

Cisco Industrial Ethernet 2000U Series Switches

Product Overview

The Cisco® Industrial Ethernet (IE) 2000U Switches are compact switches for the harsh, rugged environments often found in the energy and utility industries. IE 2000U switches support the communications needs of the utility- and customer-owned energy-delivery infrastructure across distributed generation, transmission, and distribution sectors. This infrastructure includes substation applications supporting electrical transmission and distribution, renewable generation, oil and gas, water, distributed generation, cogeneration, and trackside operations.

Product Details

Cisco IE 2000U Series Switches are designed for DIN rail mounting, low port counts, and small sizes. They offer:

- Four, eight, or 16 Fast Ethernet ports (either SFP (Small Form-Factor Pluggable) or 100BaseT RJ45 downlinks depending on the model); fixed configurations with a compact form factor
- Two Gigabit Ethernet uplink ports (SFP, RJ45 or combo) and up to 2 additional FE uplinks depending on model
- IEC-62439-3: Parallel Redundancy Protocol support on 8 and 16 port models
- Dual-input DC power supply, alarm relays, DIN rail mount
- Swappable SD flash card required and included
- Mini-USB and traditional serial console connector
- Substation environmental compliance and certifications: IEC-61850-3 and IEEE 1613
- Conformal coating available on specific models

Primary IE 2000U Features and Benefits

- Rugged industrial design and substation compliance: IEC-61850-3 and IEEE 1613 for utility substation environments
- Advanced quality of service (QoS) capabilities to support mission-critical substation applications such as Supervisory Control and Data Acquisition (SCADA) and IEC 61850 Generic Object Oriented Substation Events (GOOSE) messaging
- Tools for easy deployment, management, and replacement
- Extensive instrumentation and remote diagnostic capabilities
- Comprehensive network security features based on open standards, such as 802.1x, Dynamic Address Resolution Protocol (ARP) Inspection, and Port Security

The IE 2000U is designed for network security, high availability, ease of use, and durability. Table 1 lists the business benefits of the IE 2000U.

Table 1. IE 2000U Primary Business Benefits

Benefit(s)	Description
Rugged Design for Substation Compliance and Durability	<ul style="list-style-type: none"> Compliant with IEEE 1613 and IEC-61850-3 substation standards for rugged design. Convection cooled, with no moving parts or fans for maximum reliability and reduced network outages.
Network Security	<ul style="list-style-type: none"> Advanced Cisco IOS® Software features such as 802.1x, Dynamic ARP Inspection, DHCP Snooping, Layer 2 - Layer 4 access control lists (ACLs), port security, protected port/private VLAN, user network interfaces/enhanced network interfaces (UNI/ENI) in default shutdown mode and configuration file security to prevent unauthorized network access and reduce operational costs of securing the network.
High Availability and Redundancy	<ul style="list-style-type: none"> Advanced Cisco IOS Software features such as Resilient Ethernet Protocol (REP) and FlexLink provide fast reconvergence in ring and hub-and-spoke topologies, reducing network downtime and associated costs. Supports Parallel Redundancy Protocol (PRP) on 8 and 16 port models. Field-replaceable components such as power supplies and SFPs reduce redeployment time. Redundant DC power inputs.
Ease of Use	<ul style="list-style-type: none"> Intuitive graphical user interface (GUI) in Cisco Configuration Professional simplifies configuration of switches and reduces training time and costs. Utility-focused enhancements have been added to further increase ease of use. SmartPort templates provide one-touch global and port-level macros to simplify switch deployments.
Investment Protection	<ul style="list-style-type: none"> Two Cisco IOS Software images are available so you can match the right feature set to your networking needs. An advanced Layer 2 switching feature set comes standard with the IE 2000U. An IP Services feature set with advanced Layer 3 functionality is available. Ongoing development of software capabilities leads to a longer product lifecycle, lowering the total cost of ownership.
Energy Efficiency	<p>The IE 2000U architecture provides energy-saving features:</p> <ul style="list-style-type: none"> High-efficiency power supplies with dual connections for redundancy and high availability. No fans are used, which reduces overall power consumption.

Software Optimized for Energy Applications

The IE 2000U software is optimized for energy applications and builds on the strength of Cisco IOS Software, which powers mission-critical networks across the world. Numerous new features make the IE 2000U the optimal Ethernet switch for energy network operators. For example, Cisco SmartPort templates can enable simple configuration for utility environments. Features such as Generic Online Diagnostics (GOLD) publish an event when critical failures are detected, and this can be retrieved from the switch. Also, onboard failure logging (OBFL) collects and logs information from critical sensors in the switch, monitoring voltage, temperature, and other information.

In addition, many default behaviors of the IE 2000U are different from those of traditional Ethernet switches, making the IE 2000U easier to configure, manage, secure, and troubleshoot.

High Availability and Redundancy

High availability is a vital requirement for networks that transport mission-critical data. The IE 2000U supports dual connections for power supplies, SFP modules, and the connected grid swap drive, which increases network uptime and reduces redeployment time in the field. In addition, external alarm inputs/outputs allow network operators to monitor changes in the switch's environmental conditions before a failure occurs.

To further increase high availability on a network-wide level, the IE 2000U offers PRP, REP and FlexLink for fast reconvergence, link-state tracking, IEEE 802.1w Rapid Spanning Tree Protocol (RSTP), and per-VLAN Rapid Spanning Tree Plus (PVRST+). These capabilities help to create redundant, failsafe topologies. Strong, built-in security helps prevent the device and the network from succumbing to malicious attacks, thereby enhancing network uptime.

Security

The wide range of security features on the IE 2000U protects mission-critical traffic, prevents unauthorized access, and maintains uninterrupted operation. The IE 2000U protects operational and nonoperational data by focusing on securing connectivity, defending against network threats, and providing trust and identity features.

Protecting a network begins with securing connectivity. For example, ACLs can be used to restrict access to sensitive portions of the network. To defend against network threats such as Dynamic Host Configuration Protocol (DHCP) spoofing, DHCP snooping can be used to allow only DHCP requests (but not responses) from untrusted user-facing ports. Workforce management is a critical use case, where trust and identity features such as IEEE 802.1x can be used to facilitate strong security policies, yet provide maximum mobility to a remote workforce.

Table 2 lists these and other primary features of the security solution.

Table 2. Primary Features for Each Area of Comprehensive Security Solution

Secure Connectivity	Threat Defense	Trust and Identity
UNI/ENI default: control traffic shut down	Configurable control plane security	ACLs
DHCP snooping and IP source guard	Storm control	IEEE 802.1x
Dynamic Address Resolution Protocol (ARP) inspection	Port security	UNI/ENI default: port down
Private VLAN	Configurable per-VLAN MAC learning	Configuration file security

Switch Management Options

The IE 2000U offers an easy-to-use GUI for configuration through the Cisco Configuration Professional tool, as well as a superior command-line interface (CLI) for detailed configuration. In addition, the switches support Simple Network Management Protocol (SNMP) for network-wide management. Network operators can integrate the IE 2000U transparently into their network operations centers and promote improved flow-through provisioning.

Network operators can also manage the IE 2000U using SNMP Versions 2 and 3. A comprehensive set of MIBs is provided for network operators to collect traffic information from the IE 2000U.

Switch Performance and Scalability

- Line-rate/nonblocking uplink/downlink ports
- Forwarding rate: 6.5 mpps with 64-byte packets
- Egress buffer: 2 MB
- Unicast MAC addresses: 8000
- Internet Group Management Protocol (IGMP) multicast groups: 1000
- Maximum virtual LANs (VLANs): 1000
- IPv4 MAC security Access Control Entries (ACE): 375 (default ternary content-addressable memory [TCAM] template)

- Switching Database Manager (SDM) templates for Layer 2 and Layer 3 deployments: optimizes memory allocation to the desired features based on deployment-specific requirements

Switch Configurations

Figure 1 displays switch models, and Table 3 provides Cisco IE 2000U Series Switch configuration information.

Figure 1. Switch Models



Table 3. Cisco IE 2000U Series Configurations

Product Number	Total Ports	RJ45 Ports	Combo Ports	SFP Ports	Software	IEEE 1588	PRP	PoE(+)
IE-2000U-4TS-G	6	4 FE		2 GE	LAN Base			
IE-2000U-4T-G	6	2 GE + 4 FE			LAN Base			
IE-2000U-4S-G	6			2 GE + 4 FE	LAN Base			
IE-2000U-8TC-G	10	8 FE	2 GE		LAN Base	X	X	
IE-2000U-16TC-G	20	16 FE	2 GE + 2 FE		LAN Base	X	X	
IE-2000U-16TC-G-X*	20	16 FE	2 GE + 2 FE		LAN Base	X	X	
IE-2000U-16TC-GP	20	16 FE	2 GE		LAN Base	X	X	X

* Conformal coating

Table 4. Power Supplies

Product Number	Wattage	Rated Nominal Input Operating Range	Supported Input Voltage Operating Range	Power Output	PoE/PoE+ Support	Use Case Scenario
PWR-IE170W- PC-AC=	170W	AC 100-240V/2.3A 50-60Hz or DC 125-250V/2.1A	AC 90-264V or DC 106-300V	54VDC/3.15A	Yes	Maximum PoE/PoE+ port support in a AC or high DC environment ¹
PWR-IE170W- PC-DC=	170W	DC 12-54V/23A	DC 10.8-60V	54VDC/3.15A	Yes	Maximum PoE/PoE+ port support in a DC environment ¹
PWR-IE50W- AC=	50W	AC 100-240V/1.25A 50-60Hz or DC 125-250V/1.25A	AC 90-264V or DC 106-300V	24VDC/2.1A	No	Provides power to main system, not used for PoE in an AC or high DC environment
PWR-IE50W- AC-IEC=	50W	AC 100-240V/1.25A 50-60Hz	AC 90-264V	24VDC/2.1A	No	Provides power to main system, not used for PoE in DC environment

Product Number	Wattage	Rated Nominal Input Operating Range	Supported Input Voltage Operating Range	Power Output	PoE/PoE+ Support	Use Case Scenario
PWR-IE65W- PC-AC=	65W	AC 100-240V/1.4A 50-60Hz or DC 125-250V/1.0A	AC 90-264V or DC 106-300V	54VDC/1.2 A	Yes	Supports up to 4 ports PoE or 2 ports PoE+ when used in PoE power input in an AC or high DC environment
PWR-IE65W- PC-DC=	65W	DC 24-48VDC/4.5A	DC 18-60V	54VDC/1.2 A	Yes	Supports up to 4 ports PoE or 2 ports PoE+ when used in PoE power input in a DC environment

¹ The 170W (both AC and DC) power supplies have enough power for the base unit and the PoE. Connect one power output from the 170W PSU to the main power input of the IE2000, and the other power output of the 170W PSU to the PoE power input of the IE2000.

IE 2000U switches are field upgradable from LAN Base to IP Services images. Table 5 shows available accessories and IP Services License.

Table 5. IE 2000U Accessories

Product Number	Description
MEM-SD-1GB-RGD	1 GB industrial-grade secure digital (SD) memory card
STK-RACKMNT-2955	19 in. DIN rail mount kit
SIEUIISK9T-15002EK=	IP Services Software License for IE-2000U switches

Product Specifications

Table 6 lists product specifications.

Table 6. Specifications

Description	Specification
Hardware	<ul style="list-style-type: none"> • 256 MB DRAM with ECC memory • 1 GB removable SD flash memory card (CG swap drive) – (128MB space available) • Mini-USB connector
Alarm	<ul style="list-style-type: none"> • Alarm I/O: two alarm inputs to detect dry contact open or closed, one alarm output relay. 48 VDC, 0.5A max
Power Supply	<ul style="list-style-type: none"> • Redundant DC input voltage with operating range: 12-48 VDC Nominal, 9.6-60 VDC Maximum • Maximum DC input current: 0.5A at 48 VDC, 1A at 24 VDC
Power Consumption	<ul style="list-style-type: none"> • 6-port models: 9.5-15 W • 10-port models: 11-16 W • 20-port models: 13-20 W
Dimensions (H x W x D), Including DIN Rail	<ul style="list-style-type: none"> • IE-2000U 6 ports (copper downlinks) chassis: 5.1 x 2.95 x 4.51 in (130 x 74.9 x 115 mm) • IE-2000U 6 ports (SFP downlinks) chassis: 5.1 x 3.15 x 4.51 in (130 x 80 x 115 mm) • IE-2000U 10 ports: 5.1 x 3.6 x 5.26 in (130 x 91.4 x 134 mm) • IE-2000U 20 ports: 5.1 x 5.0 x 5.26 in (130 x 127 x 134 mm)
Weight	<ul style="list-style-type: none"> • IE-2000U 6 ports (copper downlinks) chassis: 2.45 lbs (1.11 kg) • IE-2000U 6 ports (SFP downlinks) chassis: 2.69 lbs (1.22 kg) • IE-2000U 10 ports long chassis: 3.45 lbs (1.56 kg) • IE-2000U 20 ports chassis: 4.35 lbs (1.97 kg)

Table 7 lists the primary features in the LAN Base Cisco IOS Software image.

Table 7. Primary Features for LAN Base and IP Services Cisco IOS Software Image

LAN Base	
Per port per VLAN ingress policing	Resilient Ethernet Protocol
SCADA protocol classification using ACLs	FlexLink
Per GOOSE VLAN classification/statistics	Link-state tracking
Configurable egress queue bandwidth	UDLD
Configurable egress buffers/thresholds	xSTP: 802.1s/802.1w
Strict priority queuing with optional policer	EtherChannel/LACP/Port Aggregation Protocol (PAgP)
Web- and MAC-based authentication	External alarm contacts
Port security plus Cisco enhancements	Modbus memory map support
DHCP snooping, dynamic ARP inspection, IP source guard	FEFI
Spanning Tree Protocol security mechanisms	Cisco Configuration Professional
Storm control	Utility-specific Smartport macros
Wire-speed L2-L4 ACLs	DHCP autoconfig/image upgrade
Private VLAN	Config rollback/replace
Secure connectivity: SSH/SSL/SCP	SPAN/RSPAN
RADIUS/TACACS+	Layer 3 IP SLA
SNMPv3 crypto	GOLD
Configuration file security	OBFL
UNI/ENI and NNI port types (configurable on all ports)	Time Domain Reflectometry (copper ports)
Configurable per VLAN MAC learning	Digital Optical Monitoring (DOM), optical ports
MAC address learning and aging notifications	Ethernet OAM
Configurable control plane security	Connectivity Fault Management (CFM)
IEEE 802.1x and identity-based network services	IEEE 802.1ag Ethernet in the first mile (EFM)
IEEE 802.1AR for hardware-based security	IEEE 802.3ah Ethernet LMI (PE) -MEF
Ethernet LMI (CE): MEF	CFM to E-LMI Interworking
CFM to EFM Interworking	802.1ag plus IPSLA (Ethernet SLAs)
Parallel Redundancy Protocol (PRP)	PoE and PoE+
IP Services	
Static routing, Inter-VLAN routing	HSRP
Multi-VRF CE (VRF-lite)	Multicast routing: PIM (SM, DM)
Policy-based routing	Source Specific Multicast
RIP Versions 1 and 2	Source Specific Multicast mapping
EIGRP, OSPF, and IS-IS	Bidirectional Forwarding Detection
BGPv4	Multicast support for VRF (mVRF-Lite)
IPv6 routing	VRF-aware services (ARP, ping, SNMP, HSRP, uRPF syslog, traceroute, FTP, and TFTP)

Management and Standards

Table 8 provides management and standards support information for the IE 2000U.

Table 8. Management and Standards

Description	Specification	
Management	<ul style="list-style-type: none"> • BRIDGE-MIB (RFC1493) • BGP4-MIB (RFC1657) • CISCO-CABLE-DIAG-MIB • CISCO-BULK-FILE-MIB • CISCO-CDP-MIB • CISCO-CONFIG-COPY-MIB • CISCO-CONF-MAN-MIB • CISCO-DATA-COLLECTION-MIB • CISCO-ENVMON-MIB • CISCO-ERR-DISABLE-MIB • CISCO-ETHERNET-ACCESS-MIB • CISCO-FLASH-MIB • CISCO-FTP-CLIENT-MIB • CISCO-IETF-DOT3-OAM-MIB • CISCO-IGMP-FILTER-MIB • CISCO-IPLSA-ETHERNET-MIB • CISCO-PAGP-MIB • CISCO-PAE-MIB • CISCO-PING-MIB • CISCO-POE-EXTENSIONS-MIB • CISCO-PRIVATE-VLAN-MIB • CISCO-PROCESS-MIB • CISCO-PORT-QOS-MIB • CISCO-PORT-SECURITY-MIB • CISCO-PORT-STORM-CONTROL-MIB • CISCO-IMAGE-MIB • CISCO-LAG-MIB • CISCO-L2L3-INTERFACE-CONFIG-MIB • CISCO-MAC-NOTIFICATION-MIB • CISCO-MEMORY-POOL-MIB • CISCO-RTTMON-MIB • CISCO-STACK-MIB • CISCO-STP-EXTENSIONS-MIB 	<ul style="list-style-type: none"> • CISCO-SYSLOG-MIB • CISCO-TCP-MIB • CISCO-UDLD-MIB • CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB • CISCO-VLAN-MEMBERSHIP-MIB • ENTITY-MIB (RFC2737) • ETHERLIKE-MIB • IEEE8021-PEA-MIB • IEEE8023-LAG-MIB • IF-MIB (RFC 1573) • IGMP-MIB • IPMROUTE-MIB • OLD-CISCO-CHASSIS-MIB • OLD-CISCO-FLASH-MIB • OLD-CISCO-INTERFACES-MIB • OLD-CISCO-IP-MIB • OLD-CISCO-SYS-MIB • OLD-CISCO-TCP-MIB • OLD-CISCO-TS-MIB • PIM-MIB • RFC1213-MIB (MIB-II) • RMON-MIB (RFC 1757) • RMON2-MIB (RFC 2021) • SNMP-FRAMEWORK-MIB (RFC2571) • SNMP-MPD-MIB (RFC 2572) • SNMP-NOTIFICATION-MIB (RFC 2573) • SNMP-TARGET-MIB (RFC 2573) • SNMPv2-MIB (RFC 1907) • SNMP-USM-MIB (SNMP-USER-BASED-SM-MIB) (RFC2574) • SNMP-VACM-MIB (SNMP-VIEW-BASED-ACM-MIB) (RFC2575) • TCP-MIB (RFC 2012) • UDP-MIB (RFC 2013)
Standards and Protocols	<ul style="list-style-type: none"> • IEEE 802.1s • IEEE 802.1w • IEEE 802.1x • IEEE 802.3ad • IEEE 802.3ah • IEEE 802.1ag • IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports • 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-2000U-16TC-GPE only) • IEEE 802.3at (IE-2000U-16TC-GPE only) • IEEE 1588v2 • IEC-62439-3 PRP • IPv6: MLD Snooping v1 and v2 • Management: SNMP versions 1, 2, and 3 	

SFPs for Cisco IE 2000U Switches

Table 9 provides SFP support information.

Table 9. 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
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-MMD=	1000BASE-EX	GE	40km	SMF	EXT	Yes
GLC-ZX-MMD=	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
GLC-TE=	1000BASE-T	GE	100m	Copper	EXT	NA
GLC-T=	1000BASE-T	GE	100m	Copper	COM	NA

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

Note: For DOM support and for first software release supporting SFP, refer to http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html

Safety and Compliance

Table 10 gives safety and compliance information for the IE 2000U.

Table 10. Safety and Compliance Specifications

Description	Specification
Substation Compliance	<ul style="list-style-type: none"> • IEC 61850-3 • IEEE1613
Hazardous Location	<ul style="list-style-type: none"> • ANSI/ISA 12.12.01 (Class 1, Div 2 A-D) (requires cabinet enclosure) • UL/CSA 60079-0, -15 (Class 1, Zone 2, group II gases, requires cabinet enclosure) • EN 60079-0, -15 ATEX certification (Class I, Zone 2, Group II gases, requires cabinet enclosure) • IEC 60079-0, -15 (Class I Zone 2, Group II gases, requires cabinet enclosure) • CSA 213
Industrial Control Safety	<ul style="list-style-type: none"> • UL508 • CSA C22.2 No. 142
EMC Interface Immunity	<ul style="list-style-type: none"> • EN 55024 (CISPR 24) • AS/NZS CISPR 24 • KN 24 • IEC61000-4-2 (Criteria A - Class 2) • IEC61000-4-3/ENV50204 (Criteria A) • IEC61000-4-4 (Criteria A/Criteria B) • IEC61000-4-5 (Criteria B) • IEC61000-4-6 (Criteria A)
Standard Electromagnetic Emissions Certifications	<ul style="list-style-type: none"> • FCC Part 15 Class A • EN 55022 Class A (CISPR22 Class A) • ICES-003 Class A • EN 300 386 • VCCI Class A • AS/NZS CISPR22 Class A • CNS 13438 Class A • KN 22 Class A CE Marking
Standard Safety Certifications	<ul style="list-style-type: none"> • UL 60950-1 • CSA 60950-1 • EN 60950-1 • IEC 60950-1, CB report and certificate with all national differences
Operating Environment	<ul style="list-style-type: none"> • -Operating Temperature: -40C to +74C • -40C to +70C (Vented Enclosure Operating) • -40C to +60C (Sealed Enclosure Operating) • -34C to +74C (Fan or Blower equipped Enclosure Operating) • -40 to +85C (Type test for 100 hours at +85C) • Operating altitude: -60 m (-200 ft) to 3,000 m (10,000 ft), de-rate maximum operating temperature per IEEE 1613-2009: • Relative humidity: 5% to 95% non-condensing
Storage Environment	<ul style="list-style-type: none"> • Temperature: -50° C to +85° C • Altitude: 15,100 ft (4600 m)
Warranty	<ul style="list-style-type: none"> • Five-year limited warranty on all IE-2000U HW PIDs and all IE Power Supplies defined in table 4 above. See link at end of Data Sheet for details on warranty.
Mean Time Between Failure (MTBF)	<ul style="list-style-type: none"> • 16 Port Models - 535,190 Hours • 8 Port Models – 700,760 Hours • 4 Port Models - 979,280 Hours
Protection Class Code	<ul style="list-style-type: none"> • IP30 per EN60529

Warranty Information

IE 2000U Series Switches come with a five-year limited hardware warranty. More information is available at <http://www.cisco-servicefinder.com/warrantyfinder.aspx>.

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco Services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, refer to Cisco Technical Support Services or Cisco Advanced Services at <http://www.cisco.com/go/services>.

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- Europe: 32 2 778 4242
- Australia: 612 9935 4107
- Other: 408 526-7209
- Cisco Industrial Ethernet 2000U (IE 2000U) Series Switches:
<http://www.cisco.com/en/US/products/ps13222/index.html>.



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