TSN-G5000 Series
Quick Installation Guide

Moxa Industrial Managed Ethernet Switch

Version 1.2, October 2023

Technical Support Contact Information
www.moxa.com/support

Package Checklist

The TSN-G5000 Series is shipped with the following items. If any of these items are missing or damaged, please contact your customer service representative for assistance.

- 1 TSN-G5000 Series industrial Ethernet switch
- 1 RJ45 to RS-232 9-pin female console cable
- 1 Quick installation guide (printed)
- 1 Warranty card
- 2 Terminal blocks

Default Settings

- Default IP address: 192.168.127.253
- Default Subnet Mask: 255.255.255.0
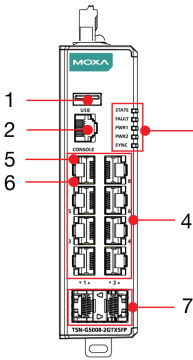- Default User Name: admin
- Default Password: moxa

TSN-G5000 Series Panel Layout

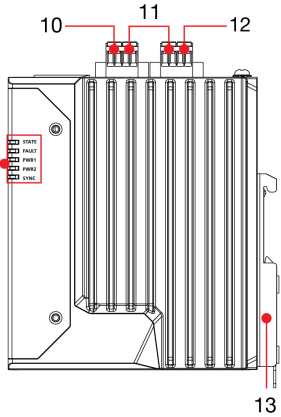### TSN-G5004

Front View

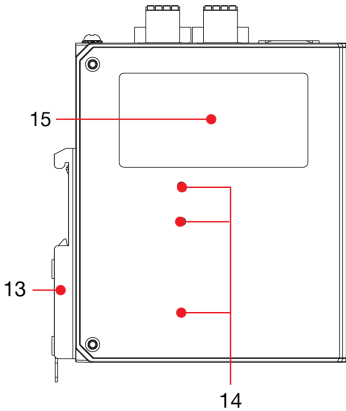Right Side View

Left Side View
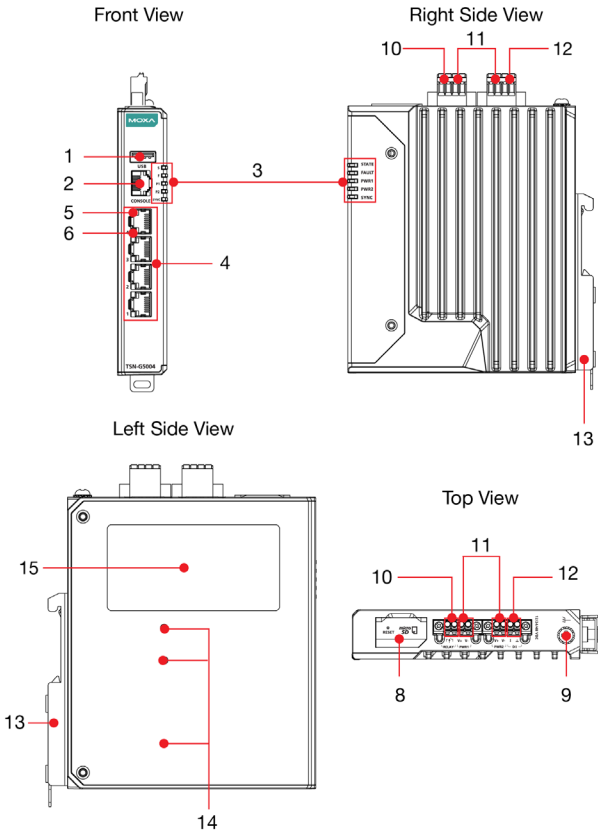
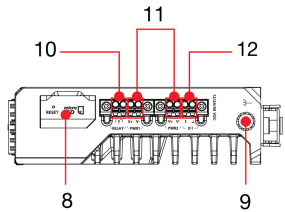Top View

TSN-G5008-2GTXSFP

Front View

Right Side View

Left Side View

Top View

1. USB storage port (type A)
2. Console port (RJ45, RS-232)
3. LED indicators x 5 (STATE, FAULT, PWR1, PWR2, SYNC)
4. Ethernet ports x 4 (8 for TSN-G5008), (RJ45, 10/100/1000BaseT(X))
5. LED indicator for 1000BaseT(X)
6. LED indicator for 10/100BaseT(X)
7. Ethernet ports x 2 (SFP, 100/1000BaseSFP)
8. Rubber cover for reset button and microSD card slot (currently disabled)
9. Grounding screw (chassis ground)
10. Relay output (terminal block)
11. Power inputs x 2 (terminal block)
12. Digital input (terminal block)
13. DIN-rail mounting kit
14. Screw holes reserved for DIN-rail kit side mounting
15. Model side label (multiple product information included)

Dimensions

TSN-G5004
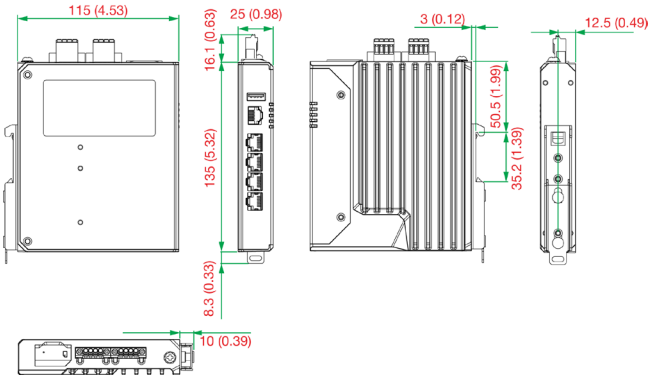
TSN-G5008-2GTXSFP
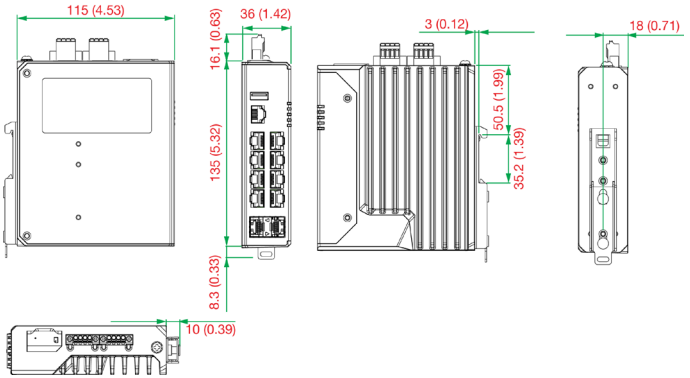
Unit: mm (inch)

DIN-Rail Mounting

There are two options for DIN-rail mounting that can be used for the TSN-G5000 Series. Option 1 is the default type when shipped.

Option 1 (default):

When shipped, the metal DIN-rail mounting kit is fixed to the back panel of the TSN-G5000 Series. Mount the TSN-G5000 Series on the corrosion-free mounting rail that adheres to the EN 60715 standard.

Suggested Installation Method

Step 1—Insert the upper lip of the DIN-rail kit into the mounting rail.

Step 2—Press the TSN-G5000 Series towards the mounting rail until it snaps into place.
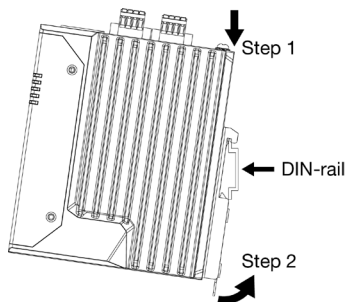
Suggested Removal Method

Step 1—Pull down the latch on the DIN-rail kit with a screwdriver.

Steps 2 & 3—Slightly pull the TSN-G5000 Series forward and lift up to remove it from the mounting rail.

Option 2 (when side cabling is needed):

The metal DIN-rail mounting kit can be fixed to the side panel of the TSN-G5000 Series. Mount the TSN-G5000 Series on the corrosion-free mounting rail that adheres to the EN 60715 standard.

Default Installation **Side Installation**

Suggested Installation Method

Step 1—Detach the metal DIN-rail mounting kit from the back panel and attach it to the side panel, vertically as indicated in the figure below.
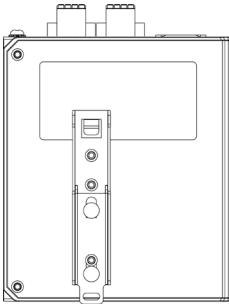
Step 2—Insert the upper lip of the DIN-rail kit into the mounting rail.
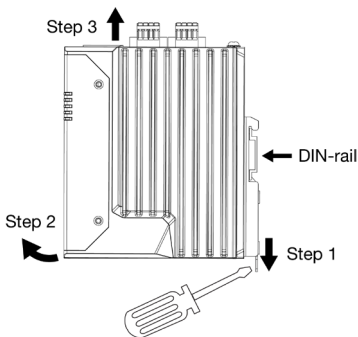
Step 3—Press the TSN-G5000 Series towards the mounting rail until it snaps into place.
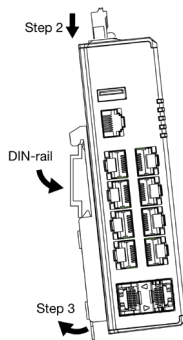
Suggested Removal Method

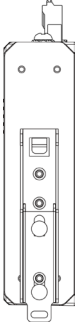**Step 1**—Pull down the latch on the DIN-rail kit with a screwdriver.

Steps 2 & 3—Slightly pull the TSN-G5000 Series forward and lift up to remove it from the mounting rail.
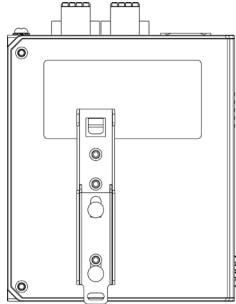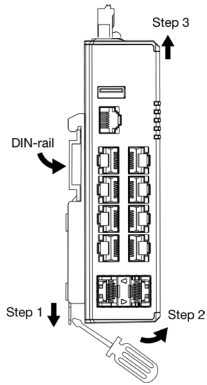

NOTE Screws that are used to fix the DIN-rail kit on the TSN-G5000 Series should be securely fastened before mounting on the mounting rail. Please make sure that if you remove the DIN-rail kit, it must be securely fastened when it is reattached.

Wall-mounting

For some applications, you will find it convenient to mount your TSN-G5000 Series on the wall, as illustrated below.

Step 1—Remove the aluminum DIN-rail attachment plate from the TSN-G5000 Series rear panel, and then attach the wall mount plates, as shown in the diagram below.
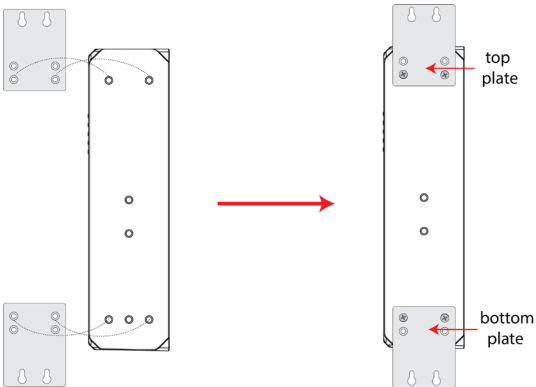
Step 2—Mounting the TSN-G5000 Series on the wall requires four screws. Use the switch, with wall mount plates attached, as a guide to mark the correct locations of the four screws. The heads of the screws should be less than 6 mm in diameter, and the shafts should be less than 3.5 mm in diameter, as shown in the figure at the right.
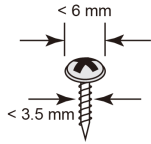
NOTE Before tightening the screws into the wall, make sure the screw head and shank size are suitable by inserting the screw into one of the keyhole-shaped apertures of the wall mounting plates.

Do not screw the screws in all the way—leave about 2 mm to allow room for sliding the wall mount panel between the wall and the screws.

Step 3—Once the screws are fixed in the wall, insert the four screw heads through the large parts of the keyhole-shaped apertures, and then slide the TSN-G5000 Series downwards, as indicated on the right. Tighten the four screws for added stability.
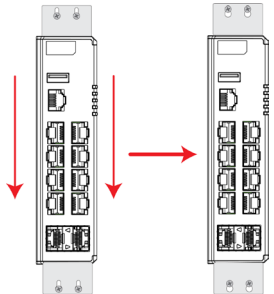
⚠ **ATTENTION**

Safety First!
External metal parts are hot. Take necessary precautions if it is necessary to touch.

⚠ **ATTENTION**

In order to ensure reliable operations, please make sure the operating temperature of the environment does not exceed the specifications. When mounting a TSN-G5000 Series with other operating units in a cabinet without forced ventilation, a minimum of 5 cm space on both the left and right of the switch is recommended.

Wiring Requirements

> ⚠️ **ATTENTION**
>
> **Safety First!**
>
> Be sure to disconnect the power cord before installing and/or wiring your Moxa TSN-G5000 Series. Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size. If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

Be sure to read and follow these important guidelines:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.

> **NOTE** Do not run signal or communications wiring and power wiring through the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.

- You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- You should separate input wiring from output wiring.
- We advise that you label the wiring to all devices in the system.

Grounding the TSN-G5000 Series

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screw (chassis ground) to the grounding surface prior to connecting devices. The grounding screw is located on the top panel of the TSN-G5000 Series.

Grounding Screw
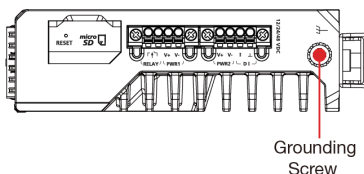
> ⚠️ **ATTENTION**
>
> This product is intended to be mounted onto a well-grounded mounting surface, such as a metal panel.

Suggested Wire Type for Wiring Relay Contact (R), Digital Input (DI) and Power Inputs (P1/P2)

The switch includes two 4-pins, 3.5 mm pin-pitch terminal blocks. The following includes suggestions for wiring the relay contact (R), digital input (DI) and power inputs (P1/P2) for the TSN-G5000 Series.

⚠️ **ATTENTION**

We suggest using a copper conductor with the cable type - AWG (American Wire Gauge) 18-24 and the corresponding pin type cable terminals. In addition, the wire must be able to withstand at least 105°C.

NOTE We suggest the length of the pin type cable terminal is 8 mm.

In order to tighten the wire properly, please perform the following three steps: Step 1. Use a small flathead screwdriver to press the push-in button beside each terminal of the terminal block connector. Step 2. Insert the wire. Step 3. Release the screwdriver after the wire has been fully inserted. Please refer to the diagram below.
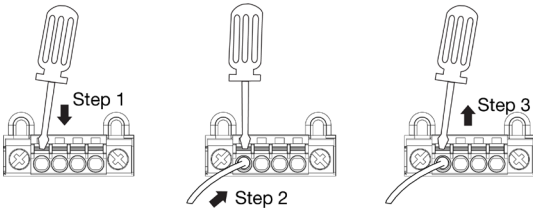
Wiring the Relay Contact

The TSN-G5000 Series has one relay output for identifying when a specific event has occurred (i.e., fault; see below). This relay output uses the first contact out of the first 2-pin terminal on the TSN-G5000 Series' top panel.

Refer to the instructions and diagram below on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor.

Step 1—Insert two wires into the relay position (see the diagram below showing the top view) on the terminal to form an open circuit.

Step 2—To keep the relay wires from coming loose, use a small flathead screwdriver to press the button beside each terminal of the plastic terminal block connector in order to insert the wire tightly. Release the screwdriver after the wire has been inserted properly.

Step 3—Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on the TSN-G5000 Series' top panel. Finally, tighten the screws either side of the terminal block and ensure that the terminal block is fixed tightly on to the device.
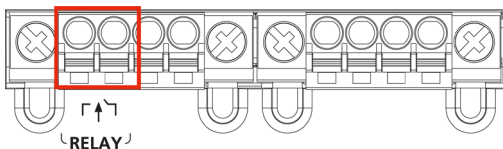
NOTE The relay output of the TSN-G5000 Series reflects a potential-free, normally opened electromagnetic relays. When there is no power supply to the switch, or user-configured events are triggered, the relays will open. To indicate a fault has occurred one can integrate the relay contact on the TSN-G5000 Series with an external alarming system circuit so that the status of user-configured events or no power supply can be monitored. An example is given in the diagram below where the buzzer will sound when user-configured events happen.
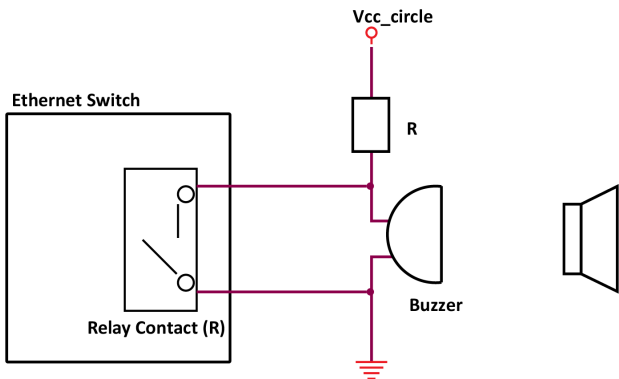
Wiring the Digital Input

The TSN-G5000 Series has one set of digital inputs (DI). The DI consists of two contacts of the second 4-pin terminal block on the TSN-G5000 Series' top panel, and the other 2 contacts are used for the power input 2 (PWR 2/P2).

Refer to the instructions and diagram (top view) below on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor.
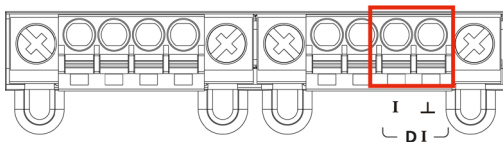
Step 1—Insert the negative (ground)/positive DI wires into the respective ⏚/I terminals.

Step 2—To prevent the DI wires from coming loose, use a small flathead screwdriver to press the button beside each terminal of the plastic terminal block connector in order to insert the wire tightly. Release the screwdriver after the wire has been properly inserted.

Step 3—Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on the top panel of the TSN-G5000 Series. Finally, tighten the screws either side of the terminal block and ensure that the terminal block is fixed tightly on to the device.

Wiring the Redundant Power Inputs (12-48 VDC)

NOTE The devices are designed for operation with a Safety Extra-Low Voltage. Thus, they may only be connected to the supply voltage connections and to the signal contact with the Safety Extra-Low Voltages (SELV).

The TSN-G5000 Series has two sets of power inputs–power input 1 (PWR 1/P1) and power input 2 (PWR 2/P2). The top view of the terminal block connector and the positions of the power inputs are shown below.

Take the following steps to wire the redundant power inputs:

Step 1—Insert the Positive/Negative DC wires into the V+/V- terminals for PWR 1 and PWR 2.
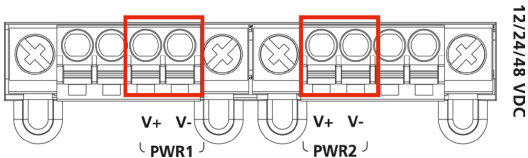
Step 2—To prevent the DC wires from coming loose, use a small flathead screwdriver to press the button beside each terminal of the plastic terminal block connector in order to insert the wire tightly. Release the screwdriver after the wire has been properly inserted.

Step 3—Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on the top panel of the TSN-G5000 Series. Finally, tighten the screws either side of the terminal block and ensure that the terminal block is fixed tightly on to the device.

⚠ ATTENTION

Before connecting the TSN-G5000 Series to the DC power inputs, ensure the DC power supply voltage is stable and of a correct level and polarity.

Communication Connections

Each TSN-G5000 Series Ethernet switch has various types of communication ports:

- 1 RJ45 console port (RS-232 interface)
- 1 USB storage port (type A connector)
- 4 10/100/1000BaseT(X) Ethernet ports (TSN-G5004 Series)
- 8 10/100/1000BaseT(X) Ethernet ports (TSN-G5008-2GTXSFP Series)
- 2 100/1000BaseSFP slots (TSN-G5008-2GTXSFP Series)
- 1 microSD card slot (currently disabled)

Console Port Connection

The TSN-G5000 Series has one RJ45 console port (RS-232 interface), located on the front panel. Use either an RJ45-to-DB9 (see the cable following wiring diagrams) to connect the TSN-G5000's console port to your PC's COM port. You may then use a console terminal program, such as Moxa PComm Terminal Emulator, to access the TSN-G5000 that has a baud rate of 115200.

RJ45 Console Port Pinouts

Pin	Description
1	DSR
2	RTS
3	–
4	TxD
5	RxD
6	GND
7	CTS
8	DTR
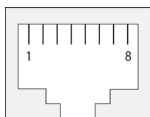
USB Connection

NOTE This port cannot be used for charging any devices.

Use Moxa's ABC-02-USB automatic backup configurator to connect to the USB storage port (Type A connector; see the diagram below for pinout assignments) to backup configurations, upgrade firmware, or backup system log files.

USB Port (Type A Connector) Pinouts
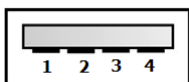
Pin	Description
1	VCC (+5V)
2	D– (Data -)
3	D+ (Data+)
4	GND (Ground)

10/100/1000BaseT(X) Ethernet Port Connection

The 10/100/1000BaseT(X) ports located on Moxa TSN-G5000 Switch's front panel are used to connect to Ethernet-enabled devices. Most users will choose to configure these ports for Auto MDI/MDI-X mode, in which case the port's pinouts are adjusted automatically depending on the type of Ethernet cable used (straight-through or cross-over), and the type of device (NIC-type or HUB/Switch-type) connected to the port.

In the following section, we give pinouts for both MDI (NIC-type) ports and MDI-X (HUB/Switch-type) ports. We also give cable wiring diagrams for straight-through and cross-over Ethernet cables.

10/100Base T(X) RJ45 Pinouts

MDI Port Pinouts

Pin	Signal
1	Tx+
2	Tx-
3	Rx+
6	Rx-

MDI-X Port Pinouts

Pin	Signal
1	Rx+
2	Rx-
3	Tx+
6	Tx-

8-pin RJ45
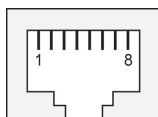
1000Base T(X) RJ45 Pinouts

Pin	MDI	MDI-X
1	BI_DA+	BI_DB+
2	BI_DA-	BI_DB-
3	BI_DB+	BI_DA+
4	BI_DC+	BI_DD+
5	BI_DC-	BI_DD-
6	BI_DB-	BI_DA-
7	BI_DD+	BI_DC+
8	BI_DD-	BI_DC-
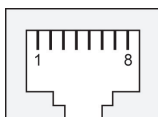
RJ45 (8-pin) to RJ45 (8-pin) Straight-through Cable Wiring

Switch Port — Straight-Through Cable — NIC Port

RJ45 Connector — RJ45 Plug Pin 1 — **Cable Wiring** — **RJ45 Connector**

Switch Port	Pin		Pin	NIC Port
Tx+	3	———	3	Rx+
Tx-	6	———	6	Rx-
Rx+	1	———	1	Tx+
Rx-	2	———	2	Tx-
DD+	4	———	4	DC+
DD-	5	———	5	DC-
DC+	7	———	7	DD+
DC-	8	———	8	DD-
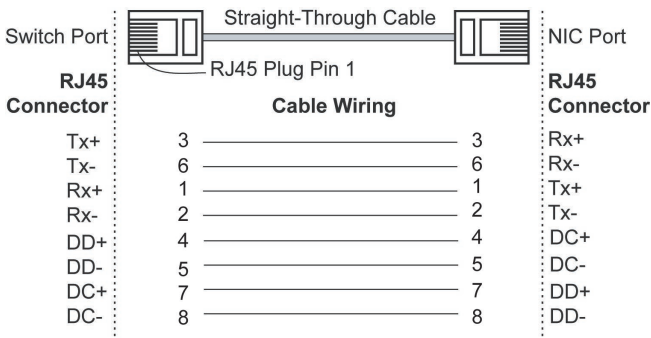
RJ45 (8-pin) to RJ45 (8-pin) Cross-over Cable Wiring

(Rx+) Tx+	3	——————	1	Rx+ (Tx+)
(Rx-) Tx-	6	——————	2	Rx- (Tx-)
(Tx+) Rx+	1	——————	3	Tx+ (Rx+)
(Tx-) Rx-	2	——————	6	Tx- (Rx-)
(DD+) DC+	4	——————	7	DD+ (DC+)
(DD-) DC-	5	——————	8	DD- (DC-)
(DC+) DD+	7	——————	4	DC+ (DD+)
(DC-) DD-	8	——————	5	DC- (DD-)
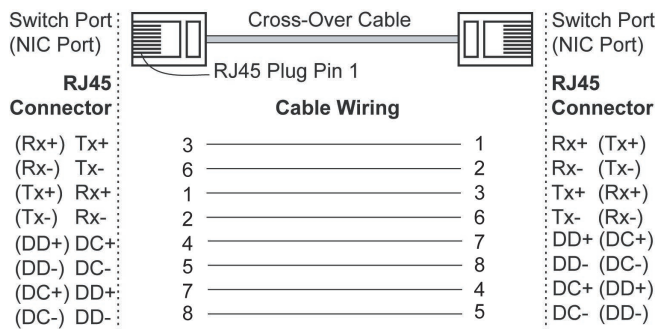
100/1000Base-X Fiber Port

The Fiber ports on the TSN-G5008-2GTXSFP are SFP type slots, which support both 100Base-FX and 1000Base-X speeds. Moxa provides complete transceiver models for various distance requirements.

The concept behind the LC port and cable is quite straightforward. Suppose you are connecting devices I and II. Unlike electrical signals, optical signals do not require a circuit in order to transmit data. Consequently, one of the optical lines is used to transmit data from device I to device II, and the other optical line is used to transmit data from device II to device I, for full-duplex transmission.
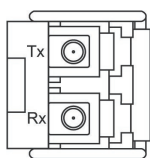
Remember to connect the Tx (transmit) port of device I to the Rx (receive) port of device II, and the Rx (receive) port of device I to the Tx (transmit) port of device II. If you make your own cable, we suggest labeling the two sides of the same line with the same letter (A-to-A and B-to-B, as shown below, or A1-to-A2 and B1-to-B2).

LC-port Pinouts   **LC-port to LC-port Cable Wiring**

Cable Wiring

A	——————	A
B	——————	B
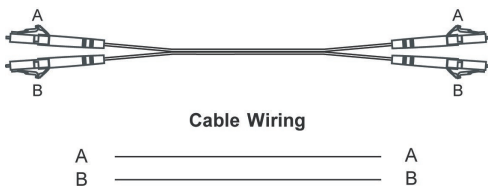
⚠ **ATTENTION**

This is a Class 1 Laser/LED product. To avoid causing serious damage to your eyes, do not stare directly into the Laser Beam.

Installing the microSD card

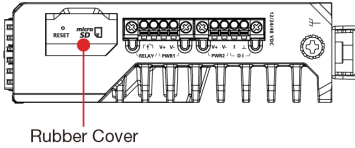**NOTE** The microSD card function is currently disabled.

The TSN-G5000 Series has a microSD slot located on the top panel of the switch. Remove the rubber cover first.

Rubber Cover

Insert the microSD card into the slot. Make sure you insert the card in the correct direction. There is an image above the slot indicating the direction that the microSD card should be inserted.

microSD Card Slot
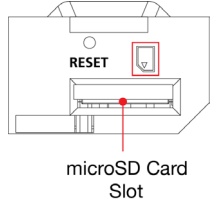
Reset Button

The reset button can perform two functions. One is to reset the switch to factory default settings and the other is to reboot the switch if the button has been pressed and released immediately. This button is located inside the rubber cover on the top panel of the switch.

Reset to Factory Default Settings

Use a pointed object, such as a straightened paper clip or needle, to press the reset button for five seconds to load the factory default settings. When you start pressing the reset button, the STATE LED will start to blink about one time per second. After five seconds, you can release the reset button to load factory default settings.

NOTE DO NOT power off the switch when loading the default settings.

LED Indicators

LED	Color	Status	Description
Per Device LED			
STATE	Green	On	System is running normally.
		Blinking	1. The system is booting up. 2. When pressing the reset button for 5 seconds to reset to factory default settings.
	Red	On	System failed to initialize.
FAULT	Red	On	Reserved.
		Off	The system is operating normally.
PWR 1	Amber	On	Power is being supplied to the main system's power input PWR1.
		Off	Power is not being supplied to the main system's power input PWR1.
PWR 2	Amber	On	Power is being supplied to the main system's power input PWR2.
		Off	Power is not being supplied to the main system's power input PWR2.
SYNC	Amber	On	PTP function is enabled.
		Blinking	Switch receiving sync packets.
		Off	PTP function is disabled.
	Green	On	PTP function successfully converged
Per Port LED			
Copper (10/100/1000 Mbps)	Green	On	When the port is active and linking at 1000 Mbps.
		Blinking	When the data is being transmitted at 1000 Mbps.
		Off	When the port is inactive or link down.
	Amber	On	When the port is active and linking at 10/100 Mbps.
		Blinking	When the data is being transmitted at 10/100 Mbps.
		Off	When the port is in inactive or link down status.
SFP (100/1000 Mbps)	Green	On	When the port is active and linking at 1000 Mbps.
		Blinking	When the data is being transmitted at 1000 Mbps
		Off	When the port is inactive or link down.
	Amber	On	When the port is active and linking on 100 Mbps.
		Blinking	When the data is being transmitted at 100 Mbps.
		Off	When the port is inactive or link down status.

Specifications

Interface	
RJ45 Ports	10/100/1000BaseT(X)
Fiber Ports	100/1000BaseSFP
Console Port	RS-232 (RJ45)
Relay Contact (Relay Output)	1 normally open electromagnetic relays output with current carrying capacity of 1 A @ 24 VDC
Digital Input	1 isolated digital input: • +13 to +30 V for state "1" • -30 to +3 V for state "0" • Max. input current: 8 mA
Button	Reset button
Power Requirements	
Rated Input Voltage	12-48 VDC, redundant dual inputs
Input Current	TSN-G5004: 1.25 A @ 12 V TSN-G5008-2GTXSFP: 1.72 A @ 12 V
Connection	2 removable 4-contact terminal blocks
Overload Current Protection	Supported
Reverse Polarity Protection	Supported
Physical Characteristics	
Housing	Metal
IP Rating	IP40
Dimension (W x H x D)	TSN-G5004: 25 x 135 x 115 mm (0.98 x 5.32 x 4.53 in) TSN-G5008-2GTXSFP: 36 x 135 x 115 mm (1.42 x 5.32 x 4.53 in)
Weight	TSN-G5004: 582 g (1.28 lb) TSN-G5008-2GTXSFP: 787 g (1.74 lb)
Installation	DIN-rail mounting, wall mounting (with optional kit)
Environmental Limits	
Operating Temperature	-10 to 60°C (14 to 140°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5% to 95% (non-condensing)
Altitude	Up to 2000 m Note: Please contact Moxa if you require products guaranteed to function properly at higher altitude.
Standards and Certifications	
Safety	UL 61010-2-201, EN 62368-1
EMC	EN 55035/55032
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV IEC 61000-4-5 Surge: Power: 2 kV; Signal: 1 kV IEC 61000-4-6 CS: Signal: 10 V IEC 61000-4-8 PFMF: 100 A/m, 60 s

Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
Note: Please check Moxa's website for the latest certification status.	
Warranty	
Warranty Period	5-years
Details	See www.moxa.com/warranty

⚠️ **ATTENTION**

This device complies with Part 15 of the FCC rules.

Operation is subject to the following conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received including interference that may cause undesired operation.

⚠️ **ATTENTION**

This product is for indoor use and meets the Pollution degree 2 requirements.

If the device needs to be cleaned it should be wiped with a dry cloth. The device must be installed within a suitable, secure, final enclosure. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.