | Parameter defines the delay after which the device will start signaling lack of communication with the controller on the LED indicators. Value 0 disables signaling. Value range: 0-64 seconds. Default value 20.                                                                                                                                                                                         |
| LED SYSTEM pulsing when card near reader     | Parameter enables LED SYSTEM (orange) pulsing when card is close to the device. Range: [0]: No, [1]: Yes. Default value: [0]: No.                                                                                                                                                                                                                                                                         |
| Backlight level [%]                          | Parameter defines backlight level. When set to 0 then backlight is disabled. Range: 0-100. Default value: 100.                                                                                                                                                                                                                                                                                            |
| Backlight switching off when no activity     | Parameter enables temporary backlight dimming whenever card is read, or key is pressed. Range: [0]: No, [1]: Yes. Default value: [0]: Yes.                                                                                                                                                                                                                                                                |
| LED SYSTEM flash after card read             | Parameter enables short flash of LED SYSTEM (orange) when card is read. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.                                                                                                                                                                                                                                                                                |
| <b>Acoustic signalisation</b>                |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Buzzer loudness level [%]                    | Parameter defines buzzer loudness level. When set to 0 then buzzer is disabled Range: 0-100. Default value: 100.                                                                                                                                                                                                                                                                                          |
| Short sound after card read                  | Parameter enables short sound (beep) generating by buzzer when card is read. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.                                                                                                                                                                                                                                                                           |
| Short sound after key press                  | Parameter enables short sound (beep) generating by buzzer when key is pressed. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.                                                                                                                                                                                                                                                                         |
| <b>Keypad settings</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Keypad activated                             | Parameter enables deactivation of keypad. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.                                                                                                                                                                                                                                                                                                              |
| <b>Advanced settings</b>                     |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Card/PIN buffer timeout [s]                  | Parameter defines the time of keeping the card number or PIN code in the reader's buffer. After exceeding this time, the identifier will be deleted even though it has not been sent to the controller. Range: 1-64. Default value: 10.                                                                                                                                                                   |
| BLE activated                                | Parameter enables deactivation of Bluetooth transmission. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.                                                                                                                                                                                                                                                                                              |

|                                          |                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BLE session timeout [s]                  | Parameter defines maximal time for establishing connection between mobile device and terminal in Bluetooth technology. When timeout elapses, the session is interrupted by terminal so mobile device could attempt to establish connection again. When set to 0 then timeout is disabled. Range: 0-10. Default value: 5. |
| BLE broadcasting power [dBm]             | Parameter defines power of broadcasting radio signal for Bluetooth communication. Range: [1]: -18, [2]: -12, [3]: -6, [4]: -3, [5]: -2, [6]: -1, [7]: 0. Default value: [1]: -18.                                                                                                                                        |
| BLE transmission power [dBm]             | Parameter defines power of transmission radio signal for Bluetooth communication. Range: [0]: Auto; [1]: -18, [2]: -12, [3]: -6, [4]: -3, [5]: -2, [6]: -1, [7]: 0. Default value: [0]: Auto.                                                                                                                            |
| <b>Input types</b>                       |                                                                                                                                                                                                                                                                                                                          |
| IN1                                      | Parameter defines input type. Range: [1]: NO, [2]: NC. Default value: [1]: NO.                                                                                                                                                                                                                                           |
| IN2                                      | Parameter defines input type. Range: [1]: NO, [2]: NC. Default value: [1]: NO.                                                                                                                                                                                                                                           |
| IN3                                      | Parameter defines input type. Range: [1]: NO, [2]: NC. Default value: [1]: NO.                                                                                                                                                                                                                                           |
| <b>Input response times</b>              |                                                                                                                                                                                                                                                                                                                          |
| IN1 [ms]                                 | Parameter defines minimal duration of pulse which is required to trigger the input. Range: 50-5000. Default value: 50.                                                                                                                                                                                                   |
| IN2 [ms]                                 | Parameter defines minimal duration of pulse which is required to trigger the input. Range: 50-5000. Default value: 50.                                                                                                                                                                                                   |
| IN2 [ms]                                 | Parameter defines minimal duration of pulse which is required to trigger the input. Range: 50-5000. Default value: 50.                                                                                                                                                                                                   |
| <b>Output polarity</b>                   |                                                                                                                                                                                                                                                                                                                          |
| OUT1                                     | Parameter defines polarity of output. Normal polarity means that the output by default is switched off while Reversed polarity means that the output by default is switched on. Range: [0]: Normal polarity, [1]: Reversed polarity. Default value: [0]: Normal polarity.                                                |
| OUT2                                     | Parameter defines polarity of output. Normal polarity means that the output by default is switched off while Reversed polarity means that the output by default is switched on. Range: [0]: Normal polarity, [1]: Reversed polarity. Default value: [0]: Normal polarity.                                                |
| REL1                                     | Parameter defines polarity of output. Normal polarity means that the output by default is switched off while Reversed polarity means that the output by default is switched on. Range: [0]: Normal polarity, [1]: Reversed polarity. Default value: [0]: Normal polarity.                                                |
| <b>Display</b>                           |                                                                                                                                                                                                                                                                                                                          |
| Default background colour                | Parameter defines default colour of font background.                                                                                                                                                                                                                                                                     |
| Default font colour                      | Parameter defines default colour of fonts.                                                                                                                                                                                                                                                                               |
| Default font background colour           | Parameter defines default colour of font background.                                                                                                                                                                                                                                                                     |
| File name with additional characters     | File name with additional characters.                                                                                                                                                                                                                                                                                    |
| Screensaver                              | Parameter enables screensaver displaying. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.                                                                                                                                                                                                                             |
| Screensaver display delay [s]            | Parameter defines inactivity time before screensaver displaying. Range: 0-3600. Default value: 60.                                                                                                                                                                                                                       |
| <b>Serial card number (CSN) settings</b> |                                                                                                                                                                                                                                                                                                                          |

|                                                                      |                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Serial number length (CSNL) [B]                                      | Parameter defines the number of bytes from serial card number (CSN) which will be used to generate returned card number (RCN). RCN is the actual card number read by reader and it is created as sum of serial card number (CSN) and programmable card number (PCN). Default value: 8. |
| <b>Programmable card number (PCN) settings for Mifare Ultralight</b> |                                                                                                                                                                                                                                                                                        |
| Sector type                                                          | Parameter defines sector type with programmable number (PCN). If the option [0]: None is selected, then card returned number (RCN) will include only CSN and PCN will be discarded. Range: [0]: None, [1]: SSN. Default value: [0]: None.                                              |
| SSN first page number                                                | Parameter defines location of SSN in card memory. Range: 4-12. Default value: 4.                                                                                                                                                                                                       |
| <b>Programmable card number (PCN) settings for Mifare Classic</b>    |                                                                                                                                                                                                                                                                                        |
| Sector type                                                          | Parameter defines sector type with programmable number (PCN). If the option [0]: None is selected, then card returned number (RCN) will include only CSN and PCN will be discarded. Range: [0]: None, [1]: SSN, [2]: MAD. Default value: [0]: None.                                    |
| Format                                                               | Parameter defines format of PCN. Range: [0]: BIN, [1]: ASCII HEX. Default value: [0]: BIN.                                                                                                                                                                                             |
| First byte position (FBP)                                            | Parameter defines the position of the first byte for PCN in data block on card. Range: 0-15. Default value: 0.                                                                                                                                                                         |
| Last byte position (LBP)                                             | Parameter defines the position of the last byte for PCN in data block on card. Range: 0-15. Default value: 7.                                                                                                                                                                          |
| Sector ID                                                            | Parameter defines sector number where PCN is stored. Range: 0-39. Default value: 1.                                                                                                                                                                                                    |
| Application ID (AID)                                                 | Parameter defines application ID number (AID) which indicates sector where PCN number is stored. Range: 0-9999. Default value: 5156.                                                                                                                                                   |
| Block ID                                                             | Parameter defines block number where PCN is stored. Range: 0-2 for sectors 0-31 and 0-14 for sectors 32-39. Default value: 0.                                                                                                                                                          |
| Key type                                                             | Parameter defines key type used to access sector with PCN. Range: [0]: A, [1]: B, [2]: Roger. Default value: [0]: A.                                                                                                                                                                   |
| Key                                                                  | Parameter defines 6 bytes (12 HEX digits) key for accessing sector where PCN is stored.                                                                                                                                                                                                |
| <b>Programmable card number (PCN) settings for Mifare Plus</b>       |                                                                                                                                                                                                                                                                                        |
| Sector type                                                          | Parameter defines sector type with programmable number (PCN). If the option [0]: None is selected, then card returned number (RCN) will include only CSN and PCN will be discarded. Range: [0]: None, [1]: SSN, [2]: MAD. Default value: [0]: None.                                    |
| Format                                                               | Parameter defines format of PCN. Range: [0]: BIN, [1]: ASCII HEX. Default value: [0]: BIN.                                                                                                                                                                                             |
| First byte position (FBP)                                            | Parameter defines the position of the first byte for PCN in data block on card. Range: 0-15. Default value: 0.                                                                                                                                                                         |
| Last byte position (LBP)                                             | Parameter defines the position of the last byte for PCN in data block on card. Range: 0-15. Default value: 7.                                                                                                                                                                          |
| Sector ID                                                            | Parameter defines sector number where PCN is stored. Range: 0-39. Default value: 1.                                                                                                                                                                                                    |
| Application ID (AID)                                                 | Parameter defines application ID number (AID) which indicates sector where PCN number is stored. Range: 0-9999. Default value: 5156.                                                                                                                                                   |

|                                                                   |                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Block ID                                                          | Parameter defines block number where PCN is stored. Range: 0-2 to for sectors 0-31 and 0-14 for sectors 32-39. Default value: 0.                                                                                                                    |
| Key type                                                          | Parameter defines key type used to access sector with PCN. Range: [0]: A, [1]: B. Default value: [0]: A.                                                                                                                                            |
| Sector type                                                       | Parameter defines sector type with programmable number (PCN). If the option [0]: None is selected, then card returned number (RCN) will include only CSN and PCN will be discarded. Range: [0]: None, [1]: SSN, [2]: MAD. Default value: [0]: None. |
| <b>Programmable card number (PCN) settings for Mifare Desfire</b> |                                                                                                                                                                                                                                                     |
| Sector type                                                       | Parameter defines sector type with programmable number (PCN). If the option [0]: None is selected, then card returned number (RCN) will include only CSN and PCN will be discarded. Range: [0]: None, [1]: Desfire file. Default value: [0]: None.  |
| Format                                                            | Parameter defines format of PCN. Range: [0]: BIN, [1]: ASCII HEX. Default value: [0]: BIN.                                                                                                                                                          |
| First byte position (FBP)                                         | Parameter defines the position of the first byte for PCN in data block on card. Range: 0-15. Default value: 0.                                                                                                                                      |
| Last byte position (LBP)                                          | Parameter defines the position of the last byte for PCN in data block on card. Range: 0-15. Default value: 7.                                                                                                                                       |
| Application ID (AID)                                              | Parameter defines application ID number (AID) which indicates sector where PCN number is stored. Range: 0-9999. Default value: F51560.                                                                                                              |
| File ID (FID)                                                     | Parameter defines file identifier in AID. Range: 0-32 for Desfire EV1 and 0-16 for Desfire EV0. Default value: 0.                                                                                                                                   |
| Communication protection level                                    | Parameter defines encryption method for communication between card and reader. Range: [0]: Plain, [1]: Data authentication by MAC, [2]: Full encryption. Default value: [0]: Plain.                                                                 |
| Key number                                                        | Parameter defines application key number used for file read. Range: 0-13. Default value: 0.                                                                                                                                                         |
| Key type                                                          | Parameter defines encryption key type for Desfire file. Range: [0]: TDES Native, [1]: TDES Standard, [2]: 3-KTDES, [3]: AES128. Default value: [0]: TDES Native.                                                                                    |
| Key                                                               | Parameter defines access key for Desfire file with PCN. 3-KTDES key is 24 bytes (48 HEX digits), TDES and AES keys are 16 bytes (32 HEX digits).                                                                                                    |

## Manual addressing

Manual addressing procedure enables configuration of new OSDP address with all other settings unchanged.

### Manual addressing procedure:

1. Remove all connections from A and B lines.
2. Remove jumper from MEM contacts (fig. 6) if it is placed there.
3. Restart the device (switch power supply off and on) and orange LED SYSTEM will pulsate. Then within 5 seconds place jumper on MEM contacts and the terminal will display CONFIG MODE text.
4. Enter 3 digits of OSDP address in range of 000-126 with keypad.
5. Wait till device starts to emit continuous sound.
6. Leave jumper on MEM.
7. Restart the device.

## Memory reset

Memory reset procedure resets all settings to factory default ones including ID=0 address.

#### Memory reset procedure:

1. Remove all connections from A and B lines.
2. Remove jumper from MEM contacts (fig. 6) if it is placed there.
3. Restart the device (switch power supply off and on) and orange LED SYSTEM will pulsate. Then within 5 seconds place jumper on MEM contacts and the terminal will display CONFIG MODE text.
4. Press [\*] or read any MIFARE card 11 times.
5. Wait till device confirms reset with continuous sound.
6. Leave jumper on MEM.
7. Restart the device.

#### High level configuration (VISO)

The purpose of high level configuration is to define logical functioning of the terminal which communicates with the MC16 access controller, and it depends on applied scenario of operation. The example of access control system configuration is given in AN006 application note which is available at [www.roger.pl](http://www.roger.pl).

### 5. FIRMWARE UPDATE

The firmware of device can be changed to newer or older version. Firmware can be uploaded to the terminal by means of included memory card or requires connection to computer with RUD-1 interface and starting RogerVDM software. The latest firmware file is available at [www.roger.pl](http://www.roger.pl).

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Note: During the firmware update process, it is necessary to ensure continuous and stable power supply for the device. If interrupted the device may require repair by Roger.

Note: Backup configuration with RogerVDM software before firmware update because the update will restore factory default settings.

Note: If MCI-3-LCD interface is connected to the terminal, it must be disconnected during firmware update.

---

#### Firmware update procedure via memory card:

1. Disconnect power supply.
2. Press and remove memory card from socket (fig. 6).
3. Using memory card reader, copy main firmware (\*.frg) to the card and rename it as FW.BUF.
4. Insert the card into socket.
5. Connect power supply. During firmware update the LED STATUS (red) will pulsate and the LED OPEN (green) will be switched on and after firmware update the LED SYSTEM (orange) will pulsate.
6. Restart the device (switch power supply off and on) and orange LED SYSTEM will pulsate. Then within 5 seconds place jumper on MEM contacts and the terminal will display CONFIG MODE text.
7. Start RogerVDM program and perform low level configuration or restore the configuration from backup file using Read from File... command.

#### Firmware update procedure via RogerVDM:

1. Connect the device to RUD-1 interface (fig. 9) and connect the RUD-1 to computer's USB port.
2. Place jumper on MEM contacts (fig. 6).
3. Restart the device (switch power supply off and on).
4. Start RogerVDM program and in the top menu select *Tools* and then *Update firmware*.
5. In the opened window select device type, serial port with RUD-1 interface and path to firmware file (\*.frg).
6. Click *Update* to start firmware upload with progress bar in the bottom.
7. When the update is finished, disconnect from RUD-1 interface and remove jumper from MEM contacts. Additionally, it is recommended to start memory reset procedure.

### 6. SPECIFICATION

| Table 6. Specification      |         |
|-----------------------------|---------|
| Nominal supply voltage      | 12VDC   |
| Nominal current consumption | ~110 mA |



|                        |                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                 | Three inputs internally connected to the power supply plus (+12V) through a 5.6kΩ resistor, approx. 3.5V triggering level when configured as NO or NC.                                                                                                                                                                                                                                   |
| Relay output           | Relay output with single NO/NC contacts, rated 30V/1.5A                                                                                                                                                                                                                                                                                                                                  |
| Transistor outputs     | Two (IO1, IO2) open collector outputs, 15VDC/150mA rated                                                                                                                                                                                                                                                                                                                                 |
| Tamper protection      | Enclosure opening reported to access controller                                                                                                                                                                                                                                                                                                                                          |
| Identification methods | ISO/IEC14443A MIFARE Ultralight, Classic, DESFire (EV1, EV2, EV3) and Plus proximity cards<br>Mobile device (Android) compatible with NFC<br>Mobile device (Android, iOS) compatible with BLE (Bluetooth Low Energy) v4.1                                                                                                                                                                |
| Reading range          | Up to 7 cm for MIFARE and NFC<br>Up to 10 m for BLE – depends on ambient conditions and particular mobile device. Terminal's radio power can be increased within low level configuration.<br>Note: In the presence of electrical interference, the operating range of proximity cards and the BLE communication can be significantly reduced and, in extreme cases, may even be blocked. |
| Distances              | Up to 1200 m between controller and terminal (OSDP)                                                                                                                                                                                                                                                                                                                                      |
| IP                     | IP30                                                                                                                                                                                                                                                                                                                                                                                     |
| IK                     | IK05                                                                                                                                                                                                                                                                                                                                                                                     |
| Environment            | Indoor general conditions, temperature: +5°C to +40°C, relative humidity: 10 to 75% (no condensation)                                                                                                                                                                                                                                                                                    |
| Dimensions H x W x D   | 85 x 155,5 x 21,5 mm                                                                                                                                                                                                                                                                                                                                                                     |
| Weight                 | ~180g                                                                                                                                                                                                                                                                                                                                                                                    |
| Compliance             | CE, RoHS                                                                                                                                                                                                                                                                                                                                                                                 |

## 7. ORDERING INFORMATION

**Table 7. Ordering information**

|           |                                                                                                                                                                                                                                             |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OSR88M-IO | Access terminal; colour matrix display; 3 inputs; 2 transistor outputs; 1 relay output; sensor keypad; 4 function keys; MIFARE Ultralight/Classic/DESFire (EV1, EV2, EV3)/Plus/NFC/Bluetooth; OSDP v2.2; 12 V supply; QUADRUS series design |
| MCI-3-LCD | The interface enables the connection of the OSR88M-IO with OSDP v2 communication protocol to the MC16 series controllers (RACS 5 system); 12 VDC power supply                                                                               |
| MCX8-BRD  | I/O expander; 8 supervised inputs; 8 relay outputs 1.5 A/30 V; 13.8 VDC supply input.                                                                                                                                                       |
| RUD-1     | Portable USB-RS485 communication interface dedicated to ROGER access control devices.                                                                                                                                                       |

## 8. PRODUCT HISTORY

**Table 7. Product history**

| Version        | Date    | Description                             |
|----------------|---------|-----------------------------------------|
| OSR88M-IO v1.0 | 12/2022 | The first commercial version of product |



This symbol placed on a product or packaging indicates that the product should not be disposed of with other wastes as this may have a negative impact on the environment and health. The user is obliged to deliver equipment to the designated collection points of electric and electronic waste. For detailed information on recycling, contact your local authorities, waste disposal company or point of purchase. Separate collection and recycling of this type of waste contributes to the protection of the natural resources and is safe to health and the environment. Weight of the equipment is specified in the document.

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