



**DIGISOL**



# **DG-CS4616F GIGA LAYER 3 SWITCH**

## **Installation Guide**

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As our products undergo continuous development the specifications are subject to change without prior notice

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# Chapter 1 Introduction

## 1.1 Product Brief

DG-CS4616F switch



Fig 1- 1 DG-CS4616F switch

### 1.1.1 Introduction

DG-CS4616F switch is uplink layer 3 10Gb switch. DG-CS4616F has 16 SFP+ port. DG-CS4616F switch can serve ideally as distribution layer switches for the 10Gb input device of campus networks, enterprise networks and IP metropolitan networks. DG-CS4616F is also used in the Internet bar as the full 10Gb convergence device.

## 1.2 Physical Specifications

- Management Port
  - 1 RJ-45 serial console port
  - 1 RJ-45 management Ethernet interface
  - 1 USB interface which supports USB2.0
- AC/DC Power Input
  - AC: 90 ~ 264VAC, 47 ~ 63Hz
  - DC: -48VDC, 2.5A
- Power Consumption
  - 12W to 24W
- Operating Temperature
  - 5°C ~ 45°C
- Storage Temperature
  - 40°C ~ 70°C
- Relative Humidity
  - 5% ~ 95%, no condensate
- Dimension
  - 440mm×44mm×240mm (W \* H \* D)

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- Weight  
About 3.14kg
- Mean time between failure  
Minimal MTBF: 50,000 hours

## 1.3 Description of Hardware

### 1.3.1 Front Panel

DG-CS4616F has 16 10Gb SFP+ ports, 1 Console port, 1 management Ethernet interface, 1 system reset button, 1 USB interface and 19 LEDs.

The front panel of DG-CS4616F is shown below:



Fig 1-2 Front Panel of DG-CS4616F

### 1.3.2 Back Panel

The back panel of DG-CS4616F is shown below, there is a fan, 1 220V AC power socket, 1 -48V DC power socket and 1 ground screw hole.



Fig 1-3 Back Panel of DG-CS4616F

### 1.3.3 Status LEDs

DG-CS4616F switches include port indications, system status indication and fan indication. Their status meanings are shown below.

#### 1.3.3.1 Port indication Description



Fig 1-4 DG-CS4616F LED diagram

Table 1-1 DG-CS4616F port indications description

Panel Symbol	Status	Description
Port 1-16(Link/Act)	On (Green)	ports are in successful link state
	Flash(Green)	ports are in successful link state and receive/send data
	Off	ports are not in link

### 1.3.3.2 System Status Indication Description



Fig 1-5 DG-CS4616F diagram

Table 1-2 system indication description

Panel Symbol	Status	Description
PWR	On (Green)	The internal power is operating normally
	Off	Power is off or error
SYS	On (Green)	System is abnormal
	Flash (Green)	System is in normal
	Off	Power is off or system is abnormal
FAN	On (Red)	Fan is abnormal
	Off	Fan is normal

### 1.3.4 Front Panel Port Description

Each port description is shown below:

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Table 1-3 DG-CS4616F switch port description

Interface mode	Spec
RJ-45 port	<ul style="list-style-type: none"> <li>• 10/100/1000Mbps auto negotiation</li> <li>• MDI/MDI-X cable mode auto negotiation</li> <li>• 5 kinds of UTP: 100 m</li> </ul>
SFP	<ul style="list-style-type: none"> <li>• SFP-SX-L transceiver 1000Base-SX SFP (850nm, MMF, 550m)</li> <li>• SFP-LX-L transceiver 1000Base-LX SFP interface card module (1310nm, SMF, 10km or MMF, 550m)</li> <li>• SFP-LX-20-L transceiver 1310nm light waves, 9/125um single mode fiber: 20km</li> <li>• SFP-LX-40 transceiver 9/125um single mode fiber: 40km</li> <li>• SFP-LH-70-L transceiver 9/125um single mode fiber: 70km</li> <li>• SFP-LH-120-L transceiver 9/125um single mode fiber: 120km</li> </ul>
SFP+	<ul style="list-style-type: none"> <li>• SFPX-SR: 62.5/125um multimode fiber: 32m 50.0/125um,500MHz/km multimode fiber: 85m 50.0/125um,2000MHz/km multimode fiber: 300m</li> <li>• SFPX-LR: 9/125um single mode fiber: 10km</li> <li>• SFPX-ER: 9/125um single mode fiber: 40km</li> </ul>
DAC-SFPX	<ul style="list-style-type: none"> <li>• DAC-SFPX-3M</li> <li>• DAC-SFPX-5M</li> </ul>
AOC-SFPX	<ul style="list-style-type: none"> <li>• AOC-SFPX-5M</li> <li>• AOC-SFPX-10M</li> </ul>

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# Chapter 2 Hardware Installation

## 2.1 Installation Notice

To ensure the proper operation of DG-CS4616F 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 within 0 to 50 °C and the humidity within 5% to 95%, non-condensing.
- The switch must be put in a dry and cool place. Leave sufficient spacing around the switch for good air circulation.
- The switch must work in the right range of power input (AC power: 100~240VAC, 1.0A (50/60 Hz), DC power: -48~-60VDC, 2.5A)
- 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 DG-CS4616F. 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 <sup>3</sup> )	1.4×10 <sup>7</sup>	7×10 <sup>5</sup>	2.4×10 <sup>5</sup>	1.3×10 <sup>5</sup>

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**Table 2- 1 Environmental Requirements: Dust**

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 SO<sub>2</sub>, H<sub>2</sub>S, NO<sub>2</sub>, NH<sub>3</sub> and Cl<sub>2</sub>, etc. The table below details the threshold value.

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

**Table 2- 2 Environmental Requirements: Particles**

### 2.1.1.2 Temperature and Humidity

The switch install 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 is shown below:

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

**Table 2- 3 Environmental Requirements: Temperature and Humidity**

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**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 parameter of power is shown below:

The AC input voltage: 100~240V; 1.0A

The frequency: 50/60Hz

The DC input voltage: -48V~-60V; 2.5A

Before powering on the power supply, please check the power input to ensure proper grounding of the power supply system. The input source 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 discharges 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

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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 dimensions of the DG-CS4616F are designed to be mounted on a standard 19" rack. The size is 442.9mm×44mm×230.2mm (W \* H \* D). 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 DG-CS4616F 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,

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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/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.
- Class A ITE is a category of all other ITE which satisfies the class A ITE limits but not the class B ITE limits. The following warning shall be included in the instructions for use:

**Warning**

This is class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

#### 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

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## 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 Utilities

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 and utilities by themselves.

## 2.3 Installation Guide

### 2.3.1 Installing the Switch

Please mount DG-CS4616F switch as below:

1. Attach the 2 brackets on the DG-CS4616F with screws provided in the accessory kit.



Fig 2-1 Fasten the Brackets to the Switch

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2. Put the bracket-mounted switch smoothly into a standard 19" rack. Fasten the DG-CS4616F 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 Connecting Console

DG-CS4616F provide a serial RJ45 console port.



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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.

### 2.3.3 SFP/SFP+ Transceiver Installation

DG-CS4616F has multiple 10Gb interfaces and provides multiple 1000Mb SFP or 10Gb SFP+ transceiver slots.

The procedure for installing the SFP/SFP+ transceiver is shown below:

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

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

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

Step 3: Push the SFP/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/SFP+ transceiver is hot swappable.

Caution!

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

### 2.3.4 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 some 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

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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/SFP+ 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/SFP+ transceiver, and attach the other end to the transceiver of the other devices. Note: SFP/SFP+ transceiver's TX port should be connected to RX port of other device, and SFP/SFP+ transceiver's RX port should be connected to TX port of other device.

Step 3: Check the fiber port status indicator, a light 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.

## 2.3.5 Power Supply Connection

DG-CS4616F uses 220V AC power. Please read the power input specification for the detailed information.

Power supply connection procedure is described as below:

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Fig 2- 4 Attaching power cable to DG-CS4616F

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. DG-CS4616F 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.

## 2.3.6 Ground Cable Connection

Grounding: The chassis of the equipment must be grounded properly so that the lightning can flow to the ground, which improves the capability of the chassis for resisting the electromagnetic interference.

1. Ensure that the grounding cable is connected correctly so that the equipment is protected against lightning and interference. The correct connection of the grounding cable is an important measure to ensure the human safety.
2. Connect the chassis to the ground by using a grounding cable. The grounding resistance must be smaller than 0.10 ohms and the gauge of the grounding cable must be greater than 10 AWG and the length is 50 cm.

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### 3. Installation steps:

Step 1: Ensure the power switch is set to the off position.

Step 2: Use the screwdriver to turn the screws on the earth ground screw point.

Step 3: Strip one end of the ground wire to the ground hole of system.

Step 4: Connect the other end of the ground wire to a suitable grounding point of building at your side.

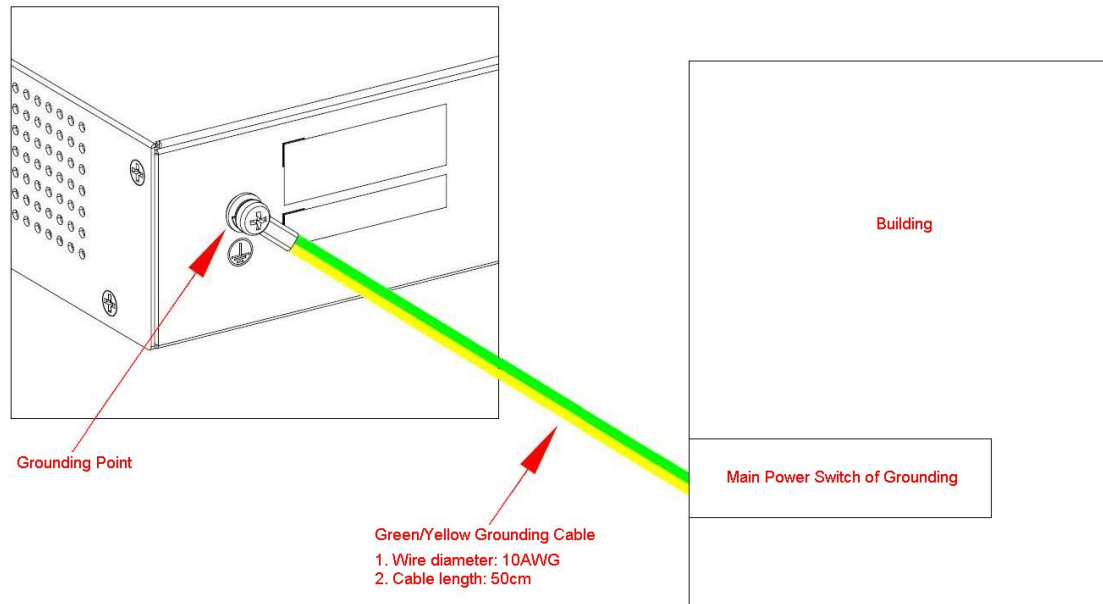


Figure 2-5 the grounding points

This product comes with lifetime warranty.  
For further details about warranty policy and  
product registration, please visit support  
section of [www.digisol.com](http://www.digisol.com)



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