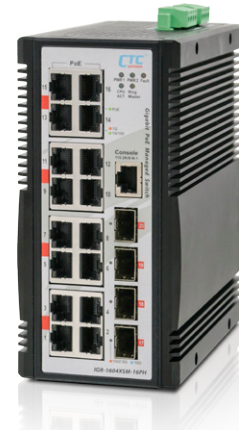


16x GbE RJ45 + 4x 1G/2.5G/10G SFP+ with 16x PoE 300W

- » VRRP v2/v3, L3 IPV4/IPV6 Static Routing, RIP v1/v2 Dynamic Routing, OSPF v2/v3 Dynamic Routing
- » Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for Redundant Cabling
- » Auto Checking and Auto Reset when PoE PD Fail
- » EN62368-1, EN50121-4, EN61000-6-2, EN61000-6-4, CE and FCC Certified



As an industrial Layer 3 PoE Ethernet switch, DIN-RAIL mounting type, suitable for process and transportation automation applications, IGR-1604XSM-16PH has 4 10G SFP+ slots and 16 Gigabit UTP ports, up to 16 PoE+/PSE ports to meet the stringent requirements of centralized and mission-critical applications, compliant with IEEE 802.3af/IEEE 802.3at standards providing up to 30 watts of power output per port for connecting heavy-duty industrial PoE equipment, Support for static and dynamic routing protocols, fanless design and redundant power input are certified by many industry standards, making it ideal for deployment in harsh environments to provide mission-critical network services.

Features

- 48VDC (46~57VDC) redundant dual input power, 55-57VDC input is recommended for environment 75°C application
- Provides 16-port IEEE 802.3af / 802.3at PoE+ output (30W per port. total 300W)
- Cable diagnostics, identifies opens/shorts distance
- Provides 5 ring instances that each can support μ-Ring, μ-Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device (Please see CTC μ-Ring white paper for more details and more topology application)
- μ-Ring for redundant cabling, recovery time<10ms in 250 devices
- Supports EMS Management

Specifications

Standard		
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	10G bit/s Ethernet over Fiber	
IEEE 802.3af	PoE (Power over Ethernet)	
IEEE 802.3at	PoE+ (Power over Ethernet enhancements)	
IEEE 802.1D	STP (Spanning Tree Protocol)	
IEEE 802.1W	RSTP (Rapid Spanning Tree Protocol)	
IEEE 802.1S	MSTP (Multiple Spanning Tree Protocol)	
ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	
ITU-T G.8031 /Y.1342	EPS (Ethernet Protection Switching)	
IEEE 802.1Q	Virtual LANs (VLAN)	
IEEE 802.1X	Port based and MAC based Network Access Control, Authentication	
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)	
IEEE 802.3az	EEE (Energy Efficient Ethernet)	

Industrial Layer 3 10G PoE Switch

Switch Architecture	Back-Plane (Switching Fabric): 112Gbps (Full Wire-Speed)			
Data Processing	Store and Forward			
Flow Control	IEEE 802.3x for full duplex mode back pressure for half duplex mode			
Network Connector	16x 10/100/1000Base-T RJ-45 + 4x 100/1000/2.5G/5G/10GBase-X SFP connector RJ-45 UTP port supports Auto-negotiation speed, Auto MDI/MDI-X function SFP port supports 1G/2.5G/5G/10G speed with DDMI			
Console	RS-232 (RJ-45)			
PoE standard & RJ-45 Pin Assignment	16x IEEE 802.3af /IEEE 802.3at 2 pairs PoE, PoE+, 30W/port End-Span, Alternative A mode. Positive (V+) : RJ-45 pin 1, 2. Negative (V-) : RJ-45 pin 3, 6.			
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)			
Protocols	CSMA/CD			
Reverse Polarity Protection	Supported for power input			
Overload Current Protection	Supported			
CPU Watch Dog	Supported			
Power Supply	Redundant Dual DC 48V (46~57VDC) input power, (Removable terminal block) (50~57VDC input is recommended for IEEE802.3at PoE+ applications) (55~57VDC input is recommended for environment 75°C application)			
Power Consumption	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget
	50VDC (60°C)	337W	28.5W	300W
	55VDC (75°C)	335.5W	29W	300W
PoE Power Budget	Maximum PoE Output power budget 30W / Per Port Total 300W			
LED	System: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)			
	UTP: 10/100 Link/Active (Green), 1000 Link/Active (Amber)			
	SFP Slot: 1G/2.5G Link/Active (Amber), 10G Link/Active (Blue)			
	PoE: ON (Green)			
Jumbo Frame	10KB			
IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)			
MAC Address Table	32K			
Memory Buffer	4M Bytes for packet buffer			
Device Memory	128M Bytes Flash ROM, 2G Bytes RAM			
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay			
DO(Alarm Relay Contact)	Relay outputs with current carrying capacity of 1A @24VDC			
DI Input	DI 17 to 30 V for state 1, 0 to 15 V for state 0			
Removable Terminal Block	Provides 2 terminal block for DO (Alarm Relay), DI, redundant power PWR1 and PWR2			
Operating Temperature	-40 ~ 60°C (IGR-1604XSM-16PH)			
	-40 ~ 75°C (IGR-1604XSM-16PHE)			
Operating Humidity	5% to 95% (Non-condensing)			
Storage Temperature	-40 ~ 85°C			
Housing	Rugged Metal, IP30 Protection and Fanless			
Dimensions	155.6 x 77 x 160mm (D x W x H)			
Weight	2.355kg			
Installation Mounting	DIN Rail mounting or wall mounting (Optional)			
MTBF	224,776 Hours (MIL-HDBK-217)			
Warranty	5 years			
Certification				
EMC	CE (EN55032, EN55035)			
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE			
Railway Traffic	EN50121-4			
Immunity for Heavy Industrial Environment	EN61000-6-2			
Emission for Heavy Industrial Environment	EN61000-6-4			
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B			
	EN61000-4-3 (RS) Level 3, Criteria A			
	EN61000-4-4 (Burst) Level 3, Criteria A			
	EN61000-4-5 (Surge) Level 3, Criteria B			

Industrial Layer 3 10G Ethernet Switch

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN62368-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-31
Vibration	IEC 60068-2-6

Software Specifications

L3 Routing

IPv4/v6 Static Routing	Supported
RIP v1/v2 Dynamic Routing	Supported
OSPF v2, OSPF v3 Dynamic Routing	Supported
Layer 3 Redundancy	VRRP v2, v3

Topology

VLAN	IEEE 802.1q VLAN, up to 4094 802.1Q VLAN ID
	IEEE 802.1q VLAN, up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN, up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
	Voice VLAN
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE 802.1D STP, IEEE 802.1W RSTP, IEEE 802.1S MSTP
Multiple μ-Ring	Up to 5 instances that each supports μ -Ring, μ -Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings
	Recovery time <10ms The maximum number of devices is allowed 250 nodes in a Ring.
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms
	Single Ring, Sub-Ring, Multiple ring topology network
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported

QoS Features

Class of Service	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS, IP Precedence based CoS, IP DSCP based CoS
	QCL (QoS Control List) Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI, Protocol, Source IP IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control for Ingress	100~1,000,000 when the "Unit" is "kbps", and 1~1,000 when the "Unit" is "Mbps"
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps", and 1~1,000 when the "Unit" is "Mbps"
	Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	For Unicast, Broadcast and Multicast

IP Multicasting Features

IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2
	Port Filtering Profile
	Throttling
	Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port

Industrial Layer 3 10G Ethernet Switch

Security Features

IEEE 802.1X	Port-Based
	MAC-Based
ACL	Number of rules : up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS	Authentication & Accounting
TACACS+	Authentication, Authorization and Accounting
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH, CLI RS-232 console

Management Features

CLI	Cisco® like CLI
Web UI	Supported
Telnet	Server
SNMP	V1, V2c, V3
sFlow	Supported
Modbus/TCP	Supports management and monitoring
SW & Configuration Upgrade	SFTP, TFTP, HTTP
	Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82, Snooping
RARP	Supported
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED

IPv6 Features

IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4
	L2 : Mac address SA/DA/VLAN
	L3: IP address SIP, Subnet (32bit) L4: TCP/UDP

Industrial Layer 3 10G Ethernet Switch

Others Features

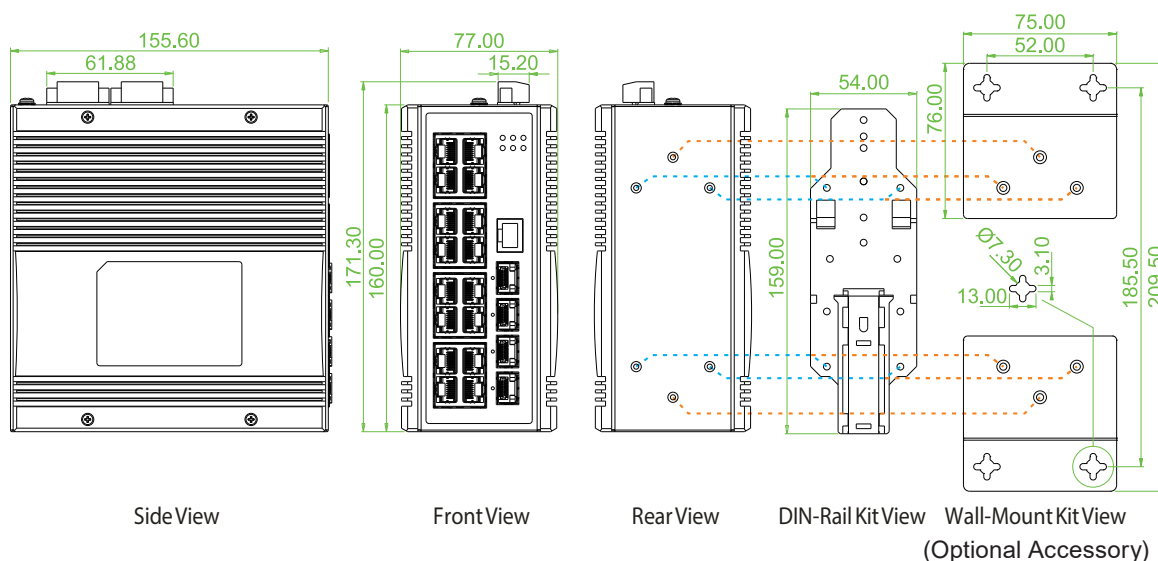
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
	Determine the cable length and lowering the power for ports with short cables
	Lower the power for a port when there is no link
	LED Power Management :Adjustment LEDs intensity

Cable Diagnostic	Measuring UTP cable normal or broken point distance
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Advanced PoE

Management	PoE PD failure auto checking, and auto reset when PD fail
	PoE port on/off weekly scheduling
	PoE Configuration
	PoE Enable/Disable
	Power limit by classification
	Power feeding priority
Total PoE power budget limitation: maximum 300W	

Dimensions



Ordering Information

Model Name	Total Port	RJ45	SFP	PoE		Input Power	Certification				Operating Temperature
		10/100/1000 Base-T(X)	1000/2.5G/5G/10G Base-X	IEEE802.3 at/af	Power Budget	Redundant	EN62368-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE FCC	
IGR-1604XSM-16PH	20	16	4	16	300W	48VDC	V	V	V	V	-40~60℃
IGR-1604XSM-16PHE	20	16	4	16	300W	55VDC	V	V	V	V	-40~75℃

Optional Accessories

■ Wall Mount Kit

IND-WMK04	Wall Mount kit for Industrial product (Wide) (2 pcs in 1 set, 76mm x 75mm x 2pcs)
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■ 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 10GBase-SR MM, 300meter, wave length 850nm LC, DDMI, -10~70°C (-40~85°C)
ISFP-S9010-31-D(E)	Industrial SFP 10GBase-LR SM, 10km, 1310nm, 6.4dB, LC, 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)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

■ Industrial Power Supply

NDR-480-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ 70°C
XDR-480E-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 480W, -40 ~ 70°C