Cisco IE3500 Rugged Series

Contents

Products overview

The Cisco IE3500 Rugged Series switches deliver high bandwidth, higher power and feature rich switching performance in a rugged and modular form factor. The Cisco IE3500 Rugged Series are designed with features that enable the industrial network infrastructure to seamlessly accommodate machine vision use cases, AI-driven analysis, virtualization, large scale networks, robust security, and edge-to-cloud connectivity.

Advanced Features for Operational Technology (OT) Networks

- **TSN Frame-Preemption**[1]: The IE3500 is the first Cisco IE switch to incorporate IEEE802.1Qbu and IEEE802.3br based frame-preemption technology, significantly reducing jitter and delay for time-sensitive control packets.
- **Enhanced Resiliency**: The IE3500 supports protocols such as **Media Redundancy Protocol (MRP)**, **Resilient Ethernet Protocol (REP)**, and **Device Level Ring (DLR)**[2], providing redundancy and fast failover times.
- **Lossless Redundancy**: For deployments requiring uninterrupted connectivity, the IE3505 includes **High-Availability Seamless Redundancy (HSR)**[2] and **Parallel Redundancy Protocol (PRP)**[2], ensuring seamless failover and network continuity.

Network security and Observability

- **Secure Boot:** The IE3500 features Secure Boot designed to ensure that only trusted and authenticated software is executed during the boot process, with its hardware-anchored root of trust in Cisco Trust Anchor Module.
- **Cyber visibility:** Cisco Cyber Vision built-into the IE3500 identifies connected assets, their profiles, vulnerabilities, and communication patterns to assess your OT security posture and help drive cybersecurity best practices.
- **Secure remote access:** Cisco Secure Equipment Access[1] built-into the IE3500 enables zero-trust remote access to connected assets.
- **Segmentation:** Cisco TrustSec technology enables policy-based segmentation that helps reduce attack surfaces and contains threats by automatically adapting access based on user and device identity.
- **Network Assurance:** IE3500 can host ThousandEyes Enterprise Agent[1] that gains visibility into owned and third-party network to avoid network outages.

Flexible Management Options

The IE3500 offers multiple management choices to suit various deployment needs:

1. **On-Device Management:** Use the **WebUI** or **command line tool** for standalone devices, providing an intuitive on-device GUI and CLI options.
2. **On-Premises Management:** Manage the IE3500 via **Catalyst Center** for on-premises deployments.
3. **Cloud Management:** Leverage **Meraki dashboard**[1] for cloud-based network management, enabling simplified and centralized control.

Fabric Capabilities

The IE3500 supports Layer 3 functionality and can extend the IT fabric into the OT network. With support for Cisco Software Defined Access Fabric Edge[1] and BGP-EVPN[1], large networks are easy to scale and manage

Future-Ready Hardware Capabilities

The IE3500 is designed to meet the demands of expanding networks, offering:

- **Three 10G uplink ports** for high-speed connectivity
- **Up to 90W of PoE power per port**, ensuring support for power-intensive devices.
- **Versatile expansion module options that expand total switch capacity 4, 8 or 16 ports**.

[1] Planned to be supported with a future IOS-XE release

[2] Supported on IE3505 variants only

Figure 1.
Cisco IE3500 Rugged Series Switch

Features and benefits

Table 1. IE3500 Features and benefits

Feature	Benefit
Robust industrial design	• Built for harsh environments and temperature ranges (-40° C to +75° C or -40° F to 167° F) • Fanless, convection-cooled with no moving parts for extended durability • Hardened for industrial shock and vibration, surge, and electrical noise immunity • Complies with multi-industry specifications for automation, ITS, and substation environments • Improves uptime, performance, and safety of industrial systems and equipment • Covers a wide range of Power over Ethernet (PoE) application requirements • Alarm I/O for monitoring and signaling to external equipment

Feature	Benefit
Ethernet Interfaces	• Provides secure access for new high-speed applications in the industrial space • Packs up to 11 ports of 1/10 Gigabit Ethernet (GE) – 3 ports of 1GE Small Form-Factor Pluggable (SFP) uplinks or 3 ports of 10GE Small Form-Factor Pluggable (SFP+) and 8 ports of 1GE Data or PoE+/4PPoE RJ45 downlinks in a DIN-Rail form-factor base system • Expandable to 27 ports of GE/Multigigabit by attaching one of 8 compatible modules (copper, fiber options) • Connects high-speed WiFi 7 access points • Enables High-Definition (HD) IP cameras and Programmable Logic Controllers (PLC) • Supports precision time protocol as a transparent or a boundary clock. • Delivers multiple rings and redundant ring topology for network configurations • Extends geographical scalability where longer-distance connectivity is required
High-density industrial Power over Ethernet (PoE)	• Supports up to 24 PoE ports with combination or PoE/PoE+/4PPoE ports and total PoE power budget of up to 480W • Fast and Perpetual PoE ensure seamless PoE experience and quick boot of end points • Controls costs by limiting wiring, distribution panels, and circuit breakers • Reduces equipment needs, thus requiring less space and reducing heat dissipation • Enables ready-to-use PoE devices, such as IP phones, cameras, and wireless access points
Network security	• Device security for secure boot with its hardware-anchored root of trust in Cisco Trust Anchor Module • Support for MACSEC-256 to prevent man-in-the-middle attack • Supports Cisco Cyber Vision to identify all devices and assets on the network • Supports Cisco TrustSec technology based network segmentation to help reduce the spread of malware • Supports Cisco Secure Equipment Access[1] for zero-trust remote access to connected industrial assets, enabling secure troubleshooting, monitoring, and maintenance, without requiring VPNs
Management	• Easy configuration through WebUI on device • On-prem management through Catalyst Center • Cloud based managed via Meraki dashboard[1]
IOx Application Hosting	• Cisco Cyber Vision for Visibility • Secure Equipment Access for Zero trust network Access[1] • ThousandEyes enterprise Agent[1]
Network assurance	Support for ThousandEyes Enterprise Agent[1] helps to quickly identify and resolve potential disruptions in complex network environments, minimizing downtime and enhancing operational productivity

Feature	Benefit
Fabric support	• Support for Cisco Software Defined Access • Extended and Policy Extended node • Fabric Edge node[1] • Support for BGP-EVPN[1]
Swap Drive: zero-configuration replacement	• True zero-configuration and simple switch replacement when swapping RMA units or system upgrade • No networking expertise required • Helps ensure fast recovery
Full Flexible NetFlow (FNF)	• Provides enhanced flow and threat visibility • Enables optimization of the network infrastructure, reduces operation costs, and improves capacity planning and security incident detection
Advanced data plane features	• Parallel Redundancy Protocol (PRP)[2] • High-availability Seamless Redundancy Protocol (HSR)[2] • Device Level Ring (DLR)[2]

[1] Planned to be supported with a future IOS-XE release

[2] Supported on IE3505 variants only

Table 2. Product feature set

Product family	Platforms supported	Cisco IOS Software images (feature sets) supported
IE3500	IE3500	Network Essentials, Network Advantage[1]

[1] Network Advantage License includes all Network Essentials Features.

Product specifications

Table 3. IE3500 Hardware Configurations and Expansion Modules

Product number	Total ports	1000/100/10M RJ45 Copper ports	SFP ports	2.5G/1G/ 100M RJ45 Copper ports	Max PoE budget (Base switch only)	Max Total PoE Budget with Expansion Module	Network License
IE-3500-8T3S-E	11	8	3x 1G/100M	-	-	-	Network Essentials
IE-3500-8T3S-A	11	8	3x 1G/100M	-	-	-	Network Advantage
IE-3500-8P3S-E	11	8 PoE/PoE+	3x 1G/100M	-	240W	360W	Network Essentials
IE-3500-8P3S-A	11	8 PoE/PoE+	3x 1G/100M	-	240W	360W	Network Advantage

Product number	Total ports	1000/100/10M RJ45 Copper ports	SFP ports	2.5G/1G/ 100M RJ45 Copper ports	Max PoE budget (Base switch only)	Max Total PoE Budget with Expansion Module	Network License
IE-3505-8T3S-E	11	8	3x 1G/100M	-	-	-	Network Essentials
IE-3505-8T3S-A	11	8	3x 1G/100M	-	-	-	Network Advantage
IE-3505-8P3S-E	11	8 PoE/PoE+	3x 1G/100M	-	240W	480W	Network Essentials
IE-3505-8P3S-A	11	8 PoE/PoE+	3x 1G/100M	-	240W	480W	Network Advantage
IE-3500-8T3X-E	11	8	3x 10G/1G	-	-	-	Network Essentials
IE-3500-8T3X-A	11	8	3x 10G/1G	-	-	-	Network Advantage
IE-3500-8U3X-E	11	8 PoE/PoE+/ 4PPoE	3x 10G/1G	-	480W	480W	Network Essentials
IE-3500-8U3X-A	11	8 PoE/PoE+/ 4PPoE	3x 10G/1G	-	480W	480W	Network Advantage
IEM-3500-8P=[1]	8	8 PoE/PoE+	-	-	-	-	-
IEM-3500-16P=[1]	16	16 PoE/PoE+	-	-	-	-	-
IEM-3500-8S=	8	-	8x 1G/100M	-	-	-	-
IEM-3500-8T=	8	8	-	-	-	-	-
IEM-3500-16T=	16	16	-	-	-	-	-
IEM-3500-6T2S=	8	6	2x 1G/100M	-	-	-	-
IEM-3500-14T2S=	16	14	2x 1G/100M	-	-	-	-
IEM-3500-4MU=[1,2]	4	4 PoE/PoE+/ 4PPoE	-	4	-	-	-

[1] PoE modules can only be installed on a host system that supports PoE.

[2] HSR/PRP/DLR is not supported on IEM-3500-4MU=.

Table 4. IE3500 Hardware Specifications

Hardware specifications	IE-3500-8T3S	IE-3500-8P3S	IE-3505-8T3S	IE-3505-8P3S	IE-3500-8T3X	IE-3500-8U3X
PoE power budget	Not applicable	360W[1] (including expansion module)	Not applicable	480W[1] (including expansion module)	Not applicable	480W
Removable storage	USB[2,3], SD card[2]	USB[2,3], SD card[2]	USB[2,3], SD card[2]	USB[2,3], SD card[2]	USB[2,3], SD card[2]	USB[2,3], SD card[2]
Alarms	2 alarms in, 1 alarm out	2 alarms in, 1 alarm out	2 alarms in, 1 alarm out	2 alarms in, 1 alarm out	2 alarms in, 1 alarm out	2 alarms in, 1 alarm out
Console ports	1 RS-232 (via RJ-45), 1 USB Type C	1 RS-232 (via RJ-45), 1 USB Type C	1 RS-232 (via RJ-45), 1 USB Type C	1 RS-232 (via RJ-45), 1 USB Type C	1 RS-232 (via RJ-45), 1 USB Type C	1 RS-232 (via RJ-45), 1 USB Type C
Power inputs	Dual DC power input	Dual DC power input	Dual DC power input	Dual DC power input	Dual DC power input	Dual DC power input

[1] The selected power supply must have sufficient capacity to power the switch (see table 3), the expansion module (see table 3), and the connected PoE load.

[2] The USB and SD card are optional and are not shipped by default with the switch.

[3] USB 2.0 to load system images and set configurations.

Table 5. Highlights the hardware configuration for Cisco IE3500 Rugged Series modules.

Product ID	Total ports on expansion module	Copper (RJ45)	PoE/PoE+	SFP	Copper (RJ45) 2.5G/1G/100M (with up to 802.3bt type 4 PoE)	Total system ports (base switch + expansion module)
IEM-3500-8P=	8	-	8	-	-	19
IEM-3500-16P=	16	-	16	-	-	27
IEM-3500-8S=	8	-	-	8	-	19
IEM-3500-8T=	8	8	-	-	-	19
IEM-3500-16T=	16	16	-	-	-	27
IEM-3500-6T2S=	8	6	-	2	-	19
IEM-3500-14T2S=	16	14	-	2	-	27
IEM-3500-4MU=[1]	4	-	-	-	4	15

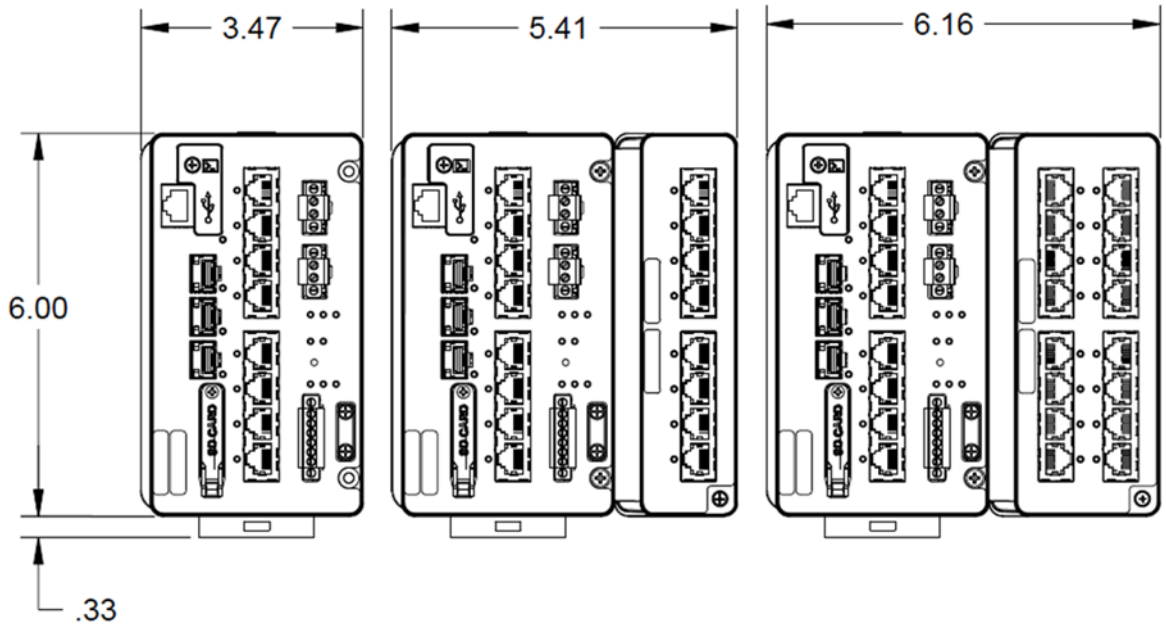
[1] Please refer to the conditions for using IEEE 802.3bt type 4 standard power in the Hardware Installation Guide

Table 6. Highlights the physical configuration for Cisco IE3500 Rugged Series switches and modules.

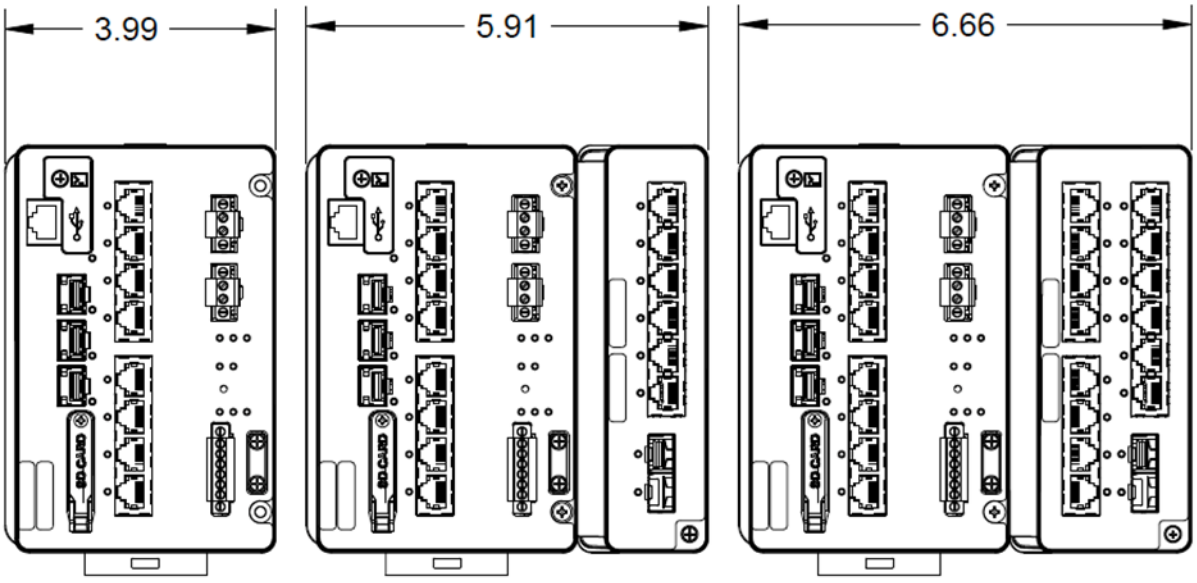
Product ID	Dimension (W x H x D)	Weight	Mounting
IE-3500-8T3S	3.48 x 6.00 x 5.29 inches 8.84 x 15.24 x 13.44 cm	3.90 lbs 1.77 kgs	DIN rail
IE-3500-8P3S	3.48 x 6.00 x 5.29 inches 8.84 x 15.24 x 13.44 cm	3.90 lbs 1.77 kgs	DIN rail
IE-3505-8T3S	3.48 x 6.00 x 5.29 Inches 8.84 x 15.24 x 13.44 cm	3.95 lbs 1.79 kgs	DIN rail
IE-3505-8P3S	3.98 x 6.00 x 5.29 inches 10.11 x 15.24 x 13.44 cm	4.35 lbs 1.97kgs	DIN rail
IE-3500-8T3X	3.98 x 6.00 x 5.29 inches 10.11 x 15.24 x 13.44 cm	4.70 lbs 2.13 kgs	DIN rail
IE-3500-8U3X	4.38 x 6.00 x 5.29 inches 11.13 x 15.24 x 13.44 cm	5.05 lbs 2.29 kgs	DIN rail
IEM-3500-8T=	2.51 x 6.00 x 5.29 inches 6.38 x 15.24 x 13.44 cm	1.95 lbs 0.88 kgs	DIN rail
IEM-3500-8S=	2.51 x 6.00 x 5.29 inches 6.38 x 15.24 x 13.44 cm	1.95 lbs 0.88 kgs	DIN rail
IEM-3500-16T=	3.26 x 6.00 x 5.29 inches 8.28 x 15.24 x 13.44 cm	2.45 lbs 1.11 kgs	DIN rail
IEM-3500-6T2S=	2.51 x 6.00 x 5.29 inches 6.38 x 15.24 x 13.44 cm	1.95 lbs 0.88 kgs	DIN rail
IEM-3500-14T2S=	3.26 x 6.00 x 5.29 inches 8.28 x 15.24 x 13.44 cm	2.50 lbs 1.13 kgs	DIN rail
IEM-3500-8P=	2.51 x 6.00 x 5.29 inches 6.38 x 15.24 x 13.44 cm	1.95 lbs 0.88 kgs	DIN rail
IEM-3500-16P=	3.26 x 6.00 x 5.29 inches 8.28 x 15.24 x 13.44 cm	2.50 lbs 1.13 kgs	DIN rail
IEM-3500-4MU=	3.26 x 6.00 x 5.29 inches 8.28 x 15.24 x 13.44 cm	2.15 lbs 0.98 kgs	DIN rail

System dimensions

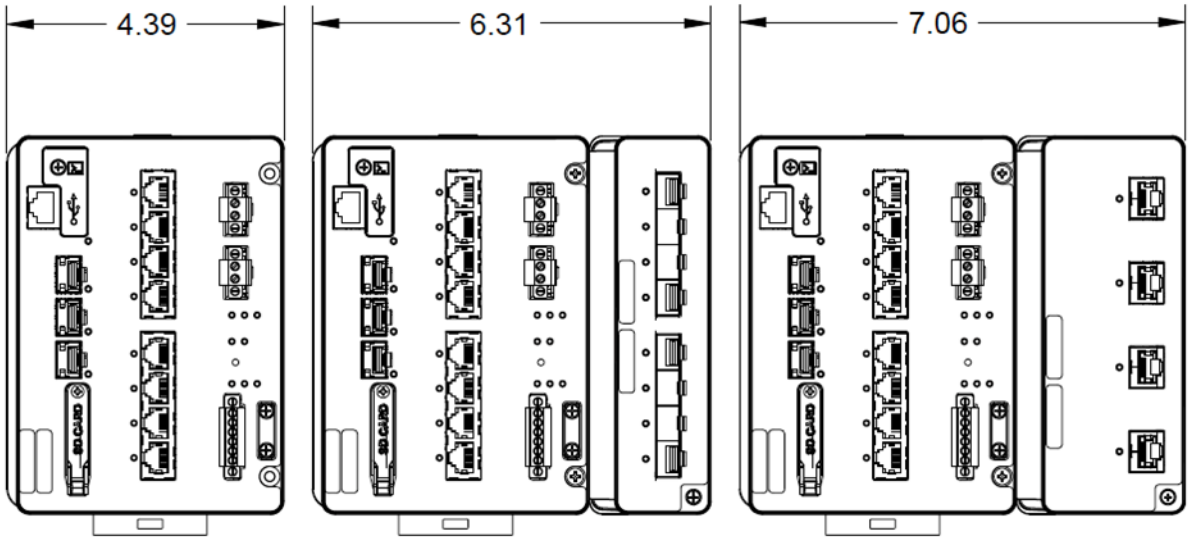
Below image shows the dimensions of IE-3500-8T3S, IE-3500-8P3S, IE-3505-8T3S chassis. They share the same dimension. The image shows the dimensions of the base unit (left), base unit with single width module (middle) and base unit with double width module (right).



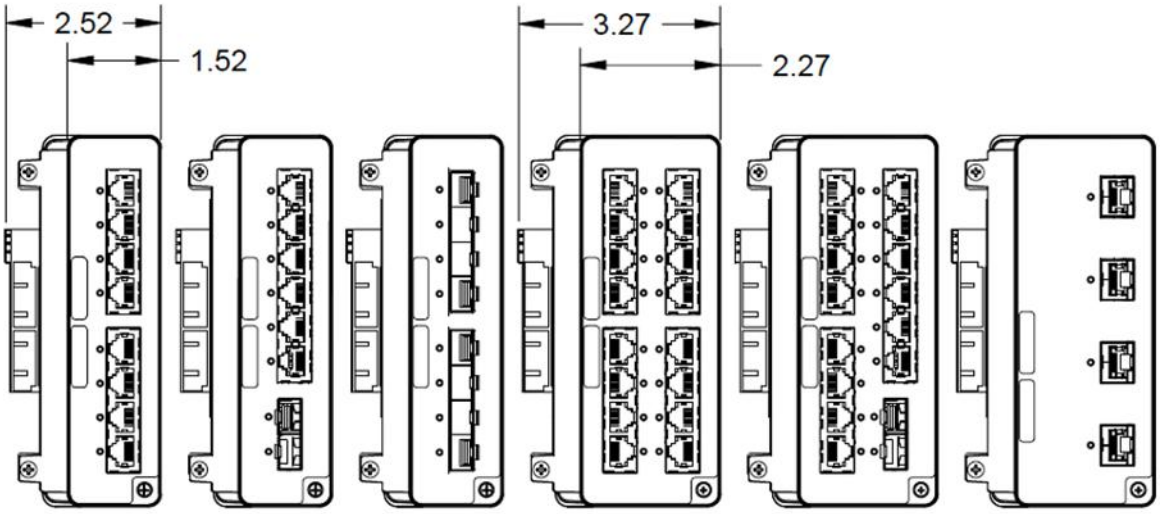
Below image shows the dimensions of IE-3500-8T3X, IE-3505-8P3S chassis. They share the same dimension. The image shows the dimensions of base unit (left), base switch with single width module (middle) and base switch with double width module (right).



Below image shows the dimensions of IE-3500-8U3X base unit (left), base unit with single width module (middle) and base unit with double width module (right).



Front View of Expansion Modules



Top view

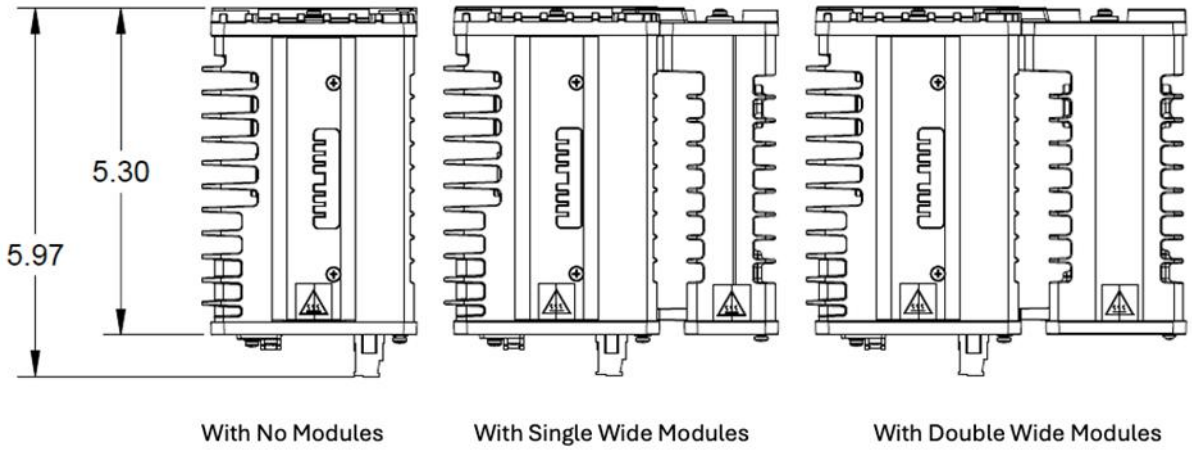


Table 7. Highlights the performance and scalability features for Cisco IE3500 Rugged Series switches.

Features	All SKUs
Forwarding rate	Line rate for all ports and all packet sizes
Number of queues	8
Unicast MAC addresses	24000
Internet Group Management Protocol (IGMP multicast groups)	1024
No. of Active VLANs	1024
No. of VLAN IDs	4096
IPv4 Indirect routes	7000
IPv6 Indirect routes	1522
Spanning Tree Protocol (STP) instances	128
Access Control Entries (PACL/VACL/RACL)	1536
DRAM	8 GB
Flash (User Accessible)	5.1 GB
SD card capacity[1]	16 GB
Jumbo Frames[2]	9198 bytes

[1] The SD card is optional and is not shipped by default with the switch.

[2] Jumbo Frames are limited to 2000 bytes when using ERSPAN/DLR/PRP/HSR/SGT.

Table 8 Highlights the power specifications for Cisco IE3500 Rugged Series switches.

Table 8. IE3500 Power Specifications

	IE-3500-8T3S	IE-3500-8P3S	IE-3505-8T3S	IE-3505-8P3S	IE-3500-8T3X	IE-3500-8U3X
Input voltage range	12V to 48V nominal 9.6V to 60V absolute	12V to 54V nominal 9.6V to 60V absolute	12V to 48V nominal 9.6V to 60V absolute	12V to 54V nominal 9.6V to 60V absolute	12V to 48V nominal 9.6V to 60V absolute	12V to 54V nominal 9.6V to 60V absolute
Input current	7A	11A	7A	11A	11 7A	11.5A
Power consumption[1]	29W	32W	41W	42W	37W	49W

[1] Power consumption for non PoE supported model is measured at 12V and for the PoE supported model is measured at 54V. Power consumption does not include the power that is provided to attached PoE devices.

Table 9 Highlights the power specifications for IE3500 Expansion Modules.

Table 9. IEM Expansion Module Power Consumption

Product ID	Power Consumption[1]
IEM-3500-8T=	6W
IEM-3500-8S=	9W
IEM-3500-16T=	11W
IEM-3500-6T2S=	10W
IEM-3500-14T2S=	16W
IEM-3500-8P=	12W
IEM-3500-16P=	22W
IEM-3500-4MU=	20W

[1] Power consumption for non PoE supported model is measured at 12V and for the PoE supported model is measured at 54V. Power consumption does not include the power that is provided to attached PoE devices.

Table 10 Highlights the power supply options for Cisco IE3500 Rugged Series switches.

Table 10. Power Supply Options

Product ID[1]	Wattage	Rated nominal input operating range	PoE/PoE+ support[2]	More Details
PWR-IE50W-AC=	50W	AC 100-240V/1.25A 50-60Hz or DC 125-250V/1.25A	No	Click here for more details on these DIN Rail power supplies
PWR-IE50W-AC-IEC=	50W	AC 90-264V	No	
PWR-IE50W-AC-L=	50W	AC 100-240V/1.0A 50-60Hz	No	
PWR-IE65W-PC-AC=	65W	AC 100-240V/1.4A 50-60Hz or DC 125-250V/1.0A	Yes	
PWR-IE65W-PC-DC=	65W	DC 24-48VDC/4.5A	Yes	
PWR-IE170W-PC-AC=	170W	AC 100-240V/2.3A 50-60Hz or DC 125-250V/2.1A	Yes	
PWR-IE170W-PC-DC=	170W	DC 12-54VDC/23A	Yes	
PWR-IE240W-PCAC-L=	240W	AC 100-240V/2.5A 50-60Hz	Yes	
PWR-IE480W-PCAC-L=	480W	AC 100-240V/5.0A 50-60Hz	Yes	

[1] See the Power Supply Datasheet for information on which power supplies are certified for Hazardous Locations.

[2] The selected power supply must have sufficient capacity to power the switch (see table 3), the expansion module (see table 4), and the connected PoE load.

Table 11 and Table 12 Highlights the supported software features for Cisco IE3500 Rugged Series switches.

Table 11. Key Supported Software Features (Network Essentials)

Network Essentials License (Perpetual)	Features
Layer 2 switching	IEEE 802.1Q, 802.1w,802.1ab,802.1s, 802.3ad, NTP, UDLD, CDP, LLDP, unicast MAC filter, PAgP, LACP VTPv2, VTPv3, EtherChannel, Q-in-Q tunneling, voice VLAN, PVST+, MSTP, RSTP, Selective Q-in-Q, Layer 2 Tunneling
Multicast	IGMPv1, v2, v3 snooping, IGMP filtering, IGMP querier, Multicast Listener Discovery (MLD)
Management	WebUI, MIB, SNMP, syslog, DHCP server, SPAN session, RSPAN, FSPAN, FRSPAN, ERSPAN, Express setup, NETCONF, RESTCONF
Security	Port security, 802.1x, Dynamic Host Configuration Protocol (DHCP) snooping, dynamic ARP inspection, IP source guard, guest VLAN, MAC authentication bypass, 802.1x multidomain authentication, storm control - unicast, multicast, broadcast, SCP, SSH, SNMPv3, TACACS+, RADIUS server/client, MAC address notification, BPDU guard, Access Lists(PACL/RACL/VACL), SUDI 2099 (Secure Unique Device identifier), Full Flexible NetFlow (FNF), MACsec-128
Quality of Service (QoS)	Ingress policing, rate limit, egress queuing/shaping, auto QoS
IPv6	IPv6 host support, SNMP over IPv6, HTTP/HTTP(s) over IPv6, SNMP over IPv6, Syslog over IPv6, DHCPv6 relay source, DHCPv6 bulk lease query (RFC 5460), IPv6 stateless Auto Config, SCP/SSH, Radius, TACACS+, NTP over IPv6, IPv6 VRF aware BGPv6, IPV6 ND cache expire, IPv6 support for TFTP, IPv6 DNS transport, IPv6 QoS, IPv6 FHS RA Guard, IPv6 FHS DHCPv6 Guard
Layer 3 routing	Inter-VLAN routing, Static routing, Open Shortest Path First, OSPF v3, Routing Information Protocol (RIP), Policy-Based Routing (PBR)
Industrial Ethernet	CIP Ethernet/IP, IEEE 1588 PTP v2 (default and power)[1], PROFINET
TSN	Frame-Preemption[2] (802.3br, 802.1QBu)
Redundancy	Resilient Ethernet Protocol (REP) ring, PROFINET-Multi Ring Protocol (MRP), REP Fast, REP Segment ID Auto-discovery[2], REP ZTP Support, Parallel redundancy protocol (PRP)[3], PTP over PRP[3], High-Availability Seamless Redundancy (HSR-SAN)[3], Device Level Ring (DLR)[3], HSR-PRP Dual Redbox[3]
Utility	Dying gasp, SCADA protocol classification - GOOSE messaging, MODBUS TCP/IP
Automation	YANG, NETCONF, RESTCONF
Industrial Management	Layer 2 switching with 1:1 switch Network Address Translation (L2NAT) for uplink ports
IOx	Container (Native Docker), Cisco Cyber Vision, Secure Equipment Access[2], Cisco ThousandEyes[2]

[1] IEM-3500-4MU expansion module does not support PTP.

[2] Planned to be supported with a future IOS-XE release

[3] Supported on IE3505 variants only

Table 12. Network Advantage Features

Network Advantage License (Perpetual)[1]	Features
IP routing Protocols	OSPF (IPv4 and IPv6), BGP (v4 and v6), ISIS (v4 and v6), EIGRP (v4 and v6), HSRP (v4 and v6), BFD Echo Mode for OSPFv3
Virtualization	VRF-lite, VRF-Aware SGT
Security	Cisco TrustSec®: Security group ACL (SGACL), SGACL logging, Extensible Authentication Protocol – Transport Layer Security (EAP-TLS), IEEE 802.1AE MACsec-256, SD-Access Policy Extended Node, SD-Access Fabric Edge Node, Generic Routing Encapsulation (GRE)
Fabric	Cisco SDA fabric edge[2], BGP-EVPN leaf node[2]
IP Multicast	PIM sparse mode (PIM-SM), PIM dense mode (PIM-DM), MSDP, Multicast routing BSR (IPv4/IPv6), Auto RP (IPv4), Embedded RP (IPv6)
Industrial Ethernet	Layer 3 Network Address Translation (L3NAT)

[1] Network Advantage License includes all Network Essentials features.

[2] Planned to be supported with a future IOS-XE release

Table 13 Highlights the details on Cisco DNA Essentials and Cisco DNA Advantage License for Cisco IE3500 Rugged Series switches.

Table 13. Cisco DNA Essentials and Advantage Features

Feature	Description	Cisco Catalyst Center DNA Essentials[2]	Cisco Catalyst Center DNA Advantage[1,2]
Cisco Catalyst Center	Discovery, topology, inventory, software image management	Yes	Yes
Visibility	Overall Health Dashboard	Yes	Yes
Day-zero network bring-up automation	Cisco Network Plug-and-Play application	Yes	Yes
SD-Access Extended Node	SD-Access fabric overlay extension	Yes	Yes
Industrial Support	MRP Monitoring, REP Configuration, REP Topology View	Yes	Yes
LAN Automation	Lan automation helps create error-free underlay network for SDA deployments	No	Yes
SD-Access Policy Extended Node	SD-Access fabric overlay extension and segmentation	No	Yes
SD-Access Fabric Edge Node	A fabric device that connects wired endpoints to the SDA fabric.	No	Yes
Device 360	Device 360, Client 360, and Network Health Insights	No	Yes

Feature	Description	Cisco Catalyst Center DNA Essentials[2]	Cisco Catalyst Center DNA Advantage[1,2]
Patch/SMU Lifecycle Management	Management of Software Maintenance Upgrades (SMU) or Patches via Cisco Catalyst Center	No	Yes
Application Visibility and Control (NBAR2)	Provides application-level classification, monitoring, and traffic control	No	Yes

[1] Cisco Catalyst Center DNA Advantage license can be paired only with the Network Advantage license.

[2] Cisco Catalyst Center licenses for Industrial Ethernet switches are add-on/optional and not mandatory. They do not include Network Tier features.

Table 14 Highlights the compliance specifications for Cisco IE3500 Rugged Series switches.

Table 14. Compliance Specifications[1]

Specifications	
Electromagnetic emissions	FCC 47 CFR Part 15 subpart B Class A EN 55032/CISPR 32 Class A VCCI Class A AS/NZS CISPR 32 Class A CISPR 11 Class A ICES 003 Class A CNS 15936 Class A KS C9832 Class A EN 300 386
Electromagnetic immunity	CISPR 35 EN55035 KS C9835 EN 61000-4-2 Electro Static Discharge (air – 15kV, contact – 8kV) EN 61000-4-3 Radiated RF (10V/m UTP, 20V/m STP) EN 61000-4-4 Electromagnetic Fast Transients (4kV) EN 61000-4-5 Surge (2KV/1KV Power, 4KV STP) EN 61000-4-6 Conducted RF (10Vrms UTP) EN 61000-4-8 Power Frequency Magnetic Field (1000A/m) EN 61000-4-10 Damped Oscillatory Magnetic Field (100 A/m) EN 61000-4-16 Conducted CM Disturbances (30V, Cont/ 300V, 1 sec) EN 61000-4-17 Ripple Immunity DC Power (10%) EN 61000-4-18 Damped Oscillatory Wave (2.5kV, 1MHz) EN-61000-4-29 DC Voltage Dips and Interruptions

Specifications	
Industry standards	EN 61000-6-2 Industrial Immunity EN 61000-6-4 Industrial Emissions EN 61000-6-1 Light Industrial Immunity EN 61326-1 Measurement, Control and Laboratory Equipment IEEE 1613 Electric Power Stations Communications Networking (In-progress) EN/IEC 61850 - 3 Electric Substations Communications Networking (In-Progress) ODVA Industrial EtherNet/IP IP30
Safety standards and certifications	Information Technology Equipment: UL/CSA 62368-1, IEC 62368-1 CB with all country deviations Industrial floor (control equipment): UL/CSA 61010-2-201 Hazardous Locations: UL121201(Class I, Div 2, groups A-D) CSA 213 (Class I, Div 2, groups A-D) UL/CSA 60079-0 (Class I, Zone 2, Gc/IIC) IEC 60079-0, -7 IECEx test report (Class I, Zone 2, Gc/IIC) cabinet enclosure required EN 60079-0, -7 ATEX certificate (Class I, Zone 2, Gc/IIC) cabinet enclosure required
Operating environment	Operating temperature: -40° C to +70° C (40 LFM vented enclosure) -40° C to +60° C (sealed enclosure) -40° C to +75° C (Min. 200 LFM fan or blower-equipped enclosure) +85° C (type tested for 16 hours) Altitude: up to 15,000 feet, no derating Altitude: up to 40,000 feet, 25° C Max
Storage environment	Temperature: - 40° C to +85° C Altitude: 40,000 feet IEC 60068-2-14
Humidity	Relative humidity of 5% to 95% non-condensing IEC 60068-2-78 IEC 60068-2-30
Shock and vibration	IEC 60068-2-27 (operational shock, 50G, 3ms, half sine) IEC 60068-2-27 (non-operational shock, 65-80G, 9ms, trapezoidal) IEC 60068-2-6 (vibration-sinusoidal, 5Hz-150Hz)

Specifications	
Corrosion	IEC 60068-2-52 (salt fog) (In-Progress) IEC 60068-2-60 (flowing mixed gas) (In-Progress)
Environment	RoHS, WEEE, REACH compliant

[1] For more detailed information on safety approved power/thermal ratings refer the Hardware Installation Guide.

Table 15. Mean Time Between Failures (MTBF) Information - Telcordia Issue 4

Product ID	Rated MTBF (hours)
IE-3500-8T3S	518,889 Hrs
IE-3500-8P3S	474,469 Hrs
IE-3505-8T3S	496,476 Hrs
IE-3505-8P3S	454,728 Hrs
IE-3500-8T3X	518,082 Hrs
IE-3500-8U3X	474,807 Hrs
IEM-3500-8T=	3,012,621 Hrs
IEM-3500-8S=	4,268,192 Hrs
IEM-3500-16T=	1,649,967 Hrs
IEM-3500-6T2S=	2,438,014 Hrs
IEM-3500-14T2S=	1,590,095 Hrs
IEM-3500-8P=	1,881,021 Hrs
IEM-3500-16P=	991,619 Hrs
IEM-3500-4MU=	2,199,022 Hrs

Table 16 Highlights information about management and standards for Cisco IE3500 Rugged Series switches.

Table 16. Management and Standards

Description	Specifications	
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 1588v2 PTP Precision Time Protocol	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 802.3af Power over Ethernet IEEE 802.3at Power over Ethernet IEEE 802.3bt Type 4 Power over Ethernet
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 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 951: BootP	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 RFC 5460: DHCPv6 bulk lease query

Description	Specifications	
SNMP MIB objects	802.1X MIB	CISCO-IF-EXTENSION-MIB
	CISCO-DHCP-SNOOPING-MIB	CISCO-IMAGE-MIB
	CISCO-UDLDP-MIB	CISCO-MEMORY-POOL-MIB
	CISCO-ENVMON-MIB	CISCO-PING-MIB
	CISCO-PRIVATE-VLAN-MIB	SNMP-TARGET-EXT-MIB
	CISCO-PAE-MIB	IF_MIB
	Cisco-Port-QoS-MIB	ENTITY-MIB
	CISCO-ERR-DISABLE-MIB	LLDP-EXT-PNO-MIB
	CISCO- PROCESS-MIB	NOTIFICATION-LOG-MIB
	LLDP-MIB	OLD-CISCO-CPU-MIB
	CiscoMACNotification-MIB	ETHERLIKE-MIB
	CISCO-CONFIG-COPY-MIB	OLD-CISCO-SYSTEM-MIB
	LLDP-MED-MIB	OLD-CISCO-MEMORY-MIB
	Bridge-MIB	RMON-MIB
	CISCO-CAR-MIB	SNMP-COMMUNITY-MIB
	CISCO-LAG-MIB	SNMP-FRAMEWORK-MIB
	CISCO-SYSLOG-MIB	SNMP-PROXY-MIB
	CISCO-FTP-CLIENT-MIB	SNMP-MPD-MIB
	CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB	SNMP-NOTIFICATION-MIB
	CISCO-VLAN-MEMBERSHIP-MIB	SNMP-TARGET-MIB
	Cisco-REP-MIB	SNMP-USM-MIB
	CISCO-PORT-STORM-CONTROL-MIB	CISCO-DATACOLLECTION-MIB
	CISCO-CDP-MIB	CISCO-CABLE-DIAG-MIB
	CISCO-IP-STAT-MIB	CISCO-PORT-SECURITY-MIB
	CISCO-STP-EXTN-MIB	BULK_FILE_MIB
	CISCO-VTP-MIB	CISCO-ENTITY-ALARM-MIB
	IEEE8023-LAG-MIB	SNMP-VIEW-BASED-ACM-MIB
	SMON-MIB	CISCO-MAC-AUTH-BYPASS-MIB
	CISCO-ACCESS-ENVMON-MIB	CISCO-AUTH-FRAMEWORK-MIB
	CISCO-CALLHOME-MIB	CISCO-BRIDGE-Ext-MIB
	CISCO-CONFIG-MAN-MIB	SNMPv2-MIB
	CISCO-FLASH-MIB	CISCO-ENTITY-VENDORTYPE-OID-MIB
	CISCO-ENTITY-SENSOR-MIB	CISCO-PRODUCTS-MIB
	IP-MIB	IP-FORWARD-MIB
	CISCO-PAGP-MIB	BGP-CISCO-BGP-MIBv2

Table 17 through 19 Highlights information about supported SFPs for Cisco IE3500 Rugged Series switches and IEM3500 Modules.

Table 17. Below 100mb FE SFPs supported only on IE3500/IE3505 1G uplink variants and on expansion module SFP downlinks[1]

Product ID	Specifications	SFP type	Temperature range[1]	Maximum distance	Cable type	Dom support
GLC-FE-100FX-RGD=	100BASE-FX	FE	IND	2 km	Multimode fiber (MMF)	No
GLC-FE-100LX-RGD=	100BASE-LX10	FE	IND	10 km	Single-Mode Fiber (SMF)	No
GLC-FE-100FX=	100BASE-FX	FE	COM	2 km	MMF	No
GLC-FE-100LX=	100BASE-LX10	FE	COM	10 km	SMF	No
GLC-FE-100EX=	100BASE-EX	FE	COM	40 km	SMF	No
GLC-FE-100ZX=	100BASE-ZX	FE	COM	80 km	SMF	No
GLC-FE-100BX-U=	100BASE-BX10	FE	COM	10 km	SMF	No
GLC-FE-100BX-D=	100BASE-BX10	FE	COM	10 km	SMF	No

Table 18. Below GE SFPs supports on both IE3500/IE3505 1G uplink and 10GE uplink variants and on expansion module downlinks[1]

Product ID	Specifications	SFP type	Temperature range[1]	Maximum distance	Cable type	Dom support
GLC-SX-MM-RGD=	1000BASE-SX	GE	IND	220-550 m	MMF	Yes
GLC-LX-SM-RGD=	1000BASE-LX/LH	GE	IND	550 110 km	MMF/SMF	Yes
GLC-ZX-SM-RGD=	1000BASE-ZX	GE	IND	70 km	SMF	Yes
SFP-GE-S=	1000BASE-SX	GE	EXT	220-550 m	MMF	Yes
SFP-GE-L=	1000BASE-LX/LH	GE	EXT	550 m/10 km	MMF/SMF	Yes
SFP-GE-Z=	1000BASE-ZX	GE	EXT	70 km	SMF	Yes
GLC-BX-U=	1000BASE-BX10	GE	COM	10 km	SMF	Yes
GLC-BX-D=	1000BASE-BX10	GE	COM	10 km	SMF	Yes
GLC-SX-MM=	1000BASE-SX	GE	COM	220-550 m	MMF	Yes
GLC-LH-SM=	1000BASE-LX/LH	GE	COM	550 m/10 km	MMF/SMF	Yes
GLC-ZX-SM=	1000BASE-ZX	GE	COM	70 km	SMF	Yes

Product ID	Specifications	SFP type	Temperature range[1]	Maximum distance	Cable type	Dom support
GLC-EX-SMD=	1000BASE-EX	GE	COM	40 km	SMF	Yes
GLC-TE=[2]	1000BASE-T	GE	EXT	100 m	Cat5e	No
GLC-T=[2]	1000BASE-T	GE	EXT	100m	Cat5e	No
GLC-BX40-U-I=	1000BASE-BX40	GE	IND	40 km	SMF	Yes
GLC-BX40-D-I=	1000BASE-BX40	GE	IND	40 km	SMF	Yes
GLC-BX40-DA-I=	1000BASE-BX40	GE	IND	40 km	SMF	Yes
GLC-BX80-U-I=	1000BASE-BX80	GE	IND	80 km	SMF	Yes
GLC-BX80-D-I=	1000BASE-BX80	GE	IND	80 km	SMF	Yes
GLC-SX-MMD=	1000BASE-SX	GE	EXT	550 m	MMF	Yes
GLC-LH-SMD=	1000BASE-LX/LH	GE	EXT	550m/10km	MMF/SMF	Yes
GLC-ZX-SMD=	1000BASE-ZX	GE	EXT	70 km	SMF	Yes
GLC-T-RGD=[2]	1000BASE-T	GE	IND	100 m	Copper	NA
GLC-BX-U-I=	1000BASE-BX	GE	IND	10km	SMF	Yes
GLC-BX-D-I=	1000BASE-BX	GE	IND	10km	SMF	Yes
ONS-SI-GE-SX=	1000BASE-SX1000BASE-SX	GE	COM	20-550m	SMF	Yes
ONS-SI-GE-LX=	1000BASE-LX1000BASE-LX	GE	COM	550m	SMF/ MMF	Yes
ONS-SI-GE-EX=	1000BASE-EX1000BASE-EX	GE	COM	40km	SMF	Yes
ONS-SI-GE-ZX=	1000BASE-ZX	GE	COM	80km	SMF	Yes
ONS-SE-GE-BXU=	1000BASE-BX10	GE	COM	10km	SMF	Yes
ONS-SE-GE-BXD=	1000BASE-BX10	GE	COM	10km	SMF	Yes
CWDM-SFP-xxxx=[3]	1000BASE-CWDM	GE	COM	80km	SMF	Yes
DWDM-SFP-xxxx=[3]	1000BASE-DWDM	GE	COM	80km	SMF	Yes

[1] If nonindustrial SFPs (EXT, COM) are used, the switch operating temperature must be derated.

[2] Degrades PTP performance.

[3] DWDM-SFP-xxxx or CWDM-SFP-xxxx -- 'xxxx' stands for different wavelengths of SFPs, both in case of CWDM and DWDM GE and 10GE SFPs.

Table 19. Below 10GE SFP+ supports only on IE3500 10GE uplink variants[1]

Product ID	Specifications	SFP type	Temperature range[1]	Maximum distance	Cable type	Dom support
SFP-10G-ER=	10GBASE-ER	10GE	COM	40Km	SMF	Yes
SFP-10G-ER-I=	10GBASE-ER-I	10GE	IND	40Km	SMF	Yes
SFP-10G-SR-I=	10GBASE-SR-I	10GE	IND	26m 33m 66m 82m 300m 400m	MMF	Yes
SFP-10G-LR-X=	10GBASE-LR-X	10GE	EXT	10Km	SMF	Yes Yes
SFP-10G-LR=	10GBASE-LR	10GE	COM	10KM	SMF	Yes
SFP-10G-LR-S=	10GBASE-LR-S	10GE	COM	10Km	SMF	Yes
SFP-10G-LRM=	10GBASE-LRM	10GE	COM	220m 100m 220m 300m	MMF SMF	Yes
SFP-10G-SR=	10GBASE-SR	10GE	COM	26m 33m 66m 82m 300m 400m	MMF	Yes
SFP-10G-BX40D-I=	10G-SFP Bidirectional for 40km	10GE	IND	40Km	SMF	Yes
SFP-10G-BX40U-I=	10G-SFP Bidirectional for 40km	10GE	IND	40Km	SMF	Yes
SFP-10G-BXU-I=	10G-SFP Bidirectional for 10km	10GE	IND	10Km	SMF	Yes
SFP-10G-BXD-I=	10G-SFP Bidirectional for 10km	10GE	IND	10Km	SMF	Yes

Product ID	Specifications	SFP type	Temperature range[1]	Maximum distance	Cable type	Dom support
SFP-H10G-CU1M=	10GBASE-CU SFP+ Cable 1 Meter, passive	10GE	COM	1m	Twinax cable, passive, 30AWG cable assembly	No
SFP-H10G-CU3M=	10GBASE-CU SFP+ Cable 3 Meter, passive	10GE	COM	3m	Twinax cable, passive, 30AWG cable assembly	No
SFP-H10G-CU5M=	10GBASE-CU SFP+ Cable 5 Meter, passive	10GE	COM	5m	Twinax cable, passive, 30AWG cable assembly	No
SFP-10G-ZR=	10GBASE-ZR	10GE	COM	80Km	SMF	Yes
SFP-10G-ZR-I=	10GBASE-ZR-I	10GE	IND	80Km	SMF	Yes
ONS-SI+-10G-SR=	10GBASE-SR	10GE	COM	26m 33m 66m 82m 300m 400m	SMF	Yes
ONS-SI+-10G-LR=	10GBASE-LR	10GE	COM	10km	SMF/MMF	Yes
ONS-SI+-10G-ER=	10GBASE-ER	10GE	COM	40km	SMF	Yes
ONS-SI+-10G-ZR=	10GBASE-ZR	10GE	COM	80km	SMF	Yes
SFP-10G-T-X=[2]	10GBASE-T	10GE	COM	Upto 30m Upto 100 m	Cat 6a/cat7a or better Cat5e/Cat6A/ Cat7 or better	No
SFP-10G-LR10-I=	10GBASE-LR	10GE	COM	10km	MMF/SMF	Yes
SFP-10G-SR-S=	10GBASE-SR	10GE	COM	26m 33m 66m 82m 300m 400m	SMF	Yes

Product ID	Specifications	SFP type	Temperature range[1]	Maximum distance	Cable type	Dom support
CWDM-SFP10G-xxxx SFP[3]	CWDM 10 Gigabit Ethernet	10GE	COM		SMF	Yes
DWDM-SFP10G-xxxx SFP[3]	DWDM 10 Gigabit Ethernet	10GE	COM		SMF	Yes

[1] If nonindustrial SFPs (EXT, COM) are used, the switch operating temperature must be derated.

[2] Degrades PTP performance.

[3] DWDM-SFP-xxxx or CWDM-SFP-xxxx -- 'xxxx' stands for different wavelengths of SFPs, both in case of CWDM and DWDM GE and 10GE SFPs.

Ordering information

Table 20 lists the ordering information for fixed system, expansion modules and memory that are commonly used with the Cisco IE3500 switches.

Table 20. Ordering Information

Product ID	Description
IE-3500-8T3S-E	IE3500 with 8 GE Copper and 3 GE SFP, Modular, Network Essential
IE-3500-8T3S-A	IE3500 with 8 GE Copper and 3 GE SFP, Modular, Network Advantage
IE-3500-8P3S-E	IE3500 with 8 GE PoE/PoE+, 3 GE SFP, Modular, Network Essential
IE-3500-8P3S-A	IE3500 with 8 GE PoE/PoE+, 3 GE SFP, Modular, Network Advantage
IE-3505-8T3S-E	IE3500 with 8 GE Copper and 3 GE SFP, Adv. Modular, Network Essential
IE-3505-8T3S-A	IE3500 with 8 GE Copper and 3 GE SFP, Adv. Modular, Network Advantage
IE-3505-8P3S-A	IE3500 with 8 GE PoE/PoE+, 3 GE SFP, Adv. Modular, Network Essential
IE-3505-8P3S-A	IE3500 with 8 GE PoE/PoE+, 3 GE SFP, Adv. Modular, Network Advantage
IE-3500-8T3X-E	IE3500 with 8 GE Copper and 3 10G SFP, Modular, Network Essential
IE-3500-8T3X-A	IE3500 with 8 GE Copper and 3 10G SFP, Modular, Network Advantage
IE-3500-8U3X-E	IE3500 with 8 GE PoE/PoE+/4PPoE, 3 10G SFP, Modular, Network Essential
IE-3500-8U3X-A	IE3500 with 8 GE PoE/PoE+/4PPoE, 3 10G SFP, Modular, Network Advantage
IEM-3500-8T=	IE3500 with 8 GE Copper ports, Expansion Module
IEM-3500-8S=	IE3500 with 8 GE SFP Fiber ports, Expansion Module
IEM-3500-16T=	IE3500 with 16 GE Copper ports, Expansion Module
IEM-3500-6T2S=	IE3500 with 6 GE Copper + 2 GE SFP, Expansion Module

Product ID	Description
IEM-3500-14T2S=	IE3500 with 14 GE Copper + 2 GE SFP, Expansion Module
IEM-3500-8P=	IE3500 with 8 GE PoE/PoE+ Copper ports, Expansion Module
IEM-3500-16P=	IE3500 with 16 GE PoE/PoE+ Copper, Expansion Module
IEM-3500-4MU=	IE3500 with 4 2.5G Copper (4PPoE), Expansion Module
SD-IE-16GB=	IE 16GB SD memory card for IE
STK-RACK-DINRAIL=	19” DIN Rail mount kit
IE3500-NW-A=	Network Advantage License for IE3500 Series, Perpetual
IE3500-DNA-E	Cisco DNA Essentials license for IE3500/IE3500H Series Switches
IE3500-DNA-E-3Y	IE3500/IE3500H Cisco DNA Essentials, 3 Year Term license
IE3500-DNA-E-5Y	IE3500/IE3500H Cisco DNA Essentials, 5 Year Term license
IE3500-DNA-E-7Y	IE3500/IE3500H Cisco DNA Essentials, 7 Year Term license
IE3500-DNA-A	Cisco DNA Advantage license for IE3500/IE3500H Series Switches
IE3500-DNA-A-3Y	IE3500/IE3500H Cisco DNA Advantage, 3 Year Term license
IE3500-DNA-A-5Y	IE3500/IE3500H Cisco DNA Advantage, 5 Year Term license
IE3500-DNA-A-7Y	IE3500/IE3500H Cisco DNA Advantage, 7 Year Term license

Warranty

Five-year limited HW warranty on all IE3500 PIDs and all IE Power Supplies (see table 9 above). See link below for more details on warranty https://www.cisco.com/c/en/us/products/warranties/warranty-doc-c99-740591.html.

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Information about Cisco’s environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the “Environment Sustainability” section of Cisco’s Corporate Social Responsibility (CSR) Report.

Reference links to information about key environmental sustainability topics (mentioned in the “Environment Sustainability” section of the CSR Report) are provided in the following table:

Sustainability topic	Reference
Information on product material content laws and regulations	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

Reference links to product-specific environmental sustainability information that is mentioned in relevant sections of this data sheet are provided in the following table:

Sustainability Topic	Reference
Power	
Power specifications and consumption	Table 8. IE3500 power specifications
Environmental Characteristics	
Operating temperature, industry standards, EMC emissions	Table 14. Compliance specifications
Material	
Unit Weight	Table 6. IE3500 physical configurations

Cisco makes the packaging data available for informational purposes only. It may not reflect the most current legal developments, and Cisco does not represent, warrant, or guarantee that it is complete, accurate, or up to date. This information is subject to change without notice.

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