



**M2I Corporation**

# **Explosion Proof Wireless Barcode Scanner MSR-B2MWA-Ex**

**Hardware Manual**

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Thank you for purchasing the Explosion Proof Wireless Barcode Scanner of M2I corporation.  
Please read this manual carefully to know installing, operating this equipment for safe use of this product.

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## Chapter 1 Safety precautions

### ■ Before using the product

To ensure the safe and efficient use of the product, please read this manual thoroughly and completely before use. The safety precautions must be followed to prevent accidents and hazards. These precautions are divided into "Warning" and "Caution" sections. The meanings of each category are as follows.

|                                                                                                  |                                                                                   |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|  <b>Warning</b> | Violating the instruction may result in serious personal injury or death.         |
|  <b>Caution</b> | Violating the instruction may result in slight personal injury or product damage. |
|                 | Be cautious, for danger may be present.                                           |
|                 | Be cautious, for there is a possibility of an electric shock.                     |

### ■ General Precautions **Caution**

-  Do not press the screen with hard or sharp objects (such as an awl, screwdriver, pen, etc.) or apply excessive force. This may cause damage to the front sheet and result in touch malfunctions.
-  Do not use or store the product in environments with heavy vibrations.
-  Be cautious to prevent water, liquids, metal dust, or other foreign substances from entering the product. This could cause damage or electrical shock.
-  Keep walkie-talkies or mobile phones at least 30 cm away from the main body.
-  It is normal for the LCD screen to display up to two bright spots or for certain areas to appear brighter. This is a characteristic of the LCD and not a defect.
-  Do not store or operate the product in direct sunlight. Direct sunlight may alter the properties of the LCD.  
WARNING – DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED. or equivalent.  
AVERTISSEMENT – NE PAS CONNECTER OU DÉCONNECTER LORSQUE L'ÉQUIPEMENT EST SOUS TENSION.
-  Do not touch the adapter or power cord with wet hands. There is a risk of electric shock.
-  Do not charge or use the battery in explosive environments with flammable liquids, gases, or dust.
-  When storing the product for a long time without using the product, store it in a dry environment without direct sunlight.  
Record/store your data separately. When the product is repaired, the main contents of the device may be deleted.
-  Do not contaminate the scanner window of the device. Contamination may cause operational issues.

### ■ Usage Precautions **Caution**

-  Do not install the product in locations where the temperature exceeds the allowable range, as this may cause damage to the unit or reduce its lifespan.
-  Do not install the product in the following environments:
  - Locations where the ambient temperature is outside the range of -10 ~ 50°C
  - Surfaces of control panels where high-voltage equipment is installed
-  The maximum safe ambient temperature (Tma) is 35°C or lower.
-  Do not install the unit in areas subject to continuous strong shock or vibration.
-  When the product will not be used for an extended period, charge it fully and store it at room temperature.
-  Use only indoors.
-  Use only at altitudes of 2,000 meters (6,561 feet) or lower.

⊘ This product can be used in all European member states.

#### ■ Disposal Precautions Caution

When you dispose of product and battery, please treat it as industrial waste. It can create poisonous substances or explosion.

#### ■ A Specification and Precautions for Internal Battery Caution

| Items              | Specifications                                       |
|--------------------|------------------------------------------------------|
| Battery Voltage    | DC 3.6V (Secondary Lithium-Ion Battery Pack)         |
| Battery Model Name | FMSS18650 25R 1S1P / Fairman Co., Ltd.               |
| Battery Lifetime   | 1 year or longer (at an ambient temperature of 25°C) |

⊘ The internal battery is not user-replaceable. If a battery issue occurs, please contact M2I Corporation for inspection and replacement service.

⊘ Charge only in safe areas free from hazards. Some chargers may not be compatible with this device's charging specifications. The built-in battery's usage time will gradually decrease as its service life extends. When used for fewer than approximately 250 full charge and discharge cycles, the battery retains at least 60% of its original capacity.

#### ■ Precautions for Safe Operation Caution

⊘ THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D OR NON-HAZARDOUS LOCATIONS ONLY.

⊘ Do not attempt to replace the battery in Explosion hazard area. The internal battery pack of this product is not user-replaceable.

Battery replacement must be carried out only in a safe area by the device manufacturer or an authorized technician, ensuring that the explosion-proof structure of the device is not compromised.

If any issue occurs during use, please contact M2I Corporation.

⊘ Do not charge the battery or connect data cables in Explosion hazard area. The protective caps on the charging port and USB-C port must never be opened in hazardous areas and should only be opened and used in safe areas.

⊘ RISQUE D'EXPLOSION. NE PAS BRANCHER NI DEBRANCHER SOUS TENSION.

⊘ LES BATTERIES NE DOIVENT ETRE REMPLACEES QUE DANS UN EMPLACEMENT EXEMPT DE CONCENTRATIONS.

## Chapter 2 Overview

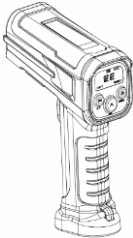
### 2.1 Product introduction

This industrial explosion-proof wireless barcode scanner is designed as an industrial device to meet the demands of field environments. It is a device that is used for basic purposes to communicate with other devices (PC, HMI, etc.) using high durability and wireless communication. This device is designed for safe operation in general industrial environments where flammable substances such as gases, vapors, or liquids may be present.

### 2.2 Components

The components of the product are as follows.

Before using the product, please check that all of the following components are included.

| Components                | Figure                                                                               | Quantity |
|---------------------------|--------------------------------------------------------------------------------------|----------|
| Product<br>(MSR-B2MWA-Ex) |     | 1        |
| Manual                    |    | 1        |
| Strap                     |  | 1        |

## Chapter 3 General specifications

### 3.1 Power specifications

|                       |                   |                                                    |                                |
|-----------------------|-------------------|----------------------------------------------------|--------------------------------|
| Input voltage         |                   | DC 5V                                              |                                |
| Battery voltage range |                   | UL/cUL                                             | DC 3.6V                        |
|                       |                   | KC/CE                                              | DC 3.2 ~ 4.2V (Standard: 3.6V) |
| Power                 | Cell type         | Lithium-ion (1S1P)                                 |                                |
|                       | Consumption       | 3W                                                 |                                |
|                       | Operating time    | 6 Hours (*Auto-off in low voltage)                 |                                |
|                       | Charging time     | 5 Hours (*From low voltage warning to full charge) |                                |
|                       | Charging capacity | 2,500mAh                                           |                                |

\* Operating time and charging time are based on 25 °C ambient temperature and may vary depending on the ambient temperature.

\* The operating time may vary depending on the usage pattern.

### 3.2 Functional specifications

|                               |                                                                                                      |
|-------------------------------|------------------------------------------------------------------------------------------------------|
| Sensor resolution & scan type | 640(H) x 400(V), 1D/2D CMOS barcode                                                                  |
| Data storage internal memory  | 32,768 code (*GTIN-08 / EAN-8)<br>24,966 code (*GTIN-13 / EAN-13)<br>23,831 code (*GTIN-14 / ITF-14) |
| Light source                  | Aiming 610nm LED, Illumination 660nm LED                                                             |
| Alarm                         | Buzzer and LED light                                                                                 |
| LED indication (White color)  | Power, Bluetooth, Transmission status, Battery status                                                |
| Action button                 | Power, Bluetooth, Transmission, Scan                                                                 |

### 3.3 Interface specifications

|           |                                                                                                                                                                                       |                                         |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Bluetooth | Spectrum band                                                                                                                                                                         | 2400 ~ 2483.5MHz                        |
|           | Standard                                                                                                                                                                              | Bluetooth® 5.2 Low energy (BLE)         |
|           | Transmit speed                                                                                                                                                                        | 1Mbps@Typ                               |
|           | Maximum power                                                                                                                                                                         | +0.36dBm (Including antenna)            |
|           | Receiver sensitivity                                                                                                                                                                  | -96dBm@Typ                              |
|           | Operation area                                                                                                                                                                        | 5M or more (*Flat-ground communication) |
|           | Security                                                                                                                                                                              | AES-128bit and AES-256bit               |
| IrDA      | Compliant with IrDA physical layer standard, supporting up to 115.2kbit/s (SIR).<br>Communication range: over 0.5 meters in open space.<br>*For dedicated use with M2I HMI equipment. |                                         |
| USB       | USB Type-C port is for battery charging only,<br>data communication for manufacturing and maintenance use only.                                                                       |                                         |

WARNING - EXPLOSION HAZARD – BATTERIES AND STATION TERMINAL MUST ONLY BE CHANGED AND CHARGED IN AN AREA KNOWN TO BE NON-HAZARDOUS.

### 3.4 Antenna specifications

|              |                    |
|--------------|--------------------|
| Model name   | ALA321C3           |
| Gain         | Peak gain +4.36dBi |
| Antenna type | Internal Antenna   |
| Manufacturer | AMOTECH Co., Ltd   |

### 3.5 Environment specifications

|                           |           |
|---------------------------|-----------|
| Operation temperature(°C) | -10 ~ +50 |
|---------------------------|-----------|

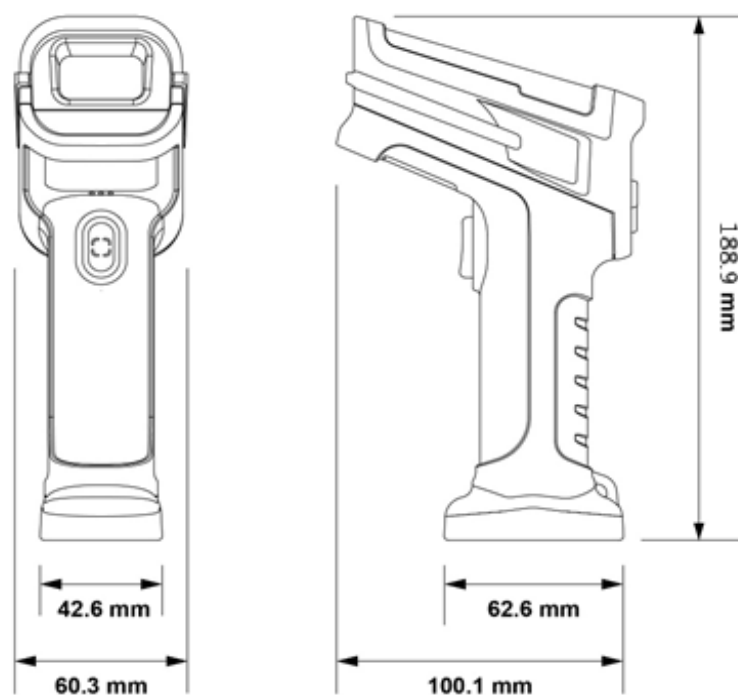
|                                 |                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------|
| Storage temperature(°C)         | -20 ~ +60                                                                         |
| Operation humidity(%RH)         | 0 ~ 90 (No dew)                                                                   |
| Atmosphere                      | No corrosive gas                                                                  |
| Vibration endurance             | Amplitude: $10 \leq F < 25\text{Hz}$ (2G) X, Y, Z each direction (for 30 minutes) |
| Noise immunity                  | 1000Vp-p (Pulse width 1 $\mu$ s)                                                  |
| Static electricity discharge    | Connective discharge from EN61000-4-2: $\pm 4\text{kV}$                           |
| Impact immunity                 | 10G X, Y, Z Each Direction (for 3 times)                                          |
| Barcode LED classification      | Exempt risk group LED product per IEC/EN 62471                                    |
| IP                              | IP66                                                                              |
| Explosion proof structure       | Ex ib IIC T4 Gb                                                                   |
| Safety ambient temperature (Ta) | Tma $\geq 35^{\circ}\text{C}$                                                     |

### 3.6 Structure specifications

|                |                                  |
|----------------|----------------------------------|
| Weight(g)      | 416                              |
| Cooling System | Natural air circulation          |
| Case Material  | PC(Flame Retardant) and Urethane |

## Chapter 4 Parts identification and functions

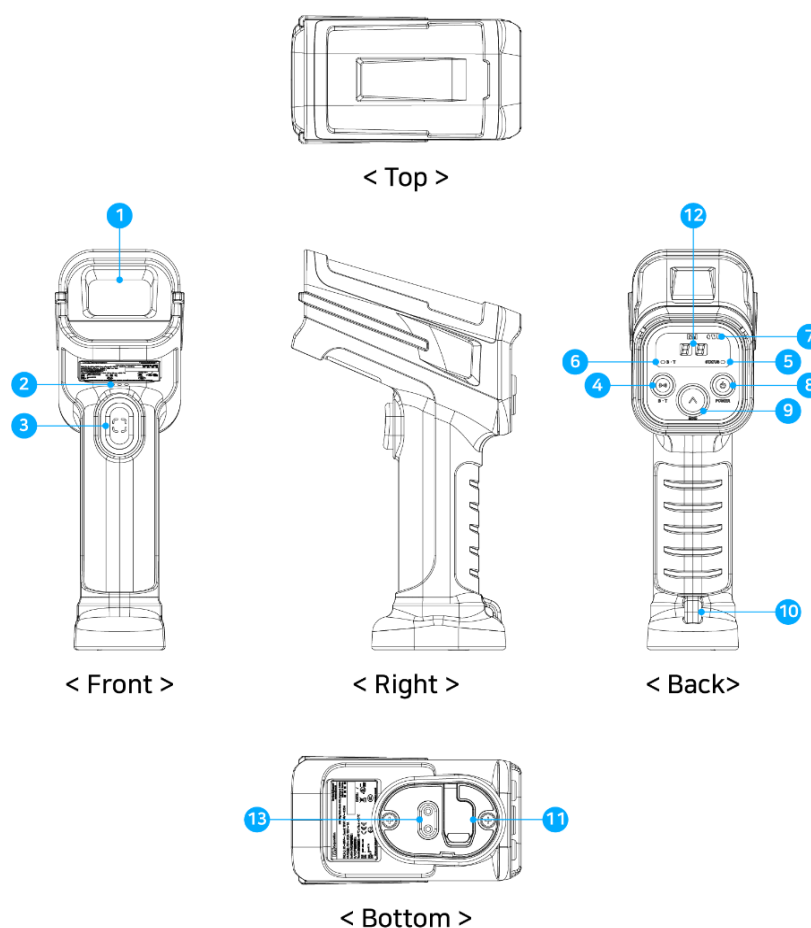
### 4.1 External dimensions



(mm)

| Model        | W     | D    | H     |
|--------------|-------|------|-------|
| MSR-B2MWA-Ex | 100.1 | 60.3 | 188.9 |

## 4.2 Components and specifications



| No. | Components                | Description                            |
|-----|---------------------------|----------------------------------------|
| ①   | Scanner window and IrDA   | Barcode scanner window and IrDA        |
| ②   | Buzzer hole               | Buzzer sound                           |
| ③   | SCAN switch               | SCAN switch                            |
| ④   | Bluetooth switch          | Bluetooth connection and disconnection |
| ⑤   | Status indicator          | Status of data transmission            |
| ⑥   | Bluetooth indicator       | Status of Bluetooth connection         |
| ⑦   | Battery indicator         | Battery remains (3 Levels)             |
| ⑧   | Power switch              | Power ON, OFF                          |
| ⑨   | SEND switch               | IrDA data transmission                 |
| ⑩   | Strap fixing hole         | Strap attached hole                    |
| ⑪   | Bottom cover              | USB charging port cover                |
| ⑫   | Scan data count indicator | The number of barcode scan data        |
| *⑬  | Charging terminal         | Battery charging terminal              |

\*⑬ Operation is allowed only in safe areas with no risk of explosion.

⊘ A protective cap of charging port and USB-C port must be closed in explosive area. It must be opened only in safe area.

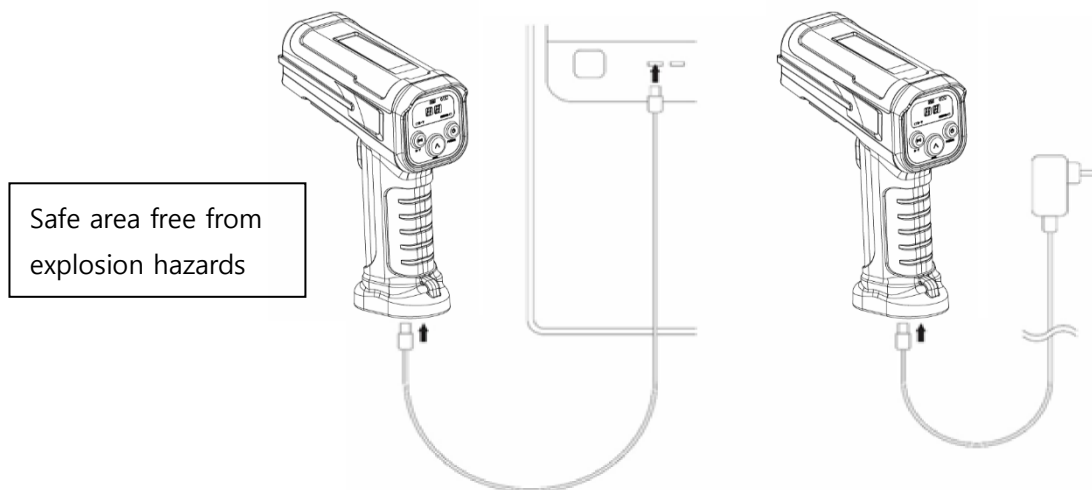
## Chapter 5 Battery charging Warning

### 5.1 Location select

- (1) A safe area free from explosion hazards
- (2) An environment where the device's operation is guaranteed to be stable
- (3) A location where the connection and disconnection of the charging cable can be done safely and easily
- (4) A place protected from direct sunlight

### 5.2 Charging battery

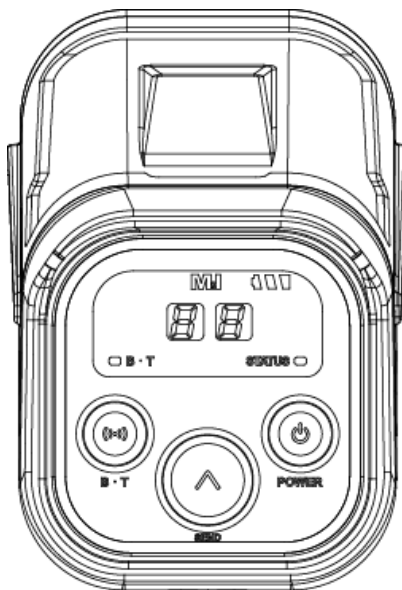
- (1) Use a USB-C cable to charge the device via the bottom charging port.
- (2) Charging must be performed only in safe areas free from explosion hazards.



-  Do not charge the battery or connect a data cable in explosive areas.
- ※ This product does not support quick charging, and some chargers may not be compatible with it.

## Chapter 6 Operation and display

### 6.1 Default status



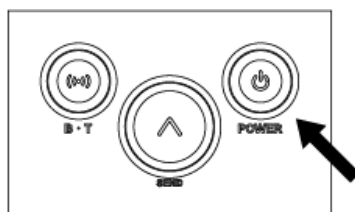
### 6.2 LED indicator

| LED     | LED status  | Description                                  |
|---------|-------------|----------------------------------------------|
| B.T     | OFF         | Bluetooth not used, default IrDA operation   |
|         | Blink       | Device register request of Bluetooth pairing |
|         | ON          | Bluetooth connected                          |
| STATUS  | OFF         | Normal operation                             |
|         | ON          | IrDA/Bluetooth data transmission failed      |
| BATTERY | Level OFF   | Battery discharge for each level             |
|         | Level ON    | Battery remains for each level               |
|         | Level blink | Charging                                     |

## 6.3 Operation and switch

### 6.3.1 Power ON/OFF: POWER switch

Press and hold the "POWER" button for 2 seconds to turn on the device. While the device is powered on, press and hold the "POWER" button for more than 3 seconds to turn it off. The power turns off automatically if there is no operation for 10 minutes.

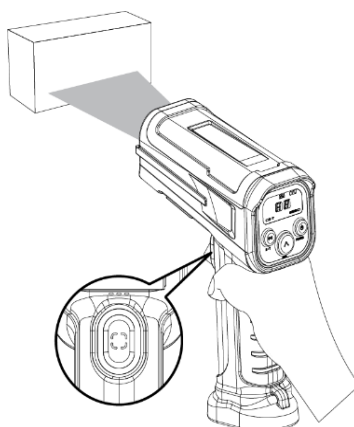


### 6.3.2 Barcode scan: scan switch

Press the "SCAN" button to activate scan mode.

If a barcode is successfully read, a buzzer will sound and scan mode will automatically end.

If connected via Bluetooth, scanned data is sent in real time and saved to internal memory at the same time. When not connected, up to 20 scanned data entries are stored in the internal memory, with the most recent data saved first.

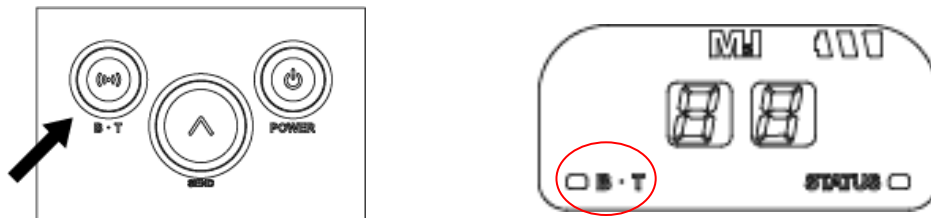


**⊘** Do not aim the scanner window at people or animals when scanning barcodes. It may cause retinal damage or impaired vision. **⚠ Caution**

The minimum resolution and optimal scanning distance are as follows.

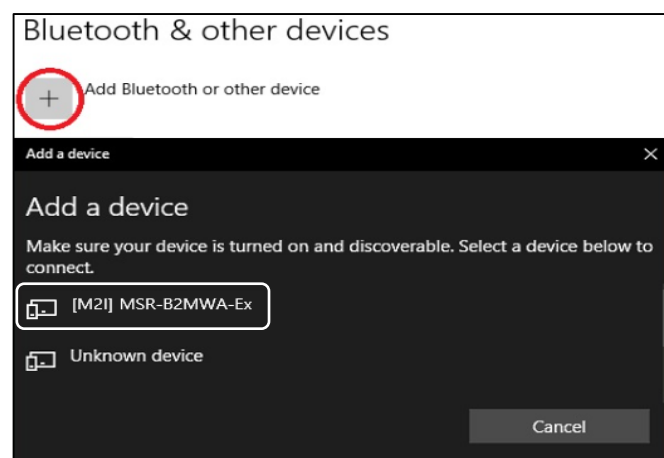
| Symbol type | Resolution | Minimum distance | Maximum distance |
|-------------|------------|------------------|------------------|
| Code 39     | 0.127 mm   | 5.1 cm           | 16.2 cm          |
| Code 39     | 0.508 mm   | 5.0 cm           | 49.5 cm          |
| Code 128    | 0.127 mm   | 6.3 cm           | 12.7 cm          |
| PDF417      | 0.167 mm   | 6.3 cm           | 16.0 cm          |
| PDF417      | 0.254 mm   | 4.5 cm           | 22.8 cm          |
| 100% UPC    | 0.330 mm   | 5.0 cm           | 31.7 cm          |
| Data Matrix | 0.508 mm   | 3.8 cm           | 34.3 cm          |
| QR Code     | 0.508 mm   | 3.8 cm           | 27.9 cm          |

## 6.3.3 Bluetooth data transmission: Bluetooth switch

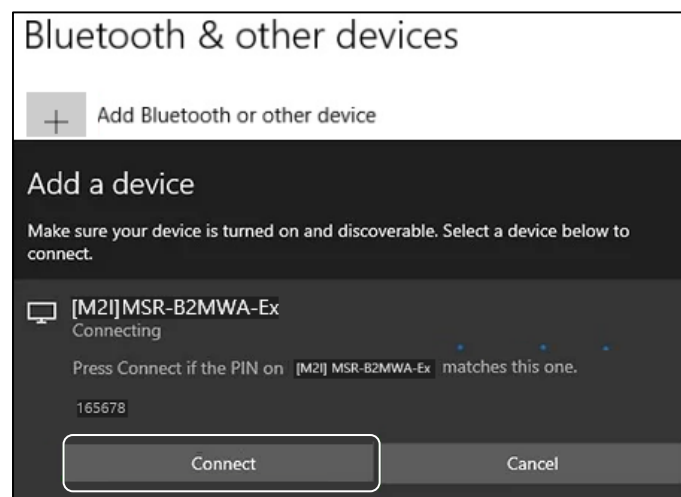


## (1) Bluetooth pairing

- 1) Press and hold the Bluetooth switch on the barcode scanner for 3 seconds, then release it. The buzzer will sound, and the B.T LED will start blinking.
- 2) Run 'Add Device' on your Bluetooth device, and select [M2I Barcode Scanner] from the list of available devices.



- 3) Click [Connect] in the Bluetooth device list to pair with the scanner.



- 4) Click the Bluetooth switch on the barcode scanner again.
- 5) When Bluetooth is successfully connected, the buzzer sounds once and the B.T LED turns on.
- 6) The device supports registration of up to 128 devices. When this limit is exceeded, the oldest device is automatically removed to register a new one.

## (2) Bluetooth data transmission

- 1) It is recommended to run a [Text Input Program] on the Bluetooth-connected device and set the input mode to English.
- 2) Scan a barcode or QR code and verify that the data is entered into the [Text Input Program] on the Bluetooth-connected device.

## (3) Bluetooth disconnection

- 1) Hold the Bluetooth switch for 3 seconds to disconnect.
- 2) A single buzzer sound and blinking B.T LED indicate that the connection has been disconnected.
- 3) The device automatically switches to IrDA (infrared) data transmission mode.

## (4) Delete all registered Bluetooth devices

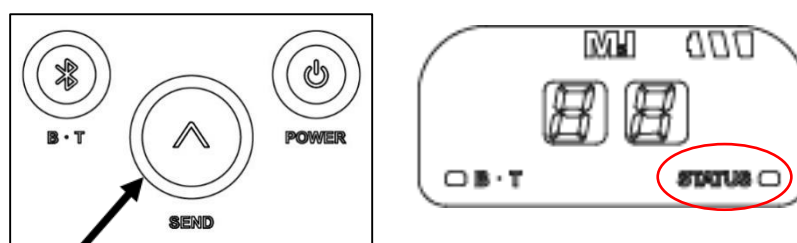
- 1) Press and hold the Bluetooth switch on the barcode scanner for 7 seconds, then release it to delete all registered Bluetooth devices.
- 2) After a single buzzer sound, the B.T LED turns off.

## (5) Bluetooth automatic reconnection

As shown in (1), once the barcode scanner and the device are paired via Bluetooth, the scanner will automatically reconnect when powered off and on again, as long as Bluetooth is enabled. Additionally, with the device's Bluetooth turned on, pressing and holding the scanner's Bluetooth switch for about 3 seconds will trigger automatic reconnection to the previously paired device.

## 6.3.4 IrDA data transmission (M2I HMI model dedicated)

When the product is turned on, [IrDA data transmission mode] is enabled by default.



- (1) Press the scan button to scan a barcode.
- (2) If you keep the product pointed at the IrDA receiver of the M2I HMI and press the [SEND] button, the data will be transmitted as described below.
  - Press and hold the [SEND] button for more than 3 seconds: Transmits all saved data (maximum 20 entries).
  - Press the [SEND] button for less than 3 seconds: Transmits the first saved data.
  - Press and hold the [SEND] button for more than 7 seconds: Delete all saved data (maximum 20 entries).

- (3) The buzzer sounds when data is sent successfully.
- (4) If data transmission fails, a buzzer will sound and the [STATUS LED] will turn on.  
The data will not be deleted and will remain stored. If retransmission succeeds, the [STATUS LED] will turn off.
- (5) A maximum of 20 barcode data entries can be transmitted to the M2I HMI in the order they were stored by repeatedly pressing the [SEND] button in short intervals.

## Chapter 7 Maintenance Warning

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### 7.1 Screen cleaning

When the surface or frame of the display become dirty, spray the cleaning solution onto a soft cloth and wipe the device. Do not spray the cleaning solution directly onto the device.

### 7.2 Periodic check points

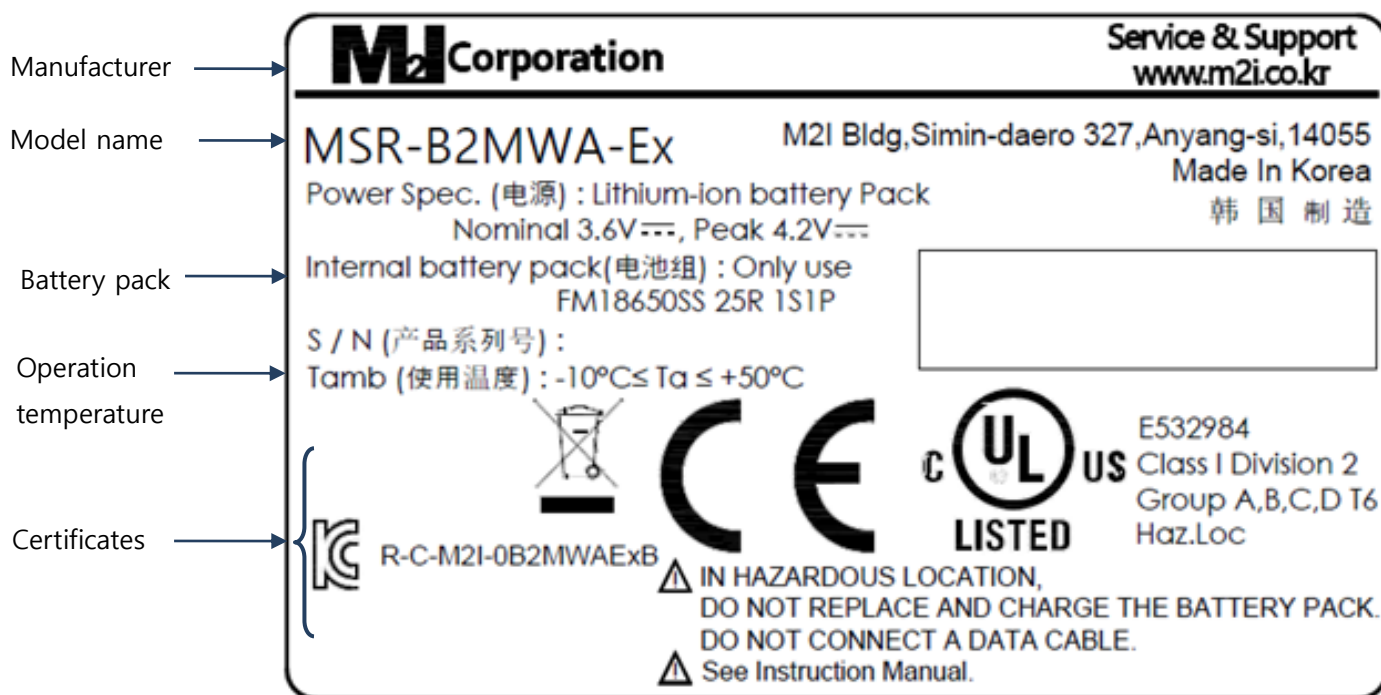
Check the followings periodically for best condition of the device.

- (1) Environment check
  - 1) Is the operating temperature within the allowable range?
  - 2) Is the operating humidity within the allowable range?
  - 3) Is the Surrounding pollution no corrosive gas?
  - 4) Please check the display crack or pollution with your eyes.

### 7.3 When a device issue occurs Warning

- (1) If a problem occurs during operation, stop using the device immediately and contact M2I for support.
- (2) Troubleshooting and repair related to device malfunction must be performed only by personnel authorized by M2I.
- (3) If the issue cannot be resolved on-site, the device may need to be sent to M2I for repair.
- (4) M2I is not responsible for any damage or malfunction caused by using the device under conditions that deviate from the installation and usage guidelines stated in this manual.
- (5) The internal battery performance may degrade over time with accumulated usage, resulting in shorter operation duration. If the operating time becomes significantly short, please contact M2I.
- (6) Users cannot replace the internal battery.
- (7) If you press and hold both the Bluetooth switch and the [SEND] button while powering on the device will activate the manufacturer's service mode. In this mode, the screen will not display anything. This is normal behavior. To return to normal operation, simply turn the power off and on again.

## Chapter 8 Product label



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Doc.No.: MSR-D0002 Rev.1

- When using M2I equipment, thoroughly read this datasheet and associated manuals introduced in this datasheet, also pay careful attention to safety and handle the module properly.
- Store this datasheet in a safe place so that you can take it out read it whenever necessary.