Emmtry Controller

Installation & Deployment Guide

CIGNO SYSTEMS AB

Emmtry v1.0

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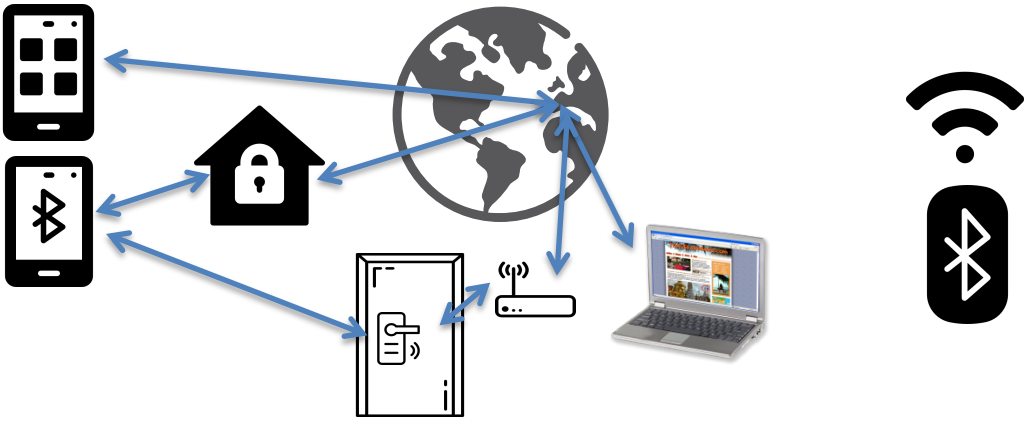
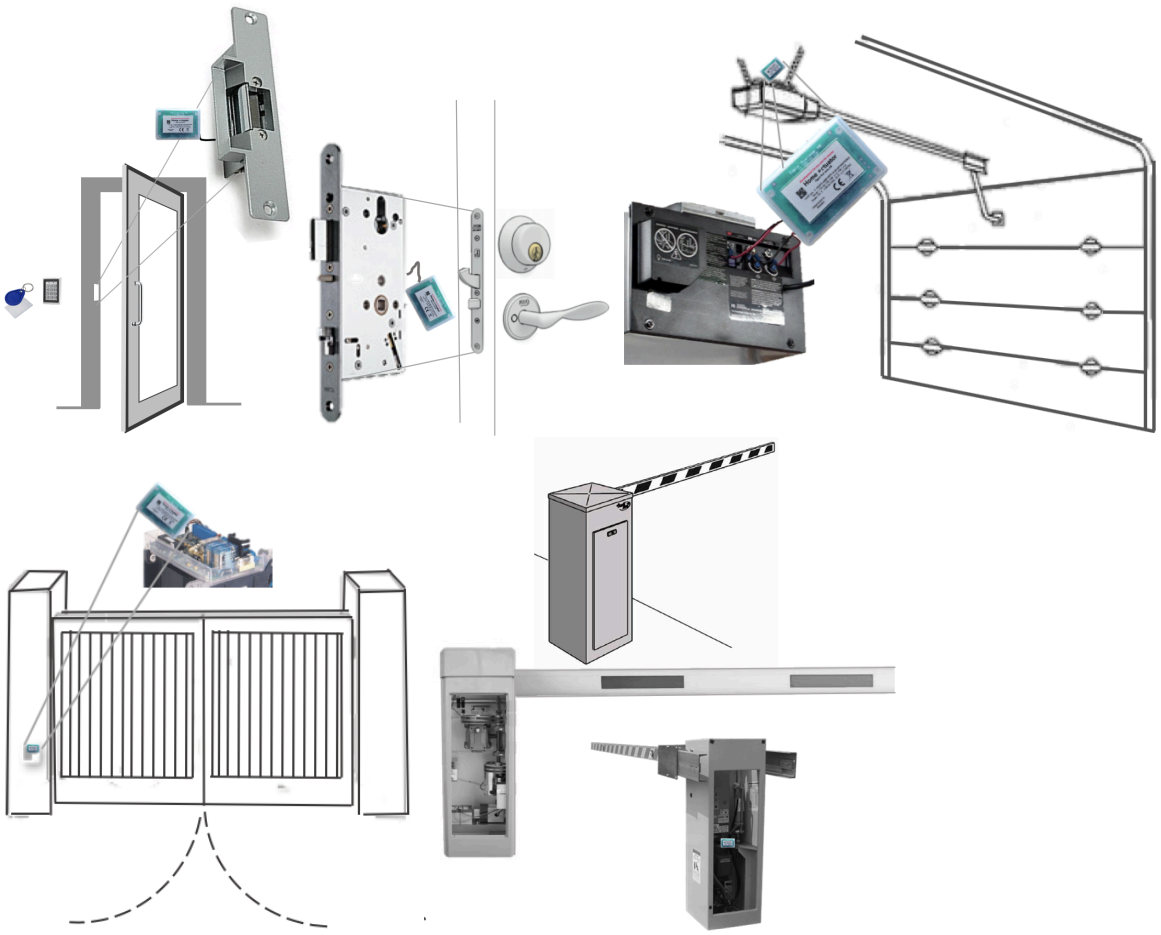
1. Overview

The Emmtry Controller manage the access of your new or existing electric door locks, garage and gate openers and/or barrier gates via Bluetooth and/or internet/WiFi.



The Emmtry Controller is very small, so it is easy to build it into door or wall.

It could be installed over existing installations, meaning you could have your existing access control system still working while connecting the Emmtry Controller directly to the Electric Locks, Strikes, Road Gates or Garage Doors.



2. Controller Hardware

The Emmtry Controller provides:

- Wireless communication, Bluetooth 4.0 and WiFi 802.11 b/g/n with WPA/WPA2.
- Up to Two outputs 4.33-24VDC 1A/each transient protected low side switched (OUT0_LS and OUT1_LS), each could be separately controlled depending on Actuator Profile setting in Emmtry App.
- Up to Eight input signals (IN0-7) with ESD protection that could be connected to micro switches

The Emmtry controller is either or both powered by:

- Micro USB connector: 5V DC
- 13Pin Cable (+VBAT wire): 2.7-4.5V DC connector – 3 AAA/AA batteries or power adapter

The Emmtry controller could drive a Actuator, usually Solenoids (+12VDC to OUT0_LS or OUT1_LS), or they could be driven with separate power adapter in range 4.33-24VDC to OUT0_LS or OUT1_LS. For switch contacts, it will pull them down to GND.

For Actuators with microswitches providing status/events, the Emmtry Controller supports up to Eight input signals (IN0-7) with ESD protection, usually from micro switches.

It is possible to do a hard reset, which will clear all Keys and Configuration, by pressing in button in small hole next to the micro USB connector for 20 seconds when power-on.

#	Wire Color	Wire Out	Function
13	Red	+BAT	2.7-4.5v, which could from 3 AAA/AA batteries or charger. For power requirements, see page [→ XXX].
12	Green	GND	The COM wire(s) from actuator
11	Yellow-Green	IN7	Up to 8 inputs with ESD protection that could be connected to micro-switches and can be monitored and trigger events depending on Profile setting. For wiring, see chapter 3.3
10	Yellow	IN6	
9	Blue	IN5	
8	Brown	IN4	
7	Grey	IN3	
6	Light Blue	IN2	
5	Pink	IN1	
4	Purple	IN0	
3	Orange	OUT1_LS	Low side switches/ For wiring, see chapter 3.1 and 3.2
2	Black	OUT0_LS	
1	White	+12v	An auxiliary 12 V DC output that can be used to supply power to electric locks or strikes, etc. See chapter 3.1. The maximum deliverable current is 2A. The amount of current drawn is subject to the amount of time to be held up under battery conditions.

Note: Blue-White wire not used

2.1 Wireless Communication

Emmtry Controller support both Bluetooth 4.0 and WiFi 802.11 b/g/n with WPA/WPA2.

If WiFi is configured in Emmtry Controller, then Industry standard HTTPS WebSocket protocol is used between Emmtry Controller and Emmtry Cloud. WiFi is optimized to reach ~100m in clear sight, it could be turned off in advanced settings if needed.

HTTPS WebSocket connection is setup from Emmtry Controller via Home/Office WiFi router and Emmtry Cloud accessible on the Internet. If you via WiFi connect your Computer or SmartPhone to the same WiFi router you want Emmtry Controller to connect to and could web browse to **https://cloud.emmtry.com**, then it will also work for the Emmtry Controller. There is no need to configure port forwarding in the firewall for inbound traffic, as most routers accept all outbound traffic. In some business firewalls, there might be restrictions on outbound traffic, but since the Emmtry Controller uses port **443** as normal encrypted web traffic, it should work transparently.

Bluetooth 4.0 communication with pairing encryption (passcode **000000**) is always active and could reach ~50m in clear sight, signal strength could be set to 100% (default), 25% or <1% in advanced settings if less reachability is desired.

The communication signal strength will be impacted in indoor installations, but in our experience, installing the Emmtry Controller inside a door or walls does not impact the signal strength much unless it is made of solid steel, in those scenarios it could be installed in conjunction with.

When the Emmtry Controller starts up during initial configuration, both Bluetooth 4.0 and and WiFi HotSpot will broadcast name Emmtry_*<4lastUUID>*.
The initial communication and configuration are done via Bluetooth 4.0 with iPhone/iPad or Android phone/tablet with the Emmtry App downloaded from the respective AppStore. For older Android phones or Android phones with Bluetooth issues, initial configuration is offered in the Emmtry app via WiFi instead Bluetooth 4.0.

After initial configuration is complete, if WiFi is configured, the Emmtry Controller will change WiFi to connect to the WiFi Router or Access Point as selected by the Owner with the given credentials for it.

WiFi is not needed for the Emmtry Controller to work, but will lack the remote open/close, status, key creation features and only allow these when in Bluetooth 4.0 proximity.

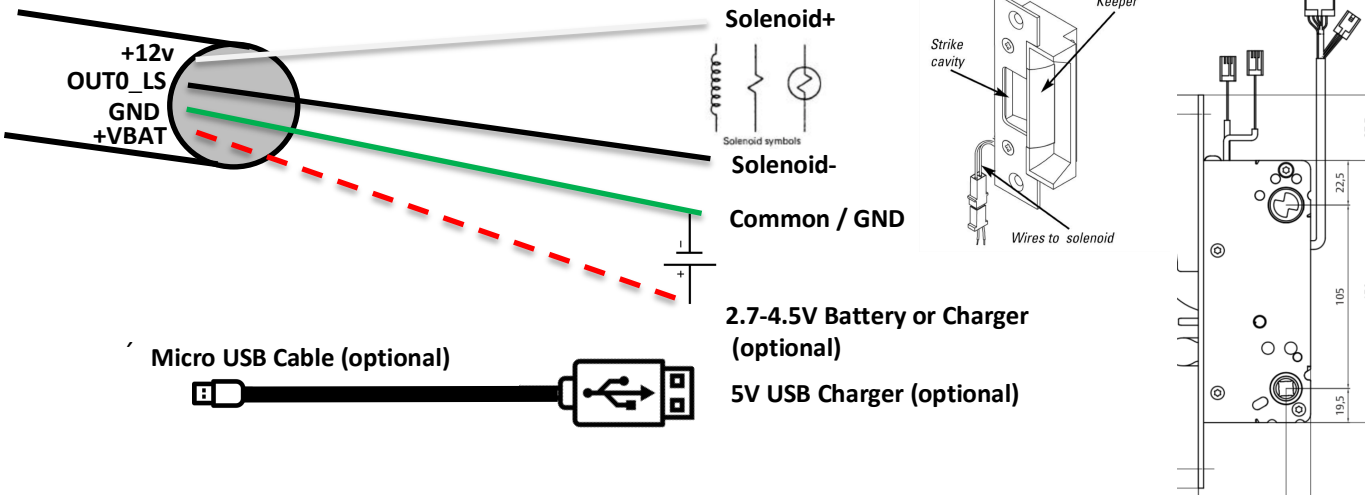
Emmtry Controller will when WiFi/Internet connected with Emmtry Cloud send HTTPS websocket keep-alive messages every 30 seconds. If connection with Emmtry Cloud is dropped it will notice and try to directly reconnect. Emmtry Cloud expects websocket keep-alive messages and will disconnect connection after 1 minute if not received.

3. Wiring the system

The Emmtry Controller has 2 low side switches, which could be controlled separately depending on the Profile setting, below shows two scenarios wiring 13pin cable

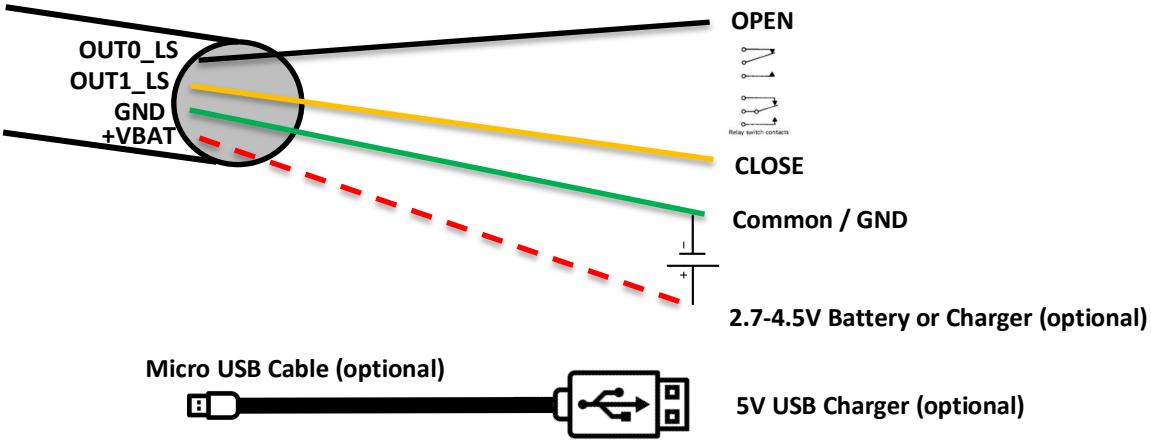
3.1 Electric Locks and Strikes

Normally for Electric Locks and Strikes, only 1 output is needed to control it from the Emmtry Controller 13wire cable. Peel off and then connect them to the corresponding wire:



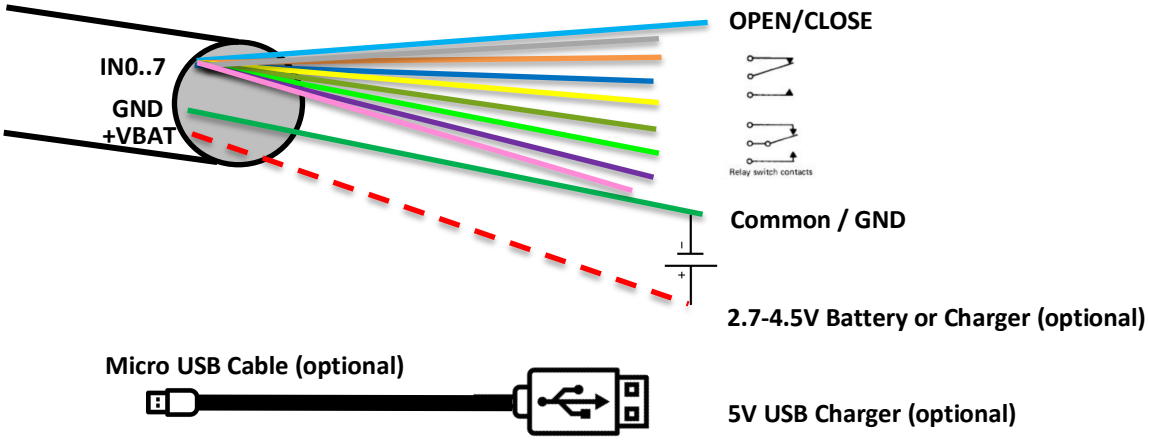
3.2 Road Gate and Garage Door

Road Gates or Garage Doors with its own electronics, they could usually be triggered with separate switch contacts (i.e push buttons etc). If they support separate OPEN and CLOSE buttons, it is desired to wire them separately to OUT0_LS and OUT1_LS to know remotely if the gate/door is open/close. Peel off and then connect them to the corresponding wire:



3.3 Sensor inputs

The Emmtry Controller supports up to 8 inputs, which could be connected to the microswitches of the actuator if supported. Some brands and models of Electric Locks and Strikes support this to indicate physically if the door position is open/close, handle movements, bolt out/in. Also, some models of Gates and Garage doors have indicator if it is open or closed. Below sketch shows connecting OPEN/CLOSE indicator from a strike:



Try to align wiring to below Generic Profile, otherwise custom profile is needed:

#	Wire Color	Wire Out	Strike	Lock
12	Green	GND	The COM/Common wire(s)	The COM/Common wire(s)
11	Yellow-Green	IN7		Handle movement: Rest
10	Yellow	IN6		Handle movement: Movement
9	Blue	IN5		Bolt in: In
8	Brown	IN4		Bolt out: Out, dead locked
7	Grey	IN3		Door position: Closed
6	Light Blue	IN2	Door position: Open / Closed	Door position: Open
5	Pink	IN1		Bolt in: Not in
4	Purple	IN0		Bolt out: Not out:

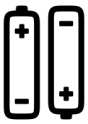
3.4 Power

The Emmtry Controller could be powered by 5V USB Charger/Powerbank and/or from 13pin cable the +VBAT wire 2.7-4.5VDC, which is suitable for 3 AAA/AA batteries or electric charger. The chargers or batteries does not come with the Emmtry Controller and have to be purchased separately. There are some powerbanks that support pass-through mode, which could serve as backup. Some powerbanks could hold up to 20Ah.

The recommendation is to power the system with an electric charger, either from +VBAT 2.7-4.5VDC or from 5VDC USB connector to avoid changing batteries.
In installations where electric outlet is not available, unstable or want backup, it could run on batteries for a long period of time.

Recommendation is to use Normally Closed (NC) equipment, which means when not powered by Emmtry Controller they are closed, which is desired at power failure.

3.4.1 Calculating the battery power requirements



It is important that adequate power is available to supply Emmtry Controller and also connected Actuator devices in the event electric charger supply failure or that it runs on battery as the main source. The table below gives and approximation of what could be expected in the case of Electric Lock/Strike with 130mA@12V at open:

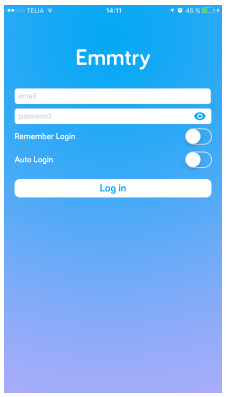
WiFi Connected and Bluetooth with beacon set to 1Hz*:

Powerbank or Batteries	Standby	5 open/close 10sec/day
3600mAh	70 days	38 days
9000mAh	174 days	95 days
10000mAh	194 days	105 days
20000mAh	388 days	211 days

Bluetooth only (WiFi disabled) with beacon set to 1Hz*:

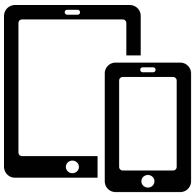
Powerbank or Batteries	Standby	5 open/close 10sec/day
3600mAh	417 days	69 days
9000mAh	1042 days	173 days
10000mAh	1157 days	192 days
20000mAh	2315 days	385 days

*Beacon frequency settable, if maximum 50Hz set, 56% days reduction could be expected
*Other factors might impact the standby, as battery characteristics and amount of WiFi network traffic.

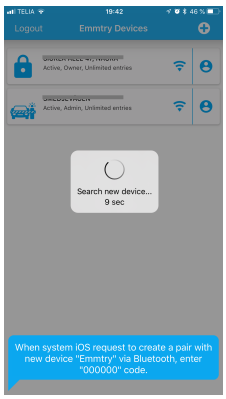


4. Starting and configuring the system

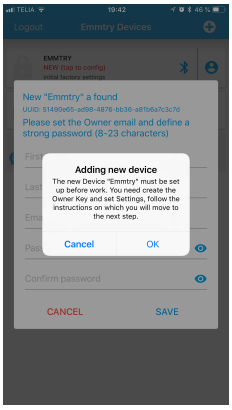
1. Power on the Emmtry Controller
2. Download the Emmtry App for your SmartPhone or Tablet



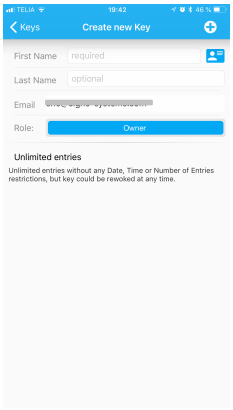
3. Open the Emmtry App and Login, use the email that you want the first Key to owner. The password used have to be at least 8 characters and is used to secure the KeyChain and encrypt the Keys.



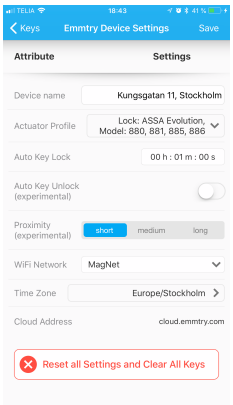
4. On next screen, press the (+) in upper right to search for the Emmtry device, you should be 0-5m from the Emmtry controller when doing this.



5. On next Key Settings screen, define the First and Last name for the owner key and press save.



6. On next Device Settings screen, set the:
   a. Device name: Usually the street address, but could be anything
   b. Actuator Profile: Select what best fits the installation
   c. Auto Key Lock: If you want the device to automatically close after hh/mm/ss being opened.
   d. WiFi Network: Select the WiFi router/accesss point it should connect to.
   e. Time Zone: Select the timezone for the installation
   f. Press SAVE!



7. DONE!!

5. Installation & Deployment

The Emmtry Controller is very small, which means it is suitable for build-in installations. Since it is wireless, it will work through doors and walls unless it is solid metal.

5.1 Inside Doors for Electric Locks

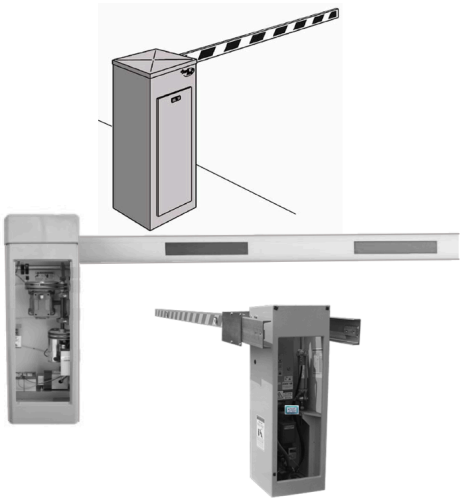
The Emmtry Controller could be placed inside the door next to the electric lock or in conjunction with the door itself.
Inside the door, next to the lock, make some extra room with a drill. Since the space is limited, it advised to remove any connector that comes with the electric lock and solder the Emmtry wires directly to the lock wires.
The electric wiring is then made through the door frame to the short side. Usually electric lock comes with a kit needed to connect the door and door frame with a wire, which could be used.

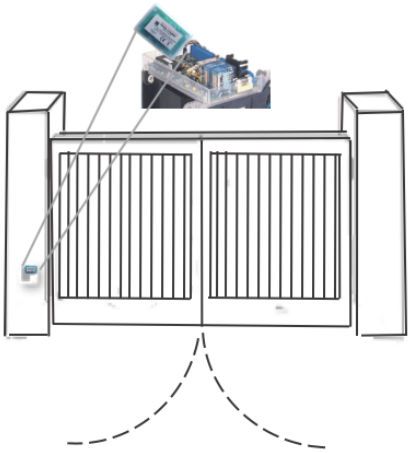
5.2 Inside door frames for Electric Strikes

The Emmtry controller could be placed in the door frame next to or under the Electric Strike. Make some room with a drill for the Emmtry controller and wire it to the Electric strike. Some additional holes are needed for the electric wiring, either to charger and/or battery.

5.3 Inside gates openers and road barriers

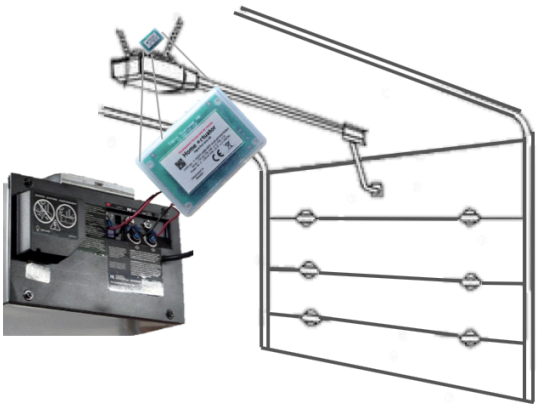
The Emmtry controller could be placed inside the gate or outside in additional plastic enclosure that is suitable for the weather condition (i.e. IP54,). If placed inside a metal enclosure, the WiFi and/or Bluetooth will have reachability problems. If the WiFi access point (via PowerLine adapter) is inside the same metal enclosure, it will work fine for remote access, but Bluetooth will be impacted to where the holes and screws are in the enclusore.





5.4 Garage Door opener

The Emmtry controller could be placed next to the garage door opener. Locate and connect to the OPEN and CLOSE inputs. Some additional wiring is needed for the power supply, either from charger and/or battery.



6. Support

For feedback and troubleshooting, please contact support@emmtry.com