

# BioStation L2

## INSTALLATION GUIDE

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English  
EN 101.00.BSL2 V1.16A

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# Safety instructions

Please read this safety instructions before you use the product to prevent injury to yourself and others and to prevent property damage. The term 'product' in this manual refers to the product and any items provided with the product.

## Instructional icons



**Warning:** This symbol indicates situations that could result in death or severe injury.



**Caution:** This symbol indicates situations that may result in moderate injury or property damage.



**Note:** This symbol indicates notes or additional information.



## Warning

### Installation

**Do not install or repair the product arbitrarily.**

- This may result in electric shock, fire, or product damage.
- Damages caused by any modifications or failure to follow installation instructions can void your manufacturer's warranty.

**Do not install the product in a place with direct sunlight, moisture, dust, soot, or a gas leak.**

- This may result in electric shock or fire.

**Do not install the product in a location with heat from an electric heater.**

- This may result in fire due to overheating.

**Install the product in a dry location.**

- Humidity and liquids may result in electric shock or product damage.

**Do not install the product in a location where it will be affected by radio frequencies.**

- This may result in fire or product damage.

### Operation

**Keep the product dry.**

- Humidity and liquids may result in electric shock, fire, or product damage.

**Do not use damaged power supply adaptors, plugs, or loose electrical sockets.**

- Unsecured connections may cause electric shock or fire.

**Do not bend or damage the power cord.**

- This may result in electric shock or fire.



## Caution

### **Installation**

**Do not install the product under direct sunlight or UV light.**

- This may result in product damage, malfunction, discoloration, or deformation.

**Do not install the power supply cable in a location where people pass by.**

- This may result in injury or product damage.

**Do not install the product near magnetic objects, such as a magnet, TV, monitor (especially CRT), or speaker.**

- The product may malfunction.

**Keep the minimum distance between products when installing multiple products.**

- The product may be affected by radio frequencies emitted by other products and the product may malfunction.

**Use only a power supply adaptor of D.C 12 V (500 mA or higher).**

- If the right power supply is not used, the product may malfunction.

**Use a separate power supply for the Secure I/O 2, electric lock, and the product.**

- If connecting and using the same power supply, the product may malfunction.

### **Operation**

**Do not drop the product or cause impacts to the product.**

- The product may malfunction.

**Do not disconnect the power supply while upgrading the firmware of the product.**

- The product may malfunction.

**Do not disclose the password to others and change it regularly.**

- This may result in illegal intrusion.

**Do not press buttons on the product by force or do not press them with a sharp tool.**

- The product may malfunction.

**Do not store your product in very hot or very cold places. It is recommended to use your product at temperatures from -20 °C to 50 °C.**

- The product may malfunction.

**When cleaning the product, mind the following.**

- Wipe the product with a clean and dry towel.
- If you need to sanitize the product, moisten the cloth or the wipe with a proper amount of rubbing alcohol and gently clean all exposed surfaces including fingerprint sensor. Use rubbing alcohol (containing 70% Isopropyl alcohol) and a clean, non-abrasive cloth like lens wipe.
- Do not apply liquid directly to the surface of the product.

**Do not use the product for anything other than its intended use.**

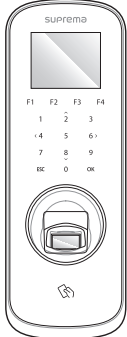

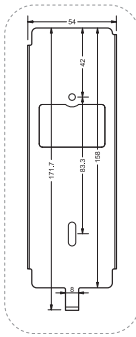
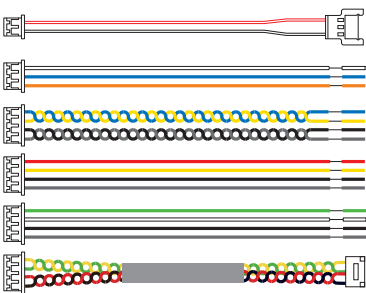


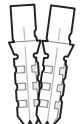
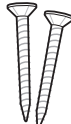

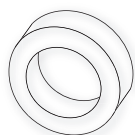
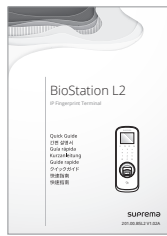

- The product may malfunction.

### **RTC battery**

Discard the battery according to the appropriate regional or international waste regulations. Discard the battery according to the appropriate regional or international waste regulations.

# Introduction

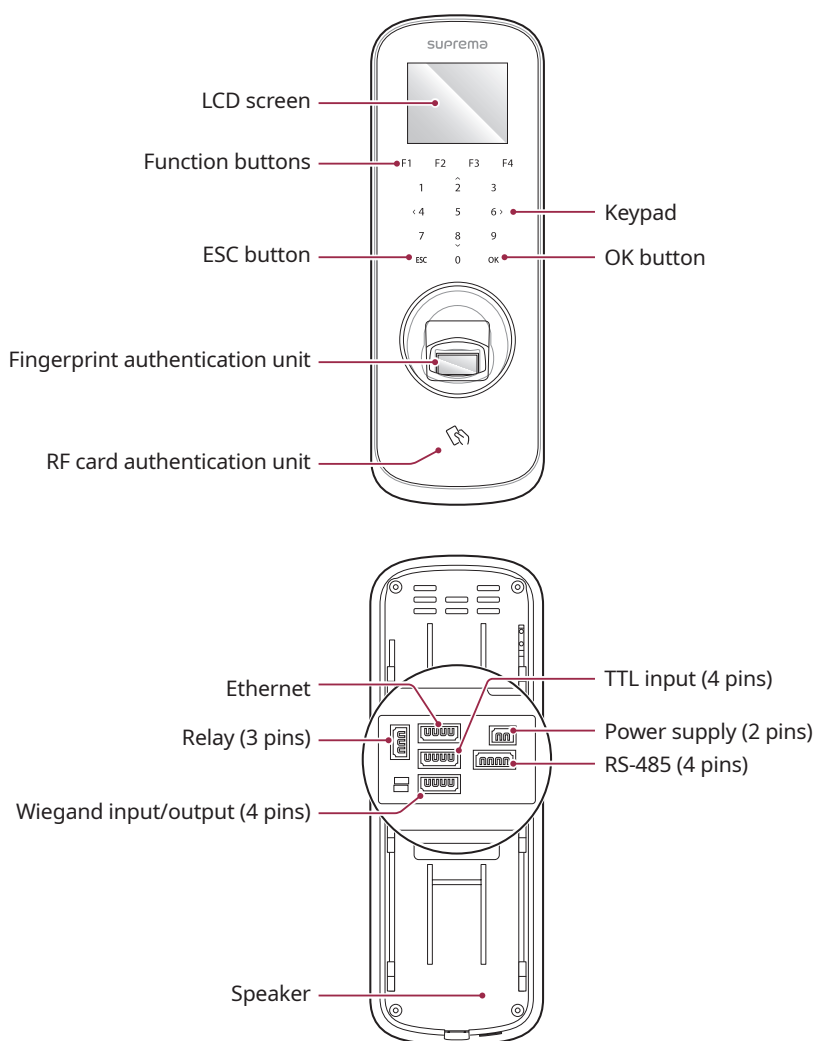
## Components

		
BioStation L2	Wall Bracket	Drilling Template
		
Cables	Diode	120 $\Omega$ resistor
		
PVC Anchor x2	Fixing Screw x2	Bracket Fixing Screw (Star Shaped)
		
Ferrite Core	Quick Guide	Open Source Software Guide



- Components may vary according to the installation environment.
- When assembling the product with the bracket, you can use the included bracket fixing screw (Star Shaped) instead of the product fixing screw for enhanced security.
- For more details regarding the product, visit the Suprema website (<https://www.supremainc.com>) and refer to the user guide.

## Name and function of each part



Name	Description
LCD screen	Provides UI for operation.
Function buttons	Serves as T&A function key.
Keypad	<ul style="list-style-type: none"> <li>• 0 to 9: Enters numbers/characters.</li> <li>• 2, 4, 6, 8: Navigates to an item.</li> </ul>
ESC button	Used for opening the menu, moving to the previous step or canceling input.
OK button	Used for selecting and setting T&A Mode. If a job code is set, you can change the job code of the user by pressing this button long.
Fingerprint Sensor	Reads fingerprints.
RF card authentication unit	Part to scan the card for entrance.
Cable connector	Connects cables. <ul style="list-style-type: none"> <li>• Power supply</li> <li>• Ethernet</li> <li>• RS-485</li> <li>• Wiegand input and output</li> <li>• TTL input</li> <li>• Relay</li> </ul>
Speaker	Delivers sound.

## Cables and connectors

### Power supply



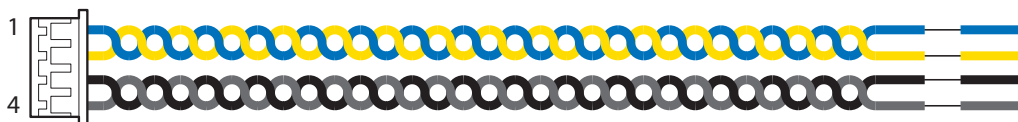
PIN	Name	Color
1	PWR +VDC	Red (White stripe)
2	PWR GND	Black (White stripe)

### Relay



PIN	Name	Color
1	RLY NO	White
2	RLY COM	Blue
3	RLY NC	Orange

### RS-485



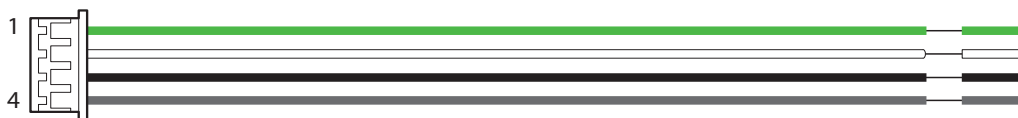
PIN	Name	Color
1	485 TRXP	Blue
2	485 TRXN	Yellow
3	485 GND	Black
4	SH GND	Gray

## TTL input



PIN	Name	Color
1	TTL IN0	Red
2	TTL IN1	Yellow
3	TTL GND	Black
4	SH GND	Gray

## Wiegand input and output



PIN	Name	Color
1	WG D0	Green
2	WG D1	White
3	WG GND	Black
4	SH GND	Gray

## Ethernet



PIN	Name	Color
1	ENET RXN	Yellow
2	ENET RXP	Green
3	ENET TXN	Red
4	ENET TXP	Black

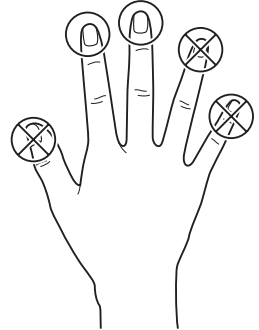


## How to enroll a fingerprint

In order to improve the fingerprint authentication rate, register the fingerprint correctly. BioStation L2 can recognize a fingerprint even if the angle and position of a user's fingerprint input change. If you register the fingerprint with attention to the following matters, the authentication rate can be improved.

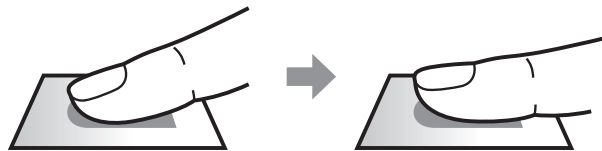
### Selecting a finger for fingerprint input

- In preparation for the case that the fingerprint of a specific finger cannot be used, for example if the user is lifting a load with one hand or a finger gets hurt, up to 10 fingerprints for each user can be registered.
- In the case of a user whose fingerprint cannot be recognized well, the authentication rate can be improved by enrolling the same finger twice repeatedly.
- If a finger has a cut or the fingerprint is blurry, select another finger for the fingerprint.
- It is recommended to use the index finger or the middle finger when scanning the fingerprint. The authentication rate can be reduced if it is difficult to place another finger at the center of fingerprint sensor accurately.



### Fingerprint enroll method

- 1 When a message saying "Place your finger on the sensor." is displayed on the LCD screen for enrolling the fingerprint, place the finger with the fingerprint you wish to enroll on the fingerprint authentication unit and press the finger gently for better authentication.



- 2 When the re-input screen is displayed after a beep sound, scan the fingerprint of the enrolled finger again (scan the fingerprint of a finger to be enrolled twice).



#### Cautions for enrolling a fingerprint

When a fingerprint is recognized, it is compared with the initially registered fingerprint, so the initial fingerprint enroll is the most important. Pay attention to the following matters when enrolling the fingerprint.

- Place the finger deep enough to contact with the sensor completely.
- Place the center of the fingerprint in the center of the sensor.
- If a finger has a cut or the fingerprint is blurry, select another finger for the fingerprint.
- Scan the fingerprint correctly without moving according to the instruction on the screen.
- If you make the finger upright so that the contact area with the sensor is decreased or the angle of finger is warped, fingerprint authentication may not be performed.



#### When the fingerprint recognition fails

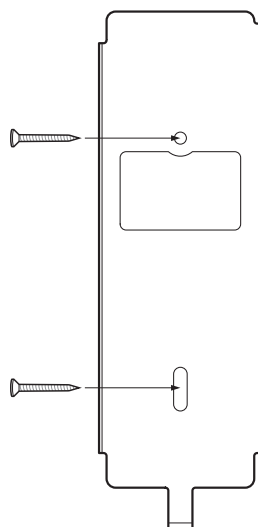
BioStation L2 can recognize a fingerprint regardless of a change in season or finger condition. However, the authentication rate may vary according to the external environment or fingerprint input method. If the fingerprint authentication cannot be done smoothly, it is recommended to take the following measures.

- If the finger is smeared with water or sweat, dry off the finger and then scan the finger.
- If the finger is too dry, blow your breath on the fingertips and then scan the finger.
- If the finger has a cut, register the fingerprint of another finger.
- The initially enrolled fingerprint often may have not been scanned correctly, so enroll the fingerprint again according to 'Cautions for enrolling a fingerprint'.

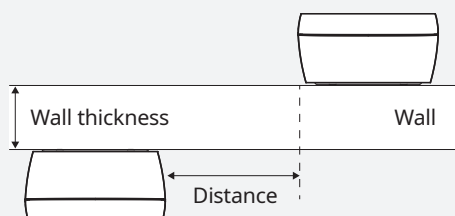
# Installation

## Fixing the bracket and the product

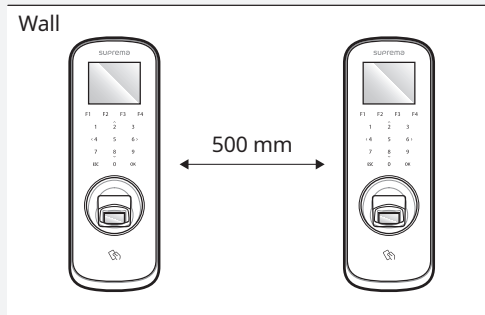
- 1 Determine the correct position to install the bracket using the provided drilling template. Fix the bracket firmly using fixing screws through the bracket to the position where BioStation L2 will be installed.



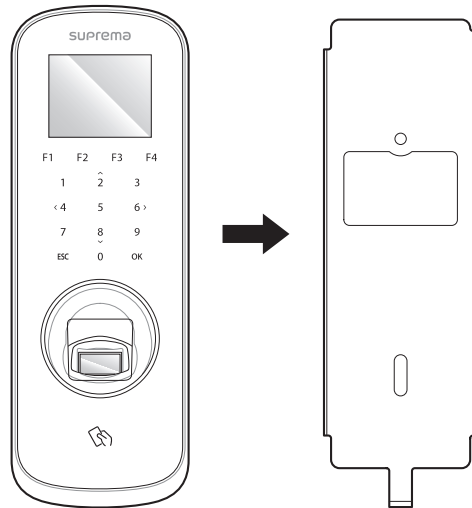
- If installing BioStation L2 on a concrete wall, drill holes, insert PVC anchors, and fix them with fixing screws.
- To avoid RF interference, a minimum separation distance must be maintained.



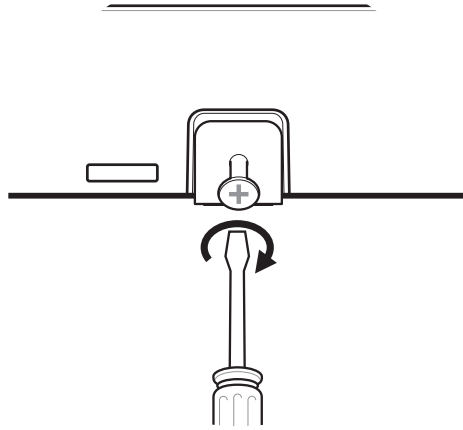
Wall thickness	Distance
100 mm	470 mm
120 mm	400 mm
150 mm	300 mm



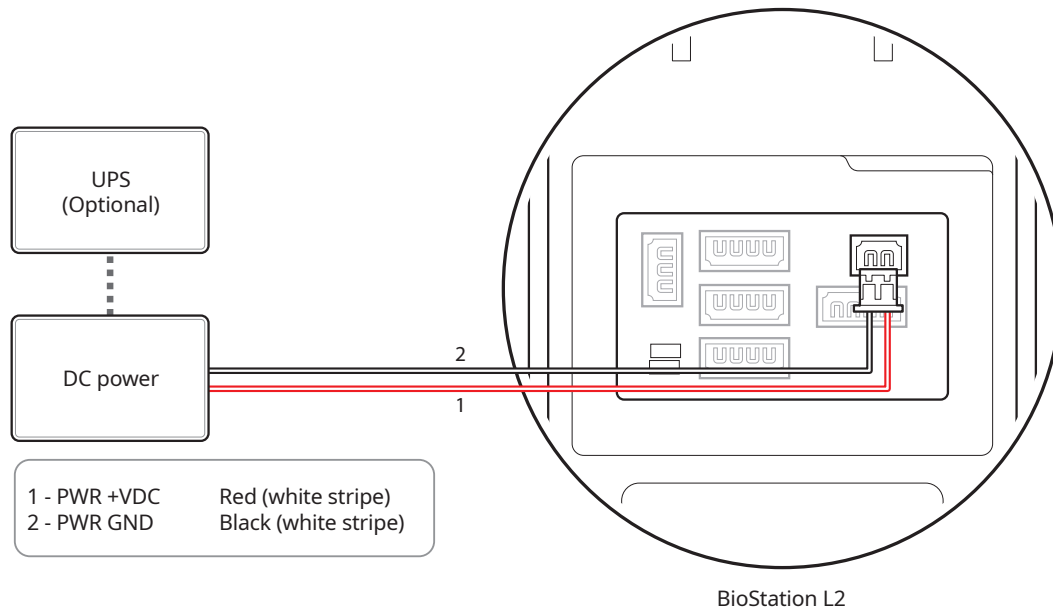
- 2** Assemble the cable cover and install BioStation L2 onto the fixed bracket.



- 3** Connect BioStation L2 to the bracket by rotating the product fixing screw of BioStation L2.



## Power supply connection



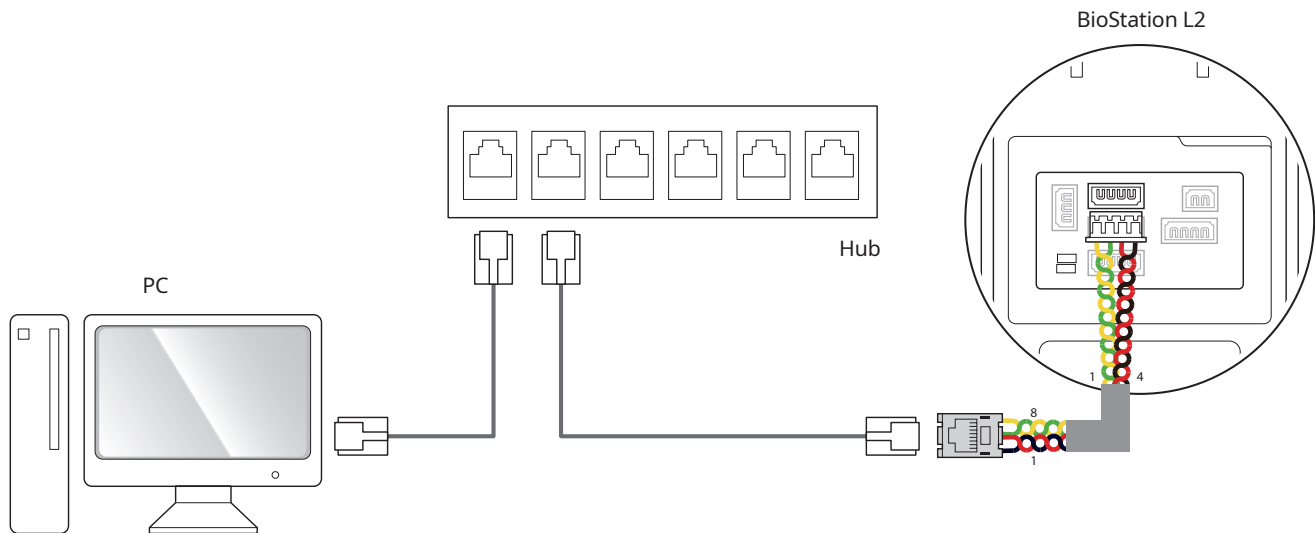
- Use a power supply adaptor of DC 12 V ( $\pm 10\%$ ) with a minimum of 1,500 mA which has obtained the approval of IEC/EN 60950-1. If you wish to connect and use another device to the power supply adaptor, you should use an adaptor with a current capacity which is the same or larger than the total power consumption required for the terminal and another device.
- Use a separate power supply for Secure I/O 2, the electric lock, and the product respectively. If connecting and using the power supply to these devices together, the devices may malfunction.

## Network connection

### TCP/IP

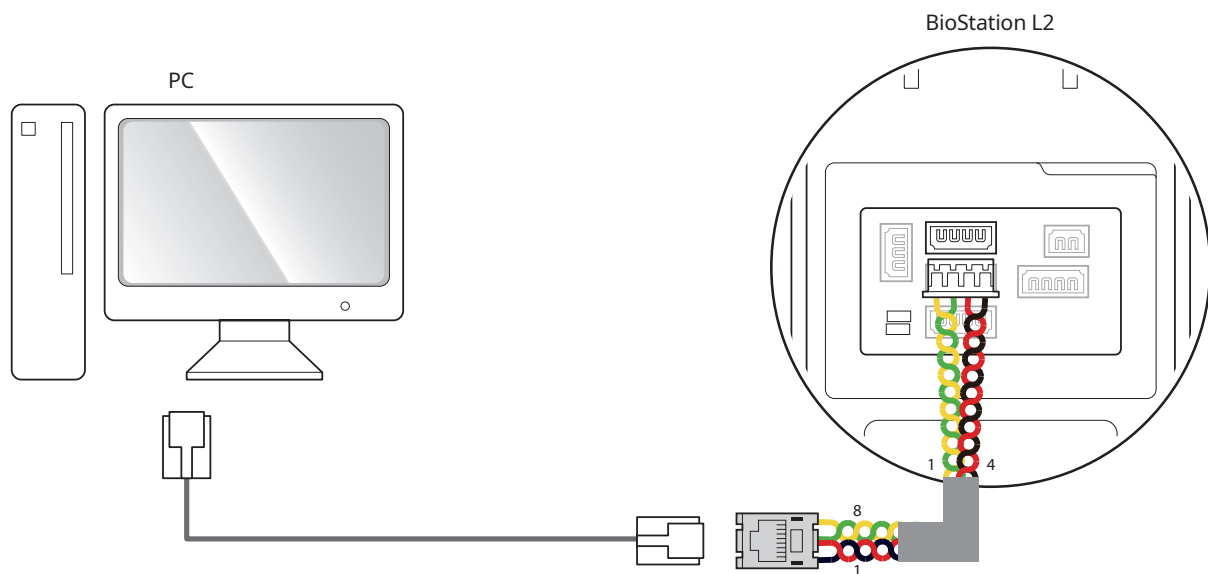
#### LAN connection (connecting to a hub)

You can connect the product to a hub using a general type CAT-5 cable.

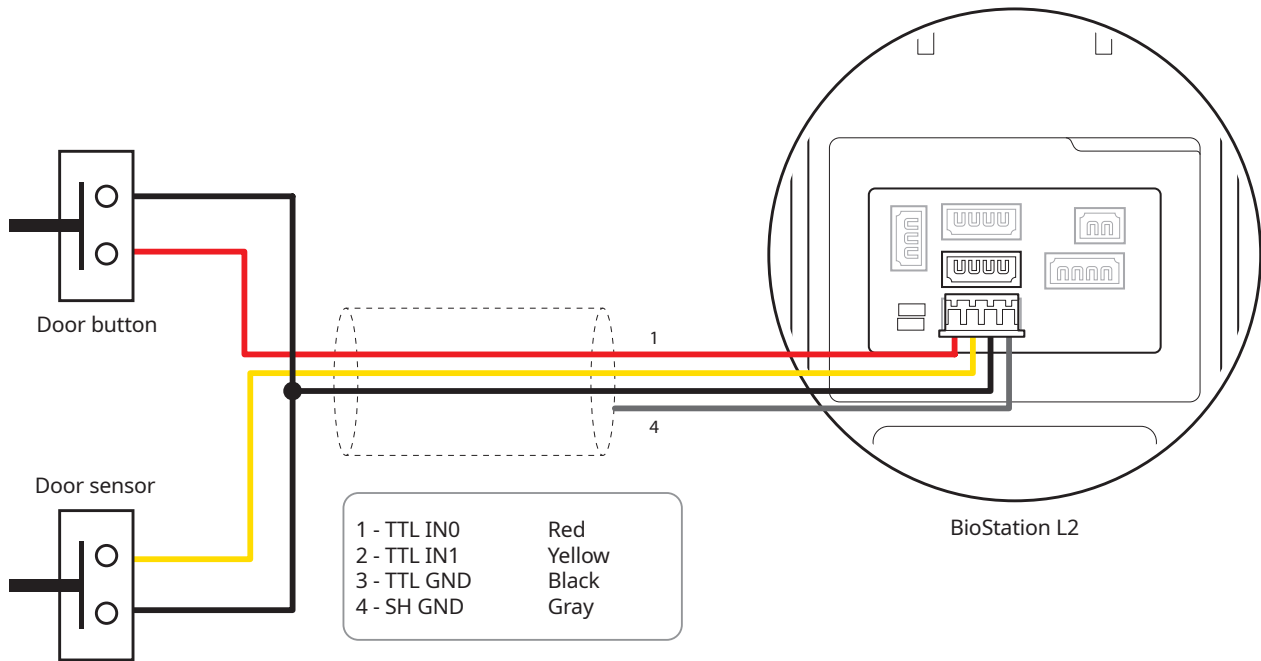


#### LAN connection (connecting to a PC directly)

BioStation L2 has an automatic MDI/MDIX function so that it can be connected to a PC directly using a normal straight type CAT-5 cable or a cross cable.



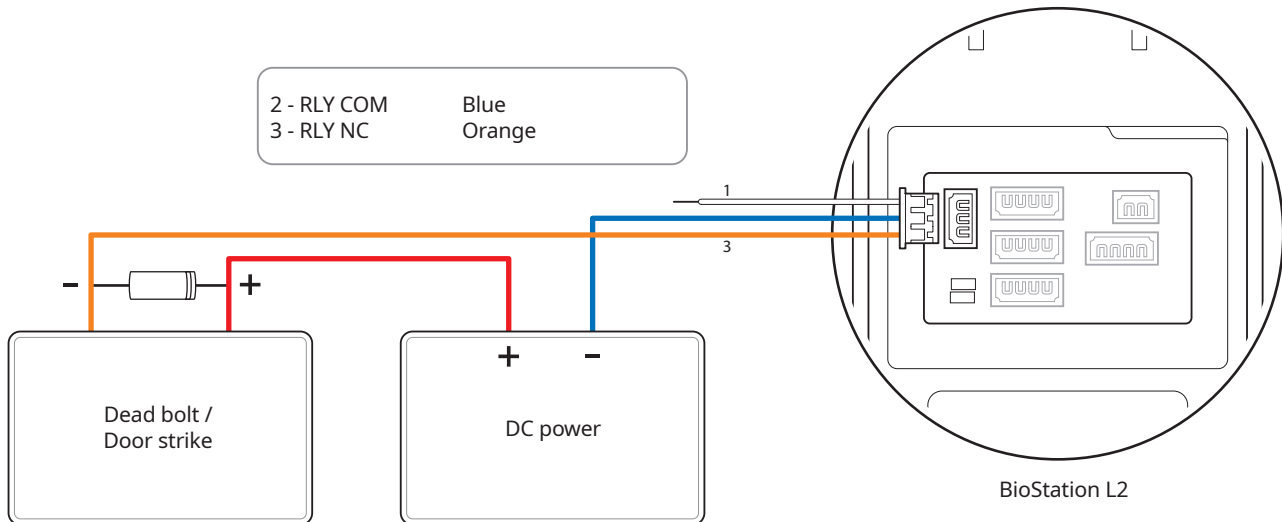
## TTL input connection



## Relay connection

### Fail Safe Lock

In order to use the Fail Safe Lock, connect N/C relay as shown in the figure below. There is normally a current flowing through the relay for the Fail Safe Lock. When the relay is activated, blocking the current flow, the door will open. If the power supply to the product is cut off due to a power failure or an external factor, the door will open.

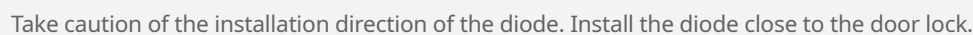
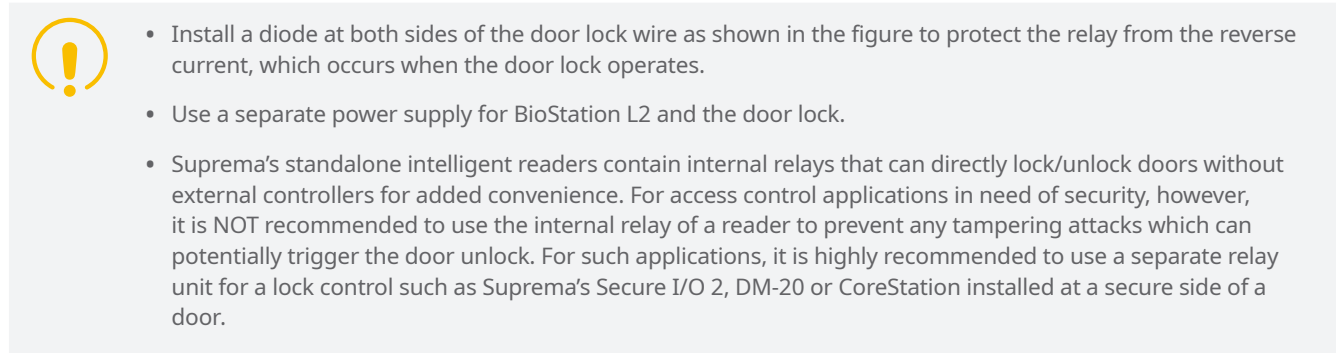


- Install a diode at both sides of the door lock wire as shown in the figure to protect the relay from the reverse current, which occurs when the door lock operates.
- Use a separate power supply for BioStation L2 and the door lock.
- Suprema's standalone intelligent readers contain internal relays that can directly lock/unlock doors without external controllers for added convenience. For access control applications in need of security, however, it is NOT recommended to use the internal relay of a reader to prevent any tampering attacks which can potentially trigger the door unlock. For such applications, it is highly recommended to use a separate relay unit for a lock control such as Suprema's Secure I/O 2, DM-20 or CoreStation installed at a secure side of a door.



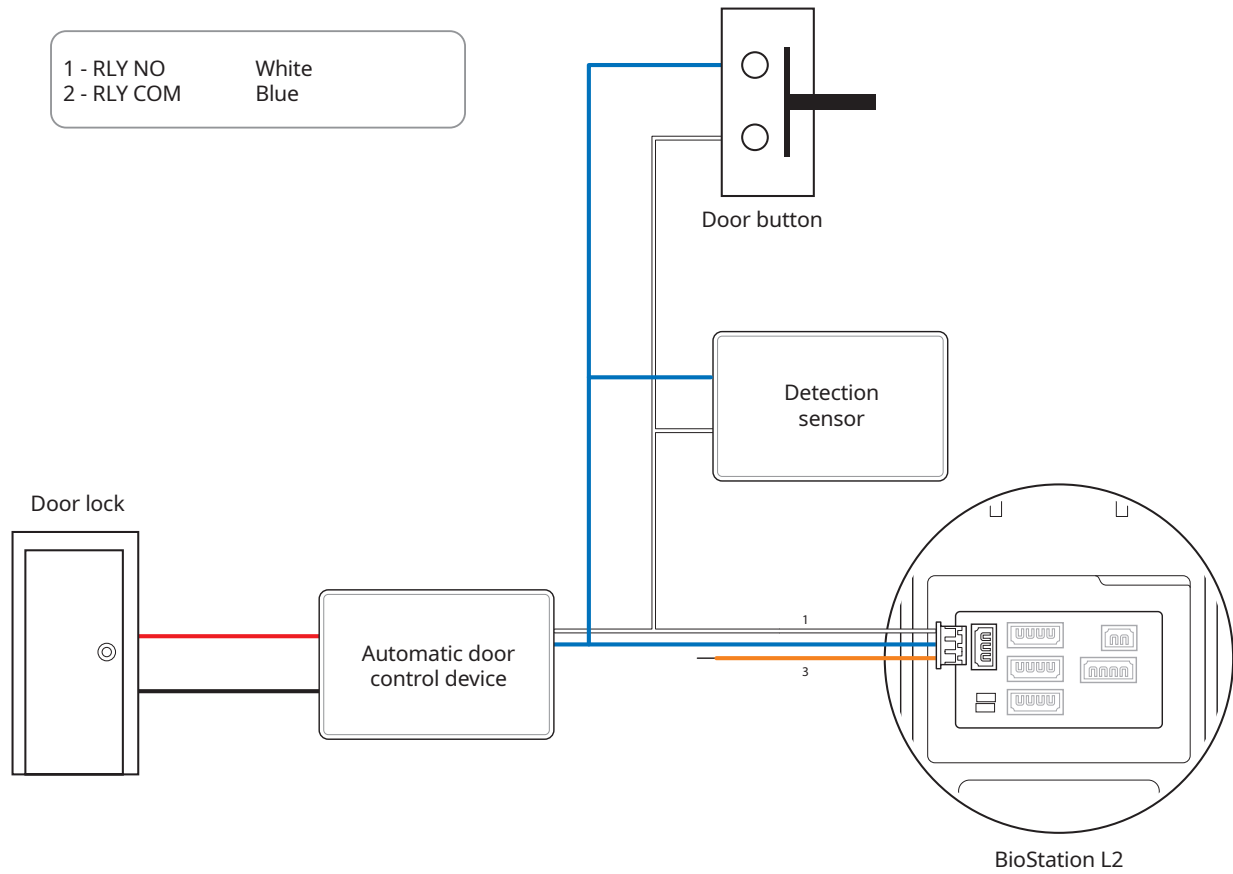
Take caution of the installation direction of the diode. Install the diode close to the door lock.

In order to use the Fail Secure Lock, connect N/O relay as shown in the figure below. There is normally no current flowing through the relay for the Fail Secure Lock. When the current flow is activated by the relay, the door will open. If the power supply to the product is cut off due to a power failure or an external factor, the door will lock.



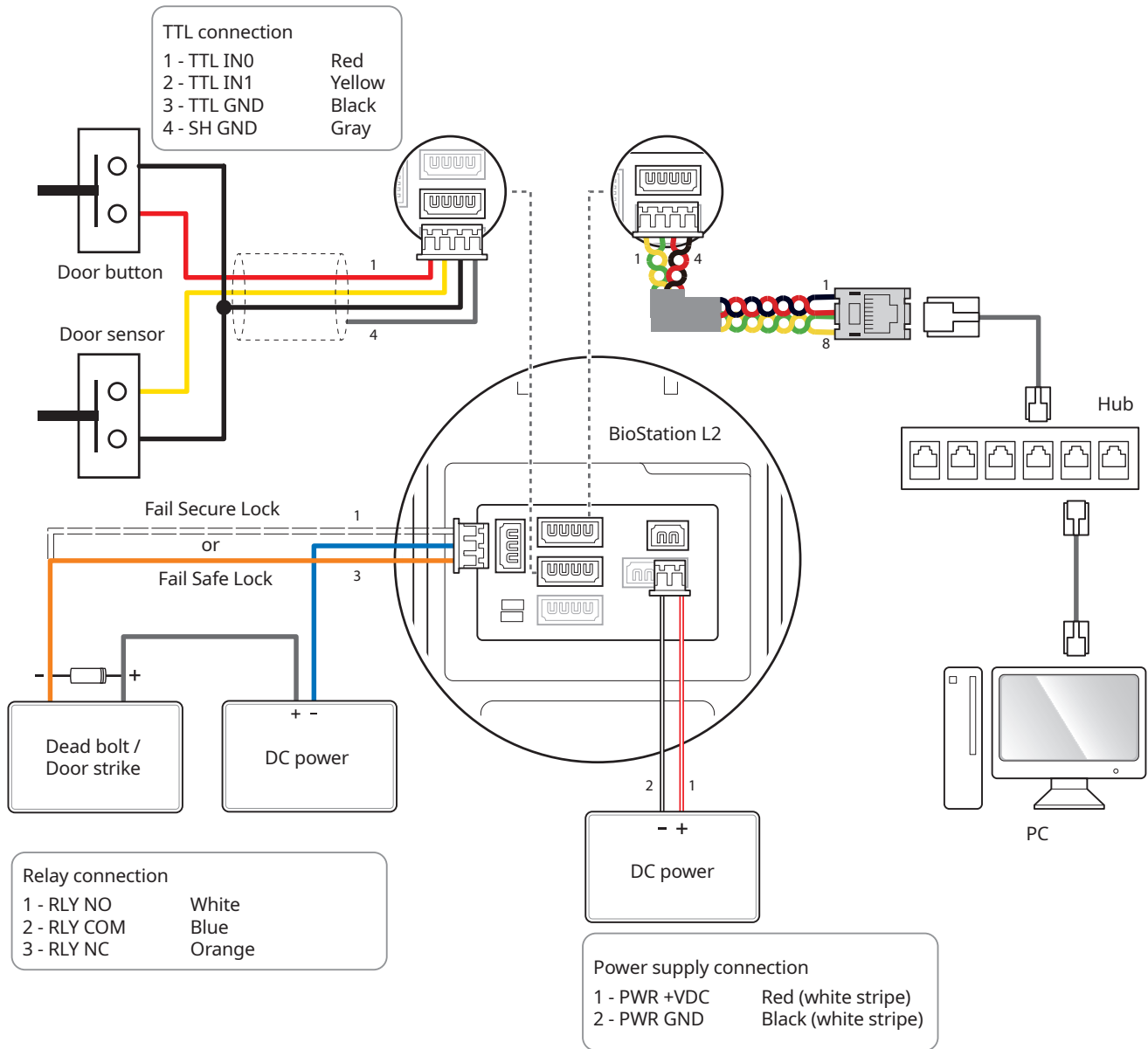


## Automatic door connection



## Connecting as a standalone

BioStation L2 can be connected to the door lock, door button, and door sensor directly without connecting a separate I/O device.



Suprema's standalone intelligent readers contain internal relays that can directly lock/unlock doors without external controllers for added convenience. For access control applications in need of security, however, it is NOT recommended to use the internal relay of a reader to prevent any tampering attacks which can potentially trigger the door unlock. For such applications, it is highly recommended to use a separate relay unit for a lock control such as Suprema's Secure I/O 2, DM-20 or CoreStation installed at a secure side of a door.

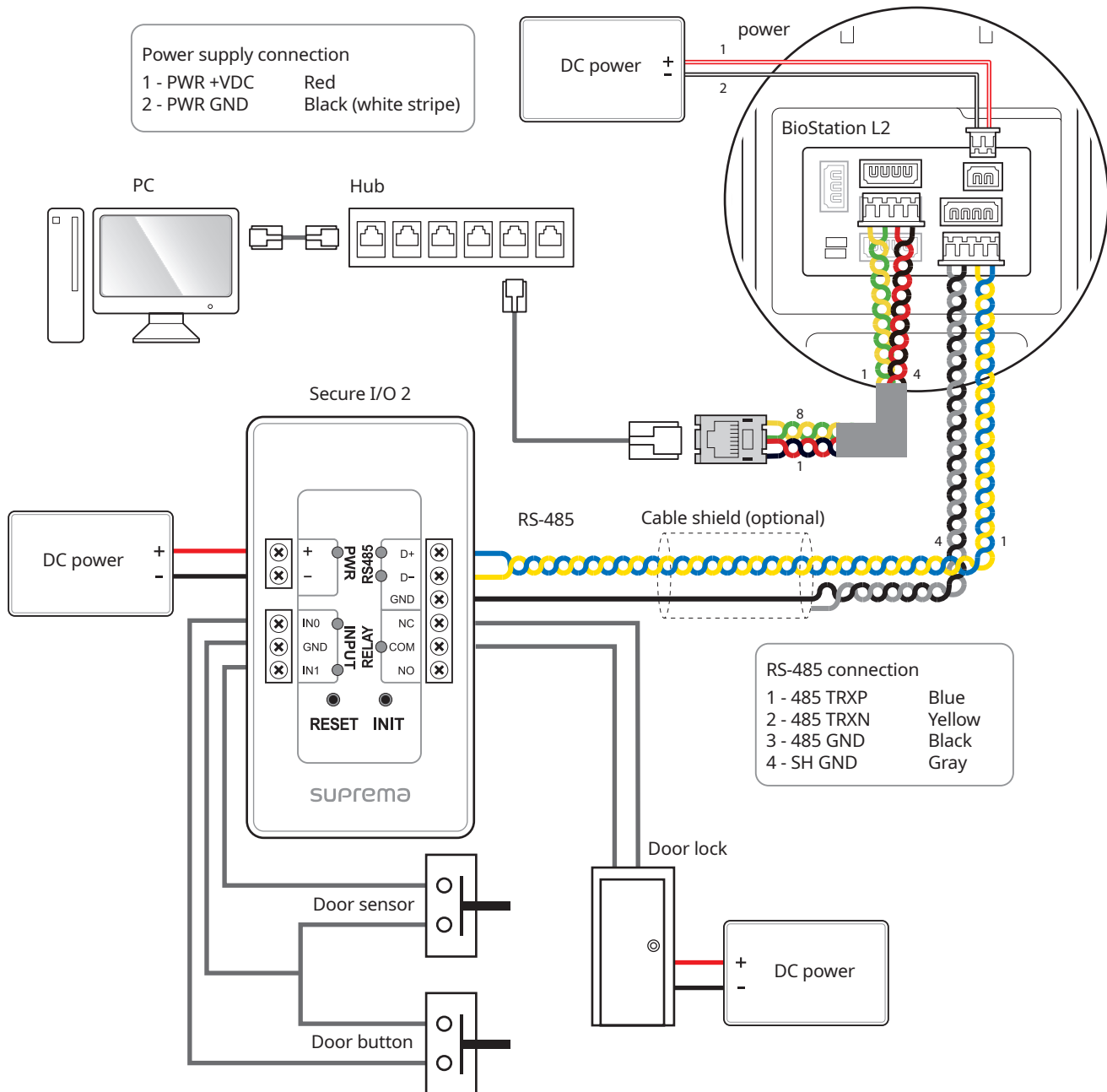


- BioStation L2 can be used as a multi-door controller with the slave devices with the RS485 cable. The slave devices are used as dummy readers and authentication is performed in the master device.
- For more information, contact the Suprema technical support team ([support.supremainc.com](mailto:support.supremainc.com)).

## Connecting to Secure I/O 2

Secure I/O 2 is an I/O device, can be connected to BioStation L2 with the RS-485 cable. Security can be maintained even if the connection between BioStation L2 and Secure I/O 2 has been lost or the power supply to BioStation L2 has been shut off due to external factors.

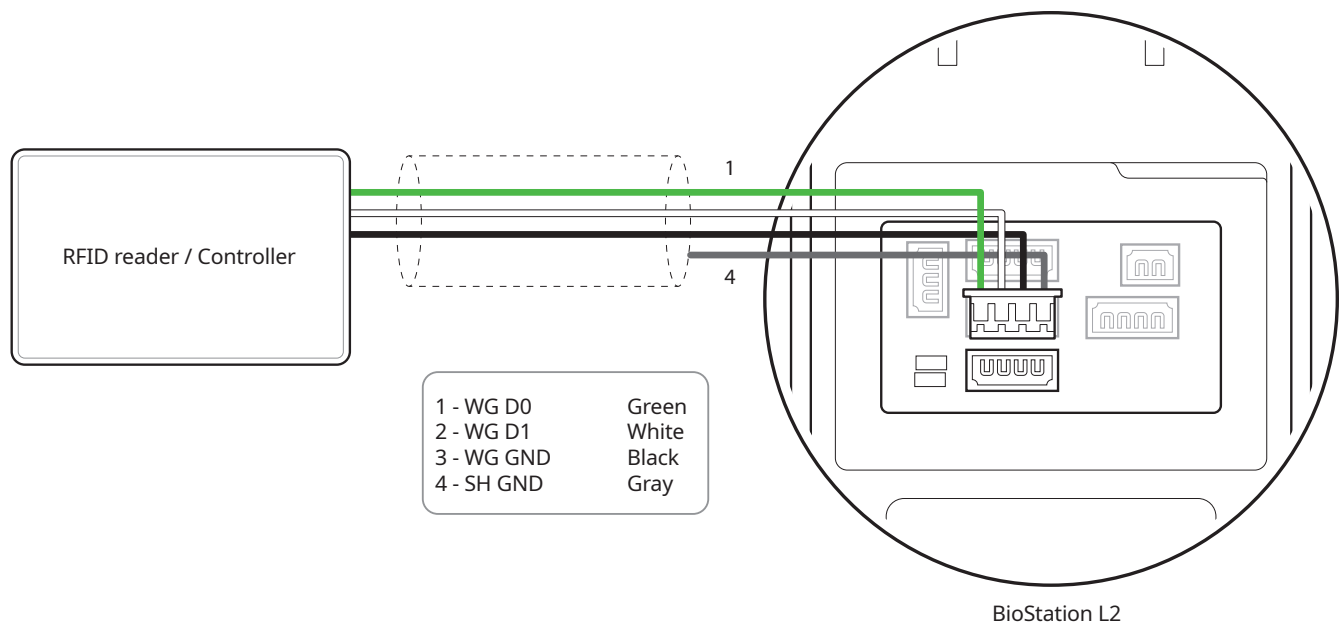
- Use an AWG24 twisted pair with less than 1.2 km in length for the RS-485 cable.
- If connecting with a RS-485 daisy chain, connect the termination resistor (120  $\Omega$ ) to both ends of the daisy chain connection. If connected to the middle line, the signal level becomes smaller and the communication performance will deteriorate. Make sure to connect it to both ends of the daisy chain connection.



- BioStation L2 can be used as a multi-door controller with the slave devices with the RS485 cable. The slave devices are used as dummy readers and authentication is performed in the master device.
- If a card reader is connected as the master device, only card authentication can be used.
- The maximum number of slave devices available to connect varies according to the authentication method, number of users, and number of devices. Also note that the number of slave devices affects the fingerprint authentication speed.
- A master device can control 31 slave devices. The bandwidth of RS485 allows for up to 7 fingerprint authentication devices to be connected.
- For more information, contact the Suprema technical support team ([support.supremainc.com](mailto:support.supremainc.com)).

## Wiegand connection

Use as a Wiegand input or output device



# Product specifications

Category	Feature	Specification
Credential	Biometric	Fingerprint
	RF Option	<ul style="list-style-type: none"> <li><b>BSL2-OE:</b> 125 kHz EM</li> <li><b>BSL2-OM:</b> 13.56 MHz MIFARE, MIFARE Plus, DESFire EV1/EV2*, FeliCa</li> </ul>
	RF read range**	MIFARE, DESFire: 50 mm / FeliCa: 30 mm
	Mobile	NFC (BLS2-OM only)
General	CPU	1.2 GHz Quad Core
	Memory	2GB Flash + 256 MB RAM
	Crypto chip	Supported
	LCD type	2" color TFT LCD
	LCD resolution	220 x 176 pixels
	Sound	16-bit Hi-Fi
	Operating temperature	-20°C–50°C
	Storage temperature	-40°C–70°C
	Operating humidity	0 %–80 %, non-condensing
	Storage humidity	0 %–90 %, non-condensing
	Dimension (W x H x D)	71 mm x 201 mm x 44 mm (Bottom) / 34 mm (Top)
	Weight	<ul style="list-style-type: none"> <li>Device: 280 g</li> <li>Bracket (Including washer and bolt): 61 g</li> </ul>
	Certificates	CE, FCC, KC, RoHS, REACH, WEEE
Fingerprint	Image dimension	272 x 320 pixels
	Resolution	500 dpi
	Template	SUPREMA / ISO19794-2, ANSI-378
	Extractor / Matcher	MINEX certified and compliant
	Live Fingerprint Detection	Supported
Capacity	Max. User	500,000***
	Max. Credential (1:N)	Fingerprint: 100,000
	Max. Credential (1:1)	<ul style="list-style-type: none"> <li>Fingerprint: 500,000</li> <li>Card: 500,000</li> <li>PIN: 500,000</li> </ul>
	Max. Text Log	1,000,000
Interface	Ethernet	Supported (10/100 Mbps, auto MDI/MDI-X)
	RS-485	1 ch Host or Slave (Selectable)
	Wiegand	1 ch Input or Output (Selectable)
	TTL input	2 ch Inputs
	Relay	1 Relay
	Tamper	Supported
Electrical	Power	Voltage: DC 12V Current: Max. 600 mA
	Switch input VIH	Min.: 3 V / Max.: 5 V
	Switch input VIL	Max.: 1 V
	Switch Pull-up resistance	4.7 kΩ (The input pots are pulled up with 4.7 kΩ.)
	Wiegand output VOH	More than 4.8 V
	Wiegand output VOL	Less than 0.2 V
	Wiegand output Pull-up resistance	Internally pulled up with 1 kΩ
	Relay	2 A @ 30 VDC Resistive load 1 A @ 30 VDC Inductive load

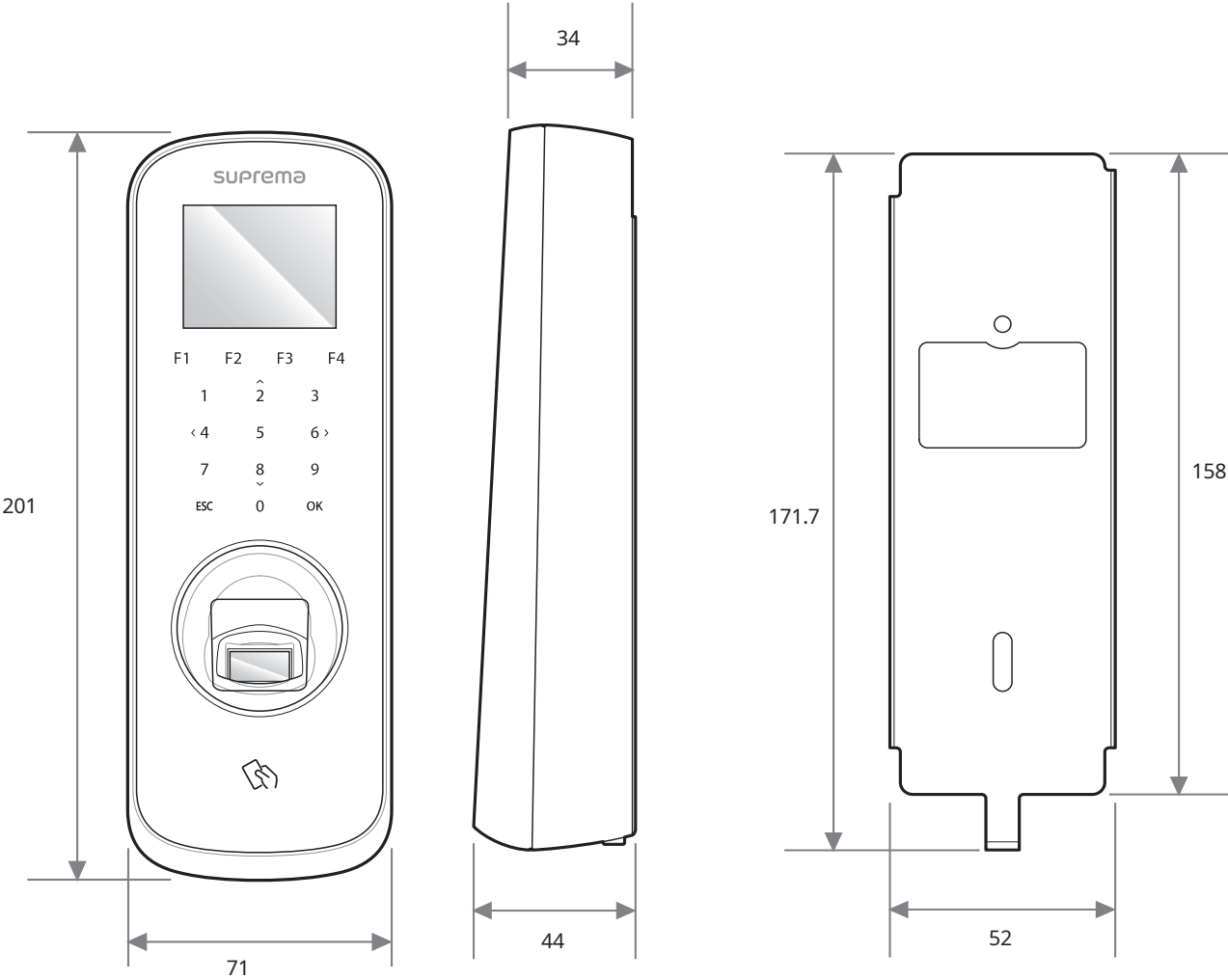
\* DESFire EV2 cards are supported by having backward compatibility of DESFire EV1 cards. CSN and smart card functions are compatible with BioStation L2.

\*\* RF read range will vary depending on installation environment.

\*\*\* The number of users registered without any credential data

Dimensions

(Unit: mm)



## FCC compliance information

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES.

Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.



This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules..

- This appliance and its antenna must not be co-located or operation in conjunction with any other antenna or transmitter.
- A minimum separation distance of 20 cm must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.

## EU Declaration of Conformity (CE)

This product is CE marked according to the provisions of the Radio Equipment Directive (RED) 2014/53/EU. Hereby, Suprema Inc. declares that this product is in compliance with the essential requirements and other relevant provisions of Radio Equipment Directive (RED) 2014/53/EU.

- NFC Frequency: 13.56 MHz
- RFID Frequency: 13.56 MHz + 125 kHz

For more information, contact us at the following contact information.

Suprema Inc.

Website: <https://www.supremainc.com>

Address: 17F Parkview Tower, 248, Jeongjail-ro, Bundang- gu, Seongnam-si, Gyeonggi-do, 13554, Rep. of KOREA

Tel: +82-31-783-4502 / Fax: +82-31-783-4503

# Appendices

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#### **Suprema Inc.**

17F Parkview Tower, 248, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 13554, Rep. of KOREA

Tel: +82 31 783 4502 | Fax: +82 31 783 4503 | Inquiry: [sales\\_sys@supremainc.com](mailto:sales_sys@supremainc.com)



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