

JetNet 5628G

IEC61850-3 24+4G Modular Managed Ethernet Switch



- 3 exchangeable modular slots for adding up to 24 10/100-TX or 18 100Base-FX
- 4 On-Board Gigabit RJ45/SFP combo ports
- Exceeds IEC61850-3, IEEE1613 Power Substation Standards IEEE 1588 Precision Time Protocol for precise time synchronization
- 12.8G Non-Blocking backplane, 16K MAC table for make wire speed bidirectional switching
- Up to 9KB Jumbo Frame for large file transmission
- Korenix MSR pattern aggregates up to 12 x 100M Rings plus 2 Gigabit Rings
- 256 Tag based VLANs segregate IEC 61850 GOOSE message streams from each other
- 8 QoS priority for prioritizing the control and management packet from SCADA
- IGMP Snooping, GMRP, Rate Control for multicast message management
- Supports LLDP and JetViewPro i²NMS software for auto topology visualization and efficient group management
- Secure system by 802.1x, IP/MAC Access Control List, SSH/HTTPS
- DHCP Option 82, DHCP Server for IP address assignment
- Advanced Network Management by SNMP, RMON, and event notifications
- 85-264VAC, 88-370VDC, 24/48VDC power input

Overview

JetNet 5628G is an IEC61850-3 Modular Managed Ethernet Switch, equipped with 4 on-board Gigabit RJ45 / MINI GBIC combo ports and 3 modular slot design, for allowing adding up to 24 copper and 18 fiber ports. As a result, it delivers maximum flexibility and simple interface exchangeability for various network connection needs while reducing the device units and costs.

With the 4 gigabit combo ports users can trunk up to 8G uplink bandwidth and/or form two independent gigabit rings. These dual gigabit rings allow JetNet 5628G to perform as an access-level switch in the power substations ensuring the high bandwidth data transmission.

JetNet 5628G, a special design for substation automation and industrial control room, is compliant with the IEC61850-3, IEEE1613 high level environmental certifications. JetNet 5628G has the capability of forwarding Data, GOOSE, SCADA message without any loss or collision. Different power input types and connectors, including 85-264VAC, 88-370VHDC and 24/48VLDC power inputs are available for flexible use in field power constructions. With the exclusive MultiRing technology, users can aggregate up to 12 fast Ethernet and 2 gigabit rings into a single switch and ensure network reliability in applications with increased bandwidth and expanded system.

The switch supports up to 9.2Kbytes Jumbo Frame forwarding for efficiently transmitting large files in industrial environments. JetNet 5628G incorporates LLDP function and perfectly works with the Korenix patented JetView Pro i2NMS for allowing administrators to automatically discover devices and efficiently manage the industrial network performance in power substations. Furthermore, it fulfills and even

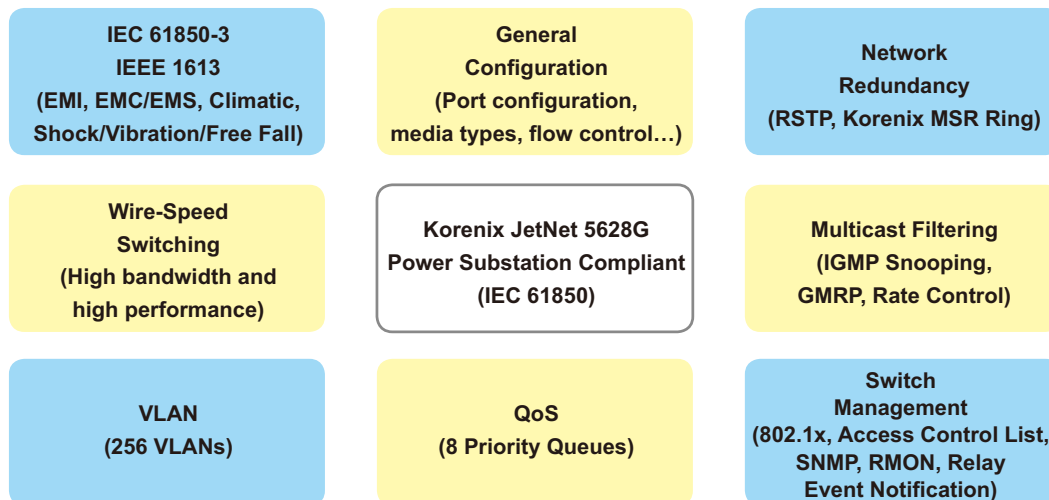
exceeds the high-end management requirements of IEC61850 substation standards by providing doubled performance and efficient traffic transmission through superb management features, including 8 QoS Priority, 256 Tag VLAN groups, 16K MAC address table, IGMP Snooping, DHCP Server/Option 82, LACP, SNMPv3...etc.

IEC61850-3 / IEEE1633 Compatibility

In the substation environment, there are many EMI & Environmental Phenomena, such as the electric, magnetic, high energy power surge, uncontrolled temperature & humidity...etc. When it comes to the Ethernet for substation automation, the utility companies generally advise you to comply to the IEC61850-3 standard and IEC1613 standard. IEC61850-3 is standardized for the design of

substation automation.

It defines the standard for the "Communication Networks and Systems in Substations". IEC61850-3 defines the "General Requirements" for relevant equipments. The IEC1613 defines the "Standard Environmental and Testing Requirements for Communications Networking Devices in Electric Power Substations".



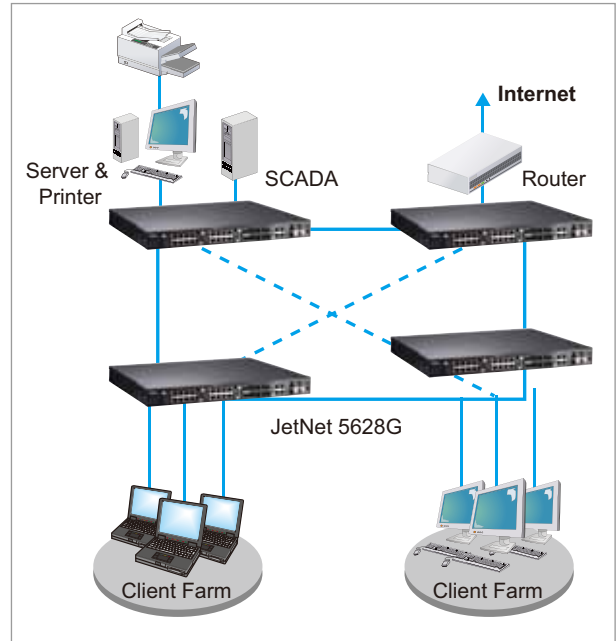
High Bandwidth and Performance

JetNet 5628G series support 24 fast Ethernet ports plus 4 gigabit combo ports as well as wire speed forwarding and up to 9,216 bytes jumbo frame.

The 24+4G combo port design provides benefits and advantages when planning your industrial network architecture.

- Industrial PoE Switch
- IP67/68 Ethernet Switch
- Rackmount Managed Switch
- Gigabit Switch
- Redundant Switch
- Entry-Level Switch
- Networking Computer
- Communication Computer
- Ethernet I/O Server
- Serial Device Server
- Media Converter
- Multiport Serial Card
- SFP Module
- Din Rail Power Supply

- Acting as the access switch, 100M speed is still the major and popular in industrial environment.
- Acting as the distribution switch, 4 Gigabit Combo ports are designed for network redundancy, connecting public server or uplink path...
- 2 Gigabit ports are for forming independent ring, or connecting multiple switches with RSTP protection.
- 2 ports for ring and the others for connecting to public servers with higher bandwidth.
- The upper connection can be aggregated with up to 8G bandwidth in full duplex mode by LACP.
- 4 Combo Ports Design to save stock of storing different kinds of transceivers.



Multiple Super Ring Technology

The JetNet 5628G supports the new generation ring technology – MSR™ which includes various new

technologies for redundancy applications and structures of different networks.



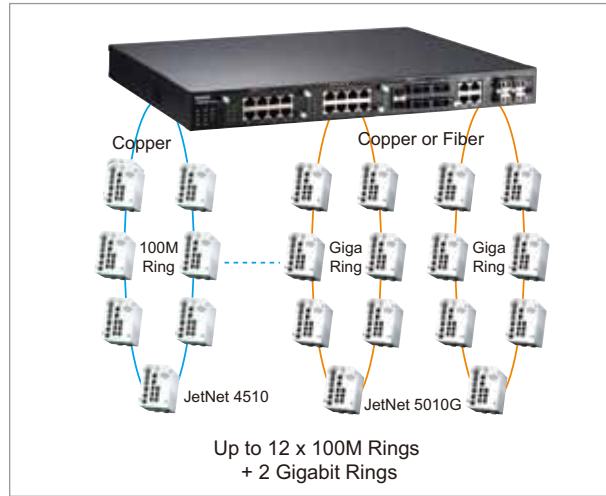
Rapid Super Ring	Rapid Dual Homing	MultiRing	TrunkRing
<ul style="list-style-type: none"> ■ Ring Master auto-select ■ Seamless restoration ■ Ring Failure alarms/LED ■ Failed ring port together with Ring Master ■ Up to 5ms Recovery Time ■ Backward compatible with legacy Super Ring 	<ul style="list-style-type: none"> ■ Multiple Uplink Paths ■ One to One upper, Many to One upper, One to Many upper switches ■ Seamless Restoration ■ Korenix Patent protected 	<ul style="list-style-type: none"> ■ Couple 2 rings with shared unit ■ Multiple up to 12 100M Rings & 4G for 2 Gigabit rings ■ Korenix Patent protected 	<ul style="list-style-type: none"> ■ Integrate Port Trunk/LACP with MSR, RSR ■ Load balancing of ring Ports ■ Backup with each other ■ Korenix Patent protected

Maximum 12+2G rings aggregation capability

Korenix JetNet 5628G supports MultiRing which allows aggregating multiple Rapid Super Rings. With the MultiRing technology all the Fast Ethernet and Gigabit Ethernet ports can be part of the ring ports.

Besides, up to 12 100M Rings can be formed and 2 Gigabit Rings can be aggregated to single access switch.

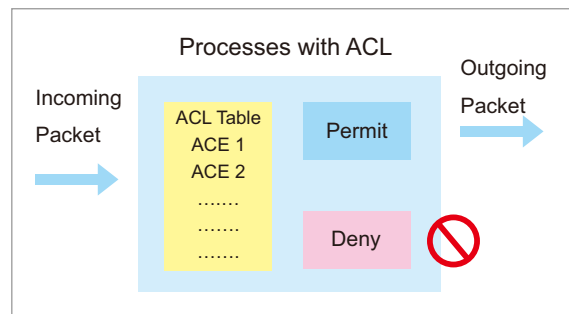
Traditional ring switches, which only allow one ring setting or one ring traffic pass-through, need additional links or settings to connect multiple rings. When there are several ring requests in your network, the setting and environment becomes complex. Unlike these traditional ring switches, with MultiRing feature the lower rings can connect to the JetNet 5628G directly.



Advanced Security by Layer 2/4 Access Control List

In substation automation or industrial control room installation, multiple types of advanced security features are required and must be implemented. The secured Access Control List (ACL) makes it easy to limit certain devices communicating with the other addressed devices and by the specific protocol. Example rules include (1) administrator to multiple stations, (2) stations to stations and (3) stations to public servers...etc.

The ACLs provide "Permit" and "Deny" rules for any or the specific host. The IP address, MAC address and port ID are the destinations allowed to be applied the rules. The protocol ID, QoS tag, TCP flag... are



the operations which users prefer to control. The JetNet 5628G is equipped with one layer 2+ switch fabric which provides flexible ACLs for the specified subjects and operations within the same LAN.

Link Layer Discover Protocol

The Link Layer Discover Protocol (LLDP) was formally ratified as IEEE 802.1AB-2005. LLDP is the Layer 2 protocol that allows the network device/station to advertise connectivity & management information, the identity & major capabilities, receives and establishes network management information on the local same network.

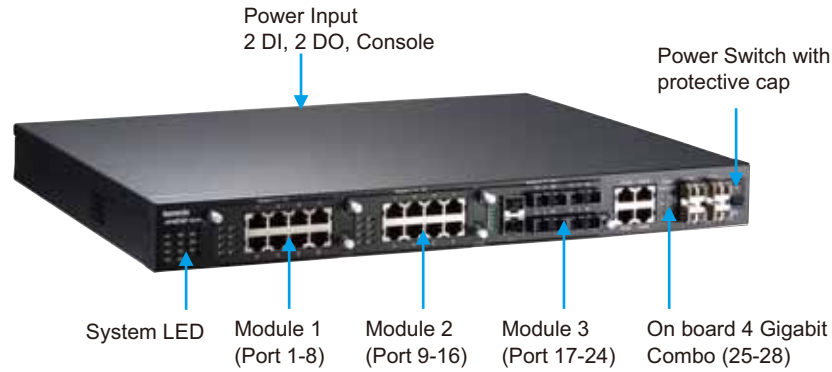
In industrial environments, most vendors provide their own discovering protocols, window utility or other tools to manage their switches. The LLDP protocol fixes the interoperability among them. With LLDP supported, users can easily browse the network devices and establish the network management information schema about the stations.

Supporting SNMP, LLDP and JetView protocol, the JetNet 5628G series can be easily discovered, port and ring status can be displayed by JetView Pro, Korenix designed Network Management System or other NMS which support SNMP and LLDP. The software can help administrators efficiently and effectively manage the surveillance network.

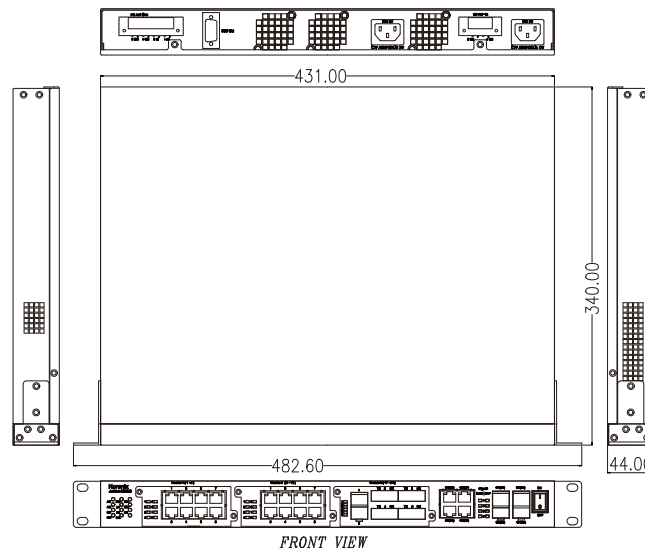


- Industrial PoE Switch
- IP67/68 Ethernet Switch
- Rackmount Managed Switch
- Gigabit Switch
- Redundant Switch
- Entry-Level Switch
- Networking Computer
- Communication Computer
- Ethernet I/O Server
- Serial Device Server
- Media Converter
- Multiport Serial Card
- SFP Module
- Din Rail Power Supply

JetNet 5628G Appearance

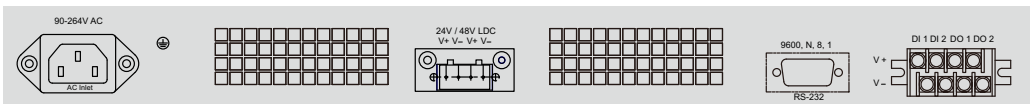


Dimensions (Unit –mm)



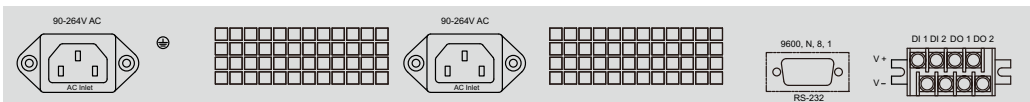
JetNet 5628G IEC61850-3 24+4G Modular Managed Ethernet Switch

Power Input: 1 x 85-264VAC/88-370VDC + 2 x 24/48VDC



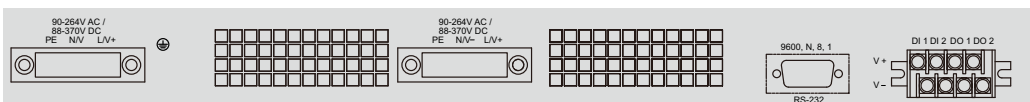
JetNet 5628G-2AC IEC61850-3 24+4G Modular Managed Ethernet Switch with Dual AC input

Power Input: 2 x 85-264VAC/88-370VDC, Standard three-pronged AC plug



JetNet 5628G-2HDC IEC61850-3 24+4G Modular Managed Ethernet Switch with Dual 88-370VDC input

Power Input: 2 x 85-264VAC/88-370VDC, 3 pin Terminal Block



Flexible Module Design

The JetNet 5628G provides several types of Fast Ethernet modules. There are 8 10/100Base-TX ports, 4 10/100Base-TX plus 4 100Base-FX and 4 100Base-FX/SC ports plus 2 100Base-FX SFP modules. By turning off the power at the front on the switch it's becoming possible to insert the modules or exchange the module types.

The modular design is more flexible for purchasing, provides less storage of stock and field installations. Once the distance is over 100 meters, users can exchange modules without replacing the device. When purchasing the JetNet 5628G, please confirm the media type and the port volume.

Naming Rule: JNM5-ABBCC/ABBCC

JNM5	A: Port Volume	BB: RJ-45/Fiber	CC: Type of Fiber Connector
5: JetNet 5xxx Series Module	2: 2 Ports 4: 4 Ports 8: 8 Ports	TX: RJ45 M: Multi mode S: Single Mode	SC: SC Connector SFP: SFP socket



JNM5-8TX:
8 ports 10/100Base-TX module



JNM5-2SFP/4MSC:
2 ports 100Base-FX + 100Base-FX/SC Multi-mode

JNM5-2SFP/4SSC:
2 ports 100Base-FX + 100Base-FX/SC Single-mode

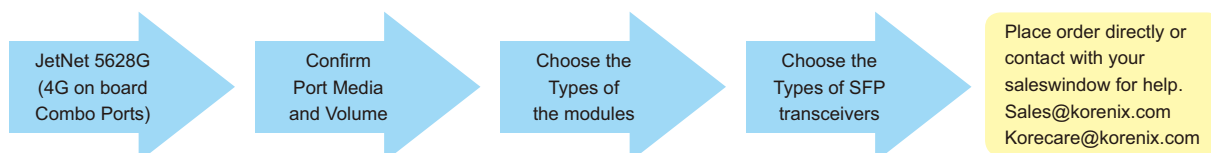


JNM5-4TX/4SFP: 4 ports 10/100Base-TX + 4 100FX-SFP

The examples:

Fast Ethernet module	On Board	Example
JNM5-4TX/4SFP x 1	4 10/100/1000 or 4G SFP	4 x 100M copper + 4 x 100M SFP + 4G, 8 x 100M copper + 4 x 100M SFP, 6 x 100M copper + 4 x 100M SFP + 2G ...etc.
JNM5-8TX x 1	4 10/100/1000 or 4G SFP	8 x 100M copper + 4G Combo, 12 x 100M copper, 10 x 100M copper + 2G combo ...etc.
JNM5-2SFP/4MSC	4 10/100/1000 or 4G SFP	6 x 100M Fiber + 4G Combo, 4 x 100M copper + 6 100M Fiber ...etc.
JNM5-8TX x 2 + JNM5-4TX/4SFP x 1	4 10/100/1000 or 4G SFP	20 x 100M copper + 4 x 100M SFP + 4G combo 22 x 100M copper + 4 x 100M SFP + 2G combo ...etc.

Purchasing Progress



Industrial
PoE Switch

IP67/68
Ethernet Switch

Rackmount
Managed
Switch

Gigabit Switch

Redundant
Switch

Entry-Level
Switch

Networking
Computer

Communication
Computer

Ethernet
I/O Server

Serial Device
Server

Media
Converter

Multiport
Serial Card

SFP Module

Din Rail
Power Supply

Specification

Technology

Standard:

IEEE 802.3 10Base-T Ethernet
 IEEE 802.3u 100Base-TX Fast Ethernet
 IEEE 802.3ab 1000Base-TX
 IEEE 802.3z Gigabit Ethernet Fiber
 IEEE 802.3x Flow Control and Back-pressure
 IEEE 802.1p class of service
 IEEE 802.1Q VLAN
 IEEE 802.1D-2004 Rapid Spanning Tree Protocol (RSTP)
 IEEE802.3ad LACP
 IEEE802.1X Port based Network Access Control
 IEEE802.1AB Link Layer Discovery Protocol
 IEEE 1588v1 Precision Time Protocol (PTP)

Performance

Switch Technology:

Store and Forward Technology, 12.8Gbps Switch Fabric.

System Throughput: 14,880pps for 10M Ethernet, 148,800pps for 100M Fast Ethernet, 1,488,100 for Gigabit Ethernet

Transfer packet size: Typical: 64 bytes to 1536 bytes,

Jumbo Frame Enabled: Up to 9,216bytes.

MAC Address: 16K MAC

Packet Buffer: 32Mbits

Relay Alarm: Dry Relay output with 1A@24V ability

Management

Configuration: Cisco-Like CLI, JetView, Web, HTTPS, backup/restore, DHCP Client, Warm reboot, Reset to default, Admin password, Port Speed/Duplex control, status, statistic, MAC address table display, Static MAC, Aging time, Jumbo Frame Enable/Disable

LLDP: Link Layer Discovery Protocol to advertise system/port identity and capability on the local network

SNMP: SNMP v1, v2c, v3 and Traps.

SNMP MIB: MIB-II, Bridge MIB, VLAN MIB, SNMP MIB, RMON and Private MIB

Port Trunk: Static Trunk and 802.3ad LACP, Up to 6 Trunk Group, 8 ports per trunk

VLAN: IEEE802.1Q VLAN, GVRP. Up to 255 Tag VLAN

Quality of Service: 8 priority queues per port, IEEE802.1p COS and Layer 3 TOS/DiffServ

IGMP Snooping: IGMP Snooping V1/V2/V3 for multicast filtering and IGMP Query

GMRP: GARP Multicast Registration Protocol

Rate Control: Ingress filtering for Broadcast, Multicast, Unknown DA or All packets, step by 64kbps.

IEEE1588 Precision Time Protocol (PTP): Synchronize time from the PTP server

NTP: Network Time Protocol to synchronize time from Internet

Embedded Watchdog: Embedded hardware watchdog timer to auto reset system when switch system failure

Port Mirroring: Online traffic monitoring on multiple selected ports

IP Security: IP security to prevent unauthorized access

802.1x: Port_based Network Access Control

Access Control List (ACL): Deny/Permit ACL Security policy for IP/MAC and TCP/UDP port

DHCP Server: Can assign 255 IP address, support IP and MAC binding

DHCP Option 82 Relay DHCP Request to different IP subnet

E-mail Warning: Automatic warning by pre-defined events

System Log: Supports both Local mode and Server mode

Network Redundancy

Rapid Spanning Tree Protocol: IEEE802.1D-2004 Rapid Spanning Tree Protocol. Compatible with Legacy STP and IEEE802.1w

Multiple Super Ring (MSR™): New generation Korenix Ring Redundancy Technology, Includes Rapid Super Ring, Rapid Dual Homing, TrunkRing, MultiRing and backward compatible with legacy Super Ring

Rapid Dual Homing (RDH™): Multiple uplink paths to one or multiple upper switch

TrunkRing™: Integrate port aggregate function in ring path to get higher throughput ring architecture

MultiRing™: Couple or multiple up to 16 Rapid Super Rings, JetNet 5628G supports up to 12 100M rings and 2 Gigabit Rings in single switch

Legacy Super Ring: Backward compatible in client mode

Interface

Number of Fixed Gigabit Ports:

10/100/1000Base-TX: 4 x RJ-45, combo with SFP
 1000Base-X: 4 x SFP with Hot Swappable

Number of Ports in Modules:

JNM5-8TX: 8 x 10/100Base-TX, Auto MDI/MDI-X, Auto Negotiation

JNM5-4TX/4SFP: 4 x 10/100Base-TX plus 4 100Base-FX SFP

JNM5-2SFP/4MSC: 2 x 100Base-FX SFP plus 4 x 100Base-FX Multi mode

JNM5-2SFP/4SSC: 2 x 100Base-FX SFP plus 4 x 100Base-FX Single mode

Cables:

10Base-T: 2-pair UTP/STP Cat. 3, 4, 5 cable (100m)

100 Base-TX: 2/4-pair UTP/STP Cat. 5 cable (100m)

1000 Base-T: 4-pair UTP/STP Cat. 5 cable (100m)

Diagnostic LED:

AC/HDC Power 1/2(Green), LDC Power 1/2 (Green), RDY(Ready) (Green), Digital Input 1/2(Green), Ring Master (Green), Digital Output 1/2(Red), Ring Fail (Red)

Port LED:

Fast Ethernet Module: Link/Activity (Green/Green Blinking)

Gigabit Copper/SFP: Link/Activity (Green/Green Blinking)

RS232 Console: DB9 Connector, Pin3: TxD, Pin2: RxD, Pin5: GND

Power Connector:

JetNet 5628G: 1 x Standard 3-pronged AC plug +4 pin LDC Terminal Block

JetNet 5628G-2AC: 2 x Standard 3-pronged AC plug

JetNet 5628G-2HDC: 2 x 3 pin HDC Terminal Block

Digital Input: 2 sets of Digital Input

Logic Low (0): 0-10VDC/Logic High(1): 11-30VDC

Alarm: 2 sets of Relay outputs for configurable events

Alarm Events: Power and Ports Failure, DI state, DO state, Ping Failure, Login Fail, Time Synchronize Fail, Super Ring Topology Change

Power Requirements

Power:

AC: 85-264VAC

HDC (High Voltage DC Input): 88-370VDC

LDC (Low Voltage DC input): 24/48VDC

AC/HDC share the same power source module

Power Consumption: Max. 50 Watts, by modules

Mechanical

Installation: 19-inch, 1U Rack Mount

Case: Aluminum metal case

Dimension: 44mm(H) x 431mm (W) x 375mm (D)

Weight: 7 kg with package

Environmental

Operating Temperature: -25 ~ 70°C

Operating Humidity: 5% ~ 95% (non-condensing)

Storage Temperature: -40 ~ 85°C

Hi-Pot: 1.5KV for ports and power

Regulatory Approvals

Power Automation: IEC 61850-3, IEEE 1613

EMI: FCC Class A, CE/EN55022. Class A

EMS:

EN61000-4-2(ESD), EN61000-4-3(RS),

EN61000-4-4(EFT), EN61000-4-5(Surge),

EN61000-4-6(CS), EN61000-4-8(RF Magnetic),

EN61000-10(Damped oscillator),

EN61000-4-11(Voltage Dips),

EN61000-4-16(Conducted command disturbances),

EN61000-4-17(Ripper on DC power),

EN61000-4-18(Damped oscillatory wave),

EN61000-4-29(Voltage Dips)

IEEE 1613.cl.5.1 Voltage Dips, cl.5.2 Ripple on DC power, cl.5.3 Voltage Dip, IEC60255-5/IEEE 1613 cl.6/ IEEE C37.90 (Impulse voltage, High voltage)

Safety: UL, cUL, EN60950 (Pending)

Shock: IEC60068-2-27

Vibration: IEC60068-2-6

Free Fall: IEC60068-2-32

MTBF: Above 200,000 Hours, MIL-HDBK-217F GB standard

Warranty: 5 years

Ordering Information

JetNet 5628G IEC61850-3 24+4G Modular Managed Ethernet Switch

Power Input: 1 x 85-264VAC/88-370VDC + 2 x 24/48VDC

JetNet 5628G-2AC IEC61850-3 24+4G Modular Managed Ethernet Switch with Dual AC input

Power Input: 2 x 85-264VAC/88-370VDC, Standard 3 pronged AC plug

JetNet 5628G-2HDC IEC61850-3 24+4G Modular Managed Ethernet Switch with Dual 88-370VDC input

Power Input: 2 x 85-264VAC/88-370VDC, 3 pin Terminal Block

	PWR 1	PWR 2	AC/HDC Connector	LDC 1	LDC 2
5628G	85~264VAC/ 88-370VDC		Standard 3 pronged AC plug	24/48VDC	24/48VDC
5628G-2AC	85~264VAC/ 88-370VDC	85~264VAC/ 88-370VDC	Standard 3 pronged AC plug		
5628G-2HDC	85~264VAC/ 88-370VDC	85~264VAC/ 88-370VDC	3 pin Terminal Block		

Accessories:

JetNet 5628G Series (4G Combo on board, No Fast Ethernet modules, no SFP transceivers)

Rack Mount Kit, Quick Installation Guide, Document CD, Console Cable, Power code

Additional Modules:

JNM5-8TX: 8 ports 10/100Base-TX module

JNM5-2SFP/4MSC: 2 ports 100Base-FX + 100Base-FX/SC Multi-mode

JNM5-2SFP/4SSC: 2 ports 100Base-FX + 100Base-FX/SC Single-mode

JNM5-4TX/4SFP: 4 ports 10/100TX + 4 100FX-SFP Socket

Optional Accessories

100Base-FX Multi-Mode SFP Transceiver

100Base-FX Single-Mode SFP Transceiver

100Base-FX BIDI/WDM Single-Mode SFP Transceiver

Gigabit Multi-Mode SFP Transceiver

Gigabit Single-Mode SFP Transceiver

Gigabit BIDI/WDM Single-Mode SFP Transceiver

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Media
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Din Rail
Power Supply