



# PT-G503 Series

IEC 61850-3/62439-3 3-port full Gigabit managed redundancy boxes



## Features and Benefits

- IEC 61850-3, IEEE 1613 (power substations) compliant
- IEC 62439-3 Clause 4 (PRP) and Clause 5 (HSR) compliant
- PRP/HSR Coupling and QuadBox functions supported
- Ethernet console reserved for local access
- Built-in MMS server based on IEC 61850-90-4 switch data modeling for power SCADA
- Hardware-based IEEE 1588v2 PTP supported
- Design ready for NERC CIP compliant system development
- Isolated redundant power inputs with universal 24 VDC, 48 VDC, or 110/220 VDC/VAC power supply range
- -40 to 85°C operating temperature range

## Certifications



EN 50121-4



## Introduction

The PT-G503-PHR-PTP Series redundancy boxes (RedBoxes) are compliant with the latest standardized redundancy protocols for industrial automation networks, IEC 62439-3 Clause 4 (Parallel Redundancy Protocol, PRP) and IEC 62439-3 Clause 5 (High-availability Seamless Redundancy, HSR). PRP/HSR ensures the highest system availability and data integrity for mission-critical applications in electrical substation and/or process automation systems that require zero recovery time redundancy. The redundant protocols Coupling and QuadBox are also supported. With Coupling and QuadBox, HSR rings can be connected to make the redundant network more versatile. The PT-G503-PHR-PTP Series comes with three 10/100/1000BaseT(X) and 100/1000BaseSFP slot combo ports.

One slot (INTERLINK port) is for an internal link for connecting with a SAN (Singly Attached Node). The other two ports (LAN A and LAN B ports) are for PRP/HSR redundant protocol communications. With this full Gigabit Ethernet port design, the PT-G503-PHR-PTP Series provides high performance for PRP/HSR systems.

The PT-G503-PHR-PTP Series also provides IEEE 1588v2 PTP in end-to-end one-step transparent clock mode for timing-critical applications and isolated redundant power inputs with 24/48 VDC or 110/220 VDC/VAC power supply ranges to increase the reliability of the power supply.

## Additional Features and Benefits

- PRP (Parallel Redundancy Protocol): Transmit or receive two independent active paths to/from different LANs simultaneously on a zero recovery time network
- HSR (High-availability Seamless Redundancy): Every frame is duplicated and then transmitted in both directions of the HSR ring to deliver zero switchover time
- PRP/HSR coupling: Supports coupling from an HSR ring node to redundant PRP LANs (Up to 7 PRP LANs)
- QuadBox function: Supports peer coupling of rings via interconnecting two INTERLINK ports on two separate RedBoxes
- Fiber Check™ provides monitoring and diagnosis functionality on SFP fiber ports
- Hardware-based IEEE 1588v2 PTP (Precision Time Protocol) end-to-end one-step transparent clock for precise time synchronization of networks
- Automatic warning by exception through email and relay output
- Configurable via web browser, CLI, Windows utility, and ABC-02 automatic backup configurator

## Specifications

### Ethernet Interface

|   |  |
|---|--|
| Combo Ports (10/100/1000BaseT(X) or 100/1000BaseSFP+) | 3  |
| Console Port  | Ethernet console (10/100/1000Mbps RJ45)  |
| Standards   | IEEE 802.3 for 10BaseT<br>IEEE 802.3ab for 1000BaseT(X)<br>IEEE 802.3u for 100BaseT(X) and 100BaseFX<br>IEEE 802.3z for 1000BaseSX/LX/LHX/ZX |

### Ethernet Software Features

|                      |   |
|----------------------|---|
| Filter               | Static Multicast  |
| Management           | Back Pressure Flow Control, BOOTP, DHCP Client, Fiber check, Flow control, HTTP, IPv4/IPv6, LLDP, Port Mirror, RARP, RMON, SMTP, SNMP Inform, SNMPv1/v2c/v3, Syslog, Telnet |
| Power Substation     | MMS   |
| Redundancy Protocols | HSR, PRP, RSTP grouping   |
| Security             | HTTPS/SSL, TACACS+, RADIUS, SSH, Trust access control   |
| Time Management      | NTP Server/Client, SNTP, IEEE 1588v2 PTP (hardware-based)   |
| MIB                  | IEC 62439-3 MIB   |

### USB Interface

|              |            |
|--------------|------------|
| Storage Port | USB Type A |
|--------------|------------|

### Serial Interface

|              |                                       |
|--------------|---------------------------------------|
| Console Port | USB-serial console (Type B connector) |
|--------------|---------------------------------------|

### Input/Output Interface

|                        |   |
|------------------------|---|
| Alarm Contact Channels | Resistive load: 1 A @ 24 VDC  |
| Digital Inputs         | +13 to +30 V for state 1<br>-30 to +3 V for state 0<br>Max. input current: 8 mA |

### Power Parameters

|                             |  |
|-----------------------------|--|
| Input Voltage               | PT-G503-PHR-PTP-HV:<br>Redundant dual inputs<br>110/220 VAC/VDC (85 to 264 VAC, 88 to 300 VDC)<br><br>PT-G503-PHR-PTP-WV:<br>Redundant dual inputs<br>24/48 VDC (18 to 72 VDC) |
| Overload Current Protection | Supported  |
| Reverse Polarity Protection | Supported  |
| Input Current               | PT-G503-PHR-PTP-HV: 0.260/0.170 A @ 110/220 VAC<br>PT-G503-PHR-PTP-HV: 0.150/0.080 A @ 110/220 VDC<br>PT-G503-PHR-PTP-WV: 0.660/0.360 A @ 24/48 VDC                            |
| Power Connector             | 1 removable 5-contact terminal block(s)  |

## Physical Characteristics

|                           |   |
|---------------------------|---|
| Housing                   | Aluminum                                  |
| IP Rating                 | IP40                                      |
| Dimensions (without ears) | 80 x 160 x 110 mm (3.15 x 6.30 x 4.33 in) |
| Weight                    | 1210 g (2.69 lb)                          |
| Installation              | DIN-rail mounting                         |

## Environmental Limits

|  |                            |
|--|----------------------------|
| Operating Temperature                  | -40 to 85°C (-40 to 185°F) |
| Storage Temperature (package included) | -40 to 85°C (-40 to 185°F) |
| Ambient Relative Humidity              | 5 to 95% (non-condensing)  |

## Standards and Certifications

|                  |  |
|------------------|--|
| Safety           | UL 508   |
| EMI              | EN 55032 Class A, CISPR 32, FCC Part 15B Class A   |
| EMS              | IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV<br>IEC 61000-4-3 RS: 80 MHz to 1 GHz: 35 V/m<br>IEC 61000-4-4 EFT: Power: 4 kV; Signal: 4 kV<br>IEC 61000-4-5 Surge: Power: 4 kV; Signal: 4 kV<br>IEC 61000-4-6 CS: 10 V<br>IEC 61000-4-8 PFMF<br>IEC 61000-4-11 DIPs |
| Power Substation | IEC 61850-3, IEEE 1613   |
| Railway          | EN 50121-4   |

## MTBF

|           |  |
|-----------|--|
| Time      | PT-G503-PHR-PTP-HV: 566,844 hrs<br>PT-G503-PHR-PTP-WV: 440,857 hrs |
| Standards | Telcordia (Bellcore) Standard TR/SR                                |

## Warranty

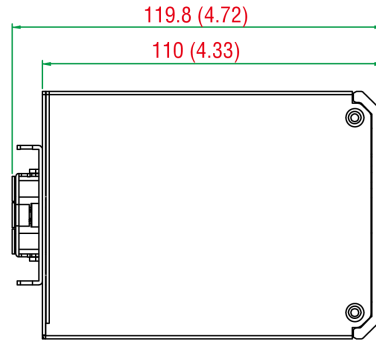
|                 |  |
|-----------------|--|
| Warranty Period | 5 years  |
| Details         | See <a href="http://www.moxa.com/warranty">www.moxa.com/warranty</a> |

## Package Contents

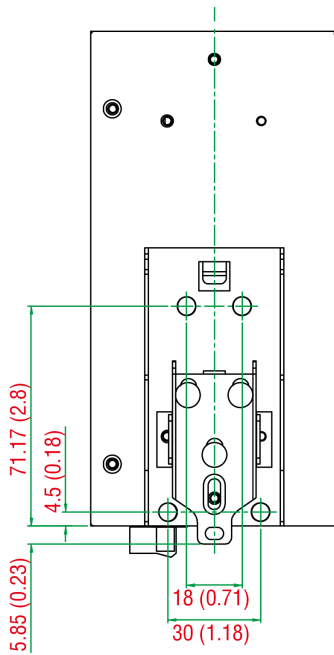
|                  |   |
|------------------|---|
| Device           | 1 x PT-G503 Series switch   |
| Cable            | 1 x USB type A male to USB type B male  |
| Installation Kit | 1 x DIN-rail kit<br>1 x cap, for type A USB port<br>4 x cap, plastic, for RJ45 port<br>1 x cap, plastic, for console port<br>3 x cap, plastic, for SFP slot                                       |
| Documentation    | 1 x document and software CD<br>1 x quick installation guide<br>1 x warranty card<br>1 x product certificates of quality inspection, Simplified Chinese<br>1 x product notice, Simplified Chinese |
| Note             | SFP modules need to be purchased separately for use with this product.  |

## Dimensions

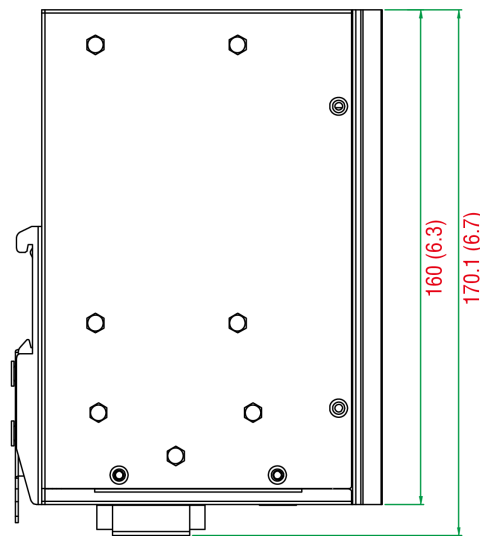
Unit: mm (inch)



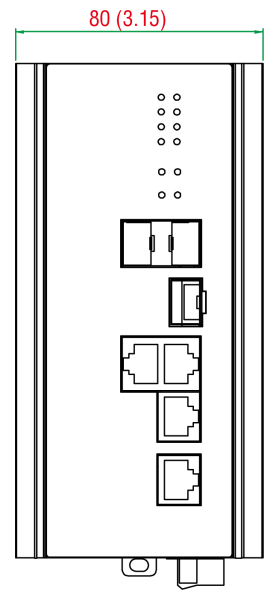
Top View



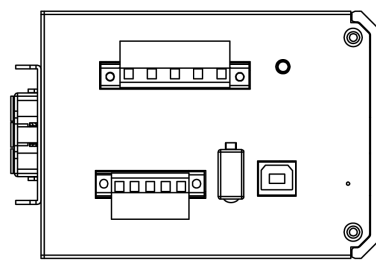
Rear View



Side View



Front View



Bottom View

## Ordering Information

| Model Name         | Max. No. of Ports | Max. No. of Gigabit Ports | Combo Ports<br>10/100/1000BaseT(X)<br>or 100/1000BaseSFP | Input Voltage   | Operating Temp. |
|--------------------|-------------------|---------------------------|--|-----------------|-----------------|
| PT-G503-PHR-PTP-WW | 3                 | 3                         | 3  | 24/48 VDC       | -45 to 85°C     |
| PT-G503-PHR-PTP-HV | 3                 | 3                         | 3  | 110/220 VDC/VAC | -45 to 85°C     |

## Accessories (sold separately)

### Software

|                   |  |
|-------------------|--|
| MXview-50         | Industrial network management software with a license for 50 nodes (by IP address)             |
| MXview-100        | Industrial network management software with a license for 100 nodes (by IP address)            |
| MXview-250        | Industrial network management software with a license for 250 nodes (by IP address)            |
| MXview-500        | Industrial network management software with a license for 500 nodes (by IP address)            |
| MXview-1000       | Industrial network management software with a license for 1000 nodes (by IP address)           |
| MXview-2000       | Industrial network management software with a license for 2000 nodes (by IP address)           |
| MXview Upgrade-50 | License expansion of MXview industrial network management software by 50 nodes (by IP address) |

### Storage Kits

|              |   |
|--------------|---|
| ABC-02-USB   | Configuration backup and restoration tool, firmware upgrade, and log file storage tool for managed Ethernet switches and routers, 0 to 60°C operating temperature   |
| ABC-02-USB-T | Configuration backup and restoration tool, firmware upgrade, and log file storage tool for managed Ethernet switches and routers, -40 to 75°C operating temperature |

### SFP Modules

|                |  |
|----------------|--|
| SFP-1FELLC-T   | SFP module with 1 100Base single-mode with LC connector for 80 km transmission, -40 to 85°C operating temperature                                      |
| SFP-1FEMLC-T   | SFP module with 1 100Base multi-mode with LC connector for 4 km transmission, -40 to 85°C operating temperature  |
| SFP-1FESLC-T   | SFP module with 1 100Base single-mode with LC connector for 40 km transmission, -40 to 85°C operating temperature                                      |
| SFP-1G10ALC    | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 10 km transmission; TX 1310 nm, RX 1550 nm, 0 to 60°C operating temperature   |
| SFP-1G10ALC-T  | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 10 km transmission; TX 1310 nm, RX 1550 nm, -40 to 85°C operating temperature |
| SFP-1G10BLC    | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 10 km transmission; TX 1550 nm, RX 1310 nm, 0 to 60°C operating temperature   |
| SFP-1G10BLC-T  | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 10 km transmission; TX 1550 nm, RX 1310 nm, -40 to 85°C operating temperature |
| SFP-1G20ALC    | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 20 km transmission; TX 1310 nm, RX 1550 nm, 0 to 60°C operating temperature   |
| SFP-1G20ALC-T  | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 20 km transmission; TX 1310 nm, RX 1550 nm, -40 to 85°C operating temperature |
| SFP-1G20BLC    | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 20 km transmission; TX 1550 nm, RX 1310 nm, 0 to 60°C operating temperature   |
| SFP-1G20BLC-T  | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 20 km transmission; TX 1550 nm, RX 1310 nm, -40 to 85°C operating temperature |
| SFP-1G40ALC    | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 40 km transmission; TX 1310 nm, RX 1550 nm, 0 to 60°C operating temperature   |
| SFP-1G40ALC-T  | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 40 km transmission; TX 1310 nm, RX 1550 nm, -40 to 85°C operating temperature |
| SFP-1G40BLC    | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 40 km transmission; TX 1550 nm, RX 1310 nm, 0 to 60°C operating temperature   |
| SFP-1G40BLC-T  | WDM-type (BiDi) SFP module with 1 1000BaseSFP port with LC connector for 40 km transmission; TX 1550 nm, RX 1310 nm, -40 to 85°C operating temperature |
| SFP-1GEZXC     | SFP module with 1 1000BaseEZXC port with LC connector for 110 km transmission, 0 to 60°C operating temperature   |
| SFP-1GEZXC-120 | SFP module with 1 1000BaseEZXC port with LC connector for 120 km transmission, 0 to 60°C operating temperature   |
| SFP-1GLHLC     | SFP module with 1 1000BaseLH port with LC connector for 30 km transmission, 0 to 60°C operating temperature  |

|               |   |
|---------------|---|
| SFP-1GLHLC-T  | SFP module with 1 1000BaseLH port with LC connector for 30 km transmission, -40 to 85°C operating temperature     |
| SFP-1GLHXLC   | SFP module with 1 1000BaseLHX port with LC connector for 40 km transmission, 0 to 60°C operating temperature      |
| SFP-1GLHXLC-T | SFP module with 1 1000BaseLHX port with LC connector for 40 km transmission, -40 to 85°C operating temperature    |
| SFP-1GLSXLC   | SFP module with 1 1000BaseLSX port with LC connector for 500 m transmission, 0 to 60°C operating temperature      |
| SFP-1GLSXLC-T | SFP module with 1 1000BaseLSX port with LC connector for 500 m transmission, -40 to 85°C operating temperature    |
| SFP-1GLXLC    | SFP module with 1 1000BaseLX port with LC connector for 10 km transmission, 0 to 60°C operating temperature       |
| SFP-1GLXLC-T  | SFP module with 1 1000BaseLX port with LC connector for 10 km transmission, -40 to 85°C operating temperature     |
| SFP-1GSXLC    | SFP module with 1 1000BaseSX port with LC connector for 300/550 m transmission, 0 to 60°C operating temperature   |
| SFP-1GSXLC-T  | SFP module with 1 1000BaseSX port with LC connector for 300/550 m transmission, -40 to 85°C operating temperature |
| SFP-1GZXLC    | SFP module with 1 1000BaseZX port with LC connector for 80 km transmission, 0 to 60°C operating temperature       |
| SFP-1GZXLC-T  | SFP module with 1 1000BaseZX port with LC connector for 80 km transmission, -40 to 85°C operating temperature     |

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