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Chapter 1 Introduction

1.1 Product Brief

SNR-S2960-24G switch:



Fig 1-1 SNR-S2960-24G switch

1.1.1 Overview

SNR-S2960-24G switches are 100Mb and 1000Mb layer 2 switch. SNR-S2960-24G provides 28 fixed ports (24 10/100Base-T fixed ports and 4 1000Mb COMBO ports). SNR-S2960-24G switches with advanced intelligent and secure features, can serve ideally as distribution layer switches for the access device of campus networks, enterprise networks and IP metropolitan networks.

1.1.2 Features and Benefits

✧ Various Interfaces

SNR-S2960-24G switches provide multiple fixed 10/100Base-t ports and SFP COMBO ports.

✧ Networking Protocols

SNR-S2960-24G switches support 802.1d/w/s, 802.1Q, 802.1p, 802.3ad, 802.3x, GVRP, DHCP and SNTP etc.

✧ ACL

SNR-S2960-24G switches support comprehensively ACL policies. The traffic can be classified by source/destination IP addresses, source/destination MAC addresses, IP protocols, TCP/UDP, IP precedence, time ranges and ToS. And various policies can be conducted to forward the traffic. By implementing ACL policies, users can filter the virus packets such as "Worm.Blaster", "Worm.Sasser" and "Red Code" etc. SNR-S2960-24G switches also support IEEE802.1x port based access authentication, which can be deployed with RADIUS, to ensure the port level security and block illegal users.

✧ QoS

SNR-S2960-24G switches fully support DiffServ Module. Each port provides four priority queue, WRR/SP/SWRR scheduling is also supported. SNR-S2960-24G support the port security. Users can deploy trusted CoS, DSCP, IP precedence, port priority and modify packets' DSCP, COS values.

✧ **3D-SMP Ready**

SNR-S2960-24G are up to the mustard of Self-defending security region management strategy. It is supported interaction with some security system such as firewall, IDS, etc. It can defense the virus and aggress effectively from the extranet and internet. Thus enhance the security and stability of the network-wide.

✧ **Perfect Web Management.**

SNR-S2960-24G support SNMP, In-band and Out-of band Management, CLI and WEB interface and RMON. It can mail the correlative sensitive information to the administrator abide by SMTP protocol. SNR-S2960-24G support SSH protocol; ensure the configuration management security of the switch. It is adopted the centralized web management system 'LinkManager' for unified management expediently and compactly.

1.2 Physical Specifications

- Management Port
1 RJ-45 serial console port
- AC Power Input
100V ~ 240V, 50Hz ~ 60Hz
- Power Consumption
<20W
- Operating Temperature
0°C~50°C
- Storage Temperature
-40°C~ 70°C
- Relative Humidity
5%~95%, no condensate
- Dimension
W×H×D 442.9mm×44mm×230.4mm
- Weight
about 4.5kg

1.3 Description of Hardware

1.3.1 Front Panel

SNR-S2960-24G provides 24 10/100Base-T ports, 4 Combo ports (4 RJ-45 and 4 SFP ports), 1 Console port and 30 LEDs.

The front panel of SNR-S2960-24G is shown as follow:



Fig 1-2 Front Panel of SNR-S2960-24G

1.3.2 Back Panel

SNR-S2960-24G provides a 220V AC power receptacle.



Fig 1-3 Back Panel of SNR-S2960-24G

1.3.3 Status LEDs

SNR-S2960-24G switches include port indicator and system status indicator, as shown in below and described in the following table.

1.3.3.1 Port Indicator Description

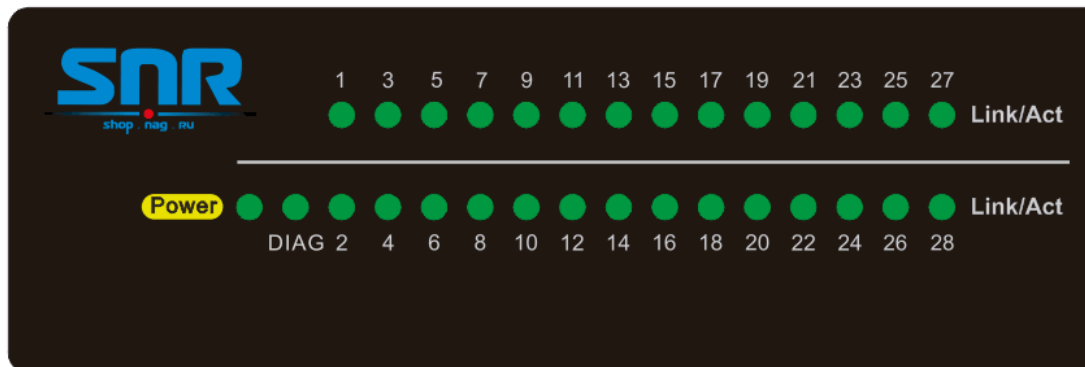


Fig 1-4 SNR-S2960-24G LED diagram

Table 1-1 SNR-S2960-24G port indicator description

Panel Symbol	Status	Description
Port1-24(Link/Act)	On (Green)	The port is linked successfully
	Flash(Green)	The port is linked successfully, and receive/send data
	Off	The port is not link
Port25/26/27/28(Link/Act)	On (Green)	Combo port is linked successfully
	Flash(Green)	Combo port is linked successfully, and receive/send data
	Off	Combo port is not link

1.3.3.2 System Status Indicator Description

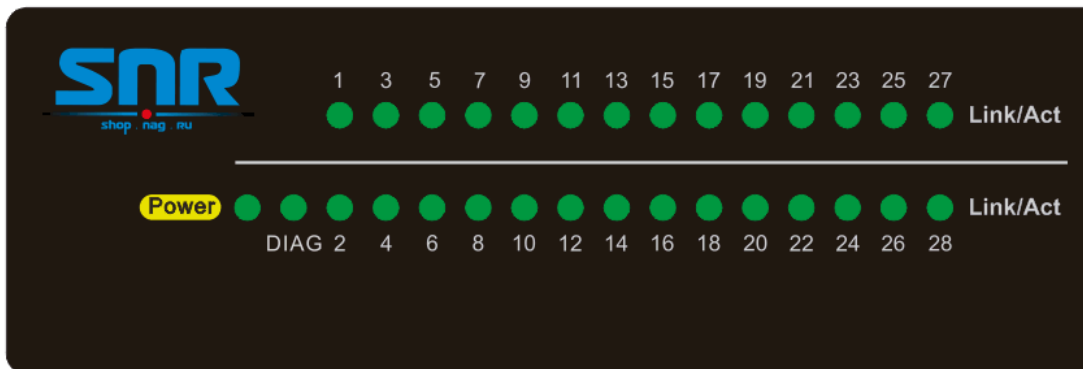


Fig 1-5 SNR-S2960-24G system LED diagram

Table 1-2 system indicator description

LED	Status	Description
Power	On (Green)	The internal power is operating normally
	Off	Power is off or error
DIAG	Flash(Green, 1Hz)	Operating state is normal
	Flash(Green, 8Hz)	System is loading

1.3.4 Front Panel Port Description

Each port description is shown below:

Table 1-3 port description

Interface mode	Spec
RJ-45 port	<ul style="list-style-type: none"> • 10/100Mbps auto negotiation • MDI/MDI-X cable mode auto negotiation • 5 kinds of UTP: 100 m • Combo port supports 10/100/1000Mbps auto negotiation
SFP	<ul style="list-style-type: none"> • SFP-SX-L transceiver 1000Base-SX SFP(850nm, MMF, 550m) • SFP-LX-L transceiver 1000Base-LX SFP(1310nm, SMF, 10km or MMF, 550m) • SFP-LX-20-L transceiver 1310nm lightwave, 9/125um single mode fiber: 20km • SFP-LX-40 transceiver 9/125um single mode fiber: 40km • SFP-LH-70-L transceiver 9/125um single mode fiber: 70km • SFP-LH-120-L transceiver 9/125um single mode fiber: 120km
SFP-GT	<ul style="list-style-type: none"> • SFP-GT 1000Base-T SFP interface card module, RJ-45 interface
SFP-FX	<ul style="list-style-type: none"> • SFP-FX 100Base-FX SFP interface card module (1310nm, MMF, 2KM), LC interface • SFP-FL 100Base-FL SFP interface card module (1310nm, SMF, 15KM), LC interface • SFP-FL-40 100Base-FL SFP interface card module (1310nm, SMF, 40KM), LC interface • SFP-FL-80 100Base-FL SFP interface card module (1550nm, SMF, 80KM), LC interface

Chapter 2 Hardware Installation

2.1 Installation Notice

To ensure the proper operation of SNR-S2960-24G and your physical security, please read carefully the following installation guide.

2.1.1 Environmental Requirements

- The switch must be installed in a clean area. Otherwise, the switch may be damaged by electrostatic adherence.
- Maintain the temperature and the humidity within the set environment.
- The switch must be put in a dry and cool place. Leave sufficient spacing around the switch for good air circulation. The switch should be cushioned on desktop or other switch.
- The switch must work in the right range of power input.
- The switch must be well grounded in order to avoid ESD damage and physical injury of people.
- The switch should avoid the sunlight perpendicular incidence. Keep the switch away from heat sources and strong electromagnetic interference sources.
- The switch must be mounted to a standard 19" rack or placed on a clean level desktop.

2.1.1.1 Dust and Particles

Dust is harmful to the safe operation of SNR-S2960-24G. Dust can lead to electrostatic adherence, especially likely under low relative humidity, causing poor contact of metal connectors or contacts. Electrostatic adherence will result in not only reduced product lifespan, but also increased chance of communication failures. The recommended value for dust content and particle diameter in the site is shown below:

Max Diameter (μm)	0.5	1	3	5
Max Density (particles/ m^3)	1.4×10^5	7×10^5	2.4×10^5	1.3×10^5

Table 2-1 Environmental Requirements: Dust content

In addition, salt, acid and sulfide in the air are also harmful to the switch. Such

harmful gases will aggravate metal corrosion and the aging of some parts. The site should avoid harmful gases, such as SO₂, H₂S, NO₂, NH₃ and Cl₂, etc. The table below details the threshold value.

Gas	Average (mg/m ³)	Max (mg/m ³)
SO ₂	0.2	1.5
H ₂ S	0.006	0.03
NO ₂	0.04	0.15
NH ₃	0.05	0.15
Cl ₂	0.01	0.3

Table 2-2 Environmental Requirements: Particles

2.1.1.2 Temperature and Humidity

The switch installation site should maintain a desirable temperature and humidity. High-humidity conditions can cause electrical resistance degradation or even electric leakage, degradation of mechanical properties and corrosion of internal components. Extreme low relative humidity may cause the insulation spacer to contract, making the fastening screw insecure. Furthermore, in dry environments, static electricity is liable to be produced and cause harm to internal circuits. Temperature extremes can cause reduced reliability and premature aging of insulation materials, thus reducing the switch's working lifespan. In the hot summer, it is recommended to use air-conditioners to cool down the site. And the cold winter, it is recommended to use heaters. The recommended temperature and humidity are shown below:

Temperature:		Relative humidity	
Long term condition	Short term condition	Long term condition	Short term condition
15~30℃	0~50℃	40~65%	5% ~95%

Table 2-3 Environmental Requirements: Temperature and Humidity

Caution!

A sample of ambient temperature and humidity should be taken at 1.5m above the floor and 0.4m in front of the switch rack, with no protective panel covering the front and rear of the rack. Short term working conditions refer to a maximum of 48 hours of continued operation and an annual cumulative total of less than 15 days. Formidable operation conditions refers to the ambient temperature and relative humidity value that may occur during an air-conditioning system failure, and normal operation conditions should be recovered within 5 hours.

2.1.1.3 Power Supply

It is adopted module switch power for the switch, the input parameters of power are shown below:

The AC input voltage: 100~240VAC

The frequency: 50Hz ~ 60Hz

Before powering on the power supply, please check the input power to ensure proper grounding of the power supply system. The input power for the switch should be reliable and secure; a voltage adaptor can be used if necessary. The building's circuit protection system should include in the circuit a fuse or circuit-breaker of no greater than 240 V, 10 A. It is recommended to use a UPS for more reliable power supplying. .

Caution!

Improper power supply system grounding, extreme fluctuation of the input source, and transients (or spikes) can result in larger error rate, or even hardware damage!

2.1.1.4 Preventing Electrostatic Discharge Damage

Static electric can cause damage to internal circuits, even the entire switch. Follow these guidelines for avoiding ESD damage:

- Ensure proper earth grounding of the device;
- Perform regular cleaning to reduce dust;
- Maintain proper temperature and humidity;
- Always wear an ESD wrist strap and antistatic uniform when in contact with circuit boards.

2.1.1.5 Anti-interference

All sources of interference, whether from the device/system itself or the outside environment, will affect operations in various ways, such as capacitive coupling, inductive coupling, electromagnetic radiation, common impedance (including the grounding system) and cables/lines (power cables, signal lines, and output lines). The following should be noted:

- Precautions should be taken to prevent power source interruptions;
- Provide the system with a dedicated grounding, rather than sharing the grounding with the electronic equipment or lightning protection devices.
- Keep away from high power radio transmitters, radar transmitters, and high frequency strong circuit devices.
- Provide electromagnetic shielding if necessary.

2.1.1.6 Rack Configuration

The dimension of the switch is designed to be mounted on a standard 19" rack. Please ensure good ventilation for the rack.

- Every device in the rack will generate heat during operation, therefore vent and fans must be provided for an enclosed rack, and devices should not be stacked closely.
- When mounting devices in an open rack, care should be taken to prevent the rack frame from obstructing the switch ventilation openings. Be sure to check the positioning of the switch after installation to avoid the aforementioned.

Caution!

If a standard 19" rack is not available, the switch can be placed on a clean level desktop, leave a clearance of 100mm around the switch for ventilation, and do not place anything on top of the switch.

2.1.2 Installation Notice

- Read through the installation instruction carefully before operating on the system. Make sure the installation materials and tools are prepared. And make sure the installation site is well prepared.
- During the installation, users must use the brackets and screws provided in the accessory kit. Users should use the proper tools to perform the installation. Users should always wear antistatic uniform and ESD wrist straps. Users should use standard cables and connectors.
- After the installation, users should clean the site. Before powering on the switch, users should ensure the switch is well grounded. Users should maintain the switch regularly to extend the lifespan of the switch.

2.1.3 Security Warnings

- When using SFP transceiver, do not stare directly at the fiber bore when the switch is in operation. Otherwise the laser may hurt your eyes.
- Do not attempt to conduct the operations which can damage the switch or which can cause physical injury.
- Do not install, move or disclose the switch and its modules when the switch is in operation.
- Do not open the switch shell.
- Do not drop metals into the switch. It can cause short-circuit.

- Do not touch the power plug and power socket.
- Do not place the tinder near the switch.
- Do not configure the switch alone in a dangerous situation.
- Use standard power sockets which have overload and leakage protection.
- Inspect and maintain the site and the switch regularly.
- Have the emergence power switch on the site. In case of emergence, switch off the power immediately.

Caution!

Potential risk include: Electric leakage, Power supply arcing, Power line breakage, Imperfect earth, Overload circuit and Electrical short circuit..If electric shock, fire, electrical short circuit occurs, please cut off the electricity supply and alarm rapidly. Rescue the injured person in the contingency under inherently safe, give the injured person proper first aid treatment according to the injury state, and seek help from the Medical Emergency using various ways.

2.2 Installation Preparation

2.2.1 Verify the Package Contents

First, open the package, please check the contents of the switch container and accessory kit. (If you are concerned that any item is missing or an incorrect item has been supplied, please contact your dealer as soon as possible.)

2.2.2 Required Tools and Materials

The required tools and utilities are shown below:

- Cross screwdrivers
- Flat-blade screwdriver
- ESD wrist strap
- Antistatic uniform

Caution!

Users should prepare the required tools by themselves.

2.3 Installation Guide

2.3.1 Installing the Switch

Please mount the switch as below:

1. Attach the 2 brackets on the switch with screws provided in the accessory kit.

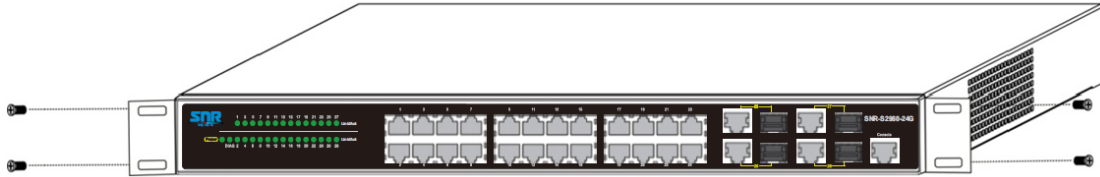


Fig 2-1 Fasten the Brackets to the Switch

2. Put the bracket-mounted switch smoothly into a standard 19" rack. Fasten the switch to the rack with the screws provided. Leave enough space around the switch for good air circulation.

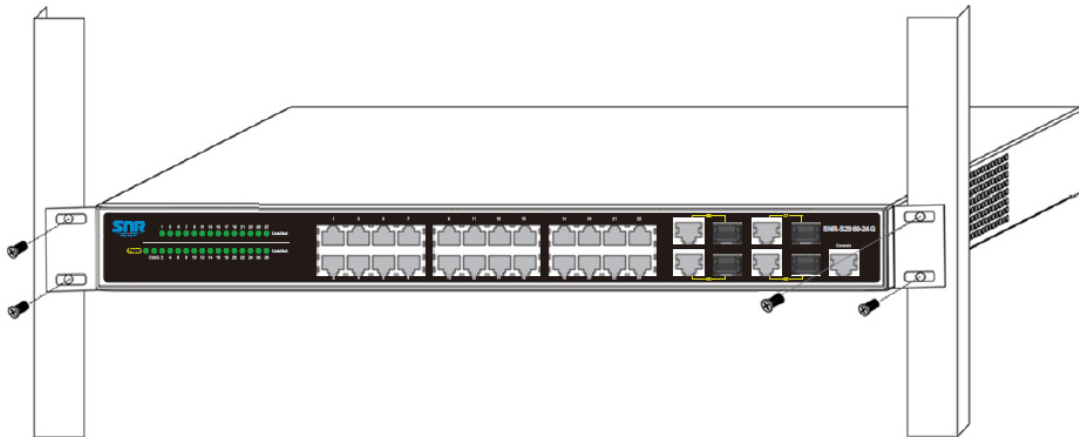


Fig 2-2 Fasten the Switch to the Rack

Caution!

The brackets are used to fix the switch on the rack. They can't serve as a bearing. Please place a rack shelf under the switch. Do not place anything on top of the switch. Do not block the blowholes on the switch to ensure the proper operation of the switch.

2.3.2 Switch grounding

A good grounding system is the groundwork for the smooth and safe operation of the

SNR-S2960-24G, and an excellent way to prevent lightning strikes and resistance interference. Please follow the switch grounding specification instructions, verify the installation site's grounding condition and ensure proper grounding accordingly.

- **Proper grounding**


When using an AC power source, the device must be grounded with the green and yellow ground cables; otherwise, shock hazards may occur when insulation resistance between the internal power supply and the chassis degrades.

- **Lightning protection grounding**

The lightning protection system is an independent system consisting of a lightning rod, conductor and connection joint with the grounding system. The grounding system usually is shared with the power reference grounding and green and yellow ground cable grounding. Lightning protection grounding is a building requirement, not a specific requirement of the switch.

- **Electromagnetic compliance grounding**

This refers to the grounding to comply with switch electromagnetic compatibility requirements, including shielded grounding, filter grounds, noise, and interference control and level reference. The overall grounding requirements are the sum total of the above. Ground resistance value should be less than 1 ohm.

The SNR-S2960-24G provides chassis grounding post in the lower rear chassis, marked as “”. Chassis protection grounding should be properly connected to the rack grounding connector.

The ground cabling procedures are listed below:

Step 1: remove the nuts from the rear chassis grounding posts

Step 2: wrap one end of the green and yellow grounding cable to the grounding posts

Step 3: attach the grounding post nut and tighten well

Step 4: attach the other end of the grounding cable to the rack grounding connector

Note:

- The grounding cable should be made of a good conductor, and the diameter should be determined by the possible maximum current that may pass through.
- Bare conductor cabling is forbidden.

Ground resistance value: the combined grounding resistance should be less than 1 ohm.

2.3.3 Connecting Console

SNR-S2960-24G provide a RJ45 serial console port.

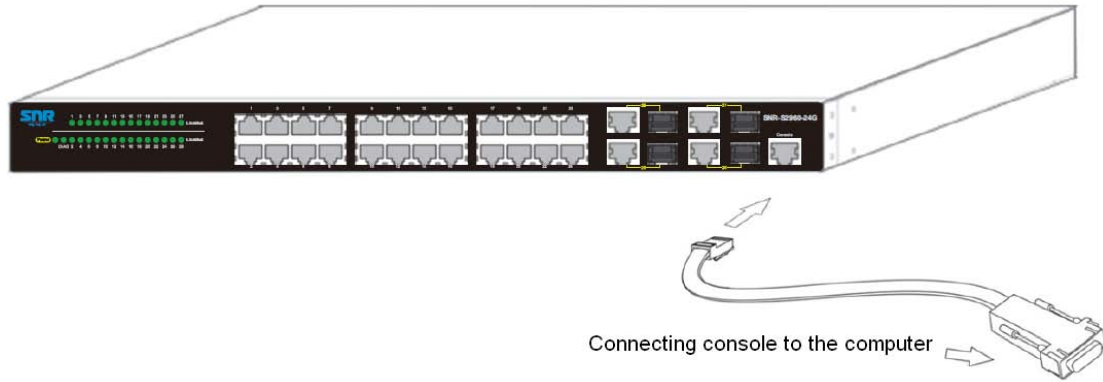


Fig 2-3 Connecting Console to switch

The connection procedure is listed below:

1. Find the console cable provided in the accessory kit. Attach the RJ45 end to console port of the switch.
2. Connect the other side of the console cable to a character terminal (PC).
3. Power on the switch and the character terminal. Configure the switch through the character terminal.

2.3.4 SFP Transceiver Installation

SNR-S2960-24G provide multiple 1000Mb SFP transceiver slots.

The procedure for installing the SFP transceiver is shown below:

Step 1: Put on a ESD wrist strap (or antistatic gloves)

Step 2: Insert the SFP transceiver to the guide rail inside the fiber interface line card.

Do not put the SFP transceiver up-side-down.

Step 3: Push the SFP transceiver along the guide rail gently until you feel the transceiver snap into place at the bottom of the line card.

Note: The SFP transceiver is hot swappable.

Caution!

Do not stare directly at the 2 fiber bore in the SFP transceiver when the switch is in operation, otherwise the laser may hurt your eyes.

2.3.5 Copper Cable/Fiber Cable Connection

Copper cables should be connected as below:

Step 1: Insert one end of the Ethernet cable to the RJ-45 Ethernet port in the switch copper cable line card;

Step 2: Insert the other end of the Ethernet cable to the RJ-45 Ethernet port of other device;

Step 3: Check all status indicators for the corresponding ports; a lighted LED indicates that the link has been established, otherwise the link is not ready and the cable should be examined.

Caution!

Please verify the sign above the port to ensure using the right port. Connecting to wrong ports might damage the switch.

Fiber cables should be connected as below:

Step 1: Remove the protective plug from the SFP/XFP fiber transceiver bore; Remove the protective cap from one end of the fiber cable. Keep the fiber end clean and neat.

Step 2: Attach one end of the fiber cable to the SFP/XFP transceiver, and attach the other end to the transceiver of the corresponding devices. Note: The SFP/XFP transceiver's TX port should be connected to the RX port of the corresponding device, and vice versa.

Step 3: Check the fiber port status indicator, a lighted LED indicates that the link has been established; otherwise the link is not ready and should be examined.

Caution!

Please verify the sign above the port to ensure using the other ports. Connecting to wrong ports might damage the transceiver or the other ports. When connecting other devices through a fiber cable to the switch, the output power of the fiber cable must not exceed the maximum received power of the corresponding modules. Otherwise, it will damage the fiber transceiver. Do not stare at the fiber bore when the switch is in operation. That may hurt your eyes.

2.3.6 AC Power Supply Connection

SNR-S2960-24G use the power is 220VAC. Please read the power input specification for the detailed information.

AC Power supply connection procedure is described as below:

1. Insert one end of the power cable provided in the accessory kit into the power source socket (with overload and leakage protection), and the other end to the power socket in the back panel of the switch.
2. Check the power status indicator in the front panel of the switch. The corresponding power indicator should light. Switch is self-adjustable for the input voltage. As soon as the

input voltage is in the range printed on the switch surface, the switch can operate correctly.

3. When the switch is powered on, it executes self-test procedure and startups.

Caution!

The input voltage must be within the required range, otherwise the switch can be damaged or malfunction. Do not open the switch shell without permission. It can cause physical injury.

2.3.7 DC Power Supply Connection

Please read the specification for the detailed information. DC Power supply connection procedure is described as below:

1. Insert one end of the power cable to the power source socket (with overload and leakage protection), and the other end to the DC power socket in the back panel of the switch.
2. Check the power status indicator in the front panel of the switch.
3. When the switch is powered on, it executes self-test procedure and startups.

Caution!

The input voltage must be within the required range, otherwise the switch can be damaged or malfunction. And pay attention to the power polarity. Do not open the switch shell without permission. It can cause physical injury.