EH9711 Series

11-Port Fast Ethernet IEC 61850-3 Industrial Managed Switch



FEATURE HIGHLIGHTS

Comprehensive Connectivity

- 8x FE ports + 3x Gbps SFP ports
- 1 x RS-232 console port (RJ-45 connector)
- 4 x DIP switches for Ring control

Compact & Robust Enclosure

- Dimensions (mm): 77 x 167 x 138
- Operating temp. from -40°C to +75°C
- Ambient relative humidity from 5% to 95%

Secured & Trusted Network

- Secure industrial network design based on IEC62443
- Access Control with 802.1x, AAA, ACL, IP Source Guard, etc.
- Network Monitoring with Port Mirroring, sFlow, etc.

Time Precision Certifications

- IEEE 1588 power profile specific parameters with C37.238 & IEC 61850-9-3
- Precision time synchronization with SyncE and IEEE1588v2 (PTP) P2P/E2E TC with delay within 50ns.

Substation-Fit Certifications

- IEC 61850-3 & IEEE 1613 compliance
- CE/FCC/UL & other certifications

Reliable & Redundant Topology

- Low-voltage 24-48 VDC or high-voltage 110-240 VAC/110-300 VDC power input
- ITU-T G.8032 ERPS Ring, MSTP/RSTP/STP supported

PRODUCT DESCRIPTION

The EH9711 series is a compact 11-port Layer2-managed switch, equipped with 8x Fast Ethernet ports and 3x Gbps SFP Fiber links. The series is designed for demanding power substation automation systems and is fully compliant with IEC 61850-3 and IEEE 1613 standards.

With IEEE1588v2 PTP and SyncE supported, the series can achieve ns-level accuracy and meet the strict time synchronization requirements in real-time applications. Self-healing ability for the network is provided with various types of ring protocols. ITU-T G.8032 ERPS Ring can even recover the network within 25 ms on full load of 250 devices.

Furthermore, this switch series' IP30 metal enclosure, slim and flat shape and DIN rail mountable housing allows easy deployment in harsh environments. And being IEC 62443-4-1 and IEC 62443-4-2 certified, it achieves both product security features and requirements for secure development life-cycle.

With these industrial-grade features, EH9711 switches are ideal to be positioned as a medium between the process level and bay level of substation networks.

KEY FEATURES

IEEE 1613IEC 61850-3

Compliant with IEC 61850-3 & IEEE1613 standards for power substation automation systems .

Synchronous Ethernet

Stable frequency transport at MAC Layer to ensure services continuity from end to end.

Self-Healing Network

EH9711 supports various types of ring protocols. With ITU-T G.8032 ERPS Ring, self-recovery can be done within 25ms on full load. This helps administrators build a reliable network and improve network sustainability.

Nanosecond Time Sync with 1588v2 PTP

IEEE1588v2 PTP support helps achieve the strict time synchronization requirements in real-time applications. Can be used as a hardware-based P2P/E2E transparent clock or boundary clock.

sFlow Monitoring

By sampling packets, administrators are able to monitor network traffic and discover abnormal situations in time.

RBAC

Besides multiple Admin accounts with read-&-write or read-only access, ACL by MAC/IP is supported for LAN control, and 802.1x is supported to work with RADIUS/ TACACS+ for LAN hosts authorization and accounting.

APPLICATION

As an Process Bus Switch

The EH9711 series is ideal to be positioned as a process-bus-switch in IEC 61850 substation networks, handling communications between the process level and the bay level.

The process level is composed of equipment like Merging Units (MUs), circuit breakers, switchgears, sensors, etc., while the bay level is composed of IEDs (Intelligent Electronic Devices), which collect the measurements from process level equipment and perform further processing.

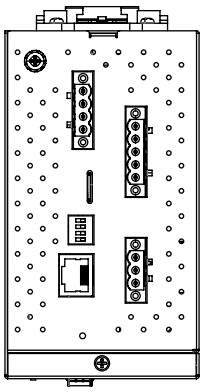
And that's where EH9711 switches come into the picture. Its 10/100BASE T(X) FE LAN ports deal with the mass amount of small sampling packets from the downlink side, while its Gbps SFP ports can be used for connection to the upper bay level and transmit the large amount of collected data without interferences.

Besides having comprehensive LAN ports, EH9711 supports IEEE1588v2 PTP and SyncE to achieve the time accuracy and clock drift limits required by MUs. On the other hand, ITU T G.8032 ERPS Ring protocol support allows for redundant topology in the process bus, creating a high-reliability network with minimal downtime.

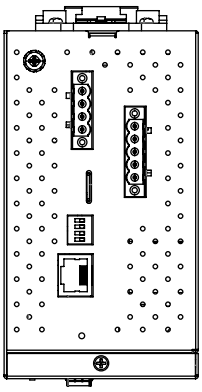
DIMENSIONS & LAYOUT

Top View

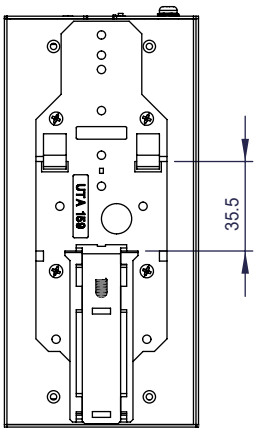
HV



DC

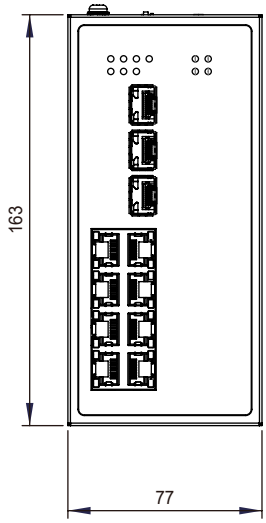


Back View

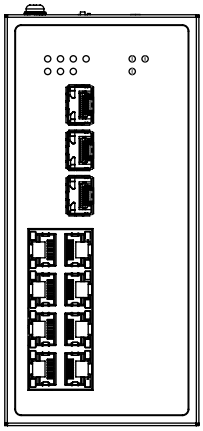


Front View

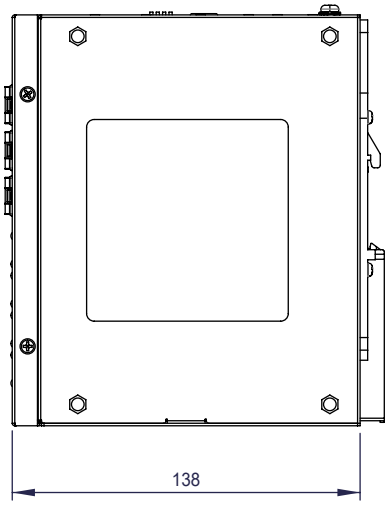
HV



DC



Side View



SPECIFICATIONS

Hardware Specifications	
Model Name	EH9711 Series
Interface	
RJ-45 Ports	8 x 10/100BASE-T(X)
Fiber Optics Ports	3 x 100/1000FX SFP Slot
Console Port	1 x RS-232 (RJ-45 connector)
LED Indicators	1 x P1 & P2 & P3 (P3 for HV Model) 1 x Alarm 1 x Firmware Running 1 x Ring Master 1 x Ring 1 x SFP1 & SFP2 & SFP3 1 x Digital Input 1 x LAN Ports
Relay Output	1 x Relay Output (24V/1A) with current carrying capacity of 1A @ 24 VDC
DIP Switch	4 x for Ring Control
Button	1 x Factory Reset
Capacity	
Switching Capacity	7.6 Gbps
Switching Fabric	5.7 Mpps
Packet Buffer Size	1.75 Mb
MAC Table Size	4K
Jumbo Frame	9216B
Networking Standards	
IP Version	IPv4, IPv6
Ethernet Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) IEEE 802.3z for 1000BaseX IEEE 802.3x for Flow Control, back pressure flow control IEEE 802.1d-2004 for Spanning Tree Protocol IEEE 802.1w for Rapid STP IEEE 802.1s for Multiple Spanning Tree Protocol IEEE 802.1q for VLAN Tagging IEEE 802.1p for Class of Service IEEE 802.1x for Authentication IEEE 802.3ad for Port Trunk with LACP IEEE 802.1ad QinQ IEEE 802.1AB LLDP
Redundancy	ITU-T G.8032 ERPS Ring IEEE 802.1d-2004 for STP IEEE 802.1w for RSTP IEEE 802.1s for MSTP

VLAN	
Max. Number of VLAN	4KB
VLAN ID	1 to 4094
VLAN Type	Management VLAN Port-Based VLAN 802.1q Tag-Based VLAN MAC-Based VLAN (up to 512 VLANs) Protocol-Based VLAN
GVRP (GARP VLAN Registration Protocol)	Y
Security	
Port Security	Y
AAA	RADIUS, TACACS+
Port Authentication	802.1x EAP, MAC-Based
IP Source Guard	Y
ARP Spoof Prevention	Y
Dynamic ARP Inspection	Y
DHCP Snooping	Y
Access Control List	MAC, IPv4, IPv6
Storm Control	Unicast, Multicast, Broadcast
UDLD Loop Protection	Y
QoS	
Number of Priority Queues	8
Queue Selection	Strict Priority (SP), Weighted Round Robin (WRR)
CoS (Class of Service)	802.1p CoS, DSCP
Rate Limit & Shaping	Y
Multicast	
IGMP Snooping	v1/v2/v3
MLD Snooping	v1
Max. Number of Static IGMP Groups	128
Link Aggregation	
Max. Number of Trunk Groups	4
Time Synchronization	
Network Time Sync.	NTP Server/Client, SNTP
Precision Network Time Sync.	IEEE1588 PTP v1/v2 (hardware-based) IEEE1588 Hardware-based peer-to-peer / end-to-end transparent clock
SyncE	Y

Management	
Web Interface	HTTP, HTTPS
Command Line Interface	Telnet, SSHv2
User Authentication	Local Database, RADIUS, TACACS+
Automation Profiles	RADIUS, TACACS+
Port Authentication	Modbus/TCP status registers
SNMP	SNMPv1/v2c/v3, SNMP Inform
SNMP MIB	IF-MIB, SNMPv2-MIB, BRIDGE-MIB, LLDP Standard MIB, 802.1q Bridge-MIB, 802.1x PAE MIB, 802.1 MSTP MIB, 802.3ad LACP MIB, RMON MIB Group 1,2,3,9, TIA 1057 LLDP-MED, RFC 1157, RFC 1213 MIB II, RFC 1213, RFC 1215, RFC 1493, RFC 1643, RFC 1757, RFC 2011, RFC 2012, RFC 2013, RFC 2233, RFC 2571, RFC 2613, RFC 2674, RFC 2742, RFC 21 819, RFC 2863, RFC 3411, RFC 3412, RFC 3413, RFC 3414, RFC 3415, RFC 3635, RFC 3636, RFC 4133, RFC 4188, RFC 4292, RFC 4293, RFC 4668, RFC 4670, RFC 4878, RFC 5519
RMON Group	1, 2, 3, 9
LLDP	Y
Alarm	Relay, E-mail (SMTP), LED
Syslog	Y
DHCP Support	DHCP Client, DHCP Relay
DHCP Option	66, 67, 82
BootP	Y
Backup/Restore	HTTP, TFTP
NMU Managed	Y
Diagnostics Utilities	Port Mirror, Ping, Ping6, IPv4/v6 TraceRoute, Cable Diagnostics
Physical	
Housing	IP30 SPCC, Black
Dimension (W x H x D)	77 x 163 x 138 mm
Weight	1,500g (3.31lb)
Installation	DIN-Rail mount / Wall mount (optional kit)
Operating Temperature	-40°C to +75°C (-40°F to +167°F)
Storage Temperature	-40°C to +85°C (-40°F to +185°F)
Ambient Relative Humidity	5% to 95% (Non-condensing test @ 55°C)
Rated Supply Voltage	24-48 VDC 110-240 VAC for AC series 110-300 VDC for HV Series
Input Voltage	18-52 VDC 85-264 VAC for AC series 88-330 VDC for HV Series
Power Consumption	13.25W@48VDC (with input current 0.276A) 10.48W@264VAC for AC series (with input current 0.105A) 11.40W@300VDC for HV series (with input 0.038A)
Connector	1 x 5-Pin 5.08mm Lockable Terminal Block for DC/HV Series 1 x 4-Pin 5.08mm Lockable Terminal Block for DC/HV Series 1 x 3-Pin 5.08mm Lockable Terminal Block for HV Series
Reverse Polarity Protection	Y

REGULATORY APPROVALS

Regulatory Approvals		
Safety	UL/IEC(CB) 62368	
EMI	FCC	FCC Part 15, Subpart B, Class A
	CE	EN 55032:2015/AC:2016 Class A EN 61000-6-4: 2007 + A1: 2011 EN 61000-3-2: 2014, Class A EN 61000-3-3: 2013
EMS	CE	EN55035:2017+A11:2020 EN 61000-6-2 2005 EMS CE EN 61000-4-2/3/4/5/6/8/11
Power Automation	IEC 61850-3 IEEE 1613	
RoHS	Y	

Test	Type	Description	Value	Level	Criterion
IEC 61000-4-2	ESD	Contact Discharge	±8KV	4	B
		Air Discharge	±15KV	4	B
IEC 61000-4-3	RS	80-1000MHz	IEC61850-3 10(V/m), 80-3000 MHz	3	A
			IEEE1613 20(V/m), 80-1000 MHz 20(V/m), 80, 160, 450, 900 MHz	3	A
IEC 61000-4-4	EFT	AC Power Port	±4.0KV @ 5.0KHz	4	B
		DC Power Port	±4.0KV @ 5.0KHz	4	B
		Signal Port	±4.0KV @ 5.0KHz	4	B
IEC 61000-4-5	Surge	AC Power Port	Line-to-Line ±2.0KV	4	B
			Line-to-Earth ±4.0KV	4	B
		DC Power Port	Line-to-Line ±1.0KV	3	B
			Line-to-Earth ±2.0KV	3	B
		Signal Port	Line-to-Line ±2.0KV	4	B
			Line-to-Earth ±4.0KV	4	B
IEC 61000-4-6	CS	AC Power Port	10V, 150KHz to 80MHz, 80%AM	3	A
		DC Power Port	10V, 150KHz to 80MHz, 80%AM	3	A
		Signal Port	10V, 150KHz to 80MHz, 80%AM	3	A
IEC 61000-4-8	PFMF	Enclosure	100A/m continuous, 1000A/m for 1S	5	A
IEC 61000-4-11	AC Power Port	Voltage Dips	30% Reduction, 1 Cycle	N/A	B
			60% Reduction, 50 Cycle	N/A	B
			100% Reduction, 5 Cycle	N/A	B
		Voltage Interruptions	100% Reduction, 50Cycle	N/A	B

REGULATORY APPROVALS

Test	Type	Description	Value	Level	Criterion
IEC 61000-4-16	Main Frequency	DC Input / Output	30V continuous, / 300V 1S	4	A
		Signal Port	30V continuous, / 300V 1S	4	A
IEC 61000-4-17	Ripple	DC Input / Output	10% of unit (10% Level3)	3	A
IEC 61000-4-18	Damped Oscillatory	AC Power Port	Line-to-Line ±1.0KV	3	B
			Line-to-Earth ±2.5KV	3	B
		DC Power Port	Line-to-Line ±1.0KV	3	B
			Line-to-Earth ±2.5KV	3	B
		Signal Port	Line-to-Earth ±2.5KV	3	B
IEC 61000-4-29	DC Input Port	Dips and Interruptions	30% Reduction: 0.1 sec	N/A	B
			60% Reduction: 0.1 sec	N/A	B
			100% Reduction: 0.05 sec	N/A	B

ORDERING INFORMATION

Ordering information

Model	Part Number	RJ-45 (10/100 BASE-T)	SFP (100/ 1000FX)	SyncE Port	Input Power
EH9711-3SFP-DC	1P1EH971100001G	8	3	7	24-48 VDC
EH9711-3SFP-HV	1P1EH971100002G	8	3	7	24-48 VDC, 110-300 VDC / 110-240 VAC
EH9711s-3SFP-DC	1P1EH9711S0001G	8	3	11	24-48 VDC
EH9711s-3SFP-HV	1P1EH9711S0002G	8	3	11	24-48VDC, 110-300 VDC / 110-240 VAC

Optional Accessories

Model	Part Number	Description
Wall Mount Set	70100000000056G	45.4 x 22.8 x 1.5 mm Aluminum wall mount kit with screw
CBL-RJ45(8P)-DB9(F)-90-C	50891971G	RJ45 to DB9 Female crossover console cable, 90cm
SDR-75-24	50500752240001G	75W/3.2A DIN-Rail 24VDC power supply 88 to 264VAC / 124 to 370VDC input
AXGD-5854-0513	522AXGD5854001G	SFP Transceiver, 1250Mbps, 850nm, Multi-mode, 550m, 3.3V, -40 to +85°C, DDMI
AXGD-1354-0523	522AXGD1354001G	SFP Transceiver, 1250Mbps, 1310nm, Multi-mode, 2km, 3.3V, -40 to +85°C, DDMI
AXGD-1354-0533	522AXGD1354011G	SFP Transceiver, 1250Mbps, 1310nm, Single-mode, 10km, 3.3V, -40 to +85°C, DDMI
AXGD-3354-0593	522AXGD3354001G	SFP Transceiver, 1250Mbps, 1310nm, Single-mode, 40km, 3.3V, -40 to +85°C, DDMI