
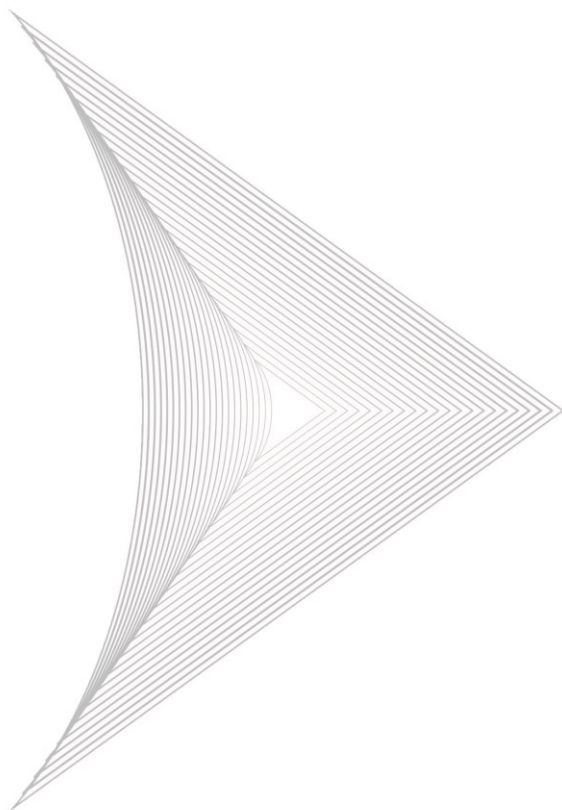




H18EDD-0402C 
Ethernet Demarcation
Access Device
Hardware Description

Beijing Huahuan Electronics Co.,Ltd.



H18EDD-0402C
Ethernet Demarcation Access Device

Hardware Description

Beijing Huahuan Electronics Co., Ltd.
June.2019

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1 Overview

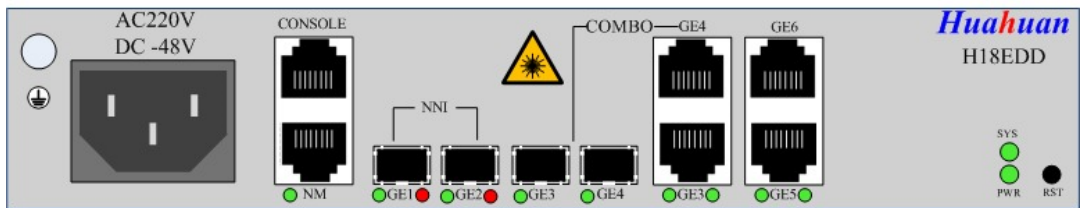
Thank you for choosing H18EDD-0402C Ethernet Demarcation Access Device from Beijing Huahuan Electronics Co., Ltd. For the best service from this product, please read this manual carefully.

H18EDD-0402C device supports 2 GE optical interfaces, 2 GE electrical interfaces and 2 1000M COMBO interfaces. You can customize the device with 4 optical interfaces+2 electrical interfaces or 2 optical interfaces+4 electrical interfaces.

2 Architecture and Introduction

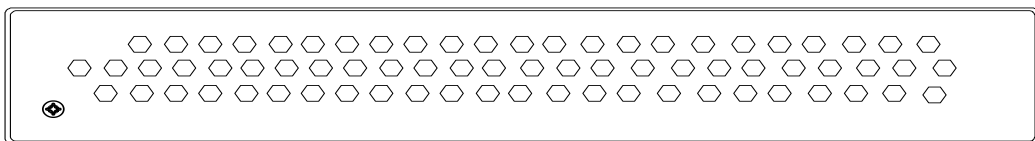
2.1 Front Panels

Figure 2-1 The front panel diagram of H18EDD-0402C (AC220V)



2.2 Rear Panel

Figure 2-2 The rear panel diagram of the device



2.3 LED

The LED functional descriptions on the front panel of H18EDD-0402C device are shown in Table 2-1.

Table 2-1 The LED functional descriptions of H18EDD-0402C device

Mark	Color	Functional description
SYS	Green	Device running indication: Blink: running normally Off: running abnormally
PWR	Green	Device power state indication: On: running normally Off: running abnormally or unconnected
NM	Green	NM port Link and Active indication: On: connection has been built at NM port Blink: data is transmitted or received at NM port Off: no connection has been built at NM port
Green LED at GE electrical port	Green	Ethernet electrical port Link and Active indication: On: connection has been built at Ethernet port Blink: data is transmitted or received at Ethernet port Off: no connection has been built at Ethernet port
Green LED at GE optical port	Green	Ethernet optical port Link and Active indication: On: connection has been built at Ethernet port Blink: data is transmitted or received at Ethernet port Off: no connection has been built at Ethernet port

Mark	Color	Functional description
Red LED at GE optical port	Red	Ethernet optical port LOS indication: On: no signal input Off: signal inputted

2.4 Device Ports

Ethernet Electrical Port

H18EDD-0402C device provides GE electrical ports in standard RJ-45 form. RJ-45 connector diagram and pin definition are shown in Figure 2-3 and Table 2-2.

Figure 2-3 RJ-45 connector pin number diagram

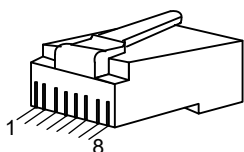


Table 2-2 RJ-45 socket definition at GE port

Pin	1	2	3	4	5	6	7	8
Definition	BI_A+	BI_A-	BI_B+	BI_C+	BI_C-	BI_B-	BI_D+	BI_D-

Note: BI stands for bidirectional.

 **NOTE**

Ethernet electrical port of H18EDD-0402C device can automatically detect the transceiver line order of the connected network cable and make adaptations. So the port can be used whether the Ethernet interface is MDI or MDI-X and whether the network cable used is crossover or straight-through.

Ethernet Optical Port

H18EDD-0402C device provides GE optical ports. GE optical ports use LC dual-fiber SFP optical module and single-fiber SFP optical module is also selectable. When using single-fiber

transceiver module, only one optical port exists. The wavelength of single-fiber module is its emission wavelength.

When connector is inserted into optical transceiver module socket, the latching tab should be aligned to the correspondent notch. The bending radius of pigtail fiber should be not less than 50mm. When optical fiber connector is inserted or pulled, do not directly pull the optical fiber. Please reserve the protection plug on SFP optical module. When no optical fiber is connected, please ensure that the protection plug is inserted to prevent dust from entering.



CAUTION

Single-fiber devices with the same emission wavelength cannot interwork. So when single-fiber devices are interworked, the devices with matched emission wavelengths should be used.

COMBO Port

H18EDD-0402C device provides COMBO ports, which supports optical interface 100/1000mbit/s and electrical interface 10/100/1000mbit/s COMBO (photoelectric multiplexing) function.

Management Port

H18EDD-0402C device provides 1 NM port and 1 CONSOLE port as their network management ports, marks and definitions are shown in Table 2-3. Network management ports use standard RJ-45 socket whose connector diagram is shown in Figure 2-3, NM is the FE electrical port; see its socket definition in Table 2-4. CONSOLE port pin definition is shown in Table 2-5.

Table 2-3 Marks and definitions of management ports

Mark	Definition
NM	Out-of-band management port, using Telnet/EzView to manage device

Mark	Definition
CONSOLE	RS232 management port, using hyper terminal to manage device

Table 2-4 RJ-45 socket definition at NM port

Pin	1	2	3	4	5	6	7	8
Definition	TxD+	TxD-	RxD+	-	-	RxD-	-	-

Table 2-5 RJ45 socket definition of CONSOLE management port

Pin	1	2	3	4	5	6	7	8
Definition	-	-	TxD	GND	GND	RxD	-	-

Reset Button

There is a reset button labeled “RST” on the H18EDD-0402C device, which can realize manual reset of the whole board.

Figure 2-4 Reset button



Power Port

The device universal power interface supports AC~220V and DC-48V, which is connected by standard three-core power line.



CAUTION

For the user’s safety, when using ~220V AC power supply, the power socket must have good protection ground connection.

2.5 Cable Introduction

2.5.1 DB9-RJ45 Serial Port Cable (ZJN.BH4.851.105A)

Introduction

Device is delivered with Console serial port cable, which can be connected to the RJ45 Console interface and allow us to log in to the device. The serial port cable is used to connect the Console interface of the device and the RS-232 serial interface of the maintenance console and transmit configuration data. The maintenance Console implements local debugging and maintenance through the Console interface.

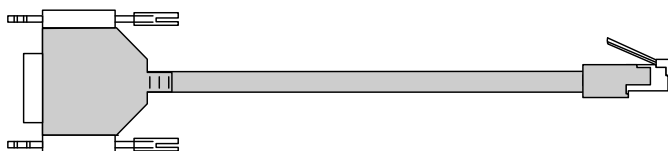
Connectors at two ends of the cable are as below:

- RJ45 connector: connect to the Console/RS232 port of the device;
- DB9-F connector: used to connect the RS-232 serial port of PC machine.

Appearance

Figure 2-5 shows the DB9-RJ45serial port cable.

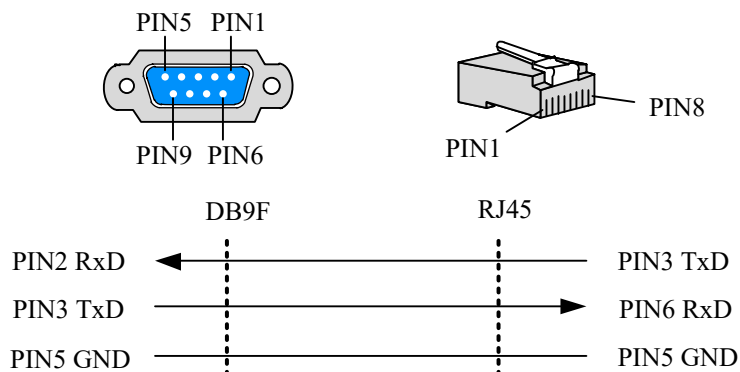
Figure 2-5 DB9-RJ45 serial port cable



Pin Assignments

Figure 2-6 shows pin assignments of the RS-232 serial port and RJ45 Ethernet port.

Figure 2-6 Pin assignments



Technical Specifications

Table 2-6 lists technical specifications of DB9-RJ45 serial port cable.

Table 2-6 Technical specifications of DB9-RJ45 serial port cable

Item	Description
Name	DB9-RJ45 serial port cable
Type	CAT5 Unshielded Twisted Pair (UTP-5, UTP-5e) and STP (Shielded Twisted Pair)
Connector	DB9 female connector and RJ45 connector
Length	2m

2.5.2 Fiber and Connector (LC/PC)

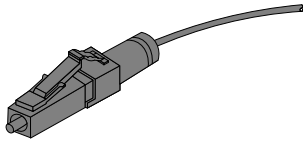
Introduction

Device supports single-mode or multi-mode fiber.

Appearance

LC/PC fiber connector is shown in Figure 2-7.

Figure 2-7 LC/PC fiber connector



When connecting or removing the LC/PC optical connector, align the connector with the optical port, and do not rotate the fiber. Note the following points:

- To insert the fiber, align the head of the fiber jumper with the optical port and insert the optical fiber into the port gently.
- To remove the fiber, press the latch on the connector, and pull the fiber out.

2.5.3 Ethernet Cable

Introduction

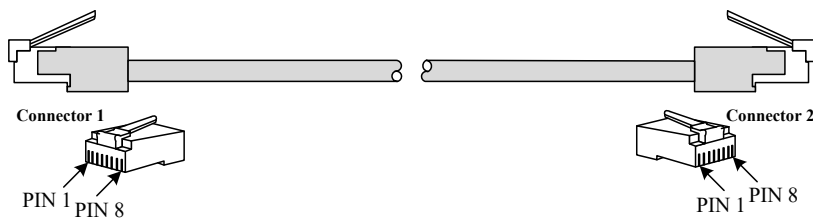
- Used to connect the Ethernet electrical interface with other devices.
- Used to connect the Ethernet monitoring interface on front panel with network interface on NM PC machine.

The Ethernet interfaces on the device are self-adaptive to straight-through cable mode and crossover cable mode. Both of them can be used to connect Ethernet electrical interface.

Appearance and Structure

Figure 2-8 shows the Ethernet cable.

Figure 2-8 Ethernet cable



Pin Assignments

Ethernet cables are classified into straight-through cables and crossover cables:

- Straight through cable: EIA/TIA 568B standard line orders are used at both RJ45 connectors crimped twisted pairs.
- Crossover cable: EIA/TIA 568A standard line order is used at one RJ45 connector crimped twisted pairs, while EIA/TIA 568B standard line order is used at the other end.

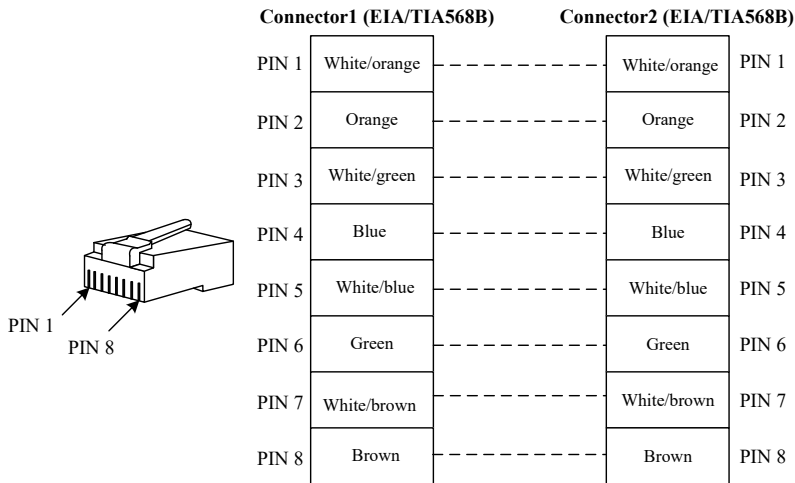
Table 2-7 lists the line orders of EIA/TIA 568A and EIA/TIA 568B standards.

Table 2-7 Line orders of EIA/TIA 568A and EIA/TIA 568B standards

Connector (RJ45)	EIA/TIA568A	EIA/TIA568B
PIN 1	White/Green	White/Orange
PIN 2	Green	Orange
PIN 3	White/Orange	White/Green
PIN 4	Blue	Blue
PIN 5	White/Blue	White/Blue
PIN 6	Orange	Green
PIN 7	White/Brown	White/Brown
PIN 8	Brown	Brown

Both RJ45 connectors of the straight through cable follow EIA/TIA568B standard line order, as shown in Figure 2-9.

Figure 2-9 Line order of the straight-through cable



RJ45 connectors on both ends of crossover cable need to use different standard line orders, usually one RJ45 connector follows EIA/TIA568A standard; the other RJ45 connector follows EIA/TIA568B standard.

The line order of the 100 Mbit/s crossover cable is different from that of the 1000 Mbit/s crossover cable. Diagrams of cable connection are shown in Figure 2-10 and Figure 2-11.

Figure 2-10 Line order of the 100 Mbit/s crossover cable

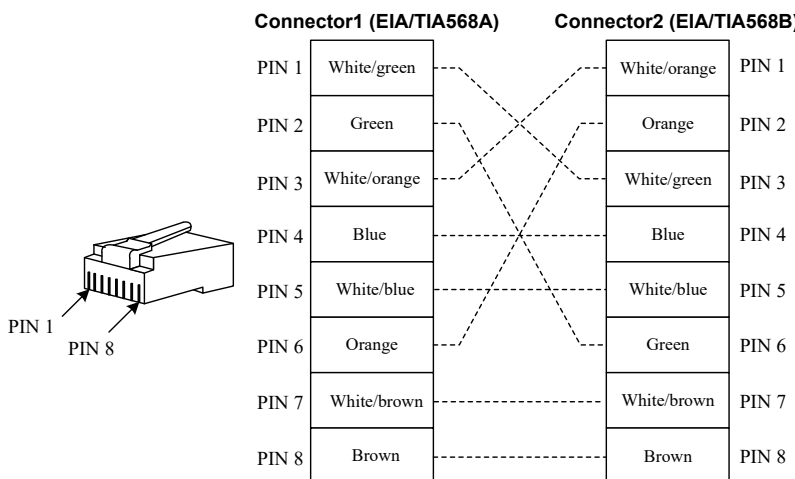
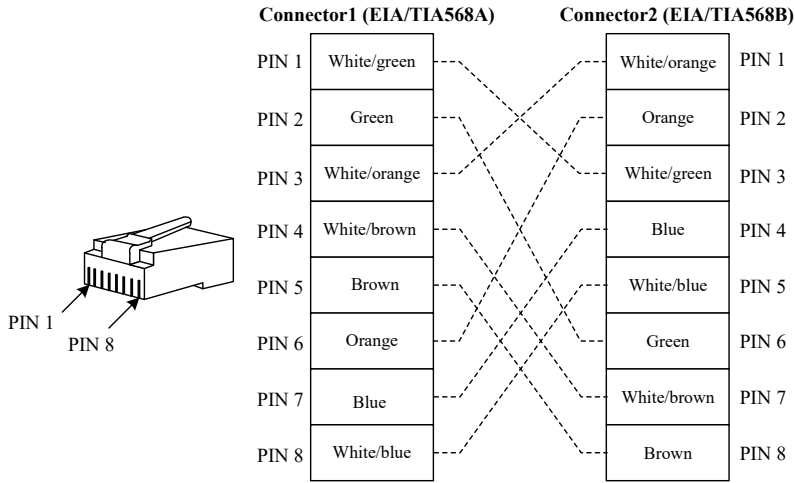


Figure 2-11 Line order of the 1000 Mbit/s crossover cable



 **NOTE**

1000Mbit/s crossover cable uses all 8 pins. The crossover is PIN1 to PIN3, PIN2 to PIN6, PIN4 to PIN7, and PIN5 to PIN8.

Technical Specifications

Table 2-8 lists technical specifications of the Ethernet cable.

Table 2-8 Technical specifications of the Ethernet cable

Item	Description
Connector type	RJ45 connector (crystal head)
Cable type	Category 5 unshielded twisted pair (UTP-5) or shielded twisted pair (STP)
Color	Dark grey
Characteristic impedance	100.0Ω
Inner conductor wire diameter	0.510mm

Item	Description
Breakdown voltage	500.0V
Inner conductor DC impedance	93.8Ω/km
Quantity of cores	8
Frequency range	0~100MHz
Frequency attenuation	22dB/100m@100MHz

2.5.4 AC Power Cable

Application

AC power cable transports AC power from power distribution equipment to AC power supply socket, and then transmits power to the entire device.

The selections of AC power cables are different according to local standards, as shown in Table 2-9.

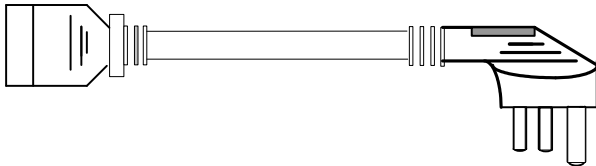
Table 2-9 AC power supply cable list

Regional standard	Cable type
Chinese standard	BH4.855.035-A
German standard	BH4.855.035-B
American standard	BH4.855.035-C
South Africa standard	BH4.855.035-D
Japanese standard	BH4.855.035-E
British standard	BH4.855.035-F
North American standard	BH4.855.035-G

Appearance and Structure

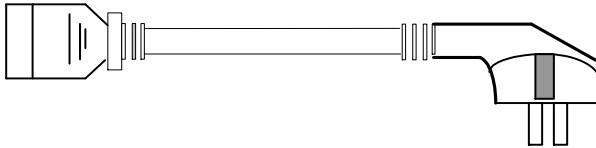
The AC power cable which meets Chinese standard is composed of Chinese standard three-plug connector and pins terminal, as shown in Figure 2-12.

Figure 2-12 Chinese standard AC power cable (BH4.855.035-A)



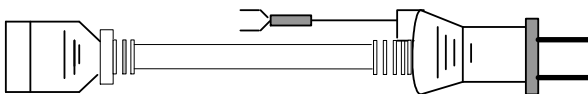
The AC power cable which meets German standard is composed of German standard French-mode two-plug connector and pins terminal, as shown in Figure 2-13.

Figure 2-13 German standard AC power cable (BH4.855.035-B)



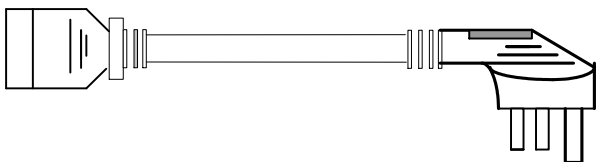
The AC power cable which meets American standard is composed of American standard two-plug connector and pins terminal, as shown in Figure 2-14.

Figure 2-14 American standard AC power cable (BH4.855.035-C)



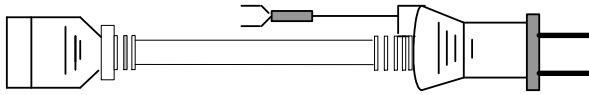
The AC power cable which meets South Africa standard is composed of South Africa standard three-plug connector and pins terminal, as shown in Figure 2-15.

Figure 2-15 South Africa AC power cable (BH4.855.035-D)



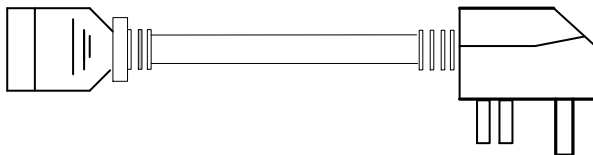
The AC power cable which meets Japanese standard is composed of Japanese standard two-plug connector and pins terminal, as shown in Figure 2-16.

Figure 2-16 Japanese standard AC power cable (BH4.855.035-E)



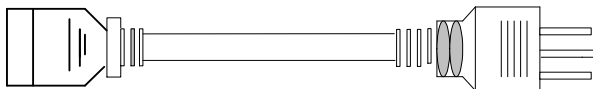
The AC power cable which meets British standard is composed of British standard three-plug connector and pins terminal, as shown in Figure 2-17.

Figure 2-17 British standard AC power cable (BH4.855.035-F)



The AC power cable which meets North American standard is composed of North American standard three-plug connector and pins terminal, as shown in Figure 2-18.

Figure 2-18 North American AC power cable (BH4.855.035-G)



Technical Specifications

Table 2-10 lists technical specifications of AC power cable.

Table 2-10 Technical specifications of AC power cable

Item	Description
Cable type	Electronic and electrical cable
Color	Black
Diameter	≥0.5mm ²

2.5.5 DC Power Cable

Application

DC power cable transports -48V DC power from power distribution equipment to DC power supply socket, and then transmits power to the entire device.

The DC power cable is the same as AC power cable. When the DC power supply is required, users can need to cut off the other end and connect the power cable with power source.

2.5.6 Protection Ground Cable (ZJN.BH4.851.134)

Introduction



CAUTION

Connecting the protection ground cable properly is an important guarantee to lightning protection, shock proof, and anti-interference.

When installing and using the device, ensure that the grounding cable is properly connected; otherwise, personnel injury or equipment damage may be caused.

Appearance

The protection ground cable is composed of wiring terminals and the coaxial cable. The wiring terminal is usually an OT bare-press terminal. The coaxial cable is yellow/green copper burn-resistant cable. Figure 2-19 shows the grounding cable.

Figure 2-19 The grounding cable diagram

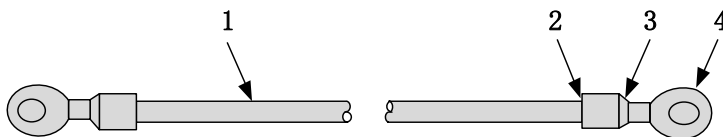


Table 2-11 Grounding cable structure list

Number	Name
1	Wire
2	Strip end (connected to the OT terminal)
3	Insulating sheath
4	OT terminal

Technical Specifications

Table 2-12 lists technical specifications of the grounding cable.

Table 2-12 Technical specifications of the grounding cable

Item	Description
Cable type	Electronic and electrical cable
Cable length	0.4 m
Color	Yellow and green
Connector type	OT/OT
Inner conductor cable standard	Cross-sectional area $\approx 0.75 \text{ mm}^2$
Maximum current	7.5 A

3 Technical Specifications

3.1 Monitoring Interface

Specifications	Instruction
Ethernet monitoring interface	10/100/1000Base-T Ethernet MDI interface
CONSOLE interface	RS232 interface
Protocol	SNMP
Connector	RJ-45

3.2 10/100/1000Base-Tx Interface

Specifications	Instruction
Interface rate	10M/100M/1000M
Interface specifications	Complying with IEEE 802.3, IEEE-802.3u, IEEE 802.1Q, IEEE 802.1p
Working mode	Auto-negotiation or manual 10/100/1000M full-duplex, 10/100 half-duplex
Interface connector	RJ-45

3.3 100/1000Base-SX/LX Interface

Specifications	Instruction
Interface specifications	IEEE 802.3z
Interface rate	100M/1000M
Working mode	Auto-negotiation, 1000M full-duplex, 100M full-duplex
Interface connector	SFP socket (supporting SR/LR/ER/ZR with 850nm, 1310nm, 1550nm)
Optical interface technical parameters	Determined by optical module

3.4 Power Voltage

Specifications	Instruction
Voltage	DC -48V (-36V~-72V) AC ~220V (AC 90V~264V)

3.5 Power Consumption

Specifications	Instruction
Power consumption	<13W

3.6 Operation Environment

Specifications	Instruction
Operation temperature	-15°C~+55°C
Storage temperature	-40°C~+70°C
Relative humidity	10%~90%RH (indoor, no condensation)

3.7 Chassis Size

Specifications	Instruction
Size	W×D×H (mm): 255×160×44

3.8 Device Weight

Specifications	Instruction
Weight	≤2.0kg

Appendix Terms and Abbreviations

This chapter introduces terms and abbreviations involved in this user's manual.

- Terms
- Abbreviations

Terms

A

ACL (Access Control List) ACL is a series of sequential rules composed by permit | deny statements. Based on these rules, the device determines which data packets can be received and which must be denied.

APS (Automatic Protection Switched) Automatic protection switched technology can conduct real-time monitoring towards transmission path and automatic analysis of alarm information, to timely detect the fault and hidden dangers. In the event of a serious fault, it can automatically switch the working channel to the spare channel, so as to recover the communication in time and complete the rapid response to failure and recovery mechanism.

Auto-Negotiation Two interconnected Ethernet interfaces automatically select interface rate and duplex mode according to negotiation result.

D

DHCP (Dynamic Host Configuration Protocol) DHCP is a technology which can assign IP address dynamically in the network. It can automatically assign IP address for all clients in the network to reduce the workload of the administrator, realizing the centralized management of IP address.

E

EFM (Ethernet in the First Mile) EFM that complies with IEEE 802.3ah is a link-level Ethernet OAM technology. It focuses on link between two directly connected devices and provides link connectivity check, link fault monitoring, remote fault notification, and other functions. EFM is mainly applied in Ethernet link of user access network edge.

F

Full-duplex In a communication link, both parties can receive and send data concurrently

H

Half-duplex In a communication link, only one party can send data at a time. One party is receiving information, while the other party is sending information

I

IEEE (Institute of Electrical and Electronics Engineers) IEEE is an international electronic technology and information science and engineer association, which is also one of the world's largest professional technical organizations (number of members).

L

Label Label is the Identification for cable, chassis and alarm.

M

Multi-mode Fiber Multi-mode can be transmitted in one fiber

N

NTP (Network Time Protocol) NTP is a time synchronization protocol defined by RFC1305, which is used for the time synchronization between distributed time server and client. The purpose of using NTP is to conduct fast clock synchronization to all devices which have clocks in the network, so that the device can provide different application based on the unified time. At the same time, NTP can guarantee high accuracy (error is about 10ms).

P

Protection Ground Wire Protection ground wire is used to connect device with the protection ground. Usually, it is a yellow-green coaxial wire.

Q

QoS (Quality of Service) QoS is a network security mechanism used to solve the network delay and congestion problems. It can ensure the timeliness and integrity of important service during network overload or congestion and the highly efficient running of the entire network.

QinQ (Stacked VLAN or Double VLAN) QinQ is extended from 802.1Q, defined by IEEE 802.1ad recommendation. In carrier backbone network (public network), the packets take double VLAN Tag passing through trunk network (public network): public network VLAN Tag and private network VLAN Tag. In public network, the private VLAN Tag is transmitted as data in packets. QinQ supports basic QinQ and flexible QinQ

S

SNMP (Simple Network Management Protocol) SNMP is a protocol which is promoted by IETF (Internet Engineering Task Force) to solve the management in network devices. SNMP can make a NMS remote manage all SNMP supported network devices, including monitoring network status, modifying the network device configuration, and receiving network event alarm etc. It is the most popular network management protocol used in TCP/IP network.

SNTP (Simple Network Time Protocol) SNTP is mainly used in the device time of synchronization network.

V

VLAN (Virtual Local Area Network) is a protocol proposed to solve broadcast and security issues for Ethernet. It divides devices in a LAN into different segment logically rather than physically, thus implementing virtual work groups which are based on Layer 2 isolation and do not affect each other.

Abbreviations**A**

AC Alternating Current
ACL Access Control List
ARP Address Resolution Protocol
APS Automatic Protection Switching

B

BITS Building Integrated Timing Supply System
BPDU Bridge Protocol Data Unit

C

CAR Committed Access Rate
CBS Committed Burst Size
CIR Committed Information Rate
CoS Class of Service

D

DC	Direct Current
DHCP	Dynamic Host Configuration Protocol
DS	Differentiated Services

E

EFM	Ethernet in the First Mile
ERPS	Ethernet Ring Protection Switching
ESD	Electro Static Discharge
EVC	Ethernet Virtual Connection

F

FE	Fast Ethernet
----	---------------

G

GE	Gigabit Ethernet
----	------------------

I

IEC	International Electro technical Commission
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force

ITU-T International Telecommunications Union -
Telecommunication Standardization Sector

L

LACP Link Aggregation Control Protocol

LACPDU Link Aggregation Control Protocol Data Unit

LAN Local Area Network

LLDP Link Layer Discovery Protocol

LLDPDU Link Layer Discovery Protocol Data Unit

M

MAC Medium Access Control

MDI Medium Dependent Interface

MDI-X Medium Dependent Interface cross-over

N

NTP Network Time Protocol

O

OAM Operation, Administration and Management

Q

QoS Quality of Service

R

RH	Relative Humidity
RADIUS	Remote Authentication Dial In User Service

S

SFP	Small Form-factor Pluggable
SLA	Service Level Agreement
SNMP	Simple Network Management Protocol

T

TCP	Transmission Control Protocol
TFTP	Trivial File Transfer Protocol
TLV	Type Length Value
ToS	Type of Service
TPID	Tag Protocol Identifier

V

VLAN	Virtual Local Area Network
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