Cisco Industrial Ethernet 2000 Series Switches

The Cisco® Industrial Ethernet 2000 (IE 2000) Series is a range of compact, industrially ruggedized access switches. IE 2000 series provide customers with ease of use, secure access, and industry leading convergence using Cisco Resilient Ethernet Protocol (REP). Multiple industries such as automotive, oil and gas, mining, transportation, and energy companies are all increasingly requiring IP based networks in their production areas. The newest IE 2000 additions have been designed to support access layer connectivity and to meet the increasing needs for security, voice, and video traffic across industrial networks.

Product Overview

Cisco IE 2000 Series are designed for low cost, low ports, and small sizes:

- 4, 8, or 16 10/100Base-T Ethernet ports fixed configurations with compact form factor
- 2x Gigabit Combo ports, SFP (100MB and 1G) or RJ45 uplink
- Dual-input DC power supply, alarm relays, DIN rail mount
- Industrial PoE solution
- Conformal coating available
- Swappable SD flash card, mini-USB connector
- Industrial environmental compliance and certifications
- Industrial partner applications: Ethernet/IP and PROFINET

Primary Applications and Features

- **Easy deployment:** Zero-touch discovery using DHCP, express setup, fast bootup time (60 sec) to help migrating to Ethernet environment without resistance
- **Security:** Dot1x, port security, and DHCP allow dynamic port-base authentication, Secure Shell (SSHv2), SNMPv3 provides encrypted administrator traffic during Telnet and SNMP sessions, TACACS+ and RADIUS authentication facilitate centralized control and restrict unauthorized users
- **Resiliency:** Flex links for fast recovery, Cisco REP protocol for fast convergence
- **Manageability:** Auto SmartPort, Web Device Manager, Telnet, HTTPS access, SNMP, CNA and Cisco Prime 1.2.1
- **Network Address Translation (NAT):** Line-rate, hardware-enabled 1:1 static address translation designed to enable duplicate IP addresses usage in the Layer2/ machine node networks.
- **Industrial PoE:** PoE (IEEE 802.af) and PoE+ (802.3at) supported on selected models.
- **Industrial automation protocols:** Support for Common Industrial Protocol (CIP) and PROFINETv2 that allow integration with existing management platform from Rockwell, Siemens, and other industrial environments

Switch Performance and Scalability

- Line rate/nonblocking uplink/downlink ports
- Forwarding rate: 6.5 Mpps with 64 bytes packets
- Egress buffer: 2MB
- Unicast MAC addresses: 8000
- IGMP multicast groups: 255
- Max VLANs: 255
- IPv4 Mac security ACEs: 384 (default TCAM template)
- Bi-directional, 128 NAT translation entries

Switch Configurations

Figure 1 shows switch models, and Table 1 shows Cisco IE 2000 Series Configuration information.

Figure 1. Industrial Ethernet 2000 Series

Table 1. Industrial Ethernet 2000 Series

Product Number	Total Ports	RJ45 Ports	Combo Ports	SFP Ports	Software	IEEE 1588	NAT	PoE(+)	Conformal Coating
IE-2000-4TS-L[1]	6	4		2 FE	LAN Lite				
IE-2000-4TS-B	6	4		2 FE	LAN Base				
IE-2000-4T-L	6	6			LAN Lite				
IE-2000-4T-B	6	6			LAN Base				
IE-2000-4TS-G-L	6	4		2 GE	LAN Lite				
IE-2000-4TS-G-B	6	4		2 GE	LAN Base				
IE-2000-4T-G-L	6	6 (2 GE)			LAN Lite				
IE-2000-4T-G-B	6	6 (2 GE)			LAN Base				
IE-2000-8TC-L	10	8	2 FE		LAN Lite				
IE-2000-8TC-B	10	8	2 FE		LAN Base				
IE-2000-8TC-G-L	10	8	2 GE		LAN Lite				
IE-2000-8TC-G-B	10	8	2 GE		LAN Base				

Product Number	Total Ports	RJ45 Ports	Combo Ports	SFP Ports	Software	IEEE 1588	NAT	PoE(+)	Conformal Coating
IE-2000-8TC-G-E	10	8	2 GE		LAN Base	X	X[2]		
IE-2000-16TC-L	20	16	2 FE	2 FE	LAN Lite				
IE-2000-16TC-B	20	16	2 FE	2 FE	LAN Base				
IE-2000-16TC-G-L	20	16	2 GE	2 FE	LAN Lite				
IE-2000-16TC-G-E	20	16	2 GE	2 FE	LAN Base	X	X[2]		
IE-2000-16TC-G-X	20	16	2 GE	2 FE	LAN Base	X	X[2]		X
IE-2000-8TC-G-N	10	8	2 GE		Enhanced LAN Base	X	X		
IE-2000-16TC-G-N	20	16	2 GE	2FE	Enhanced LAN Base	X	X		
IE-2000-16PTC-G-L	18	16	2GE		LAN Lite			X	
IE-2000-16PTC-G-E	18	16	2GE		LAN Base	X	X[2]	X	
IE-2000-16PTC-G-NX	18	16	2GE		Enhanced LAN Base	X	X	X	X

1. "–L" models are field upgradable from LAN Lite to LAN Base.
2. Upgradable to Enhanced LAN Base through license upgrade.

Table 2. Power Supply and License Upgrade

Product Number	Description
PWR-IE50W-AC-IEC	AC to DC 24V / 2.1A DIN Rail power supply, 110/220 VAC and 88-300 VDC with IEC plug
PWR-IE50W-AC	AC to DC 24V / 2.1A DIN Rail power supply, 110/220 VAC and 88-300 VDC, to replace PWR-IE3000-AC
PWR-IE65W-PC-AC	AC to DC, 65W Power Module for PoE/PoE+. support up to 4 PoE or 2 PoE+ device
PWR-IE65W-PC-DC	DC to DC, 65W Power Module for PoE/PoE+. support up to 4 PoE or 2 PoE+ device
MEM-SD-1GB-RGD	1GB SD Memory card
STK-RACKMNT-2955	19" DIN Rail Mount Kit
L-IE2000-L-B=	IE2000 LAN Lite to LAN Base E-License
IE2000-L-B=	IE2000 LAN Lite to LAN Base paper License
L-IE2000-B-E=	IE2000 LAN Base to Enhanced LAN Base E-License
IE2000-B-E=	IE2000 LAN Base to Enhanced LAN Base paper License

Table 3. Product Specifications

Description	Specification
Hardware	• 256MB DRAM with ECC memory • IEEE 1588v2 FPGA • 64MB on-board flash memory • 1GB removable SD flash memory card (optional) • Mini-USB connector
Alarm	• Alarm I/O: two alarm inputs to detect dry contact open or closed, one alarm output relay
Power Supply	• Rated redundant DC input voltage with operating range: +/- 12 to 48VDC (maximum voltage range 9.6 to 60VDC) • Maximum rated DC input current: IE-2000-4 & 8 models: 2A to 0.5A @ +/- 12 to 48VDC (recommend minimum 20W rated power input source) IE-2000-16 models: 3A to 0.5A @ +/- 12 to 48VDC (recommend minimum 30W rated power input source) • PWR-IE65W-PC-DC=Power Supply: 18-60 VDC/3.4 Amp Input, 54VDC/1.2 Amp Output • PWR-IE65W-PC-AC=Power Supply: 110/220 VAC and 88-300 VDC input, 54VDC/1.2 Amp Output

Description	Specification
Power Consumption	• 4-port downlink models: 9.5-15W • 8-port downlink models: 12.5-20W • 16-port downlink models: 21-30W • 4-port PoE/PoE+ models: 21-30W (16-port base switch) and 4 PoE/PoE+ power requirement.
Connectors and Cabling	• 100BASE-FX MMF (2 km), -LX SMF (10 km) -ZX SMF (100 km), BX10 SMF (10 km) SFP and CWDM SFP-based ports: LC fiber connectors • 10/100/1000BASE-T ports: RJ-45 connectors, 4-pair Category 5 UTP cabling
Dimensions (H x W x D) Including DIN Rail	• IE-2000 6 ports chassis: 5.1”H x 2.95”W x 4.51”D (130mm H x 749mm W x 115mm D) • IE-2000 10 ports short chassis: 5.1”H x 3.6”W x 4.51”D (130mm H x 914mm W x 115mm D) • IE-2000 10 ports long chassis: 5.1”H x 3.6“W x 5.26”D (130mm H x 914mm W x 134mm D) • IE-2000 18-20 ports chassis: 5.1”H x 5.0”W x 5.26”D (130mm H x 127mm W x 134mm D) • PWR-IE50W-AC=: 5.8"H x 2.0"W x 4.4"D (147mm H x 51 mm W x 112mm D) • PWR-65W-PC-AC=: 5.9 "H x 2.6"W x 4.6"D (150mm H x 66mm W x 117mm D) • PWR-65W-PC-DC=: 5.9 "H x 2.6"W x 4.6"D (150mm H x 66mm W x 117mm D)
Weight	• IE-2000 6 ports chassis: 2.45 lbs (1.11 kg) • IE-2000 10 ports short chassis: 2.75 lbs (1.25 kg) • IE-2000 10 ports long chassis: 3.45 lbs (1.56 kg) • IE-2000 18-20 ports chassis: 4.35 lbs (1.97 kg)

Table 4. Cisco IE 2000 Software Features

LAN Lite License (Default)	Features
Layer 2 switching	IEEE 802.1, 802.3, 802.3at, 802.3af standard (see Table 6), VTPv2, NTP, UDLD, CDP, LLDP, Unicast Mac filter, Flex Link, Resilient Ethernet Protocol (REP)
Security	SCP, SSH, SNMPv3, TACACS+, RADIUS Server/Client, MAC Address Notification, BPDU Guard, SPAN session (1)
Multicast	IGMPv1, v2, v3 Snooping, IGMP filtering, IGMP Querier
Management	Fast Boot, Express Setup, Web Device Manager, CNA, Cisco Prime, LMS, MIB, SmartPort, SNMP, syslog
Industrial Ethernet	Ethernet/IP, Profinet v2
LAN Base License	**Features**
Layer2 switching	VTPv3, EtherChannel, Voice VLAN
Security	Port-Security, DHCP Snooping, Dynamic Arp Inspection, IP Source Guard, 802.1x, Guest VLAN. MAC Authentication Bypass, 802.1x Multi-Domain Authentication, Storm Control, Trust Boundary
Quality of Service	Ingress Policing, Rate-Limit, Egress Queuing/shaping, AutoQoS
Management	Port-Based DHCP, Storm Control – Unicast, Multicast, Broadcast, SPAN Sessions (2), RSPAN, DHCP Server, Customized TCAM/SDM size configuration
Industrial Ethernet	IEEE 1588 PTPv2, CIP Time Sync
L2 IPv6	IPv6 Host support, HTTP over IPv6, SNMP over IPv6
Layer 3 routing	IPv4 Static Routing
Enhanced LAN Base	**Features**
Industrial Management	Layer2 switching with 1:1 static Network Address Translation (NAT)

Table 5. Compliance Specifications

Description	Specification
Safety Certifications	• UL/CSA 60950-1 • EN 60950-1 • CB to IEC 60950-1 (with country deviations) • NOM to NOM-019-SCF1 (through partners and distributors) • CE Marking
Hazard Location	• ANSI/ISA 12.12.01 (Class 1, Div 2 A-D) (requires cabinet enclosure) • EN 60079-0, -15 ATEX certification (Class I, Zone 2 A-D) (requires cabinet enclosure)
EMC Emissions and Immunity Compliance	• FCC 47 CFR Part 15 Class A • EN 55022A Class A • VCCI Class A • RoHS compliance • AS/NZS CISPR 22 Class A, AS/NZS CISPR 24 • CISPR11 Class A, CISPR22 Class A • ICES 003 Class A • KCC -Korea • CE Marking • C-Tick (Australia) • Russia certification • Brazil certification • IEC/EN/EN61000-4-2 (Electro Static Discharge), 15kV Air/8kV Contact • IEC/EN 61000-4-3 (Radiated Immunity, 10 and 20V/m) • IEC/EN 61000-4-4 (Fast Transients - 4kV power line, 4kV data line • IEC/EN 61000-4-5 (Surge 2 kV/1 kV) • IEC/EN 61000-4-6 (Conducted Immunity, 10V/emf) • IEC/EN 61000-4-8 (Power Frequency Magnetic Field Immunity) • IEC/EN 61000-4-9 (Pulse Magnetic Field Immunity) • IEC/EN 61000-4-10 (Oscillatory Magnetic Field Immunity) • IEC/EN 61000-4-11 (AC power Voltage Immunity) • IEC/EN 61000-4-29 (Voltage Dips Immunity) • IEC/EN 61000-6-1 (Immunity for Light Industrial Environments) • IEC/EN 61000-6-2 (Immunity for Industrial Environments) • IEC/EN 61000-6-4 Class A • EN 61326
Shock and Vibration	• IEC 60068-2-27 (Operational Shock: 30G 11ms, half sine) • IEC 60068-2-27 (Non-Operational Shock 55-70G, trapezoidal) • IEC 60068-2-6, IEC 60068-2-64, EN 61373 (Operational Vibration) • IEC 60068-2-6, IEC 60068-2-64, EN 61373 (Non-operational Vibration)
Industry Standards	• UL508 • CSA C22.2 No. 142 • EN 61131-2 (EMC/EMI, Environmental, Mechanical) • Protective Coating • Marine DnV (pending) • Substation KEMA (IEEE 1613, IEC 61850-3) • Railway EN 50155 (EMI/EMC, Environmental, Mechanical) • EN50121-3-2 • EN50121-4 • NEMA TS-2 • ABB Industrial IT Certification • IP30 • ODVA Industrial Ethernet/IP support • PROFINETv2 support
Corrosive Testing	• ISO-12944-6

Description	Specification
	• IEC-60068-2-60
Humidity	• IEC 60068-52-2 (Salt Fog Mist, Test Kb) Marine environments • IEC 60068 -2-3 • IEC 60068-2-30 • Relative Humidity: 5% to 95% Non-condensing
Operating Temperature	• -40C to +70C (Vented Enclosure Operating) • -40C to +60C (Sealed Enclosure Operating) • -34C to +75C (Fan or Blower equipped Enclosure Operating) • Operational Altitude: Up to 15,000 ft
Storage Temperature	• -40C to +85C (Storage Temperature) • IEC 60068-2-14 • Storage Altitude: Up to 15,000 ft
MTBF	• Mean time between failure: 374,052 hrs (42.7 yrs)
Warranty	• Five year limited warranty

Table 6. Management and Standards

Description	Specification	Specification
IEEE Standards	• 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	• 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	• 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	• 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
SFP Transceivers[1]	• GLC-FE-100FX-RGD 2km/MMF[2] • GLC-FE-100FX 2km/MMF • GLC-FE-100LX-RGD 10km/SMF[3] • GLC-FE-100EX 40km/SMF • GLC-FE-100LX 10km/SMF • GLC-FE-100BX-D 10km/SMF • GLC-FE-100BX-U 10km/SMF • GLC-FE-100ZX 80km/SMF	• GLC-SX-MM-RGD 220-550m/MMF • GLC-SX-MM 220-550m/MMF • GLC-SX-MMD DOM supported • GLC-LH-SM 550m/MMF, 10km/SMF • GLC-LH-SMD 550m/MMF,10km/SMF DOM • GLC-LX-SM-RGD 550m/MMF, 10km/SMF • GLC-ZX-SM-RGD 70-100km/SMF • GLC-EX-SMD DOM supported

Description	Specification	Specification
		• GLC-BX-D 10km/SMF • GLC-BX-U 10km/SMF • CWDM SFP 100km/SMF • DWDM SFP
SNMP MIB Objects	• 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-ENTITY-ALARM-MIB • CISCO-ENTITY-VENDORTYPE-OID-MIB • CISCO-ENVMON-MIB • CISCO-ERR-DISABLE-MIB • CISCO-FLASH-MIB • CISCO-FTP-CLIENT-MIB • CISCO-IF-EXTENSION-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	• CISCO-SNMP-TARGET-EXT-MIB • CISCO-STACK-MIB • CISCO-STACKMAKER-MIB • CISCO-STP-EXTENSIONS-MIB • CISCO-SYSLOG-MIB • CISCO-TCP-MIB • CISCO-UDLDP-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 • IP-MIB • LLDP-EXT-MED-MIB • LLDP-MIB • NETRANGER • NOTIFICATION-LOG-MIB • OLD-CISCO-CHASSIS-MIB • 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

[1] For the complete list of the supported SFP models, please refer to http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html

[2] MMF = multi-mode fiber

[3] SMF = Single-mode fiber

Warranty Information

Warranty information is available on http://www.cisco-servicefinder.com/warrantyfinder.aspx.

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 5 are available as part of the Cisco Desktop Switching Service and Support solution and are available directly from Cisco and through resellers.

Table 7. Cisco Services and Support Programs

Service and Support	Features	Benefits
Advanced Services		
• Cisco Total Implementation Solutions (TIS), available direct from Cisco • Cisco Packaged TIS, available through resellers • Cisco SMARTnet® and SMARTnet Onsite support, available direct from Cisco • Cisco Packaged SMARTnet support program, available through resellers • Cisco SMB Support Assistant	• Project management • Site survey, configuration, and deployment • Installation, text, 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	• 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

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