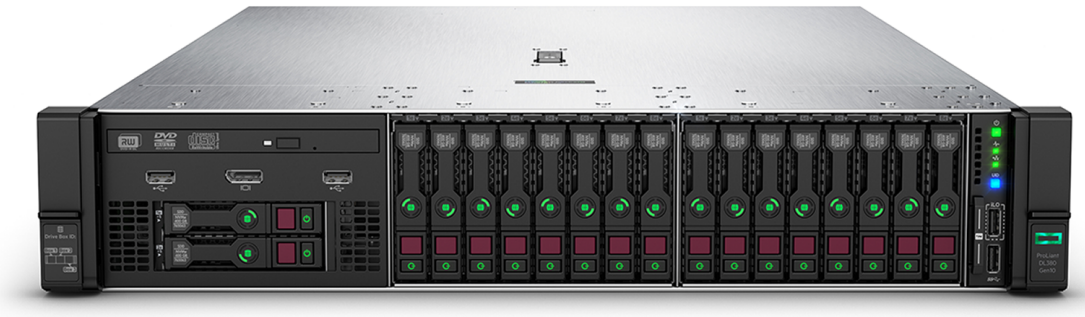
Foxboro™ DCS

Model H90 Server for Windows Operating Systems

PSS 41H-4H90

Product Specification

January 2024



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Overview

Demand for increased software capability requires increases in processing power, storage, and connectivity to peripherals. Server class computers provide these capabilities in standard rack enclosures. This greatly concentrated capability reduces the volume needed and permits both physical and cybersecurity measures to be effectively put into practice.

As a multipurpose server running the Microsoft Windows Server® 2016 or Microsoft Windows Server® 2022 operating system, the Model H90 Foxboro DCS server supports hosting Foxboro DCS Control Core Services (Control Core Services) or Foxboro DCS Control Software (Control Software) workstations, historian, domain controller function, data acquisition, and processing related to a broad range of applications, file serving capabilities, and the display of graphics and text. It also interfaces with corporate communication networks.

These servers support a USB mouse or optional USB trackball, an optional USB speaker set, an alphanumeric keyboard, up to four USB annunciator keyboards including one optional annunciator keyboard with numeric keyboard, plus up to four video monitors.

The H90 can be configured with either 1 or 2 Intel Xeon® processors. A change to 600 GB drives allows a maximum hard drive capacity of 4.8 TB. Alternatively, Serial Attached SCSI (SAS) Hard Disks or Solid State Disks are preconfigured as a system disk, expansion disks, or RAID1 or RAID5 hard drive arrays. Client/server communications are accomplished using the TCP/IP networking protocol.

NOTE: This cover image represents a fully configured server and might show configuration options (for example, hard disks or PCI cards) that are not part of an actual product order.

Features

The Model H90 Server for Windows Server 2016/Windows Server 2022 operating system features:

- A premium level system with high-end processor speed,16 GB of base memory, up to eight internal hard drives configurable as a Redundant Array of Independent Disks (RAID) with optional hot swappable spare drives, and redundant hot swappable power supplies
- The ability to host control stations and/or support data acquisition and monitoring functions
- Serves as a Control Core Services software or Control Software application platform and a human interface station
- The ability to support viewing Foxboro DCS applications from remote client stations over local area networks (LANs)
- The latest version of Veritas System Recovery software is included with each new server. However, the 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 Veritas System Recovery 23, if desired.

Network Connections

The Model H90 servers are connected to the Foxboro DCS Control Network (the Control Network) through dual Ethernet PCIe cards. It can also be simultaneously connected to one or more generic Ethernet based information networks via the four integrated Ethernet ports. Standard security practices should be followed when this is done.

Server Security

H90 Foxboro DCS servers support optional product features to allow customers to meet plant compliance for enhanced workstation security. Plant requirements for enhanced security can be met through a combination of new product security enhancements as well as current best practices, policies, and procedures.

Foxboro DCS server enhanced product security requirements are supported in two broad categories, namely, server software including passwords and server platform hardening.

Server software:

- Changeable login passwords
- Individual user passwords
- Password lock-out after a user-configurable number of unsuccessful login attempts 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 conventions
- Password file protection
- User accounts and firewalls for Microsoft Server 2016 and Server 2022 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
- Security by Local Group Policies to provide a layer of protection
- Enhanced security by Secure Boot feature
- Trellix Endpoint Security provides additional security enhancement features to help complement the security features already built into our products. For stations operating in Local Edition mode, Trellix Endpoint Security (ENS) provides advanced Threat Prevention. For stations operating in Enterprise Edition mode, Trellix ePolicy Orchestrator (ePO) provides all the security of ENS plus Rogue System Detection, Application Allowlisting, Integrity Control and Device Control for Data Loss Prevention (DLP). The license entitlement for the first five years after purchase for all of the listed options is included for the H90 server. After the five years, a renewal is required with the purchase of the Trellix five year license (J0202AS) for each H90 server using any Trellix products.

Foxboro DCS server operating system hardening:

- Unnecessary services, software, and programs removed
- Unneeded software ports disabled

- Documentation on how to re-enable services and ports where required by special circumstances
- Security-related BIOS changes

The H90 Server ships with standard Microsoft® security software.

Installation Considerations

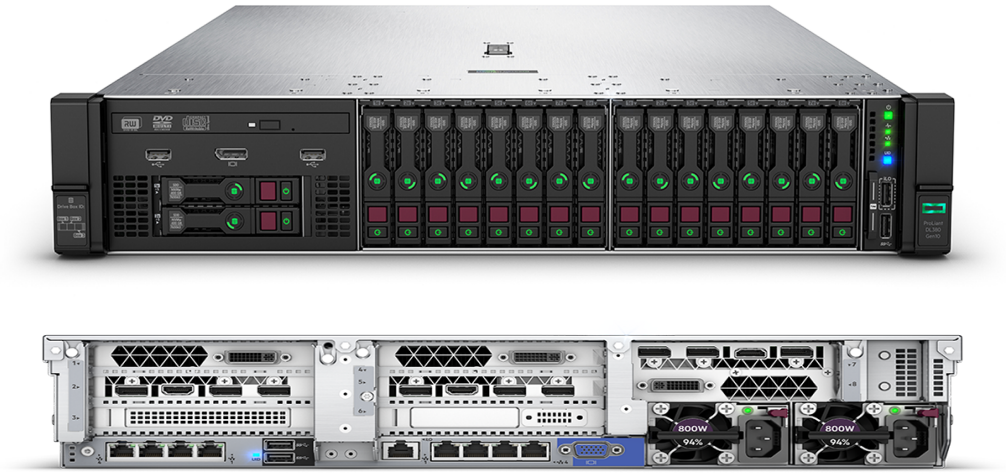
These new security enhancements are supported on Windows Server 2016 and Windows Server 2022 stations which support the Control Network and require a software update to the latest Foxboro DCS software release. The security enhancements can be deployed on a subset of servers to help increase security, but in order to maximize security protection, all workstations need to be updated to the latest software release to obtain the full benefits.

Current applications, such as Control HMI, can require logon using a Microsoft Domain Controller. A Foxboro DCS Server 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 Foxboro DCS Control Core Services Enterprise Edition installation creates Schneider Electric specific Organizational Units, Security Groups, and Group Policies (see *Foxboro DCS Security Implementation Guide* (B0700HM) or *Foxboro DCS Security for Windows 10 21H2 LTSC and Windows Server 2022 Implementation Guide* (B0700WX)). Customization of the Domain Server configuration requires Microsoft knowledgeable personnel.

The Primary and Secondary Domain Controller servers are installed as Foxboro DCS servers. However, they must be dedicated to their domain controller tasks, and must not be used to run Foxboro DCS applications, or Remote Desktop Services. An exception to this rule is the Trellix ePolicy Orchestrator® which is allowed to execute on one of the Domain Controllers. Domain Controllers are key resources since they provide user authentication and security policy enforcement for all the workstations in the domain.

Model H90 Base Configuration

Model H90 (Front and Rear views)



NOTE: This image represents a fully configured server and might show configuration options (for example, hard disks or PCI cards) that are not part of an actual product order.

The default configuration of the Model H90 server contains these elements:

- Intel Xeon Silver 4110 Processor
  - HPE DL380 Gen10 Intel Xeon-Silver 4110 (2.1GHz/8-core/85W) Processor Kit (P/N RH103DQ) is available for a field upgrade/expansion to a second processor.
  - Additional HPE 16GB (1x16GB) Dual Rank x8 DDR4-2666 Registered Memory (P/N RH103FW) is needed in the second CPU memory slot with the second processor.

NOTICE
LOSS OF FUNCTIONALITY Do not combine different memory speeds or types (Single Rank/Dual Rank) for the H90. This causes an error code to appear which prevents you from completing the operating system installation process. **Failure to follow these instructions can result in loss of functionality.**

- Preconfigured and installed Microsoft Windows Server 2016 or Windows Server 2022 operating system, 64-bit package
- Latest version of Veritas System Recovery Software
- 16 GB DDR-4 Registered Memory
- One internal 600 GB hard drive
- Internal SATA CD-RW/DVD drive
- Quad mini-DP 1.4 port PCIe graphics card with adapters to standard display port, up to 4 x 1920x1080 (Full HD) pixel resolution
- 4 Integrated 10/100/1000BaseT Ethernet ports
- Mouse (USB)
- Keyboard (USB)
- Redundant hot swappable power supplies

- Two rear USB ports and VGA analog video port
- Three front USB ports and one DisplayPort
- Mounting rail kit

Model H90 Options

The Model H90 server offers these options:

- Expandable to 384 GB of system RAM
- Expandable up to eight 600 GB hard drives or up to six 400 GB solid state hard drives (SSD)
- Trackball
- Ethernet adapter cards (copper or fiber)
- GPS Time Synchronization card
- RAID1 or RAID5 internal hard drive arrays with optional hot spare drives
- Up to four USB annunciator keyboards
- A Human Interface up to 550 m (1804 ft) on 50/125 micrometer multi-mode cable, up to 5 km (3.1 mi.) with 9/125 micrometer single mode cable extension unit (RGU) servicing these devices:
  - Up to four video monitors
  - Up to six USB devices

Mounting Options

NOTICE
POTENTIAL EQUIPMENT DAMAGE Do not mount the H90 in a standard single depth rack enclosure. 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. **Failure to follow these instructions can result in equipment damage.**

The Model H90 rack mount server can be placed in commercially available enclosures that have provisions for adequate ventilation and cooling to help ensure the ambient temperature inside the enclosure does not exceed 95°F (35°C) or 104°F (40°C) with the Optional High Temperature DL380 Gen10 High Performance Fan Kit). The Model H90 server is a 2U high, rack mount server which offers rail mounting as standard equipment.

The Model H90 servers can be located up to 100 ft (30.5 m) from the monitor using direct connect, analog video, and other human interface cables available from Foxboro.

> **NOTE:** This video connection will only operate when the Foxboro P/N P0924DF (100 ft VGA cable) is used in conjunction with the Foxboro P/N RH924DF or RH103ER Mini Displayport to VGA adapter is used.

Two optional Remote Graphics Unit (RGU) offerings are provided for each server to enable video devices to be located at a distance from the workstation or server. For more information, see Remote Graphics Unit For H90 Servers Overview, page 13.

Devices that can be remote mounted via the RGU include monitors, the keyboard and mouse (or trackball) and audio via USB speakers.

As indicated by the CE logo, the Model H90 server conforms to the applicable European Union Directives.

Functional Specifications

Processor Type	Intel Xeon
Memory	16 GB DDR4 Registered Memory
Devices Served	SAS Peripherals • One internal system disk drive, up to eight optional internal expansion disk drives Controller Peripherals • One SATA CD-RW/DVD drive Video Displays (Up to 4) • 23-inch LCD USB Touchscreen Monitor • 23-inch LCD Monitor Interfaces to External Devices (USB) • Mouse or Optional Trackball • Alphanumeric Keyboard • Up to four USB annunciator keyboards via an optional USB hub, local (up to 1.8 m (6 ft)) or up to 30.5 m (100 ft) away. For these extended connections, see the USB extension kits in *Annunciator Keyboard* (PSS 41H-4USBKBD). • Audio Speakers Time Synchronization • Optional GPS Time Synchronization card provides GPS support. See *Time Synchronization Overview* (PSS 41S-1TIME).
Internal Diagnostics	Self-checking performed at power-up
Video	Output Type • Quad mini-DP 1.4 port PCIe graphics card with adapters to standard display port, up to 4 x 1920x1080 (Full HD) pixel resolution Remote Graphics Unit (optional) supports dual or quad analog or DVI graphics Screen Presentation • Refresh Rate ◦ Up to 85 Hz • Colors ◦ 32 bit • Resolution ◦ Widescreen (16:9) (Supported by 23-Inch LCD Monitor) ◦ Up to 1920x1080 pixels
Ethernet Interface Communications	PCIe Ethernet network interface cards providing connection to Ethernet data bus (10/100Base-TX or 100Base-FX) Four Integrated Ethernet ports (10/100/1000Base-T)
Power Supplies	Two redundant, hot swappable, 800 W auto-switching input power supplies, each with a separate power cord

<table>
<tr><td>Power Requirements</td><td>

Power Parameters

<table>
<tr><th colspan="9">HPE 800W Power Supply Kit (865414–B21)</th></tr>
<tr><td>Normal Input Voltage (V rms)</td><td>100</td><td>120</td><td>127</td><td>200</td><td>208</td><td>220</td><td>230</td><td>240</td></tr>
<tr><td>Normal Input Current (A rms)</td><td>9.1</td><td>7.5</td><td>7.0</td><td>4.4</td><td>4.2</td><td>4.0</td><td>3.8</td><td>3.6</td></tr>
</table>

Input Power

- 100-240 VAC, 50 to 60 Hz, auto ranging

Inrush Current

- 30 A power supply for 20 ms

Heat Dissipation

- 3067 BTU/hr (at 100 VAC)
- 2958 BTU/hr (at 200 VAC)

</td></tr>
<tr><td>Power Consumption (Typical)</td><td>When equipped with two CPUs with 16 cores (100% utilized) and eight hard drives the measured typical power consumption is 250 watts</td></tr>
<tr><td>Cooling</td><td>Hot swappable, redundant I/O and processor fans. Each redundant power supply contains a fan. Temperature Specification may be extended up to 40°C (104°F) with the Optional High Temperature DL380 Gen10 High Performance Fan Kit, Schneider Electric Part Number RH103ES. This fan kit does increase the fan noise of the machine.</td></tr>
<tr><td>Regulatory Compliance, Electromagnetic Compatibility (EMC)</td><td>

USA and Canada

- Complies with FCC Part 15, Class B

European Union

- Complies with the European Union EMC Directive 2014/30/EU and the following Harmonized Standards:
  - EN 61000-3-2:2014
  - EN 61000-3-3:2013
  - EN 55035:2017/A11:2020
  - EN 55032:2015/A11:2020 Class A

</td></tr>
<tr><td>Regulatory Compliance, Product Safety[a]</td><td>

USA and Canada

- UL® and cUL Listed

European Union

- Complies with the Low Voltage Directive 2014/35/EU and the following Harmonized Standards:
  - EN 60950-1:2006 + A11:2009 +A1:2010 +A12:2011+A2:2013
  - EN 62368-1:2014
  - EN 62479:2010

</td></tr>
<tr><td>RoHS Compliance[a]</td><td>Complies with EU RoHS Directive 2011/65/EU under the following Harmonized Standard: EN IEC 63000:2018</td></tr>
<tr><td colspan="2">(a) Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.</td></tr>
</table>

Environmental Specifications

	Operating	Storage
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. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit might be limited by the type and number of options installed. 10 to 40°C (50 to 104°F) with the Optional RH103ES HP DL380 Gen10 High Performance Fan System performance may be reduced if operating with a fan fault or above 30°C (86°F).	-30° to 60°C (-22° to 140°F) Maximum rate of change is 20°C/hr (36°F/hr)
Relative Humidity	8% to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, noncondensing	5% to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, noncondensing
Maximum Vibration	0.26 G at 5 to 350 Hz in operational orientations	1.54 G rms at 10 Hz to 250 Hz in all orientations
Shock	Half sine shock in all operational orientations of 31 G ±5% with a pulse duration of 2.6 ms ±10%	Half sine shock on all six sides of 71 G ±5% with a pulse duration of 2 ms ±10% Square wave shock on all six sides of 27 G with velocity change at 235 in/sec or greater
Altitude	3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min)	-16 to 9144 m (-50 ft to 30,000 ft) Maximum allowable altitude change rate is 457 m/min (1500 ft/min)
Contamination	Class G1 (Mild) as defined in ISA Standard S71.04	
Location	UL/UL-C listed as suitable for use in ordinary locations and meets ordinary safety standards for fire and shock hazards.	

Physical Specifications

	Keyboard	Chassis
Dimensions	Height • 35 mm (1.4 in) Width • 445 mm (17.5 in) Depth • 150 mm (5.9 in)	Maximum outside dimensions with bezel and feet Height • 87.3 mm (3.44 in) with bezel Width • 445 mm (17.5 in) Depth • 680 mm (26.75 in)
Weight	1.8 kg (4.0 lbs)	Rack • 23.6 kg (51.5 lbs) maximum configuration

Remote Graphics Unit For H90 Servers Overview

The H90 server can be configured with a Remote Graphics Unit that connects either dual or quad video by way of fiber-optic cabling. The USB keyboard, mouse, trackball, touchscreens, and audio can be connected through the RGU, which can be located at distances from the H90 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 (164 ft) is user-supplied.

The RGU features up to six 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.

Remote Graphics Unit for H90 Servers

RGU (H90) Functional Specifications

Interfaces to External Devices	• Up to six USB 2.0 ports for mouse, optional trackball, keyboard, USB speakers, or up to four optional touchscreens • Audio connections, including microphone, audio input, and audio output connections **NOTE:** If a speaker option and four USB touchscreens are to be utilized, a USB hub must be selected for use with this server. (Refer to part numbers RH103FU, P0928EJ, P0923FS, P0923FT for the touchscreens.) • RGU solution includes up to four DisplayPort ports, and can directly support connections to up to four DisplayPort monitors	
Distance Specifications	The RGU allows distances between the H90 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 Units Kit, Dual (RH103DX) • Remote Graphics Unit Transmitter (RH103DY) • Remote Graphics Unit Receiver (RH103DZ) • 15 m (50 ft) starter LC/LC fiber cable (P0972TP)	Remote Graphics Units Kit, Quad (RH103EA) • Remote Graphics Unit Transmitter (RH103EB) • Remote Graphics Unit Receiver (RH103EC) • 15 m (50 ft) starter LC/LC fiber cable (P0972TP)

RGU (H90) Environmental Specifications

	Operating	Storage/Transportation
Temperature	0° to 40°C (32 to 104°F) (indoors, in cabinet)	-40° to + 70°C (-40 to +158°F)
Relative Humidity	20% to 80%, noncondensing (indoors)	5% to 95% (in packaged configuration)
Vibration	NEBS level 3 Seismic Zone 4[(a)]	NEBS level 3 Seismic Zone 4[(a)]
Maximum Atmospheric Pressure	650hPa (3,580 m / 11,745 ft) to 1013hPa (0 m / 0 ft)	192hPa (12,000 m / 39,370 ft) to 1020hPa (-50 m / -164 ft)
EMC Certifications	Class A (commercial, industrial, or business) • ACMA, CE, FCC, VCCI	
Laser Emissions	850 nm laser compliant to 21CFR, Subpart J, Class 1	
Contamination	Class G1 (Mild) as defined in ISA Standard S71.04	
Location	UL/UL-C listed as suitable for use in ordinary locations and meets ordinary safety standards for fire and shock hazards.	
(a) Zone 4 = 7.0 to 8.3 on the Richter scale		

RGU (H90) Physical Specifications

Resolution	Maximum Analog Resolution • 1920x1200 ◦ (DisplayPort to HD-15 adapter sold separately) Maximum Digital (DVI) Resolution • Up to 2048x1152 Maximum DisplayPort Resolution • Up to 2048x1152 • 2560x1600
Operating Systems Supported	• Windows Server 2016 • Windows Server 2022
Dimensions Transmitter and Receiver Units)	Height • 4.26 cm (1.67 in) Width • 18.9 cm (7.45 in) Depth • 21.66 cm (8.53 in)
Cable Type Supported	LC-LC optical, Duplex

Maximum Distances	**NOTE:** Fiber cable with LC/LC connections greater than 50 m is user-supplied. • OM1[a] multimode 62.5/125 µm (max. 275 m / 902 ft) • OM2[a] multi-mode 50/125 µm cable (max. 550 m / 1804 ft) • OM3[a] multi-mode 50/125 µm cable (max. 550 m / 1804 ft) • OM4[a] multi-mode 50/125 µm cable (max. 550 m / 1804 ft) • OS1,OS2[b] Single-mode 9/125 µm cable (max. 5 km / 3.10 mi)
Power Consumption and Supply Voltage	Extio Unit • Power Requirements ◦ 12 VDC, maximum 5 A ◦ (5 A fuse for overcurrent protection) • Power Connector ◦ Mini-DIN 4 socket (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 ◦ 100 to 240 VAC • Input Frequency ◦ 50 to 60 Hz • Input Connector ◦ IEC 60320-C13 • Output Voltage ◦ 12 VDC • Output Connector ◦ Mini-DIN 4 plug (4-pin) with lock • Maximum Power Output ◦ 60 W

(a) OM1, OM2, OM3, and OM4 are Matrox cable kits. You must either order them from Matrox or build equivalent cables to specification.

(b) OS1 and OS2 are Matrox single-mode fiber kits for distances greater than 400 m (1312 ft) that must be user-supplied.

Related Documents

Topic	Document
Model H90 (HP DL380) Gen10	*Model H90 (HP DL380 Gen10) for Windows Server 2016 User's Guide* (B0700HP)
	Model H90 (HP DL380 Gen10) for Windows Server 2022 User's Guide (B0700WS)
Domain Services	*Foxboro DCS Security Implementation Guide* (B0700HM)
	Foxboro DCS Security for Windows 10 21H2 LTSC and Windows Server 2022 Implementation Guide (B0700WX)
Security Products	*Trellix Security Products* (PSS 41S-4Trellix)
	Trellix ENS 10.7 and ePO 5.10 for Windows Server 2016 Installation and User's Guide (B0700WR)
	Trellix ENS 10.7 and ePO 5.10 SP1 for Windows Server 2022 Installation and User's Guide (B0700XD)
System Recovery	*Veritas System Recovery 18 User's Guide* (B0700HS)
	Veritas System Recovery 23 User's Guide (B0700WY)
USB extension kits	*Annunciator Keyboard* (PSS 41H-4USBKBD)

⚠ **WARNING**: This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.p65warnings.ca.gov/.

Schneider Electric Systems USA, Inc.
70 Mechanic Street
Foxboro, Massachusetts 02035–2040
United States of America

Global Customer Support: https://pasupport.se.com

As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

PSS 41H-4H90, Rev D