Roger Access Control System

PRT12MF-DES Reader

Operating Manual

DOMINO Series

Firmware version: v1.0.8

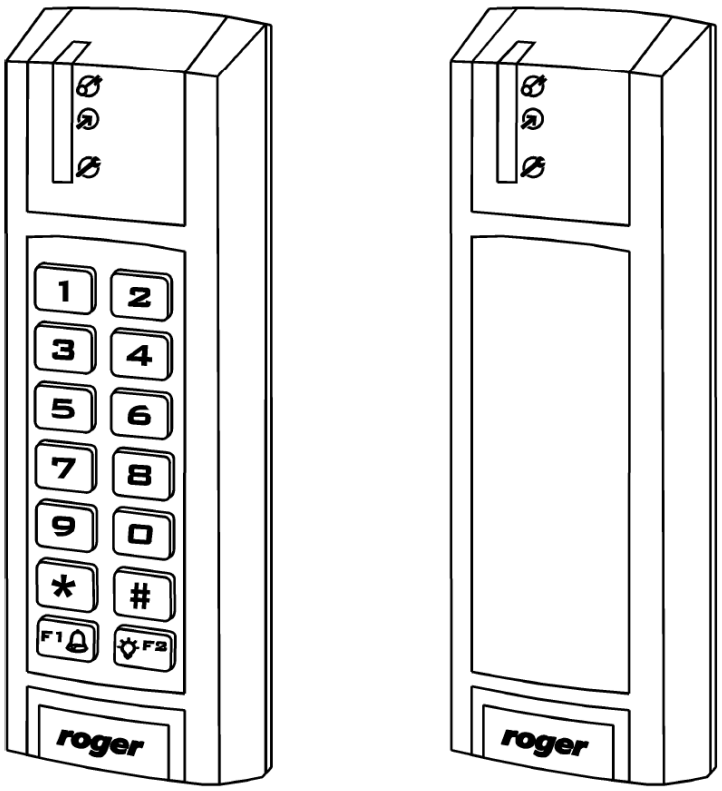
Hardware version: v1.0

Document version: Rev. B

CE

This document refers to the following products:

PRT12MF-DES, PRT12MF-DES-BK



Contents

1. GENERAL DESCRIPTION

1.1. Introduction

PRT12MF-DES access readers are designed to work with access controllers which accept RACS CLK/DTA or Wiegand 24..66 bit data output formats. Readers cannot work autonomously as standalone devices and must operate as a slave units connected to host controller. The factory new reader is pre-configured for **RACS CLK/DTA address ID=0** operating mode**.** Changing of this operating mode can be done from PC (**RogerVDM**) or manually (see *Manual programming of operating mode* section later in this document).

1.2. Technical characteristic

- ISO14443A RFID transponders
    - MIFARE® ULTRALIGHT
    - MIFARE® Classic 1k and 4k
    - MIFARE® DESFire EV0 and EV1
    - MIFARE® Plus
- Sectors: CSN, SSN and MSN (*)
- Reading range up to 7 cm
- RACS CLK/DTA output formats
- Wiegand 26..66 bit output formats
- Three LED indicators
- LED control input (Wiegand mode)
- Buzzer
- Buzzer control input (Wiegand mode)
- Buzzer loudness configurable
- Backlight level configurable
- Two function keys (PRT12MF-DES)
- Tamper contact
- Programming from PC (RogerVDM software)
- 0,5m connection cable
- Outdoor use
- CE Mark

1.3. RFID transponders

PRT12MF-DES readers support ISO 14443A and MIFARE® transponders. By default, reader is configured to read **Chip Serial Number** (**CSN**) however, it is possible to configure it to read other data sectors.

1.4. Card code

Whenever card is read reader sends to controller RCN number (*Returned Card Number*). In general, RCN can be formed from a combination of CSN number and PCN number. The CSN number is a *Chip Serial Number* which is factory programmed to the card and can't be modified. The PCN number is a number which can be programmed by user in protected data sectors of the card. The PCN number is kept either in SSN/MSN card data sectors or in file (as for DESFire card). Configuration of reader allows to define specific rules which specify the method how the RCN number is formed from CSN and PCN numbers.

RCN (Returned Card Number)		
CSN number	+	PCN number

CSN number

The part of the RCN number which is formed by CSN number is defined by means of **CSN length** parameter. This parameter specifies the number of bytes taken from the CSN number and put into final RCN number. In general, depending on a card type, CSN may contain 4 or 7 bytes, however **CSN length** parameter can be set from 0 to 15 bytes and following cases may occur:

- **CSN length=0** means that no CSN bytes will be included in RCN,
- if number of available CSN bytes is lower than declared **CSN length** parameter then the CSN number is filled by leading zeros,
- if **CSN length** is lower than number of bytes available in CSN, then RCN gets **Least Significant Bytes (LSB)** of CSN number only.

Example 1: If CSN contains 4 bytes:

55h	66h	77h	88h

and **CSN length** = 5 then the CSN section of RCN is equal to:

00h	55h	66h	77h	88h

Example 2: If CSN contains 4 bytes:

55h	66h	77h	88h

and **CSN length** = 2 then the CSN section of RCN is equal to:

77h	88h

PCN number

Depending on Mifare card type the PCN number can be formed according to following rules:

Sector type	The source of PCN number	Notes
NONE	PCN is not used to form RCN at all.	
SSN	PCN is read from the indicated sector and block of card. AID number (Application ID) is ignored.	
MSN	PCN is read from indicated block in the first identified sector, which has been marked by two-byte AID number. In some cases many sectors may be marked by indicated AID, so it is possible to read a random value from the block.	
DESFire	PCN is read from the file indicated by AID.	

The number of bytes which are read from the file (DESFire cards) or from block (other cards) is defined by parameters: **First byte** and **Last byte**. If the First byte>Last byte then it is treated as *normal sequence* of byte reading but it First byte<Last byte then it is treated as *reverse sequence* of bytes.

Note: The First byte and Last byte can be set from 0 to 15 (16 positions).

PCN can be coded in data block on card either as HEX or ASCII. When coded as ASCII every byte specify one HEX digit of the card number. If coded as HEX each byte provides two HEX digits. If the card code is coded as ASCII then the PCN length is twice less than difference between First byte and Last byte parameters. First byte and Last byte parameters are defined separately for Classic, Plus and DESFire cards. PCN read-out parameters from Ultralight card are the same as for Classic cards, while storage location of PCN code is fixed and cannot be defined.

Example 1: The form of data stored on card block is presented below, settings: First byte = 5, Last byte = 9, Format = BIN.

						First byte				Last byte						
Position in data block	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
HEX code	00h	11h	22h	33h	44h	55h	66h	77h	88h	99h	AAh	BBh	CCh	DDh	EEh	FFh

Read PCN code read from block:

55h	66h	77h	88h	99h

Example 2: The form of stored data on card block is presented below, settings: First byte = 9, Last byte = 5, Format = BIN.

						Last byte				First byte						
Position in data block	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
HEX code	00h	11h	22h	33h	44h	55h	66h	77h	88h	99h	AAh	BBh	CCh	DDh	EEh	FFh

Read PCN code read from block:

99h	88h	77h	66h	55h

Example 3: The form of stored data on card block is presented below, settings: First byte = 3, Last byte = 10, Format = ASCII HEX.

				First byte							Last byte					
Position in data block	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ASCII code	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'	'8'	'9'	'A'	'B'	'C'	'D'	'E'	'F'
HEX code	30h	31h	32h	33h	34h	35h	36h	37h	38h	39h	41h	42h	43h	44h	45h	46h

Read PCN code read from block:

34h	56h	78h	9Ah

Example 4: The form of stored data on card block is presented below, settings: First byte = 2, Last byte = 10, Format = ASCII HEX.

			First byte								Last byte					
Position in data block	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ASCII code	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'	'8'	'9'	'A'	'B'	'C'	'D'	'E'	'F'
HEX code	30h	31h	32h	33h	34h	35h	36h	37h	38h	39h	41h	42h	43h	44h	45h	46h

Read PCN code read from block:

02h	34h	56h	78h	9Ah

Example 5: The form of stored data on card block is presented below, settings: First Byte = 10, Last Byte = 2, Format = ASCII HEX.

			Last byte								First byte					
Position in data block	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ASCII code	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'	'8'	'9'	'A'	'B'	'C'	'D'	'E'	'F'
HEX code	30h	31h	32h	33h	34h	35h	36h	37h	38h	39h	41h	42h	43h	44h	45h	46h

Read PCN code read from block:

0Ah	98h	76h	54h	32h

RCN number

As explained earlier, reader sends to controller the RCN (Returned Card Number) which in general, can be combination of CSN and PCN numbers.

Example:
Settings of reader:

- CSN length = 4
- First byte = 8
- Last byte = 10
- Format = BIN

CSN						
C1	C2	C3	C4	C5	C6	C7

PCN															
AA	BB	CC	DD	EE	FF	00	11	22	33	44	55	66	77	88	99

RCN number returned by reader:

RCN						
CSN				PCN		
C4	C5	C6	C7	22	33	44

RCN code returned by PRT series reader configured to Wiegand 66 bit mode (64 data bits + 2 control bits):

00	C4	C5	C6	C7	11	22	33

RCN code returned by PRT series reader configured to Wiegand 42 bit mode (40 data bits + 2 control bits):

C6	C7	22	33	44

RCN code returned by PRT series reader configured to Wiegand 26 bit mode (24 data bits + 2 control bits):

22	33	44

RCN code returned by PRT series reader which is set to RACS CLK/DTA mode:

C6	C7	22	33	44

Notes:

1. In order to configure the reader to read CSN number only it should be selected **Sector type** parameter to value '0' – NONE, while **CSN lenght** parameter set according to required code length.

2. In order to configure the reader to read code stored in PCN sector only, the **Sector type** parameter should be set to value other than '0' – NONE, while **CSN lenght** parameter should be set to 0.

3. If RCN number configured in reader is longer than the length of code transmitted by the reader in selected mode, then reader omits leading digits of RCN code. This rule applies both to RACS CLK/DTA output format (Roger) which always transmits 5 bytes (40 bits) and to Wiegand output format which transmits from 2 to 8 bytes (16 to 64 bits).

4. If RCN number configured is shorter than the length of code transmitted by the reader in selected mode, then reader adds leading zero-s to the RCN code. This rule applies both to RACS CLK/DTA output format (Roger) which always transmits 5 bytes (40 bits) and to Wiegand output format which transmits from 2 to 8 bytes (16 to 64 bits).

2. OUTPUT FORMATS

PRT12MF-DES readers can transmit data to controller either in RACS CLK/DTA or Wiegand 26..66 bit data formats.

2.1. RACS CLK/DTA mode

RACS CLK/DTA (RCD) mode is dedicated for operation with Roger access controllers. In this output format reader uses two communication lines called **CLK** and **DTA,** which are necessary for data transmission between controller and reader. Each reader configured to the RACS CLK/DTA mode must have an unique address in range from 0 to 3. Addressing setting is made by selecting required reader operating mode. In RACS CLK/DTA mode LED and buzzer are controlled by communication protocol and no additional control lines for this purpose are necessary. In case of communication loss with host controller all reader LED-s are flashing.

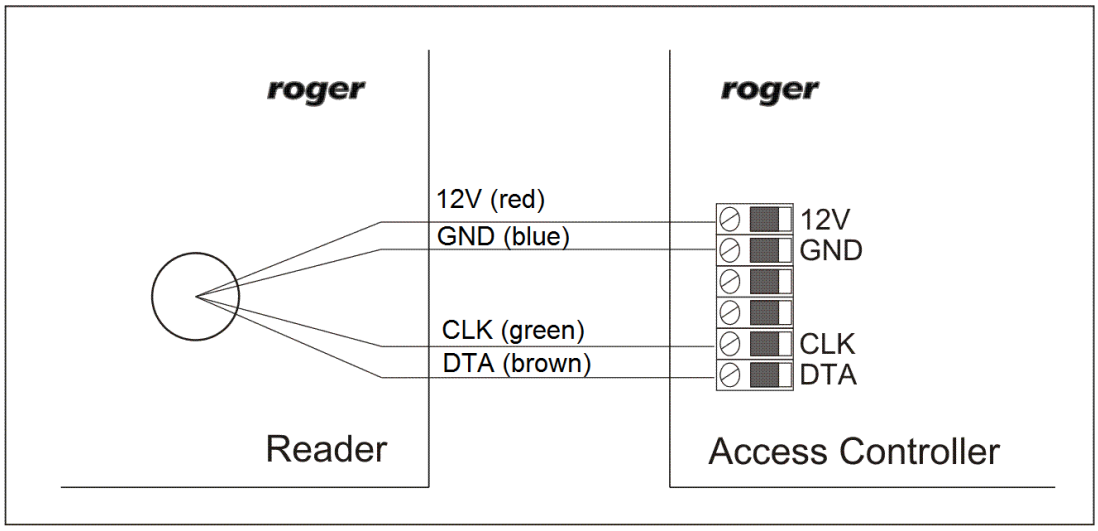


Fig. 1 Connection between PRT12MF-DES configured for RACS CLK/DTA and access controller.

2.2. Wiegand mode

In this mode reader transmits data using **CLK** and **DTA** lines which are connected to controller accordingly to **DATA0** and **DATA1** input lines. In this mode LED-s and buzzer can be controlled by signals applied to IN1 and IN2 inputs.

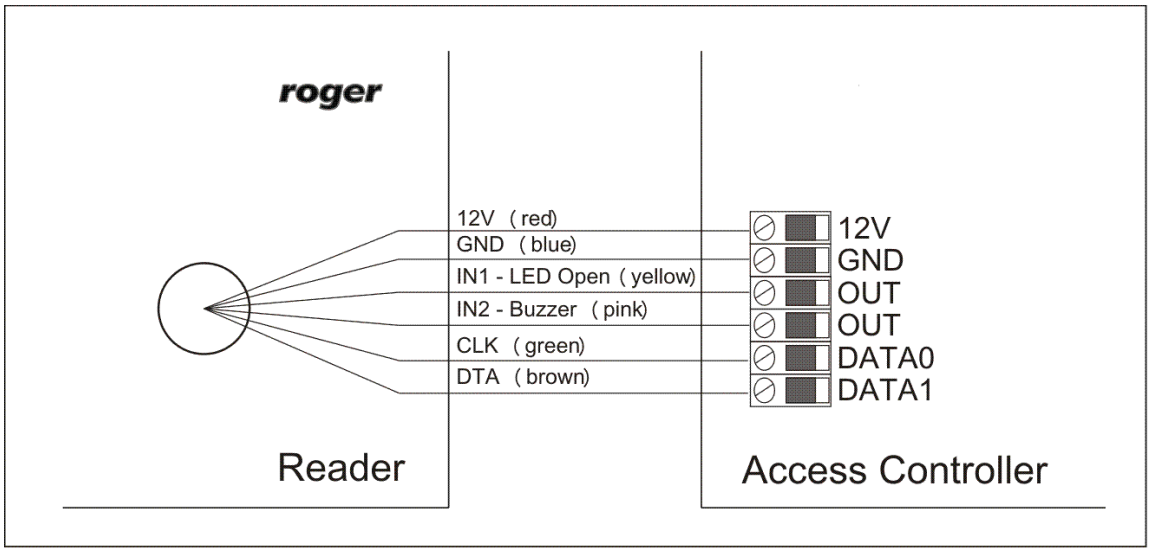


Fig. 2 Connection between PRT12MF-DES working in Wiegand mode with access controller.

3. READER CONFIGURATION

PRT12MF-DES readers can operate in few modes which determine the method of communication with controller. The setting of operating mode can be done via **RogerVDM** software (Windows) or manually in **Memory Reset** procedure.

3.1. RogerVDM configuration

To perform this method reader has to be connected to PC via RUD-1 interface (Fig. 3) and programmed by means of RogerVDM software.

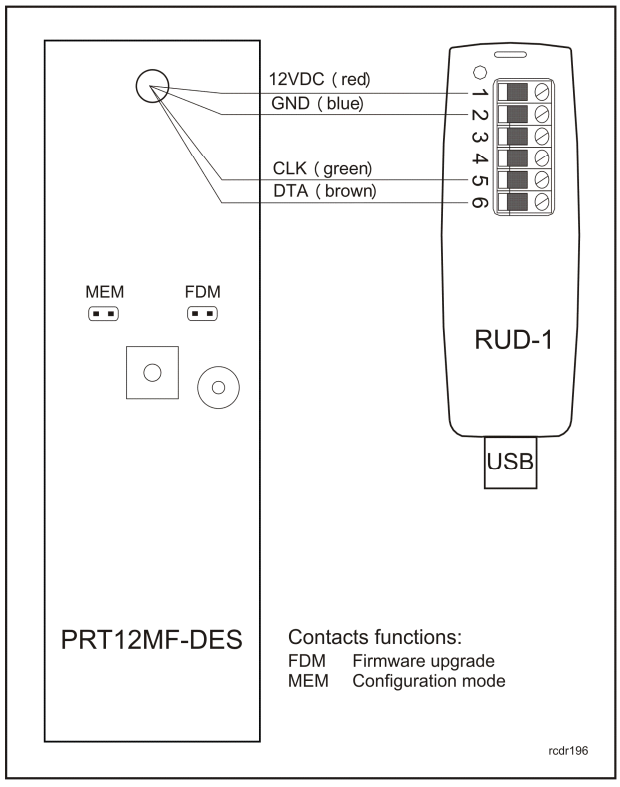


Fig. 3 PRT12MF-DES connection to RUD-1 interface.

Connection method

1. Connect reader to RUD-1 interface according to Fig. 3.

2. Put jumper on MEM contacts.
3. Restart the reader (switch power supply off and on).
4. While LED SYSTEM is flashing, in RogerVDM click: *Device -> New*.
5. Select proper device model, firmware version, communication channel and serial port, on which RUD-1 is installed.
6. Click *Connect*, the software will establish connection with the reader and automatically will proceed to *Configuration* tab, which enables full configuration of the reader.
7. Set the parameters (configuration window is shown on Fig. 6, the description of available options is given in Table 3).
8. Click *Send to device* – the software will send the configuration to reader.
9. Remove jumper from MEM contacts.
10. Restart the reader – the reader will switch to normal operation with new settings.

Note: Do not press keypad or read card when reader is under connection with RogerVDM.

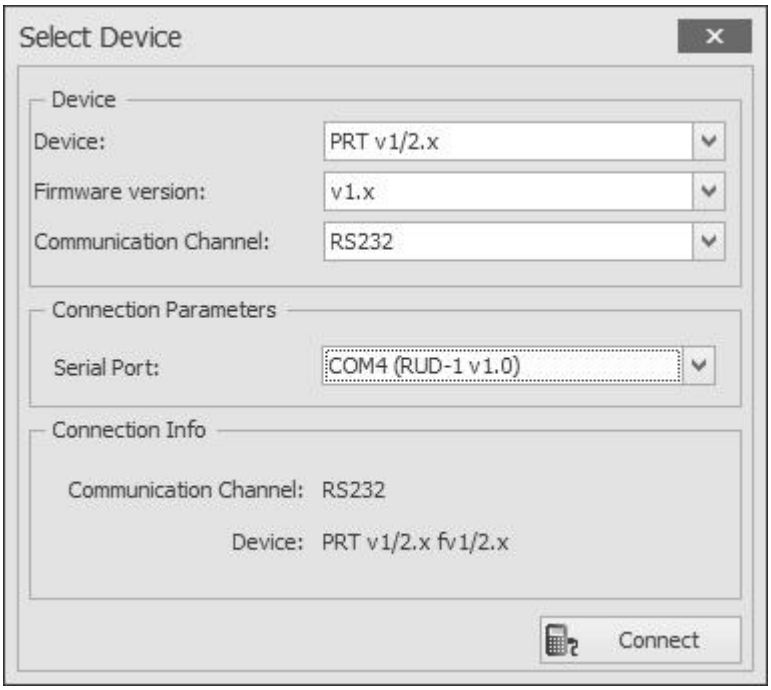


Fig. 4 Select Device window view.

Table 1: Configuration parameters		
Parameter name	**Available values**	**Description**
General		
Name	16 ASCII characters	Device description, any comment.
Operating mode		
Data output format	0 – RACS CLK/DTA 1 – Wiegand	Defines data output format which reader uses for communication with controller.
RACS CLK/DTA address	0..3	Reader address for RACS CLK/DTA address.

Card data output format for Wiegand mode	0..5	Card data output format for Wiegand mode: 0 - Wiegand 26 bit 1 - Wiegand 34 bit 2 - Wiegand 42 bit 3 - Wiegand 66 bit 4 - Wiegand 32 bit, no control bits 5 - Wiegand 32-bit, reverse order, no control bits
Keypad data output format for Wiegand mode	0..6	Sets the PIN/keys transmission options for Wiegand mode (details in table 3, chapter 3.2): 0 – The PIN code 1 to 10 digits and transmitted as a BCD number 1 - The PIN code 1 to 12 digits and transmitted as a binary number 2 - Each key pressed is immediately transmitted to the host controller as a sequence of 4 bits plus 2 control bits 3 - Each key pressed is immediately transmitted to the host controller as a sequence of 4 bits without control bits 4 - Each key pressed is immediately transmitted to the host controller as a sequence of 8 bits plus 2 control bits 5 - Each key pressed is immediately transmitted to the host controller as a sequence of 8 bits without control bits 6 - 1..6 keys long PIN, keys are buffered and send to host controller as sequence of 24 bits
Communication lost signalization delay	0 – function disabled 1..64	Defines time in seconds after which reader will signal lost of communication with controller. Available settings: 0 to 64 [s].
LED SYSTEM control input for Wigand mode	0 - None 1 - IN1 2 - IN2	Defines the input line which will control LED SYSTEM when reader operates in Wiegand mode.
LED OPEN control input for Wigand mode	0 - None 1 - IN1 2 - IN2	Defines the input line which will control LED OPEN when reader operates in Wiegand mode.
LED STATUS control input for Wigand mode	0 - None 1 - IN1 2 - IN2	Defines the input line which will control LED STATUS when reader operates in Wiegand mode.
LED SYSTEM pulsing when card is close to reader	0 - Off 1 - On	When option is active LED SYSTEM will be pulsing whenever card is in the reader field.
Keypad backlight level	0..100%	Defines keypad backlight level. Value 0 switches backlight off.
Keypad backlight animation	0 - Off 1 - On	When option is active reader reduces keypad backlight level when reader is not used and restores full keypad backlight level upon any key is pressed or card read.
Keypad backlight dimming	0 - Off 1 - On	When option is set keypad backlight is switched off for a while whenever card is read or key pressed.

LED SYSTEM flash upon card read	0 - Off 1 - On	When option is set LED SYSTEM generates single flash whenever card is read.
LED SYSTEM flash upon key press	0 - No 1 - Yes	When option is set LED SYSTEM generates single flash whenever key is pressed.
Input types		
IN1	0 – NO 1 – NC	Defines input type.
IN2	0 – NO 1 – NC	Defines input type.
Acoustic signalization		
Buzzer loudness level	0..100%	Defines buzzer loudness level. Value 0 switches buzzer off.
Buzzer control input in Wiegand mode	0 - None 1 - IN1 2 - IN2	Selects input which will control buzzer in Wiegand mode.
Short sound upon card read	0 – No 1 – Yes	When option is set buzzer generates short beep whenever card is read.
Short sound upon key pressed	0 – No 1 – Yes	When option is set buzzer generates short beep whenever key is pressed.
CSN number settings		
CSN lenght	0..16	Defines number of CSN bytes used to form RCN.
Advanced settings		
Stop card/PIN reading when buffer full	0 – No 1 – Yes	When option is active reader stops card/PIN reading until previous PIN/card is transmitted to controller.
Clear card/PIN buffer timeout	0..64	Defines time from the last card/PIN entry till moment when card/PIN buffer is automatically erased.
Buffer overflow signalisation on LED SYSTEM	0 - Off 1 - On	When option is active reader will signal on LED SYSTEM that card/PIN buffer overflow occurred.
Card/PIN encryption over RS485 bus	0 - Off 1 - On	When option is active the card/PIN data will be encrypted when transmitted over RS485.
Mifare Classic settings		
Sector type	0 – NONE 1 – SSN 2 – MAD	Specifies the type of sector where PCN number is stored. If value '0' is chosen then RCN will be formed from CSN number only.
Format	0 – HEX 1 – HEX ASCII	Specifies coding method of PCN number in data block.
First byte	0..15	Specifies position of the byte in data block where PCN number begins.
Last byte	0..15	Specifies position of the byte in data block where PCN number ends.
Sector ID	0..39	Data sector where PCN number is stored.
AID	0000 – FFFFF	Specifies AID number (Application Identifier) which indicates sector where PCN number is stored (by default Roger AID number is: 5156).
Block ID	0..15	Specifies block number within sector where PCN code is stored.

Key type	0 - A 1- B 2- Roger (classified)	Specifies key type used to encrypt data stored on the card.
Key	000000000000 – FFFFFFFFFFFF	6 bytes key used to encrypt data stored on the card.
Mifare Plus settings		
Sector type	0 – NONE 1 – SSN 2 – MAD	Specifies the type of sector where PCN number is stored. If value '0' is chosen then RCN will be formed from CSN number only.
Format	0 – HEX 1 – HEX ASCII	Specifies coding method of PCN number in data block.
First byte	0..15	Specifies position of the byte in data block where PCN number begins.
Last byte	0..15	Specifies position of the byte in data block where PCN number ends.
Sector ID	0..39	Data sector where PCN number is stored.
AID	0000..FFFFF	Specifies AID number (Application Identifier) which indicates sector where PCN number is stored (by default Roger AID number is: 5156).
Block ID	0..15	Specifies block number within sector where PCN code is stored.
Key type	0 - A 1 - B	Specifies key type used to encrypt data stored on the card.
Key	00000000000000000000000000000000..FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	16 bytes key used to encrypt data stored on the card.
Mifare DESFire settings		
Sector type	0 – NONE 1 – DESFire file	Specifies the type of sector where PCN number is stored. If value '0' is set then RCN will be formed from CSN number only. If value '1' is chosen then PCN code will be read form file on the card.
Format	0 – HEX 1 – HEX ASCII	Specifies coding method of PCN number in data block.
First byte	0..15	Specifies position of the byte in data block where PCN number begins.
Last byte	0..15	Specifies position of the byte in data block where PCN number ends.
AID	0000..FFFFF	Specifies AID number (Application Identifier)of the the file where RCN code is stored. Mifare DESFire can hold up to 28 AID numbers.
File ID	0..32	Defines file number in which RCN is placed. For DESFire EV0 cards it is acceptable number from 0 to 16, however in EV1 cards – numbers from 0 to 32.
Communication protection level	0 – Plain 1 – Data authentication by MAC 2 – Full encryption	Defines type of encryption between card and reader.
Key ID	0..13	Defines key ID of application which is used to encrypt file.

Key type	0 – TDES Crypto DESFire Native Mode 1 – TDES Crypto Standard Mode 2 – 3KTDES Crypto 3 – AES128 Crypto	Defines key type used to encrypt data on card.
Key	00000000000000000000000000000000..FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	Key used to encrypt data on card. 3KTDES key type contains 24 bytes, TDES and AES keys contain 16 bytes.

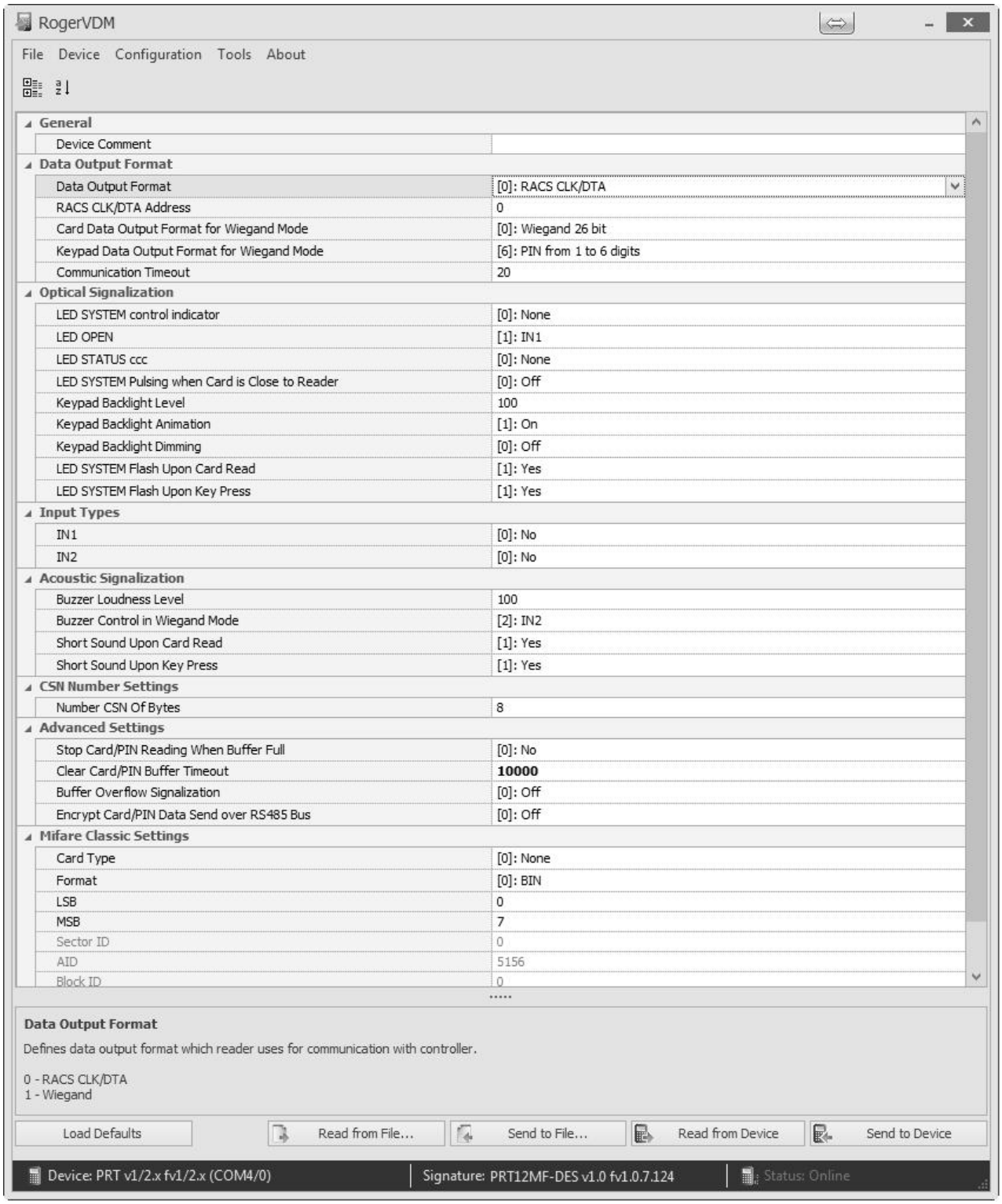


Fig. 5 Configuration window view.

3.2. Manual programming of operating mode

The operating mode of the reader can be set manually by following procedure:

1. Remove all connections from CLK and DTA lines.
2. Put jumper on MEM contacts.
3. Restart the reader (switch power supply off/on).
4. While LED SYSTEM is flashing enter three digits which will select required operating mode (Table 2).

5. Remove jumper from MEM contacts.
6. Restart the reader (switch power supply off/on) – reader will resume work with new configuration.

By default, in Wiegand mode, line IN1 is configured to control LED OPEN while IN2 is used to control buzzer. If necessary these settings can be changed by means of RogerVDM software.

Table 2: Operating mode codes	
Code	**Operating mode**
000	RACS CLK/DTA address ID=0
001	RACS CLK/DTA address ID=1
002	RACS CLK/DTA address ID=2
003	RACS CLK/DTA address ID=3
10x	26 bit Wiegand
11x	34 bit Wiegand
12x	42 bit Wiegand
13x	66 bit Wiegand
14x	32 bit Wiegand, no parity
15x	32 bit Wiegand, reverse order, no parity

The third digit of the operating mode code (marked by "x") specifies the method which reader employs when transmitting PIN or key. For details regarding methods of PIN transmission refer to Table 3.

Note: Readers without keypad can be manually programmed by so called *multiple card reading method* . In this method key pressing is emulated by multiple card reading. In order to emulate key [N] read card N-times and then wait for two beeps. Once you hear two beeps you can proceed further with emulation of next digit. Digit 0 is emulated by 10-times of card reading. Any ISO 14443A card can be used for *multiple card reading method*.

Example: In order to program mode 001:

- read card 10 times and wait for two beeps
- read card 10 times and wait for two beeps
- read card 1 time and wait for two beeps

Table 3: PIN and key transmission options		
Code	**Description**	**Details**
X=0	1-10 digits long PIN, transmitted in BCD format	Each key pressed is buffered in reader's memory; with a press of a [#] key reader transmits entire PIN code. The PIN code is transmitted as a BCD coded number.
X=1	1-12 digits PIN, transmitted in binary format	Each key pressed is buffered in reader's memory; with a press of a [#] key reader transmits entire PIN code. The PIN code is transmitted as a binary number.

X=2	Each key pressed is transmitted separately as 4-bit number plus 2 control bits	Each key pressed is immediately transmitted to the host controller as a sequence of 6 bits (EXXXXP) where XXXX represents the code of the pressed key supplemented by two control bits (E and P). The E represents the even bit calculated from the first half of a transmitted code where P represents the parity of a second half of the bit stream. This format is compatible with HID 5355 series readers, option "with parity". Key coding as in Table B.
X=3	Each key pressed is transmitted separately as 4-bit number	Each key pressed is immediately transmitted to the host controller as a sequence of 4 bits (XXXX) which represent the code of the pressed key, no control bits added. This format is compatible with HID 5355 series readers, option "without parity". Key coding as in Table B.
X=4	Each key pressed is transmitted separately as 8-bit number with parity	Each key pressed is immediately transmitted to the host controller as a sequence of 10 bits (EXXXXXXXXP) where XXXXXXXX represents the code of the pressed key supplemented by two control bits (E and P). The E represents the even bit calculated from the first half of a transmitted code where P represents the parity of a second half of the bit stream. Key coding as in Table A.
X=5	Each key pressed is transmitted separately as a 8-bit number without parity bits	Each key pressed is immediately transmitted to the host controller as a sequence of 8 bits (XXXXXXXX) where XXXXXXXX represents the code of the pressed key supplemented by two control bits (E and P). The E represents the even bit calculated from the first half of a transmitted code where P represents the parity of a second half of the bit stream. Key coding as in Table A.
X=6	1-6 keys long PIN transmitted as Wiegand 26 bit stream with control bits	1-6 keys long PIN, each key represented by 4-bit long codes (key codes according to table B). Reader sends data after six keys are pressed or earlier when # key is pressed. Key's buffer is cleared if no keys have not been entered within programmed timeout. Examples: Keys entered "1234#" – code transmitted "001234" Keys entered "123456" – code transmitted "123456"

Table A: 8-bit key coding

Key	HEX	BIN
0	F0	11110000
1	E1	11100001
2	D2	11010010
3	C3	11000011
4	B4	10110100
5	A5	10100101
6	96	10010110
7	87	10000111
8	78	01111000
9	69	01101001
*	5A	01011010
#	4B	01001011
F1	3C	00111100
F2	2D	00101101

Table B: 4-bit key coding		
Key	**ASCII**	**BIN**
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
*	A	1010
#	B	1011

3.3. Memory Reset

The **Memory Reset** procedure restores factory configuration settings and sets reader to **RACS CLK/DTA address ID=0** operating mode.

Memory Reset procedure:

1. Remove all connections from CLK and DTA lines.
2. Put jumper on MEM contacts.
3. Restart the reader (switch power supply off/on).
4. While LED SYSTEM is flashing press ***** or read any ISO 14443A card 11-times.
5. Remove jumper from MEM contacts.
6. Restart the reader – it will start with new settings.

4. INSTALLATION GUIDELINES

- Reader should be mounted on a vertical piece of supporting structure, usually wall, away from sources of heat and moisture.
- The rear panel should be mounted with use of delivered screws with orientation shown on Fig. 6 so that tamper lever leans on the surface and firmly presses the tamper switch.
- Reader is delivered with deep version of bottom panel which is intended to be used when reader is installed on metal surface and/or if there is a need for extra space for connection wires.
- Any electrical connections should be done without any voltages.
- When using separate power supply sources for the reader and the controller it is necessary to **short both supply minus**.

Table 2: Connection wires		
Name	**Wire color**	**Description**
12V	Red	Supply plus
GND	Blue	Supply minus

CLK	Green	RACS CLK/DTA communication line CLK
DTA	Brown	RACS CLK/DTA communication line DTA
IN1	Yellow	IN1 input
IN2	Pink	IN2 input
TAMP	Grey	Tamper switch contacts.
TAMP	White	

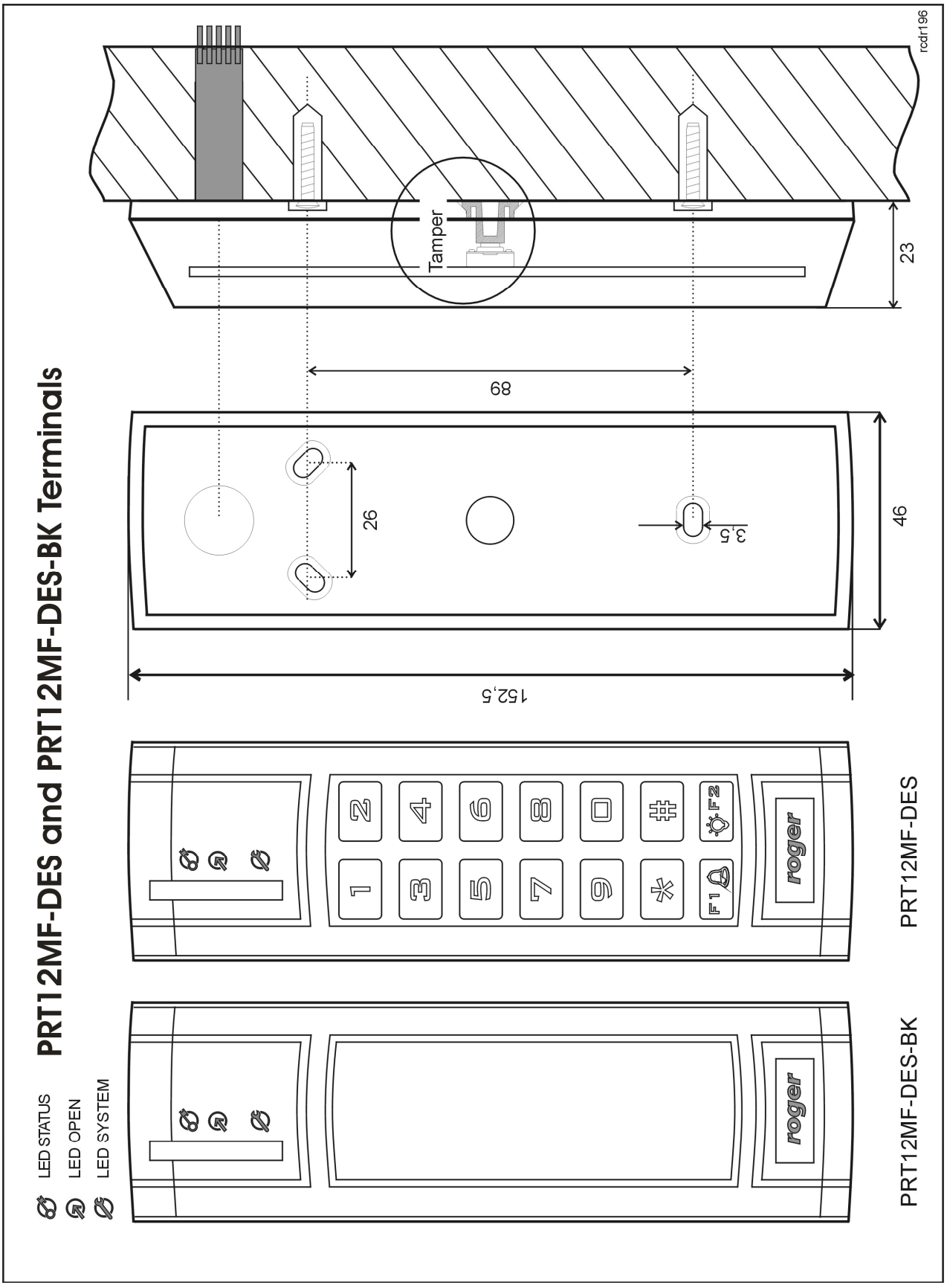


Fig. 6 Dimensions and tamper details, standard (low profile) bottom enclosure.

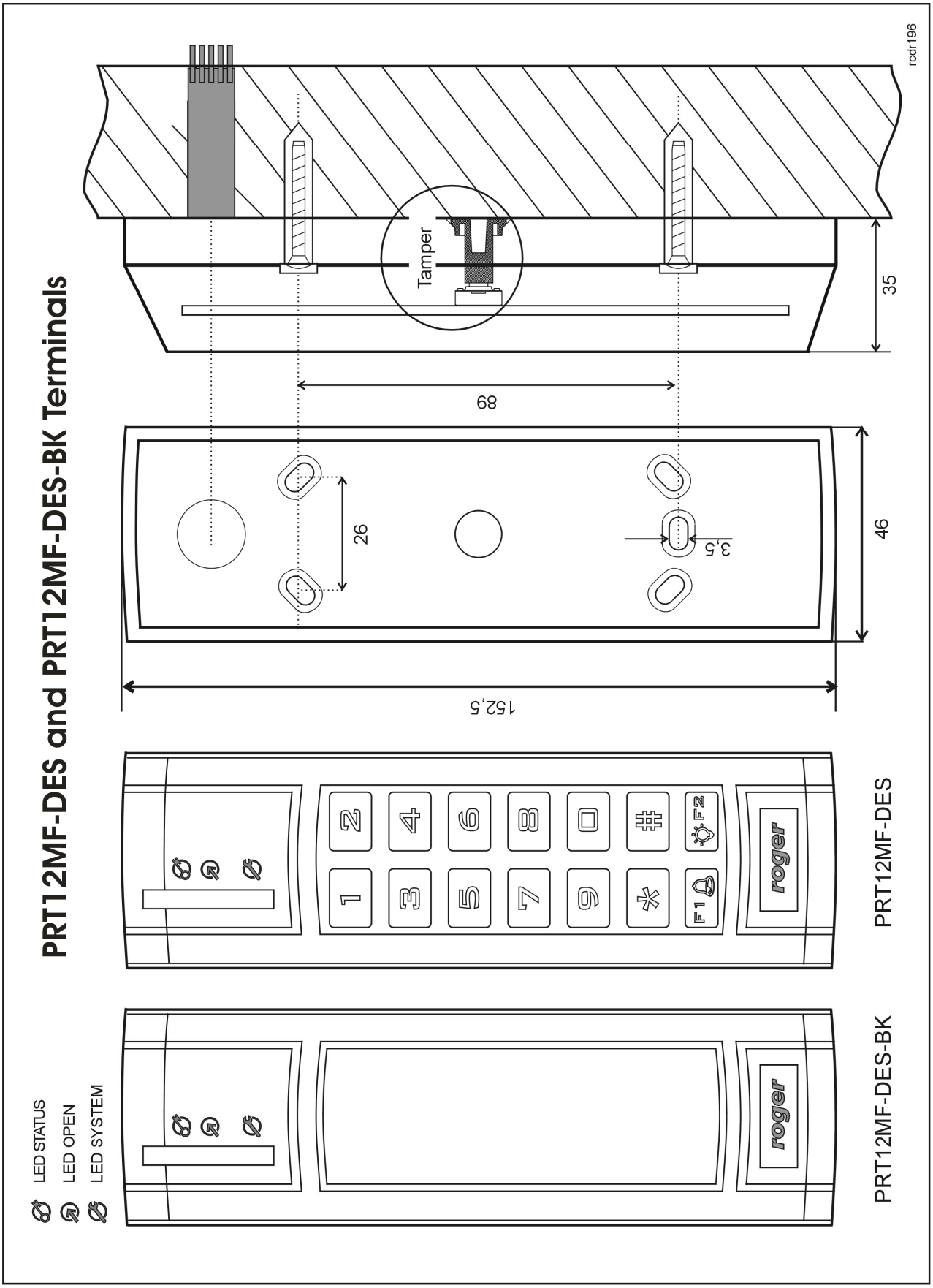


Fig. 7 Dimensions and tamper details, standard (low profile) bottom enclosure.

5. FIRMWARE UPDATE

Firmware can be updated by means of RogerVDM software and RUD-1 communication interface. The file with latest firmware is available at www.roger.pl .

Firmware update procedure

1. Connect reader to RUD-1 interface according to Fig. 3.
2. Put jumper on FDM contacts (location of contacts is given on Fig. 3).
3. Run RogerVDM application.
4. Choose: *Tools -> Update Firmware.*
5. Select device type, communication port for RUD-1, and path to firmware file (*.hex).
6. Click *Update* and follow the instructions.

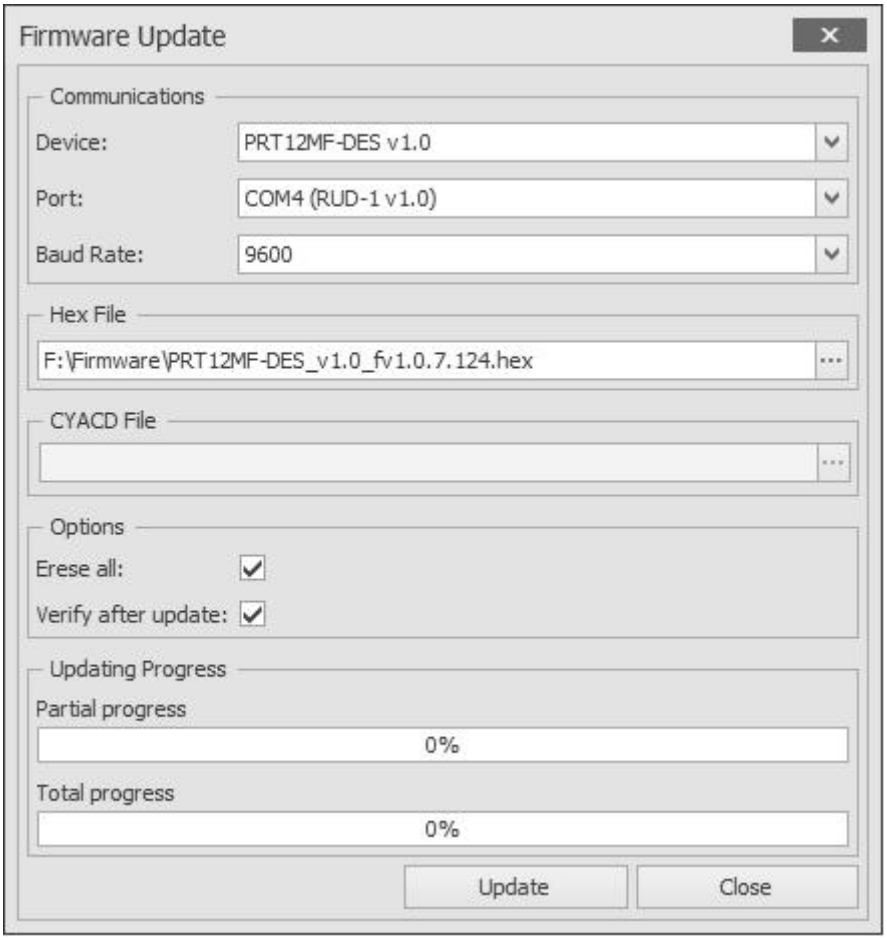


Fig. 8 Firmware Update window view.

6. TECHNICAL SPECIFICATION

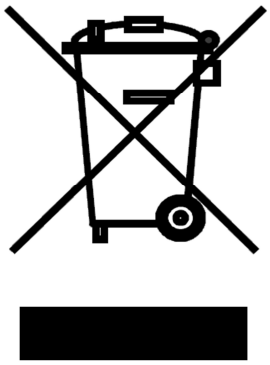
Technical specification	
Supply voltage	10..15 VDC
Current consumption (average)	PRT12MF-DES: ~70 mA PRT12MF-DES-BK: ~50 mA
Reading distance	up to 7 cm (for ISO MIFARE® Ultralight, Classic) up to 4 cm (for ISO MIFARE® DESFire EV1, Plus)
Anti-sabotage protection (TAMPER)	Isolated contact, 50mA/24V, normal closed when enclosure is closed and attached to flat surface
Proximity cards	13.56MHz MIFARE® Ultralight, Classic, DESFire EV1, E0 and Plus
Distance to controller	Up to 150m cable distance
Ingress protection	IP65
Environmental class according to EN 50133-1	Class IV, outdoor, temperature: -25°C – +60°C, relative humidity: 10 to 95% (non-condensing)
Dimensions H x W x D	152,5 X 46 X 23 mm (low profile bottom part of enclosure) 152,5 X 46 X 35 mm (high profile bottom part of enclosure)
Weight	~150 g
Approvals	CE

7. ORDERING

Ordering guide	
PRT12MF-DES	13.56 MHz ISO/IEC 14443A/MIFARE® Ultralight, Classic, DESFire EV0, EV1 and Plus outdoor reader, dark grey enclosure, silicone keypad with backlight, 0.5m connection cable.
PRT12MF-DES-BK	13.56 MHz ISO/IEC 14443A/MIFARE® Ultralight, Classic, DESFire EV0, EV1 and Plus outdoor reader, dark grey enclosure, 0.5m connection cable.
RUD-1	Communication interface USB-RS485 with 12VDC supply output.

8. PRODUCT HISTORY

Product history			
Electronic module	Firmware	Date	Description
v1.0	fv1.0.8.126	08/07/2015	The first commercial version of the product.

	The symbol of a crossed-through waste bin on wheels means that the product must be disposed of at a separate collection point. This also applies to the product and all accessories marked with this symbol. Products labeled as such must not be disposed of with normal household waste, but should be taken to a collection point for recycling electrical and electronic equipment. Recycling helps to reduce the consumption of raw materials, thus protecting the environment. Weight of the equipment is specified in the document.

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