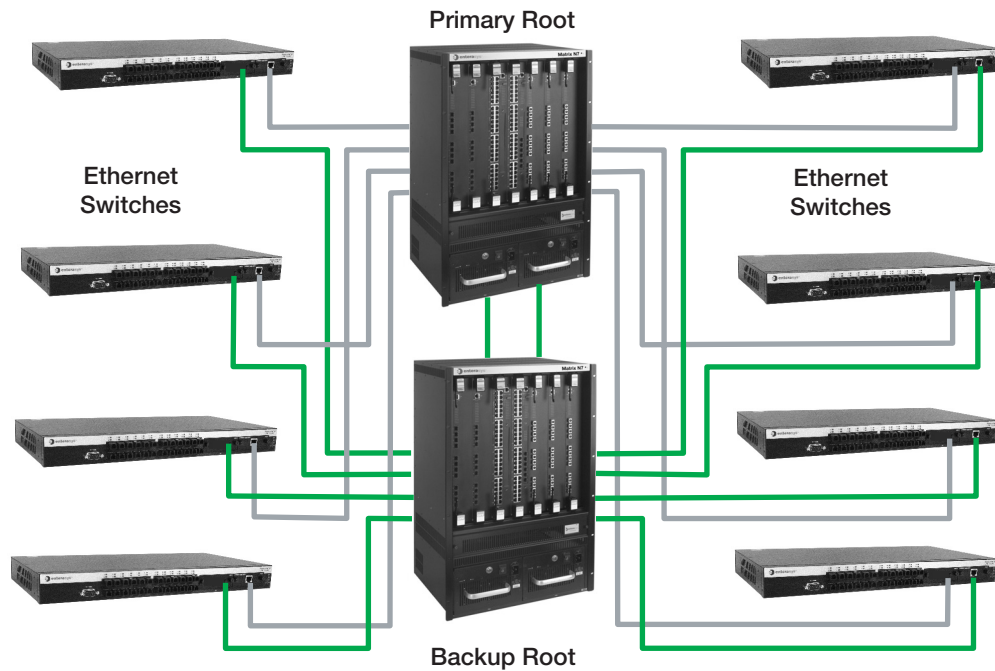


I/A Series® Hardware

PSS 21H-7C3 B4

The MESH Control Network Ethernet Equipment



The MESH control network utilizes Invensys qualified Ethernet equipment to allow you to configure your system to meet your functional, performance, and plant requirements.

FEATURES

- ▶ System scalability by interconnecting Ethernet switches, each having 16-ports or more in various increments
- ▶ Support for Fast Ethernet (100 Mbps) and Gigabit (uplink only) Ethernet (1000 Mbps)
- ▶ Modular uplinks to high-speed backbones using 1 Gb 1000Base-T, 1000Base-LX/SX and 1000Base-LX/LH standards
- ▶ Full duplex operation based on the IEEE 802.3 standards
- ▶ Rapid Spanning Tree Protocol (RSTP), which manages redundant paths, prevents loops, and provides high speed convergence time for a network
- ▶ Network management and configuration via local port
- ▶ System Management software for monitoring the health of the control system and managing equipment in the system
- ▶ Ethernet switches and converters are European Union (EU) Low Voltage and EMC directives safety certificated ("CE" logo marked on product).

INTRODUCTION

The MESH control network equipment described herein has been tested and qualified by Invensys for use with I/A Series® system products.

The qualified Ethernet switches offered are listed in Table 1. The qualified Media Converter offered is listed in Table 2.

Table 1. Qualified Ethernet Switches

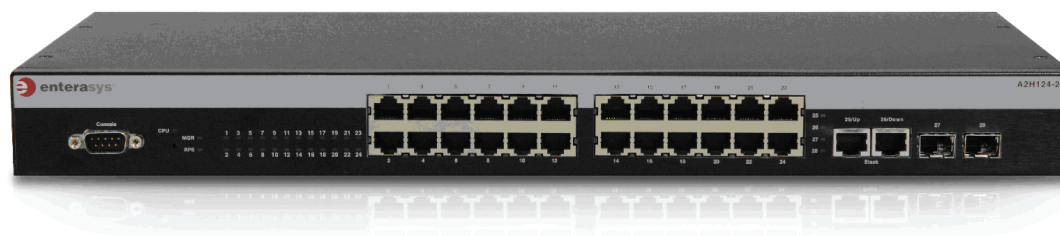
Switch	Page Reference
24-Port Copper managed switch (P0973BH) with two RJ-45 uplink ports and two ports for Mini-GBIC modules	page 3
24-Port Fiber managed switch (P0973BJ) with two RJ-45 uplink ports and two ports for Mini-GBIC modules	page 6
8-Port Copper/ 8-Port Fiber managed switch (P0973BK) with two RJ-45 uplink ports and two ports for Mini-GBIC modules	page 9
24-Gigabit (SFP ^(a)) Port managed switch (P0973BL) with twenty-four ports for Mini-GBIC modules	page 12
N1 Chassis managed switch (P0973AR) with up to 48-ports with six 1 Gb uplink connector ports, configured as fiber or copper uplinks	page 19
N3 Chassis managed switch (P0973AS) with up to 144-ports with eighteen 1 Gb uplink connector ports, configured as fiber or copper uplinks	page 23
N7 Chassis managed switch (P0972YE) with up to 336-ports with forty-two 1 Gb uplink connector ports, configured as fiber or copper uplinks	page 27

(a) Small Form Factor Pluggable

Table 2. Qualified Media Converter

Media Converter	Page Reference
Media Converter 100Base-FX to 100Base-TX (P0972XH)	page 32

24-PORT COPPER MANAGED SWITCH (P0973BH)



FEATURES

The 24-Port Copper managed switch features:

- ▶ 24-ports of 100Base-TX
- ▶ Two fixed RJ-45 10/100/1000 ports, configurable for uplink
- ▶ Two 1000Base-X uplink Gigabit (SFP) ports
- ▶ Full duplex operation
- ▶ Monitoring and configuration tasks via local console port, or any SNMP/RMON based management application.
- ▶ Port mirroring technology and diagnostics that allow local network traffic to be redirected to an external probe for detailed analysis
- ▶ Compliance with industry standards, including IEEE 802.3u Fast Ethernet, 802.1w Rapid Spanning Tree Protocol (RSTP)
- ▶ Optional redundant power supply
- ▶ Shelf, desk, or 19-inch rack mounting.

INTRODUCTION

The 24-Port Copper managed switch (P0973BH) provides twenty-four 100Base-TX ports with RJ-45 connectors, two fixed 10/100/1000 uplink ports and two 1000Base-X uplink Gigabit (SFP) ports. The two 1000Base-X uplink Gigabit (SFP) ports can be populated with MGBIC uplink connector modules (P0972WT, P0972WU, P0972YQ, or P0972YL).

The switch allows high-performance, full-featured layer-2 Ethernet switching in small to medium-sized network applications, as well as high-performance direct end-station connectivity.

OPTIONAL REDUNDANT POWER SUPPLY

See “Redundant Power Supply (P0973BP)” on page 15.

UPLINK/SWITCH INTERFACES

Table 3 lists the 24-Port Copper switch and the uplink interfaces that can be added to the switch. The uplink connectors are added to specific uplink interfaces.

Table 3. 24-Port Copper Managed Switch (P0973BH) Interfaces

Switch		Uplink Ports (on Switch)	Uplink Connectors (Add to Interfaces)	
Description	Invensys Part No.	Description	Description	Invensys Part No.
24-Port Copper managed switch with two RJ-45 ports for uplink and two ports for Mini-GBIC modules	P0973BH	Two 1 Gb uplink RJ-45 ports, 1000Base-T for Cat5 copper cables	n/a	
		Two 1 Gb uplink ports, 1000Base-X, for Mini-GBIC modules	Uplink module 1000Base-SX with LC connector	P0972WT - 275 m (900 ft) with MMF
			Uplink module 1000Base-LX with LC connector	P0972WU - 10 km (6.2 mi) with SMF
			Uplink module 1000Base-LX/LH with LC connector	P0972YQ - 2 km (1.25 mi) with MMF
			Uplink module 1000Base-T with RJ-45 connectors	P0972YL - 100 m (330 ft)

FUNCTIONAL SPECIFICATIONS

24-PORT COPPER MANAGED SWITCH (P0973BH)

Power

INTERNAL

ac Input power (auto-sensing)
100 V ac to 240 V ac, 50 to 60 Hz

EXTERNAL

Supports connection for redundant power supply

HEAT DISSIPATION

99 BTU/Hr

POWER CONSUMPTION

29 Watts maximum

MAXIMUM CURRENT

0.5 A at 110 V ac, 0.47 A at 220 V ac

ENVIRONMENTAL SPECIFICATIONS

Operating Conditions

TEMPERATURE

0 to +40°C (32 to +104°F)

RELATIVE HUMIDITY

5 to 95% (noncondensing)

Storage Conditions

TEMPERATURE

-40 to +70°C (-40 to +158°F)

RELATIVE HUMIDITY

5 to 95% (noncondensing)

PHYSICAL SPECIFICATIONS

Mounting

Desk or Enclosure - 48.3 cm (19-inch) equipment rack, 1U high

Dimensions - Nominal

HEIGHT

4.4 cm (1.7 in)

WIDTH

44.1 cm (17.36 in)

DEPTH

21.0 cm (8.3 in)

Mass - Approximate

2.61 kg (5.8 lb)

Cable Connectors

SWITCH PORTS

RJ-45

UPLINK PORTS

RJ-45 copper and LC fiber

Vibration

Vibration - IEC 68-2-36, IEC 68-2-6

Shock - IEC 68-2-29

Drop - IEC 68-2-32

REGULATORY COMPLIANCE AND CERTIFICATION

Electromagnetic Compatibility (EMC)

Industry Canada Class A, EN55022 and EN55024 (CISPR 22) Class A, EN61000-3-2/3, FCC Class A, VCCI V-3 Class A, C-Tick-AS/NZS CISPR 22 Class A, 47 CFR Parts 2 and 15 Class A, CSA C108.8 Class A, 89/336/EEC Class A

Product Safety

UL 60950, CSA C22.2 No. 60950, 73/23/EEC, EN 60950, IEC 60950, EN 60825, 21 CFR 1040.10

Certification for Switch

The switch is certified for use in ordinary (non-hazardous) locations.

24-PORT FIBER MANAGED SWITCH (P0973BJ)



FEATURES

The 24-Port Fiber managed switch features:

- ▶ 24-ports of 100Base-FX
- ▶ Two fixed RJ-45 10/100/1000 ports, configurable for uplink
- ▶ Two 1000Base-X uplink Gigabit (SFP) ports
- ▶ MT-RJ connectors on switch ports
- ▶ Full duplex operation
- ▶ Monitoring and configuration tasks via local console port, or any SNMP/RMON based management application.
- ▶ Port mirroring technology and diagnostics that allow local network traffic to be redirected to an external probe for detailed analysis
- ▶ Compliance with industry standards, including IEEE 802.3u Fast Ethernet, 802.1w Rapid Spanning Tree Protocol (RSTP)
- ▶ Optional redundant power supply.

INTRODUCTION

The 24-Port Fiber managed switch (P0973BJ) provides twenty-four 100Base-FX ports with MT-RJ connectors, two fixed 10/100/1000 ports for uplink and two 1000Base-X uplink Gigabit (SFP) ports. The two 1000Base-X uplink Gigabit (SFP) ports can be populated with Mini-GBIC uplink connector modules (P0972WT, P0972WU, P0972YQ, or P0972YL).

The switch allows high-performance, full-featured layer-2 Ethernet switching in small to medium-sized network applications, as well as high-performance direct end-station connectivity.

OPTIONAL REDUNDANT POWER SUPPLY

See “Redundant Power Supply (P0973BP)” on page 15.

UPLINK/SWITCH INTERFACES

Table 4 lists the 24-Port Fiber switch and the uplink interfaces that can be added to the switch. The uplink connectors are added to specific uplink interfaces.

Table 4. 24-Port Fiber Managed Switch (P0973BJ) Interfaces

Switch		Uplink Ports (on Switch)	Uplink Connectors (Add to Interfaces)	
Description	Invensys Part No.	Description	Description	Invensys Part No.
24-Port Fiber managed switch with two RJ-45 ports for uplink and two ports for Mini-GBIC modules	P0973BJ	Two 1 Gb uplink RJ-45 ports, 1000Base-T for Cat5 copper cables	n/a	
		Two 1 Gb uplink ports, 1000Base-X, for Mini-GBIC modules	Uplink module 1000Base-SX with LC connector	P0972WT - 275 m (900 ft) with MMF
			Uplink module 1000Base-LX with LC connector	P0972WU - 10 km (6.2 mi) with SMF
			Uplink module 1000Base-LX/LH with LC connector	P0972YQ - 2 km (1.25 mi) with MMF
			Uplink module 1000Base-T with RJ-45 connectors	P0972YL - 100 m (330 ft)

FUNCTIONAL SPECIFICATIONS

24-PORT FIBER MANAGED SWITCH (P0973BJ)

Power

INTERNAL

ac Input power (auto-sensing)
100 V ac to 240 V ac, 50 to 60 Hz

EXTERNAL

Supports connection for redundant power supply

HEAT DISSIPATION

174 BTU/Hr

POWER CONSUMPTION

29 Watts

MAXIMUM CURRENT

0.5 A at 110 V ac, 0.47 A at 220 V ac

ENVIRONMENTAL SPECIFICATIONS

Operating Conditions

TEMPERATURE

0 to +40°C (32 to +104°F)

RELATIVE HUMIDITY

5 to 95% (noncondensing)

Storage Conditions

TEMPERATURE

-40 to +70°C (-40 to +158°F)

RELATIVE HUMIDITY

5 to 95% (noncondensing)

PHYSICAL SPECIFICATIONS

Mounting

Desk or Enclosure - 48.3 cm (19-inch) equipment rack, 1U high

Dimensions

HEIGHT

4.4 cm (1.7 in)

WIDTH

44.1 cm (17.36 in)

DEPTH

21.0 cm (8.3 in)

Mass - Approximate

2.7 kg (5.95 lb)

Cable Connectors

SWITCH PORTS

MT-RJ fiber

UPLINK PORTS

RJ-45 copper and LC fiber

Vibration

Vibration - IEC 68-2-36, IEC 68-2-6

Shock - IEC 68-2-29

Drop - IEC 68-2-32

REGULATORY COMPLIANCE AND CERTIFICATION

Electromagnetic Compatibility (EMC)

Industry Canada Class A, EN55022 and EN55024 (CISPR 22) Class A, EN61000-3-2/3, FCC Class A, VCCI V-3 Class A, C-Tick-AS/NZS CISPR 22 Class A, 47 CFR Parts 2 and 15 Class A, and CSA C108.8 Class A

Product Safety

UL 60950, CSA 60950, EN 60950, EN 60825, IEC 60950, EN 60825, 21 CFR 1040.10

Certification for Switch

The switch is certified for use in ordinary (non-hazardous) locations.

8-PORT COPPER / 8-PORT FIBER MANAGED SWITCH (P0973BK)



FEATURES

The 8-Port Copper/8-Port Fiber managed switch features:

- ▶ 8-ports of 100Base-FX
- ▶ 8-ports of 100Base-TX
- ▶ Two fixed RJ-45 10/100/1000 ports, configurable for uplink
- ▶ Two 1000Base-X uplink Gigabit (SFP) ports
- ▶ RJ-45 Category 5 connectors on switch copper ports
- ▶ MT-RJ connectors on switch fiber ports
- ▶ Full duplex operations
- ▶ Monitoring and configuration tasks via local console port, or any SNMP/RMON based management application.
- ▶ Port mirroring technology and diagnostics that allow local network traffic to be redirected to an external probe for detailed analysis
- ▶ Compliance with industry standards, including IEEE 802.3u Fast Ethernet, 802.1w Rapid Spanning Tree Protocol (RSTP)
- ▶ Optional redundant power supply
- ▶ Shelf, desk, or 19-inch rack mounting.

INTRODUCTION

The 8-Port Copper/8-Port Fiber managed switch (P0973BK) provides eight 100Base-TX ports with RJ-45 connectors, eight 100Base-FX ports with MT-RJ connectors, two fixed 10/100/1000 ports for uplink and two 1000Base-X uplink Gigabit (SFP) ports. The two 1000Base-X uplink Gigabit (SFP) ports can be populated with Mini-GBIC uplink connector modules (P0972WT, P0972WU, P0972YQ, or P0972YL).

The switch allows high-performance, full-featured layer-2 Ethernet switching in small to medium-sized network applications, as well as high-performance direct end-station connectivity.

OPTIONAL REDUNDANT POWER SUPPLY

See “Redundant Power Supply (P0973BP)” on page 15.

UPLINK/SWITCH INTERFACES

Table 5 lists the 8-Port Copper/8-Port Fiber switch and the uplink interfaces that can be added to the switch. The uplink connectors are added to specific uplink interfaces.

Table 5. 8-Port Copper / 8-Port Fiber Managed Switch (P0973BK) Interfaces

Switch		Uplink Ports (on Switch)	Uplink Connectors (Add to Interfaces)	
Description	Invensys Part No.	Description	Description	Invensys Part No.
8-Port Copper/ 8-Port Fiber managed switch with two RJ-45 ports for uplink and two ports for Mini-GBIC modules	P0973BK	Two 1 Gb uplink RJ-45 ports, 1000Base-T for Cat5 copper cables	n/a	
		Two 1 Gb uplink ports, 1000Base-X, for Mini-GBIC modules	Uplink module 1000Base-SX with LC connector	P0972WT - 275 m (900 ft) with MMF
			Uplink module 1000Base-LX with LC connector	P0972WU - 10 km (6.2 mi) with SMF
			Uplink module 1000Base-LX/LH with LC connector	P0972YQ - 2 km (1.25 mi) with MMF
			Uplink module 1000Base-T with RJ-45 connectors	P0972YL - 100 m (330 ft)

FUNCTIONAL SPECIFICATIONS

8-PORT COPPER / 8-PORT FIBER MANAGED SWITCH (P0973BK)

Power

INTERNAL

ac Input power (auto-sensing)
100 V ac to 240 V ac, 50 to 60 Hz

EXTERNAL

Supports connection for redundant power supply

HEAT DISSIPATION

174 BTU/Hr

POWER CONSUMPTION

29 Watts

MAXIMUM CURRENT

0.5 A at 110 V ac, 0.47 A at 220 V ac

ENVIRONMENTAL SPECIFICATIONS

Operating Conditions

TEMPERATURE

0 to +40°C (32 to +104°F)

RELATIVE HUMIDITY

5 to 95% (noncondensing)

Storage Conditions

TEMPERATURE

-40 to +70°C (-40 to +158°F)

RELATIVE HUMIDITY

5 to 95% (noncondensing)

PHYSICAL SPECIFICATIONS

Mounting

Desk or Enclosure - 48.3 cm (19-inch) equipment rack, 1U high

Dimensions

HEIGHT

4.4 cm (1.7 in)

WIDTH

44.1 cm (17.36 in)

DEPTH

21.0 cm (8.3 in)

Mass - Approximate

2.7 kg (5.95 lb)

Cable Connectors

SWITCH PORTS

RJ-45 copper and MT-RJ fiber

UPLINK PORTS

RJ-45 copper and LC fiber

Vibration

Vibration - IEC 68-2-36, IEC 68-2-6

Shock - IEC 68-2-29

Drop - IEC 68-2-32

REGULATORY COMPLIANCE AND CERTIFICATION

Electromagnetic Compatibility (EMC)

Industry Canada Class A, EN55022 and EN55024 (CISPR 22) Class A, EN61000-3-2/3, FCC Class A, VCCI V-3 Class A, C-Tick-AS/NZS CISPR 22 Class A, 47 CFR Parts 2 and 15 Class A, and CSA C108.8 Class A

Product Safety

UL 60950, CSA 60950, EN 60950, EN 60825, IEC 60950, EN 60825, 21 CFR 1040.10

Certification for Switch

The switch is certified for use in ordinary (non-hazardous) locations.

24-GIGABIT (SFP) PORT MANAGED SWITCH (P0973BL)



FEATURES

The 24-Gigabit (SFP⁽¹⁾) Port managed switch features:

- ▶ 24 ports of non-blocking SFP Mini-GBIC connectivity
- ▶ Full duplex operation
- ▶ Monitoring and configuration tasks via local console port, or any SNMP/RMON based management application.
- ▶ Port mirroring technology and diagnostics that allow local network traffic to be redirected to an external probe for detailed analysis
- ▶ Compliance with industry standards, including IEEE 802.3u Fast Ethernet, 802.1w
- ▶ Rapid Spanning Tree Protocol (RSTP)
- ▶ Optional redundant power supply
- ▶ Shelf, desk, or 19-inch rack mounting.

It delivers extensive Layer 2/3/4 packet classification and marking based on any of the following:

- ▶ MAC address
- ▶ Physical port
- ▶ IP address

- ▶ IP Protocol
- ▶ IP ToS/DSCP marking
- ▶ TCP/UDP port
- ▶ IP subnet
- ▶ Routing Information Protocol (RIP v1/v2)
- ▶ Internet Control Message Protocol (ICMP)
- ▶ Address Resolution Protocol (ARP) & ARP Redirect
- ▶ Dynamic Host Configuration Protocol (DHCP) Relay
- ▶ Bootstrap Protocol (BOOTP) Relay.

INTRODUCTION

The 24-Gigabit (SFP) Port managed switch (P0973BL) provides twenty-four modular 1000Base-X Gigabit (SFP) ports. All twenty-four ports can be populated with Mini-GBIC uplink connector modules (P0972WT, P0972WU, P0972YQ, or P0972YL).

The switch allows high-performance, full-featured layer-2 Ethernet switching in small to medium-sized network applications. It has been designed to be utilized as an uplink switch in The MESH control network.

(1) Small Form Factor Pluggable

OPTIONAL REDUNDANT POWER SUPPLY

See “Redundant Power Supply (P0973BP)” on page 15.

UPLINK/SWITCH INTERFACES

Table 6 lists the 24-Gigabit (SFP) Port switch and the uplink interfaces that can be added to the switch. The uplink connectors are added to specific uplink interfaces.

Table 6. 24-Gigabit (SFP) Port Managed Switch (P0973BL) Interfaces

Switch		Uplink Ports (on Switch)	Uplink Connectors (Add to Interfaces)	
Description	Invensys Part No.	Description	Description	Invensys Part No.
24-Gigabit (SFP) Port managed switch	P0973BL	Twenty-four 1 Gb uplink ports, 1000Base-X, for Mini- GBIC modules	Uplink module 1000Base-SX with LC connector	P0972WT - 275 m (900 ft) with MMF
			Uplink module 1000Base-LX with LC connector	P0972WU - 10 km (6.2 mi) with SMF
			Uplink module 1000Base-LX/LH with LC connector	P0972YQ - 2 km (1.25 mi) with MMF
			Uplink module 1000Base-T with RJ-45 connectors	P0972YL - 100 m (330 ft)

FUNCTIONAL SPECIFICATIONS

24-GIGABIT (SFP) PORT MANAGED SWITCH (P0973BL)

Power

INTERNAL

ac Input power (auto-sensing)
100 V ac to 240 V ac, 50 to 60 Hz

EXTERNAL

Supports connection for redundant power supply

HEAT DISSIPATION

176 BTU/Hr

POWER CONSUMPTION

29 Watts

MAXIMUM CURRENT

0.5 A at 110 V ac, 0.47 A at 220 V ac

ENVIRONMENTAL SPECIFICATIONS

Operating Conditions

TEMPERATURE

5 to +40°C (41 to +104°F)

RELATIVE HUMIDITY

5 to 90% (noncondensing)

Storage Conditions

TEMPERATURE

-40 to +70°C (-40 to +158°F)

RELATIVE HUMIDITY

5 to 90% (noncondensing)

PHYSICAL SPECIFICATIONS

Mounting

Desk or Enclosure - 48.3 cm (19-inch) equipment rack, 1U high

Dimensions

HEIGHT

4.4 cm (1.7 in)

WIDTH

44.1 cm (17.36 in)

DEPTH

36.85 cm (14.5 in)

Mass - Approximate

5.32 kg (11.7 lb)

Cable Connectors

UPLINK PORTS

RJ-45 copper or LC fiber

Vibration

Vibration - IEC 68-2-36, IEC 68-2-6

Shock - IEC 68-2-29

Drop - IEC 68-2-32

REGULATORY COMPLIANCE AND CERTIFICATION

Electromagnetic Compatibility (EMC)

Industry Canada Class A, EN55022 and EN55024 (CISPR 22) Class A, EN61000-3-2/3, FCC Class A, VCCI V-3 Class A, C-Tick-AS/NZS (CISPR 22) Class A, 47 CFR Parts 2 and 15 Class A, CSA C108.8 Class A and 89/336/EEC

Product Safety

UL 60950, CSA C22.2 No. 60950, 73/23/EEC, EN 60950, and IEC 60950. The Mini-GBICs support laser connections that meet the EN 60825 and 21 CFR 1040.10 standards.

Certification for Switch

The switch is certified for use in ordinary (non-hazardous) locations.

REDUNDANT POWER SUPPLY (P0973BP)



Redundant Power Supply (P0973BP)

Features

The redundant power supply for the 24-Port Copper (P0973BH), 24-Port Fiber (P0973BJ), 8-Port Copper/8-Port Fiber (P0973BK) or 24-Gigabit (SFP) Port (P0973BL) managed switches features:

- ▶ Support for up to eight P0973BH, P0973BJ, P0973BK, or P0973BL managed switches (one supply/switch)
- ▶ Desk-top, shelf, or 19-inch rack mounting
- ▶ Up to 156 W of power per supply (with up to eight supplies/chassis).

Overview

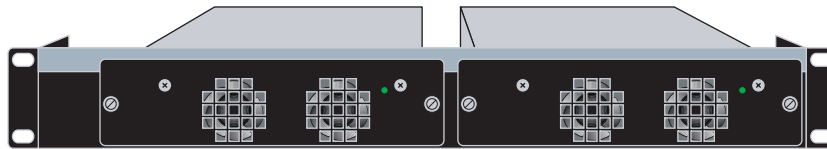
The 156 watt redundant power supply (P0973BP) can supply redundant power for the P0973BH, P0973BJ, P0973BK, or P0973BL managed switches. It operates in a parallel capacity with the switch's internal power supply. In the event of an ac power loss or failure of an internal power supply, the redundant power supply supports the full load of the switch without affecting network operation.

The (RPS) redundant power supply (P0973BP) must be used with the (RPSC) Redundant Power Supply Chassis (P0973BM/BN). This chassis does not have AC power connections or electronics.

The P0973BN power supply chassis accommodates two RPSes (P0973BP) which can support up to two P0973BH, P0973BJ, P0973BK, or P0973BL switches. The P0973BM power supply chassis accommodates up to eight RPSes (P0973BP) which can support up to eight P0973BH, P0973BJ, P0973BK, or P0973BL switches.



Redundant Power Supply Chassis (P0973BM) - Eight Slot



Redundant Power Supply Chassis (P0973BN) - Two Slot

FUNCTIONAL SPECIFICATIONS

REDUNDANT POWER SUPPLY (P0973BP)

Power

AC INPUT RANGE
85-264 V ac Hz, 47 to 63 Hz

OUTPUT

102 W or 156 W continuous

ENVIRONMENTAL SPECIFICATIONS

Operating Conditions

TEMPERATURE
5 to +40°C (41 to +104°F)
RELATIVE HUMIDITY
5 to 90% (noncondensing)

Storage Conditions

TEMPERATURE
-30 to +73°C (-22 to +164°F)
RELATIVE HUMIDITY
5 to 90% (noncondensing)

PHYSICAL SPECIFICATIONS

Mounting

Redundant power supply chassis (P0973BM for eight RPS and P0973BN for two RPS)

Mass - Approximate

1.75 kg (3.85 lb)

Dimensions

HEIGHT
19.6 cm (7.7 in)
WIDTH
5.2 cm (2.04 in)
DEPTH
25.7 cm (10.1 in)

REGULATORY COMPLIANCE AND CERTIFICATION

Electromagnetic Compatibility (EMC)

(Applies to P0973BM with eight power supplies installed and working with eight switches)
47 CFR Parts 2 and 15, CSA C108.8, 89/336/EEC, EN 55022, EN 61000-3-2, EN 61000-3-3, EN 55024; AS/NZS CISPR 22, and VCCI V-3

Certification for Power Supply

The redundant power supply is certified for use in ordinary (non-hazardous) locations.

Product Safety

UL 60950, CSA C22.2 No. 60950, 73/23/EEC, EN 60950, and IEC 60950

FUNCTIONAL SPECIFICATIONS

REDUNDANT POWER SUPPLY CHASSIS (P0973BM)

PHYSICAL SPECIFICATIONS

Mounting

Desk or Enclosure - 48.3 cm (19-inch) equipment rack, 1U high

Mass - Approximate

5.27 kg (11.6 lb)

Power Supply Slots

Eight slots for redundant power supplies (P0973BP)

Dimensions**HEIGHT**

22.26 cm (8.77 in)

WIDTH

44 cm (17.3 in)

DEPTH

26.4 cm (10.4 in)

REDUNDANT POWER SUPPLY CHASSIS (P0973BN)

PHYSICAL SPECIFICATIONS

Mounting

Desk or Enclosure - 48.3 cm (19-inch) equipment rack, 1U high

Mass - Approximate

0.95 kg (2.09 lb)

Power Supply Slots

Two slots for redundant power supplies (P0973BP)

Dimensions**HEIGHT**

5.5 cm (2.2 in)

WIDTH

48.2 cm (19 in)

DEPTH

18 cm (7.0 in)

N1 CHASSIS MANAGED SWITCH (P0973AR)



FEATURES

The features of the N1 Chassis managed switch (P0973AR) are:

- ▶ Up to 48 - 100Base-FX fiber ports or 100Base-TX copper ports depending on the choice of modules
- ▶ Up to six 1 Gb fiber uplink ports
- ▶ Selectable switch modules/uplink modules and interfaces (see Table 7, "N1 Chassis Managed Switch Modules/Uplink Modules," on page 20)
- ▶ Rapid Spanning Tree (RSTP), IEEE 802.1w compatible
- ▶ Monitoring and configuration tasks via local port, or SNMP-based management application
- ▶ Distributed switching architecture for maximum uptime
- ▶ No single point of failure - contains integral redundant power supplies.

INTRODUCTION

The N1 Chassis managed switch has a single slot that can contain a variety of interface modules.

The chassis managed switch:

- ▶ uses a distributed switching architecture
- ▶ can be installed as a free-standing unit or installed into a standard 19-inch rack.

Distributed switching architecture with integral load-sharing redundant power supplies make the Chassis managed switch extremely reliable.

SWITCH/UPLINK MODULES

Table 7 lists the type of Ethernet switch modules and their uplink modules which are compatible with the N1 Chassis. Platinum (DFE) switch modules offer advanced packet switching and other services beyond those offered by the Gold (DFE) switch modules.

The N1 Chassis switch has been designed with one slot, which can be populated with any Gold (DFE) or Platinum (DFE) switch module (blade). In addition to the ports that are built onto the modules, an uplink module can be added to any switch module. All SFP (uplink) connectors require Mini-GBIC modules if the ports are to be utilized.

Table 7. N1 Chassis Managed Switch Modules/Uplink Modules

Switch Modules		Uplink Modules (add to switch module)		Uplink Connectors (add to uplink module)	
Description	Invensys Part No.	Description	Invensys Part No.	Description	Invensys Part No.
Gold DFE Blade 48-Port RJ-45 switch module with expansion slot	P0972YG	1 Gb uplink module, with six module slots	P0972YK	Uplink module 1000Base-SX with LC connectors	P0972WT - 275 m (900 ft)
Gold DFE Blade 48-Port MT-RJ/MMF switch module with expansion slot	P0972YJ			Uplink module 1000Base-LX/LH with LC connectors	P0972YQ - 2 km (1.25 mi) with MMF
Platinum DFE Blade 48-port RJ-45 switch module with expansion slot	P0973BQ ^(a)			Uplink module 1000Base-LX with LC connectors	P0972WU - 10 km (6.2 mi) with SMF
Platinum DFE Blade 48-Port 100FX w/MT-RJ switch module with expansion slot	P0973BR ^(a)			Uplink module 1000Base-T with RJ-45 connectors	P0972YL - 100 m (330 ft)
Platinum DFE Blade 18-Port SFP switch module with expansion slot	P0973BT ^(a)				
Platinum DFE Bridging Blade 24-Port TRJ-45 switch module with expansion slot	P0973BS ^(a)				

(a) If Platinum blades are to be used in an E7 Chassis switch when populated with second and third generation blades (P0972LS, P0972LT, P0972LU, P0972LV, P0972LW, P0972LX, P0972TY, and P0972TZ), a bridging blade (P0973BS) must be used to link to two types of blades together.

FUNCTIONAL SPECIFICATIONS

N1 CHASSIS MANAGED SWITCH (P0973AR)

Standards Supported

IEEE 802.1q, 802.1d, 802.1p, 802.1w, 802.1x,
802.3, 802.3ad
Fast Ethernet: IEEE 802.3u, 100Base-TX,
100Base-FX
Gigabit Ethernet: IEEE 802.3z, 1000Base-T

Fault Tolerance

SWITCH MODULES

Independent, hot-swappable modules

POWER SUPPLIES

1:1 redundant integral supplies

Number of Ports

1 GB UPLINK PORTS

Up to 6

100FX PORTS OR 100-TX PORTS

Up to 48

Power

AC INPUT POWER (AUTO-SENSING)

2 X 100 V ac to 125 V ac, 3.6 Amps

2 X 200 V ac to 240 V ac, 1.6 Amps

Two ac outlets independently fused within
182 cm (6 ft) of power supply, each outlet uses a
separate 15 A power circuit per power supply
module.

INPUT POWER

400 Watts maximum

Management Options

NetSight® Console, NetSight Policy Manager.

NetSight Inventory Manager, NetSight Automated
Security Manager

Link Power Budget

The maximum drive distance depends on the quality
of the installed single-mode and multi-mode fiber-
optic cable segment. Use the link power budget to
calculate the maximum cable length of the attached
segment. The link power budget must not be
exceeded.

ENVIRONMENTAL SPECIFICATIONS

Operating Conditions

TEMPERATURE

5 to +40°C (41 to +104°F)

Maintained within 10°C (18°F) per hour

RELATIVE HUMIDITY

5 to 90% (noncondensing)

Storage Conditions

TEMPERATURE

-30 to +73°C (-22 to +164°F)

RELATIVE HUMIDITY

5 to 90% (noncondensing)

PHYSICAL SPECIFICATIONS

N1 CHASSIS MANAGED SWITCH (P0973AR)

Mounting

Desk or Enclosure - 48.3 cm (19-inch) equipment rack, 2U high

Chassis Dimensions - Nominal

HEIGHT

8.8 cm (3.5 in)

WIDTH

44.7 cm (17.6 in)

DEPTH

52 cm (20.5 in)

Mass - Approximate

CHASSIS ONLY

6.4 kg (14lb) (Chassis only)

AVERAGE MODULE

2.0 kg (4.5 lb)

Cables

COPPER

100Base-T, RJ-45

FIBER

100Base-FX, MT-RJ

1 GB ETHERNET PORT INTERFACE MODULE

1000Base-SX, 1000Base-LX or

1000Base-LX/LH, LC connector

MEDIA TYPE

MMF/SMF and STP CAT5 cables

REGULATORY COMPLIANCE AND CERTIFICATION

Electromagnetic Compatibility (EMC)

47 CFR Parts 2 and 15, CSA C108.8, EN55022, EN 61000-3-2, EN 61000-3-3, EN55024, AS/NZS CISPR 22 and VCCI-V3

Product Safety

UL60950, CSA 60950, EN60950, EN 60825, IEC60950

Certification

Certified for use in only ordinary (non-hazardous) locations.

N3 CHASSIS MANAGED SWITCH (P0973AS)



FEATURES

The features of the N3 Chassis managed switch (P0973AS) are:

- ▶ Up to 144 - 100Base-FX fiber ports or 100Base-TX copper ports depending on the choice of modules
- ▶ Up to eighteen 1 Gb fiber uplink ports depending on the choice of modules
- ▶ Selectable switch modules/uplink modules and interfaces (see Table 8, "N3 Chassis Managed Switch Modules/Uplink Modules," on page 24)
- ▶ Rapid Spanning Tree (RSTP), IEEE 802.1w compatible
- ▶ Monitoring and configuration tasks via local port, or SNMP-based management application
- ▶ Distributed switching architecture for maximum uptime
- ▶ No single point of failure - with optional, pluggable, redundant power supply for increased power security.

INTRODUCTION

The N3 Chassis managed switch provides three slots that can contain a variety of interface modules.

The chassis managed switch:

- ▶ uses a distributed switching architecture
- ▶ allows hot-swapping of the interface modules
- ▶ supports hot-swappable redundant power supplies
- ▶ can be installed as a free-standing unit or installed into a standard 19-inch rack.

Distributed switching architecture with redundant processors and power supplies and hot-swappable components make the N3 Chassis managed switch extremely reliable.

SWITCH/UPLINK MODULES

Table 8 lists the type of Ethernet switch modules and their uplink modules which are compatible with the N3 Chassis. Platinum (DFE) switch modules offer advanced packet switching and other services beyond those offered by the Gold (DFE) switch modules.

The N3 Chassis switch has been designed with three slots; each slot can be populated with a Gold (DFE) or Platinum (DFE) switch module (blade), however all

switch modules within the Chassis must be from the same family (Gold or Platinum). In addition to the ports that are built onto the modules, an uplink module can be added to any switch module. All SFP (uplink) connectors require Mini-GBIC modules if the ports are to be utilized.

Table 8. N3 Chassis Managed Switch Modules/Uplink Modules

Switch Modules		Uplink Modules (add to switch module)		Uplink Connectors (add to uplink)	
Description	Invensys Part No.	Description	Invensys Part No.	Description	Invensys Part No.
Gold DFE Blade 48-Port RJ-45 switch module with expansion slot	P0972YG	1 Gb uplink module, with six module slots	P0972YK	Uplink module 1000Base-SX with LC connector	P0972WT - 275 m (900 ft)
Gold DFE Blade 48-Port MT- RJ/MMF switch module with expansion slot	P0972YJ			Uplink module 1000Base-LX/LH with LC connector	P0972YQ - 2 km (1.25 mi) with MMF
Platinum DFE Blade 48-port RJ-45 switch module with expansion slot	P0973BQ ^(a)			Uplink module 1000Base-LX with LC connector	P0972WU - 10 km (6.2 mi) with SMF
Platinum DFE Blade 48-Port 100FX w/MT-RJ switch module with expansion slot	P0973BR ^(a)			Uplink module 1000Base-T with RJ-45 connector	P0972YL - 100 m (330 ft)
Platinum DFE Blade 18-Port SFP switch module with expansion slot	P0973BT ^(a)				
Platinum DFE Bridging Blade 24-Port TRJ-45 switch module with expansion slot	P0973BS ^(a)				

(a) If Platinum blades are to be used in an E7 Chassis switch when populated with second and third generation blades (P0972LS, P0972LT, P0972LU, P0972LV, P0972LW, P0972LX, P0972TY, and P0972TZ), a bridging blade (P0973BS) must be used to link to two types of blades together.

FUNCTIONAL SPECIFICATIONS

N3 CHASSIS MANAGED SWITCH (P0973AS)

Standards Supported

IEEE 802.1q, 802.1d, 802.1p, 802.1w, 802.1x,
802.3, 802.3ad
Fast Ethernet: IEEE 802.3u, 100Base-TX,
100Base-FX
Gigabit Ethernet: IEEE 802.3z, 1000Base-T

Fault Tolerance

SWITCH MODULES

Independent, hot-swappable modules

POWER SUPPLIES

1:1 redundant, hot-swappable

FAN ASSEMBLY

Hot-swappable

Number of Ports

1 GB UPLINK PORTS

Up to 18

100FX PORTS OR 100-TX PORTS

Up to 144

Power

AC INPUT POWER (AUTO-SENSING)

100 V ac to 125 V ac, 12 Amps

200 V ac to 240 V ac, 6 Amps

One ac outlet independently fused within 182 cm
(6 ft) of each power supply, each outlet uses a
separate 15 A power circuit per power supply
module.

INPUT POWER

863 Watts, maximum

Management Options

NetSight Console, NetSight Policy Manager, NetSight
Inventory Manager, NetSight Automated Security
Manager

Link Power Budget

The maximum drive distance depends on the quality
of the installed single-mode and multi-mode fiber-
optic cable segment. Use the link power budget to
calculate the maximum cable length of the attached
segment. The link power budget must not be
exceeded.

ENVIRONMENTAL SPECIFICATIONS

Operating Conditions

TEMPERATURE

5 to +40°C (41 to +104°F)

Maintained within 10°C (18°F) per hour

RELATIVE HUMIDITY

5 to 90% (noncondensing)

Storage Conditions

TEMPERATURE

-30 to +73°C (-22 to +164°F)

RELATIVE HUMIDITY

5 to 90% (noncondensing)

PHYSICAL SPECIFICATIONS

N3 CHASSIS MANAGED SWITCH (P0973AS)

Mounting

Enclosure mounting - 8U rack

Chassis Dimensions - Nominal

HEIGHT

36 cm (14 in)

WIDTH

49 cm (19 in)

DEPTH

45 cm (17.5 in)

Mass - Approximate

EMPTY CHASSIS WITH FAN ASSEMBLY

19 kg (42lb)

POWER SUPPLY

9.1 kg (20 lb) each

AVERAGE MODULE

2.0 kg (4.5 lb) each

Cables

COPPER

1000Base-T, RJ-45: 100Base-TX, RJ-45

FIBER

100Base-FX, MT-RJ

1 GB ETHERNET PORT INTERFACE MODULE

1000Base-SX, 1000Base-LX or

1000Base-LX/LH, LC connector

MEDIA TYPE

MMF/SMF and STP CAT5 cables

REGULATORY COMPLIANCE AND CERTIFICATION

Electromagnetic Compatibility (EMC)

47 CFR Parts 2 and 15, CSA C108.8, EN55022, EN 61000-3-2, EN 61000-3-3, EN55024, AS/NZS CISPR 22 and VCCI-V3

Product Safety

UL60950, CSA 60950, EN60950, EN60825, EC60950

Certification

Certified for use in only ordinary (non-hazardous) locations.

N7 CHASSIS MANAGED SWITCH (P0972YE)



FEATURES

The features of the N7 Chassis managed switch (P0972YE) are:

- ▶ Up to 336 - 100Base-FX fiber ports or 100Base-TX copper ports depending on the choice of modules
- ▶ Up to one hundred sixty-six (166) 1 Gb fiber uplink ports depending on the choice of modules
- ▶ Selectable switch modules/uplink modules and interfaces (see Table 9, "N7 Chassis Managed Switch Modules/Uplink Modules," on page 29)
- ▶ Rapid Spanning Tree (RSTP), IEEE 802.1w compatible
- ▶ Monitoring and configuration tasks via local port, or SNMP-based management application
- ▶ Distributed switching architecture for maximum uptime
- ▶ No single point of failure - with optional redundant power supplies. A second optional power supply is available for increased power security.

INTRODUCTION

The N7 Chassis managed switch provides seven slots that can contain a variety of interface modules.

The N7 Chassis managed switch:

- ▶ uses a distributed switching architecture
- ▶ allows hot-swapping of the interface modules
- ▶ supports hot-swappable redundant power supplies
- ▶ can be installed as a free-standing unit or installed into a standard 19-inch rack.

Distributed switching architecture with redundant processors and power supplies and hot-swappable components make the N7 Chassis managed switch extremely reliable.

SWITCH/UPLINK MODULES

Table 9 lists the type of Ethernet switch modules and their uplink modules which are compatible with the N7 Chassis. Platinum (DFE) switch modules offer advanced packet switching and other services beyond those offered by the Gold (DFE) switch modules.

The N7 Chassis switch has been designed with seven slots; each slot can be populated with a Gold (DFE) or Platinum (DFE) switch module (blade), however, all blades within the Chassis must be from the same family (Gold or Platinum). In addition to the ports that are built onto the modules, an uplink module can be added to any switch module. All SFP (uplink) connectors require Mini-GBIC modules if the ports are to be utilized.

Table 9. N7 Chassis Managed Switch Modules/Uplink Modules

Switch Modules		Uplink Modules (add to switch module)		Uplink Connectors (add to uplink)	
Description	Invensys Part No.	Description	Invensys Part No.	Description	Invensys Part No.
Gold DFE Blade 48-Port RJ-45 switch module with expansion slot	P0972YG	1 Gb uplink module, with six module slots	P0972YK	Uplink module 1000Base-SX with LC connector	P0972WT - 275 m (900 ft)
Gold DFE Blade 48-Port MT- RJ/MMF switch module with expansion slot	P0972YJ			Uplink module 1000Base-LX/LH with LC connector	P0972YQ - 2 km (1.25 mi) with MMF
Platinum DFE Blade 48-port RJ-45 switch module with expansion slot	P0973BQ ^(a)			Uplink module 1000Base-LX with LC connector	P0972WU - 10 km (6.2 mi) with SMF
Platinum DFE Blade 48-Port 100FX w/MT-RJ switch module with expansion slot	P0973BR ^(a)			Uplink module 1000Base-T with RJ-45 connector	P0972YL - 100 m (330 ft)
Platinum DFE Blade 18-Port SFP switch module with expansion slot	P0973BT ^(a)				
Platinum DFE Bridging Blade 24-Port TRJ-45 switch module with expansion slot	P0973BS ^(a)				

(a) If Platinum blades are to be used in an E7 Chassis switch when populated with second and third generation blades (P0972LS, P0972LT, P0972LU, P0972LV, P0972LW, P0972LX, P0972TY, and P0972TZ), a bridging blade (P0973BS) must be used to link to two types of blades together.

FUNCTIONAL SPECIFICATIONS

N7 CHASSIS MANAGED SWITCH (P0972YE)

Standards Supported

IEEE 802.1q, 802.1d, 802.1p, 802.1w, 802.1x, 802.3, 802.3ad

Fast Ethernet: IEEE 802.3u, 100Base-TX, 100Base-FX

Gigabit Ethernet: IEEE 802.3z, 1000Base-T

Fault Tolerance

SWITCH MODULES

Independent, hot-swappable modules

POWER SUPPLIES

1:1 redundant, hot-swappable

FAN TRAY

Hot-swappable

Number of Ports

1 GB UPLINK PORTS

Up to 42

100FX PORTS OR 100-TX PORTS

Up to 336

Power

AC INPUT POWER (AUTO-SENSING)

2 X 100 V ac to 125 V ac, 12 Amps

2 X 200 V ac to 240 V ac, 6 Amps

Two ac outlets independently fused within 182 cm (6 ft) of each power supply, each outlet uses a separate 15 A power circuit per power supply module.

INPUT POWER

1600 Watts

Management Options

NetSight Console, NetSight Policy Manager, NetSight Inventory Manager, NetSight Automated Security Manager

Link Power Budget

The maximum drive distance depends on the quality of the installed single-mode and multi-mode fiber-optic cable segment. Use the link power budget to calculate the maximum cable length of the attached segment. The link power budget must not be exceeded.

ENVIRONMENTAL SPECIFICATIONS

Operating Conditions

TEMPERATURE

5 to +40°C (41 to +104°F)

Maintained within 10°C (18°F) per hour

RELATIVE HUMIDITY

5 to 90% (noncondensing)

Storage Conditions

TEMPERATURE

-30 to +73°C (-22 to +164°F)

RELATIVE HUMIDITY

5 to 90% (noncondensing)

PHYSICAL SPECIFICATIONS

N7 CHASSIS MANAGED SWITCH (P0972YE)

Mounting

Enclosure mounting - 18U rack

Chassis Dimensions - Nominal

HEIGHT

77.5 cm (30.5 in)

WIDTH

44.04 cm (17.34 in)

DEPTH

36.83 cm (14.5 in)

Mass - Approximate

EMPTY CHASSIS WITH FAN TRAY

24 kg (52 lb)

POWER SUPPLY

9.1 kg (20 lb) each

AVERAGE MODULE

2.0 kg (4.5 lb) each

Cables

COPPER

1000Base-T, RJ-45: 100Base-TX, RJ-45

FIBER

100Base-FX, MT-RJ

1 GB ETHERNET PORT INTERFACE MODULE

1000Base-SX, 1000Base-LX or

1000Base-LX/LH, LC connector

MEDIA TYPE

MMF/SMF and STP CAT5 cables

REGULATORY COMPLIANCE AND CERTIFICATION

Electromagnetic Compatibility (EMC)

47 CFR Parts 2 and 15, CSA C108.8, EN55022, EN 61000-3-2, EN 61000-3-3, EN55024, AS/NZS CISPR 22 and VCCI-V3

Product Safety

UL60950, CSA 60950, EN60950, EN 60825, IEC60950

Certification

Certified for use in only ordinary (non-hazardous) locations.

FUNCTIONAL SPECIFICATIONS

MEDIA CONVERTER 100BASE-FX TO 100BASE-TX (P0972XH)

Link Length

MMF, 2 km (1.25 mi)
CAT 5 cable, 100 m (330 ft)

Power CONSUMPTION

1.65 W

Power Internal

ac Input power (auto-sensing)
100 V ac to 260 V ac, 50 to 60 Hz

ENVIRONMENTAL SPECIFICATIONS

Operating Conditions

TEMPERATURE

0 to +50°C (32 to + 132°F)

RELATIVE HUMIDITY

5 to 95% (noncondensing)

Storage Conditions

TEMPERATURE

-25 to +70°C (-12 to +158°F)

RELATIVE HUMIDITY

5 to 95% (noncondensing)

PHYSICAL SPECIFICATIONS

Dimensions - Nominal (19-inch Rack Width)

HEIGHT

3.8 cm (1.5 in)

WIDTH

9.5 cm (3.75 in)

DEPTH

17.8 cm (7.0 in)

Mounting

Desk, shelf, or wall mount

Mass - Approximate

0.55 kg (1.2 lb)

Construction

Fade-resistant plastic

REGULATORY COMPLIANCE AND CERTIFICATION

Product Safety and Electromagnetic Compatibility (EMC)

UL, CSA, CE, EN55024, EN60950, EN55022,
IEC 825-1, Class 1 Laser Product

Compliance

IEEE802.3 and 802.3u

Certification for Converter

The converter is certified for use in ordinary (non-hazardous) locations.



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