



## **User manual RFID IND-U1 Reader**



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## **Dear Customer!**

Thank you very much for choosing our product. Before its use, please read these instructions carefully. There are given here 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.

## **Remember!**

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

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

## 1 Preliminary informations

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**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 module



Important information and guidelines



Following this guidelines makes the use of the module easier.

Attention: The appearance of the screen shots shown in this manual may differ slightly from the actual work with the module. The differences may relate to the size and font type and size of symbols. There are no differences in the content of the information.

## **2 Purpose of the device**

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RFID-IND-U1 reader is used to read the UNIQUE transponders code. The transponder code is available using the MODBUS RTU protocol.

## **3 Warranty and liability of the manufacturer**

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The manufacturer provides a 2-year warranty on the module. The manufacturer also provides post-warranty service for 10 years from the date of the introducing the module 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 module, not following this manual and the repairs of the module by individuals without permission.



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

## **4 Safety guidelines**

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The module has been constructed 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 IP65 hermetic housing with a high-quality plastic.

### **4.1 Power supply**

The module is suitable for power supply 10-24VDC.

### **4.2 Storage, work conditions.**

The reader is equipped with a sealed IP65 enclosure which means:

- total resistance to foreign objects
- resistance to water jet directed directly to the device
- storage and operation at temperatures from -25 ° C to + 60 ° C,

### **4.3 Installation and use of the module**

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

### **4.4 Utilisation of the module**

When it becomes necessary to liquidate the device (e.g., after the time of use), please contact the manufacturer or its representative, who are obliged to respond appropriately, i.e., collecting the module 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 garbage

## 5 Construction of the module

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### 5.1 General features

The reader is equipped with an RS485 port supporting MODBUS RTU protocol and a USB port used for configuration and testing of the module. The device has two relay outputs and two inputs.

#### Technical data:

Supply voltage: 12-24VDC

Power supply: 15mA (12V)

#### Transponders:

Supported transponder standard: UNIQUE

Carrier frequency: 125kHz

Reading distance to 10cm (depending on the type of transponder used)

#### Communication:

1 RS485 port -modbus RTU

1 USB port to configuration

#### Inputs/Outputs

2 relay outputs

2 inputs

#### Dimensions:

(width) 100 mm x (height) 100 mm x (depth) 55.6 mm

## 6 Device configuration

After installing the RFID U1 Config program and starting it, connect the USB cable to the computer and the module (in this case, the external power supply of the module is not required - the device is plugged into the USB port).

The first line of the program window displays information about the version of the configuration program - **PC version**, reader software version - **RFID Software** and reader version - **RFID Hardware**. We also have information on whether the configuration program was connected to a reader - **Connected** - **Not connected**

The screenshot shows the 'RFID U1 Configurator' window with the following sections:

- INFO:**

PC version: 0.1	RFID Software: 1.0	RFID Hardware: 1.0 IND-U1 MIFARE	Connected
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- OUTPUTS:**

Name	OUT1	OUT2
Mode	ASTABLE	ASTABLE
Power ON	ACTIVE	INACTIVE
Time ON	2	25
Time OFF	2	40
State	<input checked="" type="checkbox"/> OUT 1	<input type="checkbox"/> OUT 2
- INPUTS:**

State	<input checked="" type="checkbox"/> INPUT 1	<input type="checkbox"/> INPUT 2
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- BUZZER & LED:**

Buzzer	<input type="radio"/> OFF	<input checked="" type="radio"/> ON READ
Led 1	<input type="radio"/> OFF	<input checked="" type="radio"/> ON READ
Led 2	<input type="radio"/> OFF	<input checked="" type="radio"/> ON READ
- RS485:**

Mode	NONE
BaudRate	9600
Device Address	1
- Card Serial Number:** 00-00-00-00-00-00-00-00-00
- Buttons:** 'Upload data to RFID' and 'Download data from RFID'

Figure 1. Program window view

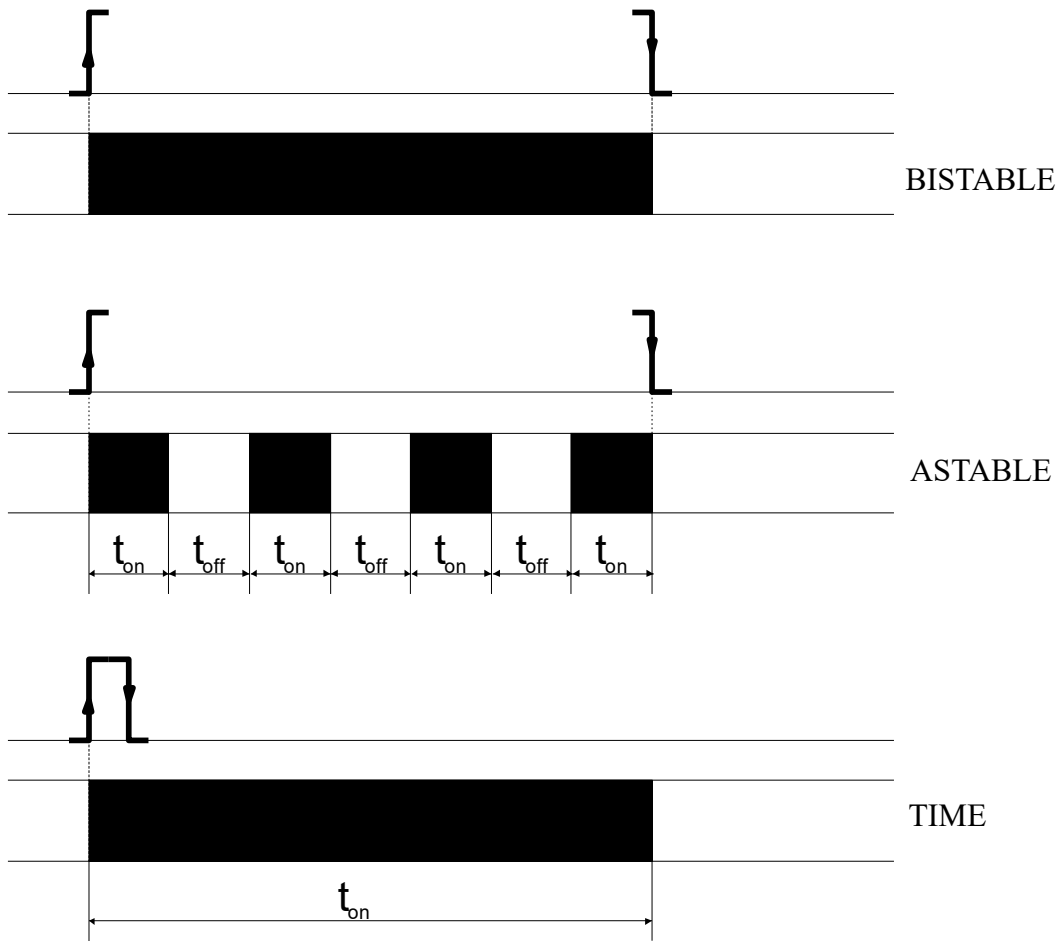


## 6.1 OUTPUTS – Outputs operating mode

**Mode** – Sets the output mode. The output can work in the following modes:

- **DISABLE**
- **BISTABLE**
- **ASTABLE**
- **TIME** – the output will trip to the **Time ON** then the output will turn off (eg the control of the electromagnet)

The work charts are shown in the figure below.



**Power ON** – the state of the output after turn on the power

- **Active**
- **Inactive**

**Time ON** – the time for which the channel is switched on (Astable and Time mode)

**Time OFF** – the time interval between activations of the channel (Astable mode)

**State** – visualization of the output, if a rectangle is yellow it means that the output current is turned on.

Buttons **Out 1** and **Out 2** outputs can be activate or deactivate.

## 6.2 INPUTS – Status of inputs

Fields **STATE INPUT 1** and **STATE INPUT 2** displays the actual state of inputs. Square field in black - input inactive, field in yellow - active input.

## 6.3 BUZZER & LEDS – Leds and sound signaling control

In the BUZZER & LEDS settings we can indicate how the leds and the buzzer react when the card is inserted into the reader.

- **OFF** - no reaction after card application
- **ON READ** -activation after card application

For example, select the option:

BUZZER & LED			
Buzzer	<input type="radio"/> OFF	<input type="radio"/> ON READ	
Led 1	<input type="radio"/> OFF	<input type="radio"/> ON READ	
Led 2	<input type="radio"/> OFF	<input checked="" type="radio"/> ON READ	

When the card is applied to the reader, the LED 1 will light up and the buzzer will sound, LED 2 will be off.

These options help in interacting with the operator (the person applying the card knows the reader correctly reads it).

**Regardless of the selected setting, it is always possible to control the signaling via the MODBUS RTU protocol.**

## 6.4 RS485 - Configuration RS485

This field is used to configure the communication of the reader with the MASTER device.

**MODE**(setting of 9th bit of transmission):

- **None**
- **Even** – parity bit
- **Odd** – odd bit

**BaudRate** – speed transmission boxi (**1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200**)

**Device Address** – device address for MODBUS protocol

## 6.5 CARD SERIAL NUMBER - Read card number

The field displays the last RFID transponder code read and the type of card.

## 7 Modbus support

The following MODBUS RTU functions are supported:

- 0x01 Read Coils
- 0x03 Read Holding Register
- 0x05 Write Single Coil
- 0x06 Write Single Register
- 0x0F Write Multiple Coils
- 0x10 Write Multiple Registers

### 7.1 MODBUS addresses

O.n.	Address	Type	R/W	Description
1	1000	Holding Reg	R/W	<b>IsNewId</b> Read: 1 - the correct reading of the RFID tag Record: 0 -clear the read flag (possible reading of the next RFID tag)
2	1001	Holding Reg	R	<b>UID Length</b> -the length of the code of RFID tag read, for Unique cards: 5
3	1002 -1011	Holding Reg	R	<b>UID</b>
4	1012	Holding Reg	R	<b>Card Type:</b> Type of RFID tag read UNIQUE
5	1017	Holding Reg	R	<b>MODEL ID</b> (0x2401 - U1-unique)
6	1018	Holding Reg	R	<b>Software Version</b>
7	1019	Holding Reg	R	<b>Hardware Version</b>
8	1020	Holding Reg	R/W	<b>Mode OUT1:</b> 1 - BISTABILE mode 2 - ASTABILE mode 3 -TIME mode
9	1021	Holding Reg	R/W	<b>Time On OUT1</b> (1-65535) (*0,1 second) ex. 120 - 12 seconds
10	1022	Holding Reg	R/W	<b>Time Off OUT1</b> (1-65535) (*0,1 second) ex. 120 - 12 seconds
11	1023	Holding Reg	R/W	<b>Mode OUT2</b> 1 - BISTABILE mode 2 - ASTABILE mode 3 - TIME mode
12	1024	Holding Reg	R/W	<b>Time On OUT2</b> (1-65535) (*0,1 second) ex. 120 - 12 seconds
13	1025	Holding Reg	R/W	<b>Time Off OUT2</b> (1-65535) (*0,1 second) ex. 120 - 12 seconds
14	1000	Single Coil	R/W	<b>ON 1</b> - switching on / off output 1 Read: 1 - output switched on 0 - output switched off Record: 1 - switching on the output 0 - switching off the output
15	1001	Single Coil	R/W	<b>ON 2</b> - switching on / off output 2
16	1002	Single Coil	R	<b>COIL STATE 1</b> - state of relay coil no. 1
17	1003	Single Coil	R	<b>COIL STATE 2</b> - state of relay coil no. 2
18	1010	Single Coil	R	<b>INPUT 1</b> - state of input no. 1

19	1011	Single Coil	R	<b>INPUT 2</b> – state of input no. 2
20	1012	Single Coil	R/W	<b>LED1</b> - switching on / off LED 1
21	1013	Single Coil	R/W	<b>LED2</b> - switching on / off LED 2
22	1014	Single Coil	W	<b>BUZZ ACCEPT</b> – 1 - switching on the sound of acceptance
23	1015	Single Coil	W	<b>BUZZ REJECT</b> – 1 - switching on the reject sound
24	1016	Single Coil	R/W	<b>IsNewId:</b> Read: 1 - the correct reading of the RFID tag Record: 0 - clear the read flag (possible reading of the next RFID tag) Equivalent to Holding Reg. 1000.
25	1017	Single Coil	R/W	<b>ResetFlag:</b> Read: 1- the device has been reset Record: 0 -reset flag ResetFlag

In general use, you have to polling Coil 1000.

When it change to 1 it is mean that the RFID device read new tag.

Holding registers 1002-1011 contains tag ID.

When you read ID number you should release Coil 1016 (or Holding Reg 1000) flag (clear to 0). Only after that the reader is able to read next ID tag.

Modification of the output parameters can be done by the MODBUS protocol. It is not stored in the module's permanent memory. That means after reboot, the output parameters previously saved to the EEPROM by the configuration program will be restored.

Examples of communication:

**Question: if the card was applied:**

	PDU Address	Function	Address	Number of registers	CRC
MASTER → SLAVE	01	03	03 E7	00 01	34 79

**Answer: Applied card:**

	PDU Address	Function	How many bytes	DATA	CRC
SLAVE → MASTER	01	03	02	00 01	79 84

**Answer: The card has not been applied:**

	PDU Address	Function	How many bytes	DATA	CRC
SLAVE → MASTER	01	03	02	00 00	B8 44

**Reading the card number in the UNIQUE format:**

DIRECTION	PDU Address	Function	Address	Number of registers	CRC
MASTER → SLAVE	01	03	03 E9	00 05	54 79

	Address	Function	How many bytes	DATA						CRC					
SLAVE → MASTER :	01	03	0A	00	54	00	00	00	E5	00	28	00	61	E6	43

**Turning on the acceptance tone:**

	PDU Address	Function	Address	DATA	CRC
MASTER → SLAVE	01	05	03 F5	FF 00	9C 4C

	PDU Address	Function	Address	DATA	CRC
SLAVE → MASTER	01	05	03 F5	FF 00	9C 4C

**Switching relay 1 on:**

	PDU Address	Function	Address	DATA	CRC
MASTER → SLAVE	01	05	03 E7	FF 00	3C 49

	PDU Address	Function	Address	DATA	CRC
SLAVE → MASTER	01	05	03 F5	FF 00	3C 49

## 8 Description of terminals

The view of the PCB is shown in the figure below.

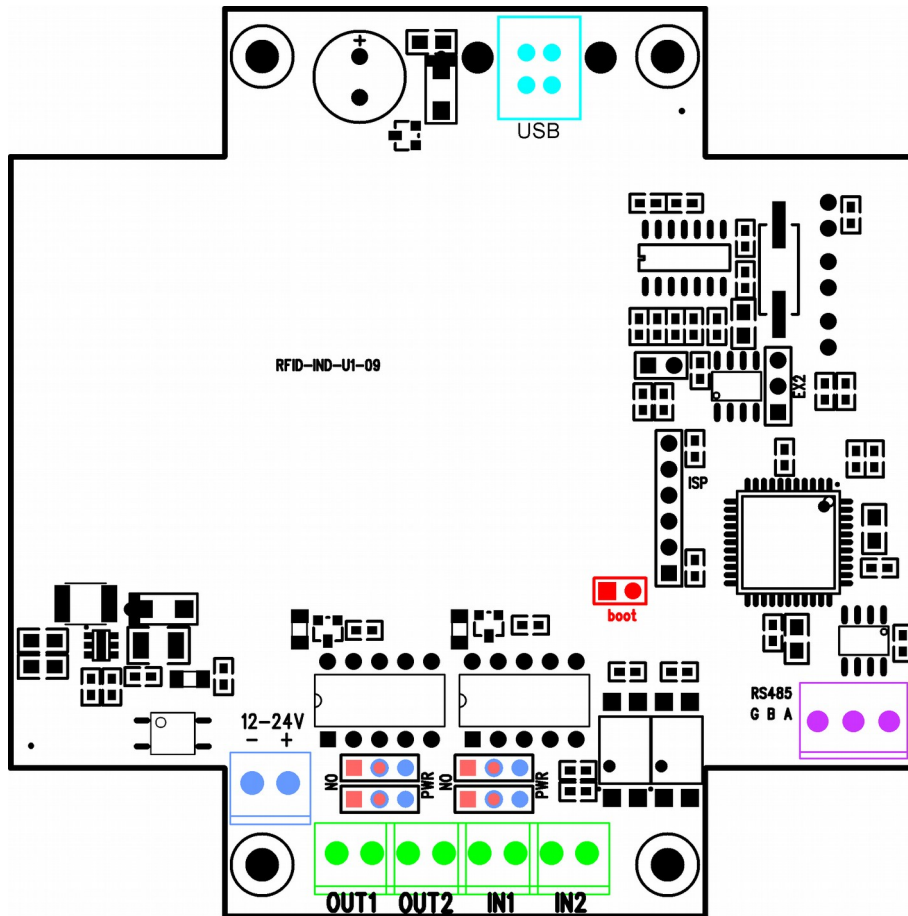


Figure 1. Description of pins.

Name	Description
Power	Power connector 12-24VDC
OUT 1	Relay output 1 max 1 A if 30 VDC max 0.5 A if 125 VAC
OUT 2	Relay output 2 max 1 A if 30 VDC max 0.5 A if 125 VAC
IN 1	Input 1
IN 2	Input 2
USB	USB port - module configuration
RS485	Connector RS485 MODBUS
Boot	Shortening the BOOT pins when power is applied causes the module to enter the bootloader mode

**9 Distance fixing holes**

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