Data Sheet

# EM-1000G-4G

DS01010101 V1.02 Date:2026/7/6

## General Description

The EM-1000G-4G is a high-performance ARM industrial computer developed by ZLG ZHIYUAN Electronics for the industrial control market.

The EM-1000G-4G industrial PC's main controller features multiple Cortex-A55 cores with a maximum clock speed of 1.6GHz, along with 2/4GB of onboard memory and 16GB eMMC storage. It offers a comprehensive array of functional interfaces, including Gigabit Ethernet, LVDS, USB, CANFD, RS485, RS232, DI, DO, M.2, and MiniPCIe slots.

## features

- Multi-core Cortex-A55 1.6GHz
- 2/4GB DDR4
- 16GB eMMC
- rich hardware interface
  - 4 Gigabit Ethernet interfaces
  - 2 USB Host communication ports
  - 8 channels RS-485 1 M.2 interfaces
  - 2 channels RS-232 interfaces
  - 3 channels isolated CANFD interfaces
  - 1 SD card slot
  - 1 LVDS interface
  - 18 channels optocoupler isolation DI
  - 6 channels relay isolation DO
  - 2 high-side drive DO
  - 1 M.2 interface
  - 2 MiniPCIe interfaces

## Applications

- industrial computer
- industrial gateway

## Ordering Information

| Model | Temperature | configuration |
|---|---|---|
| EM-1000G-4GL | -40°C ~ +70°C | 2+16GB,LTE |
| EM-1000G-4G | -40°C ~ +70°C | 4+16GB,LTE |

## Product picture





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**Revision History**

| Revision | Date | Summary |
|---|---|---|
| V0.90 | 2023/09/25 | Create Document |
| V0.91 | 2024/06/26 | Adjust the manual according to the project approval documents. |
| V0.92 | 2024/08/12 | The operating temperature is adjusted to-40 to +70℃. |
| V0.93 | 2025/10/30 | 1、EM-1000G-4G model order information has been updated;<br>2、Add power consumption information and software resources;<br>3、RT-Linux is being adjusted to Linux. |
| V1.00 | 2025/11/25 | 1、Adjust the power and reliability test performance description in the official manual;<br>2、Update accessory list;<br>3、Summary of key parameters: Adjusted for product selection. |
| V1.01 | 2026/03/27 | 1、Add installation diagrams and instructions. |
| V1.02 | 2026/04/09 | 1、Delete Bluetooth content. |

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# 1. General Description

## 1.1 Product picture

Figure 1 Shows the Front Interface of the EM-1000G-4G, and Figure 2 Shows the Rear Interface of the EM-1000G-4G.

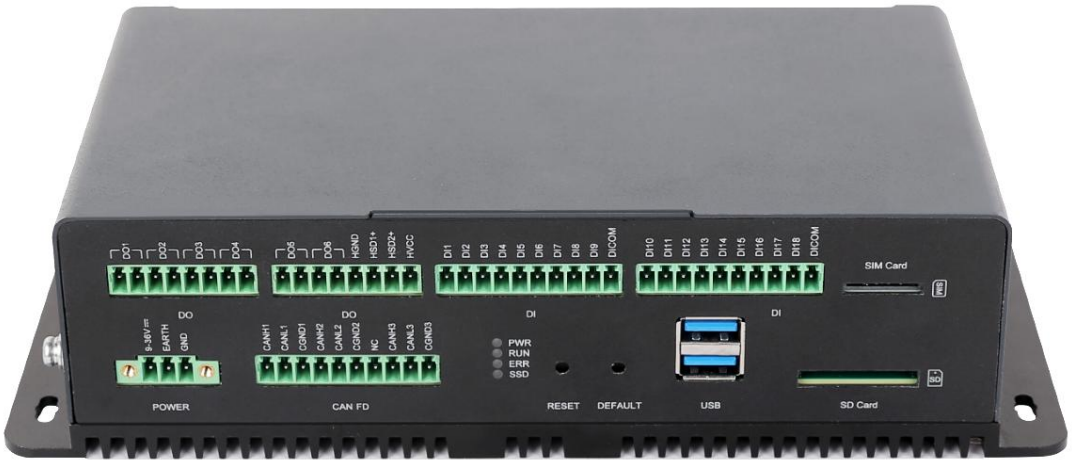



Figure 1 Front Interface of the EM-1000G-4G




Figure 2 Rear Interface of the EM-1000G-4G

Note: The appearance of the product is subject to the actual product sold, this document is only for illustration.

## 1.2 Ordering Information

Table 1 Ordering Information

| Parameter | EM-1000G-4GL | EM-1000G-4G |
|---|---|---|
| Processor | Multi-core 1.6GHz Cortex-A55 | Multi-core 1.6GHz Cortex-A55 |
| RAM | 2GB | 4GB |
| ROM | 16GB | 16GB |
| RS232 | 2 channels | 2 channels |
| RS485 | 8 channels | 8 channels |
| CAN-FD | 3 channels | 3 channels |
| Ethernet | 4 channels | 4 channels |
| 4G module | EG912UGLAC-I05-SNNSA Universal network compatibility, globally certified LTE Cat.1 | EG912UGLAC-I05-SNNSA Universal network compatibility, globally certified LTE Cat.1 |
| WiFi module | MiniPCIe-FCU760K 2.4G Wi-Fi 6 | MiniPCIe-FCU760K 2.4G Wi-Fi 6 |
| Ambient Operating Temperature | -40~＋70℃ | -40~＋70℃ |
| Ambient Operating humidity | 5%~95%RH | 5%~95%RH |
| Ambient Operating altitude | Below 5000 meters | Below 5000 meters |
| weight | 1348g | 1348g |

## 1.3 Hardware Resource

Table 2 Hardware Resource

| interface/peripheral | count | Description |
|---|---|---|
| Ethernet | 4 | 10/100/1000Mbps |
| USB | 2 | Host，USB3.0 |
| CANFD | 3 | Isolation |
| RS485 | 8 | Isolation |
| RS232 | 2 | 1 channels for communication，1 channel for DEBUG |
| SD Card | 1 | |
| LVDS | 1 | The physical interface uses DVI terminals (including 1 USB port for touch control) |
| M.2 | 1 | PCIe3.0 X1，supports SSD expansion |
| miniPCIe | 2 | Expandable 4G and WiFi cards |
| Dry contact DI | 12 | Internal pull-up 24V power supply |
| Wet contact DI | 6 | Input High level voltage: 9-24V, input low level voltage: 0-7V |
| DO | 6 | Relay contact resistance load 5A 250VAC/30VDC |
| High-side DO | 2 | MOS driver, external power supply 9-36V/2A |
| SIM Card | 1 | Use with miniPCIe expansion 4G module |

| interface/peripheral | count | Description |
|---|---|---|
| LED | 4 | PWR、RUN、ERR、SSD |

## 1.4 Software Resource

- Linux core;
- Ubuntu system;
- eMMC driver；
- Ext4 file system；
- PCIe and SSD drivers;
- LVDS display driver, LCD backlight driver, and touch screen driver;
- USB Host driver supporting USB keyboards, mice, flash drives, and 4G modules.
- Gigabit Ethernet driver;
- CANFD driver;
- RS485/RS232 driver;
- SD card driver with hot-swappable capability;
- I2C driver, including EEPROM and RTC driver;
- LED indicator driver;
- 4G module driver;
- WiFi driver;
- General Digital I/O driver;
- Buzzer drive;
- Watchdog and reset driver;

## 1.5 Applications

- energy storage gateway
- industrial computer
- industrial gateway

# 2. Electrical Character

## 2.1 Limiting Working Condition

Table 3 Working Environment Conditions

| Parameter | Working environment conditions |
|---|---|
| Ambient Operating Temperature | -40℃~+70℃ |
| Ambient Operating humidity | 5%~95% |

## 2.2 Power Specification and Power Characteristics

Table 4 Power Supply Specifications and Power

| Parameter | Min | Typical | Max | Unit | Description |
|---|---|---|---|---|---|
| input voltage | 9.0 | 24.0 | 36.0 | V | Minimum and maximum voltage allowed with 10% fluctuation |
| Power rating | -- | 10 | 20 | W | The CPU operates at full load during peak power consumption. The ZPM-101RTW-01 screen is connected, and all external interfaces are operational (4G and M.2 ports remain unconnected, with reserved power for these interfaces). |

Note: Use a power supply that meets the ES1 and PS2 specifications.

# 3. Hardware Interface

## 3.1 Interface Distribution

The Interface Distribution of the EM-1000G-4G is Shown in Figure 3 and Figure 4.

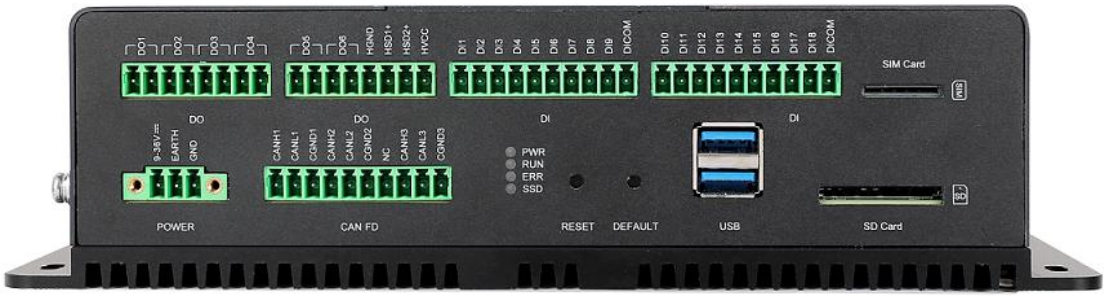



Figure 3 Front View of the EM-1000G-4G




Figure 4 Back View of the EM-1000G-4G

The lower front interface of the EM-1000G-4G is shown from left to right in Table 5.

Table 5 Front Lower Interface of EM-1000G-4G

| No. | interface/peripheral | interface/peripheral | Description |
|---|---|---|---|
| 1 | POWER | Power terminal socket | 3.81-03P |
| 2 | CAN FD | CAN FD interface | 3.81-10P |
| 3 | PWR<br>RUN<br>ERR<br>SSD | Pilot lamp | LED |
| 4 | RESET、REFAULT | Tap the button | Rest and Default |
| 5 | USB1、USB2 | USB dual-layer socket | USB3.0 x2 |
| 6 | SD Card | SD card slot | |

The upper interface on the front of the EM-1000G-4G is shown from left to right in table 6.

Table 6 Front Upper Interface of the EM-1000G-4G

| No. | interface/peripheral | interface/peripheral | Description |
|---|---|---|---|
| 1 | DO | Isolated DO interface | 3.81-08P |

| No. | interface/peripheral | interface/peripheral | Description |
|---|---|---|---|
| 2 | DO | Isolated DO interface | 3.81-08P |
| 3 | DI | Isolated DI interface | 3.81-10P |
| 4 | DI | Isolated DI interface | 3.81-10P |
| 5 | SIM Card | SIM card slot | |

The lower layer interfaces on the back of the EM-1000G-4G are shown from left to right in table 7.

Table 7 Lower-Layer Interfaces on the Back of the EM-1000G-4G

| No. | interface/peripheral | interface/peripheral | Description |
|---|---|---|---|
| 1 | ANT | Antenna | SMA，IPEX1 |
| 2 | NET1 | Gigabit network port | RJ45 |
| 3 | NET2 | Gigabit network port | RJ45 |
| 4 | NET3 | Gigabit network port | RJ45 |
| 5 | NET4 | Gigabit network port | RJ45 |
| 6 | LVDS | LVDS display interface | DVI |
| 7 | DEBUG | Debugging serial port | DB9 |

The upper interface on the back of the EM-1000G-4G is shown from left to right in table 8.

Table 8 Upper Interface on the Rear Side of the EM-1000G-4G

| No. | interface/peripheral | interface/peripheral | Description |
|---|---|---|---|
| 1 | ANT*2 | Antenna | SMA，IPEX1 generation |
| 2 | RS232 | Isolate RS232 interface | 3.81-03P |
| 3 | RS485 | Isolate RS485 interface | 3.81-06P |
| 4 | RS485 | Isolate RS485 interface | 3.81-06P |
| 5 | RS485 | Isolate RS485 interface | 3.81-06P |
| 6 | RS485 | Isolate RS485 interface | 3.81-06P |

## 3.2 Front Panel Interface Description

### 3.2.1 Power

The EM-1000G-4G industrial computer is powered by a DC power (9-36V/20W) supply. Please use a suitable power supply. The physical form of the interface is a green socket with 3Pin, 3.81 mm spacing and screw holes, as shown in Figure 5. The pin definition is shown in Table 9.

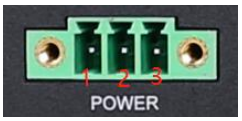



Figure 5 Power Interface

Table 9 Power Interface Pin Definitions

| Pin | Pin name | Description |
|---|---|---|
| 1 | 9~36VDC | Positive terminal of the power supply |
| 2 | EARTH | Chassis ground |

| Pin | Pin name | Description |
|---|---|---|
| 3 | GND | Negative terminal of the power supply |

### 3.2.2 CANFD

The EM-1000G-4G industrial PC features three CANFD interfaces as shown in Figure 6. The pin configuration from left to right is detailed in Table10. For wiring, twisted-pair cables are recommended. In low-interference environments, unshielded cables may suffice. However, if field interference is present, shielded twisted-pair cables should be used with reliable single-point grounding of the shielding layer. In scenarios with severe electromagnetic interference, double-shielded twisted-pair cables are advised. For CAN interface connections, both the G pin and the opposite terminal should connect to the inner shielding layer, while the outer shielding layer should be grounded at a single point. The CANFD interface incorporates a software-controlled 120 Ω termination resistor, which can be activated or deactivated through software configuration.

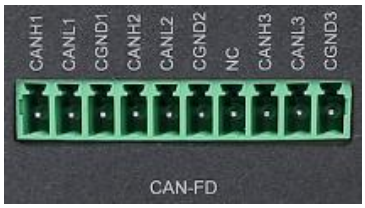



Figure 6 CANFD Interface

Table 10 CANFD Interface Pin Definitions

| Pin | Pin name | Description |
|---|---|---|
| 1 | H1 | Support CANFD |
| 2 | L1 | Support CANFD |
| 3 | G1 | G1 is isolated and cannot be connected to PE |
| 4 | H2 | Support CANFD |
| 5 | L2 | Support CANFD |
| 6 | G2 | G1 is isolated and cannot be connected to PE |
| 7 | NC | NC |
| 8 | H3 | Support CANFD |
| 9 | L3 | Support CANFD |
| 10 | G3 | G1 is isolated and cannot be connected to PE |

### 3.2.3 LED

The EM-1000G-4G has four indicator lights, namely power indicator, operation indicator, error indicator and hard disk indicator, which are convenient to understand the operating status of the system under any circumstances. See Table 11 for details.

Table 11 Indicator Light Description

| Symbol | Function | Description |
|---|---|---|
| PWR | Power indicator, red | ON: The device is powered on normally<br>OFF: Power off the device |
| RUN | System status light: green | Flash: System running normally.<br>ON/OFF: System crashed. |
| ERR | system error status light, red | ON: System error.<br>OFF：System is running normally |
| SSD | Hard disk indicator, green | ON/Flash：The hard drive is normal.<br>OFF：The hard drive is not in place or is abnormal. |

### 3.2.4 Key

The EM-1000G-4G front panel features a system reset button and a factory reset button, See table 12 for details.

Table 12 Key Signal Description

| No. | Symbol | Function | Description |
|---|---|---|---|
| 1 | RESET | System reset | Concealed |
| 2 | DEFAULT | Firmware burning | Concealed |

To flash the factory firmware, insert the card into the SD card slot, hold the DEFAULT button, power on, wait 2 seconds, then release to start the firmware update.

### 3.2.5 USB

The dual-layer USB port supports various devices including USB flash drives, mice, keyboards, and USB WiFi, with the lower port dedicated to firmware updates.

Table 13 USB port Description

| No. | Symbol | Function | Description |
|---|---|---|---|
| 1 | USB | USB 3.0 | The upper USB port connects to the processor's USB2 port. |
| 2 | USB | USB 3.0 | The upper USB port connects to the processor's USB2 port. |

### 3.2.6 SD Card

The EM-1000G-4G features a standard SD card slot for system debugging, firmware flashing, booting, and upgrades. Once the system is up and running, users can perform standard SD card operations.

### 3.2.7 SIM Card

The EM-1000G-4G features a single SIM card slot, which can be used with the internal MiniPCIe expansion slot to support 4G module deployment.

### 3.2.8 DO

The EM-1000G-4G provides 6 relay-isolated passive DO ports and 2 high-side drive DO ports, which can be used to control the power of external devices or as switches, etc.Table14 shows the

DO port signals.

Table 14 DO Interface Signal Description

| Symbol | Function | Description | Remarks |
|---|---|---|---|
| DO1 | DO1 output | Relay isolation | Contact normally open, resistive load 3A/5A 250VAC/30VDC |
| DO2 | DO2 output | Relay isolation | Contact normally open, resistive load 3A/5A 250VAC/30VDC |
| DO3 | DO3 output | Relay isolation | Contact normally open, resistive load 3A/5A 250VAC/30VDC |
| DO4 | DO4 output | Relay isolation | Contact normally open, resistive load 3A/5A 250VAC/30VDC |
| DO5 | DO5 output | Relay isolation | Contact normally open, resistive load 3A/5A 250VAC/30VDC |
| DO6 | DO6 output | Relay isolation | Contact normally open, resistive load 3A/5A 250VAC/30VDC |
| HGND | High-side drive power supply negative terminal | Input GND | |
| HSD1+ | High side drive channel 1 | Optocoupler isolation | Continuous overcurrent capacity 2A |
| HSD2+ | High side drive channel 2 | Optocoupler isolation | Continuous overcurrent capacity 2A |
| HVCC | High-side drive power supply positive terminal | Input VCC | |

Figure 7 Shows the Schematic Diagram of the High-Side Drive Interface.

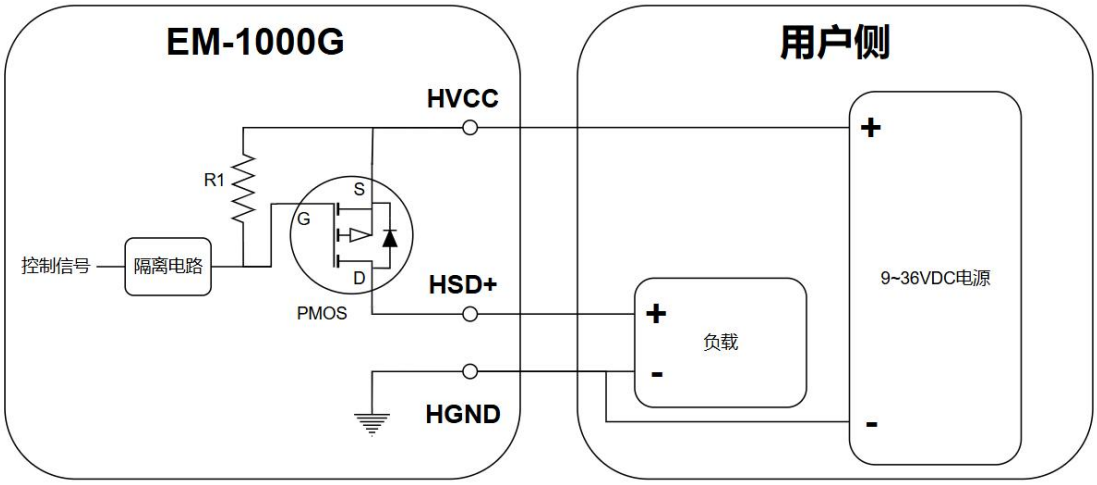



Figure 7 Schematic Diagram of High-Side Drive Interface Usage

### 3.2.9 DI

The EM-1000G-4G features 18 optocoupler-isolated digital input(DI) channels with two

internally interconnected common terminals (COM). Channels DI1 to DI12 are dry contacts designed for passive switch signals and sensor inputs, while DI13 to DI18 serve as wet contacts for +9-24V active switches. These wet contacts function as low-voltage side trigger signals to control external device power, or as interrupt enable signals for switches and triggers. This configuration maximizes channel capacity while ensuring signal independence and universal usability.Table 15 details the signal specifications for both dry and wet contact DI interfaces.

Table 15 DIInterface Signal Description

| Symbol | Function | Description | Remarks |
|---|---|---|---|
| DI1 | DI1 Input | Optocoupler LED+ Pole Pull-Up 24V Power Supply | Dry contact |
| DICOM | DI signal ground | Connect to DI signal ground | DI common port |
| DI18 | DI18Input | Connect to the optocoupler LED+ pole | Wet contact, +9~24V |
| DICOM | DI signal ground | Connect to DI signal ground | DI common port |

Figure 8 and Figure 9 are Schematic Diagrams of the EM-1000G-4G Dry Contact and Wet Contact DI Circuit, Respectively.

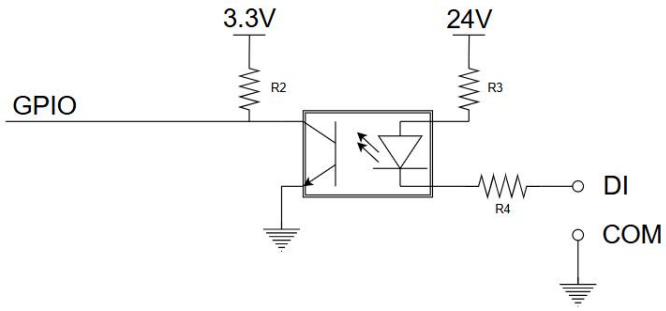



Figure 8 Schematic Diagram of the Circuit Principle for the Dry Contact DI

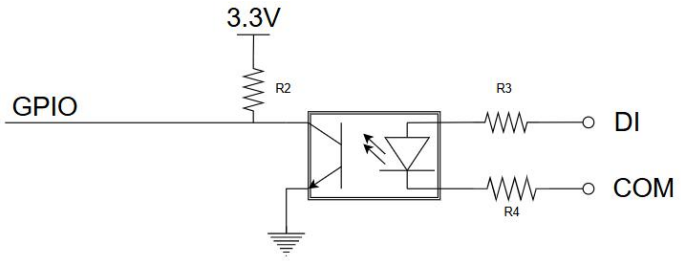



Figure 9 Schematic Diagram of the Circuit Principle of Wet Contact DI

The signal logic on the input side of the dry contact and wet contact and on the GPIO side is shown in table 16.

Table 16 Explanation of DI Interface Signal Logic

| Interface type | Digital input(DI) | Signal Output（GPIO） | Remarks |
|---|---|---|---|
| Dry contact | High level | High level | Switching signal |

| Interface type | Digital input(DI) | Signal Output（GPIO） | Remarks |
|---|---|---|---|
| Dry contact | Low level | Low level | Switching signal |
| Wet contact | High level | Low level | Input high-level voltage: +9~24V |
| Wet contact | Low level | High level | Input high-level voltage: +9~24V |

## 3.3 Back Panel Interface Description

### 3.3.1 Antenna

The EM-1000G-4G features three SMA antenna interfaces that require MiniPCIe slot compatibility. These interfaces can be paired with antennas of appropriate type and frequency band for integration with 4G modules and WiFi modules. ANT1 handles WiFi signals, while ANT2 and ANT3 antennas are dedicated to GPS and 4G signals respectively (standard versions lack GPS functionality, with ANT2 left unconnected). The selected external antenna connector must be a female type, as shown in Figure 10. When the wireless module is not in use, the antenna interface may remain unconnected.



Figure 10 Preferred Antenna Connector Reference

### 3.3.2 Debugging Interface

The EM-1000G-4G industrial PC features two RS232 interfaces, with the DB9 socket's RS232 interface serving as a system debugging port. When connected to a computer via a serial cable and the debugging tool is activated, users can view system startup and debugging information, enabling real- time monitoring of system status. The serial port defaults to 115200bps baud rate, 8-bit data, 1-stop bit, and no parity check.

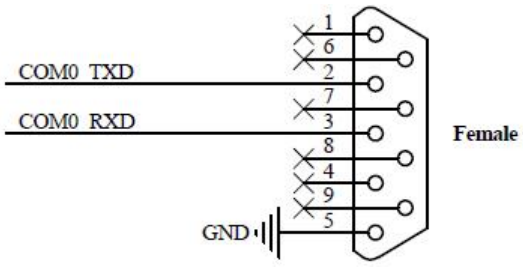



Figure 11 Schematic Diagram of RS232 Serial Port Debugging Connection

The wiring diagram of the RS232 debug serial port DB9 socket is shown in Table 17.

Table 17 RS232 Debug Serial Port Pin Specifications

| Pin number | Signal | Description |
|---|---|---|
| 2 | RS232 TX | EM-1000G-4G Send |
| 3 | RS232 RX | EM-1000G-4G receiver |

| Pin number | Signal | Description |
|---|---|---|
| 5 | GND | Signal ground |

### 3.3.3 RS232

The RS-232 interface with 3.81-3pin socket is an isolated communication interface, which can communicate with external RS-232 devices through serial port. Please refer to Table 18 for details.

Table 18 RS232 Serial Port Pin Specifications

| Symbol | Signal | Description |
|---|---|---|
| TXD | RS232 TXD | EM-1000G-4G Send |
| RXD | RS232 RXD | EM-1000G-4G receiver |
| GND | GND | Signal ground |

### 3.3.4 LVDS

The LVDS display interface of the EM-1000G-4G industrial PC features a DVI socket containing power supply (when screen power exceeds 3W, this interface should be used exclusively for signal transmission with the screen powered by an independent external power source; when powering the screen through this interface, keep the cable length under 1.5 meters to prevent screen distortion or other malfunctions), LVDS signals, backlight control PWM signals, and USB signals. The USB port supports touch screen functionality. The pin configuration ofthe DVI socket is shown in Figure12, while signal definitions for each pin are detailed in Table19. Note that screen cables must comply with DVI dual-channel specifications to avoid display or touch anomalies. Under no circumstances should the screen be plugged in or unplugged while powered, as this poses risks of damaging both the host unit and the display.

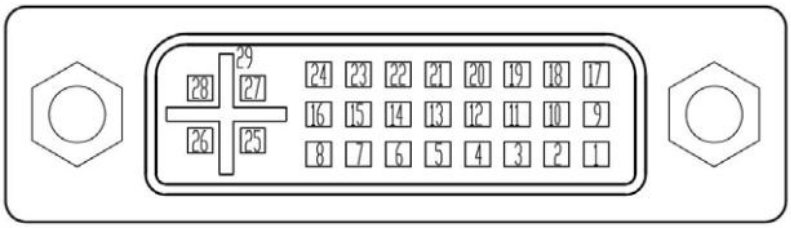



Figure 12 Front View of DVI Socket Pin Arrangement

Table 19 DVI Socket Pin Signal Definitions

| Pin number | Signal | Description |
|---|---|---|
| 1 | OLDI0_A2_N | LVDS Data Channel 2 Differential Negative |
| 2 | OLDI0_A2_P | LVDS Data Channel 2 Differential Positive |
| 3 | GND | Signal ground |
| 4 | OLDI0_PWM | PWM signal for backlight control |
| 5 | NC | NC |
| 6 | 5.0V | 5VDC Power ouput |
| 7 | 5.0V | 5VDC Power ouput |
| 8 | NC | NC |
| 9 | OLDI0_A1_N | LVDS Data Channel 1 Differential Negative |

| Pin number | Signal | Description |
|---|---|---|
| 10 | OLDI0_A1_P | LVDS Data Channel 1 Differential Positive |
| 11 | GND | Signal ground |
| 12 | OLDI0_A3_N | LVDS Data Channel 3 Differential Negative |
| 13 | OLDI0_A3_P | LVDS Data Channel 3 Differential Positive |
| 14 | 5.0V | 5VDC Power ouput |
| 15 | GND | Signal ground |
| 16 | GND | Signal ground |
| 17 | OLDI0_A0_N | LVDS Data Channel 0 Differential Negative |
| 18 | OLDI0_A0_P | LVDS Data Channel 0 Differential Positive |
| 19 | GND | Signal ground |
| 20 | USB_TS_N | USB Differential Negative |
| 21 | USB_TS_P | USB Differential Positive |
| 22 | GND | Signal ground |
| 23 | OLDI0_CLK_P | LVDS clock Differential Positive |
| 24 | OLDI0_CLK_N | LVDS clock Differential Positive |
| 25 | NC | NC |
| 26 | NC | NC |
| 27 | NC | NC |
| 28 | NC | NC |
| 29 | GND | Signal ground |

### 3.3.5 Ethernet

The EM-1000G-4G industrial PC features four Ethernet ports with RJ45 physical connectors. NET1 and NET2 are chip-native Ethernet ports, while NET3 and NET4 support PCIe expansion. The factory firmware configures all four ports to automatically switch between 10Mbps, 100Mbps, and 1000Mbps modes. For optimal performance, we recommend using the 1000Mbps mode. The port configuration is detailed in Figure 13.

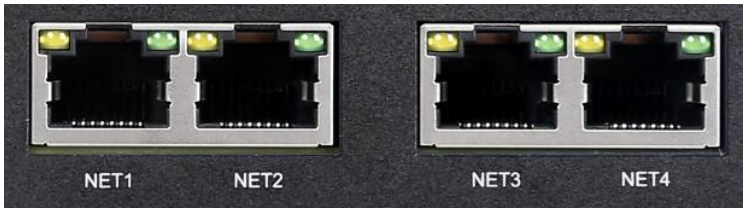



Figure 13 Distribution of Network Port Labels

Table 20 shows the channels of the four network ports.

Table 20 Channel Description of Network Ports

| Symbol | Signal | Description |
|---|---|---|
| NET1 | RGMII | Chip native network port. |
| NET2 | RGMII | Chip native network port. |
| NET3 | PCIe | PCIe expansion port. |
| NET4 | PCIe | PCIe expansion port. |

There are two LED indicators on each port, as shown in table 21.

Table 21 Description of Network Port Indicators

| LED position | Pigment | Function | Description |
|---|---|---|---|
| Right | Green | Link | Network connection always on. |
| left | Yellow | Active | Flash when the network is active. |

### 3.3.6 RS485

The EM-1000G-4G industrial computer provides eight isolated RS-485 interfaces, which are drawn out using four 3.81-6P sockets. Each 3.81-6P socket has two sets of RS-485 signals.Table22 lists the signals of one of the sockets, and the other three sockets are similar.

Table 22 RS485 Pin Definitions

| Symbol | Signal | Description |
|---|---|---|
| 485A1 | Channel 1 RS-485 A port signal | Isolation |
| 485B1 | Channel 1 RS-485 B port signal | Isolation |
| 485G1 | Channel 1 RS-485 signal ground | Isolation |
| 485A2 | Channel 2 RS-485 A port signal | Isolation |
| 485B2 | Channel 2 RS-485 B port signal | Isolation |
| 485G2 | Channel 2 RS-485 signal ground | Isolation |

## 3.4 Extensible Interface

### 3.4.1 M.2

The EM-1000G-4G industrial PC features a single M.2 expansion slot supporting PCIe3.0 x1 channel, enabling expansion of PCIe3.0 x1 compliant M.2 SSDs in 2280 and 2242 formats (note: customers must provide their own mounting screws and bolts when using the 2242 specification). SSDs must support PCIe protocol with physical interfaces labeled M_KEY or B&M_KEY, as illustrated in Figures 14,15,16 and17.

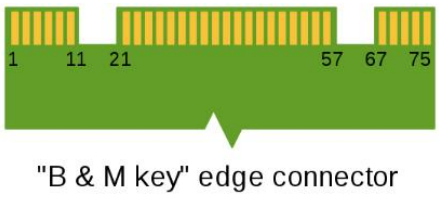



Figure 14 Schematic Diagram of the B&M KEY

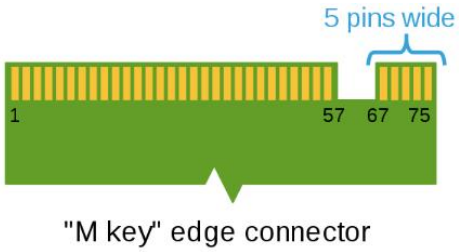



Figure 15 Schematic Diagram of the M KEY

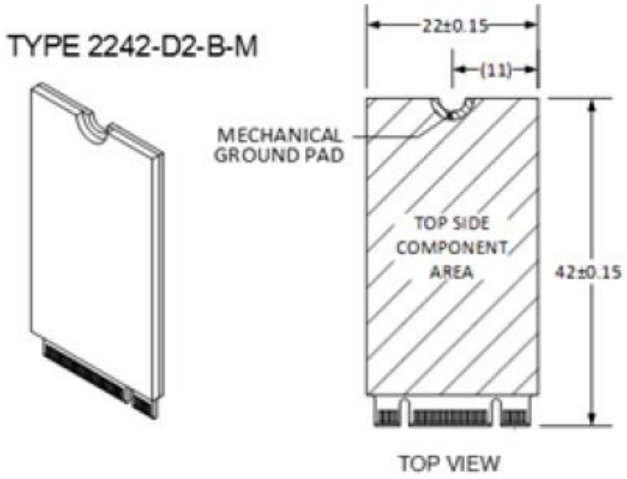



Figure 16 B&M KEY 2242 SSD Dimensions and Key Layout Diagram

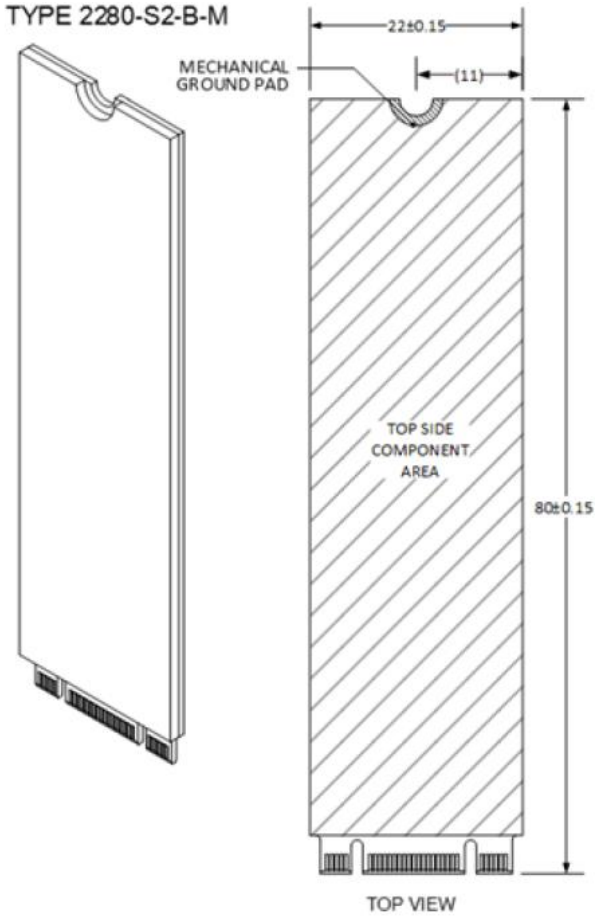



Figure 17 B&M KEY 2280 SSD Dimensions and Key Layout Diagram

### 3.4.2 MiniPCIe

The EM-1000G-4G industrial computer features dual miniPCIe expansion slots for wireless communication. The lower-level slot supports USB, UART, and SDIO interfaces, enabling expansion of WiFi modules. The upper-level slot supports USB and is equipped with a SIM card slot for 4G modules.

## 3.5 Performance

### 3.5.1 SD Card Storage Performance Parameters

Table 23 SD Card Storage Performance Parameters

| Test item | Test condition | Min | Max | Unit | Remarks |
|---|---|---|---|---|---|
| Writing rate | Write 1GB of data | - | 16 | MB/s | SanDisk-Ultra 32GB |
| Read rate | Read 1GB of data | - | 36 | MB/s | SanDisk-Ultra 32GB |

### 3.5.2 DI Interface Performance Parameters

Table 24 DI interface performance parameters

| Interface type | Enter the high-level voltage range | Enter the low voltage range |
|---|---|---|
| Wet contact（DI13~DI18） | 9~24V | 0~7V- |

### 3.5.3 DO Interface Performance Parameters

Table 25 DO interface performance parameters

| Interface type | Contact resistive load | Max switching voltage | Max switching current | Max switching power |
|---|---|---|---|---|
| Relay | 5A 250VAC/30VDC | 250VAC/125VDC(at0.3A) | 5A | 1250VA/150W |

### 3.5.4 Ethernet Interface Performance Parameters

Table 26 Ethernet Interface Performance Parameters

| Test item | Test condition | Min | Max | Unit | Remarks |
|---|---|---|---|---|---|
| Transmission rate | Unidirectional transmission | - | 119 | MB/s | - |
| Receiving rate | Unidirectional reception | - | 118 | MB/s | - |

### 3.5.5 USB Interface Performance Parameters

Table 27 USB Interface Performance Parameters

| Test item | Test condition | Min | Max | Unit | Remarks |
|---|---|---|---|---|---|
| Writing rate | Write 1GB of data | - | 16 | MB/s | Kingston USB flash drive USB3.0 32GB |
| Read rate | Read 1GB of data | - | 36 | MB/s | Kingston USB flash drive USB3.0 32GB |

### 3.5.6 High-Side DO Performance Parameters

Table 28 Performance Parameters of High-Side DO

| Input voltage | Continuous current carrying capacity | Max power under load | Testing environment |
|---|---|---|---|
| 9~36VDC | 3A | 108W | +70℃ |

### 3.5.7 RS232/RS485 Interface Performance Parameters

Table 29 RS232/RS485 Interface Performance Parameters

| Test item | Min | Max |
|---|---|---|
| Baud rate | 1200bps | 115200bps |
| Transmission rate | - | 11KB/s |
| Receiving rate | - | 11KB/s |

### 3.5.8 CAN/CANFD Interface Performance Parameters

Table 30 CAN/CANFD Interface Performance Parameters

| Test item | Test condition | Min | Max | Unit |
|---|---|---|---|---|
| Baud rate | CAN | 5 | 115200bps | Kbps |
| Baud rate | CANFD | 50 | 11KB/s | Kbps |
| Transmission rate | CAN, 1Mbps baud rate, 8 bytes | - | 11KB/s | fps |
| Receiving rate | CAN, 1Mbps baud rate, 8 bytes | - | | fps |
| Transmission rate | CANFD, arbitration field baud rate 1Mbps 80%, data field baud rate 5Mbps 75%, send extended data frame(accelerated), 64 bytes | - | | fps |
| Receiving rate | CANFD, arbitration field baud rate 1Mbps 80%, data field baud rate 5Mbps 75%,64 bytes | - | | fps |

### 3.5.9 LVDS Interface Performance Parameters

Table 31 LVDS Interface Performance Parameters

| Parameter | Default | Max |
|---|---|---|
| Resolution ratio | 1280*800@60Hz | 1920x1080@60Hz |

# 4. Electromagnetic Compatibility

Table 32 Summary of Electromagnetic Compatibility Tests

| Test item | Test interface | Test criteria | Test class |
|---|---|---|---|
| Electrostatic discharge immunity test | Power and signal ports | GB/T 17626.2 | Level 3 |
| Electrical fast transient pulse group immunity test | Power and signal ports | GB/T 17626.4 | Level 3 |
| Surge immunity test | Power supply (24V) and signal ports | GB/T 17626.5 | Level 3 |
| Test of Conductive Interference Resistance of RF Field Induction | Power and signal ports | GB/T 17626.6 | Level 3 |
| Radio frequency electromagnetic field radiation immunity | / | GB/T 17626.3 | Level 3 |

# 5. Environmental Suitability

Table 33 Summary of Environmental Adaptability Tests

| Test item | Test criteria | Test condition |
|---|---|---|
| Low temperature start-up and operation test | GBT 2423.1-2008 | Test environment temperature: -40℃ |
| High temperature start-up and operation test | GBT 2423.2-2008 | Test environment temperature: +70℃ |
| Steady-state damp heat test | GB/T 2423.3-2016 | Test environment temperature and humidity: +40℃/95%RH |
| Change of temperature test | GB/T 2423.22-2012 | Temperature Change Test of Product in Power On Test State from-40℃ to +70℃ |

# 6. Mechanical Dimension

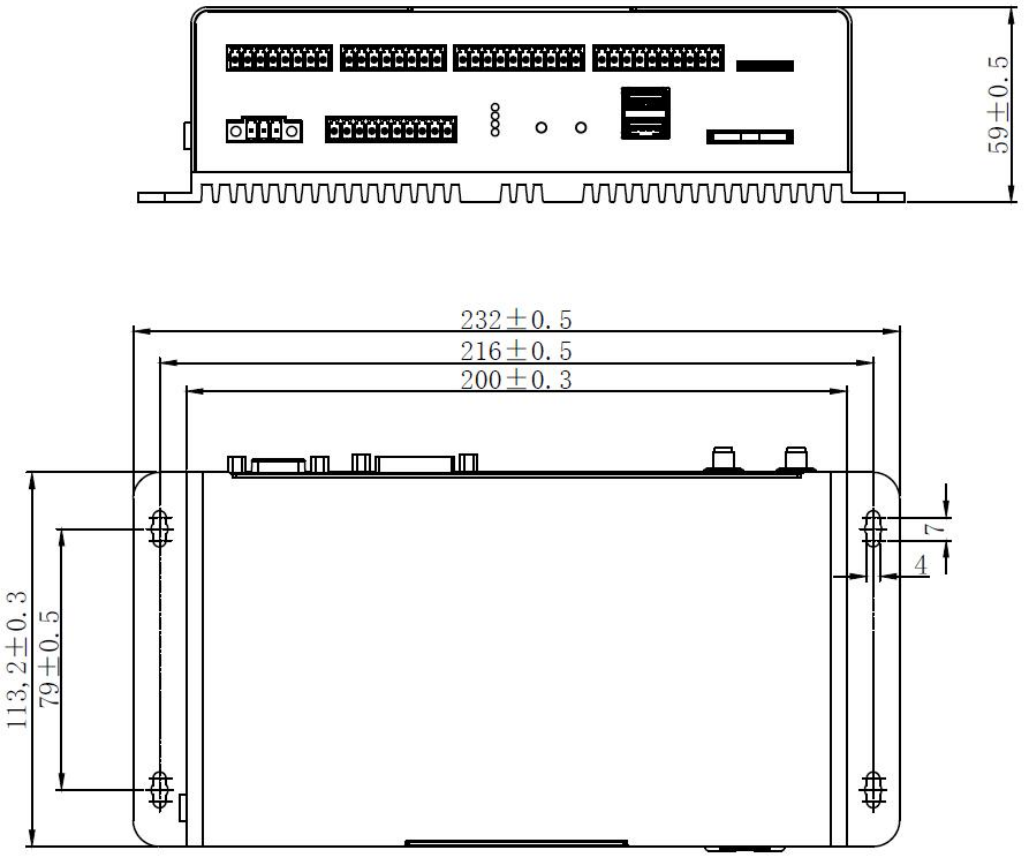



Figure 18 Mechanical Dimension

# 7. Installation Mathod

The EM-1000G-4G supports wall mounting and DIN rail installation. Rail clips and mount ing screws are included in the package; please refer to the packing list for details.

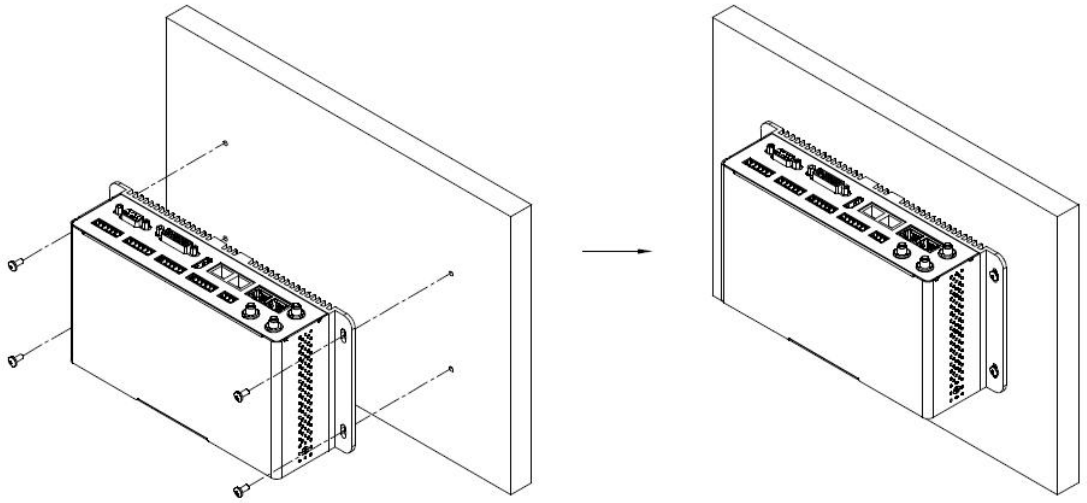


Figure 19 Wall mouanting diagram

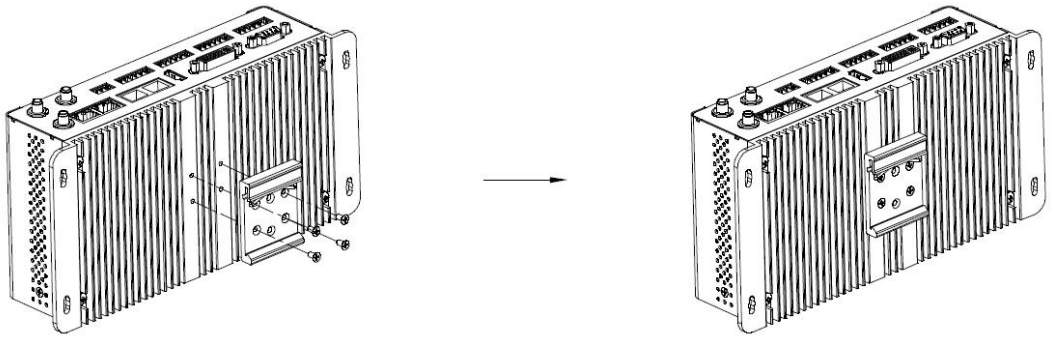


Figure 20 Rail clip installation diagram

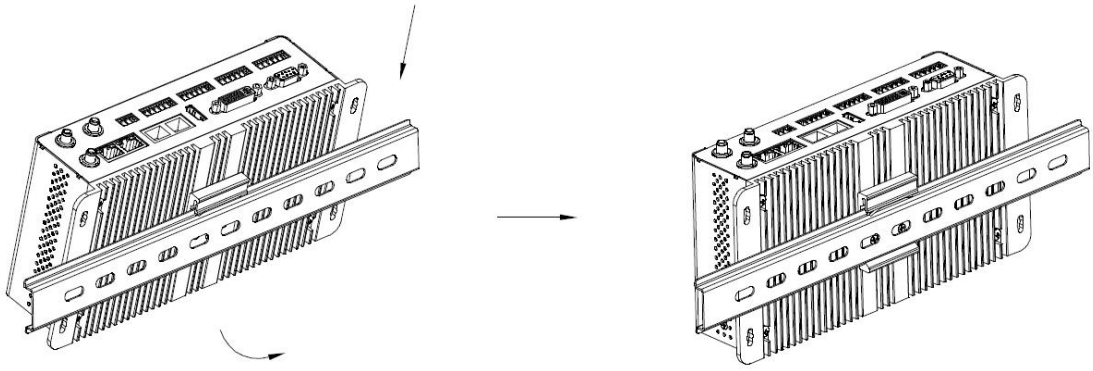


Figure 21 Installation using rail clips

# 8. Supported Accessories

Table 34 Tested Accessories Supported

| No. | Name | Model | Manufacturer | Description |
|---|---|---|---|---|
| 1 | 4G module | PCIE-EG912U | ZLG | LTE Cat1 wireless communication module |
| 2 | LCD display screen | ZPM-101RTW-01 | ZLG | 10.1 寸，1024*600，resistive touch, 250nits |
| 3 | LCD display screen | ZPM-101RTW-02 | ZLG | 10.1 寸，1280*800，resistive touch，800nits |
| 4 | LCD display screen | ZPM-101CTW-02 | ZLG | 10.1 寸，1280*800，capacitive touch，800nits |
| 5 | DVI connection cable | TLA00111001, LINE, DVI24+1 compati- ble with 24+5 M-M DVI cable, L= 1500mm | ZLG | Dual-channel DVI cable. |
| 6 | SSD | M.2 2280 | / | PCIe3.0 x1 |
| 7 | WiFi module | ZM5955P miniPCIe | ZLG | SDIO |
| 8 | Antenna | AB0727-2603BSM | CORTEC | 3G/4G antenna |
| 9 | Antenna | AB2450-29H01BSM | CORTEC | WiFi antenna |

# 9. Packing List

Table 35 EM-1000G-4G Packing List

| No. | Name | Model | Quantity | Remarks |
|---|---|---|---|---|
| 1 | ARM IPC | EM-1000G-4G | 1 | |
| 2 | Terminal blocks | 3.81-03P | 1 | Power supply with fixed screw |
| 3 | Terminal blocks | 3.81-03P | 1 | RS232 terminal blocks |
| 4 | Terminal blocks | 3.81-06P | 4 | RS485 terminal blocks |
| 5 | Terminal blocks | 3.81-08P | 2 | DO terminal blocks |
| 6 | Terminal blocks | 3.81-10P | 3 | DI and CANFD terminal blocks |
| 7 | Hardware bracket | DIN rail bracket, 50*40mm, aluminum | 1 | Guide rail installation accessories |
| 8 | Metric screw | M4*8mm, round head, nickel-plated | 4 | Product installation fixed to wall or cabinet. |
| 9 | Metric screw | M3 * 8, countersunk head | 4 | DIN rail bracket fixing screws |
| 10 | Combination screw | PM4 * 8 triple combination flat washer | 1 | Side grounding screw installed on the housing |
| 11 | Metric screw | PM3*5,D=5.5,round head | 1 | M.2 module fixing screws |
| 12 | Certificate of conformity | Certificate of conformity | 1 | Certificate of conformity |

# 10. Disclaimers

Based on the principle of providing better service to users,Guangzhou ZHIYUAN Electronics Co., Ltd. (hereinafter referred to as "ZHIYUAN Electronics") will present detailed and accurate product information to users as much as possible in this manual. However,due to the timeliness of the content in this manual,ZHIYUAN Electronics cannot fully guarantee the timeliness and applicability of this document at any time.ZHIYUAN Electronics reserves the right to update the content of this manual without prior notice.In order to obtain the latest version of information,please visit the official website of ZHIYUAN Electronics regularly or contact the staff of ZHIYUAN Electronics.Thank you for your tolerance and support!

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