Roger Access Control System
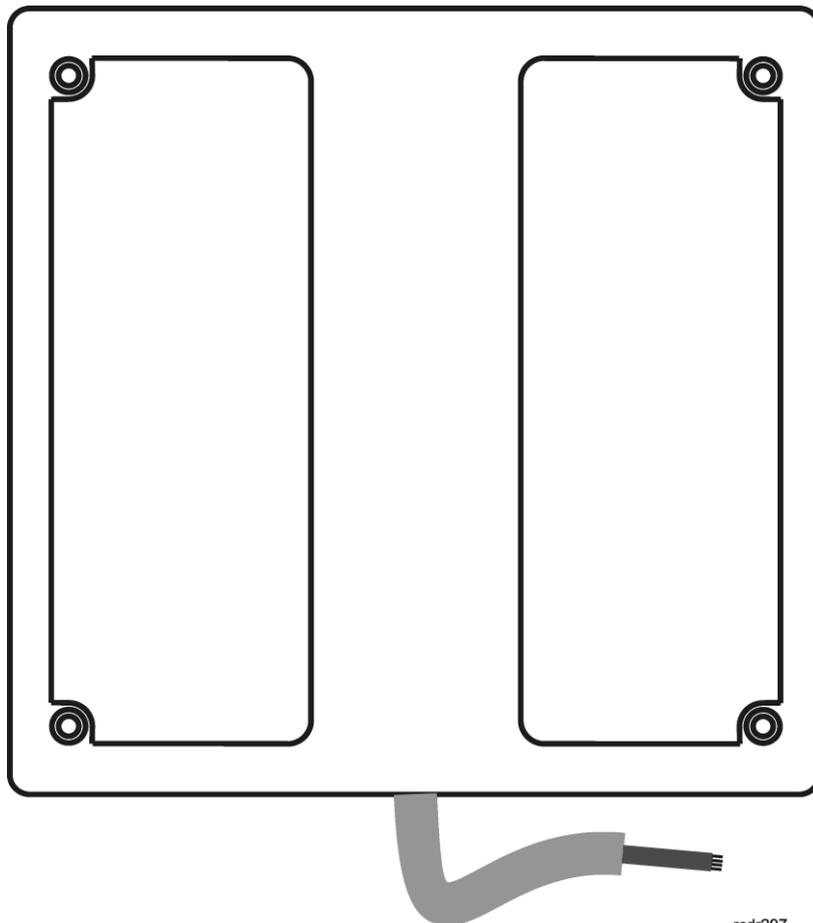
LRT-1 reader Operating Manual

Product version: v1.0

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CE **RoHS**

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Design and application

LRT-1 is a long range proximity card reader. The reader is offered in a set with MCI-1 interface which enables connection of the reader both to MC16 series access controllers (RACS 5 system) and PRxx1/PRxx2 series access controllers (RACS 4 system). In all scenarios the reader sends 32bit card number. LRT-1 enables EM125kHz proximity card reading in distance of 1 m. The reader can be installed outdoors.

Power supply

LRT-1 and MCI-1 require 11-15VDC power supply. Devices can be supplied directly from the access controller (e.g. TML output) or from dedicated power supply. Due to relatively high supply current (300mA), wire diameter must be selected in such way that voltage drop between supply output and the reader is less than 1V. The proper wire diameter is especially critical when reader is located in long distance from the supply source. In such a case the use of dedicated power supply located close to the reader should be considered. When local power supply is used then its negative terminal should be connected to COM terminal of MCI-1 by means of signal wire with any diameter.

Note: Interferences in supply voltage may reduce reading range. In case of LRT-1 it is recommended to use power supplies which generate low level interferences, preferably analogue power supply units.
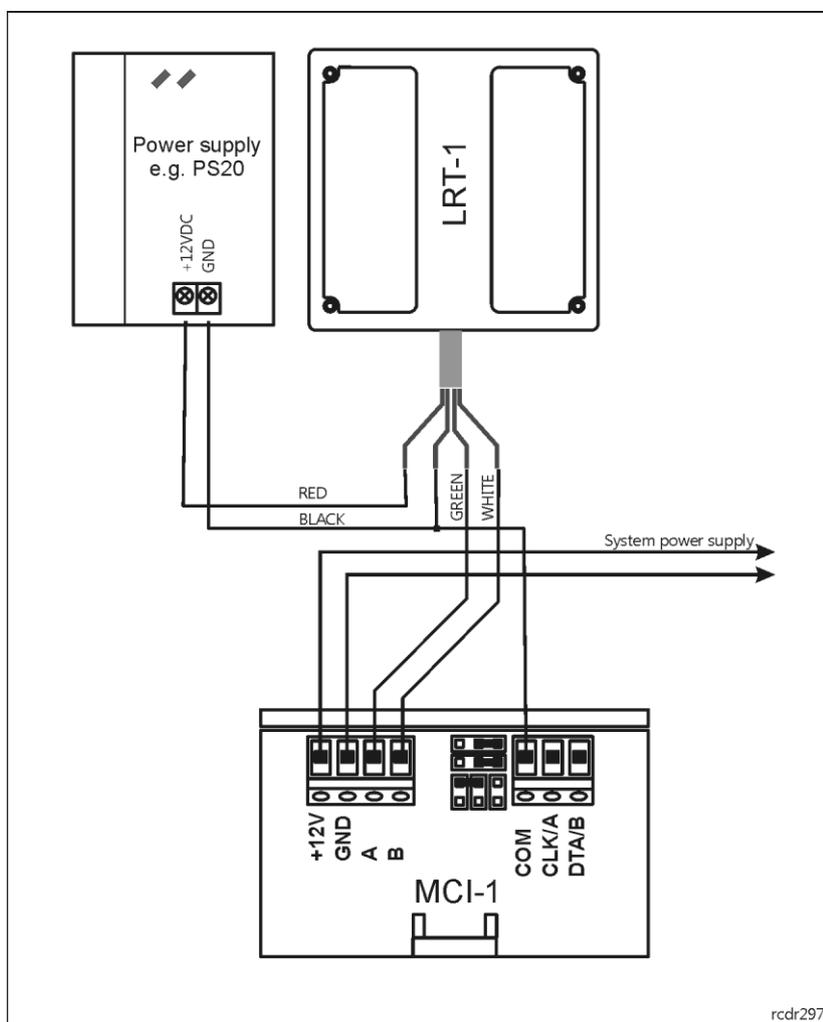

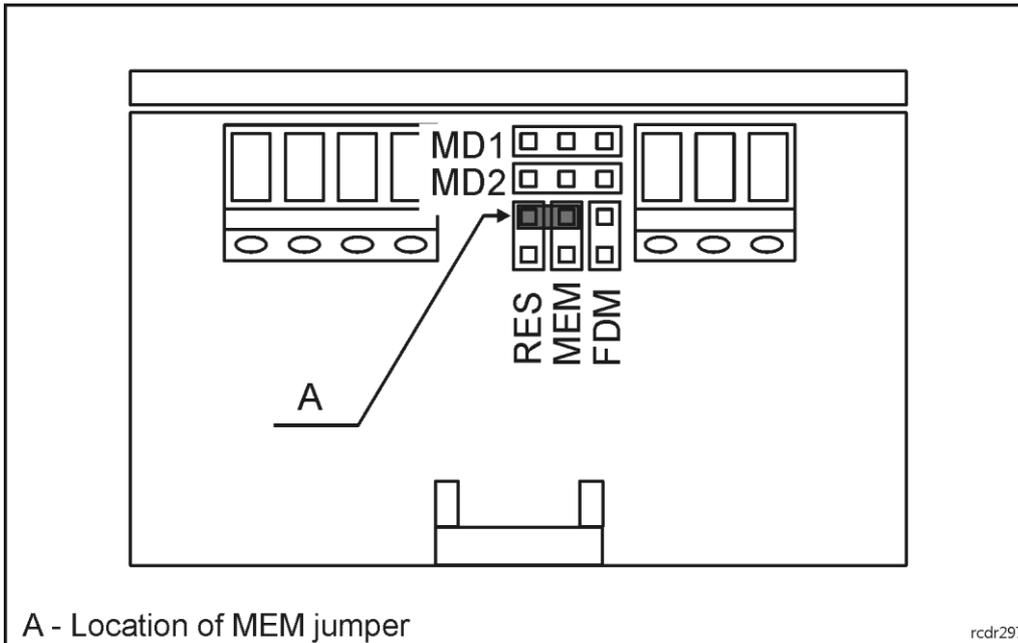Fig. 1 LRT-1 power supply from local PSU (e.g. PS20)

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Fig. 2 LRT-1 power supply from system (e.g. from controller)

Reading range

In optimal conditions, the LRT-1 enables reading of EM125kHz proximity cards from the distance of 95cm. Such range is possible for ISO card of EMC-3 type (Roger) and for optimal orientation of card at the reader and without electrical interference in vicinity of the reader. Metal objects close to the reader and electrical interferences may reduce reading range. Metal objects are irrelevant if located in distance of more than 1m from the reader. In case of LRT-1 installed in distance of 15 cm from metal wall the reading range is approximately reduced by 50%. If the distance is 25cm then the range is reduced approximately by 15%. If the reader is installed in a distance lower than 15 cm from metal wall then card reading might be not possible at all. If the LRT-1 is mounted on metal pole with maximal cross section of 10x10 cm then reading range is reduced by 15%.

Note: Reading range may be slightly reduced (approx. by 5%) if supply voltage is in range of 11-12V. Such reduction results from device design.

Note: Every time the LRT-1 power supply is restored, the device calibrates its antenna circuit to adapt to metal object in its vicinity. If metal objects size or location is changed during the operations of LRT-1 then the reading range may be reduced. Therefore in such situation it is recommended to restart the reader to perform automatic calibration procedure.

Service contacts

MCI-1 interface is equipped with service contacts which are used for device programming and servicing.

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A - Location of MEM jumper

Fig. 3 Arrangement of service contacts

Contacts	Function
MD1	The first contact for selection of operating mode (RACS 4 or RACS 5)
MD2	The second contact for selection of operating mode (RACS 4 or RACS 5)
RES	Restart. When contacts are shorted for a moment then interface restarts. After restart, LED_SY (orange) indicator is pulsing for 2s.
MEM	Service mode. When contacts are shorted then low level configuration can be started. The contact is used both for manual address programming and configuration with RogerVDM.
FDM	Firmware download. When contacts are shorted then firmware download mode is started and new firmware can be uploaded with RogerVDM.

Tab. 1 Service contacts

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LED indicators

LED indicators are located inside the enclosure of MCI-1 and they are visible from the top of the interface. LED indicators are used to signal various states both in programming and normal modes. Communication loss with controller is signalled with synchronic pulsing of all indicators.
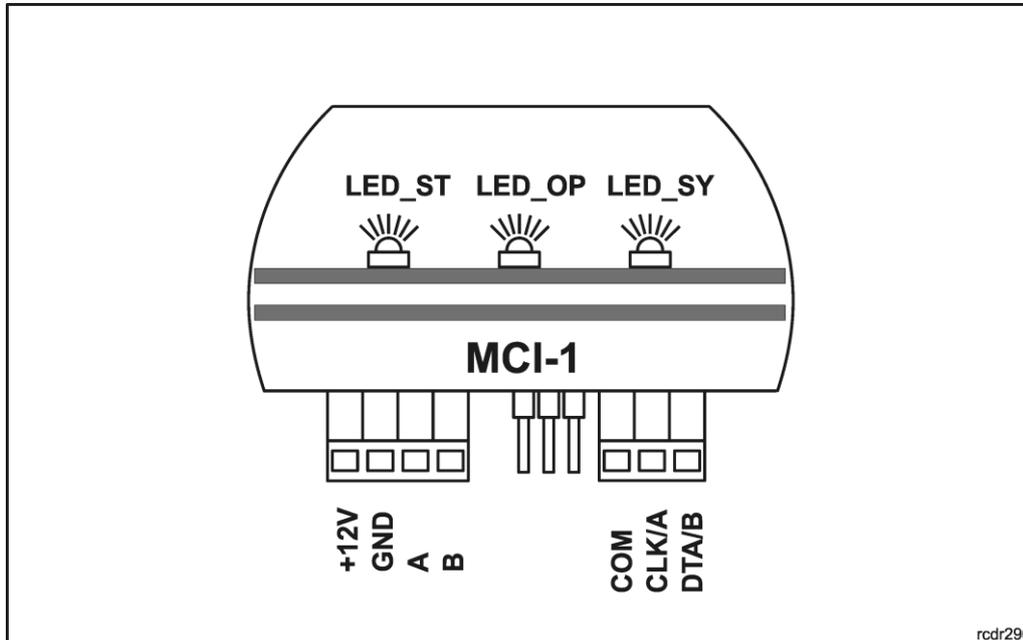
Fig. 4 LED indicators

Address programming

The address of MCI-1 interface must be configured both for operation in RACS 4 and RACS 5 system. The address can be programmed manually (without computer) or with RogerVDM software. In case of operation in RACS 4 system the address range is 0-3 while in RACS 5 the address range is 100-115.

Note: In case of manual address programming for operation in RACS 5, the first digit of address is skipped.

Manual address programming:

- Switch power supply off
- Place jumper on MEM contacts
- Select RACS 4 operating mode on MD1 and MD2 contacts (table 2)
- Connect CLK/A terminal with DTA/B terminal
- Switch power supply on
- LED_ST (red) indicator will pulsate
- Disconnect CLK/A and DTA/B terminals
- Count the number of LED_SY (orange) pulses and switch power supply off when the number of pulses equals to desired address
- Remove jumper from MEM contacts
- Switch power supply on and connect the interface to controller

Note: The address 100 (for RACS 5) or 0 (for RACS 4) is programmed with 16 pulses of LED_SY (orange) indicator. After 16 pulses, LED_SY lights steady on and LED_ST (red) pulsates. Remove jumper from MEM contacts then and restart power supply.

Number of pulses	RACS 4 address	RACS 5 address
1	1	101
2	2	102

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3	3	103
4	4	104
5	5	105
6	6	106
7	7	107
8	8	108
9	9	109
10	10	110
11	11	111
12	12	112
13	13	113
14	14	114
15	15	115
16	0	100

Tab. 2 Number of pulses corresponding to RACS 4 and RACS 5 address

MCI-1 operating mode

LRT-1 reader can be used both in RACS 4 and RACS 5 systems. The selection of operating mode is done with MD1 and MD2 contacts.

Contacts	Function
MD1 / MD2	RACS 4 operating mode. The MCI-1 interface is connected to RACS CLK/DTA bus (CLK and DTA terminals) of PRxx1 or PRxx2 access controller
MD1 / MD2	RACS 5 operating mode. The MCI-1 interface is connected to RS485 bus (A and B terminals) of MC16 access controller

Tab. 3 Selection of MCI-1 operating mode

The reader when operated in RACS 4 and RACS 5 system returns 32bit proximity card number (instead of typical 40bit number). Therefore some additional configuration steps are necessary to adapt both RACS systems to operation with LRT-1.

In RACS 4 system it is necessary to select the option *24 bit (reduced card number)* in PR Master software (PRMaster/Tools/Options/Cards). In RACS 5 system it is necessary to additionally define and assign 32bit type Authentication Factor for each user who will identify at LRT-1. Alternatively all Authentication Factors used in the system could be defined as 32-bit type and then no additional factors for LRT-1 are necessary.

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Configuration with RogerVDM software

The address and other settings can be programmed with RogerVDM program (Windows). The connection to computer requires RUD-1 USB-RS485 interface.

Procedure for programming with computer:

- Make connections as in fig. 5
- Place jumper on MEM contacts
- Connect RUD-1 to computer USB port
- Start RogerVDM software
- Select *MCI-1* interface and *RS485* communication channel.
- In the field *Serial port* select serial COM port with RUD-1 interface
- The program will establish connection with the device and it will display its current settings
- Configure MCI-1 as required
- Select *Send to Device* to upload new settings
- Optionally select *Send to File…* to backup your settings in file
- In the top menu select *Device* and *Disconnect*
- Connect device to your system
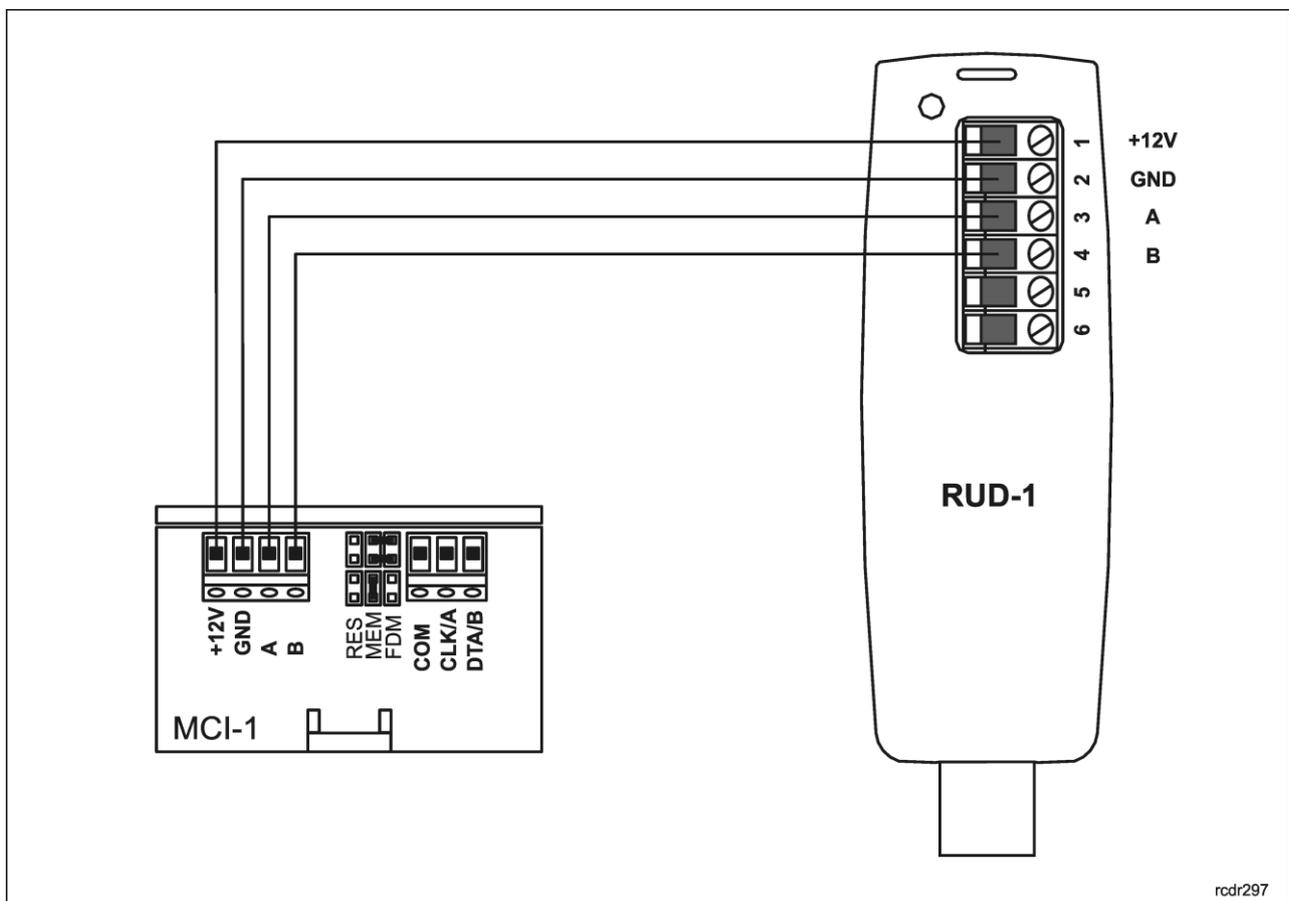
Fig. 5 Connection of MCI-1 to RUD-1 interface (configuration)

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MCI-1 configuration parameters

MCI-1 settings are presented in the table below. All these parameters are configured with RogerVDM software within low level configuration of the device. RS485 and RACS CLK/DTA addresses can also be configured manually without computer.

Parameter	Function
RS485 address	Parameter defines device address on RS485 bus. Range: 100-115. Parameter concerns RACS 5 system only.
RACS CLK/DTA address	Parameter defines device address on RACS CLK/DTA bus. Range: 0-3. Parameter concerns RACS 4 system only.
RS485 communication timeout	Parameter defines delay after which device will signal lost communication with controller. When set to 0 then signalling is disabled. Parameter concerns RACS 5 system only.
RS485 encryption	Parameter enables encryption at RS485 bus.
RS485 encryption key	Parameter defines key for encryption of communication at RS485 bus. Range: 4-16 ASCII characters.
AF Type	Parameter defines authentication factor type returned by reader. Parameter concerns RACS 5 system only.
AF Class	Parameter defines authentication factor class returned by reader. Parameter concerns RACS 5 system only.
DEV	Parameter defines any text or comment which corresponds to the object. It is later displayed in VISO program.
CDI	Parameter defines any text or comment which corresponds to the object. It is later displayed in VISO program.

Tab. 4 MCI-1 configuration parameters

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Firmware update

Device firmware can be updated with RogerVDM (Windows) software. RUD-1 interface is necessary for such update.

Firmware update procedure:

- Make connections as in fig. 6
- Place jumper on FDM contacts
- Connect RUD-1 to computer USB port
- Start RogerVDM program
- In the top menu select *Tools* and then *Update Firmware*
- Proceed according to displayed messages
- After firmware upload remove jumper from FDM contacts
- Restart the interface by switching power supply off/on or with jumper on RES contacts
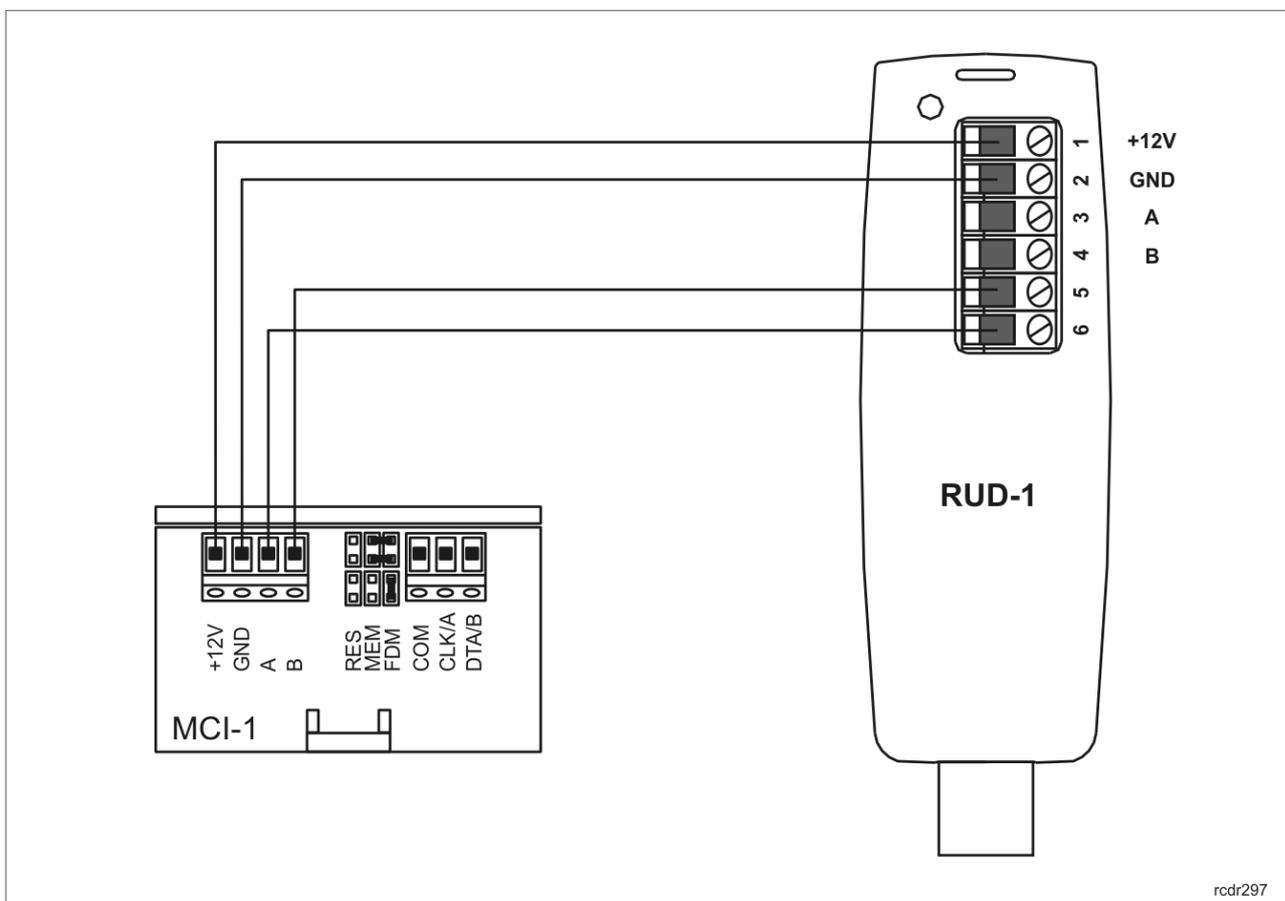
Fig. 6 Connection of MCI-1 to RUD-1 interface (firmware update)

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Connection to access controller

Select operating mode with MD1 and MD2 contacts and define address prior to connection of MCI-1 interface to access controller. The address must be in range of 100-115 (RACS 5) or 0-3 (RACS 4). The address can be programmed manually while all low level settings can be configured with RogerVDM software. LRT-1 reader must be connected to MCI-1 interface with UTP cable. Unused wires of the UTP cable can be used for power supply.
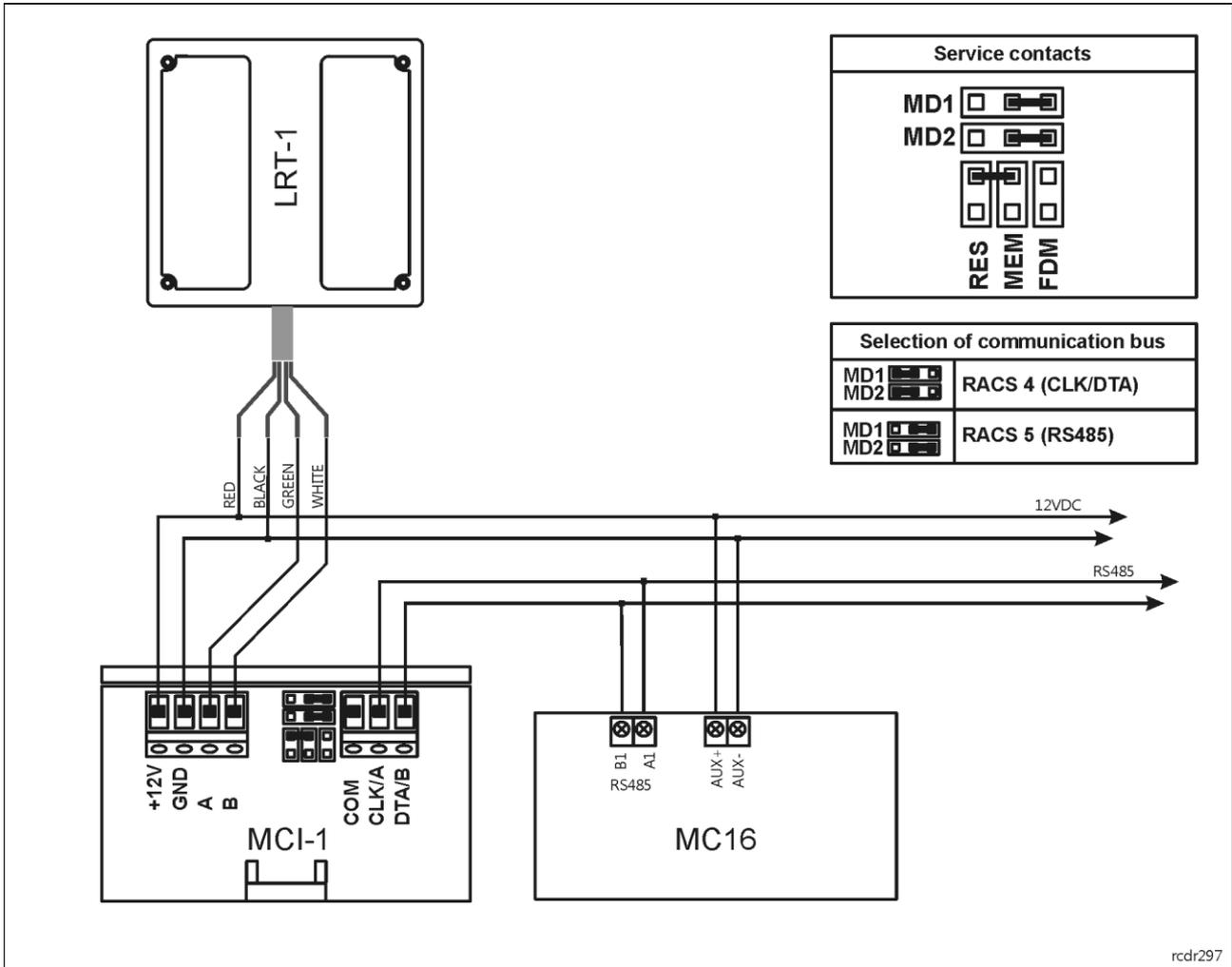
Fig. 7 Connection of LRT-1 reader to MC16 access controller
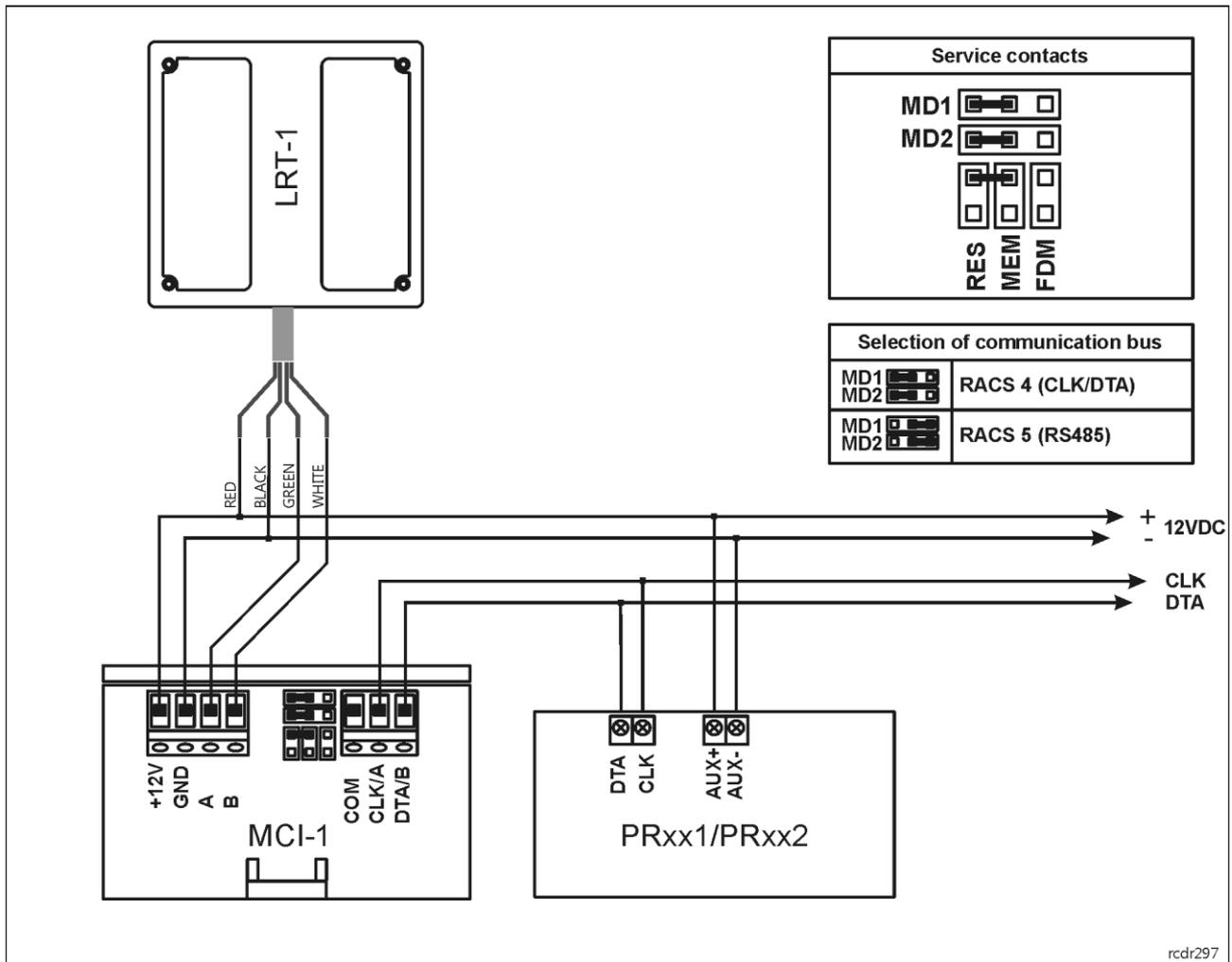
Fig. 8 Connection of LRT-1 reader to PRxx1 or PRxx2 access controller

Installation

1. LRT-1 reader must be installed on vertical structure (wall, pole) in a place which is free from strong electromagnetic interferences and possibly far from metal objects.
2. Configure MCI-1 interface prior to connection.
3. The address of MCI-1 interface can be configured manually for both RACS 4 and RACS 5 operating modes without connection of MCI-1 to computer.
4. Full configuration of MCI-1 interface can be done only with RogerVDM program ad it requires connection of RUD-1 interface.
5. MCI-1 interface must be installed indoors, preferably in the same metal enclosure as access controller.
6. MCI-1 interface can be mounted on flat surface with two screws or on DIN rail with included holder.
7. All electrical connections must be made with switched off power supply.
8. Start and verify the operation of devices when electrical connections are finished.
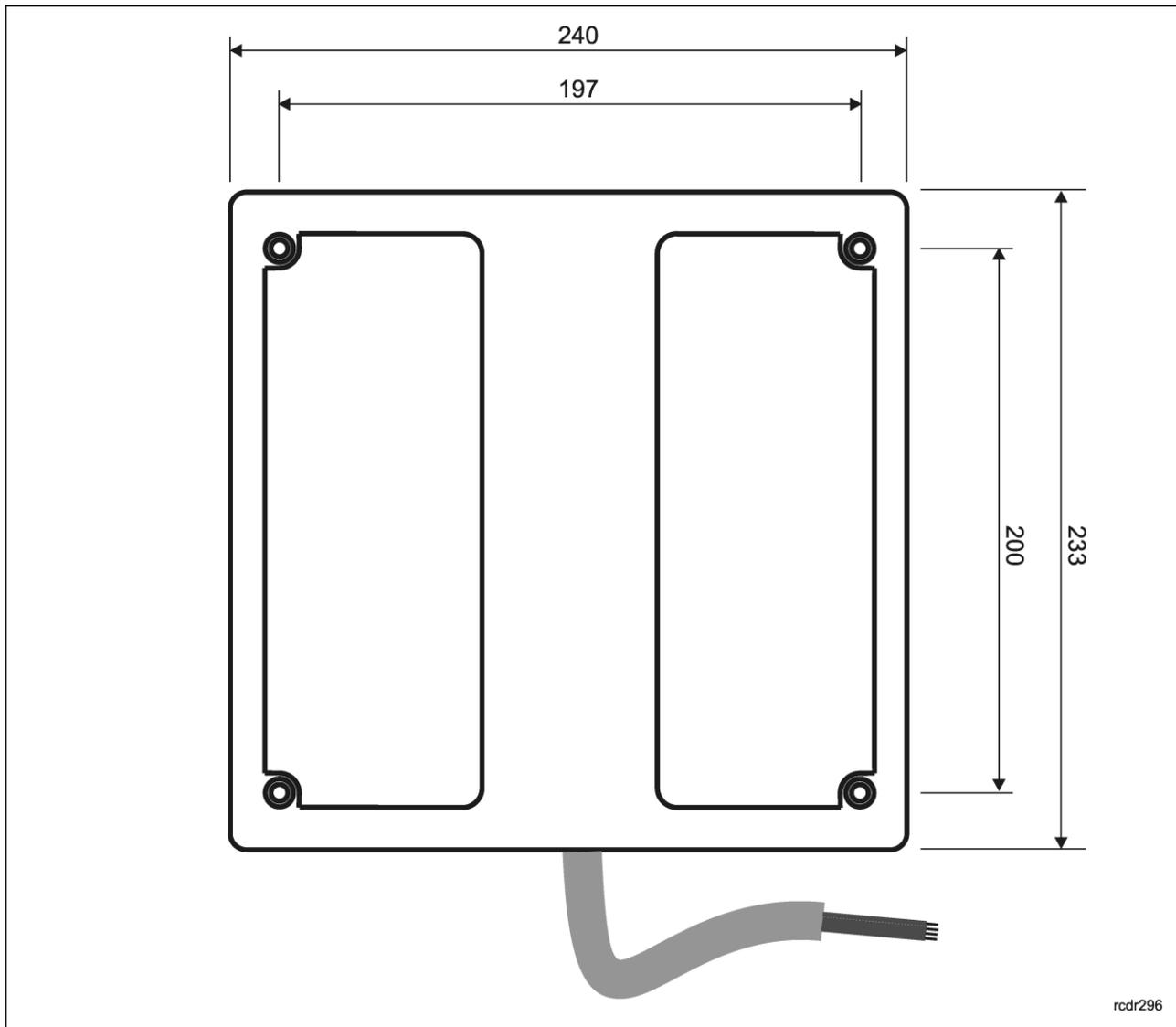
Fig. 9 LRT-1 dimensions

Specification

Parameter	Value
Power supply	11-15VDC
LRT-1 current consumption (average)	290mA
MCI-1 current consumption (average)	40mA
Cable length between MCI-1 and LRT-1	max. 1200m
Cable length between MCI-1 and MC16 controller	max. 1200m
Cable length between MCI-1 and PRxx1 or PRxx2 controller	max. 150m
LRT-1 environmental conditions	Class IV, outdoor general conditions, temperature: -25°C to +60°C, relative humidity: 10 to 95% (no condensation)
MCI-1 environmental conditions	Class II, indoor general conditions, temperature: -10°C

	to +50°C, relative humidity: 10 to 95% (no condensation)
IP Code	IP65 (LRT-1 reader)
Dimensions (H x W x D.)	240 x 233 x 40mm
Weight	0,93 kg
Certificates	CE

Ordering information

Product	Description
LRT-1	Long range reader
MCI-1	Communication interface

Product history

Version	Date	Description
LRT-1 v1.0	08/2017	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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