

Cisco Industrial Ethernet 3000 Series Switches

Product Overview

The Cisco® Industrial Ethernet 3000 (IE3000) Series Switches are a new family of switches that provide a rugged, easy-to-use, secure switching infrastructure for harsh environments. The Cisco IE3000 family features industrial design and compliance; tools for ease of deployment, management, and replacement; and network security based on open standards. The Cisco IE3000 is an ideal product for Industrial Ethernet applications, including factory automation, intelligent transportation systems (ITSs), substations, and other deployments in harsh environments.

The Cisco IE3000 offers:

- Design for Industrial Ethernet applications, including extended environmental, shock/vibration, and surge ratings; a complete set of power input options; convection cooling; and DIN-rail or 19" rack mounting
- Support for 300 different hardware configurations
- Easy setup and management using the Cisco Device Manager Web interface and supporting tools, including Cisco Network Assistant and CiscoWorks
- Easy switch replacement using removable memory, allowing the user to replace a switch without having to reconfigure
- High availability, guaranteed determinism, and reliable security using Cisco IOS® Software
- Recommended software configurations for industrial applications that can be applied at the touch of a button
- Compliance to a wide range of Industrial Ethernet specifications covering industrial automation, ITS, substation, railway, and other markets
- Support for IEEE1588, a timing protocol with nanosecond-level precision for high-performance applications

Configurations

The Cisco IE3000 Series comprises the following products (refer to Table 1):






- **Cisco IE3000-4TC:** Industrial Ethernet switch with four Ethernet 10/100 ports and two dual-purpose uplink ports (a dual-purpose port has one 10/100/1000BaseTX port and one Small Form-Factor Pluggable [SFP] port, port active)
- **Cisco IE3000-8TC:** Industrial Ethernet switch with eight Ethernet 10/100 ports and two dual-purpose uplink ports
- **Cisco IE3000-8FE:** Expansion module for Cisco IE3000-4TC and Cisco IE3000-8TC with eight Ethernet 10/100 ports
- **Cisco IE3000-8FX:** Expansion module for Cisco IE3000-4TC and Cisco IE3000-8TC with eight 100BaseFX ports
- **Cisco IE3000-PWR:** Expansion module supporting AC and extended DC power inputs

Solution Specifications



The Cisco IE3000 Series software, based on Cisco IOS Software, is a rich suite of intelligent services, supporting high availability, quality of service (QoS), and security features. The SFP-based uplink ports accommodate a range of industrial-grade SFP transceivers, including 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX, 100BASE-FX, and 100BASE-LX10.

Table 1. Cisco IE3000 Switches

Description	Specification
<p>Cisco IE3000-4TC</p> 	<ul style="list-style-type: none"> • 4 Ethernet 10/100 ports and 2 Dual-Purpose Uplinks (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 (2) Cisco IE3000-8FE modules, one (1) Cisco IE3000-8FX module, or one (1) Cisco IE3000-8FE module and one (1) Cisco IE3000-8FX module
<p>Cisco IE3000-8TC</p> 	<ul style="list-style-type: none"> • 8 Ethernet 10/100 ports and 2 Dual-Purpose Uplinks (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 (2) Cisco IE3000-8FE modules, one (1) Cisco IE3000-8FX module, or one (1) Cisco IE3000-8FE module and one (1) Cisco IE3000-8FX module
<p>Cisco IE3000-8FE</p> 	<ul style="list-style-type: none"> • Expansion Module for Cisco IE3000-4TC and Cisco IE3000-8TC Switches, 8 10/100 TX ports
<p>Cisco IE3000-8FX</p> 	<ul style="list-style-type: none"> • Expansion Module for Cisco IE3000-4TC and Cisco IE3000-8TC Switches, 8 100 FX ports
<p>Cisco IE3000-PWR</p> 	<ul style="list-style-type: none"> • Expansion Power Module for Cisco IE3000-4TC and Cisco IE3000-8TC Switches, supports 110/220VAC and 90-300VDC (base switches support 18VDC-60VDC)

Industrial Ethernet Applications

The new Cisco IE3000 Series is an ideal product for a variety of Industrial Ethernet applications:

- **Industrial automation:** The Cisco IE3000 is designed to support a wide array of Industrial Ethernet protocols for automation. The Cisco IE3000 features a programmable logic controller (PLC) form-factor design with extended environmental ratings, convection cooling, DIN-rail mounting, redundant 24VDC power input, alarm relays, and surge/noise immunity. The Cisco IE3000 software and configuration tools allow for easy setup, optimized for Industrial Ethernet applications, including Ethernet/IP, ProfiNet, Modbus TCP, FoundationFieldbus High-Speed Ethernet (FFB HSE), and others. Multicast control, traffic prioritization, and security features are specified in default templates recommended for these protocols.
- **ITSs:** The Cisco IE3000 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 the Cisco IOS Software supports critical ITS features, including virtual LAN (VLAN), QoS, Internet Group Management Protocol (IGMP) snooping, and security access control lists (ACLs).
- **Substations:** The Cisco IE3000 is fully compliant to substation automation specifications, including IEC61850 and IEEE1613. The switch supports high-speed ring recovery; fiber access and uplink ports; and AC, 48VDC, and 125VDC power input options for the substation environments.
- **Other applications:** The Cisco IE3000 can be deployed in railway, military, metro Ethernet, and other applications requiring unique environmental, form factor, or power inputs in harsh environments.

Table 1 gives the features and benefits of the Cisco IE3000 Series. Table 2 gives the hardware specifications, and Table 3 gives the power specifications. Table 4 lists the management and standards support, and Table 5 provides the safety and compliance information.

Table 2. Features and Benefits of Cisco IE3000 Series

Category	Feature/Benefit
Designed for Industrial Applications	<ul style="list-style-type: none"> • Extended temperature, vibration, shock and surge, and noise immunity ratings comply to specifications for automation, ITS, and substation environments. • Compact, PLC-style form factor is ideal for deployment in industrial environments. • DIN-rail, wall, and 19" rack mount options allow for deployments in a variety of control systems. • 24/48/125VDC and 100-220VAC power input options cover a wide range of power requirements for Industrial Ethernet applications. • Up to 300 deployment configurations, supporting a range of access port densities, copper and fiber uplinks, fiber access ports, and power input delivers 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 can be used for an external alert system.

Category	Feature/Benefit
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. • Smartports templates for Ethernet/IP provide an optimized setup for these Industrial Ethernet protocols at the touch of a button. • Swappable 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. • The Common Industrial Protocol (CIP) management objects are supported. The including a custom profile for primary Ethernet switch features. The Cisco IE3000 can be managed by CIP-based management tools, allowing the user to manage an entire industrial automation system with one tool. • PROFINET IO enables the Cisco IE3000 to exchange data, alarms and diagnostics information with the PROFINET automation controllers and IO devices. • Simple Network Management Protocol (SNMP) (v1/v2/v3) support allows for management using traditional IT-based management tools including CiscoWorks. • Cisco Network Assistant is a no-charge, Windows-based application that simplifies the administration of networks of up to 250 users. It supports the Cisco IE3000 and a wide range of Cisco Catalyst[®] intelligent switches. With Cisco Network Assistant, users can manage Cisco Catalyst switches and launch the device managers of Cisco integrated services routers and Cisco Aironet[®] WLAN access points. Configuration wizards need just a few user inputs to automatically configure the switch to optimally handle different types of traffic: control, voice, video, multicast, and high-priority data.
Availability and Scalability	<ul style="list-style-type: none"> • Virtual LANs (VLANs) allow for logical segmentation for a network for optimal use of bandwidth. • QoS classifies and prioritizes data, guaranteeing determinism for mission-critical data. • IGMPv3 snooping provides fast client joins and leaves of multicast streams and limits bandwidth-intensive traffic to only the requestors. An additional querier allows this operation in a Layer 2 only environment. • IGMP filtering provides multicast authentication by filtering out no subscribers and limits the number of concurrent multicast streams available per port. • Per-port broadcast, multicast, and unicast storm control prevents faulty end stations from degrading overall systems performance. • IEEE 802.1d Spanning Tree Protocol support for redundant backbone connections and loop-free networks simplifies network configuration and improves fault tolerance. • Resilient Ethernet Protocol (REP) provides network redundancy of up to 200 nodes at a convergence speed of 50ms or less.
Security	<ul style="list-style-type: none"> • IEEE 802.1x with VLAN assignment, guest VLAN, and voice VLAN allows dynamic port-based security, providing 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. • Secure Shell (SSH) Protocol v2 and SNMPv3 provide network security by encrypting administrator traffic during Telnet and SNMP sessions. SSHv2 and the cryptographic version of SNMPv3 require a special cryptographic software image because of U.S. export restrictions. • TACACS+ and RADIUS authentication enable centralized 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. • Dynamic Host Configuration Protocol (DHCP) snooping allows administrators to help ensure consistent mapping of IP to MAC addresses. This can be used to prevent attacks that attempt to poison the DHCP binding database, and to rate limit the amount of DHCP traffic that enters a switch port. • 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. • Up to 512 ACLs are supported, with two profiles: Security (384 Security ACL entries and 128 QoS policies), and QoS (128 Security ACL entries and 384 QoS policies).

Table 3. Cisco IE3000 Series Switch Hardware

Description	Specification
Performance	<ul style="list-style-type: none"> • Wire-speed switching • 128 MB DRAM • 64 MB Flash memory • Configurable up to 8000 MAC addresses • Configurable up to 255 IGMP groups • 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 of Multiprotocol Label Switching (MPLS) tagged frames on both 10/100 and 10/100/1000 ports
Connectors and Cabling	<ul style="list-style-type: none"> • 10BASE-T ports: RJ-45 connectors, two-pair Category 3, 4, or 5 unshielded twisted-pair (UTP) cabling • 100BASE-TX ports: RJ-45 connectors, two-pair Category 5 UTP cabling • 1000BASE-T ports: RJ-45 connectors, four-pair Category 5 UTP cabling • 1000BASE-SX, -LX/LH, -ZX SFP-based ports: LC fiber connectors (single/multimode fiber) • 100BASE-LX10, -FX: LC fiber connectors (single/multimode fiber)
Power Connectors	<ul style="list-style-type: none"> • The internal power supply supports voltages between 18VDC and 60VDC. • The extended power adapter (Cisco IE3000-PWR) supports 90-300VAC and 90-300VDC. • Use the supplied cable to connect the extended power adapter to the switch power input.
Indicators	<ul style="list-style-type: none"> • Per-port status LED: Link integrity, disabled, activity, speed, full-duplex indications • System-status LED: System, link status, link duplex, link speed, indications
Dimensions (H x W x D)	<ul style="list-style-type: none"> • Cisco IE3000-4TC: 6.0"W x 5.8"H x 4.4"D (152mm H x 147mm W x 112mm D) • Cisco IE3000-8TC: 6.0"W x 5.8"H x 4.4"D (152mm H x 147mm W x 112mm D) • Cisco IE3000-8FE: 3.8"W x 5.8"H x 4.4"D (97mm H x 147mm W x 112mm D) • Cisco IE3000-8FX: 3.8"W x 5.8"H x 4.4"D (97mm H x 147mm W x 112mm D) • Cisco IE3000-PWR: 3.8"W x 5.8"H x 4.4"D (97mm H x 147mm W x 112mm D)
Weight	<ul style="list-style-type: none"> • Cisco IE3000-4TC: 4.0 lb (3.6 kg) • Cisco IE3000-8TC: 4.0 lb (3.6 kg) • Cisco IE3000-8FE: 2.0 lb (1.8kg) • Cisco IE3000-8FX: 2.0 lb (1.8 kg) • Cisco IE3000-PWR: 2.0 lb (1.8 kg)
Environmental Ranges	<ul style="list-style-type: none"> • Operating temperature: 32 to 113°F (-40 to 70°C) • Storage temperature: -13 to 158°F (-25 to 70°C) • Operating relative humidity: 10 to 95% (condensing) • Operating altitude: Up to 10,000 ft (3049m) • Storage altitude: Up to 15,000 ft (4573m)
Mean Time Between Failure (MTBF)	<ul style="list-style-type: none"> • Cisco IE3000-4TC: 384,509 • Cisco IE3000-8TC: 338,801 • Cisco IE3000-8FE: 1,002,788 • Cisco IE3000-8FX: 265,492 • Cisco IE3000-PWR: 350,000

Table 4. Power Specifications for Cisco IE300 Series Switch

Description	Specification
Maximum Power Consumption	<ul style="list-style-type: none"> • 31W (Cisco IE3000-4TC and Cisco IE3000-8TC)
Input Voltage and Currents Supported	<ul style="list-style-type: none"> • 18-60VDC, (Cisco IE3000-4TC and Cisco IE3000-8TC) • 85-265VAC/88-300VDC, 1.3-0.8A, 50-60 Hz (with addition of Cisco IE3000-PWR)
Power Rating	<ul style="list-style-type: none"> • Cisco IE3000-4TC: .05KVA • Cisco IE3000-8TC: .05KVA

Table 5. Management and Standards Support for Cisco IE3000 Series Switch

Description	Specification
Standards	<ul style="list-style-type: none"> • 100BASE-X (SFP) • 1000BASE-X (SFP) • 1000BASE-SX • 1000BASE-LX/LH • 1000BASE-ZX • RMON I and II standards • SNMPv1, SNMPv2c, and SNMPv3

Table 6. Compliance Specifications

Description	Specification
Standard Safety Certifications	<ul style="list-style-type: none"> • UL to UL 60950, Third Edition • C-UL to CAN/CSA C22.2 No. 60950-00, Third Edition • TUV/GS to EN 60950:2000 • CB to IEC 60950 with all country deviations • NOM to NOM-019-SCFI • CE Marking
Industrial Safety Certifications	<ul style="list-style-type: none"> • UL 508 • CSA 22.2 / 142 • EN60204-1 • EN61010-1 • EN61131-2 • EN61140
Mechanical Stability	<ul style="list-style-type: none"> • Shock—15g (Operational), 30g (Nonoperational)
EMC Interface Immunity	<ul style="list-style-type: none"> • 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: 1998 (CISPR22) • EN 55024: 1998 (CISPR24) • VCCI Class A • AS/NZS 3548 Class A • CE • CNS 13438 Class A • MIC
Industrial Electromagnetic Emissions Certifications	<ul style="list-style-type: none"> • EN 50081-2 • EN 50082-2 • EN 61131-2 • EN 61326-1 • CISPR11
Industry Specifications	<ul style="list-style-type: none"> • IEC 61850-3 (Substations) • IEEE1613 (Substations) • NEMA TS-2 (ITs) • EN50155 (Railway) • ODVA Common Industrial Protocol • IEEE 1588v2 • PROFINET IO
Hazardous Locations	<ul style="list-style-type: none"> • UL 1602 Class 1, Div 2 A-D • CSA 22.2 / 213 Class 1, Div 2 A-D • IEC 60079-15 • EN 50021—Class 1, Zone 2

Description	Specification
Telco	Common Language Equipment Identifier (CLEI) code
Warranty	One year limited warranty

Service and Support

Cisco is committed to minimizing total cost of ownership (TCO). The company offers a portfolio of technical support services to help ensure 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 7. 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 SMARTnet® and SMARTnet Onsite support, available direct from Cisco • Cisco Packaged SMARTnet support program, available through resellers • Cisco SMB Support Assistant 	<ul style="list-style-type: none"> • 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 	<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 gives ordering information for the Cisco IE3000 Series.

Table 8. Ordering Information for Cisco IE3000 Series

Part Numbers	Description
IE3000-4TC	<ul style="list-style-type: none"> • Industrial Ethernet switch • 4 Ethernet 10/100 ports and 2 dual-purpose uplinks (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 (2) Cisco IE3000-8FE modules, one (1) Cisco IE3000-8FX module, or one (1) Cisco IE3000-8FE module and one (1) Cisco IE3000-8FX module • IE Base image Installed
IE3000-8TC	<ul style="list-style-type: none"> • Industrial Ethernet switch • 8 Ethernet 10/100 ports and 2 dual-purpose uplinks (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 (2) Cisco IE3000-8FE modules, one (1) Cisco IE3000-8FX module, or one (1) Cisco IE3000-8FE module and one (1) Cisco IE3000-8FX module • IE Base image Installed
IEM-3000-8TM=	<ul style="list-style-type: none"> • Expansion module for Cisco IE3000-4TC and Cisco IE3000-8TC Switches • 8 10/100 TX ports
IEM-3000-8TM=	<ul style="list-style-type: none"> • Expansion module for Cisco IE3000-4TC and Cisco IE3000-8TC Switches • 8 100 FX ports
PWR-IE3000-AC=	<ul style="list-style-type: none"> • Expansion power module for Cisco IE3000-4TC and Cisco IE3000-8TC Switches • Supports 110/220VAC and 90-300VDC (base switches support 18VDC-60VDC)
GLC-LX-SM-RGD	Gigabit Ethernet SFP, LC connector, LH (1Gps single mode) transceiver
GLC-SX-MM-RGD	Gigabit Ethernet SFP, LC connector, SX (1Gps multimode) transceiver
GLC-ZX-SM-RGD	Gigabit Ethernet SFP, LC connector, ZX (1Gbps single mode, 40km) transceiver
GLC-FE-100FX-RGD	Fast Ethernet SFP, LC connector, FX (100Mb/s multimode) transceiver

Part Numbers	Description
GLC-FE-100LX-RGD	Fast Ethernet SFP, LC connector, LX (100Mb/s single mode) transceiver
CAB-SM-LCSC-1M	1m-fiber single-mode LC-to-SC connectors
CAB-SM-LCSC-5M	5m-fiber single-mode LC-to-SC connectors

For more information about Cisco products, contact:

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