# BITSTREAM®
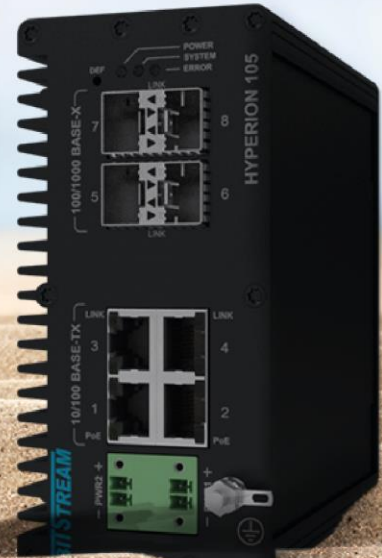
Leader in time synchronization and data transmission solutions

Ethernet Switch
# Hyperion - 105

*Designed and built to work continuously under extreme conditions.*

Solid          Robust          Easy to use          Safe

## Industrial switch with 8/4x RJ45 10/100Mbps or 4x RJ45 10/100/1000Mbps and 2/4x SFP 100M/1000M/2.5Gbps (2x SFP 2.5 Gbps ports )

- ✓ Secondary surge protection on RJ-45 ports, ITU-T K.44 4kV 10/700us (only for the transmission path)
- ✓ Work in a ring compliant with the ITU-T G.8032 standard with reconfiguration < 20ms , up to 64 rings simultaneously
- ✓ Energy saving with Energy Efficient Ethernet 'EEE' technology
- ✓ Radius - centralized authentication
- ✓ Conformance Class A protocol support
- ✓ Ethernet OAM support (Link OAM and Service OAM)
- ✓ Optional I/O functions: interface 1x opto-isolated digital input, 2x NO/NC relay outputs
- ✓ 1-Wire interface for measuring temperature and humidity and for communication with the MOD-EXT module
- ✓ Access security SNMPv3, HTTPS, SSH
- ✓ Operating temperature from -40 to +85°C
- ✓ IP-40 metal housing
- ✓ DC redundant power supply

### Optional features
- ✓ **PoE ÷ PoE++/High PoE (802.3bt)** support up to 90W per UTP port (all ports max. 240W), **POE Watchdog**.

# Features of Hyperion-105

### Reliable
The Hyperion-105 switch has been designed to withstand extreme environmental conditions. We have made a device that meets the environmental standards for data transmission devices, additionally we guarantee the reliability of operation at temperatures from -40° to +85°C with met conditions.

### Sure
Hyperion-105 series switches are equipped with two power connectors. This guarantees continuous operation of the device and reduces the likelihood of transmission interruptions by connecting two power sources. On the other hand, on the RJ45 ports, we installed ITU-T K.44 4kV 10/700us surge protectors as a standard for safety.

### Easy to use
We have designed the user interface so that it is maximally user-friendly for the network administrator and installer. From the very first moment, you will find the configuration settings in an intuitive way, despite the many functionalities. You can configure the switch through a secure interface, preparing configuration files in advance and updating e.g. on a large group of devices at the same time. Access, of course, is via a secure https connection , centralized RADIUS authentication.

### Just what you need
You choose from many versions of the device that we have created in response to the needs of our customers. There are 4x to 8x electrical ports available, with a throughput of 4 ports 10/100/1000 Mbps , or 4x/8x 10/100 Mbps . In addition, we have equipped the switches with 2 or 4 SFP ports, in which you can install any SFP module with a transfer rate of 100/1000 Mb/s or even 2.5 Gb/s. This flexibility and 2.5G transfer allows you to think calmly about building large networks as well as their free expansion in the future.

### Safe
Security such as https , SNMPv3, SSH allow you to configure and control access for your application. Storm mechanism implemented control will avoid unwanted traffic and network congestion.

### With a communication platform
Bitstream switches can be managed through the BTNet platform . This environment makes it easy to build a network topology in a logical way. After a short configuration, you can manage your network and devices from other manufacturers from anywhere in the world.

### Protection
When creating our devices, we could not forget about the need to protect the connection. Hyperion-105 series switches are equipped with protocols compliant with the ITU-T G.8032 standard, enabling operation with redundancy of the transmission path with reconfiguration time less than 20ms. Moreover, the device implements standard STP, RSTP, MSTP and Chain protection protocols enabling protection through an existing network.

### Strong
The switches can deliver up to 240W to external devices. On electrical ports, the maximum power that you will deliver to a single device is 90W in 802.3af/at/bt modes , additionally a switch thanks to the WatchDog PoE function will monitor the status of devices for you.

# Technical specifications

## Supported transmission standards:

- ✓ IEEE 802.3u 100Base-TX Fast Ethernet
- ✓ IEEE 802.3 10Base-T 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 - power per port 30W maximum on all ports 240W
- ✓ IEEE 802.3at PoE++ - power per port 90W ( Option available only in Hyperion-105-5 version), maximum on all ports 240W
- ✓ IEEE 802.3bt High PoE - power per port 90W maximum on all ports 240W
- ✓ ITU K.44 - Secondary overvoltage protection on RJ-45 only in the transmission path, 4kV, 10/700us in accordance with the requirements: Resistibility tests for telecommunication equipment exposed to overvoltages and overcurrents – Basic Recommendation

## Supported protocols

- ✓ IPv4, IPv6, ARP, ICMP, TCP, UDP, DNS
- ✓ IGMP v1, v2, v3, MLD v1, v2, GVRP,
- ✓ SNMP v1/v2c/v3, DHCP Client,
- ✓ NTP, SMTP, RMON,
- ✓ HTTP, HTTPS, Telnet, SSH v2, Syslog ,
- ✓ EtherNet /IP, SNMP Inform, LLDP,
- ✓ NTP server/ client
- ✓ MIB-II, Ethernet-Like MIB
- ✓ PROFINET Conformance Class
- ✓ Radius centralized password management
- ✓ 1-wire

## Supported standards, recommendations and directives for EMC, safety*

| | | |
|---|---|---|
| **PN-EN 55011:2016** | Industrial, scientific and medical devices | Radio frequency disturbance characteristics - Limits and methods of measurement. |
| **PN-EN 55035:2017-09** | Electromagnetic compatibility of multimedia devices | Resistance requirements |
| **PN-EN IEC 62368-1:2020-11** | Audio/visual, IT and telecommunication devices | Part 1: Safety requirements |
| **PN-EN 60825-1:2014-11** | Laser safety Part 1: Equipment classification and requirements. | |
| **EMC 2014/30/EU** | EMC Electromagnetic Compatibility Directive. | |
| **LVD 2014/35/EU** | Low Voltage Directive LVD. | |
| **IEC 61000-4-2** | Electromagnetic Compatibility (EMC) | Part 4-2: Testing and measurement methods - Electrostatic discharge immunity test. |
| **IEC 61000-4-3** | Electromagnetic Compatibility (EMC) | *Part 4-3: Testing and measurement methods - Radiated radio frequency electromagnetic field immunity test.* |
| **IEC 61000-4-4** | Electromagnetic Compatibility (EMC) | Part 4-4: Immunity test against bursts of fast electrical transients. |
| **IEC 61000-4-5** | Electromagnetic Compatibility (EMC) | Part 4-5: Test and measurement methods - Shock resistance test. |
| **IEC 61000-4-6** | Electromagnetic Compatibility (EMC) | Part 4-6: Test and measurement methods - Immunity test against conducted disturbances induced by radio frequency fields. |
| **IEC 61000-4-8** | Electromagnetic Compatibility (EMC) | Part 4-8: Power frequency magnetic field immunity test. |
| **IEC 61000-4-11** | Electromagnetic Compatibility (EMC) | Part 4-11: Tests for immunity to voltage dips, short interruptions and changes in voltage. |
| **IEC 61000-4-12** | Electromagnetic Compatibility (EMC) | Part 4-12: Test and measurement methods - Damped sinusoidal immunity test. |
| **IEC 61000-4-29** | Electromagnetic Compatibility (EMC) | Part 4-29: Test of immunity to voltage dips, short interruptions and changes in voltage at the DC power supply connection. |

\* - The scope and list of supported standards may change as the device develops

## Ethernet interfaces

- ✓ Ethernet connectors: 8/4x 10/100 Mbps RJ45 or 4x 10/100/1000 Mbps RJ45 and 2/4x 100/1000/2500Mbps SFP (2x SFP 2.5 Gbps ports ) (speed 100Mb/s on Optical Interface works only with optical SFP)
- ✓ QoS : Support 8 physical queues, Weighted algorithm Round Robin and Strict queuing priority . Priority settings based on: PCP priorities
- ✓ 802.1p, DSCP/ ToS , port priority settings, ability to configure priorities based on port numbers
- ✓ TCP/UDP
- ✓ VLAN: 4096 VLAN entries, 802.1Q, 802.1QinQ, private VLAN, VLAN translation
- ✓ Throughput control: inbound filtering for Broadcast, Multicast, Unknown DA or all packets, outbound filtering for all packet types, throughput limiting
- ✓ IGMP snooping V1/V2/V3, IGMP Filtering/Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- ✓ RMON, MIB II, Port mirroring, DNS, IEEE802.1ab LLDP, LLDP-MED
- ✓ Syslog - cooperation with the syslog server ,
- ✓ Port Mirroring: Monitor traffic on selected ports
- ✓ IEEE 802.3az: Energy Efficient Ethernet, 4 power saving modes
- ✓ ITU K.44 - secondary overvoltage protection on RJ45 ports only in the transmission path, 4kV, 10/700us
- ✓ Port Trunk: IEEE 802.3ad LACP or Static Aggregation
- ✓ MAC address table: up to 8192 entries

- ✓ IEEE 802.1x Port Based Network Access Protocol , EAP, TACACS+, RADIUS - Authentication, Authorization and Accounting - AAA
- ✓ Security: HTTP/HTTPS, SSL/SSH,
- ✓ Network Redundancy:
  - ✓ ITU-T G.8032 Ethernet Ring (ERPS) <20ms
  - ✓ IEEE 802.1D Spanning Tree (STP)
  - ✓ IEEE 802.1D-2005 Rapid Spanning Tree Protocol (RSTP)
  - ✓ IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)

## Network synchronization

- ✓ NTP protocol in server/client mode and SNTP

## MTBF

- ✓ Time: 649000 hours
- ✓ Standard: Telecordia , SR-332

## Management

- ✓ SNMPv1/2c/3, SSH, TELNET
- ✓ HTTP/HTTPS protocol - management via a web browser
- ✓ " Privilege level " - permission level configuration - read/write, independently configured for many users

## Optional IO module

### Outputs interface

- ✓ Number of outputs - 2
- ✓ Type of outputs - relay NO/NC
- ✓ Maximum switching current - 0.5A 60VDC with resistive load
- ✓ Connector: screw

### Input interface

- ✓ Number of inputs - 1
- ✓ Input type - digital, potential-free, opto-isolated
- ✓ Connector: screw

## Optional IO1W module:

- ✓ 2x 1-Wire interface:
  - ✓ speed 0 - 16.3 kbps
  - ✓ Range ≤ 100m
  - ✓ Connector: screw; 8x pins
- ✓ Input dedicated to MOD-EXT module or T/H sensor.

## Physical characteristics

- ✓ Dimensions: 135x124x65mm
- ✓ Weight: 0.90kg
- ✓ Can be mounted on a DIN TH35 rail
- ✓ IP-40 metal housing

## Work environment requirements

✓ Operating temperature: -40 to +85°C with air flow of at least 0.4m/s
✓ Operating temperature: -40 to +70°C with air flow of at least 0.0m/s
✓ Working time at a maximum temperature of +85°C is up to 16 hours
✓ Standard operating humidity: 0 to 95% (non-condensing)
✓ Type of location: class C in accordance with the PN-EN 60870-2-2 standard - sheltered locations
✓ Degree of protection in accordance with IP-40

## Power

✓ DC redundant power supply, 20-60V DC, isolated
✓ Two screw power inputs, redundant power supply
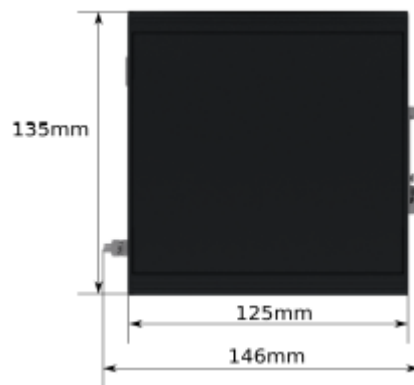✓ PoE÷HiPoE function requires a power supply in the range of 45-57V DC

## PoE powered

✓ Compliant with IEEE802.3af, IEEE802.3at, IEEE802.3bt
✓ Power available per port up to 90W
✓ For 55VDC power supply, the maximum total PoE power is 240W
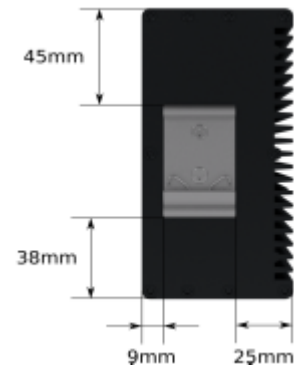✓ Hyperion-105-5 version available (IEEE802.3at) PoE++ up to 90W

## Mechanical drawing
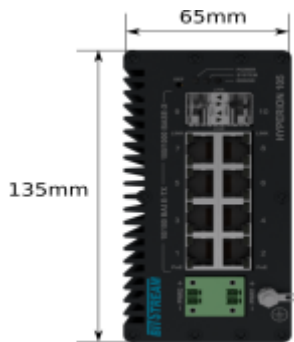


View - front            View - side            View - back

## HYPERION-105-Y-(IO)-(Z)-K-U

| Hyperion-105 | Y | (IO) | (Z) | K | U |
|---|---|---|---|---|---|
| **Versions available** | | | | | |
| 8xRJ45(10/100M) + 2xSFP (100M/1G/2.5G) | 1 | | | | |
| 4xRJ45(10/100M) + 2xSFP (100M/1G/2.5G) + 2xSFP(100M/1G) | 3 | | | | |
| 4xRJ45(10/100/1000M) + 2xSFP(100M/1G/2.5G) + 2xSFP(100M/1G) | 5 | | | | |
| **Additional interfaces** | | | | | |
| standard version | | - | | | |
| 1x digital input, 2x relay outputs | | IO | | | |
| 2x 1-wire interface dedicated to the MOD-EXT module or T/H sensors | | IO1W | | | |
| **PoE option** | | | | | |
| no PoE | | | - | | |
| 4x PoE++ (802.3at) PSE (option for HYPERION-105-5) | | | S4P2 [3] | | |
| 4x High PoE (802.3bt) PSE | | | S4P2b [2] | | |
| 8x High PoE (802.3bt) PSE | | | S8P2b | | |
| **Overvoltage protection** | | | | | |
| 4kV 10/700µs ITU K.44 on RJ 45 ports | | | | K [4] | |
| **Power** | | | | | |
| Redundant power supply 20 to 60V DC, isolated<br>PoE requires 45 to 57V DC power supply<br>PoE + 802.3at (up to 30W) 52 to 57V<br>PoE ++ 802.3at (up to 60W) 55 to 57V<br>High PoE 802.3bt (up to 90W) 55 to 57V | | | | | 77p [1] |

**Legend**

1 – for the PoE version, the maximum power available on all RJ45 ports is 240W

2 – option not available in Hyperion-105-1 version

3 - option available only on Hyperion- 105-5

4 – ITU K.44 protection only in the transmission path

## Sample markings

**HYPERION-105-1-S8P2b-K-77p**     Hyperion 105 with 8xRJ45(10/100M) interface with HIGH PoE up to 90W + 2xSFP (100M/1G/2.5G), but the total power on all PoE ports cannot exceed 240W, standard built-in surge protection secondary 4kV 10/700µs ITU K. 44 on the RJ45 ports only in the transmission path, redundant power supply 20-60V DC (for PoE++ 55-57V)

**HYPERION-105-1-K-77p**     secondary surge protection 4kV 10/700µs ITU K.44 on RJ45 ports only in the transmission path, redundant power supply 20-60V DC

## Additional accessories

| Designation | Transmission speed | Wavelength | Fiber type | Distance | Cartridge type | WDM | Connector type | Working temperature | Comments |
|---|---|---|---|---|---|---|---|---|---|
| BTP-8524-S5TD | 1.25 Gb/s | 850nm | MM | 550 m | SFP | —— | LC | -40~85°C | —— |
| BTP-3124-L2TD | 1.25 Gb/s | 1310nm | MM/SM | 2/20km | SFP | —— | LC | -40~85°C | —— |
| BTP-3124-L4TD | 1.25 Gb/s | 1310nm | SM | 40 km | SFP | —— | LC | -40~85°C | —— |
| BTP-5524-L8TD | 1.25 Gb/s | 1550nm | SM | 80 km | SFP | —— | LC | -40~85°C | —— |
| BTPP-85192-SRT | 10 Gb/s | 850 nm | MM | 300 m | SFP+ | —— | LC | -40~85°C | support 2.5Gbp |
| BTPP-31192-LRT | 10 Gb/s | 1310 nm | SM | 10 km | SFP+ | —— | LC | -40~85°C | support 2.5Gbp |
| BTP-8503-02TD | 155 Mb/s | 850nm | MM | 2 km | SFP | —— | LC | -40~85°C | —— |
| BTP-3103-02TD | 155 Mb/s | 1310nm | MM | 2 km | SFP | —— | LC | -40~85°C | —— |
| BTP-3103-L2TD | 155 Mb/s | 1310nm | SM | 20 km | SFP | —— | LC | -40~85°C | —— |
| BTPB-3503L-L2TD | 155 Mb/s | 1310/1550 nm | SM | 20 km | SFP | TAK | LC | -40~85°C | —— |
| BTPB-5303L-L2TD | 155 Mb/s | 1550/1310 nm | SM | 20 km | SFP | TAK | LC | -40~85°C | —— |
| BTPB-3524S-L2TD | 1.25 Gb/s | 1310/1550 nm | SM | 20 km | SFP | TAK | SC | -40~85°C | —— |
| BTPB-5324S-L2TD | 1.25 Gb/s | 1550/1310 nm | SM | 20 km | SFP | TAK | SC | -40~85°C | —— |
| BTE-GB-P1RT | 10/100/1000 Mb/s | | | | copper | —— | RJ-45 | -40~85°C | —— |
| BTE-GB-P3RT | 1000 Mb/s | | | | copper | —— | RJ-45 | -40~85°C | —— |
| LT-19-TS-35-02 | rack mounting . Dimensions: 19" x 3U x 202-302mm (adjustable depth). Weight: 2.5kg. 7pcs Hyperion-105 devices positioned vertically. | | | | | | | | |
| Sensor T/H-2/5/10 | temperature and humidity measurement, cable length up to 2/5/10 meters | | | | | | | | |
| MOD-EXT-6I2O3V-H105 | External module extending IO functions with digital inputs and digital outputs as well as voltage measurement inputs, operating temperature: -40~ +70°C, power supply 9-60V DC **(NOTE - only for HYPERION-105-Y-IO1W version)** | | | | | | | | |

## List of proposed power supplies for BITSTREAM devices

| Power supply designation | Output voltage range | Nominal output power | Number of ports with PoE (15W) | Number of ports with PoE+ (30W) | Number of ports with PoE++ (60W) | Number of ports with PoE++ (90W) | Working temperature C-standard T-industrial | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | DC | IN | | | | | | |
| ZAS-24-25-W-T | 24 V | 25 | 0 | 0 | 0 | 0 | -30°C ~ +70°C | No PoE support |
| ZAS-48-25-W-T | 48 V | 25 | 1 | 0 | 0 | 0 | -30°C ~ +70°C | PoE support |
| ZAS-48V56-40-R-T | 48 - 56 V | 40 | 2 | 1 | 0 | 0 | -20°C ~ +70°C | No 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-48V55-240-R-T | 48 - 55 V | 240 | 14 | 7 | 3 | 2 | -25°C ~ +70°C | PoE support |

Legend of markings: W – plug-in; S – standalone ; R - for DIN rail

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