HYPERION-401

26-port Gigabit Ethernet Industrial Switch 1x 100M/1G/2.5G SFP and 1x 100M/1000M SFP and 24x 10M/100M/1G RJ45 PoE÷PoE++

- Industrial managed Ethernet Switch L2 with 1x ***100M/1G/2.5Gbps SFP*** *and* *1x* ***100M/1G SFP*** *24x 10M/100M/1Gbps RJ45*
- ***PoE÷PoE++*** (optional) support up to ***90W*** (all ports max. 120/240W), ***Watchdog PoE***
- 'ITU-T ***G.8032***' Ethernet ring support, up to ***20ms*** protection and recovery switching
- Optionally[1] IEEE 1588-2008v.2 (***PTPv2***): precise time synchronization, hardware support for timestamping; precise time synchronization for real-time applications
- Optional control and measurement functions*: interface 3x ***RS232/485*** virtual-com, ***1-Wire*** (T/H), 1x ***digital input***, 4x ***relay outputs***
- Energy efficiency with the Energy Efficient Ethernet "EEE" technology support
- ***PROFINET Conformance Class A***
- ***Radius*** centralized password management
- Ethernet OAM (Link and Service OAM) support
- Security: ***SNMPv3***, **HTTPS**, **SSH** management
- Operating temperatures: -40 to +80°C with DC power and
- IP-30, mounted in standard 19" rack, 1U high
- Redundant power supply ***230V AC*** *and* ***48V DC***

Description of the device

Transmission

The family of 26 port, managed ***L2 HYPERION-401*** industrial switches, Gigabit Ethernet fitted with 24x **10/100/1000Mbps** RJ45 and 1x ***100M/1G/2.5G*** SFP, and 1x ***100M/1G*** SFP (depending on the version) is dedicated for data transmission in electrotechnical substation supervision and management applications, CCTV and other industrial applications.

Connection redundancy

The **HYPERION-401** switch supports Ethernet Ring Protection Switching technology compatible with the ITU-T ***G.8032*** standard, which facilitates transmission path redundancy with reconfiguration times under 20ms and support for up to ***64 rings***. Moreover, the device supports the standard protection protocols:

- RSTP (Rapid Spanning Tree Protocol) – IEEE802.1D-2004 compatible with legacy Spanning Tree and IEEE 802.1w
- MSTP (Multiple Spanning Tree Protocol – IEEE 802.1s (802.1q), where each MSTP instance can comprise one or more VLAN networks
- STP (Spanning Tree Protocol) – IEEE 802.1d

Network Performance

HYPERION-401 supports ***IEEE 1588v.2*** **Precision Time Protocol 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 links aggregation** ***(****static or* ***LACP)*****, programmable rate limiting and port priority setting as well as jumbo frames.**

VLAN, Q-in-Q

The available Ethernet data stream channel can be divided into independent datalinks using the virtual VLAN network mechanisms (802.1Q and 802.1ad) or remain transparent for the device. Device supports advanced Ethernet interface features like *VLAN* stacking (*QinQ*, *IEEE802.1ad*), private VLANs.

OAM

The device supports Ethernet OAM functionality (Link OAM and Service OAM) by providing advanced operating monitoring and control mechanisms (remote loopbacks, continuity checks using CFM messages, performance monitoring measurements such as frame

* - option at the expense of one SFP port available after consultation with the manufacturer

1 - For version 401.2, the PTPv2 function is available as standard

loss ratio, frame delay and frame delay variation and collection of Ethernet statistics from remote devices).

QoS

The **HYPERION-401** switch is fitted with a number of QoS mechanisms. The devices support eight traffic classes, transmission priorities for individual frames can be assigned on the basis of port priorities, MAC addresses, VLAN IDs, DSCP/ToS values or TCP/UDP port numbers. The available bandwidth can be adjusted for input and output for both the respective ports and individual queues (priorities).

Power supply PoE

Hyperion-401 can optionally support ***PoE÷PoE++*** (Power over Ethernet) technology compliance with standard IEEE802.3af, IEEE802.3at. In PoE++ technology, the first eight ports can work with power up to 90 W, a the remaining with power 60W, and on all ports max. power up to 240W.

Management

Embedded ***HTTPs*** server, ***SSH*** server and ***SNMPv3*** 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.

Environmental requirements

The switch was designed to operate in temperatures ranging from -40 to 80°C for DC power and -40 to 50° C for AC power, but -40 to 70°C for 0,2m/s air flow for AC power. The durable IP-30 casing protects the device even in severe working conditions. The redundant power supply ensures uninterrupted operation during power outages or if one of the power sources becomes damaged.

The **HYPERION-401** supports Energy Efficient Ethernet (compliant with IEEE 802.3az) technology, which significantly reduces energy consumption by optimizing power consumption based on the port traffic load 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-401 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 applications.

Figure 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 Gigabit Ethernet
- IEEE 802.3z Gigabit Fiber
- IEEE 802.3x Flow Control and Back-pressure
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- IEEE 802.30ah Link OAM
- IEEE 802.1p Class of Service (CoS)
- IEEE 802.1Q VLAN
- IEEE 802.1ad QinQ
- IEEE 802.1d - Spanning Tree Protocol (STP)
- IEEE 802.1w - 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 i PoE++ support up to ***90W*** per port (all ports max. 120/240W)

Supported protocols

- IGMP v1,v2,v3, MLD v1, v2, GMRP, GVRP,
- SNMP v1/v2c/v3, DHCP Client,
- NTP, SMTP, RMON,
- NAS, 802.1X,
- HTTP, HTTPS, Telnet, SSH v2, Syslog,
- STP, RSTP, MSTP
- EtherNet/IP, SNMP Inform, LLDP, LLDP-MED
- IEEE1588 PTP v2 (optionlly[1]), Ipv6, NTP Client,
- MIB-II, Ethernet-Like MIB
- Radius centralized password management

1 - For version 401.2, the PTPv2 function is available as standard

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:** 24 x 10/100/1000 Mbps RJ45,
- 1x 100/1000/2.5G SFP, 1x 100/1000 SFP (range of up to 200km for 100Mbit/s 100BASE-FX)
- **QoS:** Weighted Round Robin, Strict Priority. PCP 802.1p, DSCP/ToS,
- **VLAN:** 4094, 802.1Q, 802.1QinQ, VLAN translation, private VLAN
- **Flow Control:** controls sent and received packets to prevent buffer overflow and thus loss of data
- **Storm traffic protection:** filtering for incoming Broadcast, Multicast, Unknown DA or all packet traffic, outbound filtering for all types of packets, bit rate limitation
- **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, LLDP-MED
- **Port Mirroring:** Monitoring traffic on selected ports
- **IEEE 802.3az:** Energy Efficient Ethernet
- **Port Aggregation:** IEEE 802.3ad LACP
- **MAC address table**: up to 8192 entries
- **Security:** HTTP/HTTPS, SSL/SSH monitoring optical connection parameters for violations
- **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
- **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)**

Power supply PoE

- Compliance with standard IEEE802.3af, IEEE802.3at
- For power supply 230VAC output power for port is 90W
- For the PoE ++ standard, the first 8 ports can work with power up to 90W and the remaining 60W
- For 55VDC power, the maximum total power of the PoE is 240W

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HYPERION-401

- For 230VAC power, the maximum total power of the PoE is 120W

Power supply
- Power supply 36-220VDC (50W without PoE)
- Power supply: 90-250VAC (50W without PoE)
- Two power supply inputs, redundant
- Screw connection for DC power supply
- IEC socket for AC power

Environment Operating
- Operating temperature: -40 to 80°C for 0,2m/s air flow for DC power
- Operating temperature: -40 to 50°C with AC
- Operating temperature: -40 to 70°C for 0,2m/s air flow for AC power
- Operating humidity (non condensing): 5%-95%
- Location type: class C as per PN-EN 60870-2-2 - covered location
- IP-30 protection rating

Management
- Console (using USB port)
- 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

Physical design
- Dimensions [434x184x43] mm without PoE
- Dimensions [434x270x43] mm with PoE
- Weight 2,5 kg
- 1U, standard 19”
- IP 30 rated metal enclosure

Warranty
- 5 years

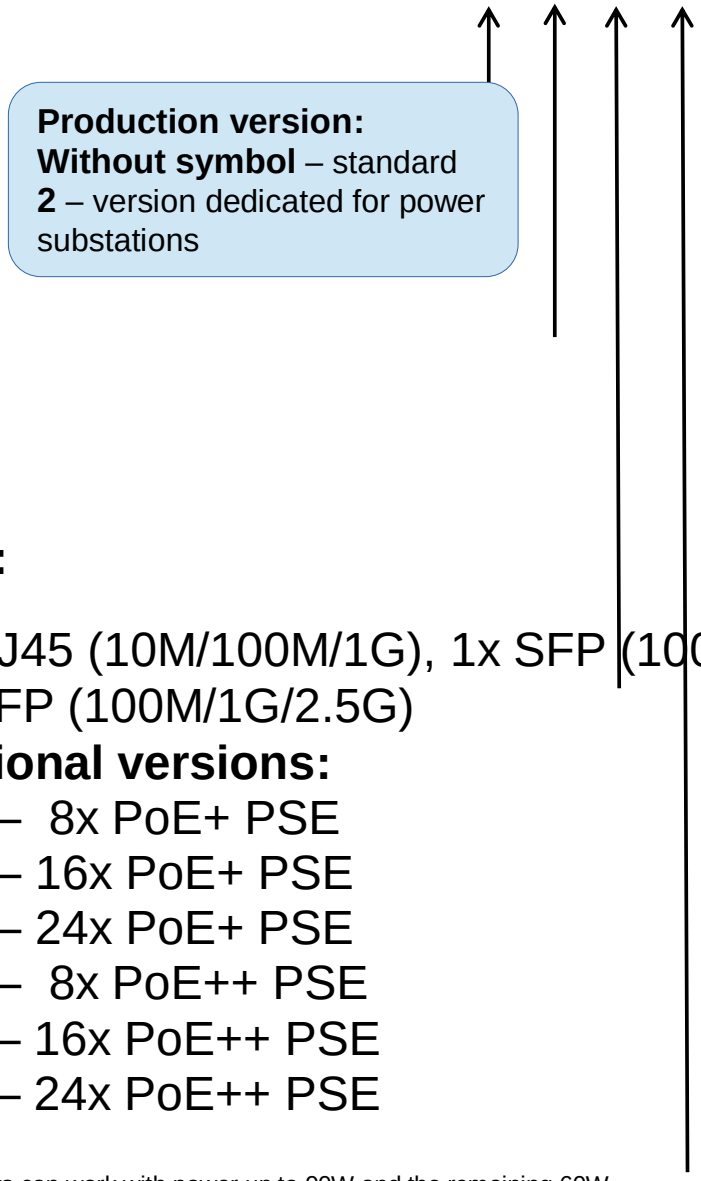
Mechanical drawing

Side view with dimensions

Code

HYPERION-401(.X)-Y-(Z)-U

1 - For version 401.2, the PTPv2 function is available as standard



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

Versions:

1 – 24x RJ45 (10M/100M/1G), 1x SFP (100M/1G), 1x SFP (100M/1G/2.5G)

PoE optional versions:

S8P – 8x PoE+ PSE
S16P – 16x PoE+ PSE
S24P – 24x PoE+ PSE
S8P2 – 8x PoE++ PSE
S16P2[1] – 16x PoE++ PSE
S24P2[1] – 24x PoE++ PSE

1 - the first 8 ports can work with power up to 90W and the remaining 60W

Power supply:

71p* - redundant power 36-72V DC, 230VAC/ 220VDC with PoE++
for 230 VAC/220 VDC all ports max. 120W

77p - redundant power 36-72V DC
PoE (max. 15W) 45-57V
PoE+ (max. 30W) 52-57V
PoE++ (max. 90W) 55-57V
for 55V all ports max. 240W

* - for versions with PoE- Offer and availability after consultation with the manufacturer

Examples of code:

HYPERION-401-1-S8P-77p	Hyperion-401, in version standard with interface 24x RJ45 (10M/100M/1G), 1x SFP (100M/1G), 1x SFP (100M/1G/2.5G), power supply 2x 36-72VDC; 8x ports PoE+ up to 30W per port, but the total power on all PoE ports cannot exceed 240W
HYPERION-401.2-1-77p	Hyperion-401, in version dedicated for power substations with interface 24x RJ45 (10M/100M/1G), 1x SFP (100M/1G), 1x SFP (100M/1G/2.5G), PTPv2 IEEE 1588:2008, power supply 2x 36-72VDC;

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ORDERING:

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

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

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

- **BTPB-3524L-L4TD** 1.25G, 1310/1550nm, SM, 40km, SFP, WDM, LC, -40~85^{O}C, (support 100M)
- **BTPB-5324L-L4TD** 1.25G, 1550/1310nm, SM, 40km, SFP, WDM, LC, -40~85^{O}C, (support 100M)
- **BTPB-3524S-L4TD** 1.25G, 1310/1550nm, SM, 40km, SFP, WDM, SC, -40~85^{O}C, (support 100M)
- **BTPB-5324S-L4TD** 1.25G, 1550/1310nm, SM, 40km, SFP, WDM, SC, -40~85^{O}C, (support 100M)

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

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-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

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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
ZAS-48V55-960-R-T	48 - 55 V	960	60	30	15	8	-20°C ~ +70°C	PoE support

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

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