

BioSmart 5M-0/5M-E

Installation Guide



Contents

Contents	1
Safety Instructions	2
1. Overview	3
1.1. Specifications.....	3
1.2. Part names and functions.....	5
1.3. Package contents.....	5
1.4. Opening the case.....	6
1.5. Circuit board.....	7
1.6. Circuit board LEDs and jumpers.....	7
1.7. Connector names and description.....	7
2. Installation	8
2.1. Cable types.....	8
2.2. General installation notes.....	8
2.3. Mounting on wall.....	9
2.4. Power supply connection.....	10
2.5. Network connection.....	11
2.6. Locks connection.....	11
2.7. Exit buttons and door sensors connection.....	12
2.8. Wiegand output connection.....	13

Safety Instructions

Safety instructions must be followed in addition to **International Standards (ISO/IEC)***, and other safety regulations.



Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.



Note indicates an important remark, which should be taken into attention.



General requirements:

Read, follow and retain instructions – All safety and operating instructions must be read and followed properly before putting the unit into operation.

Do not turn on the power supply until all installation procedures are finished – this may lead to injury or equipment damage.

Do not disconnect or connect cables while unit is powered on – this may lead to unit malfunction and software errors.

Do not expose unit to heat or fire – high temperature impact may lead to case deformation and circuit board damage.

Make sure that all cables and screws are fastened properly - otherwise case damage or circuit shortcut may happen.



Additional requirements:

Use a clean, dry cloth to remove any dirt or dust from the unit.

*IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)

1. Overview

BioSmart 5M-O Controller is designed for identification of users by fingerprints and RFID cards. It can also control a lock or a turnstile (from one side only).

BioSmart 5M-E is a modification of **BioSmart 5M-O** designed to operate at the below zero temperatures (in Celsius). The controller is equipped with a capacitive fingerprint scanner that improves the quality of biometric identification. The controller internal elements have special protection against corrosion and condensate, making device suitable for outdoor application. Fingerprint scanner is equipped with a heating circuit that ensures comfortable scanning even at low temperatures down to -40 °C.

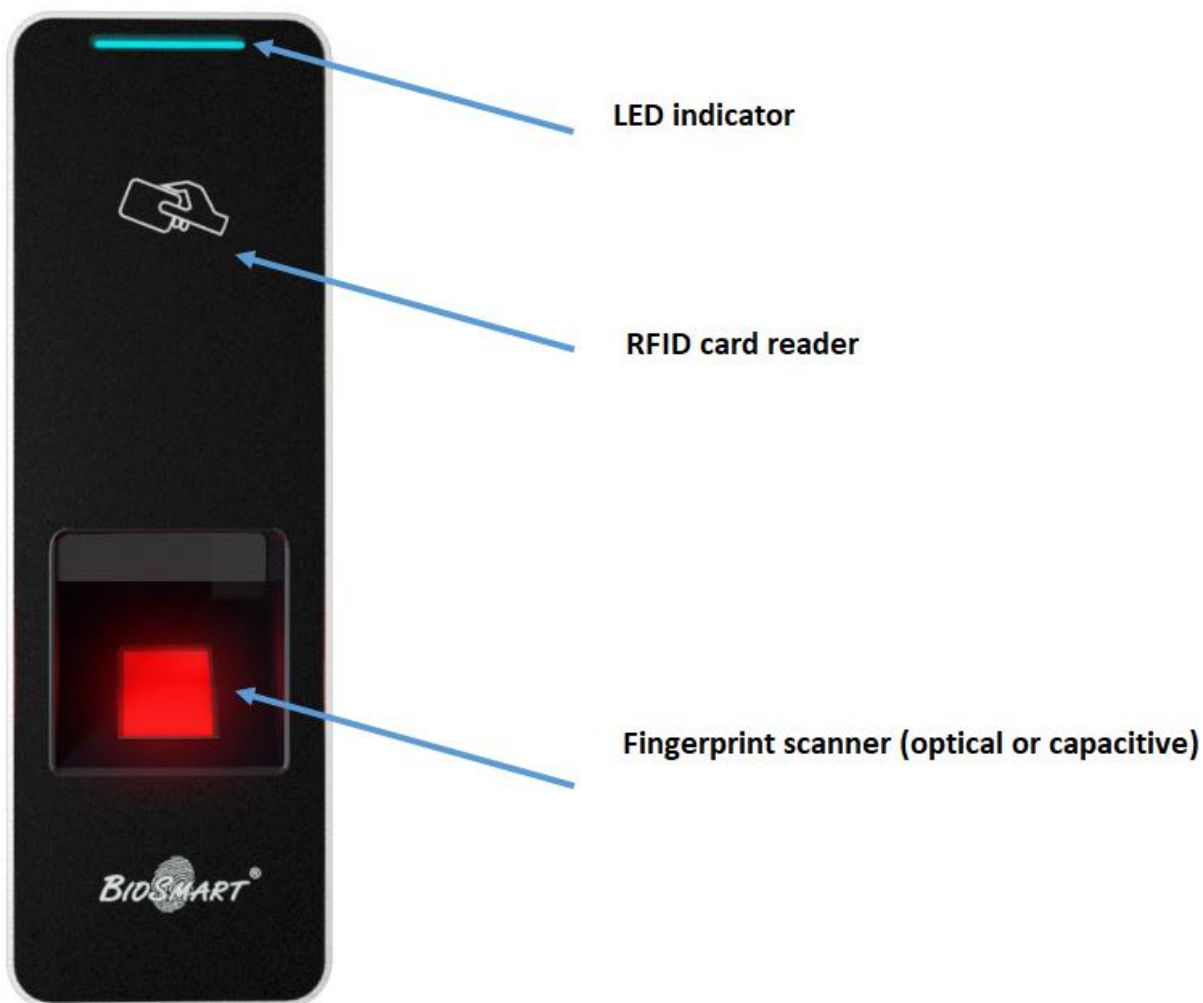
Controller is compatible with **BioSmart Studio software version V5.7.0** and above.

1.1. Specifications

Parameters	5M-O	5M-E
Authentication types	Biometric or card Card + biometric	Biometric or card Card + biometric
Users	1000	1000
Fingerprint templates	4 500	4 500
Event log capacity	25 000	25 000
Match time (1:1000) in local mode, by fingerprints	< 970 ms	< 970 ms
Verification time (1:1)	< 600 ms	< 600 ms
FAR (False Acceptance Rate)	10 ⁻⁴ -10 ⁻⁸	10 ⁻⁴ -10 ⁻⁸
FRR (False Rejection Rate), at FAR = 10 ⁻⁵ **	1%	1%
Sensor technology	Optical	Capacitive
Image size	272 x 320	272 x 320
Resolution	500 dpi	500 dpi
Smart card reader	HID Prox/iClass/iClass SE (125 kHz / 13.56 MHz) Legic Advant (13.56 MHz) EM Marin (125 kHz)	HID Prox/iClass/iClass SE (125 kHz / 13.56 MHz) Legic Advant (13.56 MHz) EM Marin (125 kHz)
LED indication	Tri-color (blue, red, green)	Tri-color (blue, red, green)
Communication	Ethernet (100 BASE-T),	Ethernet (100 BASE-T),

ZFlex Relay Module support	None	None
WIEGAND I/O	Output, 26/32 bit	Output, 26/32 bit
Discrete inputs	1	1
Onboard lock control relay	12VDC, 1A	12VDC, 1A
Tamper detection	1 sensor – on case opening	1 sensor – on case opening
Power requirements	12VDC±15%, 0.5 A	12VDC±15%, 0.5 A
PoE (Power over Ethernet)	None	None
Operating temperature	0 ... +50°C	-40 ... +50°C
Housing type	Aluminum, wall mount	Aluminum, wall mount
Dimensions (H x W x D)	160 x 50 x 43 mm	160 x 50 x 43 mm
Weight	260 g	260 g
Warranty	5 years	5 years
Note: * - Each user can be provided with single card code		

1.2. Part names and functions



Name	Description
LED indicator	Blue – waiting mode Green – identification successful Red – identification failed
RFID card reader	RFID card identification
Fingerprint scanner	Fingerprint identification

1.3. Package contents

Item	Number, pcs
BioSmart 5M Controller	1
Mounting kit (two 6x35 dowels, two 3.5x38 self-tapping screws)	1

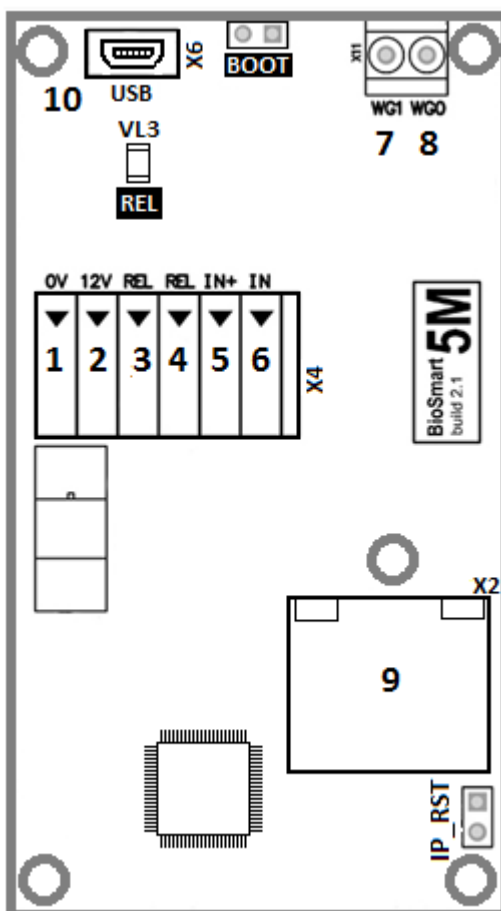
1.4. Opening the case

- 1) Remove the back cover retaining screw;



- 2) Detach the case from the back cover to access the circuit board.

1.5. Circuit board



1.6. Circuit board LEDs and jumpers

Name	Type	Description
VL3	LED	Indicates if Relay 2 is powered on
IP RST	Jumper	IP settings reset
BOOT	Jumper	Boot mode

1.7. Connector names and description

No	Name	Description	Used for
1	GND	Power supply -ground	Power supply
2	+12V	+12VDC Power supply	Power supply
3	REL	Relay output	Fail-safe lock/ Fail-secure lock, turnstile
4	REL	Relay output	Fail-safe lock/ Fail-secure lock, turnstile
5	IN+	Discrete input «+»	Enter/exit buttons, door sensors
6	IN	Discrete input	Enter/exit buttons, door sensors
7	WG1	Wiegand output DATA1	External controller wiegand output DATA1
8	WG0	Wiegand output DATA0	External controller wiegand output DATA0
9	Ethernet	Ethernet connection	Local network connection

2. Installation

2.1. Cable types

No	Cable connection	Max. length	Type
1	Ethernet (IEEE 802.3)	100 m.	Four twisted pair cables of no lower than category five with a wire size of no less than 0.2 mm ²
2	Power source	50 m.	Duplex cable with a wire size of no less than 0.75 mm ² (for example, 3192Y)
3	Turnstile, lock	20 m.	Duplex cable with a wire size of no less than 0.75 mm ² (for example, 3192Y)
4	Exit buttons, sensors	10 m.	CQR-6 or RAMCRO-6 cable
5	Wiegand interface	60 m.	Four twisted pair cables of no lower than category five with a wire size of no less than 0.2 mm ²

2.2. General installation notes

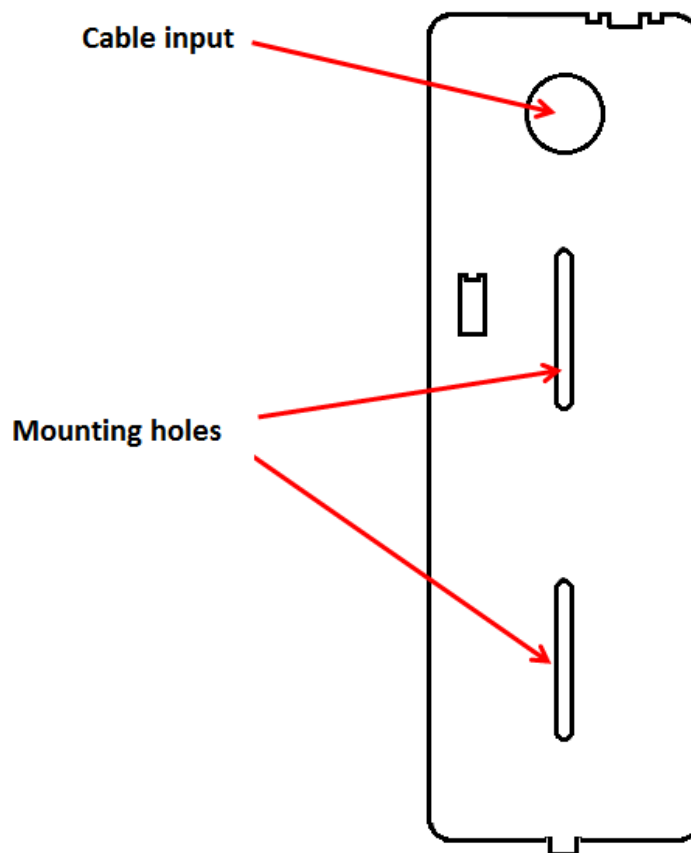
- Install the controller on vertical surface;
- Cables must be installed in accordance with the operational code for electrical installations;
- Do not lay cables within 30 cm of sources of electromagnetic interference;
- All cables must only intersect power cables at a right angle;
- All cable extensions must be soldered.
- Carefully check for mechanical damage on the surface of the controller circuit board and case;
- In order to avoid short circuits, the protected ends of cables used to connect the controller must not exceed 5 mm.



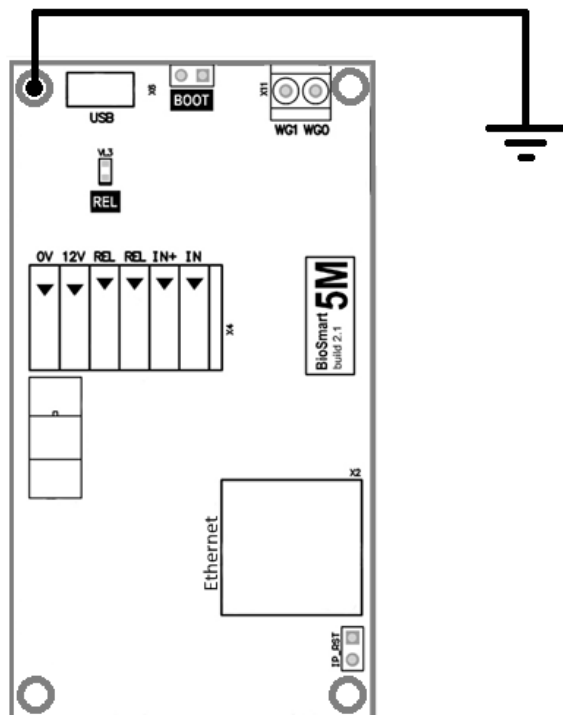
Caution

BioSmart 5M-E should be protected from rain and water.

2.3. Mounting on wall

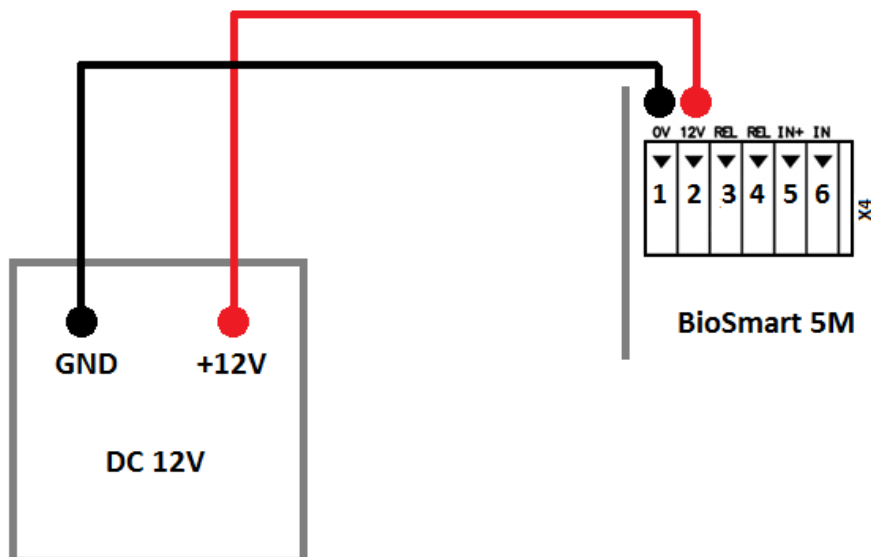


1. Decide where to install controller, using a mounting template.
2. Drill holes, according to a mounting template and insert dowels inside the holes.
3. Place back cover on wall and fix it with self-tapping screws.
4. Connect power supply, lock and buttons, if needed, according to p.2.4-2.8. Put cables through cable input.
5. In order to protect controller from electrostatic discharge, connect an annular crimp in a top left corner of PCB with a grounding device (see figure below).



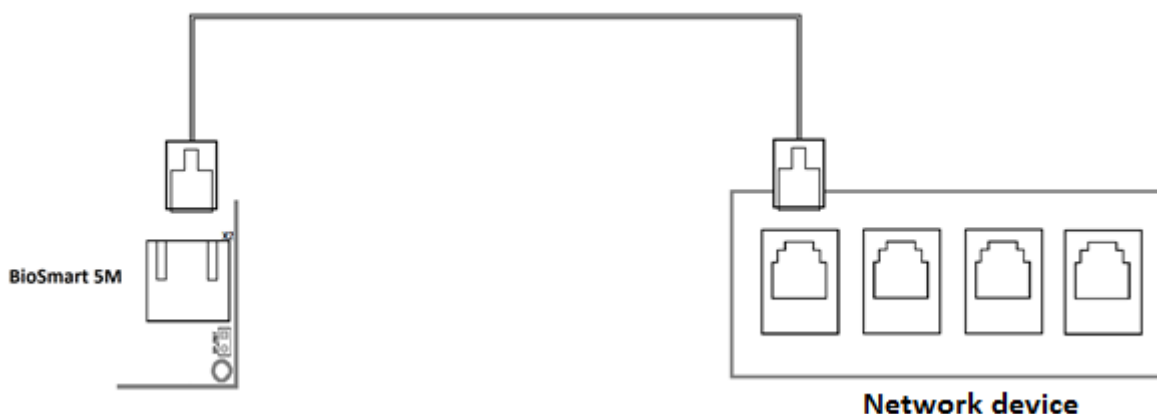
6. Attach the case and fix the retaining screw.

2.4. Power supply connection



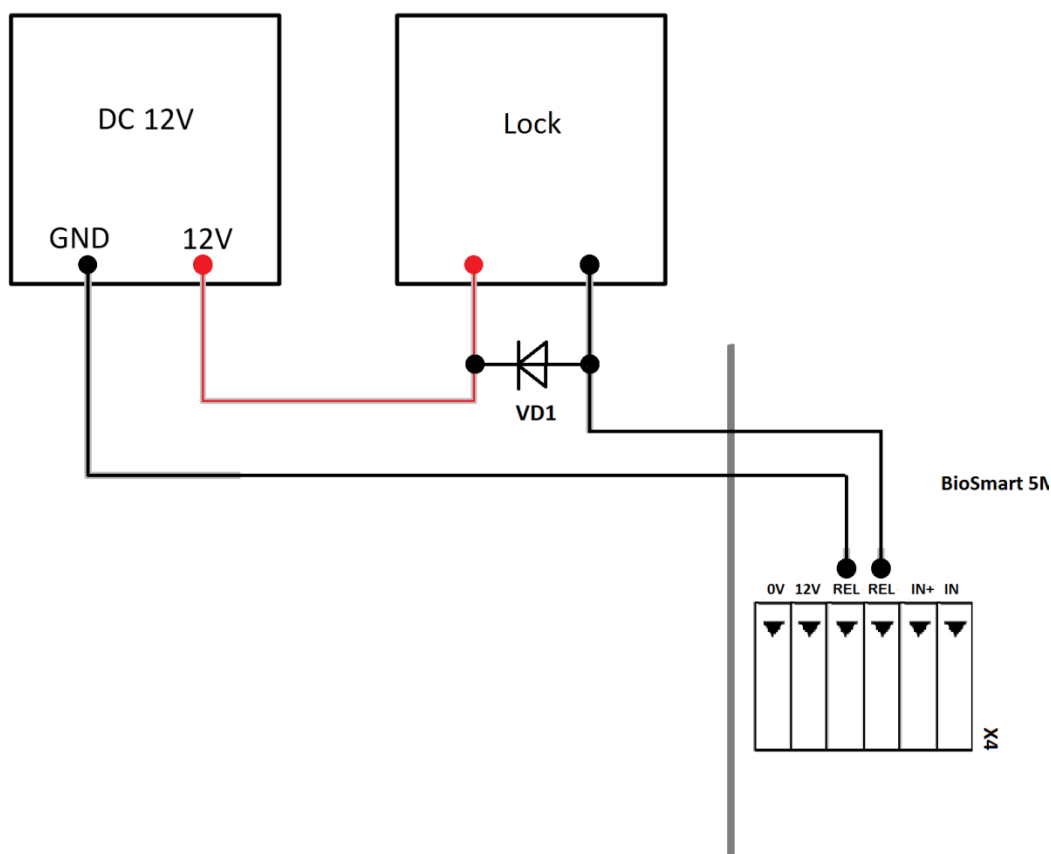
- Use a DC 12 V power supply adaptor with a minimum of 0,500 mA, which has obtained the approval of IEC/EN 60950-1;
- See recommended cable type and maximum length of the cable in **Cable types** table.

2.5. Network connection



- See recommended cable type in **Cable types** table;
- The order of connections in the cable's modular connector must correspond to the TIA/EIA-568-B standard.

2.6. Locks connection



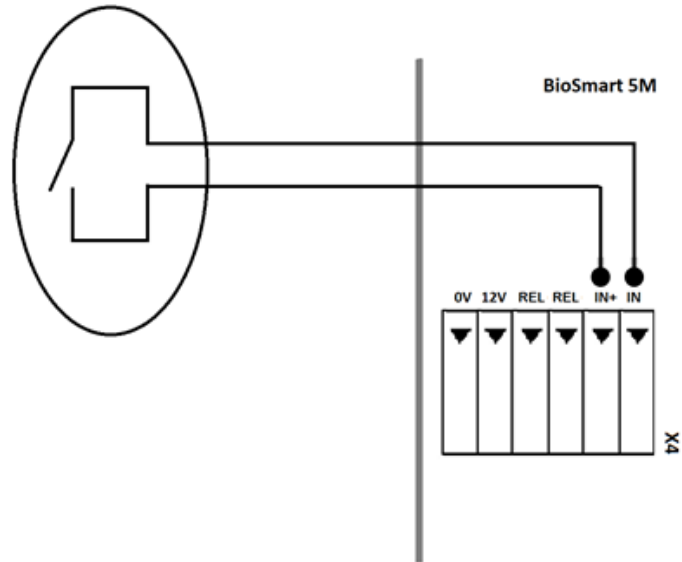
- See recommended cable type in **Cable types** table;
- Install a diode as it shown on figure, to protect controller relay from reverse current. Use 1N4007 diode (1000V,1A) or similar;
- Use separate power supplies for lock and controller;



Turn on “Relay inversion” in BioSmart Studio v5, if connecting an electromagnetic lock.

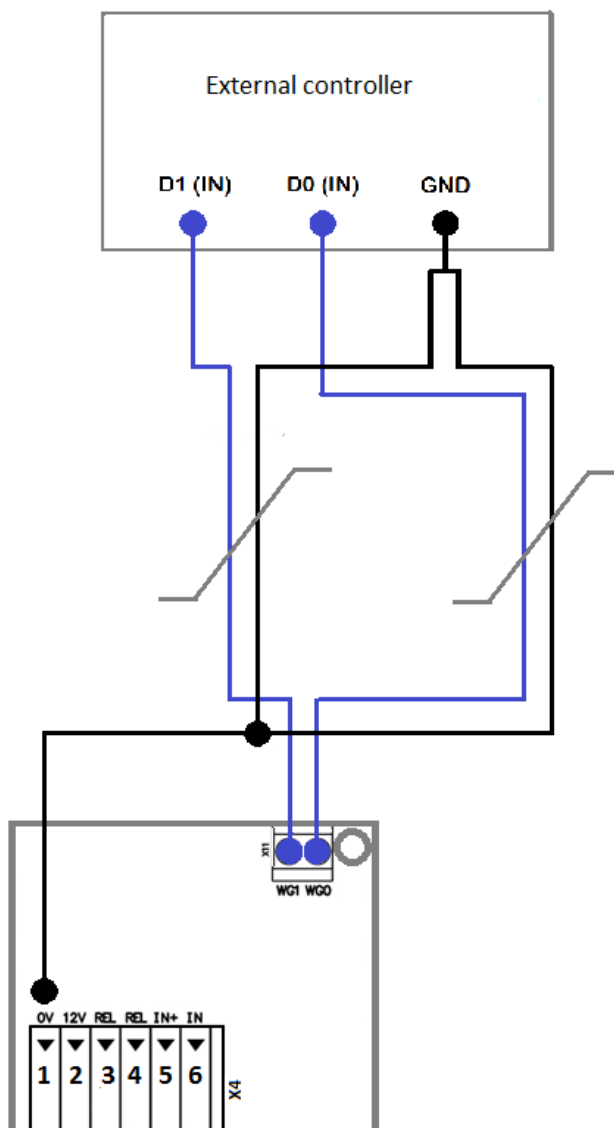
2.7. Exit buttons and door sensors connection

Button/door sensor



- See recommended cable type in **Cable types** table;

2.8. Wiegand output connection



- See recommended cable type in **Cable types** table;

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