

DM4100 Series

DATACOM

DM4100 Series

INSTALLATION MANUAL

WARRANTY

This product has warranty against manufactured materials and its coverage is specified on the sales invoice.

The warranty only includes the repair and the replacement of components or defect parts without any charge for the customer. The following defects are not covered: equipment use under inadequate conditions; faults on electric supply; nature phenomenon (e.g. lightning discharge), equipment faults connected to this product; inadequate grounding installations or repair executed by a person who is not authorized by DATACOM.

This warranty does not cover the repair at the customer's facilities. The equipment must be sent to DATACOM for repair.



Quality Management System

Certificated by DQS Compliance

With ISO9001

Register N° (287097 QM)



Despite all precautions have been taken for the creation of this document, the company does not assumes any responsibility for eventual errors or omissions, as well as none obligation is also assumed for damages resulted by the use of information from this manual. The specification provided on it can be changed without prior advice and is not recognized as any type of contract.

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CONVENTIONS

The following conventions were adopted along this manual, in order to better understanding

[Hyperlink](#) - indicates an address on Internet or an e-mail address.

Command or Button – when a when a command, button or software's menu is referred; this indication will be always in italic.

Commands and terminal screen messages are showed as texts without any form, preceded by # (sharp).



The note better explains some of details showed in the text.



This form indicates the text that has great importance and indicates risks of damages or hazards. The text must be read more carefully. It can avoid great difficulty.



It indicates an existing risk of electric shock, in case all procedures are not correctly applied.



It indicates a laser radiation presence. It can cause damages to the skin or the vision if the instructions are not applied and if direct exposure to the skin and to the eyes is not avoided.



It indicates equipment or parts sensibility to EMI (static electricity). It should not be manipulated without care, such as grounding bracelet or equivalent.



It indicates non-ionized radiation and emission.

WEEE Directive Symbol (Applicable in the European Union and other European countries with separate collection systems). This symbol on the product or its packaging indicates that this product must not be disposed of with other waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your consumer waste equipment for recycling, please contact your local city recycling office or the dealer from whom you originally purchased the product

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1. GENERAL RECOMMENDATIONS



Have a look at the safety instructions during installation, operation and maintenance of this product.



Installation, adjusts or maintenance must be executed by qualified, trained and authorized personal only.



Before installing, read attentively all this manual. Contact the authorized technical support for any doubt.



The installation of any electric equipment must be in accordance with the actual legislation, where the equipment will be installed. It includes the static electricity protection devices, measurement and an appropriate protection for the equipment's capacities.



All slots that are not occupied by interface cards must be closed with a blank panel. Thus, it can avoid the exposure to the equipment's interior energized parts and the overheating. This procedure must be executed by trained and authorized people only.



Once the installation is being executed, tighten screws and knurled screws up to the end of its thread as well as until they are totally screwed. However, never execute it with excessive force because it may damage the equipment.



The equipment described in this manual is sensitive to static electricity (ESD - Electrostatic Sensitive Device). Before manipulating any equipment explained here, certify the use of static electricity protection devices.



Despite there are fan's protection rails, be careful when manipulating the ventilation module. It must be pulled out by indicated places from the frontal part only. Besides, it requires attention regarding chains, bracelets and other objects small enough to pass through the ventilation's rails.



This product depends on the previous installations against short-circuit (circuit overload). Each equipment power input must be protected by a specific circuit-breaker, located near the equipment, with easy access.



This equipment must be installed in a restrict or controlled area.



CISPR 22 Class A: this equipment complies with CISPR22 Class A requirements. It may interfere or suffer interference when used in a domestic environment. User must take proper care to protect the equipment in this situation.



Before work with the powered equipment, take of all jewelry (rings, neck laces, watches, etc.). These metallic stuff may cause short-circuits, causing severe skin burning or soldering metallic contacts.



Some of the products included in this manual have Class 3B laser emitting optical modules. Care must be taken to avoid exposure to the eyes and to the skin.



This unit may have more than one energy source. All connections must be removed to turn off the equipment.



Only trained and qualified staffs are allowed to install, replace or make revision and maintenance of this equipment.



Suitable only for mounting in or on concrete or other non-combustible surface.



The discard of old batteries must be done in a recycling center, or mail it to DATACOM using the packaging which was received with the replacement battery.



Risk of fire and explosion if the battery terminals are short-circuited, installed with the reversed polarity, dismantled, recharged or exposed to water, fire or high temperatures.

2. INTRODUCTION

This manual can be used for all DATACOM DM4100 Metro and Enterprise Ethernet Switches Series, providing information about installation of DM4100 family.

The document focuses on the physical, electrical, status indications and installation portion of the hardware. It is assumed that the individual or individuals managing any aspect of this product have basic understanding of Switching, Routing, Ethernet, and general Telecommunications.

2.1. Overview

The DM4100 product line of high-capacity Ethernet switches is designed to reach Metro and Enterprise Ethernet solutions, reaching up to 48x1Gbit/s Ethernet ports and up to four 10Gbit/s Ethernet ports. All Ethernet switches versions have L2/L3 and MPLS hardware options.

The L3 and MPLS versions have larger L3 tables to reach complex applications. MPLS Label Switching is only featured in MPLS versions and need an additional software license to become available.

The DM4100 24 Ports model have an internal switch fabric of 152Gbit/s, and the DM4100 48 Ports model have an internal switch fabric of 224Gbit/s. Both versions enables wire speed non-blocking operation.

The DM4100 Series stacking capability, with speeds starting at 52Gbit/s (24 Port DM4100 models) up to 64Gbit/s (DM4100 48 Ports model), allows the stacking of up to eight pieces for easy expansion of the applications within the same physical environment and also provides a lower-cost alternative for Metro and Enterprise networks.

DM4100 PoE versions are fully compliant of IEEE 802.3at-2009 PoE standard also known as PoE+ or PoE plus. It can deliver up to 34.20W of power per port (up to 600mA) negotiating all five power class levels at initial connection.



Figure 1. DM4100 Series

3. PACKAGE

The equipment comes wrapped up with a protection plastic and packed in a paperboard box, surrounded by lateral protection, as shown on Figure 2, avoiding damages while transporting the equipment.

For product unpacking, open the box's superior part and then remove DM4100 along with mounting brackets, according to Figure 2. After this procedure, take out the protections.

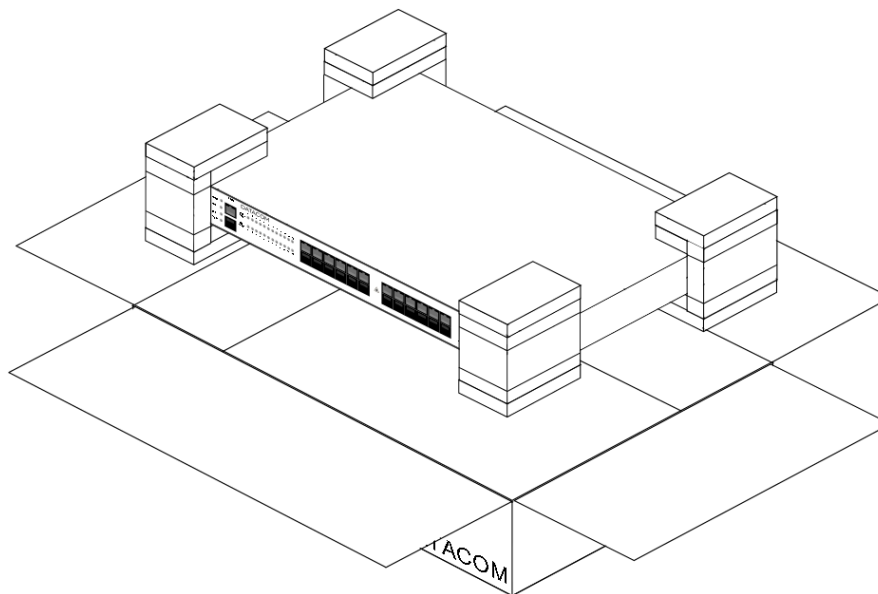


Figure 2. DM4100 Product Package

4. INTERFACE SPECIFICATIONS

4.1. System Status LEDs

The System Status LEDs on the front panel are used to monitor system activity. Following figure shows where the LEDs are located and the next table indicates the system status according to each LEDs condition.

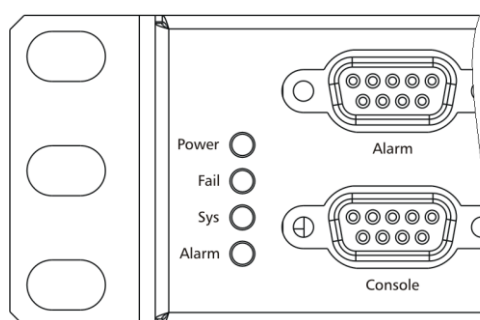


Figure 3. System LEDs

LED	Condition	Status
Power	On	System is powered on
	Off	System is powered off
Fail	On	Indicates hardware failure
	Off	System is operating normally
Sys	On	System is ready
	Off	System is booting
Alarm	On	System Alarm is active
	Off	System Alarm is inactive

Table 1. System Status LEDs

4.2. Gigabit Port LEDs

Port LEDs indicate data activity and speed on each port. Their location is shown in the next figure and their status on the Table 2.

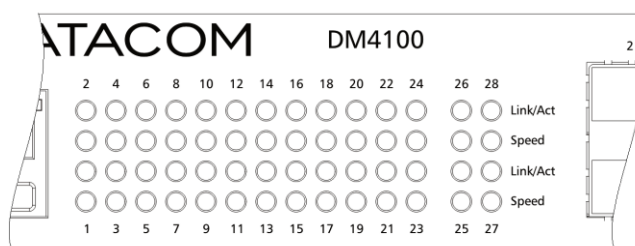


Figure 4. Port LEDs Location in DM4100 24 Ports Model

LED	Condition	Port Status
Link/Act	On	Connection established
	Blinking	Port TX or RX activity
	Off	No connection established
Speed	On	Connection established at 10Mbit/s or 100Mbit/s
	Off	Connection established at 1000Mbit/s (Link ON)

Table 2. DM4100 24 Ports Model LEDs

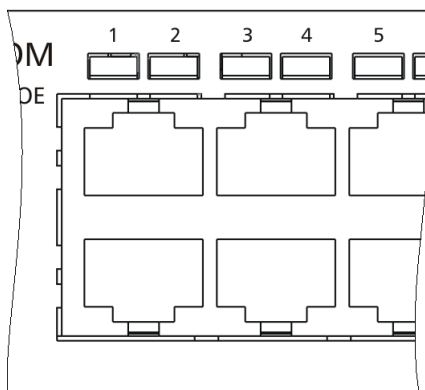


Figure 5. Port LEDs Location in DM4100 48 Ports Model

LED	Condition	Port Status
Link / Act / Speed	On / Green	Connection established at 1000Mbit/s
	On / Yellow	Connection established at 10Mbit/s or 100Mbit/s
	Blinking	Port TX or RX activity
	Off	No connection established

Table 3. DM4100 48 Ports Model LEDs Behavior

4.3. 10 Gigabit Port LEDs

Port LEDs of 10Gbit/s ports indicate link state, data traffic and LASER TX ON in each port.

4.3.1. DM4100 with Two 10Gbit/s Ports Model (2XX)

In the DM4100 Series which contains two 10Gbit/s ports, its location is at the front panel, as shown in Figure 6.

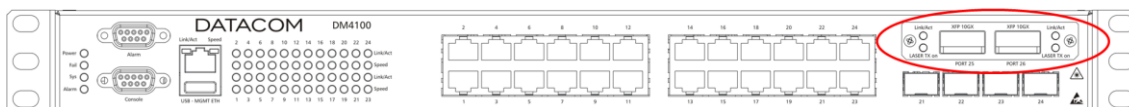


Figure 6. DM4100 with Two 10 Gigabit Ports Model

4.3.2. DM4100 with Four 10Gbit/s ports Model (4XX)

In the DM4100 Series with four 10Gbit/s ports for Ethernet traffic, two of them are displayed in the front panel, in the same way as shown in the item above. The remaining two 10Gbit/s ports are located in the rear panel of the equipment. The Figure 7 displays this hardware configuration and the equipment ports location.

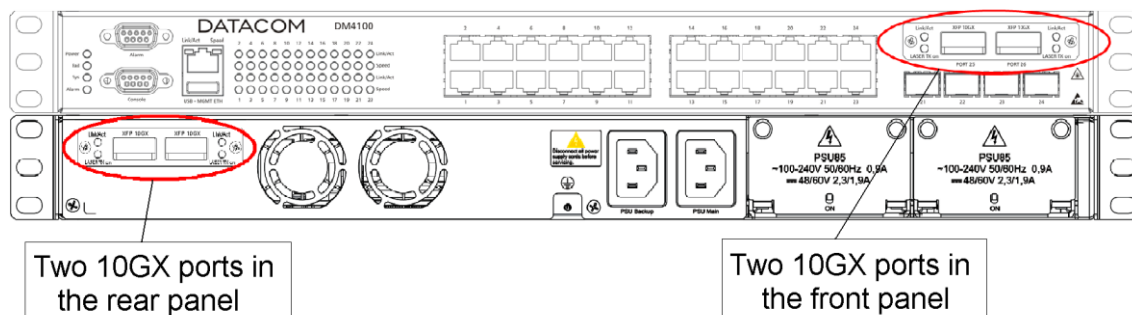


Figure 7. 10Gbit/s Ports Location in DM4100 4XX Models

4.3.3. 10 Gigabit Usage Ports for Stacking

The DM4100 2XX+S indicates that this switch model supports stacking operation (see item 7.4 about Equipment Stacking). Thus, two 10Gbit/s ports for Ethernet traffic are available in the front panel and two stacking ports in the rear panel.

The Figure 8 shows the Ethernet and Stacking ports location in the equipment.

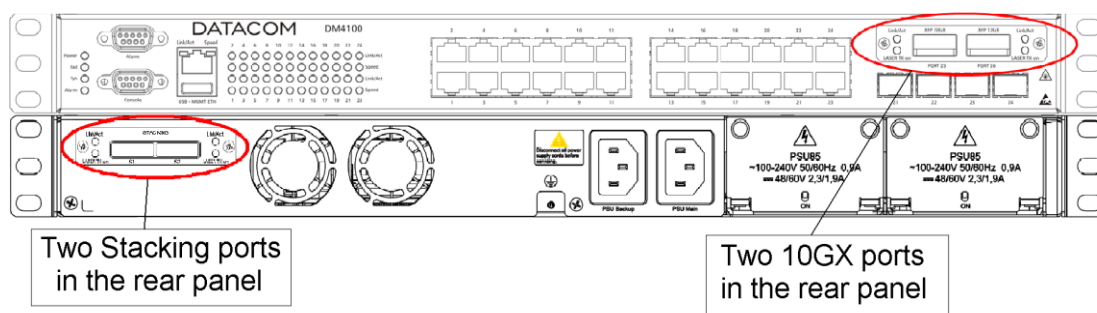


Figure 8. DM4100 2XX+S Model



There is a possibility of use the 10Gbit/s ports in the rear panel of DM4100+4XX for stacking application, as shown in Figure 7. Check for availability of rear 10Gbit/s for stacking getting contact with DATACOM Technical Support.

The LEDs behavior is displayed in the Table 4.

LED	Condition	Port Status
Link/Act	On	Connection established
	Blinking	Port TX or RX activity
	Off	No connection established
LASER TX on	On	XFP Module LASER is ON
	Off	XFP Module LASER is OFF

Table 4. 10 Gigabit Ports LEDs Behavior

4.4. Stacking Ports LEDs

Port LEDs indicate link, data activity and Stacking on each port. The stacking ports are located in the rear panel of the equipment, as shown in Figure 9, and their status in the Table 5.

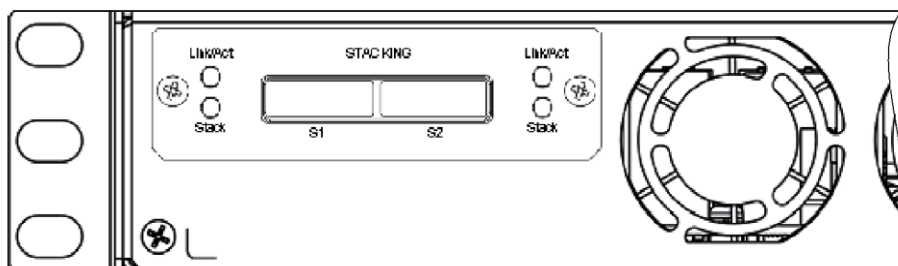


Figure 9. Stacking Ports Location

LED	Condition	Port Status
Link/Act	On	Connection established
	Blinking	Port TX or RX activity
	Off	No connection established
Stack	On	Stacking protocol is established
	Off	Stacking protocol is not established

Table 5. Stacking Port LEDs Behavior

4.5. Console Port in DM4100 24 Ports Model



The DM4100 Series products do not support a hardware flow control, therefore, in the Console port configuration, the hardware flow control must stay disabled. If this option be enabled, the device will be inaccessible.

The DM4100 24 Ports model contains a console port to direct manage the equipment. The console follows RS232 (EIA/TIA 574) standard in a DB9 connector. Use a DB9 Male/Female Straight through Serial Cable to connect to a computer.

The pin out console RS232 are shown in the next figure, followed by its pin out table.

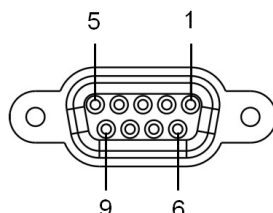


Figure 10. Console Pin Order

Serial Port Pin Name	Pin Number
RX	3
TX	2
GND	4 and 5

Table 6. Console Port Pins Assignments

4.6. Console Port in DM4100 48 Ports Model



The DM4100 Series products do not support a hardware flow control, therefore, in the Console port configuration, the hardware flow control must stay disabled. If this option be enabled, the device will be inaccessible.

The DM4100 48 Port Models contains a console port to direct manage the equipment. The console uses an RJ45 connector. Must be used an RJ45 male to DB9 female cable to connect it to a computer.

The DM4100 console cable is described in the Figure 11, and the pin out of the RJ45 is illustrated in the Figure 12. The corresponding pin out of RJ45 and DB9 connectors is described in Table 7.



Figure 11. DM4100 Console Cable

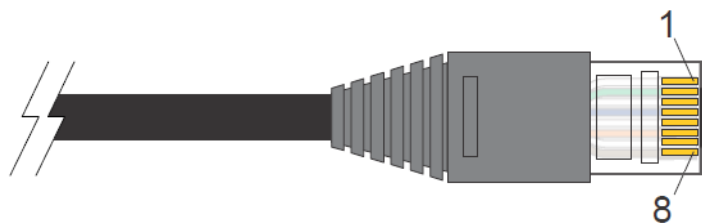


Figure 12. RJ45 Connector Pins

Signal	RJ45 Male	DB9 Female
CTS/RTS	1	8
DSR/DTR	2	6
RXD/TXD	3	2
GND	4	5
GND	5	5
TXD/RXD	6	3
DTR/DSR	7	4
RTS/CTS	8	7

Table 7. Console Port Pins Assignments

4.7. Alarm Ports (DM4100 24 Port Models)

The DM4100 24 Ports model contains a DB9 connector on its front panel for Alarm Inputs and Output. This alarm port contains three alarm inputs and one alarm output.

The pin order of Alarm DB9 is shown in the next figure, followed by its pin out table.

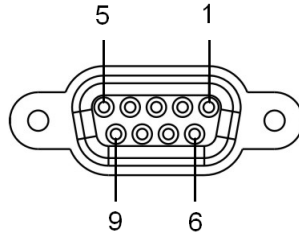


Figure 13. Alarm Port Pin Order

Input/Output	Pin Name	DB9 Pin Number
Alarm Input #1	IN-	6
	IN+	1
Alarm Input #2	IN-	7
	IN+	2
Alarm Input #3	IN-	8
	IN+	3
Alarm Output #1	Common	4
	NA	5
	NF	9

Table 8. Alarm Port Pins Assignments

The Alarm output works as follows. In an alarm situation or when the device is turned off, pin 4 (common) is short-circuited with pin 9 (NF). When alarm is off, the pin 4 turns to a short circuit with pin 5 (NA), while pin 9 keeps isolated.

IN+ Pin	IN- Pin	Alarm State
0V	0V to -3V	No Alarm
0V	-12V to -60V	Alarm Active

Table 9. Voltages and States for Alarm Inputs

4.8. Alarm Ports in DM4100 48 Ports Model

The DM4100 48 Ports model contains an RJ45 connector on its rear panel for Alarm Inputs and Output. The Alarm port contains two alarm inputs and one alarm output.

The pin order of Alarm RJ45 is shown in the next figure, followed by its pin out table.

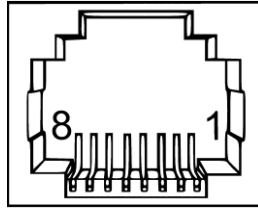


Figure 14. Alarm Port Pin Order

Input/Output	Pin Name	RJ45 Pin Number
Alarm Input #1	IN-	2
	IN+	1
Alarm Input #2	IN-	4
	IN+	3
Alarm Output #1	Common	7
	NA	6
	NF	8

Table 10. Alarm Port Pins Assignments

The Alarm Output works as follows. In an alarm situation or when the device is turned off, pin 7 (common) is short-circuited with pin 8 (NF). When alarm is off, the pin 7 turns to a short circuit with pin 6 (NA), while pin 8 keeps isolated.

IN+ Pin	IN- Pin	Alarm State
0V	0V to -3V	No Alarm
0V	-12V to -60V	Alarm Active

Table 11. Voltages and States for Alarm Inputs

4.9. USB and Management Ethernet Ports

The DM4100 Series contains a USB 1.1 port for firmware's download, upload and download of configurations. It also provides a 100Base-TX out band management Ethernet for manage of equipment.

4.9.1. USB Port Support

In order to have the USB Port activated in the equipment, the equipment must have a hardware version equal or greater than 6.

It is possible to display information about the hardware version of the equipment, and if it supports the USB port by using the following command, observing the **bold font** line:

```
DM4100#show system
```

```
Unit 1
  Product
    Model:      DM4100 - ETH24GX+2XX+S+MPLS
    OID:        1.3.6.1.4.1.3709.1.2.89
  Factory
    Mainboard ID: 1111111
    MAC Address:  00:04:DF:DF:DF:DF
    Product ID:   1111111
  System Capabilities  HW Available      License Enabled
```

```

Bridge:          yes          yes
Router:          yes          yes
MPLS:           yes          yes
USB-console:    yes         yes
PoE:             no           no
Rear Expansion Board
  Board Name:     2xStacking
  Serial Number:  1111111
User configurable
  Name:           DM4100
  Location:
  Contact:

```



The access to the USB Console Port can be made by a USB – USB or a USB - RS232 Serial converter. In both cases, for computers with Windows Operation System is required the installation of a Driver in order to support the connection of the computer to the switch (via TeraTerm, Putty, etc.) properly, and recognize the switch in a COM port. The Driver is available for download in DATACOM's page (www.datacom.ind.br). Get contact with DATACOM Technical Support to obtain further information about the Driver installation.

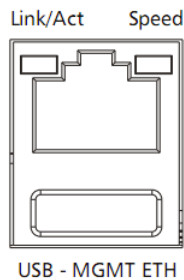


Figure 15. USB and Management Ethernet Ports

LED	Condition	Port Status
Link/Act	On	Connection established
	Blinking	Port TX or RX activity
	Off	No connection established
Speed	On	Connection established at 10Mbit/s
	Off	Connection established at 100Mbit/s (Link ON)

Table 12. Management Ethernet Port LEDs Behavior

5. TECHNICAL SPECIFICATION

5.1. Environmental Conditions

- Operation temperature: 0 to 55 degrees Celsius;
- Storage Temperature: -30 to 70 degrees Celsius;
- Relative Humidity: 10% to 90%, non-condensing.

5.2. Power Supply

Power is supplied to the equipment through a power cord terminated with a three-prong plug. This cable can be connected to any type of AC outlet, within the necessary specifications, within the current and voltage and limits mentioned in the item 5.2.1. In case the device to be empowered is a DM4100 ETH44GP model as shown in Figure 18, the power cable must have connection pins with capacity to 20A at least, in order to support the higher consumption capability of the PoE ports. For all other models, the cable may have support to 10A.

If the device is using a DC power supply, the power cable should be cut off near the AC sockets connection plug. Must be identified the ground wire which corresponds to the connector central pin. This wire must be connected as ground (GND) in the power supply system, and the two other wires will provide the power supply to the equipment.

The power supply values variation does not require any manual adjustment. This is automatically performed by the equipment, for both the main supply and the optional back-up power supply. Two supplies can be installed for redundant operation and provides a hot-swappable maintenance.



Figure 16. ETH24GX and ETH20GT+4GC with Power Supplies Connectors



The ETH24GX and ETH20GT+4GC Series have two slots at the rear panel, one for each power supply.

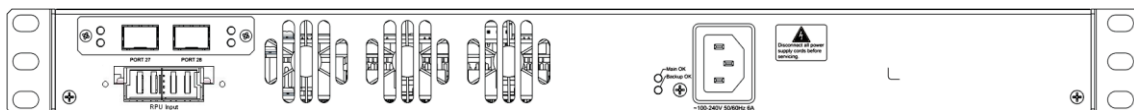


Figure 17. ETH20GP+4GC with Power Supply Connector

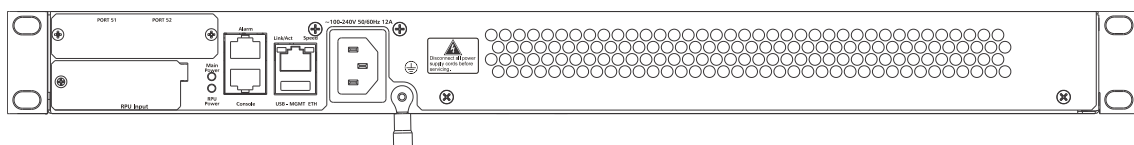


Figure 18. ETH44GP+4GC with Power Supply Connector

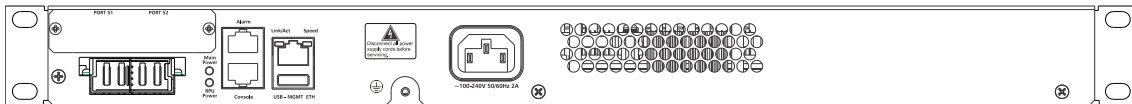


Figure 19. ETH44GT+4GC with Power Supply Connector



The ETH20GP+4GC and DM4100 48 Ports model have internal AC power supplies, and a DC input for external RPU supply. Specifications about DM4100 RPU power supplies in the chapter 8 in this manual.

5.2.1. Recommended Power Limits

Recommended Voltage Limits		Power Type	Freq.	Max. Power	Max. Current
Min.	Max.				
-48V	-60V	DC	-	85W	1.77A
100V	240V	AC	50/60Hz	85W	0.85A

Table 13. Recommended Power Limits for ETH24GX and ETH20GT+4GC Series

Recommended Voltage Limits		Power Type	Freq.	Max. Power	Max. Current
Min.	Max.				
100V	240V	AC	50/60Hz	555W	5.6A

Table 14. Recommended Power Limits for ETH20GP+4GC Series

Recommended Voltage Limits		Power Type	Freq.	Max. Power	Max. Current
Min.	Max.				
100V	240V	AC	50/60Hz	170W	1.7A

Table 15. Recommended Power Limits for ETH44GT+4GC Series

Recommended Voltage Limits		Power Type	Freq.	Max. Power	Max. Current
Min.	Max.				
100V	240V	AC	50/60Hz	1100W	11A

Table 16. Recommended Power Limits for ETH44GP+4GC Series

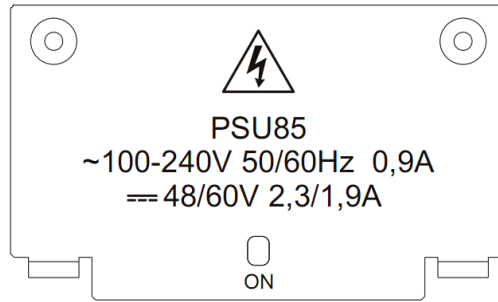


Figure 20. PSU85 Power Supply Rear Panel



The plug is the disconnection device on the equipment. The socket outlet, where the supply cable is connected, must be positioned near the equipment and have easy access.



In case of using DC voltage, be careful so that the equipment protection ground cable (green cable with yellow line related to the central socket pin) matches the system protection ground cable. This cable must be connected before any other connection. The metallic structure of the equipment is connected to the protection ground cable.



The fuse F4 supports a 3.15A fuse, type T (delay), 250V. If necessary, replace it only for another one of the same type and value.



The fuse F3 supports a 10A fuse Fast Acting, 125V. If necessary, replace it only for another one of the same type and value.



The power supply PSU85 is able to handle up to 125V_{DC}.

5.3. Consumption

Model	Equipment Consumption (W)	Maximum Consumption PoE (W)
DM4100 ETH24GX+2XX+S+L3	85	NA
DM4100 ETH24GX+2XX+S+MPLS	85	NA
DM4100 ETH24GX+4GX+L3	85	NA
DM4100 ETH24GX+4GX+MPLS	85	NA
DM4100 ETH24GX+4XX+L3	85	NA
DM4100 ETH24GX+4XX+MPLS	85	NA
DM4100 ETH20GP+4GC+2XS+S+L3	90	821
DM4100 ETH20GP+4GC+2XX+S+L3	90	821
DM4100 ETH20GP+4GC+4XS+L3	90	821
DM4100 ETH20GP+4GC+4XX+L3	90	821
DM4100 ETH20GP+4GC+S+L3	90	821
DM4100 ETH20GT+4GC+2XS+S+L3	90	NA
DM4100 ETH20GT+4GC+2XX+S+L3	85	NA
DM4100 ETH20GT+4GC+2XX+S+MPLS	85	NA
DM4100 ETH20GT+4GC+4XS+L3	90	NA
DM4100 ETH20GT+4GC+4XX+L3	85	NA
DM4100 ETH20GT+4GC+4XX+MPLS	85	NA
DM4100 ETH20GT+4GC+L3	80	NA
DM4100 ETH20GT+4GC+S+L3	80	NA
DM4100 ETH20GT+4GC+S+MPLS	85	NA
DM4100 ETH44GP+4GC+2XS+S+L3	120	1642
DM4100 ETH44GP+4GC+2XX+S+L3	170	1642
DM4100 ETH44GP+4GC+4XS+L3	120	1642
DM4100 ETH44GP+4GC+4XX+L3	170	1642
DM4100 ETH44GP+4GC+S+L3	170	1642
DM4100 ETH44GT+4GC+2XS+S+L3	120	NA
DM4100 ETH44GT+4GC+2XX+S+L3	170	NA
DM4100 ETH44GT+4GC+2XX+S+MPLS	170	NA
DM4100 ETH44GT+4GC+2XX+S+MPLS (DC)	120	NA
DM4100 ETH44GT+4GC+4XS+L3	120	NA
DM4100 ETH44GT+4GC+4XX+L3	170	NA
DM4100 ETH44GT+4GC+4XX+MPLS	170	NA
DM4100 ETH44GT+4GC+4XX+MPLS (DC)	120	NA
DM4100 ETH44GT+4GC+S+L3	170	NA
DM4100 ETH44GT+4GC+S+MPLS	170	NA
DM4100 ETH44GT+4GC+S+MPLS (DC)	120	NA

Table 17. Maximum Power Consumption of Different Models



The Table 17 is considering the maximum power consumed. The total consumed power in the equipment must be composed by the sum of the internal consumption plus the maximum PoE consumption, considering if the equipment is using or not an external power source (RPU). If an RPU is connected to the equipment, the power will be divided between internal and external source. Using the RPU in power balance configuration in conjunction of internal power source, the equipment provide 34.2W in each 24 or 48 ports, according switch model. For further information, read chapter 8 of this manual.

5.4. Weight

The specified weights in the Table 18 are not considering the weight of PSU Power Sources.

Models	Weight (Kg)
ETH24GX Series	3.4
ETH20GT+4GC Series	2.96
ETH20GP+4GC Series	3.34
ETH44GT+4GC Series	3.58
ETH44GP+4GC Series	3.68

Table 18. Weight of Different Models

5.5. Dimensions

All of DM4100 Series equipment are 1U height and are sent with the side brackets for installation in 19-inch racks. In the 24 Ports model, these supports are removable, but in the 48 ports model, it is not possible to remove these supports.

Models	Without Mouting Brackets			With Mouting Brackets		
	Height	Width	Depth	Height	Width	Depth
ETH24GX Series	43.5mm	440mm	249.6mm	43.5mm	480.8mm	249.6mm
ETH20GT+4GC Series	43.5mm	440mm	251.6mm	43.5mm	480.8mm	251.6mm
ETH20GP+4GC Series	43.8mm	440mm	326.6mm	43.8mm	480.8mm	326.6mm
ETH44GT+4GC Series	NA	NA	NA	43.5mm	482.5mm	415mm
ETH44GP+4GC Series	NA	NA	NA	43.5mm	482.5mm	415mm

Table 19. DM4100 Dimensions

5.6. Applicable Standards - Specification and Description

Specification	Description
Immunity	EN 61000-4-2 Electrostatic Discharge
	EN 61000-4-3 Radio Frequency Electromagnetic Field Amplitude Modulated
	EN 61000-4-4 Fast Transients (burst)
	EN 61000-4-5 Surges
	EN 61000-4-6 Radio Frequency Conducted Continuos
	EN 300386 Radiated Immunity
EMC	CISPR-22 Class A
	FCC Class A
	EN 61000-3-3 Voltage Fluctuation and Flicker
EMI	CISPR-22 Class A
	FCC Class A
Safety	IEC 90050

Table 20. DM4100 Immunity Information



6. EQUIPMENT INSTALLATION

6.1. Package Contents

- One DM4100 Chassis
- One AC power cord

In 24 Port DM4100 models, the mounting brackets can be removed using a Phillips screwdriver

Be sure you have received all the content listed above and check the items for damage. If there's something missing or damaged, contact DATACOM for assistance.

6.2. Installation Guidelines

Before you choose a location to install the equipment, make sure to follow the guidelines below:

- Choose a location where you can easily access the SFP ports and that allows the LEDs to be visible;
- The site's temperature should be kept within the patterns described in chapter 5.1;
- Install the equipment near a power source.

6.3. Installing the Equipment in a Rack

The equipment can be installed in 19-inch racks. The brackets used to fix the DM4100 24 Ports models already come attached to the equipment. The DM4100 48 Ports models require an additional support for installation. In the following items will be described the procedure to install them both chassis model.

6.3.1. DM4100 24 Ports Model Installation

- Place the equipment carefully in the rack;
- Insert two screws M5 standard (not provided) on each bracket to secure the equipment in the rack, according Figure 21;
- Tighten the screws in order to ensure that the equipment is appropriately steady in the rack.

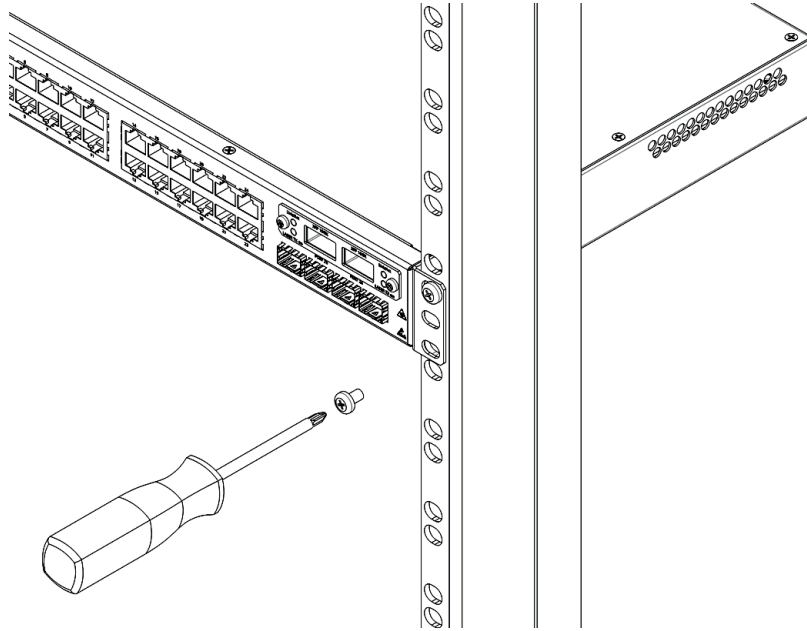
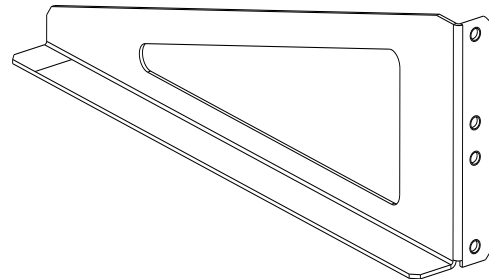
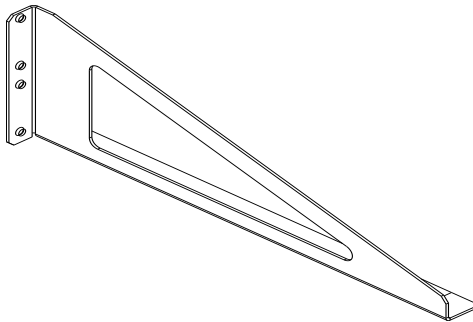


Figure 21. DM4100 24 Ports Model Rack Mounting

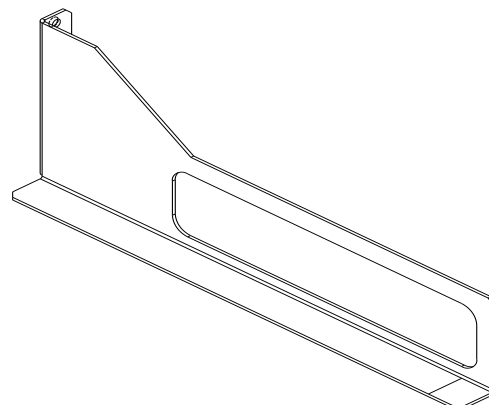
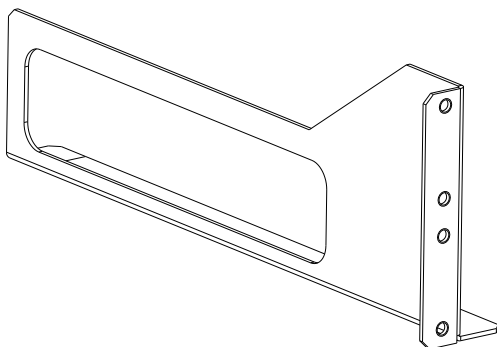
6.3.2. DM4100 48 Ports Model Installation

To perform the correct installation of DM4100 48 Ports model in the rack it's necessary, at first of all, to install an additional strengthening support, described in the following figures.

- **Right Strengthening Support**



- **Left Strengthening Support**



These strengthening supports must be installed in the frontal face of the rack and it's fixed by M5 standard screws, which are sent already screwed in the supports, inside the equipment package

These strengthening supports does not require the usage of nut-cages, because it has his holes threaded, remaining only to choose the height unit in the rack, place the supports in the internal position inside the rack and fasten its screws.

To install the strengthening supports and the equipment in the rack, read the following described procedure (steps from 1 to 3 to install one switch, and steps from 1 to 5 to install two switches).

1. The strengthening supports have four threaded holes, each one. Fix the supports in the rack using only the superior holes, as illustrated in the Figure 22, and check if its properly stuck in the rack;
2. Place the equipment's chassis carefully into the rack, ensuring it's precisely conditioned in both sides in the strengthening supports, according Figure 23;
3. Tighten the screws in order to ensure that the equipment is appropriately steady in the rack.
4. To insert another DM4100 48 ports model, remove the superior screws in order to insert the second chassis. At this moment, the equipment already installed and the screws inserted in the step 3 will sustain the equipment in the rack
- Place the second chassis over the first one and screw it in the rack using the upper holes of the strengthening supports as shown in Figure 24.

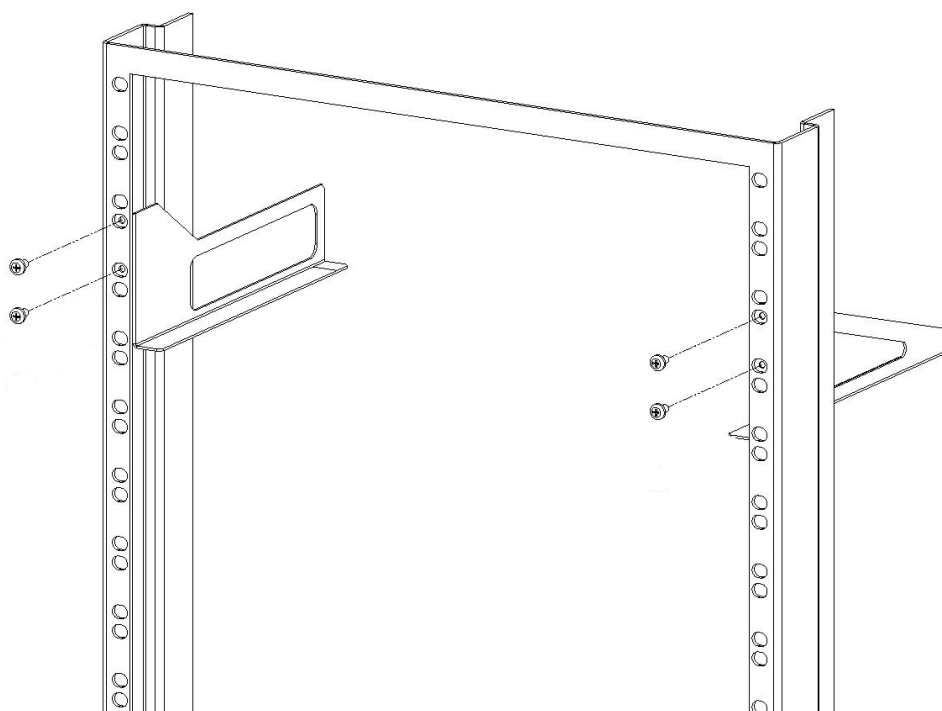


Figure 22. Strengthening Supports Installed in the Rack

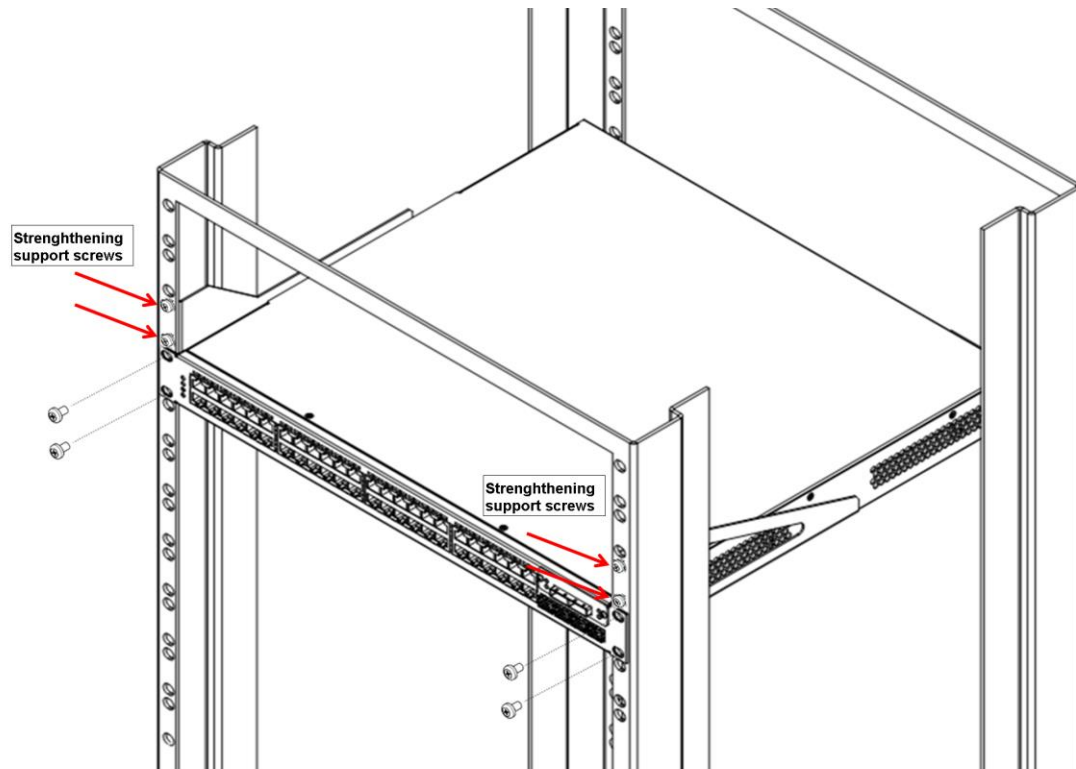


Figure 23. Two DM4100 Chassis with One Strengthening Support

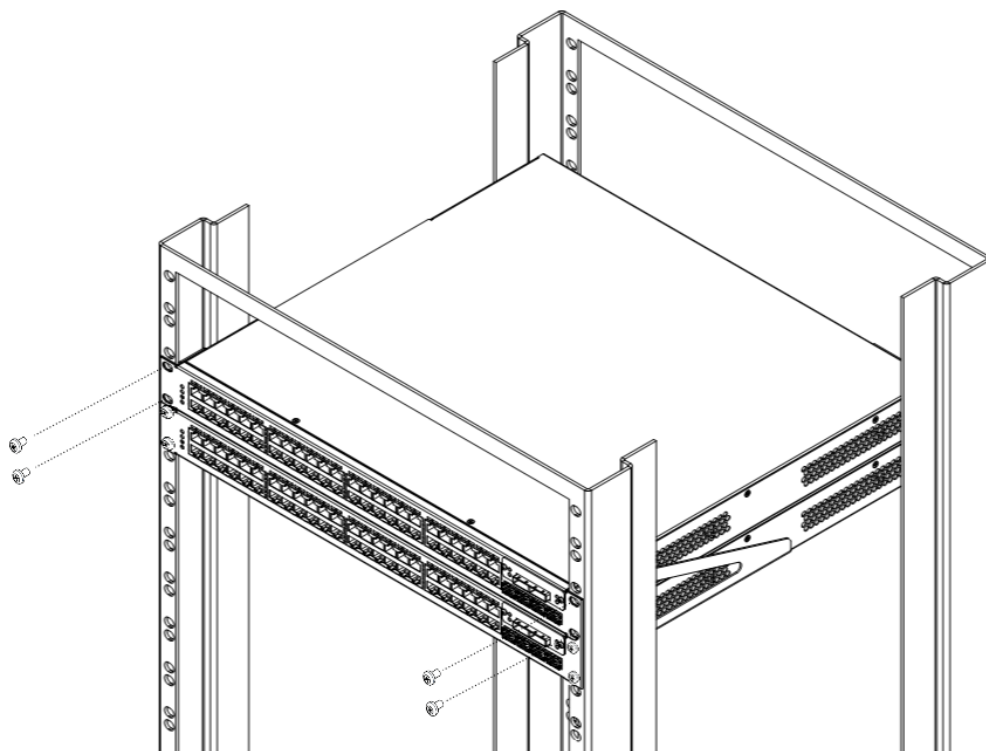


Figure 24. DM4100 with Strengthening Supports in the Rack

6.3.3. Air Flow and Clearance Required Area

To start the device installation, see the following figures to ensure the correct air flow within the equipment. Not following this guidelines, may cause malfunctioning of the equipment.

The items 6.3.4 e 6.3.5 will display the air flow and the ventilation areas which must be unobstructed in both 24 and 48 ports chassis. It's necessary to observe the figures and attempt to the required distances to ensure the correct installation of the equipment in the rack.

6.3.4. Air Flow and Ventilation Area in 24 Ports Model

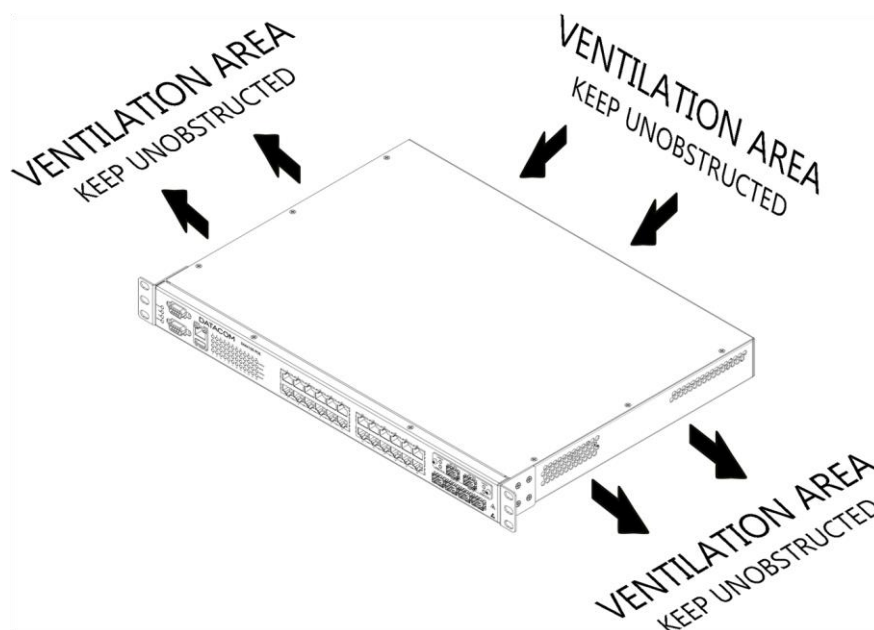


Figure 25. DM4100 24 Ports Air Flow

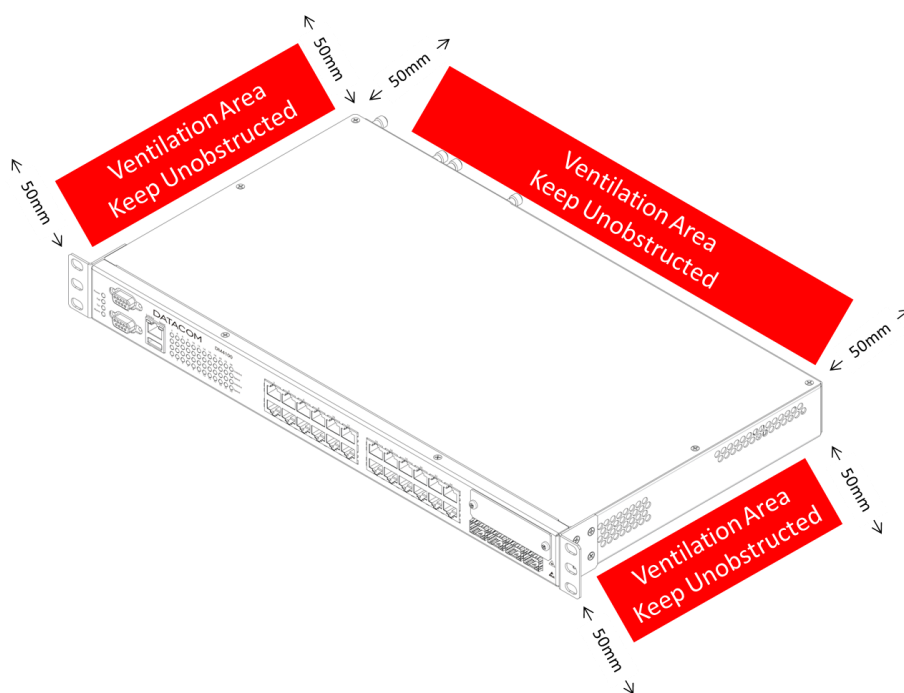


Figure 26. DM4100 24 Ports Ventilation Area

6.3.5. Air Flow and Ventilation Area in 48 Ports Model

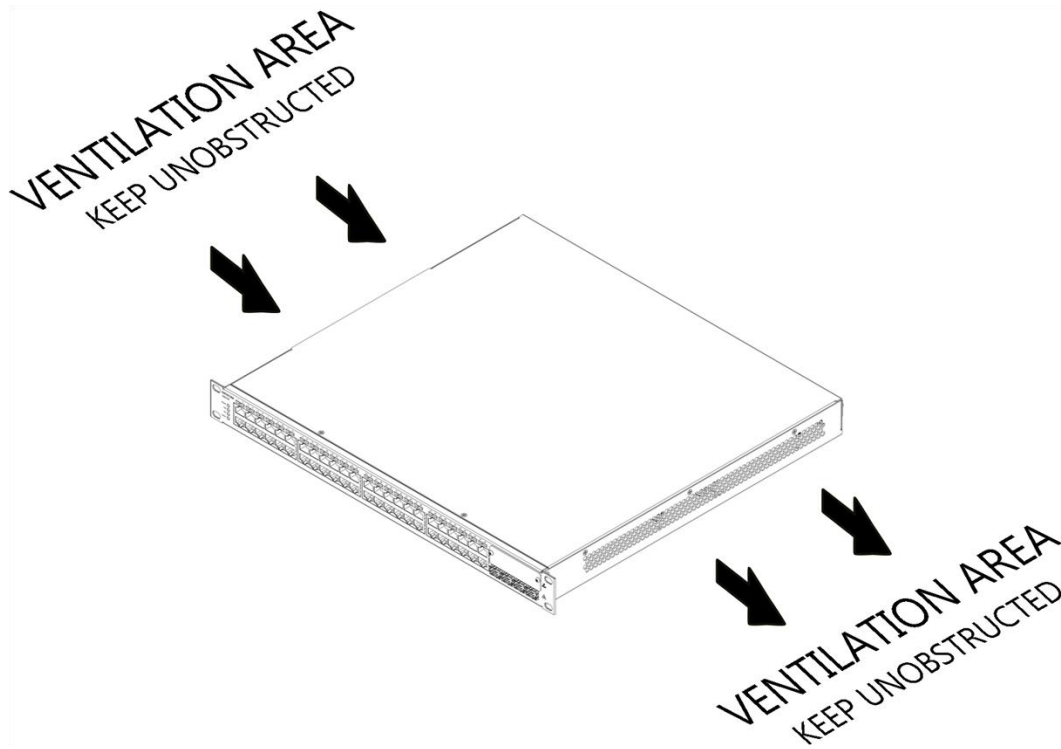


Figure 27. DM4100 48 Ports Air Flow

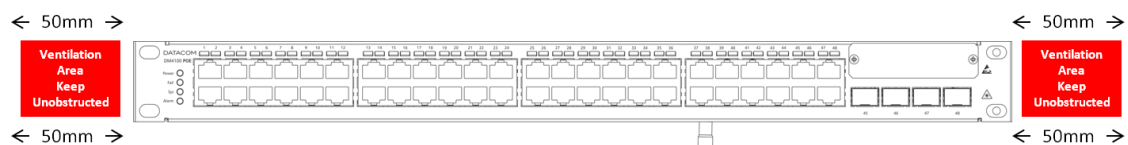


Figure 28. DM4100 48 Ports Ventilation Areas

6.4. Installing the Equipment without a Rack

To use the equipment outside a rack, you may remove the side brackets that come attached to the equipment. Use a Phillips screwdriver to remove them (only possible in DM4100 24 Port models).

After removing the brackets, choose a flat surface near an AC power source to place the equipment.

For any DM4100 model is necessary to attempt to keep the air flow areas of the equipment unobstructed, according the figures above. For security, the equipment must have their air flow areas up to 50cm away from any obstruction. These precautions will ensure proper functioning of equipment.

6.5. Powering the Equipment



The plug is the disconnection device on the equipment. The socket outlet, where the supply cable is connected, must be positioned near the equipment and have easy access.



Before connecting any cable to the equipment, be sure that the grounding system is functional.

After installing the equipment, plug one end of an IEC-320 standard power cable into the AC receptacle located at the rear panel of the equipment and the other end into the local power source outlet. The Power LED should light up, indicating the equipment is correctly powered.

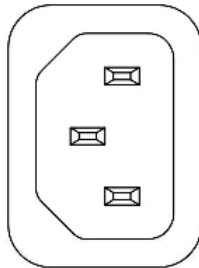


Figure 29. DM4100 Power Connectors

If the equipment is using a DC power supply, the power cable should be cut off near the AC sockets connection plug. Must be identified the ground wire which corresponds to the connector central pin. This wire must be connected as ground (GND) in the power supply system, and the two other wires will provide the power supply to the equipment. Its polarity will follow the specifications of Figure 30.

The equipment shelf is connected directly to protection ground.

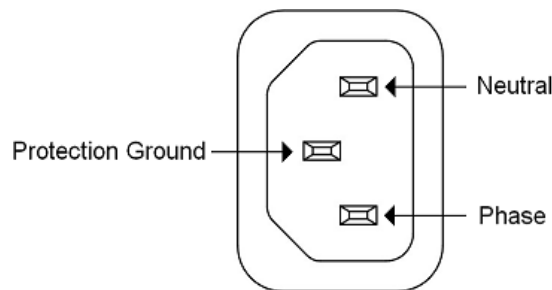


Figure 30. AC/DC Power Supply Connector

6.6. Installing/Removing the Hot-Swap Power Unit

The DM4100 ETH24GX and ETH24GT+4GC series are able to work with one or two Hot-Swap Power Units. Follow the next instructions to install or remove a Power Unit:

6.6.1. Installing a Power Unit:

- Use a Phillips screwdriver to remove the screws that attach the protection panel of the Power Unit's site (if present);
- Insert the PSU into the slot and slide it through the track. After it reaches the backplane, press it firmly to ensure it is properly placed;
- Use your fingers to attach the two big silver plated screws placed on the Power Unit's panel to secure it on its slot.

- Insert the power cord and check if the LED “ON” lights up. It will indicate that the power unit is working normally.

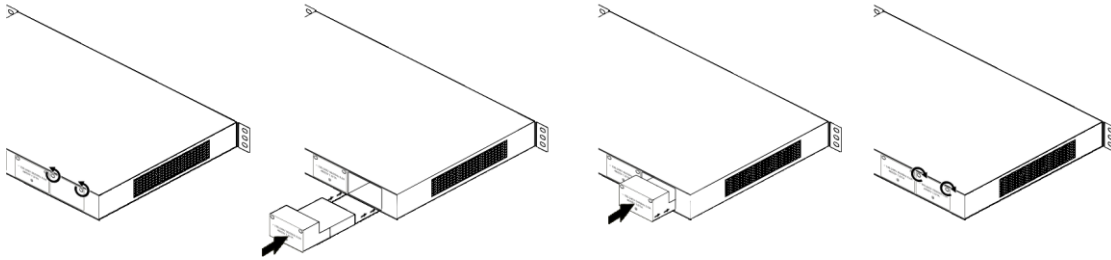


Figure 31. Inserting PSU in DM4100

6.6.2. Removing a Power Unit:

- Remove the power cord from the power unit. If the LED is working normally and this is not the reason of the exchange of the device, check if it turns off by removing the power cord;
- Use your fingers to detach the two big silver plated screws placed on the Power Unit's panel;
- Pull the PSU, using the screws as knobs, and remove it outside the slot;
- If no other Power Unit is to be put into the same slot, attach the protection panel (if you have one) using a Phillips screwdriver.

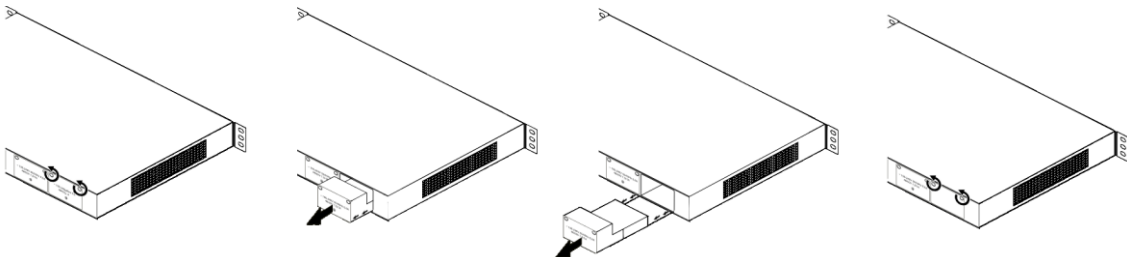


Figure 32. Removing PSU from DM4100



If there are no other power unit connected in the equipment, it will turn off.

7. MAKING CONNECTIONS

This chapter describes how SFP modules should be installed and removed. It also informs about DATACOM recommendations on cleanness and storing optical modules and fibers.

The SFP (Small Form-factor Pluggable) modules are applied in the equipment's SFP ports, operating as transceivers between the equipment and the selected optical communication path.

In order to ensure a good health and high performance of the equipment is very important to follow the next guidelines which DATACOM recommends.

- **Optical Cords Care**
 - Keep the unused optical cords always with the protection covers. The nucleus of the optical cords may get dirty and provoke loss of performance just by being kept uncovered, even placed inside appropriated cabinet;
 - Perform the cleanness of the optical cord nucleus before use them. To perform the cleanness procedure, must be used specific material only. Any other used material for the optical cord nucleus cleanness may cause loss of performance of the equipment or even irreparable damage in the optical cords.
- **Optical Modules Care**
 - To handle the optical modules, it must be performed always using a grounded wrist strap;
 - For transporting and storing the optical modules, always must be used the original packing box in order to prevent any physical or electrostatic damage in the module.
 - The unused modules must always be stored with its protection cover cage inserted in order to avoid the ingress of dirt, which may cause loss of performance of the link.



Signals over fiber optic cables are transmitted via LASERs. Although the LASERs are compliant with the requirements of Class 1 LASER Products and are eye safe in normal conditions, never look directly at a transmission port when it is in operation.



During any work execution in the equipment, certify that the technician responsible for the modification is using the appropriate protections. The grounding (and use of grounded wrist strap) can avoid damages for the technician's health as well as for the equipment.



The DATACOM SFP and XFP modules are tested to fulfill the INF-8074i and IEC60825-1 Specification. Non-approved modules do not guarantee the correct operation of the equipment and can damage the interface cards. From Firmware Version 12.4 onwards, DATACOM equipment will allow the usage of non-homologated SFPs. However, in previous firmware versions, DATACOM equipment will check if the SFP is homologated and if not, it will perform the lockout of the module. Contact the technical support of DATACOM to further information about the risks of usage of non-homologated SFP and the possibility of unlock them.

7.1. SFP Module Installation

Insertion or removal of SFP transceivers can be performed without turning off the switch. The modules are hot-swappable, but make sure there are no network optical cords connected to the module before removing it.

The installation of SFP modules is simply executed by fitting the module into the equipment's SFP slot and by pushing it until it will be fixed. The right position to fit it can be checked on Figure 33.

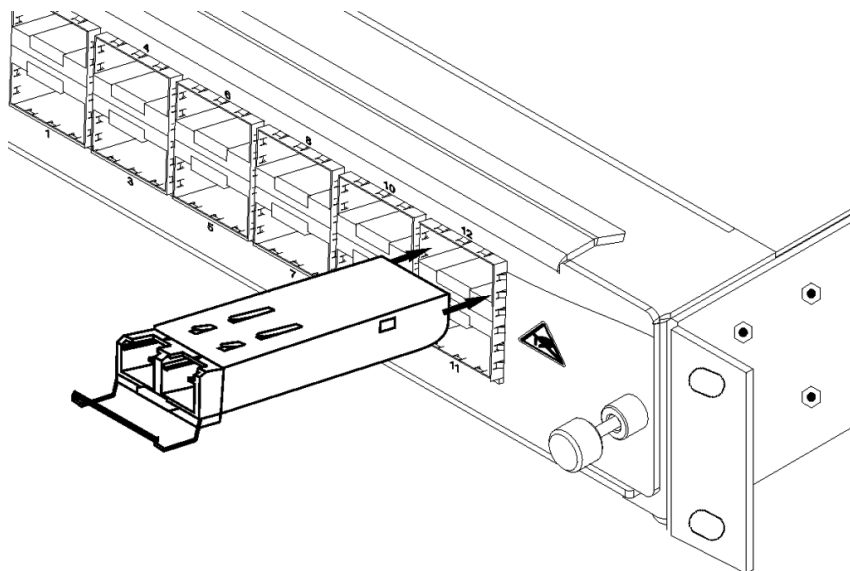


Figure 33. SFP Modules Installation

After the module fitting, fasten the security latch according to Figure 34. It will work as a safety catch for the optical fibers, whenever they will be connected.

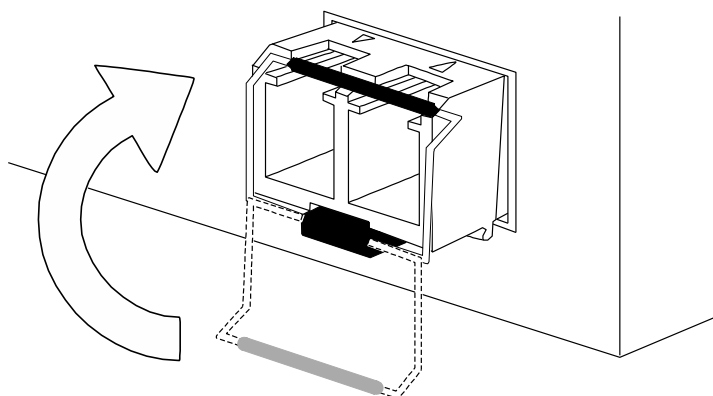


Figure 34. Security Latch

As soon as the latch is positioned, connect the optical fibers.

7.2. SFP Modules Removal



Before removing the optical fibers it is recommended to verify if there is any mark/instruction, indicating which fiber should be connected to which module.

Follow the installation's inverse order for modules removal:

- Remove the fiber optical.
- Drop the security latch.
- Pull the module by the latch, according to Figure 35.

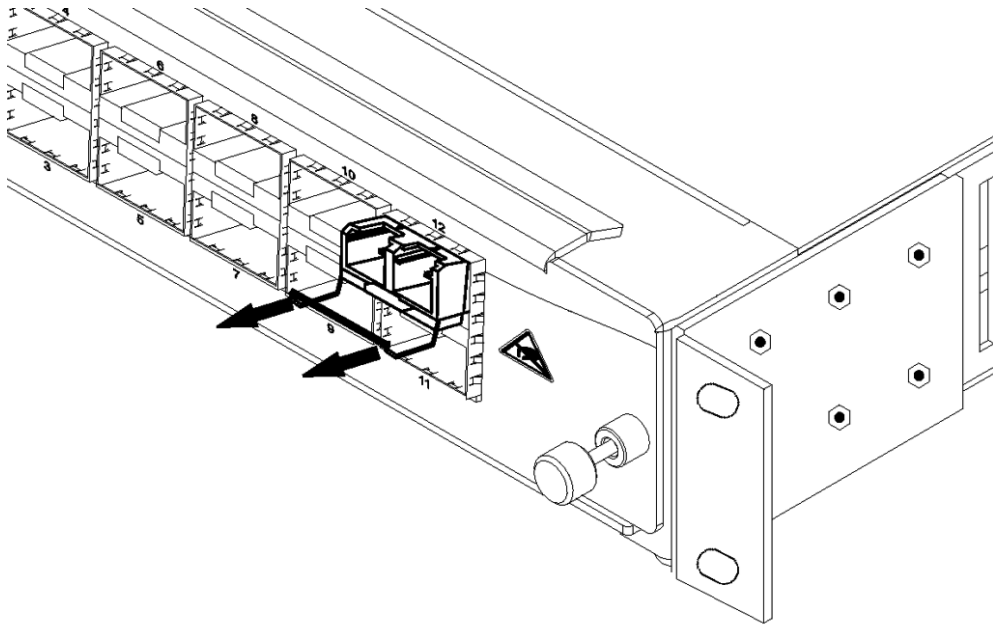


Figure 35. Removing the SFP Module

7.3. Transceiver Models

SFP Module	Data Rate	Lambda	Maximum Length
100BASE-SX	125Mbit/s	1310nm	2 km
100BASE-LX	125Mbit/s	1310nm	30 km
100BASE-LX+	125Mbit/s	1310nm	40 km
100BASE-LH	125Mbit/s	1550nm	100 km
100BASE-LZ	125Mbit/s	1550nm	120 km
100BASE-BX20-U	125Mbit/s	1550nm / 1310nm	20 km
100BASE-BX20-D	125Mbit/s	1310nm / 1550nm	20 km
100BASE-BX60-U	125Mbit/s	1550nm / 1310nm	60 km
100BASE-BX60-D	125Mbit/s	1310nm / 1550nm	60 km
1000BASE-SX	1.25Gbit/s	850nm	550 m
1000BASE-LX	1.25Gbit/s	1310nm	10 km
1000BASE-LX+	1.25Gbit/s	1310nm	30 km
1000BASE-LH	1.25Gbit/s	1550nm	80 km
1000BASE-LZ	1.25Gbit/s	1550nm	120 km
1000BASE-LZ150	1.25Gbit/s	1550nm	150 km
1000BASE-BX10-U	1.25Gbit/s	1490nm / 1310nm	10 km
1000BASE-BX10-D	1.25Gbit/s	1310nm / 1490nm	10 km
1000BASE-BX20-U	1.25Gbit/s	1490nm / 1310nm	20 km
1000BASE-BX20-D	1.25Gbit/s	1310nm / 1490nm	20 km
1000BASE-BX60-U	1.25Gbit/s	1490nm / 1310nm	60 km
1000BASE-BX60-D	1.25Gbit/s	1310nm / 1490nm	60 km
2500BASE-SX	2.5Gbit/s	1310nm	2 km
2500BASE-LX	2.5Gbit/s	1310nm	15 km
2500BASE-LX+	2.5Gbit/s	1310nm	40 km
2500BASE-LH	2.5Gbit/s	1550nm	80 km
2500BASE-LZ	2.5Gbit/s	1550nm	120 km
2500BASE-BX20-U	2.5Gbit/s	1490nm / 1310nm	20 km
2500BASE-BX20-D	2.5Gbit/s	1310nm / 1490nm	20 km
2500BASE-BX40-U	2.5Gbit/s	1490nm / 1310nm	40 km
2500BASE-BX40-D	2.5Gbit/s	1310nm / 1490nm	40 km
10GBase-LRM (XFP)	10Gbit/s	1330nm	260 m
10GBase-SR (XFP)	10Gbit/s	850nm	300 m
10GBase-LR (XFP)	10Gbit/s	1310nm	10 km
10GBase-ER (XFP)	10Gbit/s	1550nm	40 km
10GBase-ZR (XFP)	10Gbit/s	1550nm	80 km
10GBase-ZR120 (XFP)*	10Gbit/s	1550nm	120 km
10GBase-BX20-U (XFP)	10Gbit/s	1330nm / 1270nm	20 km
10GBase-BX20-D (XFP)	10Gbit/s	1270nm / 1330nm	20 km
10GBase-LRM (SFP+)	10Gbit/s	1310nm	260 m
10GBase-SR (SFP+)	10Gbit/s	850nm	300 m
10GBase-LR (SFP+)	10Gbit/s	1310nm	10 km

Table 21. Transceiver Models

* It reaches up to 120km using an external booster.

7.4. Connecting the DM4100 in a Stack Configuration

DM4100 family supports two stacking topology configurations: the line and the ring topologies. Can be assembled stacking topologies with up to eight pieces. In line-topology, there's one cable connecting each Ethernet switch to its neighbor, according Figure 36.

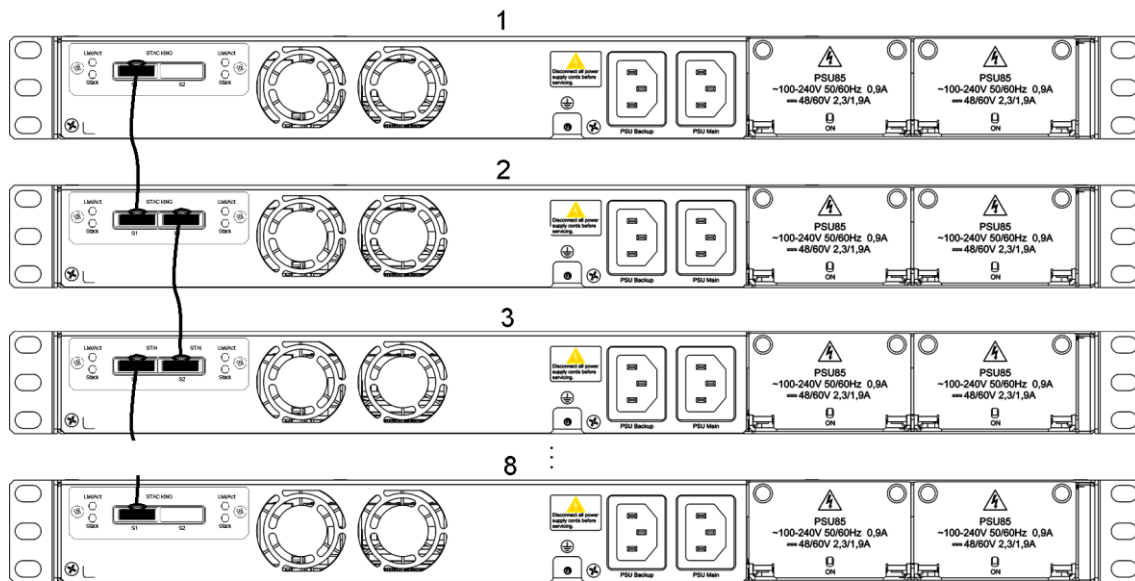


Figure 36. Line Stacked Switches Example

In ring-topology, a redundant path is formed by the cable which connects the bottom switch to the top switch of the stack, according Figure 37.

In DM4100 models featuring dedicated stacking ports, the connections should be performed only using DATACOM Stacking cables. There are 2 lengths available: 0.5m and 1m.

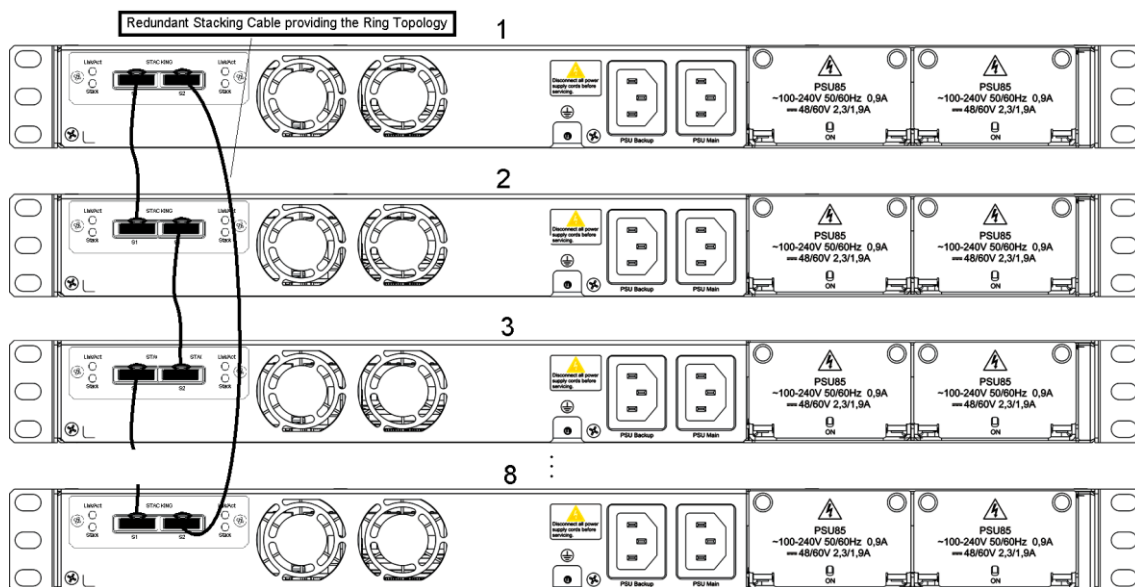


Figure 37. Ring Stacked Switches Example

In DM4100 models featuring XFP ports at the rear panel, stacking connections should be build using XFP transceivers and fiber optic cables. In this mode of operation, stacking speed will be limited to 40Gbit/s per equipment.



Either the stacking cables and the XFP modules are not included in the equipment package and must be purchased separately.

8. DM4100 RPU



Figure 38. DM4100 RPU Bayface

8.1. Specification and Installation

The DM4100 RPU (Remote Power Unit) is an external device with 1U height for 19-inch racks. It is illustrated in Figure 39.

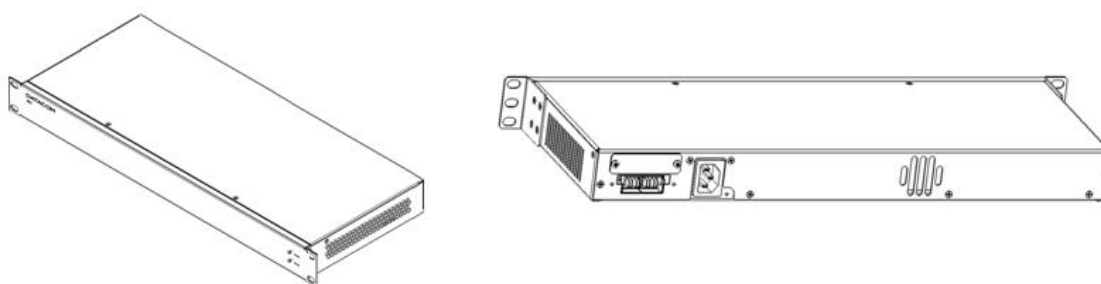


Figure 39. DM4100 RPU

This power supply has an AC input through a power cord with a three-prong plug termination (sent with the RPU) and one DC output power, through a cable with a Power Blade connector (not sent, must be purchased separately).

DATACOM offers three DM4100 RPU models to power with DC voltage the DM4100 Series products, one RPU for each switch model. This power supplies are used to provide the system power redundancy in the DM4100 Series models or to provide enough power to delivery PoE+ in all equipment ports (only possible in DM4100 ETH20GP+4GC and DM4100 ETH44GP+4GC).

The compatibility of DM4100 RPU and chassis models is described in Table 22.

DM4100 Model	Power
DM4100 ETH44GT + 4GC (redundancy)	300W
DM4100 ETH20GP + 4GC (redundancy or load balance)	500W
DM4100 ETH44GP + 4GC (redundancy or load balance)	1000W

Table 22. DM4100 RPU and Chassis Compatibility



Different mounting configurations are not allowed.

The power supply must be installed in the rack near to the equipment which will be powered, observing also the distance to the AC power source that will be connected to the RPU.

To connect the RPU to the equipment, read the next instructions:

1. Install the RPU in the rack, near the DM4100;
2. Before turn the RPU on, is mandatory to make the connection of the DM4100 and the RPU. To perform this connection, insert one end of the connector in the DC output of the RPU and the other end in the DC input of the DM4100, using the Power Blade connector;
3. Insert the AC power cord form the AC power source in the RPU and check if the Power LED will light up. It will ensure that the DM4100 RPU is correctly turned ON.



Is very important perform the step 2 carefully. Turning on at first the RPU and later perform its connection to the switch may cause irreversible damages in the equipment.

The DC power cables to connect the RPU and the switch may vary due to its length. In the following table are described the size specifications of each cable and its DATACOM's code.

Cable Model	Datacom Code
Cable DM4100 RPU - Power Blade - 1m	710.0298.xx
Cable DM4100 RPU - Power Blade - 3m	710.0299.xx

Table 23. DC Cable Specifications

8.2. Redundancy and PoE+ Provision

If a DM4100 RPU is connected to a DM4100 ETH44GT+4GC model, it will provide redundancy of its equipment power system. If the internal power supply fails, the equipment will stay up and running, powered by the DM4100 RPU.

To the switch models which the RPU provides PoE+ in all equipment ports, there are two different configurations for the supply mode. These configurations are performed via software by the switch DM4100, and works as follow:

If an RPU is powering a switch DM4100 ETH20GP+4GC model, or a DM4100 ETH44GP+4GC model, the operator will manage the power configuration mode that the RPU will works. The RPU can work in load sharing with the internal power supply (to provide PoE+ in all equipment ports) or as a redundant power supply. If the RPU is configured to works in a redundant power supply mode, if a failure occurs in the internal power of the equipment, it will be sustained by the DM4100 RPU. But, if the RPU is configured to work in the load sharing mode, if a failure occurs in its internal power supply, is not guaranteed that the equipment functionalities will still properly working.

8.2.1. PoE and PoE+ Behavior

In the DM4100 PoE+ 24 ports model, the equipment provides PoE power in the 24 ports of the equipment, and PoE+ in only 12. In the 48 ports model, it enables PoE in all 48 ports and PoE+ in only 24.

Using the DM4100 RPU in these DM4100 models and configuring the DM4100 RPU for the load sharing mode, the equipment will perform the load balance with the internal power supply, in order to provide enough power to delivery PoE+ in all 24 or 48 ports of the switch.

The PoE models are DM4100 ETH20GP+4GC and DM4100 ETH44GP+4GC.

8.2.2. Ports with PoE+ Variation Due to High Temperature

The behaviors of PoE+ delivery in the Ethernet ports described above are conditioned to the equipment operation temperature.

The description of power supply from the RPU to the equipment Ethernet ports is only valid if the equipment is working in temperature sub 50°C. If the temperature is between 50°C and 55°C, there will have a power limitation available to the PoE interfaces.

This limitation due to temperature variation is described in Table 24.

Equipment Temperature up to 50°C		
Model	Without RPU	With RPU
24 Ports	Up to 12 PoE+ ports or equivalent consumption	Up to 24 PoE+ ports or equivalent consumption
48 Ports	Up to 24 PoE+ ports or equivalent consumption	Up to 48 PoE+ ports or equivalent consumption

Equipment Temperature Between 50°C and 55°C		
Model	Without RPU	With RPU
24 Ports	Up to 9 PoE+ ports or equivalent consumption	Up to 21 PoE+ ports or equivalent consumption
48 Ports	Up to 20 PoE+ ports or equivalent consumption	Up to 43 PoE+ ports or equivalent consumption

Table 24. PoE+ Ports with Temperature Variation

The power specifications of RPU models are described in Table 25.

Model	Input Voltage	Output Power
DM4100 RPU 300W	100~240 V _{AC}	300W
DM4100 RPU 500W	100~240 V _{AC}	500W
DM4100 RPU 1000W	100~240 V _{AC}	1000W

Table 25. DM4100 External RPUs Specification

The rear panel of the RPU, with the power input and output indications, is illustrated in the next figure.

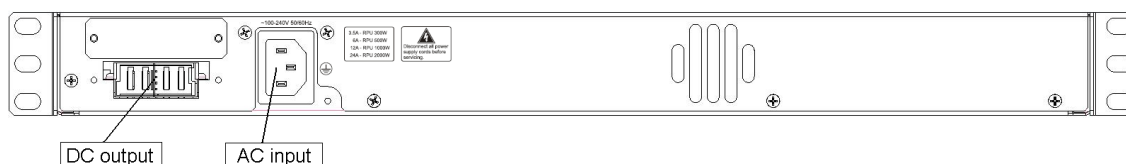


Figure 40. DM4100 RPU Rear Panel

9. UNDERSTANDING POE (IEEE 802.3AF) & POE+ (IEEE 802.3AT)

9.1. Description

The Power Source Device (PSE) injects power in the center tap of the line transformer enabling the power to be sent by Ethernet cable to the Powered Device (PD). The power sent by PSE and received by the PD varies from a minimum value specified by the standard classes up to the output PSE power. Due to the Ethernet connection can be done with a straight or a cross Ethernet cable, the PD uses a diode bridge rectifier and a DC/DC converter to generate its internal power.

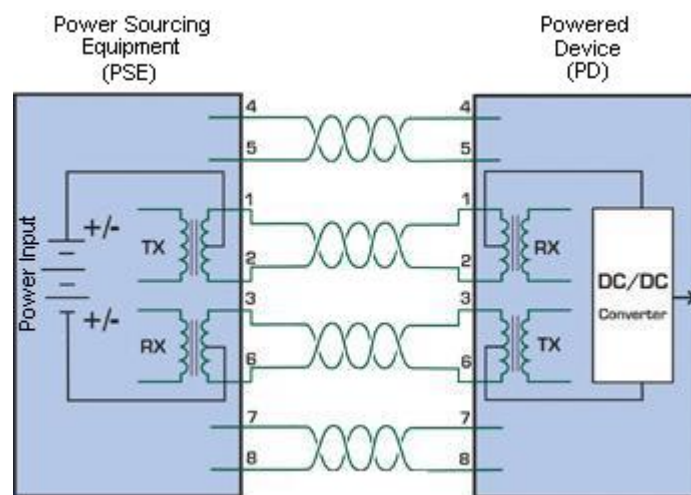


Figure 41. PoE Basic Concept

The IEEE 802.3af and IEEE 802.3at standards define five classes of power that need to be negotiated by the PSE and PD at the PoE / PoE+ initialization. The class four is only valid for IEEE 802.3at (PoE+) devices and is reserved in IEEE 802.3af (PoE).

Class	PSE Power Output Level (W)	Range of Maximum Power Used by the PD (W)
0	15.4	0.44 to 12.95
1	4	0.44 to 3.84
2	7	3.84 to 6.49
3	15.4	6.49 to 12.95
4	34.2	12.95 to 25.50

Table 26. DM4100 PoE / PoE+ Classes

The difference between both columns happens due to cable power loss.

Information	IEEE 802.3af (PoE)	IEEE 802.3at (PoE+)
PSE Output Voltage	44 to 57 VDC	50 to 57 VDC
PD Input Voltage	37 to 57 VDC	42.5 to 57 VDC
Maximum Current	350mA	600mA
Supported Cabling	CAT 3, CAT5, CAT 6	CAT5, CAT 6

Table 27. PoE / PoE+ Additional Information

The PoE / PoE+ negotiation has four steps:

1. Validation of PD connected to the port;
2. Identification of the class which will attend the PD;
3. Start-up the power process;
4. PD enters in normal operation.

In case of the first two steps did not have finished properly (per example for a non-PoE link), the port will not deliver power to the cable. Depending of the software configuration, it is possible to do not start the start-up process if the PD is not supported by the PSE or if the PSE does not have enough power to supply to the PD.

9.2. PoE & PoE+ in DM4100 Family

The DM4100 family has two series, ETH20GP+4GC and ETH44GP+4GC that are fully compatible with PoE (IEEE 802.3af) and PoE+ (IEEE 802.3at) in all electrical ports. Both series, besides guaranteeing the supply of the equipment switch functions, can also guarantee the maximum output power (15.4W) on all ports for PoE applications without the usage of an external RPU supply. For PoE+ applications the Software controls the links in all ports and depending of the amount of power available it will release power to the port. Using an external RPU supply it is possible to reach the maximum output power (34.2W) in all the ports (PoE+).

Information	DM4100 ETH20GP+4GC+4XX	DM4100 ETH44GP+4GC+4XX
Available PoE / PoE+ Ports	24 Ports	48 Ports
Guaranteed power for PoE and PoE+ Applications	430 Watts	879 Watts
Minimum ports in PoE applications available	24 Ports	48 Ports
Minimum ports in PoE+ applications available without the use of an external RPU	12 Ports	25 Ports
Minimum ports in PoE+ applications available with the using external 500W RPU	24 Ports	NA
Minimum ports in PoE+ applications available with the using external 1000W RPU	NA	48 Ports

Table 28. DM4100 PoE / PoE+ Support Information

The above values are examples using worst case internal power consumptions. Use maximum power values in Table 17 to calculate available PoE Power in all DM4100 Models.

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