

Matrix II MF-I

Mifare 13.56MHz RFID reader

with connection via iButton / Wiegand-26 protocols

User Manual

1. OVERVIEW

Matrix II MF-I RFID reader is used in Access Control Systems (ACS) to acquire codes from approached Mifare tokens (cards, key fobs, bracelets etc.) and transmit them to controllers via iButton (Dallas Touch Memory) or Wiegand protocols.

A distinctive feature of this model is the support of IronLogic Protected technology, to reliably protect cards against cloning (see more details on www.ironlogic.me website). This technology, in addition to a Matrix II MF-I RFID reader requires: a Z-2 USB MF Desktop reader (with modified firmware), IronLogic Object Card(s) and Mifare cards or key fobs to make access cards.

2. MOUNTING AND CONNECTION

The reader should be mounted on a flat surface, in a place allowing unimpeded proximity card access to the reader.

To mount the reader, perform the following operations:

1. Mark and drill the mounting holes of the same size as the reader case holes (Fig. 1)
2. Connect wires to the reader socket, according to layouts on Fig. 4 and Fig. 5.
3. Break out a thin tab in the case from the side where the cable must come out (Fig. 3), and feed the cable through. When the power is connected to the reader, the red LED will come up.
4. Mount the reader in the desired place and fix it with screws.
5. Close the reader case openings with plugs (Fig. 2).

Note 1: Do not install readers closer than 10 cm one from another.

Note 2: To avoid electrical interference when connecting the reader to the controller, a UTP cable is recommended, such as CAT5e UTP cable (see Fig. 5).

3. OPERATION

Reader operation without external indication control:

1. When power is supplied, in standby mode (no card in working zone), the LED shines red.
2. On card approach, its number is acquired. If done successfully, the LED turns green for a short time, then switches off, at the same time a short beep also sounds.
3. While the card remains within the reader working zone, the LED stays off.

External indication control for red/green colours of the LEDs and the buzzer is done by shorting the corresponding terminal (LED R, LED G, BEEP) to the common ground terminal (GND).

External indication control can be used in parallel with internal indication control; by default, the LED and the buzzer are internally controlled. After external indication control signal has been activated for one of indication modes (for example, for the LED), that mode becomes externally controlled, while the other (in this example, the buzzer) remains under internal control.

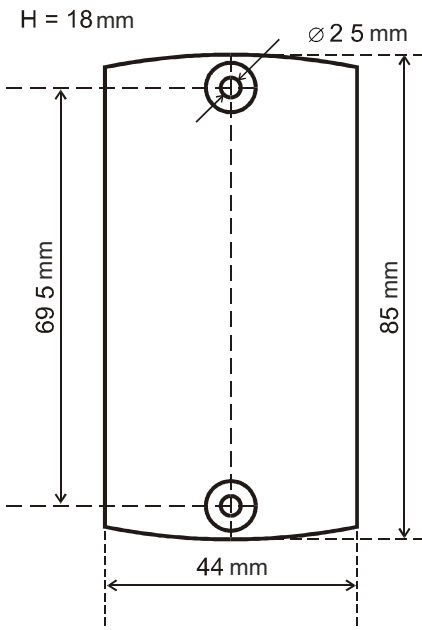


Fig. 1

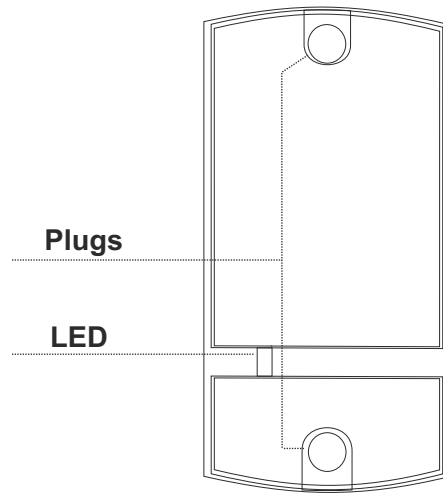


Fig. 2

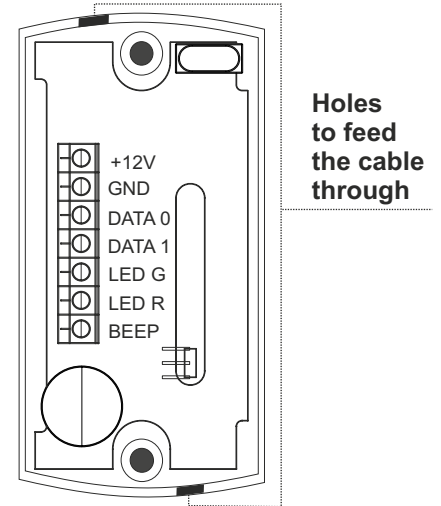


Fig. 3

CONNECTION LAYOUT

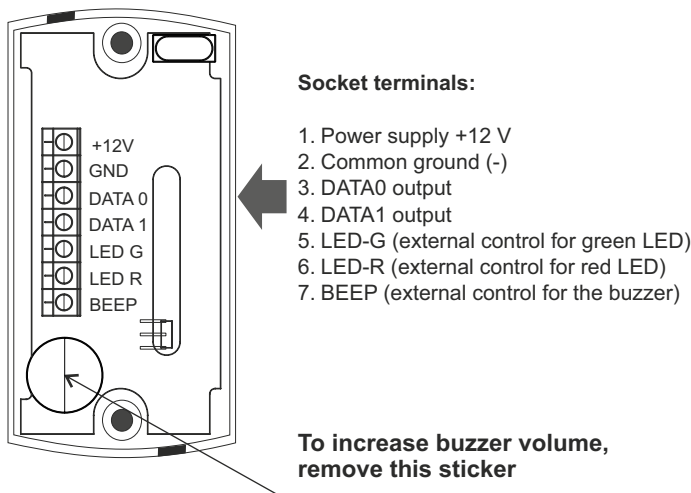


Fig. 4

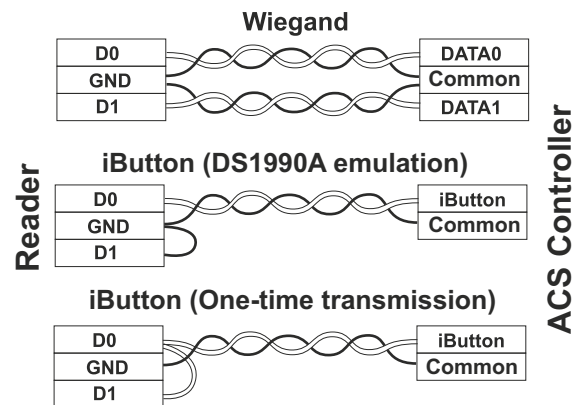


Fig. 5
Connecting the reader to ACS controller.

4. PROTECTED MODE

In the Protected Mode, the reader reliably protects the ACS from unauthorised access. To initialise the Protected Mode, an IronLogic Object card containing a special key is required. This key is stored onto blank access cards using a Z-2 USB MF desktop reader with specific custom firmware. To store the special key to a Matrix II MF-I reader, touch it with an IronLogic Object card. Once this is done, the Matrix II MF-I will transmit to the controller only UIDs (serial numbers) of initialised cards. This reader supports simultaneous holding of up to 10 IronLogic Object cards.

The first IronLogic Object card stored into Matrix II MF-I becomes the Master card. That card allows storing other IronLogic Object cards and switching off the Protected Mode. Without this Master card, the reader cannot be reverted to Unprotected (Initial) mode.

4.1 Switching Between Protected and Unprotected Mode

From the factory, the reader arrives in Unprotected mode, transmitting to the controller the UIDs of all cards it could read.

4.1.1 Entering Protected Mode

- 1) On an unpowered reader, connect DATA0 and LED R terminals.
- 2) Power on the reader.
- 3) If the LED is blinking red and a signal is sounding, the reader is already in Protected Mode.
- 4) If the LED is shining solid red, touch the reader with the IronLogic Object card. The reader changes LED colour to green and issues a beep for 1 second. The Object card has now been stored into reader as a Master card.
- 5) Power off the reader.

4.1.2 Storing Object Cards (Up to 10)

- 1) Ensure that the reader is powered on and operational.
- 2) Touch it with the Master card; the LED starts blinking red. Keep touching the reader with additional Object Cards, leaving no more than 16 s in between the cards. Each new card is acknowledged with a green LED flash.
- 3) To leave Storing Object Cards mode, either wait 16 s, or touch the reader again with the Master card.

4.1.3 Leaving Protected Mode

- 1) On an unpowered reader, connect DATA1 and LED R terminals.
- 2) Power on the reader.
- 3) If the LED is blinking red and a signal is sounding, the reader is already in Unprotected mode.
- 4) If the LED is shining solid red, touch the reader with the Master IronLogic Object card. The reader changes LED colour to green and issues a beep for 1 second. All the Object cards stored into the reader will be erased, and Unprotected mode will be activated.
- 5) Power off the reader.

5. CONFIGURATION

Regardless of the current Protected Mode activation state, the controller interface parameters can be configured. Initially, Wiegand transmission protocol is active. To select iButton protocol, connect DATA1 terminal to GND terminal. iButton (Dallas Touch Memory) is transmitted via DATA0.

5.1 Parameter Numbers and Values

Parameter	Value	Description
1. Wiegand bit width	1 *	Wiegand 26 (3 bytes)
	2	Wiegand 34 (4 bytes)
	3	Wiegand 42 (5 bytes)
	4	Wiegand 50 (6 bytes)
2. iButton transmission bit width	1 *	iButton transmits <i>ALL</i> UID bytes (up to 6, depending on the card UID).
	2	iButton transmits <i>ONLY</i> the number of bytes defined by Parameter 1
3. 7-byte UIDs encoding	1 *	As in CP-Z 2MF reader
	2	As in Matrix III Net reader
	3	As in CP-Z 2MF reader, but with shift and removal of first digit 0x04

Note: (*) Factory default.

5.2 Manual Parameter Setup

- 1) On an unpowered reader, connect BEEP and DATA0 terminals, then LED R to GND terminals.
- 2) Power on the reader.
- 3) Choosing parameter: the reader LED starts to beep in sequences, synchronously flashing LED red. The flashes/beeps count in a sequence (1...3) corresponds to active parameter number.
- 4) When the desired parameter number is active, connect LED G and GND terminals. The reader will confirm the parameter choice, and will switch into indicating parameter value.
- 5) Indicating parameter value is similar to indicating parameter number, but instead of LED flashing red, it's flashing green. Parameter values start with the current parameter value.
- 6) To confirm the currently active parameter value: connect LED G and GND terminals. The new value is stored.
- 7) Power off the reader.
- 8) To adjust another parameter, power it on again.

5.3. Configuration via RS-485 Link

Configuration via an RS-485 link requires **Reader Config** software (see www.ironlogic.me website) and Z-397 Guard converter.

- 1) Connect the reader to an RS-485 connector:
 - a. DATA0 to A;
 - b. DATA1 to B;
 - c. GND to G.
- 2) Connect BEEP and DATA0 terminals. Power on the reader.
- 3) Disconnect BEEP from DATA0. RS-485 link on the reader is now active until power off.
- 4) Launch the **Reader Config** software, choose the converter COM port, then configure the parameters.

6. SPECIFICATIONS

- Working frequency:13.56 MHz;
- Supported tokens type:Mifare Ultralight, Mifare ID, Mifare Standard (Classic) 1K and 4K;
- Card/key fobs reading distance:2...6 cm;
- Output protocol:iButton (Dallas Touch Memory), Wiegand;
- Line distance from controller:
 - via iButton protocol:up to 15 m;
 - via Wiegand protocol:up to 100 m;
- Card reading status indication:visual bicoloured LED, audial buzzer;
- Indication control:internal / external;
- Power supply voltage:12 V DC;
- Current in Card Standby mode:up to 40 mA;
- Dimensions:85 x 44 x 18 mm.

7. OPERATING CONDITIONS

Ambient temperature: -30...40°C.

Humidity: ≤ 98% at 25°C.

When operating under non-recommended conditions, device parameters can deviate from specified values.

8. PACKAGE CONTENTS

- Matrix II MF-I RFID Reader: ...1
- Plugs:2
- Screws 3*30:2
- Wall plugs:2

9. LIMITED WARRANTY.

This Device is covered by limited warranty for 24 months.

The warranty becomes void, if:

- this Manual's guidelines are not followed;
- the device has suffered physical damage;
- the device has visible traces of exposure to moist and/or aggressive chemicals;
- the device circuits have visible traces of tampering by unauthorised parties.

Under this warranty, the Manufacturer shall repair the device or replace any broken parts as required, free of charge, in cases where the fault is caused by a Manufacturer's defect.

10. IRONLOGIC CONTACTS

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