

Cisco Industrial Ethernet 4010 Series Switches

Product Overview

Cisco® Industrial Ethernet (IE) 4010 Series Switches with 28 Gigabit Ethernet interfaces are high-performance ruggedized Layer2/3 switches with high-density Power-over-Ethernet (PoE) capabilities, making them an ideal choice for use as access switches in industrial environments. The 4010 delivers comprehensive Cisco IOS® Software security features and high-availability ring protocols. The switch is ideal for outdoor enclosures or harsh environments while adhering to overall IT network design, compliance, and performance requirements.

The 4010 has a comprehensive software feature set, developed from manufacturing, utility, and enterprise switching products making it excellent for extended temperature range locations, such as smart buildings, utility, process control, intelligent transportation systems (ITS), and city surveillance programs. The 4010 complements the existing Cisco IE 2000, IE 2000U, IE 3000, IE 3010, IE 4000, and IE 5000 Series Switching families, as well as the Cisco CGS 2520 Switch.

The 4010 supports a GUI-based web user Interface, and Express Setup for the switch provides easy out-of-box configuration to deliver advanced security, data, video, and voice services over industrial networks.

Features and Benefits

Table 1. Features and Benefits of Cisco IE 4010 Series Switches

Feature	Benefit
Robust industrial design	<ul style="list-style-type: none"> • A utility grade, fully managed 1 RU rack mount Ethernet access switch with PoE capabilities. • Fanless, convection cooled with no moving parts. • Extended operational temperature range (-40 to 75C). • Hardened for vibration, shock, surge, and electrical noise immunity. • Complies with multi-industry specifications for industrial automation, ITS, and electrical substation environments. • Improves uptime, performance, and safety of industrial systems and equipment. • IEEE 1588v2 PTP (both power profile for utility and default profile for manufacturing are supported). • Alarm I/O for monitoring and signaling to external equipment.
User-friendly GUI device manager	<ul style="list-style-type: none"> • Allows easily configuration and monitoring via a web browser. • Eliminates the need for terminal emulation programs.
Swap drive: zero- config replacement	<ul style="list-style-type: none"> • Simple switch replacement in case of a failure. • No networking expertise required. • Helps ensure fast recovery.
High-density industrial Power over Ethernet (PoE/PoE+)	<ul style="list-style-type: none"> • Supports up to 24 total PoE/PoE+ ports with power budget of 200W available with two power supplies. • Platform ready to support up to 370W PoE power budget in the future with new power supplies. • Enables ready-to-use PoE devices, such as high definition (HD) IP cameras, wireless access points, and IP phones.
Complete Gigabit Ethernet switch	<ul style="list-style-type: none"> • Total of 28 Gigabit Ethernet ports provide multiple resilient design options. • Connects new wireless access point (802.11n and 802.11ac). • Enables new HD IP cameras and future proof Gigabit speed automation devices. • Allows IP-based Supervisory Control And Data Acquisition (SCADA) connectivity. • Supports very-delay-sensitive applications and time-sensitive networks. • Delivers multiple rings; redundant ring topology for new network configurations. • Extends geographical scalability where longer distance connectivity is required.

Your Ruggedized Choice for Industrial Environments

Cisco Industrial Ethernet (IE) 4010 Series Switches offer:

- Bandwidth and capacity to grow with your networking needs: high performance nonblocking switching capacity with 28 Gigabit Ethernet ports per switch.
- High-density 12 or 24 Gigabit PoE/PoE+ capable ports to connect IP cameras, IP phones, badge readers, wireless access points, etc.
- Cisco IOS Software features for easy IT integration and management consistency.
- Robust resiliency enabled by dual ring design through 4x Gigabit Ethernet uplink ports, Resilient Ethernet Protocol (REP), Parallel Redundancy Protocol (PRP), EtherChannel and Flexlink support, integrated redundant power supplies, dying gasp, etc.
- True zero-touch replacement for middle-of-night or middle-of-nowhere failure.
- Line-rate, low-latency forwarding with advanced hardware assist features (such as NAT, IEEE1588).
- Simplified software upgrade path with universal images.
- Support of Industrial automation protocols EtherNet/IP (CIP) and Profinet.

Figure 1 shows switch models, Table 2 shows all the available 4010 models, and Table 3 lists the power supplies for Cisco IE 4010 Series Switches.

Figure 1. Cisco IE 4010 Series Switches Models

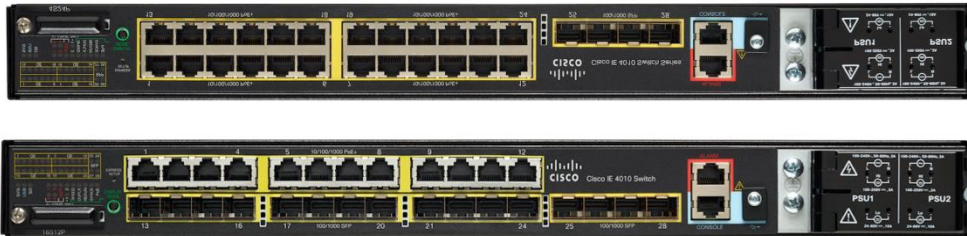


Table 2. Cisco IE 4010 Series Switches Models

Product Number	Total Ports	Uplinks	SFP Fiber Ports	Copper 10/100/1000 PoE/PoE+ Ports ²	Default Software
IE-4010-16S12P	28	4 SFP (100MB/1G)	12 (100/1000M)	12 (10/100/1000M)	LAN Base ¹
IE-4010-4S24P	28	4 SFP (100MB/1G)		24 (10/100/1000M)	LAN Base ¹

¹ Can be upgraded to IP Services for a fee. IP Services license product numbers are the following: L-IE4000-RTU= (electronic software license for Cisco Industrial Switches)

² All copper Gigabit Ethernet interfaces support speed negotiation to 10/100/1000 mbps and duplex negotiation. Ethernet 4010 Series

Table 3. Power Supplies for Cisco IE 4010 Series Switches^{1,2}

Product Number	Wattage	Rated Nominal Input Operating Range	Supported Input Voltage Operating Range	PoE/PoE+ Support	Use Case Scenario
PWR-RGD-AC-DC-H	150W	AC 100-240V/2.0A 50-60Hz or DC 100-250V/2.0A	AC 85-264V or DC 88-300V	Yes	High voltage AC or DC power source, for hazardous locations ^{1,2} PoE power application
PWR-RGD-LOW-DC-H	150W	DC 24-60V/10A	DC 18-75V	Yes	Low voltage DC power source, for hazardous locations ^{1,2} PoE power application

¹ With 1 PS there is 65W available for PoE/PoE+; with 2 PS there is 200W available.

² A single power supply from the previous list is required when ordering. A second power supply of any voltage type is supported and provides redundancy, as well as additional power for PoE devices.

Product Specifications

Table 4 lists specifications, Table 5 lists information about switch performance and scalability, Tables 6 and 7 list important software features, Table 8 lists compliance specifications, and Table 9 lists information about management and standards of Cisco IE 4010 Series Switches.

Table 4. Product Specifications

Description	Specification
Hardware	<ul style="list-style-type: none"> • 1 GB DRAM • 128 MB onboard flash memory • 1-GB removable SD flash memory card • Mini-USB and traditional RJ-45 console connector
Alarm	Alarm I/O: four alarm inputs to detect dry contact open or closed, one Form C alarm output relay
Dimensions, (H x W x D)	1.75 x 17.5 x 14.0 in. (4.45 x 44.5 x 35.6 cm), 1 RU (rack unit) height
Weight	<ul style="list-style-type: none"> • Without power supply: IE-4010-4S24P: 12.1 lbs (5.46 kg), IE-4010-16S12P: 12.7 lbs (5.78 kg) • PWR-RGD-AC-DC-H: 2.55 lb (1.16 kg) • PWR-RGD-LOW-DC-H: 2.5 lb (1.13 kg)
Power Consumption	<ul style="list-style-type: none"> • Maximum of 90W not including PoE consumption
Accessories	<ul style="list-style-type: none"> • SD-IE-1GB= - Spare SD card • L-IE4000-RTU= - Electronic RTU IP services software license for 4010 switches • 21-in. and 23-in. ETSI rack mount brackets

Table 5. Switch Performance and Scalability

Description	Specification
Forwarding bandwidth	28 Gbps (line rate/non-blocking)
Switching bandwidth	56 Gbps (Switching bandwidth is full-duplex capacity)
Forwarding rate	41.67 mpps with 64 byte packets (line rate for all ports and packet sizes)
Number of queues	4 egress
Unicast MAC addresses	16,000
IGMP multicast groups	1000
Number of VLANs	1000
IPv4 MAC security ACEs	1000 with default TCAM template
NAT translation	Bidirectional, 128 unique subnet NAT translation entries, which can expand to tens of thousands of translated entries if designed properly

Table 6. Cisco IE 4010 LAN BASE License: Key Software Features

LAN Base License (Default)	Features
Layer 2 switching	IEEE 802.1, 802.3, 802.3at, 802.3af standard, VTPv2, NTP, UDLD, CDP, LLDP, Unicast Mac filter, Flexlink, Resilient Ethernet Protocol (REP), Parallel Redundancy Protocol (PRP), VTPv3, EtherChannel, Voice VLAN, QinQ tunneling
Security	SCP, SSH, SNMPv3, TACACS+, RADIUS Server/Client, MAC Address Notification, BPDU Guard, Port-Security, Private VLAN, DHCP Snooping, Dynamic ARP Inspection, IP Source Guard, 802.1x, Guest VLAN, MAC Authentication Bypass, 802.1x Multi-Domain Authentication, Storm Control, Trust Boundary, Cisco TrustSec® security, FIPS 140-2, IEEE 802.AE MACSec
Layer 2 multicast	IGMPv1, v2, v3 Snooping, IGMP filtering, IGMP Querier
Management	Fast Boot, Express Setup, HTTP Web Config, SmartPort, MIB, SNMP, syslog, Storm Control—Unicast, Multicast, Broadcast, SPAN Sessions, RSPAN, DHCP Server, Per-port DHCP, Energywise, PnP, Customized TCAM/SDM size configuration, DOM (digital optical management)
Industrial Ethernet	CIP Ethernet/IP, Profinet v2, IEEE 1588 PTP v2 Default Profile
Quality of service (QoS)	Ingress Policing, Rate-Limit, Egress Queueing/shaping, AutoQoS, Modular QoS CLI (MQC)
Layer 2 IPv6	IPv6 Host support, HTTP over IPv6, SNMP over IPv6
Layer 3 routing	IPv4 Static Routing
Industrial management	Layer 2 switching with 1:1 static Network Address Translation (NAT)
Utility	IEEE 1588v2 PTP Power Profile, dying gasp, GOOSE messaging, SCADA protocol classification, MODBUS TCP/IP Memory Maps, utility SmartPort macro, BFD, Ethernet OAM, IEEE 802.3ah, CFM (IEEE 802.1ag)

Table 7. Cisco IE 4010 IP Services License: Key Software Features

IP Services License	Additional Features
IP multicast	PIM sparse mode (PIM-SM), PIM dense mode (PIM-DM), and PIM sparse-dense mode
Industrial management	Embedded Event Manager (EEM)
IP unicast routing protocols	OSPF, EIGRP, BGPv4, IS-IS, RIPv2, Policy-Based Routing (PBR), HSRP
Cisco Express Forwarding	Hardware routing architecture delivers extremely high-performance IP routing
IPv6 routing	RIPng, OSPFv6, and EIGRPv6 support
Virtualization	VRF-lite

Table 8. Compliance Specifications

Type	Standards
Electromagnetic emissions	FCC 47 CFR Part 15 Class A EN 55022A Class A VCCI Class A AS/NZS CISPR 22 Class A CISPR 11 Class A CISPR 22 Class A ICES 003 Class A CNS13438 Class A (pending) KN22 (pending)
Electromagnetic immunity	EN55024 CISPR 24 AS/NZS CISPR 24 KN24 (pending) EN 61000-4-2 Electro Static Discharge EN 61000-4-3 Radiated RF EN 61000-4-4 Electromagnetic Fast Transients EN 61000-4-5 Surge EN 61000-4-6 Conducted RF EN 61000-4-8 Power Frequency Magnetic Field EN 61000-4-9 Pulse Magnetic Field

Type	Standards
	<p>EN 61000-4-11 AC Power Voltage</p> <p>EN 61000-4-18 Damped Oscillatory Wave</p> <p>EN-61000-4-29 DC Voltage Dips</p>
Industry standards	<p>EN 61000-6-1 Light Industrial</p> <p>EN 61000-6-2 Industrial</p> <p>EN 61000-6-4 Industrial</p> <p>EN 61326 Industrial Control</p> <p>EN 61131-2 Programmable Controllers</p> <p>IEEE 1613 Electric Power Stations Communications Networking</p> <p>IEC 61850-3 Electric Substations Communications Networking</p> <p>EN50121-4 Railway - Signaling and Telecommunications Apparatus</p> <p>EN50121-3-2 Railway - Apparatus for Rolling Stock</p> <p>PROFINET conformance B IP30</p>
Safety standards and certifications	<p>Information Technology Equipment:</p> <p>UL/CSA 60950-1</p> <p>EN 60950-1</p> <p>CB to IEC 60950-1 with all country deviations</p> <p>NOM to NOM-019-SCFI (through partners and distributor)</p> <p>Industrial Floor (Control Equipment):</p> <p>UL 508</p> <p>UL 61010-2</p> <p>CSA C22.2, No 142</p> <p>Hazardous Locations:</p> <p>Class 1, Div2, gas groups IIC ANSI/ISA 12.12.01 CSA C22.2 No 213</p> <p>IEC 60079-0, -15 IECEx test report</p> <p>EN 60079-0, -15 ATEX certification (Class I Zone 2) (Cabinet enclosure required)</p>
Operating environment	<p>Operating Temperature: -40C to +75C</p> <ul style="list-style-type: none"> • -40C to +70C (Vented Enclosure - 40 LFM Air Flow) • -40C to +60C (Sealed Enclosure - 0 LFM Air Flow) • -34C to +75C (Fan or Blower equipped Enclosure - 200 LFM Air Flow) • -40C to +85C (IEC 60068-2-2 Environmental Type Testing, 16 hours) • Operating altitude: Up to 13,800ft • EN 60068-2-1, EN 61163
Storage environment	<p>Temperature: -40C to +85C</p> <p>Altitude: Up to 15,000 feet</p> <p>IEC 60068-2-14</p>
Humidity	<p>Relative humidity of 5% to 95% noncondensing</p> <p>IEC 60068-2-3</p> <p>IEC 60068-2-30</p>
Shock and vibration	<p>IEC 60068-2-27 (operational shock, 50G, 11ms, Half Sine)</p> <p>IEC 60068-2-27 (Non-Operational Shock, 65-80G, 9ms, Trapezoidal)</p> <p>IEC 60068-2-6, IEC 60068-2-64, EN 61373 (Operational Vibration)</p> <p>IEC 60068-2-6, IEC 60068-2-64, EN 61373 (Nonoperational Vibration)</p>
Corrosion	<p>ISO 9223: Corrosion</p> <p>class C3-Medium</p> <p>class C4-High</p> <p>EN 60068-2-52</p> <p>EN 60068-2-60 (Flowing Mixed Gas)</p>
Others	<p>RoHS Compliance</p> <p>China RoHS Compliance</p> <p>TAA (Government)</p> <p>CE (Europe)</p>
Warranty	<p>Five-year limited hardware warranty on all IE-4010 PIDs and power supplies (see Table 3). See link that follows for more details on warranty.</p>

Type	Standards
Mean time between failures (MTBF)	IE-4010-4S24P: 429,620 hours IE-4010-16S12P: 415,160 hours

Table 9. Management and Standards

Description	Specification	
IEEE standards	<ul style="list-style-type: none"> • IEEE 802.1D MAC Bridges, STP • IEEE 802.1p Layer2 COS prioritization • IEEE 802.1q VLAN • IEEE 802.1s Multiple Spanning-Trees • IEEE 802.1w Rapid Spanning-Tree • IEEE 802.1x Port Access Authentication • IEEE 802.1AB LLDP • IEEE 802.3ad Link Aggregation (LACP) • IEEE 802.3af Power over Ethernet provides up to 15.4W DC power to each end device • IEEE 802.3at Power over Ethernet provides up to 25.5W DC power to each end device 	<ul style="list-style-type: none"> • IEEE 802.3af Power over Ethernet • IEEE 802.3at Power over Ethernet Plus • IEEE 802.3ah 100BASE-X SMF/MMF only • IEEE 802.3x full duplex on 10BASE-T • IEEE 802.3 10BASE-T specification • IEEE 802.3u 100BASE-TX specification • IEEE 802.3ab 1000BASE-T specification • IEEE 802.3z 1000BASE-X specification • IEEE 1588v2 PTP Precision Time Protocol
RFC compliance	<ul style="list-style-type: none"> • RFC 768: UDP • RFC 783: TFTP • RFC 791: IPv4 protocol • RFC 792: ICMP • RFC 793: TCP • RFC 826: ARP • RFC 854: Telnet • RFC 951: BOOTP • RFC 959: FTP • RFC 1157: SNMPv1 • RFC 1901,1902-1907: SNMPv2 • RFC 2273-2275: SNMPv3 • RFC 2571: SNMP Management • RFC 1166: IP Addresses • RFC 1256: ICMP Router Discovery 	<ul style="list-style-type: none"> • RFC 1305: NTP • RFC 1492: TACACS+ • RFC 1493: Bridge MIB Objects • RFC 1534: DHCP and BOOTP interoperation • RFC 1542: Bootstrap Protocol • RFC 1643: Ethernet Interface MIB • RFC 1757: RMON • RFC 2068: HTTP • RFC 2131, 2132: DHCP • RFC 2236: IGMP v2 • RFC 3376: IGMP v3 • RFC 2474: DiffServ Precedence • RFC 3046: DHCP Relay Agent Information Option • RFC 3580: 802.1x RADIUS • RFC 4250-4252: SSH Protocol
SNMP MIB objects	<ul style="list-style-type: none"> • BRIDGE-MIB • CALISTA-DPA-MIB • CISCO-ACCESS-ENVMON-MIB • CISCO-ADMISSION-POLICY-MIB • CISCO-AUTH-FRAMEWORK-MIB • CISCO-BRIDGE-EXT-MIB • CISCO-BULK-FILE-MIB • CISCO-CABLE-DIAG-MIB • CISCO-CALLHOME-MIB • CISCO-CAR-MIB • CISCO-CDP-MIB • CISCO-CIRCUIT-INTERFACE-MIB • CISCO-CLUSTER-MIB • CISCO-CONFIG-COPY-MIB • CISCO-CONFIG-MAN-MIB • CISCO-DATA-COLLECTION-MIB • CISCO-DHCP-SNOOPING-MIB • CISCO-EMBEDDED-EVENT-MGR-MIB • CISCO-ENTITY-ALARM-MIB • CISCO-ENTITY-VENDORTYPE-OID-MIB • CISCO-ENVMON-MIB • CISCO-ERR-DISABLE-MIB • CISCO-FLASH-MIB 	<ul style="list-style-type: none"> • CISCO-SNMP-TARGET-EXT-MIB • CISCO-STACK-MIB • CISCO-STACKMAKER-MIB • CISCO-STP-EXTENSIONS-MIB • CISCO-SYSLOG-MIB • CISCO-TCP-MIB • CISCO-UDLD-MIB • CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB • CISCO-VLAN-MEMBERSHIP-MIB • CISCO-VTP-MIB • ENTITY-MIB • ETHERLIKE-MIB • HC-RMON-MIB • IEEE8021-PAE-MIB • IEEE8023-LAG-MIB • IF-MIB • IP-FORWARD-MIB • LLDP-EXT-MED-MIB • LLDP-EXT-PNO-MIB • LLDP-MIB • NETRANGER • NOTIFICATION-LOG-MIB • OLD-CISCO-CHASSIS-MIB

Description	Specification	
	<ul style="list-style-type: none"> • CISCO-FTP-CLIENT-MIB • CISCO-IGMP-FILTER-MIB • CISCO-IMAGE-MIB • CISCO-IP-STAT-MIB • CISCO-LAG-MIB • CISCO-LICENSE-MGMT-MIB • CISCO-MAC-AUTH-BYPASS-MIB • CISCO-MAC-NOTIFICATION-MIB • CISCO-MEMORY-POOL-MIB • CISCO-PAE-MIB • CISCO-PAGP-MIB • CISCO-PING-MIB • CISCO-PORT-QOS-MIB • CISCO-PORT-SECURITY-MIB • CISCO-PORT-STORM-CONTROL-MIB • CISCO-PRIVATE-VLAN-MIB • CISCO-PROCESS-MIB • CISCO-PRODUCTS-MIB • CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB • CISCO-RTTMON-ICMP-MIB • CISCO-RTTMON-IP-EXT-MIB • CISCO-RTTMON-MIB • CISCO-RTTMON-RTP-MIB 	<ul style="list-style-type: none"> • OLD-CISCO-CPU-MIB • OLD-CISCO-FLASH-MIB • OLD-CISCO-INTERFACES-MIB • OLD-CISCO-IP-MIB • OLD-CISCO-MEMORY-MIB • OLD-CISCO-SYS-MIB< • OLD-CISCO-SYSTEM-MIB • OLD-CISCO-TCP-MIB • OLD-CISCO-TS-MIB • RMON-MIB • RMON2-MIB • SMON-MIB • SNMP-COMMUNITY-MIB • SNMP-FRAMEWORK-MIB • SNMP-MPD-MIB • SNMP-NOTIFICATION-MIB • SNMP-PROXY-MIB • SNMP-TARGET-MIB • SNMP-USM-MIB • SNMP-VIEW-BASED-ACM-MIB • SNMPv2-MIB • TCP-MIB • UDP-MIB

Table 10. SFP Support

Part Number	Specification	SFP Type	Max Distance	Cable Type	Temp Range*	DOM Support
GLC-FE-100FX-RGD=	100BASE-FX	FE	2 km	MMF	IND	Yes
GLC-FE-100LX-RGD=	100BASE-LX10	FE	10 km	SMF	IND	Yes
GLC-FE-100FX=	100BASE-FX	FE	2 km	SMF	COM	No
GLC-FE-100LX=	100BASE-LX10	FE	10 km	SMF	COM	No
GLC-FE-100EX=	100BASE-EX	FE	40 km	SMF	COM	No
GLC-FE-100ZX=	100BASE-ZX	FE	80 km	SMF	COM	No
GLC-FE-100BX-D=	100BASE-BX10	FE	10 km	SMF	COM	No
GLC-FE-100BX-U=	100BASE-BX10	FE	10 km	SMF	COM	Yes
GLC-SX-MM-RGD=	1000BASE-SX	GE	550 m	MMF	IND	Yes
GLC-LX-SM-RGD=	1000BASE-LX/LH	GE	550 m/10 km	MMF/SMF	IND	Yes
GLC-ZX-SM-RGD=	1000BASE-ZX	GE	70 km	SMF	IND	Yes
GLC-BX40-U-I=	1000BASE-BX40	GE	40 km	SMF	IND	Yes
GLC-BX40-D-I=	1000BASE-BX40	GE	40 km	SMF	IND	Yes
GLC-BX40-DA-I=	1000BASE-BX40	GE	40km	SMF	IND	Yes
GLC-BX80-U-I=	1000BASE-BX80	GE	80km	SMF	IND	Yes
GLC-BX80-D-I=	1000BASE-BX80	GE	80km	SMF	IND	Yes
GLC-SX-MMD=	1000BASE-SX	GE	550m	MMF	EXT	Yes
GLC-LH-SMD=	1000BASE-LX/LH	GE	550m/10km	MMF/SMF	EXT	Yes
GLC-EX-SMD=	1000BASE-EX	GE	40 km	SMF	EXT	Yes
GLC-ZX-SMD=	1000BASE-ZX	GE	70 km	SMF	EXT	Yes
GLC-BX-D=	1000BASE-BX10	GE	10 km	SMF	COM	Yes
GLC-BX-U=	1000BASE-BX10	GE	10 km	SMF	COM	Yes

Part Number	Specification	SFP Type	Max Distance	Cable Type	Temp Range*	DOM Support
CWDM-SFP-xxxx= (8 freq)	CWDM 1000BASE-X	GE		SMF	COM	Yes
DWDM-SFP-xxxx= (40 freq)	DWDM 1000BASE-X	GE		SMF	COM	Yes
SFP-GE-S=	1000BASE-SX	GE	550 m	MMF	EXT	Yes
SFP-GE-L=	1000BASE-LX/LH	GE	550 m/10 km	MMF/SMF	EXT	Yes
SFP-GE-Z=	1000BASE-ZX	GE	70 km	SMF	EXT	Yes
GLC-SX-MM=	1000BASE-SX	GE	550 m	MMF	COM	No
GLC-LH-SM=	1000BASE-LX/LH	GE	550 m/10 km	MMF/SMF	COM	No
GLC-ZX-SM=	1000BASE-ZX	GE	70 km	SMF	COM	Yes
GLC-TE=	1000BASE-T	GE	100 m	Copper	EXT	NA
GLC-T=	1000BASE-T	GE	100 m	Copper	COM	NA