AUTOMATISME • INFORMATIQUE • ÉLECTRICITÉ

User manual

RFID 1xx, RFID 2xx, RFID 3xx et RFID 4xx

Soft >= 0.60

Dear Customer!

Thank you very much for choosing our product. Before its use, please read these instructions carefully. Here you find the most appropriate ways of dealing with this device, the basic principles of safety and maintenance. Please, also keep the user manual so that you can read it during later use.

Attention!

The manufacturer is not liable for any damage caused by improper use of the device which differ from its intended purpose, or improper handling, as well as a fault of driver resulting from improper use.

Table of contents

1 Preliminary information

Before starting work with the device, read The User manual and follow the instructions contained therein!

Description of visual symbols used in this user manual:

⚠ This symbol is responsible for reviewing the appropriate place in the user instructions, warnings and important information. Failure to follow warnings could cause injury or damage to the device

✋ Important information and guidelines

☞ Following this guidelines makes the use of the device easier

Attention: The screenshots in this manual can be dissimilar from actual images at the time of the device purchase. Due to continuous development of the devices software, some of the functions may differ from these in the manual. The manufacturer claims no responsibility for any undesirable effects (misunderstanding) caused by changes of the software.

2 Applications of the device

Industry, services, trade, logistics are just some of the industries in which it is possible to use the reader. It can be used as a machine login tool, room access (storage), loyalty system component, work time recorder, etc. Using your own application or protocols supported by the reader the user has the ability to control practically every element of the reader – display, buzzer, entrances, outputs. Thanks to the built-in memory, it also has access to the list of logs stored in it. The high-quality IP65 housing provides correct operation of the reader, even if it is mounted on the facade of the building*.

The "RFID IND-LED/LCD" device is designed to read RFID tags. RFID Standard depends on module version:

Normes	Modèle	Firmware
Unique EM4100 EM4102	RFID 1x0 RFID 2x0 RFID 4x0	AP-RFID-Uni
HITAG (HITAG 2)		AP-RFID-HT2
HID 125kHz		AP-RFID-H125
ICODE® (ISO 15693)	RFID 1x1 RFID 2x1 RFID 4x1	AP-RFID-Ico
HID iClass® (tylko CSN)		AP-RFID-iCla
Mifare Classic® (ISO/IEC 14443-A) Mifare Plus® (UID) Mifare DESFire® (UID)		AP-RFID-Mif
Unique EM4100 EM4102	RFID 3x0	AP-RFID-LCD-Uni
HITAG (HITAG 2)		AP-RFID-LCD-HT2
HID 125kHz		AP-RFID-LCD-H125
ICODE® (ISO 15693)	RFID 3x1	AP-RFID-LCD-Ico
HID iClass® (tylko CSN)		AP-RFID-LCD-iCla
Mifare Classic® (ISO/IEC 14443-A) Mifare Plus® (UID) Mifare DESFire® (UID)		AP-RFID-LCD-Mif

The device is used for an integration with other systems by way of of modbus RTU/TCP, HTTP client / server, SNMP protocols. The reader can also work as a standalone device.

* it is necessary to use cable gland

3 Warranty and liability of the manufacturer

⚠ The manufacturer provides a 2-year warranty on the device. The manufacturer also provides post-warranty service for 10 years from the date of the introducing the device on the market. The warranty covers all defects in material and workmanship.

The manufacturer undertakes to comply with the contract of guarantee, if the following conditions are met:

- all repairs, alterations, extensions and device calibrations are performed by the manufacturer or authorized service,
- supply network installation meets applicable standards in this regard,
- the device is operated in accordance with the recommendations outlined in this manual,
- the device is used as intended

The manufacturer assumes no responsibility for consequences resulting from improper installation, improper use of the device, not following this manual and the repairs of the device by individuals without permission.

⚠ **This device doesn't contain serviceable parts.**

4 Safety guidelines

The reader has been designed and built using modern electronic components, according to the latest trends in the global electronics. In particular, much emphasis was placed on ensuring optimum safety and reliability of control. The device has a housing with a high-quality plastic.

4.1 Power supply

⚠ RFID LED IND LED and RFID IND LCD are designed to supply 10-24VDC and POE IEEE 802.3af or Passive PoE 10-24VDC.

4.2 Storage, work conditions.

The device has to be stored in enclosed rooms which are free of caustic vapors and substances and also meet the requirements:

- surrounding temperature from -30°C to +60°C,
- humidity from 25 to 90%,
- atmospheric pressure from 700 to 1060hPa.

The device working conditions:

- surrounding temperature from -10°C to +55°C, relative humidity from 30% to 75%,
- atmospheric pressure from 700 to 1060hPa.

Recommended transport conditions:

- surrounding temperature from -40°C to +85°C,
- relative humidity from 5% to 95%,
- atmospheric pressure from 700 to 1060hPa.

4.3 Installation and use of the reader

⚠ **The reader should be used following the guidelines shown in next part of the user manual.**

4.4 Utilization of the reader

When it becomes necessary to liquidate the device (for instance retiring of the device from service), please contact the manufacturer or its representative, who are obliged to respond, appropriately, i.e. collecting the reader from the user. You can also ask the companies involved in utilization and/or liquidation of electrical or computer equipment.

Under no circumstances should you place the device along with other waste material.

5 Construction of the reader

5.1 Technical data

Power supply:

DC: 10-24VDC (screw terminals 3,5mm) or PoE
IEEE 802.3af (depends on the version) or Passive
PoE 12-24VDC (depends on the version) Power
consumption: max 2.5W (~200mA@12V)

Transponders:

Tag reading distance: up to 8cm from the directions of the device front side (display or LEDs)
Internal memory: 1000 tags, 30000 events

Inputs:

number of inputs: 2 input type: opto-isolator, dry contact (NO)

Outputs:

number of outputs: 2 output type: relay
NO maximum relay current load: 1A @
30VDC

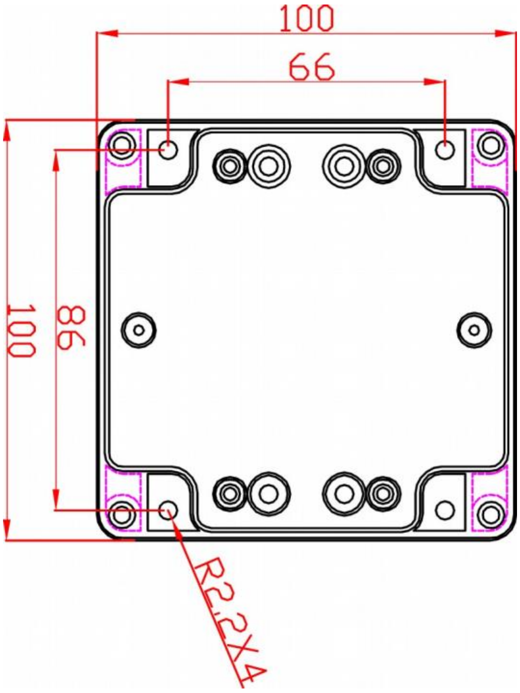
Communication:

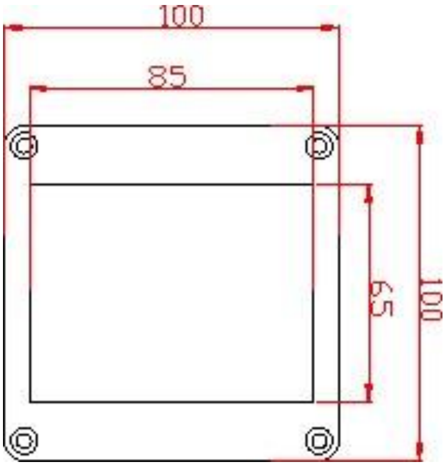
1 port Ethernet, 10Mbps
1 port RS485, modbus RTU

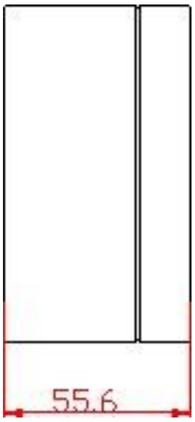
Enclosure:

IP Rating: IP65

Dimensions:







5.2 General features

General view of the RFID 3xx and RFID 1xx is shown below.

RFID 3xx

RFID 1xx

Communication with the reader is carried out by the LAN or RS485.

User can choose from the following options to access the code readout from a RFID tag:

- through built-in web server, using a standard web browser (preferred browsers are MOZILLA FIREFOX, OPERA, CHROME),
- HTTP server mode
- HTTP client mode
- Modbus TCP
- ModbusRTU (RS485)
- SNMP

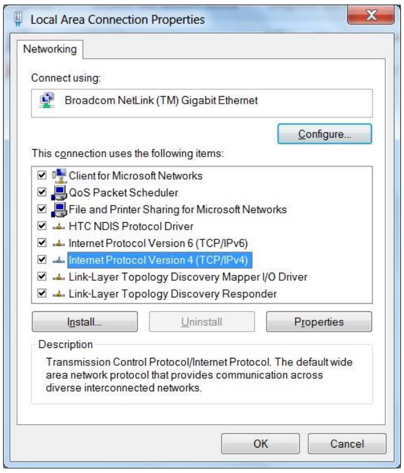
The reader, depending on the version, is equipped with an LCD display or LEDs for power supply indication and current state of the device.

6 Configuration of the device

The device when used for first time needs to be configured.

6.2 Changing the PC's subnet address, for the device configuration

After the device is connected to a network, a subnet address of a PC which is connected to the same network has to be changed.
To do so, go to the PC's MS Windows network configuration: Start->Control panel ->Network and Sharing Center->Network and Internet->Network Connections, choose the related controller and right click on „Properties”.
After selecting this option configuration window will show up:



Local Area Connection Properties

Networking

Connect using:

Broadcom NetLink (TM) Gigabit Ethernet

This connection uses the following items:

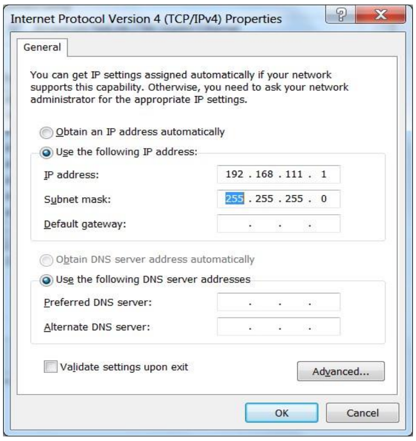
- ☑ Client for Microsoft Networks
- ☑ QoS Packet Scheduler
- ☑ File and Printer Sharing for Microsoft Networks
- ☑ HTC NDIS Protocol Driver
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- ☑ Internet Protocol Version 4 (TCP/IPv4)
- ☑ Link-Layer Topology Discovery Mapper I/O Driver
- ☑ Link-Layer Topology Discovery Responder

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

Changing network settings in MS WINDOWS

Next choose "Internet Protocol (TCP/IP)", double click on it and enter following settings:



Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: 192 . 168 . 111 . 1

Subnet mask: 255 . 255 . 255 . 0

Default gateway: . . .

○ Obtain DNS server address automatically

● Use the following DNS server addresses

Preferred DNS server: . . .

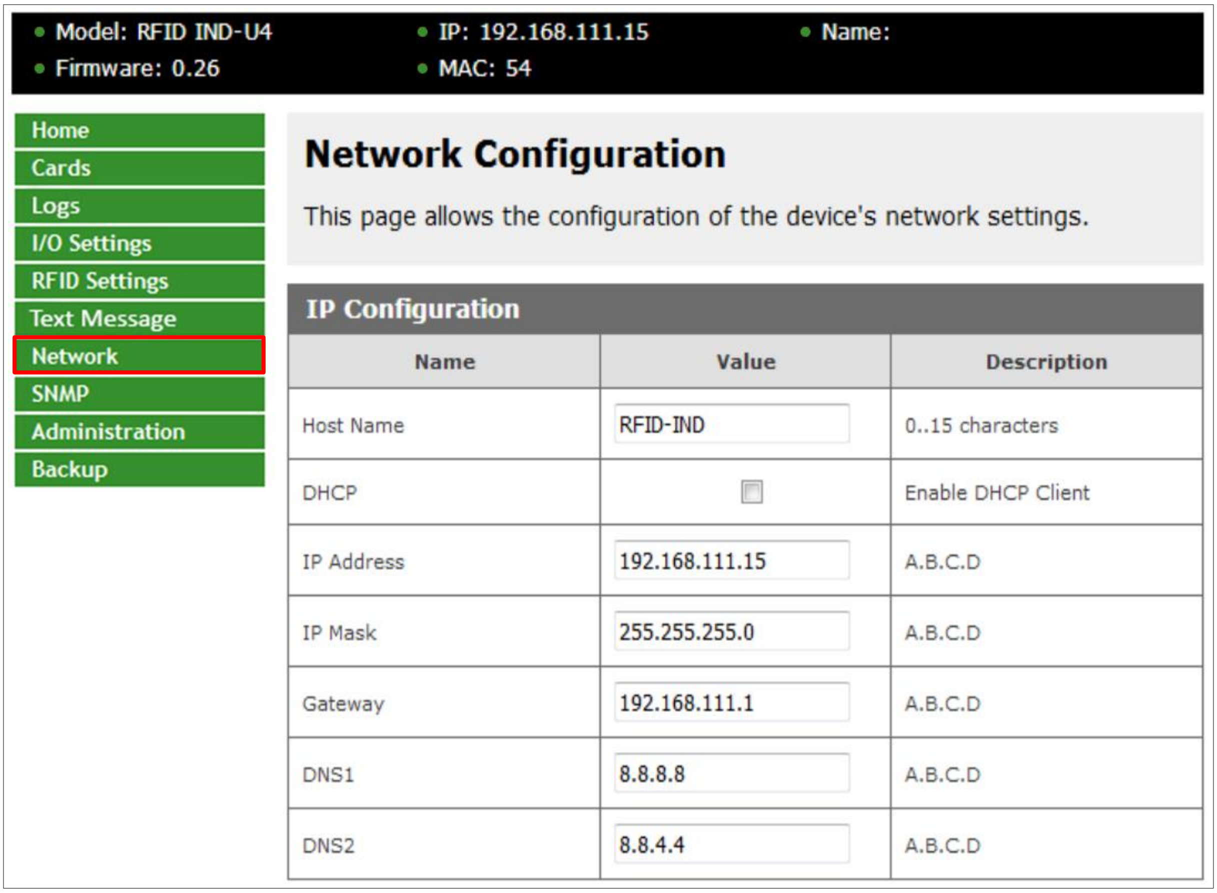
Alternate DNS server: . . .

□ Validate settings upon exit

Illustrative TCP/IP protocol settings

After saving changes by clicking OK, open an Internet browser and enter in the browser's address line: **192.168.111.15**.
Default user name/password: admin/admin00

In the ***Network*** tab it is possible to change the LAN parameters.



Network Configuration

This page allows the configuration of the device's network settings.

IP Configuration

Name	Value	Description
Host Name	RFID-IND	0..15 characters
DHCP	□	Enable DHCP Client
IP Address	192.168.111.15	A.B.C.D
IP Mask	255.255.255.0	A.B.C.D
Gateway	192.168.111.1	A.B.C.D
DNS1	8.8.8.8	A.B.C.D
DNS2	8.8.4.4	A.B.C.D

Configuration of the network connection

To change the network settings of the reader, use the following fields:

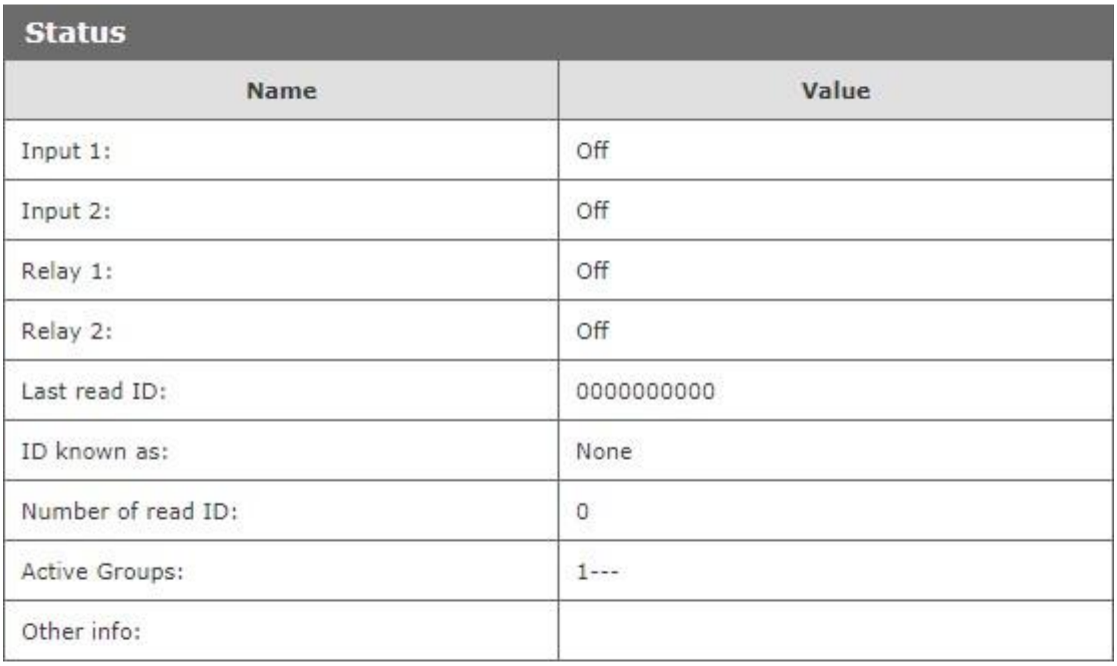
- ***Host Name*** – NETBIOS name,
- ***DHCP*** – checking this box forces use of the address assigned by the DHCP server,
- ***IP Address*** – the IP address of the reader (at this address, the reader will be visible on the network),
- ***IP Mask*** – IP subnet mask,
- ***Gateway*** – network gateway,
- **DNS1, DNS2 –** DNS servers addresses.

After changes, click **Save**.

7 The device functions

7.1 The reader status

The reader status can be found at *Home* tab in the reader's menu (192.168.111.15).



Status

Name	Value
Input 1:	Off
Input 2:	Off
Relay 1:	Off
Relay 2:	Off
Last read ID:	0000000000
ID known as:	None
Number of read ID:	0
Active Groups:	1---
Other info:	

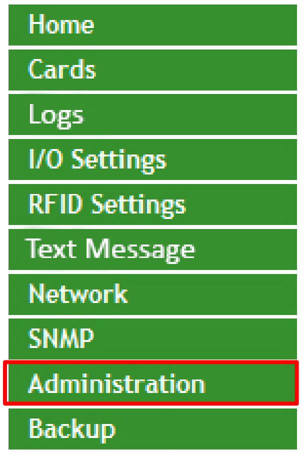
Selected HOME tab shows following information:

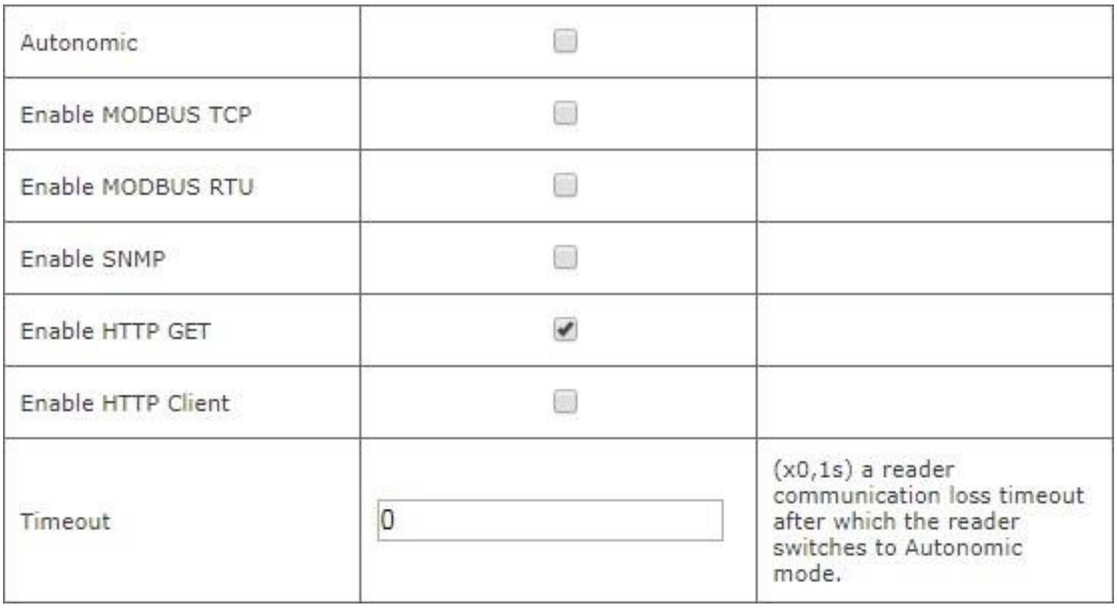
Input 1 – input number 1 current status (binary input),
Input 2 – input number 2 current status (binary input),
Relay 1 – current status of relay output number 1,
Relay 2 – current status of relay output number 2,
Last read ID – last tag readout in HEX format,
ID known as – type of tag read (unknown/user),
Number of read IDs – number of read **ID**s since the reader's reset,
Active Groups – numbers of groups that are active at this moment,
Other info – this can inform about the reader-server protocol communication timeout (message: Protocol Timeout!).

⚠ **Attention:**
If readout at a last read ID shows 8500c2b4a8 **(LOCK!)** it indicates blocking of further tags reading until **releaseId** (HTTP GET) command is sent or in case of Modbus, value "0" has to be sent to 1 Holding Reg address or 1004 Single Coil address.

7.2 The reader work modes

The device can be set up for various work modes. Enhanced settings allow the reader to work as a standalone device (Autonomic mode) as well as it can be controlled by a software.





Autonomic	□	
Enable MODBUS TCP	□	
Enable MODBUS RTU	□	
Enable SNMP	□	
Enable HTTP GET	☑	
Enable HTTP Client	□	
Timeout	0	(x0,1s) a reader communication loss timeout after which the reader switches to Autonomic mode.

Standalone – Autonomic mode

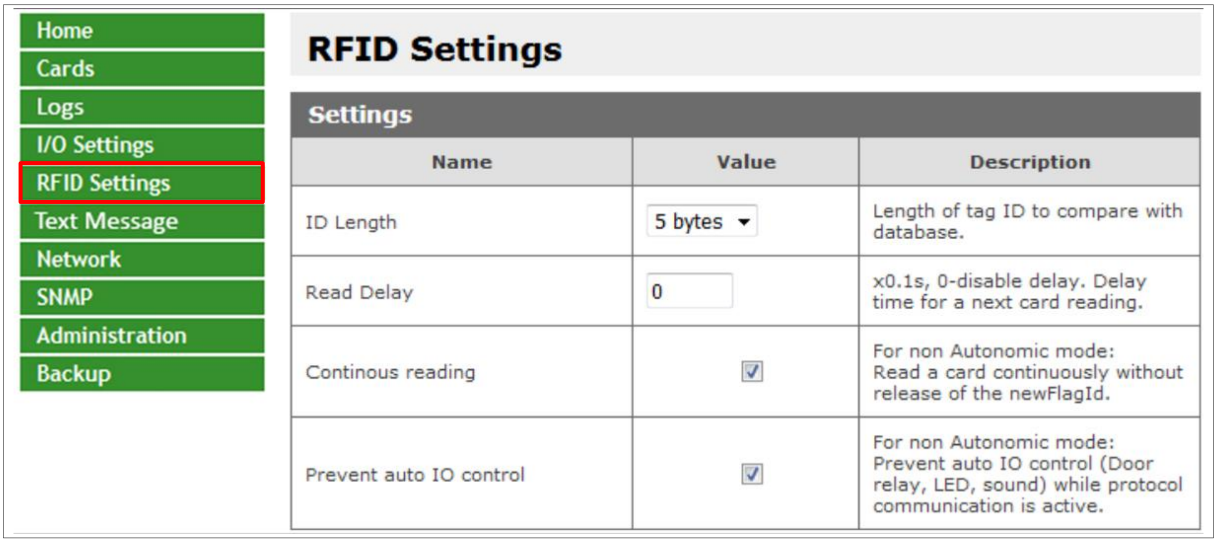
In this mode the reader isn't connected to network and compares tag readout with its own internal memory, opens a lock's bolt by drawing a RFID card near to the reader, and the like.

Controlled by software mode

The reader can be controlled by communications protocols. Time duration of the reader server communication loss can be set (Timeout value). After expiration of set time, the device will switch to the autonomic mode.

Remember, when connection with the server is re-established the reader will return to a software mode control.

Advanced work settings



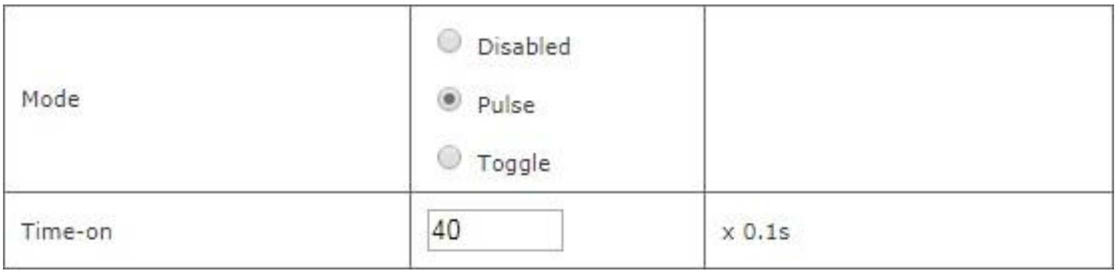
RFID Settings

Settings

Name	Value	Description
ID Length	5 bytes	Length of tag ID to compare with database.
Read Delay	0	x0.1s, 0-disable delay. Delay time for a next card reading.
Continous reading	☑	For non Autonomic mode: Read a card continuously without release of the newFlagId.
Prevent auto IO control	☑	For non Autonomic mode: Prevent auto IO control (Door relay, LED, sound) while protocol communication is active.

ID Length – length of ID code for comparison with cards database
Read Delay – value of read delay for a consecutive tag multiplied by 0.1s (150 = 15 seconds)

These settings relate to control by communications protocols only:
Continuous reading – "hotel mode" – when this mode is chosen, a card is seen at the time when it is drawn near to the reader **only.** If the card is moved away from the reader, ID code is overwritten by zeros.
Additionally, in I/O Settings tab, table Output Relay 1, the Pulse mode can be set. This mode allows the reader to hold on to "on" status for set time length after a card is drawn away. (for example: Time-on = 40 * 0.1s = 4 seconds).



Mode	○ Disabled ● Pulse ○ Toggle	
Time-on	40	x 0.1s

Often this mode is used to maintain power supply for a machinery which is active only when an authorized employee logs in using a card reader. Likewise, it is used in hotel systems. Hotel rooms are often powered after a card is seen by a reader ***special purpose housing**.

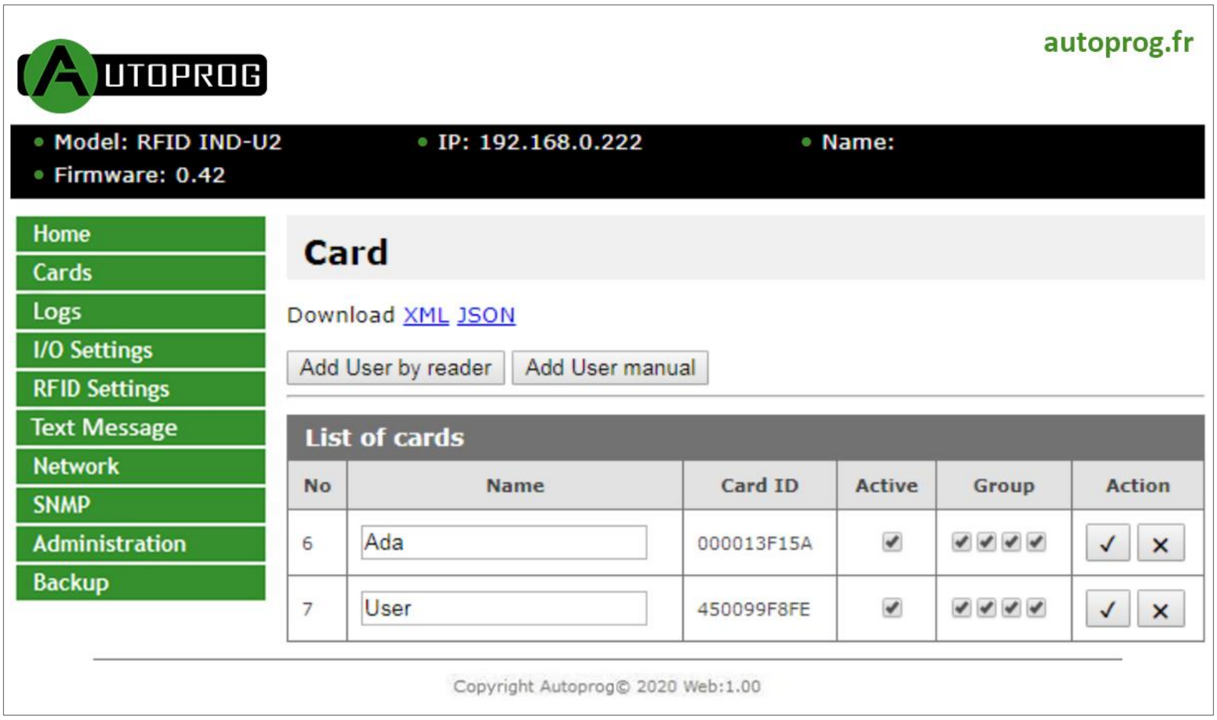
Prevent auto IO control – enforces software control of outputs, LED diodes and display, when the reader is controlled by a communications protocol. This mode is useful together with the reader-server communication loss time expiration setting, as the reader will switch to autonomic mode after set up time expire. In turn, during control by software, server/controller ought to maintain interaction with the reader. If server lost connection and the device start standalone mode, the reader will respond as it is set in "I/O Settings" tab.

7.3 Cards management

The reader supports card management through implemented communication protocols as well as using external software.

7.3.1 Add or delete a card using a network browser

At the browser, in the reader's Cards tab, a user can assign TAGs that the reader will recognize.



• Model: RFID IND-U2 • IP: 192.168.0.222 • Name:
• Firmware: 0.42

Card

Download XML JSON

List of cards

No	Name	Card ID	Active	Group	Action
6	Ada	000013F15A	☑	☑ ☑ ☑ ☑	✓ ✕
7	User	450099F8FE	☑	☑ ☑ ☑ ☑	✓ ✕

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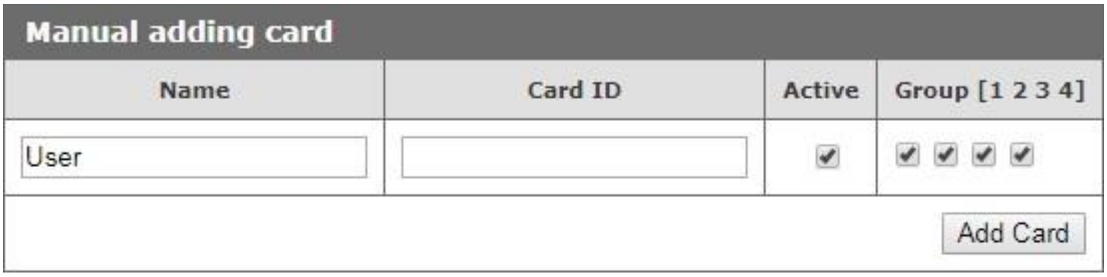
To add a new user card, on the **Cards** tab, click the **Add User by reader** button, and then approximate the card to the reader. The assignment of the card will be signalized by the appropriate beep.

If the user does not have a physical TAG, and there is a need to add a new user, press the button **Add User manual**. The following window will be displayed:



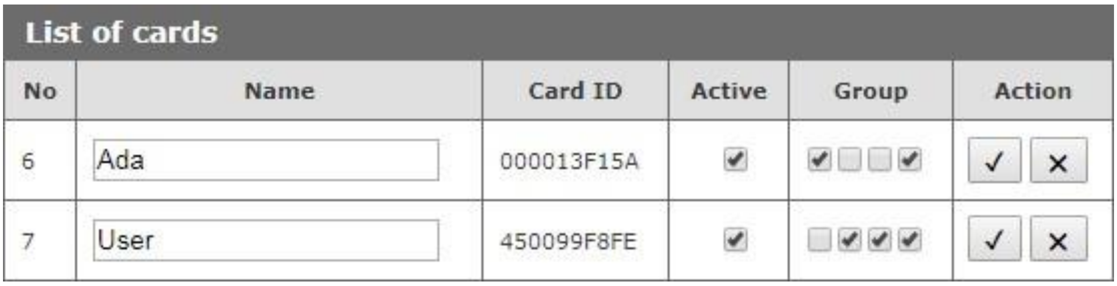
Manual adding card

Name	Card ID	Active	Group [1 2 3 4]
User		☑	☑ ☑ ☑ ☑

In the window above, just give the user name, enter the ID of the card and assign to the appropriate groups. The entered data confirm the **Add Card** button.

After correct assignment, in the **List of cards** table a new record will show up.

The **List of cards** table allows you to edit cards stored in the module's memory.



List of cards

No	Name	Card ID	Active	Group	Action
6	Ada	000013F15A	☑	☑ □ □ ☑	✓ ✕
7	User	450099F8FE	☑	□ ☑ ☑ ☑	✓ ✕

Active field activates or deactivates the selected card, so that the user blocked after applying the card will not be recognized.

The **Group** option is responsible for activating the card at a specified time (chapter Błąd: Nie znaleziono źródła odwołania).

The ✓ button is responsible for saving the current settings.

The ✕ button allows to remove the card from the reader's memory.

All cards in the reader memory can be retrieved by referencing to the resource file **cardList.xml** (e.g. http://192.168.111.15/cardList.xml).

Sample:

```
<cardList>
      <cardItem>
            <no>5</no>
            <name>Ada</name>
            <active>1</active>
            <group>1001</group>
            <cardId>000013F15A</cardId>
      </cardItem>
      <cardItem>
            <no>6</no>
            <name>User</name>
            <active>1</active>
            <group>0111</group>
            <cardId>450099F8FE</cardId>
      </cardItem>
</cardList>
```

To add cards to the reader's memory choose CSV file with a recorded card number, a user name and a card ID. **RfidIndManager** application will connect with the reader and will write the cards to the reader's memory.

7.3.2 Add cards by Modbus protocol

The reader has a built-in Modbus protocol function. Using the protocol a customer may write a new card and card username in the reader memory.

In chapter 8.1, in a table, all Modbus addresses for the RFID readers can be found. In a following example, values sent to Holding Registers are **decimal**.

The example of a Mifare card recording:

card number 8
card id: 4923267D
user name: John

At the beginning Modbus RTU or Modbus TCP function has to be enabled.
Modbus communication with a PC can be established by attaching USB – RS485 converter cable or by TCP connection. In the next step open up an application for working with Modbus and select the PC as the master. At this time it is worth to set up number of Holding Registers items from 1100 to 1150 address (50 items), so possible errors can be corrected.

After the configuration set up, open the addresses edition window.
To write a card number the required value reduced by 1 has to be sent to 1100 address of Holding Registers (e.g. for a number "8" a value "7" has to be sent).

In the next step the card has to be configured by sending proper value to 1101 address. (see chapter 8.1)

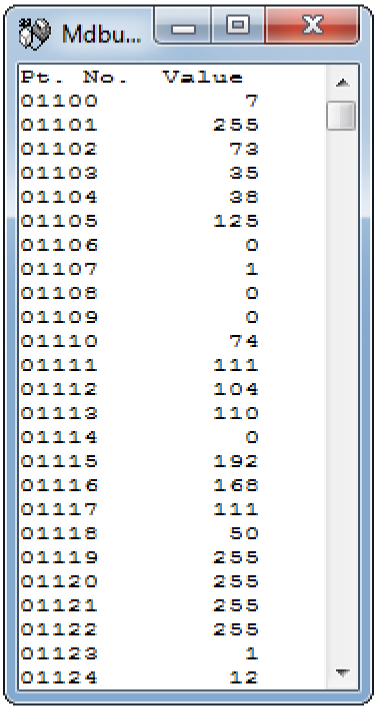
Later, the card's ID bytes has to be segmented and changed to decimal values.
49 (hex)=73 (dec)
23 (hex)=35 (dec)
26 (hex)=38 (dec)
7D (hex)=125 (dec)
4 bytes for Mifare cards, 5 bytes for UNIQUE cards

Writing the card ID take place by sending the segments of bytes to 1102-1105 Holding Registers addresses.

Lastly, the user name has to be written by changing actual name to ASCII code.
J=74
o=111
h=104
n=110

The user name in ASCII code values has to be sent to Holding Registers starting from 1110 address (in the example: 1110-1113). The name has to be finalized with NULL, so at the last ASCII code "0" has to be written to a subsequent address
(in the example: 1114).

The screen shows the Holding Registers addresses and corresponding values as in the example.

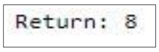


```
Pt. No.   Value
01100         7
01101       255
01102        73
01103        35
01104        38
01105       125
01106         0
01107         1
01108         0
01109         0
01110        74
01111       111
01112       104
01113       110
01114         0
01115       192
01116       168
01117       111
01118        50
01119       255
01120       255
01121       255
01122       255
01123         1
01124        12
```

7.3.3 User's own API (HTTP GET)

Other method of a card registering in the reader's memory is applying commands of the httpGET protocol.

To add a new card enter in an address field of the browser:
„thereaderIPaddress”/msg.php?addId=”thecardID*”* in hexadecimal numeral system
„thereaderIPaddress”/msg.php?addDecId=*”thecardID”* in decimal numeral system
e.g. http://192.168.111.15/msg.php?addId=0600ADDA62 The reader returns number at which the new card is recorded:



```
Return: 8
```

Using this number the card's user name can be added by writing:
„thereaderIPaddress”/msg.php?changeName=*”the card number”*!*”user name”* e.g.
http://192.168.111.15/msg.php?changeName=8!John

Cards can be added, by sending command: *„theDeviceIPaddress”*/msg.php?addCard. First read the card then write the above command to the browser. The reader writes in the last read tag. After the command execution the reader returns a number of the card.
Next, to add a user name enter as before a command:
„thereaderIPaddress”/msg.php?changeName=*”the card number”*!*”user name”*

More about **HTTP GET** commands in a chapter 8.4.

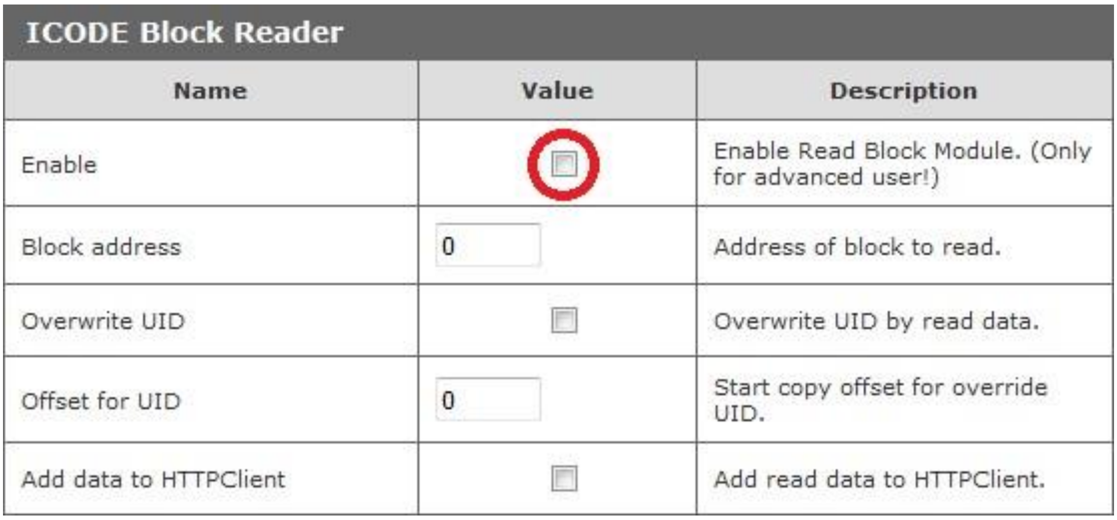
7.4 Data record on Mifare and ICODE cards – HTTP GET command

The reader can write memory blocks of Mifare Classic 1k / 4k and ICODE cards. Data can be saved to any memory block.

7.4.1 Data record on the ICODE card

ICODE cards has an EEPROM memory. The user can write and read as well data on the card memory. The tag memory is organized in blocks (**one block** consists of **4 bytes**).

Attention! For proper operation of the read / write function **via HTTP GET,** it is **necessary** to **disable the Read Block Module function in the RFID Settings tab!**



ICODE Block Reader

Name	Value	Description
Enable	□	Enable Read Block Module. (Only for advanced user!)
Block address	0	Address of block to read.
Overwrite UID	□	Overwrite UID by read data.
Offset for UID	0	Start copy offset for override UID.
Add data to HTTPClient	□	Add read data to HTTPClient.

The user can write and read the content of the tag.
By sending the appropriate parameters, you can save 16 bytes of tag memory at a time (4 data blocks). **If fewer bytes are written than a multiple of 4 (length of a single ICODE block), the remaining bytes in the given block will be overwritten by zeros – example #1.**

Syntax: IPaddress/block.xml?block=**blocknumber**&data=**userdata**

a) **block** – block number to recording / reading data,
b) **data –** up to 16 bytes of data in hex format.

Note!
If 'data' field occur – it will be a recording function. If not, the read function will occur.

After sending the command, bring the card close to the reader.

The reader will respond as follows:

```
<cardContent>
        <result>0</result>
        <uid>9D720004000004E0</uid>
        <block>33333333444444445555555566666666</block>
</cardContent>
```

In case the **result value** is **different** from **0** - the write operation **failed**.

Example #1 – sending 7 bytes of data:
http://192.168.111.15/block.xml?block= **3** &data= **1A 999999111118**

Description:
The reader will respond as follows:

```
<cardContent>
        <result>0</result>
        <uid>9D720004000004E0</uid>
        <block>1A999999111111800987654 21AF251536</block>
</cardContent>
```

The reader has an IP address: 192.168.111.15. The **data** parameter can include up to 16 bytes. 7 bytes were sent. Starting from block 3, the data will be saved to the card:

- block 3 – **1A999999**,
- block 4 – **11111800**, (the remaining byte was overwritten with zeros)
- block 5 – **98765421**, (block unchanged)
- block 6 – **AF251536**. (block unchanged)

Example #2 – full data record of 4 memory blocks:
http://192.168.111.15/block.xml?block=4&data= BBB44444555CCC556666AAA688888FFF

Description:
The reader will respond as follows:

```
<cardContent>
        <result>0</result>
        <uid>9D720004000004E0</uid>
        <block>BBB44444555CCC556666AAA688888FFF</block>
</cardContent>
```

The reader has an IP address: 192.168.111.15. Starting from block 4, the data will be saved to the card:

- block 4 – **BBB44444**,
- block 5 – **555CCC55**,
- block 6 – **6666AAA6**,
- block 7 – **88888FFF**.

Example #3 – unsuccessful save operation:
http://192.168.111.15/block.xml?block=4&data= BBB44444555CCC556666AAA688888FFF The reader will respond as follows:

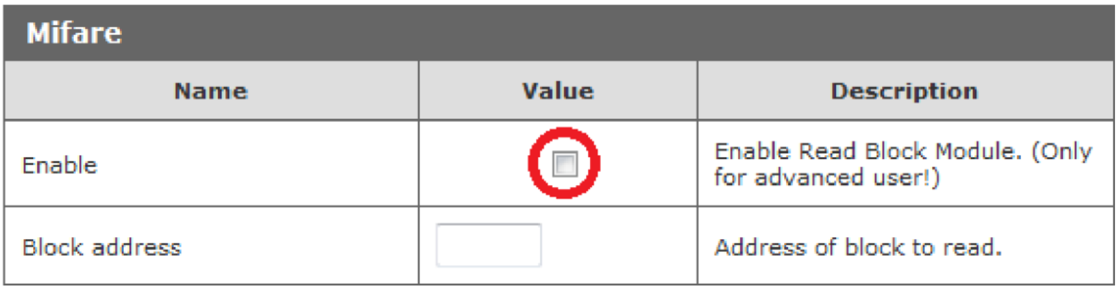
```
<cardContent>
        <result>10</result>
        <uid>9D720004000004E0</uid>
        <block>BBB44444555CCC556666AAA688888FFF</block>
</cardContent>
```

Note! Data write **failed** because the value for **result** is **different** from **0**.

7.4.2 Data record on the Mifare Classic 1k / 4k card

Mifare cards has an EEPROM memory. The user can write and read as well data on the card memory. The tag memory is organized in blocks, each 16 bytes long.

Attention! For proper operation of the read / write function **via HTTP GET,** it is **necessary** to **disable the Read Block Module function in the RFID Settings tab!**



Mifare

Name	Value	Description
Enable	□	Enable Read Block Module. (Only for advanced user!)
Block address		Address of block to read.

The user can write and read the content of the tag.
By sending the appropriate parameters you can save 16 bytes at a time, i.e. the entire one block of tag memory. **When entering less than 16 bytes, the remaining bytes of the block will be replaced by zeros.**

Syntax:
IPaddress/block.xml?block=**blockno**&data=**userdata**&keyType=**AorB**&keyIdx=**0-7**

a) **block** – block number for recording / reading data,
b) **data** – up to 16 bytes of data in hex format,
c) **keyType** – authorization type: key A or key B,
d) **keyIdx** – key index from memory (0-7) - description below.

Note!
If 'data' field occur – it will be a recording function. If not, the read function will occur.

After sending the command, bring the card close to the reader.

The user can set up to 8 Mifare keys. An indicated key should be referenced via **keyIdx**.
By default, all keys (0-7) have the value FFFFFFFFFFFF.
We recommend that the key with index '0' remain unchanged. Mifare tags have the default A and B keys set to FFFFFFFFFFFF.

To set the Mifare key, the user needs to send 2 parameters:
a) **keyIdx** – location number,
b) **key** – key in hex format (6 bytes 12 hex characters).→

Syntax:
IPaddress/block.xml?keyIdx=**location**&key=**key(in hex format)**

After sending the command, bring the card close to the reader.

An example of key definition:
http://192.168.111.15/block.xml?keyIdx=2&key=FFB7FFB7FFB7

Description:
The reader will respond as follows:

```
<cardContent>
	<result>12</result>
	<uid>00000000000000</uid>
	<block>00000000000000000000000000000000</block>
</cardContent>
```

Note! (pertain to key definition)
If the **result** value **equals 12** – key write operation completed **successfully**. If the **result** value **equals 11** – key write operation **failed**.

Example #1 – saving data to block 34:
http://192.168.111.15/block.xml?block=34&data=39383736353433AA&keyType=A&keyIdx=1

Description:
The reader will respond as follows:

```
<cardContent>
	<result>0</result>
	<uid>0000001CC60D0D</uid>
	<block>39383736353433AA0000000000000000</block>
</cardContent>
```

The **result** value is '**0**', so the data record operation was **successful**.

Key authorization **'A'** (keyType=**A**) from location No. **'1'** (keyIdx=**1**).
The **data** parameter can include up to 16 bytes. 8 bytes were sent, the remaining 8 bytes in block No. 34 were overwritten with zeros.

Example #2 – record operation failed: http://192.168.111.15/block.xml?block=34&data=ABA00D&keyType=B&keyIdx= 1

Description:
The reader will respond as follows:

```
<cardContent>
	<result>10</result>
	<uid>0000001CC60D0D</uid>
	<block>ABA00D00000000000000000000000000</block>
</cardContent>
```

Attention! Data record failed because the value for **result** is **different** from **0**.

Key authorization **'B'** (keyType=**B**) from location No. **'1'** (keyIdx=**1**).

7.5 Reading Mifare and ICODE blocks

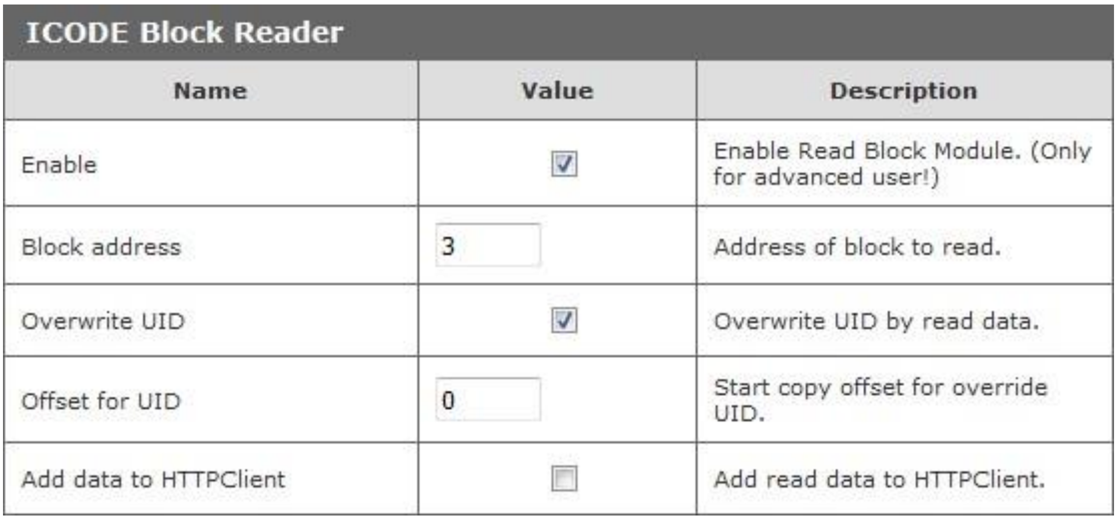
The reader can read memory blocks of **Mifare Classic 1k / 4k** and **ICODE** cards. Any block from memory can be read. The read data are available via the **HTTPClient** and **Modbus** protocol (from address 100 Holding Registers).

In **HTTPClient** mode, a "block" field with a hexadecimal value of **read data** (16 bytes) is **added** to the GET **request**.

Additionally, the user can **force** the **read block** to be assigned **as the UID** number of the card. In this case, as many bytes of the block are copied as many bytes have the UID of the card (e.g. 8 bytes for ICODE tags).

7.5.1 Reading the content of the ICODE tag – Block Reader

In the ***RFID Settings*** tab of the **ICODE Block Reader** table the user can configure the block reading of the ICODE card.



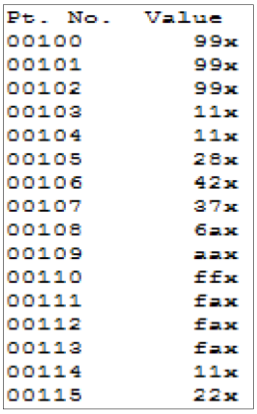
ICODE Block Reader

Name	Value	Description
Enable	☑	Enable Read Block Module. (Only for advanced user!)
Block address	3	Address of block to read.
Overwrite UID	☑	Overwrite UID by read data.
Offset for UID	0	Start copy offset for override UID.
Add data to HTTPClient	□	Add read data to HTTPClient.

Meaning of fields:

- **Enable** – a read block function is enabled,
- **Block address** – a block address,
- **Override UID** – a card's UID is overwritten with readout data,
- **Offset for UID** – an offset for a UID rewrite,
- **Add data to HTTPClient** – a block of readout data is added to GET request in HTTP Client mode.

An example of block reading via the **modbus protocol**:

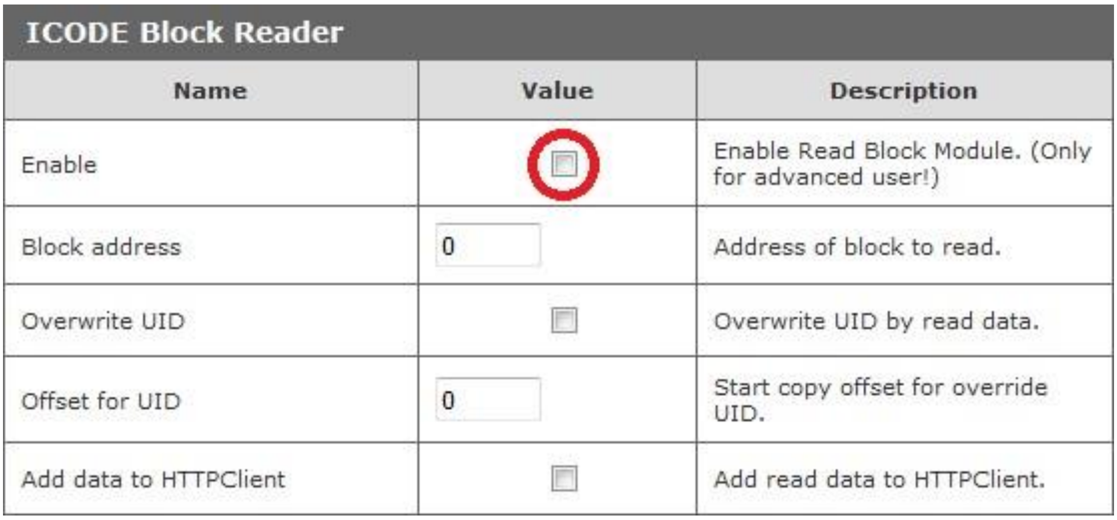


```
Pt. No.   Value
00100       99x
00101       99x
00102       99x
00103       11x
00104       11x
00105       28x
00106       42x
00107       37x
00108       6ax
00109       aax
00110       ffx
00111       fax
00112       fax
00113       fax
00114       11x
00115       22x
```

7.5.2 Reading the content of the ICODE tag – HTTP GET command

ICODE cards has an EEPROM memory. The user can write and read as well data on the card memory. The tag memory is organized in blocks (**one block** consists of **4 bytes**).

Attention! For proper operation of the read / write function **via HTTP GET,** it is **necessary** to **disable the Read Block Module function in the RFID Settings tab!**



ICODE Block Reader

Name	Value	Description
Enable	□	Enable Read Block Module. (Only for advanced user!)
Block address	0	Address of block to read.
Overwrite UID	□	Overwrite UID by read data.
Offset for UID	0	Start copy offset for override UID.
Add data to HTTPClient	□	Add read data to HTTPClient.

The user can record and read the content of the tag.

To read the contents of the card, simply use the command: IPaddress/block.xml?block=**blocknumber**

After sending the command, bring the card close to the reader.

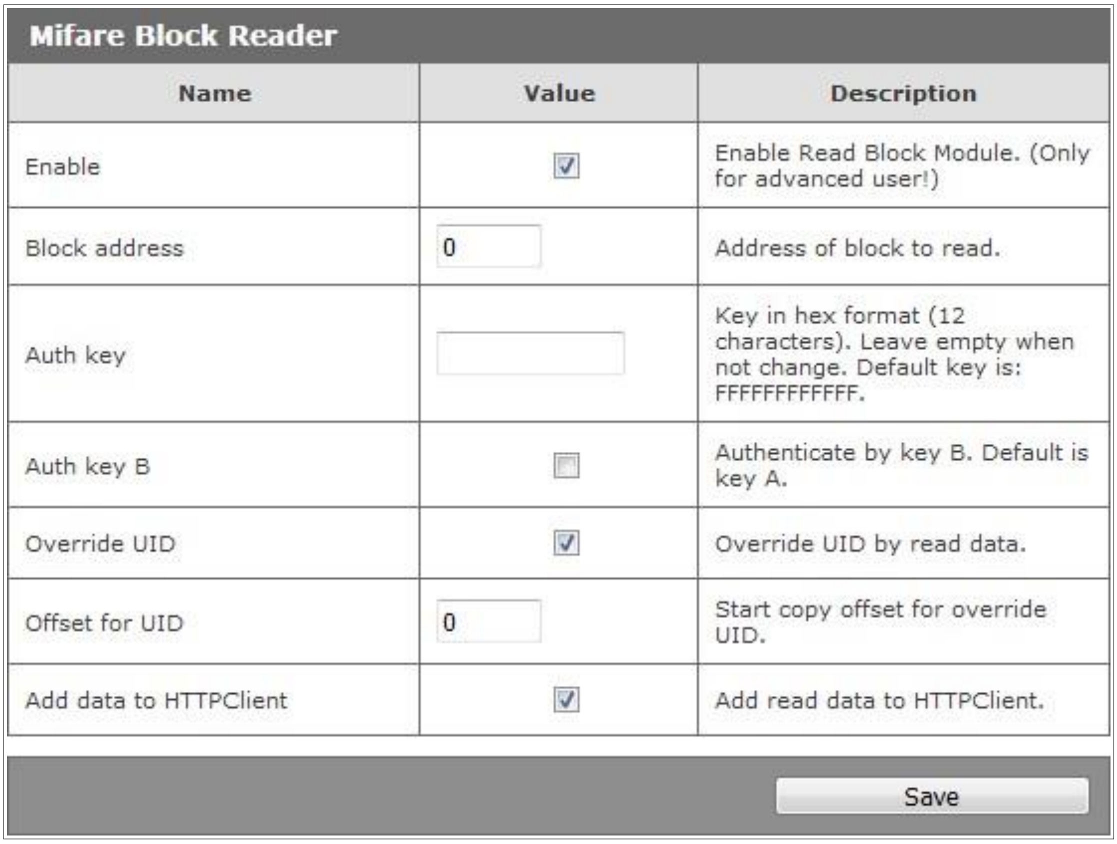
The reader will respond as follows:

```
<cardContent>
      <result>0</result>
      <uid>9D720004000004E0</uid>
      <block>33333333444444445555555566666666</block>
</cardContent>
```

Note!
In case the **result** value is **different** from **0** – read operation **failed**.

7.5.3 Reading the content of the Mifare Classic 1k/4k tag – Block Reader

At ***RFID Settings*** tab in **Mifare Block Reader** table the user can configure the block reading of the Mifare card.



Mifare Block Reader

Name	Value	Description
Enable	☑	Enable Read Block Module. (Only for advanced user!)
Block address	0	Address of block to read.
Auth key		Key in hex format (12 characters). Leave empty when not change. Default key is: FFFFFFFFFFFF.
Auth key B	□	Authenticate by key B. Default is key A.
Override UID	☑	Override UID by read data.
Offset for UID	0	Start copy offset for override UID.
Add data to HTTPClient	☑	Add read data to HTTPClient.

Meaning of fields:

- **Enable** – a read block function is enabled,
- **Block address** – a block address,
- **Auth key –** authentication key in hexadecimal value written to read only memory. It is changed only if necessary. Default key is 6xff (FFFFFFFFFFFF),
- **Auth key B** – Key B choice. By default the authentication key is "A", in case key "B" is required mark this option.,
- **Override UID –** a card's UID is overwritten with readout data,
- **Offset for UID –** an offset for a UID rewrite,
- **Add data to HTTPClient** – a block of readout data is added to GET request in HTTP Client mode.

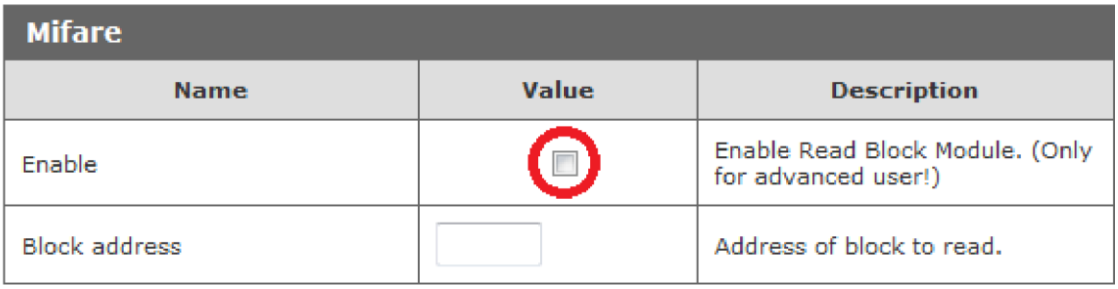
Attention! Entering an incorrect authentication key cases the reader will not beep. This state is considered an unread card.

An example of block reading by the **HTTPClient protocol**:

GET ?mac=801F127B8E7B&ip=192.168.0.236&name=&id=697C0004000004E0&inout=0&**block**=99999911112842376AAAFFFAFAFA1122&io=0&put=1

7.5.4 Reading the content of the Mifare Classic 1k/4k – HTTP GET command

Attention! For proper operation of the read / write function **via HTTP GET,** it is **necessary** to **disable the Read Block Module function in the RFID Settings tab!**



Mifare

Name	Value	Description
Enable	□	Enable Read Block Module. (Only for advanced user!)
Block address		Address of block to read.

The user can record and read the content of the tag.
By sending the appropriate parameters, the user can read 16 bytes at a time -> the entire one block of tag memory.

Syntax:
IPaddress/block.xml?block=**blocknumber**&keyType=**AorB**&keyIdx=**0-7**

- block – block number for reading data,
- keyType – authorization type: key A or key B,
- keyIdx – key index from memory (0-7) - description below.

After sending the command, bring the card close to the reader.

Attention! Entering an incorrect authentication key cases the reader will not beep. This state is considered an unread card.

The reader will respond as follows:

```
<cardContent>
      <result>0</result>
      <uid>0000001CC60D0D</uid>
      <block>ABA00D00000000000000000000000000</block>
</cardContent>
```

Note! In case the **result** value is **different** from **0** – read operation **failed**.

The user can set up to 8 Mifare keys. An indicated key should be referenced via **keyIdx**. By default, all keys (0-7) have the value FFFFFFFFFFFF.
We recommend that the key with index '0' remain unchanged. Mifare tags have the default A and B keys set to FFFFFFFFFFFF.

To set the Mifare key, the user needs to send 2 parameters:

c) **keyIdx** – location number,
d) **key** – key in hex format (6 bytes 12 hex characters).→

Syntax:
IPaddress/block.xml?keyIdx=**location**&key=**key(in hex format) After**

sending the command, bring the card close to the reader.

An example of key definition:
http://192.168.111.15/block.xml?keyIdx=2&key=FFB7FFB7FFB7

Description:
The reader will respond as follows:

```
<cardContent>
      <result>12</result>
      <uid>00000000000000</uid>
      <block>00000000000000000000000000000000</block>
</cardContent>
```

Note! (pertain to key definition)
If the **result** value **equals 12** – key write operation completed **successfully**. If the **result** value **equals 11** – key write operation **failed**.

Example #1 – reading data of block 14:
http://192.168.111.15/block.xml?block=14&keyType=A&keyIdx=3

Description:
The reader will respond as follows:

```
<cardContent>
      <result>0</result>
      <uid>0000001CC60D0D</uid>
      <block>99000000000000000000000000000000</block>
</cardContent>
```

The **result** value is **'0'**, so the **data read** operation was **successful**.

Key authorization **'A'** (keyType=**A**) from location No. **'3'** (keyIdx=**3**).

Example #2 - unsuccessful data reading operation:
http://192.168.111.15/block.xml?block=14&keyType=B&keyIdx=3

Description:
The reader will respond as follows:

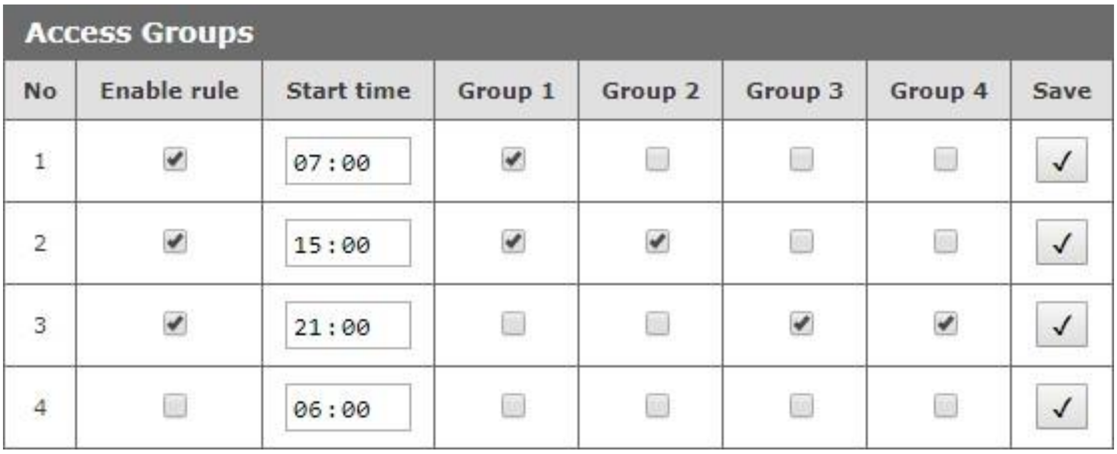
```
<cardContent>
      <result>10</result>
      <uid>0000001CC60D0D</uid>
      <block>00000000000000000000000000000000</block>
</cardContent>
```

In case the **result** value is **different** from **0** – read operation **failed**.

Key authorization **'B'** (keyType=**B**) from location No. **'3'** (keyIdx=**3**).

7.6 Access groups

The reader allows you to activate selected cards at a specified time. This means that you should set the time from which the user will be recognized in the system. Group configurations are made in the *Access* tab.



Access Groups

No	Enable rule	Start time	Group 1	Group 2	Group 3	Group 4	Save
1	☑	07:00	☑	☐	☐	☐	✓
2	☑	15:00	☑	☑	☐	☐	✓
3	☑	21:00	☐	☐	☑	☑	✓
4	☐	06:00	☐	☐	☐	☐	✓

In the **Access Groups** table, you can set 4 activation times for the group. The individual fields of the table mean:

- **enable rule –** rule activation,
- **start time –** group activation time (at 21:00, groups 1 and 2 are inactive, and groups 3 and 4 are active),
- **group 1-4** – assigning the rule to the groups.

The configuration of each rule should be saved with the **Save** button.

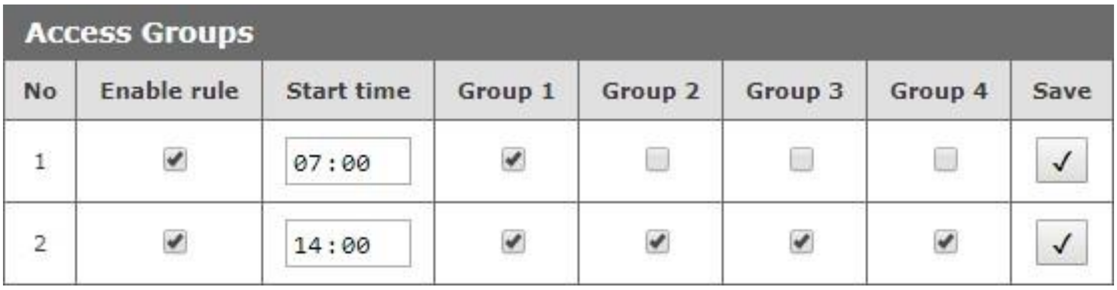
Attention! If the **Enable rule** field is not checked, the group assignment for this rule will not unlock the card.

Attention! In the case when several groups with different activation rules are assigned to the card, the rule that **activates** the card takes **priority**.

Attention! If the card is not assigned to any group, it means its deactivation.

Example No. 1:

Only rules No. 1 and 2 are enabled.

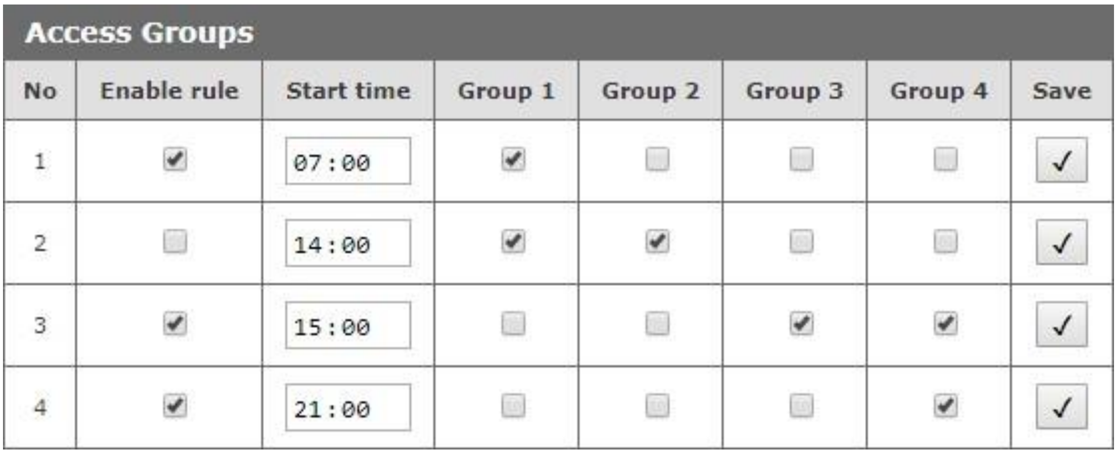


Access Groups

No	Enable rule	Start time	Group 1	Group 2	Group 3	Group 4	Save
1	☑	07:00	☑	☐	☐	☐	✓
2	☑	14:00	☑	☑	☑	☑	✓

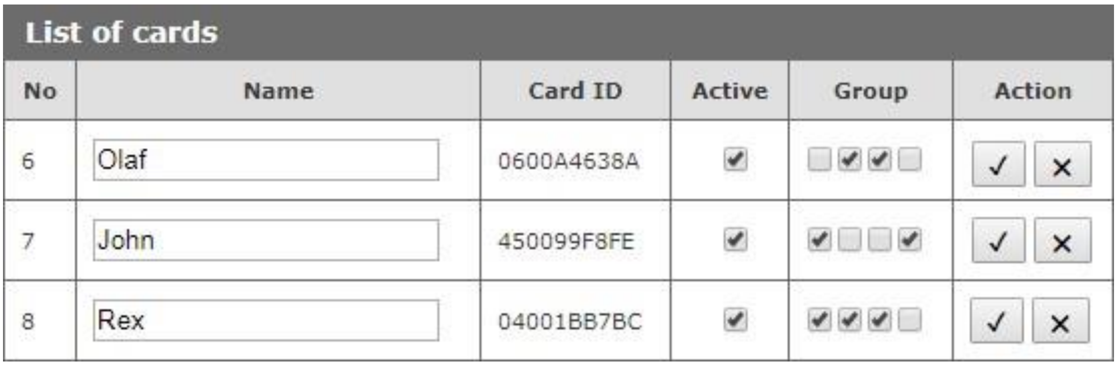
Cards with group 1 will be active all day.
Cards with groups 2, 3 and 4 will be active from 14:00 to 7:00.

Example No. 2:
Rules No. 1 and 3 and 4 are enabled.



Access Groups

No	Enable rule	Start time	Group 1	Group 2	Group 3	Group 4	Save
1	☑	07:00	☑	☐	☐	☐	✓
2	☐	14:00	☑	☑	☐	☐	✓
3	☑	15:00	☐	☐	☑	☑	✓
4	☑	21:00	☐	☐	☐	☑	✓



List of cards

No	Name	Card ID	Active	Group	Action
6	Olaf	0600A4638A	☑	☐☑☑☐	✓ ×
7	John	450099F8FE	☑	☑☐☐☑	✓ ×
8	Rex	04001BB7BC	☑	☑☑☑☐	✓ ×

Groups:
Before 7:00 am, group 4 is active (rule from 21:00). At 7:00 the group 4 is deleted and group 1 is activated. At 14:00, rule number 2 begins, which should delete rule 1.
The **Enable rule** field is **not** checked, so the reader does not include this rule.
At 15:00, group 1 is deactivated but groups 3 and 4 are activated. From 21:00 to 7:00 only group 4 is active. Group 2 is inactive all day.

Users:
Groups 2 and 3 are assigned to the user **Olaf**. The user will be recognized in the system **between 15:00 and 21:00**. Only rule No. 3 activates group 3.

Groups 1 and 4 are assigned to the user **John**. This means that the card will be active **all day**. From 7:00 the group 1 is activated. At 15:00, Group No. 1 is inactive, however group 4 is activated. Group 4 is deactivated at 7:00.

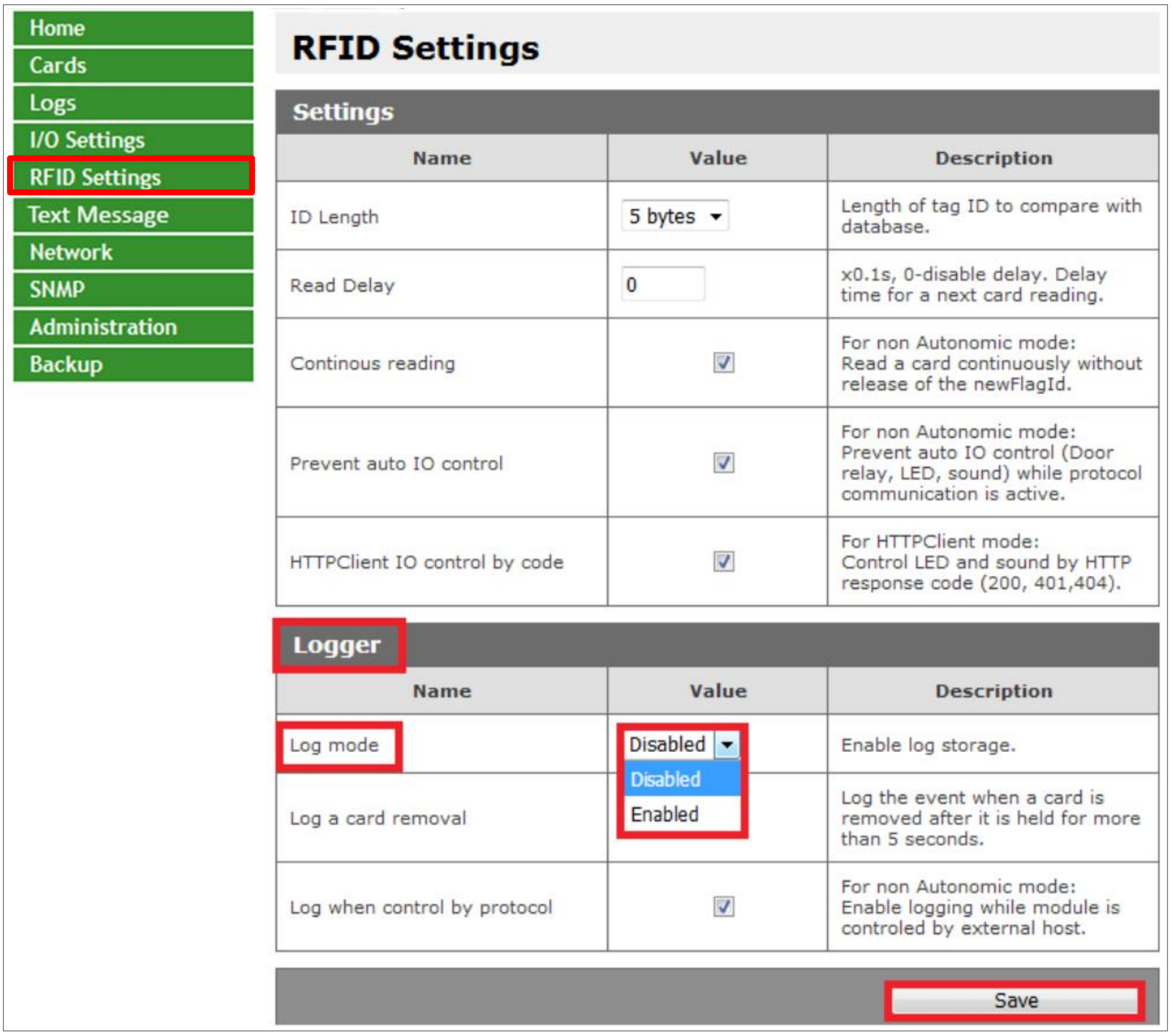
Groups 1, 2 and 3 are assigned to the user **Rex**. This user's card will be active **from 7:00 to 21:00**. From 7:00 the group 1 is activated. At 15:00 the rule for group No. 1 is deleted, but the rule for group 3 is fulfilled. At 21:00 the rule for group 3 is deleted.

7.7 Event logs

The reader has ability to log tags readout data.

To record a log of a RFID tag readout in the reader's memory, in the menu select **RFID Settings Logger** → and enable **Log mode**.

Events logs can be viewed by:
1. WWW page (The menu Logs tab)
2. XML file
3. Modbus – readout from relevant addresses (chapter 8.1) 4. raw file



RFID Settings

Settings

Name	Value	Description
ID Length	5 bytes	Length of tag ID to compare with database.
Read Delay	0	x0.1s, 0-disable delay. Delay time for a next card reading.
Continous reading	☑	For non Autonomic mode: Read a card continuously without release of the newFlagId.
Prevent auto IO control	☑	For non Autonomic mode: Prevent auto IO control (Door relay, LED, sound) while protocol communication is active.
HTTPClient IO control by code	☑	For HTTPClient mode: Control LED and sound by HTTP response code (200, 401,404).

Logger

Name	Value	Description
Log mode	Disabled Disabled Enabled	Enable log storage.
Log a card removal		Log the event when a card is removed after it is held for more than 5 seconds.
Log when control by protocol	☑	For non Autonomic mode: Enable logging while module is controled by external host.

Events logger setup panel

Log mode: Disabled – logging disabled

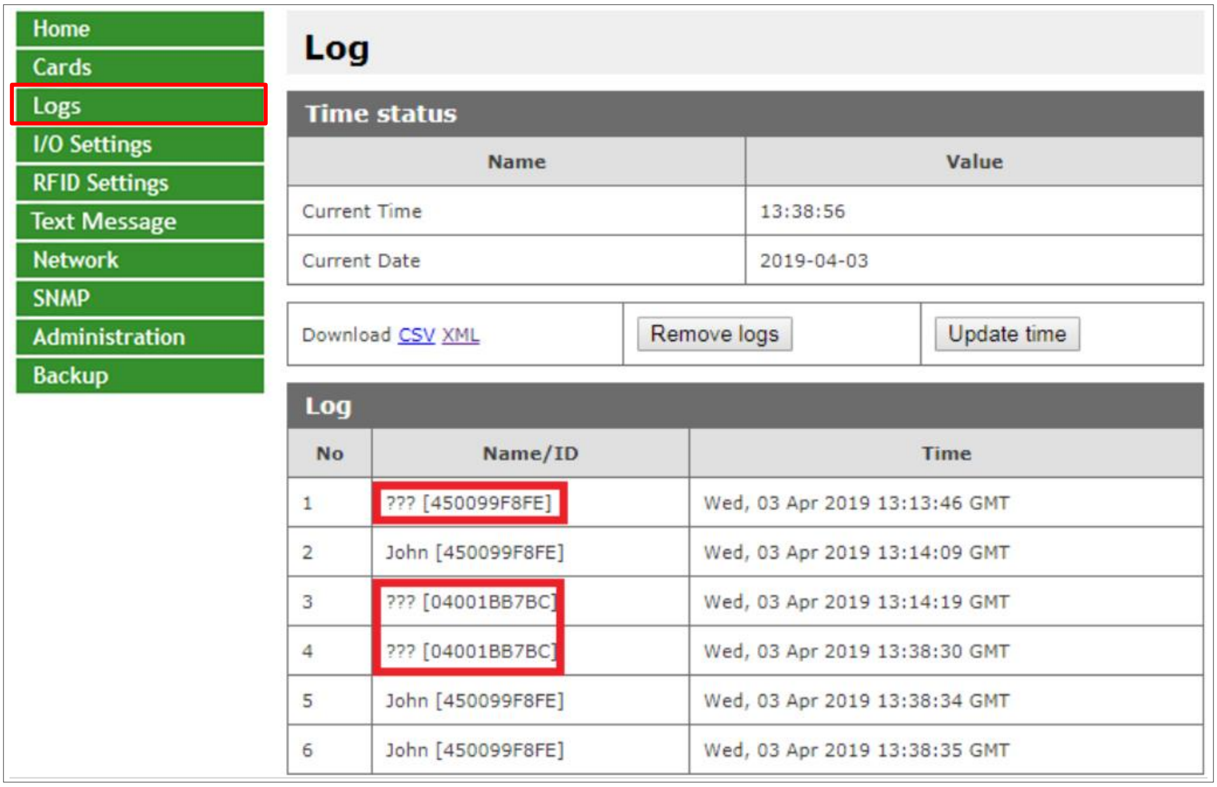
Log mode: Enabled – logging to internal memory enabled

Log a card removal – selecting this option results in an additional record of an event when a tag has been drawn away, after it was drawn near the reader for more then 5 seconds. The option is available in the "Continuous reading" mode, only.

Log when controlled by a protocol – this option allows to log events even the reader is controlled by a network protocol. By default the reader, when operated by a network protocol doesn't log events.

7.7.1 Event logs on the website

The **Log** table contains the history of card readings.



Log

Time status

Name	Value
Current Time	13:38:56
Current Date	2019-04-03

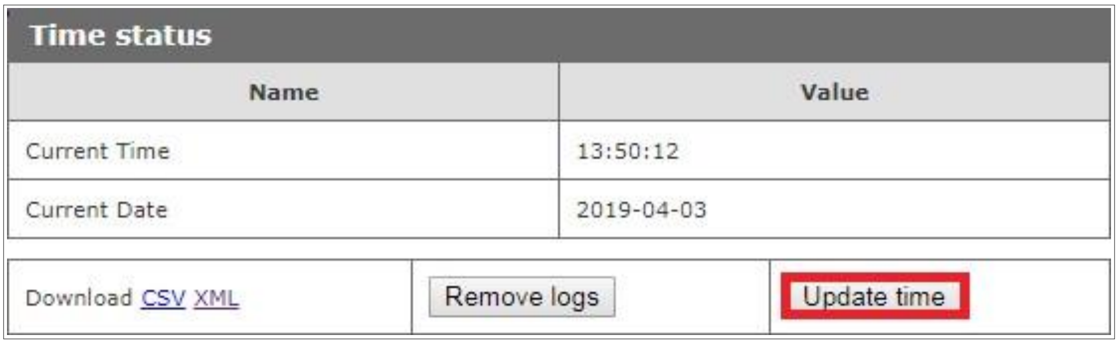
Log

No	Name/ID	Time
1	??? [450099F8FE]	Wed, 03 Apr 2019 13:13:46 GMT
2	John [450099F8FE]	Wed, 03 Apr 2019 13:14:09 GMT
3	??? [04001BB7BC]	Wed, 03 Apr 2019 13:14:19 GMT
4	??? [04001BB7BC]	Wed, 03 Apr 2019 13:38:30 GMT
5	John [450099F8FE]	Wed, 03 Apr 2019 13:38:34 GMT
6	John [450099F8FE]	Wed, 03 Apr 2019 13:38:35 GMT

Marked in the log table, cards ID data is an example of unrecognized cards which are not registered in the reader's memory or the card is inactive.

Remove logs deletes all logs from the reader's memory.

There is a real time clock inbuilt into the reader. After selecting **Update time** button the internal reader's clock will synchronize with the connected computer current time.



Time status

Name	Value
Current Time	13:50:12
Current Date	2019-04-03

7.7.2 Event logs by XML file

All cards logs in the reader memory can be retrieved by referencing to the resource file theDeviceIPaddress/logList.xml or on the ***Logs*** tab press Download **XML** line.

Sample:

```
<logList>
        <logItem>
                <no>1</no>
                <id>0</id>
                <name/>
                <cardId>450099F8FE</cardId>
                <state>00000110</state>
                <time>1554297226</time>
        </logItem>
        <logItem>
                <no>2</no>
                <id>7</id>
                <name>John</name>
                <cardId>450099F8FE</cardId>
                <state>10000110</state>
                <time>1554297249</time>
        </logItem>
        <logItem>
                <no>3</no>
                <id>0</id>
                <name/>
                <cardId>04001BB7BC</cardId>
                <state>00000110</state>
                <time>1554297259</time>
        </logItem>
</logList>
```

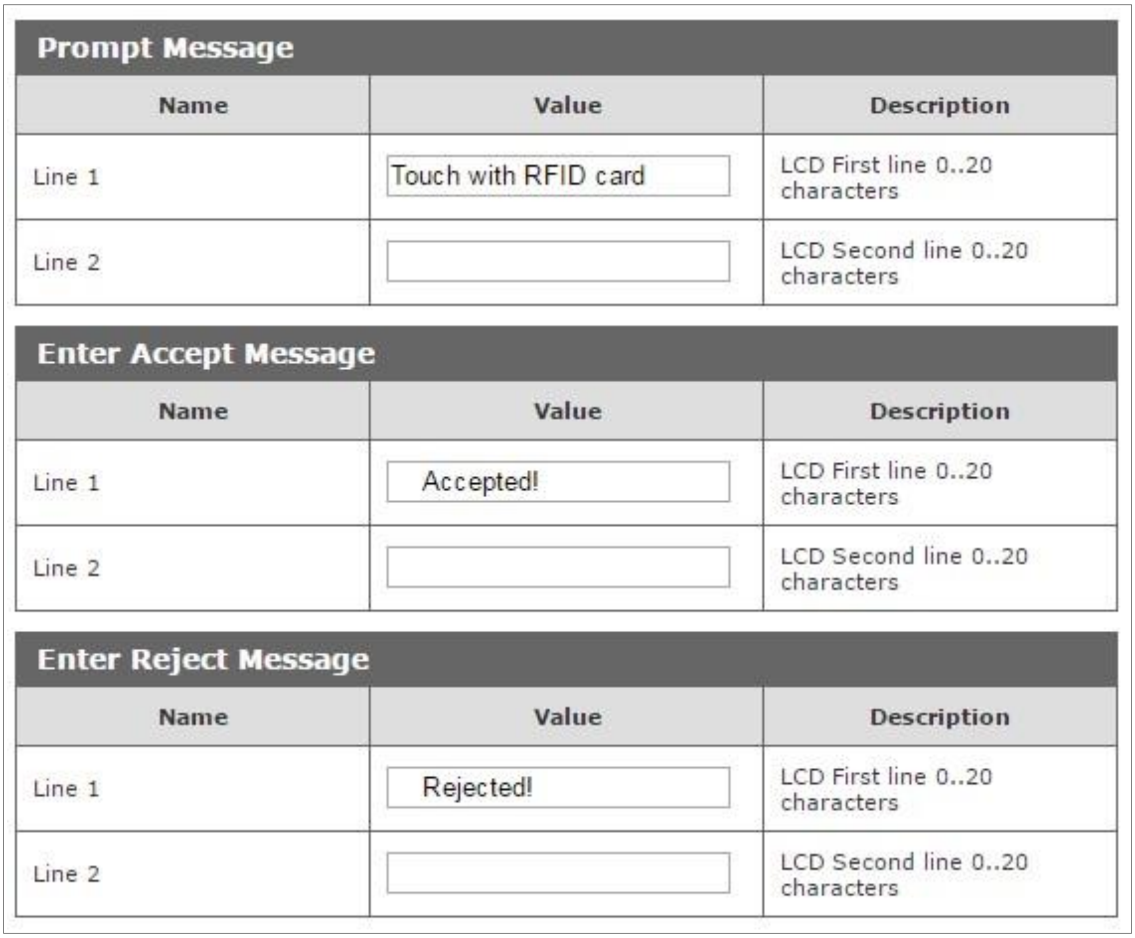
- **no** – log number
- **id** – ID number of the defined card from the ***Cards*** tab,
- **name** – name of recognized card. For unsaved or inactive cards this tag is empty,
- **cardID** – the UID number of the card,
- **state** – it refer only to the RCP reader with keys – flag defines which function keys have been selected:

Bit	Decimal value	Description
0	1	Function key no.1 (np. privete)
1	2	Function key no.2 (np. official)
2	4	Function key no.3 (np. entrance)
3	8	Function key no.4 (np. exit)
4	16	Reserved
5	32	Reserved
6	64	Reserved
7	128	The card recognized by the reader

- **time** – time in Unix format

7.8 Text Messages

In the **Text Message** menu, an administrator needs to set up text messages which will be shown on the reader display during the device's operation e.g. an active card readout, an inactive card readout, a timeout value.



Prompt Message

Name	Value	Description
Line 1	Touch with RFID card	LCD First line 0..20 characters
Line 2		LCD Second line 0..20 characters

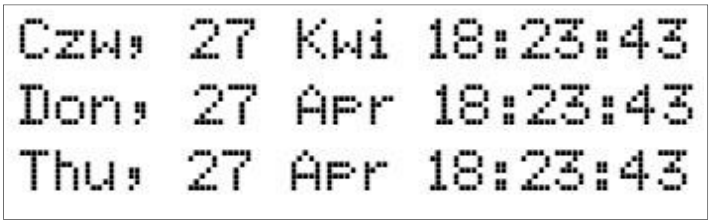
Enter Accept Message

Name	Value	Description
Line 1	Accepted!	LCD First line 0..20 characters
Line 2		LCD Second line 0..20 characters

Enter Reject Message

Name	Value	Description
Line 1	Rejected!	LCD First line 0..20 characters
Line 2		LCD Second line 0..20 characters

In the **Time** table, a local language can be selected for a display of real time in the first line of the reader's LCD.



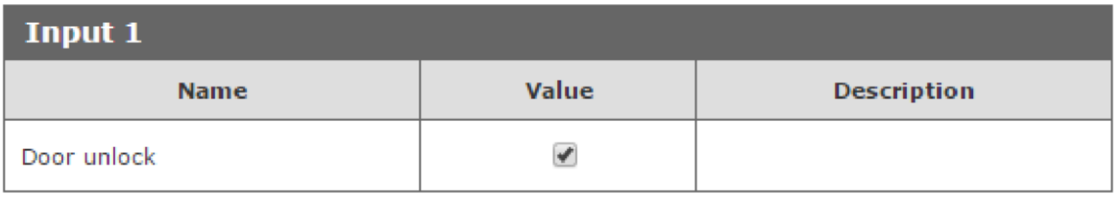
```
Czw, 27 Kwi 18:23:43
Don, 27 Apr 18:23:43
Thu, 27 Apr 18:23:43
```

7.9 Events responses – I/O Settings

The reader can automatically control the sound indicator system, an optical indicator system, bolt relay and alarm state. These functions are described in the tables below.

Attention! If the reader is set up to control by software mode (chapter 7.2), configuration of additional functions for control (of outputs, as well as for the sound and optical indicators) is needed.

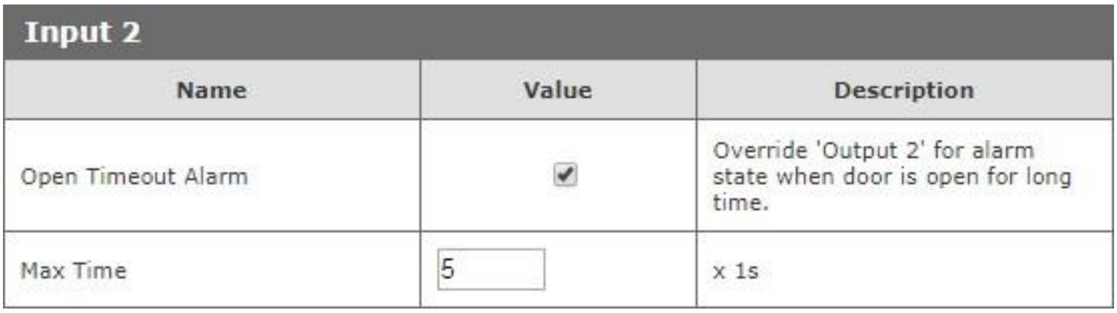
In **Input 1** table, when **Door unlock** option is marked, activation of Input 1 will automatically switch on the output relay (e.g. for a lock's bolt).



Input 1

Name	Value	Description
Door unlock	☑	

The **Input 2** table allows you to set the response to the contact open of **input 2** for specified time (defined in Max Time field).



Input 2

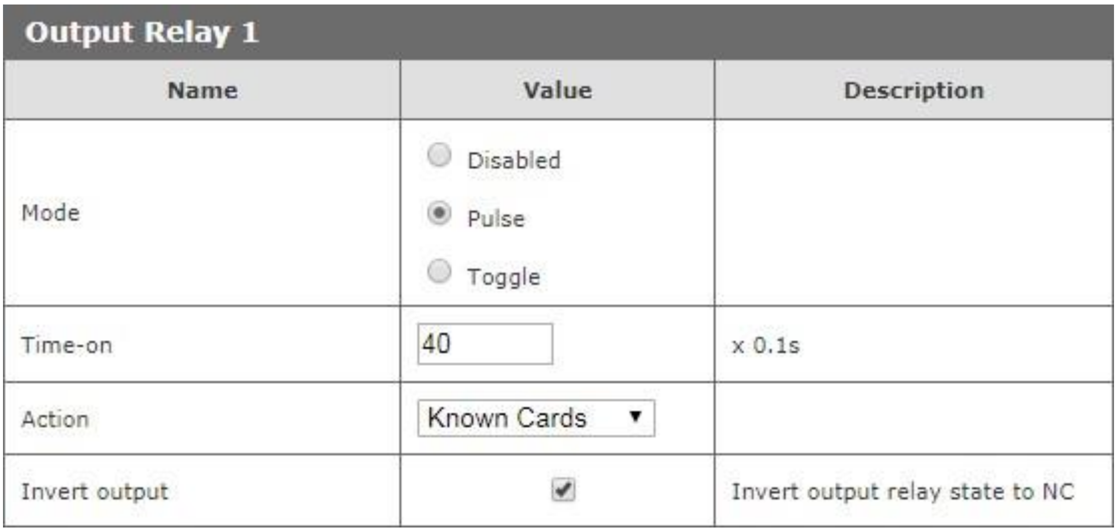
Name	Value	Description
Open Timeout Alarm	☑	Override 'Output 2' for alarm state when door is open for long time.
Max Time	5	x 1s

Checking the **"Open Timeout Alarm"** forces the relay No. 2 at the time when the input No. 2 will be switched on for longer than the time specified in the Max Time field.

With this function, you can connect the door open sensor to the No. 2 input, and the alarm siren to the No. 2 output will cause that if someone opens the door and does not close in the specified time, the siren will sound.

All changes must be saved by clicking the **Save** button.

The relay outputs can be configured in the **Output Relay 1**, **Output Relay 2** table.



Output Relay 1

Name	Value	Description
Mode	○ Disabled ● Pulse ○ Toggle	
Time-on	40	x 0.1s
Action	Known Cards ▼	
Invert output	☑	Invert output relay state to NC

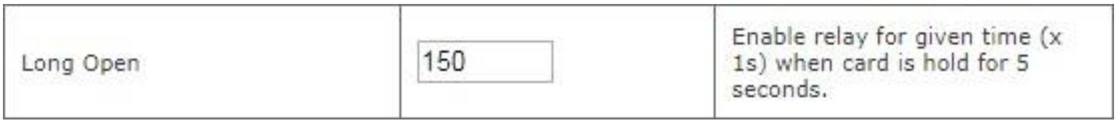
In **Output Relay** table a work mode of the relay for a lock's bolt can be adjusted.

No	Name	Description
1	Mode	**Disabled –** relay control is switched off **Pulse** – output activation switches relay on for a set time duration (e.g. for a lock's control) **Toggle** – every tag read event changes the relay state to opposite
2	Time-on	The set time duration for activation of the relay in **Pulse** mode, in numbers multiplied by 0.1 second (e.g. value 20 equals to 2 seconds)
3	Action	Actions modes which activate output. **None (control by a protocol)** – control take place by HTTP, SMNP, MODBUS protocols. **All Cards** – activation of output by RFID tags readout of all cards. **Known Cards** – activation of output by RFID tags readout of known cards only. **Unknown Cards** – activating the output only after readout an inactive or unknown tag (for example: warning).
4	Invert output	It changes the type of relay output from the NO output to the NC output.

The relay outputs are configured independently.

7.10 Long open – I/O Settings

The option is available only for relay output 1 and allows the output to be turned on for a specified time (maximum 38912 seconds).



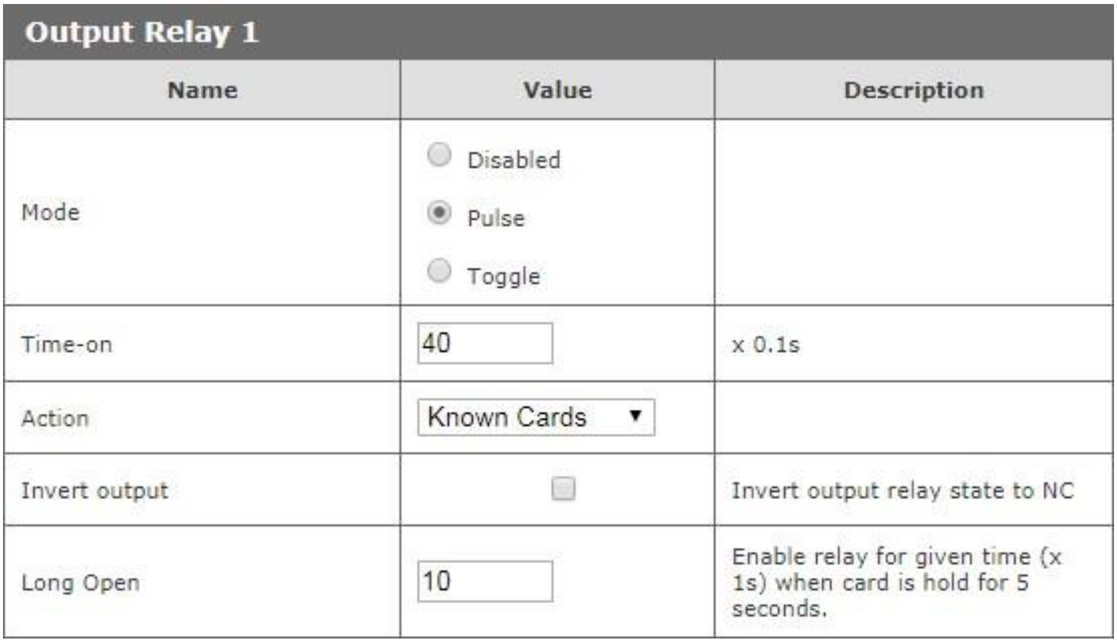
Long Open	150	Enable relay for given time (x 1s) when card is hold for 5 seconds.

The option is activated only when the relay output is set to **Pulse mode,** the user **card** must be **active** and **assigned** to **group No. 4**. Group 4 does not have to be active, but the card must be assigned to it.

Attention! If the card is not assigned to group #4, the Long Open option will not be activated.

Example:

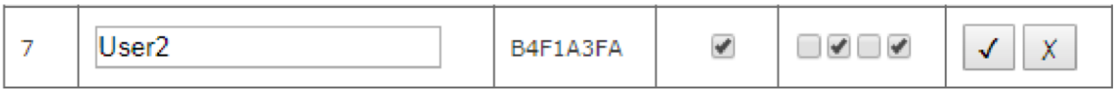
Output setting **(I / O Settings)**



Output Relay 1

Name	Value	Description
Mode	○ Disabled ● Pulse ○ Toggle	
Time-on	40	x 0.1s
Action	Known Cards ▾	
Invert output	□	Invert output relay state to NC
Long Open	10	Enable relay for given time (x 1s) when card is hold for 5 seconds.

The User2 card is assigned to groups No. 2 and No. 4 (***Cards*** tab).



7	User2	B4F1A3FA	☑	□ ☑ □ ☑	✓ X

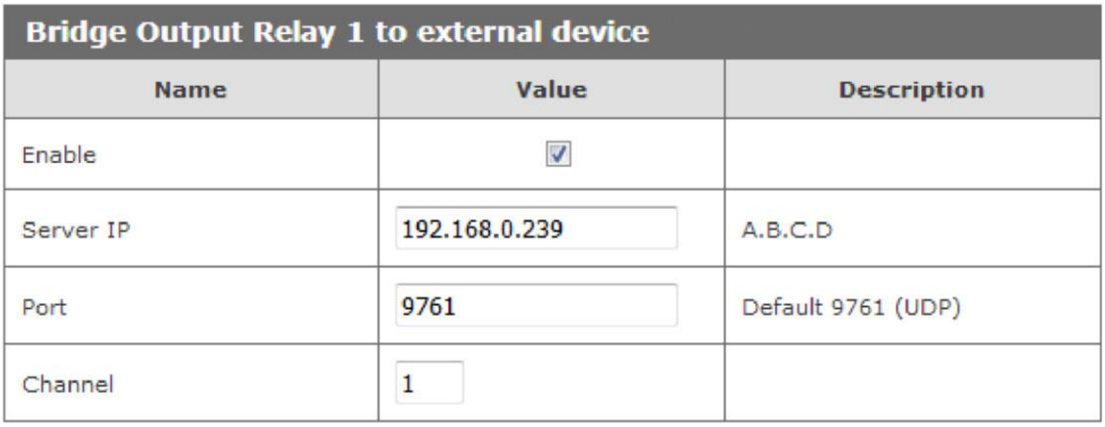
Groups #1 and #2 are active at the moment.

After drawing near the **User2 card** to the reader, **output 1** will be **activated** for **4 seconds** (0.1 * 40), and if the card is drawn near to the reader for more than 5 seconds, the output will be activated for an additional 10 seconds. (output will be enable for 4 seconds, disable for 1 second and enable for 10 seconds).

After drawing near the card, the user will hear the standard card read sound. If the card is close to the reader for more than 5 seconds – the device will signal that the card is in the reader field by one-tone beeps. The last high tone indicates that the Long Open function has been enabled.

7.11 Switching on the relay in another device – I/O Settings

RFID reader after having brought a card closer, can turn on the relay in another device. The option is available in the ***I/O Settings*** tab.



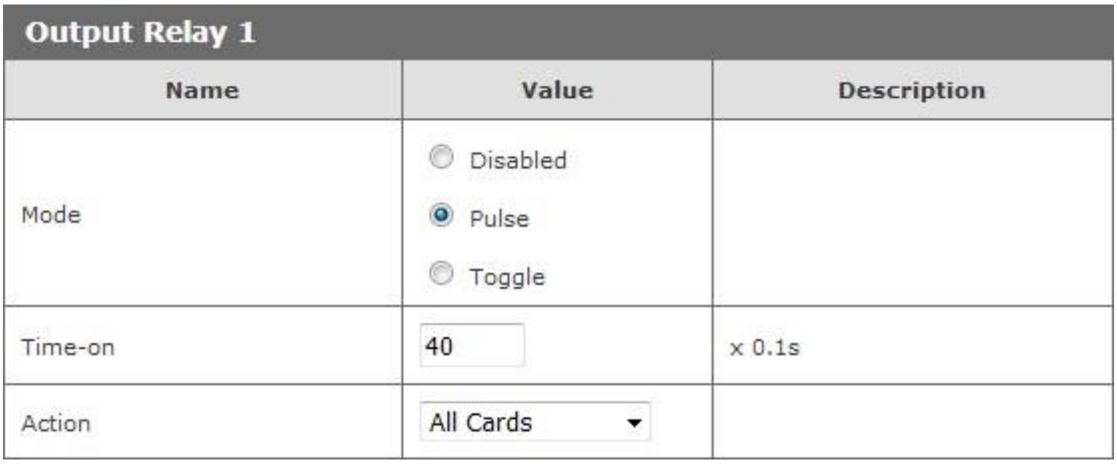
Bridge Output Relay 1 to external device

Name	Value	Description
Enable	☑	
Server IP	192.168.0.239	A.B.C.D
Port	9761	Default 9761 (UDP)
Channel	1	

Meaning of fields:

- **Enable** – enable the relay status transfer service,
- **Server IP** – external device IP address,
- **Port** – the port of the external device – default 9761 (UDP),
- **Channel** – channel in the external device.

The service transfers the state of relay output 1 of the RFID reader to a external device (e.g. LanTick). The relay in the external device is activated when the relay output 1 is activated in the reader, therefore what is set in the **Output Relay 1** table is important.



Output Relay 1

Name	Value	Description
Mode	○ Disabled ● Pulse ○ Toggle	
Time-on	40	x 0.1s
Action	All Cards ▾	

Attention! If the relay No. 1 in the reader is set in the **Pulse** mode, it is necessary to properly configure the output in the external device (**Time Based mode**) so that the output in this device works the same as in the reader. Placing close the card will **only enable** the output. A **external device must automatically turn off the relay** after a specified time.

External modules configuration

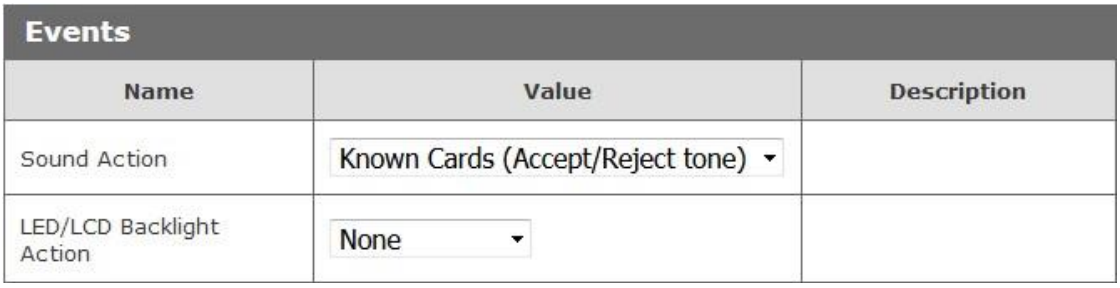
To enable the service, go to the ***Administration*** tab and select the **Enable Program Access** option, and then confirm with the **Save Config** button.

7.12 Sound and visual signaling – I/O Settings

RFID reader has three possible sound indicators:

- *Accept sound* – two audio tones, one after another: first short low and second longer and higher in tone. "Accepting" sound.
- *Reject sound* – two audio tones, one after another: first short low, same as for accept sound and second longer and lower then the first. "Rejecting" sound.
- *Short beep* – short and low as the first one for accept/reject

In **Events** table the reader's behavior can be programmed for RFID tags readout events:



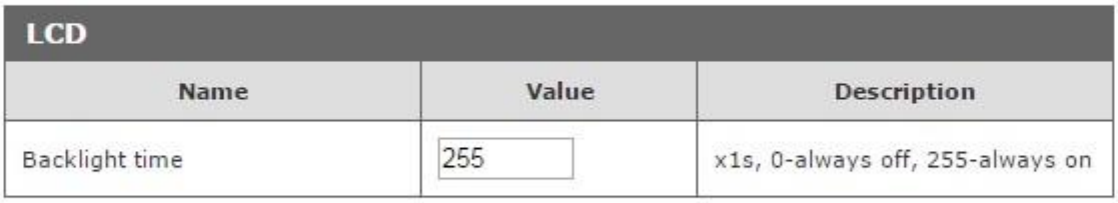
Events

Name	Value	Description
Sound Action	Known Cards (Accept/Reject tone) ▾	
LED/LCD Backlight Action	None ▾	

No	Name	Description
1	Sound Action	Sound indicators for different events modes **None –** no sound indicator **All Cards (Accept tone) –** the reader makes an accept tone sound for all cards. **All Cards (Short beep)** – the reader makes a short beep tone sound for all RFID tags.* **Known Cards** – the reader makes an accept tone sound for known cards (recorded in the reader's memory) and reject sound for unknown.
2	LED/LCD backlight Action	The reader's LED, LCD optical indications modes **None** – the reader is controlled by HTTP, SMNP, MODBUS protocols. **All Cards** – optical indications for all RFID tags **Known Cards** – optical indications for known card tags (recorded in the reader's memory)

* the short beep tone can be used for the reader's communication with a network server. In this case the reader gives the short beep tone indication for a tag readout, but the server ought to process received information.

The readers LCD screen backlight has a timeout setting.



LCD

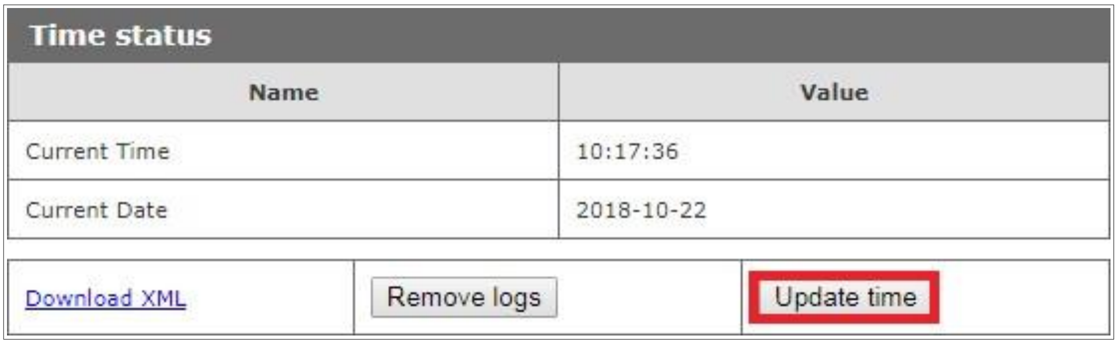
Name	Value	Description
Backlight time	255	x1s, 0-always off, 255-always on

When the value is set to 255 the display is always on.
The value set to 0 turns the display off.
The value set to e.g. 5 causes the display to turn on for 5 seconds after a tag's readout.

7.13 Real Time Clock (RTC)

The readers are equipped with a real time clock.

The time can be set manually in the ***Logs*** tab. The time is copied from the system.

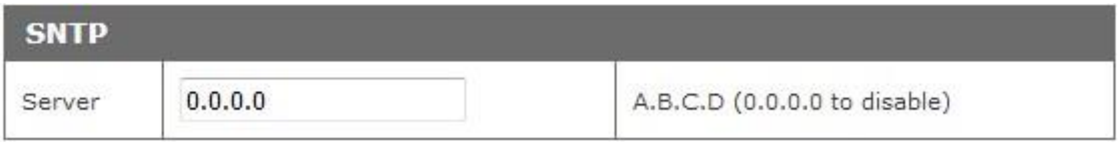


Time status

Name	Value
Current Time	10:17:36
Current Date	2018-10-22

Additionally, a time server can be synchronized with internal time of the reader by SNTP protocol. The configuration settings is available in **NETWORK SNTP tab.** →

To switch on synchronization with SNTP server, write its address in Server address field. If 0.0.0.0 address is entered, time synchronization is switched off.



SNTP

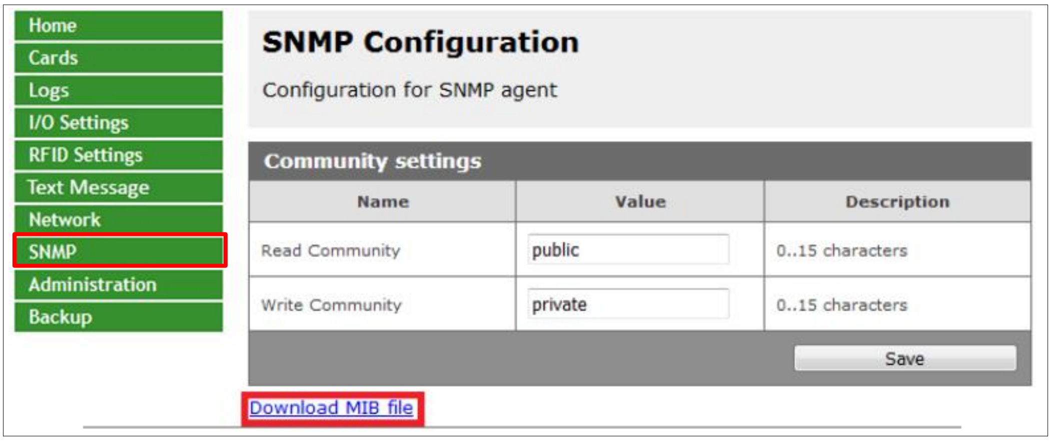
Server	0.0.0.0	A.B.C.D (0.0.0.0 to disable)

7.14 SNMP server configuration

The reader is fitted with a SNMP v2c server. This function can be enabled by **Administration Services Enable SNMP**→ → .

SNMP protocol facilitates inputs retrieving, setting up outputs status and retrieving ID number of the read tag.

MIB file which describes the structure is available for download in the SNMP tab under **Download MIB file** name.



SNMP Configuration

Configuration for SNMP agent

Community settings

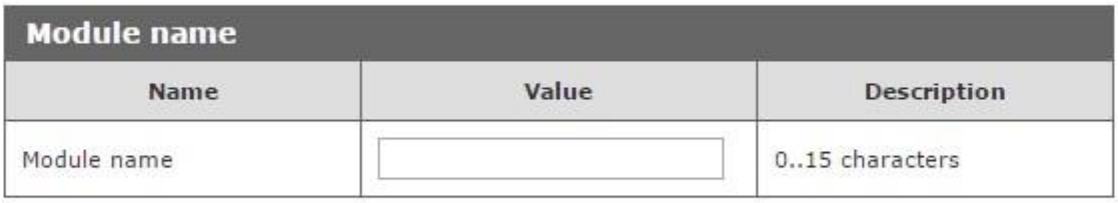
Name	Value	Description
Read Community	public	0..15 characters
Write Community	private	0..15 characters

7.15 Communications protocols and administration.

Administration menu allows for configuration of services, which needs to be active during operation of the device and for change of an access password.

The reader's name

Every reader may be named for identification purpose.

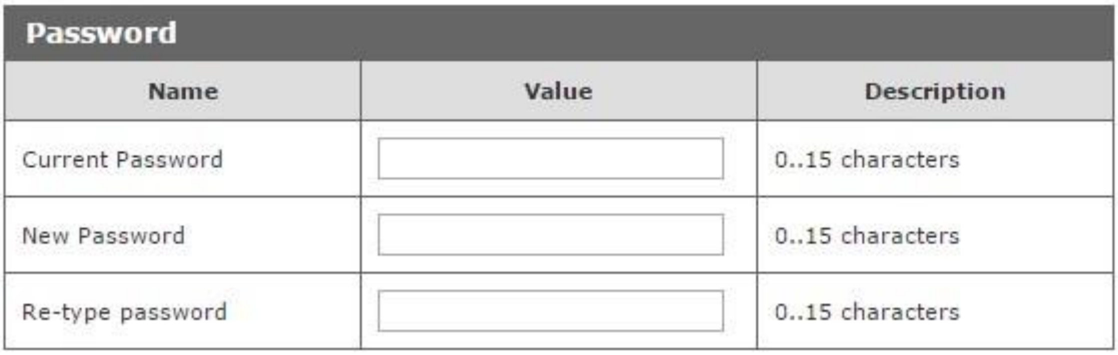


Module name

Name	Value	Description
Module name		0..15 characters

Change of an access password

In order to change of the password, the current password is written in the value field, then in ***New Password*** *and* ***Re-type Password*** a new password can be entered and saved with ***Save Config*** *button*.

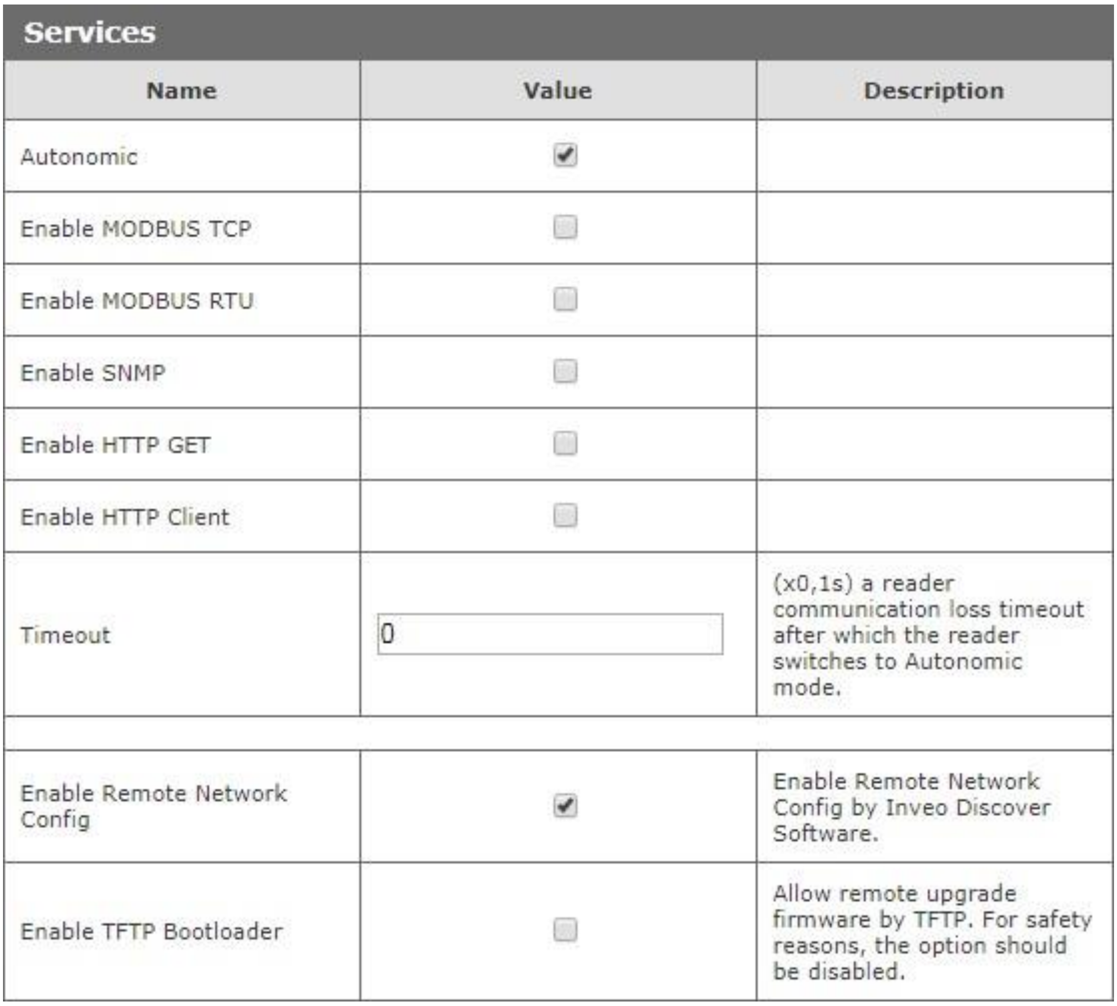


Password

Name	Value	Description
Current Password		0..15 characters
New Password		0..15 characters
Re-type password		0..15 characters

Services setup

The device allows choice of services available for its operation. Services can be activated by selecting suitable check box.



Services

Name	Value	Description
Autonomic	☑	
Enable MODBUS TCP	☐	
Enable MODBUS RTU	☐	
Enable SNMP	☐	
Enable HTTP GET	☐	
Enable HTTP Client	☐	
Timeout	0	(x0,1s) a reader communication loss timeout after which the reader switches to Autonomic mode.
Enable Remote Network Config	☑	Enable Remote Network Config by Inveo Discover Software.
Enable TFTP Bootloader	☐	Allow remote upgrade firmware by TFTP. For safety reasons, the option should be disabled.

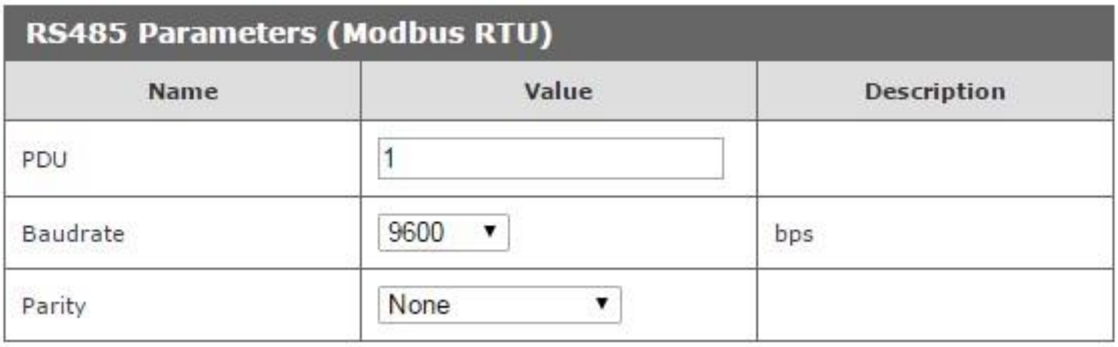
Autonomic – the reader's standalone mode,
Enable MODBUS TCP– Modbus TCP service is enabled,
Enable MODBUS RTU– Modbus RTU service is enabled,
Enable SNMP- SNMP protocol is enabled,
Enable HTTP GET – the reader's **HTTP Server** work's mode is selected,
Enable HTTP Client – the reader's **HTTP Client** work's mode is selected,
Timeout – time duration of server-reader communication loss after which the reader switches to Autonomic mode,
Enable Remote Network Config – remote network configuration is selected (for Discoverer application),
Enable TFTP Bootloader – TFTP bootloader is enabled.

Attention:
For precaution reason, **TFTP Bootloader** and **Remote Network** configuration during regular operation of the reader, should be **disabled**. These are enabled for the device firmware upgrade task, only.

8 Communication with the reader

8.1 Modbus

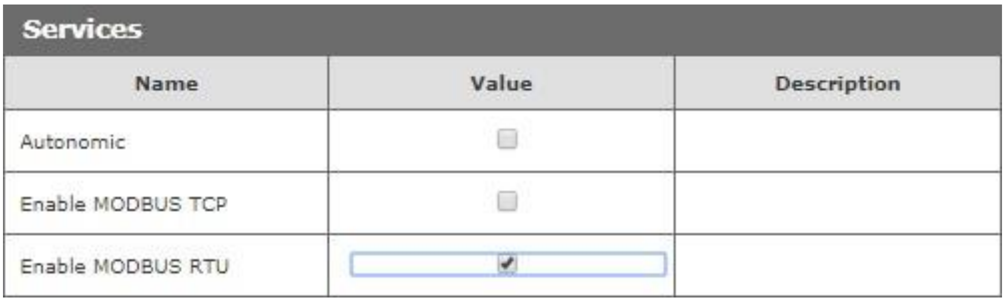
Modbus is available by RS485 (Modbus RTU) or by TCP (Modbus TCP).
Parameters of RS485 port for MODBUS RTU communication can be set at the table:



RS485 Parameters (Modbus RTU)

Name	Value	Description
PDU	1	
Baudrate	9600 ▼	bps
Parity	None ▼	

No	Name	Description
1	PDU	The reader's Modbus address value.
2	Baudrate	Data transfer speed Available speeds: 1200, 2400, 4800, 9600, 19200, 34800, 57600, 115200
3	Parity	Parity setting. Available options: None, None and 2 Stop, Even, Odd, Mark, Space



Services

Name	Value	Description
Autonomic	□	
Enable MODBUS TCP	□	
Enable MODBUS RTU	☑	

After setting the required parameters, enable the Modbus RTU service and confirm with the **Save** button.

The reader supports following functions of MODBUS RTU:
- 0x01 Read Coils
- 0x03 Read Holding Register
- 0x05 Write Single Coil
- 0x06 Write Single Register
- 0x0F Write Multiple Coils
- 0x10 Write Multiple Registers

No	Address	Type	R/W	Description
1	1	Holding Reg	R/W	Readout flag Read: 1 – a new transponder has been read Write: 0 – setting to zero of a readout flag
2	2	Holding Reg	R	ID_LEN
3	3	Holding Reg	R	Card ID/UID/CSN [0]
4	4	Holding Reg	R	Card ID/UID/CSN [1]
5	5	Holding Reg	R	Card ID/UID/CSN [2]
6	6	Holding Reg	R	Card ID/UID/CSN [3]
7	7	Holding Reg	R	Card ID/UID/CSN [4]
8	8	Holding Reg	R	Card ID/UID/CSN [5]
9	9	Holding Reg	R	Card ID/UID/CSN [6]
10	10	Holding Reg	R	Card ID/UID/CSN [7]
11	11	Holding Reg	R	Card ID/UID/CSN [8]
12	12	Holding Reg	R	Card ID/UID/CSN [9]
13	13	Holding Reg	R	Tag's type
14	14	Holding Reg	R	ID_MODEL
15	15	Holding Reg	R	ID_SW
16	16	Holding Reg	R	ID_HW
17	17	Holding Reg	R	Type of tag read 0 – none TAG 1 – unknown TAG 2 – USER 3 – MASTER
18	100	Holding Reg	R	For RFID IND M2/M4 only – Mifare block readout 16 subsequent bytes
19	1000	Holding Reg	R	Card ID/UID/CSN [0]
20	1001	Holding Reg	R	Card ID/UID/CSN [1]
21	1002	Holding Reg	R	Card ID/UID/CSN [2]
22	1003	Holding Reg	R	Card ID/UID/CSN [3]
23	1004	Holding Reg	R	Card ID/UID/CSN [4]
24	1005	Holding Reg	R	A device model (IND-U4 0x5534)→
25	1006	Holding Reg	R	Software version
26	1007	Holding Reg	R	Hardware version

Holding Registers 1000-1007 are so arranged for backward compatibility.

Cards records edition				
27	1100	Holding Reg	R/W	Address of a card record for edition
28	1101	Holding Reg	R/W	Card settings: described below
29	1102	Holding Reg	R/W	Card ID/UID/CSN [0]
30	1103	Holding Reg	R/W	Card ID/UID/CSN [1]
31	1104	Holding Reg	R/W	Card ID/UID/CSN [2]
32	1105	Holding Reg	R/W	Card ID/UID/CSN [3]
33	1106	Holding Reg	R/W	Card ID/UID/CSN [4]
34	1107	Holding Reg	R/W	Card ID/UID/CSN [5]
35	1108	Holding Reg	R/W	Card ID/UID/CSN [6]
36	1109	Holding Reg	R/W	Card ID/UID/CSN [7]
37	1110-1149	Holding Reg	R/W	User name, Polish character encoding ISO8859-2, name has to be finished with NULL (0x00)

Card settings (address 1101 Holding Registers):

Address 1101 Holding Register is responsible for whether the card is stored in the reader's memory, whether it is active and for which groups are assigned to the card.

Bit	Decimal value	Description
0	1	Determines whether the card is saved in the reader's memory.
1	2	Determines whether the card is active: 0 – inactive card, 1 – active card.
2	4	Assignment to group 1
3	8	Assignment to group 2
4	16	Assignment to group 3
5	32	Assignment to group 4
6	64	Reserved
7	128	Reserved

Examples of sent values and what does it means:

1. Removal of the card from the reader's memory - value 0.
2. Deactivating the card and assigning it to group 1 - value 5.
3. Assigning the card to all groups and activating it - value 63.

Log's records				
38	1200	Holding Reg	R/W	Number of records [MSB], sending 0 deletes all records
39	1201	Holding Reg	R	Number of records [LSB]
40	1202	Holding Reg	R	Selected record for readout [MSB]
41	1203	Holding Reg	R	Selected record for readout [LSB]
42	1204	Holding Reg	R	Timestamp [LSB]
43	1205	Holding Reg	R	Timestamp
44	1206	Holding Reg	R	Timestamp
45	1207	Holding Reg	R	Timestamp [MSB]
46	1208	Holding Reg	R	Event Event 0x0080 – a known card Event 0x0040 – a card drawn away
47	1210	Holding Reg	R	User ID (as in cards table)
48	1212	Holding Reg	R	Card ID/UID/CSN [0]
49	1213	Holding Reg	R	Card ID/UID/CSN [1]
50	1214	Holding Reg	R	Card ID/UID/CSN [2]
51	1215	Holding Reg	R	Card ID/UID/CSN [3]
52	1216	Holding Reg	R	Card ID/UID/CSN [4]
53	1217	Holding Reg	R	Card ID/UID/CSN [5]
54	1218	Holding Reg	R	Card ID/UID/CSN [6]
55	1219	Holding Reg	R	Card ID/UID/CSN [7]

Checking the card				
No	**Address**	**Type**	**R/W**	**Description**
56	1300	Holding Reg	R	Address of a card record
57	1301	Holding Reg	R	Card settings
58	1302	Holding Reg	R	Card ID/UID/CSN [0]
59	1303	Holding Reg	R	Card ID/UID/CSN [1]
60	1304	Holding Reg	R	Card ID/UID/CSN [2]
61	1305	Holding Reg	R	Card ID/UID/CSN [3]
62	1306	Holding Reg	R	Card ID/UID/CSN [4]
63	1307	Holding Reg	R	Card ID/UID/CSN [5]
64	1308	Holding Reg	R	Card ID/UID/CSN [6]
65	1309	Holding Reg	R	Card ID/UID/CSN [7]
66	1310-1349	Holding Reg	R	User name, Polish character encoding ISO8859-2, name has to be finished with NULL (0x00)

Attention!
Addresses 1300-1349 Holding Registers contain the same data as addresses 1100-1149 Holding Registers. The difference is that addresses 1300-1349 are read-only.

LCD display				
67	2000	Holding Reg	R/W	LCD Mode: 0 – standard 1 – controlled by MODBUS
68	2001	Holding Reg	R/W	LCD TIME, if LCD Mode=1: 0 – don't show real time on the LCD 1 – show real time on the LCD
69	2002	Holding Reg	R/W	LCD Clear: 1 – clear screen of the LCD
70	2010-2019	Holding Reg	W	First line of the LCD (if LCD TIME = 0 only)
71	2020-2039	Holding Reg	W	Second line of LCD
72	2040-2059	Holding Reg	W	Third line of the LCD
73	2060-2079	Holding Reg	W	Fourth line of the LCD

No	Address	Type	R/W	Description
1	1	Single Coil	R/W	Status/set up of output number 1
2	2	Single Coil	R/W	Status/set up of output number2
3	3	Single Coil	R	Status of output number 1
4	4	Single Coil	R	Status of output number 2
5	11	Single Coil	R	Status of input number 1
6	12	Single Coil	R	Status of input number 2
7	13	Single Coil	R/W	Controlling LED diode
8	14	Single Coil	R/W	Controlling LED diode
9	15	Single Coil	W	1-Accept sound
10	16	Single Coil	W	1-Reject sound
11	17	Single Coil	R/W	Readout flag Read: 1 – a new transponder has been read Write: 0 – setting to zero of a readout flag
12	18	Single Coil	R/W	Reset status Read: 1 – the reader has been reset (e.g. because power cut) Write: 1 – forced reset of the reader 0 – setting to 0 of a restart flag
13	1000	Single Coil	R	Status of output number 1 – e.g. of lock's bolt relay
14	1001	Single Coil	R	Status of input number 1
15	1002	Single Coil	R	Status of input number 2
16	1003	Single Coil	R	Auxiliary
17	1004	Single Coil	R/W	Readout flag Read: 1 – new transponder has been read Write: 0 – setting to zero of a readout flag
18	1005	Single Coil	R/W	Reset status Read: 1 – the reader has been reset (e.g. because of power cut) Write: 1 – forced reset of the reader 0 – setting to 0 of a restart flag
19	1010	Single Coil	W	1- e.g. door's lock bolt relay switches on
20	1011	Single Coil	W	1-Accept sound
21	1012	Single Coil	W	1-Reject sound
22	1013	Single Coil	R/W	Controlling LED diode
23	1014	Single Coil	R/W	Controlling LED diode

When a tag has been read, value 1 is written in Single Coil 1004 register- a new tag is found. Next readout of a new transponder is possible when readout flag is set to zero (Zero is written to 1004 Single Coil). It is not necessary to reset readout flag if module is set to Continuous reading mode.

8.2 Integration with user's software

The readers may be used with a customer's own software, in server mode (by choosing **Administration Enable HTTP Get**→) or in client mode (by choosing **Administration** → **Enable HTTP Client**).

Server work mode (HTTP Server):

In this mode external host (client) connects to the reader and controls it by HTTP protocol GET method.
The client has to read status.xml periodically and after suitable XML tags are decoded, (individual tags are explained in the chapter 8.3) it may send back data and commands. The resource file status.xml let a user read all required information, which can be entered to a database (e.g. the reader's mac address, inputs outputs status, card ID). After the data processing the client is able to send back data which is required for interaction with a user of the reader. The client can send information to the reader which may control the accept/reject sounds, the LED diodes blinking, a lock's bolt release, as well as displaying text on the reader display.
In this mode, every time a tag is read the reader blocks reading ability until the client triggers *releaseId=1* function.

Given that the communication isn't always done in the actual time of the reader's event, the device will indicate a tag's readout by short beep as confirmation for the tag's owner. It is useful as the tag's owner can draw the tag away after the sound indicator.

Client work mode (HTTP Client):

In this mode the reader may be compared to an Internet browser. The client's page (The reader's) sends a request to server and waits for answer. The server – the page which shares data – waits for requests, then processes them and sends a response back.

The reader connects with the server automatically and sends a tag's readout to the server resource by HTTP GET. In response the server may send a XML file with commands which specify type and status of the reader's indicator system, e.g. the LED diodes status, the sounds indicators, a status of the reader's LCD and the like.

In this mode an advantage is that, immediately after the card readout the reader automatically sends request to the server or the controlling application.

This mode allows easy integration with PHP, Node JS, MySQL and the like servers.

8.3 *Viewing the reader status by HTTP GET*

The RFID readers can be controlled by HTTP protocol (port 80).

To view the reader's current status user may refer to the resource file by entering in an Internet browser address line: theDeviceIPaddress/status.xml

It shows the resource file with basic information in XML format:

```
<status>
        <name/>
        <mac>00:00:00:00:00:00</mac>
        <id>0000000000</id>
        <newId>0</newId>
        <known>2</known>
        <cnt>87</cnt>
        <out0>Off</out0>
        <out1>Off</out1>
        <in0>Off</in0>
        <in1>Off</in1>
        <resetFlag>1</resetFlag>
        <enable>1</enable>
        <group>1234</group>
        <httpClientStatus>0</httpClientStatus>
        <n_logs>301</n_logs>
        <timeout>0</timeout>
        <fw>0.42</fw>
        <hw>1.0</hw>
</status>
```

Section	Description
`<name></name>`	The reader's name
`<mac>00:00:00:00:00:00</mac>`	The reader's MAC address
`<id>0600ADDA8E</id>`	The last RFID tag's readout in hexadecimal system
`<newId>1</newId>`	In the **Control only by HTTP GET** mode, only 1 – a new RFID tag has been read 0 – a new RFID tag hasn't been read
`<known>2</known>`	Type of tag read 0 – none TAG 1 – unknown TAG 2 – user 3 – master
`<cnt>1</cnt>`	Number of RFID tags readouts since the reader's reset
`<out0>Off</out0>`	Current status of relay output number 1
`<out1>Off</out1>`	Current status of relay output number 2
`<in0>Off</in0>`	Current status of input number 1
`<in1>Off</in1>`	Current status of input number 2
`<resetFlag>1</resetFlag>`	1 – reset took place

Section	Description
<enable>1</enable>	1 – radio module has been switched on 0 – radio module has been switched off
<group>1234</group>	The numbers of currently active groups
<httpClientStatus>0</httpClientStatus>	Current status of TCP connection in **Control only by HTTP Client** mode 1- the server has been connected – open socket 2- data from the server has been received 3- connection has ended 100- lost connection with server
<n_logs>0</n_logs>	Current number of logs in the reader
<timeout>0</timeout>	The time of the last connection with the server
<fw>0.42</fw>	Software version
<hw>1.0</hw>	Hardware version

8.4 Control by HTTP GET protocol

Controlling the reader in **Enable HTTP GET** mode involves sending proper command by HTTP protocol.

http://theDeviceIPaddress/status.xml?			
No	**Command**	**Name**	**Description**
1	enable	Enable RFID	Switches on RFID reader's antenna http://192.168.111.15/status.xml?en able =1 Switches off RFID reader's antenna http://192.168.111.15/status.xml?enable =0
2	resetFlag	Reset Flag	After reset, the flag is set to 1 Reset Flag deletion http://192.168.111.15/status.xml?resetFlag=0
3	releaseId	Release ID	Deletes read flag and awaits for RFID tag to draw near http://192.168.111.15/status.xml?release I d=1
4	ledr ⚠	Red LED	Switches on the LED diode indicator led=TimeOn,TimeOff,Cnt TimeOn*0,1 second, TimeOff*0,1 second http://192.168.111.15/status.xml?led r =5,3,4 Switches on the LED for 0,5 second, switches off for 0,3 second and repeats sequence 4 times Cnt=255 – endless repeat Cnt=0 -switches off the LED diode
5	ledg ✔	Green LED	Switches on the LED diode indicator led=TimeOn,TimeOff,Cnt TimeOn*0,1 second, TimeOff*0,1 second http://192.168.111.15/status.xml?led g =5,3,4 Switches on the LED for 0,5 second, switches off for 0,3 second and repeats sequence 4 times Cnt=255 – endless repeat Cnt=0 – switches off the LED diode

http://theDeviceIPaddress/status.xml?		
No	**Command**	**Description**
6	buzz	Controls the sound tone indicator Generates the sound tone **REJECT** http://192.168.111.15/status.xml?buzz=r Generates the sound tone **ACCEPT** http://192.168.111.15/status.xml?buzz=a
7	open	Switching relay output No. 1 in the mode as defined in the **I/O Settings tab** http://192.168.111.15/status.xml?open=1
8	open2	Switching relay output No. 2 in the mode as defined in the **I/O Settings tab** http://192.168.111.15/status.xml?open2=1
9	out0	Controls relay output No. 1 0 – switching off the relay output 1 – switching on the relay output http://192.168.111.15/status.xml?out0=1
10	out1	Controls relay output No. 2 0 – switching off the relay output 1 – switching on the relay output http://192.168.111.15/status.xml?out0=1
11	takeLcd	It takes control over the reader's LCD display http://192.168.111.15/status.xml?takeLcd=1
12	showTime	Shows up current time in the first line of the LCD display http://192.168.111.15/status.xml?showTime=1
13	lcdClr	Clears screen of the LCD display http://192.168.111.15/status.xml?lcdClr=1
14	lcd1	Shows up a text in the first line of the LCD display Function available if showTime=0, only http://192.168.111.15/status.xml?lcd1=HelloWord
15	lcd2	Shows up a text in the second line of the LCD display http://192.168.111.15/status.xml?lcd2=HelloWord
16	lcd3	Shows up a text in the third line of the LCD display http://192.168.111.15/status.xml?lcd3=HelloWord
17	lcd4	Shows up a text in the fourth line of the LCD display http://192.168.111.15/status.xml?lcd4=HelloWord
18	ring	Refers only to the **RFID RCP** with keys. Backlighting of function keys: 1 – backlight off 2/3 – backlighting the left / right function key 4/5 – blinking the backlight of the left / right function key 6/7 – blinking (in the loop) the backlight of the left / right function key 8 – blinking (in the loop) the backlight of the function keys http://192.168.111.15/status.xml?ring=2

http://theDeviceIPaddress/msg.php?			
No	**Command**	**Name**	**Description**
1	setLog		Sets up active log data set http://192.168.111.15/msg.php?setLog=x x- number of logs
2	removeCard		Removes a selected card from the memory x- a card number minus 1 http://192.168.111.14/msg.php?removeCard=x
3	removeAllCards		Removes all card tags from the reader http://192.168.111.15/msg.php?removeAllCards=1
4	removeLog		Removes all logs from the reader http://192.168.111.15/msg.php?removeLog=1
5	clkY		Sets up a year in the RTC http://192.168.111.15/msg.php?clkY=x x=[0-99]
6	clkM		Sets up a month in the RTC http://192.168.111.15/msg.php?clkM=x x=[0-11] 0-January, 1-February …..
7	clkD		Sets up a day in the RTC http://192.168.111.15/msg.php?clkD=x x=[1-31]
8	clkH		Sets up an hour in the RTC http://192.168.111.15/msg.php?clkH=x x=[0-23]
9	clkm		Sets up a minute in the RTC http://192.168.111.15/msg.php?clkm=x x=[0-59]
10	clkS		Sets up a second in the RTC http://192.168.111.15/msg.php?clkS=x x=[0-59]
11	clkd		Sets up a week day in the RTC http://192.168.111.15/msg.php?clk d =x x=[0-6] 0-Sunday, 1-Monday
12	factory		Factory reset http://192.168.111.15/msg.php? factory = 1
13	addId		Manual addition of a card to the reader's ID memory in Hexadecimal system http:// 192.168.111.15/ msg.php?addId=1122334455
14	changeName		Manual change of a card name x – card number minus 1 http://192.168.111.15/msg.php?changeName=x!Jan

8.5 Edit cards via HTTP POST

The reader has the ability to edit cards via HTTP POST method.

The data structure is described in the edit.xml file.
id: 6 **card:** 00 **name:** User2 **act:** 1 **grp:** 0100

Description: **id** – the card number from the Cards tab
reduced by 1, **card** – TAG, **name –** user name,
act – determines whether the Active option is selected (value 0 or 1), **grp –** assigning a card to appropriate groups (value 0 means a card not assigned to a group, value 1 means a card assigned to a selected group) eg:
0001 – card assigned only to group 4,
0111 – card assigned to group No. 2, No. 3 and No. 4.

The data **structure** of the **POST** method has the following form:
id=6&card=00&name=User2&act=1&grp=0100

Example
id=**value**&card=**value**&name=**value**&act=**value**&grp=**value**

By changing the desired parameters, you can edit the card.

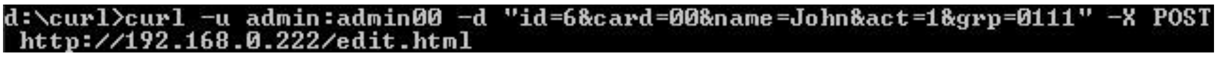
HTTP POST allows to add a new card by entering **id=-1**. The reader will add the card to the first free position.

Attention! It is not possible to edit the UID number of the card stored in the reader's memory.

Example:
To edit the card, use the program **cURL**. **cURL** allows you to send HTTP requests from the Windows command line. The syntax of the card editing request:

curl -u admin:admin00 -d "id=6&card=00&name=John&act=1&grp=0111" -
X POST http://192.168.0.222/edit.html

-u admin:admin00 – the command responsible for user authorization, login:password, **-d "id=6&card=00&name=John&act=1&grp=0111" -X POST –** card editing parameters: id=6 – card number 7,
card=0 – it is not possible to change the UID number via HTTP POST, name=John – new username,
act=1 – forcing activation of the selected card, grp=0111 – assigning the card to groups No. 2, No. 3 and No. 4. **http://192.168.0.222/edit.html –** IP address of the module and resource to be referenced.



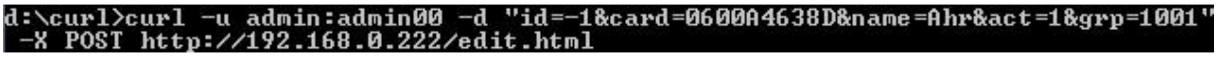
```
d:\curl>curl -u admin:admin00 -d "id=6&card=00&name=John&act=1&grp=0111" -X POST
 http://192.168.0.222/edit.html
```

Example of adding a new card:
To edit the card, use the program cURL. cURL allows you to send HTTP requests from the Windows command line. The syntax of the card editing request:

curl -u admin:admin00 -d
"id=-1&card=0600A4638D&name=Ahr&act=1&grp=1001" -
X POST http://192.168.0.222/edit.html

The request will add another card to the next free position in the reader's memory. **id=-1**

– forces the addition of a new card.

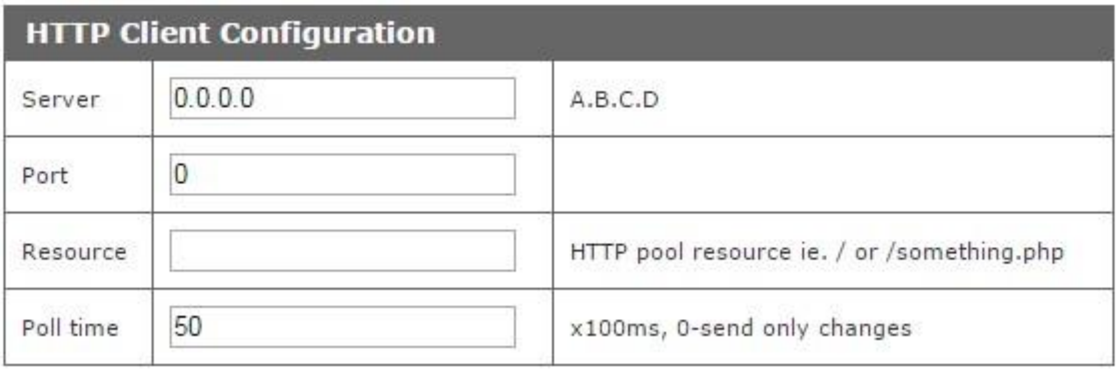


```
d:\curl>curl -u admin:admin00 -d "id=-1&card=0600A4638D&name=Ahr&act=1&grp=1001"
 -X POST http://192.168.0.222/edit.html
```

8.6 Controlling by HTTP protocol in client mode

To control the reader by HTTP protocol in client mode the option **Enable HTTP Client** in *Administration tab* needs to be selected.

When the **Enable HTTP Client** option is selected, an address for a data transfer has to be configured. For this the table in **Network HTTP Client Configuration**→ tab is used.



HTTP Client Configuration		
Server	0.0.0.0	A.B.C.D
Port	0	
Resource		HTTP pool resource ie. / or /something.php
Poll time	50	x100ms, 0-send only changes

No	Name	Description
1	Server	The server's IP address the reader will use to send data
2	Port	The server's listening port
3	Resource	Resource file for the reader's reference e.g. /somefile.php
4	Poll time	Poll time duration frequency of sending data to the server Poll time=0 – data is sent when a RFID tag has been read, only Poll time>0 – data is sent periodically and when a RFID tag has been read e.g. Poll time=50- data is sent every 5 seconds and when a RFID tag has been read

Sending data to the server

The module sends data to the appropriate server resource after reading the TAG, or due to cyclical information exchange.

If the reader has read the RFID tag, then the data is sent in the form:

- **A –** MAC address,
- **B –** IP address,
- **C –** UID,
- **D –** refers only for RFID RCP with keys, flag defines which function keys have been selected,
- **E –** information about enabled inputs and outputs,
- **F** – status indicating whether the card has been applied or taken.

?mac=**A**&ip=**B**&id=**C**&inout=**D**&io=**E**&**F**

During the cyclical exchange of information, data is sent to the server in the form:

- **A –** MAC address,
- **B –** IP address,
- **E –** information about enabled inputs and outputs.

?mac=**A**&ip=**B**&io=**E**

D – flag defines which function keys have been selected (e.g: private entrance or business exit). The value represents the sum of components:

Examples	Private	Business	Entrance	Exit	D
	0 or 1	0 or 2	0 or 4	0 or 8	
1.	1	0	4	0	5
2.	0	2	4	0	6
3.	1	0	0	8	9
4.	0	2	0	8	10

Example number from the table:

1. Private entrance. The **inout** value=5.
2. Business entrance The **inout** value=6.
3. Private exit. The **inout** value=9.
4. Business exit. The **inout** value=10.

E – the current state of inputs and outputs is sent as a sum of the component values:

Examples	In1	In2	Out1	Out2	E
	0 or 1	0 or 2	0 or 4	0 or 8	0-15
1.	1	0	4	0	5
2.	0	0	4	8	12
3.	1	2	4	8	15

Example number from the table:

1. Input 1 and output 1 are enabled. The value of io = 5.
2. Outputs No. 1 and No. 2 are enabled. The value of io = 12.
3. Input No. 1 and No. 2, and output No. 1 and No. 2 are enabled. The value of io = 15.

F – application signaling or taking out the card. It can take the following values:

- put=1 – applying a card,
- away=1 – removing the card (only 'Continuous reading' mode),
- put=1&away=1 – application and immediate taking of the card (only 'Continuous reading' mode).

Examples of data sent to the server after applying the card:

- ?mac=0000000&ip=10.10.0.1&id=00000000&inout=6&io=8&put=1
- ?mac=0000000&ip=10.10.0.1&id=00000000&inout=6&io=12&put=1&away=1

Examples of cyclically sent data (poll time):

- ?mac=0000000&ip=10.10.0.1&io=0
- ?mac=0000000&ip=10.10.0.1&io=7

For devices supporting the Mifare standard, only:

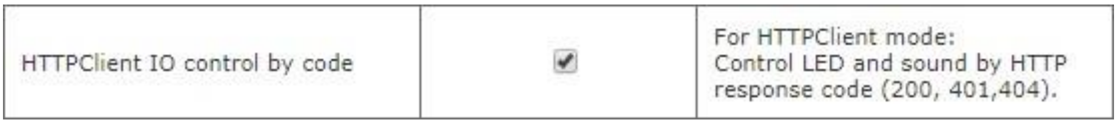
The readers, with a block readout switched on, may send additional readout of a block information e.g. block=1234567890ABCDEF1234567890ABCDEF.

The server may not respond, or send back the XML resource file with the XML tags:

No	Command	Description
1	<time>	1 – show time on the reader's LCD 0 – don't show time on the reader's LCD
2	<clear>	1 – clear screen of the reader's LCD
3	<text>	Writes a text on the LCD. A new line starts after 20 characters. E.g. if a text HELLO has to start at second line, it should be preceded by 20 SPACE characters
4	<textxy>	Writes a text on the LCD with a suitable syntax: xXXyYY_TEXT e.g. x05y02_HELLO
5	<ledg>	Switches on green LED indicator Syntax: <ledg>TimeOn,TimeOff,Cnt</ledg> (same like in HTTP GET)
6	<ledr>	Switches on red LED indicator Syntax: <ledr>TimeOn,TimeOff,Cnt</ledr> (same like in HTTP GET)
7	<open>	Switching relay output No. 1 in the mode as defined in the **I/O Settings tab**
8	<open2>	Switching relay output No. 2 in the mode as defined in the **I/O Settings tab**
9	<out0>	Controls relay output No. 1 0 – switching off the relay output 1 – switching on the relay output
10	<out1>	Controls relay output No. 2 0 – switching off the relay output 1 – switching on the relay output
11	<buzz>	1 – Switches on the sound indicator (ACCEPT sound) 2 – Switches on the sound indicator (REJECT sound)
12	<ring>	Refers only to the **RFID RCP** with keys. Backlighting of function keys: 1 – backlight off 2/3 – backlighting the left/right function key 4/5 – blinking the backlight of the left/right function key 6/7 – blinking (in the loop) the backlight of the left/right function key 8 – blinking (in the loop) the backlight of the function keys

Using HTTP code (Response code) which is sent back in the reader's HTTP Client mode, it is easy to control interaction with a user.

In the ***RFID Settings*** tab, the reader's automatic reaction for three basic HTTP response codes (200, 401, 404) can be switched on.



HTTPClient IO control by code	☑	For HTTPClient mode: Control LED and sound by HTTP response code (200, 401,404).

In this configuration the reader will respond in the following manner:

- code 200: the reader generates ACCEPT sound and blinks with green LED diode,
- code 401: the reader generates REJECT sound and blinks with red LED diode,
- code 404: the reader generates REJECT sound and blinks with both LED diodes.

The XML file may consist of e.g. fields (in the following example the code brings out activation of the sound indicator, a door opening and showing a text on the reader's LCD).

```
<buzz>1</buzz>
<clear>0</clear>
<text>Enter please</text>
<open>1</open>
```

To switch on the green diode for two seconds duration:

```
<ledg>20,0,1</ledg>
```

The red diode will blink two times, every 0.5 second:

```
<ledr>5,5,2</ledr>
```

The XML file syntax is not checked. It is searched for data inside known tags, only.

An example of code for php server:

```
<?php

if($_GET["id"]) // module send id and MAC - $_GET["mac"]
{
      $who=$_GET["id"];
      // you can check id in DB and do some action
      echo "<buzz>1</buzz>";  // sound signal echo
      "<clear>1</clear>";     // clear LCD
      echo "<text>Card ID: $who</text>"   // print ID on LCD echo
      "<open>1</open>"; // door open
}
else // no id - default state polling
{
      echo "<clear>1</clear>";      // clr LCD echo
      "<text>Hello</text>";   //print prompt text
}
```

8.7 Communication with the reader from an external network

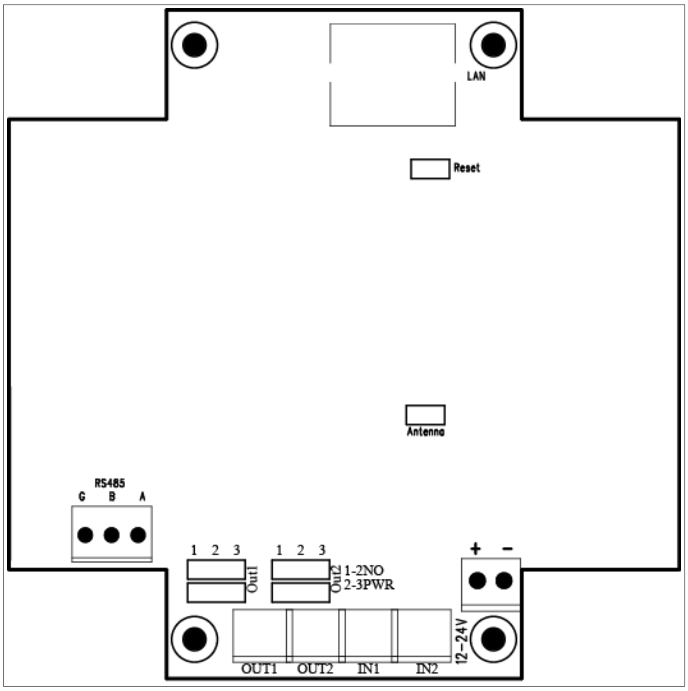
If the reader is connected to an external LAN network, the communication ports have to be forwarded.
Depending of a method used to communicate with the reader it is necessary to contact the network administrator and forward communication ports:

Communication by WWW site and HTTP protocol: -
port TCP/IP 80

Communication by MODBUS TCP:
- port TCP/IP 502

Communication by SNMP: -
port UDP 161

9 Connectors description



No	Name	Description
1	LAN	LAN connection socket
2	Reset	RESET jumper pins If the pins are shorted for around 10 -15 seconds, the reader returns to default factory settings
3	Antenna	Antenna connector
4	RS485	RS485 connector for Modbus
5	RelayMode	Jumpers to set relay operating mode. Position 1-2 – potential free at the contacts, position 2-3 – 12 Volts output
6	OUT1	Relay number 1 connector
7	OUT2	Relay number 2 connector
8	IN1	General application input
9	IN2	General application input
10	+12V-	Power supply input 12-24VDC

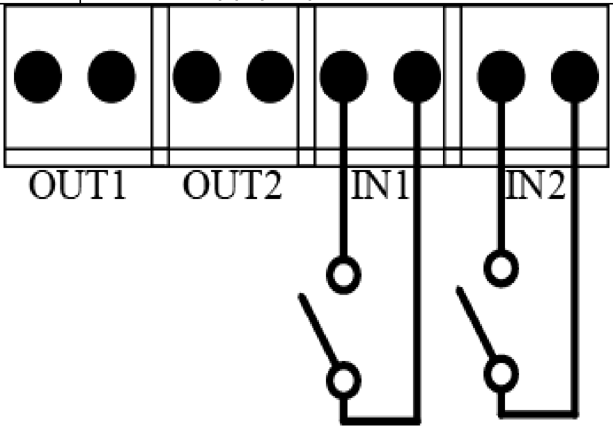


Illustration of the inputs arrangement

The OUT1 and OUT2 outputs can work in two modes:

- **12VDC mode** – the configuration jumpers set to 2-3 (see the picture below).
  In this mode, after the activation of the relay, the output voltage is e.g. 12VDC. If the reader is powered from 24VDC then the voltage will be 24VDC.
  Attention! If the reader is powered through PoE802.3af and there is no power supply connected to the power input then the OUT1 and OUT2 outputs **will be without voltage**.

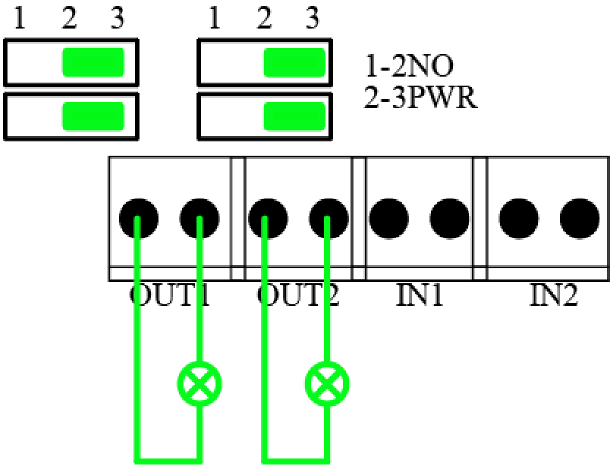


Illustration of the outputs arrangement (OUT1 and OUT2) for 12VDC mode

- **NORMAL OPEN mode –** the configuration jumpers set to 1-2 (see the picture below). In this mode, an external power source is required.

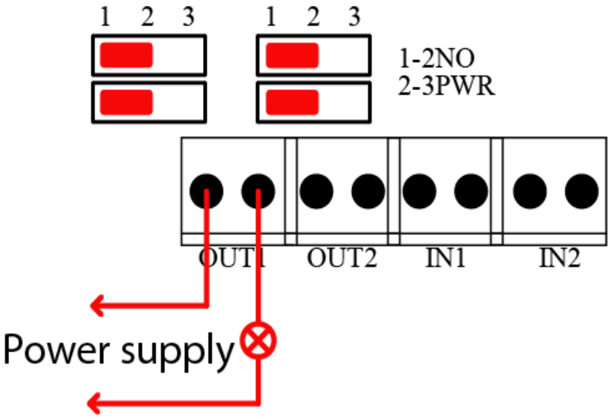


Illustration of the output arrangement

(OUT1) for NORMAL OPEN mode

10 DHCP

The DHCP service can be enabled in the *Network* tab.

11 Return to the factory settings default

To reset the device to factory settings:
1. Turn on the device.
2. Shorten the RESET jumper for 10 to 15 seconds.
3. During the sound, open the RESET jumper.

After performing the above steps, the device will set to the factory default parameters:
– IP Address: 192.168.111.15
– IP Mask: 255.255.255.0
– User: admin
– Password: admin00

12 The reader software update

The reader has ability to update the software. The software update program is provided as a *.bin file.
Warning! Incorrect use of the update feature may damage the reader.

To update the software:

- check the **Enable TFTP Bootloader** option, which is located in the Administration tab,
- run the Windows command line (Start-> Run enter 'cmd' and confirm with the Enter key),
- go to the directory where the .bin file is located• enter the command:

tftp -i <address_ip_of the reader> **PUT** file.bin

where: <address_ip_of the reader> is the IP Address of the reader file.bin – the file with the update program

Programming takes 1-2 minutes. End of programming confirms the message 'File Transferred'.

For correct functioning of the reader, after the update operation the „**Enable TFTP Bootloader**" option has to be switched off.