

10/8/7 Ports - Managed Industrial Ethernet Switch

n x 100M/1000M/2.5Gbps SFP

n x 10M/100Mbps RJ45 PoE÷PoE++

- Industrial switch with 8/4x RJ45 10/100Mbps and 2/3/4x SFP 100M/1000M/2.5Gbps (only two SFP) and additional interfaces measurement and control
- PoE÷PoE++ (option) support up to 90W per port (all ports max. 240W), Watchdog PoE
- Standard built-in overvoltage protection on RJ45 ports, ITU-T K.44 4kV 10 / 700us e.g. for external cameras
- 'ITU-T G.8032' Ethernet ring support, up to 20ms protection and recovery switching
- Optional function¹ IEEE 1588-2008v.2 (PTPv2): precise time protocol
- Energy Efficient Ethernet (EEE) support
- Radius centralized password management
- PROFINET Conformance Class A
- Ethernet OAM (Link and Service OAM) support
- Security: SNMPv3, Https, SSH management
- Operating temperature: -40 to +85°C with conditions
- IP-40 DIN mounted metal enclosure
- Redundant power supply DC



Description of the device

Transmission

HYPERION-105 is Managed Industrial Ethernet Switch equipped with eight 10/100/Mbps RJ45 (with PoE++ support) and 100M/1G/2.5Gbps SFP ports. It is dedicated to provide the transmission of applications, supervision and operation of power stations, CCTV and other applications for the industry.

Network resiliency

HYPERION-105 switch supports Ethernet Ring Protection Switching according to the ITU-T G.8032 standard, providing up to 20ms protection and recovery switching for Ethernet traffic in ring topologies. Standard resiliency spanning tree protocols like STP, RSTP, MSTP are also supported to ensure system reliability.

Network Performance

HYPERION-105 supports IEEE 1588v.2 Precision Time Protocol (optionally¹) to provide precise time synchronization for applications with restrictive real-time requirements. Ethernet transmission channel may be set as transparent or divided into independent transmission channels through the virtual VLAN mechanism. Device supports advanced Ethernet interface features like VLAN stacking (QinQ, IEEE802.1ad), private VLANs, LACP links aggregation, jumbo frame size, programmable rate limiting and port priority setting. Moreover, despite typical 1Gbit/s SFP modules **HYPERION-105** switches can be connected

using 2,5Gbit/s optical modules. Device supports Ethernet OAM features (Link OAM and Service OAM), providing effective fault management and performance monitoring (remote loopbacks, continuity checks using CFM messages, performance monitoring measurements such as frame loss ratio, frame delay and frame delay variation).

Management

Embedded HTTP server, SSH server and SNMP agent allow free configuration of the device performance by standard Web browser and continuous monitoring from any management platforms equipped with SNMP client. In addition, SSH and SNMPv3 provide secure communication with remote devices using encrypted messages. Remote software update is supported to allow further functionality improving.

Power supply PoE++

Hyperion-105 can optionally support PoE÷PoE++ (Power over Ethernet) technology compliance with standard IEEE802.3af, IEEE802.3at. In PoE++ technology, the ports can work with power up to 90 W, but the total power on all PoE ports cannot exceed 240W.

Environmental limits

The switch is designed to operate in the temperature range from -40 to +85°C with a minimum airflow of 0.4m/s. The operating time at the maximum temperature of +85°C is up to 16 hours. Solid IP-40 metal enclosures stable operation in heavy environment. **HYPERION-105** can be mounted on a standard DIN rail. Redundant power supply provides stable and continuous operation in case of one power supply failing. The device supports Energy Efficient Ethernet technology (compatible with IEEE 802.3az), which allows significant reduction of energy consumption by optimizing energy consumption based on the traffic load of the port and allows the electrical port to go into

sleep mode if the device connected to it is not active. The switch also has power adjustment functions on the RJ45 port depending on the length of the UTP cable.

Applications

HYPERION-105 switch can be used to provide reliable connections between SCADA system and network controllers, to create IP CCTV monitoring systems, to provide communication for wind farms, to monitor environmental parameters in harsh environment, to realize smart grid applications and in many others industrial application.

A typical application is presented in the drawing below.

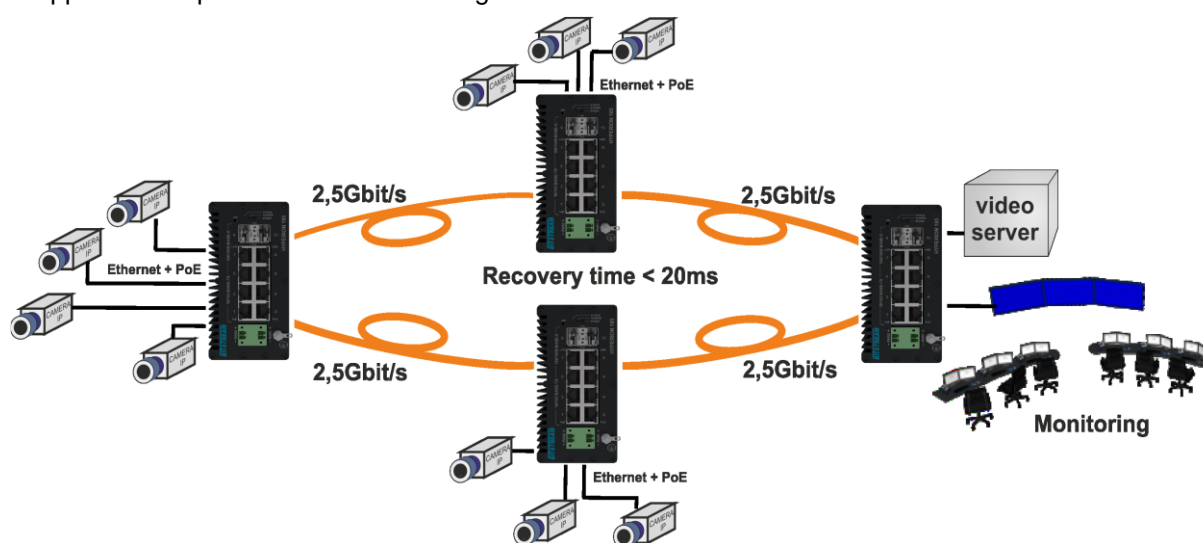


Fig. 1. The sample application, illustrating the connection of peripheral systems to measure the detectors or measuring environmental parameters in power stations unattended

Technical specifications

Supported transmission standards

- IEEE 802.3 10Base-T Ethernet
- IEEE 802.3u 100Base-TX Fast Ethernet
- IEEE 802.3u 100Base-FX Fast Ethernet Fiber
- IEEE 802.3ab 1000Base-T
- IEEE 802.3z Gigabit Fiber
- IEEE 802.3x Flow Control and Back-pressure
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- IEEE 802.1p Class of Service (CoS)
- IEEE 802.1Q VLAN
- IEEE 802.1ad QinQ
- IEEE 802.1D- Spanning Tree Protocol (STP)
- IEEE 802.1D-2004 Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)

- IEEE 802.3ad Link Aggregation Protocol (LACP)
- IEEE 802.1x Port Based Network Access Protocol
- IEEE 802.3az EEE
- IEEE 802.3af/at type 1/2 up to **90W** per port

Supported protocols

- IGMP v1, v2, v3, MLD v1, v2, GMRP, GVRP,
- SNMP v1/v2c/v3, DHCP Client,
- NTP, SMTP, RMON,
- HTTP, HTTPS, Telnet, SSH v2, Syslog,
- EtherNet/IP, SNMP Inform, LLDP,
- IEEE1588 PTP v2 (optionally¹), Ipv6, NTP Client,
- MIB-II, Ethernet-Like MIB
- Radius centralized password management
- PROFINET Conformance Class A

Supported standards, recommendations and directives EMC Security*:

- PN-EN 55011:2012 - Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
- PN-EN 55022:2010/AC:2011 - Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
- PN-EN 55024:2011/A1:2015-08 – Electromagnetic compatibility (EMC) - Information technology equipment immunity characteristics - Limits and methods of measurement
- PN-EN 60950-1:2007/A2:2014-05- Information technology equipment–Safety– Part 1: General requirements
- EMC 2004/108/WE – Electromagnetic Compatibility Directive
- LVD 2006/95/WE – Low Voltage Directive
- PN-EN 60825-1:2014-11 – Safety of laser products Part 1: Equipment classification and requirements
- IEC 61000-4-2 Electromagnetic compatibility (EMC)- Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test
- IEC 61000-4-3 Electromagnetic compatibility (EMC)- Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test
- IEC 61000-4-4 Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test
- IEC 61000-4-5 Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test
- IEC 61000-4-6 Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields
- IEC 61000-4-8 Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test
- IEC 61000-4-11 Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests
- IEC 61000-4-12 Electromagnetic compatibility (EMC) – Part 4-12: Testing and measurement techniques – Ring wave immunity test
- IEC 61000-4-29 Electromagnetic compatibility (EMC) – Part 4-29: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests

* - list of supported standards may vary with the development of the device

Ethernet interface

- **Ethernet:** 8/4x RJ45 10/100 Mbps, 82/3/4x 100/1000/2500Mbps SFP (range of up to 200km for 100Mbit/s 100BASE-FX)
- **QoS:** Weighted Round Robin, Strict Priority. PCP 802.1p, DSCP/ToS,
- **VLAN:** 4096, 802.1Q, 802.1QinQ, private VLAN
- **Broadcast,** Multicast, Unknown DA
- **802.1p,** DSCP/ToS
- **TCP/UDP**
- **IGMP snooping** V1/V2/V3, IGMP Filtering/Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- RMON, MIB II, Port mirroring, Event syslog
- DNS, NTP, IEEE802.1ab LLDP
- **Port Mirroring**
- IEEE 802.3az: Energy Efficient Ethernet
- Port Trunk: IEEE 802.3ad LACP
- MAC: 8192
- Security: HTTP/HTTPS, SSL/SSH
- IEEE 802.1x Port Based Network Access Protocol, EAP, TACACS+, RADIUS – authentication, authorization and accounting functions – AAA

Network redundancy:

- ITU-T G.8032 Ethernet Ring (ERPS)
- IEEE 802.1D Spanning Tree (STP)
- IEEE 802.1D-2005 Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
- **ITU K.44** - standard built-in overvoltage protection on RJ45 ports 4kV 10/700us: Resistibility tests for telecommunication equipment exposed to overvoltages and overcurrents – Basic Recommendation
- **UTP module reflectometric test:** Each RJ45 port can perform a reflectometric test of all pairs (4 pairs for 1000Base-T and 2 pairs for 10 / 100Base-Tx) for twisted cable, i.e. line short circuit diagnostics or line interruption diagnostics, and total cable length for next active device

Management

- Http/Https protocol and web browser as a management application
- Privilege level for configuration/status - read/write, configuration independent for multi-user
- Telnet, SSH, SNMP v1/v2c/v3, NTP, TFTP,
- Syslog - cooperation with the syslog server

Power supply

- Power supply: 6-60V DC / 1-0.15A (without PoE)
- Power supply: 100-370VDC / 88-264VAC / 90-40mA
- Two power supply inputs, redundant

Physical design for power supply versions 6-60V DC

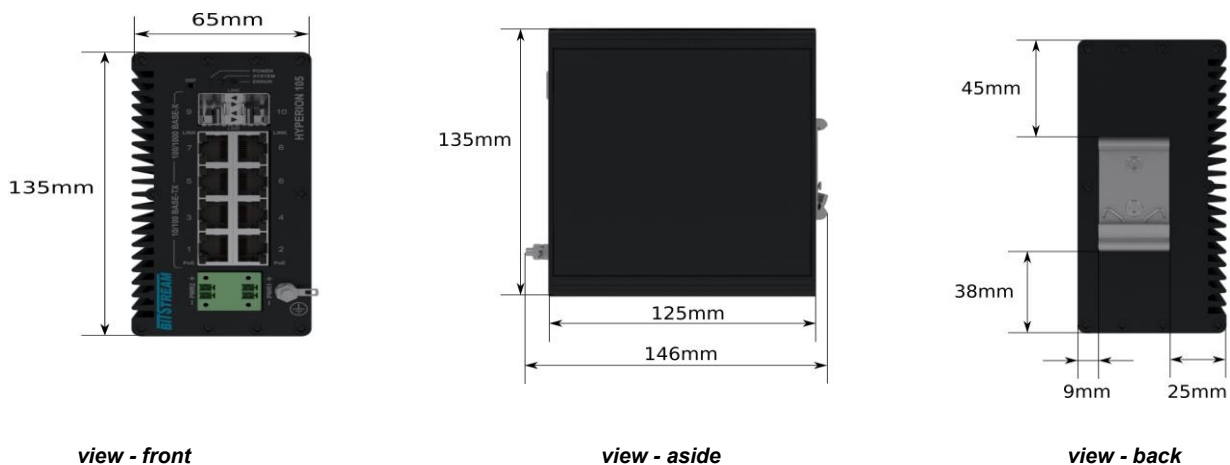
- Dimensions: 135x125x65mm
- Weight 0.90kg
- DIN rail mounting
- IP 30 rated metal enclosure

Environmental parameters:

- Operating temperature: -40 to +85°C with a minimum airflow of 0.4m/s
- Operating temperature: -40 to +70°C with a minimum airflow of 0.0m/s.
- Operating time at maximum +85°C is up to 16 hours.
- Operating humidity (non-condensing): 5%-95%

Mechanical drawing

Dimensions for power supply versions 6-60V DC



Code

HYPERION-105(.X)-Y-(IO)-(Z)-K-U

Production version:
Without symbol – standard
2 – version dedicated for power substations

Versions:

- 1 – 8xRJ45(10/100M) + 2xSFP (100M/1G/2.5G)
- 2 – 4xRJ45(10/100M) + 2xSFP (100M/1G/2.5G) + 1xSFP(100M/1G)
- 3 – 4xRJ45(10/100M) + 2xSFP (100M/1G/2.5G) + 2xSFP(100M/1G)
- 4 – 8xRJ45(10/100M) + 2xSFP (100M/1G/2.5G) + 1xSFP(100M/1G)

Additional interfaces:
No symbol - standard version
IO – 1x digital input, 2x relay outputs

PoE optional versions:

- S4P – 4x PoE+ PSE
- S8P – 8x PoE+ PSE
- S4P2 – 4x PoE++ PSE
- S8P2 – 8x PoE++ PSE

K- standard built-in overvoltage protection on RJ45 ports, ITU-T K.44 4kV 10 / 700us

Power supply:

77p – redundant power 6-60V DC, for PoE 45-57V DC
PoE (max. 15W) 45-57V
PoE+ (max. 30W) 52-57V
PoE++ (max. 90W) 55-57V
all ports max. 240W

Examples of code:

- HYPERION-105-1-S8P2-K-77p** Hyperion 105 in version standard with interface 8xRJ45(10/100M) + 2xSFP (100M/1G/2.5G) and built-in overvoltage protection on RJ45 ports, ITU-T K.44 4kV 10 / 700us, redundant power supply 6-60VDC (for PoE++ 56V), 8xPoE++ max. 90W per port, but the total power on all PoE ports cannot exceed 240W
- HYPERION-105.2-1-K-77p** Hyperion-105 in version dedicated for power substations with interface 8xRJ45(10/100M) + 2xSFP (100M/1G/2.5G), PTPv2 IEEE 1588:2008 and built-in overvoltage protection on RJ45 ports, ITU-T K.44 4kV 10 / 700us

Additional accessories:

- **BTPB-8524-S5TD** 1.25G, 850nm, MM, 550m, SFP, LC, -40~85°C, (support 100M)
- **BTPB-3124-L2TD** 1.25G, 1310nm, MM/SM, 2/20km, SFP, LC, -40~85°C, (support 100M)
- **BTPB-3124-L4TD** 1.25G, 1310nm, SM, 40km, SFP, LC, -40~85°C, (support 100M)
- **BTPB-5524-L4TD** 1.25G, 1550nm, SM, 40km, SFP, LC, -40~85°C, (support 100M)
- **BTPB-5524-L8TD** 1.25G, 1550nm, SM, 80km, SFP, LC, -40~85°C, (support 100M)
- **BTPB-5524-12TD** 1.25G, 1550nm, SM, 120km, SFP, LC, -40~85°C, (support 100M)

- **BTP-3131-L2TD** 1.25G-3.125G, 1310nm, SM, 20km, SFP, LC, -40~85°C
- **BTP-3131-L4TD** 1.25G-3.125G, 1550nm, SM, 40km, SFP, LC, -40~85°C
- **BTP-3131-L8TD** 1.25G-3.125G, 1550nm, SM, 80km, SFP, LC, -40~85°C
- **BTP-3131-L12TD** 1.25G-3.125G, 1550nm, SM, 120km, SFP, LC, -40~85°C

- **BTPB-3524L-L2TD** 1.25G, 1310/1550nm, SM, 20km, SFP, WDM, LC, -40~85°C, (support 100M)
- **BTPB-5324L-L2TD** 1.25G, 1550/1310nm, SM, 20km, SFP, WDM, LC, -40~85°C, (support 100M)
- **BTPB-3524S-L2TD** 1.25G, 1310/1550nm, SM, 20km, SFP, WDM, SC, -40~85°C, (support 100M)
- **BTPB-5324S-L2TD** 1.25G, 1550/1310nm, SM, 20km, SFP, WDN, SC, -40~85°C, (support 100M)

- **BTE-GB-P1RT** 10/100/1000M, 100m(UTP-5), Copper SFP, RJ-45, -40~85°C
- **BTE-GB-P3RT** 1000M, 100m(UTP-5), Copper SFP, RJ-45, -40~85°C

- **LT-19-TS-35-02** DIN rail in 19 "housing for rack mounting Dimensions: 19" x 3U x 202-302mm (adjustable depth). Weight: 2.5kg. 7pcs. Hyperion-105 devices in a 6-60V power supply set vertically.

List of proposed power supplies for BITSTREAM devices

Model	Output voltage range	Rated power	Number of ports for PoE support (15W)	Number of ports for PoE+ support (30W)	Number of ports for PoE++ support (60W)	Number of ports for PoE++ support (90W)	Working temperature C-Standard T-Industrial	COMMENTS
	DC	W						
ZAS-24-40-R-T	24 V	40	0	0	0	0	-20°C~+70°C	no PoE support
ZAS-48V56-40-R-T	48 - 56 V	40	2	1	0	0	-20°C~+70°C	PoE support
ZAS-48V56-60-R-T	48 - 56 V	60	3	1	0	0	-20°C~+70°C	PoE support
ZAS-48V55-120-R-T	48 - 55 V	120	6	3	1	1	-20°C~+70°C	PoE support
ZAS-48V56-240-R-T	47 - 56 V	240	13	6	3	2	-20°C~+70°C	PoE support
ZAS-48V56-480-R-T	47 - 56 V	480	30	14	7	4	-20°C~+70°C	PoE support

Legend of symbols: W - plug-in; S - standalone; R - DIN rail mounting