

Datasheet

ALAXALA Compact Gigabit Layer 3 Switch

AX3660S Series

1. Outline

ALAXALA Gigabit Layer 3 Switch Series, AX3660S, provides the following eight models.

For the power redundancy (W) models other than AX3660S-24T4X, two types of power supplies (AC power supply and DC power supply) are available and enable hot-swappable power supply redundancy. AX3660S-24T4X supports only AC power supply and is equipped with two built-in power supply units to enable redundant power supply.



Figure 1 AX3660S-24T4X,AX3660S-24T4XW



Figure 2 AX3660S-48T4XW



Figure 3 AX3660S-16S4XW, AX3660S-24S8XW



Figure 4 AX3660S-48XT4QW



Figure 5 AX3660S-24X4QW,AX3660S-48X4QW

1.1 Product concept

For networking mission-critical applications, the AX3660S Series provides the high-end box-type Layer 3 switches featuring fast redundancy switching, with high reliability and high functionality of core routers, all packed in their compact bodies. The AX3660S Series is ideal for a wide range of scenes, from core to base connections.

1.2 Positioning

The AX3660S Series can be used in a wide range of scenes as core switches for enterprises and small-and medium-scale networks, and as user-intensive switches for providers.

Its lineup covers high-end models for ISP, public network and academic market. It supports stack, network partition (VRF), VXLAN, fast redundancy switching, and various capacity upgrades.

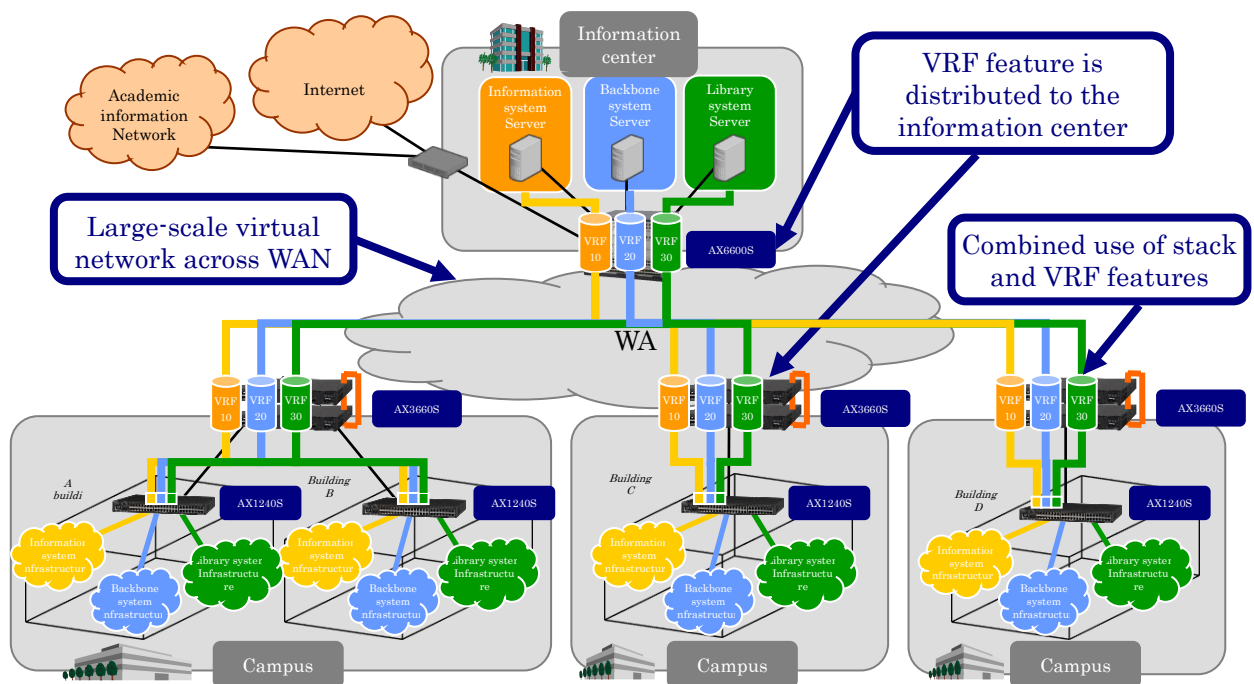


Figure 6 Example of campus network

Table 1 Application positions

適用位置		ポイント
Connection between customer sites	Customer edge	<ul style="list-style-type: none"> Integrating different networks by Network Partition Stable operation of routing protocols (e.g., OSPF) Supports advanced features (e.g., IPv6, multicast) High reliability (VRRP polling, GSRP), fast redundancy switching (Ring Protocol) Compact 1U body for all models
Large scale campus network	Distribution switch	<ul style="list-style-type: none"> Line redundancy by Stack 10G/40G/100G Security functions (flow monitoring, authentication, quarantine) TCO reduction (power consumption / operation manageability) Compact 1U body for all models
Small and medium scale campus network	Core switch	<ul style="list-style-type: none"> Multiport accommodation and switch redundancy by Stack Medium-sized core switch capable of accommodating wireless APs and IP telephones Security functions (flow monitoring, authentication, quarantine) TCO reduction (power consumption / operation manageability) Compact 1U body for all models
Server farm	Server aggregation switch	<ul style="list-style-type: none"> Server teaming by Stack 1G multiport 10G/40G/100G TCO reduction (power consumption / operation manageability) Compact 1U body for all models

2. Features

2.1 Features of the AX3660S series

(1) Network partition

- Cost reduction through horizontal and vertical integration of networks
 - VRF feature that virtually accommodates multiple logically divided switches in a switch, combining multiple physical networks that were previously separated into a single physical network
 - Consolidates Layer 3 devices at the center and deploy Layer 2 devices at each office or site to facilitate network design and operation management.
 - Virtualizes wide-area and multi-site networks by distributing Layer 3 box switches that support VRF at various locations.

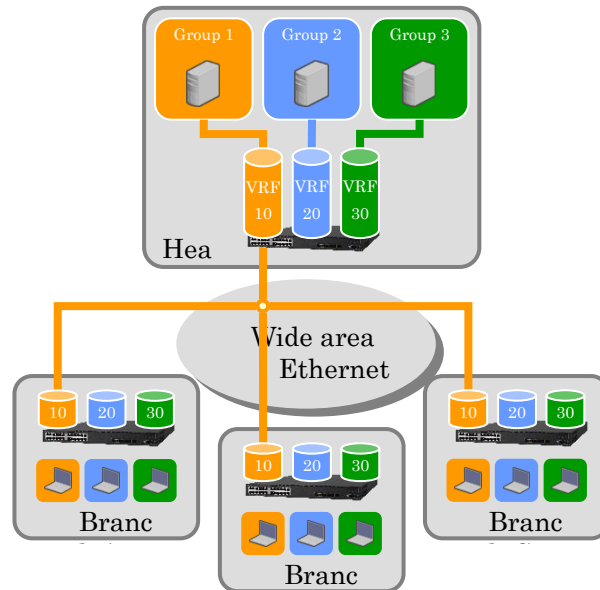


Figure 7 Network partition

(2) Stack capability for fault tolerant switching

- Highly scalable fault tolerant switch
 - By configuring multiple devices, communication can continue even with some failures.
 - The number of available ports can be expanded by adding devices.
- Traffic forwarding independent of stack port bandwidth
 - In a stack configured of multiple member switches, packets are forwarded from the link aggregation port of a member switch that received the packets.
- Non-stop software update
 - Software can be updated by switchover between the master switch and the backup switch without interrupting network communication.
- Cost reduction through unified management
 - Integration of management is possible by operating multiple devices as a single device

(3) Proven routing capability

- Stable, high-performance routing
 - Provides site-to-site connection based on wide-area Ethernet and IP-VPN services, with reliable routing based on OSPF and BGP, and load distribution based on multipaths.
 - Routing software equivalent to the proven AX7800S series is installed.
- Rich IPv4 routing protocols
 - Supports various proven IPv4 routing protocols (Static, RIP, OSPF, BGP4, PIM-SM/SSM, IGMP)
- Policy-based routing

-Supports policy-based routing that allows the best route to be selected according to the route status of the forwarding destination

(4) Rich IPv6 features

- IPv6 multicast support
 - IPv4 and IPv6 achieve the same peak-performance
- 10G Ethernet for full wire rate IPv6 routing
- Various IPv6 routing protocols (Static, RIPng, OSPFv3, BGP4+, PIM-SM, PIM-SSM, MLD) enable diverse and flexible IPv6 networking
- Supports enhanced features such as IPv4/v6 dual-stack, IPv6-only networking (SNMP over IPv6) and authorization (RADIUS over IPv6)

(5) High reliability for realizing a mission-critical network

- High equipment quality
 - Highly reliable equipment based on carefully selected components and strict design and inspection standards
 - Redundant configuration of the power supply system is possible by mounting two power supplies.
 - Stable routing process based on the software proven by and inherited from carrier /ISP
- To build a variety of redundant networks
 - Fast path switching
 - Autonomous Extensible Ring Protocol, Rapid Spanning Tree Protocol (IEEE802.1w, IEEE802.1s), Uplink Redundant, GSRP (*1), Link Aggregation (IEEE802.1AX), Hot Standby (VRRP), Static /VRRP Polling (*2), etc.
 - Load balancing
 - IP-level equal traffic distribution with OSPF Equal-Cost Multipathing
- L2 loop avoidance
 - UDLD feature prevents loops in Spanning Tree networks and frame loss in link aggregation.
 - L2 loop detection function detects false connections of networked devices and prevents loops

(*1) GSRP (Gigabit Switch Redundancy Protocol)

Refer to the manual on our website for details.

(*2) Monitoring function for checking reachability on a designated route by polling, and then switching routes dynamically in conjunction with VRRP or static routing

(6) High reliability and high availability system is realized by fast redundancy switching

- Ring Protocol enables fast switching of 50 milliseconds or less.
- Proprietary multi-core CPU optimization technique enables fast redundancy switching.

(7) Flexible virtual networking VXLAN features

- Flexible and scalable VXLAN fabrics can be built in datacenters.
- Extends L2 connections between datacenters and realizes BCP/DR measures utilizing existing networks.

(8) 10G/40G/100G Uplink

- A high-performance 10G/40G/100G network is realized by combining with the AX8600S/AX8300S/AX4600S Series in campus network.
- 10G Ethernet uses SFP + as an optical transceiver. SFP/SFP + shared port allows smooth transition from 1G Ethernet to 10G Ethernet.
- QSFP+ as a transceiver for 40G Ethernet
- QSFP28 is adopted as a transceiver capable of supporting 100G Ethernet. (AX3660S-48XT4QW, AX3660S-24X4QW, AX3660S-48X4QW).

(9) Easy-to-use user interface (configuration command)

- Compatible with industry-standard command-line interfaces
 - Same format is adopted for both input commands and configuration information to

- improve operability.
 - Enables copy and paste of configuration information.
- (10) Superior network management, maintenance and operation
- CFM (Connectivity Fault Management)(Ether OAM)
 - Continuity Check (CC), LoopBack, LinkTrace for Layer 2 connectivity monitoring, Fault management
 - Supports a wide range of MIB, including IPv6-MIB,RMON, in addition to basic MIB-II
 - The mirror port feature allows traffic to be monitored and analyzed (on both receiver and sender ports).
 - Supports policy-based mirroring to monitor traffic on a per-tenant basis
 - All Ethernet ports, console ports, management ports, and memory card slots are located on the front.
 - On-line maintenance
 - Communication can be continued by partial reboot due to configuration change, etc.
 - Adoption of SD memory card
 - Eases configuration backup and error information collection.
 - Simplifies maintenance work.
 - Cooling system suitable for stable operation
 - Front-side intake and rear-side exhaust make the device less susceptible to exhaust heat from other devices when mounted in a rack, ensuring stable operation.
 - Fine-grained flow statistics can be obtained using sFlow.
 - Supports long-life solutions
 - In addition to the long-term support for up to 10 years, product support functions to maintain a good temperature environment are also supported.
 - A scripting language (Python based) enables customization and automation of device operation.
- (11) Hardware-based strict QoS ensuring communication quality
- High-performance hardware-based QoS process
 - Precise QoS control with fine-grained parameters (Layer 2, Layer 3, and Layer 4 headers)
 - Variety of QoS control functions
 - L2-QoS (IEEE802.1p, bandwidth control, priority control, discard control, etc.),
 - IP-QoS (Diff-Serv, bandwidth control, priority control, discard control, etc.)
- (12) Robust security
- High-performance and fine-grained packet filter
 - High-performance filtering by hardware
 - Outbound filtering enables efficient aggregation of security rules per destination network.
 - Partial specification of Layer 2, Layer 3, and Layer 4 headers is possible.
 - Scalability that can be specified with multiple conditions
 - Filter entries are defined up to 4096 entries/unit on IN and up to 1024 entries/unit on OUT.
 - VLAN tunneling for layer 2 VPN
 - Supports various VLANs (Port VLAN, Protocol VLAN, MAC VLAN, VLAN Tag)
 - RADIUS/TACACS+ can be used to authenticate a login password for the device and to restrict the commands that can be entered by each user.
 - Elimination of illegal DHCP servers/fixed IP terminals
 - DHCP snooping enables robust security measures, such as eliminating unauthorized DHCP servers and fixed IP address terminals.

3. Specifications

3.1 Main unit specifications

The following models are available in the AX3660S series. These models are designed in a unified architecture. Table 2 through Table 5 show the specifications of the AX3660S series main units.

Table 2 Switch specifications (1/4)

			Specifications				
			AX3660S-24T4X	AX3660S-24T4XW		AX3660S-48T4XW	
Max. switching capacity (Gbit/s)			288Gbit/s	288Gbit/s		336Gbit/s	
Packet processing performance (Mpacket/s) (Note 1)	Max. packet forwarding rate		214.3	214.3		250.0	
	Network interface						
40GBASE-SR4/LR4/CR4(QSFP+) Stack port (Note 3)			2	2		2	
10GBASE-SR/LR/ER/ZR/BR/CU(SFP+) 1000BASE-SX/LX/BX/LH/LHB(SFP) SFP+/SFP shared port (Note 4)			4	4		4	
10BASE-T/100BASE-TX/1000BASE-T(UTP) (Note 14)			24	24		48	
Amount of memory installed (MB)			4096MB				
Number of memory card slots			SD memory card x 1				
Redundancy			AC power supply (fixed)	AC power supply / DC power supply (replaceable)			
Power supply conditions			AC power	AC power	DC power	AC power	DC power
	Voltage	Rated voltage (V)	AC100 to 120 / AC200 to 240	AC100 to 120 / AC200 to 240	DC-48	AC100 to 120 / AC200 to 240	DC-48
		Fluctuation range (V) (Note 5)	AC90 to 127.2 / AC180 to 254.4	AC90 to 127.2 / AC180 to 254.4	DC-40 to -57	AC90 to 127.2 / AC180 to 254.4	DC-40 to -57
	Frequency (Hz)		50 / 60	50 / 60	-	50 / 60	-
	Max. input current (A) (Note 6)		1.1@AC100V 0.6@AC200V	1.3@AC100V 0.7@AC200V	3.1@DC-48V	1.4@AC100V 0.7@AC200V	3.3@DC-48V
	Max. apparent power (VA) (Note 6)		110	130	-	140	-
	Max. power consumption (W) (Note 6)		110	130	145	140	155
AC wall outlet			[100V] Grounding type: 2-pole plug [200V] Grounding type: 2-pole hook (Note 7)	[100V] Grounding type: 2-pole plug [200V] Grounding type: 2-pole hook (Note 7)	Screw-on type terminal device	[100V] Grounding type: 2-pole plug [200V] Grounding type: 2-pole hook (Note 7)	Screw-on type terminal device
Heating value (kJ/h) (Note 6)			396	468	522	504	558
Equipment conditions	Dimensions: W x D x H (mm) (height: U)		445 x 380 x 43 (1U)	445 x 450 x 43 (1U)			
	Weight (kg) (including power supply units)		6.0 or less	10.0 or less			
Environmental conditions (Note 8)	Temperature	Allowable operating range	-10°C to 50°C (Note 9)(Note 10)(Note 11)(Note 12)	-10°C to 50°C (with front-to-back airflow) (Note 9)(Note 10)(Note 11)(Note 12)			
		Non-operating (when powered off)	-10°C to 50°C				
		Storage/transportation temperature	-25°C to 65°C				
	Relative humidity	Allowable operating range	10% to 90% (non-condensing) when using AC power supply 10% to 80% (non-condensing) when using DC power supply				
		Non-operating (when powered off)	10% to 90% (non-condensing)				
Storage/transportation temperature		10% to 90% (non-condensing)					

Applied standards	Floating dust (Note 13)	Floating dust of about 10 microns or less: 0.15mg/m ³
	Vibration (m/s ²)	2.45 or less
	EMI	VCCI Class A
	Harmonic current	JIS C61000-3-2
	EMS	JEITA IT-3001A
	Safety standards	UL60950-1 compliant
	Related laws and regulations	Electrical Appliance and Material Safety Law (Power Cables)

Table 3 Switch specifications (2/4)

			Specifications			
			AX3660S-16S4XW		AX3660S-24S8XW	
Max. switching capacity (Gbit/s)			296Gbit/s (Note 17)		392Gbit/s	
Packet processing performance (Mpacket/s) (Note 1)	Max. packet forwarding rate		220.2 (Note 17)		291.7	
	40GBASE-SR4/LR4/CR4 (QSFP+) Stack port (Note 3)		2		2	
Network interface	10GBASE-SR/LR/ER/ZR/BR/CU (SFP+) SFP+ port (Note 16)		4 (Note 17)		8	
	1000BASE-SX/LX/BX/LH/LHB(SFP) SFP port		16 (Note 17)		24	
	10BASE-T/100BASE-TX/1000BASE-T (SFP) (Note 14)		16 (Note 17)		24	
	10BASE-T/100BASE-TX/1000BASE-T (UTP) (Note 14)		12		12	
Amount of memory installed (MB)			4096MB			
Number of memory cards slots			SD memory card x 1			
Redundancy			AC power supply / DC power supply (removable)			
Power supply conditions			AC	DC	AC	DC
	Voltage	Rated voltage (V)	AC100 to 120 / AC200 to 240	DC-48	AC100 to 120 / AC200 to 240	DC-48
		Fluctuation range (V) (Note 5)	AC90 to 127.2 / AC180 to 254.4	DC-40 to -57	AC90 to 127.2 / AC180 to 254.4	DC-40 to -57
	Frequency (Hz)		50 / 60	-	50 / 60	-
	Max. input current (A)		1.4@AC100V 0.7@AC200V (Note 17)	3.2@DC-48V (Note 17)	1.6@AC100V 0.8@AC200V	3.5@DC-48V
	Max. apparent power (VA)		135 (Note 17)	-	155	-
	Max. power consumption (W)		135 (Note 17)	150 (Note 17)	155	165
	AC wall outlet		[100V] Grounding type: 2-pole plug [200V] Grounding type: 2-pole hook (Note 7)	Screw-on type terminal device	[100V] Grounding type: 2-pole plug [200V] Grounding type: 2-pole hook (Note 7)	Screw-on type terminal device
Heating value (kJ/h) (Note 6)			486 (Note 17)	540 (Note 17)	558	594
Equipment conditions	Dimensions: W x D x H (mm) (height: U)		445 x 450 x 43 (1U)			
	Weight (kg) (including power supply units)		10.0 or less			
Environmental conditions (Note 8)	Temperature	Allowable operating range	-10°C to 50°C (with front-to-back airflow) (Note 9) (Note 10) (Note 11) (Note 12) -10°C to 40°C (with back-to-front airflow) (Note 9) (Note 10)			
		Non-operating (when powered off)	-10°C to 50°C			
		Storage/transportation temperature	-25°C to 65°C			
	Relative humidity	Allowable operating range	10% to 90% (non-condensing) when using AC power supply 10% to 80% (non-condensing) when using DC power supply			
		Non-operating (when powered off)	10% to 90% (non-condensing)			
		Storage/transportation temperature	10% to 90% (non-condensing)			
Floating dust (Note 13)		Floating dust of about 10 microns or less: 0.15mg/m ³				
Vibration (m/s ²)		2.45 or less				
Applied standards	EMI		VCCI Class A			
	Harmonic current		JIS C61000-3-2			
	EMS		JEITA IT-3001A			
	Safety standards		UL60950-1 compliant			
	Related laws and regulations		Electrical Appliance and Material Safety Law (Power Cables)			

Table 4 Switch specifications (3/4)

Specifications			AX3660S-24X4QW	AX3660S-48X4QW		
Max. switching capacity (Gbit/s)			1280Gbit/s (Note 18)	1760Gbit/s		
Packet processing performance (Mpacket/s)(Note 1)	Max. packet forwarding rate		519.3 (Note 18)	758.9		
Network interface	100GBASE-SR4/CWDM4/LR4/4WDM-40/CR4 (QSFP28) 40GBASE-SR4/LR4/CR4 (QSFP+) QSFP28/QSFP+ shared port		4	4		
	10GBASE-SR/LR/ER/ZR/BR/CU(SFP+) 1000BASE-SX/LX/BX/LH/LHB(SFP) SFP+/SFP shared port (Note 4)		24 (Note 18)	48		
	10BASE-T/100BASE-TX/ 1000BASE-T(SFP) (Note 14)		24 (Note 18)	48		
Amount of memory installed (MB)			4096MB			
Number of memory cards slots			SD memory card x 1			
Redundancy			AC power supply / DC power supply (removable)			
Power supply conditions	Voltage	Rated voltage (V)	AC100 to 120 / AC200 to 240	DC-48	AC100 to 120 / AC200 to 240	DC-48
		Fluctuation range (V) (Note 5)	AC90 to 127.2 / AC180 to 254.4	DC-40 to -57	AC90 to 127.2 / AC180 to 254.4	DC-40 to -57
	Frequency (Hz)		50 / 60	-	50 / 60	-
	Max. input current (A)		1.8/1.9@AC100V 0.9/1.0@AC200V (Note 15) (Note 18)	4.0/4.2@DC-48V (Note 15) (Note 18)	2.0/2.3@AC100V 1.0/1.2@AC200V (Note 15) (Note 18)	4.5/5.0@DC-48V (Note 15)
	Max. apparent power (VA)		175 / 190 (Note 15) (Note 18)	-	200 / 230 (Note 15)	-
	Max. power consumption (W)		175 / 190 (Note 15) (Note 18)	190 / 200 (Note 15) (Note 18)	200 / 230 (Note 15)	215 / 240 (Note 15)
	AC wall outlet		[100V] Grounding type: 2-pole plug [200V] Grounding type: 2-pole hook (Note 7)	Screw-on type terminal device	[100V] Grounding type: 2-pole plug [200V] Grounding type: 2-pole hook (Note 7)	Screw-on type terminal device
	Heating value (kJ/h) (Note 6)			630 / 684 (Note 15) (Note 18)	684 / 720 (Note 15) (Note 18)	720 / 828 (Note 15)
Equipment conditions	Dimensions: W x D x H (mm) (height: U)		445 x 480 x 43 (1U)			
	Weight (kg) (including power supply units)		11.0 or less			
Environmental conditions (Note 8)	Temperature	Allowable operating range	-10°C to 50°C (with front-to-back airflow) (Note 9) (Note 10) (Note 11) (Note 12) -10°C to 40°C (with back-to-front airflow) (Note 9) (Note 10)			
		Non-operating (when powered off)	-10°C to 50°C			
		Storage/transportation temperature	-25°C to 65°C			
	Relative humidity	Allowable operating range	10% to 90% (non-condensing) when using AC power supply 10% to 80% (non-condensing) when using DC power supply			
		Non-operating (when powered off)	10% to 90% (non-condensing)			
		Storage/transportation temperature	10% to 90% (non-condensing)			
	Floating dust (Note 13)		Floating dust of about 10 microns or less: 0.15mg/m ³			
Vibration (m/s ²)		2.45 or less				
Applied standards	EMI		VCCI Class A			
	Harmonic current		JIS C61000-3-2			
	EMS		JEITA IT-3001A			
	Safety standards		UL60950-1 compliant			

Table 5 Switch specifications (4/4)

Specifications			
		AX3660S-48XT4QW	
Max. switching capacity (Gbit/s)		1440Gbit/s	
Packet processing performance (Mpacket/s)(Note 1)	Max. packet forwarding rate	714.2	
Network interface	100GBASE-SR4/CWDM4/LR4/4WDM-40/CR4(QSFP28) 40GBASE-SR4/LR4/CR4 (QSFP+) QSFP28/QSFP shared port	4 (Note 2)	
	10GBASE-SR/LR/ER/ZR/BR/CU (SFP+) 1000BASE-SX/LX/BX/LH/LHB (SFP) SFP+/SFP shared port (Note 4)	4	
	100BASE-TX/1000BASE-T/ 10GBASE-T (UTP) (Note 14)	44	
Amount of memory installed (MB)		4096MB	
Number of memory cards slots		SD memory card x 1	
Redundancy		AC power supply / DC power supply (removable)	
Power supply conditions	AC		
	Voltage	Rated voltage (V)	AC100 to 120 / AC200 to 240
		Fluctuation range (V) (Note 5)	AC90 to 127.2 / AC180 to 254.4
	Frequency (Hz)		50 / 60
	Max. input current (A)		2.5@AC100V 1.3@AC200V
	Max. apparent power (VA)		250
	Max. power consumption (W)		250
AC wall outlet		[100V] Grounding type: 2-pole plug [200V] Grounding type: 2-pole hook (Note 7)	
Heating value (kJ/h) (Note 6)		900	
Equipment conditions	Dimensions: W x D x H (mm) (height: U)	445 x 480 x 43 (1U)	
	Weight (kg) (including power supply units)	11.0 or less	
Environmental conditions (Note 8)	Temperature	Allowable operating range	-10°C to 50°C (with front-to-back airflow) (Note 9) (Note 10) (Note 11) (Note 12) (Note 19)
		Non-operating (when powered off)	-10°C to 50°C
		Storage/transportation temperature	-25°C to 65°C
	Relative humidity	Allowable operating range	10% to 90% (non-condensing) when using AC power supply 10% to 80% (non-condensing) when using DC power supply
		Non-operating (when powered off)	10% to 90% (non-condensing)
		Storage/transportation temperature	10% to 90% (non-condensing)
Floating dust		Floating dust of about 10 microns or less: 0.15mg/m ³	
Vibration (m/s ²)		2.45 or less	
Applied standards	EMI	VCCI Class A	
	Harmonic current	JIS C61000-3-2	
	EMS	JEITA IT-3001A	
	Safety standards	UL60950-1 compliant	
	Related laws and regulations	Electrical Appliance and Material Safety Law (Power Cables)	

[Notes for Table 2 to Table 5]

Note 1: The measurement conditions are as follows.

- Physical medium: 1000BASE-T, 10GBASE-R, 40GBASE-R
- Packet type: Layer 2 relay, no flooding

- Packet length: 64 bytes
- QoS, filtering: not configured

- Note 2 : When using 100GBASE-SR4(QSFP28), 100GBASE-CWDM4(QSFP28), 100GBASE-LR4(QSFP28), 100GBASE-4WDM-40(QSFP28) or 100GBASE-CR4(QSFP28) on AX3660S-48XT4QW, some 100BASE-TX/1000BASE-T/10GBASE-T ports are disabled depending on the number of lines used.
- Note 3 : This port can be used only as a stack port for 40GBASE-R that uses QSFP+. Adding the Stack Port Feature Option license enables the stack feature and 40G Gigabit Ethernet (stack only).
- Note 4 : This port can be used as 10GBASE-R port when using SFP+ or 1000BASE-X port when using SFP. Note that for AX3660S-24T4X, AX3660S-24T4XW and AX3660S-48T4XW, 10GBASE-R will be available by uplink 10G software license or uplink 10G option license (by adding an uplink 10G option license, 10 Gigabit Ethernet will be available).
- Note 5 : The range to guarantee normal operation.
- Note 6 : Value when power supply is redundant.
- Note 7 : Shape of the AC200V power cable prepared by ALAXALA as an optional item. The AC200V power cable is not attached to the equipment. Purchase it separately as an option.
- Note 8 : Do not use the equipment in the following environment. Doing so may shorten the service life of this equipment.
• Places where hydrogen sulfide is generated, such as hot springs, or seashore with high levels of salt
- Note 9 : The range is from 0°C to the upper limit when the device is started.
- Note 10 : Conditions at below 0°C: Continuous 72 hours and no more than 15 days per year.
- Note 11 : Conditions at above 45°C: Continuous 72 hours and no more than 15 days per year (only when using DC power supply).
- Note 12 : The upper limit is 40°C when using SFPP-ZR or QSFP28-4WDM-40.
- Note 13 : According to General Rules for Measuring Airborne Dust Concentration (JIS Z 8813).
- Note 14 : Only for full-duplex communication.
- Note 15 : Value when SFPP-ER or SFPP-ZR is not installed (on the left) and installed (on the right).
- Note 16 : 1000BASE-X is not supported for the SFP+ ports of AX3660S-16S4XW and AX3660S-24S8XW.
- Note 17 : When the port density expansion option license (OP-PORT) for AX3660S-16S4XW / AX3660S-24X4QW is applied, values are the the same as AX3660S-24S8XW.
- Note 18 : When the port density expansion option license (OP-PORT) for AX3660S-16S4XW / AX3660S-24X4QW is applied, values are the the same as AX3660S-48X4QW.
- Note 19 : AX3660S-48XT4QW does not support back-to-front airflow.

3.2 Function list

Table 6 lists the supported functions and their standards.

However, there are differences in the functionality supported by software.

Table 4 AX3660S series functions

Category	Function		Compliance standards	Remarks
LAN	Ethernet	10BASE-T/100BASE-TX/ 1000BASE-T	IEEE802.3 IEEE802.3u IEEE802.3ab	(Note 1)
		100BASE-TX/1000BASE-T/ 10GBASE-T	IEEE802.3 IEEE802.3u IEEE802.3ab IEEE802.3an	(Note 1)
		1000BASE-X(SX/LX)	IEEE802.3z	
		1000BASE-X (BX(for 40km)/LH/LHB)	-	
		1000BASE-X(BX)	IEEE802.3ah	
		10GBASE-R(SR/LR)(SFP+)	IEEE802.3ae	
		10GBASE-R(ER)(SFP+)		
		10GBASE-R(ZR/BR)(SFP+)	-	
		10GBASE-CU(SFP+)	-	
		40GBASE-R(SR4/CR4)(QSFP+)	IEEE802.3ba	
		40GBASE-R(LR4)(QSFP+)	IEEE802.3ba	
		100GBASE-R(SR4)(QSFP28)	IEEE802.3bm	
		100GBASE-R(CWDM4)(QSFP28)	-	
		100GBASE-R(LR4)(QSFP28)	IEEE802.3bm	
		100GBASE-R(4WDM-40)(QSFP28)	-	
		100GBASE-R(CR4)(QSFP28)	IEEE802.3bm	
	Synchronous Ethernet	ITU-T G.8261 ITU-T G.8262	Option license is required. Supported by AX3660S-24X4QW and AX3660S-48X4QW. (Note 15)	
	Flow control	IEEE802.3x		
	Auto negotiation extension	10BASE-T/100BASE-TX/ 1000BASE-T downshift	-	
	Link aggregation		IEEE802.1AX	
Jumbo frame		-		
Layer 2 function	Transparent bridge		-	
	VLAN	Port VLAN	IEEE802.1Q	
		VLAN tagging	IEEE802.1Q	
		Protocol VLAN	-	
		MAC VLAN	-	(Note 2)
		Tag translation	-	
		VLAN debounce	-	
	VLAN tunneling		-	
	Inter-port relay blocking		-	
	Layer 2 relay blocking		-	
	VXLAN		RFC7348	Advanced only
	Spanning tree	STP	IEEE802.1D IEEE802.1t	
		RSTP	IEEE802.1w	
		MSTP	IEEE802.1s	
		PVST+	-	
		BPDU filter	-	
		Loop guard	-	
		Root guard	-	
	Autonomous Extensible Ring Protocol		-	Only the advanced version is available for Rapid RING.
	Uplink redundancy		-	
	DHCP snooping		RFC2131	(Note 2)
	IGMP / MLD snooping	IGMPv2 snooping	RFC4541	(Note 2)
		IGMPv3 snooping		
		IGMP snooping fast-leave feature		
		MLDv1 snooping		
		MLDv2 snooping		
	Storm control		-	
IEEE802.3ah/UDLD		IEEE802.3ah	(Note 3)	

Category	Function	Compliance standards	Remarks		
	L2 loop detection	-			
	CFM (Connectivity Fault Management) (Ether OAM)	IEEE802.1ag	(Note 2)		
	Flush Request frame (GSRP) reception	-	(Note 2)		
	Flush control frame (uplink redundancy) reception	-			
Layer 3 function	IPv4	IP, ARP, ICMP	RFC791 RFC792 RFC826 RFC922 RFC950 RFC1027 RFC1122 RFC1519 RFC1812 RFC2644		
		RIP RIP2	RFC1058 RFC1519 RFC2453		
		VRF support	-	Advanced only	
		RIPv2 authentication	RFC4822		
		OSPF	RFC1519 RFC2328 RFC3101 RFC5309	Advanced only	
		Stub router	RFC3137	Advanced only	
		VRF support	-	Advanced only	
		Static routing	-		
		VRF support	-	Advanced only	
		Null interface	-		
	Local Proxy ARP	-			
	IPv6	IPv6, NDP, ICMPv6	RFC2373 RFC2460 RFC2461 RFC2462 RFC2463 RFC2710 RFC3587 RFC5095		
		RA	RFC2461 RFC2462		
		RDNSS/DNSSEC option	RFC8106		
		RIPng	RFC2080		
		VRF support	-	Advanced only	
		OSPFv3	RFC2740 RFC5309	Advanced only	
		Stub router	RFC3137	Advanced only	
		VRF support	-	Advanced only	
		Static routing	-		
		VRF support	-	Advanced only	
	Null interface	-			
	BGP4 BGP4+	EBGP, IBGP peering	RFC1519 RFC1771 RFC2385 RFC2842 RFC2858 RFC2918 RFC3392 RFC4271 RFC4760 RFC5492 draft-ietf-idr-avoid-transition-04.txt	Advanced only	
		Community	RFC1997	Advanced only	
		Route reflection	RFC2796 RFC4456	Advanced only	
		Configuration	RFC1965 RFC3065 RFC5065	Advanced only	
		Route flap dampening	RFC2545	Advanced only	
		BGP Maximum Prefix	-	Advanced only	
		VRF support	-	Advanced only	
		IPv4 multicast	IGMP	RFC2236	
			IGMP ver2		
			IGMP ver3	RFC3376	
	VRF support (IGMPv2, v3, static)		-	Advanced only	
	PIM-SM/-SSM		RFC2362		
			RFC4601 draft-ietf-pim-sm-bsr-07.txt	Compliant only with the Generation ID related parts of PIM-Hello option and the fragment function of Bootstrap Message	
			RFC4607		
BSR extension	-				
VRF support	-	Advanced only			
IPv6 multicast	MLD ver1 ver2	RFC2710 RFC3810	(Note 2)		
	VRF support (MLDv1, v2, static)	-	Advanced only (Note 2)		

Category	Function		Compliance standards	Remarks	
	PIM-SM/-SSM		RFC2362	(Note 2)	
			RFC4601 draft-ietf-pim-sm-bsr-07.txt	Compliant only with the Generation ID related parts of PIM-Hello option (Note 2)	
			draft-ietf-pim-sm-v2-new-03.txt	Compliant with the IPv6 related parts (Note 2)	
			RFC4607	(Note 2)	
		VRF support	-	Advanced only (Note 2)	
	DHCP/BOOTP relay agent		RFC1542 RFC1812 RFC2131		
		VRF support	-	Advanced only	
	IPv6 DHCP relay		RFC3315		
	IPv4 DHCP server		RFC2131 RFC2136 RFC3679	(Note 2)	
			RFC2132		
	IPv6 DHCP server function (Prefix Delegation)		RFC3315 RFC3319 RFC3633 RFC3646 RFC3736 RFC4075	(Note 2)	
	Multipath (load balancing)	IPv4		-	
		VRF support	-	Advanced only	
		IPv6		-	
		VRF support	-	Advanced only	
Policy-paced routing	IPv4		-	Advanced only	
		Tracking function	-	Advanced only	
		VRF support	-	Advanced only	
UDP broadcast relay	IPv4		-		
		VRF support	-	Advanced only	
Additional functions	Filter		-		
	Flow detection conditions	Layer 2 conditions	-		
		Layer 3 conditions	-		
		Layer 4 conditions	-		
	QoS / Diff-serv	Usage parameter control (UPC)		-	
		DSCP marking		RFC2474 RFC2475 RFC2597 RFC3246 RFC3260	
		CoS mapping		-	
		Output priority control		RFC2597 RFC3246 RFC3260	
		PQ+RR		-	
		PQ+WFQ		-	
		PQ+WRR		-	WRR: Weighted (frames) Round robin
		PQ+ERR		-	ERR: Weighted (Byte-Based Ratio) Round Robin
	Tail drop		-		
	Layer 2 authentication	IEEE 802.1X	Per-port authentication (static)	IEEE802.1X RFC2865 RFC2866	(Note 2)
			Per-VLAN authentication (static)	RFC2868 RFC2869 RFC3162 RFC3579	
Per-VLAN authentication (dynamic)			RFC3580 RFC3748		
Web-based authentication		Fixed VLAN mode		-	(Note 2) (Note 12)
		URL redirection			
		Keep Alive			
		Dynamic VLAN mode			
		URL redirection			
		Legacy mode			
MAC authentication		Fixed VLAN mode		-	(Note 2)
	Dynamic VLAN mode		-	(Note 2)	
Authentication VLAN			-	(Note 2)	

Category	Function		Compliance standards	Remarks		
	Common features	Limit on the number of authentications	-	(Note 2) (Note 13)		
		Forced authentication	-	(Note 2) (Note 14)		
	Port mirroring	Local	-			
		802.1Q Tag assignment	-			
Policy-based mirroring	Local	-				
Network function	Network partition		-	Advanced only (Note 4)		
Stack	Stack features	Link aggregation across multiple switches		-		
		Stack port	Ethernet	-	(Note 5)	
			Grouping	-		
		Unified management	IP address for stack management		-	
			Device MAC address		-	
			Configuration		-	
		Availability	Upgrade	Non-stop upgrade	-	(Note 6)
			-			
Reliability	Environmental monitor		-			
	Self-diagnosis		-			
	Redundancy (power supply)		-			
	Hot standby (VRRP)	IPv4	VRRP support	RFC3768	(Note 2)	
				-	Advanced only (Note 2)	
		IPv6		draft-ietf-vrrp-ipv6-spec-07.txt draft-ietf-vrrp-ipv6-spec-02.txt		(Note 2)
			VRRP support	-	Advanced only (Note 2)	
	Gigabit Switch Redundancy Protocol (GSRP)	Layer 2		-	(Note 2)	
		Layer 3		-		
		VLAN group only control function		-	(Note 2)	
	GSRP aware		-			
	Fast failure detection	BFD (Bidirectional Forwarding Detection)		RFC5880 RFC5881 RFC5882 RFC5883	Advanced only (Note 2)	
		Cooperation with IPv4	BGP4			
	Graceful Restart				Advanced only	
				RFC3623	OSPF/OSPFv3	
			RFC2370	OSPF		
			draft-kompella-ospf-opaquev2-00.txt draft-ietf-ospf-ospfv3-graceful-restart-04.txt	OSPFv3		
			draft-ietf-idr-restart-13.txt	BGP4/BGP4+		
VRRP support			-	Advanced only		
Network management	SNMP (v1/v2c/v3)		RFC1155 RFC1157 RFC1901 RFC1902 RFC1903 RFC1904 RFC1905 RFC1906 RFC1907 RFC1908 RFC2578 RFC2579 RFC2580 RFC3410 RFC3411 RFC3412 RFC3413 RFC3414 RFC3415 RFC3416 RFC3417 RFC3418 RFC3584 RFC3826 RFC7860			
	VRRP support		-	Advanced only		
	MIB-II, RMON, IP Forwarding MIB, Interface MIB		RFC1158 RFC1213 RFC1354 RFC1757 RFC2233	(Note 7)		

Category	Function		Compliance standards	Remarks		
	IPv6 MIB		RFC2452 RFC2454 RFC2465 RFC2466			
	Private MIB	Statistical information	-			
		L2 (VLAN, FDB, GSRP) data	-			
		LLDP data	-			
		OADP data	-	(Note 2)		
		Filter/QoS related data	-	(Note 8)		
		Data on each protocol (e.g., OSPF)	-			
		System data (startup information, login)	-			
		Device data	-	(Note 8)		
	sFlow data	-	(Note 2)			
	VRF data	-	Advanced only			
	dot1dBridge MIB		RFC1493 RFC2674			
	Ethernet MIB		RFC1643 RFC3621			
	IPv4 PIM MIB		RFC2934			
	Protocol (OSPF, BGP, etc.) MIB		RFC1657 RFC1850 draft-ietf-ospf-ospfv3-mib-03.txt	Advanced only		
	VRRP MIB	IPv4	RFC2787	(Note 2)		
		IPv6	draft-ietf-vrrp-unified-mib-04	(Note 2)		
	CFM-MIB		IEEE802.1ag	(Note 2)		
	LLDP MIB		IEEE Std 802.1AB-2009			
	LLDP-EXT-DOT1-V2-MIB		IEEE Std 802.1AB-2009	(Note 16)		
	LLDP		IEEE802.1AB/D6.0 IEEE Std 802.1AB-2009			
	OADP(Octpower Auto Discovery Protocol)		-	(Note 2)		
	CDP(Cisco Discovery Protocol)		-	(Note 2) (Note 9)		
	sFlow		RFC3176			
	PTP	E2E-TC	IEEE Std 1588-2008			
	OAN	ON-API support	RFC4741 RFC4743	(Note 2) (Note12)		
		AX-Networker's-Utility support	RFC5381	Cryptographic communication is not supported		
	AX-Security-Controller		-	(Note 2)		
	Operatio & maintena nce	Operation terminal device connection	Serial (console)	-		
			Management port	-		
Configuration		CLI	-			
Security		Login authentication (password/host address/RADIUS/TACACS+)		RFC2865 RFC2866 RFC3162 draft-grant-tacacs-02-txt	Compliant with RADIUS Compliant with TACACS+	
		SSH	Version 1(Note 17)	draft-ylonen-ssh-protocol-00.txt		
			Version 2	RFC4251 RFC4252 RFC4253 RFC4254 RFC4344 RFC4419 RFC4716 RFC5656 RFC6668 RFC8268 draft-ietf-secsh-filexfer-13		
			VRF support (common to Ver1 / Ver2)	-	Advanced only	
Collection of management information		Device/interface status display		-		
		Operation message log		-		
		Statistics for each link		-		
Advanced script (Python)		Basic function		-		
		Command script		-		
		Resident script		-		
		Event monitoring function	System message monitoring		-	
			Timer monitoring		-	
		Applet function	Event startup script	-		
NTP		RFC1305				
		VRF support (IPv4 only)	-	Advanced only		
Commandless maintenance		-				
Energy saving function		Dynamic power saving	Port power-off	-	(Note 10)	

Category	Function		Compliance standards	Remarks
		LED brightness control	-	(Note 2)
		Power consumption information display	-	
	Long life solution	Temperature log	-	(Note 11)
		Fan control	-	

[Legend] - : No compliant standard

Note 1: Only full-duplex communication is supported.

Note 2: Does not operate in stack mode.

Note 3: Only Information OAMPDU is supported.

Note 4: Cooperation with Layer 2 functions is not supported in stack mode.

Note 5: Flow control and port mirroring do not work.

Note 6: Commandless operation can be performed remotely.

Note 7: RMON is not supported in stack mode.

Note 8: Partially supported in stack mode.

Note 9: Reception only.

Note 10: When stacked, port power-off by shutdown is supported. Scheduling is not supported.

Note 11: When stacked, configuration setting specific to each member switch is not possible.

Note 12: Cryptographic communication using SSL (Secure Socket Layer) is also available.

Note 13: Supports IEEE802.1X, MAC authentication and Web-based authentication.

Note 14: Supports MAC authentication and Web-based authentication.

Note 15: Operational verification is recommended before introducing the device. Clock synchronization using the physical layer is supported (synchronization based on the time stamp of a packet, ESMC function and holdover function are not supported).

Note 16: Supported for the objects corresponding to Port VLAN ID TLV, Port And Protocol VLAN ID TLV, and VLAN Name TLV.

Note 17: Software supplied after 2022 may not support SSH Version 1.

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