

# HMG-1648EP



## Introduction

### Overview

HMG-1648EP (広域温度モデル) と HMG-1648P (標準温度モデル) は、16ポートの10/100Base-T(X) と 4SFPポートのGigabit/Fast Ethernetを搭載、安定した信頼性の高いイーサネット通信をご提供する産業用イーサネットマネージドスイッチです。このパワフルなスイッチは、ハードウェア製品の信頼性を最大限に高めるため、アメリカ製CPUプラットフォームを使用しています。さらに強化されたソフトウェア機能には、STP/RSTP/MSTP/ITU-T G.8032 ERPSや冗長ケーブル用のマルチダイレクトリング、レイヤ2イーサネットIGMP、VLAN、サービス品質、ACL、セキュリティ、IPv6、帯域制御、ポートミラーリング、ケーブル診断、グリーンイーサネットなどがあります。

HMG-1648EP と HMG-1648P は、頑丈なDINレールメタルエンクロージャを備え、特に過酷な環境向けに設計されています。Ethernet Direct社はミッションクリティカルなアプリケーションに着目しており、産業用ネットワーク、セキュリティ&監視、軍事&防衛、ビルオートメーション、ファクトリーオートメーション、ユーティリティマーケットアプリケーションなどの利用に適しています。このスイッチは、標準温度モデル (-10~70℃) と広域温度モデル (-40~80℃) をサポートしています。

## Features

- High Performance Network Switching Technology**
  - Complies with IEEE standards
  - Provides 16 x 10/100Base-T(X) with RJ-45 connector with supporting of Green Ethernet IEEE802.3az EEE (Energy Efficient Ethernet)
  - Provides 4 x 100/1000Base SFP slots with supporting of DDMI
  - Supports various network redundant solutions, including Direct-Ring, Direct-Chain, Join-Ring, STP, RSTP, MSTP and ITU-T G.8032
  - Proprietary ultra high speed redundant technology with < 10ms recovery time @ 250 devices
  - Supports IEEE1588 PTP V2 for precise time synchronization, to operate in Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave mode by each port
  - Supports various network security solutions, Port and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
  - Supports DHCP Server/Client/Relay/Snooping/Snooping option 82/Relay option 82
  - Network traffic priority, QoS, Traffic classification QoS, CoS, bandwidth control for Ingress/Egress, broadcast storm control, DiffServ
  - Supports IEEE802.1Q VLAN, MAC-based VLAN, IP Subnet-based VLAN, Protocol-based VLAN, VLAN translation, GVRP/MVRP
- Supports IGMP/MLD snooping V1/V2/V3, IGMP Filtering/Throttling, IGMP query, IGMP proxy reporting, MLD snooping
- Supports dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- Supports RMON, MIB II, Port mirroring, Syslog, IEEE802.1ab LLDP for network monitoring
- Supports IPv6 Telnet server, ICMPv6
- Supports CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- Supports firmware upgrade via TFTP & HTTP with redundant firmware option

### Reliable Power Design

- Equipped with redundant power inputs
- Supports 12 to 48VDC power input
- Power reverse polarity protection and overload current protection

### Robust Industrial Design

- EN 61000-6-2 and EN 61000-6-4 certified to use in heavy industrial environment
- EN 50121-4 certified for Railway Applications (Track Side)
- Robust industrial design case complies with IP30 housing standard
- Supports operating temperature -10 to 70°C & extended temperature -40 to 80°C
- DIN-Rail or optional wall mounting installation

## Specifications

### Hardware Specifications

#### Interface

**Total Ports:** 20 ports  
**RJ-45 Ports:** 16 x 10/100Base-T(X) auto-negotiation speed, Full/Half duplex, auto MDI/MDI-X  
**Console Port:** RS-232 (RJ-45 interface)  
**Fiber Ports:** 4 x 100/1000Base SFP slots  
**LEDs:** System: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)  
 Fiber Ports: Link/Active (Green)  
 RJ-45 Ports: 10/100 Link/Active (Green)  
**Alarm Contact:** 1A@24VDC  
**CPU Watchdog:** Supported

#### Power Requirements

**Power Input:** 12 to 48VDC, redundant dual inputs  
**Power Consumption:** 12VDC/10.8W, 24VDC/10.6W, 48VDC/12.5W  
**Power Protection:** Reverse polarity protection, overload current protection

#### Physical

**Dimensions:** IP30 standard, 72mm (W) x 152mm (H) x 106mm (D)  
**Installation:** DIN-Rail or optional wall mounting

#### Environmental

**Operating Temperature:** Regular: -10 to 70°C, Extended: -40 to 80°C  
**Storage Temperature:** -40 to 85°C  
**Operating Humidity:** 5% to 95% RH (Non-condensing)

#### Technical

**Standard:**  
 IEEE 802.3 10Base-T Ethernet  
 IEEE 802.3u 100Base-TX/100Base-FX

IEEE 802.3z Gigabit Fiber  
 IEEE 802.3x Flow Control  
 IEEE 802.3ad Port trunk with LACP  
 IEEE 802.3ac VLAN Tagging extension (Max. frame size extended to 1522 Bytes)  
 IEEE 802.3az EEE (Energy Efficient Ethernet)  
 IEEE 802.1D Spanning Tree  
 IEEE 802.1w Rapid Spanning Tree  
 IEEE 802.s Multiple Spanning Tree  
 IEEE 802.1p Class of Service  
 IEEE 802.1Q VLAN Tagging  
 IEEE 802.1X User Authentication (Radius)  
 IEEE 802.1AB LLDP  
 ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection Switching)  
**Protocol Technology:** CSMA/CD  
**Switching Architecture:** Store and Forward

#### Regulatory Approvals

**EMC:** CE, EN 61000-6-2, EN 61000-6-4  
**EMI:** FCC Part 15 Subpart B Class A, CE EN55022 Class A  
**EMS:** EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8,  
**Safety:** UL 60950-1  
**Railway Application (Track Side):** EN 50121-4 (Certified)  
**Shock:** IEC 60068-2-27  
**Vibration:** IEC 60068-2-6  
**Free Fall:** IEC 60068-2-32  
**Environmental:** WEEE, RoHS  
**MTBF:** 419,048 hours based on Mil-Hdbk-217F, GB  
**Warranty:** 5 years

## Software Specifications

### Redundancy:

Direct-Ring, Direct-Chain, Join-Ring < 10ms recovery time,  
 (Each switch can configure up to 5 rings regardless of Direct-Ring, Direct-Chain, Join-Ring,  
 and each ring can contents 250 units of switches), supports loop protection  
 STP/RSTP/MSTP  
 ITU-T G.8032 / Y.1344 ERPS with < 50ms recovery time  
 (Single Ring, Sub-Ring, Multiple ring topology networks)  
 Link Aggregation: Static supports up to 10 trunk groups  
 Dynamic (IEEE 802.3ad LACP) supports up to 10 trunk groups

### VLAN:

VID 1 to 4094  
 VLAN group up to 4094 groups  
 IEEE 802.1ad Q-in-Q  
 MAC-based VLAN (256 entries)  
 IP Subnet-based VLAN (128 entries)  
 Protocol-based VLAN (Ethernet, SNAP, LLC), (128 entries)  
 VLAN Translation (256 entries)  
 GVRP (GARP VLAN Registration Protocol)  
 MVR (Multicast VLAN Registration)

### QoS:

Port based and IEEE 802.1p based CoS  
 QoS determined by port, per port 8 active priorities queues  
 IP Precedence based Co, IP DSCP based CoS  
 DiffServ (RFC 2474) Remarking

### Bandwidth Control:

Ingress/Egress

### Storm Control:

Unicast, Broadcast, Multicast

### IGMP/MLD Snooping:

IGMP Snooping v1/v2/v3, MLD Snooping v1/v2  
 Port Filtering Profile  
 Throttling, Fast Leave  
 Maximum Multicast Group: Up to 1022 entries  
 Query / Static Router Port

### Security:

IEEE 802.1X (Port-based, MAC-based), RADIUS, TACACS+ 3.0  
 Supports ACL, no. of rules up to 256 entries  
 HTTP/HTTPS, SSL, SSH v2  
 Local Authentication  
 Remote Access Security: RADIUS, TACACS+  
 Management interface access filtering via Web, Telnet/SSH, CLI console

### Management:

SNMP, Web, Telnet/SSH, CLI management  
 TFTP/HTTP backup/restore configurations  
 Firmware upgrade via TFTP/HTTP, supports dual firmware  
 RMON I (1, 2, 3, 9 group), RMON II  
 RFC1213 MIB II, Private MIB  
 Supports UPnP, IP Source Guard, Port Mirroring  
 Warning message sends to syslog, e-mail, alarm relay  
 DNS Client, Proxy  
 LLDP: LLDP-MED

### System Log:

Supports local system log and remote Syslog server

### DHCP:

Server, Client, Relay, Snooping  
 Snooping option 82, Relay option 82

### Time Management:

IEEE1588 PTP V2: Ordinary-Boundary, Peer to Peer Transparent Clock, End to End  
 Transparent Clock, Master, Slave  
 NTP/SNTP Client

### IPv6:

IPv6 Management Telnet Server/ICMP v6  
 SNMP over IPv6, HTTP over IPv6, SSH over IPv6, IPv6 Telnet, IPv6 NTP (Client), IPv6 SNTP  
 (Client), IPv6 TFTP, IPv6 QoS, IPv6 ACL (256 entries)

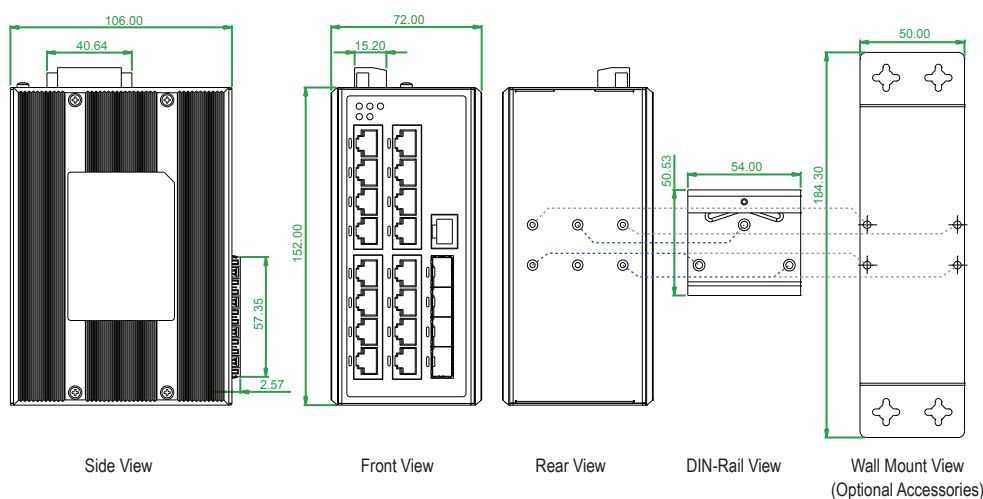
### Green Ethernet:

Supports IEEE802.3az EEE (Energy Efficient Ethernet): Management to optimize the power  
 consumption  
 Determine the cable length and lowering the power for ports work with short cable  
 Lower the power for a port when there is no link  
 LED Power Management: Adjustment on LEDs intensity

### Cable Diagnostic: (Copper ports only)

Shows physical status of the UTP cable, in order to get more accurate result the cable length  
 suggestion is 7-140 meters

## Dimensions (unit=mm)



## Ordering Information

<b>HMG-1648P</b>	Industrial 16 x 10/100Base-T(X) + 4 x 100/1000Base SFP Gigabit Managed Ethernet Switch, -10 to 70°C, (IEEE 1588 PTP)
<b>HMG-1648EP</b>	Industrial 16 x 10/100Base-T(X) + 4 x 100/1000Base SFP Gigabit Managed Ethernet Switch, -40 to 80°C, (IEEE 1588 PTP)

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