

**Model H91 Workstation Servers for the Windows Server® 2008 R2
Operating System**



The Model H91 Workstation Servers are server-class processors running the Microsoft Windows Server® 2008 R2 operating system.

FEATURES

The Model H91 Workstation Servers for Windows Server 2008 R2 operating system, available with an I/A Series® S10 software license features:

- ▶ A premium level system with high-end processor speed, 4 GB of memory, up to 8 internal Redundant Array of Independent Disks (RAID), and redundant hot-swap power supplies
- ▶ The ability to host control stations and/or support data acquisition and monitoring functions
Serves as an I/A Series or Foxboro Control Software (FCS) application platform and a human interface station
- ▶ The ability to support viewing I/A Series or FCS applications from remote client stations over local area networks (LANs).
- ▶ Security enhancements provided by the following McAfee® software packages:
 - VirusScan with AntiSpyware Enterprise
 - ePolicy Orchestrator
 - Host Intrusion Prevention
 - Data Loss Prevention (Device Control)

OVERVIEW

As multipurpose servers running the Windows Server 2008 R2 operating system, the Model H91 servers support hosting I/A Series or Foxboro Control Software (FCS) control stations, data acquisition and processing related to a broad range of applications, file serving capabilities, and the display of graphics and text. They also interface with corporate communication networks. The latest version of Symantec System Recovery software is included with each new server; however this software is also available to be ordered as a separate part number to allow earlier versions of the servers to be upgraded to the latest version of Symantec System Recovery Server Edition Software if desired.

These servers each support a USB mouse or optional USB trackball, an optional USB speaker set, an alphanumeric keyboard, up to four USB or serial/GCIO annunciator or annunciator/numeric keyboards⁽¹⁾ plus up to four video monitors. The H91 servers also support multiple, optional USB touchscreens and an optional external USB floppy drive that may be purchased separately.

These servers each have an Intel Xeon® processor that can be configured with up to 2.4 TB of internal RAID hard disk storage and has 4 GB of ECC DDR-3 SDRAM. The Serial Attached SCSI (SAS) interface supports RAID1 or RAID5 hard drive arrays.

Client/server communications are accomplished using the TCP/IP networking protocol.

NOTE

Remote client workstations supported by Model H91 servers should not be used as replacements for dedicated, multiple I/A Series or FCS workstations because of single-point-of-failure and performance considerations. When remote client stations are totally dependent on applications running in a Model H91 server, a failure or shutdown of the Model H91 server will affect all these remote stations as well. Also, due to the variability of demand that can be placed on the Model H91 server by remote client sessions, the performance of the applications running on the Model H91 server may not be as deterministic as it is on a dedicated, single-user workstation.

Network Connections

The Model H91 servers are connected to The Mesh network on the I/A Series or FCS system. They can also be connected to a generic Ethernet-based information network. The two Ethernet communications ports, which are integrated on the processor motherboard, can be used for connecting to non-I/A Series or non-FCS Ethernet networks. Standard security practices should be followed when this is done.

Workstation Security

Workstations on The Mesh network support optional product features to allow customers to meet plant compliance for enhanced workstation security, including NERC CIP. Plant requirements for enhanced I/A Series or FCS workstation security can be met through a combination of new product security enhancements as well as services provided by the Invensys Security Consulting team or other qualified service providers.

(1) Up to two serial/GCIO annunciator keyboards can be connected to each GCIO, and the server can accept up to two GCIOs. Servers with USB annunciator keyboards cannot connect to serial/GCIO annunciator keyboards.

I/A Series or FCS workstation enhanced product security requirements are supported in two broad categories, namely, I/A Series or FCS workstation software including passwords and workstation platform hardening.

I/A Series or FCS Workstation software:

- ▶ Changeable log-on passwords
- ▶ Individual user passwords
- ▶ Password lock-out after a user-configurable number of unsuccessful log-ins and secured mechanisms to reset login
- ▶ Password aging that requires password change on a periodic basis
- ▶ Password support of alphanumeric and symbol characters as per Microsoft convention
- ▶ Password file protection
- ▶ User accounts and McAfee firewalls for Microsoft Windows 7 based workstations managed from a central location through Microsoft Domains and Active Directory
- ▶ User account creation, deletion and modifications tracking
- ▶ User logon/ logoff tracking
- ▶ Least privilege file and account access
- ▶ Necessary system services running in non-admin accounts where possible
- ▶ Security patches from software suppliers, including Microsoft, are supported plus patch status reporting
- ▶ Anti-virus software including malware protection supported

I/A Series or FCS Workstation platform hardening:

- ▶ Unnecessary services, software, and programs removed
- ▶ Unneeded software ports disabled
- ▶ McAfee Host Intrusion Prevention (HIP, described below) is used to protect the use of software ports that may be used depending on the software configuration
- ▶ Documentation on how to re-enable services and ports where required by special circumstances
- ▶ Secure BIOS changes

Installation Considerations

These new security enhancements are supported only on Microsoft Windows 7 and Windows Server 2008 R2 stations which support The Mesh network and require a software update to the latest I/A Series or FCS software release to obtain these security features. The security enhancements can be deployed on a sub-set of workstations to increase security, but in order to maximize security protection, all workstations need to be updated to the latest software release to obtain the full benefits.

A Server class workstation in the system as the Primary Domain Controller runs standard Microsoft domain services. A Secondary Domain Controller is recommended as a back-up, but not strictly required. The standard install creates default Organizational Unit, Security Groups, and Group Policies and is documented in *Security Enhancements User's Guide for I/A Series Workstations with Windows 7 or Windows Server 2008 Operating Systems* (B0700ET). However, customization of the Domain Server configuration requires Microsoft knowledgeable personnel.

The Primary and Secondary Domain Controller servers are installed as I/A Series workstations. However, they must be dedicated to their domain controller tasks, and must not be used to run I/A Series or FCS applications, or Remote Desktop Services. An exception to this rule is the McAfee ePolicy Orchestrator® which needs to execute on one of the Domain Controllers. Domain Controllers are key resources since they provide user authentication for all the workstations in the domain.

McAfee® Software Packages

Additional security enhancements are provided through the following McAfee® software packages.

VirusScan with AntiSpyware Enterprise

The VirusScan with AntiSpyware Enterprise packages check the Model H91 workstation servers for viruses and spyware continually. The VirusScan with AntiSpyware Enterprise signature files are regularly updated by McAfee, but for the stations to be actively protected, these updated signature files must be downloaded onto the stations.

ePolicy Orchestrator®

The ePolicy Orchestrator (ePO) allows users to centrally monitor and manage the other McAfee security products using predefined and custom reports and dashboards. While some tools do not require ePO, such as VirusScan with AntiSpyware Enterprise, other tools do require it, such as Host Intrusion Prevention and Device Control. The ePolicy Orchestrator offers many features that are beneficial even for the tools that do not require ePO. For example, ePO can be used to keep virus signature (DAT) files up to date from a single location.

The ePO provides the ability, from a Domain Controller, to install the McAfee security products automatically on all the Windows-based workstations and servers on The Mesh control network that are in the I/A Series Active Directory domain.

As well, these products' policies and options can be managed and distributed from the ePO console.

Host Intrusion Prevention (HIP)

Host Intrusion Prevention proactively blocks zero-day and known attacks, and protects against unauthorized viewing, copying, modifying, and deleting of information and the compromising of system and network resources and applications that store and deliver information.

The Host Intrusion Prevention (HIP) package provides features such as:

- ▶ A configurable firewall, to control access to TCP and UDP software ports
- ▶ Application blocking, to allow known applications to run (referred to as “whitelisting”) or to block specific applications (such as “blacklisting”)
- ▶ Intrusion detection, to log messages when unknown devices are plugged into The Mesh network.

Device Control

The Data Loss Prevention package provides control over the access to hardware ports, such as the floppy drive, CD/DVD drive, or USB ports on Windows 7 workstations only (not servers).

MODEL H91 SERVER

Model H91 Base Configuration



The Model H91 server contains the following elements:

- ▶ Intel Xeon 5650 Series Processor
- ▶ Pre-configured and installed Microsoft® Windows Server® 2008 R2, 64-bit package
- ▶ Latest version of Symantec System Recovery (SSR) Server Edition Software
- ▶ 4 GB ECC DDR-3 SDRAM (fixed)
- ▶ One internal 300 GB hard drive
- ▶ Internal SATA CD-RW/DVD drive
- ▶ Dual DisplayPort/DVI PCIe card graphics generator, up to 1600 x 1200 pixel resolution
- ▶ 2 Integrated 10/100/1000BaseT Ethernet ports
- ▶ Mouse (USB)
- ▶ Keyboard (USB)
- ▶ Redundant hot-swap power supplies
- ▶ Two rear USB ports.

- ▶ Two front USB ports

Model H91 Options

The Model H91 server offers the following options:

- ▶ Expandable to 12 GB of system RAM (24 GB with dual CPU option)
- ▶ Expandable to eight 300 GB hard drives
- ▶ External, USB 3.5-inch, 1.44 MB floppy disk drive
- ▶ Monitors with optional USB touchscreens⁽²⁾
- ▶ Trackball (USB)
- ▶ Ethernet adapter cards (copper or fiber)
- ▶ Dual or quad monitor graphics cards
- ▶ RAID1 or RAID5 internal hard drive arrays, both available with hot spare configurations
- ▶ Up to four USB annunciator keyboards⁽³⁾
- ▶ Up to two GCIO interface modules, each with one or two serial/GCIO annunciator keyboards⁽³⁾
- ▶ Five PCIe peripheral slots
- ▶ One multi-port serial expansion card (3 ports; two serial and one parallel). Supports:
 - Printers
 - GCIO (optionally with one or two serial/GCIO annunciator keyboards⁽³⁾)
 - Other serial devices
- ▶ A Human Interface up to 150 m (492 ft) extension unit (RGU) servicing the following devices:
 - Up to four video monitors
 - Up to five USB devices.

⁽²⁾ Model H91 server supports up to four monitors with optional touchscreen capability.

⁽³⁾ The server can only be used with USB or serial/GCIO annunciator keyboards - it cannot be connected to both types.

Mounting Options

The Model H91 server can be placed on a desktop or in commercially available enclosures that have provisions for adequate ventilation and cooling to ensure the ambient temperature inside the enclosure does not exceed 95°F at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. The maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. The server's performance may be reduced if operating with a fan fault or above 30°C (86°F).

The Model H91 server also offers an optional rack mounting kit (P0928EW) for mounting in deep enclosures.

NOTE

Enclosures must accommodate a depth of at least 39.4 in (1000 mm) to allow space for air flow at the front and back of the unit plus cables at the back of the unit. Because of their depth, the H91 server cannot be mounted in the standard Invensys enclosures, such as the Industrial Enclosure 32, Metal Enclosure 32, and Modular Industrial Workstations (MIW) or Modular Industrial Consoles (MIC).

With dual or quad PCIe video cards, the Model H91 server can be located up to 100 ft from the monitor using direct connect, analog video and other human interface cables available from Invensys.

Two optional Remote Graphics Unit (RGU) offerings are provided for each server to enable video, USB, and FireWire devices to be located at a distance from the workstation (refer to "REMOTE GRAPHICS UNIT FOR H91 SERVERS OVERVIEW" on page 10).

Devices, which are able to be remotely mounted via the RGU, include monitors, the keyboard and mouse (or trackball), audio via USB speakers, USB touchscreens, external USB floppy drives.

A GCIO module with associated serial/GCIO annunciator keyboards may be extended to a maximum of 30 m (100 ft) through the use of the appropriate serial cable and optional serial expansion card.

As indicated by the CE logo, the Model H91 server conforms to the applicable European Union Directives.

FUNCTIONAL SPECIFICATIONS (H91)

Processor Type

Intel Xeon

Memory

4 GB ECC DDR-3 SDRAM standard

Devices Served

SAS PERIPHERALS

One internal system disk drive (standard), up to a total of 8 internal RAID1/5 hard drive arrays

CONTROLLER PERIPHERALS

One SATA CD-RW/DVD drive

VIDEO DISPLAYS (UP TO 4)

19-inch LCD Monitor

20.1-inch LCD Monitor

20.1-inch LCD USB Touchscreen Monitor

23-inch LCD USB Touchscreen Monitor

23-inch LCD Monitor

40-inch LCD Overview Monitor

INTERFACES TO EXTERNAL DEVICES

USB

Mouse or Optional Trackball

Alphanumeric Keyboard

Up to four USB annunciator keyboards via an optional USB hub, local (1.8 m (6 ft)) or up to 30.5 m (100 ft) away - for these extended connections, refer to the USB extension kits in *Annunciator Keyboard/Panel* (PSS 21H-4E1 B4)

Up to four optional touchscreens

Audio speakers

Floppy disk drive

Serial

Alarm/Text Printer

Serial/GCIO annunciator and/or annunciator/numeric keyboards (one or two per GCIO) attached through one or two GCIO Interface modules

Parallel

Printer

Internal Diagnostics

Self-checking performed at power-up.

Video

OUTPUT TYPE

Dual-head, DVI/VGA PCIe video card (default) up to 1600 x1200 resolution

Single, dual, or quad head video configurations available with analog or digital video outputs

Remote Graphics Unit (optional) supports dual or quad analog or DVI graphics.

SCREEN PRESENTATION

Refresh Rate

Up to 85 Hz

Colors

32-bit

Resolution (Pixels)

Standard (4:3) (Supported by All Monitors)

Up to 1600x1200 pixels (maximum)

Widescreen (16:9) (Supported by 23-Inch LCD Monitor)

Up to 1920x1080 pixels

Serial Interface Port

TYPE

RS-232-C compatible

Ethernet Interface Communications

PCIe Ethernet network interface cards providing connection to Ethernet data bus (10/100Base-TX or 100Base-FX)

Two Integrated Ethernet ports (10/100/1000Base-T)

Power Supplies

Two redundant, hot-swap 750 W auto-switching input power supplies, each with a separate power cord

Power Requirements

INPUT POWER

100-240 V ac, 50 to 60 Hz, auto ranging

POWER PARAMETERS

100-120 V ac, 13.32A maximum

200-240 V ac, 6.65A maximum

Cooling

Hot swappable, redundant I/O and processor fans

Each redundant power supply contains 2 internal fans

ENVIRONMENTAL SPECIFICATIONS (H91)

Processor Operating

TEMPERATURE

10 to 35 °C (50 to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. The maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. Server performance may be reduced if operating with a fan fault or above 30°C (86°F).

RELATIVE HUMIDITY

10 to 90%, noncondensing

ALTITUDE

-15.2 to +3,048 m (-50 to 10,000 ft)

MAXIMUM VIBRATION

0.26 G at 10 to 350 Hz for 5 min

Processor Storage

TEMPERATURE

-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).

RELATIVE HUMIDITY

5% to 95%, noncondensing

ALTITUDE

-16 to +10,668 m (-50 to +35,000 ft)

MAXIMUM VIBRATION

1.54 Grms Random @ 10 Hz to 250 Hz for 10 minutes

Processor Environmental

LOCATION

UL/UL-C listed as suitable for use in ordinary locations and meets ordinary safety standards for fire and shock hazards.

CONTAMINATION

Class G1 (Mild) as defined in ISA Standard S71.04

REGULATORY COMPLIANCE (H91)

Safety Certifications

USA

UL® (UL Std 1950)

CANADA

CSA® (CSA C22.2 No. 60950-1)

EUROPE

TUV (CENELEC EN60950-1)

EMC

CANADA

ICES Class A

EUROPE

CE EN55022, EN55024, EN61000-3-2, EN61000-3-3

PHYSICAL SPECIFICATIONS (H91)

Dimensions and Mass

MODEL H91 SERVER KEYBOARD

Height

33 mm (1.3 in)

Width

462 mm (18.2 in)

Depth

160 mm (6.3 in)

Mass

0.9 kg (2 lbs)

MODEL H91 TOWER

Height

470 mm (18.5 in)

Width

218 mm (8.6 in)

Depth

596 mm (23.5 in)

Mass, Maximum (Approximate)

31.8 kg (70 lb) (All hard drives, power supplies, and processors installed)

Mass, Minimum (Approximate)

24.5 kg (54 lb) (One hard drive, power supply, and processor installed)

Dimensions and Mass (Cont.)

MODEL H91 RACK MOUNT

Dimensions include feet and bezel

Height

217 mm (8.5 in)

Width

445 mm (17.5 in)

Depth

556 mm (21.9 in)

Mass, Maximum (Approximate)

29.9 kg (66 lb) (All hard drives, power supplies, and processors installed)

Mass, Minimum (Approximate)

21.8 kg (48 lb) (One hard drive, power supply, and processor installed)

Heat Dissipation

750 W - 2892 BTU/hr (at 120 V ab), 2797 BTU/hr (at 240 V ac)

REMOTE GRAPHICS UNIT FOR H91 SERVERS
OVERVIEW

The H91 server can be configured with a Remote Graphics Unit PCIe card that connects to a Remote Graphics Unit (RGU) by way of fiber-optic cabling. The USB keyboard, mouse, trackball, touchscreens, floppy drive, and audio can be connected through the RGU, which may be located at distances from the H91 of up to 70 m (230 ft) with 62.5/125 μ m fiber or 150 m (492 ft) with 50/125 μ m fiber cable.

The RGU (see Figure 1) features five USB 2.0 ports (one which supports a BIOS level keyboard), and passive (fanless) cooling. The RGU also includes a universal input power supply.

For video connections, the RGU includes four DisplayPort ports, which can directly connect to up to four DisplayPort monitors.

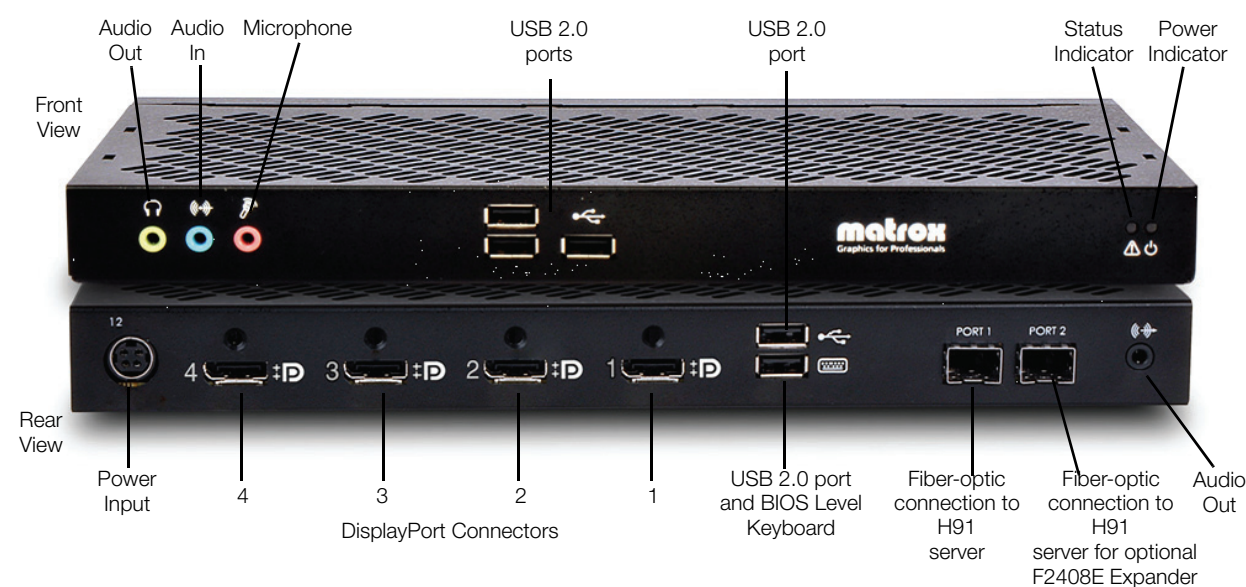


Figure 1. Remote Graphics Unit for H91 Servers (Front and Rear Views)

RGU (H91) FUNCTIONAL SPECIFICATIONS

Interfaces to External Devices

- ▶ Five USB 2.0 ports for mouse, optional trackball, keyboard, USB speakers, floppy drive, or up to four optional touchscreens
- ▶ Audio connections, including microphone, audio input, and audio output connections

NOTE

If four USB touchscreens are to be utilized, a USB hub must be selected for use with this server. (Refer to part numbers P0928EH, P0928EJ, P0923FS, P0923FT for the touchscreens.)

- ▶ RGU includes four DisplayPort ports, and can directly support connections to up to four DisplayPort monitors.

Distance Specifications

The RGU allows distances between the H91 server and attached devices of up to 70 m (230 ft) with 62.5/125 μ m fiber or 150 m (492 ft) with 50/125 μ m fiber cable. Fiber cable with LC/LC connections greater than 50 m is user-supplied.

Kit Contents

REMOTE GRAPHICS UNIT KIT, DUAL (P0928DU)

Remote Graphics Unit (P0928DS)
PCIe card for RGU (P0928DT)
15 m (50 ft) starter LC/LC fiber cable (P0972TP)

REMOTE GRAPHICS UNIT KIT, QUAD (P0928DV)

Remote Graphics Unit (P0928DS)
PCIe card for RGU (P0928DT)
15 m (50 ft) starter LC/LC fiber cable (P0972TP)

RGU (H91) ENVIRONMENTAL SPECIFICATIONS

Operational

TEMPERATURE (INDOORS, IN CABINET)

0 to 55°C (32 to 131°F)

RELATIVE HUMIDITY (INDOORS)

20% to 80%, noncondensing

VIBRATION

NEBS level 3 Seismic Zone 4⁽⁴⁾

MAXIMUM ATMOSPHERIC PRESSURE

650hPa (3,580 m / 11,745 ft) to

1013hPa (0 m / 0 ft)

Non-Operational, Storage, and Transportation

TEMPERATURE

-40 to + 75°C (-40 to +167°F)

RELATIVE HUMIDITY (IN PACKAGED CONFIGURATION)

5% to 95%

VIBRATION

NEBS level 3 Seismic Zone 4⁽⁴⁾

MAXIMUM ATMOSPHERIC PRESSURE

192hPa (12,000 m / 39,370 ft) to

1020hPa (-50 m / -164 ft)

EMC Certifications

Class A (commercial, industrial, or business)

Laser Emissions

850 nm laser compliant to 21CFR, Subpart J, Class 1

RGU Environmental

LOCATION

Is suitable for use in ordinary locations and is designed to meet ordinary safety standards for fire and shock hazards

CONTAMINATION

Class G1 (Mild) as defined in ISA Standard S71.04

(4) Zone 4 = 7.0 to 8.3 on the Richter scale

RGU (H91) PHYSICAL SPECIFICATIONS

Interface Card

F2208 F2408 F2408E EXPANDER

Provided with an OM2 multi-mode 50/125 µm optical cable – 5 m (16 ft).

MONITORS SUPPORTED

2, 4, 4

DIGITAL MONITOR SUPPORT

DVI, DisplayPort

MEMORY

1 GB

MAXIMUM ANALOG RESOLUTION

1920 × 1200 - DisplayPort to HD-15 adapter sold separately.

MAXIMUM DIGITAL (DVI) RESOLUTION

Up to 2048 × 1152

MAXIMUM DISPLAYPORT RESOLUTION

Up to 2048 × 1152, and 2560 × 1600

OPERATING SYSTEMS SUPPORTED

Windows 7, Windows Server 2008 R2, Windows Server 2008, Windows Vista, Windows XP, and Windows Server 2003

DIMENSIONS

Height

29 mm (1.15 in)

Width

300 mm (11.8 in)

Depth

147 mm (5.8 in)

LASER EMISSIONS

850 µm laser compliant to 21CFR, Subpart J, Class 1

EMC CERTIFICATIONS

Class A: ACMA, CE, FCC, VCCI

INTERFACE CARD

Optical

CARD TYPE

PCIe ×1

FORM FACTOR

Low-profile

CABLE TYPE SUPPORTED

LC-LC optical, Duplex

MAXIMUM DISTANCES

OM1 multimode 62.5/125 µm (max. 70 m / 230 ft)

OM2 multi-mode 50/125 µm cable (max. 150 m / 492 ft)

OM3 multi-mode 50/125 µm cable (max. 380 m / 1247 ft)

OM4 multi-mode 50/125 µm cable (max. 400 m / 1312 ft)

Single-mode 9/125 µm cable (max. 1000 m / 3280 ft)*

EMC CERTIFICATIONS

Class A: ACMA, CE, FCC, VCCI

Power Consumption and Supply Voltage

TEMPERATURE, OPERATIONAL

0 to 55 °C (32 to 131 °F)

TEMPERATURE, NON-OPERATIONAL, STORAGE AND TRANSPORTATION

-40 to 70 °C (-40 to 158 °F)

HUMIDITY, OPERATIONAL (INDOOR)

20 to 80% (non-condensing)

HUMIDITY, NON-OPERATIONAL STORAGE AND TRANSPORTATION

5% to 95% (non-condensing)

ATMOSPHERIC PRESSURE, OPERATIONAL

650hPa (3,580 m / 11,745 ft)

to 1013hPa (0 m / 0 ft)

ATMOSPHERIC PRESSURE, NON-OPERATIONAL AND TRANSPORTATION

192hPa (12,000 m / 39,370 ft)

to 1020hPa (-50 m / -164 ft)

RGU (H91) PHYSICAL SPECIFICATIONS (CONTINUED)

Power Consumption and Supply Voltage (Continued)

ESTIMATED MTBF (MEAN TIME BEFORE FAILURE)

Interface Card

70.81 years @ 40 °C

Extio F2208 Unit

26.87 years @ 40 °C (excluding power
supply)

Extio F2408 Unit

23.20 years @ 40 °C (excluding power
supply)

Extio F2408E Expander Unit

22.68 years @ 40 °C (excluding power
supply)

INTERFACE CARD

Maximum Power Consumption

6.5 W

EXTIO UNIT

Power Requirements

12 V dc, maximum 5 A

(5 A fuse for overcurrent protection)

Power Connector

Mini-DIN 4 female (4-pin)

MAXIMUM POWER CONSUMPTION

Calculated for the following configuration: a USB
keyboard and mouse, two other USB devices,
and four DisplayPort monitors.

External Power Supply

Input ac Voltage Range

90 to 264 V ac

Input Frequency

47/63 Hz

Input Connector

IEC 60320-C14

Output Voltage

12 V dc

Output Connector

Mini-DIN 4 male (4-pin) with lock

Maximum Power Output

60 W

