# Aquam8010/Aquam8020/Aquam8512 Series Industrial Ethernet Switches Hardware Installation Manual

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KYLAND

**Aquam8010/Aquam8020/Aquam8512 Series**
**Industrial Ethernet Switches Hardware Installation Manual**

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# Notice for Safety Operation

The product performs reliably as long as it is used according to the guidance. Artificial damage or destruction of the device should be avoided. Before using the device, read this manual carefully for personal and equipment safety. Please keep the manual for further reference. Kyland is not liable to any personal or equipment damage caused by violation of this notice.

- Do not place the device near water sources or damp areas. Keep the ambient relative humidity within the range from 5% to 95% (non-condensing).
- Do not place the device in an environment with high magnetic field, strong shock, or high temperature. Keep the working and storage temperatures within the allowed range.
- Install and place the device securely and firmly.
- Please keep the device clean; if necessary, wipe it with a soft cotton cloth.
- Do not place any irrelevant materials on the device or cables. Ensure adequate heat dissipation and tidy cable layout without knots.
- Wear antistatic gloves or take other protective measures when operating the device.
- Avoid any exposed metal wires because they may be oxidized or electrified.
- Install the device in accordance with related national and local regulations.
- Before power-on, make sure the power supply is within the allowed range of the device. High voltage may damage the device.
- Power connectors and other connectors should be firmly interconnected.
- Do not plug in or out the power supply with wet hands. When the device is powered on, do not touch the device or any parts with wet hands.
- Before operating a device connected to a power cable, remove all jewelry (such as rings, bracelets, watches, and necklaces) or any other metal objects, because they may cause electric shock or burns.
- Do not operate the device or connect or disconnect cables during an electrical storm.
- Use compatible connectors and cables. If you are not sure, contact our sales or technical support personnel for confirmation.
- Do not disassemble the device by yourself. When an anomaly occurs, contact our sales or technical support personnel.
- If any part is lost, contact our sales or technical support personnel to purchase the substitude. Do not purchase parts from other channels.
- Dispose of the device in accordance with relevant national provisions, preventing environmental pollution.

In the following cases, please immediately shut down your power supply and contact your Kyland representative:

- Water gets into the equipment.
- Equipment damage or shell damage.
- Equipment operation or performance has abnormally changed.
- The equipment emits odor, smoke or abnormal noise.

The following information applies when operating this device in hazardous locations:

Suitable for use in Class I, Division 2, Groups A, B, C and D Hazardous Locations, or nonhazardous locations only.

Cet appareillage est utilisable dans les emplacements de Classe I, Division 2, Groupes A, B, C et D, ou dans les emplacements non dangereux seulement.

**WARNING:** EXPLOSION HAZARD

- Do not disconnect equipment while the circuit is live or unless the area is known to be free of ignitable concentrations.
- Substitution of any component may impair suitability for Class I, Division 2.

**AVERTISSEMENT:** RISQUE D'EXPLOSION

- Avant de deconnecter l'equipement, couper le courant ou s'assurer que l'emplacement est designe non dangereux.
- La substitution de composants peut rendre ce materiel inacceptable pour les emplacements de Classe I, Division 2.

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# 1 Product Overview

Aquam8010/Aquam8020/Aquam8512 includes a series of high-performance industrial Ethernet switches developed by Kyland particularly for traffic control systems. The series devices are applicable to rail transit industry due to the solid closed housing, fanless but heat dissipation-capable single-rib shaped chassis, overcurrent, overvoltage, and EMC protection for power input, sound EMC protection of M12 ports, and IP67 protection class. All the devices meet the requirements stipulated in the EN50155 and EN50121 industrial standards. Redundancy protocol guarantees the reliable operation of the system.

Aquam8010/Aquam8020/Aquam8512 provides powerful network management functions. The devices can be managed through CLI, Telnet, Web, and SNMP-based network management software.

Aquam8512 is a layer 3 switch that supports the layer 3 routing protocol, Bypass power-off direct-connection function, and train topology discovery protocol (TTDP).

The switches support DIN rail and panel mounting. They provides up to four 10/100/1000Base-T(X) Ethernet ports, and sixteen 10/100Base-T(X) Ethernet ports. For Aquam8010, the 10/100Base-T(X) Ethernet ports support IEEE802.3at (compatible with IEEE802.3af) POE output. Each POE port provides 30W feed.

Table 1 Aquam8010 Models

| **Model** | **Aquam8010-Ports-PS1-PS2**<br>**Aquam8010-UM-Ports-PS1-PS2** |
|---|---|
| Code definition | Code option |
| UM | Unmanaged model |
| Ports:<br>GE, T, P | **Managed model:**<br>2GE8T, 2GE4T4P, 2GE8P, 8T, 4T4P, 8P<br>**Unmanaged model:**<br>2GE8T, 8T |
| | ***Note:***<br>*2GE4T4P: two 10/100/1000Base-T(X) M12 ports; four 10/100Base-T(X) M12 ports; four 10/100Base-T(X) M12 POE ports* |
| PS1-PS2:<br>power input | **Model without POE:**<br>H5-H5(110DC, redundant power input), L1-L1(48DC, redundant power input), L3-L3(24DC, redundant power input)<br>**Model with POE:**<br>L10-L10(48DC, redundant power input) |

Table 2 Aquam8020 Models

| **Model** | **Aquam8020-Ports-PS1-PS2** |
|---|---|
| Code definition | Code option |
| Ports: GE, T, P | 16T，2GE16T，4GE16T |
| | ***Note:***<br>*4GE16T : four 10/100/1000Base-T(X) M12 ports; sixteen 10/100Base-T(X) M12 ports* |
| PS1-PS2: power input | H2-H2(110DC, redundant power input), L1-L1(48DC, redundant power input), L3-L3(24DC, redundant power input) |

Table 3 Aquam8512 Models

| **Model** | **Aquam8512-Ports-PS1-PS2**<br>**Aquam8512-B-Ports-PS1-PS2** |
|---|---|
| Code definition | Code option |
| B | Support Bypass function |
| Ports: GE, T, P | 12T，4GE8T |
| | ***Note:***<br>*4GE8T : four 10/100/1000Base-T(X) M12 ports； eight 10/100Base-T(X) M12 ports* |
| PS1-PS2: power input | H2-H2(110DC, redundant power input), L1-L1(48DC, redundant power input), L3-L3(24DC, redundant power input) |

Table 4 Optional Accessories

| **Model** | **Description** |
|---|---|
| M12-4Pin-99-3729-810-04 | 10/100Base-T(X) port connector |
| M12-8Pin-99-1487-812-08 | 10/100/1000Base-T(X) port connector |
| M12-4Pin-99-1430-810-04 | Console port connector |
| M12-4Pin-99-1430-812-04 | Alarm port connector |
| M16-5Pin-99-5614-15-05 | Power port connector |
| DT-XL-PWR-M16-xxx-3m | M16 to bare end cable for power port, 3m |

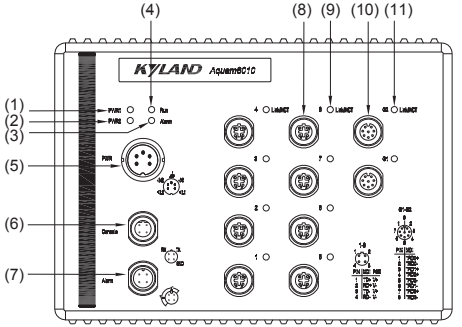
**Note:**

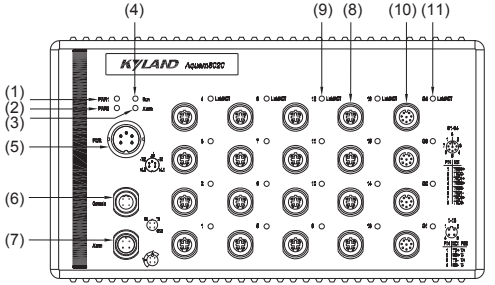
We reserve the right to amend the product information listed in this table without notice. To obtain the latest information, you can contact our sales or technical support personnel.

# 2 Structure and Interface

**Caution:**
It is recommended to purchase the port dustproof shield (optional) to keep ports clean and ensure switch performance.

- Front Panel



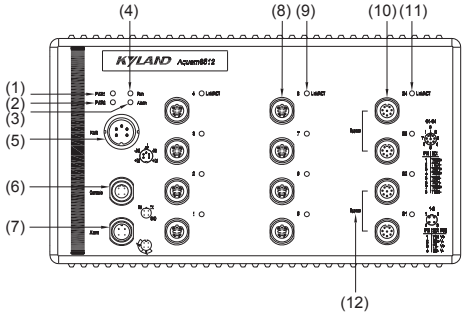



Figure 1 Front Panel

(1) Power 1 LED
(2) Power 2 LED
(3) Alarm LED
(4) Running LED
(5) Power port
(6) Console Port
(7) Alarm port
(8) 10/100Base-T(X) Ethernet Port
(9) 10/100Base-T(X) Ethernet Port connection status LED
(10) 10/100/1000Base-T(X) Ethernet Port
(11) 10/100/1000Base-T(X) Ethernet Port connection status LED
(12) Two pairs of Bypass ports

- Left panel

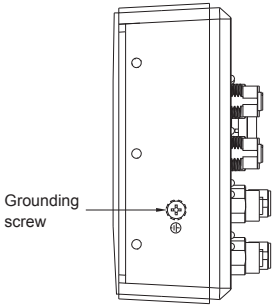



Figure 2 Left Panel

# 3 Mounting

## 3.1 Dimension Drawing

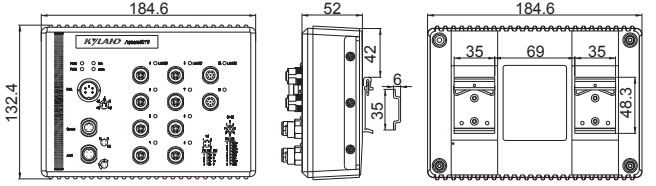



Figure 3 Aquam8010-Dimensions for DIN-Rail Mounting (unit: mm)

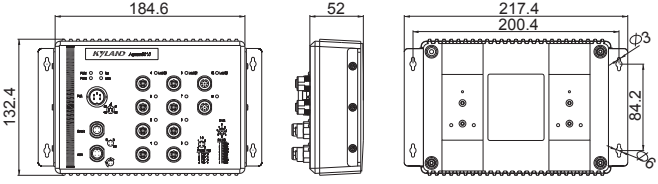



Figure 4 Aquam8010-Dimensions for Panel Mounting (unit: mm)

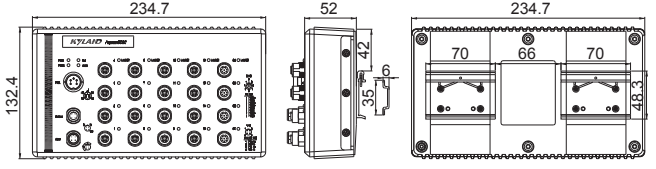



Figure 5 Aquam8020/Aquam8512-Dimensions for DIN-Rail Mounting (unit: mm)

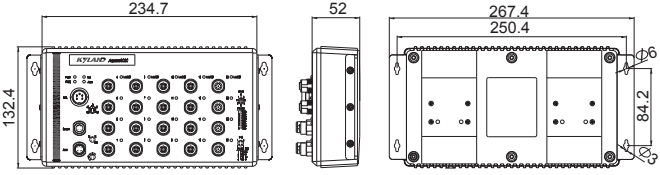



Figure 6 Aquam8020/Aquam8512-Dimensions for Panel Mounting (unit: mm)

**Caution:**

- As part of the heat dissipation system, the switch housing becomes hot during operation. Please use caution when coming in contact and avoid covering the switch housing when the switch is running.
- The figures in this manual are only for reference.

## 3.2 Mounting Modes and Steps

The series devices support both DIN-rail mounting and panel mounting. Before installation, make sure that the following requirements are met.

1) Environment: temperature (-40℃ to 75℃), ambient relative humidity (5% to 95%, non-condensing).
2) Power requirement: The power input is within the voltage range of the switch.
3) Grounding resistance: <5Ω
4) No direct sunlight, distant from heat source and areas with strong electromagnetic interference.

### 3.2.1 DIN-Rail Mounting

**Note:**
To adopt DIN-rail mounting, you need to purchase the DIN rail connecting seat (optional) for DIN-rail mounting.

- DIN-Rail Mounting

Step 1: Select the mounting position for the device and guarantee adequate space and heat dissipation.

Step 2: Insert two connecting seats onto the top of the DIN rail, and push the bottom of the device inward and upward to ensure the DIN rail fits in the connecting seat. Make sure the device is firmly installed on the DIN rail, as shown in the following figure.

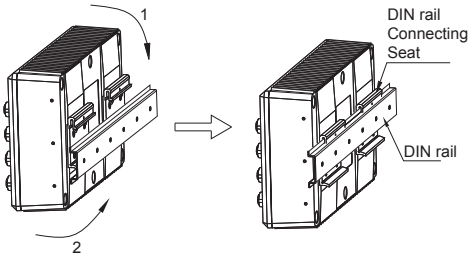



Figure 7 DIN-Rail Mounting

- DIN-Rail Dismounting

Step 1: As shown in the following figure, press the device downward and move the device in direction 1 until the bottom of the device is detached from the DIN rail.

Step 2: Pull the device upward and move the device in direction 2 until the device is removed from the DIN rail completely.

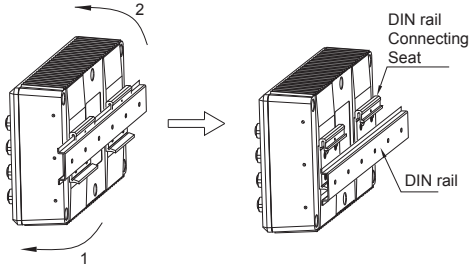



Figure 8 DIN-Rail Dismounting

### 3.2.2 Panel Mounting

- Panel Mounting

Step 1: Select the mounting position (on a wall or inner wall of a cabinet) for the device and guarantee adequate space and heat dissipation.

Step 2: Punch four holes in the selected position according to the dimensions of the device. Insert four screws into the four holes with a screwdriver until about a 5mm distance is left between each screw head and the wall.

Step 3: Align the four mounting holes on the plate for panel mounting with the four screws. Insert the screws through the Φ6 positions in the following figure. Move the device in direction 1 until the four screws are in the Φ3 positions. Then tighten the screws.

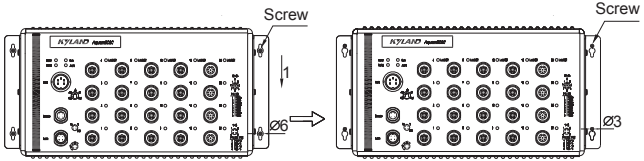



Figure 9 Panel Mounting

● Panel Dismounting

Step 1: Loosen the screws with a screwdriver. Pull the device upward until the screws are in the Φ6 positions in the following figure. Then remove the plate for panel mounting from the screws to detach the device from the wall or inner wall of the cabinet.

Step 2: Loosen the screws completely with a screwdriver. Remove them from the wall or inner wall of the cabinet.

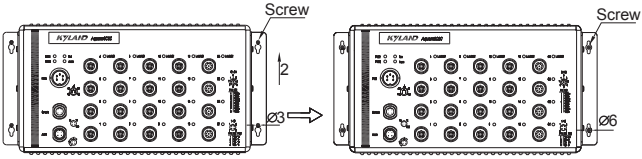



Figure 10 Panel Dismounting

# 4 Connection

10/100Base-T(X) port connector, 10/100/1000Base-T(X) port connector, console port connector, alarm port connector, power port connector, and power port connection cable are all optional (For details, see Table 4 ). That is, these components need to be purchased separately as required.

## 4.1 10/100Base-T(X) Ethernet Port

### 4.1.1 Functions

● Data Transmission

10/100Base-T(X) Ethernet port is equipped with M12 connector, which is dustproof, waterproof, and anti-vibration. The port is self-adaptive. It can automatically configure itself to work in 10M or 100M state, full or half duplex mode. The port can also adapt to MDI or MDI-X connection automatically. You can connect the port to a terminal or network device with a straight-through or cross-over cable.

● POE

The 10/100Base-T(X) Ethernet ports of the Aquam8010 support IEEE802.3at POE output. Serving as the Power Sourcing Equipment (PSE), the switches can provide power supply for PDs through 10/100Base-T(X) Ethernet ports. Each POE port provides 30W feed.

1. POE Definition

POE indicates that the device can provide power supply for PDs through Ethernet ports. The device supports a maximum distance of 100m for power supply.

2. POE Power Supply

The device supports data wires to provide power supply for PDs.

### 4.1.2 Pin Definitions and Wiring Sequence

- Pin Definition

Figure 11 M12 Port (female)

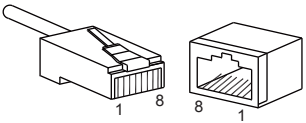



Figure 12 RJ45 Port

You can use an M12-M12 or M12-RJ45 cable to connect the port for communication. The preceding figures show the pin numbers of an M12 port and an RJ45 port. For pin definitions, see the following table.

Table 5 Pin Definitions of M12/RJ45 Port

| Pin | MDI-X Signal | MDI Signal | POE |
|---|---|---|---|
| **M12 Port** | | | |
| 1 | Receive Data+ (RD+) | Transmit Data+ (TD+) | V+ |
| 2 | Transmit Data+ (TD+) | Receive Data+ (RD+) | V- |
| 3 | Receive Data- (RD-) | Transmit Data- (TD-) | V+ |
| 4 | Transmit Data- (TD-) | Receive Data- (RD-) | V- |
| **RJ45 Port** | | | |
| 1 | Receive Data+ (RD+) | Transmit Data+ (TD+) | – |
| 2 | Receive Data- (RD-) | Transmit Data- (TD-) | – |
| 3 | Transmit Data+ (TD+) | Receive Data+ (RD+) | – |
| 6 | Transmit Data- (TD-) | Receive Data- (RD-) | – |
| 4，5，7，8 | Unused | Unused | – |
| NOTE | **Note:** "+" and "-" indicate level polarities. | | |

- Wiring Sequence

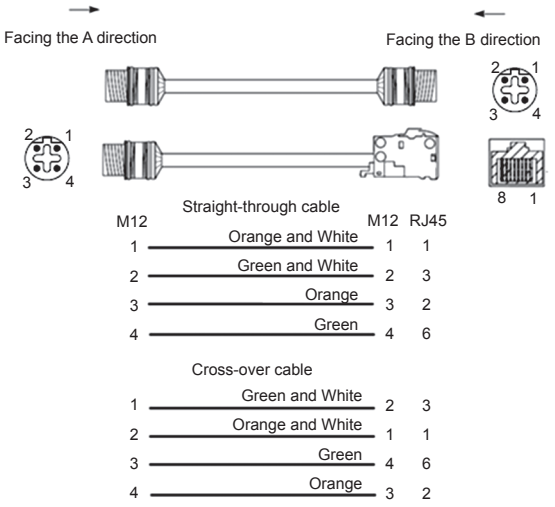



Figure 13 Connection Using Straight-through/Cross-over Cable

**Note:**

- The color of the cable for RJ45 connector meets the 568B standard: 1-orange and white, 2-orange, 3-green and white, 4-blue, 5-blue and white, 6-green, 7-brown and white, and 8-brown.
- The 1 and 3, 2 and 4 pins on the M12 interface are differentiated signal pins in pairs. The orange-and-white and orange pair, green-and-white and green pair, blue-and-white and blue pair, and brown-and-white and brown pair in twist pair cables must be used in correct pairs while being connected with the signal pins. For example, the above figure, the orange-and-white and orange and green-and-white and green pairs are used.

## 4.2 10/100/1000Base-T(X) Ethernet Port

10/100/1000Base-T(X) Ethernet port is equipped with M12 connector, which is dustproof, waterproof, and anti-vibration. The port is self-adaptive. It can automatically configure itself to work in 10M or 100M state, full or half duplex mode. The port can also adapt to MDI or MDI-X connection automatically. You can connect the port to a terminal or network device with a straight-through or cross-over cable.

- Pin Definition

Figure 14 M12 Port (female)

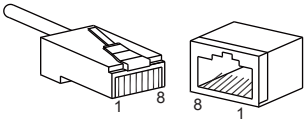



Figure 15 RJ45 Port

You can use an M12-M12 or M12-RJ45 cable to connect the port for communication. The preceding figures show the pin numbers of an M12 port and an RJ45 port. For pin definitions, see the following table.

Table 6 Pin Definitions of M12/RJ45 Port

| Pin | MDI-X Signal | MDI Signal |
|---|---|---|
| 1 | Transmit/Receive Data (TRD1+) | Transmit/Receive Data (TRD0+) |
| 2 | Transmit/Receive Data (TRD1-) | Transmit/Receive Data (TRD0-) |
| 3 | Transmit/Receive Data (TRD0+) | Transmit/Receive Data (TRD1+) |
| 4 | Transmit/Receive Data (TRD3+) | Transmit/Receive Data (TRD2+) |
| 5 | Transmit/Receive Data (TRD3-) | Transmit/Receive Data (TRD2-) |
| 6 | Transmit/Receive Data (TRD0-) | Transmit/Receive Data (TRD1-) |
| 7 | Transmit/Receive Data (TRD2+) | Transmit/Receive Data (TRD3+) |
| 8 | Transmit/Receive Data (TRD2-) | Transmit/Receive Data (TRD3-) |
| NOTE | **Note:**<br>"+" and "-" indicate level polarities. | |

- Wiring Sequence

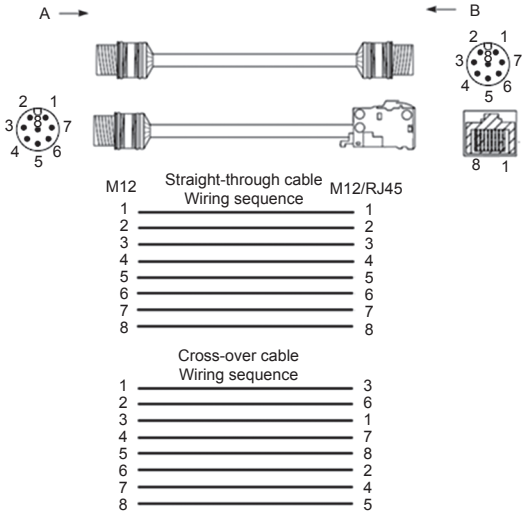



Figure 16 Connection Using Straight-through/Cross-over Cable

**Note:**
The color of the cable for RJ45 connector meets the 568B standard: 1-orange and white, 2-orange, 3-green and white, 4-blue, 5-blue and white, 6-green, 7-brown and white, and 8-brown.

## 4.3 Bypass port

Aquam8512 provides two pairs of Bypass ports, and the device provides the Bypass function through the power supply trigger status. When the power supply is turned off, the Bypass function is enabled, that is, each pair of Bypass ports are physically connected directly to prevent the communication of the two networks/devices connected to each pair of Bypass interfaces from being affected. After the power supply is turned on properly, the Bypass function is disabled.

## 4.4 Console Port

There is a console port on the front panel. The port is equipped with M12 connector. Connect the console port of the switch to the 9-pin serial port of a PC with an M12-DB9 console cable. You can configure, maintain, and manage the switch by running Hyper Terminal in Windows OS of a computer.

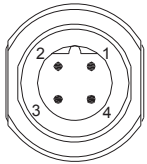



Figure 17 Console Port (male)

- M12-DB9 Console Cable

One end of the M12-DB9 cable is an M12 connector to be inserted into the console port of the device, and the other end is the DB9 connector to be inserted into the 9-pin serial port of a PC.

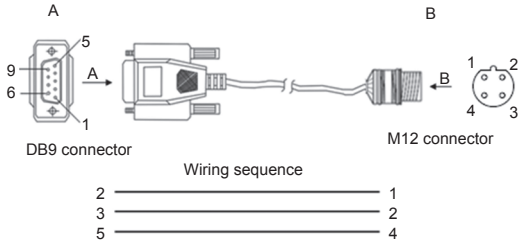



Figure18 Wiring Sequence M12-DB9 Console Cable

Table 7 Pin Definition of DB9 Port (9-Pin Serial Port) and M12 Port (Console Port)

| DB9 Port (9-Pin Serial Port) | | M12 Port (Console Port) | |
|---|---|---|---|
| **Pin** | **Signal** | **Pin** | **Signal** |
| 2 | RXD (Receive Data) | 1 | TXD (Transmit Data) |
| 3 | TXD (Transmit Data) | 2 | RXD (Receive Data) |
| 5 | GND (Grounding) | 4 | GND (Grounding) |

## 4.5 Grounding

Grounding protects the device from lightning and interference. Therefore, you must ground the device properly. You need to ground the device before it is powered on and disconnect the grounding cable after the device is powered off. There is a grounding screw (see Figure 2) on the front panel of the device. The screw is for chassis grounding. After crimping one end of the grounding cable to a cold pressed terminal, secure the end of the grounding cable to the grounding screw and firmly connect the other end to ground.

**Note:**
Cross-sectional area of the chassis grounding cable>2.5mm$^2$;
Grounding resistance<5Ω.

## 4.6 Power port

There is a power port on the front panel of the device. You need to connect the power cable to the power port to provide power to the device. Power port is equipped with M16 connector, which is dustproof, waterproof, and anti-vibration. The device supports redundant power input, when one power input is faulty, the device can continue operating properly, thereby improving network reliability.

**Note:**
0.75mm$^2$<Cross-sectional area of the power cable<2.5mm$^2$;
grounding resistance<5Ω.

- Pin Definition

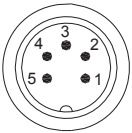



Figure 19 Power Port (male)

Table 8 Pin Definitions of Power Port

| Pin | Signal | DC Wiring Definition | AC Wiring Definition |
|---|---|---|---|
| 1 | +/L1 | PWR1：+ | PWR1：L |
| 2 | -/N1 | PWR1：- | PWR1：N |
| 3 | ⏚ | PGND | PGND |
| 4 | -/N2 | PWR2：- | PWR2：N |
| 5 | +/L2 | PWR2：+ | PWR2：L |

● Wiring and Mounting

Step 1: Ground the device properly according to section 4.5.

Step 2: Insert one end of the power cable into the M16 connector firmly.

Step 3: Insert the M16 connector with the connected cable into the power port on the device.

Step 4: Connect the other end of the power cable to an external power supply system according to the power supply requirements of the device. View the status of the power LED. If the LED is on, the power is connected properly.

**Caution:**

- Before connecting the device to power supply, make sure that the power input meets the power requirement. If connected to an incorrect power input, the device may be damaged.
- The specification of the power supply supported by the device of the POE model is L10: 48 DC (45-57 V DC). POE output complies with the IEEE802.3at standard, and the input voltage must be in the range of 50-57 V DC.
- To comply with UL restrictions, this equipment must be powered from a source compliant with Class 2.

**Warning:**

- Do not touch any exposed conducting wire, terminal, or component with a voltage warning sign, because it may cause personal injury.
- Do not remove any part or plug in or out any connector when the device is powered on.

## 4.7 Alarm Port

The device provides an alarm port on the front panel for alarm output. When the switch works properly, the normally-open contacts of the alarm relay are closed and the normally-closed contacts are open; when an alarm occurs, the normally-open contacts are open and the normally-closed contacts are closed. The alarm is outputted through a 4-pin M12 connector.

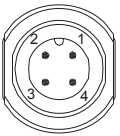



Figure 20 Alarm Port (male)

Electrical parameters of the relay:
Maximum voltage: 250VAC/350VDC
Maximum current: 120mA

**Note:**

- Aquam8512-4GE8T, Aquam8512-B-4GE8T: Pin 3 and pin 4 are normally-open contacts; pin 2 and pin 3 are normally -closed contacts. When the switch works properly, pin 3 and pin 4 are closed, pin 2 and pin 3 are open; when an alarm occurs, pin 3 and pin 4 are open; pin 2 and pin 3 are closed.
- Others: Pin 1 and pin 2 are normally-open contacts; pin 2 and pin 3 are normally -closed contacts. When the switch works properly, pin 1 and pin 2 are closed, pin 2 and pin 3 are open; when an alarm occurs, pin 1 and pin 2 are open; pin 2 and pin 3 are closed.

- Wiring and Mounting

Step 1: Insert the alarm cable into the alarm port connector firmly.
Step 2: Insert the alarm port connector with connected cable into the alarm port.

# 5 LEDs

Table 9 Front Panel LEDs

| LED | State | Description |
|---|---|---|
| Power 1 LED-PWR1 | On | The power 1 is connected and operates properly. |
| | Off | The power 1 is not connected or operates abnormally. |
| Power 2 LED-PWR2 | On | The power 2 is connected and operates properly. |
| | Off | The power 2 is not connected or operates abnormally. |
| Running LED-Run | On | The device is starting up |
| | Blinking | The CPU operates properly. |
| | Off | The device does not start up |
| Alarm LED-Alarm | On | An alarm occurs |
| | Off | No alarm occurs |
| Ethernet port connection status LED-Link/ACT | On | Effective port connection |
| | Blinking | Ongoing network activities |
| | Off | No effective port connection |
| Ethernet port POE LED-POE | On | The POE port provides power supply normally |
| | Blinking | The POE port provides power supply abnormally |
| | Off | The POE port provides no power supply |

# 6 Switch Access

You can access the switch in any of the following ways (excluding the unmanaged switch, as shown in Table 1).

## 6.1 Access through Console Port

Step 1: Connect the console port of the switch to the 9-pin serial port of a PC with the M12-DB9 console cable.

Step 2: Open Hyper Terminal in Windows OS. On the computer's desktop, click Start →All Programs → Accessories →Communications → Hyper Terminal.

Step 3: Create a connection "Switch", as shown in the following figure.

Figure 21 Creating a Connection

Step 4: Connect the communication port in use, as shown in the following figure.

**Note:**
To confirm the communication port in use, right-click [My Computer] and select [Property]. Click [Hardware] → [Device Manager] → [Port] to view the communication port.

Figure 22 Selecting a Serial Port

Step 5: Set port parameters for Aquam8010/Aquam8512 (Bits per second: 115200, Data bits: 8, Parity: None, Stop bits: 1 and Flow control: None). Set port parameters for Aquam8020 (Bits per second: 9600, Data bits: 8, Parity: None, Stop bits: 1, and Flow control: None), as shown in Figure 23.

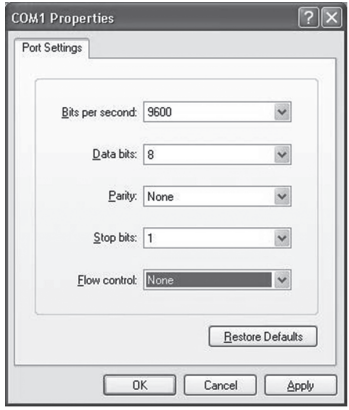



Figure 23 Setting Port Parameters

Step 6: Click OK to enter the switch CLI. Then you can run the commands in Table 10 and Table 11 to perform operations.

Table 10 CLI Commands for Aquam8010/Aquam8020

| View | Command | Description |
|---|---|---|
| General mode | SWITCH>enable | Enter the privileged mode |
| Privileged mode | SWITCH#show interface | Query the IP address of the switch |
| Privileged mode | SWITCH#show version | Query the version of the switch |
| Privileged mode | SWITCH#reboot | Restart the switch |
| Privileged mode | SWITCH#load default | Restore the factory default settings (including the IP address) |
| Privileged mode | SWITCH#config terminal | Enter the configuration mode |

Table 11 CLI Commands for Aquam8512

| View | Command | Description |
|---|---|---|
| General mode | SWITCH>enable | Enter the privileged mode |
| Privileged mode | SWITCH#show interface vlan 1 | Query the IP address of the switch |
| Privileged mode | SWITCH#show version | Query the version of the switch |
| Privileged mode | SWITCH#reload | Restart the switch |
| Privileged mode | SWITCH#set default<br>SWITCH#write | Restore the factory default settings (including the IP address) |
| Privileged mode | SWITCH#config terminal | Enter the configuration mode |

## 6.2 Access through Telnet

Step 1: Connect the network port of the PC to the Ethernet port of the device with a network cable.

Step 2: On the Windows desktop, click Start and Run. The Run Dialog box is displayed. Enter "telnet *IP address*". For example, if the IP address of the switch is 192.168.0.2 (default IP address of a Kyland switch), enter "telnet 192.168.0.2" in the dialog box.

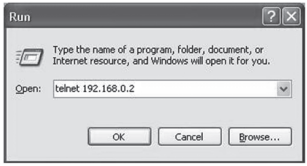



Figure 24 Access through Telnet

Step 3: Click OK. The Telnet CLI is displayed. Then you can run the commands in Table 10 and Table 11 to perform operations.

## 6.3 Access through Web

Step 1: Connect the network port of the PC to the Ethernet port of the device with a network cable.

Step 2: Enter the IP address of the switch in the address box of the browser. The user login interface is displayed. You can log in to the Web UI by using default user name "admin" and password "123".

**Note:**

- IE8.0 or a later version is recommended.
- For details about how to access the switch and other operation, refer to the Web operation manual in the delivered CD.

# 7 Basic Features and Specifications

| **Power Requirements** | | |
|---|---|---|
| Power Identifier | Rated Voltage Range | Maximum Voltage Range |
| L3 (24DC) | 24VDC | 18-36VDC |
| L1 (48DC) | 48VDC | 36-72VDC |
| H2 (110DC) | 110VDC | 77-154VDC |
| H5 (110DC) | 72VDC/96VDC/110VDC | 40-160VDC |
| L10(48DC) | 48VDC | 45-57VDC(POE output complies with the IEEE802.3af)<br>50-57VDC(POE output complies with the IEEE802.3at) |
| Terminal Block | 5-pin M16 connector | |
| **Rated Power Consumption** | | |
| Rated Power Consumption | Aquam8010：12W (MAX, no PD)<br>Aquam8020：16W (MAX)<br>Aquam8512：13W (MAX) | |
| **Physical Characteristics** | | |
| Housing: | Metal, fanless | |
| Installation | DIN rail and panel mounting | |
| Dimensions (W×H×D) | Aquam8010：184.6mm×132.4mm×52mm<br>Aquam8020/Aquam8512：234.7mm×132.4mm×52mm<br>(excluding connectors, DIN rail, and plate for panel mounting) | |
| Weight: | Aquam8010：2Kg<br>Aquam8020：2.5Kg<br>Aquam8512：2.5Kg | |
| **Environmental Limits** | | |
| Ambient temperature | -40℃～+75℃ | |
| Storage temperature | -40℃～+85℃ | |
| Ambient relative humidity | 5%～95% (non-condensing) | |
| **MTBF** | | |
| MTBF | Aquam8010：268129h<br>Aquam8020：211933h<br>Aquam8512：236311h | |
| **Warranty** | | |
| Warranty | Five years | |

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