

Cisco Industrial Ethernet 3010 Series Switches Layer 2/Layer 3

Product Overview

The Cisco® Industrial Ethernet 3010 Series (IE 3010) is a family of rack-mount L2/L3 switches provide fiber SFP layer 3 aggregation and Power over Ethernet (PoE) configurations in the harsh industrial environment. It brings Cisco's leadership in switching to industrial Ethernet application with innovative features, robust security, and end-to-end Ethernet in the industrial network.

The Cisco IE 3010 Series features:

- Industrial design and compliance
- Tools for easy deployment, management, and replacement
- Market leading resiliency and availability features
- Network performance for the most demanding applications
- Network security based on open standards
- Integration of IT and industrial networks

The Cisco IE 3010 Series is an ideal product for Industrial Ethernet applications, including factory automation, process automation and control, intelligent transportation systems (ITSs), rail transport, and mass transit.

The Cisco IE 3010 offers:

- Design for Industrial Ethernet applications, including extended environmental, shock/vibration, and surge ratings; a complete set of power input options; and fanless convection cooling
- Compliance to a wide range of industrial applications covering automation, intelligent transportation, railways, and mass transit markets
- Compact 1-RU (rack unit), 19" rack mounting or wall mounting, both front and rear LED panels to allow reverse mounting
- Support for fiber aggregation (16 SFP ports) and PoE (8 ports) configurations
- Transparent IT integration with the support of Layer 3 functionality in IP Services software
- Tools and features such as Dynamic Host Configuration Protocol (DHCP) persistence for easy deployment, management, and device replacement
- Removable SD flash memory (Swap Drive feature), allowing the user to quickly replace a switch in the field
- High availability, deterministic quality of service (QoS) behavior, and reliable security using Cisco IOS® Software
- Recommended software configurations for industrial applications preconfigured using Smartport macros
- Improved resiliency with the support of Cisco Resilient Ethernet Protocol (REP) for ring topology and Flex Link, Link State Tracking, and EtherChannel for other topologies

- High security using support of port-security, encrypted access (Secure Shell [SSH] Protocol, HTTPS, Simple Network Management Protocol Version 3 [SNMPv3]), and other network protection features
- Cisco Prime LMS, it provides an extensive library of easy-to-use feature to automate the day-to-day management of your Cisco network infrastructure

Configurations

The Cisco IE 3010 Series includes the following products:

- Cisco IE-3010-24TC: Rugged Industrial Ethernet switch with 24 10/100BASETX ports and 2 dual-purpose Gigabit Ethernet uplinks. The dual-purpose Gigabit Ethernet uplinks consist of two 10/100/1000BASETX ports and two 100/1000 SFP ports on board. The user can select two fiber ports, two copper ports, or a combination of fiber and copper ports
- Cisco IE-3010-16S-8PC: Rugged Industrial Ethernet switch with 16 Fast Ethernet SFP ports, 8 10/100BASETX/PoE ports, and 2 dual-purpose Gigabit Ethernet uplinks
- SIELBK9T-15002SE: Layer 2 LAN Base image
- SIEISK9T-15002SE: Upgradable Layer 3 IP Services image
- PWR-RGD-LOW-DC/IA: Low DC (24/48V) power supply module for the IE-3010 switch
- PWR-RGD-AC-DC/IA: High AC/DC (88-300VDC/85-264VAC) power supply module for the IE-3010 switch

Figure 1. Cisco IE 3010 Series Switches (Front and Back Views)

IE-3010-24TC, Front View



IE-3010-16S-8PC, Front View



IE-3010, Rear View (Power Supply Side)



Software Requirements

The Cisco Industrial Ethernet 3010 Series Switches is supported in Cisco IOS Software. The minimum software versions are as follows:

- Layer 2 support (LAN Base image): Cisco IOS Software Release 12.2(53)EZ
- Layer 3 support (IP Services image): Cisco IOS Software Release 15.0(2)SE or later

Industrial Ethernet Applications and Benefits

The new Cisco IE 3010 Series is an ideal product for a variety of Industrial Ethernet applications:

- **Intelligent transportation systems (ITSs):** The Cisco IE 3010 supports ITS and other applications for outdoor video and traffic or transportation systems control. The switch supports compliance to NEMA TS-2, a variety of gigabit fiber uplinks, and AC and DC power input options, while Cisco IOS Software supports critical ITS features, including virtual LAN (VLAN), QoS, Internet Group Management Protocol (IGMP) snooping, and security access control lists (ACLs).
- **Industrial automation:** The Cisco IE 3010 is designed to support a wide array of Industrial Ethernet protocols for automation. The Cisco IE 3010 features an industrial compliance design with extended environmental ratings, convection cooling, rack mounting, redundant AC, DC or a combination of both power input, alarm relays, and surge/noise immunity. The Cisco IE 3010 software and configuration tools allow for easy setup, optimized for Industrial Ethernet applications, multicast control, traffic prioritization, and security features, specified in default templates recommended for these protocols.
- **Other applications:** The Cisco IE 3010 can be deployed in railway, mass transit, military, Metro Ethernet, and other applications requiring rugged design, form factor, and unique power inputs in harsh environments.

Table 1. Features and Benefits of Cisco IE 3010 Series

Feature	Benefit
Designed for industrial applications	<ul style="list-style-type: none"> • Extended temperature, vibration and shock, surge and noise immunity ratings comply to specifications for automation, ITS, and most industrial environments • 19" rack mount with wall mount options allow for deployments in a variety of control systems • Variety of power input options covers a wide range of power requirements for Industrial Ethernet applications • Fixed configuration of downlink ports with choices of copper or fiber, and power over Ethernet (PoE), deliver ease of use and flexibility in deployment • Support for SFP modules provides uplink connectivity supporting 100BASE-LX, 100BASE-FX, 1000BASE-SX, 1000BASE-LX, and 1000BASE-ZX options • Alarm relay contacts with four inputs and one Form-C output to meet various alarm needs
Ease of deployment, management, and replacement	<ul style="list-style-type: none"> • Cisco Express Setup simplifies initial configuration with a web browser, eliminating the need for more complex terminal emulation programs • Cisco Smartports templates provide the option to apply a default global or interface-level macro with a recommended configuration, allowing the user to easily set up the switch in a configuration optimized for the specific application • Swappable SD Flash memory is ideal for quick and easy switch replacement. Memory can be moved from one switch to another, so a switch can be replaced without the need to reconfigure software features • SNMP (v1/v2/v3) support allows for management using common network management tools • DHCP port-based allocation retains the IP address on a per port basis and simplifies the end-host replacement in an industrial setting • HTTPS access offers secure session to the switch • Cisco Prime LMS 4.2 supported. • Cisco Network Assistant (CNA) supported.

Feature	Benefit
Availability and scalability	<ul style="list-style-type: none"> • Virtual LANs (VLANs) allow for logical segmentation for a network for optimal use of bandwidth • 802.1q trunking • QoS classifies and prioritizes data, guaranteeing determinism for mission-critical data • IGMP snooping or filtering provides multicast authentication by filtering out nonsubscribers and limits the number of concurrent multicast streams per port. IGMPv2 and v3 support provides fast client joins and leaves of multicast streams. An additional querier function allows this operation in a Layer 2 only environment • Per-port broadcast, multicast, and unicast storm control prevents faulty end stations from degrading overall systems performance • IEEE 802.1d Spanning Tree Protocol, IEEE 802.1w Rapid Spanning Tree Protocol, and IEEE 802.1s Multiple Spanning Tree Protocol support for redundant backbone connections and loop-free networks simplifies network configuration and achieves high resilience • EtherChannel LACP support for quick recovery and load-balancing across multiple links • FlexLinks and Link State Tracking for fast recovery and easy configuration and troubleshooting • Resilient Ethernet Protocol with a very fast convergence within 50ms
Security	<ul style="list-style-type: none"> • IEEE 802.1x with VLAN assignment, guest VLAN, and voice VLAN allows dynamic port-based security, and application-aware user authentication • Port-based ACLs for Layer 2 interfaces allow application of security policies on individual switch ports • MAC address filtering prevents the forwarding of any type of packet with a matching MAC address • SSH Protocol v2 and SNMPv3 provide network security by encrypting administrator traffic during Telnet and SNMP sessions • TACACS+ and RADIUS authentication enable centralized security control of the switch and restrict unauthorized users from altering the configuration • MAC address notification allows administrators to be notified of users added to or removed from the network • DHCP snooping allows administrators to make sure of consistent mapping of IP to MAC addresses. This prevents malicious uses of DHCP by spoofing a DHCP server or poisoning the DHCP binding database. This feature is often used with other security features to build a complete security solution • DHCP Interface Tracker (Option 82) augments a host IP address request with the switch port ID • Port security secures the access to an access or trunk port based on MAC address • After a specific time frame, the aging feature removes the MAC address from the switch to allow another device to connect to the same port • Trusted Boundary provides the ability to trust the QoS priority settings if an IP phone is present and to disable the trust setting if the IP phone is removed, thereby preventing a malicious user from overriding prioritization policies in the network • Dynamic ARP Inspection helps make sure of user integrity by preventing malicious users from exploiting the insecure nature of the ARP protocol • IP source guard prevents a malicious user from spoofing or taking over another user's IP address by creating a binding table between client's IP and MAC address, port, and VLAN
High performance IP routing	<ul style="list-style-type: none"> • Inter-VLAN IP routing for full Layer 3 routing between 2 or more VLANs • Basic IP unicast routing protocols (static, Routing Information Protocol Version 1 [RIPv1], RIPv2 and RIPv3) • Advanced IP unicast routing protocols (Open Shortest Path First [OSPF], Interior Gateway Routing Protocol [IGRP], Enhanced IGRP [EIGRP], Border Gateway Protocol Version 4 [BGPv4] and Intermediate System-to-Intermediate System [IS-IS]) are supported for load balancing and constructing scalable LANs • Protocol Independent Multicast (PIM) for IP multicast routing is supported, including PIM sparse mode (PIM-SM), PIM dense mode (PIM-DM), and PIM sparse-dense mode • Cisco Express Forwarding hardware routing architecture delivers extremely high-performance IP routing • IPv6 routing (OSPFv6 and EIGRPv6) support in hardware for maximum performance • Policy-based routing (PBR) allows superior control by facilitating flow redirection regardless of the routing protocol configured • HSRP provides dynamic load balancing and failover for routed links • Support for 1000 multicast groups

Product Specifications

Table 2. Cisco IE 3010 Series Switch Hardware

Description	Specification
Performance and scalability	<ul style="list-style-type: none"> • Wire-speed switching, 8.8 Gbps switching fabric • Forwarding rate based on 64-byte packets: 6.5 Mpps • 256 MB DDR2 SDRAM • 1 GB SD Flash memory (128 MB enabled) • Layer 2 LAN Base image supports 255 Vlans, 2000 MAC addresses, 256 IGMP groups • Layer 3 IP Services image supports 1000 Vlans, 3000 MAC addresses, 1000 IGMP groups, 3000 unicast routes • Configurable maximum transmission unit (MTU) of up to 9000 bytes, with a maximum Ethernet frame size of 9018 bytes (jumbo frames) for bridging on Gigabit Ethernet ports, and up to 1998 bytes for bridging on both Fast Ethernet ports
Connectors and cabling	<p>10/100 ports</p> <ul style="list-style-type: none"> • 10/100BASE-TX ports: RJ-45 connectors, 2-pair Category 5 unshielded twisted pair (UTP) or shielded twisted pair (STP) cabling • 100FX SFP ports (IE-3010-16S-8PC only) • 100BASE-FX, -LX, -ZX, and -BX10: Duplex LC receptacle fiber connectors (multimode and single mode) <p>Gigabit ports</p> <ul style="list-style-type: none"> • 10/100/1000BASE-T ports: RJ-45 connectors, 4-pair Category 5 UTP/STP cabling • 1000BASE-SX, -LX/LH, -ZX, and -BX10: Duplex LC receptacle fiber connectors (multimode and single-mode fiber) <p>Console ports</p> <ul style="list-style-type: none"> • Management console port: RJ45 connector for serial connection • Management console port: USB mini type B connector for USB connection
Indicators	<ul style="list-style-type: none"> • Per-port status LEDs: Link integrity, port disabled, and activity indications • System-status LED: System activity, system integrity • Alarm-in status LEDs: Four alarm inputs status indicator • Alarm-out status LED: Alarm status indicator • Power supply unit LED: Power output integrity and power supply presence • PoE (IE-3010-16S-8PC only): PoE activity, PoE integrity, and PoE disabled • SD Flash LED: SD flash integrity and SD flash presence • RS232 LED: RS232 console selection • USB LED: USB console selection
Dimensions (H x W x D)	<ul style="list-style-type: none"> • Cisco IE-3010-24TC: 1.75 x 17.5 x 14.0 in. (4.45 x 44.5 x 35.6 cm), 1RU (rack unit) height • Cisco IE-3010-16S-8PC: 1.75 x 17.5 x 14.0 in. (4.45 x 44.5 x 35.6 cm), 1RU (rack unit) height
Weight	<ul style="list-style-type: none"> • Cisco IE-3010-24TC (without power supply unit): 9.1 lb (4.1kg) • Cisco IE-3010-16S-8PC (without power supply unit): 10 lb (4.5kg) • PWR-RGD-AC-DC/IA: 2.5 lb (1.1kg) • PWR-RGD-LOW-DC/IA: (available Q1 CY2011)
Operating Environment	<ul style="list-style-type: none"> • Operating Temperature: -40C to +75C • -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: 3000 m (9843 ft) at 40°C (104°F) • Operating relative humidity: 5% to 95% noncondensing
Storage and transportation	<ul style="list-style-type: none"> • Temperature: -40C to +85C) • Altitude: 15,000 ft (4570 m) • Relative humidity: 5% to 95% noncondensing
Mean time between failure (MTBF)	<ul style="list-style-type: none"> • Cisco IE-3010-24TC: 207,731 hrs • Cisco IE-3010-16S-8PC: 230,112 hrs
Warranty	<ul style="list-style-type: none"> • Five years limited warranty

Table 3. Power Specifications for Cisco IE3010 Series Switch

Description	Specification
AC input voltage and frequency	<ul style="list-style-type: none"> • Cisco IE-3010-24TC: 100-240 VAC, 2-0.75A, 50-60 Hz • Cisco IE-3010-16S-8PC: 100-240 VAC, 2-0.75A, 50-60 Hz
DC input voltage and current	<ul style="list-style-type: none"> • Cisco IE-3010-24TC Low DC: 24-60 VDC (+/- 25%), 10-2.5A • Cisco IE-3010-24TC High DC: 100-250 VDC (+20%/-12%), 2-0.75A • Cisco IE-3010-16S-8PC Low DC: 24-60 VDC (+/- 25%), 10-2.5A • Cisco IE-3010-16S-8PC High DC: 100-250 VDC (+20%/-12%), 2-0.75A
Power consumption	<p>Cisco IE-3010-24TC</p> <ul style="list-style-type: none"> • Cisco IE 3010-24TC, one PWR-RGD-AC-DC Power Module with AC Input: 29.8W¹, 102 BTUs per hour² • Cisco IE 3010-24TC, two PWR-RGD-AC-DC Power Modules with AC Input: 35.5W, 121 BTUs per hour • Cisco IE 3010-24TC, one PWR-RGD-AC-DC Power Module with DC Input: 28.6W, 98 BTUs per hour • Cisco IE 3010-24TC, two PWR-RGD-AC-DC Power Modules with DC Input: 34.4W, 117 BTUs per hour • Cisco IE 3010-24TC, two PWR-RGD-LOW-DC Power Module: 26.8W, 92 BTUs per hour • Cisco IE 3010-24TC, two PWR-RGD-LOW-DC Power Modules: 30.7W, 105 BTUs per hour <p>Cisco IE-3010-16S-8PC</p> <ul style="list-style-type: none"> • Cisco IE-3010-16S-8PC, one PWR-RGD-AC-DC Power Module with AC Input (4 ports PoE): 110.1W¹, 376 BTUs per hour² • Cisco IE-3010-16S-8PC, two PWR-RGD-AC-DC Power Modules with AC Input (8 ports PoE): 184.1W, 628 BTUs per hour • Cisco IE-3010-16S-8PC, one PWR-RGD-AC-DC Power Module with DC Input (4 ports PoE): 109.8W, 375 BTUs per hour • Cisco IE-3010-16S-8PC, two PWR-RGD-AC-DC Power Modules with DC Input (8 ports PoE): 182.2W, 622 BTUs per hour • Cisco IE-3010-16S-8PC, one PWR-RGD-LOW-DC Power Module (4 ports PoE): 106W (24V input), 363 BTUs per hour • Cisco IE-3010-16S-8PC, two PWR-RGD-LOW-DC Power Modules (8 ports PoE): 181.9W (24V input), 622 BTUs per hour

¹ maximum

² maximum

Table 4. Management and Standards Support for Cisco IE 3010 Series Switch

Description	Specification
Standards and protocols	<ul style="list-style-type: none"> • IEEE 802.1s • IEEE 802.1w • IEEE 802.1x • IEEE 802.3ad • IEEE 802.1ag • IEEE 802.3x Full Duplex • IEEE 802.1D Spanning Tree Protocol • IEEE 802.1p CoS classification • IEEE 802.1Q VLAN • IEEE 802.3 10BASE-T • IEEE 802.3u 100BASE-T • IEEE 802.3ab 1000BASE-T • IEEE 802.3z 1000BASE-X • IEEE 802.3af (IE-3010-16S-8PC) • IGMP v1, v2, v3 • IPv6: MLD Snooping v1 and v2 • SNMP versions 1, 2, and 3 • IEEE 802.1AB

Table 5. Compliance Specifications

Description	Specification
Standard safety certifications	<ul style="list-style-type: none"> • UL CSA 60950-1 • EN 60950-1 • IEC 60950-1 • CB to IEC 60950-1 (CB with all country deviations) • NOM (through partners) • CE Marking

Description	Specification
Mechanical stability	<p>Operational Shock</p> <ul style="list-style-type: none"> • 30.6 g peak acceleration, 11 ms half sine <p>Operational Vibration</p> <ul style="list-style-type: none"> • Frequency 2-9 Hz, Displacement 3 mm • Frequency 9-200 Hz, Acceleration 1 g • Frequency 200-500 Hz, Acceleration 1.5 g
EMC interface immunity	<ul style="list-style-type: none"> • IEC61000-4-2 [Criteria A] • IEC61000-4-3/ENV50204 [Criteria A] • IEC61000-4-4 [Criteria A] • IEC61000-4-5 [Criteria A] • IEC61000-4-6 [Criteria A]
Standard electromagnetic emissions certifications	<ul style="list-style-type: none"> • FCC Part 15 Class A • EN 55022: (CISPR22) • EN 55024: (CISPR24) • VCCI Class A • AS/NZS 3548 Class A • CE Mark • CNS 13438 Class A • KCC • EN 300 386 • EN 61000-3-2 • EN 61000-3-3
Industrial electromagnetic emissions certifications	<ul style="list-style-type: none"> • EN 61000-6-2 • EN 61000-6-4 • EN 61131-2 (EMC/EMI, Environmental Mechanical) • EN 61326-1 • CISPR11
Industry specifications	<ul style="list-style-type: none"> • Railway EN 50155 (EMI/EMC, environmental, mechanical)
Protection class	<ul style="list-style-type: none"> • IP30

Service and Support

Cisco is committed to minimizing total cost of ownership (TCO). The company offers a portfolio of technical support services to help make sure that its products operate efficiently, remain highly available, and benefit from the most up- to-date system software. The services and support programs described in Table 6 are available as part of the Cisco Desktop Switching Service and Support solution and are available directly from Cisco and through resellers.

Table 6. Cisco Services and Support Programs

Service and Support	Features	Benefits
Advanced Services		
<ul style="list-style-type: none"> • Cisco Total Implementation Solutions (TIS), available direct from Cisco • Cisco Packaged TIS, available through resellers • Cisco Smart Net Total Care™ and Cisco Smart Net Total Care Onsite support, available direct from Cisco • Cisco Packaged Cisco Smart Net Total Care support program, available through resellers • Cisco SMB Support Assistant 	<ul style="list-style-type: none"> • Project management • Site survey, configuration, and deployment • Installation, test, and cutover • Training • Major moves, adds, and changes • Design review and product staging • Access to software updates 24 hours • Web access to technical repositories • Telephone support through the Cisco Technical Assistance Center (TAC) • Advance replacement of hardware parts 	<ul style="list-style-type: none"> • Supplements existing staff • Helps ensure that functions meet needs • Mitigates risk • Helps enable proactive or expedited issue resolution • Lowers TCO by taking advantage of Cisco expertise and knowledge • Minimizes network downtime

Ordering Information

Table 7. Ordering Information for Cisco IE 3010 Series

Part Numbers	Description
IE-3010-24TC	Rugged Industrial Ethernet switch 24 10/100BASETX ports and two dual-purpose Gigabit Ethernet uplink ports. (each dual-purpose uplink port has one 10/100/1000 Ethernet port and one SFP-based Gigabit Ethernet port, one port active) Each switch supports two Cisco power supply units (PSUs)
IE-3010-16S-8PC	Rugged Industrial Ethernet switch 16 Fast Ethernet SFP ports, 8 10/100BASETX/PoE ports, and 2 dual-purpose Gigabit Ethernet uplink ports. (each dual-purpose uplink port has one 10/100/1000 Ethernet port and one SFP-based Gigabit Ethernet port, one port active) Each switch supports two Cisco PSUs
PWR-RGD-LOW-DC/IA	Low DC (24/48V) power supply module for the IE-3010 switch (available Q1 CY2011)
PWR-RGD-LOW-DC/IAR	Redundant low DC (24/48V) power supply module for the IE-3010 switch (available Q1 CY2011)
PWR-RGD-AC-DC/IA	High AC/DC (88-300VDC/85-264VAC) power supply module for the IE-3010 switch
PWR-RGD-AC-DC/IAR	Redundant high AC/DC (88-300VDC/85-264VAC) power supply module for the IE-3010 switch
SD-IE-1GB=	Spare 1 GB SD flash memory card
MEM-SD-COVER-RGD=	Spare SD flash slot cover
RPS-CG-COVER=	Spare PSU slot cover
RM-RGD-19IN=	Spare 19" rack-mount kit
CAB-CONSOLE-RJ45=	Spare console cable 6 ft with RJ45 and DB9F
CAB-CONSOLE-USB=	Spare console cable 6 ft with USB Type A and mini-B
SIELBK9T-15002SE(=)	Cisco IOS Software for IE 3010 (LAN Base image)
SIEISK9T-15002SE(=)	Cisco IOS Software for IE 3010 (IP Services image)

* supported in 15.2(3)E

¹ For the complete list of the supported SFP models, refer to our support team

SFPs for IE 3010 Series Switches

Table 8. SFP Support

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

Part Number	Specification	SFP Type	Max Distance	Cable Type	Temp Range*	DOM Support
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	40km	SMF	EXT	Yes
GLC-ZX-SMD=	1000BASE-ZX	GE	70km	SMF	EXT	Yes
GLC-BX-D=	1000BASE-BX10	GE	10km	SMF	COM	Yes
GLC-BX-U=	1000BASE-BX10	GE	10km	SMF	COM	Yes
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	550m	MMF	EXT	Yes
SFP-GE-L=	1000BASE-LX/LH	GE	550m/10km	MMF/SMF	EXT	Yes
SFP-GE-Z=	1000BASE-ZX	GE	70km	SMF	EXT	Yes
GLC-SX-MM=	1000BASE-SX	GE	550m	MMF	COM	No
GLC-LH-SM=	1000BASE-LX/LH	GE	550m/10km	MMF/SMF	COM	No
GLC-ZX-SM=	1000BASE-ZX	GE	70km	SMF	COM	Yes

* If non industrial (i.e., EXT, COM) SFPs are used the switch operating temperature must be derated.