## ORing

SWITCH INDUSTRIAL MANAGED

# Quick Installation Guide

## Introduction

In conformity with the IEC 61850-3 and IEEE 1613 standards, the **IGS-P9812GP** is an industrial managed Ethernet switch designed for power substation applications. The device is also ideal for rolling stock applications due to its EN50155 compliance. The device features 8x10/100/1000Base-T(X) ports and 12x100/1000Base-X SFP ports and provides complete support of Ethernet redundancy protocols such as MSTP (RSTP/STP compatible) as well as O-Ring (recovery time < 30ms for over 250 connected devices) topologies, and hence can protect your mission-critical applications from network interruptions or temporary malfunctions. With a wide operating temperature from -40~70°C, the device can be managed centralized via ORing's proprietary Open-Vision platform as well as via Web-based interfaces, Telnet and console (CLI).

### Package Contents

The device is shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.



## Preparation

Before you begin installing the device, make sure you have all of the package contents available and a PC with Microsoft Internet Explorer 6.0 or later, for using web-based system management tools.

#### Safety & Warnings



Elevated Operating Ambient: If installed in a closed environment, make sure the operating ambient temperature is compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

**Reduced Air Flow:** Make sure the amount of air flow required for safe operation of the equipment is not compromised during installation.

Mechanical Loading: Make sure the mounting of the equipment is not in a hazardous condition due to uneven mechanical loading.



**IGS-P9812GP Series** 

#### Dimension











1. Wall-mount screw holes 2. Din-rail screw holes

## Installation

firmly.

Use the mounting kits attached with the package and follow the steps below to install the switch to a rail or to the wall.

#### DIN-rail Installation

Step 1: Slant the switch and screw the Din-rail kit onto the back of the switch, right in the middle of the back panel. Step 2: Slide the switch onto a DIN-rail from the Din-rail kit and make sure the switch clicks into the rail IEC 61850-3 Industrial Managed Ethernet

## Switch

#### • Wall-mounting

Step 1: Screw the two pieces of wall-mount kits onto both ends of the rear panel of the switch. A total of six screws are required, as shown below. Step 2: Use the switch, with wall mount plates attached, as a guide to mark the correct

Incations of the four screws. Step 3: Insert a screw head through the large parts of the keyhole-shaped apertures, and then

Step 3: Insert a screw head through the large parts of the keyhole-shaped apertures, and the slide the switch downwards. Tighten the screw for added stability.



#### Network Connection

The switch provides standard Ethernet ports. According to the link type, the switch uses CAT 3, 4, 5, 5e UTP cables to connect to any other network devices (PCs, servers, switches, routers, or hubs). Please refer to the following table for cable specifications.

#### Cable Types and Specifications:

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Cable	Туре	Max. Length	Connector
10BASE-T	Cat. 3, 4, 5 100-ohm	UTP 100 m (328 ft)	RJ-45
100BASE-TX	Cat. 5 100-ohm UTP	UTP 100 m (328 ft)	RJ-45
1000BASE-T	Cat. 5 / Cat. 5e 100-ohm UTP	UTP 100 m (328 ft)	RJ-45

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For pin assignments for different types of cables, please refer to the following

 5163.		_		
1000	Base-T RJ-45		10/100 E	ase-T(X) RJ-45
Pin Number	Assignment		Pin Number	Assignment
1	BI_DA+		1	TD+
2	BI_DA-		2	TD-
3	BI_DB+		3	RD+
4	BI_DC+		4	Not used
5	BI_DC-		5	Not used
6	BI_DB-		6	RD-
7	BI_DD+		7	Not used
8	BI_DD-		8	Not used

10/10	00 Base-T(X) MD	I/MDI-X
'in Number	MDI port	MDI-X port
1	TD+(transmit)	RD+(receive)
2	TD-(transmit)	RD-(receive)
3	RD+(receive)	TD+(transmit)
4	Not used	Not used
5	Not used	Not used
6	RD-(receive)	TD-(transmit)
7	Not used	Not used
8	Not used	Not used

Note: "+" and "-" signs represent the polarity of the wires that make up each wire pair.

#### **Console Port Pin Definition**

To connect the console port to an external management device, you need an RJ-45 to DB-9 cable, which is also supplied in the package. Below is the console port pin assignment information.

	RS-232 with DB9 (female) pin	D 145 min an airmannat
PC DB9 (male) pin assignment	assignment (RJ45-DB9 cable)	RJ45 pin assignment
PIN#2 RxD	PIN#2 RxD	PIN#2 RxD
PIN#3 TxD	PIN#3 TxD	PIN#3 TxD
PIN#5 GND	PIN#5 GND	PIN#5 GND

### Wiring

Power inputs

The switch supports dual redundant power supplies, Power Supply 1 (PWR1) and Power Supply 2 (PWR2). The connections for PWR1, PWR2 and the RELAY are located on the front panel along with LAN ports. Follow the steps below to wire power cables. **STEP 1:** Insert the negative/positive wires into the V-/V+ terminals\_respectively.



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Fail

terminals, respectively. STEP 2: To keep the wires from pulling loose, use a small flatblade screwdriver to tighten the wire-clamp screws on the front of the connector.

#### Relay contact

The switch provides fail open and fail close options for you to form relay circuits based on your needs. If you want the relay device to start operating at power failure, attach the two wires to COM and fail close to form a close circuit, vice versa. The relay contact of the 3-pin terminal block connector will respond to user-configured events according to the wiring.

#### Grounding

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screws to the grounding surface prior to connecting devices.

### Configurations

After installing the switch card, the green power LED should turn on. Please refer to the following tablet for LED indication.

**GS-P9812GP Series** 

	-		
LED	Color	Status	Description
PWR	Green	On	DC power on
PWR1	Green	On	DC power module 1 activated
PWR2	Green	On	DC power module 2 activated
R.M	Green	On	Ring Master
Dimm	Green	On	Ring enabled
Ring	Green	Blinking	Ring structure is broken
Fault	Amber	On	Faulty relay (power failure or port malfunctioning)
10/100/1000	Base-T(X) Fast Ether	net ports	i.
LNK/ACT		On	Port is linked
LNK/ACT	Green	Blinking	Transmitting data
	Green	On	Port is running at 1000Mbps
Speed	Amber	On	Port is running at 100Mbps
	Green / Amber	Off	Port is running at 10Mbps
SFP	•		i.
LNK/ACT	0	On	Port is linked
LNK/ACT	Green	Blinking	Transmitting data

Follow the steps below to log in and access the system

1. Launch the Internet Explorer and type in IP address of the switch. The default static IP address is 192.168.10.1

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Address http://192.168.10.1	👻 🛃 GO	Links »

2. Log in with default user name and password (both are **admin**). After logging in, you should see the following screen. For more information on configurations, please refer to the user manual. For information on operating the switch using ORing's Open-Vision management utility, please go to ORing website.

admin ••••• Domain: ORING Remember my credentials S Logon failure: unknown user name or bad password.	- des ta				
Omain: ORING     Remember my credentials					
Remember my credentials	idmin				
Remember my credentials	••••				
🔞 Logon failure: unknown user name or bad password.	Remember my c	redential	5		
	failure: unknown u	ser name	or bad pas	sword.	
	17	Remember my c	Remember my credential:	Remember my credentials	Remember my credentials failure: unknown user name or bad password.

#### Resetting

To reboot the switch, press the **Reset** button for 5 seconds. To restore the switch configurations back to the factory defaults, press the **Reset** button for 5 seconds.

## Specifications

ORing Switch Model	IGS-P9812GP-LV	IGS-P9812GP-HV
Physical Ports		
10/100/1000Base-T(X) Ports in RJ-45 Auto MDI/MDIX		8
100/1000Base-X with SFP port		2

Technology       IEEE 802.3 for 10Bash.T         IEEE 802.3 for 10Bash.T       IEEE 802.3 for 10Bash.T         IEEE 802.3 for 10B0Bash.T       IEEE 802.3 for 10B0Bash.T         IEEE 802.3 for 10B0Bash.T       IEEE 802.3 for 10B0Bash.T         IEEE 802.3 for 10B0Bash.T       IEEE 802.3 for 10B0Bash.T         IEEE 802.3 for 10B0Bash.T       IEEE 802.1 for CASP (Law Ageregation Collect 800.1 for VLAN Tagging IEEE 802.1 for CASP (Law Dathentication 1EEE 802.1 for CASP (L	Control Protocol)  ree Protocol Tree Protocol Tree Protocol Tree Protocol Tree Protocol Tree Protocol Tree Tree Tree Tree Tree Tree Tree Tre	
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Elect Bol.3ab for 1000Base-T           Ethernet Standards         IEEE 802.3b for 1000 CACP (Link Agyregation Co           Ethernet Standards         IEEE 802.1b for LACP (Link Agyregation Co           Ethernet Standards         IEEE 802.1b for UACP (Link Agyregation Co           MAC Table         9K           Packat Buffer         4Mbits           Packat Buffer         4Mbits           Processing         Store-and-Forward           Switch Ibandwidth: 40Gbps         Max. Number Of Available (LAN: 255           Switch bandwidth: 40Gbps         Max. Number Of Available (LAN: 255           Switch Dancy: 7 to:         Switch Ibandwidth: 40Gbps           Switch Properties         Switch Ibandwidth: 40Gbps           Bax. Number Of Available (LAN: 256         ICMP multicast groups: 126 for each VLAN           Processing         Up to 9.6k Bytes           Security Features         Switch Ibandwidth: 40Gbps           Switch Norpe et also and extrem factor         ICMP ibace etwork access control (802.12)           Security Features         Systep abance etwork acceurity (802.12)           Switch Bance etwork acceurity (802.12)         ICMP ibace etwork acceurity (802.12)           Software Features         Systep abarticity (802.12)           Systep abarticy (802.12)         ICMP ibace etwork acceurity (802.12) <t< td=""><td>ree Protocol Tree Protocol) very Protocol) N N curity (x) tx) tx tx tx f(x) less than 30ms over 250 units traffic (RP supported intoring, security (RSTP/STP compatible), Fast Recovery able. Baud rate setting: 115200bps, 8, N, 1 ////////////////////////////////////</td><td></td></t<>	ree Protocol Tree Protocol) very Protocol) N N curity (x) tx) tx tx tx f(x) less than 30ms over 250 units traffic (RP supported intoring, security (RSTP/STP compatible), Fast Recovery able. Baud rate setting: 115200bps, 8, N, 1 ////////////////////////////////////	
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IEEE 802.1 is for MSTP (Multiple Spanning TV)           MAC Table         8k           Packet Buffer         4Mb1ts           Processing         Store-and-Forward           Switch Brooperties         Switch Iatency: 7 us Switch Brooperties           Switch Iatency: 7 us Switch Brooperties         Switch Iatency: 7 us Switch Brooperties           Switch Brooperties         Switch Brooperties           Switch Brooperties         Device Binding security reture Enable(rlabel ports, MAC based port security Port sate network access control (802.1%)           Security Features         Device Binding security feature Enable(rlabel ports, MAC based port securit Port based network access control (802.1%)           Security Features         STP/RSTP/MSTP (IEEE 802.10/v/s) Redundant Ring (0Ring) with recover y time TOS/DIFers vaported Quality of Service (802.10) proteal-time tra SWBVD and cytose proteer time TOS/DIFers vaported           Software Features         STP/RSTP/MSTP (IEEE 802.10/v/s) Redundant Ring (0Ring) with recover y time TOS/DIFers vaported           Software Features         STP/RSTP/MSTP (IEEE 802.10/v/s) Redundant Ring (0Ring) with races and grain ad GVRP WTP Server           NUA (802.10) With LAN tagging and GVRP WTP Server         SWBV Clain time recover y time TOS/DIFers vaported Quality of Service (802.10) proteol-time tra DOS/DODS auto prevention Port configuration, status, statistics, monito DOS/DODS auto prevention Port configuration, status, statistics, monito DOS/DODS auto prevention Port configuration, status, statistics, monito DOS/DODS auto prevention	Tree Protocol) very Protocol)  N N (uilty V) very Karffic t t t (KSTP/STP compatible), Fast Recovery able. Baud rate setting: 115200bps, 8, N, 1 ///// //////////////////////////////	
IEEE 802.1x for Authentication           IEEE 802.1x AB for LLDP (Link Layer Discover)           MAC Table         8K           Packet Buffer         4Mbits           Packet Buffer         4Mbits           Processing         Store-and-Forward           Switch Istency: 7 us         Switch Istency: 7 us           Switch Properties         Switch Istency: 7 us           Switch Storey: 7 us         Switch Istency: 7 us           Switch Storey: 7 us         Switch Istency: 7 us           Switch Storey: 7 us         Switch Istency: 7 us           Switch Storey: 8 us         Switch Istency: 7 us           Switch Storey: 128 for each VLAN         Switch Istency: 128 for each VLAN           Processing         Up to 9.6K Bytes           Security Features         Device Binding security feature           Security Features         Device Binding security feature           Switch Storey: All Advectorit Access control (802.1) for real-time tra MNPS 2 encrypted authentication and acces Hittps / SSH enhance network security           Software Features         STP/RSTP/MSTP (IEEE 802.1D/W/s) Redundant Ring (0-Ring With recovery time TOS/DIFer supported           Software Features         STP/RSTP/MSTP (IEEE 802.1D/W/s) Redundant Ring Users           MYP Server         Store acting Users           NYP Server         Store acting Users <td>very Protocol)  N  (urity (x)  (x)  (x)  (x)  (x)  (x)  (x)  (x)</td> <td></td>	very Protocol)  N  (urity (x)  (x)  (x)  (x)  (x)  (x)  (x)  (x)	
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Packet Buffer     4Mbits       Processing     Store-and-Forward       Switch Bradwicht: 40Gbps     Switch Bradwicht: 40Gbps       Switch Properties     Switch Bradwicht: 40Gbps       Max, Numer of Availas: 126 for each ULMs: 255     Max, Numer of Availas: 126 for each ULMs: 256       Processing     Up to 9.6K Bytes       Security Features     Device Binding security feature Enable/disable ports, MAC based port security       Security Features     Store 2016 (180.14)       Software Features     Store 2016 (180.14)       Store 2016 (180.14)     Store 2016 (180.14)       Software Features     Overong	curity (x) (x) (x) (x) (x) (x) (x) (x)	
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IOM multicast groups: 128 for each VLAN           Processing         Up to 9.6K Bytes           Processing         Up to 9.6K Bytes           Device Binding security feature Enable/(Jashie ports, MAC Dased port security Enable/(Jashie ports, MAC Dased port security Enable/(Jashie ports, MAC Dased port security Enable/(Jashie ports, MAC Dased port security Reduing centralized password management NANP 3 encrypted authentication and access Https / SSH enhance network security addundant Ring (O-Ring) with recovery tim TOS/I/MErer supported           Software Features         STP/RSTP/MSTP (IEEE 802.10/w/s) Redundant Ring) (O-Ring) with recovery tim TOS/I/MErer supported           Software Features         STP/RSTP/MSTP (IEEE 802.10/w/s) Redundant Ring) (O-Ring) with recovery tim TOS/I/MErer supported           Software Features         STP/RSTP/MSTP (IEEE 802.10/w/s) Redundant Nigoling and GVRP NTP Server           Software Features         STP/RSTP/MSTP (IEEE 800.10/w/s) Redundant Nigoling and GVRP NTP Server           NMP V1/v2(v3, NIB, RMON IGMP Shooping for multicast filtering IP-based Dadwidth management Application-based QoS management DOS/DOS auto prevention Port Configuration, status, statistics, monito DoS/DOS auto prevention Port Configuration, status, statistics, monito DoS/DOS auto prevention Port Configuration, status, statistics, monito DoS/DOS auto prevention           Relay         Relay output to carry capacity of 1A at 24VDC Power           Relay         Relay output to carry capacity of 1A at 24VDC Power           Power         Dal DC Inputs. 1248VDC on 6-pin terminal Power onsumption(Typ.) <t< td=""><td>curity (x) (x) (x) (x) (x) (x) (x) (x)</td><td></td></t<>	curity (x) (x) (x) (x) (x) (x) (x) (x)	
Http:/SSH enhance network security           Processing         Up to 9.6K Bytes           Processing         Device Binding security feature Enable/disable ports, MAC based port security returns access control (802.1s)           Security Features         Device Binding security feature Enable/disable ports, MAC based port security returns access control (802.1s)           Security Features         STP/RSTP/MSTP (IEEE 802.1D/W/s) Redundant Ring (0.8-Ring with recovery tim TOS/II/Rerv supported authentication and acces Http://STP/RSTP/MSTP (IEEE 802.1D/W/s) Redundant Ring (0.8-Ring with recovery tim TOS/II/Rerv supported (0.8-Ring with recovery tim TOS/II/Rerv supported (0.8-Ring with recovery tim TOS/II/Rerv supported With of Server WITP Server           Software Features         STP/RSTP/MSTP (IEEE 802.1D/W/s) Redundant Ring (0.8-Ring with recovery tim TOS/II/Rerv supported (0.8-Ring with recovery tim Application-based QoS management DOS/DOS auto prevention Port configuration, status, statistics, monito bos/DOS auto prevention Port configuration, status, statistics, monito SWTP Client Modbus TCP           Network Redundancy         0-Ring, Open-Ring, 0-chain, MRP, MSTP (RS RS-232 Serial Console Port Fourt Contact           Relay         Relay output to carry capacity of 1A at 24V0C Power           Relay         Network Redundant Input power           Dual DC Inputs. 1248VDC on 6-pin terminal Power Consumption(Typ.)         22 Watts           Overload current protection         Present           Physical Characteristic         Forto 15.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)	IX) (X) (X) (X) (X) (X) (X) (X) (X) (X) (	
Processing         Up to 9.6K Bytes           Device Binding security feature Enable/diable ports, MAC based port securit Port based network access control (802.1k) Network access control (802.1k) Security Features         Device Binding security feature Port based network access control (802.1k) Network access control (802.1k) Network access control (802.1k) Radius centralized password management Nttps / SSH enhance network security           Software Features         STP/RSTP/MSTP (IEEE 802.10) for real-time tra Document of the security of service (802.1k) for one-line tra Document of the security of service (802.1k) for neal-time tra Doc/NAM for multicast filtering Quality of service (802.1k) for neal-time tra Doc/NDDS auto prevention Motous TCP           Network Redundancy         O-Ring, Open-Ring, O-chain, MRP, MSTP (RS Rs-232 Serial Console Port Modous TCP           Relay         Relay output to carry capacity of 1A at 24V0C Power           Redundant Input power         Dual DC Inputs. 12~48VDC on 6-pin terminal Present           Power consumption(Typ.)         22 Watts           Overload current protection         Present           Physical Characteristic Enclosure         115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x) Weight (g)           Dimension (W x D x H)         115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x) Weight (g)           Derating Temperature         -40 to 85°C (-40 to 185°F)           Operating Temperature         -40 to 75°C (-40 to 167°F)           Operating Temperature         -50 to 75°C (-40 to 167°F)           Operat	IX) (X) (X) (X) (X) (X) (X) (X) (X) (X) (	
Device Binding security Feature Enable/diable ports, MAC based port securit Port based network access control (802.1x) Port based network access control (802.1x) NAMPU encrypted authentication and access Https / SSH enhance network security Radius centralized password management (802.1x) (802.1x) (102.1x) Redundant Ring (0-Ring) with recovery time ToS/Differs vary Differ (BEE 802.10)/s) Redundant Ring (0-Ring) with recovery time ToS/Differs vary bith LAN tagging and GVRP NTP Server SMWP vi (Ary2Viz), MIB, RMON IGMP Shooping for multicast filtering IP-based bandwidth management DOS/IDDS sub prevention, status, status, status, SMWP vi (Ary2Viz), MIB, RMON IGMP Shooping for multicast filtering IP-based bandwidth management DOS/IDDS sub prevention Prot configuration, status, status, status, status, SMTP Cleant DOS/DDS Sub prevention, status, status, status, SMTP Cleant DOS/DDS Sub prevention Modus TCP           Network Redundancy         O-Ring, Open-Ring, O-chain, MRP, MSTP (RS RS-232 Serial Console Port Modus TCP           Relay         Relay output to carry capacity of 1A at 24V0D Power           Relay         Pasent           Power consumption(Typ.)         22 Watts           Overload current protection Present         Present           Physical Characteristic Enclosure         115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)           Dimension (W x D x H)         115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)           Derating Temperature         -40 to 85°C (-40 to 185°F)           Operating Temperature         -40 to 75°C (-40 to 167°F)           Operating Temperature         -60 to 75°F (- 0000-4.2 ((ES)) FM1000-4.2 ((ES)) <td>IX) (X) (X) (X) (X) (X) (X) (X) (X) (X) (</td> <td></td>	IX) (X) (X) (X) (X) (X) (X) (X) (X) (X) (	
Security Features         Port based network access control (802.1%) VAN (802.10) to segregate and secure netw Radius centralized password management Radius centralized password management Hittps / SSH enhance network security           Software Features         STP/RSTP/MSTP (IEEE 802.10) for real-time tra Redundant Ring (0-Ring) with recovery time or SyNP van very (IEEE 802.10) for neal-time tra Possophing and GVRP VAN (802.10) with VAN tagging and GVRP NTP Server           Software Features         SWM v 1/v2/v3, MB, RMON ICMP Snooping for multicast filtering Phased landwidth of signement DOS/IDDS sub prevention MMP v 1/v2/v3, MB, RMON ICMP Snooping for multicast filtering Phased landwidth of signement DOS/IDDS sub prevention Modus TCP           Network Redundancy         O-Ring, O-chain, MRP, MSTP (RS R5-232 Serial Console Port Modus TCP           Redundant Input power         Dual DC inputs. 12~48VDC on 6-pin terminal Power consumption(Typ.)           Pasent 1         Present           Power         Present           Power onsumption(Typ.)         22 Watts           Overload current protection         Present           Power onsumption(Typ.)         15.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)           Dimension (W x D x H)         115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)           Dimension (W x D x H)         150.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)           Dimension (W x D x H)         150.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)           Operating Temperature         40 to 5	IX) (X) (X) (X) (X) (X) (X) (X) (X) (X) (	
Security Features         VLAN (802.1a) to segregate and secure networks adduss centralized password management SMMPV ancrypted authentication and access SMMPV and (2011) SMMPV (2011) SMMPVV (2011) SMMPV (2011) SMMPVV (2011) SMMPVV (2011) SMMPVV (2011) SMMPVV (2011) SMMPVV (2011) SMMPVVV (2011) SMMPVVV (2011) SMMPVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV	Network tardlic tit tit me less than 30ms over 250 units traffic (RFP supported (RSTP/STP compatible), Fast Recovery able. Baud rate setting: 115200bps, 8, N, 1 //DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
Radius centralized password management           Radius centralized password management           MNPV2 encrypted authentication and access           MITUP STYPRETY MERCINE CEE 802.101/s01           Redundant Ring (De-Ring) with recovery time TOS/DIFsers vary Mercine (802.101 for neal-time tra DOS/DIDOS auto prevention and access           Software Features         SWMP V1/2/CV/3, MIB, RMON ICMP Shooping for multicast filtering IP-based land/with management DOS/DIDOS sub prevention mercine           Network Redundancy         O-Ring, Open-Ring, O-chain, MRP, MSTP (RS RS-232 Serial Console POrt Modus TCP           Network Redundancy         O-Ring, Open-Ring, O-chain, MRP, MSTP (RS RS-232 Serial Console POrt Modus TCP           Relay         Relay output to carry capacity of IA at 24V0D Power           Redundant Input power         Dual DC inputs. 12~48VDC on 6-pin terminal Power consumption(Typ.)           Qualto Computery Capacity of IA at 24V0D Power         Present           Power onsumption(Typ.)         22 Watts           Overload current protection         Present           Physical Characteristic Reverse polarity protection         Present           Physical Characteristic Respective Provent         15.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)           Storage Temperature         40 to 85°C (-40 to 185°F)           Operating Temperature         40 to 75°C (-40 to 185°F)           Operating Temperature         40 to 75°C (-4	tt crease security ime less than 30ms over 250 units traffic KRP supported intoring, security (RSTP/STP compatible), Fast Recovery able. Baud rate setting: 115200bps, 8, N, 1 //DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
Http:/SSH enhance network security           Strip.RSTP/MSTP (IEEE 802.1D/w/s)           Redundart Ring (ORing) with recovery time           Software Features           Relay output to carry capacity of Lat 24VDC           Power           Relay Output to carry capacity of Lat 24VDC           Power           Software Input power	Ime less than 30ms over 250 units traffic IRP supported INTORING, security IRSTP/STP compatible), Fast Recovery able. Baud rate setting: 115200bps, 8, N, 1 IDC IDC IDL IDUAL DOWER INPUTS. 85~264VAC / 88~373VDC on 6-P terminal block	
Redundant Ring (0-Ring) with recovery time OS/DIFers vaported Quality of Service (802.1p) for real-time tra VLAK (802.10) with VLAK tagging and GXRP NTP Server SMKP V1/22/V3, MB, RMON IDM Snooping for multicast filtering IDM Snooping for multicast filtering Port configurated QoS management DOS/DODS auto prevention Port configurated QOS management DOS/DOS auto prevention Port configurated QOS management DOS/DOS auto prevention Port configurated QOS management DOS/DOS auto prevention Port configurated QOS management Power Power Power Power Dosent Port DOS/DOS auto prevention Port Dosent Port DOS Dosent Port Port Dimension (Vx Dx M) 115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g) 1520 g Port Port Port Port Port Dimension (W x Dx M) 115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Power Automation 1EC 61850-3, IEEE 1613 EMI CC Part 15, CISPR (EMSSO2) class A, EMO EMI (DOS -42 ((ES)) FMI (DO	traffic RRP supported Initoring, security (RSTP/STP compatible), Fast Recovery able. Baud rate setting: 115200bps, 8, N, 1 /DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
TOS/DIFERV Supported           Software Features         VLAN (602.10) with VLAN tagging and GVRAP VLAN (602.10) with VLAN tagging and GVRAP Program           Software Features         VLAN (602.10) with VLAN tagging and GVRAP Program           Software Features         Software (602.10) with VLAN tagging and GVRAP Program           Software Features         Software (602.10) with VLAN tagging and GVRAP Program           IGMP Shouping for multicast Illering IP-based Badwidth management DOS/DIOS auto prevention Port configuration, status, statistics, monito DioCP Server (1 client support = SMTC Client Modous TCP           Network Redundancy         0-Ring, Open-Ring, O-chain, MRP, MSTP (RS RS-232 Serial Console Port           Relay         Relay output to carry capacity of 1A at 24VDC Power           Power         Partice (1)           Redundant Input power         Pala DoLipupus, 12–48VDC on 6-pin terminal Power consumption(Typ.)           Overload current protection         Present           Power         Present           Dimension (W to D + M)         115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52 M) (H) (H) (H) (H) (H) (H) (H) (H) (H) (H)	traffic RRP supported Initoring, security (RSTP/STP compatible), Fast Recovery able. Baud rate setting: 115200bps, 8, N, 1 /DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
Software Peatures     VLAN (802.10) with VLAN iagging and GVRP NP Server       Software Peatures     SNP VL/V2C/V3, MIB, RMON IGMP Songing for multicast litering Passed bandwidth management DOS/DOOS auto prevention DOS/DOOS auto prevention DHCP Server/Dient / Client support SMTP Client su	RRP supported INTERFINE Security (RSTP/STP compatible), Fast Recovery able. Baud rate setting: 115200bps, 8, N, 1 /DC /DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
Software Features     NTP Server       SMP 1/2/2/3, MLB, RMON       ICMP Shooping for multicast filtering       ICMP Shooping for multicast filtering       Phose dambidith management       Approximation prement       OPT configuration, status, stat	nitoring, security (RSTP/STP compatible), Fast Recovery able. Baud rate setting: 115200bps, 8, N, 1 //DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
IGM Snooping for multicast filtering ID-based parkit management Application-based QoS management Application-based QoS management DoS/DOS autory ("Inter Support Suppor	(RSTP/STP compatible), Fast Recovery bble. Baud rate setting: 115200bps, 8, N, 1 /DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
Application-based QoS management DOS/DODS auto prevention Port configuration, status, statistics, monitor SMTC Dienst y prevention Port configuration, status, statistics, monitor SMTC Dienst y Modous TCP           Network Redundancy         0-Ring, Open-Ring, O-chain, MRP, MSTP (RS RS-232 Serial Console Port           Rate of the status	(RSTP/STP compatible), Fast Recovery bble. Baud rate setting: 115200bps, 8, N, 1 /DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
DOS/DOS auto prevention Port configuration, status, status, status, status, status, status, Status, monitor Dires Server / Client support SWTF Client Modus TCP           Network Redundancy         O-Ring, Open-Ring, O-chain, MRP, MSTP (RS RS-232 Serial Console RW Fault Contact           Relay         Rs-232 In RJ45 connector with console cable Fault Contact           Relay         Relay output to carry capacity of IA at 24VDC Power           Redundant Input power         Dual DC inputs. 12~48VDC on 6-pin terminal Power consumption(Typ.)           Power consumption(Typ.)         22 Watts           Overload current protection         Present           Physical Characterize Enclosure         In-30           Dimension (W x D x H)         115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)           Disorg Temperature         -40 to 85°C (-40 to 165°F)           Operating Humidity         -50 to 55°C (-40 to 165°F)           Operating Humidity         -50 to 55°C (-40 to 165°F)           Power Automation         IEC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (EMSSO2) class A, EMSO           FW1000-4-2 ((ES) FM51000-4-2 ((ES))         FM51000-4-2 ((ES)	(RSTP/STP compatible), Fast Recovery bble. Baud rate setting: 115200bps, 8, N, 1 /DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
DHC Servier / Client support Modus TCP           Network Redundancy         0-Ring. Open-Ring. Op-chain, MRP, MSTP (RS RS-232 Serial Console Port           Rs-232 In RJ45 connector with console cable Full Contact         Fall Sconnector with console cable Full Contact           Relay         Relay output to carry capacity of IA at 24V0C Power           Power         Dual DC Inputs. 12-48VDC on 6-pin terminal Power consumption(Typ.)         22 Watts           Overload current protection         Present           Physical Characteristic         Present           Dimension (W x D x H)         15.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)           Dimension (W x D X H)         15.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)           Dimension (W x D X H)         15.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)           Dimension (W x D X H)         15.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)           Operating Temperature         40 to 55°C (-40 to 165°F)           Operating Temperature         40 to 55°C (-40 to 165°F)           Operating Temperature         16 C 1580°, 1EEE 1613           EMI         FC C Part 15, CISPR (EMSSO2) class A, EMSO FMS1000-42 ((ES)) FMS1000-42 ((ES))	(RSTP/STP compatible), Fast Recovery bble. Baud rate setting: 115200bps, 8, N, 1 /DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
SMTC Cleat Moduus TCP           Network Redundancy         0-Ring, Open-Ring, O-chain, MRP, MSTP (RS RS-232 Serial Console Part           Ratuation         Relay output to carry capacity of 1A at 24VDC Power           Power         Dual DC inputs. 12~48VDC on 6-pin terminal Power consumption(Typ.)           Daul DC inputs. 12~48VDC on 6-pin terminal Power consumption(Typ.)         22 Watts           Overlaad current protection         Present           Physical Characteristic Enclosure         Pr-30           Dimension (W x D x H)         115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x Weight (g)           Storage Temperature         -40 to 85°C (-40 to 185°F) Operating Temperature           Operating Temperature         -40 to 75°C (-40 to 167°F)           Operating Temperature         -40 to 75°C (-40 to 167°F)           Payer Automation         IEC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (EMSCD2) class A, EMSC PMS1000-4 (S) (S)	able. Baud rate setting: 115200bps, 8, N, 1 /DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
Activative Redundancy         O-Ring, Open-Ring, O-chain, MRP, MSTP (RS           Rs5-232 Serial Console Port         Rs5-232 In RJ45 connector with console cable           Fault Contact         Relay output to carry capacity of 1A at 24VDC           Power         Bual O Linputs. 1248VDC on 6-pin terminal           Power         Dual DC Inputs. 1248VDC on 6-pin terminal           Power consumption(Typ.)         22 Watts           Overload current protection         Present           Physical Character         Incomposition (Typ.)           Enclosure         Incomposition (Typ.)           Dimension (W x D x H)         15.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x           Weight (g)         120 o go           Enclosure         -40 to 85°C (-40 to 185°F)           Operating Temperature         -40 to 85°C (-40 to 165°F)           Operating Humidity         5% to 95% Non-condensing           Regulatory Approvals         IEC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (EMSO2D) class A, EMSO2D           FMS1000-4 (ES)         IMS1000-4 (ES)           FMS1000-4 (ES)         IMS1000-4 (ES)	able. Baud rate setting: 115200bps, 8, N, 1 /DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
R5-232 Serial Console Port     RS-232 In R345 connector with console cable       Fault Contact     Relay output to carry capacity of 1A at 24VDC       Power     Dual DC inputs. 1248VDC on 6-pin terminal       Power consumption(Typ.)     22 Watts       Overload current protection     Present       Physical Characteristic     Present       Enclosure     IP-30       Dimension (W x D x H)     115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x)       Weight (g)     1520 g       Environmental     -40 to 85°C (-40 to 185°F)       Operating Temperature     -40 to 75°C (-40 to 167°F)       Operating Temperature     150 og S% Non-condensing       Regulatory Approvals     FCC Part 19, CISPR (ENSO22) class A, ENSO:       ENI     FCC Fort 19, CISPR (ENSO22) class A, ENSO:       ENI     FCC Part 19, CISPR (ENSO22) class A, ENSO:	able. Baud rate setting: 115200bps, 8, N, 1 /DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
Fault Contact           Relay output to carry capacity of 1A at 24VDC           Power           Power           Redundant Input power         Dual DC inputs. 12~48VDC on 6-pin terminal           Power consumption(Typ.)         22 Watts           Overload current protection         Present           Physical Character         Present           Enclosure         IP-30           Dimension (W x D x H)         115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x           Weight (g)         1520 g           Environmental         -40 to 85°C (~40 to 185°F)           Operating Temperature         -40 to 75°C (~40 to 165°F)           Operating Humidity         5% to 59% Non-condensing           Regulatory Approvals         IEC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (EMSSO2) class A, EMSO           FMS1000-4: 2 (ESD)         IMS1000-4: 2 (ESD)	/DC nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
Relay output to carry capacity of 1A at 24900       Power       Redundant Input power     Dual DC inputs. 12~48VDC on 6-pin terminal       Power consumption(Typ.)     22 Watts       Overload current protection     Present       Reverse polarity protection     Present       Physical Characterist     Present       Enclosure     I15.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x       Weight (g)     152 0 g       Entromontal     -40 to 85°C (-40 to 185°F)       Operating Temperature     -40 to 85°C (-40 to 167°F)       Operating Temperature     5% to 95% Non-condensing       Regulatory Approvalis     IEC 61850-3, IEEE 1613       EMI     FCC Part 15, CISPR (EMSO22) class A, EMSO       Finding -4.7 (FS)     FMS1000-4.2 (FS)	nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
Power           Redundant Input power         Dual DC inputs. 12~48VDC on 6-pin terminal           Power consumption(Typ.)         22 Watts           Overload current protection         Present           Reverse polarity protection         Present           Physical Characteristic         Enclosure           Dimension (W x D x H)         15.0 (W) x 159.0(D) x 154.0(H) mm (4.52x           Weight (g)         1520 g           Environmental         -           Storage Temperature         -40 to 85°C (-40 to 165°F)           Operating Temperature         -40 to 75°C (-40 to 165°F)           Operating Temperature         -60 to 75°C (-40 to 165°F)           Power Automation         IEC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (EMSCD2) class A, EMSC)           FMS (CIGO) - 42 ((ES))         FMS (CIGO) - 42 ((ES))	nal block Dual power inputs. 85~264VAC / 88~373VDC on 6-p terminal block	
Redundant Input power         Dual DC inputs. 12~48VDC on 6-pin terminal           Power consumption(Typ.)         22 Watts           Overload current protection         Present <b>Physical Characteristic</b> Present <b>Physical Characteristic</b> IP-30           Dimension (W x D X)         15.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x           Weight (g)         1520 g <b>Environmental</b> Storage Temperature           Storage Temperature         -40 to 85°C (-40 to 185°F)           Operating Temperature         -40 to 75°C (-40 to 167°F)           Regulatory Approvals         Fectoratis, LESPR (ENSO22) class A, ENSO2           Power Automation         IEC 61850-3, IEEE 1613           EM1         FCC Part 15, CISPR (ENSO22) class A, ENSO2           FM51000-4-2 (ESD)         FM51000-4-2 (ESD)	nal block terminal block	
Power onsumption(Typ.)         22 Watts           Overload current protection         Present           Reverse polarity protection         Present           Physical Characteristic         Prosent           Dimension (W x D x H)         115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x           Weight (g)         152.0 g           Environmental         Storage Temperature           Storage Temperature         -40 to 85°C (-40 to 165°F)           Operating Temperature         -40 to 75°C (-40 to 165°F)           Regulatory Approvels         February Storage Temperature           Power Automation         IEC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (EMSSO2) class A, EMSO2           FMS1000-4-2 (ES)         FMS1000-4-2 (ES)           FMS1000-4-2 (ES)         FMS1000-4-2 (ES)	nal block terminal block	
Overload current protection         Present           Reverse polarity protection         Present           Physical Characteristic         Enclosure           Dimension (W x D x H)         115.0 (W) x 159.0(D) x 154.0(H) mm (4.52x           Weight (g)         1520 g           Environmental         Storage Temperature           Storage Temperature         -40 to 85°C (-40 to 185°F)           Operating Temperature         -40 to 75°C (-40 to 167°F)           Operating Temperature         50 by SNon-condensing           Regulatory Approvals         FOC Part 15, CISPR (ENSO22) class A, ENSO:           EMI         FCC Part 15, CISPR (ENSO22) class A, ENSO:           FN61000-4-2 (ES)         FN61000-4-2 (FC)	24 Watts	in
Reverse polarity protection         Present           Physical Characteristic         IP-30           Dimension (W x D x H)         115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52x           Weight (g)         1520 g           Environmental         Storage Temperature           Operating Temperature         -40 to 85°C (-40 to 185°F)           Operating Temperature         -40 to 75°C (-40 to 167°F)           Operating Humidity         5% to 95% Non-condensing           Regulatory Approvals         FCC Part 15, CISPR (EMSC02) class A, EMSC0           EMI         FCC Part 15, CISPR (EMSC02) class A, EMSC0           FMS1000-4-2 (ESD)         FMS1000-4-2 (ESD)           FMS1000-4-2 (FT)         FMS1000-4-2 (FT)		
Physical Characteristic           Enclosure         IP-30           Dimension (W x D x H)         115.0 (W) x 159.0(D) x 154.0(H) mm (4.52 x           Weight (g)         1520 g           Environmental		
Enclosure         IP-30           Dimension (W x D x H)         115.0 (W) x 159.0 (D) x 154.0 (H) mm (4.52 x           Weight (g)         1520 g           Environmental           Storage Temperature         -40 to 85°C (-40 to 185°F)           Operating Temperature         -40 to 75°C (-40 to 165°F)           Operating Humidity         5% to 95% Non-condensing           Regulatory Approvals         FCC Part 15, CISPR (EMSO22) class A, EMSO2           EMI         FCC Part 15, CISPR (EMSO22) class A, EMSO2           FMS1000-4-2 (FC)         FMS1000-4-2 (FC)           FMS1000-4-2 (FC)         FMS1000-4-2 (FC)		
Dimension (W x D x H)         115.0 (W) x 159.0(D) x 154.0(H) mm (4.52x           Weight (g)         1520 g           Environmental         -           Storage Temperature         -40 to 85°C (-40 to 185°F)           Operating Temperature         -40 to 75°C (-40 to 167°F)           Operating Humidity         5% to 95% Non-condensing           Regulatory Approvals         -           Power Automation         IEC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (EMSO22) class A, EMSO2           FMS1000-4-2 (ESD)         -40 (FT)		
Weight (g)         1520 g           Environmental         -           Storage Temperature         -40 to 85°C (-40 to 165°F)           Operating Temperature         -40 to 75°C (-40 to 165°F)           Operating Humidity         % to 95% Non-condensing           Regulatory Approvals         -           Power Automation         IEC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (EMSSO2) class A, EMS02           FM61000-4-2 (EGD)         -40 (FT)		
Environmental           Storage Temperature         -40 to 85°C (-40 to 185°F)           Operating Temperature         -40 to 75°C (-40 to 165°F)           Operating Humidity         5% to 95% Non-condensing           Regulatory Approvals         FC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (EMS5022) class A, EN50: EM61000-4-2 (ESD) EM61000-4-3 (RS)	2x 6.26 x 6.06 inch)	
Storage Temperature     -40 to 85°C (-40 to 185°F)       Operating Temperature     -40 to 75°C (-40 to 167°F)       Operating Humidity     5% to 95% Non-condensing       Regulatory Approvals	1870 g	
Operating Temperature         -40 to 75°C (-40 to 167°F)           Operating Humidity         5% to 95% Non-condensing           Regulatory Approvals         F           Power Automation         IEC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (EMS5022) class A, EN50; EN61000-4-2 (RS)           EN61000-4-2 (RS)         EN61000-4-2 (RS)		
Operating Humidity         5% to 95% Non-condensing           Regulatory Approvals         File           Power Automation         IEC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (EMS022) class A, EMS02           FM61000-4-2 (ESD)         FM61000-4-2 (FSD)           FM61000-4-2 (FST)         FM61000-4-2 (FST)		
Regulatory Approvals           Power Automation         IEC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (ENS5022) class A, EN502           EMI 06-02 (ESD)         EN61000-42 (ESD)           EMI 06-02 (FCT)         EN61000-42 (FCT)		
Power Automation         IEC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (ENS5022) class A, EN502           EN61000-4-2 (ESD)         EN61000-4-2 (FSD)           EN61000-4-4 (FF)         EN61000-4-4 (FF)		
Power Automation         IEC 61850-3, IEEE 1613           EMI         FCC Part 15, CISPR (ENS5022) class A, EN502           EN61000-4-2 (ESD)         EN61000-4-2 (FSD)           EN61000-4-4 (FF)         EN61000-4-4 (FF)		l
EMI FCC Part 15, CISPR (EN55022) class A, EN502 EN61000-4-2 (ESD) EN61000-4-3 (RS) FN61000-4-3 (RS)		
EN61000-4-2 (ESD) EN61000-4-3 (RS) EN61000-4-4 (FFT)	50155 (EN50121-3-2, EN55011, EN55012-4)	
EN61000-4-3 (RS) EN61000-4-4 (EFT)		
EMS EN61000-4-5 (Surge)		
EN61000-4-6 (CS) EN61000-4-8		
EN61000-4-11		
Shock IEC60068-2-27		-
Free Fall IEC60068-2-32		
Vibration IEC60068-2-6		
Safety EN60950-1		
Warranty 5 years		

**IEC 61850-3 Industrial Managed Ethernet** 

Switch