

MDS-G4000 Series Quick Installation Guide

Version 1.1, April 2020

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P/N: 180204000002



Package Checklist

Moxa's MDS-G4000 Series industrial modular DIN-rail switch is shipped with the following items. If any of these items are missing or damaged, please contact your customer service representative for assistance.

- 1 MDS-G4000 switch
- RJ45 to RS-232 9 pin female console cable
- 2 protective caps for unused ports
- Pre-installed DIN-rail kit (MDS-G4012 x 1, MDS-G4020/28 x 2)
- Quick installation guide (printed)
- Substance Disclosure Table
- Product Certificate of Quality Inspection (Simplified Chinese)
- Product Notices (Simplified Chinese)
- Warranty card

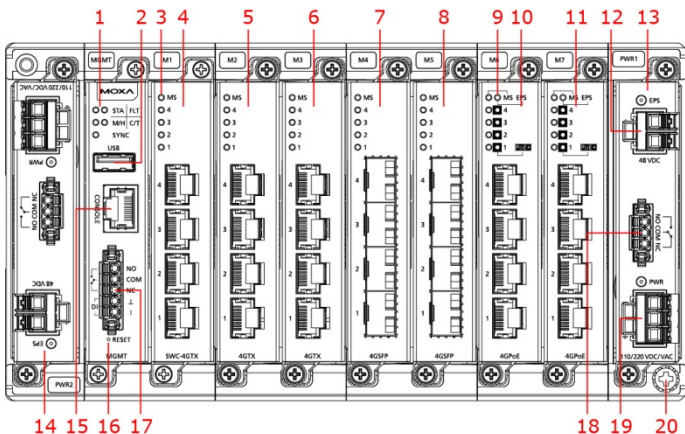
NOTE You can find information and software downloads on the relevant product pages located on Moxa's website:

www.moxa.com

Default Settings

- IP address: 192.168.127.253
- Subnet Mask: 255.255.255.0
- Username: admin
- Password: moxa

Panel Layouts

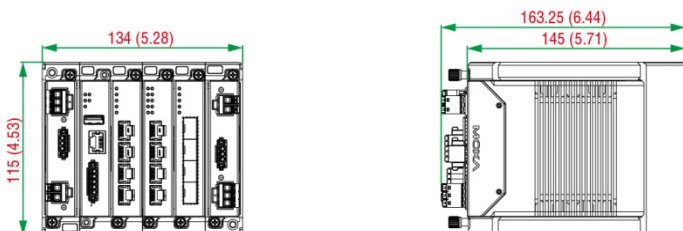


1. System status LEDs (from left to right, top to bottom)
STATE, FAULT, MASTER/HEAD, COUPLER/TAIL and SYNC LED indicators
2. USB port (Reserved for future)
3. Module Status
4. Switch and Control Module slot 1 (Embedded)
5. Ethernet module slot 2
6. Ethernet module slot 3
7. Ethernet module slot 4 (For MDS-G4020/28)
8. Ethernet module slot 5 (For MDS-G4020/28)

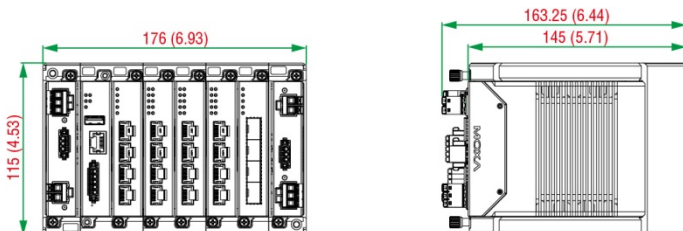
9. External power input status from EPS
10. Ethernet module slot 6 (For MDS-G4028)
11. Ethernet module slot 7 (For MDS-G4028)
12. External Power Supply input for PoE
13. Redundant power module slot 1
14. Redundant power module slot 2
15. RS232 console port with RJ45 interface
16. Reset button (Pin hole 0.9 mm)
17. Relay output and Digital Input port
18. Relay output
19. Power input
20. Grounding screw

Dimensions

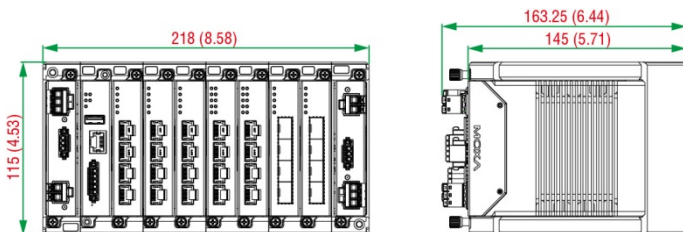
MDS-G4012 Series



MDS-G4020 Series



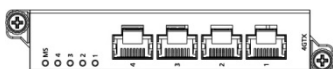
MDS-G4028 Series



Unit: mm (inch)

Ethernet Modules (Hardware Rev.2.0.0 and above)

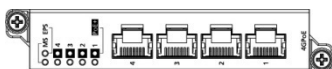
LM-7000H-4GTX



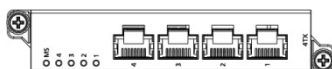
LM-7000H-4GSFP



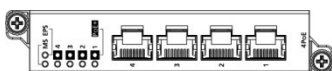
LM-7000H-4GPoE



LM-7000H-4TX

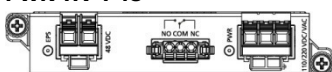


LM-7000H-4PoE

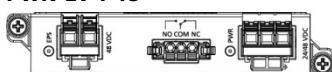


Power Modules (Hardware Rev.2.1.0 and above)

PWR-HV-P48

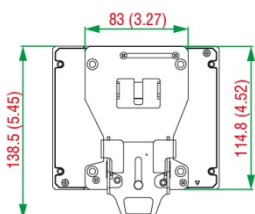


PWR-LV-P48



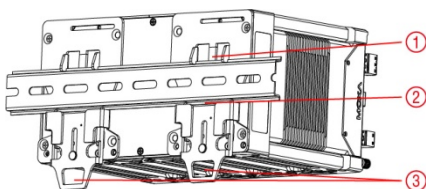
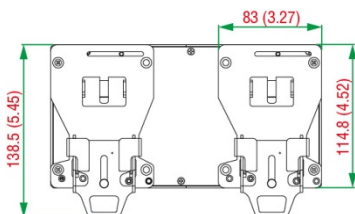
DIN-Rail Dimension and Instructions

MDS-G4012 Series



Unit: mm (inch)

MDS-G4020/MDS-G4028 Series

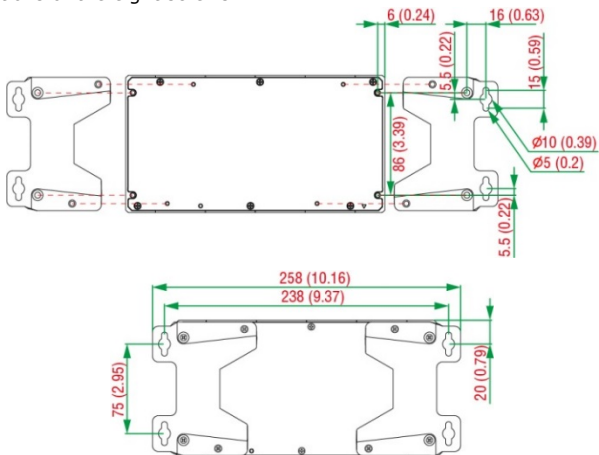
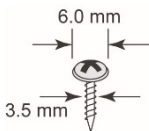


1. Insert the upper lip of the DIN-rail into the DIN-rail mounting kit.
2. Press the device towards the DIN-rail until it snaps into place.
3. Pull down the two latches one by one to release the DIN-rail kit and lift up to remove the device from the DIN-rail.

NOTE The DIN-rail must use TS35 (15 mm) specification for the MDS-G4000 Series.

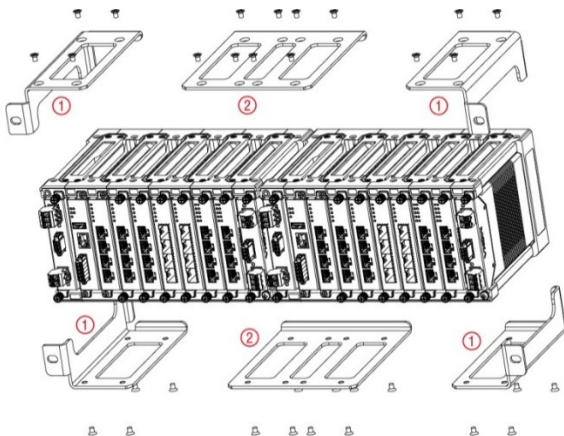
Wall Mount Dimension and Instructions (Optional: WK-112-01)

Mounting the switch to a wall requires four screws. The heads of the screws should be between 6.0 to 9.0 mm in diameter, and the diameter of screw thread should be between 3.5 to 4 mm, as shown in the figure shown on the right. Use the MDS-G4000 Series with the wall mounting kit attached, as a guide to mark the correct locations of the eight screws.

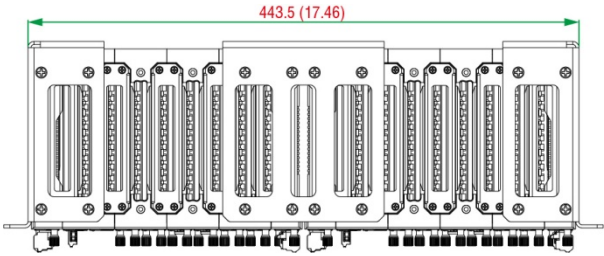


Rack Mounting Dimension and Instructions (Optional: RK-3U-01)

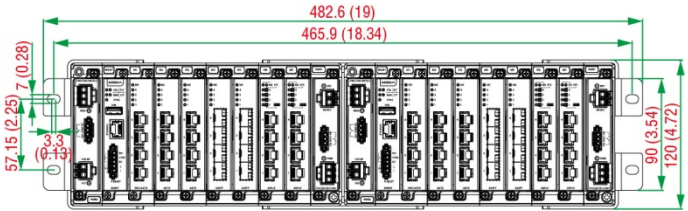
The rack mount kit is designed for two MDS-G4028 products. To mount the rack mount kit, please assemble the right and left part of the kit (indicated with No. 1 below) with four screws. Then assemble the part of the rack kit (indicated with No. 2 below) with eight screws in order to combine the two MDS-G4028 products.



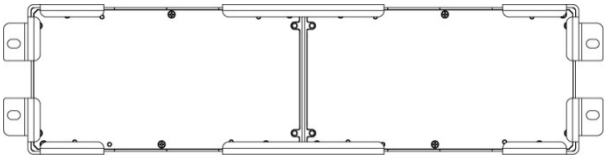
Rack Mount Top View



Rack Mount Front View



Rack Mount Rear View



Matters That Require Attention

- 1. Elevated Operating Temperature:** If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T_{ma}) specified by the manufacturer.

NOTE In order to ensure reliable operations, please make sure the operating temperature of the environment does not exceed the spec. When mounting a rack-mounted switch with other operating units in a cabinet without forced ventilation, it is recommended that 1U of space is reserved between each rack-mounted switch and/or device.

- 2. Required Air Flow:** Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- 3. Mechanical Loading:** Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

4. **Circuit Overloading:** Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable Grounding:** Reliable grounding of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).



ATTENTION

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your Ethernet Switch. 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, which can cause serious damage to your equipment.

Connecting the Power Inputs

The MDS-G4000 Series supports 2 types of power supply:

- PWR-HV-P48: one 110/220 VAC/VDC (90 to 264 VAC, 88 to 300 VDC), one 48VDC PoE power input for PoE+ ports.
- PWR-LV-P48: one 24/48 VDC (18 to 72 VDC), one 48 VDC PoE power input for PoE+ ports.

For the PWR-HV-P48, the 110/220 VAC/VDC power supplies provide power to the switch. Separate 48 VDC power supplies are required to provide power to all PoE+ ports (50 to 57 VDC is recommended for IEEE 802.3at devices. The max. PoE output from an external power supply is 720 W when the operating temperature is under 60°C; 360 W when the operating temperature is under 75°C.)

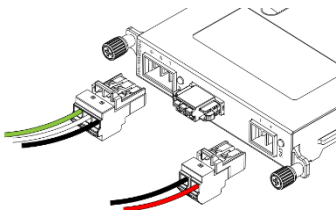
For the PWR-LV-P48 models, the 24/48 VDC power supplies provide power to the switch. Separate 48 VDC power supplies are required to provide power to all PoE+ ports (50 to 57 VDC is recommended for IEEE 802.3at devices. The max. PoE output from an external power supply is 720 W when the operating temperature is under 60°C; 360 W when the operating temperature is under 75°C.)

Power Terminal Blocks

The connection for power input and PoE external power supply is on the power modules.



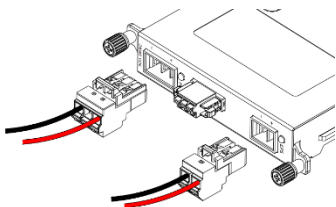
PWR-HV-P48



STEP 1: Insert the neutral/line (L/N/Ground) AC wires into the terminals.

STEP 2: Insert the terminal block connector into the terminal block receptor.

PWR-LV-P48



STEP 1: Insert the negative/positive (-/+) DC wires into the terminals.

STEP 2: Insert the terminal block connector prongs into the terminal block receptor.

PoE Power Terminal Blocks

STEP 1: Insert the negative/positive DC wires into the -/+ terminals, respectively.

STEP 2: Insert the terminal block connector prongs into the terminal block receptor.

NOTE In order to have higher levels of protection against surge, it is suggested to install a surge protector in front of the power input of the PoE powered device so that it is suitable for use in IEC 61850 conditions.

NOTE When wiring the power input, we suggest using the cable type - AWG (American Wire Gauge) 18 (1.03 mm²) and the corresponding pin type cable terminals. The connector must be able to withstand torque at maximum 5 pound-inches. The rated temperature of wiring should be at least 105°C.

NOTE When two power units are installed on the MDS-G4000 Series switch, both power units will be activated simultaneously, which will enable power redundancy.

NOTE The reverse power input connection will not activate the device or PoE input. In addition, the PoE will only activate when the external power supply is installed on the same power unit.

Wiring the Relay Contact

Each power module has one relay output that can provide two types of relay output. Refer to the table below for detailed information.

The relay contact is used to detect user-configured events. Two wires are attached to the relay pins with normally close and normally open options.

FAULT:

The relay contact of the 3-pin terminal block connector is used to detect user-configured events. The module provides normally open and normally closed circuits depending on what the user chooses. For pin definitions refer to the table below.

Relay Connection	Power Off	Boot up Ready	Event Trigger
NO and COM	Closed Circuit	Open Circuit	Closed Circuit
NC and COM	Open Circuit	Closed Circuit	Open Circuit

NOTE When wiring the relay contact, we suggest using the cable type - AWG (American Wire Gauge) 16-24 (1.31-0.205 mm²) and the corresponding pin type cable terminals. The connector must be able to withstand torque at maximum 5 pound-inches. The rated temperature of wiring should be at least 105°C.

Digital Input/Output

Digital Output

1 relay output with current carrying capacity of 2 A @ 30 VDC

Digital Input

1 digital output with the same ground, but electrically isolated from the electronics

- +13 to +30 V for state 1
- -30 to +1 V for state 0
- Max. input current: 8 mA

Install/Remove the Ethernet module

The Ethernet modules are hot-swappable for the same module type. You have the option to mount or remove the Ethernet module while the device is operating.

- NOTE**
1. When performing a cold start, you cannot remove and insert a module before booting up as it will cause the module to initially fail.
 2. The default module is 4GTX, if it is the first time to mount 4TX, PoE, or SFP module, please reboot the switch after inserting it. The hot-swappable function, as defined above, will work after the device is rebooted for the first time.
 3. If a different model type module is changed on the same slot, it is recommend to reconfigure the settings or reset the device to default settings after rebooting the switch.

The installation procedure is as follows:

1. Insert the Ethernet module straight into the slot
2. Fasten the module to the device by tightening the 2 screws. The tightening torque is 3.5 kgf-cm (0.35 Nm)

The removal procedure is as follows:

1. Loosen the 2 screws of the module
2. Pull the module out of the slot
3. Insert the dummy module in to the slot in order to have better protection against dust and EMI
4. Fasten the dummy module using 2 screws. The tightening torque is 4 kgf-cm (0.4 Nm)

Install/Remove the Power module

The power supply units are hot-swappable when both power modules are installed. You have the option to mount or remove the power supply units while the device is operating.

The installation procedure is as follows:

1. Insert the power unit straight into the slot
2. Fasten the unit to the device by tightening the 2 screws. The tightening torque is 3.5 kgf-cm (0.35 Nm)

The removal procedure is as follows:

1. Loosen the 2 screws of the module
2. Pull the module out of the slot
3. Insert the dummy module in to the slot in order to have better protection against dust and EMI.
4. Fasten the dummy module using 2 screws. The tightening torque is 4 kgf-cm (0.4 Nm)

- NOTE** If one of the modules is removed from the device, it is advisable to insert a dummy module in order to provide better protection against dust and EMI.

Grounding the Moxa Industrial DIN-rail Switch

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screw to the grounding surface prior to connecting devices.

NOTE Using a shielded cable achieves better electromagnetic resistance.

RS-232 with RJ45 Interface Console Connection

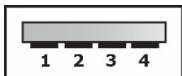
The switch has an RS-232 serial console with an RJ45 interface. Please use a Moxa 9-pin female console cable to connect to your PC's COM port (or via USB-to-Serial converters or hubs). You can then use a console terminal program, such as Moxa's PComm Terminal Emulator, to access the console configuration utility of the switch.

RS-232 Setup:

- Baud rate: 115,200
- Data Bits: 8
- Parity: None
- Stop Bits: 1
- Terminal Type: VT100

USB Connection

The USB connection is reserved for functions that may be required in the future.



Pin	Description
1	VCC (+5V)
2	D- (Data-)
3	D+ (Data+)
4	GND (Ground)

The Reset Button (diameter 0.9 mm)

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 depressed and release immediately.

Reset to Factory Default Settings

Depress the Reset button for five seconds to load the factory default settings. Use a pointed object, such as a straightened paper clip or needle (the diameter must not exceed 0.9 mm), to depress the Reset button. When you do so, the STATE LED will start to blink about four times per second. Continue to depress the STATE LED until it begins blinking more rapidly; this indicates that the button has been depressed for five seconds and you can release the Reset button to load factory default settings.

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

LED Indicators

The function of each LED is described in the table below.

LED	Color	State	Description
System LEDs			
STA (STATE)	Green	On	Normal operation
		Blinking	1. The system is booting up 2. When pressing the reset button and continue 5 seconds to reset factory default
	Off	N/A	
	Red	On	The system has initially failed
FLT (FAULT)	Red	On	1. Switch initial failure 2. EEPROM information error
		Blinking	When switch boot up and firmware load to memory
		Off	When system boot up and run well or user-configured event is not trigger
M/H (MSTR/ HEAD)	Green	On	When the switch is Master/Head/Root of Turbo Ring/Turbo Chain
		Blinking	When the switch is Ring Master/Head of Turbo Ring/Turbo Chain and the Turbo Ring/Turbo Chain is broken
		Off	When the switch is not the Master/Head/Root of this Turbo Ring/Turbo Chain
C/T (CPRL/TAIL)	Green	On	1. When the switch enables the coupling function to form a back-up path 2. When the switch is tail of Turbo Chain
		Blinking	When the switch is enable Turbo Chain and Turbo Chain is broken
		Off	When the switch disables the coupling or tail role of Turbo Chain.
SYNC (Reserved)	Amber	On	PTP function is enabled
		Blinking	The switch receives sync packets
	Green	On	The PTP function is successful converged
System LED (Except PWR)	Green/ Amber/ Red	Blinking	The switch is being discovered/located by locator function

LM-7000H-4GTX/LM-7000H-4GSFP/LM-7000H-4TX

LED	Color	State	Description
MS (Module State)	Green	On	Normal operation
		Blinking	This module is booting up
		Off	The module is out of service
	Red	On	1. The module has initially failed 2. When insert module by different model
Copper (10/100 Mbps)	Green	On	When the port is active and links on 100 Mbps.
		Blinking	When the port's data is being transmitted at 100 Mbps.
		Off	When the port is inactive or link down.
	Amber	On	When the port is active and links on 10 Mbps.
		Blinking	When the port's data is being transmitted at 10 Mbps.
		Off	When the port is inactive or link down.
Copper (10/100/ 1000Mbps)	Green	On	When the port is active and links on 1,000 Mbps.
		Blinking	When the port's data is being transmitted at 1,000 Mbps.
		Off	When the port is inactive or link down.
	Amber	On	When the port is active and links on 10/100 Mbps.
		Blinking	When the port's data is being transmitted at 10/100 Mbps.
		Off	When the port is inactive or link down.
SFP (100/1000 Mbps)	GREEN	ON	When the port is active and links on 1,000Mbps.
		Blinking	When the port's data is being transmitted at 1,000 Mbps.
		OFF	When the port is inactive or link down.
	Amber	On	When the port is active and links on 100 Mbps.
		Blinking	When the port's data is being transmitted at 100 Mbps.
		Off	When the port is inactive or link down.

LM-7000H-4GPoE/LM-7000H-4PoE

LED	Color	State	Description
MS (Module State)	Green	On	Normal operation
		Blinking	The module is booting up
		Off	This module is out of service.
Red	On	1. The module has initially failed 2. When insert module by different model 3. When cold start, remove and insert module before initial done	
EPS (External Power Supply for PoE module)	Amber	On	Normal operation
		Off	No external power supply for PoE.
Copper (10/100 Mbps)	Green	On	When the port is active and links on 100 Mbps.
		Blinking	When the port's data is being transmitted at 100 Mbps.
		Off	When the port is inactive or link down.
	Amber	On	When the port is active and links on 10 Mbps.
		Blinking	When the port's data is being transmitted at 10 Mbps.
		Off	When the port is inactive or link down.
Copper (10/100/1000Mbps)	Green	On	When the port is active and links on 1,000Mbps.
		Blinking	When the port's data is being transmitted at 1,000 Mbps.
		Off	When the port is inactive or link down.
	Amber	On	When the port is active and links on 10/100Mbps.
		Blinking	When the port's data is being transmitted at 10/100 Mbps.
		Off	When the port is inactive or link down.
PoE/PoE+	Green	On	When the port is connected to IEEE 802.3at powered device (PD)
		Off	1. When the power is not being supplied to a powered device (PD) 2. The port is not connected to an IEEE 802.3at standard PD
	Amber	On	When the port is connected to IEEE 802.3af powered device (PD)
		Blinking	The PoE power has been shut off because low power budget
		Off	1. When the power is not being supplied to a powered device (PD) 2. The port is not connected to an IEEE 802.3af standard PD
	Red	On	Powered device (PD) detection failure

LED	Color	State	Description
		Blinking	When detecting over current or short circuit on the powered Device (PD)
		Off	PoE is normal operation

PWR-HV-P48/PWR-LV-P48

LED	Color	State	Description
EPS (External Power Supply)	Amber	On	External Power Supply is being supplied to the module's EPS input
		Off	No external power supply for PoE
PWR	Amber	On	Power is being supplied to the module's power input
		Off	Power is not being supplied to the module's power input

Specifications

Interface	
Gigabit Ethernet	4-ports 10/100/1000BaseT(X)
Console Port	RS-232 console with an RJ45 interface
LED Indicators	PWR, EPS, STATE, SYNC, FAULT, MSTR/HEAD, CPLR/TAIL
Relay Output	2 A @ 30 VDC
Power Requirements	
Input Voltage	PWR-HV-P48: 110/220 VDC, 110 VAC, 60 Hz, 220 VAC, 50 Hz, PoE: 48 VDC (53 to 57 VDC is recommended of PoE+ device) PWR-LV-P48: 24/48 VDC PoE: 48 VDC (53 to 57 VDC is recommended of PoE+ device)
Operating Voltage	PWR-HV-P48: 88 to 300 VDC, 90 to 264 VAC, 47 to 63 Hz, PoE: 46 to 57 VDC PWR-LV-P48: 18 to 72 VDC, PoE: 46 to 57 VDC
Power Consumption (without modules consumption)	When using PWR-HV-P48: 110 VDC: 12.43 W 220 VDC: 12.87 W 110 VAC: 13.42 W 220 VAC: 14.08 W When using PWR-LV-P48: 24 VDC: 12.67 W 48 VDC: 13.2 W
Power Consumption of module	LM-7000H-4GTX: 3.63 W LM-7000H-4GPoE: 3.8 W LM-7000H-4GSFP: 4.8 W LM-7000H-4TX: 1.85 W LM-7000H-4PoE: 1.85 W

Input Current (without modules consumption)	When using PWR-HV-P48: 110 VDC: 0.11 A 220 VDC: 0.06 A 110 VAC: 0.29 A 220 VAC: 0.18 A When using PWR-LV-P48: 24 VDC: 0.53 A 48 VDC: 0.28 A
Peak Inrush Current	PWR-HV-P48: 110 VAC: <10 A (t > 0.1 ms) 220 VAC: <20 A (t > 0.1 ms) PWR-LV-P48: 24 VDC: <5 A (t > 0.1 ms) 48 VDC: <10 A (t > 0.1 ms)
Overload Current Protection	Present
Reverse Polarity Protection	Present
Physical Characteristics	
Ingress Protection Rating	IP40 (This rating will only be achieved when the relay output terminal block and all modules are installed.)
Dimensions	MDS-G4012 Series: 134 x 115 x 163.25 mm MDS-G4020 Series: 176 x 115 x 163.25 mm MDS-G4028 Series: 218 x 115 x 163.25 mm
Weight	MDS-G4012 Series: 2.00 kg (4.41 lb) MDS-G4020 Series: 2.50 kg (5.51 lb) MDS-G4028 Series: 2.84 kg (6.26 lb) LM-7000H-4GSFP: 0.3 kg (0.66 lb) LM-7000H-4GTX: 0.24 kg (0.53 lb) LM-7000H-4GPoE: 0.31 kg (0.69 lb) LM-7000H-4TX: 0.24 kg (0.53 lb) LM-7000H-4PoE: 0.31 kg (0.69 lb) PWR-HV-P48/PWR-LV-P48: 0.36 kg (0.69 lb)
Installation	Din-rail mounting: Pre-installed by default Wall mount: WK-112-01 (with optional kit) 19" rack mounting: RK-3U-01 (optional, only for combining two 28-port models)
Environmental Limits	
Operating Temp.	Standard Temperature Models: -10 to 60°C (-14 to 140°F) - MDS-G4012 - MDS-G4020 - MDS-G4028 Wide Temperature Models: -40 to 75°C (-40 to 167°F) - MDS-G4012-T - MDS-G4020-T - MDS-G4028-T
Storage Temp.	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% (non-condensing)
Standards and Certifications	
Safety	EN 62368-1
EMC	EN 55035/55032

EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV IEC 61000-4-3 RS: 80MHz to 1GHz: 20 V/m IEC 61000-4-4 EFT: Power: 4 kV; Signal: 4 kV IEC 61000-4-5 Surge: Power 4 kV; Signal: 4 kV IEC 61000-4-6 CS: 10V IEC 61000-4-8 PFMF IEC 61000-4-11 Voltage Dips & Interruptions
Note: For better conductive radiation immunity, it is recommended to use a STP cable and install a surge protector at the PoE power input: EPS.	
Rail Traffic	EN 50121-4
Traffic Control	NEMA TS2
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-31
Vibration	IEC 60068-2-6
Warranty	
Warranty Period	5 years
Details	See www.moxa.com/warranty

Restricted Access Locations

- This equipment is intended to be used in Restricted Access Locations, such as a computer room, with access limited to service personnel or users who have been instructed on how to handle the metal chassis of equipment that is very hot. The location should only be accessible with a key or through a security system.
- External metal parts of this equipment are extremely hot. Before touching the equipment, you must take special precautions to protect your hands and body from serious injury.

