

## DATA SHEET

# ARUBA 2930F SWITCH SERIES

## PRODUCT OVERVIEW

The Aruba 2930F Switch Series is designed for customers creating smart digital workplaces that are optimized for mobile users with an integrated wired and wireless approach. These convenient Layer 3 network switches include built-in uplinks and PoE power and are simple to deploy and manage with advanced security and network management tools like Aruba ClearPass Policy Manager, Aruba AirWave and cloud-based Aruba Central.

A powerful Aruba ProVision ASIC delivers performance, robust feature support and value with programmability for the latest applications. Stacking with Virtual Switching Framework (VSF) provides simplicity and scalability. The 2930F supports built-in 1GbE or 10GbE uplinks, PoE+, Access OSPF routing, Dynamic Segmentation, robust QoS, RIP routing, and IPv6 with no software licensing required.

The Aruba 2930F Switch Series provides a convenient and cost-effective access switch solution that can be quickly set up with Zero Touch Provisioning. The robust Layer 3 feature set includes a limited lifetime warranty.



## KEY FEATURES

- Aruba Layer 3 switch series with VSF stacking, static, RIP and Access OSPF Routing, Dynamic Segmentation, ACLs, and robust QoS
- Supports advanced security and network management via Aruba ClearPass Policy Manager, Aruba AirWave and Aruba Central
- Convenient built-in 1GbE or 10GbE uplinks and up to 740 W PoE+
- Software defined ready with REST APIs and OpenFlow support
- Simple deployment with Zero Touch Provisioning

## ENHANCED CAPABILITIES

### Unified Wired and Wireless Support

- Supports unified wired and wireless policies using Aruba ClearPass Policy Manager
- Switch auto-configuration automatically configures switch for different settings such as VLAN, CoS, PoE max. power, and PoE priority when an Aruba access point is detected
- User Role defines a set of switch-based policies in areas such as security, authentication, and QoS. A user role can be assigned to a group of users or devices, using switch-based local user role or download from ClearPass
- For improved network simplicity and security, Aruba Dynamic Segmentation automatically enforces user, device and application-aware policies on Aruba wired and wireless networks. Automated device profiling, role-based access control, and Layer 7 firewall features deliver enhanced visibility and performance for a better overall experience for both IT and end users alike

- Dynamic Segmentation provides a secure tunnel that transports network traffic on a per-port or per-user role basis to an Aruba Controller. In a per-user role Tunnel Node, users are authenticated by the ClearPass Policy Manager which directs traffic to be tunneled to an Aruba controller or switch locally
- Static IP visibility allows ClearPass to do accounting for clients with a static IP address

### Software-defined networks

- Supports multiple programmatic interfaces, including REST APIs and Openflow 1.0 and 1.3, to enable automation of network operations, monitoring, and troubleshooting

### Quality of Service (QoS)

- Traffic prioritization (IEEE 802.1p) for classification into eight priority levels mapped to eight queues
- Layer 4 prioritization based on TCP/UDP port numbers
- Class of Service (CoS) sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, and DiffServ



- Rate limiting sets per-port ingress enforced maximums and per-port, per-queue minimums
- Large buffers provide graceful congestion management
- Unknown Unicast Rate Limiting throttles unicast packets with unknown destination addresses and limits flooding on the VLAN

### Connectivity

- Convenient built-in 10 Gbps Ethernet (4 x SFP+) uplinks available on select models
- 12 port fanless model with built-in power supply includes 12 x 1 Gbps Ethernet PoE+ ports and four built-in uplinks (2 x SFP+ and 2 x 1GBASE-T)
- Auto-MDIX provides automatic adjustments for straight-through or crossover cables on all 10/100 and 10/100/1000 ports
- IEEE 802.3at Power over Ethernet (PoE+) provides up to 30 W per port that allows support of the latest PoE+-capable devices such as IP phones, wireless access points, and security cameras, as well as any IEEE 802.3af-compliant end device; eliminates the cost of additional electrical cabling and circuits that would otherwise be necessary in IP phone and WLAN deployments
- Support for pre-standard PoE detects and provides power to pre-standard PoE devices
- IPv6
  - IPv6 host enables switches to be managed in an IPv6 network
  - Dual stack (IPv4 and IPv6) transitions from IPv4 to IPv6, supporting connectivity for both protocols
  - MLD snooping forwards IPv6 multicast traffic to the appropriate interface
  - IPv6 ACL/QoS supports ACL and QoS for IPv6 network traffic
  - IPv6 routing supports static and RIPv6 protocols
  - Security provides RA guard, DHCPv6 protection, dynamic IPv6 lockdown, and ND snooping

### Performance and efficiency

- Energy-efficient design
  - 80 PLUS Silver Certified power supply increases power efficiency and savings
  - Energy-efficient Ethernet (EEE) support reduces power consumption in accordance with IEEE 802.3az
- Designed with the latest Aruba Provision ASIC, providing very low latency, increased packet buffering, and adaptive power consumption

- Selectable queue configurations allows for increased performance by selecting the number of queues and associated memory buffering that best meet the requirements of the network applications
- Stacking Topology
  - Virtual Switching Framework (VSF) front plane stacking creates one virtual resilient switch from up to eight\* switches
  - Ring topology—Supports up to eight member stack
  - Virtualized switching provides simplified management as the switches act as a single chassis when stacked

### Convergence

- IP multicast snooping and data-driven IGMP automatically prevents flooding of IP multicast traffic
- LLDP-MED (Media Endpoint Discovery) defines a standard extension of LLDP that stores values for parameters such as QoS and VLAN to automatically configure network devices such as IP phones
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP) facilitates easy mapping using network management applications with LLDP automated device discovery protocol
- PoE and PoE+ allocations support multiple methods (automatic, IEEE 802.3at dynamic, LLDP-MED fine grain, IEEE 802.3af device class, or user-specified) to allocate and manage PoE/PoE+ power for more efficient energy savings
- Local MAC Authentication assigns attributes such as VLAN and QoS using a locally configured profile that can be a list of MAC prefixes
- IP multicast routing includes PIM Sparse and Dense modes to route IP multicast traffic (limited to 16 interfaces)
- Protocol Independent Multicast for IPv6 supports one-to-many and many-to-many media casting use cases such as IPTV over IPv6 networks

### Resiliency and high availability

- IEEE 802.1s Multiple Spanning Tree provides high link availability by allowing Multiple Spanning Trees; provides legacy support for IEEE 802.1d and IEEE 802.1w
- Virtual Router Redundancy Protocol (VRRP) allows groups of two routers to dynamically back each other up to create highly available routed environments for IPv4 and IPv6 networks (limited to 128 VRs)
- IEEE 802.3ad link aggregation control protocol (LACP) and port trunking support up to 60 static or dynamic trunks active across a stack, with each trunk having up to eight links (ports) per static trunk; and offer support for trunking across stack members



- SmartLink provides easy-to-configure link redundancy of active and standby links

### Simplified configuration and management

- Aruba Central cloud-based management platform offers a simple, secure and cost-effective way to manage switches
- Zero Touch Provisioning (ZTP) simplifies installation of the switch infrastructure using Aruba Activate or a DHCP-based process with AirWave and Central Network Management
- Flexible management with same hardware – Supports both cloud-based Central and on-premises AirWave with the same hardware, ensuring management platform changes without ripping and replacing switching infrastructure
- Built-in programmable and easy-to-use REST API interface provides configuration automation for campus networks
- SNMPv1, v2, and v3 provide complete support of SNMP; provide full support of industry-standard Management Information Base (MIB) plus private extensions; SNMPv3 supports increased security using encryption

### Manageability

- Dual flash images provide independent primary and secondary operating system files for backup while upgrading
- Friendly port names allow assignment of descriptive names to ports
- Find-Fix-Inform feature finds and fixes common network problems automatically, then informs administrator
- Supports multiple configuration files to be stored to a flash image
- RMON, XRMON, and sFlow provide advanced monitoring and reporting capabilities for statistics, history, alarms, and events
- Troubleshooting ingress and egress port monitoring enable more efficient network problem solving
- Unidirectional link detection (UDLD) monitors the link between two switches and blocks the ports on both ends of the link if the link goes down at any point between the two devices
- IP SLA for Voice monitors quality of voice traffic using the UDP Jitter and UDP Jitter for VoIP tests

### Layer 2 switching

- IEEE 802.1ad Q-in-Q increases the scalability of an Ethernet network by providing a hierarchical structure; connects multiple LANs on a high-speed campus or metro network
- VLAN support and tagging support IEEE 802.1Q (4,094 VLAN IDs) and 2K VLANs simultaneously
- Jumbo packet support improves the performance of large data transfers; supports frame size of up to 9,220 bytes

- IEEE 802.1v protocol VLANs isolate select non-IPv4 protocols automatically into their own VLANs
- Rapid Per-VLAN Spanning Tree (RPVST+) allows each VLAN to build a separate spanning tree to improve link bandwidth usage; is compatible with PVST+
- GVRP and MVRP allows automatic learning and dynamic assignment of VLANs
- VxLAN encapsulation (tunneling) protocol for overlay network that enables a more scalable virtual network deployment

### Layer 3 services

- DHCP server centralizes and reduces the cost of IPv4 address management

### Layer 3 routing

- Static IP routing provides manually configured routing; includes ECMP capability
- 256 static and 10,000 RIP routes facilitate segregation of user data, without adding external hardware
- Routing Information Protocol (RIP) provides RIPv1, RIPv2, and RIPng routing
- Access OSPF
  - Provides OSPFv2 and OSPFv3 protocols for routing between access and the next layer on the LAN. Only one OSPF area and up to 8 interfaces are supported.
- Policy-based routing uses a classifier to select traffic that can be forwarded based on policy set by the network administrator (limited to 16 next hop routes)

### Security

- Control Plane Policing sets rate limit on control protocols to protect CPU overload from DOS attacks
- Multiple user authentication methods
  - Uses an IEEE 802.1X supplicant on the client in conjunction with a RADIUS server to authenticate in accordance with industry standards
  - Supports web-based authentication
  - Supports MAC-based client authentication
- Authentication flexibility
  - Multiple IEEE 802.1X users per port provides authentication of multiple devices on a single port; prevents a user from "piggybacking" on another user's IEEE 802.1X authentication
  - Concurrent IEEE 802.1X, Web, and MAC authentication schemes per port switch port will accept up to 32 sessions of IEEE 802.1X, Web, and MAC authentications



- TPM-based Security
  - Includes a Trusted Platform Module (TPM) for secure hardware-based generation and storage of cryptographic keys that can be used for a variety of authentication purposes
- Access control lists (ACLs) provide IP Layer 3 filtering based on source/destination IP address/subnet and source/destination TCP/UDP port number
- Source-port filtering allows only specified ports to communicate with each other
- RADIUS/TACACS+ eases switch management security administration by using a password authentication server
- Secure shell encrypts all transmitted data for secure remote CLI access over IP networks
- Secure Sockets Layer (SSL) encrypts all HTTP traffic, allowing secure access to the browser-based management GUI in the switch
- Port security allows access only to specified MAC addresses, which can be learned or specified by the administrator
- Radius over TLS (RadSec) allows users to use a more secure and reliable mode of communications between switch and radius servers over unsecure networks
- MAC address lockout prevents particular configured MAC addresses from connecting to the network
- Secure FTP allows secure file transfer to and from the switch; protects against unwanted file downloads or unauthorized copying of a switch configuration file
- Switch management logon security helps secure switch CLI logon by optionally requiring either RADIUS or TACACS+ authentication
- Custom banner displays security policy when users log in to the switch
- STP BPDU port protection blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks
- DHCP protection blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- Dynamic ARP protection blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
- STP root guard protects the root bridge from malicious attacks or configuration mistakes
- Identity-driven ACL enables implementation of a highly granular and flexible access security policy and VLAN assignment specific to each authenticated network user
- Per-port broadcast throttling configures broadcast control selectively on heavy traffic port uplinks
- Private VLAN provides network security by restricting peer-to-peer communication to prevent a variety of malicious attacks; typically a switch port can only communicate with other ports in the same community and/or an uplink port, regardless of VLAN ID or destination MAC address
- Open Authentication Role simplifies first-time deployment of AAA in brownfield deployments by allowing full network access for failed clients and provides instant connectivity as soon as a client is plugged-in
- Critical Authentication Role ensures that important infrastructure devices such as IP phones are allowed network access even in the absence of a RADIUS server
- MAC Pinning allows non-chatty legacy devices to stay authenticated by pinning client MAC addresses to the port until the clients logoff or get disconnected
- Enrollment over Secure Transport (EST) enhances the switch PKI infrastructure with a simpler, scalable and more secure method of certificate provisioning, re-enrollment and renewal

#### Monitor and diagnostics

- Digital optical monitoring of SFP+ and 1000BASE-T transceivers allows detailed monitoring of the transceiver settings and parameters

#### Customer first, customer last support

When your network is important to your business, then your business needs the backing of Aruba Support Services. Partner with Aruba product experts to increase your team productivity, keep pace with technology advances, software releases, and obtain break-fix support.

Foundation Care for Aruba support services include priority access to Aruba Technical Assistance Center(TAC) engineers 24x7x365, flexible hardware and onsite support options, and total coverage for Aruba products. Aruba switches with assigned Aruba Central subscriptions benefit with option for additional hardware support only.



Aruba Pro Care adds fast access to senior Aruba TAC engineers, who are assigned as a single point of contact for case management, reducing the time spent addressing and resolving issues.

For complete details on Foundation Care and Aruba Pro Care, please visit: <https://www.arubanetworks.com/supportservices/>

#### **Warranty, services and support**

- Limited Lifetime Warranty, see <https://www.arubanetworks.com/support-services/product-warranties/> for warranty and support information included with your product purchase
- For Software Releases and Documentation, refer to <https://asp.arubanetworks.com/downloads>
- For support and services information, visit <https://www.arubanetworks.com/support-services/arubacare/>



## SPECIFICATIONS

	Aruba 2930F 24G 4SFP+ Switch (JL253A)	Aruba 2930F 48G 4SFP+ Switch (JL254A)	Aruba 2930F 24G PoE+ 4SFP+ Switch (JL255A)
<b>I/O ports and slots</b>			
	24 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP+ 1/10GbE ports; PHY-less	48 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP+ 1/10GbE ports; PHY-less	24 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP+ 1/10GbE ports; PHY-less
<b>Additional ports and slots</b>			
	1 dual-personality (RJ-45 or USB micro-B) serial console port	1 dual-personality (RJ-45 or USB micro-B) serial console port	1 dual-personality (RJ-45 or USB micro-B) serial console port
<b>Physical characteristics</b>			
Dimensions	17.42 (w) x 7.88 (d) x 1.73 (h) in (44.25 x 20.02 x 4.39 cm) (1U height)	17.42 (w) x 9.7 (d) x 1.73 (h) in (44.25 x 24.63 x 4.39 cm) (1U height)	17.42 (w) x 11.98 (d) x 1.73 (h) in (44.25 x 30.42 x 4.39 cm) (1U height)
Weight	5.31 lb (2.41 kg)	6.83 lb (3.10 kg)	8.6 lb (3.9 kg)
<b>Memory and processor</b>			
	Dual Core ARM® Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC	Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC	Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC
<b>Performance</b>			
	IPv6 Ready Certified	IPv6 Ready Certified	IPv6 Ready Certified
1,000 Mb Latency	< 3.8 μs (64-byte packets)	< 3.8 μs (64-byte packets)	< 3.8 μs (64-byte packets)
10 Gbps Latency	< 2.9 μs (64-byte packets)	< 2.9 μs (64-byte packets)	< 2.9 μs (64-byte packets)
Throughput	up to 95.2 Mpps	up to 112.0 Mpps	up to 95.2 Mpps
Switching capacity	128 Gbps	176 Gbps	128 Gbps
Routing table size	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP
MAC address table size	32,768 entries	32,768 entries	32,768 entries



## SPECIFICATIONS

	Aruba 2930F 24G 4SFP+ Switch (JL253A)	Aruba 2930F 48G 4SFP+ Switch (JL254A)	Aruba 2930F 24G PoE+ 4SFP+ Switch (JL255A)
<b>Environment</b>			
Operating temperature	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet
Non-operating/Storage relative humidity	15% to 95% @ 149°F (65°C), noncondensing	15% to 95% @ 149°F (65°C), noncondensing	15% to 95% @ 149°F (65°C)
Acoustic (power and pressure) in decibals	Power: 49.7 dB, Pressure: 37.1 dB	Power: 54.1 dB, Pressure: 40.2 dB	Power: 54.1 dB, Pressure: 40.6 dB
Airflow direction	Side-to-side	Side-to-side	Side-to-side
<b>Electrical characteristics</b>			
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Power efficiency certifications			80plus.org certification: Silver
Maximum heat dissipation	100.0 BTU/hr (105.5 kJ/hr)	157.2 BTU/hr (165.8 kJ/hr)	258.0 BTU/hr (272.2 kJ/hr)
Voltage	100 - 127 / 200 - 240 VAC, rated	100 - 127 / 200 - 240 VAC, rated	100 - 127 / 200 - 240 VAC, rated
Current	0.6/0.4 A	0.9/0.6 A	4.9/2.4 A
Maximum power rating	29.3 W	46.6 W	445 W
Idle power	19.5 W	32.7 W	36.8 W
PoE power			370 W PoE+
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.
<b>Safety</b>			
	UL 60950-1: 2nd Edition; UL 62368-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1: 2nd Edition; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; IEC-62368-1: 2nd Edition; EN 60825-1:2014 / IEC 60825-1: 2014 Class 1	UL 60950-1: 2nd Edition; UL 62368-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1: 2nd Edition; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; IEC-62368-1: 2nd Edition; EN 60825-1:2014 / IEC 60825-1: 2014 Class 1	UL 60950-1: 2nd Edition; UL 62368-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1: 2nd Edition; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; IEC-62368-1: 2nd Edition; EN 60825-1:2014 / IEC 60825-1: 2014 Class 1






## SPECIFICATIONS

	<b>Aruba 2930F 24G 4SFP+ Switch (JL253A)</b>	<b>Aruba 2930F 48G 4SFP+ Switch (JL254A)</b>	<b>Aruba 2930F 24G PoE+ 4SFP+ Switch (JL255A)</b>
<b>Emissions</b>			
	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438
<b>Immunity</b>			
Generic	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3	IEC 61000-4-3	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4	IEC 61000-4-4	IEC 61000-4-4
Surge	IEC 61000-4-5	IEC 61000-4-5	IEC 61000-4-5
Conducted	IEC 61000-4-6	IEC 61000-4-6	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8	IEC 61000-4-8
Voltage dips and Interruptions	IEC 61000-4-11	IEC 61000-4-11	IEC 61000-4-11
Harmonics	IEC/EN 61000-3-2	IEC/EN 61000-3-2	IEC/EN 61000-3-2
Flicker	IEC/EN 61000-3-3	IEC/EN 61000-3-3	IEC/EN 61000-3-3
<b>Management</b>			
	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP






## SPECIFICATIONS

			
	<b>Aruba 2930F 48G PoE+ 4SFP+ Switch (JL256A) (JL256ACM1)</b>	<b>Aruba 2930F 8G PoE+ 2SFP+ Switch (JL258A) (JL258ACM1)</b>	<b>Aruba 2930F 24G 4SFP Switch (JL259A)</b>
<b>I/O ports and slots</b>			
	48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP+ 1/10GbE ports; PHY-less	8 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 2 SFP+ 1/10GbE ports; PHY-less	24 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP
<b>Additional ports and slots</b>			
	1 dual-personality (RJ-45 or USB micro-B) serial console port	1 dual-personality (RJ-45 or USB micro-B) serial console port	1 dual-personality (RJ-45 or USB micro-B) serial console port
<b>Physical characteristics</b>			
Dimensions	17.42 (w) x 11.98 (d) x 1.73 (h) in (44.25 x 30.42 x 4.39 cm) (1U height)	10 (w) x 10 (d) x 1.73 (h) in (25.4 x 25.4 x 4.39 cm) (1U height)	17.42 (w) x 7.88 (d) x 1.73 (h) in (44.25 x 20.02 x 4.39 cm) (1U height)
Weight	9.83 lb (4.46 kg)	4.41 lb (2.0 kg)	5.31 lb (2.41 kg)
<b>Memory and processor</b>			
	Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC	Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC	Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC
<b>Performance</b>			
	IPv6 Ready Certified	IPv6 Ready Certified	IPv6 Ready Certified
1,000 Mb Latency	< 3.8 $\mu$ s (64-byte packets)	< 3.8 $\mu$ s (64-byte packets)	< 3.8 $\mu$ s (64-byte packets)
10 Gbps Latency	< 2.9 $\mu$ s (64-byte packets)	< 2.9 $\mu$ s (64-byte packets)	
Throughput	up to 112.0 Mpps	up to 41.7 Mpps	up to 41.7 Mpps
Switching capacity	176 Gbps	56 Gbps	56 Gbps
Routing table size	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP
MAC address table size	32,768 entries	32,768 entries	32,768 entries
<b>Environment</b>			
Operating temperature	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet
Non-operating/Storage relative humidity	15% to 95% @ 149°F (65°C)	15% to 95% @ 149°F (65°C)	15% to 95% @ 149°F (65°C), noncondensing
Acoustic	Power: 55.7 dB, Pressure: 41.7 dB	Power: 0 dB, Pressure: 0 dB Fanless	Power: 49.7 dB, Pressure: 37.1 dB
Airflow direction	Side-to-side		Side-to-side






## SPECIFICATIONS

			
	<b>Aruba 2930F 48G PoE+ 4SFP+ Switch (JL256A) (JL256ACM1)</b>	<b>Aruba 2930F 8G PoE+ 2SFP+ Switch (JL258A) (JL258ACM1)</b>	<b>Aruba 2930F 24G 4SFP Switch (JL259A)</b>
<b>Electrical characteristics</b>			
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Power efficiency certifications	80plus.org certification: Silver	DoE VI certification	
Maximum heat dissipation	293.0 BTU/hr (309.1 kJ/hr)	58.6 BTU/hr (61.8 kJ/hr)	100.0 BTU/hr (105.5 kJ/hr)
Voltage	100 - 127 / 200 - 240 VAC, rated	90 - 264 VAC, rated	100 - 127 / 200 - 240 VAC, rated
Current	5.1/2.5 A	2.6 A	0.6/0.4 A
Maximum power rating	459 W	155 W	29.3 W
Idle power	48.6 W		19.5 W
PoE power	370 W PoE+	125 W PoE+	
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.
<b>Safety</b>			
	UL 60950-1: 2nd Edition; UL 62368-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1: 2nd Edition; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; IEC-62368-1: 2nd Edition; EN 60825-1:2014 / IEC 60825-1:2014 Class 1	UL 60950-1: 2nd Edition; UL 62368-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1: 2nd Edition; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; IEC-62368-1: 2nd Edition; EN 60825-1:2014 / IEC 60825-1:2014 Class 1	UL 60950-1: 2nd Edition; UL 62368-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1: 2nd Edition; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; IEC-62368-1: 2nd Edition; EN 60825-1:2014 / IEC 60825-1:2014 Class 1
<b>Emissions</b>			
	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438
<b>Immunity</b>			
Generic	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3	IEC 61000-4-3	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4	IEC 61000-4-4	IEC 61000-4-4
Surge	IEC 61000-4-5	IEC 61000-4-5	IEC 61000-4-5
Conducted	IEC 61000-4-6	IEC 61000-4-6	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8	IEC 61000-4-8



## SPECIFICATIONS

			
	<b>Aruba 2930F 48G PoE+ 4SFP+ Switch (JL256A) (JL256ACM1)</b>	<b>Aruba 2930F 8G PoE+ 2SFP+ Switch (JL258A) (JL258ACM1)</b>	<b>Aruba 2930F 24G 4SFP Switch (JL259A)</b>
<b>Immunity</b>			
Voltage dips and Interruptions	IEC 61000-4-11	IEC 61000-4-11	IEC 61000-4-11
Harmonics	IEC/EN 61000-3-2	IEC/EN 61000-3-2	IEC/EN 61000-3-2
Flicker	IEC/EN 61000-3-3	IEC/EN 61000-3-3	IEC/EN 61000-3-3
<b>Management</b>			
	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP



## SPECIFICATIONS

	<b>Aruba 2930F 48G 4SFP Switch (JL260A)</b>	<b>Aruba 2930F 24G PoE+ 4SFP Switch (JL261A) (JL261ACM¹)</b>	<b>Aruba 2930F 48G PoE+ 4SFP Switch (JL262A) (JL262ACM¹)</b>
<b>I/O ports and slots</b>			
	48 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP	24 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP	48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP
<b>Additional ports and slots</b>			
	1 dual-personality (RJ-45 or USB micro-B) serial console port	1 dual-personality (RJ-45 or USB micro-B) serial console port	1 dual-personality (RJ-45 or USB micro-B) serial console port
<b>Physical characteristics</b>			
Dimensions	17.42 (w) x 9.7 (d) x 1.73 (h) in (44.25 x 24.63 x 4.39 cm) (1U height)	17.42 (w) x 11.98 (d) x 1.73 (h) in (44.25 x 30.42 x 4.39 cm) (1U height)	17.42 (w) x 11.98 (d) x 1.73 (h) in (44.25 x 30.42 x 4.39 cm) (1U height)
Weight	6.83 lb (3.10 kg)	8.6 lb (3.9 kg)	9.83 lb (4.46 kg)
<b>Memory and processor</b>			
	Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC	Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.785 Egress, 4 GB eMMC	Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC
<b>Performance</b>			
	IPv6 Ready Certified	IPv6 Ready Certified	IPv6 Ready Certified
1,000 Mb Latency	< 3.8 µs (64-byte packets)	< 3.8 µs (64-byte packets)	< 3.8 µs (64-byte packets)
Throughput	up to 77.4 Mpps	up to 41.7 Mpps	up to 77.4 Mpps
Switching capacity	104 Gbps	56 Gbps	104 Gbps
Routing table size	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP
MAC address table size	32,768 entries	32,768 entries	32,768 entries
<b>Environment</b>			
Operating temperature	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet
Non-operating/Storage relative humidity	15% to 95% @ 149°F (65°C), noncondensing	15% to 95% @ 149°F (65°C)	15% to 95% @ 149°F (65°C)
Acoustic	Power: 54.1 dB, Pressure: 40.2 dB	Power: 54.1 dB, Pressure: 40.6 dB	Power: 55.7 dB, Pressure: 41.7 dB
Airflow direction	Side-to-side	Side-to-side	Side-to-side



## SPECIFICATIONS

	Aruba 2930F 48G 4SFP Switch (JL260A)	Aruba 2930F 24G PoE+ 4SFP Switch (JL261A) (JL261ACM¹)	Aruba 2930F 48G PoE+ 4SFP Switch (JL262A) (JL262ACM¹)
<b>Electrical characteristics</b>			
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Power efficiency certifications		80plus.org certification: Silver	80plus.org certification: Silver
Maximum heat dissipation	100.0 BTU/hr (105.5 kJ/hr)	258.0 BTU/hr (272.2 kJ/hr)	293.0 BTU/hr (309.1 kJ/hr)
Voltage	100 - 127 / 200 - 240 VAC, rated	100 - 127 / 200 - 240 VAC, rated	100 - 127 / 200 - 240 VAC, rated
Current	0.9/0.6 A	4.9/2.4 A	5.1/2.5 A
Maximum power rating	46.6 W	445 W	459 W
Idle power	32.7 W	36.8 W	48.6 W
PoE power		370 W PoE+	370 W PoE+
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.
<b>Safety</b>			
	UL 60950-1: 2nd Edition; UL 62368-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1: 2nd Edition; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; IEC-62368-1: 2nd Edition; EN 60825-1:2014 / IEC 60825-1:2014 Class 1	UL 60950-1: 2nd Edition; UL 62368-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1: 2nd Edition; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; IEC-62368-1: 2nd Edition; EN 60825-1:2014 / IEC 60825-1:2014 Class 1	UL 60950-1: 2nd Edition; UL 62368-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1: 2nd Edition; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; IEC-62368-1: 2nd Edition; EN 60825-1:2014 / IEC 60825-1:2014 Class 1
<b>Emissions</b>			
	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438
<b>Immunity</b>			
Generic	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3	IEC 61000-4-3	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4	IEC 61000-4-4	IEC 61000-4-4
Surge	IEC 61000-4-5	IEC 61000-4-5	IEC 61000-4-5
Conducted	IEC 61000-4-6	IEC 61000-4-6	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8	IEC 61000-4-8



## SPECIFICATIONS

	<b>Aruba 2930F 48G 4SFP Switch (JL260A)</b>	<b>Aruba 2930F 24G PoE+ 4SFP Switch (JL261A) (JL261ACM¹)</b>	<b>Aruba 2930F 48G PoE+ 4SFP Switch (JL262A) (JL262ACM¹)</b>
<b>Immunity</b>			
Voltage dips and Interruptions	IEC 61000-4-11	IEC 61000-4-11	IEC 61000-4-11
Harmonics	IEC/EN 61000-3-2	IEC/EN 61000-3-2	IEC/EN 61000-3-2
Flicker	IEC/EN 61000-3-3	IEC/EN 61000-3-3	IEC/EN 61000-3-3
<b>Management</b>			
	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP



SPECIFICATIONS			
	<b>Aruba 2930F 48G PoE+ 4SFP 740W Switch (JL557A)</b>	<b>Aruba 2930F 48G PoE+ 4SFP+ 740W Switch (JL558A) (JL558ACM*)</b>	<b>Aruba 2930F 12G PoE+ 2G/2SFP+ Switch (JL693A)</b>
<b>I/O ports and slots</b>			
	48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP	48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP+ 1/10GbE ports; PHY-less	12 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 2 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 2 SFP+ 1/10GbE ports; PHY-less
<b>Additional ports and slots</b>			
	1 dual-personality (RJ-45 or USB micro-B) serial console port	1 dual-personality (RJ-45 or USB micro-B) serial console port	1 dual-personality (RJ-45 or USB micro-B) serial console port
<b>Physical characteristics</b>			
Dimensions	17.42 (w) x 12.77 (d) x 1.73 (h) in (44.25 x 32.42 x 4.39 cm) (1U height)	17.42 (w) x 12.77 (d) x 1.73 (h) in (44.25 x 32.42 x 4.39 cm) (1U height)	10 (w) x 10 (d) x 1.73 (h) in (25.4 x 25.4 x 4.39 cm) (1U height)
Weight	10.56 lb (4.79 kg)	10.56 lb (4.79 kg)	4.85 lb (2.2kg)
<b>Memory and processor</b>			
	Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5 MB Ingress/7.785 Egress, 4 GB eMMC	Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5 MB Ingress/7.785 Egress, 4 GB eMMC	Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.785MB Egress, 4 GB eMMC
<b>Performance</b>			
1,000 Mb Latency	< 3.8 $\mu$ s (64-byte packets)	< 3.8 $\mu$ s (64-byte packets)	< 3.8 $\mu$ s (64-byte packets)
10 Gbps latency		< 2.9 $\mu$ s (64-byte packets)	< 2.9 $\mu$ s (64-byte packets)
Throughput	up to 77.4 Mpps	up to 112.0 Mpps	up to 41.7 Mpps
Switching capacity	104 Gbps	176 Gbps	68 Gbps
Routing table size	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP
MAC address table size	32,768 entries	32,768 entries	32,768 entries
<b>Environment</b>			
Operating temperature	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet






## SPECIFICATIONS

	Aruba 2930F 48G PoE+ 4SFP 740W Switch (JL557A)	Aruba 2930F 48G PoE+ 4SFP+ 740W Switch (JL558A) (JL558ACM*)	Aruba 2930F 12G PoE+ 2G/2SFP+ Switch (JL693A)
<b>Environment</b>			
Non-operating/Storage relative humidity	15% to 95% @ 149°F (65°C)	15% to 95% @ 149°F (65°C)	15% to 95% @ 149°F (65°C)
Acoustic	Power: 55.1 dB, Pressure: 41.1 dB	Power: 55.1 dB, Pressure: 41.1 dB	Power: 0 dB, Pressure: 0 dB Fanless
Airflow direction	Side-to-side	Side-to-side	
<b>Electrical characteristics</b>			
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Power efficiency certifications	80plus.org certification: Gold	80plus.org certification: Gold	DoE VI certification
Maximum heat dissipation	420.9 BTU/hr (444.1 kJ/hr)	420.9 BTU/hr (444.1 kJ/hr)	68.2 BTU/hr
Voltage	100 - 127/200 - 240 VAC, rated	100 - 127/200 - 240 VAC, rated	90 - 264 VAC, rated
Current	9.2/4.9 A	9.2/4.9 A	1.7 A
Maximum power rating	980 W	980 W	170 W
Idle power	49.9 W	49.9 W	20 W
PoE power	740 W PoE+	740 W PoE+	139 W PoE+
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.
<b>Safety</b>			
	UL 60950-1: 2nd Edition; UL 62368-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1: 2nd Edition; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; IEC-62368-1: 2nd Edition; EN 60825-1:2014 / IEC 60825-1:2014 Class 1	UL 60950-1: 2nd Edition; UL 62368-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1: 2nd Edition; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; IEC-62368-1: 2nd Edition; EN 60825-1:2014 / IEC 60825-1:2014 Class 1	UL/CUL 60950-1: 2nd Edition; UL/CUL 62368-1:2014; UL 62368-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1: 2014; IEC-62368-1: 2nd Edition; IEC 60950-1:2005 +A1:2009 +A2:2013; IEC 62368-1:2014; IEC-62368-1: 2nd Edition; EN 60825-1:2014 / IEC 60825-1:2014 Class 1
<b>Emissions</b>			
	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438



## SPECIFICATIONS

			
	Aruba 2930F 48G PoE+ 4SFP 740W Switch (JL557A)	Aruba 2930F 48G PoE+ 4SFP+ 740W Switch (JL558A) (JL558ACM <sup>1</sup> )	Aruba 2930F 12G PoE+ 2G/2SFP+ Switch (JL693A)
<b>Immunity</b>			
Generic	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3	IEC 61000-4-3	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4	IEC 61000-4-4	IEC 61000-4-4
Surge	IEC 61000-4-5	IEC 61000-4-5	IEC 61000-4-5
Conducted	IEC 61000-4-6	IEC 61000-4-6	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8	IEC 61000-4-8
Voltage dips and Interruptions	IEC 61000-4-11	IEC 61000-4-11	IEC 61000-4-11
Harmonics	IEC/EN 61000-3-2	IEC/EN 61000-3-2	IEC/EN 61000-3-2
Flicker	IEC/EN 61000-3-3	IEC/EN 61000-3-3	IEC/EN 61000-3-3
<b>Management</b>			
	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP



## STANDARDS AND PROTOCOLS (APPLIES TO ALL PRODUCTS IN SERIES)

### Denial of service protection

- CPU DoS Protection

### Device management

- RFC 1155 Structure and Management Information (SMIv1)
- RFC 1157 SNMPv1/v2c
- RFC 1591 DNS (client)
- RFC 1901 (Community based SNMPv2)
- RFC 1901-1907 SNMPv2c, SMIv2 and Revised MIB-II
- RFC 1908 (SNMPv1/v2 Coexistence)
- RFC 2576 (Coexistence between SNMPv1, v2, v3)
- RFC 2578-2580 SMIv2
- RFC 2579 (SMIv2 Text Conventions)
- RFC 2580 (SMIv2 Conformance)
- RFC 2819 (RMON groups Alarm, Event, History, and Statistics only)
- RFC 3416 (SNMP Protocol Operations v2)
- RFC 3417 (SNMP Transport Mappings)
- HTML and Telnet management
- HTTP, SSHv1, and Telnet
- Multiple Configuration Files
- Multiple Software Images
- SNMPv3 and RMON RFC support
- SSHv1/SSHv2 Secure Shell
- TACACS/TACACS+
- Web UI

### General protocols

- IEEE 802.1ad Q-in-Q
- IEEE 802.1AX-2008 Link Aggregation
- IEEE 802.1d MAC Bridges
- IEEE 802.1p Priority
- IEEE 802.1Q VLANs
- IEEE 802.1s Multiple Spanning Trees
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.3af Power over Ethernet
- IEEE 802.3at PoE+
- IEEE 802.3az Energy Efficient Ethernet
- IEEE 802.3x Flow Control
- RFC 768 UDP
- RFC 783 TFTP Protocol (revision 2)
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 854 TELNET
- RFC 868 Time Protocol

- RFC 951 BOOTP
- RFC 1058 RIPv1
- RFC 1256 ICMP Router Discovery Protocol (IRDP)
- RFC 1350 TFTP Protocol (revision 2)
- IEEE 802.1v VLAN classification by Protocol and Port
- RFC 1519 CIDR IEEE 802.1w Rapid Reconfiguration of Spanning Tree
- RFC 1542 BOOTP Extensions IEEE 802.3ab 1000BASE-T
- RFC 1918 Address Allocation for Private Internet
- RFC 2030 Simple Network Time Protocol (SNTP) v4
- RFC 2131 DHCP
- RFC 2236 IGMP Snooping
- RFC 2453 RIPv2
- RFC 2865 Remote Authentication Dial In User Service (RADIUS)
- RFC 2866 RADIUS Accounting
- RFC 3046 DHCP Relay Agent Information Option
- RFC 3411 An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks
- RFC 3412 Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)
- RFC 3413 Simple Network Management Protocol (SNMP) Applications
- RFC 3414 User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)
- RFC 3415 View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)
- RFC 3416 Protocol Operations for SNMP
- RFC 3417 Transport Mappings for the Simple Network Management Protocol (SNMP)
- RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
- RFC 3575 IANA Considerations for RADIUS
- RFC 3576 Ext to RADIUS (CoA only)
- RFC 4541 Considerations for Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches
- RFC 4675 RADIUS VLAN & Priority
- RFC 4861 Neighbor Discovery for IP version 6 (IPv6)
- RFC 4862 IPv6 Stateless Address Autoconfiguration
- RFC 5905 Network Time Protocol Version 4: Protocol and Algorithms Specification
- UDLD (Uni-directional Link Detection)



## IP multicast

- RFC 1112 IGMP
- RFC 2236 IGMPv2
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 3376 IGMPv3
- RFC 4541 Considerations for Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches

## IPv6

- RFC 1981 IPv6 Path MTU Discovery
- RFC 2080 RIPng for IPv6
- Protocol Applicability Statement
- RFC 2082 RIP-2 MD5
- RFC 2460 IPv6 Specification
- RFC 2464 Transmission of IPv6 over Ethernet Networks
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only)
- RFC 2925 Remote Operations MIB (Ping only)
- RFC 3019 MLDv1 MIB
- RFC 3315 DHCPv6 (client and relay)
- RFC 3484 Default Address Selection for IPv6
- RFC 3513 IPv6 Addressing Architecture
- RFC 3596 DNS Extension for IPv6
- RFC 3810 MLDv2 for IPv6
- RFC 4022 MIB for TCP
- RFC 4113 MIB for UDP
- RFC 4251 SSHv6 Architecture
- RFC 4252 SSHv6 Authentication
- RFC 4253 SSHv6 Transport Layer
- RFC 4254 SSHv6 Connection
- RFC 4291 IP Version 6 Addressing Architecture
- RFC 4293 MIB for IP
- RFC 4419 Key Exchange for SSH
- RFC 4443 ICMPv6
- RFC 4541 IGMP & MLD Snooping Switch
- RFC 4861 IPv6 Neighbor Discovery
- RFC 4862 IPv6 Stateless Address Auto-configuration
- RFC 5095 Deprecation of Type 0 Routing Headers in IPv6
- RFC 6620 FCFS SAVI
- draft-ietf-savi-mix

## MIBs

- IEEE 802.1ap (MSTP and STP MIB's only)
- IEEE 8021-Bridge-MIB (2008)
- IEEE 8021-Q-Bridge-MIB (2008)
- RFC 1155 Structure & ID of Management Information for TCP/IP Internets
- RFC 1156 (TCP/IP MIB)
- RFC 1157 A Simple Network Management Protocol (SNMP)
- RFC 1213 MIB II
- RFC 1493 Bridge MIB
- RFC 1724 RIPv2 MIB
- RFC 2021 RMONv2 MIB
- RFC 2578 Structure of Management Information Version 2 (SMIv2)
- RFC 2579 Textual Conventions for SMIv2
- RFC 2580 Conformance Statements for SMIv2
- RFC 2613 SMON MIB
- RFC 2618 RADIUS Client MIB
- RFC 2620 RADIUS Accounting MIB
- RFC 2665 Ethernet-Like-MIB
- RFC 2668 802.3 MAU MIB
- RFC 2674 802.1p and IEEE 802.1Q Bridge MIB
- RFC 2737 Entity MIB (version 2)
- RFC 2819 RMON MIB
- RFC 2863 The Interfaces Group MIB
- RFC 2925 Ping MIB
- RFC 2932 IP (Multicast Routing MIB)
- RFC 2933 IGMP MIB
- RFC 3414 SNMP-User based-SM MIB
- RFC 3415 SNMP-View based-ACM MIB
- RFC 3417 Simple Network Management Protocol (SNMP) over IEEE 802 Networks
- RFC 3418 MIB for SNMPv3
- RFC 4292 IP Forwarding Table MIB
- RFC 4836 Managed Objects for 802.3 Medium Attachment Units (MAU)



## Network management

- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- RFC 1155 Structure of Management Information
- RFC 1157 SNMPv1
- RFC 2021 Remote Network Monitoring Management Information Base version 2 using SMIv2
- RFC 2576 Coexistence between SNMP versions
- RFC 2578 Structure of Management Information Version 2 (SMIv2)
- RFC 2579 Textual Conventions for SMIv2
- RFC 2580 Conformance Statements for SMIv2
- RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm), and 9 (events)
- RFC 2819 Remote Network Monitoring Management Information Base
- RFC 2856 Textual Conventions for Additional High Capacity Data Types
- RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operationsn Applications
- RFC 3164 BSD syslog Protocol
- RFC 3176 sFlow
- RFC 3411 SNMP Management Frameworks
- RFC 3412 Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)
- RFC 3413 Simple Network Management Protocol (SNMP) Applications
- RFC 3414 User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)
- RFC 3415 View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)
- RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
- RFC 5424 Syslog Protocol
- ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED)
- SNMPv1/v2c/v3 XRMON
- RFC 1492 An Access Control Protocol, Sometimes Called TACACS
- RFC 1492 TACACS+
- RFC 1994 PPP Challenge Handshake Authentication Protocol (CHAP)
- RFC 2082 RIP-2 MD5 Authentication
- RFC 2104 Keyed-Hashing for Message Authentication
- RFC 2138 RADIUS Authentication
- RFC 2139 RADIUS Accounting
- RFC 2246 Transport Layer Security (TLS)
- RFC 2548 Microsoft® Vendor-specific RADIUS Attributes
- RFC 2618 RADIUS Authentication Client MIB
- RFC 2620 RADIUS Accounting Client MIB
- RFC 2698 A Two Rate Three Color Marker
- RFC 2716 PPP EAP TLS Authentication Protocol
- RFC 2818 HTTP Over TLS
- RFC 2865 RADIUS (client only)
- RFC 2865 RADIUS Authentication
- RFC 2866 RADIUS Accounting
- RFC 2867 RADIUS Accounting Modifications for Tunnel Protocol Support
- RFC 2868 RADIUS Attributes for Tunnel Protocol Support
- RFC 2869 RADIUS Extensions
- RFC 2882 NAS Requirements: Extended RADIUS Practices
- RFC 3162 RADIUS and IPv6
- RFC 3576 Dynamic Authorization Extensions to RADIUS
- RFC 3579 RADIUS Support For Extensible Authentication Protocol (EAP)
- RFC 3580 IEEE 802.1X RADIUS
- RFC 3580 IEEE 802.1X Remote Authentication Dial In User Service (RADIUS) Usage Guidelines
- RFC 4576 RADIUS Attributes Access Control Lists (ACLs)
- draft-grant-tacacs-02 (TACACS)
- Guest VLAN for 802.1X
- MAC Authentication
- MAC Lockdown
- MAC Lockout
- Port Security
- RFC Secure Sockets Layer (SSL)
- SSHv2 Secure Shell
- Web Authentication
- RFC 7030 Enrollment over Secure Transport
- RFC 6614 Transport Layer Security (TLS) Encryption over Radius (RadSec)

## QoS/CoS

- IEEE 802.1p (CoS)
- RFC 2474 DiffServ Precedence, including 8 queues/port
- RFC 2475 DiffServ Architecture
- RFC 2597 DiffServ Assured Forwarding (AF)
- RFC 2598 DiffServ Expedited Forwarding (EF)
- Ingress Rate Limiting

## Security

- IEEE 802.1X Port Based Network Access Control
- RFC 1321 The MD5 Message-Digest Algorithm
- RFC 1334 PPP Authentication Protocols (PAP)



## ARUBA 2930F SWITCHES AND ACCESSORIES

### Switch Models

- Aruba 2930F 24G 4SFP Switch (JL259A)
- Aruba 2930F 48G 4SFP Switch (JL260A)
- Aruba 2930F 24G PoE+ 4SFP Switch (JL261A)
- Aruba CM 2930F 24G PoE+ 4SFP Switch (JL261ACM)<sup>1</sup>
- Aruba 2930F 48G PoE+ 4SFP Switch (JL262A)
- Aruba CM 2930F 48G PoE+ 4SFP Switch (JL262ACM)<sup>1</sup>
- Aruba 2930F 24G 4SFP+ Switch (JL253A)
- Aruba 2930F 48G 4SFP+ Switch (JL254A)
- Aruba 2930F 24G PoE+ 4SFP+ Switch (JL255A)
- Aruba 2930F 48G PoE+ 4SFP+ Switch (JL256A)
- Aruba CM 2930F 48G PoE+ 4SFP+ Switch (JL256ACM)<sup>1</sup>
- Aruba 2930F 8G PoE+ 2SFP+ Switch (JL258A)
- Aruba CM 2930F 8G PoE+ 2SFP+ Switch (JL258ACM)<sup>1</sup>
- Aruba 2930F 12G PoE+ 2G/2SFP+ Switch (JL693A)
- Aruba 2930F 48G PoE+ 4SFP 740W Switch (JL557A)
- Aruba 2930F 48G PoE+ 4SFP+ 740W Switch (JL558A)
- Aruba CM 2930F 48G PoE+ 4SFP+ 740W Switch (JL558ACM)<sup>1</sup>

### Transceivers

- Aruba 100M SFP LC FX 2km MMF XCVR (J9054D)
- Aruba CM 100M SFP LC FX 2km MMF XCVR (J9054DCM)<sup>1</sup>
- Aruba 1G SFP LC SX 500m MMF XCVR (J4858D)
- Aruba CM 1G SFP LC SX 500m MMF XCVR (J4858DCM)<sup>1</sup>
- Aruba 1G SFP LC LX 10km SMF XCVR (J4859D)
- Aruba CM 1G SFP LC LX 10km SMF XCVR (J4859DCM)<sup>1</sup>
- Aruba 1G SFP LC LH 70km SMF XCVR (J4860D)
- Aruba CM 1G SFP LC LH 70km SMF XCVR (J4860DCM)<sup>1</sup>
- Aruba 1G SFP RJ45 T 100m Cat5e XCVR (J8177D)
- Aruba CM 1G SFP RJ45 T 100m Cat5e XCVR (J8177DCM)<sup>1</sup>
- Aruba 10G SFP+ LC SR 300m MMF XCVR (J9150D)<sup>2</sup>
- Aruba CM 10G SFP+ LC SR 300m MMF XCVR (J9150DCM)<sup>1, 2</sup>
- Aruba 10G SFP+ LC LR 10km SMF XCVR (J9151E)<sup>2</sup>
- Aruba CM 10G SFP+ LC LR 10km SMF XCVR (J9151ECM)<sup>1, 2</sup>
- Aruba 10G SFP+ LC ER 40km SMF XCVR (J9153D)<sup>3</sup>
- Aruba 10G SFP+ to SFP+ 1m DAC Cable (J9281D)
- Aruba 10G SFP+ to SFP+ 3m DAC Cable (J9283D)

Note: 2930F Series Switches do not support the use of 10G LRM, nor 7M 10G DAC

### Cables

- Aruba X2C2 RJ45 to DB9 Console Cable (JL448A)

### Mounting Kit (for 24 and 48 port models)

- HPE X410 1U Universal 4-post Rack Mounting Kit (J9583A)
- Aruba X414 1U Universal 4-post Rack Mounting Kit (J9583B)

### Accessories for 8 port PoE+ model (JL258A)

- Aruba 2930F 8-port Cable Guard (JL311A)
- Aruba CM 2930F 8-port Cable Guard (JL311ACM)<sup>1</sup>
- Aruba 2930F 8-port Power Shelf (JL312A)
- Aruba CM 2930F 8-port Power Shelf (JL312ACM)<sup>1</sup>

### Aruba Central Foundation Licenses

- Aruba Central Switch 6200/29xx Foundation 1 year Subscription E-STU (Q9Y73AAE)
- Aruba Central Switch 6200/29xx Foundation 3 year Subscription E-STU (Q9Y74AAE)
- Aruba Central Switch 6200/29xx Foundation 5 year Subscription E-STU (Q9Y75AAE)
- Aruba Central Switch 6200/29xx Foundation 7 year Subscription E-STU (Q9Y76AAE)
- Aruba Central Switch 6200/29xx Foundation 10 year Subscription E-STU (Q9Y77AAE)
- Aruba Central 25xx/6100/8 to 12 port Switch Foundation 1 year Subscription E-STU (Q9Y68AAE)
- Aruba Central 25xx/6100/8 to 12 port Switch Foundation 3 year Subscription E-STU (Q9Y69AAE)
- Aruba Central 25xx/6100/8 to 12 port Switch Foundation 5 year Subscription E-STU (Q9Y70AAE)
- Aruba Central 25xx/6100/8 to 12 port Switch Foundation 7 year Subscription E-STU (Q9Y71AAE)
- Aruba Central 25xx/6100/8 to 12 port Switch Foundation 10 year Subscription E-STU (Q9Y72AAE)
- Aruba Central On-Premises 62xx or 29xx Switch Foundation 1 year Subscription E-STU (R6U78AAE)
- Aruba Central On-Premises 62xx or 29xx Switch Foundation 3 year Subscription E-STU (R6U79AAE)
- Aruba Central On-Premises 62xx or 29xx Switch Foundation 5 year Subscription E-STU (R6U80AAE)
- Aruba Central On-Premises 62xx or 29xx Switch Foundation 7 year Subscription E-STU (R6U81AAE)
- Aruba Central On-Premises 62xx or 29xx Switch Foundation 10 year Subscription E-STU (R6U82AAE)
- Aruba Central On-Premises 25xx/6100/8 to 12 port Switch Foundation 1 year Subscription E-STU (R6U73AAE)
- Aruba Central On-Premises 25xx/6100/8 to 12 port Switch Foundation 3 year Subscription E-STU (R6U74AAE)
- Aruba Central On-Premises 25xx/6100/8 to 12 port Switch Foundation 5 year Subscription E-STU (R6U75AAE)



- Aruba Central On-Premises 25xx/6100/8 to 12 port Switch Foundation 7 year Subscription E-STU (R6U76AAE)
- Aruba Central On-Premises 25xx/6100/8 to 12 port Switch Foundation 10 year Subscription E-STU (R6U77AAE)

For details and complete listing of Aruba Central licensing options, please refer to the [Aruba Central Data Sheet](#).

### Support

- JL259A: 4 Hour Onsite 3 Year (H1XL5E)
- JL260A: 4 Hour Onsite 3 Year (H1ZJ5E)
- JL261A: 4 Hour Onsite 3 Year (H1YE9E)
- JL262A: 4 Hour Onsite 3 Year (H2AC9E)
- JL253A: 4 Hour Onsite 3 Year (H1XV7E)
- JL254A: 4 Hour Onsite 3 Year (H1ZT7E)
- JL255A: 4 Hour Onsite 3 Year (H1YQ1E)
- JL256A: 4 Hour Onsite 3 Year (H2AN1E)
- JL258A: 4 Hour Onsite 3 Year (H2BG5E)
- JL693A: 4 Hour Onsite 3 Year (HP7Y1E)
- JL557A: 4 Hour Onsite 3 Year (H9NY2E)
- JL558A: 4 Hour Onsite 3 Year (H9PH3E)

For Aruba Central hardware only support, 24x7 TAC support, and many other support options, go to Support Services Central SKU lookup [tool](#).

# DHI-ITC413-PW4D Series

Dahua Access ANPR Camera



## System Overview

Using deep learning algorithms, Smart ANPR Camera can recognize vehicles, license plates, vehicle brands and vehicle colors. It can be used in scenarios that require vehicle detection and recognition. It also supports using IVS to detect events, and triggers sound and light alarms. The camera can perform various functions without being connected to other devices, which not only greatly improves the security of factories and compounds, but also simplifies the installation process. The camera is dustproof, waterproof, and tamper-proof, and is IP67 rated and IK10 rated.

## Functions

### Vivid Images

With its intuitive CMOS image sensor, the camera has WDR, a high signal-to-noise ratio, and is highly sensitive, producing vivid images 24/7, making it ideal for use in the traffic industry.

### Impressive Performance

The high-performance CPU processor extracts and analyzes information on motor and non-motor vehicles in real time, providing valuable information on their features. This information is useful for effective decision making.

### High-level Protection

Resilient and versatile, the camera is uniquely designed with an illuminator, junction box and more integrated into its structure. It is IP67 rated and has low power consumption, making it suitable for harsh environments.

- High-performance CMOS image sensor and processor that supports continuously extracting metadata 24/7.
- Adopts intelligent deep learning algorithms and supports recognition of unlicensed vehicles and the type, brand and color of vehicles.
- Built-in signal port, data port, communication port and remote controllers assist in controlling external devices such as entry and exit barriers.
- Built-in LED for simplified installation and commissioning.
- All-in-one structure with junction box and bracket, and it is also low power consumption.
- IP67 and IK10 rated.
- Supports intrusion and loitering detection and triggers light and voice alarms when perimeter events occur to actively deter targets. Custom audios can also be imported and edited.
- Easily adapts to scenarios through its motorized vari-focal lens.

## Easy Installation

Ideal for scenarios where license plate recognition is needed, the camera is capable of capturing more than ten different types of traffic violations, and supports traffic information collection and event detection. It is suitable for road scenarios.

## Multi-dimensional Data Sensing

Easy to install and commission, the camera has an LED illuminator and motorized vari-focal lens embedded in its structure.

## Scene

Suitable for shopping malls, hospitals, schools, communities, office buildings and stations.

Technical Specification					
Camera					
Image Sensor		1/1.8" CMOS			
Image Resolution		2688 × 1520			
Electronic Shutter Speed		Auto/Manual 1/25 s–1/100,000 s			
Max. Detection Speed		DHI-ITC413-PW4D-Z1, DHI-ITC413-PW4D-IZ1:80 km/h DHI-ITC413-PW4D-Z3, DHI-ITC413-PW4D-IZ3:120 km/h			
Min. Illumination		DHI-ITC413-PW4D-Z1,DHI-ITC413-PW4D-IZ1: 0.001 Lux@F1.4 (Color, 30 IRE) 0.0002 Lux@F1.4 (B/W, 30 IRE) 0 Lux (Illuminator on) DHI-ITC413-PW4D-Z3,DHI-ITC413-PW4D-IZ3: 0.001 Lux@F1.6 (Color, 30 IRE) 0.0002 Lux@F1.6 (B/W, 30 IRE) 0 Lux (Illuminator on)			
ROM		4 GB			
RAM		1 GB			
S/N Ratio		>56 dB			
Scanning System		progressive scanning			
Lens					
Focal Length		DHI-ITC413-PW4D-Z1, DHI-ITC413-PW4D-IZ1: 2.7 mm–12 mm DHI-ITC413-PW4D-Z3, DHI-ITC413-PW4D-IZ3: 8 mm–32 mm			
Field of View		DHI-ITC413-PW4D-Z1, DHI-ITC413-PW4D-IZ1: H: 92° (W)—46.1° (T) V: 49° (W)—26.0° (T) D: 109° (W)—52.8° (T) DHI-ITC413-PW4D-Z3, DHI-ITC413-PW4D-IZ3: H: 39.9° (W)—15.1° (T) V: 21.8° (W)—8.5° (T) D: 46.6° (W)—17.4° (T)			
Focus Control		Auto, area focus, manual			
Number of Lens		1			
Lens Type		Motorized Vari-focal			
Max. Aperture		DHI-ITC413-PW4D-Z1, DHI-ITC413-PW4D-IZ1:1.4 DHI-ITC413-PW4D-Z3, DHI-ITC413-PW4D-IZ3:1.6			
Iris Control		DHI-ITC413-PW4D-Z1, DHI-ITC413-PW4D-IZ1:DC-Iris DHI-ITC413-PW4D-Z3, DHI-ITC413-PW4D-IZ3:P-Iris			
DORI Distance	Lens	Detect	Observe	Recognize	Identify
	W: (DHI-ITC413-PW4D-Z1, DHI-ITC413-PW4D-IZ1)	60.4 m (198.16 ft)	24.2 m (79.40 ft)	12.1 m (39.70 ft)	6.0 m (19.68 ft)
	T: (DHI-ITC413-PW4D-Z1, DHI-ITC413-PW4D-IZ1)	128.7 m (422.24 ft)	51.5 m (168.96 ft)	25.7 m (84.32 ft)	12.9 m (42.32 ft)
	W: (DHI-ITC413-PW4D-Z3, DHI-ITC413-PW4D-IZ3)	160.0 m (524.93 ft)	64.0 m (209.97 ft)	32.0 m (104.99 ft)	16.0 m (52.49 ft)
	T: (DHI-ITC413-PW4D-Z3, DHI-ITC413-PW4D-IZ3)	406.9 m (1334.97 ft)	162.8 m (534.12 ft)	81.4 m (267.06 ft)	40.7 m (133.53 ft)

Illuminator	
Illuminator Number	4
Illuminator On/Off Control	Auto, manual
Illuminator Type	DHI-ITC413-PW4D-IZ1, DHI-ITC413-PW4D-IZ3:IR (850 nm) DHI-ITC413-PW4D-Z1, DHI-ITC413-PW4D-Z3:Dual Illuminators (730 nm IR/warm light)
Illumination Distance	DHI-ITC413-PW4D-Z1, DHI-ITC413-PW4D-IZ1: ANPR: 10 m (32.81 ft) Video monitoring: 30 m (98.43 ft) DHI-ITC413-PW4D-Z3, DHI-ITC413-PW4D-IZ3: ANPR: 20 m (65.62 ft) Video monitoring: 60 m (196.85 ft)
Smart Illumination	According to the brightness of the environment, the camera automatically adjusts the intensity of its light to reveal the details of moving targets. Devices with warm light can automatically adjust the light intensity according to the time.
Infrared Wavelength	DHI-ITC413-PW4D-IZ1, DHI-ITC413-PW4D-IZ3:850 nm DHI-ITC413-PW4D-Z1, DHI-ITC413-PW4D-Z3:730 nm

Video	
Video Resolution	Main stream: 4M (2688 × 1520)/1080p (1920 × 1080)/720p (1280 × 720) Sub stream: 720p (1280 × 720)/960H (960 × 576, 960 × 480)/D1 (704 × 576, 704 × 480)/CIF (352 × 288, 352 × 240)
Stream	PAL: Main stream (2688 × 1520@25 fps, 1920 × 1080@25 fps, 1280 × 720@25 fps), sub stream (1280 × 720@25 fps, 960 × 576@25 fps, 704 × 576@25 fps, 352 × 288@25 fps); NTSC: Main stream (2688 × 1520@30 fps, 1920 × 1080@30 fps, 1280 × 720@30 fps), sub stream (1280 × 720@30 fps, 960 × 480@30 fps, 704 × 408@30 fps, 352 × 240@30 fps)
Video Compression	H.264H; H.264B; H.264M by default; H.265; MJPEG; H.264M
Video Bit Rate	H.264B: 2,179 kbps–13,074 kbps H.264M: 2,179 kbps–13,074 kbps H.264H: 2,179 kbps–13,074 kbps H.265: 2,179 kbps–13,074 kbps MJPEG: 6,537 kbps–39,223 kbps
Scene Self-adaptation (SSA)	Yes
Gain Control	Manual; Auto
Noise Reduction	3D NR
Region of Interest (RoI)	Yes, 3
Image Tampering Prevention	Yes. Watermarks can be added to videos and images. The watermark can also be verified.
Bit Rate Control	CBR; VBR

Function	
Storage	Built-in TF card port. Supports Kingston 16 G, 32 G, 128 G, 256 G; Dahua card 16 G, 32 G, 128 G, 256 G; SanDisk 16 G, 32 G, 128 G, 256 G
Restricted List/Trusted List	Allowlist: 110,000 Blocklist: 110,000
IVS	Intrusion detection, loitering detection, up to 4 areas can be set.
Basic Event	Alarms for events of defocus, no storage card, storage card no space, storage card error, network disconnection, IP conflict, and illegal access.

## Smart ANPR Camera | DHI-ITC413-PW4D Series

Sound and Light Alarm	Yes, blue & red indicator, and supports broadcasting custom audio.
Alarm Linkage	Upload to FTP/Memory card, notify monitoring center, send e-mail, trigger alert output, snapshot and active deterrence
Capture Distance	DHI-ITC413-PW4D-Z1, DHI-ITC413-PW4D-IZ1: 3 m–8 m (9.84 ft–26.25 ft) DHI-ITC413-PW4D-Z3, DHI-ITC413-PW4D-IZ3: 8 m–20 m (26.25 ft–65.62 ft)
Detected Width	DHI-ITC413-PW4D-Z1, DHI-ITC413-PW4D-IZ1: 3 m–4 m (9.84 ft–13.12 ft) DHI-ITC413-PW4D-Z3, DHI-ITC413-PW4D-IZ3: 6 m–8 m (19.69 ft–26.25 ft)

### Network

Network Protocol	HTTP; Https; 802.1x; TCP; ARP; RTSP; RTP; UDP; RTCP; SMTP; FTP; DHCP; DNS; IPv4/v6; NTP; SFTP; DDNS; SNMP; PPPoE
API	Yes
SDK	Yes
Interoperability	ONVIF (Profile S/Profile G/Profile T); CGI; ITSAPI; P2P
Management Software	DSS Pro; DSS Express; Cybercity; Smart PSS
Security	Username and password; MAC address; HTTPS; IEEE 802.1x; network access control
Browser	Plug in: IE 9, 10, 11. Chrome 52 and earlier versions Firefox 42 and earlier versions No plug in: Chrome 92 and later versions

### Image

Image Encoding Format	JPEG
Image Setting	Brightness; contrast; saturation; gamma; sharpness; gain; white balance
Day/Night	IR filter, support three modes: color/B/W/auto
WDR	140 dB
HLC	Yes
BLC	Yes
White Balance	Auto; Regional Custom; Manual; Outdoor; Natural; Street Lamp
Digital Detail Enhancement (DDE)	Yes
OSD Overlay	Supports overlay of time; address (position of channel), lane (number/direction), plate (number and color), vehicle (speed, color, type)

### Audio

Audio Port	Yes
Built-in MIC	Yes; Pick-up distance: 3 m (9.84 ft), Sampling Rate: 48 k.
Built-in Speaker	Yes; Power: 2 W

### Port

Audio Output	1 channel (RCA port)
Network Port	RJ-45 (10/100/1000 self-adaptive Ethernet Port)

Alarm Input	2, optocoupler input (wet node on-off value: 5 V)
Alarm Output	2, relay output (2A 30 VDC/0.5A 125 VAC), which can connect to devices such as barriers
RS-485	2 (half duplex, Transparent, DHRS, Push Data through Serial Port)
Reset Button	Yes
Wiegand	1 channel, SHA-1 26 bit

### Performance

Maximum Number of Passed Vehicles	10,000
Max. Number of Connections	10

### Intelligence

AI Recognition	Recognizes vehicle types, vehicle signs, vehicle color, vehicle plate, plate, vehicle without plate.
Video Metadata	Displays the intelligent frame, plate and vehicle paths.
Vehicle Brand	Recognizes 147 vehicle logos.
Vehicle Color	Recognizes 12 colors: Grey, black, white, silver, blue, green, purple, red, orange, pink, brown, and yellow.
Vehicle Type Recognition	Recognizes 9 vehicle types: Large Bus, Heavy Truck, Medium Truck, Sedan, Van, Light Truck, Medium Bus, SUV, MPV, Pickup
Country and Region Supported by ANPR	Baseline support: GCC (U.A.E., Saudi Arabia, Morocco, Oman, Iraq, Egypt, Jordan, Qatar, Kuwait, Bahrain, Lebanon) Europe (Netherlands, France, Germany, Britain, Italy, Poland, Belgium, Bulgaria, Serbia, Slovakia, Spain, Denmark, Turkey, Israel, Czech Republic, Bosnia and Herzegovina, Switzerland, Austria, Hungary, Romania, Lithuania, Latvia, Sweden, Estonia, Portugal, Greece, Slovenia, Luxembourg, Palestine, Lebanon, Ireland, Finland, Norway, Croatia, North Macedonia) Russian-speaking regions (Russia, Ukraine, Kyrgyzstan, Uzbekistan, Moldova, Lithuania, Latvia, Georgia, Azerbaijan, Turkmenistan) SADC (Uruguay, Paraguay, Brazil, Argentina, Chile, Colombia, Peru, Ecuador, Guyana) North America (United States, Canada) Can be customized: Mongolia, Japan, Philippines, Vietnam, Laos, Cambodia, myanmar, Thailand, Malaysia, Singapore, Indonesia, Bangladesh, India, Pakistan, Curacao, Mexico, Guatemala, Costa Rica, Australia, New Zealand, Tunisia, Algeria, Ethiopia, Tanzania, Uganda, Equatorial Guinea, Japan, Zambia, Mozambique, South Africa, Mauritius
Capture Rate	In the recommended installation and lighting condition, the vehicle capture rate ≥ 99%
Recognition Rate	In the recommended installation and lighting condition, the recognition rate for positive and departing vehicles ≥ 96%; the recognition rate for European vehicle plates ≥ 98%
General	
Remote control	Yes
Communication Band	433 MHz; 868 MHz
Remote Control Distance	15 m (49.21 ft) (In an open, undisturbed environment)
Power Supply	12 VDC, 2 A and POE: 802.3at, Type 2, Class 4, (44V to 57V), 0.455A to 0.351A, max. 20W
Power Consumption	Power consumption in different conditions: No lighting < 6 W Lighting < 12 W Speaker and Red/Blue Light Warning on < 17 W

Protection	IK10; IP67
Material	Aluminum alloy body+Plastic
Product Dimensions	396.0 mm × 120.8 mm × 127.8 mm (15.59" × 4.76" × 5.03") (L × W × H)
Packaging Dimensions	445.0 mm × 238.0 mm × 229.0 mm (17.52" × 9.37" × 9.02")
Net Weight	2.3 kg (5.07 lb)
Gross Weight	3.2 kg (7.05 lb)
Storage Humidity	−40 °C to +70 °C (−40 °F to +158 °F)
Storage Temperature	≤ 95% (non-condensing)
Operating Temperature	−30 °C to +65 °C (−22 °F to +149 °F)
Operating Humidity	10%–90% (non-condensing)
Certifications	CE-EMC; CE-LVD; CE-RED; FCC

Ordering Information		
Type	Part Number	Description
Smart ANPR Camera	DHI-ITC413-PW4D-Z1	4MP Smart ANPR Camera (Dual Illuminators, 2.7 mm-12 mm, 433 MHz)
		4MP Smart ANPR Camera (Dual Illuminators, 2.7 mm-12 mm, 868MHz)
	DHI-ITC413-PW4D-IZ1	4MP Smart ANPR Camera (IR illuminator, 2.7 mm-12 mm, 433 MHz)
		4MP Smart ANPR Camera (IR illuminator, 2.7 mm-12 mm, 868MHz)
	DHI-ITC413-PW4D-Z3	4MP Smart ANPR Camera (Dual Illuminators, 8 mm-32 mm, 433 MHz)
		4MP Smart ANPR Camera (Dual Illuminators, 8 mm-32 mm, 868MHz)
	DHI-ITC413-PW4D-IZ3	4MP Smart ANPR Camera (IR illuminator, 8 mm-32 mm, 433 MHz)
		4MP Smart ANPR Camera (IR illuminator, 8 mm-32 mm, 868MHz)
Accessories (Optional)	PFA150	Pole Mount

Accessories

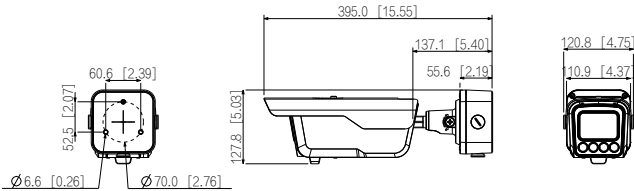
Optional:



PFA150 Pole Mount

Ceiling Mount	Wall Mount	Pole Mount

Dimensions (mm [inch])



# DH-IPC-HF7442F-Z-X

4MP BOX WizMind Network Camera



Launched by Dahua Technology, Dahua WizMind is a full portfolio of solutions composed of project-oriented products including IPC, IVSS, NVR, PTZ, XVR, Thermal and software platform which adopts industry-leading deep learning algorithms. Focusing on customer's requirements, WizMind provides precise, reliable and comprehensive AI solutions for verticals.

## Series Overview

Driven by deep learning algorithms, Dahua WizMind X Series network camera supports various intelligent functions, meeting the requirements of a wide variety of scenes. The camera can accurately recognize people, motor and non-motor vehicles, faces. It also supports PPE detection, smart sound detection, privacy protection, ANPR, parking space management, and enabling 2 intelligent functions at the same time. The camera adopts advanced image processing AI-Powered Image technology, has the Deeplight night vision effect and works with ultra-low streams. It is also dustproof, waterproof and vandal-proof, and is certified as IP67 and IK10 (the type of protection varies depending on the model).

## Functions

### AI-Powered Image

With AI ISP technology, the camera is able to easily adapt to scenes, producing high quality images that reveal the fine details of targets.

### Video Metadata

With deep learning algorithm, Dahua Video Metadata technology can detect, track, capture vehicle, non-motor vehicle and people, and select the best images, and extract attributes. The camera can count targets by directions ( $A > B$ ,  $B > A$ , or  $A < B$ ), and export the report.

### Parking Space Management

With Parking Space Management, the camera can count the number of parked vehicles and parking spaces available in open parking lots and planned parking lots. It can extract and display the status of parking spaces, so as to facilitate the management of parking spaces and improve parking efficiency.

- 4-MP 1/1.8" CMOS image sensor, low luminance, and high definition image.
- Outputs max. 4 MP (2688 × 1520)@50/60 fps.
- Time-Division Exposure technology ensures that when the device is taking multiple snapshots of more than one targets, the quality of the snapshots will not be affected. It can also be used to adjust the brightness, speed and more of targets, to produce high quality snapshots.
- ROI, flexible coding, applicable to various bandwidth and storage environments.
- Two intelligent functions can be enabled at the same time, such as face recognition+people counting, face detection+people counting and PPE Detection+IVS.
- With deep learning algorithm, it supports: face recognition, face detection, IVS, people counting, video metadata, PPE Detection, parking space management and ANPR, etc.
- Privacy Protection: Mosaics can be automatically placed over the face or body of a person to protect their privacy.
- Alarm: 2 in, 2 out; audio: 2 in, 1 out; RS-485, BNC; supports max. 512 G Micro SD card.
- 12 VDC/24 VAC/PoE+/ePoE power supply, 12 VDC power output, max. current 165 mA and peak current is 700 mA, easy for installation.



### ANPR

With high-performance GPU chip, deep learning algorithm, and lots of sample training learning, Dahua ANPR technology can automatically collect and recognize the vehicle information, including license plate, logo, vehicle type, and vehicle color.

### PPE Detection

With the PPE Detection function, the camera can detect attributes including workwear, hat, face mask, apron, gloves, shoe covers, boots, seatbelt, safety vest, and determine whether PPE requirements are met. Match attributes alarm or mismatch attributes alarm can be triggered according to the alarm settings.

### Cyber Security

Dahua network cameras employ a series of security technologies, including security authentication and authorization, access control protocols, trusted protection, encrypted transmission and encrypted storage. These technologies improve the camera's defense against external cyber threats and prevent malicious programs from compromising the device.

## Technical Specification

### Camera

Image Sensor	1/1.8" CMOS
Max. Resolution	2688 (H) × 1520 (V)
ROM	8 GB
RAM	4 GB
Scanning System	Progressive
Electronic Shutter Speed	Auto/Manual 1/3 s–1/100,000 s
Min. Illumination	0.0005 lux@F1.2 (Color, 30 IRE) 0.0002 lux@F1.2 (B/W, 30 IRE)
S/N Ratio	>56dB

### Lens

Lens Mount	C/CS
Iris Control Type	DC-Iris; P-Iris

### Smart Event

IVS	Abandoned object; missing object
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### Intelligence

IVS (Perimeter Protection)	Intrusion, tripwire, fast moving (the three functions support the classification and accurate detection of vehicle and human); loitering detection, people gathering, and parking detection, privacy protection
Face Detection	Face detection; track; snapshot; snapshot optimization; optimal face snapshot upload; face enhancement; face exposure; face attributes extraction including 6 attributes and 8 expressions; face snapshot set as face or one-inch photo; snapshot strategies (real-time snapshot, quality priority and optimization snapshot); face angle filter; optimization time setting; privacy protection
Face Recognition	There are two modes: General mode and counting mode. General mode: Face detection; snapshot; snapshot optimization; optimal face snapshot upload; face enhancement; face exposure; face attributes extraction including 6 attributes and 8 expressions; face snapshot set as face or one inch photo; snapshot strategies (recognition priority and optimization snapshot); face angle filter; optimization time setting. Supports adding 5 group face databases; registering person one by one or in batches; setting face similarity; and supports face comparison with the face database containing up to 200,000 face pictures. Counting mode: Offers advanced customer counter, filters out specified faces from the face database, and exports reports both before and after removing duplicate faces.
PPE Detection	Triggers alarms when the detected object matches or does not match all of the configured attributes (workwear, hat, face mask, apron, gloves, shoe covers, boots, seatbelt, safety vest); privacy protection
People Counting	Tripwire people counting and people counting in area, generating and exporting report (day/month/year); queue management, generating and exporting report (day/month); 4 rules can be set for tripwire, people counting in area and queue management; privacy protection
ANPR	ANPR: ANPR, track, priority, snapshot. Vehicle attributes: License plate, vehicle type, vehicle color. Other attributes: Seat belt, smoking, calling. Support up to 10,000 blacklist and allowlist records. The camera can recognize plate numbers of vehicles moving at speeds of up to 60km/h.

### Parking Space Management

Parking Space Management: Manage outdoor and planned parking lots; manage parking spaces in multiple areas; display the total number of parking spaces and parking spaces that are available; trigger alarms based on a predefined number of vehicles.

### Video Metadata

Motor vehicle, non-motor vehicle, face, and human body detection; snapshot; snapshot optimization; optimal face snapshot upload.  
Motor vehicle attributes: License plate, vehicle type, vehicle color, vehicle logo, seatbelt, smoking, and calling. Generates flow statistics for people, motor vehicles and non-motor vehicles based on the direction, and exports reports.  
Non-motor vehicle attributes: Type, vehicle color, number of people, top type and color, and hat.  
Human body attributes: Top and bottom type and color, bag, hat, gender and umbrella.  
privacy protection.

### Smart Search

Work together with Smart NVR to perform refine intelligent search, event extraction and merging to event videos

### Video

Video Compression	H.265; H.264; H.264H; H.264B; MJPEG (Only supported by the sub stream)
Smart Codec	Smart H.265+; Smart H.264+
Video Frame Rate	Main Stream: 2688 × 1520@(1–50/60 fps) Sub stream: 1920 × 1080 @(1–25/30 fps) Third stream: 1920 × 1080@(1–25/30 fps) Fourth stream: 1920 × 1080@(1–25/30 fps) Fifth stream: 704 × 576@(1–25 fps)/704 × 480@(1–30 fps) *The values above are the max. frame rates of each stream; for multiple streams, the values will be subjected to the total encoding capacity.
Stream Capability	5 streams
Resolution	4M (2688 × 1520); 3M (2048 × 1536); 3M (2304 × 1296) 1080p (1920 × 1080); 1.3M (1280 × 960); 720p (1280 × 720); D1 (704 × 576/704 × 480); CIF (352 × 288/352 × 240)
Bit Rate Control	CBR/VBR
Video Bit Rate	H.264: 32 kbps–10240 kbps; H.264: 12 kbps–10240 kbps
Day/Night	Auto(ICR)/Color/B/W
BLC	Yes
HLC	Yes
WDR	140 dB
Scene Self-adaptation (SSA)	Yes
White Balance	Auto; natural; street lamp; outdoor; manual; regional custom
Gain Control	Auto
Noise Reduction	3D NR
Motion Detection	OFF/ON (4 areas, rectangular)
Region of Interest (RoI)	Yes (4 areas)
Image Stabilization	Electronic Image Stabilization (EIS)
Defog	Yes
Image Rotation	0°/90°/180°/270° (Support 90°/270° with 2688 × 1520 resolution and lower)



Mirror	Yes
Privacy Masking	8 areas

## Audio

Built-in MIC	Yes
Audio Compression	G.711a; G.711Mu; PCM; G.726; G.723

## Alarm

Alarm Event	No SD card; SD card full; SD card error; network disconnection; IP conflict; illegal access; motion detection; video tampering; tripwire; intrusion; fast moving; abandoned object; missing object; loitering detection; people gathering; parking detection; parking space management; scene changing; audio detection; defocus detection; external alarm; face detection; face recognition; video metadata; ANPR; people counting in area; stay alarm; people counting; people number error detection; people stay detection; security exception; PPE detection
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## Network

Network Port	RJ-45 (10/100/1000 Base-T)
SDK and API	Yes
Network Protocol	IPv4; IPv6; HTTP; TCP; UDP; ARP; RTP ; RTSP; RTCP; RTMP; SMTP; FTP; SFTP; DHCP; DNS; DDNS; QoS; UPnP; NTP; Multicast; ICMP; IGMP; NFS; SAMBA; PPPoE; SNMP; P2P
Interoperability	ONVIF (Profile S/Profile G/Profile T); CGI
User/Host	20 (Total bandwidth: 340 M)
Storage	FTP;SFTP; Micro SD card (support max. 512 GB); NAS
Browser	IE: IE11 and later; Chrome: Chrome 88.0.4324.190 and later; Firefox: Firefox 47.0.2 and later
Management Software	SmartPSS Lite; DSS; DMSS
Mobile Client	iOS;Android
Cyber Security	Configuration encryption; Trusted execution; Digest; Security logs; WSSE; Account lockout; syslog; Video encryption; 802.1x; IP/MAC filtering; HTTPS; Trusted upgrade; Trusted boot; Firmware encryption; Generation and importing of X.509 certification

## Certification

Certifications	CE-LVD: EN62368-1; CE-EMC: Electromagnetic Compatibility Directive 2014/30/EU; FCC: 47 CFR FCC Part 15, Subpart B; UL/CUL: UL62368-1 & CAN/CSA C22.2 No. 62368-1-14
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## Port

RS-485	1 (baud rate range:1200 bps–115200 bps)
Audio Input	2 channels (3.5mm JACK port)
Audio Output	1 channel (3.5mm JACK port)
Alarm Input	2 channels in: 5mA 3V–5V DC
Alarm Output	2 channels out: 1,000mA 30V DC/500mA 50V AC
Analog Output	1 channel (CVBS output: BNC)

## Power

Power Supply	12 VDC/24 VAC/PoE+ (802.3at)/ePoE
Power Consumption	Basic: 8.4 W (12 VDC); 8 W (24 VAC); 6.3 W (PoE) Max. (WDR+ intelligence on+ ICR switch): 17.1 W (12 VDC); 16.5 W (24 VAC); 15 W (PoE)

## Environment

Operating Temperature	–30 °C to +60 °C (–22 °F to +140 °F)
Operating Humidity	≤95%
Storage Temperature	–30 °C to +60 °C (–22 °F to +140 °F)
Storage Humidity	10–95%
Anti-corrosion Level	Low

## Structure

Casing Material	Metal + plastic
Product Dimensions	161.6 mm × 86.8 mm × 74 mm (6.36" × 3.42" × 2.91") (L × W × H)
Net Weight	0.80 kg (1.76 lb)
Gross Weight	1.02 kg (2.25 lb)

## Ordering Information

Type	Model	Description
4MP Camera	DH-IPC-HF7442F-Z-X	4MP BOX WizMind Network Camera
	IPC-HF7442F-Z-X	4MP BOX WizMind Network Camera
Accessories (Optional)	PFB110W	Wall /Ceiling/Plane Mount
	PFB121W	Wall Mount
	DH-PFL1040-A12PE	10-40 mm
	PFH610V	Housings
	PFM320D	12 VDC 2A Power Adapter
	PFM900-E	Integrated Mount Tester
	TF-P100	MicroSD Memory Card

Accessories

Optional:



PFB110W  
Wall/Ceiling/Plane  
Mount Bracket



PFB121W  
Wall Mount Bracket



DH-PFL1040-A12PE  
10-40 mm



PFH610V Series  
Housings



PFM320D  
12 VDC 2A Power Adapter

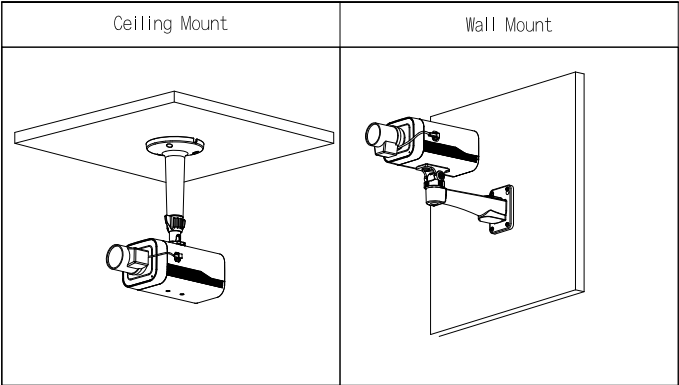
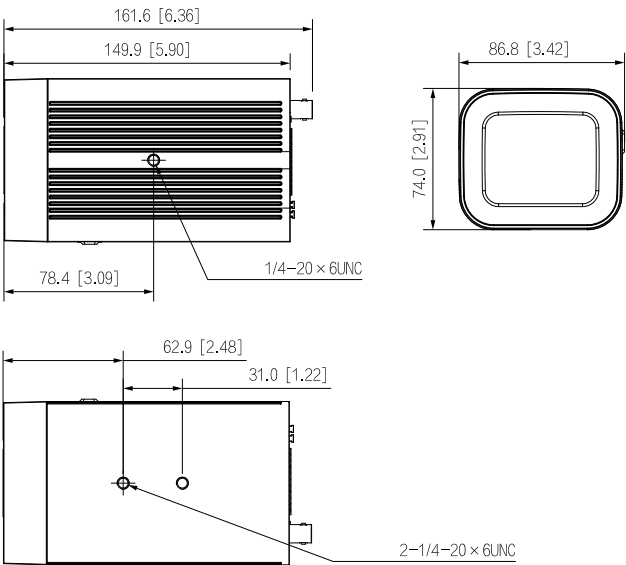


PFM900-E  
Integrated Mount Tester



TF-P100  
MicroSD Memory Card

Dimensions (mm[inch])



# PFL2712-E6D

**Dahua**



- 2.7-12 mm Varifocal
- 1/2.7" - F1.6
- Direct Drive Iris (DC)
- CS screw
- Suitable for use with IR (IR correction)
- 6.0 Mega Pixel Quality

## Features

- Lens with CS thread
- Quality 6.0 Mpix
- AutoIris Direct Drive (DC)
- Varifocal: 2.7 to 12 mm
- 1/2.7" / F1.6
- IR correction

## Specs

**Focal length**

2.7~12 mm

**Aperture**

F1.6

**Format**

1/2.7"

**Quality**

6.0 Megapíxel

**Iris control**

Automatic Direct Drive

**Thread type**

CS

**Dimensions**

57.6 (D) x 33.7 (Ø) mm

**Weight**

73.5 g

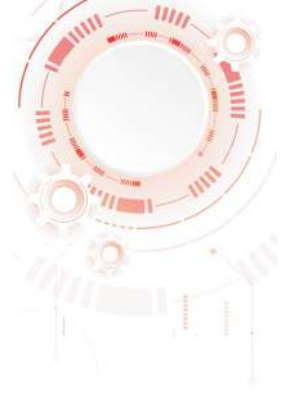
**Operating temperature**

-30°C ~ 70°C

## Package content



- Lens



## DH-PFH610A Series

### 14" Corrosion-proof Housing



### Features

- 14" housing, provides all-weather protection for box cameras and lens;
- All-aluminum shell design, IP67, IK10, corrosion-proof, 14" housing with different function modules:  
Built-in heating and cooling system, windows adopt water-proof films, 0-100m IR, built-in PoE module and support remote control of IR light and wiper function by RS485;
- Aesthetic design.

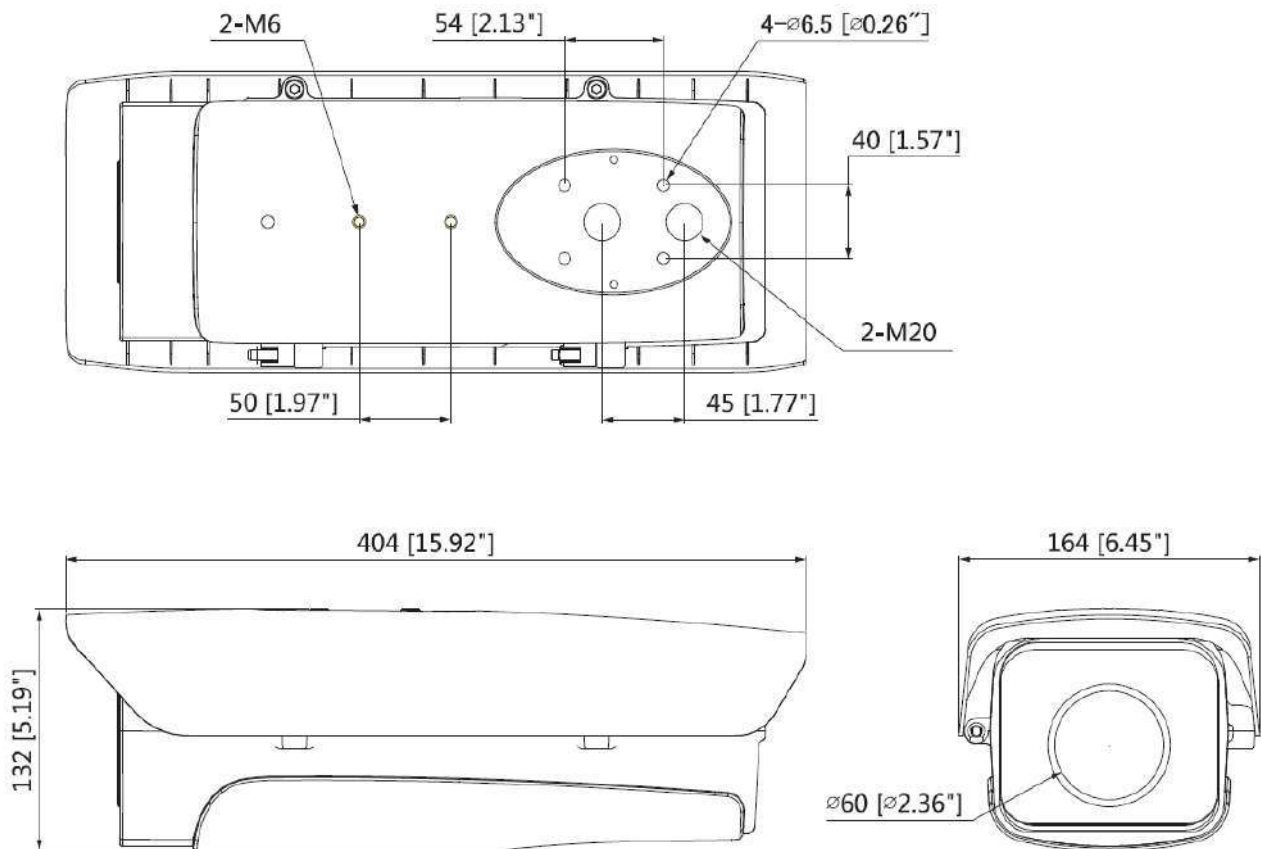
## Technical Specifications

Model		PFH610A	PFH610A-H	PFH610A-H -POE	PFH610A-IR	PFH610A-IR-POE
General						
Inside Dimension (LxWxH)		215x90x83mm (8.46"x3.54"x3.27")	255x90x70.5mm(10.04"x3.54"x2.78") 215x90x83mm(8.46"x3.54"x3.27")			
Window Dimension		φ60mm(φ2.36")				
Operating Temperature	Set	-30°C ~+60°C (-22°F ~+140°F)	-40°C ~+60°C(-40°F ~+140°F)			
	Heater	N/A	ON: 5±5 °C /OFF: 15±5 °C			ON: <+5°C(+41°F) /OFF: ≥+5°C(+41°F)
	Cooler	N/A	ON: 37±5 °C /OFF: 20±5 °C ON: 5±5 °C /OFF: 15±5 °C			ON: 37±1°C(98.6±33.8°F) /OFF: 20±1°C(68±33.8°F)
IR Distance		N/A			0~100m(0~328.08ft)	
RS485 Control		N/A			Yes, use RS485 to control IR light	
Power Supply		DC12V, AC24V	AC24V/3A, DC24V	POE+	AC24V/5A, DC24V	POE+
Power Consumption (without camera)		N/A	45W	25.5W	67W	25W
Environmental						
Operating Temperature		-30°C ~60°C (-22°F ~+140°F)	-40°C ~60°C (-40°F ~+140°F)			
Humidity		<90% RH				
Ingress Protection		IP67				
Vandal Resistance		IK10				
Corrosion Protection		Meet the criteria of NEMA 4X				
Construction						
Material		Aluminum(case)&PC(others)				
Dimension(LxWxH)		404mmx164mmx132mm(15.91"x6.46"x5.2")				
Weight		2.5kg(5.51lb)	2.7kg(5.95lb)	3.0kg(6.61lb)	3.0kg(6.61lb)	3.2kg(7.05lb)
Others						
Certification		CE, FCC, ICES	CE, FCC, UL, EAC, ICES	CE, FCC	CE, FCC, UL, EAC, ICES	CE, FCC, ICES
Applicable Model		Please see "Accessory Selection"				

## Order Information

Type	Part Number	Description
Housing Series	DH-PFH610A	14" corrosion-proof housing, IP67, IK10, without any modules
	PFH610A	14" corrosion -proof housing, IP67, IK10, without any modules
	DH-PFH610A-H	14" corrosion -proof housing, IP67, IK10, heater
	PFH610A-H	14" corrosion -proof housing, IP67, IK10, heater
	DH-PFH610A-H-POE	14" corrosion -proof housing, IP67, IK10, heater, POE+
	PFH610A-H-POE	14" corrosion -proof housing, IP67, IK10, heater, POE+
	DH-PFH610A-IR	14" corrosion -proof housing, IP67, IK10, heater, IR
	PFH610A-IR	14" corrosion -proof housing, IP67, IK10, heater, IR
	DH-PFH610A-IR-POE	14" corrosion -proof housing, IP67, IK10, heater, IR, POE+
	PFH610A-IR-POE	14" corrosion -proof housing, IP67, IK10, heater, IR, POE+
Optional Brackets	PFB604W	Wall-mount bracket
	PFB600W	Plane-mount bracket
	PFB601W	Ceiling-mount bracket
	PFA162	Support three-axis rotation for housing installation

## Dimensions (mm/inch)



### Application



### Package Information

#### PFH610A

- 14" vandal-proof housing \*1
- Installation instruction \*1
- M20 water joint \*2
- 1/4/20×8UNC screw \*2
- S5.0 wrench \*1

#### PFH610A-H

- 14" vandal-proof IR housing \*1
- Installation instruction \*1
- M20 water joint \*2
- 1/4/20×8UNC screw \*2
- S5.0 wrench \*1
- Connecting line(link camera to IR driver board) \*1

#### PFH610A-H-POE

Bag 1:

- 14" vandal-proof POE housing \*1
- Installation instruction \*1
- M20 water joint \*2
- 1/4/20×8UNC screw \*2
- S5.0 wrench \*1
- Connecting line(link POE board to temperature control board) \*1

Bag 2:

- 1/4/20×8UNC screw \*1
- Temperature control board \*1

#### PFH610A-IR

- 14" vandal-proof IR housing \*1
- Installation instruction \*1
- M20 water joint \*2
- 1/4/20×8UNC screw \*2
- S5.0 wrench \*1
- Connecting line(link camera to IR driver board) \*1

#### PFH610A-IR-POE

- 14" vandal-proof IR POE housing \*1
- Installation instruction \*1
- M20 water joint \*2
- 1/4/20×8UNC screw \*2
- S5.0 wrench \*1
- Connecting line(link camera to IR driver board) \*1
- Network cable(link camera to POE power module) \*1
- Terminal block \*1

## DH-PFB121W

### Wall Mount Bracket



### Features

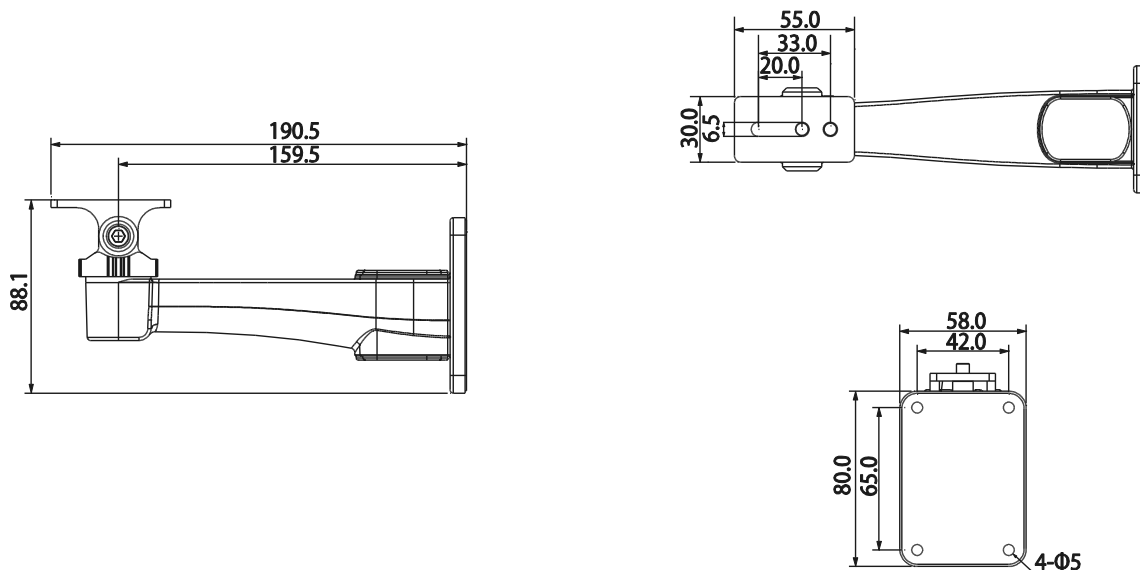
- Material: Aluminum
- Wall Mount Bracket
- Neat & Integrated design

### Specifications

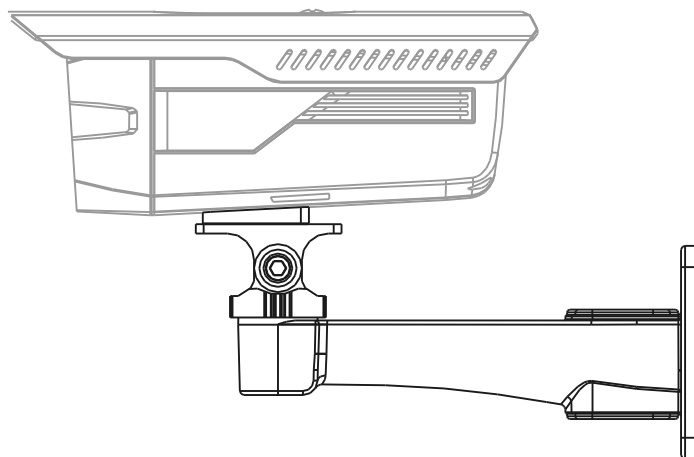
Model	DH-PFB121W
General	
Material	Aluminum
Dimension (W x H x D)	190.5mm(W) x 88mm(H) x 58mm(D)
Pipe Thread	N/A
Operating Temperature	-40°C ~60°C
Humidity	0~90% RH
Load Bearing	1.0Kg
Weight	0.38kg
Applicable Model	CA-F(E/F), CA-FW(D/H/J/K), HAC-HFW(B/D), HDC-HF3200, IPC-HF, IPC-HFW(D)

## DH-PFB121W

### Dimensions (mm)



### Application



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[www.dahuasecurity.com](http://www.dahuasecurity.com)

\*Design and specifications are subject to change without notice.

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# DH-PFM320D-EN/BS/US

12V 2A Power Adapter



## Features

- Easy installation
- With indicator light working
- Support  $-30^{\circ}\text{C} \sim +70^{\circ}\text{C}$  wide-range temperature operation, and the full load efficiency of the power supply can be up to 100% at these temperatures
- Accurate overcurrent, overvoltage protection

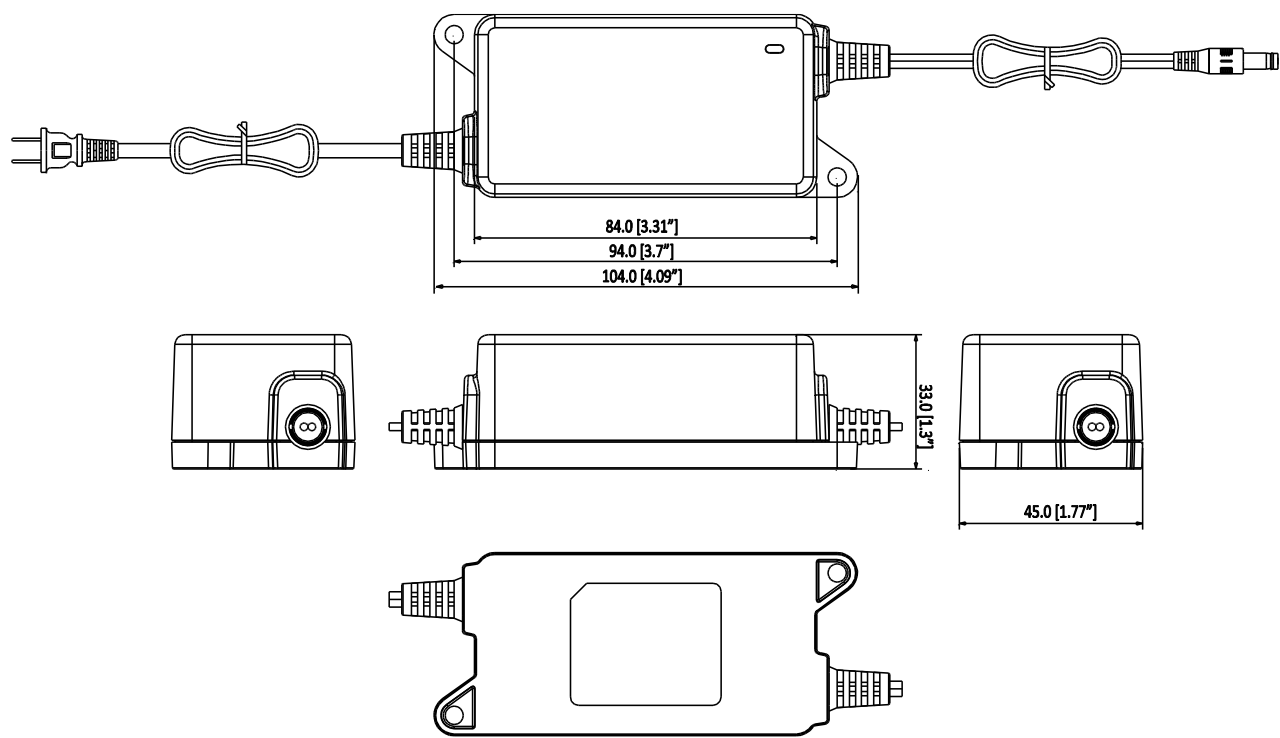
## Technical Specifications

Model	DH-PFM320D-EN	DH-PFM320D-BS	DH-PFM320D-US (VI)
Electrical Specification			
Input	100~240V, 50/60Hz, 0.6A		
Output	12V, 2A(+7% , -3%)		
Protection/Environmental			
Protection	Surge protection, over temperature protection, over current, voltage load protection		
	ESD: EN61000-4-2 ±4kV Contact; ±8kV Air		
	Surge: EN61000-4-5" Combination Wave: Common Mode ±4KV (12 ohms); Differential Mode ±2kV (2 ohms)		
Working Temperature	-30℃ ~ +70℃ (-22℉ ~ +158℉)		
Working Humidity	<95% RH		
Physical Properties			
Weight	170g(0.37lb)		
Dimension(Lxwxh)	104mmx45mmx33mm(4.09"x1.77"x1.3")		
Installation Mode	Plane installation		
Color	Black		
Input Plug	2-pin Euro plug	3-pin British plug	2-pin North American plug
Outgoing Cord	AC wire: 50cm(19.69"), DC wire: 80cm(31.5")		
DC Plug	Φ5.5mmxΦ2.1mmx12mm(Φ0.22"xΦ0.08"x0.47")		
Safety Standards			
Certification	CE, FCC, UL-VI		

## Order Information

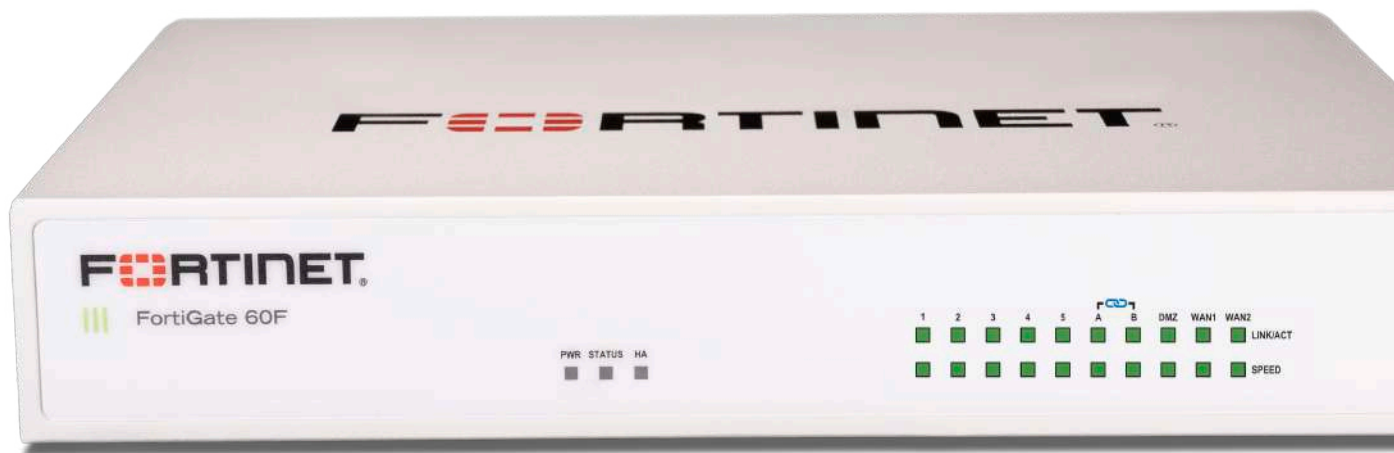
Type	Part Number	Description
Power	DH-PFM321D-EN	DC12V 1A Power Adapter _ Dahua brand, European standard
	DH-PFM321D-BS	DC12V 1A Power Adapter _ Dahua brand, British standard
	DH-PFM321D-US	DC12V 1A Power Adapter(VI) _ Dahua brand, North American standard
	<b>DH-PFM320D-EN</b>	DC12V 2A Power Adapter _ Dahua brand, European standard
	<b>DH-PFM320D-BS</b>	DC12V 2A Power Adapter _ Dahua brand, British standard
	<b>DH-PFM320D-US</b>	DC12V 2A Power Adapter(VI) _ Dahua brand, North American standard

Dimensions (mm/inch)



# FortiGate FortiWiFi 60F Series

FG-60F, FG-61F, FWF-60F, and FWF-61F



## Highlights

**Gartner Magic Quadrant Leader** for both Network Firewalls and SD-WAN.

**Security-Driven Networking** with FortiOS delivers converged networking and security.

**Unparalleled Performance** with Fortinet's patented SoC processors.

**Enterprise Security** with consolidated AI / ML-powered FortiGuard Services.

**Simplified Operations** with centralized management for networking and security, automation, deep analytics, and self-healing.

## Converged Next-Generation Firewall (NGFW) and SD-WAN

The FortiGate Next-Generation Firewall 60F series is ideal for building security-driven networks at distributed enterprise sites and transforming WAN architecture at any scale.

With a rich set of AI/ML-based FortiGuard security services and our integrated Security Fabric platform, the FortiGate FortiWiFi 60F series delivers coordinated, automated, end-to-end threat protection across all use cases.

FortiGate has the industry's first integrated SD-WAN and zero-trust network access (ZTNA) enforcement within an NGFW solution and is powered by one OS. FortiGate FortiWiFi 60F automatically controls, verifies, and facilitates user access to applications, delivering consistency with a seamless and optimized user experience.

IPS	NGFW	Threat Protection	Interfaces
1.4 Gbps	1 Gbps	700 Mbps	Multiple GE RJ45   Variants with internal storage   WiFi variants



Available in



Appliance



Virtual



Hosted



Cloud



Container

## FortiOS Everywhere

### FortiOS, Fortinet's Advanced Operating System

FortiOS enables the convergence of high performing networking and security across the Fortinet Security Fabric. Because it can be deployed anywhere, it delivers consistent and context-aware security posture across network, endpoint, and multi-cloud environments.

FortiOS powers all FortiGate deployments whether a physical or virtual device, as a container, or as a cloud service. This universal deployment model enables the consolidation of many technologies and use cases into organically built best-of-breed capabilities, unified operating system, and ultra-scalability. The solution allows organizations to protect all edges, simplify operations, and run their business without compromising performance or protection.

FortiOS dramatically expands the Fortinet Security Fabric's ability to deliver advanced AI/ML-powered services, inline advanced sandbox detection, integrated ZTNA enforcement, and more. It provides protection across hybrid deployment models for hardware, software, and Software-as-a-Service with SASE.

FortiOS expands visibility and control, ensures the consistent deployment and enforcement of a simplified, single policy and management framework. Its security policies enable centralized management across large-scale networks with the following key attributes:

- Interactive drill-down and topology viewers that display real-time status
- On-click remediation that provides accurate and quick protection against threats and abuses
- Unique threat score system correlates weighted threats with users to prioritize investigations



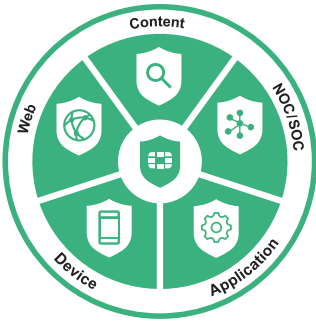
*Intuitive easy to use view into the network and endpoint vulnerabilities*



*Visibility with FOS Application Signatures*

### FortiConverter Service

FortiConverter Service provides hassle-free migration to help organizations transition from a wide range of legacy firewalls to FortiGate Next-Generation Firewalls quickly and easily. The service eliminates errors and redundancy by employing best practices with advanced methodologies and automated processes. Organizations can accelerate their network protection with the latest FortiOS technology.



## FortiGuard Services

### FortiGuard AI-Powered Security

FortiGuard's rich suite of security services counter threats in real time using AI-powered, coordinated protection designed by FortiGuard Labs security threat researchers, engineers, and forensic specialists.

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### Web Security

Advanced cloud-delivered URL, DNS (Domain Name System), and Video Filtering providing complete protection for phishing and other web born attacks while meeting compliance.

Additionally, its dynamic inline CASB (Cloud Access Security Broker) service is focused on securing business SaaS data, while inline ZTNA traffic inspection and ZTNA posture check provide per-sessions access control to applications. It also integrates with the FortiClient Fabric Agent to extend protection to remote and mobile users.

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### Content Security

Advanced content security technologies enable the detection and prevention of known and unknown threats and file-based attack tactics in real-time. With capabilities like CPRL (Compact Pattern Recognition Language), AV, inline Sandbox, and lateral movement protection make it a complete solution to address ransomware, malware, and credential-based attacks.

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### Device Security

Advanced security technologies are optimized to monitor and protect IT, IIoT, and OT (Operational Technology) devices against vulnerability and device-based attack tactics. Its validated near-real-time IPS intelligence detects, and blocks known and zero-day threats, provides deep visibility and control into ICS/OT/SCADA protocols, and provides automated discovery, segmentation, and pattern identification-based policies.

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### Advanced Tools for SOC/NOC

Advanced NOC and SOC management tools attached to your NGFW provide simplified and faster time-to-activation.

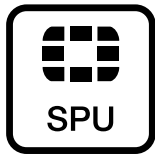
### SOC-as-a-Service

Includes tier-one hunting and automation, log location, 24×7 SOC analyst experts, managed firewall and endpoint functions, and alert triage.

### Fabric Rating Security Best Practices

Includes supply chain virtual patching, up-to-date risk and vulnerability data to deliver quicker business decisions, and remediation for data breach situations.

## Secure Any Edge at Any Scale



### Powered by Security Processing Unit (SPU)

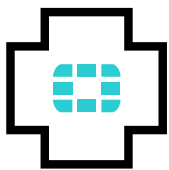
Traditional firewalls cannot protect against today's content- and connection-based threats because they rely on off-the-shelf hardware and general-purpose CPUs, causing a dangerous performance gap. Fortinet's custom SPU processors deliver the power you need—up to 520Gbps—to detect emerging threats and block malicious content while ensuring your network security solution does not become a performance bottleneck.

### ASIC Advantage



### Secure SD-WAN ASIC SOC4

- Combines a RISC-based CPU with Fortinet's proprietary Security Processing Unit (SPU) content and network processors for unmatched performance
- Delivers industry's fastest application identification and steering for efficient business operations
- Accelerates IPsec VPN performance for best user experience on direct internet access
- Enables best of breed NGFW Security and Deep SSL Inspection with high performance
- Extends security to access layer to enable SD-Branch transformation with accelerated and integrated switch and access point connectivity



### FortiCare Services

Fortinet is dedicated to helping our customers succeed, and every year FortiCare Services help thousands of organizations get the most from our Fortinet Security Fabric solution. Our lifecycle portfolio offers Design, Deploy, Operate, Optimize, and Evolve services. Operate services offer device-level FortiCare Elite service with enhanced SLAs to meet our customer's operational and availability needs. In addition, our customized account-level services provide rapid incident resolution and offer proactive care to maximize the security and performance of Fortinet deployments.

## Use Cases



### Next Generation Firewall (NGFW)

- FortiGuard Labs' suite of AI-powered Security Services—natively integrated with your NGFW—secures web, content, and devices and protects networks from ransomware and sophisticated cyberattacks
- Real-time SSL inspection (including TLS 1.3) provides full visibility into users, devices, and applications across the attack surface
- Fortinet's patented SPU (Security Processing Unit) technology provides industry-leading high-performance protection



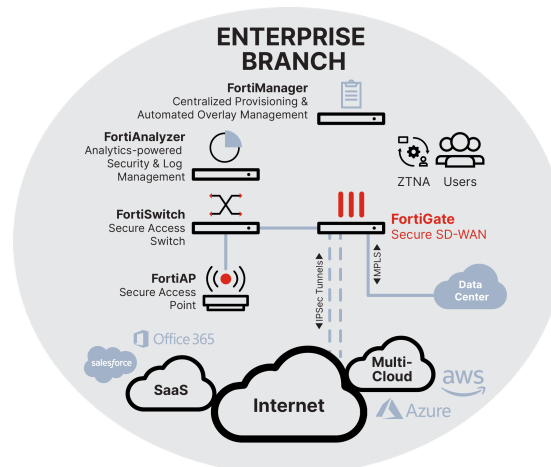
### Secure SD-WAN

- FortiGate WAN Edge powered by one OS and unified security and management framework and systems transforms and secures WANs
- Delivers superior quality of experience and effective security posture for work-from-any where models, SD-Branch, and cloud-first WAN use cases
- Achieve operational efficiencies at any scale through automation, deep analytics, and self-healing



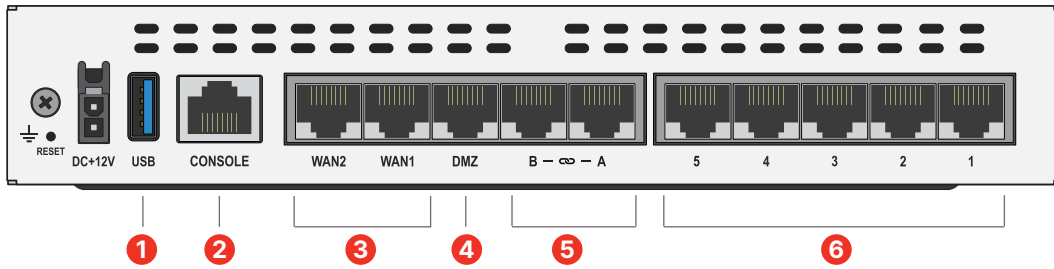
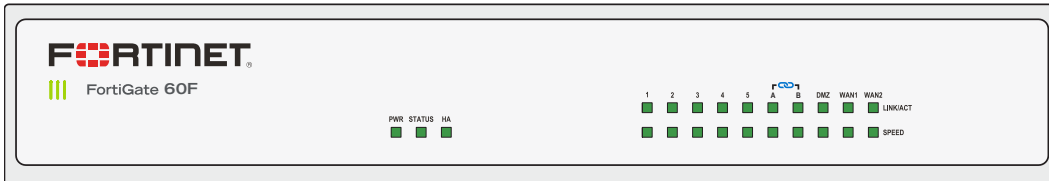
### Universal ZTNA

- Control access to applications no matter where the user is and no matter where the application is hosted for universal application of access policies
- Provide extensive authentications, checks, and enforce policy prior to granting application access - every time
- Agent-based access with FortiClient or agentless access via proxy portal for guest or BYOD



## Hardware

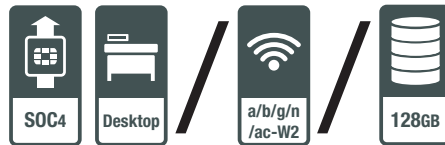
### FortiGate FortiWiFi 60F/61F



#### Interfaces

1. 1 x USB Port
2. 1 x Console Port
3. 2 x GE RJ45 WAN Ports
4. 1 x GE RJ45 DMZ Port
5. 2 x GE RJ45 FortiLink Ports
6. 5 x GE RJ45 Internal Ports

#### Hardware Features



#### Compact and Reliable Form Factor

Designed for small environments, you can place it on a desktop or wall-mount it. It is small, lightweight, yet highly reliable with a superior MTBF (Mean Time Between Failure), minimizing the chance of a network disruption.

#### Access Layer Security

FortiLink protocol enables you to converge security and the network access by integrating the FortiSwitch into the FortiGate as a logical extension of the NGFW. These FortiLink enabled ports can be reconfigured as regular ports as needed.

## Specifications

	FORTIGATE 60F	FORTIGATE 61F	FORTIWIFI 60F	FORTIWIFI 61F
<b>Hardware Specifications</b>				
GE RJ45 WAN / DMZ Ports	2 / 1	2 / 1	2 / 1	2 / 1
GE RJ45 Internal Ports	5	5	5	5
GE RJ45 FortiLink Ports (Default)	2	2	2	2
Wireless Interface	–	–	Single Radio (2.4GHz/5GHz), 802.11 a/b/g/n/ac-W2	Single Radio (2.4GHz/5GHz), 802.11 a/b/g/n/ac-W2
USB Ports	1	1	1	1
Console (RJ45)	1	1	1	1
Internal Storage	–	1 × 128 GB SSD	–	1 × 128 GB SSD
<b>System Performance — Enterprise Traffic Mix</b>				
IPS Throughput <sup>2</sup>			1.4 Gbps	
NGFW Throughput <sup>2,4</sup>			1 Gbps	
Threat Protection Throughput <sup>2,5</sup>			700 Mbps	
<b>System Performance</b>				
Firewall Throughput (1518 / 512 / 64 byte UDP packets)			10/10/6 Gbps	
Firewall Latency (64 byte UDP packets)			3.3 μs	
Firewall Throughput (Packets Per Second)			9 Mpps	
Concurrent Sessions (TCP)			700 000	
New Sessions/Second (TCP)			35 000	
Firewall Policies			5000	
IPsec VPN Throughput (512 byte) <sup>1</sup>			6.5 Gbps	
Gateway-to-Gateway IPsec VPN Tunnels			200	
Client-to-Gateway IPsec VPN Tunnels			500	
SSL-VPN Throughput			900 Mbps	
Concurrent SSL-VPN Users (Recommended Maximum, Tunnel Mode)			200	
SSL Inspection Throughput (IPS, avg. HTTPS) <sup>3</sup>			630 Mbps	
SSL Inspection CPS (IPS, avg. HTTPS) <sup>3</sup>			400	
SSL Inspection Concurrent Session (IPS, avg. HTTPS) <sup>3</sup>			55 000	
Application Control Throughput (HTTP 64K) <sup>2</sup>			1.8 Gbps	
CAPWAP Throughput (HTTP 64K)			8 Gbps	
Virtual Domains (Default / Maximum)			10 / 10	
Maximum Number of FortiSwitches Supported			24	
Maximum Number of FortiAPs (Total / Tunnel Mode)			64 / 32	
Maximum Number of FortiTokens			500	
High Availability Configurations			Active-Active, Active-Passive, Clustering	
<b>Dimensions</b>				
Height x Width x Length (inches)			1.5 × 8.5 × 6.3	
Height x Width x Length (mm)			38.5 × 216 × 160 mm	
Weight			2.23 lbs (1.01 kg)	
Form Factor			Desktop	
<b>Radio Specifications</b>				
Multiple User (MU) MIMO	–	–	3×3	
Maximum Wi-Fi Speeds	–	–	1300 Mbps @ 5 GHz, 450 Mbps @ 2.4 GHz	
Maximum Tx Power	–	–	20 dBm	
Antenna Gain	–	–	3.5 dBi @ 5 GHz, 5 dBi @ 2.4 GHz	

Note: All performance values are “up to” and vary depending on system configuration.

<sup>1</sup> IPsec VPN performance test uses AES256-SHA256.

<sup>2</sup> IPS (Enterprise Mix), Application Control, NGFW and Threat Protection are measured with Logging enabled.

<sup>3</sup> SSL Inspection performance values use an average of HTTPS sessions of different cipher suites.

<sup>4</sup> NGFW performance is measured with Firewall, IPS and Application Control enabled.

<sup>5</sup> Threat Protection performance is measured with Firewall, IPS, Application Control and Malware Protection enabled.



## Specifications

	FORTIGATE 60F	FORTIGATE 61F	FORTIWIFI 60F	FORTIWIFI 61F
<b>Operating Environment and Certifications</b>				
Power Rating	12Vdc, 3A			
Power Required	Powered by External DC Power Adapter, 100–240V AC, 50/60 Hz			
Maximum Current	100Vac/1.0A, 240Vac/0.6A			
Power Consumption (Average / Maximum)	10.17 W / 12.43 W	17.2 W / 18.7 W	17.2 W / 18.7 W	17.5 W / 19.0 W
Heat Dissipation	42.4 BTU/hr	42.4 BTU/hr	63.8 BTU/hr	64.8 BTU/hr
Operating Temperature	32°–104°F (0°–40°C)			
Storage Temperature	-31°–158°F (-35°–70°C)			
Humidity	Humidity 10%–90% non-condensing			
Noise Level	Fanless 0 dBA			
Operating Altitude	Up to 7400 ft (2250 m)			
Compliance	FCC, ICES, CE, RCM, VCCI, BSMI, UL/cUL, CB			
Certifications	USGv6/IPv6			



## SUBSCRIPTIONS

Service Category	Service Offering	A-la-carte	Bundles		
			Enterprise Protection	Unified Threat Protection	Advanced Threat Protection
Security Services	FortiGuard IPS Service	•	•	•	•
	FortiGuard Anti-Malware Protection (AMP) — Antivirus, Mobile Malware, Botnet, CDR, Virus Outbreak Protection and FortiSandbox Cloud Service	•	•	•	•
	FortiGuard Web Security — URL and web content, Video and Secure DNS Filtering	•	•	•	
	FortiGuard Anti-Spam		•	•	
	FortiGuard IoT Detection Service	•	•		
	FortiGuard Industrial Security Service	•	•		
	FortiCloud AI-based Inline Sandbox Service <sup>1</sup>	•			
NOC Services	FortiGate Cloud (SMB Logging + Cloud Management)	•			
	FortiGuard Security Fabric Rating and Compliance Monitoring Service	•	•		
	FortiConverter Service	•	•		
	FortiGuard SD-WAN Underlay Bandwidth and Quality Monitoring Service	•			
SOC Services	FortiAnalyzer Cloud	•			
	FortiAnalyzer Cloud with SOCaaS	•			
Hardware and Software Support	FortiCare Essentials	•			
	FortiCare Premium	•	•	•	•
	FortiCare Elite	•			
Base Services	FortiGuard Application Control				
	FortiCloud ZTNA Inline CASB Service <sup>1</sup>				
	Internet Service (SaaS) DB Updates				
	GeoIP DB Updates				
	Device/OS Detection Signatures				
	Trusted Certificate DB Updates				
	DDNS (v4/v6) Service				

included with FortiCare Subscription

<sup>1</sup> Available when running FortiOS 7.2

### FortiGuard Bundles

FortiGuard Labs delivers a number of security intelligence services to augment the FortiGate firewall platform. You can easily optimize the protection capabilities of your FortiGate with one of these FortiGuard Bundles.

### FortiCare Elite

FortiCare Elite services offers enhanced service-level agreements (SLAs) and accelerated issue resolution. This advanced support offering provides access to a dedicated support team. Single-touch ticket handling by the expert technical team streamlines resolution. This option also provides Extended End-of-Engineering-Support (EoE's) of 18 months for added flexibility and access to the new FortiCare Elite Portal. This intuitive portal provides a single unified view of device and security health.

### Fortinet CSR Policy

Fortinet is committed to driving progress and sustainability for all through cybersecurity, with respect for human rights and ethical business practices, making possible a digital world you can always trust. You represent and warrant to Fortinet that you will not use Fortinet's products and services to engage in, or support in any way, violations or abuses of human rights, including those involving illegal censorship, surveillance, detention, or excessive use of force. Users of Fortinet products are required to comply with the [Fortinet EULA](#) and report any suspected violations of the EULA via the procedures outlined in the [Fortinet Whistleblower Policy](#).

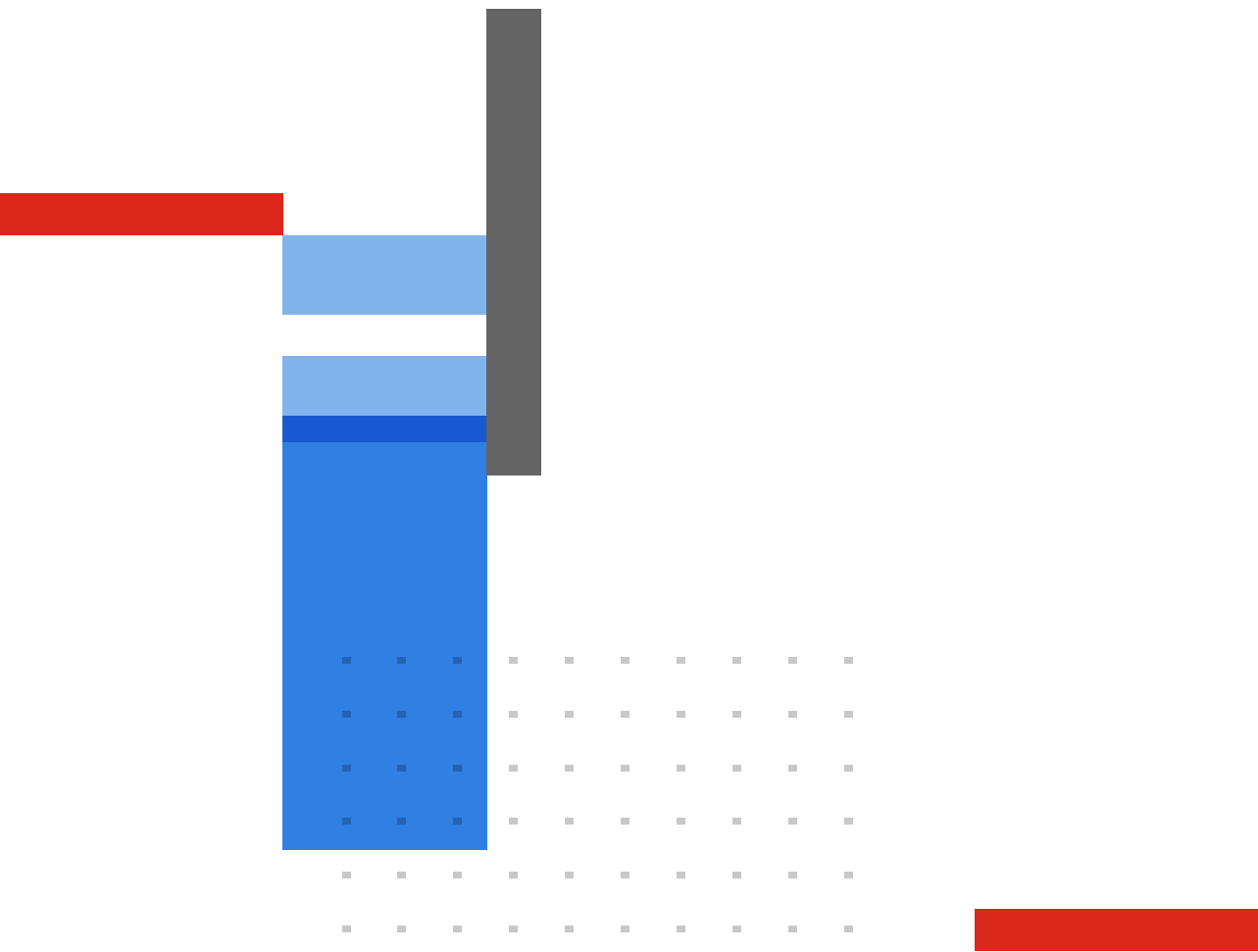


## Ordering Information

Product	SKU	Description
<b>FortiGate 60F</b>	FG-60F	10x GE RJ45 ports (including 7x Internal ports, 2x WAN ports, 1x DMZ port)
<b>FortiGate 61F</b>	FG-61F	10x GE RJ45 ports (including 7x Internal ports, 2x WAN ports, 1x DMZ port), 128 GB SSD onboard storage
<b>FortiWiFi 60F</b>	FWF-60F-[RC]	10x GE RJ45 ports (including 7x Internal Ports, 2x WAN Ports, 1x DMZ Port), Wireless (802.11 a/b/g/n/ac-W2)
<b>FortiWiFi 61F</b>	FWF-61F-[RC]	10x GE RJ45 ports (including 7x Internal Ports, 2x WAN Ports, 1x DMZ Port), Wireless (802.11 a/b/g/n/ac-W2), 128GB SSD onboard storage
<b>Optional Accessories</b>		
<b>Rack Mount Tray</b>	SP-RACKTRAY-02	Rack mount tray for all FortiGate E series and F series desktop models are backwards compatible with SP-RackTray-01. For list of compatible FortiGate products, visit our Documentation website, docs.fortinet.com
<b>AC Power Adaptor</b>	SP-FG60E-PDC-5	Pack of 5 AC power adaptors for FG/FWF 60E/61E, 60F/61F, and 80E/81E
<b>Wall Mount Kit</b>	SP-FG60F-MOUNT-20	Pack of 20 wall mount kits for FG/FWF-60F and FG/FWF-80F series

[RC] = regional code: A, B, D, E, F, I, J, N, P, S, V, and Y





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# HPE MSA 2060 Storage



## What's new

- HPE MSA Gen6 2060 Storage Array models and HPE MSA 2060 Drive Enclosure options with 94% efficient power supplies that meet EU Lot9 2023 power efficiency requirements.
- TAA compliant HPE MSA 2060 Storage Array models supporting LFF and SFF 16 Gb FC, SFF 10GbE iSCSI, and SFF 12 Gb SAS host connectivity.
- TAA compliant HPE MSA 2060 Disk Enclosure options for both LFF and SFF models.
- Expand the capacity of your LFF HPE MSA 2060 Arrays and Drive Enclosure using the new HPE MSA 20 TB SAS 7.2K LFF HDD. Available as a single drive or six-pack drive option.

## Overview

Is your company looking for easy to use, affordable, high-performance shared storage?

The HPE MSA 2060 Storage is a flash-ready hybrid storage system designed to deliver hands-free, affordable application acceleration for small and remote office deployments. Don't let the low cost fool you. It gives you the combination of simplicity, flexibility, and advanced features you may not expect in an entry-priced array. Start small and scale as needed with any combination of solid state drives (SSDs), high-performance Enterprise SAS HDDs, or lower-cost Midline SAS HDDs. With the ability to deliver up to 395,000 IOPS, the new HPE MSA 2060 is up to 80% faster than its prior generation with ample horsepower for even the most demanding workloads.

- Maximize the flash storage capacity of your HPE MSA 2060 Array and Drive Enclosures by adding the new HPE MSA 7.68 TB SAS RI SFF SSD.
- Add 25 Gb iSCSI host connectivity support to your MSA 2060 Array with the new HPE MSA 25Gb SFP28 Short Range 4-pack of iSCSI Transceivers.

## Features

### Accelerate Applications Affordably

The HPE MSA 2060 is capable of delivering up to 395,000 IOPS for affordable application acceleration for small to medium-sized businesses.

The HPE MSA 2060 allows users to define and deploy hybrid or flash storage configurations day one and grow as their needs change.

### HPE MSA's 'Set It And Forget IT' Data Services Does Not Require a Dedicated Storage Administrator

The HPE MSA 2060 Storage is easy to install, easy to use, easy to maintain, even for an IT generalist. Administrators will find the HPE MSA 2060's new Storage Management Utility intuitive and easy to navigate.

HPE MSA's automated tiering engine dynamically responds to workload changes so you don't have to, ensuring the hottest data will be moved to the fastest media automatically and in real-time.

### Leverage Data Protection Features to Keep Your Business Running in the Event of a Disaster

The HPE MSA 2060 Storage delivers virtualized snapshot technology making data protection and instant recovery a snap.

Remote replication via Fibre Channel (FC) or iSCSI facilitates a affordable disaster recovery solution.

Encrypted SSDs and HDDs with local key management can be deployed to deliver a secure, encrypted hybrid flash array.

### Flexible, Modular Architecture That Facilitates Growth Into the Future

The HPE MSA 2060 Storage solution supports a mixture of 3.5 inch LFF and 2.5 inch SFF expansion enclosures for a maximum of 9 enclosures (10 total including the array).

Start small and scale as needed with any combination of SSDs, Enterprise SAS or MidLine SAS HDDs.



Technical specifications

HPE MSA 2060 Storage

Drive description	Up to 12 LFF HDD and/or SSD or up to 24 SFF HDD and/or SSD per array, depending on model
Capacity	Up to 1,843.2 TB (all SFF) and 2.4 PB (all LFF) depending on model, depending on drive mix
Host interface	16 Gb Fibre Channel, 10/25GbE iSCSI, 10GBase-T iSCSI, or 12 Gb SAS depending on model
Storage controller	2 per array, 4-ports each (8-ports total)
Compatible operating systems	Windows Server 2022; Windows Server 2019; Windows Server 2016; VMWare vSphere 6.7; Red Hat Linux 8; SuSE SLES 15
Form factor	2U
Product dimensions (imperial)	3.5 x 17.5 x 20.0 in
Weight	11 lb
Warranty	Three-year limited warranty, parts exchange next business day delivery. Disk enclosures, hard drives and options carry their own warranty.

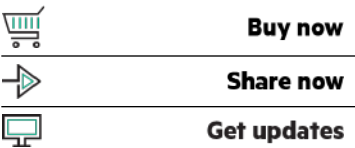
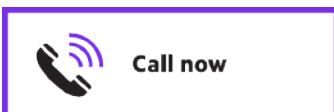
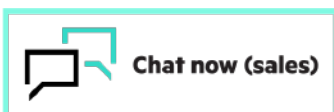
[1] Based on internal testing. See MSA QuickSpecs for details [www.hpe.com/storage/msa](http://www.hpe.com/storage/msa)



For additional technical information, available models and options, please reference the [QuickSpecs](#)

Make the right purchase decision.  
Contact our presales specialists.

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## HPE Services

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Explore **HPE GreenLake**

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[PSN1012748869USEN](#), July, 2023.

# HPE ProLiant DL380 Gen10 Plus server



## What's new

- Supports 3rd Generation Intel® Xeon® Scalable Processors.
- Support for PCIe Gen4, resulting in improved bandwidth and throughput.
- Support for industry-standard OCP 3.0 Network Adapters.
- Support for Trimodal (NVMe/SAS/SATA) HPE Smart Array controllers.

## Overview

Do your servers need increased performance in storage, compute, or expansion?

The HPE ProLiant DL380 Gen10 Plus server is adaptable for diverse workloads and environments, providing you with the right balance of expandability and scalability. Designed for supreme versatility and resiliency, this 2U/2P platform is capable for deployment in multiple environments, built on 3rd Generation Intel® Xeon® Scalable Processors, and backed by a comprehensive warranty. Equipped with PCIe Gen4 capabilities, the HPE ProLiant DL380 Gen10 Plus server offers improved data transfer rates and higher networking speeds.

## Features

### Built for Some of the Most Demanding Workloads

The HPE ProLiant DL380 Gen10 Plus server is built with foundational intelligence to transform IT with insights that enhance workload performance, placement, and efficiency, delivering better outcomes faster.

Provide real-time operational feedback on server performance and recommendations for fine-tuning BIOS settings to customize for changing business needs.

### 360-degree Holistic Security

The HPE ProLiant DL380 Gen10 Plus server provides an enhanced, holistic, 360-degree view to security that begins in the manufacturing supply chain and concludes with a safeguarded, end-of-life decommissioning.

HPE ProLiant security begins with the corruption-free manufacture of the server and auditing the integrity of every component – hardware and firmware – to provide verification that the server begins its lifecycle uncompromised through the supply chain.

HPE ProLiant servers provide rapid detection of a security-compromised server, even to the point of not allowing it to boot, verify containment of malicious code, and protect healthy servers.

HPE ProLiant servers provide automated recovery from a security event, including restoration of validated firmware, and facilitating recovery of operating system, application and data connections, providing the fastest path to bring a server back online and into normal operations.

When it's time to retire or repurpose an HPE ProLiant server, one button secure erase speeds and simplifies the complete removal of passwords, configuration settings and data, preventing inadvertent access to previously secured information.

### Intelligent Management Automation

The HPE ProLiant DL380 Gen10 Plus server simplifies and automates management tasks, establishing a solid foundation for an open, hybrid cloud platform enabled by composability.

Embedded in HPE servers, HPE Integrated Lights-Out (iLO) is an exclusive core intelligence that monitors server status, providing the means for reporting, ongoing management, service alerting, and local or remote management to quickly identify and resolve issues.

Automation and software defined control reduces time spent on provisioning and maintenance, as well as reduces deployment times from weeks to mere days.

HPE InfoSight for servers continually analyzes server infrastructure and applies real-world examples of hundreds of thousands of servers to predict and prevent problems before they can adversely affect business operations.

### Available in an As-a-Service Experience

The HPE ProLiant DL380 Gen10 Plus server is supported by HPE GreenLake to simplify IT infrastructure management across your entire hybrid estate. With 24x7 monitoring and management, our experts do the heavy lifting to manage your environment with services built into consumption-based solutions.

Hewlett Packard Enterprise provides customers choice in how they acquire and consume IT beyond traditional financing and leasing, offering options that free trapped capital, accelerate infrastructure updates, and provide on-premises pay-per-use consumption with HPE GreenLake.



## Technical specifications

## HPE ProLiant DL380 Gen10 Plus server

<b>Processor type</b>	Intel®
<b>Processor name</b>	3rd Generation Intel® Xeon® Scalable Processors
<b>Processor family</b>	3rd Generation Intel® Xeon® Scalable Processors
<b>Processor number</b>	1 or 2
<b>Processor core available</b>	16 to 40 core, depending on processor
<b>Processor speed</b>	3.1 GHz maximum, depending on processor
<b>Power supply type</b>	Dual hot-plug redundant 1+1 HPE Flexible Slot Power Supplies (2.6")
<b>Expansion slots</b>	8, for detailed descriptions refer to the QuickSpecs
<b>Maximum memory</b>	8.1 TB - RDIMM (4 TB per processor), 11.2 TB - LRDIMM and Intel® Optane™ (5.6 TB per processor with 8x LRDIMM and 8x 512 GB Intel Optane)
<b>Memory, standard</b>	16 GB (1 x 16 GB) RDIMM
<b>Memory slots</b>	32
<b>Persistent memory type</b>	Intel® Optane™ Persistent Memory for HPE
<b>Persistent memory media capacity</b>	128 GB - 512 GB
<b>Memory type</b>	HPE DDR4 SmartMemory
<b>Memory protection features</b>	RAS – Advanced ECC, online spare, mirroring, combined channel (lockstep) functionality, and HPE Fast Fault Tolerant Memory (ADDDC) Intel® Optane Persistent Memory
<b>Included hard drives</b>	None ship standard, SFF and LFF drives supported
<b>Optical drive type</b>	Optional DVD-ROM Optional via Universal Media Bay External support only
<b>System fan features</b>	Hot-plug redundant fans, standard
<b>Network controller</b>	Intel I350 1GbE 4 port Base-T OCP3 adapter or Broadcom 57416 10GbE 2 port Base-T adapter and/or optional network adapters depending on model
<b>Storage controller</b>	HPE SR932i-p and/or HPE SR416i-a and/or HPE MR216i-a and/or HPE MR416i-a and/or HPE MR216i-p and/or HPE MR416i-p and/or HPE Smart Array P816i-a SR and/or HPE Smart Array E208i-a SR and/or HPE Smart Array P408i-a SR and/or HPE Smart Array E208i-p SR and/or HPE Smart Array E208e-p SR and/or HPE Smart Array P408e-p SR and/or HPE Smart Array P408i-p SR
<b>Infrastructure management</b>	HPE iLO Standard with intelligent provisioning (embedded), HPE OneView Standard (requires download) (standard) HPE iLO Advanced, and HPE OneView Advanced (optional, requires licenses)
<b>Warranty</b>	3/3/3: Server Warranty includes three years of parts, three years of labor, and three years of onsite support coverage. Additional information regarding worldwide limited warranty and technical support is available at: <a href="http://h20564.www2.hpe.com/hpsc/wc/public/home">http://h20564.www2.hpe.com/hpsc/wc/public/home</a> . Additional HPE support and service coverage, to supplement the product warranty, is available. For more information, visit <a href="http://www.hpe.com/support">http://www.hpe.com/support</a>
<b>Drive supported</b>	8 or 12 LFF SAS/SATA/SSD 8, 10, 16, 18 or 24 SFF SAS/SATA/SSD, 2 M.2 SATA SSD standard on primary riser, depending on configuration, 8 SFF mid-tray optional, 6 SFF rear drive optional or 4 LFF mid tray optional, 3 LFF rear-drive optional and 2 SFF or 2 Dual UFF rear-drive optional, 20 SFF NVMe optional, NVMe support via Express Bay will limit maximum drive capacity, depending on model

For additional technical information, available models and options, please reference the [QuickSpecs](#)

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[PSN1013291298USEN](#), July, 2023.

# VEZHA License Plate Recognition

## Product Specification



## Product Description

Cutting-edge LPR analytics, powered by IncoreSoft improves security systems, creates safe and smart cities with high recognition accuracy, using neural networks in a traffic flow at speeds up to 300 km/h or up to 185 mph. IncoreSoft utilizes mobile and fixed LPR solutions that are designed to work stand-alone, or to be integrated with any third party hardware and software. LPR software with its newest technology will be able to identify license plate characters even in a low quality real world traffic video stream.

## VEZHA License Plate Recognition Features

- 99.6% recognition rate (including low quality, dirty, blurred, and damaged plates) up to 300 km/h (185 mph)\*
- 100+ countries license plate support
- Make, model, color, direction of vehicle, country/state, speed recognition
- ADR (Accord Dangereuses Route) Recognition
- Up to 6 lanes support
- Unlimited lists (black, white, VIP, etc) quantity with different rules
- Not limited number of license plates that can be recognized in one frame
- Works on plates with 2 or 3-rows, ordinary, inverse, and special types of license plates
- License plate for recognition:
  - Europe - minimum: 48x12 px (WxH), recommended: 100x25 px (WxH)
  - America - minimum: 50x25 px (WxH), recommended: 100x50 px (WxH)
  - Arabs - minimum: 70x25 px (WxH), recommended: 100x35 px (WxH)

\*subject to the instructions for camera installation



## General Information

Supported Operating Systems	Linux / Windows
Supported Platform	x86_64 / Nvidia Jetson
Supported Hardware Acceleration	Intel OpenVINO / NVIDIA TensorRT
Supported Database	MySQL / PostgreSQL / MS SQL / Oracle

## Interface

Camera stream protocol	RTSP / HTTP / HTTPS / ONVIF
Recorded video formats	MKV; MP4; ASF; AVI; MJPEG
Supported codecs	MPEG-4; MJPEG; H.264; H.265
Recommended Frame Rate	10+ fps for 100 km/h
Output data	Number plate OCR result Number plate type Make & Model Vehicle color ADR Vehicle category Country / State Timestamp
Output formats	JSON / XML / CSV

## Main Functionality

Centralized Management	+
Finding and navigating the vehicle route	+
Real-time alarms	+
Integration with Microsoft Power BI, Google Data Studio, and others	+
Unlimited lists support	+
Notification settings: internal alarm, by Email / SMS / HTTP / Telegram	+
REST API	+
Database import (CSV) and export support (EXCEL / PDF / CSV / JSON)	+
Integration with any bases (police, stolen cars, etc) via connector	+
Integrated business logic builder	+
Support for various interface languages	+

## VMS Integration

Event based integration	Luxriot Evo, Milestone XProtect, Nx Meta, Genetec, Pelco and other
Plugins integration	Luxriot Evo, Milestone XProtect, Nx Meta, Pelco

## Security Features

Active Directory / LDAP	+
Groups and roles support	+
Encryption of all packages	+



## Main functionality

Centralized Management	+
Finding and navigating the vehicle route	+
Real-time alarms	+
Integration with Microsoft Power BI, Google Data Studio, and others	+
Unlimited lists support	+
Notification settings: internal alarm, by Email / SMS / HTTP / Telegram	+
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Database import (CSV) and export support (EXCEL / PDF / CSV / JSON)	+
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Integrated business logic builder	+
Support for various interface languages	+

## VMS INTEGRATION

Event based integration	Luxriot Evo, Milestone XProtect, Nx Meta, and other
Plugins integration	Luxriot Evo, Milestone XProtect, Nx Meta

## Security Features

Active Directory / LDAP	+
Groups and roles support	+
Encryption of all packages	+



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# Feature Overview

## Key features

- **Scalable multi-server and multi-site solution:**  
XProtect Professional+ supports an unrestricted number of users, hardware devices, servers and sites. It allows the expansion of any installation as it is required
- **High performance recording server:**  
Building on a native 64-bit windows implementation and a highly-optimized database technology with RAM-based pre-buffering, the recording server supports minimum 3.1 Gbit/s recording rate
- **Hardware accelerated Video Motion Detection:**  
Video motion detection decoding takes advantage of processing power in Graphical Processing Units to significantly reduce the CPU load and improve performance of the recording servers. It requires CPU with support for Intel Quick Sync Video
- **Centralized management:**  
A Management Client connected to the management server enables full remote system configuration of all recording servers, devices, rules, schedules and user rights
- **Milestone Interconnect™:**  
A unique system concept that allows all Milestone VMS and Milestone Husky™ NVRs to be interconnected with a central XProtect Corporate system to gain central surveillance operation across geographically dispersed sites
- **Alarm Manager:**  
Single-point alarm function that provides a consolidated and clear overview of security and system-related alarms
- **Centralized Search in Smart Client:**  
Dedicated tab for searching recording sequences, bookmarks, motion, vehicle<sup>1</sup>, people<sup>1</sup> and location<sup>1</sup>. These Search categories can be combined, also with third party search agent plugins
- **Metadata support:**  
Supports reception, storage and export of metadata, including metadata from camera-resided video analytics and location data in Video Push from XProtect Mobile
- **Edge Storage with audio support:**  
Uses camera-based storage as a complement to the central storage in the recording servers, with flexible video retrieval based on time schedules, events or manual requests, including the ability to combine centrally and remotely stored video using Scalable Video Quality Recording™ (SVQR).
- **64-bit recording servers:**  
Allow more cameras to be run on a single recording server
- **Intuitive map function:**  
Multi-layered and interactive maps display the location of every camera and offer control of the entire surveillance system.
- **Bookmarking:**  
Allows users to mark video sections of particular interest and add descriptive notes for later analysis or sharing with other users
- **Multiple language support:**  
Lets most operators use the system in their native language with support for 31 different languages, while the Management Client is available in 14 languages
- **Fast evidence export:**  
Deliver authentic evidence to public authorities by exporting video to various formats, including video from multiple cameras in encrypted XProtect format with dedicated player application included
- **Audit logs:**  
Enables extensive logging of all user system accesses, configuration changes and operator actions
- **Flexible user and rights management:**  
Strict privileges on management of users' access to functions and camera actions. Modular user management with support for basic user accounts to global user management with single sign-on Microsoft® Active Directory accounts.
- **Versatile rule system:**  
Facilitates the automation of different aspects of the system, including camera control, system behavior and external devices, based on events or time schedules
- **Customer Dashboard**  
Support for sending system, server, storage and device status and errors to the Milestone Customer Dashboard
- **Virtual environment**  
Support for VMware and Hyper-V virtualization solutions (to exclude hardware acceleration which is not supported in a virtual environment)

## Integration options

- The Milestone Integration Platform Software Development Kit (MIP SDK) enables seamless integration of video analytics algorithms and other

<sup>1</sup> Limited to certain camera models that can perform video analytics and export ONVIF compliant metadata

third-party applications in XProtect Smart Client and Management Client

- Compatible with XProtect® Transact and XProtect® Retail, which integrate video surveillance with ATMs, point-of-sale (POS) and enterprise resource planning (ERP) systems for managing loss prevention and fraud
- Compatible with XProtect® Access for video enabled physical security, which integrates with access control and intrusion systems
- Compatible with XProtect® LPR for automatic reading and tracking of vehicle license plates
- Generic event integration enables easy and fast integration of third-party applications and systems via a simple message-based socket communication interface
- Supports Milestone Open Network Bridge that enables full video interoperability in multivendor installations using a standardized ONVIF compliant video-out interface
- REST API and API gateway enable external applications to make changes to the system's configuration
- Live Video streaming via WebRTC. Enables easy access to XProtect video in browser-based applications.
- MIP SDK Mobile enables integrations to third party Mobile or Web applications
- Milestone's Driver Framework enables device manufacturers to develop their own drivers for XProtect using MIP SDK, enabling wider device support and deeper integration of cameras, IoT devices, and more
- Milestone AI Bridge simplifies the integration and deployment of AI and intelligent video analytics applications and enables access to video and the return of events and metadata. The Milestone AI Bridge is targeted towards developers utilizing Linux and containers.

## Detailed Product Features

### Recording server

#### System

- Simultaneous digital multi-channel MJPEG, MPEG4, MPEG-4 ASP, MxPEG, H.264 and H.265 video recording of IP cameras and IP video encoders without any software limitations on number of cameras per server
- Two-way audio allows users to transmit and record audio from connected microphones and audio from the operator's microphone to attached speakers
- Generic framework for receiving and storing metadata from compatible devices and clients
- Route traffic between multiple connected cameras and multiple clients requesting live view, playback and export
- A dedicated recording stream enables optimization stream properties (resolutions, encodings and frame rate) for video storage and forensic usage
- Secure high-speed recording database holding JPEG images or MPEG4, MPEG-4 ASP, MxPEG, H.264 or H.265 streams
- Flexible control of recording characteristics for MPEG4/H.264/H.265 streams, making it possible to toggle between recording key frames only or the full stream
- Record more than 30 frames per second per camera, limited only by hardware
- Recording quality depends entirely on camera and video encoder capabilities with no software limitations
- Possibility to import pre-event images recorded locally in camera or video encoder
- Pre-recording buffer (used for event/motion based recording) in RAM minimizes the disk read/write operations when no video is recorded
- Edge Storage with flexible retrieval enables video retrieval from camera storage based on time schedules, events or manual requests. This enables users to effectively retrieve video recordings across low-bandwidth connections
- Scalable Video Quality Recording™ (SVQR) enables seamless merging of video stored centrally in the recording server and video retrieved from a camera associated edge storage
- Built-in, real-time, camera-independent motion detection with the ability to generate motion metadata for Smart Search
- The recording server runs as a Windows service under local system account or optional local Windows user or Microsoft Active Directory account with run-as-a-service privileges
- Port forwarding enables clients to access the recording servers from outside a network address translation (NAT) firewall
- Support for both IPv4 and IPv6 addressing
- 64-bit recording servers allow more cameras to be run on a single server unit
- Secure HTTPS camera connection on devices supporting HTTPS
- Encrypted communication between Recording Server and services retrieving streaming data
- Video motion detection decoding takes advantage of processing power in Graphical Processing Units. This includes the GPU part of the Intel CPU (requires CPU with support for Intel Quick Sync Video)
- Functional recording server even if a recording storage area is unavailable. Continued recording of video from devices with available recording storage and live video on devices without available recording storage
- Support for shutdown of recording server if recording storage becomes unavailable, to enable fail over to take over

**Pan-tilt-zoom (PTZ)**

- “Pass-through” control of manual PTZ operation from clients with user priority
- 3 PTZ priority levels for control of rights between different operators and automatic patrolling schemes
- Execute rule-based go-to preset position on events and patrolling
- Pause PTZ patrolling on event and resume patrolling after manual session timeout
- Import PTZ presets defined in the PTZ camera
- Rename imported PTZ presets

**I/O and events**

- Support for devices with one or more input and output ports
- Powerful rule processing engine for execution of start and stop actions triggered by events or time profiles

**Setup and management**

- Download and install the recording server from a web page on the management server. The recording server is completely managed via the Management Client and configuration changes are applied instantly while recording is in operation
- Selecting “Single computer” set up during the initial installation the system automatically performs certain configurations for an easier installation experience
- Local recording server configuration data is available during periods where the management server is inaccessible
- Recording server manager is available in the local console notification area (icon tray) for status messages, start/stop of the service and change of network settings

**Client access**

- Facilitate client access
- Clients are authenticated and authorized at the management server and use a session-limited access token to access the recording server
- System administrators controlling systems with multiple users can control access permission per client for each of the three XProtect clients, resulting in safer security access

**Logs**

- Logging of system, audit and rule entries to the management server with local caching during of-line scenarios.

**Management server and Management Client****System**

- Management server for user authentication logon, system configuration and logging
- Management Client for central administration of the system such as recording servers, devices, security, rules and logging
- Management Client compatible with XProtect Essential+, XProtect Express+ and XProtect Professional+, XProtect Expert and XProtect Corporate 2019 R1 and newer
- All configuration and logs from the entire system are stored in a centralized SQL database and accessible by the management server only
- Failover solution for the management server provides a resilient system solution based on Windows Server Clustering, ensuring high system availability
- Encrypted communication between Management Server and Recording Server
- Management server manager is available in the local console notification area (icon tray) for status messages and to start/stop the service
- The management server runs as a Windows service under local system account or optional local Windows user or Microsoft active directory account with run-as-a-service privileges
- To register and validate your licenses, the system offers easy-to-use automatic or manual online activation via the Internet and alternatively, offline activation via email and web for closed surveillance networks
- Support for both IPv4 and IPv6 addressing

**Milestone Interconnect**

- XProtect Professional+ is compatible with Milestone Interconnect enabling multiple XProtect Professional+ systems to be connected with a central XProtect Corporate system to gain central surveillance operation across geographically dispersed sites

**Storage**

- Definition of one or more storage containers with individual archiving schemes and retention times. Recording capacity is limited only by disk space
- Each storage container is defined as live database and one optional archive, where the video data is moved from the live database to secondary disk systems or network drives. The archived data is still online and available for clients
- Archiving scheme define when video is archived and how long the video data is retained before deletion
- Ability to allocate individual devices to different storage containers

- Move a device or a group of devices between two storage containers
- Storage overview gives instant indication of used vs. available storage in total and for individual cameras

## Devices

- Hardware wizard to add devices; automatically using Universal Plug and Play (UPnP) discovery, via IP network range scanning, or using manual device detection. All methods support automatic or manual model detection
- Wizard for swift replacement of malfunctioning devices with preserved configuration settings and recordings
- Wizard for easy moving of hardware devices (with attached cameras, microphones, speakers, inputs, outputs and metadata devices) between recording servers in runtime without losing settings, recordings, rules, permissions etc.
- Enable and disable devices if they are not used or are down for maintenance
- Adjust settings such as brightness, color level, compression, maximum bit rate, resolution and rotation per camera or camera group
- Enable up to two streams per camera; one stream for live viewing and one stream for recording
- Select and configure video format, frames per second (FPS), resolution and quality for the video streams used per camera
- Adjustable group of pictures (GOP) length for MPEG4 H.264 and H.265 encoded video
- Assign camera shortcut number for easy operation by clients
- Optional preview window for immediate verification of video settings per camera or for a group of cameras
- Define multiple PTZ preset positions per camera
- Import PTZ preset positions from cameras
- PTZ scanning on supported devices
- Define multiple PTZ patrolling schemes with adjustable wait time between shifts and customizable transitions with disabling of motion detection to avoid false alarms
- Run multiple patrolling schedules per camera per day. For example, run different schedules for day/night/weekend
- Privacy masking conceals certain parts of the image, both in live and playback video and in exported material. It supports permanent masks and liftable masks that can be lifted and managed

with user credentials. Masking level is adjustable and ranges between 'light blur' to 'solid grey'

- Configure device events like motion detection with pre- and post-buffers, or input signal behavior options
- Fine-tune motion detection sensitivity per camera manually or automatically
- Apply one or multiple exclusion zones for where motion detection is to be disabled to avoid unwanted detection
- Manage device password on one or multiple devices from within the Management Client <sup>2</sup>
- Device firmware upgrade of single devices<sup>3</sup>
- Adding devices on HTTPS
- Initial setup of credentials on devices without factory default credentials increases the level of security in the customer's system.
- User handling: Add/change VMS user account that communicates with the device. List and delete existing device's users.<sup>4</sup>
- Network configuration: enabling change of IP address, subnet mask, and default gateway for a device<sup>2</sup>
- Management client contains a field showing the firmware version of each device
- Option "Update Hardware" updates the information about the firmware and features available for a specific device
- Full list of devices, firmware versions and features supported by Milestone can be found here <https://www.milestonesys.com/community/business-partner-tools/supported-devices/> and drivers are available in Device Packs here: [Download Drivers](#)

## Rules, time profiles and notifications

- Powerful Microsoft Outlook®-style rule system supports an unlimited number of rules
- Rule actions can be triggered by event, time interval, time schedule (recurring, or a combination of event and time). Rules can be optionally stopped by an event or after a certain time
- Time profiles with reoccurring time selection and expire condition support an unlimited number of time profiles
- Dynamic day-length time profile follows daylight changes over the year for a given location defined by a GPS position, including daylight savings time
- Play audio files on rule making it possible to automate announcements over speakers.

<sup>2</sup> Not supported for all devices. For details read latest Milestone XProtect device pack release notes

<sup>3</sup> Applicable only for devices integrated through Axis, Bosch, Hanwha and ONVIF drivers (drivers in Legacy Device Pack excluded)

<sup>4</sup> Applicable only for devices integrated through the Milestone ONVIF drivers and that are ONVIF Profile T & Q compliant

- **Trigger events:**  
The XProtect Professional+ VMS system and connected devices support a wide set of events that can be used to trigger actions using the rule system. Events are grouped in the following categories:
  - Hardware: events that relate to physical hardware devices connected to the system
  - Devices: events that relates to certain functions and states of devices available to the XProtect VMS system via the connected hardware devices
  - External Events: events that relate to VMS integrations
  - Recording server: events that relate to archiving and database functions.
  - Analytics: events from integrated applications and systems
- For further details on available trigger events, please refer to the XProtect VMS Administrator's Manual.
- **Start actions:** The triggering events may initiate a wide set of actions in the VMS system, connected devices or integrated systems.  
For a complete list of available actions, please refer to the XProtect VMS Administrator's Manual
- **Stop actions:** The rule engine may also trigger stop actions in the VMS system, connected devices or integrated systems upon the completion of a rule.  
For a complete list of available stop actions, please refer to the XProtect VMS Administrator's Manual
- Multi-recipient customizable email notification with image and/or AVI attachment of incidents

### User rights management

- Common and central management of all user rights across all user and programmatic (MIP SDK) interfaces
- Overall system security definition makes it possible to globally allow or deny permission to devices and functions (such as manage, read, edit and delete).
- Device-specific security definition makes it possible to allow or deny permission to individual devices and functions (such as manage, read, edit and delete).
- Roles control user and administrator access to:
- General: Management Client and XProtect Smart Client profiles, dual authorization rights
- Cameras: visibility, administrate, live view (playback search sequences, export, smart search, AUX commands, manual recording, bookmark functions)
- Microphones and speakers: visibility, administrate, listen to live audio, playback audio search

sequences, export, manual recording, bookmark functions, speak to speakers

- Inputs and outputs: visibility, administrate, status, activation
- PTZ: manual control, activate PTZ presets, PTZ priority, manage PTZ presets and patrolling, lock/unlock PTZ presets and release PTZ session
- Remote recordings: retrieve remote recordings
- External events: visibility, administrate, trigger
- View groups privileges
- Servers: XProtect® Enterprise, XProtect® Professional and XProtect® Express slave server access and authentication details,
- Alarms: visibility of alarms and ability to manage alarms
- MIP: Plug-in permissions
- General application permissions: Management Client, XProtect Smart Client, XProtect Web Client and XProtect Mobile
- Scripting disable/enable option

### Logging

- Logs of system, audit and rule entries are consolidated from all recording servers and clients
- Each log file has adjustable size and time limitations

### XProtect Smart Client profiles

- Centralized management of XProtect Smart Client application options enables optimization of XProtect Smart Client for different user categories and skill levels
- Ability to enforce or recommend optional XProtect Smart Client application options for a user or group of users, using maximum three different XProtect Smart Client profiles
- Define general XProtect Smart Client application options, including (listing not exhaustive): visibility of time, visibility of camera live indicators, default image quality, default frame rate, keyboard and joystick setup, startup mode and de-interlacing filters
- Access to live mode and the availability of individual control panes and overlay buttons
- Access to playback mode and the availability of individual control panes, overlay buttons and settings for specific functions, such as default export path
- Access to setup mode and the availability of individual control panes and setup functions
- Access to Centralized Search and Alarm Manager
- Definition of available view layouts

### System administration

- Built-in backup and restore support for manual system backup of all configuration data, including (listing not exhaustive): system configuration data,

maps, alarm settings and definitions and client views

- Configuration data and backup can be password protected, to enhance security around restore procedure.
- Configuration Reporting enables complete or partial documentation of system configuration. Custom and site-specific free-text information, integrator's notes and logo can be added to the printer-friendly reports
- License administration
- License overview including add-on products, Milestone Care coverage and renewal date
- License owner information, that is synchronized with the software registration page on the Milestone website
- Expanded license information for multi-site installations where both the total used licenses for the common SLC is presented and the license use in the specific system
- License overview that presents the license use of all the individual sites running on the same SLC
- "Changes without activation" function that allow additions and replacements of limited number of hardware devices without requiring license activation

### Authentication

- System log-in uses Microsoft Active Directory, local Windows or basic user account
- Use current Windows logon for authentication
- Dual authorization offers an optional additional level of system security, where Management Client users are granted access to the system only when a second user or supervisor has confirmed the log-in with a successful authorization of the second user
- Kerberos support enables deployment in high security Kerberos IT environments
- Use organization's own Identity and Access Management system (Open ID Connect based) to authorize and authenticate users. It enables support for SSO

### Event Server

#### Alarm Manager

- Single-point alarm management of all internal system alarms and external security alarms
- Alarm descriptions and work instructions make alarms actionable for operators
- An alarm location map can be linked to each alarm providing instant situational awareness to the operator dealing with the alarm
- Customizable alarm priorities allow operators to focus on the most critical alarms

- Customizable alarm categories enable logical grouping of alarms dependent on their type and nature
- Customizable alarm statuses enable alignment of the alarm handling workflow with existing workflows and security systems
- Alarm handling result code enables tracking of the outcome of the alarms
- Automatic allocation to alarm owner with escalation and alarm forwarding possibilities
- Time profiles for definition of active alarms
- Possibility to associate one or more cameras to an alarm (maximum 15 cameras can be displayed simultaneously in the alarm preview window)
- A set of alarm handling reports gives valuable information about alarm inflow and alarm handling performance
- Extensive logging of alarms
- Microsoft Clustering support for the event server enables secure and redundant alarm handling

### XProtect Mobile server

- The XProtect Mobile server runs as a dedicated service, allowing it to be installed either on the same server as other system components or on dedicated hardware in more demanding installations
- The XProtect Mobile server can serve video directly to the Web client/Mobile clients via the direct streaming feature. No transcoding to MJPEG required which significantly reduces the load on the Mobile server
- The XProtect Mobile server can transcode video and can adapt to changing connection bandwidth as well as optimize the use of available bandwidth to get the best possible stream quality in the XProtect Web Clients and XProtect Mobile clients
- Adjustable transcoding logic enables capping of video resolution and frame rate for video streams provided to XProtect Web Clients and XProtect Mobile clients
- The XProtect Mobile Server encodes audio in a format suitable for Web Client and Mobile Client, so users can play live or recorded audio.
- Installing the XProtect Mobile Server plugin in the Management Client will give access to XProtect Mobile Server management in order to change settings, read out miscellaneous status information, configure codecs used for exports as well as manage ongoing and completed exports
- XProtect Mobile servers can be installed in parallel, offering redundancy and/or allowing more simultaneous users
- XProtect Mobile servers can be configured through the tray controller to easily adjust or update settings

- Connect securely to the XProtect Mobile server using trusted CA certificates for HTTPS encryption. XProtect Mobile clients do not support self-signed certificates. Unencrypted HTTP connection is supported in the XProtect Mobile client
- Video Push configuration is done from the server, so users can push video via XProtect Mobile without having to apply any additional setting
- XProtect Mobile Server supports creating server-side export through XProtect Web Client and XProtect Mobile
- Video decoding in XProtect Mobile Server takes advantage of processing power in Graphical Processing Units. This includes the GPU part of the Intel CPU (requires CPU with support for Intel Quick Sync Video) and in the GPU of additional external NVIDIA cards
- Smart Connect enables easy configuration of internet access to the Mobile Server by automatic configuration of firewalls and internet routers via UPnP. Smart Connect also verifies the configuration and operation of the internet connection, and can be used to email connection details to Mobile client users<sup>5</sup>

### DLNA server

- DLNA allows users to display video directly onto any DLNA supported tv without needing to have a PC nor a Smart client. The function supports live video and camera selection can be manual, carousel or rule based
- The Milestone DLNA server runs as a dedicated service, allowing it to be installed either on the same server as other system components or on dedicated hardware in more demanding installations and can be downloaded here: <https://www.milestonesys.com/support/re-sources/download-software/>
- The DLNA servers can be configured through the tray controller to easily adjust or update settings
- Installing the DLNA server plugin in the Management Client will allow the DLNA server management to change settings
- Supports more than one DLNA server
- The populated cameras on the DLNA interface can be set by an admin
- The DLNA functionality requires the selected cameras to be configured to use H.264

### Server Configurator

- Makes it easier to select and assign security certificates on the server/computer where it is running

- The security certificates for the Management Server, Recording Server, Mobile Server, Data Collector can be configured from the same place.
- Server configurator is backwards compatible with components from XProtect 2020 R1 and later
- Registration functionality available through server configurator. This can be used to update configuration after changing hostnames such as when setting up a Windows Server Failover Cluster

## XProtect Smart Client

### General

- Dedicated task-oriented tabs for the Centralized Search and Alarm Manager in addition to Views, Export, and Incident Manager
- Application theme support with choice of dark or light themes
- Multi-window support where secondary windows have full functionality and can be operated in independent mode or synchronized mode where they follow the control of the main window
- Shortcuts to select a specific window or specific camera in a window
- Camera search function promptly finds cameras, types of cameras and views in the system with the ability to create temporary views to display all or a subset of cameras matching the search criteria
- Display metadata bounding boxes from supported devices in live views and playback
- Generic 360 dewarping allows users to cover a wide area with a single device with 360 cameras, but at the same time get a 'normal' view of a fish eye image.

### Customization

- Application options enables customization of the general behavior and look of the XProtect Smart Client
- The customization can either be made as individual personalization managed by each operator, or centrally enforced through Smart Client Profiles
- Control of general look & feel and navigation properties, such as color mode, camera title bar, grid sizes etc.
- Availability of control panes and functions in live and playback tabs, and in setup mode
- Information included in timeline in playback tab
- Behavior and availability of expert function
- Setup of keyboard short cuts and joystick controls
- Specific behavior of alarms and access control notifications

<sup>5</sup> Use of Smart Connect require Milestone Care Plus

- Advanced application settings such as use of hardware acceleration, videos diagnostics overlay and time zone settings
- Application language

### Live view

- View live video from 1-100 cameras per computer monitor/view
- Multiple computer monitor support provides a main window and any number of either floating windows or full screen views
- Live view digital zoom allows a full view of recordings while the operator can digitally zoom in to see details
- Multi-live streaming gives the possibility to define multiple streams for live viewing with different properties. It optimizes XProtect Smart Client viewing performance according to the available bandwidth and view layouts, which is ideal for deployments with remote viewing. Number of streams supported is set by the camera driver<sup>6</sup>
- Adaptive streaming enables a lower resolution stream from the recording server to the Smart Client, Smart Wall, Mobile Client or Web client when a high resolution is not required, i.e. when displaying video where the view items do not require high resolution streams
- Supports multiple view layouts optimized for 4:3 and 16:9 display settings in both landscape and portrait
- Independent playback capability allows for instant playback of recorded video for one or more cameras, while in live mode
- Centralized storage of shared and private camera views, enables coherent access to views across the system
- Possibility to instantly re-arrange cameras in views for optimized monitoring of incidents, with single click restore of original view
- Instant camera placement in live view allows for instant replacement of cameras in a view, where new cameras can be placed in a particular view and positioned through a simple drag-and-drop operation
- Update on "motion only" optimizes CPU use by allowing motion detection to control whether the image should be decoded and displayed
- Global hotspot function allows users to work in detail with any camera selected from any view
- Local hotspot function allows users to work in detail with a camera selected from the same view
- Carousel function makes a specific view item rotate between pre-defined cameras that are not necessarily present in the view at the same time.

Operators can select default or custom display times for each camera, and they are able to manually switch to the next or previous camera in the carousel list

- Matrix function shows live video from multiple cameras in any view layout with customizable rotation paths, remotely controlled by computers sending matrix remote commands
- Import static or active HTML maps for fast navigation to cameras and to provide a good overview of premises
- Hide HTML page toolbar in HTML page views
- Activate matrix via graphical maps of premises using JavaScript or integrate with centralized access control systems
- The operator can assign outputs, PTZ presets and views as actions to joystick buttons and as keyboard shortcuts.
- Two-way audio support enables XProtect Smart Client to record and play live audio from camera-connected microphones and outgoing audio from the operator's microphone to one or multiple camera speakers
- Adaptive de-interlacing option secures high video quality, based on the actual video content received. XProtect Smart Client can optionally apply a filter to areas of the image where jagged edges would otherwise show up
- Operators may start/stop manual recording on individual cameras, where the recording status is propagated to all XProtect Smart Client users active in the system

### PTZ

- Control PTZ cameras by using:
  - PTZ preset positions
  - PTZ point-and-click control
  - Overlay buttons
  - PTZ zoom to a defined rectangle
  - Video overlaid PTZ control
  - Virtual joystick function
  - Joystick
  - Manage PTZ presets
  - Start, stop and pause patrolling
  - View who has PTZ control and time to automatic release
  - Lock PTZ control
- Take manual control of a PTZ camera that is running a patrolling scheme. After a timeout with no activity, the camera reverts to its scheduled patrolling scheme
- PTZ camera specific icons to easier identify PTZ cameras

<sup>6</sup> Please view list of supported devices and number of supported streams here:

- 360° Fisheye Lens Viewing: Capability for fisheye lens camera views provided through utilization of the ImmerVision Enables panomorph lens technology. Other lenses than ImmerVision can be supported by using the integrated generic de-warping lens profile or a third-party plug-in

### I/O and events

- Overlay buttons provide intuitive control of cameras, camera-integrated devices and other integrated systems directly from the camera view
- Manually trigger output port relay operation, for example when controlling gates
- Manually trigger events by activating a server-defined event from a list

### Bookmarking

- Manually define quick or detailed bookmarks with the bookmark function
- Bookmarks are shown in timeline with instant preview
- Listing and previewing of bookmarks in recording search
- Bookmark reports enable effortless incident documentation
- Direct video export of a bookmark reduces the time needed to prepare forensic video material
- Search and apply filters to bookmarks (searching by camera and key words, and adding time frame)

### Playback

- Playback video from 1-100 cameras per computer monitor/view
- Advanced video navigation includes fast/slow playback, jump to date/time, single step and video motion search
- Integrated video timeline with time navigation and playback controls, including an integrated function to select a time interval for export, or video retrieval from Edge Storage devices
- Overview of recorded sequences and bookmarks
- Independent playback capability allows the independent playback of recorded video from one or more cameras
- Instant camera placement in playback view allows users to instantly replace cameras in a view, where a new camera can be placed in a particular view and position with a simple drag-and drop operation
- Digital zoom allows the operator to see magnified details in the recorded video

### Export and print

- The snapshot function enables operators to produce instant visual documentation of a camera by

saving the camera image to a file, or sending it directly to a printer

- The storyboarding function makes it possible to include video sequences from different or overlapping time intervals from different cameras in the one and the same export
- Export in XProtect format; including the standalone XProtect Smart Client - Player application for instant and easy viewing by authorities
- Export preview with looped playback
- Encryption and password protection of exported video material based on 256-bit AES encryption algorithm
- Secure video evidence handling with a digital signature of exported video material that enables users to verify the video has not been modified or tampered with when viewing the export in the XProtect Smart Client - Player
- Create evidence material in media player format (AVI files), MKV format, or still image format (JPEG images)
- Disable re-export option to prevent undesirable distribution of sensitive evidence material
- Bulk camera export in multiple formats to multiple destinations, including direct export to optical media, results in more efficient video exports and more secure handling of evidence material
- Export comment function enables users to add general and/or camera-specific comments to a video export when exporting to XProtect format.
- In media player format comments can be added as pre/post slides
- Print incident reports including image, surveillance details and free-text user comments

### Centralized Search

- Dedicated tab for Centralized Search (replacing Sequence Explorer)
- Search categories are video sequences, bookmarks, motion, vehicle<sup>7</sup>, people<sup>7</sup> and location<sup>7</sup>
- Easy application of filtering with dynamic update of search window
- Preview of selected search results with direct options for export of video, making bookmarks, exporting to pdf, and more
- Hide/show search results that are not matched on all search agents

### Map function

- Built-in map function in XProtect Smart Client provides intuitive overview of the system and offers integrated access to all system components

<sup>7</sup> Limited to certain camera models that can perform video analytics and export ONVIF compliant metadata

- Map images can be in standard graphic file formats including JPG, GIF, PNG and TIF
- Any number of layered maps such as city, street, building and room
- Instant camera preview on “mouse over” and one-click shows all cameras on map
- One-click function to open floating window with all cameras (maximum 25 cameras) on the map
- Depiction of camera view zones on map with clickable PTZ zones for instant PTZ control
- Easy drag-and-drop and point-and-click definition of: cameras, servers, microphones, speakers, I/O devices, hot-zones for map hierarchies, camera view zones and PTZ camera presets position view zones
- Integrated control of speakers, microphones, and events and output I/O control, including: doors, gates, light and access control systems
- Real-time status monitoring indication from all system components including cameras, I/O devices and system servers
- Graphical visualization of the system status through color coding
- Hierarchical propagation of status indications to higher ordered maps
- Different levels of status indications available (alarm, warning and errors)
- System performance data for cameras and servers including camera resolution, FPS, network use and disk space
- Ability to suppress status indications (such as error and warning) for a given device
- Possibility to edit device names in a map and assign map-specific names and references to devices in a map
- Map editing subject to user rights

### Alarm Manager

- Dedicated dockable tab for the Alarm Manager
- Alarm list with extensive filtering capabilities and an alarm preview in both live and playback mode
- Extensive alarm sort and filtering functions allow operators to focus on most critical alarms
- Instant preview of primary and related cameras helps reduce the number of false alarms
- Tight integration with the map function allows operators to indicate and acknowledge active alarms in the map
- Alarm descriptions and work instructions make alarms actionable for operators
- Alarm escalation and alarm forwarding possibilities allow operators with appropriate skills to handle different alarms
- Alarm reports enable incident documentation
- Alarm location map presents the alarm operator with a map showing the alarm area when an alarm is selected

- Desktop alarm notification linked to alarm manager
- Alarm notification to a single or a groups of XProtect Mobile client users using Push Notifications
- Optional sound notifications for different alarm priorities for notification of new incoming alarm
- Alarm disabling option enables users to suppress alarms from a given device in a certain time period
- Instant access to both live and recorded video from the cameras that are related to the alarm
- Alarm handling reports give valuable information about alarm inflow and alarm handling performance

### Setup and management

- Download and install XProtect Smart Client from a web page on the management server
- Notification about new updates at log-in
- Application options allow users to adapt the layout and personalize the application to their particular preferences

### Authentication

- System log-in uses Microsoft Active Directory, local Windows or a basic user account
- Use current Windows logon for authentication
- Change password for basic users in Smart client login dialogue
- Auto-log-in and auto-restore views
- Dual authorization offers an optional additional level of system security, where XProtect Smart Client users are granted access to the system only when a second user or supervisor has confirmed the log-in with a successful authorization of the second user
- Use organization's own Identity and Access Management system (Open ID Connect based) to authorize and authenticate users. It enables support for SSO

### System

- Support for IPv4 and IPv6 addressing
- 64-bit Windows® operating system support enables better performance when viewing and operating many cameras
- Hardware video decoding is done to significantly reduce the CPU load and improve performance of the recording servers. XProtect supports video decoding done in the GPU part of the Intel CPU (requires CPU with support for Intel Quick Sync Video) and in the GPU of additional external NVIDIA cards

### XProtect Smart Client - Player

- Play back recorded or archived video and audio evidence, including edited storyboard exports

- Same user-friendly interface and most functions as XProtect Smart Client
- Instant one-click playback for easy viewing of exported video evidence
- Advanced second-level investigation tools make it easy to refine exported video and re-export the most essential evidence
- Metadata bounding boxes included in exports are displayed time synchronized in XProtect Smart Client – Player
- The project tool allows users to merge video exports or archives from two different locations or XProtect systems together into one new export
- Generic 360 dewarping. Dewarping allows the user to cover a wide area with a single device, but also to have a 'normal' view of an otherwise distorted or reversed image
- View up to 100 cameras time-synched during playback
- Camera search function promptly finds cameras, types of cameras and camera views in the system
- Scrollable activity timeline with magnifying feature
- Instant search on recordings based on date/time and activity/alarm (video motion detection)
- Evidence can be generated as a printed report, a JPEG image, an AVI or MKV film or in XProtect format
- Export audio recordings in WAV, MKV or AVI format
- Exported video can be digitally zoomed to view an area of interest and minimize export footprint size
- Re-export evidence containing XProtect format and XProtect Smart Client - Player for instant, easy viewing by authorities
- Encryption and password protection of exported video material based on 256-bit AES encryption algorithm
- Secure video evidence handling with a digital signature of re-exported video material enables users to verify that the video has not been modified or tampered with when viewing the export in XProtect Smart Client – Player
- View, modify or add general and/or camera-specific comments for a given video export
- De-interlacing of video from analog cameras
- 360° ImmerVision Enables® panomorph lens technology
- Timeline with the switch between live and playback within a view or single camera, ability to adjust playback speed, timeline ruler scale, play forward and backward, scrub between sequences once at a time, simplified flow for working with bookmarks from the timeline
- Direct streaming supported, meaning that the Web client can receive H.264 directly from the recording server without transcoding, which is more efficient and provides a smoother experience
- Adaptive streaming enables a lower resolution stream from the recording server to the Smart Client, Smart Wall, Mobile Client or Web client when a high resolution is not required, i.e. when displaying video where the view items do not require high resolution streams
- Camera search function promptly finds cameras, types of cameras and camera views in the system
- Easy single/multi camera video playback including fast/slow playback, single frame step and jump to date/time with frame preview while adjusting time
- Investigation function with ability to save exports for later usage or download
- Users can quickly get an overview and act if needed via the list of alarms
- Control PTZ cameras remotely with PTZ mouse gestures, including preset positions
- Two-way audio support for playing and exporting live or recorded audio from device or camera-connected microphones. Use the camera's speaker to talk with a person in front of the camera, and at a later stage play back recorded audio
- Broadcast audio support for mass communication to multiple camera-connected speakers at once.
- Dynamic bandwidth optimization when streaming from server to client gives better use of bandwidth
- Create AVI, MKV media exports
- Export in XProtect format; excluding the standalone XProtect Smart Client Player
- Re-export of exports in XProtect format is always prevented
- Encryption and password protection of exported video material
- Secure video evidence handling with a digital signature of exported video material that enables users to verify the video has not been modified or tampered with when viewing the export in the XProtect Smart Client – Player. Always enabled.
- Export on the server to avoid moving large video files back and forth. Only download needed files or save them for downloading when on a faster connection
- Preview exports on the server without downloading them

### XProtect Web Client

- Access XProtect views through the browser and avoid advanced setup. No installation needed on client computer
- Shared views can be managed centrally via the server with administrator/user rights and user groups

- Trigger outputs and events with live view of related camera
- System log-in using XProtect username and password. Possible to change basic user password via a link from the login dialogue box.
- System log-in using Microsoft Active Directory user
- Secure connection through HTTPS
- Use organization's own Identity and Access Management system (Open ID Connect based) to authorize and authenticate users. It enables support for SSO

### Bookmarking

- Manually define quick or detailed bookmarks with the bookmark function
- Create bookmarks based on rules
- Search and apply filters to bookmarks (searching by camera and key words, and adding time frame)

### XProtect Mobile Client

- Available for Android and iOS devices. Supported version listed on Milestone's system requirements page
- Add log-in credentials for multiple servers in XProtect Mobile to easily switch between sites or different connection addresses
- Direct streaming supported meaning that the Mobile client can receive H.264 and H.265 directly from the recording server without transcoding in the Mobile Server, which is more efficient and provides a smoother experience
- Adaptive streaming enables a lower resolution stream from the recording server to the Smart Client, Smart Wall, Mobile Client or Web client when a high resolution is not required, i.e. when displaying video where the view items do not require high resolution streams
- Views are inherited from the connected XProtect VMS system. The client automatically obtains the user's private and shared views from the system to be used as camera lists in XProtect Mobile
- A view with all cameras is automatically generated, allowing XProtect Mobile to be used when no views are set up. It also provides a quick way of searching through cameras
- Camera search function promptly finds cameras, types of cameras and camera views in the system
- Cameras can be viewed in full screen to take better advantage of the device's screen. It is also possible to search through cameras in a view while in full screen by swiping left or right
- Digital pinch-to-zoom enables users to zoom in on a part of the image for closer review and conduct detailed investigation of video when using megapixel or high-definition cameras

- Play back recordings from the database, navigate recorded video using a flexible timeline control or select a specific time or recorded sequence to start playback, step through recordings and select a playback speed.
- Picture-in-picture in playback mode allows users to view recordings from the database while keeping an eye on the live video. The client displays a live picture-in-picture frame of the same camera when in playback mode.
- Background Picture in Picture leaves the live feed of a camera on screen, when the app is minimized, allowing users to navigate to another app, while continuing viewing live video. Available for Android devices
- Control PTZ cameras with XProtect Mobile either manually or by selecting predefined presets for quick navigation
- Video Push allows users to use their mobile devices' cameras as cameras in the XProtect VMS. Easy to use and requires no setup in the mobile device
- Option to include location metadata in Video Push
- Option to record audio during Video Push
- Two-way audio to play live or recorded audio from device or camera-connected microphones. Use the camera's speaker to talk with a person in front of the camera simply using the Push-To-Talk button. Push-to-talk communication is recorded and can be played back
- View access control events and grant/deny access to the premises if an access control system is integrated via the XProtect Access add-on product
- Trigger outputs and events: Mobile devices can trigger outputs connected to the XProtect VMS, or user-defined events to have greater control while on the go
- Connect securely to the XProtect Mobile server using trusted CA certificates for HTTPS encryption. The XProtect Mobile client does not support self-signed certificates. Unencrypted HTTP connection is supported in XProtect Mobile Client.
- Export on the server to avoid moving large video files back and forth. Only download needed files or save them for downloading when on a faster connection
- Take screenshots when using the mobile application

- Receive alarm notifications using Push Notifications, notifications include access to video, alarm information and instructions <sup>8</sup>
- Smart Connect with automatic Mobile Server discovery on LAN using UPnP, and easy connection via WAN to known Mobile servers without having to keep track of actual server addresses
- Investigation function to access investigations done in the Web client
- System log-in using XProtect username and password. Possible to change basic user password via a link from the login dialogue box.
- System log-in using Microsoft Active Directory user
- Support of biometric authentication for log-in for Android and iOS devices
- MDM (Mobile Device Management) support for Android and iOS devices
- Use organization's own Identity and Access Management system (Open ID Connect based) to authorize and authenticate users. It enables support for SSO

### Bookmarking

- Manually define quick or detailed bookmarks with the bookmark function
- Create bookmarks based on rules
- Search and apply filters to bookmarks (searching by camera and key words, and adding time frame)
- Sharing bookmark links between mobile devices by generating and accessing links.

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<sup>8</sup> Use of Push Notifications require Milestone Care Plus

## Miscellaneous

### FIPS 140-2 compliant mode

XProtect can be used in a FIPS 140-2 compliant mode.

For more information please refer to: <https://doc.milestonesys.com/latest/en-US/portal/htm/chapter-page-hardening-guide.htm>

### Minimum system requirements

The following are minimum requirements for the computers used, please refer to:

<https://www.milestonesys.com/support/tools-and-references/system-requirements/>

### Supported languages

For details on supported languages, please refer to:

<http://www.milestonesys.com/supportedlanguages/>

### Licensing structure

#### Server base license

- XProtect server base license is mandatory for installing the product
- The base server license permits the following deployments within the legal entity purchasing the base server license:
  - Unrestricted number of Management Servers
  - Unrestricted number of Recording Servers
  - Unrestricted number of XProtect Smart Clients, XProtect Web Clients and XProtect Mobile applications

#### IP device license

- To connect cameras, video encoders, NVR/DVR, video services or other types of video devices to XProtect, one device license is required per enabled video channel. For Non-Video devices, one license is required per IP device. License per enabled video channel rule do not apply for the multichannel cameras and encoders (up to 16 Channels) that are on the Supported Devices List and will require only one license per IP device. Milestone Supported Device List governs and provides information on the number of required device licenses for IP devices connected to and enabled in XProtect. Always refer the [Milestone Supported Device List](#) to see how many device licenses you shall purchase for your use of XProtect with IP devices.
- In total, for all copies of the product installed under this license, the product may only be used with IP devices as you have purchased IP device licenses for. An unlimited number of IP device licenses can be purchased. To extend an installation with additional IP device licenses, the base server license number (SLC) is required when ordering.

#### Licensing of Milestone Interconnect

- One Milestone Interconnect device license is required per device (camera) in an interconnected site that is enabled in the central XProtect Corporate system

**Licensing of Video Processing Service Driver (included in the MIP SDK)**

- The Video Processing Service Driver when receiving modified video from any connected video processing system or any directly or indirectly connected device, requires one device license per enabled video channel.

**Advanced Audio Codec (AAC) license**

- The use of AAC audio decoding within the XProtect Smart Client is licensed and requires a license per concurrent XProtect Smart Client. All XProtect VMS Base licenses (SLC's) for products supporting AAC audio include AAC licenses for 2 concurrent XProtect Smart Clients. Additional licenses can be purchased in packs of 50 if needed.



Milestone Systems is a leading provider of open platform video management software; technology that helps the world see how to ensure safety, protect assets and increase business efficiency. Milestone enables an open platform community that drives collaboration and innovation in the development and use of network video technology, with reliable and scalable solutions that are proven in more than 150,000 sites worldwide. Founded in 1998, Milestone is a stand-alone company in the Canon Group.