

**AE-MC EN 1.00**

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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.

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

**Keep the minimum separation distances between the devices when install multiple devices.**

- Otherwise, RF performance is affect to the other device, the devices may not operate normally.

## **Operation**

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

- 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.

# Introduction

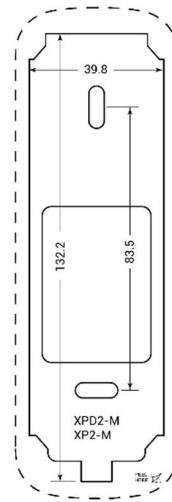
## Components



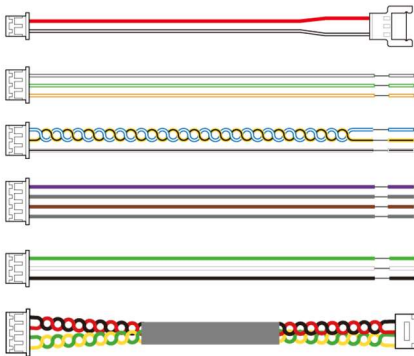
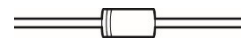
AE-MC



Wall Bracket



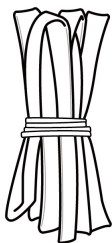
Drilling Template

Connection Cables  
(1x2-pin, 3x3-pin, 2x4-pin)120  $\Omega$  resistor

Diode



Wall Fixing Screw x 2

Bracket Fixing Screw  
(Star Shaped)

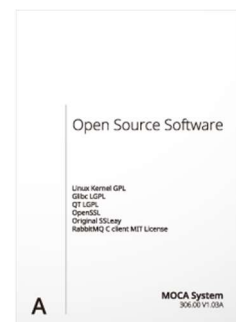
Shrink Tube



PVC Anchor x 2



Quick Guide

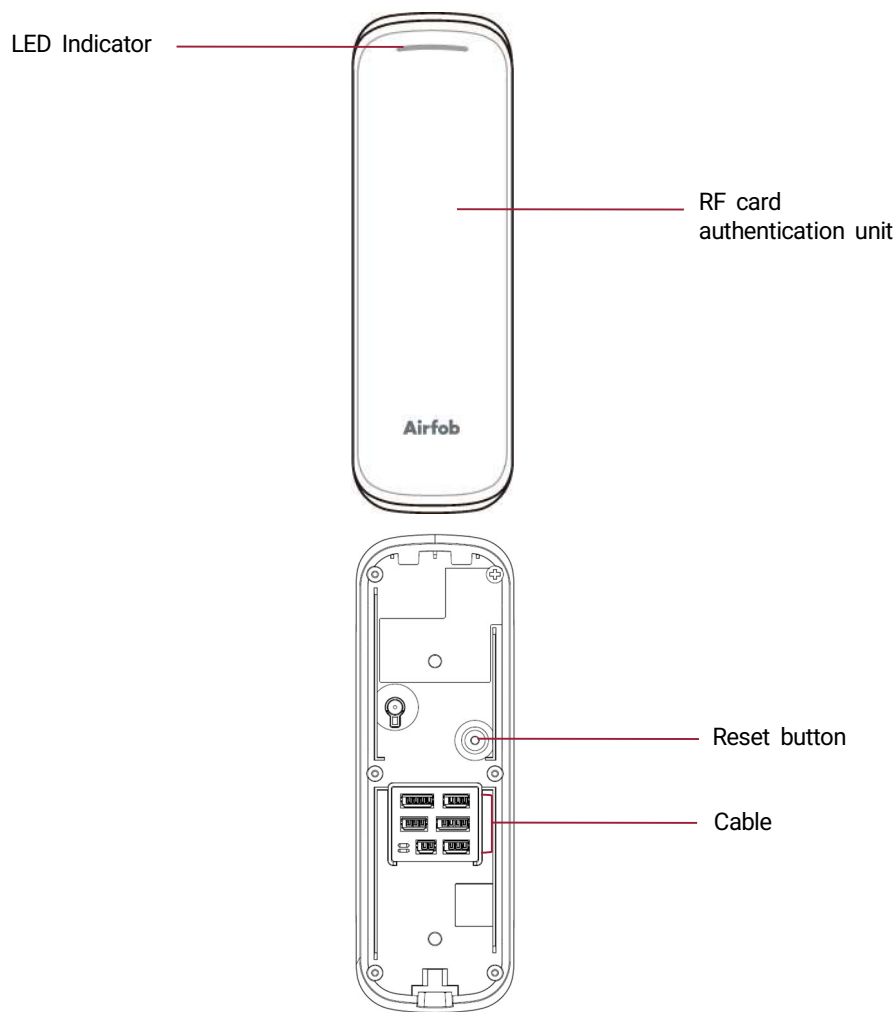


Open Source Software Guide

### NOTE

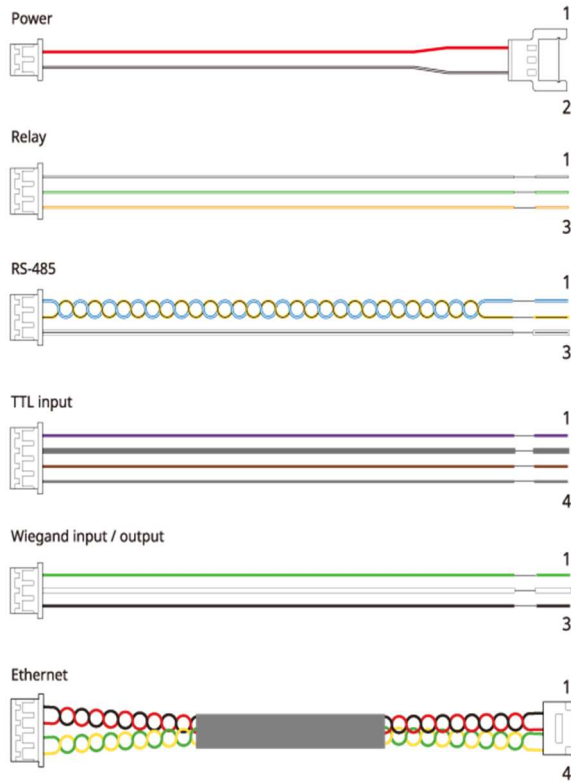
- Components may vary according to the installation environment.

## Name and function of each part



| Name                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LED Indicator</b>               | <p>Indicates the operational status of the device with the color of the LED.</p> <ul style="list-style-type: none"> <li>• Green solid: Authentication success</li> <li>• Red solid: Authentication failure</li> <li>• Blue/Sky blue blinking: Normal operation</li> <li>• Blue/Green blinking: The IP address has not been received properly when using DHCP</li> <li>• Blue/Green blinking: When initializing network settings</li> <li>• Green blinking: Waiting for an input</li> <li>• Green/White blinking: Connecting with the Mobile Credential (BLE) application</li> <li>• White blinking: Connecting with the Device Manager application</li> </ul> |
| <b>RF card authentication unit</b> | Reads RF cards for entering and exiting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Reset button</b>                | Initialize the device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Cable</b>                       | <ul style="list-style-type: none"> <li>• Power cable</li> <li>• RS485 cable</li> <li>• Ethernet cable</li> <li>• Wiegand input/output cable</li> <li>• TTL input cable</li> <li>• Relay cable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Cables and connectors

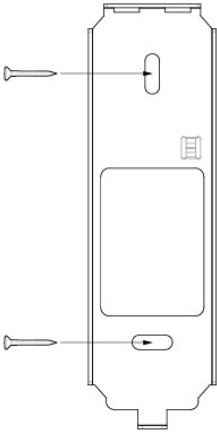


|                        | Pin | Name      | Color                 |
|------------------------|-----|-----------|-----------------------|
| Power                  | 1   | PWR + VDC | Red                   |
|                        | 2   | PWR GND   | Black(White stripe)   |
| Relay                  | 1   | RLY NO    | Gray(White stripe)    |
|                        | 2   | RLY COM   | Green(White stripe)   |
|                        | 3   | RLY NC    | Orange (White stripe) |
| RS-485                 | 1   | 485 TRXP  | Blue (White stripe)   |
|                        | 2   | 485 TRXN  | Yellow (Black stripe) |
|                        | 3   | 485 GND   | White (Black stripe)  |
| TTL Input              | 1   | TTL IN0   | Purple                |
|                        | 2   | TTL GND   | Gray                  |
|                        | 3   | TTL IN1   | Brown                 |
|                        | 4   | TTL GND   | Gray                  |
| Wiegand Input / Output | 1   | WG D0     | Green                 |
|                        | 2   | WG D1     | White                 |
|                        | 3   | WG GND    | Black                 |
| Ethernet               | 1   | ENET TXP  | Black                 |
|                        | 2   | ENET TXN  | Red                   |
|                        | 3   | ENET RXP  | Green                 |
|                        | 4   | ENET RXN  | Yellow                |

# Installation

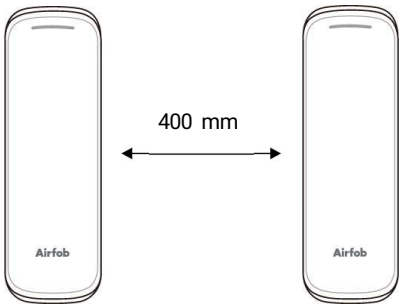
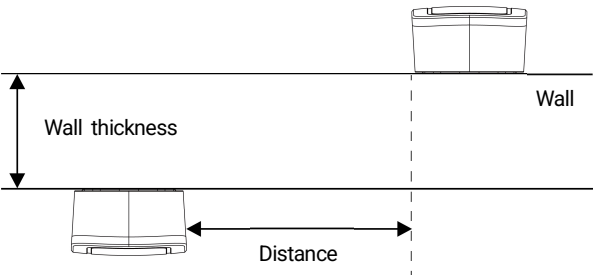
## Fixing the bracket and the product

- 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 AE-MC will be installed.



**NOTE**

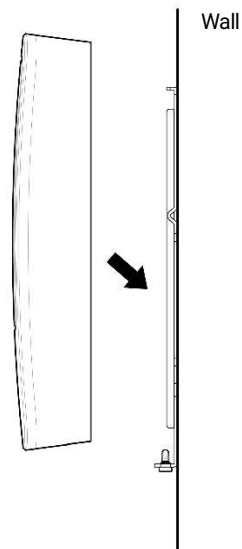
- If installing AE-MC on a concrete wall, drill holes, insert PVC anchors, and fix them with fixing screws.
- To avoid RF interference, a minimum separation distance must be maintained.



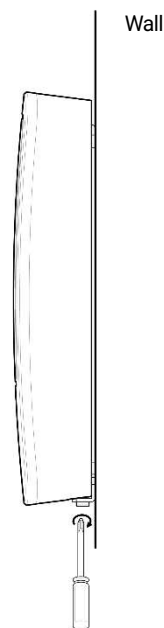
| Wall thickness | Distance |
|----------------|----------|
| 100 mm         | 360 mm   |
| 120 mm         | 360 mm   |
| 150 mm         | 300 mm   |

The standard installation height of product is under 2,000 mm from floor.

- 2 Install AE-MC onto the fixed bracket.

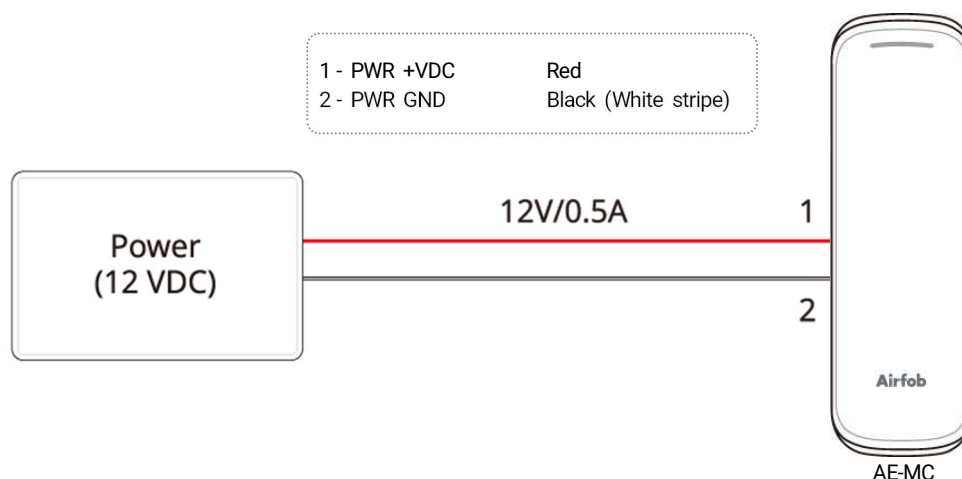


- 3 Assemble AE-MC with the bracket by rotating the product fixing screw.

**NOTE**

- 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.

## Power supply connection



### NOTE

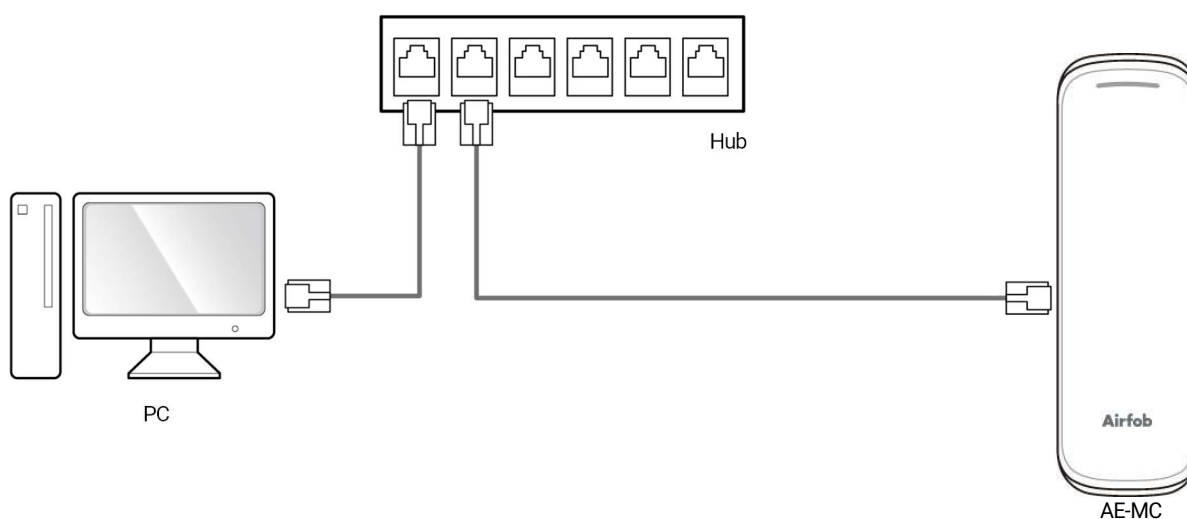
- Use a power supply adaptor of DC 12 V ( $\pm 10\%$ ) with a minimum of 1,000 mA which has obtained the approval of IEC/EN 60950-1. If you wish to connect and use another device to the power supply adaptor, you should use an adaptor with a current capacity which is the same or larger than the total 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

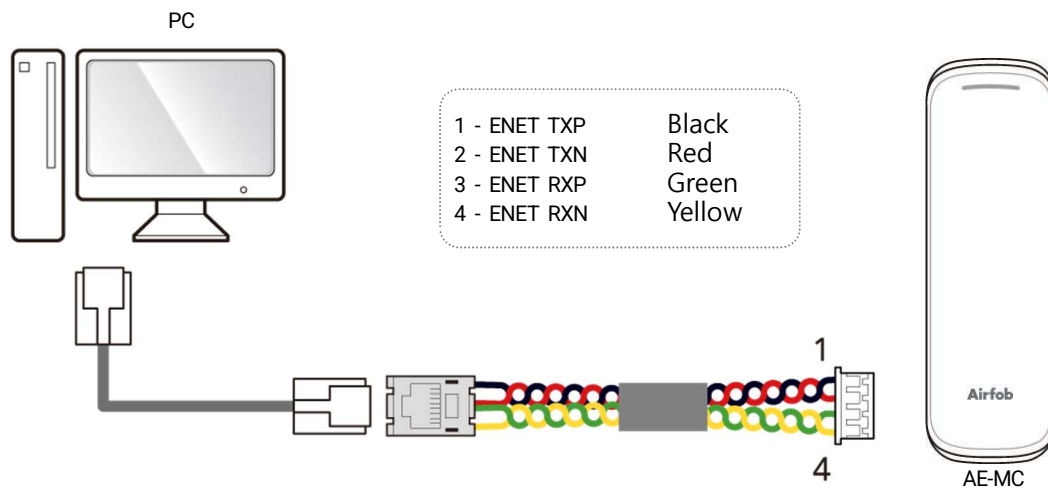
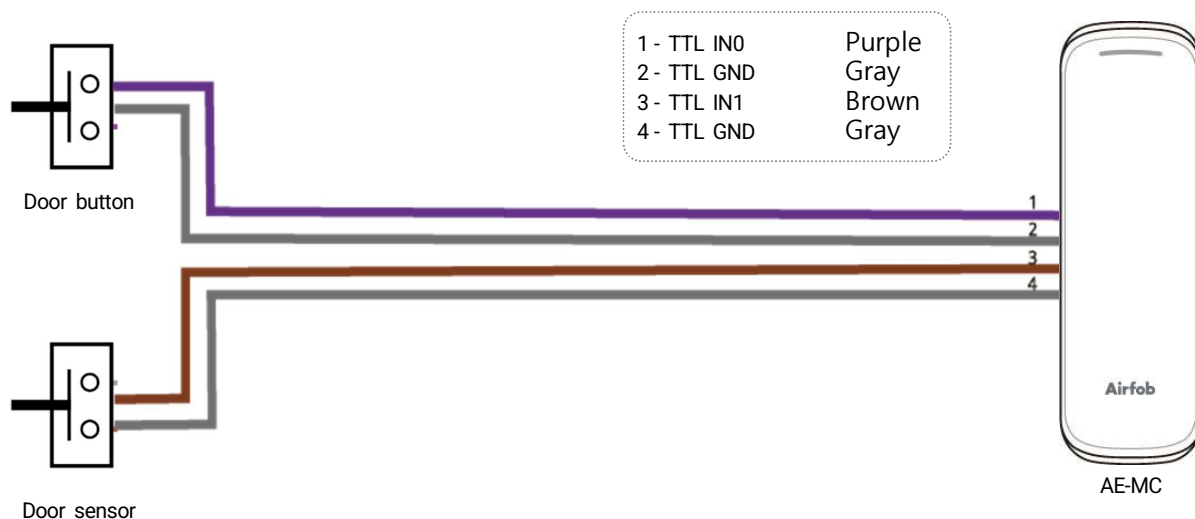
#### LAN connection (connecting to a hub)

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



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

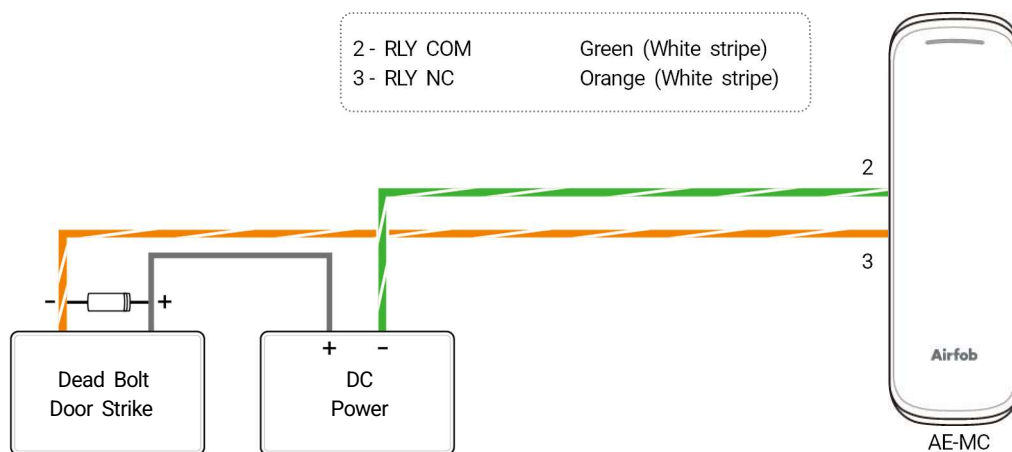
AE-MC has an automatic MDI/MDIX function so that it can be connected to a PC directly using a normal straight type CAT-5e cable, not a cross cable.

**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.

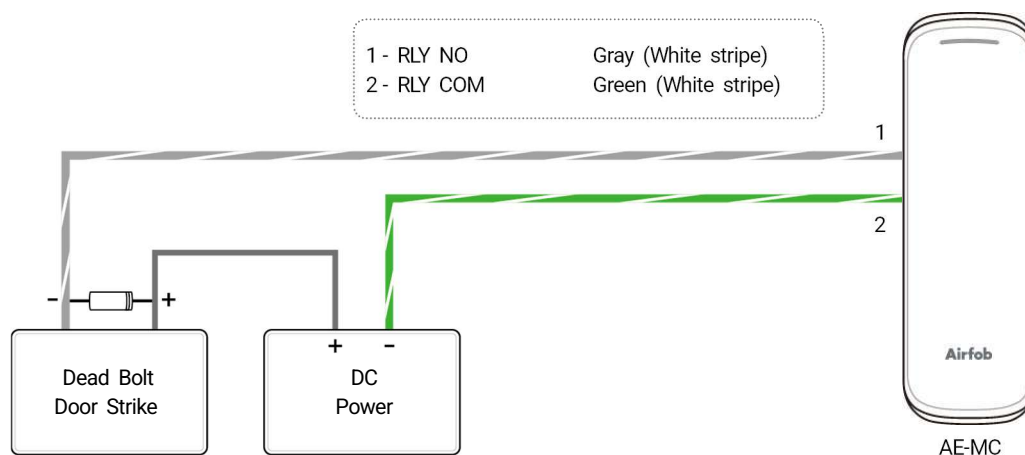


#### NOTE

- 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 AE-MC and the door lock.

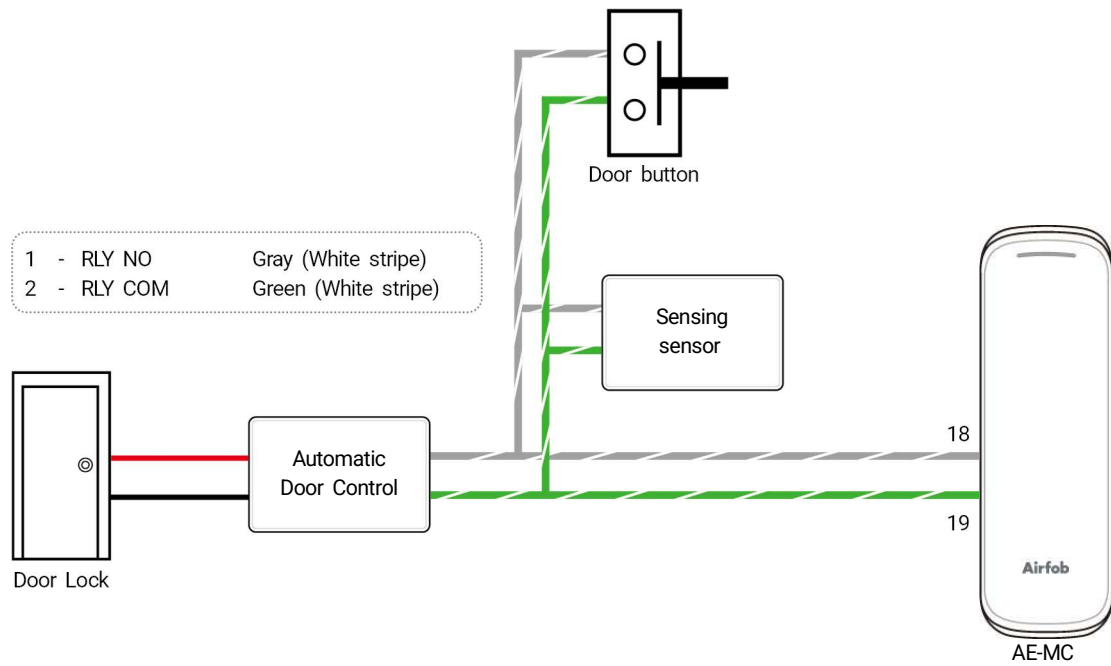
### Fail Secure Lock

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.



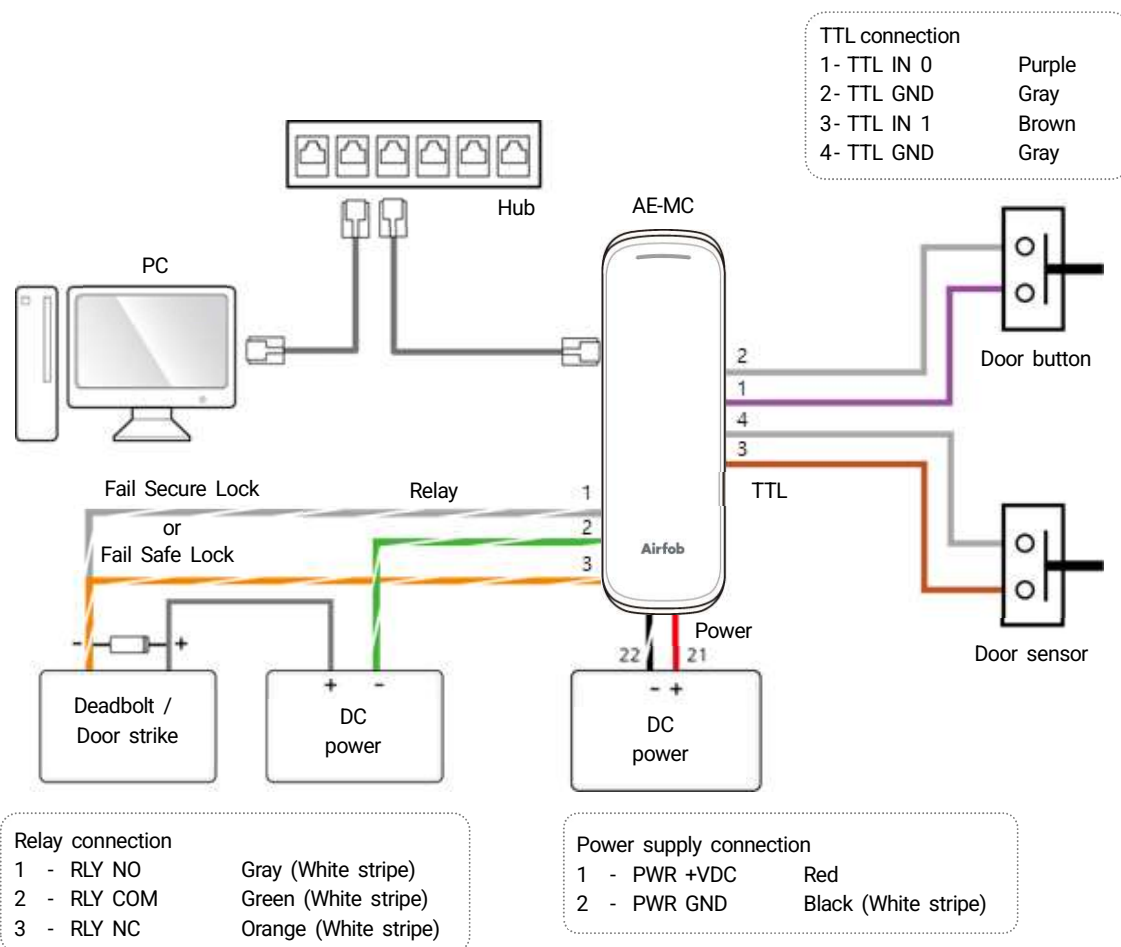
#### NOTE

- 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 AE-MC and the door lock.

**Automatic door connection**

## Connecting as a standalone

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



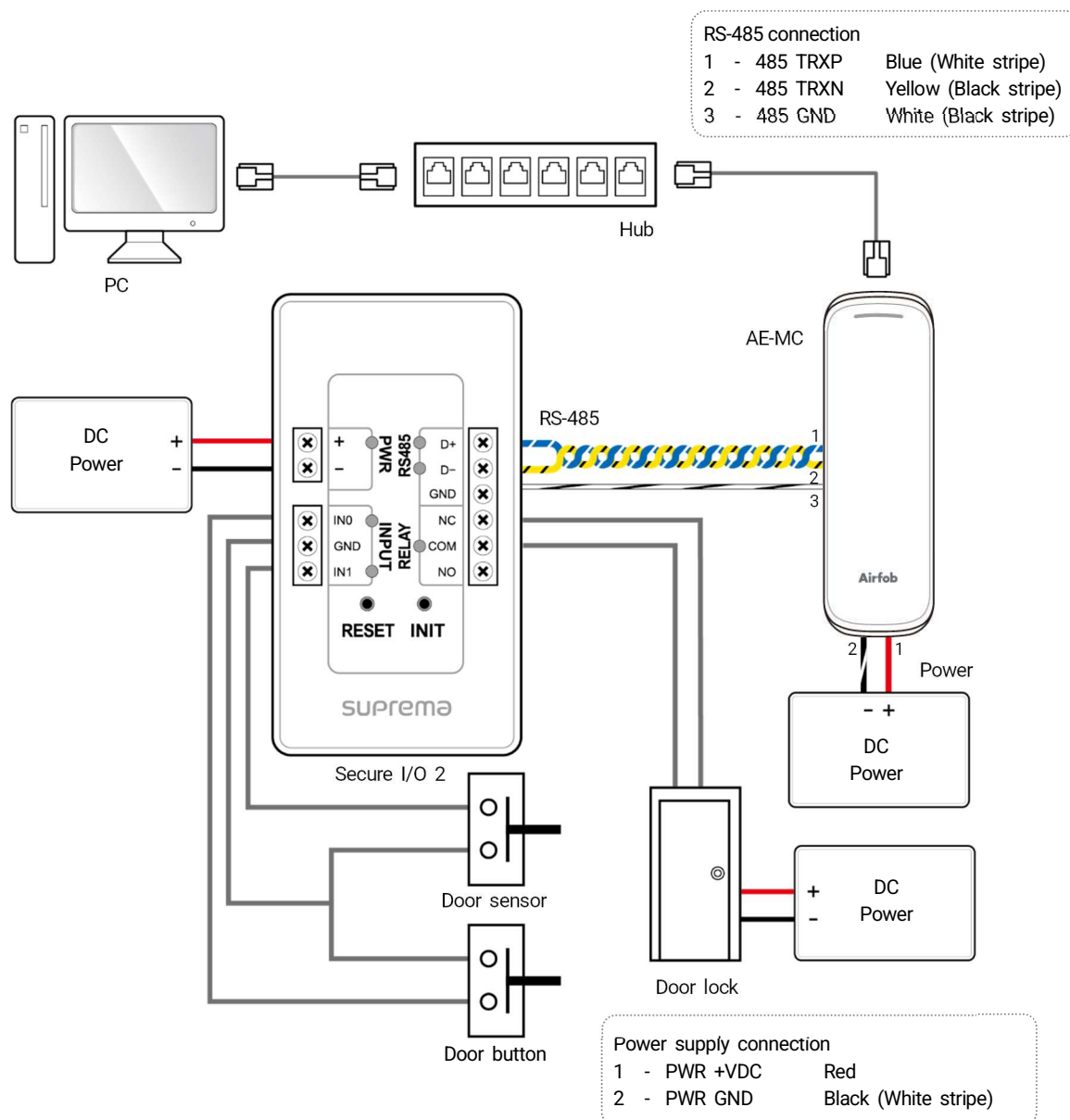
### NOTE

- AE-MC 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 AE-MC is connected as the master device, only card authentication is available on the slave device.
- Up to 31 slave devices can be connected.
- For more information, contact the MOCA System technical support team ([moca\\_sales@mocainc.com](mailto:moca_sales@mocainc.com)).

## Connecting to Secure I/O 2

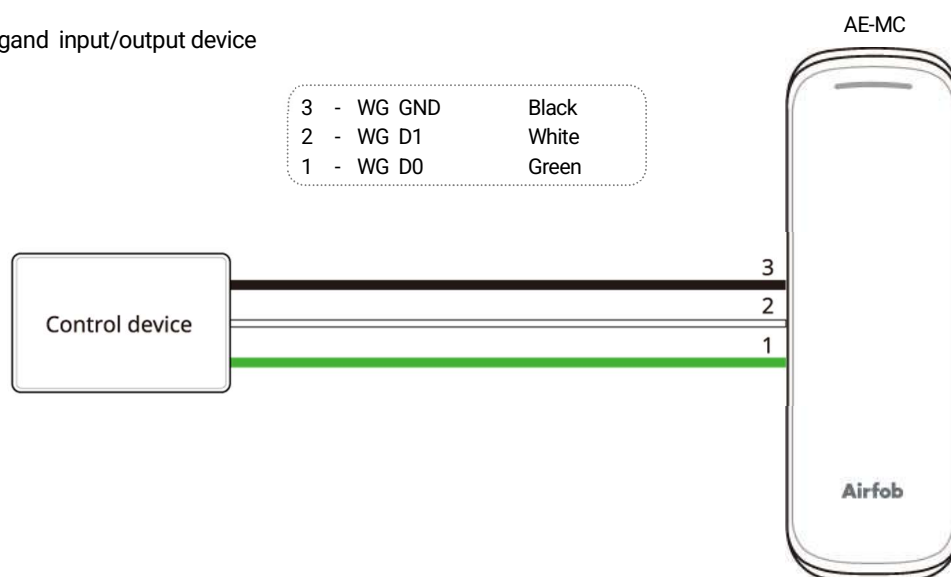
Secure I/O 2 is an I/O device, can be connected to AE-MC with the RS-485 cable. Security can be maintained even if the connection between AE-MC and Secure I/O 2 has been lost or the power supply to AE-MC has been shut off due to external factors.

- Use the RS-485 cable with AWG24, twisted pair, and less than 1.2 km in length.
- 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.



## Wiegand connection

Use as a Wiegand input/output device



## Resetting Network Settings

- 1 Turn the power on.
- 2 Press and hold the reset button on the rear of device until the device restart automatically.
- 3 Connect the device with default values.
  - TCP/IP address: DHCP address assignment (If DHCP address assignment is failed, 169.254.x.x will be set.)
  - Server mode: Disabled
  - RS-485: Default, 115200 bps
- 4 Change the TCP/IP address or RS-485 information.
- 5 Turn the power off later on and then check the network setting is properly.

## Restoring the Factory Defaults

This will delete all data and root certificate on the device and reset the settings.

- 1 Turn the power on.
- 2 Press the reset button three times quickly.
- 3 When the green LED is blinking, press the reset button again.

**NOTE**

- If there is no root certificate on the device, you cannot restore the factory defaults.

## Product specifications

| Category   | Feature                           | Specification                                                            |
|------------|-----------------------------------|--------------------------------------------------------------------------|
|            |                                   | AE-MC                                                                    |
| Credential | HF card option                    | MIFARE, MIFARE Plus*, DESFire EV1/EV2*, FeliCa                           |
|            | NFC card                          | Supported                                                                |
|            | BLE card                          | Supported                                                                |
|            | RF read range*                    | MIFARE/DESFire/EM : 50 mm, FeliCa: 30 mm                                 |
|            | CPU                               | 1 GHz                                                                    |
| General    | Memory                            | 4 GB Flash + 64 MB RAM                                                   |
|            | LED                               | Multi-color                                                              |
|            | Sound                             | Multi-tone Buzzer                                                        |
|            | Operating temperature             | -35 °C - 65 °C                                                           |
|            | Storage temperature               | -40 °C - 70 °C                                                           |
|            | Operating humidity                | 0% - 95 %, non-condensing                                                |
|            | Storage humidity                  | 0% - 95 %, non-condensing                                                |
|            | Dimension (W x H x D)             | 48 mm x 145 mm x 27 mm                                                   |
|            | Weight                            | Device: 107 g<br>Bracket: 30 g (Including washer and bolt)               |
|            | IK rating                         | IK08                                                                     |
|            | Certificates                      | CE, FCC, KC, RoHS, REACH, WEEE, SIG, TELEC, UKCA                         |
|            | Max. User                         | 200,000                                                                  |
|            | Max. Card                         | 200,000                                                                  |
|            | Max. Text Log                     | 1,000,000                                                                |
| Capacity   | Wi-Fi                             | Not supported                                                            |
|            | Ethernet                          | Supported (10/100 Mbps, auto MDI/MDI-X)                                  |
|            | RS-485                            | 1ch Master or Slave (Selectable)                                         |
| Interface  | Wiegand                           | 1ch Input or Output (Selectable)                                         |
|            | TTL input                         | 2ch Input                                                                |
|            | Relay                             | 1 Relay                                                                  |
|            | Tamper                            | Supported                                                                |
|            | Power                             | Voltage: DC 12 V, Current: Max. 500 mA<br>* Use 12 VDC, 1 A power supply |
|            | Switch input V <sub>IH</sub>      | Min. 3 V<br>Max. 5 V                                                     |
|            | Switch input V <sub>IL</sub>      | Max. 1 V                                                                 |
|            | Switch Pull-up resistance         | 4.7k $\Omega$ (The input ports are pulled up with 4.7k $\Omega$ .)       |
| Electrical | Wiegand output V <sub>OH</sub>    | Min. 4.8 V                                                               |
|            | Wiegand output V <sub>OL</sub>    | Max. 0.2 V                                                               |
|            | Wiegand output Pull-up resistance | Internally pulled up with 1 k $\Omega$                                   |
|            | Relay                             | Voltage: Max. 30 VDC                                                     |
|            |                                   | Current: Max. 2 A                                                        |

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

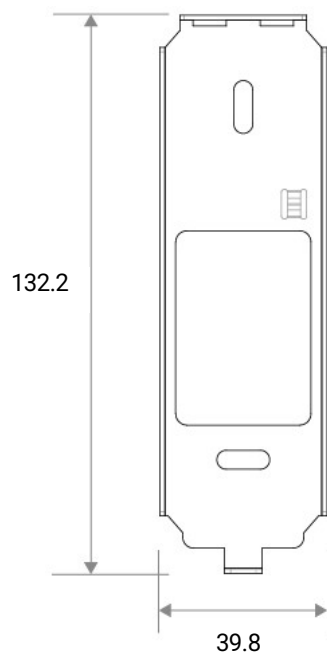
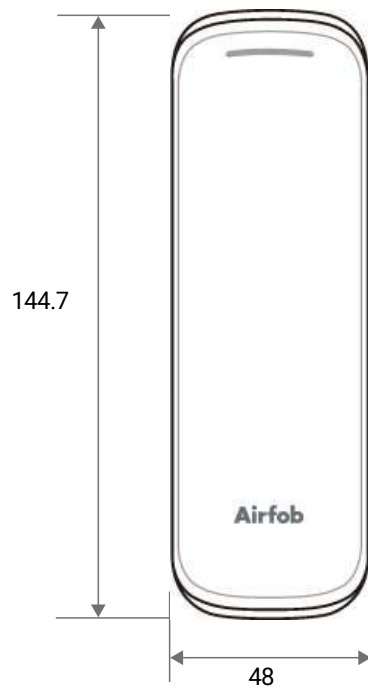
\* Always Support : MIFARE & FeliCa / Selective Support : MIFARE Plus & DESFire

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

## Dimensions

(Unit: mm)

\* The tolerance is  $\pm 0.3\text{mm}$ .



## 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 A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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.

### FCC Caution FCC Interference Statement

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## EU Declaration of Conformity (CE)

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

- Bluetooth Transmit Power: 2.32dBm
- Bluetooth Frequency: 2402~2480 MHz
- NFC Frequency: 13.56 MHz

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

MOCA System Inc.

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

Address: Room 1702 KINS Tower, 331beon-gil, 8 Seongnam-daero , Bundang- gu, Seongnam-si, Gyeonggi-do, 13558, Rep. of KOREA Email: support@mocainc.com

## IC compliance information

### Industry Canada Statement

This device complies with RSS-247, RSS-210, RSS-102 of the Industry Canada 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. Ce dispositif est conforme à la norme CNR-247, CNR-210, CNR-102 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

### Industry Canada Radiation Exposure Statement

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

### Déclaration d'exposition aux radiations

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

# Appendices

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- This product uses the "QT" library, which is licensed under LGPL. As for LGPL, please refer to the [GNU Lesser General Public License](#) in this manual.
- This product uses the "OpenSSL", which is licensed under the OpenSSL and Original SSLeay licenses. As for the OpenSSL and Original SSLeay licenses, please refer to [OpenSSL License](#) and [Original SSLeay License](#) in this manual.
- To request the modified source code based on Linux Kernel 3.x and the source code of glibc and QT libraries, which are included in this product, please visit at <https://mocainc.zendesk.com> and contact to MOCA System Tech Team.

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Version 3, 29 June 2007

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Version 3, 29 June 2007

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