KGC-261-DP/G

KGC-261-DP/I

Industrial Managed

10/100/1000Base-T to Dual-speed Fiber

Media Converter

with PoE++ PSE Support

Installation Guide

For more information, contact:

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TRADEMARKS

Ethernet is a registered trademark of Xerox Corp.

FCC NOTICE

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including the interference that may cause undesired operation.

CE NOTICE

Marking by the symbol indicates compliance of this equipment to the EMC directive 2014/30/EU of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards:

EMC
EN 55032 Class A
CISPR 32
IEC 55024
    IEC 61000-4-2
    IEC 61000-4-3
    IEC 61000-4-4
    IEC 61000-4-5
    IEC 61000-4-6
    IEC 61000-4-8

VCCI-A Notice

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。　　　VCCI－A

Table of Contents

1. Introduction

The KGC-261-DP series are Gigabit Ethernet media converters which provide the following features:

Data Conversion between different Media types and Speed

The media converter supports the following conversions:

- 1000Mbps (1000BASE-T) copper to/from 1000Mbps (1000BASE-X) fiber

- 100Mbps (100BASE-TX) copper to/from 1000Mbps (1000BASE-X) fiber

- 10Mbps (10BASE-T) copper to/from 1000Mbps (1000BASE-X) fiber

- 1000Mbps (1000BASE-T) copper to/from 100Mbps (100BASE-FX) fiber

- 100Mbps (100BASE-TX) copper to/from 100Mbps (100BASE-FX) fiber

- 10Mbps (10BASE-T) copper to/from 100Mbps (100BASE-FX) fiber

Dual-speed SFP Fiber Connectivity

The SFP port can be installed with different optional SFP optical fiber transceiver to support multimode or single mode fiber for short reach up to long reach distance. The SFP can support both 1000BASE-X and 100BASE-FX fiber connection. This feature extends a wider application range with this device.

Link Fault Pass-Through

This important feature of a media converter can force the link to shut down as soon as it notices that the other link has failed. It allows a link partner on one cable segment can notice a link fault occurred on the other segment and give application a chance to react.

802.1Q Control

With software configuration support, the device is enhanced with more 802.1Q control features for VLAN applications rather than just a typical media converter function. The optional features include:

● Filtering all untagged packets

● Filtering all tagged packets

● Filtering tagged packets with certain VID

● Egress un-tagging

● Egress tagging

● Double tagging

● 802.1ad Q-in-Q support

Optical Power Alarm (OPA)

OPA function allows to set lower and upper alarm thresholds for the optical power of the fiber port. The alarm is sent via relay alarm output and SNMP trap.

Auto Laser Shutdown (ALS)

ALS function is supported for the fiber port and used to automatically shut down the output power of the transmitter in case of fiber break for human safety purpose or hazardous environment.

Web Management

The device is embedded with an Http server which provides management functions for advanced network functions including Port Control and 802.1Q and 802.1ad functions. The management can be performed via Web browser based interface over TCP/IP network.

PoE++ PSE

The device is equipped with PoE PSE capability that can deliver output power supporting proprietary PoE++ 90W Type 4 PDs, 802.3at Type 2 high-power PDs, and 802.3af Type 1 PDs. The device supports both Fast Ethernet connection and Gigabit Ethernet connection.

1.1 Model Definitions

Model	Description	IEC 61850-3 & IEEE 1613 Compliance verified
KGC-261-DP/G	Industrial Managed 10/100/1000Base-T to Dual-speed Fiber Media Converter with PoE++ PSE Support	N/A
KGC-261-DP/I	IEC 61850-3 Managed 10/100/1000Base-T to Dual-speed Fiber Media Converter with PoE++ PSE Support	Yes

1.2 Features

- Tri-speed 10Mbps/100Mbps/1Gbps copper to dual-speed 100Mbps/1Gbps fiber conversion

- Comply with IEEE 802.3, 802.3u, 802.3ab, 802.3z, 802.3af, 802.3at standard

- Support full wire speed conversion for Gigabit copper to Gigabit fiber

- Support auto-negotiation with link partners

- Provide dual-speed SFP on fiber port for mounting variety of fiber options

- Provide important LFPT (Link Fault Pass Through) media converter function

- Support Jumbo frame conversion

- Energy efficient Ethernet (EEE) support

- Alarm events relay output

- Fiber support for multimode, short reach up to long reach single mode fiber, Bi-Di applications

- Web-based configuration management support

- Support SNMP management

- Optical Power Alarm (OPA) function if optical power is higher than a upper limit setting or lower than a lower limit setting

- Auto Laser Shutdown (ALS) function in case of fiber cable break

- Multiple built-in power connectors to support a variety of external power supply

Power over Ethernet (PoE) PSE

- Supports both Fast Ethernet and Gigabit Ethernet

- Backward compatible with 802.3af and 802.3at-compliant PDs

- Delivers power output to support 90W PD

- Type 1 ~ Type 4 compliant PD discovery & classification

- Power shutdown protection for incompliant PD

- Power shutdown protection for disconnection

- Power shutdown protection for overload, over-current, and short circuit

1.3 Product Panels

The following figure illustrates the top panel of the device:

Top Panel

Front Panel

KGC-261-DP/G	**KGC-261-DP/I**
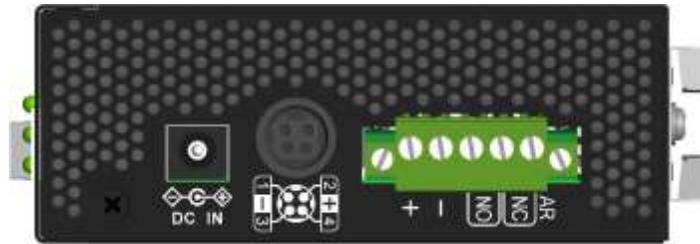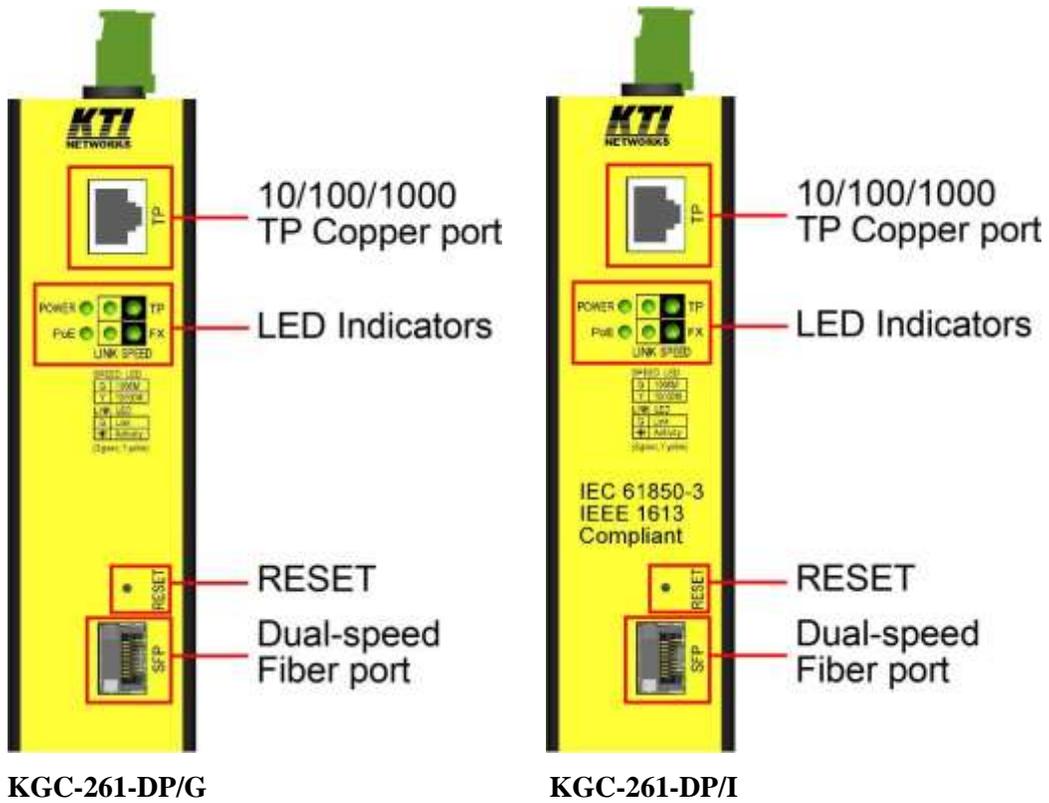
1.4 LED Indicators

LED	Function
POWER	Power status
TP SPEED	UTP port speed status
TP LINK	UTP port link status
FX SPEED	FX port speed status
FX LINK	FX port link status
PoE	PoE power status

1.5 Specifications

10/100/1000 Twisted-pair Copper Port (UTP, RJ-45)

Compliance	IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX, IEEE 802.3u 1000Base-T
Connectors	Shielded RJ-45 jacks
Pin assignments	Auto MDI/MDI-X detection
Configuration	Auto-negotiation, manual settings or software control
Transmission rate	10Mbps, 100Mbps, 1000Mbps
Duplex support	Full/Half duplex
Network cable	Cat.5 UTP or better
PoE	IEEE 802.3af, IEEE 802.3at, Proprietary PoE++ PSE
Pin assignments	V_{poe}: PoE power

Pin	10/100Base-TX	1000Base-T	PoE
1	RX+	BI_DA+	V_{poe}+
2	RX-	BI_DA-	V_{poe}+
3	TX+	BI_DB+	V_{poe}-
4		BI_DC+	V_{poe}+
5		BI_DC-	V_{poe}+
6	TX-	BI_DB-	V_{poe}-
7		BI_DD+	V_{poe}-
8		BI_DD-	V_{poe}-

Dual-speed Fiber Port (FX, SFP)

Compliance	IEEE 802.3 1000Base-X, 100BASE-FX
Connectors	SFP for optional SFP type fiber transceivers
Configuration	Auto, 1000Mbps Full duplex Auto-negotiation, 100Mbps Full
Transmission rate	1000Mbps, 100Mbps (Dual-speed support)
Network cables	MMF 50/125 60/125, SMF 9/125
Eye safety	IEC 825 compliant

Basic Functions

MAC addresses	Support up to 8K
Forwarding technology	Store and forward
Maximum packet length	Jumbo frame support up to 9600 bytes
Flow control	IEEE 802.3x pause frame base for full duplex operation Back pressure for half duplex operation

DC Terminal Block Input

Connector   Flange terminal block 5P

Contacts   Rating 15A 57VDC

Pin	Marking	Remark
1	DC+	DC power input (+)
2	DC-	DC power input (-)
3,4,5	AR	Alarm relay output contacts

Alarm Relay Output

Contacts   3 dry contacts for NC & NO pairs

Rating   30VDC/1A or 120VAC/0.5A

Alarm events   Power failure, configured port link fault, OPA alarm

Pin	Marking	Alarm Relay Output contacts
3,4	AR/NO	NO pair: Normal – open, Alarm - shorted
4,5	AR/NC	NC pair: Normal – shorted, Alarm - open

DC Power Jack

Connector   DC Jack (-Ø6.3mm/+Ø2.0mm) for external AC-DC power adapter

Contacts   Rating 8A 48V

Contact	Marking	Remark
Center (Ø2.0mm)	<+>	DC power input (+)
Outer (Ø6.3mm)	<->	DC power input (-)

DC Power DIN

Connector   Female power Mini-DIN-4 for external AC-DC power adapter

Contacts   Rating 7.5A 48V

Pins	Marking	Remark
2, 4	DC+	DC power input (+)
1, 3	DC-	DC power input (-)

DC Power Input

DC working voltages   +12 ~ +57V for general applications

                                  +45 ~ +57V for PoE applications

Power consumption   4W(PoE inactive), 5W (PoE active)

Protection   Polarity Reversal shutdown

Isolation	DC+/- vs. Frame Ground 1.5KV

RESET

Push Button	Short push - System reset
	Long push – Restore factory default settings

Power Over Ethernet (PoE)

PoE type	PSE
Standard	IEEE 802.3af, IEEE 802.3at, and proprietary PoE++
PSE power pins	Pin 1/2/4/5: V_{poe}+, Pin 3/6/7/8: V_{poe}- (V_{poe} comes from DC power input)
	Power delivery 132W max. at port output (Depending on DC power voltage)
Protection	PoE output shutdown
Protection events	Incompliant PD detection, PD disconnection
	Overload, Over-current, Short-circuit, Under voltage
PD classes support	PSE output vs. PD input

Type	Class	DC power min. [2]	PSE output	PD input min. [3]
1	0	45V	15.4W	12.95W
1	1	45V	4W	3.84W
1	2	45V	7W	6.49W
1	3	45V	15.4W	12.95W
2	4	51V	32W	25.5W
3[1]	5	55V	50W	38.7W
3[1]	6	55V	74W	52.7W
4[1]	7	55V	90W	70W
4[1]	8	55V	128W	90W

[1]: The associated classes are proprietary std.

[2]: The minimum DC power voltage to support the specified PSE output

[3]: The minimum power received at the PD end in worst case

Mechanical

Dimension (base)	40 x 106 x 140 mm (WxDxH)
Housing	Enclosed metal with no fan
Mounting	Din-rail mounting
	Panel mounting (with optional bracket)

MTBF

KGC-261-DP/G	260K hours

KGC-261-DP/I   260K hours

Environmental

Operating Temperature   Typical -40ºC ~ +75ºC

Storage Temperature   -40ºC ~ +85ºC

Relative Humidity   5% ~ 95% non-condensing

Tests and Approvals

FCC Part 15 rule Class A

CE EMC Class A

VCCI Class A

EN 55032 Emission

IEC 55024 Immunity

IEC 61850-3 EMC & environment for power substation

IEEE 1613 for power substation

LVD, IEC60950-1 Safety

IEC 60068-2-64 Vibration

IEC 60068-2-27 30G Shock test

Management:

Management	Web-based browser interface, SNMP manager
Port Control	Operating mode, Flow control, LLDP
Packet Filtering	802.1Q tagged packet filtering, Untagged packet filtering
802.1Q VLAN	Ingress 802.1Q tag stripping, Egress 802.1Q tagging (tag insertion)
	S-tag tagging (802.1ad double tagging)
OPA Control	Configuration
ALS Control	Configuration
PoE	Power over Ethernet control
Maintenance	Restore factory default, reboot, firmware update, configuration file save & upload
SNMP Private MIB	DDM status, OPA control, ALS control, PoE status
SNMP Trap	Trap events: Boot up, Port link change, OPA trap
Power saving	Disable, Link Up, Link Down, Full

1.6 IEC 61850-3 & IEEE 1613

KGC-261-DP/I model has been verified that it is compliant with IEC 61850-3 EMC, environmental and mechanical requirements and IEEE 1613 requirements for power substations.

IEC 61850-3

IEC 61850-3 defines the general requirements, mainly regarding construction, design and environmental conditions for utility communication and automation IEDs (intelligent electronic devices) and systems in power plant and substation environments.

IEEE 1613

IEEE Standard Environmental and Testing Requirements for Communications Networking Devices in Electric Power Substations

KGC-261-DP/I: IEC 61850-3 EMC Test Specifications

IEC 61850-3	Test	Level
C 6.7.4 / EN 55022	DC IN conducted emission	Class A
C 6.7.4 / EN 55022	LAN conducted emission	Class A
C 6.7.4 / EN 55022	Radiated emission	Class A
C 6.7.3 / IEC 61000-4-2	ESD	+/-15kV Air, +/-8kV Contact
C 6.7.3 / IEC 61000-4-3	RFS	20V/m
C 6.7.3 / IEC 61000-4-4	EFB	DC IN & LAN: +/-4kV
C 6.7.3 / IEC 61000-4-5	Surge	DC IN +/-1kV, LAN +/-4kV
C 6.7.3 / IEC 61000-4-6	CD	DC IN & LAN: 10V
C 6.7.3 / IEC 61000-4-8	PFM	100A/m, 1000A/m
C 6.7.3 / IEC 61000-4-11	AC power Dip	N/A: No AC input in DUT
C 6.7.3 / IEC 61000-4-16	MFV	DC IN & LAN: 30V/300V
C 6.7.3 / IEC 61000-4-17	DC ripple	10% of DC IN
C 6.7.3 / IEC 61000-4-18	Damped Oscillatory Wave	DC IN & LAN: +/-2.5kV
C 6.7.3 / IEC 61000-4-29	DC dips and interruption	DC IN 40% 0.1s, 0% 50ms

KGC-261-DP/I: IEC 61850-3 Environmental Test Specifications

IEC 61850-3	Test	Specification
C 6.9.3	Dry heat - operational	+75℃, 30%RH, 72hrs
C 6.9.3	Cold – operational	-40℃, 72hrs
C 6.9.3	Change of temperature - operational	-40 ~ 75℃, 3hr, 6 cycles
C 6.9.3	Damp heat - operational	+75℃, 95%RH, 72hrs

C 6.9.3	Damp heat – steady state	+40℃, 95%RH, 48hrs
C 6.9.3	Humidity	+25℃ 95%RH 12hrs/ 55ºC 95%RH 12hrs, 2 cycles
C 6.9.3	Dry heat - storage	+85℃, 30%RH, 96hrs
C 6.9.3	Cold – storage	-40℃, 96hrs

KGC-261-DP/I: IEC 61850-3 Mechanical Test Specifications

IEC 61850-3	Test	Specification
C 6.10	Vibration – resonant search	Class 2, 1Gn, 1/axis
C 6.10	Vibration – endurance	Class 2, 2Gn, 20/axis
C 6.10	Shock - responds	Class 2, 10Gn, 11ms, 3/axis
C 6.10	Shock - withstand	Class 2, 30Gn, 11ms, 3/axis
C 6.10	Shock – bump	Class 2, 20Gn, 16ms, 1000/axis
C 6.10	Seismic	Class 2, x – 2Gn, y – 1Gn, 10min.
C 6.10	Enclosure protection	Ingress of solid foreign subjects >=2.5mm

KGC-261-DP/I: IEEE 1613 Test Specifications

IEEE 1613	Test	Level
Clause 4.1	DC rated control power inputs	80% 100% Max. DC IN
Clause 4.2	Ripple on DC power input	10%
Clause 4.3	AC rated control power inputs	N/A: No AC input in DUT
Clause 5.2	Dielectric strength	DC IN vs. LAN ports: 2.8kV
Clause 5.3	Impulse voltage	DC IN vs. LAN ports: 1000Vac
Clause 6 / EMC	1Mhz oscillatory wave	DC IN & LAN: +/-2.5kV
Clause 6 / EMC	EFB	DC IN & LAN: +/-4kV
Clause 7 / EMC	RFS	20V/m
Clause 8 / EMC	ESD	+/-15kV Air, +/-8kV Contact

2. Installation

2.1 Unpacking

The product package contains:

- The device unit for Din-rail mounting
- QR code label linking to product documentation folder

2.2 Safety Cautions

To reduce the risk of bodily injury, electrical shock, fire and damage to the product, observe the following precautions.

|	
	Do not service any product except as explained in your system documentation.
	Opening or removing covers may expose you to electrical shock.
	Only a trained service technician should service components inside these compartments.
	If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your trained service provider: - The power cable, extension cable, or plug is damaged. - An object has fallen into the product. - The product has been exposed to water. - The product has been dropped or damaged. - The product does not operate correctly when you follow the operating instructions.
	Do not push any objects into the openings of your system. Doing so can cause fire or electric shock by shorting out interior components.
	Operate the product only from the type of external power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult your service provider or local power company.
	Since the surface temperature of the device may be higher than 70℃ in range of the rated operating temperatures, install and operate the product only by authorized personnel only. Install the product at a restricted area where un-authorized persons cannot reach.

2.3 Mounting the Device to a DIN-Rail

In the product package, a DIN-rail bracket is provided or has been installed for mounting the device in a industrial DIN-rail enclosure.

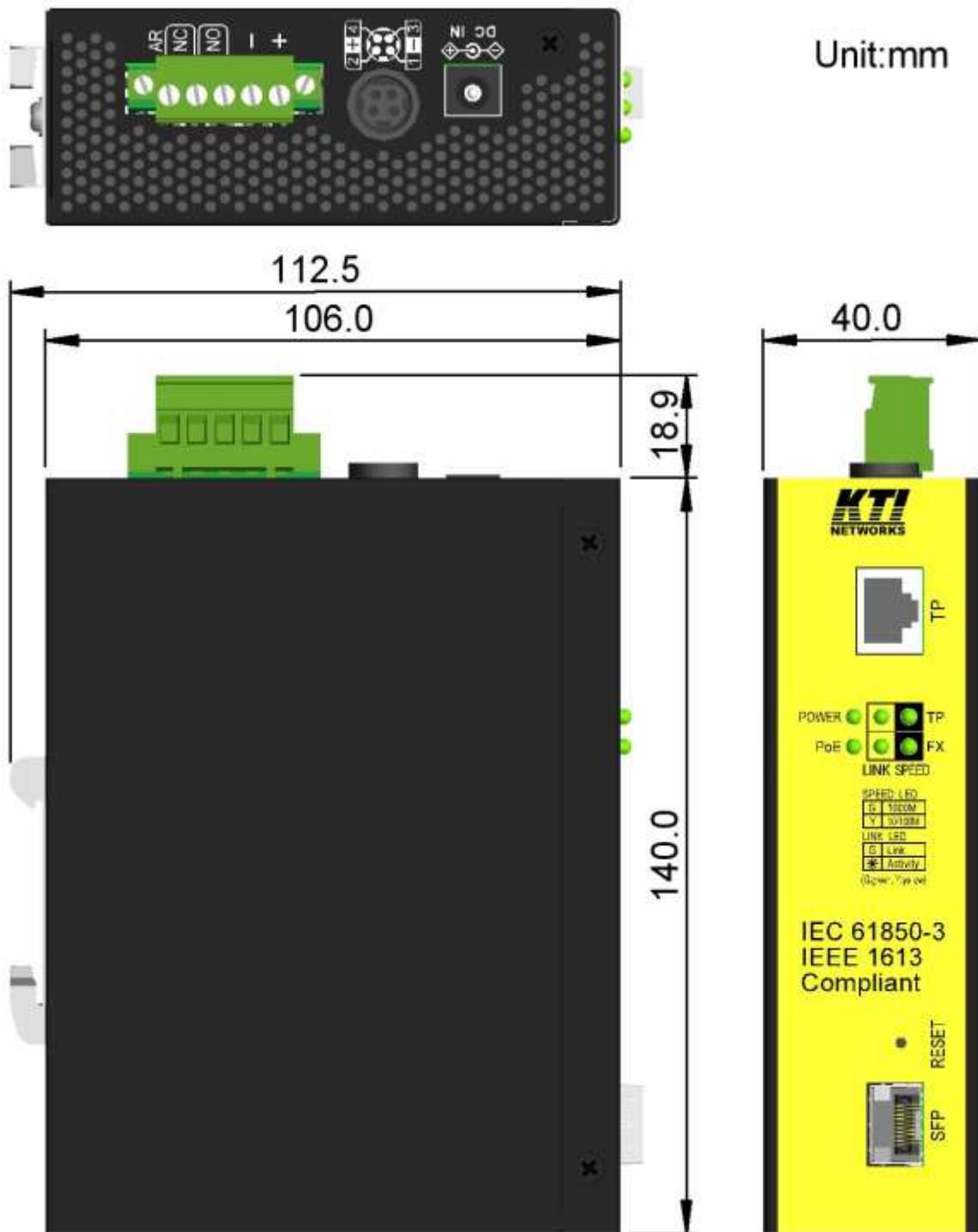The steps to mount the device onto a DIN rail are:

1. Install the mounting bracket onto the back of the device with screws as shown below:

2. Attach bracket to the lower edge of the DIN rail and push the unit upward a little bit until the bracket can clamp on the upper edge of the DIN rail.

3. Clamp the device to the DIN rail and make sure it is mounted securely.
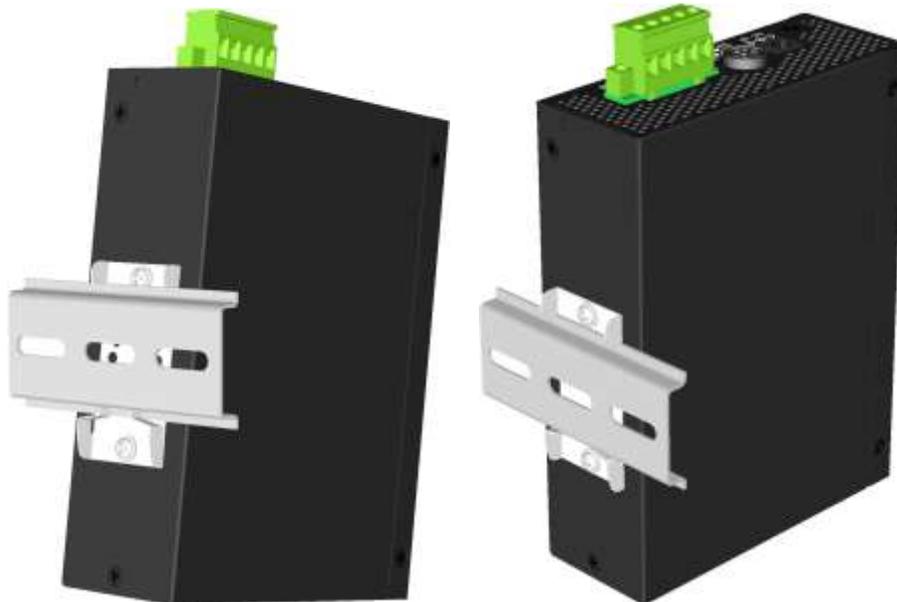
Both models are with same dimension. The final dimension after DIN-rail bracket is installed is:

Unit:mm

112.5

106.0

40.0

18.9

140.0

KTI
NETWORKS

TP

POWER TP
PoE FX
LINK SPEED

SPEED LED
G 1000M
Y 10/100M
LINK LED
G Link
Activity

IEC 61850-3
IEEE 1613
Compliant

RESET

SFP

2.4 Mounting the Device on a Panel

The device may be provided optionally with a panel mounting bracket. The bracket supports mounting the device on a plane surface securely. The mounting steps are:
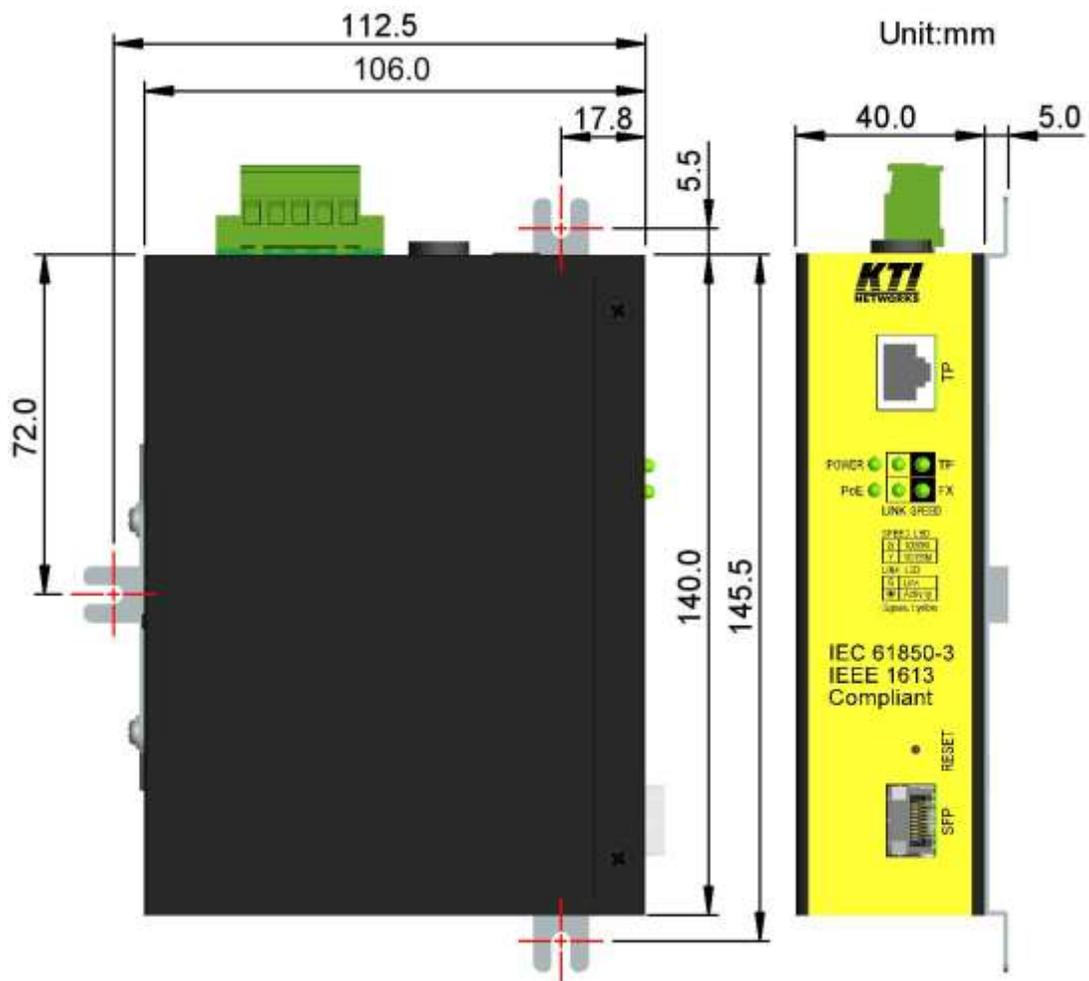
1. Install the mounting bracket on the device.

2. Screw the bracket on the device.
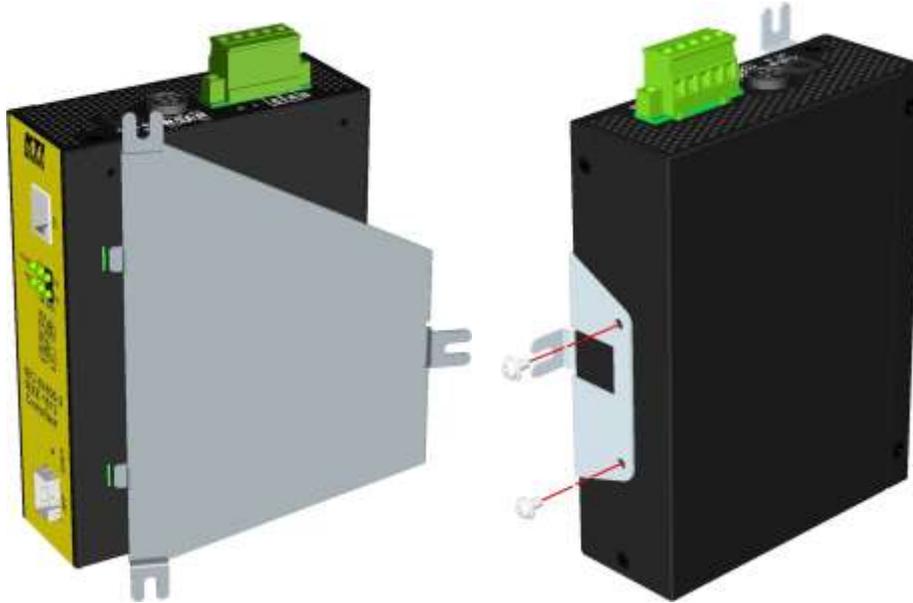
3. Screw the device on a panel and the locations for screws are shown below:

Both models are with same dimension. The final dimension after the bracket is installed is:

2.5 Applying Power

DC Power Connectors

The device is featured with three different DC power input connectors for supporting different types of external AC-DC power supply or AC-DC power adapters.

Note: Each connector has its own contact rating.

DC Power

The DC power input is used to support not only the power consumed by the device itself but also power for the remote PoE Device (PD) over the Cat.5 cable directly.
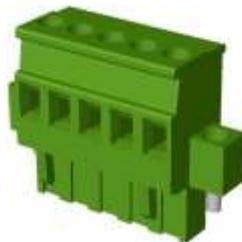
2.5.1 DC power Terminal Block
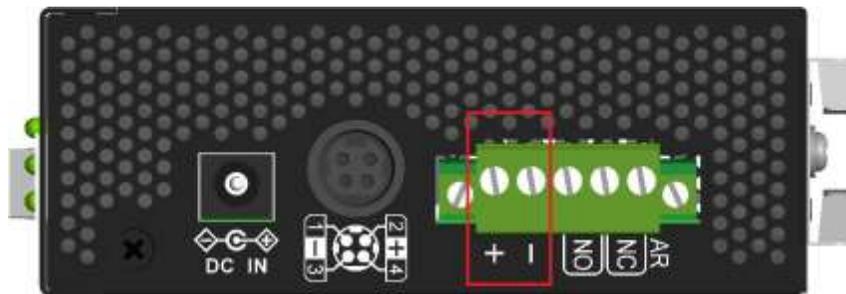
Connector: European 5P flange terminal block

DC Power input contacts:

Pin	1	+	DC+ Positive (+) input terminal
	2	-	DC– Negative (–) input terminal

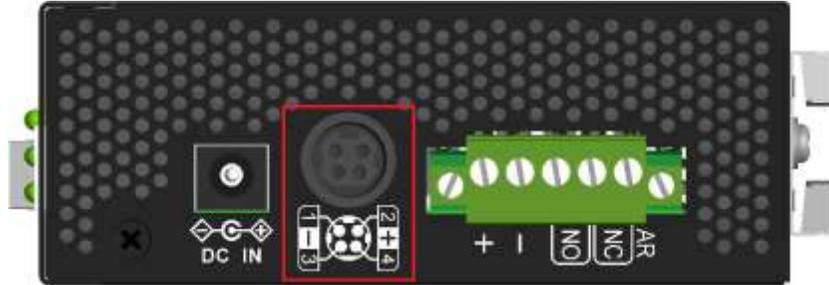Terminal Plug: A 5P flange terminal plug

Power wires: 24 ~ 12AWG (IEC 0.5~2.5mm^2)

Wire length: 1 meter max.

Contact rating: 15A +57V

2.5.2 DC Power DIN

Connector: Female power DIN for external AC-DC power adapter

Contacts:

Pins	Marking	Remark
2, 4	DC+	DC power input (+)
1, 3	DC-	DC power input (-)

Rating: 7.5A +48V

2.5.3 DC Power Jack
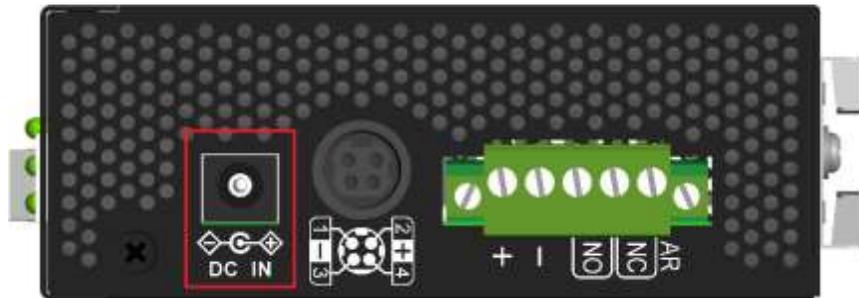
Connector: DC Jack (-Ø6.3mm/+Ø2.0mm) for external AC-DC power adapter

Contacts:

Contact	Marking	Remark
Center (Ø2.0mm)	<+>	DC power input (+)
Outer (Ø6.3mm)	<->	DC power input (-)

Rating: 8A +48V,

2.6 Alarm Relay Output
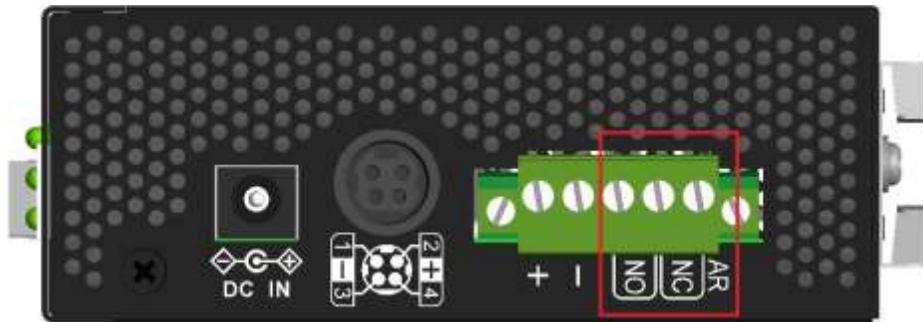
Alarm relay output is provided for reporting failure events to a remote alarm relay monitoring system. The replay output is provided with three contacts next DC power interface on the terminal block connector.

Alarm Relay output pins and logic:

Pin			
	3	4	Alarm relay output, NO (Normal Open) contacts
	NO		Normal: Open, Alarm: Shorted
	4	5	Alarm relay output, NC (Normal Close) contacts
	NC		Normal: Shorted, Alarm: Open

The relay output can connect relay monitoring system. Both of NO and NC logic are provided individually for logic selection.

Alarm Events

- Input power failure
- Configured port link fault
- OPA alarm

Note:

Be sure the voltage applied on the relay contacts is within the specification of 30VDC/1A max. or 120VAC/0.5A max.

2.7 Reset Button

The reset button is used to perform a reset to the device. It is not used in normal cases and can be used for diagnostic purpose. If any network hanging problem is suspected, it is useful to push the button to reset the device without turning off the power. Check whether the network is recovered.
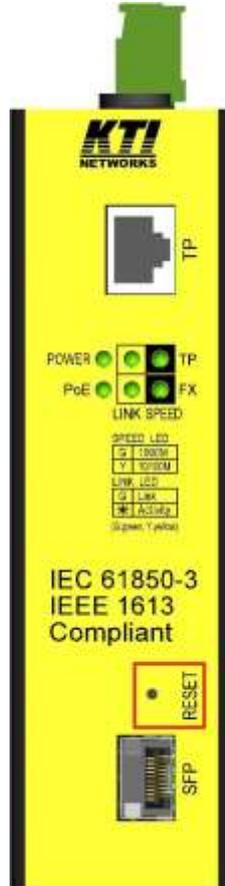

The button can also be used to restore the software configuration settings to factory default values.

The operations are:

Operation	Function
Press the button and release during operation	Reset & boot up the device. The behavior is same as power boot procedure.
Press the button when boot-up until all LEDs blink.	Boot & restore all factory default settings

3. Making LAN Connections

3.1 10/100/1000 TP Copper Port
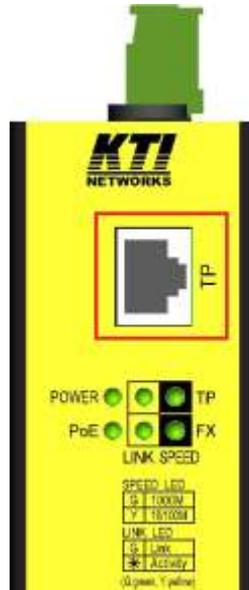
The 10/100/1000 TP copper port supports the following connection types and distances:

Network Cables

10BASE-T: 2-pair UTP Cat. 3, 4, 5 , EIA/TIA-568B 100-ohm

100BASE-TX: 2-pair UTP Cat. 5, EIA/TIA-568B 100-ohm

1000BASE-T: 4-pair UTP Cat. 5 or higher (Cat.5e is recommended), EIA/TIA-568B 100-ohm

Link distance: Up to 100 meters for all above

Auto MDI/MDI-X Function

This function allows the port to auto-detect the twisted-pair signals and adapts itself to form a valid MDI to MDI-X connection with the remote connected device automatically. No matter a straight through cable or crossover cable are connected, the ports can sense the receiving pair automatically and configure themselves to match the rule for MDI to MDI-X connection. It simplifies the cable installation.

Auto-negotiation Function

The port is featured with auto-negotiation function and full capability to support connection to any Ethernet devices. The port performs a negotiation process for the speed and duplex configuration with the connected device automatically when each time a link is being established. If the connected device is also auto-negotiation capable, both link partners will come out the best configuration after negotiation process. If the connected device is incapable in auto-negotiation, the port will sense the speed and use half duplex for the connection.

3.2 Making Fiber Connection

The SFP slot (FX port) must be installed with an SFP fiber transceiver for making fiber connection. Your device may come with an SFP transceiver pre-installed when it was shipped.
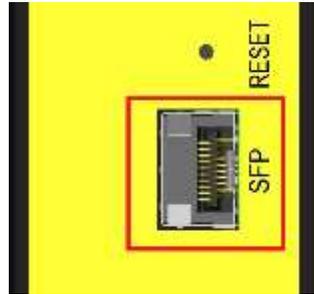
Installing SFP Fiber Transceiver

To install an SFP fiber transceiver into SFP slot, the steps are:

1. Turn off the power to the device unit.
2. Insert the SFP fiber transceiver into the SFP slot. Normally, a bail is provided for every SFP transceiver. Hold the bail and make insertion.

3. Until the SFP transceiver is seated securely in the slot, place the bail in lock position.

Dual Speed Support

The SFP slot supports 1000BASE-X based SFP fiber transceivers and 100BASE-FX based SFP fiber transceivers. Refer to Section 2.7 DIP SW Configuration for FX port operating mode setting.

Connecting Fiber Cables

LC connectors are commonly equipped on most SFP transceiver modules. Identify TX and RX connector

before making cable connection. The following figure illustrates a connection example between two fiber ports:
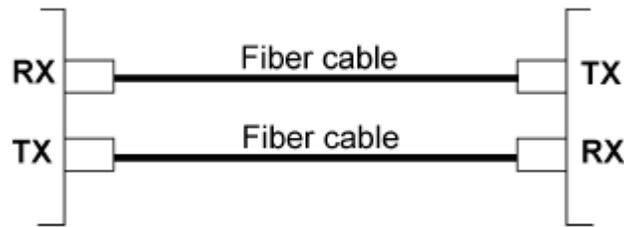
Make sure the Rx-to-Tx connection rule is followed on the both ends of the fiber cable.

Network Cables

Multimode (MMF) - 50/125, 62.5/125

Single mode (SMF) - 9/125

3.3 Making PoE Connection
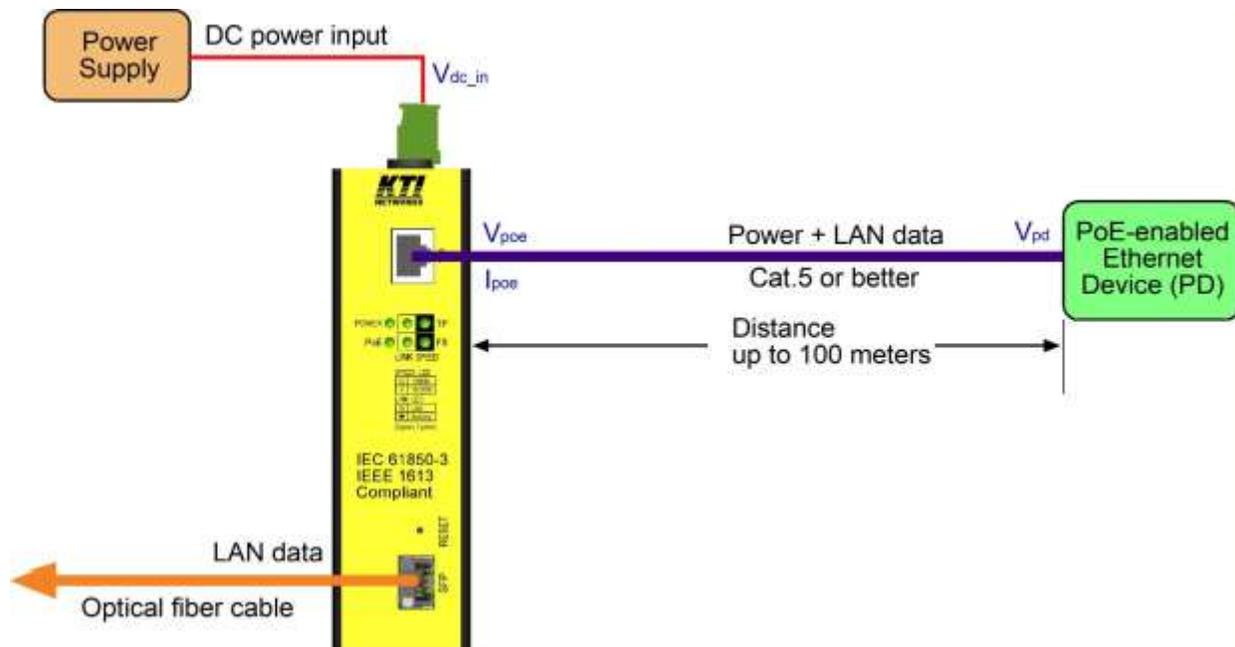
The device is equipped with PoE PSE function, which can supply power to a remote Ethernet device together with LAN data via TP port over Cat.5 cable. Above figure is a standard PoE connection example. By auto-detection and classification, the device supports the following PD types and classes:

Classification for the Compatible PD Types and Power Level

Type	PD Class	IEEE Standard	PSE output power max.	PD input power min. (*1)
1	0	802.3af PoE	15.4W	12.95W
1	1	802.3af PoE	4W	3.84W
1	2	802.3af PoE	7W	6.49W
1	3	802.3 af PoE	15.4W	12.95W
2	4	802.3at PoE+	32W	25.5W
3	5 (*2)	Proprietary PoE++	50W	38.7W
3	6 (*2)	Proprietary PoE++	74W	52.7W
4	7 (*2)	Proprietary PoE++	90W	70W
4	8 (*2)	Proprietary PoE++	128W	90W

*1: The minimum power received at the PD end in worst case with the specified maximum PSE output.

*2: The proprietary classes are not defined by IEEE. They support higher PoE power level than ever. The classification must be completed by the compatible PSE and PD devices.

PoE power pins on TP port

Pin	10/100Base-TX	1000Base-T	PoE
1	RX+	BI_DA+	$V_{poe}+$
2	RX-	BI_DA-	$V_{poe}+$
3	TX+	BI_DB+	$V_{poe}-$
4		BI_DC+	$V_{poe}+$
5		BI_DC-	$V_{poe}+$
6	TX-	BI_DB-	$V_{poe}-$
7		BI_DD+	$V_{poe}-$
8		BI_DD-	$V_{poe}-$

V_{poe}: PoE power voltage on TP port

DC power input vs. PoE power output

Type	PD Class	Working V_{dc_in}	I_{poe} max.
1	0	+45 ~ 57V	0.375A
1	1	+45 ~ 57V	0.112A
1	2	+45 ~ 57V	0.208A
1	3	+45 ~ 57V	0.375A
2	4	+45 ~ 57V	0.636A
3	5	+45 ~ 57V	0.919A
3	6	+45 ~ 57V	1.35A
4	7	+45 ~ 57V	1.65A
4	8	+45 ~ 57V	2.32A

1. V_{poe} is equal to V_{dc_in} with a small voltage drop of 0.2V typically.

2. I_{poe} max. can be treated as a threshold of over-current event.

3. PSE output power max. $\sim= V_{poe} * I_{poe}$ max.

4. The V_{pd} measured at the PD end may be in the range of 36 ~ 57VDC.

5. $V_{pd} \sim= V_{poe}$ – Voltage drop over Cat.5

    Data of typical voltage drop over standard Cat.5 (Wire: 24AWG, Length: 100m):

I_{poe}	Cable pairs	Voltage drop
2A	4	2V
2A	2	8.3V
1A	4	1V
1A	2	4.1V

PoE Shutdown Protection for events:

1. Detection of an incompatible PD

2. Disconnection of a classified PD

3. Over-current

4. Short-circuit

3.4 LED Indication
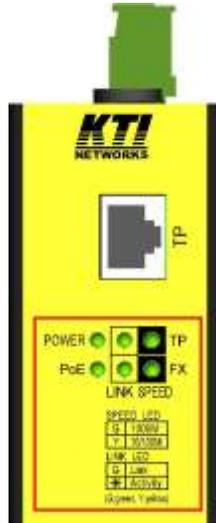
OPERATION

LED	Function	Color	State	Interpretation
POWER	Power status	Green	ON	The power is supplied to the device.
			OFF	The power is not supplied to the device.
PoE	PoE status	Green	ON	The PoE power is delivered to PD.
			OFF	The PoE power is off.
TP SPEED	Port speed status	Green	ON	TP port is running on speed 1Gbps (1000Mbps)
		Yellow	ON	TP port is running on speed 100Mbps or 10Mbps
TP LINK	Port link status	Green	ON	TP Port link is established.
		Green	BLINK	TP Port link is up and there is traffic.
			OFF	TP Port link is down.
FX SPEED	Port speed status	Green	ON	FX port is running on speed 1Gbps (1000Mbps)
		Yellow	ON	FX port is running on speed 100Mbps
FX LINK	Port link status	Green	ON	FX Port link is established.
		Green	BLINK	FX Port link is up and there is traffic.
			OFF	FX Port link is down.

BOOT-UP / RESET

LED	Color & State	Interpretation
2 SPEED LEDs	Quick blinking	Device initialization
All 4 LEDs	Green ON -> Yellow ON -> OFF	Device boot-up finished with normal result
2 SPEED LEDs	Slow blinking	Device boot-up finished with error result

4. Functions

This chapter describes some advanced functions provided by the media converter.

4.1 Converter Function

Media Conversion

The device supports the following data conversions between fiber cable and twisted-pair Cat.5 (copper) cable:


The data rate on twisted-pair segment depends on the link speed finally established with the link partner.

4.2 Link Fault Pass Through Function

When the Link Fault Pass Through (LFPT) function is enabled and the media converter detects a link fault on one port segment, it will force the other port segment link down. It looks like that a link fault is passed from one port to the other.

The following example illustrates a link fault occurs on the fiber cable (any one cable in a duplex fiber connection). The link fault is forwarded to both copper link partners finally by LFPT operation of two media converters.
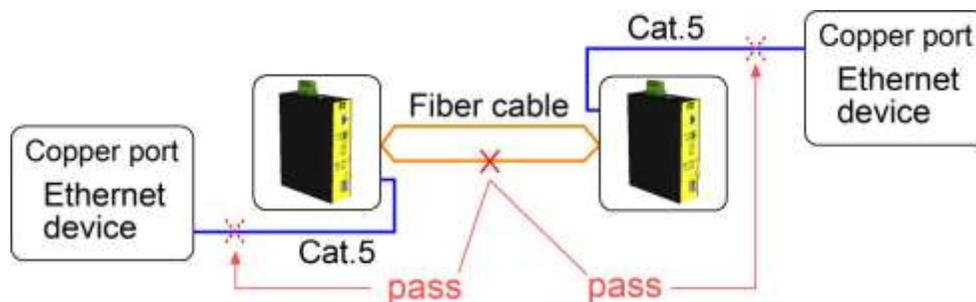
Both Ethernet devices will also detect a link fault on each Cat.5 connection, although the real fault occurs on the fiber connection exactly.

The following example illustrates a real link fault occurs on one Cat.5 and the link fault is passed to the other Cat.5 over two converters and the fiber cable by LFPT operation. Finally, the other link partner also detects a link fault.
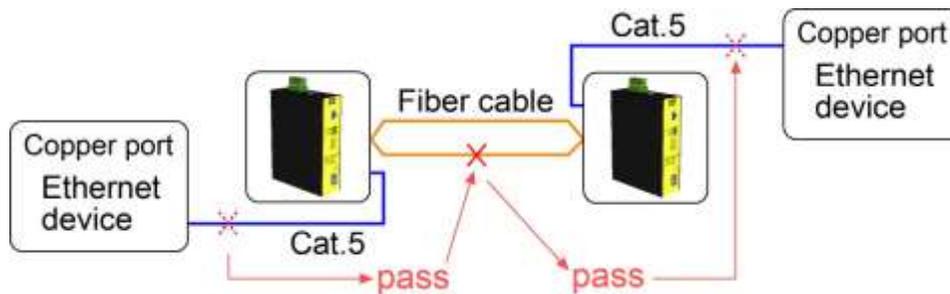
Advantage

The function allows two remote link partners of the media converters detect the link fault finally no matter where the exact fault occurs. It allows the upper application takes necessary action in case a real link fault occurs in any cable segment.
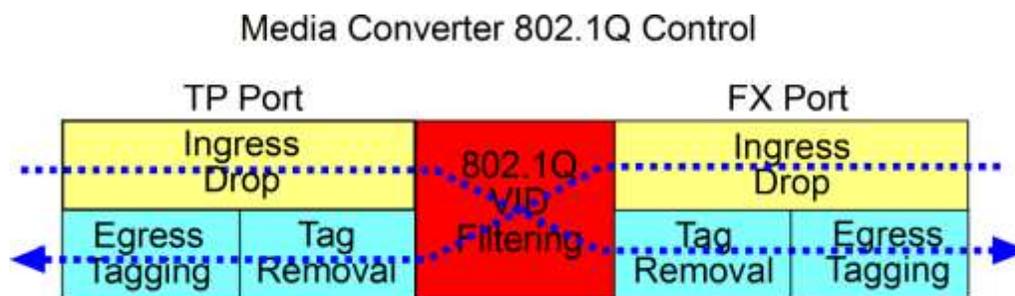
Methods to enable the function

The LFPT function can be enabled by:

    Software setting: Web management ->

                           Configuration -> System -> [Link fault pass through]

4.3 802.1Q Control Function

802.1Q Control function allows perform 802.1Q VLAN related operation to the packets passing through the media converter according packet contents as follows:

[Ingress Drop] setting

The setting is the first filtering mechanism to filter incoming packets based on frame types. The options are:

Disable -   disable port ingress drop and admit all packet types

Drop Untag -   drop all untagged frames

Drop C-tag -   drop frame with outer tag TPID 0x8100

Drop S-tag -   drop frame with outer tag TPID 0x88A8

Drop All taggged -   drop frames with outer tag TPID 0x8100 or 0x88A8

802.1Q VID Filtering

802.1Q VID Filtering function allows to admit or reject certain VID tagged packets. Up to 16 "*allowed*" (positive list) or "*rejected*" (negative list) VIDs can be configured. This function allows limit certain frames to pass from one link segment to another one. Disabling 802.1Q filtering function also sets VLAN to "Port-based" mode. Enabling the function sets VLAN to "VLAN aware" mode.

[VID Table]

Disable -   802.1Q VID filtering is disabled.

Allowed VID -   Only the frames with classified VIDs in VID table are admitted.

Rejected VID -   The frames with classified VIDs in VID table are rejected and dropped.

Each ingress frame is classified via VLAN classification and gets one Classified Tag. The Classification Tag is bundled to the frame in passing through VLAN operation until egress. Refer to next section for more information.

[Tag Removal] setting

This setting is used to remove tags of the incoming frames if available. The options are:

Keep All tags -   disable tag removal

Pop up 1 tag -   remove up to 1 tag (outer tag if available)

Pop up 2 tag -   remove up to 2 tags (outer and inner tag if available)

Egress Tagging – [Egress Tagging Rule] setting

Tag is inserted into the outgoing frame in egress operation.

Type 0 –   Port Egress Tagging disabled

Type 1 –   Tag all frames

Type 2 –   Tag all frames, except priority-tagged frames (VID=0) and
             frame with VID= Exceptional VID

Type 3 –   Tag all frames, except priority-tagged frames (VID=0)

Egress Tagging - [Tagging Exceptional VID (Type 2)] setting

Type 2 exceptional VID in Tagging rule, *1 ~ 4095* - decimal 12-bit VID value

4.3.1 VLAN Operation

This section describes the operation relations between different configuration settings.

[802.1Q Filtering] setting options		*Disable*	*Allowed VIDs* *Rejected VIDs*
VLAN operation for TP port and FX port		*Port-based mode*	*VLAN aware mode*
Each ingress frame is classified with one Classified Tag: **(outer tag is classified if double tagged)**	**Classified Tag – VID, PCP, DEI, TPID**	*For all types of ingress frames* *Classified Tag =>* *VID= [Default Tag – VID]* *PCP= [Default Tag – PCP]* *DEI= [Default Tag – DEI]* *TPID=0x8100*	*For untagged frames* *Classified Tag =>* *VID= [Default Tag – VID]* *PCP= [Default Tag – PCP]* *DEI= [Default Tag – DEI]* *TPID=0x8100*
			For priority tagged frame *Classified Tag =>* *VID= [Default Tag – VID]* *PCP= Frame outer tag – PCP* *DEI= Frame outer tag – DEI* *TPID= Frame outer tag – TPID*
			For all tagged frame *Classified Tag =>* *VID= Frame outer tag – VID* *PCP= Frame outer tag – PCP* *DEI= Frame outer tag – DEI* *TPID= Frame outer tag – TPID*
VID Filtering		*No filtering*	*For untagged frames =>* *No filtering*
			For other types of frames => *Filtering based on VID table configuration and the classified Tag – VID*
			Note: *[Management VLAN] – VID,* *TP port PVID and FX port PVID are always permitted.*
[Egress Tagging Rule] options		*Type 0, Type 1*	*Type 0, Type 1,Type 2,Type 3*

[Egress Tag TPID] options		0x8100(C-tag) 0x88A8(S-tag) s-customer-tag 1	0x8100(C-tag) 0x88A8(S-tag) s-custom-tag 1 s-custom-tag 2
Egress tagging operation	**Inserted Tag - VID, PCP, DEI**	*Use Classified Tag - VID, PCP, DEI*	*Use Classified Tag - VID, PCP, DEI*
	Inserted Tag - TPID	*[Egress Tag TPID] = 0x8100(C-tag) or 0x88A8(S-tag) => Use the setting value*	*[Egress Tag TPID] = 0x8100(C-tag) or 0x88A8(S-tag) => Use the setting value*
		[Egress Tag TPID] = s-custom-tag 1 => Use [Custom TPID] setting	*[Egress Tag TPID] = s-custom-tag 1 => Use [Custom TPID] setting*
			[Egress Tag TPID] = s-custom-tag 2 => Use [Custom TPID] setting if Classified Tag TPID = 0x88A8 All other cases, use 0x8100(C-tag)

4.4 SNMP Trap Function

SNMP trap function allows the device to send trap message to an SNMP trap host over SNMP protocol when the associated trap event occurs.

SNMP Trap settings

The settings are used to configure a trap host who can receive the SNMP trap message issued from a media converter device unit.

[SNNP Trap destination]

The IP address of the target SNMP trap host who is allowed to receive the traps.

[SNMP Trap community]

The community string bound in a trap message

SNMP Trap events

The following events are defined for generating a trap message when the event occurs on the unit.

● The device boot up.

● TP copper port link down

● TP copper port link up (link recovery)

● FX fiber port link down

● FX fiber port link up (link recovery)

● OPA alarm trap for FX fiber port

The following example illustrates an event of FX port link down occurs and is detected by the device. Then, it generates a trap message to the SNMP trap host PC.
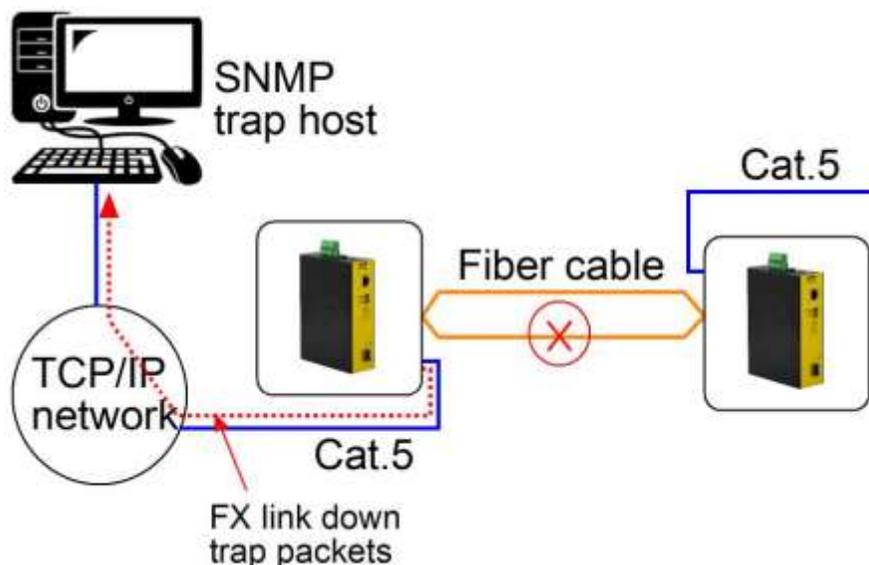
5. Web Management

The media converter features an http server which can serve the management requests coming from any web browser software over TCP/IP network.

Set IP Address for the System Unit

Before the device unit can be managed from a web browser software, make sure a unique IP address is configured for the unit.

5.1 Start Browser Software and Making Connection

Start your browser software and enter the IP address of the unit to which you want to connect. The IP address is used as URL for the browser software to search the device.

> URL: http://xxx.xxx.xxx.xxx/

Factory default IP address: 192.168.0.2
Factory default password: 123↵

5.2 Login to the Device Unit

When browser software connects to the device unit successfully, a Login screen is provided for you to login to the device as follows:

The device will accept only one successful management connection at the same time. The other connection attempts will be prompted with a warning message.

A new connection will be accepted when the current user logout successfully or auto logout by the device due to no access for time out of 5 minutes. *System Configuration* is displayed after a successful login.

5.3 Main Management Menu

The following information describes the basic functions of the main menu.

Configuration

System	Device information, system and IP related settings
Ports	Port link status, operation mode configuration and other per port settings
LLDP	Settings for LLDP support
OPA	Optical Power Alarm function
ALS	Auto Laser Shutdown function

Monitoring

Statistics Overview	List statistics for the local ports and remote TP port link status
LLDP Statistics	Statistics counters of LLDP operation
LLDP Tables	LLDP information received
SFP DDM	Fiber port DDM status

PoE   PoE status

Ping   Ping utility command

<u>Maintenance</u>

Reboot System	Command to reboot the device unit
Restore Default	Command to restore the device unit with factory default settings
Update Firmware	Command to update the device's firmware
Configuration File Transfer	Configuration file download & upload
Logout	Command to logout from current web management

5.4 Configuration

5.4.1 System

System Configuration

MAC Address	00-40-F6-CF-00-00
S/W Version	1.0
H/W Version	1.0
Active IP Address	192.168.0.210
Active Subnet Mask	255.255.255.0
Active Gateway	0.0.0.0
DHCP Server	0.0.0.0
Lease Time Left	0 secs

DHCP Enabled	☐
Fallback IP Address	192.168.0.210
Fallback Subnet Mask	255.255.255.0
Fallback Gateway	0.0.0.0
WDT	○ Enable ◉ Disable
Management VLAN	0
Name	
Password	●●●
Inactivity Timeout (secs)	300 (0 or 60~10000)
SNMP enabled	☐
SNMP Trap destination	0.0.0.0
SNMP Read Community	public
SNMP Write Community	private
SNMP Trap Community	public

Operating Mode	Advanced Mode [Change]
802.1Q Control	○ Enable ◉ Disable
Jumbo Mode	○ Enable ◉ Disable
Link fault pass through	○ Enable ◉ Disable
Power Saving Mode	○ Enable ◉ Disable

[Apply] [Refresh]

Configuration	Description
MAC Address	The MAC address factory configured for the device.
	It can not be changed in any cases.
S/W Version	Firmware version currently running
H/W Version	Hardware version currently operating
Active IP Address	Current IP address for the device management
Active Subnet Mask	Current subnet mask for IP address for the device management
Active Gateway	Current gateway IP address for the device management
DHCP Server	Current IP address of the DHCP server
Lease Time Left	The time left for the lease IP address currently used
DHCP Enabled	Use DHCP to get dynamic IP address configuration for the device
Fallback IP Address	IP address used when DHCP mode is disabled
Fallback Subnet Mask	Subnet mask for IP address used when DHCP mode is not enabled
Fallback Gateway	Default gateway IP address used when DHCP mode is not enabled
WDT	Watch Dog Timer
Management VLAN	Set management VLAN ID
Name [*1]	Set the system name for this device unit
Password	Set new password
Inactivity Timeout	No user interaction timeout for web disconnection (Auto logout). Options:
	0 - no timeout
	60 ~ 10000 seconds
SNMP enabled	Enable SNMP agent
SNMP Trap destination	The IP address of the SNMP trap manager
SNMP Read community	SNMP community allowed for the SNMP [get] message
SNMP Write community	SNMP community allowed for the SNMP [set] message
SNMP Trap community	SNMP community used for the SNMP trap messages sent by the device
Operating Mode	Select operating mode
	Basic – Configuration for transparent conversion (no packet modification)
	[802.1Q Control] disabled
	[802.1Q Filtering] disabled
	[Jumbo Frame] enabled
	[LLDP] disabled
	[Management VLAN] disabled
	Advanced – user is free to configure all above function settings
802.1Q Control	802.1Q Control function main configuration
	Disable - all packets are allowed to pass with no 802.1Q control.

	Enable - 802.1Q control mechanism is activated for the conversion.
Jumbo Mode	Enable / disable Jumbo mode to support jumbo packets
	Disable - support maximum packet size up to 1526 bytes
	Enable - support maximum packet size up to 9600 bytes
Link fault pass through	Enable / disable link fault pass through function
Power Saving Mode	Enable / disable port link down power saving mode
[Change]	Click to change operating mode
[Apply]	Click to apply the configuration change
[Refresh]	Click to refresh current configuration

Note:

1. *It is suggested to give each device unit a system name as an alternative unique identification beside IP address.*

2. *Setting change of DHCP mode takes effective in next boot-up.*

Click Change :

Operting Mode Configuration

Advanced Mode ▼

Apply   Refresh   Back

Remark

Operting Mode :
Basic Mode   - Configuration for transparent conversion (no packet modification)
                    [802.1Q Control] disabled
                    [802.1Q Filtering] disabled
                    [Jumbo Frame] enabled
                    [LLDP] disabled
                    [Management VLAN] disabled
Advanced Mode - All above functions are free for configuration

Note: [Apply] will get system re-configured. The re-configuration takes a while. Please be patient.

Click Apply to make change and get system re-configured:

The re-configuration takes a while.

5.4.1.1 Management VLAN

Management VLAN settings allow administrator to access the device and perform the management over a dedicated VLAN.

The following rules are applied with the Management VLAN:

1. If [Management VLAN] setting is VID=0, no limitation is applied in accessing the web management interface, but password authentication.
2. If [Management VLAN] setting is VID>0, the web (http) server only replies to the management hosts through the tagged packets with the embedded VID same as the configured [Management VLAN] setting.
3. The web (http) server can accept untagged or tagged management accessing packets. Reply to the web access host based on the following rule:

Incoming web access packets	Reply packets (Outgoing to the management host)
Untagged packets	None
Tagged packets	Packets tagged with configured management VLAN VID

4. The SNMP trap packets sent by the system is untagged.
5. The configured VID is always included in permitted VID list under "802.1Q VID Filtering" function.

Notes:

No matter how management VLAN is configured, login password authentication is still required.

5.4.2 Ports

Port Configuration

Port	TP	FX
Link	1000FDX	1000FDX
Mode	Auto ▼	Auto ▼
Flow Control	☑	☑
Link Fault Relay Alarm	☐	☐
PoE	☐	-

[Apply] [Refresh]

Port Configuration	Function
Port	TP - Twisted-Pair copper port (also specified Port #1 in other pages)
	FX - Fiber port (also specified Port #2 in other pages)
Link	Port link status
	Speed and duplex status with green background - port is link on
	Down with red background - port is link down
Mode	Select port operating mode
	Disabled - disable the port operation

TP Mode	*Auto-negotiation*	*Speed capability*	*Duplex*
Auto	*Enable*	*10, 100, 1000M*	*Full, Half*
Forced 10 Half	*Disable*	*10M*	*Half*
Forced 10 Full	*Disable*	*10M*	*Full*
Forced 100 Half	*Disable*	*100M*	*Half*
Forced 100 Full	*Disable*	*100M*	*Full*
Auto 1000 Full	*Enable*	*1000M*	*Full*

FX Mode	*Auto-negotiation*	*Speed capability*	*Duplex capability*
Auto: auto-detection for transceiver type and speed			
1000 Full	*Enable*	*1000M*	*Full*
Forced 100 Full	*Disable*	*100M*	*Full*
Disable: Disable port operation			

Flow Control	Set port flow control function
	V - set to enable 802.3x pause flow control for ingress and egress
Link Fault Relay Alarm	Set relay alarm when port link fault

	V - set to enable relay alarm when port link fault
PoE	Set port PoE function
	V - set to enable PoE PSE function

| [Apply] | Click to apply the configuration change |
| [Refresh] | Click to refresh current configuration |

802.1Q Control Page when [802.1Q Filtering] function is disabled

802.1Q Control

Port	TP	FX
Default Tag - VID (PVID)	1	1
Default Tag - DEI	0	0
Default Tag - PCP	0	0
Ingress Drop	Disable	Disable
Tag Removal	Keep All tags	Keep All tags

Port	TP	FX
Egress Tagging Rule	Type 0	Type 0
Egress Tag TPID	0x8100(c-tag)	0x8100(c-tag)
Custom TPID	0x8100	

802.1Q Filtering	Disable (Port-base)
	Setting

Apply   Refresh

802.1Q Control Page when [802.1Q Filtering] function is enabled. The setting is "*Allowed VID*" or "*Rejected VID*"

802.1Q Control

Port	TP	FX
Default Tag - VID(PVID)	1	1
Default Tag - DEI	0	0
Default Tag - PCP	0	0
Ingress Drop	Disable	Disable
Tag Removal	Keep All tags	Keep All tags

Port	TP	FX
Egress Tagging Rule	Type 0	Type 0
Tagging Exceptional VID (Type 2)	1	1
Egress Tag TPID	0x8100(c-tag)	0x8100(c-tag)
Custom TPID	0x8100	

802.1Q Filtering	Rejected (VLAN-aware)
	Setting

Apply Refresh

802.1Q Control	Function
Default Tag – VID (PVID)	Port VID, VID for Ingress Default Tag, also called "PVID" *1 ~ 4095* - decimal 12-bit VID value
Default Tag - DEI	CFI for Ingress Default Tag *0, 1* - 1-bit CFI value
Default Tag -PCP	User priority for Ingress Default Tag *0 ~ 7* - decimal 3-bit value
Ingress Drop	*Disable* - disable port ingress drop and admit all packet types *Drop Untag* – drop all untagged frames *Drop C-tag* – drop frame with outer tag TPID 0x8100

	Drop S-tag – drop frame with outer tag TPID 0x88A8
	Drop All taggged – drop frames with outer tag TPID 0x8100 or 0x88A8
Tag Removal	*Keep All tags* - disable tag removal for VLAN-tagged packets
	Pop up 1 tag – remove up to 1 tag (outer tag if available)
	Pop up 2 tag – remove up to 2 tags (outer and inner tag if available)
Egress Tagging Rule	Tag is inserted into the outgoing packet in egress operation.
	Type 0 – Port Egress Tagging disabled
	Type 1 – Tag all frames
	Type 2 – Tag all frames, except
	priority-tagged frames (VID=0) and
	frame with VID= Exceptional VID
	Type 3 – Tag all frames, except priority-tagged frames (VID=0)
	* "Type 2" and "Type 3" are available only when 802.1Q Filtering is enabled.
Tagging Exceptional VID (Type 2)	
	Type 1 exceptional VID in Tagging rule
	1 ~ 4095 - decimal 12-bit VID value
	* This configuration is available only when 802.1Q Filtering is enabled.
Egress Tag TPID	Tag TPID for Egress Tagging
	0x8100(c-tag)
	0x88A8(s-tag)
	s-*custom_tag 1* – Use value configured in [Custom TPID]
	s-*custom_tag 2* - Use value configured in [Custom TPID] if ingress tag was s-tag (TPID = 0x88A8)
	* "s-custom-tag 2" is available only when 802.1Q Filtering is enabled.
Custom TPID	Specify a user-defined TPID value.
[802.1Q Filtering]	Click to set VID filtering table

Note:

Refer to Section 4.3 and 4.3.1 for more information about:

802.1Q Control, VLAN operation, Ingress VLAN Classification, Classified Tag after VLAN classification and What tag is inserted for egress tagging. Section 3.5.1 also describes the VLAN mode under different [802.1Q Filtering] settings.

5.4.2.1 802.1Q Filtering

802.1Q Filtering

VID TABLE: [Disable ▼]
- Disable
- Allowed VID
- Rejected VID

No.	VID	No.	VID
1	0	9	0
2	0	10	0
3	0	11	0
4	0	12	0
5	0	13	0
6	0	14	0
7	0	15	0
8	0	16	0

[Apply] [Refresh] [Back]

Configuration	Description
VID TABLE	Specify the characteristic of the VID table.
	Disable - set to disable 802.1Q filtering function.
	Allowed VID - the VID table specifies the allowed VIDs
	rejected VID - the VID table specifies the rejected VIDs
	* Both Allowed VID and rejected VID are used to "Enable" 802.1Q filtering.
No.	Entry of VID table - up to 16 VIDs can be configured in VID table
VID	*1 ~ 4095* - decimal 12-bit VID value
[Apply]	Click to apply the configuration change.
[Refresh]	Click to refresh current configuration.
[Back]	Click to previous window.

As VID TABLE setting is changed from "*Disable*" to enabled state. That is a setting of either "*Allowed VID*" or "*Rejected VID*". The following message is prompt for notices and confirmation.
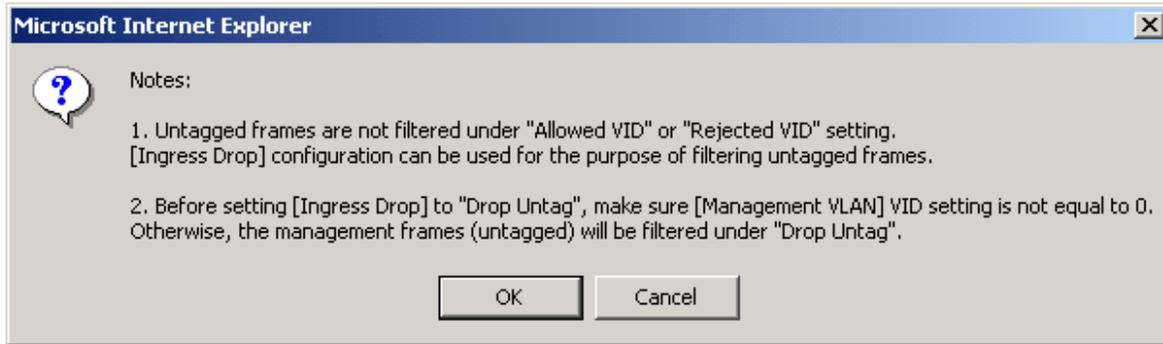
When VID TABLE setting is changed from either "*Allowed VID*" or "*Rejected VID*" to "*Disable*", the following message is also prompt for notices and confirmation.
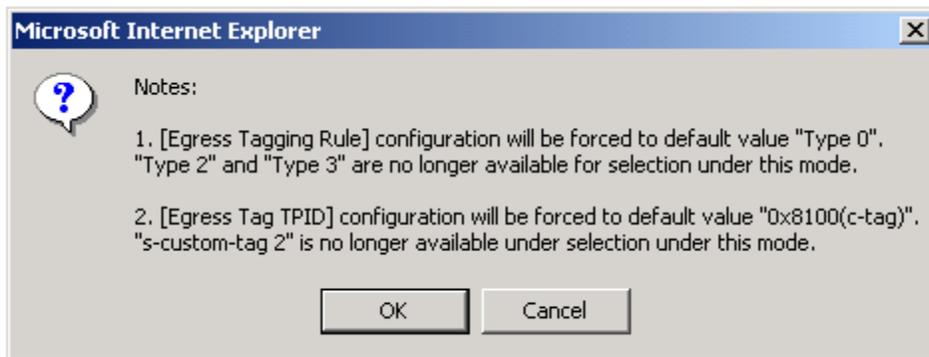
Notes:
1. *VID table is referred for filtering VLAN-tagged frames according to the classified VID of each ingress frame. Refer to Section 3.5.1 for more information about "classified VID" and VLAN operation.*
2. *[Allowed VID] setting is useful when only certain VIDs are permitted to pass the device.*
3. *[Rejected VID] setting is useful when only certain VIDs are not allowed to pass the device.*
4. *The VID value in [Management VLAN] setting and [Default Tag – VID (PVID)] for TP port and FX port are always permitted to pass and not be filtered.*

5.4.3 LLDP

Transmitted TLVs	
Port Description	✓
System Name	✓
System Description	✓
System Capabilities	✓
Management Address	✓

Parameters	
Tx Interval	10
Tx Hold	4
Tx Delay	2
Reinit Delay	2

Port	LLDP State
1(TP)	Disabled ▼
2(FX)	Disabled ▼

Apply   Refresh

Transmitted TLVs	Description
Port Description	When checked the "port description" is included in LLDP information transmitted.
System Name	When checked the "system name" is included in LLDP information transmitted.
System Description	When checked the "system description" is included in LLDP information transmitted.
System Capability	When checked the "system capability" is included in LLDP information transmitted.
Management Address	When checked the "management address" is included in LLDP information transmitted.

Parameters	Description
Tx Interval	The device is periodically transmitting LLDP frames to its neighbors for having the network discovery information up-to-date. The interval between each LLDP frame is determined by the Tx Interval value. Valid values: *5 – 32768 seconds*
Tx Hold	Each LLDP frame contains information about how long the information in the LLDP frame shall be considered valid. The LLDP information valid period is set to **Tx Hold** multiplied by **Tx Interval** seconds. Valid values: *2 – 10 times*

Tx Delay	If some configuration is changed (e.g. the IP address) a new LLDP frame is transmitted, but the time between the LLDP frames will always be at least the value of **Tx Delay** seconds. **Tx Delay** cannot be larger than 1/4 of the **Tx Interval** value. Valid values: *1 – 8192 seconds*
Reinit Delay	When a port is disabled, LLDP is disabled or the device is rebooted a LLDP shutdown frame is transmitted to the neighboring units, signaling that the LLDP information isn't valid anymore. **Reinit Delay** controls the amount of seconds between the shutdown frame and a new LLDP initialization. Valid values: *1 – 10 seconds*

Port Configuration	Description
Port	Local port number (Port #1: TP port, Port #2: FX port)
LLDP State	Set port LLDP mode: *Disabled:* The device will not send out LLDP information, and will drop LLDP information received from neighbors. *Tx and Rx:* The device will send out LLDP information, and will analyze LLDP information received from neighbors. *Tx only:* The device will drop LLDP information received from neighbors, but will send out LLDP information. *Rx only:* The device will not send out LLDP information, but LLDP information from neighbor units is analyzed.

[Apply]	Click to apply the configuration change.
[Refresh]	Click to refresh current configuration.

*The **Link Layer Discovery Protocol** (**LLDP**) is a vendor-neutral link layer protocol in the Internet Protocol Suite used by network devices for advertising their identity, capabilities, and neighbors on an IEEE 802 local area network, principally wired Ethernet.*

5.4.4 OPA

OPA function allows set lower and upper alarm thresholds for the optical power of the fiber port. The alarm is sent via relay alarm output and SNMP trap. The optical power is monitored once every second. Note that if no SFP transceiver is installed or no DDM is supported in the SFP transceiver, OPA function is disabled automatically.

Optical Power Alarm Configuration

Port	MinMode	MinLimit	MaxMode	MaxLimit
2(FX)	Disabled ▼	1 (µW)	Disabled ▼	6553 (µW)

Apply   Refresh

Configuration	Description
Port	Port 2 (FX port)
MinMode	Enable alarm if power is less than the lower threshold.
MinLimit	Set lower threshold limit, unit µW.
MaxMode	Enable alarm if power is higher than the upper threshold.
MaxLimit	Set upper threshold limit, unit µW.
[Apply]	Click to apply the configuration change.
[Refresh]	Click to refresh current configuration.

Note: dBm(N µW) = -30 dBm + log10(N) x 10

5.4.5 ALS

ALS function is provided for the SFP transceiver and used to automatically shut down the output power of the transmitter in case of fiber break. ALS is provisioned on both ends of the fiber pair. "Auto" mode is set to turn on transmitter automatically if the broken fiber is believed to have been repaired. The method is to turn on transmitter at the near end for a pulse period every interval time. This pulse causes LOS (Lost of Optical Signal) cleared at the far end if the cable has been repaired. The transmitter is turned on at the far end. At the same time LOS cleared is also detected at the near end. Transmitters of both ends are turned on and LOS alarm is cleared.

Auto Laser Shutdown Configuration

Port	Mode	Interval	Width	Restart
2(FX)	Disabled ▼	100 (sec)	2 (sec)	☐

[Apply] [Refresh]

Configuration	Description
Port	Port 2 (FX port)
Mode	*Disable* - disable ALS function.
	Manual – enable ALS and force to turn on transmitter amnaually.
	Auto – enable ALS and turn on transmitter if the broken fiber is believed to have been repaired.
Interval	Transmitter is turned on for a short period as a test pulse every interval time (unit sec) in "*Auto*" mode.
Width	The width of the test pulse (unit sec), default 2 seconds.
Restart	Check to restart transmitter for one test pulse in Manual mode
[Apply]	Click to apply the configuration change.
[Refresh]	Click to refresh current configuration.

5.5 Monitoring
5.5.1 Statistics Overview

Statistics for all ports

[Clear] [Refresh]

Port	TP	FX
Link	1000FDX	Down
Tx Bytes	817360	0
Tx Frames	923	0
Rx Bytes	223537898	0
Rx Frames	1077666	0
Tx Errors	0	0
Rx Errors	0	0

Statistics	Description
Port	TP - Twisted-Pair copper port on local unit
	FX - Fiber port on local unit
Link	Port link status
	Speed and duplex status with green background - port is link on
	Down with red background - port is link down
Tx Bytes	Total of bytes transmitted on the port
Tx Frames	Total of packet frames transmitted on the port
Rx Bytes	Total of bytes received on the port
Rx Frames	Total of packet frames received on the port
Tx Errors	Total of error packet frames transmitted on the port
Rx Errors	Total of error packet frames received on the port
[Clear]	Click to reset all statistic counters
[Refresh]	Click to refresh all statistic counters

5.5.2 LLDP Statistics

LLDP Statistics

Port	Tx Frames	Rx Frames	Rx Error Frames	Discarde Frames	TLVs discarded	TLVs unrecognized	Org. TLVs discarded	Ageouts
1(TP)	0	0	0	0	0	0	0	0
2(FX)	0	0	0	0	0	0	0	0

Refresh

Counters	Description
Port	The port on which LLDP frames are received or transmitted. (Port #1: TP port, Port #2: FX port)
Tx Frames	The number of LLDP frames transmitted on the port.
Rx Frames	The number of LLDP frames received on the port.
Rx Error Frames	The number of received LLDP frames containing error.
Discarde Frames	If an LLDP frame is received on a port, and the device's internal table has run full, the LLDP frame is counted and discarded. This situation is known as "Too Many Neighbours" in the LLDP standard. LLDP frames require a new entry in the table when the Chassis ID or Remote Port ID is not already contained within the table. Entries are removed from the table when a given port's link is down, an LLDP shutdown frame is received, or when the entry ages out.
TLVs discarded	Each LLDP frame can contain multiple pieces of information, known as TLVs (TLV is short for "Type Length Value"). If a TLV is malformed, it is counted and discarded.
TLVs unrecognized	The number of well-formed TLVs, but with an unknown type value.
Org. TLVs discarded	The number of organizationally received TLVs.
Ageouts	Each LLDP frame contains information about how long time the LLDP information is valid (age-out time). If no new LLDP frame is received within the age out time, the LLDP information is removed, and the Ageout counter is incremented.
[Refresh]	Click to refresh all statistic counters

5.5.3 LLDP Table

LLDP Neighbour Table

Local Port	Chassis Id	Remote Port ID	System Name	Port description	System Capabilities	Management Address
			No entries in table			

Refresh

Status	Description
Local Port	The port on which the LLDP frame was received. (Port #1: TP port, Port #2: FX port)
Chassis Id	The Chassis Id is the identification of the neighbor's LLDP frames.
Remote Port ID	Port ID of the neighbor port
System Name	System Name advertised by the neighbor unit
Port Description	The port description advertised by the neighbor unit
System Capabilities	System Capabilities describes the neighbor unit's capabilities. The possible capabilities are: 1. *Other* 2. *Repeater* 3. *Bridge* 4. *WLAN Access Point* 5. *Router* 6. *Telephone* 7. *DOCSIS cable device* 8. *Station only* 9. *Reserved* When a capability is enabled, the capability is followed by (+). If the capability is disabled, the capability is followed by (-).
Management Address	Management Address is the neighbor unit's address that is used for higher layer entities to assist discovery by the network management. This could for instance hold the neighbor's IP address.
[Refresh]	Click to refresh all statistic counters

5.5.4 SFP DDM

SFP DDM

Port	FX
Identifier	SFP transceiver
Connector	LC
SONET Compliance	N/A
Ethernet Compliance	1000BASE-LX
Vendor Name	APAC Opto
Vendor OUI	000F99
Temperature	50.00 (°C)
Voltage	3.30 (V)
TX Power	267.9 (µW) -5.72 (dBm)

Refresh

Remark

$dBm(N\ \mu W) = -30\ dBm + log10(N) \times 10$

Status	Description
SFP Ports	Port numbers which are equipped with SFP slot.
Identifier	Identification information of the transceiver
Connector	The connector type used on the transceiver
SONET Compliance	The SONET compliance information of the transceiver
GbE Compliance	Gigabit Ethernet compliance information of the transceiver
Vendor Name	The vendor name of the transceiver
Vendor OUI	The vendor OUI of the transceiver
Temperature	The current temperature sensed currently inside the transceiver
Voltage	The working voltage sensed currently inside the transceiver
TX Power	The transmission optical power sensed currently and shown in µW and dBm

5.5.5 PoE

PoE Status

Port	TP
PoE Mode	Enabled
Power Status	Good
PD Detect	Good
PD Class	Class 1
Voltage	55.6 V
Current	0.04 A
Power Used	2.2 W

[Refresh]

Status	Description
PoE Mode	Port PoE function setting – *Enabled, Disabled*
Power Status	*Good* – PoE power is ON. *Off* – PoE power is off.
PD Detect	*Compliant* - A compliant PD is detected. *Incompliant* – Incompliant PD detected *Under_detection* – PD detection in process
PD Class	The PoE class of the detected PD is classified.
Voltage	The sensed voltage level close to DC IN (V)
Current	The sensed PoE output current
Power Used	The calculated power = Voltage x Current
[Refresh]	Click to refresh all status

5.5.6 Ping

Ping Parameters

Target IP address	
Count	1 ▼
Time Out (in secs)	1 ▼

Apply

Ping Results

Target IP address	0.0.0.0
Status	Test complete
Received replies	0
Request timeouts	0
Average Response Time (in ms)	0

Refresh

Ping	Description
Target IP Address	The target IP address to which the ping command issues
Count	The number of ping commands generated
Time Out (in secs)	The time out for a reply (in seconds)
[Apply]	Start the ping command

Results	Description
Target IP Address	The target IP address to which the ping command issues
Status	The command status
Received replies	The number of replies received by the system
Request time-outs	The number of requests time out
Average Response Time	The average response time of a ping request (in mini-seconds)
[Refresh]	Click to refresh all statistic counters

5.6 Maintenance
5.6.1 Reboot System

Reboot Systemt

Are you sure you want to reboot system? Yes No

This menu is used to reboot the device unit remotely with current configuration. Starting this menu will make your current http connection lost. You must rebuild the connection to perform any management operation to the unit.

5.6.2 Restore Default

Factory Default

Are you sure you want to perform a Factory Default? Yes No

This menu is used to restore all settings of the device unit with factory default values except current IP configuration and Management VLAN configuration.

5.6.3 Update Firmware

Software Upload

[   ] Browse

Upload

This menu is used to perform in-band firmware (software) upgrade. Enter the path and file name of new firmware image file for uploading.

Configuration	Description
Filename	Path and filename (warp format)
[Browse]	Click to browse your computer file system for the firmware image file
[Upload]	Click to start upload

5.6.4 Configuration File Transfer

Configuration Upload

[   ] [Browse]

[Upload]

Configuration Download

[Download]

This [download] command can be used to backup current device configuration and download it to the connected management PC. The default filename is "switch.cfg".

Configuration	Description
Filename	Path and filename of a backup configuration file to be uploaded
[Browse]	Click to browse your computer file system for the configuration file
[Upload]	Click to start upload operation from the connected PC to the device
[Download]	Click to start download operation from the device to the connected PC

5.6.5 Logout

Please enter password to login

Password:	[ ]

[Apply]

This menu is used to perform a logout from the web management immediately and return a login prompt. If current user does not perform any management operation over 3 minutes, the device will execute an auto logout and abort the current connection.

6. SNMP Support

SNMP version support	Snmp v1, v2c management
Managed Objects	MIB-II
	system OBJECT IDENTIFIER ::= { mib-2 1 }
	interfaces OBJECT IDENTIFIER ::= { mib-2 2 }
	ip OBJECT IDENTIFIER ::= { mib-2 4 }
	snmp OBJECT IDENTIFIER ::= { mib-2 11 }
	ifMIB OBJECT IDENTIFIER ::= { mib-2 31 }
RFC	RFC 3418 - Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
	RFC 1213 - Management Information Base for Network Management of TCP/IP-based internets:MIB-II
Private MIB	DDM status entries
	OPA entries
	ALS entries
	PoE entries
SNMP Trap Support	TRAP_COLDSTART - the device boot up trap
	TRAP_LINKUP - the port link recovery trap
	TRAP_LINKDOWN - port link down trap
	TRAP_OPA – OPA alarm trap

Appendix A. Factory Default Settings

System Configuration

DHCP Enabled   *Disabled*

Fallback IP Address   *192.168.0.2*

Fallback Subnet Mask   *255.255.255.0*

Fallback Gateway   *0.0.0.0*

Management VLAN   *0*

Name   *Null*

Password   *123*

Inactivity Timeout (secs)   *300*

SNMP enabled   *Disabled*

SNMP Trap destination   *0.0.0.0*

SNMP Read Community   *public*

SNMP Write Community   *private*

SNMP Trap Community   *public*

Operating Mode   *Advanced Mode*

802.1Q Control   *Disabled*

Jumbo Mode   *Disabled*

Link fault pass through   *Disabled*

Power Saving Mode   *Enabled*

Ports Configuration

Mode   *Auto* for TP port, *1000 Full* for FX port

Flow Control   *v: Enabled*

Link Fault Relay Alarm   *Disabled*

PoE   *Disabled* (TP port only)

Default Tag - VID(PVID)   *1*

Default Tag – DEI   *0*

Default Tag – PCP   *0*

Ingress Drop   *Disabled*

Tag Removal	*Keep All Tags*
Egress Tagging Rule	*Type 0*
Tagging Exceptional VID	*1*
Egress Tag TPID	*0x8100(c-tag)*
Custom TPID	*0x8100*
802.1Q Filtering	*Disabled*

802.1Q Filtering

VID TABLE	*Disabled*
VID n (n=1-16)	0

LLDP Configuration

Transmitted TLVs

Port Description	*Enabled*
System Name	*Enabled*
System Description	*Enabled*
System Capabilities	*Enabled*
Management Address	*Enabled*

LLDP Parameters

Tx Interval	*10*
Tx Hold	*4*
Tx Delay	*2*
Reinit Delay	*2*

LLDP Port Configuration

LLDP State	*Disabled*

OPA

MinMode	*Disabled*
MinLimit	*1 μW*
MaxMode	*Disabled*

MaxLimit   *6553 μW*

ALS

Mode   *Disabled*

Interval   *100 sec.*

Width   *2 sec.*

Appendix B. Models & Optical Specifications

Model Definition

KGC-261-DP/G	General model with no pre-installed SFP transceiver
KGC-261-DP/G-xxxx	General models with pre-installed SFP transceiver
KGC-261-DP/I	IEC 61850-3 model with no pre-installed SFP transceiver
KGC-261-DP/I-xxxx	IEC 61850-3 models with pre-installed SFP transceiver

SFP with 1000BASE-X fiber transceiver

Model Ext.	FiberCon.	Reference Fiber Distance (Typ.)
-SX	1000M LC	Duplex MMF 500m
-LX	1000M LC	Duplex MMF 550m, SMF 10km
-LX70	1000M LC	Duplex SMF 70km

Bi-directional WDM over single SMF

-W3510	1000M LC	Simplex SMF 10km
-W5310	1000M LC	Simplex SMF 10km

Optical Specifications

Model Ext.	Wavelength	Tx Power*1	Rx Sen.*2	Max.Rx*3
-SX	850nm	-9.5~ -4	-18	0
-LX	1310nm	-9.5~ -3	-20	-3
-LX70	1550nm	0~ +5	-24	-3
Bi-Direction WDM over single SMF				
-W3510	T1310/R1550	-9~ -3	-21	-1
-W5310	T1550/R1310	-9~ -3	-21	-1

SFP with 100BASE-FX fiber transceiver

Model Ext.	FiberCon.	Reference Fiber Distance (Typ.)
-FM	100M LC	Duplex MMF 2km
-FS30	100M LC	Duplex MMF SMF 30km

Optical Specifications

Model Ext.	Wavelength	Tx Power*1	Rx Sen.*2	Max.Rx*3
-FM	1310nm	-20~ -14	-31	0
-FS30	1310nm	-15~ -8	-34	0

*1 Tx Power : Transmitter power (min. ~ max., unit: dBm)

*² Rx Sen. : Receiver sensitivity (unit :dBm)

*³ Max.Rx. : Maximal Received power (unit : dBm)