Allied Telesis™

# IE300 Series
## Industrial Ethernet Layer 3 Switches

Allied Telesis ruggedized IE300 Industrial Ethernet switches provide enduring performance in harsh environments, such as those found in manufacturing, transportation and physical security. Offering high throughput, rich functionality and advanced security features, IE300 switches deliver the performance and reliability demanded by industrial deployments in the age of the Internet of Things (IoT).

PoE *plus*

AlliedWare Plus™ OPERATING SYSTEM

## Overview
Allied Telesis IE300 Series are a highperforming and feature-rich choice for today's networks. The IE300 are ideal for Industrial Ethernet applications, being qualified for manufacturing, roadway transportation (Traffic Control) and Smart Cities.

With a fanless design and a wide operating temperature range of -40°C to 75°C, they tolerate harsh and demanding environments, such as those found in industrial and outdoor deployment.

## Network management
Allied Telesis Autonomous Management Framework™ (AMF) meets the increasing management requirements of today's modern converged networks, by automating many everyday tasks such as configuration management. AMF's powerful features allow an entire network to be easily managed as a single virtual device.

Vista Manager™ EX is an intuitive visualization tool that complements the power of AMF. It allows users to monitor the network and quickly identify issues before they become major problems.

## Securing the network edge
Ensuring data protection means controlling network access. Protocols such as IEEE 802.1X port-based authentication guarantee that only known users are connected to the network. Unknown users who physically connect can be segregated into a pre-determined part of the network. This offers network guests Internet access, while ensuring the integrity of private network data.

## Gigabit and fast Ethernet support
The IE300 Series SFP ports support both gigabit and Fast Ethernet Small Form-Factor Pluggables (SFPs). This makes the IE300 Series ideal for environments where gigabit fiber switches will be phased in over time. This allows for connectivity to the legacy 100FX hardware until it is upgraded to gigabit Ethernet.

Support for both speeds of SFPs allows organizations to stay within budget as they migrate to faster technologies.

## Network resiliency
The IE300 Series supports highly stable and reliable ICT network switching, with recovery times down to 50ms. The IE300 can be customized with the most appropriate mechanism and protocol to prevent network connection failure. Choices include Allied Telesis Ethernet Protection Switched Ring (EPSRing™), and the standards-based ITU-T G.8032.

## Configurable power budget
On the PoE sourcing IE300 switches, you can configure both the overall power budget and the power feeding limit on a per-port basis, to establish a close relationship between the power sourcing feature and the real capabilities of the external Power Supply Unit (PSU).[1]

## Future-proof
The IE300 Series ensures a future-proof network with a comprehensive feature set, and are Software Defined Networking (SDN) ready supporting OpenFlow v1.3.

## Key Features

▶ AlliedWare Plus™ functionality

▶ Allied Telesis Autonomous Management Framework™ (AMF) node

▶ OpenFlow for SDN

▶ Routing capability (ECMP, OSPF, RIP, Static and BGP)

▶ Active Fiber Monitoring™ (AFM)

▶ Industrial automation protocol support (Modbus/TCP)

▶ Ethernet Protection Switched Ring (EPSRing™)

▶ Ethernet Ring Protection Switching (ITU-T G.8032)

▶ Upstream Forwarding Only (UFO)

▶ Precise time synchronization with sub-microsecond resolution (IEEE 1588 PTP)

▶ IEEE 802.3at PoE+ sourcing (30W)

▶ Hi-PoE sourcing (60W)[2]

▶ Continuous PoE

▶ Enhanced Thermal Shutdown

▶ Redundant power inputs

▶ Alarm input/output

▶ Fanless design

[1] Power supply must be compliant with local/national safety and electrical code requirements. Select the supply with the most appropriated output power derating curve.

[2] Hi-PoE is a proprietary implementation of 4-pair PoE

AMF™

EPSRing™

# Key Details

## Allied Telesis Autonomous Management Framework (AMF)

▶ AMF is a sophisticated suite of management tools that provide a simplified approach to network management. Common tasks are automated or made so simple that the every-day running of a network can be achieved without the need for highly-trained, and expensive, network engineers. Powerful features like centralized management, auto-backup, auto-upgrade, auto-provisioning and auto-recovery enable plug-and-play networking and zero-touch management.

▶ AMF secure mode encrypts all AMF traffic, provides unit and user authorization, and monitors network access to greatly enhance network security.

## Software Defined Networking (SDN)

▶ OpenFlow is a key technology that enables the use of SDN to build smart applications that unlock value and reduce cost.

## ICT Networks Resiliency

▶ EPSRing™ and ITU-T G.8032 enable a protected ring capable of recovery within as little as 50ms. These features are perfect for high performance and high availability.

▶ Spanning Tree Protocol compatible, RSTP; MSTP; static Link Aggregation Group (LAG), and dynamic Link Aggregation Control Protocol (LACP) support.

## Quality of Service (QoS)

▶ Comprehensive low-latency wire-speed QoS provides flow-based traffic management with full classification, prioritization, traffic shaping and min/max bandwidth profiles. Enjoy boosted network performance and guaranteed delivery of business-critical Ethernet services and applications. Time-critical services such as voice and video take precedence over non-essential services such as file downloads, maintaining responsiveness of your applications.

## sFlow

▶ sFlow is an industry standard technology for monitoring high speed switched networks. It provides complete visibility into network use, enabling performance optimization, usage accounting/billing, and defense against security threats. Sampled packets sent to a collector ensure it always has a real-time view of network traffic.

## Active Fiber Monitoring

▶ Active Fiber Monitoring prevents eavesdropping on fiber communications by monitoring received optical power. If an intrusion is detected, the link can be automatically shut down, or an operator alert can be sent.

## VLAN Mirroring (RSPAN)

▶ VLAN mirroring allows traffic from a port on a remote switch to be analyzed locally. Traffic being transmitted or received on the port is duplicated and sent across the network on a special VLAN.

## Link Layer Discovery Protocol – Media Endpoint Discovery (LLDP – MED)

▶ LLDP-MED extends LLDP basic network endpoint discovery and management functions. LLDP-MED allows for media endpoint specific messages, providing detailed information on power equipments, network policy, location discovery (for Emergency Call Services) and inventory.

## VLAN Translation

▶ VLAN Translation allows traffic arriving on a VLAN to be mapped to a different VLAN on the outgoing paired interface.

▶ In Metro networks, it is common for a network Service Provider (SP) to give each customer their own unique VLAN, yet at the customer location give all customers the same VLAN-ID for tagged packets to use on the wire. SPs can use VLAN Translation to change the tagged packet's VLAN-ID at the customer location to the VLAN-ID for tagged packets to use within the SP's network.

▶ This feature is also useful in Enterprise environments where it can be used to merge two networks together, without manually reconfiguring the VLAN numbering scheme. This situation can occur if two companies have merged and the same VLAN-ID is used for two different purposes.

## VLAN ACLs

▶ Simplify access and traffic control across entire segments of the network. Access Control Lists (ACLs) can be applied to a Virtual LAN (VLAN) as well as a specific port.

## Security (Tri-Authentication)

▶ Authentication options on the IE300 Series also include alternatives to IEEE 802.1X port-based authentication, such as web authentication, to enable guest access and MAC authentication for endpoints that do not have an IEEE 802.1X supplicant. All three authentication methods— IEEE 802.1X, MAC-based and Web-based—can be enabled simultaneously on the same port for tri-authentication.

## Upstream Forwarding Only (UFO)

▶ UFO lets you manage which ports in a VLAN can communicate with each other, and which only have upstream access to services, for secure multi-user deployment.

## Dynamic Host Configuration Protocol (DHCP) Snooping

▶ DHCP servers allocate IP addresses to clients, and the switch keeps a record of addresses issued on each port. IP source guard checks against this DHCP snooping database to ensure only clients with specific IP and/or MAC address can access the network. DHCP snooping can be combined with other features, like dynamic ARP inspection, to increase security in layer 2 switched environments, and also provides a traceable history, which meets the growing legal requirements placed on service providers.

## Time synchronization with sub-microsecond precision (IEEE 1588 PTP)

▶ Measurement and automation systems involving multiple devices often require accurate timing for event synchronization and data correlation. The IEEE 1588 Precise Time Protocol is a fault tolerant method of enabling clock synchronization in a distributed Ethernet network, and supports precise timing for automation applications and measurement systems.

▶ The IE300 supports IEEE 1588-2008 (PTPv2) as Transparent Clock end-to-end mode, and performs an active role on Ethernet networks reducing the effects of Jitter.

## PoE, PoE+ and Hi-PoE

▶ Each port supplies either 15.40W (PoE), or 30.00W (PoE+); four ports are configurable for Hi-PoE, which uses all four pairs in the cable to supply up to 60W. When supplying Hi-PoE, the IE300 supports both single signature and dual signature negotiation with power devices. This supports PTZ cameras with heater/blowers for outdoor applications, enhanced infrared lighting, lighting controller and LED lighting fixtures, remote Point of Sale (POS) kiosks, and other devices.

▶ The IE300 allows configuration of the overall power budget, as well as the power limit per port.

## Continuous PoE

▶ Continuous PoE allows the switch to be restarted without affecting the supply of power to connected devices. Smart lighting, security cameras, and other PoE devices will continue to operate during a software upgrade on the switch.

## Industrial Automation

▶ Modbus/TCP is intended for supervision and control of automation equipment; that is a variant of the MODBUS protocol using the TCP/IP for communications on Ethernet networks.

▶ Modbus/TCP supports read/write register access and heartbeats functions to enhance the efficiency of the process control for both SCADA and slave devices.

## Alarm Input/Output

▶ Alarm Input/Output is useful for security integration solutions to respond to events instantly, and automatically notify the monitoring control center. The 2-pin terminal blocks may be connected to sensors and actuator relays. Alarm Input receives signals from external devices like motion sensor and magnets that will trigger actions if something changes. Alarm output controls external devices upon an event (i.e. sirens, strobes, PTZ camera).
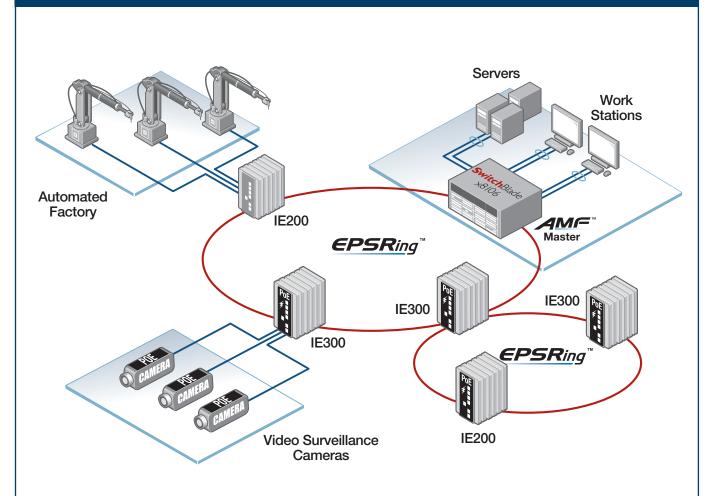
## Enhanced Thermal Shutdown

▶ The enhanced Thermal Shutdown feature acts to restrict PoE power and services when the switch exceeds the safe operating temperature. The system restores operation when the temperature returns to acceptable levels.

## Premium Software License

▶ The basic feature set can easily be upgraded with premium software licenses.

## Key Solutions



EPSRing™ and ITU-T G.8032 provide high speed resilient ring connectivity. This diagram shows the IE Series in a double ring network topology.

The IE Series operates at a large -40°C to +75°C temperature range and allows deployment in outdoor and harsh industrial environments.

PoE models feed 30 Watts per port, and support remotely controlled Pan, Tilt and Zoom (PTZ) video cameras.

The IE300 can source up to 60 Watts on four ports. The Hi-PoE utilizes all four pairs in the cable to provide power and expands the range of devices that can be added to the network, such as PTZ cameras with a heater/blower, enhanced infrared lighting, POS terminals, and thin client computer.

Management can be automated with the Allied Telesis Autonomous Management Framework™ (AMF).

# IE300 Series | Industrial Ethernet, Layer 3 Switches

## Specifications

| PRODUCT | 10/100/1000T (RJ-45) COPPER PORTS | 100/1000X SFP PORTS | TOTAL PORTS | POE+ ENABLED PORTS | SWITCHING FABRIC | FORWARDING RATE |
|---|---|---|---|---|---|---|
| IE300-12GP | 8 | 4 | 12 | 8 | 24Gbps | 17.8Mpps |
| IE300-12GT | 8 | 4 | 12 | - | 24Gbps | 17.8Mpps |

## Performance
- RAM memory: 512MB DDR SDRAM
- ROM memory: 64MB flash
- MAC address: 16K entries
- Packet Buffer: 1.5 MBytes (12.2 Mbits)
- Priority Queues: 8
- Simultaneous VLANs: 4K
- VLANs ID range: 1 – 4094
- Jumbo frames: 9KB jumbo packets
- Multicast groups: 1,023 (Layer 2), or 512 (Layer 2) and 512 (Layer 3)[2]

## Other Interfaces
Type   Serial console (UART)
Port no.   1
Connector   RJ-45 female

Type   USB2.0 (Host Controller Class)
Port no.   1
Connector   Type A receptacle

Type   Alarm input (320µA @3.3Vdc)
Port no.   1
Connector   2-pin Terminal Block

Type   Alarm output (0.5A @30Vdc)
Port no.   1
Connector   2-pin Terminal Block

Type   Power Input
Port no.   2
Connector   2-pin Terminal Block

## Reliability
- Modular AlliedWarePlus™ operating system
- Redundant power input
- Full environmental monitoring of temperature and internal voltages. SNMP traps alert network managers in case of any failure
- Enhanced Thermal Shutdown

## Flexibility and Compatibility
- Gigabit SFP ports supports any combination of Allied Telesis 10Mbps, 100Mbps and 1Gbps SFP modules listed in this document under Ordering Information

## Industrial Automation
- IEEE 1588v2 1-step End-to-End Transparent Clock
- Modbus/TCP

## Diagnostic Tools
- Active Fiber Monitoring detects tampering on optical links
- Automatic link flap detection and port shutdown
- Built-In Self Test (BIST)
- Cable fault locator (TDR)
- Connectivity Fault Management (CFM) - Continuity Check Protocol (CCP) for use with G.8032 ERPS
- Event logging via Syslog over IPv4
- Find-me device locator

- Optical Digital Diagnostic Monitoring (DDM)
- Ping polling for IPv4 and IPv6
- Port and VLAN mirroring (RSPAN)
- TraceRoute for IPv4 and IPv6
- UniDirectional Link Detection (UDLD)

## IPv4 Features
- Black hole routing
- Directed broadcast forwarding
- DHCP server and relay
- DNS relay
- Equal Cost Multi Path (ECMP) routing
- Route redistribution (OSPF, RIP, and BGP)
- Static unicast and multicast routes for IPv4
- UDP broadcast helper (IP helper)

## IPv6 Features
- DHCPv6 server and relay
- Device management over IPv6 networks with SNMPv6, Telnetv6 and SSHv6
- IPv4 and IPv6 dual stack
- IPv6 hardware ACLs
- NTPv6 client and server
- Static unicast routing for IPv6

## Management
- Front panel LEDs provide at-a-glance PSU status, PoE status, and fault information
- Allied Telesis Autonomous Management Framework (AMF) node
- Console management port on the front panel for ease of access
- Eco-friendly mode allows ports and LEDs to be disabled to save power
- Industry-standard CLI with context-sensitive help
- Powerful CLI scripting engine
- Built-in text editor
- Event-based triggers allow user-defined scripts to be executed upon selected system events
- SNMPv1/v2c/v3 support
- Comprehensive SNMP MIB support for standards based device management
- USB interface allows software release files, configurations and other files to be stored for backup and distribution to other devices
- Recessed Reset button

## Quality of Service
- 8 priority queues with a hierarchy of high priority queues for real-time traffic, and mixed scheduling, for each switch port
- Extensive remarking capabilities
- IP precedence and DiffServ marking based on Layer 2, 3 and 4 headers
- Limit bandwidth per port or per traffic class down to 64kbps

- Policy-based QoS based on VLAN, port, MAC and general packet classifiers
- Policy-based storm protection
- Strict priority, weighted round robin or mixed scheduling
- Taildrop for queue congestion control
- Wirespeed traffic classification with low latency essential for VoIP and real-time streaming media applications

## Resiliency Features
- Control Plane Prioritization (CPP) ensures the CPU always has sufficient bandwidth to process network control traffic
- Dynamic link failover (host attach)
- Ethernet Protection Switching Ring (EPSR) with SuperLoop Prevention (EPSR-SLP)
- Ethernet Ring Protection Switching (G.8032 ERPS)
- Loop protection: loop detection and thrash limiting
- PVST+ compatibility mode
- Router Redundancy Protocol (RRP) snooping
- Spanning Tree Protocol (STP) root guard

## Security Features
- Access Control Lists (ACLs) based on layer 3 and 4 headers
- Access Control Lists (ACLs) for management traffic
- Authentication, Authorisation and Accounting (AAA)
- Auth fail and guest VLANs
- BPDU protection
- Bootloader can be password protected for device security
- DHCP snooping, IP source guard and Dynamic ARP Inspection (DAI)
- DoS attack blocking and virus throttling
- Dynamic VLAN assignment
- MAC address filtering and MAC address lock-down
- Network Access and Control (NAC) features manage endpoint security
- Port-based learn limits (intrusion detection)
- Private VLANs provide security and port isolation for multiple customers using the same VLAN
- RADIUS local server (100 users) and accounting
- Secure Copy (SCP)
- Strong password security and encryption
- TACACS+ authentication and accounting
- Tri-authentication: MAC-based, Web-based and IEEE 802.1X

## Software Defined Networking (SDN)
- OpenFlow v1.3 support

## Environmental Specifications
- Operating temperature range: -40°C to 75°C (-40°F to 167°F)
- Storage temperature range: -40°C to 85°C (-40°F to 185°F)
- Operating humidity range: 5% to 95% non-condensing

[2] When PIM is enabled; see the Command Reference guide for recommended settings

▶ Storage humidity range:
5% to 95% non-condensing

▶ Operating altitude:
3,000 meters maximum (9,843 ft)

## Mechanical

▶ EN 50022, EN 60715 Standardized mounting on rails

## Environmental Compliance

▶ RoHS

▶ China RoHS

▶ WEEE

## Electrical/Mechanical Approvals

| | |
|---|---|
| Compliance Mark | CE, FCC |
| Safety | EN/IEC/UL 60950-1 |
| | EN/IEC/UL 60950-22 |
| | CAN/CSA-22.2 no. 60950-1 |
| | CAN/CSA-22.2 no. 60950-22 |
| EMC | CISPR 32 |
| | EN55024 |
| | EN55032 Class A |
| | EN61000-3-2 |
| | EN61000-3-3 |
| | EN61000-4-2 (ESD) |

| | |
|---|---|
| | EN61000-4-3 (RS) |
| | EN61000-4-4 (EFT) |
| | EN61000-4-5 (Surge) |
| | EN61000-4-6 (CS) |
| | EN61000-4-8 |
| | EN61000-4-11 |
| | FCC Part 15B, Class A |
| Shock | EN60068-2-27 |
| | EN60068-2-31 |
| Vibration | EN60068-2-6 |
| Traffic Control | NEMA TS2 |

## Physical Specifications

| PRODUCT | WIDTH | DEPTH | HEIGHT | WEIGHT | ENCLOSURE | MOUNTING | PROTECTION RATE |
|---|---|---|---|---|---|---|---|
| IE300-12GP | 146 mm (5.75 in) | 127 mm (5.00 in) | 152 mm (6.00 in) | 2.0 kg (4.5 lb) | Aluminum shell | DIN rail, wall mount | IP30 |
| IE300-12GT | 146 mm (5.75 in) | 127 mm (5.00 in) | 152 mm (6.00 in) | 2.0 kg (4.4 lb) | Aluminum shell | DIN rail, wall mount | IP30 |

## Power Characteristics

| PRODUCT | INPUT VOLTAGE | COOLING | NO POE LOAD | | | FULL POE LOAD*** | | | MAX POE POWER | MAX POE SOURCING PORTS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MAX POWER CONSUMPTION | MAX HEAT DISSIPATION | NOISE | MAX POWER CONSUMPTION | MAX HEAT DISSIPATION | NOISE | | POE (15W) | POE+ (30W) | HI-POE (60W) |
| IE300-12GP | 48V DC *, 53.5V DC ** | fanless | 30W | 102 BTU/hr | - | 320W | 147 BTU/hr | - | 240W | 8 | 8 | 4 |
| IE300-12GT | 12~55V DC | fanless | 30W | 102 BTU/hr | - | - | - | - | - | - | - | - |

\* sourcing IEEE 802.3at Type 1 (PoE)

\*\* sourcing IEEE 802.3at Type 2 (PoE+, Hi-PoE)

\*\*\* The Max Power consumption at full PoE load includes PD's consumption and margin. The cooling requirements of the switch are smaller than the power draw, because most of the load is dissipated at the PoE powered device (PD) and along the cabling.

Use these wattage and BTU ratings for facility capacity planning.

## Latency (microseconds)

| PRODUCT | PORT SPEED | | |
|---|---|---|---|
| | 10MBPS | 100MBPS | 1000MBPS |
| IE300-12GP | 54µs | 7.9µs | 3.4µs |
| IE300-12GT | 54µs | 7.9µs | 3.4µs |

## Standards and Protocols

### AlliedWare Plus Operating System
Version 5.5.0

### Authentication
RFC 1321   MD5 Message-Digest algorithm
RFC 1828   IP authentication using keyed MD5

### Automation
Modbus/TCP
IEEE 1588-2008 Precision Clock Synchronization Protocol v2

### Border Gateway Protocol (BGP)
BGP dynamic capability
BGP outbound route filtering
RFC 1772   Application of the Border Gateway Protocol (BGP) in the Internet
RFC 1997   BGP communities attribute
RFC 2439   BGP route flap damping
RFC 2545   Use of BGP-4 multiprotocol extensions for IPv6 inter-domain routing
RFC 2918   Route refresh capability for BGP-4
RFC 3882   Configuring BGP to block Denial-of-Service (DoS) attacks
RFC 4271   Border Gateway Protocol 4 (BGP-4)
RFC 4360   BGP extended communities
RFC 4456   BGP route reflection - an alternative to full mesh iBGP
RFC 4724   BGP graceful restart
RFC 4760   Multiprotocol Extensions for BGP-4
RFC 5065   Autonomous system confederations for BGP
RFC 5492   Capabilities Advertisement with BGP-4

RFC 5925   The TCP Authentication Option
RFC 6793   BGP Support for Four-Octet Autonomous System (AS) Number Space
RFC 7606   Revised Error Handling for BGP UPDATE messages

### Encryption (management traffic only)
FIPS 180-1   Secure Hash standard (SHA-1)
FIPS 186     Digital signature standard (RSA)
FIPS 46-3    Data Encryption Standard (DES and 3DES)

### Ethernet
IEEE 802.2     Logical Link Control (LLC)
IEEE 802.3     Ethernet
IEEE 802.3ab 1000BASE-T
IEEE 802.3af  Power over Ethernet (PoE)
IEEE 802.3at  Power over Ethernet up to 30W (PoE+)
IEEE 802.3az  Energy Efficient Ethernet (EEE)
IEEE 802.3u   100BASE-X
IEEE 802.3x   Flow control - full-duplex operation
IEEE 802.3z   1000BASE-X

### IPv4 Features
RFC 768   User Datagram Protocol (UDP)
RFC 791   Internet Protocol (IP)
RFC 792   Internet Control Message Protocol (ICMP)
RFC 793   Transmission Control Protocol (TCP)
RFC 826   Address Resolution Protocol (ARP)
RFC 894   Standard for the transmission of IP datagrams over Ethernet networks
RFC 919   Broadcasting Internet datagrams

RFC 922   Broadcasting Internet datagrams in the presence of subnets
RFC 932   Subnetwork addressing scheme
RFC 950   Internet standard subnetting procedure
RFC 951   Bootstrap Protocol (BootP)
RFC 1027   Proxy ARP
RFC 1035   DNS client
RFC 1042   Standard for the transmission of IP datagrams over IEEE 802 networks
RFC 1071   Computing the Internet checksum
RFC 1122   Internet host requirements
RFC 1191   Path MTU discovery
RFC 1256   ICMP router discovery messages
RFC 1518   An architecture for IP address allocation with CIDR
RFC 1519   Classless Inter-Domain Routing (CIDR)
RFC 1542   Clarifications and extensions for BootP
RFC 1591   Domain Name System (DNS)
RFC 1812   Requirements for IPv4 routers
RFC 1918   IP addressing
RFC 2581   TCP congestion control

### IPv6 Features
RFC 1981   Path MTU discovery for IPv6
RFC 2460   IPv6 specification
RFC 2464   Transmission of IPv6 packets over Ethernet networks
RFC 3484   Default address selection for IPv6
RFC 3587   IPv6 global unicast address format
RFC 3596   DNS extensions to support IPv6
RFC 4007   IPv6 scoped address architecture

| | |
|---|---|
| RFC 4193 | Unique local IPv6 unicast addresses |
| RFC 4213 | Transition mechanisms for IPv6 hosts and routers |
| RFC 4291 | IPv6 addressing architecture |
| RFC 4443 | Internet Control Message Protocol (ICMPv6) |
| RFC 4861 | Neighbor discovery for IPv6 |
| RFC 4862 | IPv6 Stateless Address Auto-Configuration (SLAAC) |
| RFC 5014 | IPv6 socket API for source address selection |
| RFC 5095 | Deprecation of type 0 routing headers in IPv6 |
| RFC 5175 | IPv6 Router Advertisement (RA) flags option |
| RFC 6105 | IPv6 Router Advertisement (RA) guard |

## Management

AT Enterprise MIB including AMF MIB and traps
Optical DDM MIB
SNMPv1, v2c and v3
IEEE 802.1ABLink Layer Discovery Protocol (LLDP)

| | |
|---|---|
| RFC 1155 | Structure and identification of management information for TCP/IP-based Internets |
| RFC 1157 | Simple Network Management Protocol (SNMP) |
| RFC 1212 | Concise MIB definitions |
| RFC 1213 | MIB for network management of TCP/IP-based Internets: MIB-II |
| RFC 1215 | Convention for defining traps for use with the SNMP |
| RFC 1227 | SNMP MUX protocol and MIB |
| RFC 1239 | Standard MIB |
| RFC 1724 | RIPv2 MIB extension |
| RFC 2578 | Structure of Management Information v2 (SMIv2) |
| RFC 2579 | Textual conventions for SMIv2 |
| RFC 2580 | Conformance statements for SMIv2 |
| RFC 2674 | Definitions of managed objects for bridges with traffic classes, multicast filtering and VLAN extensions |
| RFC 2741 | Agent extensibility (AgentX) protocol |
| RFC 2787 | Definitions of managed objects for VRRP |
| RFC 2819 | RMON MIB (groups 1,2,3 and 9) |
| RFC 2863 | Interfaces group MIB |
| RFC 3176 | sFlow: a method for monitoring traffic in switched and routed networks |
| RFC 3411 | An architecture for describing SNMP management frameworks |
| RFC 3412 | Message processing and dispatching for the SNMP |
| RFC 3413 | SNMP applications |
| RFC 3414 | User-based Security Model (USM) for SNMPv3 |
| RFC 3415 | View-based Access Control Model (VACM) for SNMP |
| RFC 3416 | Version 2 of the protocol operations for the SNMP |
| RFC 3417 | Transport mappings for the SNMP |
| RFC 3418 | MIB for SNMP |
| RFC 3621 | Power over Ethernet (PoE) MIB |
| RFC 3635 | Definitions of managed objects for the Ethernet-like interface types |
| RFC 3636 | IEEE 802.3 MAU MIB |
| RFC 4022 | MIB for the Transmission Control Protocol (TCP) |
| RFC 4113 | MIB for the User Datagram Protocol (UDP) |
| RFC 4188 | Definitions of managed objects for bridges |
| RFC 4292 | IP forwarding table MIB |
| RFC 4293 | MIB for the Internet Protocol (IP) |
| RFC 4318 | Definitions of managed objects for bridges with RSTP |
| RFC 4560 | Definitions of managed objects for remote ping, traceroute and lookup operations |
| RFC 5424 | The Syslog protocol |
| RFC 6527 | Definitions of managed objects for VRRPv3 |

## Multicast Support

Bootstrap Router (BSR) mechanism for PIM-SM
IGMP query solicitation
IGMP snooping (IGMPv1, v2 and v3)
IGMP snooping fast-leave

IGMP/MLD multicast forwarding (IGMP/MLD proxy)
MLD snooping (MLDv1 and v2)
PIM-SM and SSM for IPv6

| | |
|---|---|
| RFC 2236 | Internet Group Management Protocol v2 (IGMPv2) |
| RFC 2710 | Multicast Listener Discovery (MLD) for IPv6 |
| RFC 2715 | Interoperability rules for multicast routing protocols |
| RFC 3306 | Unicast-prefix-based IPv6 multicast addresses |
| RFC 3376 | IGMPv3 |
| RFC 3590 | Source Address Selection for the Multicast Listener Discovery (MLD) Protocol |
| RFC 3810 | Multicast Listener Discovery v2 (MLDv2) for IPv6 |
| RFC 3956 | Embedding the Rendezvous Point (RP) address in an IPv6 multicast address |
| RFC 3973 | PIM Dense Mode (DM) |
| RFC 4541 | IGMP and MLD snooping switches |
| RFC 4604 | Using IGMPv3 and MLDv2 for source-specific multicast |
| RFC 4607 | Source-specific multicast for IP |
| RFC 7761 | Protocol Independent Multicast - Sparse Mode (PIM-SM): Protocol specification |

## Open Shortest Path First (OSPF)

OSPF link-local signaling
OSPF MD5 authentication
OSPF restart signaling
Out-of-band LSDB resync

| | |
|---|---|
| RFC 1245 | OSPF protocol analysis |
| RFC 1246 | Experience with the OSPF protocol |
| RFC 1370 | Applicability statement for OSPF |
| RFC 1765 | OSPF database overflow |
| RFC 2328 | OSPFv2 |
| RFC 2370 | OSPF opaque LSA option |
| RFC 2740 | OSPFv3 for IPv6 |
| RFC 3101 | OSPF Not-So-Stubby Area (NSSA) option |
| RFC 3509 | Alternative implementations of OSPF area border routers |
| RFC 3623 | Graceful OSPF restart |
| RFC 3630 | Traffic engineering extensions to OSPF |
| RFC 4552 | Authentication/confidentiality for OSPFv3 |
| RFC 5329 | Traffic engineering extensions to OSPFv3 |
| RFC 5340 | OSPFv3 for IPv6 (partial support) |

## Quality of Service (QoS)

IEEE 802.1p  Priority tagging

| | |
|---|---|
| RFC 2211 | Specification of the controlled-load network element service |
| RFC 2474 | DiffServ precedence for eight queues/port |
| RFC 2475 | DiffServ architecture |
| RFC 2597 | DiffServ Assured Forwarding (AF) |
| RFC 2697 | A single-rate three-color marker |
| RFC 2698 | A two-rate three-color marker |
| RFC 3246 | DiffServ Expedited Forwarding (EF) |

## Resiliency Features

ITU-T G.8023 / Y.1344 Ethernet Ring Protection Switching (ERPS)
IEEE 802.1ag CFM Continuity Check Protocol (CCP)
IEEE 802.1AX Link aggregation (static and LACP)
IEEE 802.1D  MAC bridges
IEEE 802.1s  Multiple Spanning Tree Protocol (MSTP)
IEEE 802.1w  Rapid Spanning Tree Protocol (RSTP)
IEEE 802.3adStatic and dynamic link aggregation

| | |
|---|---|
| RFC 5798 | Virtual Router Redundancy Protocol version 3 (VRRPv3) for IPv4 and IPv6 |

## Routing Information Protocol (RIP)

| | |
|---|---|
| RFC 1058 | Routing Information Protocol (RIP) |
| RFC 2080 | RIPng for IPv6 |
| RFC 2081 | RIPng protocol applicability statement |
| RFC 2082 | RIP-2 MD5 authentication |
| RFC 2453 | RIPv2 |

## Security Features

SSH remote login
SSLv2 and SSLv3
TACACS+ Accounting, Authentication, Authorization (AAA)
IEEE 802.1X authentication protocols
(TLS, TTLS, PEAP and MD5)
IEEE 802.1X  multi-supplicant authentication
IEEE 802.1X  port-based network access control

| | |
|---|---|
| RFC 2818 | HTTP over TLS ("HTTPS") |
| RFC 2865 | RADIUS authentication |
| RFC 2866 | RADIUS accounting |
| RFC 2868 | RADIUS attributes for tunnel protocol support |
| RFC 2986 | PKCS #10: certification request syntax specification v1.7 |
| RFC 3579 | RADIUS support for Extensible Authentication Protocol (EAP) |
| RFC 3580 | IEEE 802.1x RADIUS usage guidelines |
| RFC 3748 | Extensible Authentication Protocol (EAP) |
| RFC 4251 | Secure Shell (SSHv2) protocol architecture |
| RFC 4252 | Secure Shell (SSHv2) authentication protocol |
| RFC 4253 | Secure Shell (SSHv2) transport layer protocol |
| RFC 4254 | Secure Shell (SSHv2) connection protocol |
| RFC 5246 | Transport Layer Security (TLS) v1.2 |
| RFC 5280 | X.509 certificate and Certificate Revocation List (CRL) profile |
| RFC 5425 | Transport Layer Security (TLS) transport mapping for Syslog |
| RFC 5656 | Elliptic curve algorithm integration for SSH |
| RFC 6125 | Domain-based application service identity within PKI using X.509 certificates with TLS |
| RFC 6614 | Transport Layer Security (TLS) encryption for RADIUS |
| RFC 6668 | SHA-2 data integrity verification for SSH |

## Services

| | |
|---|---|
| RFC 854 | Telnet protocol specification |
| RFC 855 | Telnet option specifications |
| RFC 857 | Telnet echo option |
| RFC 858 | Telnet suppress go ahead option |
| RFC 1091 | Telnet terminal-type option |
| RFC 1350 | The TFTP protocol (revision 2) |
| RFC 1985 | SMTP service extension |
| RFC 2049 | MIME |
| RFC 2131 | DHCPv4 (server, relay and client) |
| RFC 2132 | DHCP options and BootP vendor extensions |
| RFC 2616 | Hypertext Transfer Protocol - HTTP/1.1 |
| RFC 2821 | Simple Mail Transfer Protocol (SMTP) |
| RFC 2822 | Internet message format |
| RFC 3046 | DHCP relay agent information option (DHCP option 82) |
| RFC 3315 | Dynamic Host Configuration Protocol for IPv6 (DHCPv6) |
| RFC 3396 | Encoding Long Options in the Dynamic Host Configuration Protocol (DHCPv4) |
| RFC 3633 | IPv6 prefix options for DHCPv6 |
| RFC 3646 | DNS configuration options for DHCPv6 |
| RFC 3993 | Subscriber-ID suboption for DHCP relay agent option |
| RFC 4954 | SMTP Service Extension for Authentication |
| RFC 5905 | Network Time Protocol (NTP) version 4 |

## VLAN Support

Generic VLAN Registration Protocol (GVRP)
IEEE 802.1ad Provider bridges (VLAN stacking, Q-in-Q)
IEEE 802.1Q  Virtual LAN (VLAN) bridges
IEEE 802.1v  VLAN classification by protocol and port
IEEE 802.3acVLAN tagging

## Voice over IP (VoIP)

Voice VLAN
ANSI/TIA-1057 Link Layer Discovery Protocol-Media Endpoint Discovery (LLDP-MED)

# IE300 Series | Industrial Ethernet, Layer 3 Switches

## Ordering Information

| NAME | DESCRIPTION | INCLUDES |
|---|---|---|
| AT-FL-IE3-G8032 | IE300 series license for ITU-T G.8032 and Ethernet CFM | ▶ ITU-T G.8032<br>▶ Ethernet CFM |
| AT-FL-IE3-L2-01 | IE300 series Layer-2 Premium license | ▶ EPSR Master<br>▶ VLAN Translation<br>▶ VLAN double tagging (QinQ)<br>▶ UDLD |
| AT-FL-IE3-L3-01 | IE300 series Layer-3 Premium license | ▶ OSPF (256 routes)<br>▶ OSPFv3 (256 routes)<br>▶ BGP4 (256 routes)<br>▶ BGP4+ for IPv6 (256 routes)<br>▶ PIM-SM, DM and SSM<br>▶ PIMv6-SM and SSM<br>▶ RIP<br>▶ RIPng<br>▶ VRRP and VRRPv3 |
| AT-FL-IE3-MODB | IE300 Series Modbus/TCP license | ▶ Modbus/TCP |
| AT-FL-IE3-OF13-1YR | OpenFlow license | ▶ OpenFlow v1.3 for 1 year |
| AT-FL-IE3-OF13-5YR | OpenFlow license | ▶ OpenFlow v1.3 for 5 years |

## Switches

The DIN rail and wall mount kits are included.

### AT-IE300-12GP-80
8x 10/100/1000T,
4x 100/1000X SFP,
Industrial Ethernet, Layer 3 Switch, Hi-PoE Support

### AT-IE300-12GT-80
8x 10/100/1000T,
4x 100/1000X SFP,
Industrial Ethernet, Layer 3 Switch

## Supported SFP Modules

Refer to the installation guide for the recommended Max. Operating Temperature according to the selected SFP module.

### 1000Mbps SFP Modules

### AT-SPBD10-13
10 km, 1G BiDi SFP, LC, SMF
(1310Tx/1490Rx)

### AT-SPBD10-14
10 km, 1G BiDi SFP, LC, SMF
(1490Tx/1310Rx)

### AT-SPBD20-13/I
20 km, 1G BiDi SFP, SC, SMF, I-Temp
(1310Tx/1490Rx)

### AT-SPBD20-14/I
20 km, 1G BiDi SFP, SC, SMF, I-Temp
(1490Tx/1310Rx)

### AT-SPBD20LC/I-13
20 km, 1G BiDi SFP, LC, SMF, I-Temp
(1310Tx/1490Rx)

### AT-SPBD20LC/I-14
20 km, 1G BiDi SFP, LC, SMF, I-Temp
(1490Tx/1310Rx)

### AT-SPEX
2 km, 1000EX SFP, LC, MMF, 1310 nm

### AT-SPEX/E
2 km, 1000EX SFP, LC, MMF, 1310 nm, Ext. Temp

### AT-SPLX10
10 km, 1000LX SFP, LC, SMF, 1310 nm

### AT-SPLX10/I
10 km, 1000LX SFP, LC, SMF, 1310 nm, I-Temp

### AT-SPLX10/E
10 km, 1000LX SFP, LC, SMF, 1310 nm, Ext. Temp

### AT-SPLX40
40 km, 1000LX SFP, LC, SMF, 1310 nm

### AT-SPLX40/E
40 km, 1000LX SFP, LC, SMF, 1310 nm, Ext. Temp

### AT-SPSX
550 m, 1000SX SFP, LC, MMF, 850 nm

### AT-SPSX/I
550 m, 1000SX SFP, LC, MMF, 850 nm, I-Temp

### AT-SPSX/E
550 m, 1000SX SFP, LC, MMF, 850 nm, Ext. Temp

### AT-SPTX
100 m, 10/100/1000T SFP, RJ-45

### AT-SPTX/I
100 m, 10/100/1000T SFP, RJ-45, I-Temp

### AT-SPZX80
80 km, 1000ZX SFP, LC, SMF, 1550 nm

### 100Mbps SFP Modules

### AT-SPFX/2
2 km, 100FX SFP, LC, MMF, 1310 nm

### AT-SPFX/15
15 km, 100FX SFP, LC, SMF, 1310 nm

### AT-SPFXBD-LC-13
15 km, 100FX BiDi SFP, LC, SMF
(1310 Tx/1550 Rx)

### AT-SPFXBD-LC-15
15 km, 100FX BiDi SFP, LC, SMF
(1550 Rx/1310 Tx)

## Accessories

### AT-VT-Kit3
Management cable (USB to serial console)

617-000565 RevZC