

Model H90 Workstation Server for Windows Server 2016 Operating System



Demand for increased software capability requires increase 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.

OVERVIEW

As a multipurpose server running the Windows Server 2016 operating system, the Model H90 server supports 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. 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 or annunciator/numeric keyboards, plus up to four video monitors. The H90 server also supports multiple, optional USB touchscreens.

These servers have an Intel Xeon® processor that can be configured with up to 2.4 TB of internal hard disk storage and up to 96 GB of ECC DDR-4 SDRAM Registered Memory. The Serial Attached SCSI (SAS) supports a system disk, expansion disks, or RAID1 or RAID5 hard drive arrays. Client/server communications are accomplished using the TCP/IP networking protocol.

NOTICE

POTENTIAL DATA LOSS

Remote client workstations supported by Model H90 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 the server, a failure or shutdown of the server will affect all these remote stations as well. Also, due to the variability of demand that can be placed on the server by remote client sessions, the performance of the applications running on the Model 90 server may not be as deterministic as it is on a dedicated, single-user workstation.

Failure to follow these instructions can result in data loss.

Network Connections

The Model H90 servers are connected to the Foxboro Evo Control Network (the control network) on a Foxboro Evo system through dual Ethernet PCIe cards. It can also be simultaneously connected to a generic Ethernet based information network via the two integrated Ethernet ports. Standard security practices should be followed when this is done.

Server Security

Foxboro Evo 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 Evo server enhanced product security

requirements are supported in two broad categories, namely, server software including passwords and server platform hardening.

Server software:

- ▶ Changeable log-on passwords
- ▶ Individual user passwords
- ▶ Password lock-out after a user-configurable number of unsuccessful log-in 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 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.

Foxboro Evo server 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 Workstation/Server ships with native Microsoft® security software.

Installation Considerations

These new security enhancements are supported on Windows Server 2016 stations which support the control network and require a software update to the latest Foxboro Evo software release. The security enhancements can be deployed on a subset of servers 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 Implementation User's Guide for I/A Series and Foxboro Evo Workstations (Windows 10 or Windows Server 2016 Operating Systems)* (B0700HG). However, customization of the Domain Server configuration requires Microsoft knowledgeable personnel.

The Primary and Secondary Domain Controller servers are installed as Foxboro Evo Servers. However, they must be dedicated to their domain controller tasks, and must not be used to run Foxboro Evo applications, or Remote Desktop Services. An exception to this rule is the McAfee ePolicy Orchestrator® which is allowed 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.

FEATURES

The Model H90 Workstation Server for Windows Server 2016 operating system, available with a Foxboro Evo S10 software license feature:

- ▶ A premium level system with high-end processor speed, 8 GB of base memory, up to eight internal 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 Control Core Services software or the Control Software applications from remote client stations over local area networks (LANs)
- ▶ The latest version of Veritas System Recovery 16 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 16, if desired.

MODEL H90 SERVER

Model H90 Base Configuration



The Model H90 server contains the following elements:

- ▶ Intel Xeon E5-2609v3 Processor
- ▶ Pre-configured and installed Microsoft® Windows Server® 2016 operating system, 64-bit package
- ▶ Latest version of Veritas System Recovery 16 Software
- ▶ 8 GB DDR-4 Registered Memory
- ▶ 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
- ▶ 4 Integrated 10/100/1000BaseT Ethernet ports
- ▶ Mouse (USB)
- ▶ Keyboard (USB)
- ▶ One serial interface port for customer supplied serial devices
- ▶ Redundant hot swappable power supplies
- ▶ Redundant hot swappable fans
- ▶ Two rear USB ports and VGA analog video port
- ▶ Three front USB ports and VGA analog video port
- ▶ Mounting rail kit

Model H90 Options

The Model H90 server offers the following options:

- ▶ Expandable to 96 GB of system RAM
- ▶ Expandable to eight 300-GB hard drives
- ▶ Monitors with optional USB touchscreen⁽¹⁾
- ▶ Trackball
- ▶ Ethernet adapter cards (copper or fiber)
- ▶ Dual/quad monitor graphics cards (dual is analog/digital; quad analog only)
- ▶ RAID1 or RAID5 internal hard drive arrays with optional hot spare drives
- ▶ Up to four USB annunciator keyboards
- ▶ Printers
- ▶ 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 H90 server supports up to four monitors with optional touchscreen capability.

Mounting Options

The Model H90 rack mount server can be placed 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 (35° C). The Model H90 server is a 2U high, rack mount server which offers rail mounting as standard equipment.

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 H90 server cannot be mounted in the standard Foxboro® enclosures.

With dual or quad PCIe video cards, 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.

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 (refer to “REMOTE GRAPHICS UNIT FOR H90 SERVERS OVERVIEW” on page 9).

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

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

FUNCTIONAL SPECIFICATIONS (H90)

Processor Type

Intel Xeon

Memory

8GB 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

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 (up to 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 (via RGU or hub)

Audio speakers

Serial

Customer supplied serial devices

Internal Diagnostics

Self-checking performed at power-up.

Video**OUTPUT TYPE**

Dual head DisplayPort/DVI PCIe video card (default) (up to 1600 x 1200 resolution)

Quad-head, analog only, PCIe video card assembly

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

SCREEN PRESENTATION*Refresh Rate*

Up to 85 Hz

Colors

32 bit

Resolution

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).

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.

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

INRUSH CURRENT

30 A power supply for 20 ms

HEAT DISSIPATION

3207 BTU/hr (at 100 V ac),

3701 BTU/hr (at 200 V ac)

Power Consumption (Typical)

Two CPUs with 12 cores (100% utilized) and eight hard drives measure 250 watts

Cooling

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 Gen9 High Performance Fan Kit, Foxboro Part
Number P0928NE. This fan kit does increase the fan
noise of the machine.

ENVIRONMENTAL SPECIFICATIONS (H90)

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. 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.

System performance may be reduced if operating
with a fan fault or above 30°C (86°F).

Note: 10 to 40°C (50 to 104°F) with the Optional
P0918NE HP DL380 Gen 9 High Performance
Fan Option kit Foxboro Part number P0928NE

RELATIVE HUMIDITY

10% to 90% relative humidity (Rh), 28°C (82.4°F)
maximum wet bulb temperature, non-condensing

MAXIMUM VIBRATION

0.26 G at 5 to 350 Hz in operational orientations

SHOCK

Half sine shock in all operational orientations of
31 G +/-5% with a pulse duration of 2.6 ms
+/-10%

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).

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% relative humidity (Rh), 38.7°C
(101.7°F) maximum wet bulb temperature,
noncondensing

MAXIMUM VIBRATION

1.54 G rms at 10 Hz to 250 Hz in all orientations

SHOCK

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 @ 235 in/sec. or greater.

ALTITUDE

-16 to 10,600 m (-50 ft to 35,000 ft)

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 (H90)

Safety Certifications

US, CANADA

UL® and cUL Listed

EU

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 62479:2010

Complies with the following International Standards:

IEC 60950-1:2005 2nd ED+A1:2009

EMC

USA, CANADA

Complies with FCC Part 15, Class B

EU

Complies with the EU EMC Directive 2014/30/EU and the following Harmonized Standards:

EN 55022:2010 CLASS A
EN 55024:2010
EN 61000-3-2:2014
EN 61000-3-3:2013

OTHER REGULATIONS

Complies with EU RoHS Directive 2011/65/EU under the following Harmonized Standard: EN 50581:2012

NOTE: 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.

PHYSICAL SPECIFICATIONS (H90)

Dimensions and Weight

KEYBOARD

Height
35 mm (1.4 in)
Width
445 mm (17.5 in)
Depth
150 mm (5.9 in)
Weight
1.8 kg (4.0 lbs)

CHASSIS

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)
Rack Weight
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 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 H90 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 (164 ft) is user-supplied.

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.

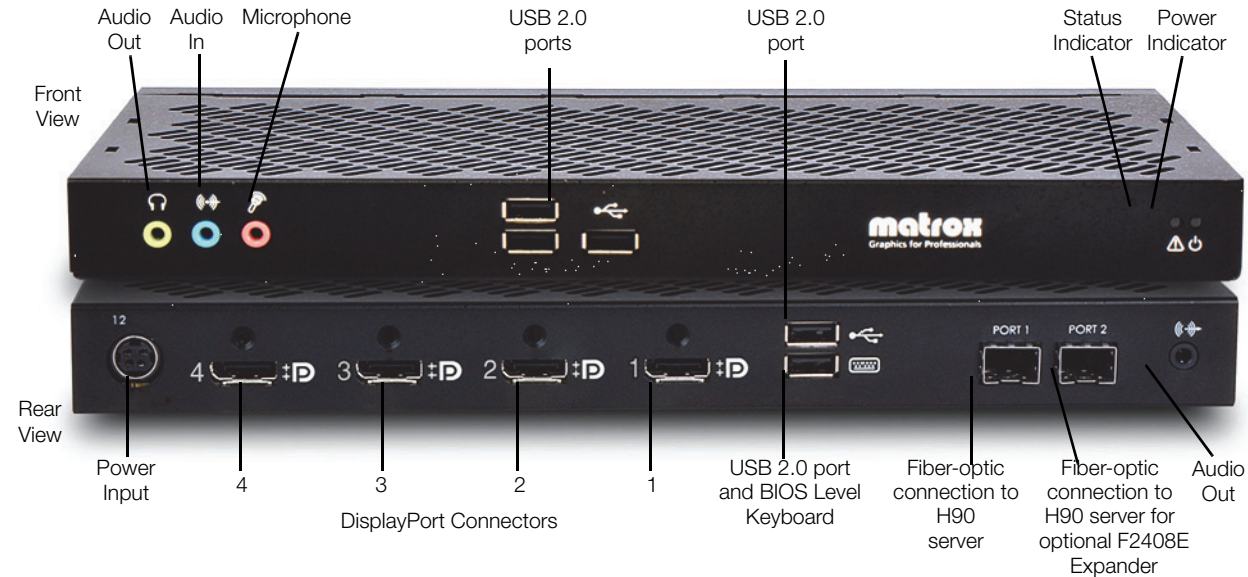


Figure 1. Remote Graphics Unit for H90 Servers (Front and Rear Views)

RGU (H90) 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 H90 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 (P0928DR)
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 (H90) 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⁽²⁾

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⁽²⁾

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

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

RGU (H90) 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 10, Windows Server 2016, 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

NOTE

Fiber cable with LC/LC connections greater than 50 m is user-supplied.

OM1⁽³⁾ multimode 62.5/125 µm (max. 70 m / 230 ft)

OM2⁽³⁾ multi-mode 50/125 µm cable (max. 150 m / 492 ft)

OM3⁽³⁾ multi-mode 50/125 µm cable (max. 380 m / 1247 ft)

OM4⁽³⁾ multi-mode 50/125 µm cable (max. 400 m / 1312 ft)

OS1, OS2⁽⁴⁾ 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)

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

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

RGU (H90) 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