Allied Telesis™

IE220 Series

Industrial Ethernet Layer 2+ Switches

The IE220 Series of Industrial Ethernet Layer 2+ switches are built for enduring performance in harsh environments, such as those found in OT networks and outdoor installations

OpenFlow™

eco friendly

AlliedWare Plus™ OPERATING SYSTEM

PoE++™

Overview

Allied Telesis IE220 Series switches are the perfect solution for access connectivity in unconditioned spaces and outside plant. They feature surge immunity on the copper ports to prevent damage from electrical spikes, common in outdoor applications, and are hardened to withstand tough environmental conditions such as wide-ranging temperatures, high humidity, and vibration.

Their low latency, high availability, large PoE capacity, and ability to deliver multiple video streams, makes them the best choice for critical physical security and surveillance applications.

The IE220 Series is ideal for many vertical markets and related applications, such as:

▶ **Building automation**
Facility management including security and access control, fire protection, energy management, heating/ ventilation/air-conditioning, and lighting control.

▶ **Smart cities**
Public space and urban infrastructure that provides safety and security, parking management, environmental metering, lighting, and information kiosks.

▶ **Roadway transportation**
Adaptive traffic control, telematics, and preventive maintenance.

10 Gigabit uplink connectivity

The IE220 Series SFP ports support 1/10 Gigabit Small-Form Factor Pluggables.

10 Gigabit uplink ports entail valuable and versatile connectivity, where high bandwidth backhauling and scalability is required.

PoE++ sourcing

In video surveillance, more advanced solutions all require a powerful camera component. Now that artificial intelligence (AI), machine learning and deep learning have gained prominence, camera hardware is more power hungry: features like PTZ, heater blower, IR, multi-sensor, and analytics at the edge drain power.

The IE220 Series sources standard IEEE 802.3bt PoE++ up to 95W to meet the demand for high power of devices connected to the network. Backwards

compatibility to PoE, PoE+ and Hi-PoE is ensured.

Distinctive PoE features

PoE power may be allocated dynamically, based on the current usage of each powered device.

The continuous PoE feature allows the switch to be restarted without affecting the supply of power to connected devices.

Network resiliency

The IE220 Series supports highly stable and reliable ICT network switching, with recovery times down to 10ms.

Choices include Allied Telesis Ethernet Protection Switched Ring (EPSRing™), and the standards-based ITU-T G.8032 -Ethernet Ring Protection Switching (ERPS).

For high-availability automation networks based on Ethernet technology, the IE220 may be integrated in networks running Media Redundancy Protocol (MRP) as a Media Redundancy Client (MRC).

Micro-segmentation Security

Micro-segmentation reduces the attack surface of your OT network and gives granular control of device-to-device communications. The IE220 Series supports SDN-based micro-segmentation solutions for more security, maintainability, and visibility than traditional security models.

Network automation and orchestration

Powerful automation options include Allied Telesis Autonomous Management Framework™ Plus (AMF Plus), and open standard-based northbound API.

For easy integration into complex networks comprising physical, virtual, and multi-vendor devices, the IE220 Series feature:

▶ NETCONF/RESTCONF + YANG data modelling for network automation.

▶ OpenFlow v1.3 for Software Defined Networking (SDN) orchestration.

Key Features

▶ 1/10 Gigabit uplink ports

▶ Surge immunity for outside plants

▶ AlliedWare Plus™ operating system

▶ Allied Telesis Autonomous Management Framework™ Plus (AMF Plus)

▶ OpenFlow v1.3 for SDN

▶ NETCONF/RESTCONF + YANG data modelling

▶ Web-based GUI and CLI management

▶ QoS with traffic shaping

▶ Efficient forwarding of multicast streams

▶ Static routing capability

▶ Extensive features for cybersecurity and denial of service prevention

▶ Active Fiber Monitoring™ (AFM)

▶ High Availability networking (EPSRing™, ITU-T G.8032, MRP client)

▶ Upstream Forwarding Only (UFO)

▶ IEEE 802.3bt PoE++ sourcing (up to 95W)

▶ Dynamic PoE power allocation

▶ Continuous PoE (CPoE)

▶ Extended operating temperature range: -40°C to 75°C

▶ Graceful thermal shutdown

▶ Fanless design

▶ Redundant power inputs

▶ Protection circuits

▶ Alarm output

▶ Certified for plenums

Key Features

Network Automation

▶ AMF Plus is a suite of tools providing centralized control and network automation, as well as visual intent-based network management. It has the the intelligence to set-up, optimize, and maintain the network according to predefined goals and policies.

▶ Powerful features like centralized management, auto backup, auto upgrade, auto provisioning and auto recovery enable plug-and-play networking and zero touch management.

▶ Integration with our Vista Manager visual monitoring and management platform means AMF Plus[1] also provides intent-based features like:

- Health monitoring to easily investigate, analyze and improve overall network health.
- Smart ACLs to control and secure the resources that clients use in the network.
- intent-based QoS to deal with network bandwidth contention.

▶ AMF Plus is scalable and can be either deployed integrated into Allied Telesis equipment, or on multi-tenant cloud architecture.

Northbound Interfaces

▶ Open standard-based interfaces are supported to easily integrate with modern management systems.

▶ NETCONF/RESTCONF with YANG data modelling provide a standardized way to represent data and securely configure devices.

▶ OpenFlow is a key technology for SDN orchestration. SDN controllers and other tools support automated behavior in a network, and allow customized applications and services to be run.

Micro-segmentation for Network Security

▶ Micro-segmentation enhances converged IT/OT network security by reducing the number of entry points for attackers or intruders. Isolating applications, data, and endpoints hampers the ability of intruders or malware to move within the network.

▶ SDN network orchestration enables self-learning Artificial Intelligence to propagate and adapt security policies to mitigate evolving cyber threats.

Resiliency

▶ EPSRing™ and ITU-T G.8032 ERPS enable a protected ring capable of recovery within as little as 10ms. These features are perfect for high performance and high availability.

▶ High-availability automation networks are supported with Media Redundancy Protocol (MRP) as defined by IEC62439-2. MRP used in ring networks allows up to 50 devices to have guaranteed and deterministic switchover behavior. The IE220 Series includes the Media Redundancy Client (MRC) functionality. It reacts on the received control frame from the MRP Master, and detect and notify the status change on its ring ports.

▶ Spanning Tree Protocol compatible RSTP, MSTP, static Link Aggregation Group (LAG), and dynamic Link Aggregation Control Protocol (LACP) feature high availability in star topology.

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 services and 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 (AFM)

▶ 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.

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 equipment, network policy, location discovery (for Emergency Call Services) and inventory.

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.

VLAN Translation

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

VLAN Access Control List (ACLs)

▶ ACLs simplify access and traffic control across entire segments of the network. They can be applied to a VLAN as well as a specific port.

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.

Power over Ethernet (PoE)

▶ With PoE, a separate power connection to media endpoints is not necessary.

PoE provides flexibility and reduced cost by removing the need for a separate power connection to media endpoints. PoE++ supports higher power devices such as advanced security cameras, kiosks, POS terminals, Wi-Fi 6 access points, and LED light fixtures.

▶ The IE220 Series complies with the standard IEEE 802.3bt and maintains the backwards compatibility with previous methods. They feature the following PoE types:

- IEEE 802.3af, IEEE 802.3at Type 1 PoE @15.4W
- IEEE 802.3at Type 2 PoE+ @30W
- IEEE 802.3at 4PPoE Hi-PoE @60W
- IEEE 802.3bt Type 3 PoE++ @60W
- IEEE 802.3bt Type 4 PoE++ @95W

▶ You may configure the overall PoE power budget to match the real capabilities of the external Power Supply Unit (PSU).

The PoE power budget may be allocated automatically and dynamically, based on the current usage of each powered device.

▶ If the devices connected to a switch require more power than the switch can deliver, the switch will deny power to some ports, according to the assigned priority.

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.

Alarm Output

▶ Alarm Output are useful for security integration solutions. These respond to events instantly and automatically on a pre-defined event scheme. Alarm Output controls external devices upon an event, for example sirens and strobes.

Alarm Monitoring and Trigger facility

▶ The IE220 Series alarm facility monitors the switch and responds to any problems. Examples of alarm events include:

- Main power supply failure
- Over-temperature
- Port link down
- System power budget exceeded
- PoE device exceeds port power budget

▶ Triggers based on alarm events provide a smart mechanism that automatically changes the network configuration to reduce downtime.

Protection Circuits

▶ The IE220 Series has optimized protection circuits to guard against the following abnormal conditions:

- Reverse input voltage polarity
- Over- and under-voltage
- Over-current, peak-current and short-circuit
- Over-temperature

[1] From AW+ 5.5.2-2 onwards, an AMF Plus license operating in the network provides all standard AMF network management and automation features, and also enables the AMF Plus intent-based networking features menu in Vista Manager EX (from version 3.10.1 onwards).

Key Features

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.

Dual power inputs

▶ The redundant power inputs provide higher system reliability and allow UPS emergency power over an extended period of time.

Plenum rated

▶ The IE220 Series is UL 2043 certified for use in plenums, ducts and other space used for environmental air.

 UL 2043 validates that the IE220 Series characteristics are in accordance with the provisions of the National Electric Code NFPA 70; International Mechanical Code NFPA 5000, and Standard for the Installation of Air Conditioning and Ventilating Systems NFPA 90A.

Premium Software License

▶ By default, the IE220 Series offers a comprehensive feature set that includes

 1 Gigabit uplink connectivity, PoE+ power sourcing @30W, Layer 2 switching, static routing and IPv6 management features.

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

Key Solutions

* Coming soon
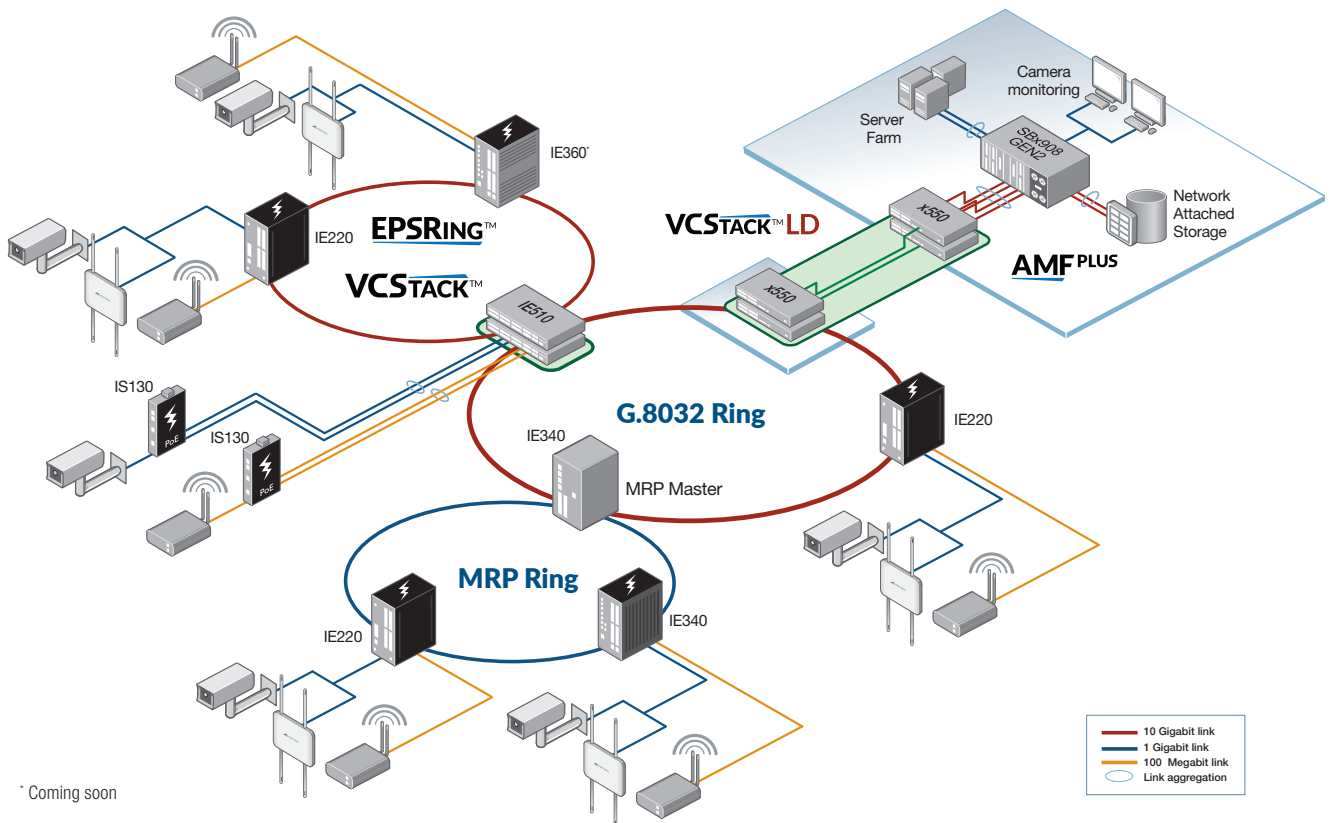
Media Redundancy Protocol (MRP), EPSRing and ERPS (ITU G.8032) provide high-speed resilient ring connectivity. This diagram shows how the IE Series can support a variety of ring network topologies.

The IE Series operates at a wide temperature range, and allows deployment in outdoor and harsh industrial environments.

PoE sourcing models support remotely controlled Pan, Tilt and Zoom (PTZ) video cameras, WiFi access points and more.

Management can be automated either with the Allied Telesis Autonomous Management Framework™ Plus (AMF Plus), or by third party tools via the open standard northbound interface.

IE220 Series | Industrial Ethernet Layer 2+ Switches

Specifications

PRODUCT	10/100T/1000 (RJ-45) COPPER PORTS	1/10G SFP+ PORTS	TOTAL PORTS	POE ENABLED PORTS	SWITCHING FABRIC	FORWARDING RATE
IE220-6GHX	4	2	6	2 x PoE++, 4 x PoE+	48Gbps	35.7Mpps
IE220-10GHX	8	2	10	2 x PoE++, 8 x PoE+	56Gbps	41.7Mpps

Performance
RAM memory   512MB DDR SDRAM
ROM memory   128MB flash
MAC address   16K entries
Packet Buffer   2 MBytes (16 Mbits)
Priority Queues   8
Simultaneous VLANs   4K entries
VLANs ID range   1 – 4094
Jumbo frames   12KB L2 jumbo frames
Multicast groups   1,023 (Layer 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 output (1A @30Vdc)
Port no.   1
Connector   3-pin terminal block (form-c)

Flexibility and Compatibility
▶ SFP+ ports support any combination of Allied Telesis 1Gbps and 10Gbps SFP modules listed in this document under Ordering Information

Reliability
▶ Modular AlliedWare Plus™ operating system
▶ Protection circuits against abnormal operations
▶ Redundant power input
▶ Full environmental monitoring of temperature and internal voltages. SNMP traps alert network managers in case of any failure
▶ Enhanced thermal shutdown

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 and TraceRoute for IPv4 and IPv6
▶ Port and VLAN mirroring (RSPAN)
▶ sFlow
▶ TraceRoute for IPv4 and IPv6
▶ UniDirectional Link Detection (UDLD)

IPv4 Features
▶ Black hole routing
▶ Static unicast and multicast routes for IPv4

IPv6 Features
▶ Device management over IPv6 networks with SNMPv6, Telnetv6 and SSHv6

▶ IPv4 and IPv6 dual stack
▶ IPv6 hardware ACLs
▶ Static unicast routing for IPv6

Management
▶ Allied Telesis Autonomous Management Framework™ Plus (AMF Plus) node
▶ NETCONF/RESTCONF northbound interface with YANG data modelling for network automation
▶ OpenFlow v1.3 for network orchestration
▶ Web-based Graphical User Interface (GUI)
▶ 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
▶ Link Layer Discovery Protocol (LLDP)
▶ Link Layer Discovery Protocol - Media Endpoint Discovery (LLDP-MED)
▶ SNMPv1/v2c/v3 support
▶ Comprehensive SNMP MIB support for standard based device management
▶ Console management port on the front panel for ease of access
▶ Front panel LEDs provide at-a-glance PSU status, PoE status, and fault information
▶ Eco-friendly mode allows ports and LEDs to be disabled to save power
▶ 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
▶ Policy and traffic shaping
▶ 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 (ITU-T G.8032 ERPS)
▶ Link Aggregation Control Protocol (LACP)
▶ Loop protection: loop detection and thrash limiting
▶ Media Redundancy Protocol (IEC62439-2 MRP)
▶ Multiple Spanning Tree Protocol (MSTP)
▶ PVST+ compatibility mode
▶ Rapid Spanning Tree Protocol (RSTP)
▶ Router Redundancy Protocol (RRP) snooping
▶ Spanning Tree Protocol (STP) root guard
▶ Continuous Power over Ethernet (CPoE)

Multicasting Features
▶ Internet Group Management Protocol (IGMPv1/v2/v3)
▶ IGMP snooping with fast leave
▶ IGMP query solicitation
▶ Multicast Listener Discovery (MLDv1/v2)
▶ MLDv2 for IPv6
▶ MLD snooping
▶ IGMP/MLD proxy (multicast forwarding)

Security Features
▶ Access Control Lists (ACLs) based on layer 3 and 4 headers
▶ Auth-fail and guest VLANs
▶ Configurable ACLs for management traffic
▶ Authentication, Authorization and Accounting (AAA)
▶ BPDU protection
▶ DHCP snooping, IP source guard and Dynamic ARP Inspection (DAI)
▶ DoS attack blocking and virus throttling
▶ Dynamic VLAN assignment
▶ HTTP over TLS (HTTPS)
▶ MAC address filtering and MAC address lockdown
▶ Network Access and Control (NAC) features manage endpoint security
▶ Password protected bootloader
▶ Port-based learn limits (intrusion detection)
▶ Private VLANs and port isolation for multiple customers using the same VLAN
▶ Secure Copy (SCP)
▶ Strong password security and encryption
▶ TACACS+ authentication and accounting
▶ Tri-authentication: MAC-based, web-based and IEEE 802.1X

Virtual LAN Features
▶ Generic VLAN Registration Protocol (GVRP)
▶ Voice VLAN
▶ VLAN translation
▶ Upstream Forwarding Only (UFO)

IE220 Series | Industrial Ethernet Layer 2+ Switches

Services
- Domain Name System (DNS) client
- Dynamic Host Configuration Protocol (DHCP) client
- HyperText Transfer Protocol (HTTP/1.1)
- Network Time Protocol (NTPv4) for IPv4 and IPv6
- Simple Mail Transfer Protocol (SMTP)
- Secure Shell (SSHv2/v3)
- TELNET
- Trivial File Transfer Protocol (TFTP)

Environmental Specifications
Operating temp.[2]	-40°C to 75°C (-40°F to 167°F)
Storage temp.	-40°C to 85°C (-40°F to 185°F)
Operating humidity	5% to 95% non-condensing
Storage humidity	5% to 95% non-condensing
Operating altitude	up to 3,000 m maximum (9,843 ft)

Mechanical
EN 50021, EN 60715 Standardized mounting on rails

Warranty
- Five-year limited hardware warranty. Refer to the Term & Policies page on the Allied Telesis web site.

COMPLIANCE	
Compliance Mark	CE, FCC, ICES, RCM, TEC[4], UKCA, UL, VCCI
Environmental Compliance	RoHS, China-RoHS, JGSSI, REACH, SCIP, TSCA, WEEE
Safety[2]	IEC 60950-22 AS/NZS 62368-1 CSA/UL 62368-1 EN/IEC/UL 62368-1
Electromagnetic Immunity	EN 55035
Harmonic current emission	EN/IEC 61000-3-2[3]
Voltage fluctuation and flicker	EN/IEC 61000-3-3[3]
Electrostatic discharge (ESD)	EN/IEC 61000-4-2
Radiated susceptibility (RS)	EN/IEC 61000-4-3
Electrical fast transient (EFT)	EN/IEC 61000-4-4
Lighting/surge immunity (Surge)	EN/IEC 61000-4-5, installation class 3 for outdoor
Conducted immunity (CS)	EN/IEC 61000-4-6
Power frequency magnetic fields	EN/IEC 61000-4-8
AC voltage dips and interruption	EN/IEC 61000-4-11[3]
DC voltage dips and Interruption	EN/IEC 61000-4-29
Electromagnetic Emissions	AS/NZS CISPR 32, class A CISPR 32, class A EN 55032, class A FCC 47 CFR Part 15, subpart B, class A ICES 003 class A VCCI class A
Industry	
Traffic controller assemblies	NEMA TS 2
Installation in air-handling space	UL 2043
Freefall	IEC60068-2-31
Shock	IEC60068-2-27
Vibration	IEC60068-2-6
Connector unmating endurance	IEC 60512-99-002, under PoE++ electrical load[4]

[2] Refer to the Installation Guide for more details on the safety approved power ratings and thermal conditions.

[3] Test was applied using the power supply AT-IE048-480-20.

[4] Certification/test in progress.

Physical Specifications

PRODUCT	WIDTH X DEPTH X HEIGHT	WEIGHT	ENCLOSURE	MOUNTING	PROTECTION RATE
IE220-6GHX	65 x 137 x 155 mm (2.56 x 5.39 x 6.12 in)	DIN rail: 1.57 kg (3.46 lbs) Wall mount: 1.45 kg (3.20 lbs)	Aluminium/Sheet Metal shell	DIN rail, wall mount	IP30
IE220-10GHX	65 x 137 x 155 mm (2.56 x 5.39 x 6.12 in)	DIN rail: 1.60 kg (3.53 lbs) Wall mount: 1.49 kg (3.28 lbs)	Aluminium/Sheet Metal shell	DIN rail, wall mount	IP30

Power Characteristics

PRODUCT	INPUT VOLTAGE[5]	COOLING	NO POE LOAD			FULL POE LOAD[6]		
			MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE	MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE
IE220-6GHX	37~57V DC	fanless	17.4W	59.5 BTU/hr	-	204W	80.3 BTU/hr	-
IE220-10GHX	37~57V DC	fanless	18.5W	63.3 BTU/hr	-	266W	87.7 BTU/hr	-

Power over Ethernet Sourcing Characteristics

PRODUCT	ENABLED POE PORTS			MAX POE POWER BUDGET[7]	MAX POE SOURING PORTS			
	POE+	HI-POE	POE++		POE+ (30W)	HI-POE (60W)	POE++ (60W)	POE++ (90W)
IE220-6GHX	4	2	2	180W	4	2	2	2
IE220-10GHX	8	4	4	240W	8	4	4	2

[5] PoE sourcing equipment requires:
   48Vdc to enable IEEE802.3at Type 1 (PoE).
   54Vdc to enable IEEE802.3at Type 2 (PoE+), IEEE802.3bt Type 3 (PoE++) and IEEE802.3bt Type 4 (PoE++).

[6] The Max Power consumption at full PoE load includes the powered device'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 and along the cabling. Use these wattage and BTU ratings for facility capacity planning.

[7] The PoE power budget is shared among all ports; we recommend configuring the dynamic PoE power allocation to optimize the power distribution

Standards and Protocols

AlliedWare Plus Operating System

Version 5.5.3-1

Authentication

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

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 802.3ae	10 Gigabit Ethernet
IEEE 802.3af	Power over Ethernet (PoE)
IEEE 802.3at	Power over Ethernet (PoE+)
IEEE 802.3az	Energy Efficient Ethernet (EEE)
IEEE 802.3bt	Power over Ethernet (PoE++)
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 Plus MIB and traps
Optical DDM MIB
SNMPv1, v2c and v3
ANSI/TIA-1057 Link Layer Discovery Protocol-Media Endpoint Discovery (LLDP-MED)
IEEE 802.1AB Link 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 2011	SNMPv2 MIB for IP using SMIv2
RFC 2012	SNMPv2 MIB for TCP using SMIv2
RFC 2013	SNMPv2 MIB for UDP using SMIv2
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 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

Multicast Support

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)

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 4541	IGMP and MLD snooping switches
RFC 4604	Using IGMPv3 and MLDv2 for source-specific multicast

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

IEC 62439-2 Media Redundancy Protocol (MRP)
IEEE 802.3ad Static and dynamic link aggregation
EEE 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)
ITU-T G.8032 / Y.1344 Ethernet Ring Protection Switching (ERPS)

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 5176	RADIUS CoA (Change of Authorization)
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 (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 4330	Simple Network Time Protocol (SNTP) version 4
RFC 4954	SMTP Service Extension for Authentication
RFC 5905	Network Time Protocol (NTP) version 4

IE220 Series | Industrial Ethernet Layer 2+ Switches

VLAN Support

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

Feature Licenses

NAME	DESCRIPTION	INCLUDES
AT-FL-IE2-L1-01	IE220 Series Layer 1 premium license	▶ 10G uplink ports ▶ Hi-PoE sourcing ▶ PoE++ sourcing
AT-FL-IE2-L2-01	IE220 Series Layer 2 premium license	▶ EPSR Master ▶ ITU-T G.8032, Ethernet CFM ▶ VLAN translation ▶ VLAN double tagging (QinQ)
AT-FL-IE2-NBI-1	IE220 Series, Northbound Interface premium license	▶ NETCONF + YANG data models ▶ RESTCONF + YANG data models ▶ OpenFlow 1.3

Ordering Information

Switches

The DIN rail and wall mount kits are included.
The management serial console cable is NOT included.

AT-IE220-6GHX-xx
4x 10/100/1000T, 2x 1G/10G SFP+,
Industrial Ethernet, Layer 2+ Switch
PoE++ Support

AT-IE220-10GHX-xx
8x 10/100/1000T, 2x 1G/10G SFP+
Industrial Ethernet, Layer 2+ Switch
PoE++ Support

Where xx = 80 standard Country of Origin
980 TAA compliant Country of Origin

Power Supply

AT-DRB50-48-1
50W @48Vdc, Industrial AC/DC power supply
DIN rail mount

AT-IE048-240-20
240W @48Vdc, Industrial AC/DC power supply
DIN rail mount (5 years warranty)

AT-IE048-480-20
480W @48Vdc, Industrial AC/DC power supply
DIN rail mount (5 years warranty)

AT-SDR120-48
120W @48Vdc, Industrial AC/DC power supply
DIN rail mount

AT-SDR240-48
240W @48Vdc, Industrial AC/DC power supply
DIN rail mount

AT-SDR480-48
480W @48Vdc, Industrial AC/DC power supply
DIN rail mount

Supported SFP Modules

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

10Gbps SFP Modules

AT-SP10BD10/I-12
10 km, 10G BiDi SFP, LC, SMF, I-Temp
(1270 Tx/1330 Rx)

AT-SP10BD10/I-13
10 km, 10G BiDi SFP, LC, SMF, I-Temp
(1330 Tx/1270 Rx)

AT-SP10BD20-12
20 km, 10G SFP, LC, SMF, TAA
(1270 Tx/1330 Rx)

AT-SP10BD20-13
20 km, 10G SFP, LC, SMF, TAA
(1330 Tx/1270 Rx)

AT-SP10BD40/I-12
40 km, 10G SFP, LC, SMF, I-Temp, TAA
(1270 Tx/1330 Rx)

AT-SP10BD40/I-13
40 km, 10G SFP, LC, SMF, I-Temp, TAA
(1330 Tx/1270 Rx)

AT-SP10BD80/I-14
80 km, 10G SFP, LC, SMF, I-Temp, TAA
(1490 Tx/1550 Rx)

AT-SP10BD80/I-15
80 km, 10G SFP, LC, SMF, I-Temp, TAA
(1550 Tx/1490 Rx)

AT-SP10ER40a/I
40 km, 10G SFP, LC, SMF,1550 nm, I-Temp, TAA

AT-SP10LRa/I
10 km, 10G SFP, LC, SMF,1310 nm, I-Temp, TAA

AT-SP10SR
300 m, 10G SFP, LC, MMF,850 nm, TAA

AT-SP10SR/I-90
300 m, 10G SFP, LC, MMF,850 nm, I-Temp, TAA

AT-SP10TM
20 m, 1/10G SFP, RJ-45, I-Temp, TAA

AT-SP10ZR80/I
80 km, 10G SFP, LC, SMF,1550 nm, I-Temp

1000Mbps SFP Modules

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

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

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

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

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

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

AT-SPBD40-13/I
40 km, 1G BiDi SFP, LC, SMF, I-Temp,
(1310 Tx/1490 Rx)

AT-SPBD40-14/I
40 km, 1G BiDi SFP, LC, SMF, I-Temp,
(1490 Tx/ 1310 Rx)

IE220 Series | Industrial Ethernet Layer 2+ Switches

AT-SPEX/E-90
2 km, 1000EX SFP, LC, MMF, 1310 nm, Ext. Temp, TAA

AT-SPLX10a
10 km, 1000LX SFP, LC, SMF, 1310 nm, TAA

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

AT-SPLX10/E-90
10 km, 1000LX SFP, LC, SMF, 1310 nm, Ext. Temp, TAA

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

AT-SPLX40/E-90
40 km, 1000LX SFP, LC, SMF, 1310 nm, Ext. Temp, TAA

AT-SPSX-90
550 m, 1000SX SFP, LC, MMF, 850 nm, TAA

AT-SPSX/I-90
550 m, 1000SX SFP, LC, MMF, 850 nm, I-Temp, TAA

AT-SPSX/E-90
550 m, 1000SX SFP, LC, MMF, 850 nm, Ext. Temp, TAA

AT-SPTX-90
100 m, 10/100/1000T SFP, RJ-45, TAA

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

AT-SPZX120/I
120 km, 1000LX SFP, LC, SMF, 1550 nm, I-Temp, TAA

Passive Interconnection Cables

AT-SP10TW1
Twinax direct attach cable (1 meter)

AT-SP10TW3
Twinax direct attach cable (3 meter)

AT-SP10TW7
Twinax direct attach cable (7 meter)

Accessories

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