

# BioStation L2

# INSTALLATION GUIDE

Version 1.14  
English

EN 101.00.BSL2 V1.14A

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# Safety instructions

Observe the following instructions to use the product safely and prevent any risk of injury or property damage.

## Warning

Noncompliance of instructions could lead to serious injury or death.

### Installation

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

- A fire or electric shock may occur.

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

- A fire or electric shock may occur due to overheating.

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

- Otherwise, a product damage or electric shock may occur due to moisture.

**Install the product in a place with no electromagnetic interference.**

- Otherwise, a product damage or electric shock may occur.

**The user should not install or repair the product independently.**

- A fire, electric shock, or personal injury may occur.
- If the product has been damaged due to independent installation or repair of the product by the user, free A/S service will not be provided.

### Operation

**Do not allow liquids such as water, beverages, or chemicals get into the product.**

- A fire, electric shock, or product damage may occur.

## Caution

Noncompliance of instructions could lead to minor injury or product damage.

### Installation

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

- Product damage or physical injury may occur.

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

- A product failure may occur.

**Use only a power supply adaptor of DC 12 V and 500 mA or higher.**

- If the proper power is not used, the product may not operate normally.

**If installing the product outside where the product is completely exposed, it is recommended to install the product together with the enclosure.**

**Use a separate power supply for Secure I/O 2, electric lock and BioStation L2 respectively.**

- If connecting and using the power supply to these devices together, the devices may malfunction.

**When installing a number of devices, allow a space between the devices for installation.**

- Otherwise, one device may affect the RF performance of other devices, resulting in malfunction.

## Operation

**Do not drop the product or apply an impact to the product.**

- A product failure may occur.

**Manage the password with care not to disclose it to others and change the password periodically.**

- Otherwise, illegal intrusion may occur.

**Do not press the buttons on the product forcibly or using a sharp tool.**

- A product failure may occur.

**Be careful not to contaminate or damage the fingerprint contact unit with a dirty hand or foreign substances.**

- Deterioration in fingerprint authentication performance and a product failure may occur.

**When cleaning the product, wipe the product with a soft and dry cloth and no water, benzene or alcohol.**

- Otherwise, a product failure may occur.

**BioStation L2 uses capacitive buttons. If the environment is moist from wet weather or the product surface is smeared with a lot of water, wipe off the product with a dry towel before using it.**

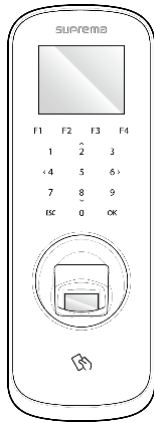
### RTC battery

Replacing the battery with an incorrect type of battery may cause explosion.

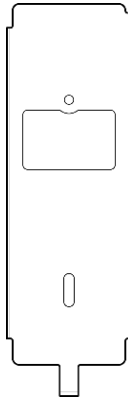
Discard the battery according to the appropriate regional or international waste regulations.

# Introduction

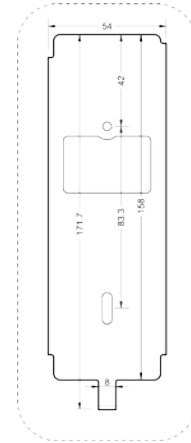
## Components



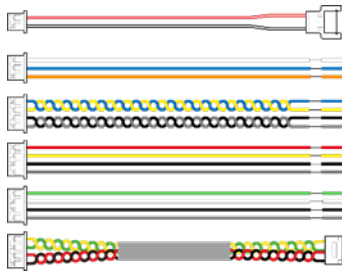
BioStation L2



Wall Bracket



Drilling Template



Connection Cable  
(2 pins 1 EA, 3 pins 1 EA, 4 pins 4 EA)



Diode

120  $\Omega$  resistor

PVC Anchor x2



Ferrite Core



Fixing Screw x2



Bracket Fixing Screw  
(Star Shaped)



Open Source Software Guide

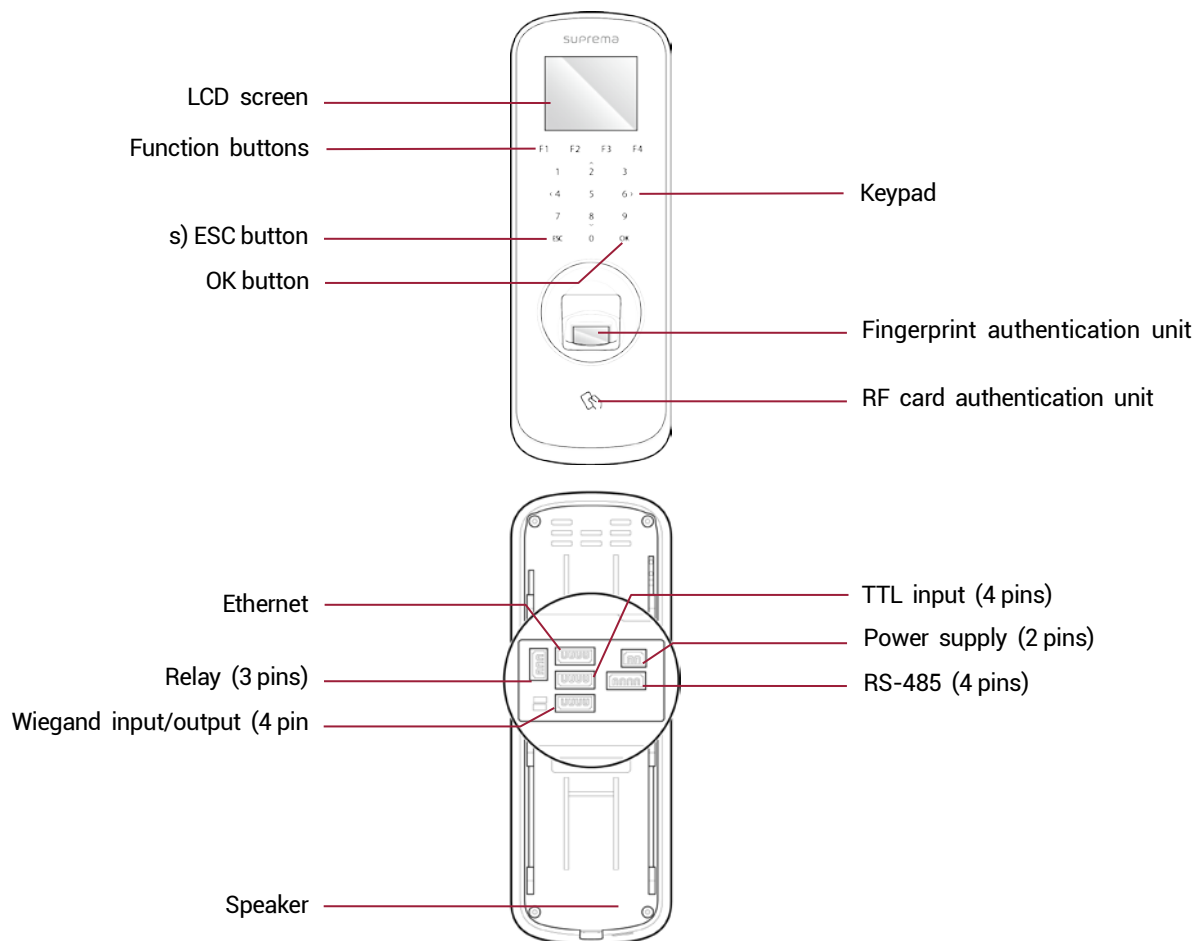


Quick Guide

### NOTE

- Components may vary according to the installation environment.

## Name and function of each part



| Name                                   | Description   |
|--|---|
| <b>LCD screen</b>                      | Provides UI for operation.  |
| <b>Function buttons</b>                | Serves as T&A function key.   |
| <b>Keypad</b>                          | <ul style="list-style-type: none"> <li>• <b>0 to 9</b>: Enters numbers/characters.</li> <li>• <b>2, 4, 6, 8</b>: Navigates to an item.</li> </ul> |
| <b>OK button</b>                       | 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.              |
| <b>ESC button</b>                      | Used for opening the menu, moving to the previous screen or canceling input.  |
| <b>Speaker</b>                         | Delivers sound.   |
| <b>Fingerprint authentication unit</b> | Part to scan the fingerprint for entrance.  |
| <b>RF card authentication unit</b>     | Part to scan the card for entrance.   |
| <b>TTL input (4 pins)</b>              | Connect the TTL input cable.  |
| <b>RS-485 (4 pins)</b>                 | Connect the RS-485 cable.   |
| <b>Relay (3 pins)</b>                  | Connect the relay cable.  |
| <b>Power supply (2 pins)</b>           | Connect the power supply cable.   |
| <b>Ethernet (4 pins)</b>               | Connect the Ethernet cable.   |
| <b>Wiegand input/output (4 pins)</b>   | Connect the Wiegand input and output cable.   |

## 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.

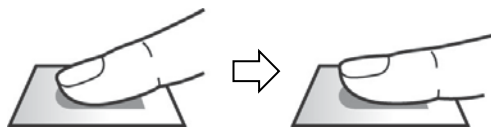
### Selecting a finger for fingerprint input

- 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 "Scan the fingerprint." is displayed on the LCD screen for enrolling the fingerprint, place the finger with the fingerprint to be registered 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 registered finger again (scan the fingerprint of a finger to be registered twice).

#### NOTE

##### 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 has decreased or the angle of finger has warped, fingerprint authentication may not be performed.



##### When the fingerprint recognition fails

BioStation L2 can recognize a fingerprint regardless of a change of season or finger condition. However, the authentication rate may vary according to the external environment or fingerprint input method.

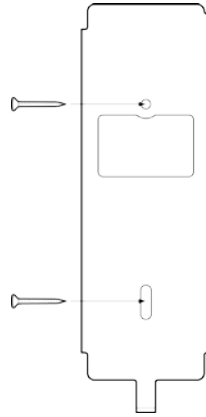
If the fingerprint authentication cannot be done smoothly, it is recommended to take the following measures.

- 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 registered fingerprint often may have not been scanned correctly, so register the fingerprint again according to 'Cautions for enrolling a fingerprint'.

# Installation

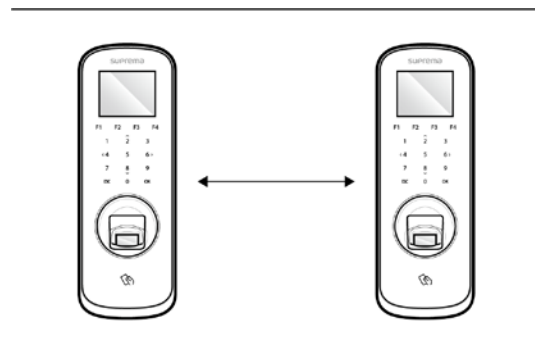
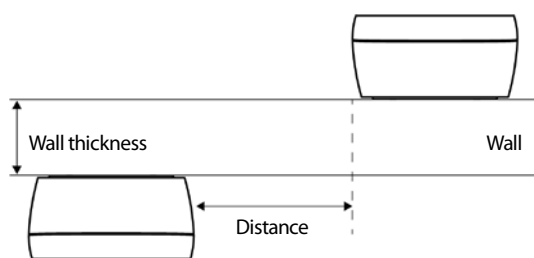
## Fixing the bracket and the product

- 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.



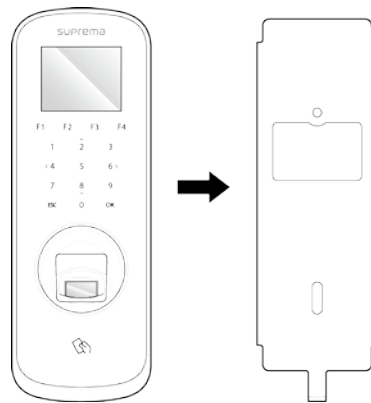
### NOTE

- 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.

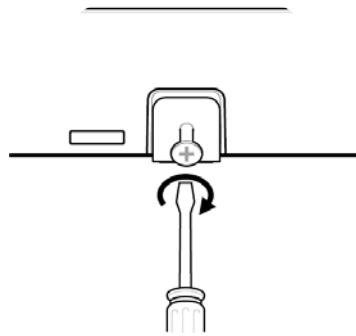


| Wall thickness | Distance |
|----------------|----------|
| 100 mm         | 470 mm   |
| 120 mm         | 400 mm   |
| 150 mm         | 300 mm   |

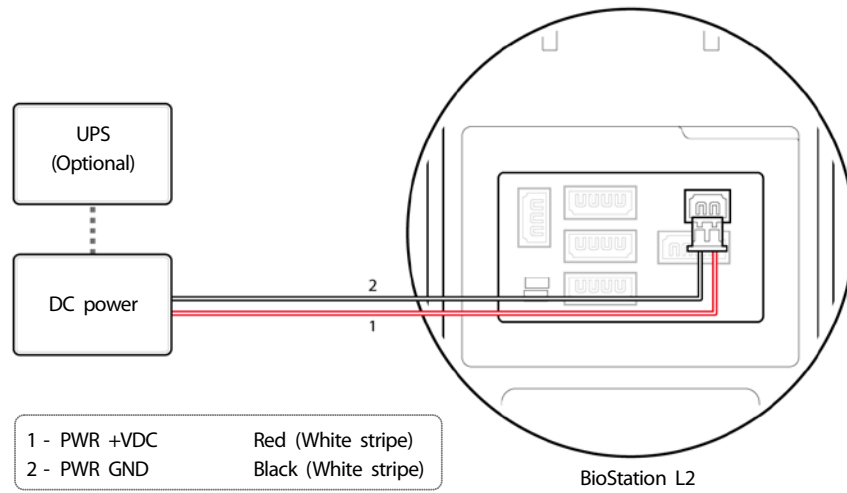
- 2** Install BioStation L2 onto the fixed bracket.



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



## Power supply connection



### NOTE

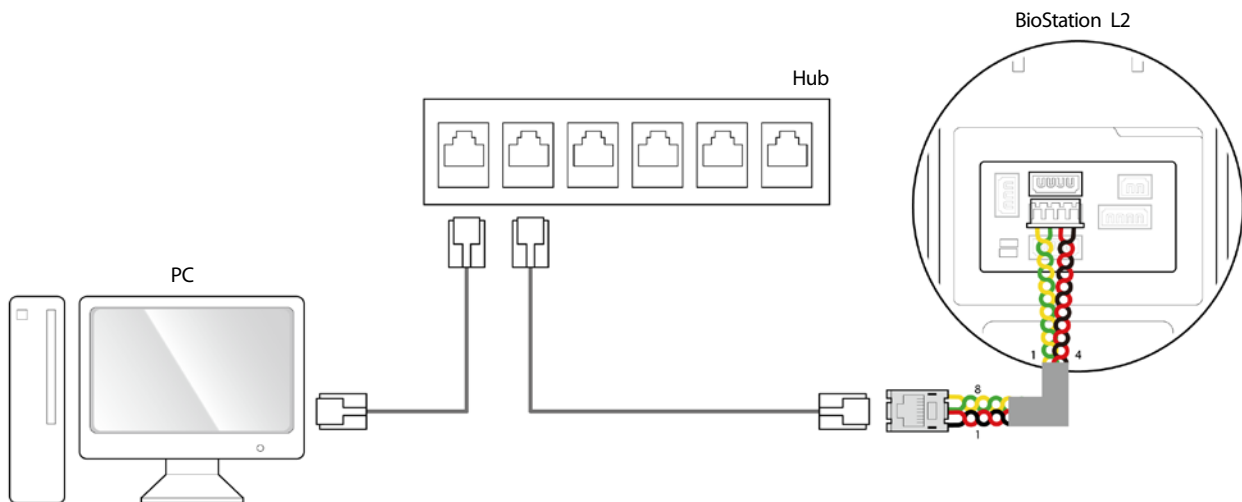
- Use a power supply adaptor of DC 12 V ( $\pm 10\%$ ) with a minimum of 1,500 mA which has obtained the approval of IEC/EN 60950-1. If you wish to connect and use another device to the power supply adaptor, you should use an adaptor with a current capacity which is the same or larger than the total power consumption required for the terminal and another device.
- Use a separate power supply for Secure I/O 2, the electric lock, and the BioStation L2 respectively. If connecting and using the power supply to these devices together, the devices may malfunction.

## Network connection

### TCP/IP

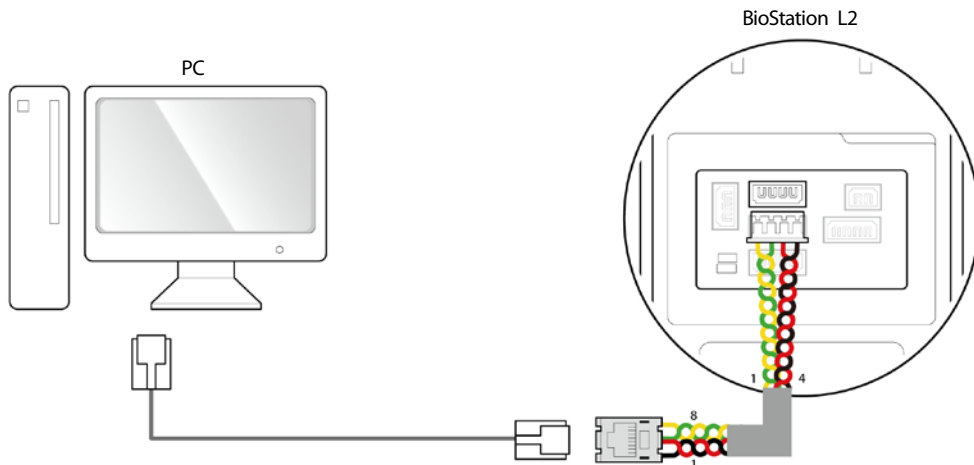
#### LAN connection (connecting to a hub)

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



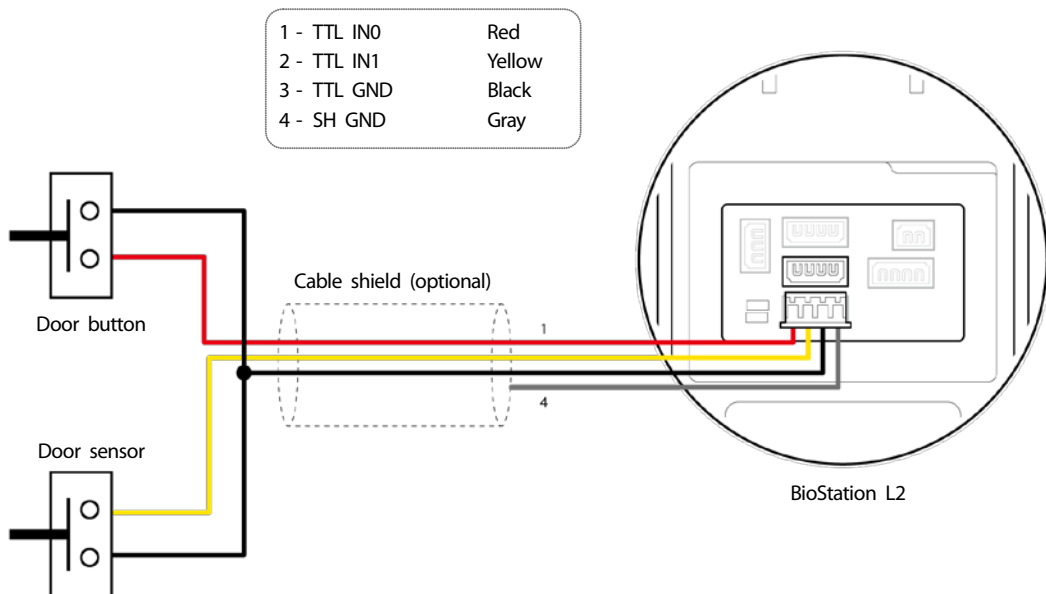
**LAN connection (connecting to a PC directly)**

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, not a cross cable.



**TTL connection**

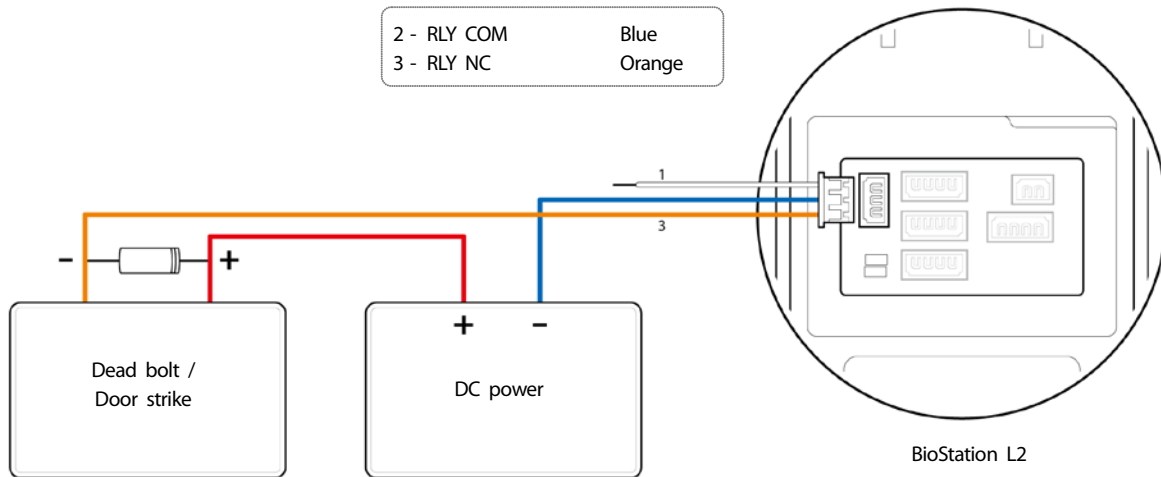
**TTL input connection**



## 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.

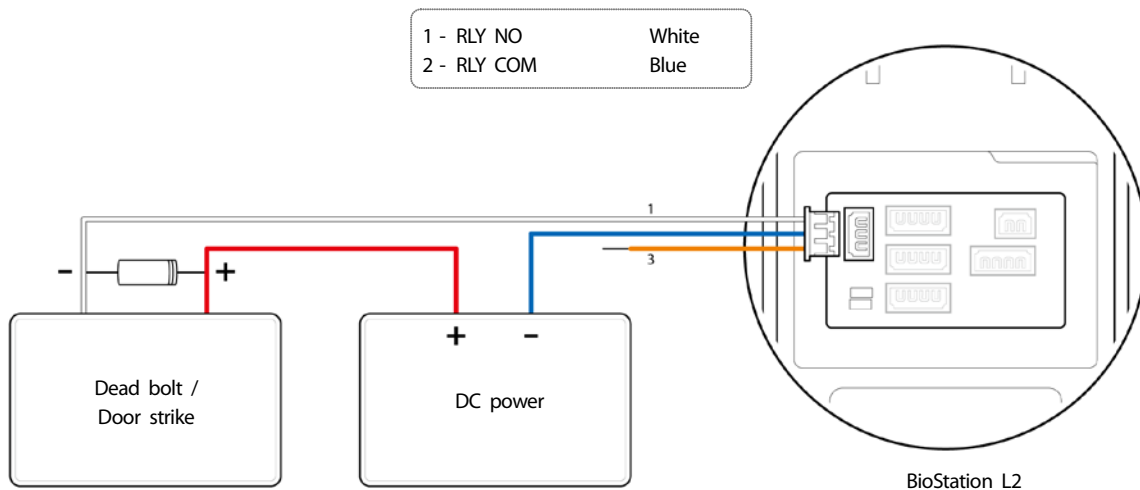


#### NOTE

- 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.
- Take caution of the installation direction of the diode. Install the diode close to the door lock.
- Use a separate power supply for BioStation L2 and the door lock.

### Fail Secure Lock

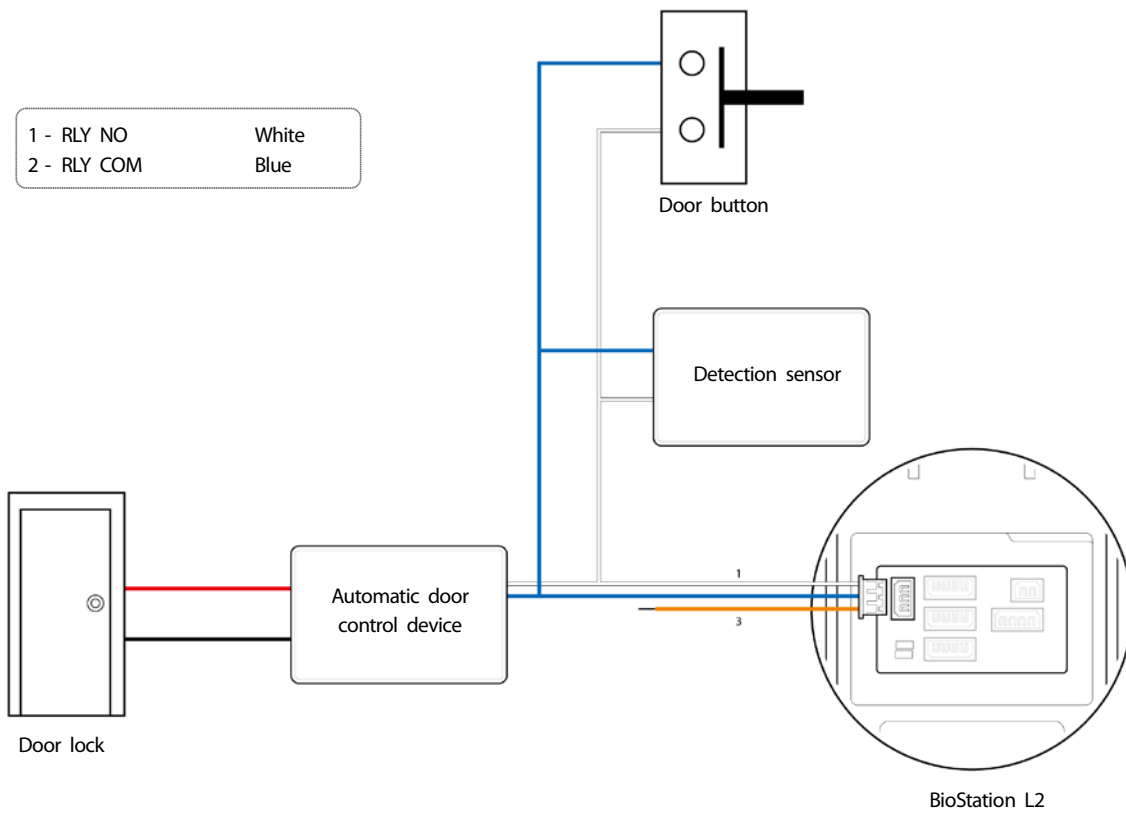
In order to use the Fail Secure Lock, connect N/O relay as shown in the figure below. There is normally no current flowing through the relay for the Fail Secure Lock. When the current flow is activated by the relay, the door will open. If the power supply to the product is cut off due to a power failure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



#### NOTE

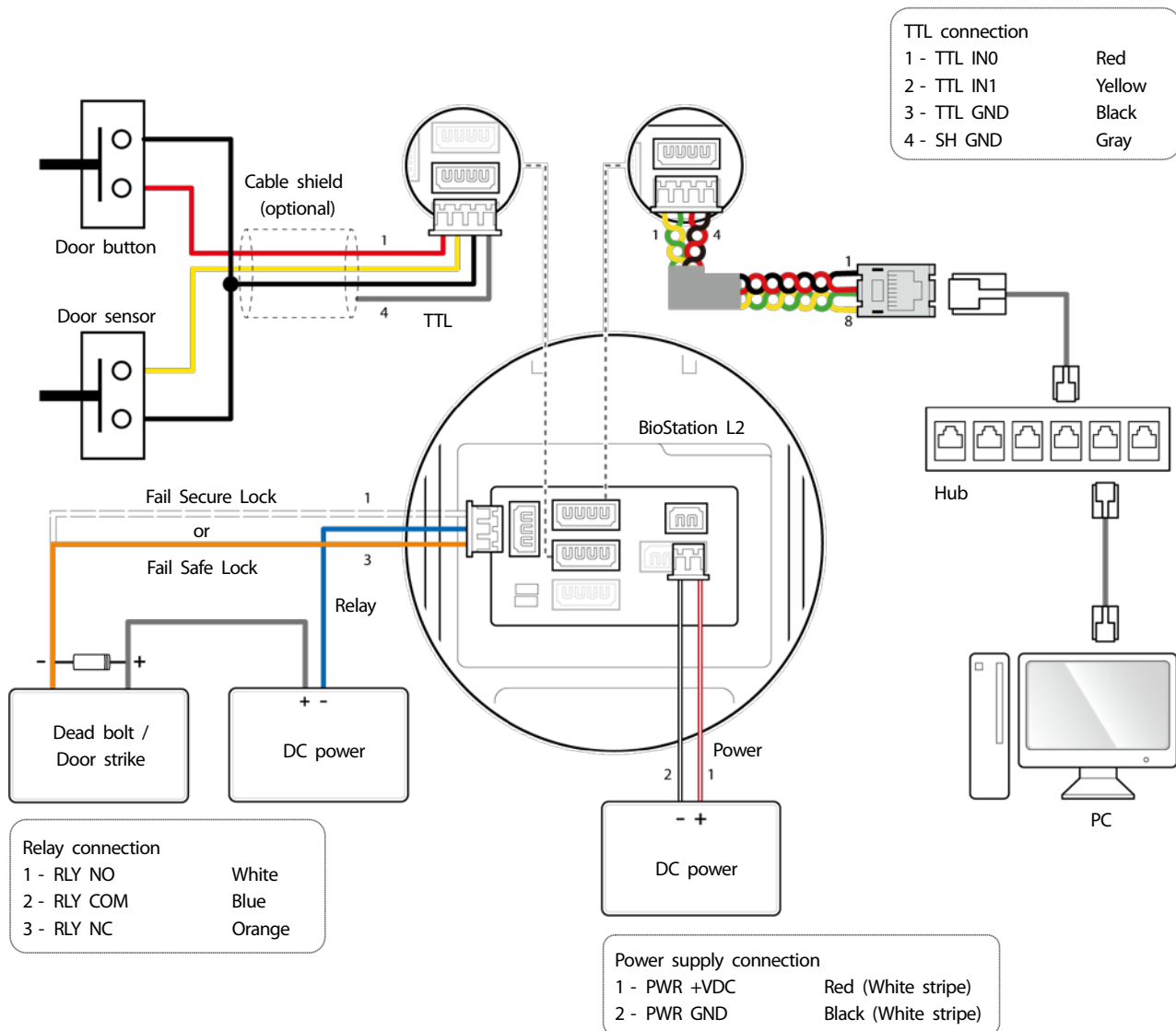
- Install a diode at both sides of the door lock wire as shown in the figure to protect the relay from the reverse current, which occurs when the door lock operates.
- Take caution of the installation direction of the diode. Install the diode close to the door lock.
- Use a separate power supply for BioStation L2 and the door 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.



### NOTE

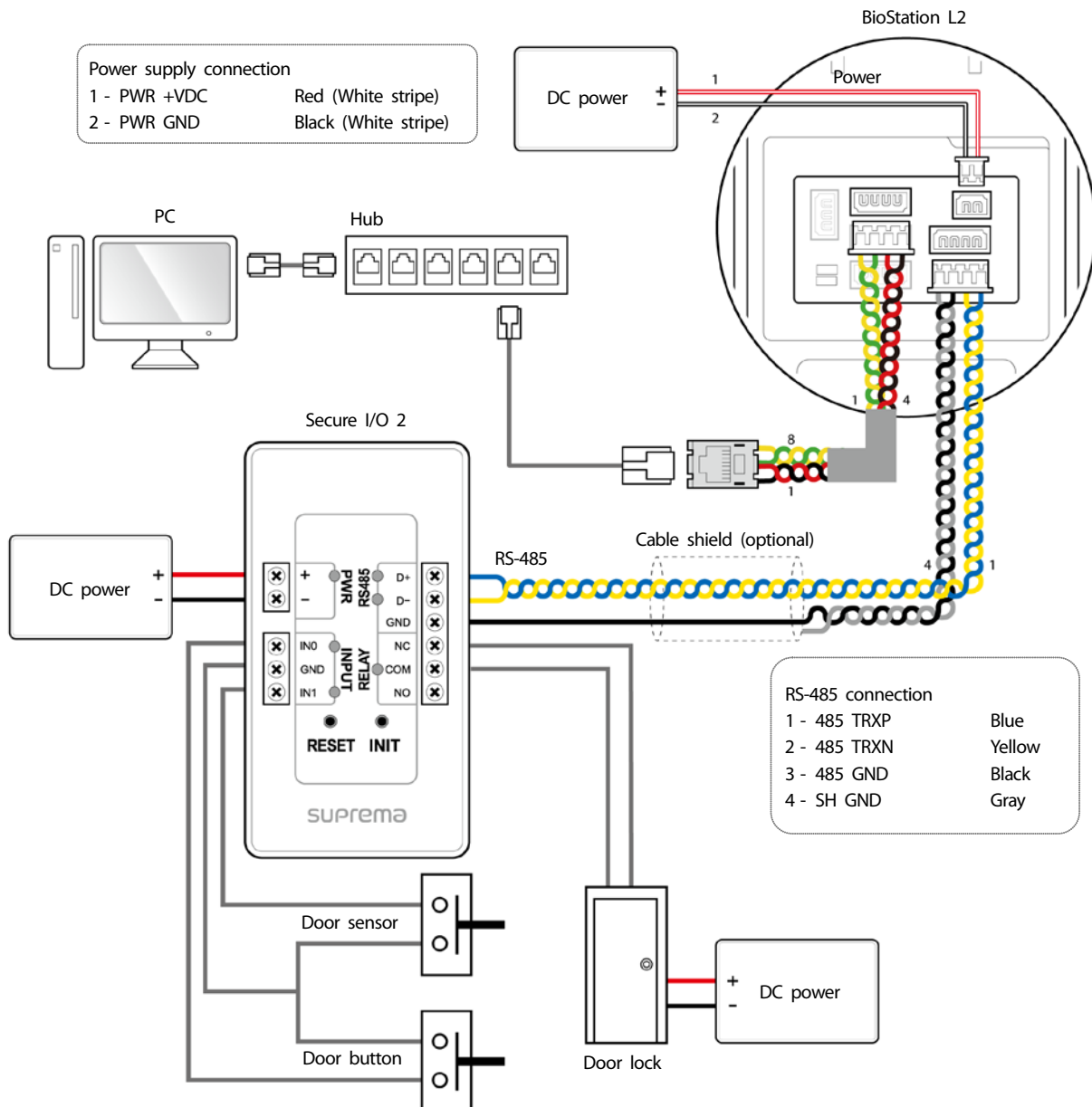
- BioStation L2 can be used as a multi-door controller with the slave devices with the RS485 cable. The slave devices are used as dummy readers and authentication is performed in the master device.
- If Xpass is connected to the master device, only card authentication can be used.
- The maximum number 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@suprema.co.kr).



## 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 a maximum length of 1.2 km for the RS-485 cable.
- If connecting with a RS-485 daisy chain, connect the termination resistor (120 Ω) 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.

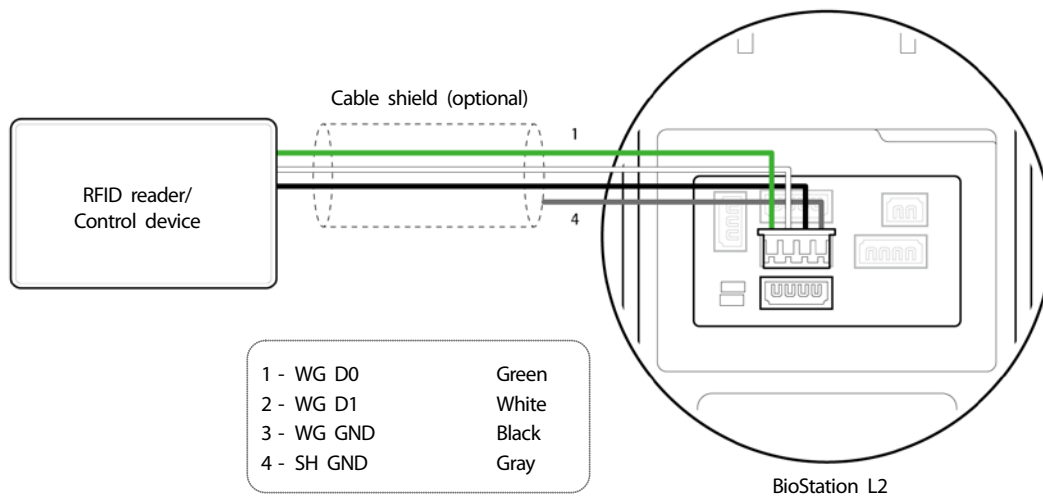


### NOTE

- 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 Xpass is connected to 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@suprema.co.kr).

## Wiegand connection

Use as a Wiegand input/output device



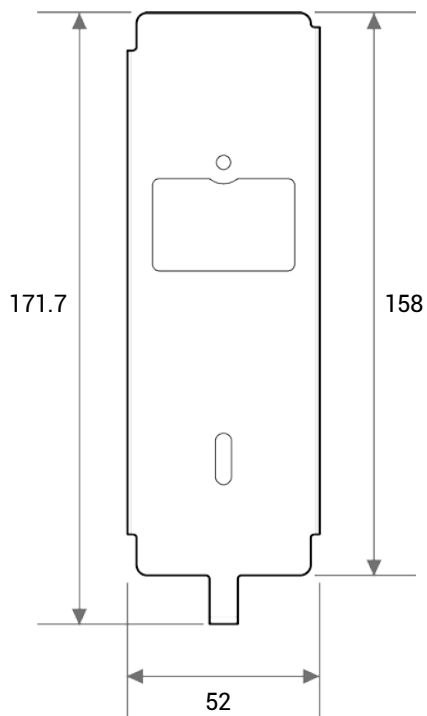
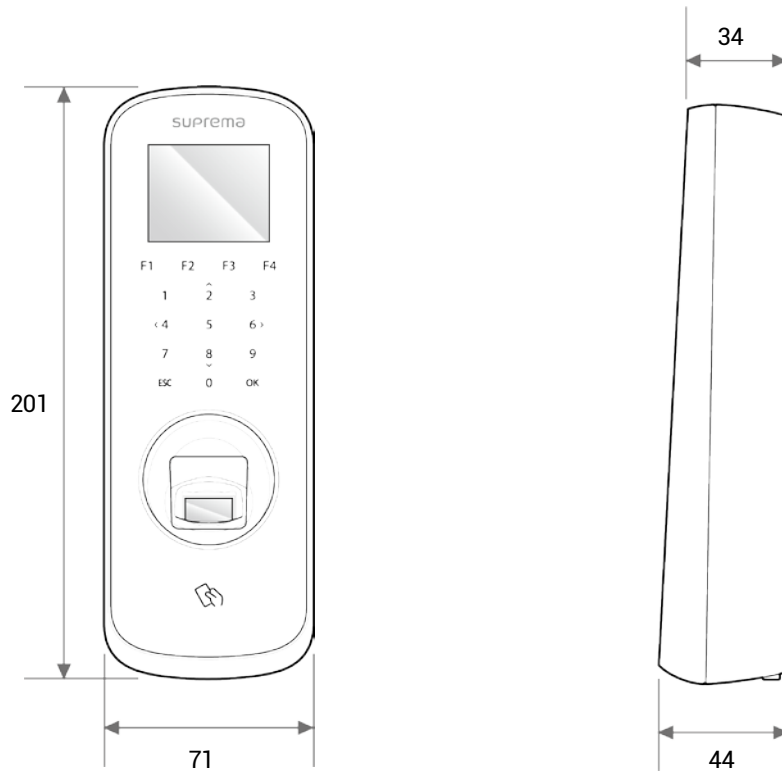
# Product specifications

| Category     | Feature                           | Specification   |
|--------------|-----------------------------------|---|
| Credential   | Biometric                         | Fingerprint   |
|              | RF Option                         | <ul style="list-style-type: none"> <li>BSL2-OE: 125kHz EM</li> <li>BSL2-OM: 13.56Mhz MIFARE, MIFARE Plus, DESFire/EV1, FeliCa, NFC</li> </ul> |
|              | RF read range *                   | MIFARE: 50 mm, DESFire: 50 mm, Felica: 30 mm  |
| General      | CPU                               | 1.2 GHz Quad Core   |
|              | Memory                            | 2GB Flash + 256 MB RAM  |
|              | 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                            | Device: 280g<br>Bracket: 61g (Including washer and bolt)  |
| Certificates | CE, FCC, KC, RoHS, REACH, WEEE    |   |
| Fingerprint  | Image dimension                   | 272 x 320 pixels  |
|              | Image bit depth                   | 8bit, 256 grayscale   |
|              | Resolution                        | 500 dpi   |
|              | Template                          | SUPREMA / ISO 19794-2 / ANSI 378  |
|              | Extractor / Matcher               | MINEX certified and compliant   |
|              | LFD                               | Supported   |
| Capacity     | Max. User (1:1)                   | 500,000   |
|              | Max. User (1:N)                   | 100,000   |
|              | Max. Template (1:1)               | 1,000,000 (Two templates per finger)  |
|              | Max. Template (1:N)               | 200,000 (Two templates per finger)  |
|              | Max. Text Log                     | 1,000,000   |
| Interface    | Ethernet                          | Supported (10/100 Mbps, auto MDI/MDI-X)   |
|              | RS-485                            | 1ch Master / Slave (Selectable)   |
|              | Wiegand                           | 1ch Input / Output (Selectable)   |
|              | TTL input                         | 2ch Input   |
|              | Relay                             | 1 Relay   |
|              | Tamper                            | Supported   |
|              | Power                             | Voltage: DC 12V<br>Current: Max. 600 mA   |
| Electrical   | Switch input VIH                  | Min. 4V<br>Max. 5V  |
|              | Switch input VIL                  | Max. 1V   |
|              | Switch Pull-up resistance         | 4.7k $\Omega$ (The input ports are pulled up with 4.7k $\Omega$ .)  |
|              | Wiegand output VOH                | Min. 4V<br>Max. 5V  |
|              | Wiegand output VOL                | Max. 1V   |
|              | Wiegand output Pull-up resistance | Internally pulled up with 1 k $\Omega$  |
|              | Relay                             | Voltage: Max. 30VDC<br>Current: 1A, Max. 2A   |

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

## 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.

Note: 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.

# Appendices

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Version 3, 29 June 2007

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