

# IEC61850-3 Layer 3 10G Ethernet Switch

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## IPR-MG2404XS

CTC<sup>®</sup>  
union

### 3x Modular Slots + 4x 1G/10G SFP+ with PTP

- » Static Routing, RIP v1, RIP v2, BGP v4, OSPF v2, PIM-SM, PIM-DM, PIM-SSM, DVMRP, VRRP v2
- » IEC62439-3 Clause 5 High-Avail-Seamless-Redundancy(HSR) (Optional Module)
- » IEC62439-3 Clause 4 Parallel-Redundancy-Protocol (PRP) (Optional Module)
- » IEEE1588 v2 Hardware Base TC, BC, high precision <25ns, Power Profile for Substation
- » Supports ERPS, MRP, MSTP, RSTP, STP for Redundant Cabling
- » CE, FCC, EN62368-1, IEC61850-3, IEEE1613 Certified
- » Modular Design for Flexible Application

**NEW**



The industrial Layer 3 IEC61850-3 Ethernet switch adopts an enhanced design to meet the substation IEC61850-3 and IEEE 1613 certification requirements. It provides up to 24 Gigabit Ethernet ports, which can be implemented through 4 types of Ethernet modules, including Gigabit copper ports, SFP slots and HSR/PRP Redbox modules, compliant with IEC 62439-3 clause 4 and 5 protocols for seamless redundancy, and it is equipped with 4 10 Gigabit SFP+ slot ports for uplinks. Its redundant power inputs increase system reliability and uninterrupted availability of the network backbone. This switch is ideal for smart grids and substations for Ethernet communication deployment in substations.

## Features

- Redundant 24~120VDC, 100~240VAC or 120~380VDC power inputs
- Rugged metal, IP30 protection & Fanless design
- Supports GOOSE Message that complies with IEC61850 standard to achieve zero packet loss
- Operating in wide temperature environments between -40°C to 85°C

## Specifications

Standard	Specification
IEEE 802.3	10Base-T 10Mbit/s Ethernet
IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
IEEE 802.3ae	10Gbit/s Ethernet over fiber
IEEE 802.1d	STP (Spanning Tree Protocol)
IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol )
IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
IEC62439-2	Media Redundancy Protocol (MRP)
ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
IEEE 802.1Q	Virtual LANs (VLAN)
IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
IEEE 802.1AE	MACsec, Local and metropolitan area networks-Media Access Control (MAC) Security
IEEE 802.3ac	Max frame size extended to 1522Bytes
IEEE 802.3ad	Link aggregation for parallel links with LACP (Link Aggregation Control Protocol)
IEEE 802.3X	Flow control for full duplex
IEEE 802.1ad	Stacked VLANs, Q-in-Q
IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)

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<b>Standard</b>	IEC-62439-3	Clause 4 PRP (Parallel Redundancy Protocol)
	IEC-62439-3	Clause 5 HSR (High-availability Seamless Redundancy)
	IEEE1588v2	PTP (Hardware-based)
<b>VLAN ID</b>	4094 IEEE 802.1Q VLAN ID	
<b>Switch Architecture</b>	Back-plane (Switching Fabric): 128Gbps (Full wire-speed)	
<b>Throughput</b>	95.24Mpps maximum	
<b>Data Processing</b>	Store and Forward	
<b>Network Connector</b>	3x modular slot + 4x 1000/10GBase-X SFP+	
	Provide various type of module for modular slot:	
	8x 10/100/1000Base-T RJ45 module	
	8x 100/1000Base-X SFP module	
	4x 10/100/1000Base-T RJ45 with HSR/PRP module	
	4x 100/1000Base-X SFP with HSR/PRP module	
	All SFP support DDMI	
All RJ45 support Auto negotiation speed, auto MDI/MDI-X function		
<b>Console Port</b>	RS232 (RJ45)	
<b>Network Cable</b>	UTP/STP Cat.5e cable or above	
	EIA/TIA-568 100-ohm (100meter)	
<b>Protocols</b>	CSMA/CD	
<b>Power Supply (For Device)</b>	Redundant 2x AC input power (-AA model)	
	Redundant 2x HV input power (-HH model)	
	Redundant 2x DC input power (-DD model)	
	AC input power : 100/240VAC (85VAC~264VAC)	
	HV input voltage : 120~380VDC	
DC input power : 24~120VDC		
<b>Power Consumption</b>	70W max (For AC model) / 62W max (For HV model) / 64W max (For DC model)	
<b>LED (System)</b>	Power 1 (Green), Power 2 (Green)	
	Run (Green)	Blinking: Normally operate OFF: Not ready
	Ring (Green)	ON: Rings in normal / OFF: Ring is disabled / Blinking: port link down in Ring
	R.M (Green)	ON: The device is a Master of the Ring / OFF: Slave of the ERPS Ring
	Alarm (Red)	ON: Alarm is triggered by user defined / OFF: Alarm is not triggered
	10G SFP	Amber : ON: 10G or 1000M Link Green: ON: Link / Blink: Link & Active / OFF: No Link
<b>LED (Module)</b>	<b>Per RJ-45 port</b>	
	<b>Amber:</b> ON: 1000M Link / Blink: 100M Link / OFF: 10M <b>Green:</b> ON: Link / Blink: Link & Active / OFF: No Link	
<b>LED (Module)</b>	<b>Per SFP Fiber port</b>	
	<b>Amber:</b> ON: 1000M Link / Blink: 100M Link <b>Green:</b> ON: Link / Blink: Link & Active / OFF: No Link	
<b>Jumbo Frame</b>	9216 Byte	
<b>MAC Address Table</b>	16K	
<b>Memory Buffer</b>	1.5M Bytes for packet buffer	
<b>Warning Message</b>	System Syslog, SMTP/ e-mail event message, alarm relay	
<b>Alarm Relay Contact</b>	Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block	
<b>Operating Temperature</b>	-40 ~ 85°C	
<b>Operating Humidity</b>	5% to 95% (Non-condensing)	
<b>Storage Temperature</b>	-40 ~ 85°C	
<b>Housing</b>	Rugged Metal, IP30 Protection and Fanless	
<b>Dimensions</b>	355 x 440 x 44mm (D x W x H)	
<b>Weight</b>	5kg (Not include module)	
<b>Installation Mounting</b>	19" rack mount	

# IEC61850-3 Layer 3 10G Ethernet Switch

<b>MTBF</b>	20 Years (MIL-HDBK-217)
<b>Warranty</b>	5 years
<b>Certification</b>	
<b>EMC</b>	CE (EN55032, EN55035)
<b>EMI (Electromagnetic Interference)</b>	FCC Part 15 Subpart B Class A, CE
<b>EMS (Electromagnetic Susceptibility) Protection Level</b>	EN61000-4-2 (ESD) Level 4, Criteria B
	EN61000-4-3 (RS) Level 4, Criteria A
	EN61000-4-4 (Burst) Level 4, Criteria A
	EN61000-4-5 (Surge) Level 4, Criteria B
	EN61000-4-6 (CS) Level 4, Criteria A
<b>Power Substation</b>	IEC61850-3 EMC, IEEE1613
<b>Safety</b>	EN62368-1
<b>Shock</b>	IEC 60068-2-27
<b>Freefall</b>	IEC 60068-2-31
<b>Vibration</b>	IEC 60068-2-6

## Software Specifications

### Layer 3

**Layer 3 Routing** Static routing, RIP v1/v2, OSPFv2, DVMRP, PIM-DM, PIM-SM, PIM-SSM

**Layer 3 Redundancy** VRRP v2

### Topology

**VLAN** IEEE 802.1q VLAN, up to 4094 802.1Q VLAN ID  
 MAC-based VLAN  
 GARP  
 GVRP (GARP VLAN Registration Protocol)  
 GMRP

**HSR Seamless Redundancy** IEC62439-3 Clause 5 (Support by IPM-4GT-HPR, IPM-4GS-HPR module)

**PRP Parallel-Redundancy** IEC62439-3 Clause 4 (Support by IPM-4GT-HPR, IPM-4GS-HPR module)

**Link Aggregation (Port Trunk)** Static, Dynamic (IEEE 802.3ad LACP)

**Spanning Tree** IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP, IEC62439-2 MRP (Client)

**ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)** Recovery time <50ms  
 Single Ring

### QoS

**QoS** Supported

**GOOSE Message** Complies with IEC61850 standard to achieve zero packet loss

### IP Multicasting Feature

**IGMP** IGMP v1, v2, v3 / IGMP Snooping

### Security Features

**IEEE 802.1X** Port-Based

**ACL** Supported

**RADIUS** Authentication & Accounting

**TACACS+** Authentication, Authorization and Accounting

**HTTPS, HTTP** Supported

**SSH** Supported

**Management Interface Access Filtering** Web, Telnet / SSH, CLI RS-232 console

### Management Features

**CLI** Supported

**Web UI** Supported

**Telnet** Server

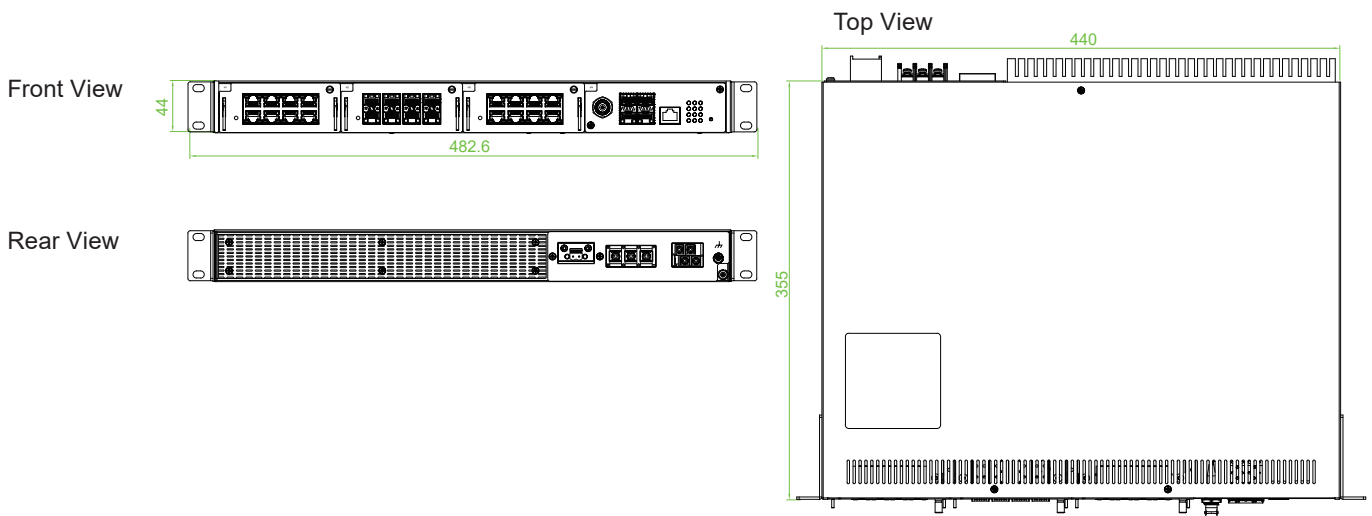
**SNMP** V1, V2c, V3

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<b>sFlow</b>	Supported
<b>SMTP</b>	SMTP, SMTP (Gmail)
<b>Automation Profile</b>	Profinet v2 conformance Modbus/TCP status registers
<b>SW &amp; Configuration Upgrade</b>	TFTP
<b>RMON</b>	RMON I (1, 2, 3, 9 group)
<b>MIB</b>	RFC1213 MIB II, Private MIB
<b>DHCP</b>	Server, Client, Relay, DHCP option 66/67/82
<b>BootP</b>	Supported
<b>RARP</b>	Supported
<b>Mirroring</b>	Supported
<b>Event Syslog</b>	Client
<b>Warning Message</b>	System syslog, SMTP e-mail, alarm relay
<b>IEEE1588 PTP v2</b>	Supports BC, TC mode (Hardware base) 25ns accuracy Supports Power profile C37.238. power profile (2017) Supports IEC61850-9-3 power profile (2016)
<b>NTP V4.0, SNTP</b>	NTP (server/ Client), SNTP (Client)
<b>LLDP (IEEE 802.1ab)</b>	Link Layer Discovery Protocol

## Dimensions



## Ordering Information

Model Name	Managed	Total Ports (Max)	Extension Port	Modular Slot	Power Input (Redundant)	Certification		
			1000/10GBase-X	See Module Selection Table for Optional		IEC61850-3 IEEE1613	EN62368-1	CE FCC
IPR-MG2404XS-AA	Layer 3	28	4x SFP	3	100~240VAC	V	V	V
IPR-MG2404XS-DD	Layer 3	28	4x SFP	3	24~120VDC	V	V	V
IPR-MG2404XS-HH	Layer 3	28	4x SFP	3	120~380VDC	V	V	V

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## Module Selection

Model Name	100/1000Base-X SFP	10/100/1000Base-T(X) RJ45	HSR/PRP
IPM-8GT		8	
IPM-8GS	8		
IPM-4GT-HPR		4	Y
IPM-4GS-HPR	4		Y



IPM-8GT



IPM-8GS



IPM-4GT-HPR



IPM-4GS-HPR

## Optional Accessories

### Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

ISFP-M9000-85-D(E)	Industrial SFP 10GbE 10GBase-SR, M/M, 300 meter (OM3 fiber), wave length 850nm, DDMI, -10~70°C (-40~85°C)
ISFP-S9010-31-D(E)	Industrial SFP 10GbE 10GBase-LR, S/M, 10km, wave length 1310nm, DDMI, -10~70°C (-40~85°C)
ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter, wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)

### Industrial Power Supply

NDR-120-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ 70°C (For DC type)
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