Foxboro Evo™ Process Automation System

Product Specifications

Foxboro®

by Schneider Electric

PSS 31H-4H91

Model H91 Workstation Server for Windows Server® 2008 R2 Operating System

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

OVERVIEW

As multipurpose servers running the Windows Server 2008 R2 operating system, the Model H91 servers support hosting Foxboro Evo™ Control Core Services (Control Core Services) or Foxboro Evo Control Software (the Control Software) workstations, 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 annunciator/numeric keyboards 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 Foxboro Evo 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 Foxboro Evo Control Network (the control network) on the Foxboro Evo 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-Foxboro Ethernet networks. Standard security practices should be followed when this is done.

Workstation Security

Workstations on the control network support optional product features to allow customers to meet plant compliance for enhanced workstation security, including NERC CIP. Plant requirements for enhanced Foxboro Evo workstation security can be met through a combination of new product security enhancements as well as services provided by the Foxboro® Security Consulting team or other qualified service providers.

Foxboro Evo workstation enhanced product security requirements are supported in two broad categories, namely, Control Core Services or Foxboro Evo workstation software including passwords and workstation platform hardening.

Control Core Services or Foxboro Evo 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.

Control Core Services or Foxboro Evo 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 control network and require a software update to the latest Control Core Services or the Control 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 Foxboro Evo workstation. However, they must be dedicated to their domain controller tasks, and must not be used to run Control Core Services software or the Control Software 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 control network that are in the 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 control 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).

FEATURES

The Model H91Workstation Servers for Windows Server 2008 R2 operating system, available with an Foxboro Evo 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 Control Core Services software or the Control Software application platform and a human interface station
- The ability to support viewing Control Core Services software or the Control Software 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)

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(1)
- 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(2)
- Five PCIe peripheral slots
- One multi-port serial expansion card (3 ports; two serial and one parallel). Supports:
  - Printers
  - 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.

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

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.

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 31H-4E1)

Up to four optional touchscreens
Audio speakers
Floppy disk drive

Serial
Alarm/Text Printer

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 Weight

MODEL H91 SERVER KEYBOARD

Height
33 mm (1.3 in)
Width
462 mm (18.2 in)
Depth
160 mm (6.3 in)
Weight
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)
Weight, Maximum (Approximate)
31.8 kg (70 lb) (All hard drives, power supplies, and processors installed)
Weight, Minimum (Approximate)
24.5 kg (54 lb) (One hard drive, power supply, and processor installed)

Dimensions and Weight (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)
Weight, Maximum (Approximate)
29.9 kg (66 lb) (All hard drives, power supplies, and processors installed)
Weight, 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 µm fiber or 150 m (492 ft) with 50/125 µm 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.

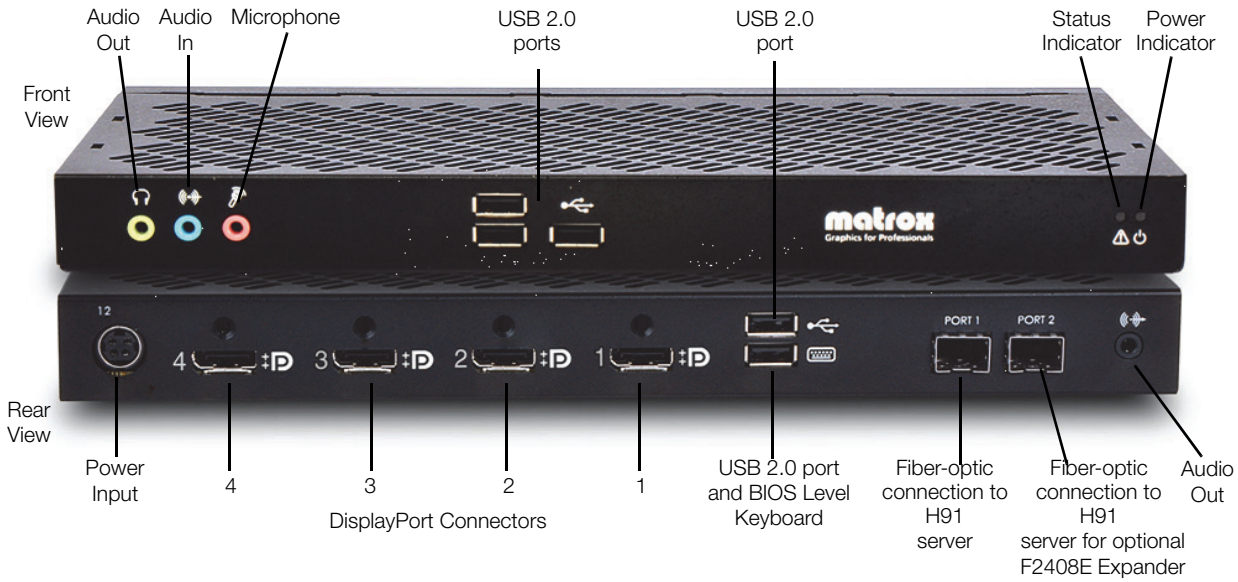

Figure 1. Remote Graphics Unit for H91 Servers (Front and Rear Views)

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 µm fiber or 150 m (492 ft) with 50/125 µm 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(3)

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(3)

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

(3) 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 ºC (32 to 131 ºF)

TEMPERATURE, NON-OPERATIONAL, STORAGE AND TRANSPORTATION
-40 to 70 ºC (-40 to 158 ºF)

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

Foxboro®

by Schneider Electric

Invensys Systems, Inc
10900 Equity Drive
Houston, TX 77041
United States of America
http://www.invensys.com

Global Customer Support
Inside U.S.: 1-866-746-6477
Outside U.S.: 1-508-549-2424
Website: https://support.ips.invensys.com

MB 031 1214