



KGC-261-DP-BT/G

KGC-261-DP-BT/I

Industrial Managed
10/100/1000Base-T to Dual-speed Fiber
Media Converters
with IEEE 802.3bt PSE Support
Installation Guide



DOC. 260225

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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.

FCC CFR Title 47 Part 15 Subpart B Class A
CISPR 22
ANSI C63.4
ICES-003 Issue 6 Class A

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 61000-6-4 Class A
EN 61000-6-2
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

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VCCI-A

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1. Introduction



The product 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.

IEEE 802.3bt PSE

The device is equipped with PoE PSE capability that can deliver output power supporting IEEE 802.3bt compliant 90W Type 4 PDs, IEEE 802.3at Type 2 high-power PDs, and IEEE 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-BT/G (Basic model) | Industrial Managed 10/100/1000Base-T to Dual-speed Fiber Media Converter with IEEE 802.3bt PSE Support | N/A |
| KGC-261-DP-BT/I (Enhanced model) | IEC 61850-3 Managed 10/100/1000Base-T to Dual-speed Fiber Media Converter with IEEE 802.3bt 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, 802.3bt 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

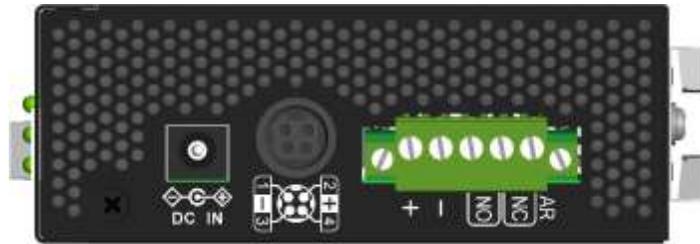
Power over Ethernet (IEEE 802.3bt PoE) PSE

- Supports both Fast Ethernet and Gigabit Ethernet
- Backward compatible with IEEE 802.3af and IEEE 802.3at-compliant PDs
- Type 1 ~ Type 4 compliant PD discovery & classification
- Delivers power output to support Type 3 and Type 4 PD over both 2-pair lines
- Power shutdown protection for incompliant PD
- Power shutdown protection for disconnection
- Power shutdown protection for overload, over-current, and short circuit

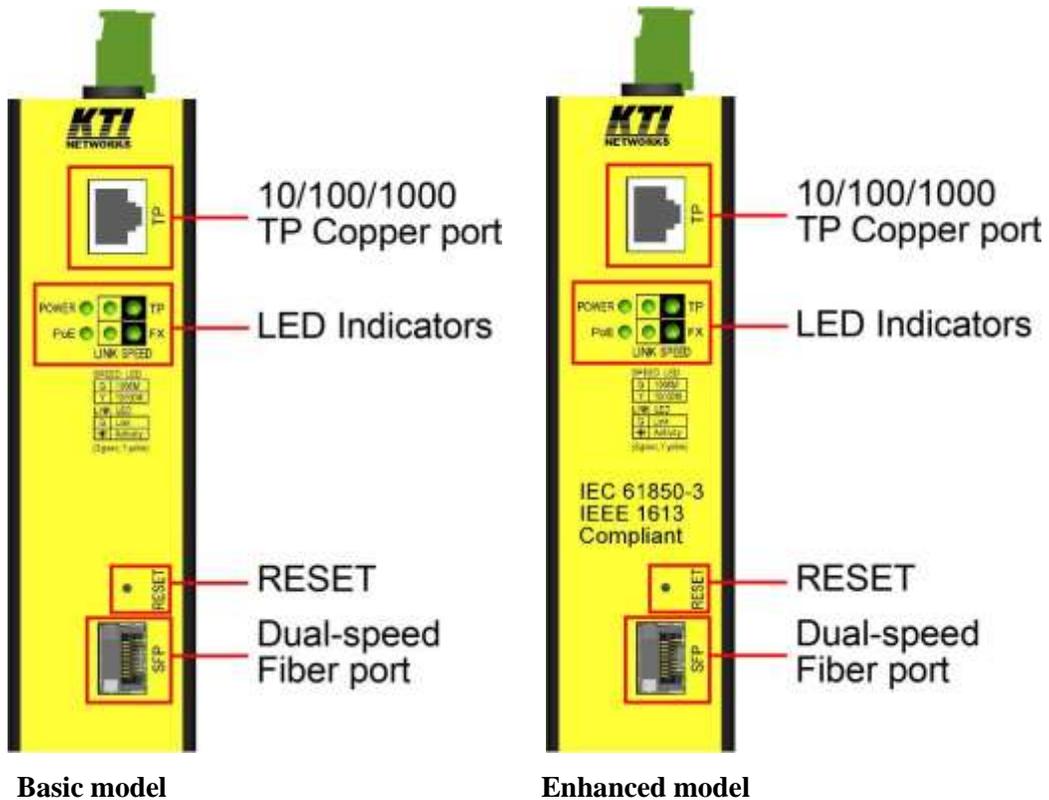
1.3 Product Panels

The following figure illustrates the top panel of the device:

Top Panel



Front Panel



1.4 LED Indicators

| <u>LED</u> | <u>Function</u> |
|------------|-----------------------|
| 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, IEEE 802.3bt 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 (\varnothing 6.3mm/ \varnothing 2.0mm) for external AC-DC power adapter

Contacts Rating 8A 48V

| Contact | Marking | Remark |
|-------------------------------|---------|--------------------|
| Center (\varnothing 2.0mm) | <+> | DC power input (+) |
| Outer (\varnothing 6.3mm) | <-> | 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, excluded PoE load)

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 IEEE 802.3bt
PSE power pins Pin 3/4/5/6: V_{poe+} , Pin 1/2/7/8: V_{poe-} (V_{poe} comes from DC power input) (Rev A1)
Power delivery 95W 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

| Compliant PD classes | IEEE std. | | | DC power min. *1 | PSE output power max. *2 | Cable power pairs | PD Available power min. *3 |
|-------------------------|-----------|---------|---------|---------------------|-----------------------------|----------------------|-------------------------------|
| | 802.3af | 802.3at | 802.3bt | | | | |
| Class 1 | √ | √ | √ | 45V | 5.3W | 2 | 3.84W |
| Class 2 | √ | √ | √ | 45V | 8.5W | 2 | 6.49W |
| Class 3 | √ | √ | √ | 45V | 19W | 2 | 13W |
| Class 4 | | √ | √ | 45V | 36W | 4 | 25.5W |
| Class 5 | | | √ | 51V | 51W | 4 | 40W |
| Class 6 | | | √ | 51V | 68W | 4 | 51W |
| Class 7 | | | √ | 53V | 83W | 4 | 62W |
| Class 8 | | | √ | 53V | 95W | 4 | 71.3W |

*1: The minimum DC power voltage to support the specified PSE output

*2: The maximum output power at the PSE end for the requested PD class

*3: The minimum power received at the PD end with maximum output at the PSE 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

Basic model 260K hours

Enhanced model 260K hours

Environmental

Operating Temperature Typical -40°C ~ +75°C
Storage Temperature -40°C ~ +85°C
Relative Humidity 5% ~ 95% non-condensing

Tests and Approvals

FCC CFR Title 47 Part 15 Subpart B Class A
CISPR 22
ANSI C63.4
ICES-003 Issue 6 Class A
CE EMC Class A
VCCI Class A
EN 61000-6-4 Emission
EN 61000-6-2 Immunity
IEC 61850-3 EMC & environment for power substation
IEEE 1613 for power substation
LVD, IEC62368-1 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

The enhanced 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

The enhanced model: 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 | +/-8kV Air, +/-6kV Contact |
| C 6.7.3 / IEC 61000-4-3 | RFS | 10V/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 |

The enhanced model: IEC 61850-3 Environmental Test Specifications

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

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

The enhanced model: 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 |

The enhanced model: 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 | 10V/m |
| Clause 8 / EMC | ESD | +/-8kV Air, +/-6kV 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. | | |
| | <p>If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your trained service provider:</p> <ul style="list-style-type: none"> - 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. | | |
| |  | <p>Since the surface temperature of the device may be higher than 70°C 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.</p> | |

2.3 Mounting the Device to a DIN-Rail

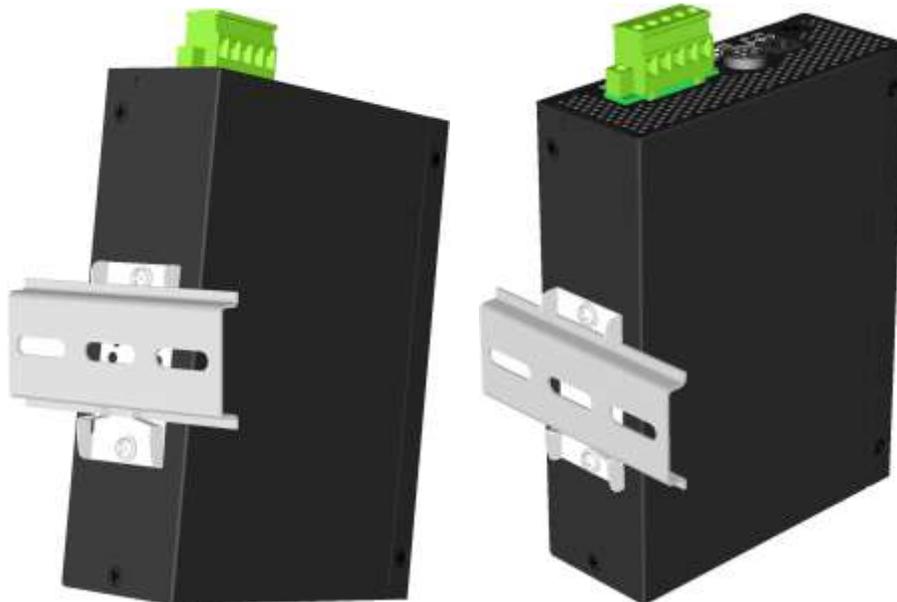
In the product package, a DIN-rail bracket is provided or has been installed for mounting the device in a industrial DIN-rail enclosure.

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

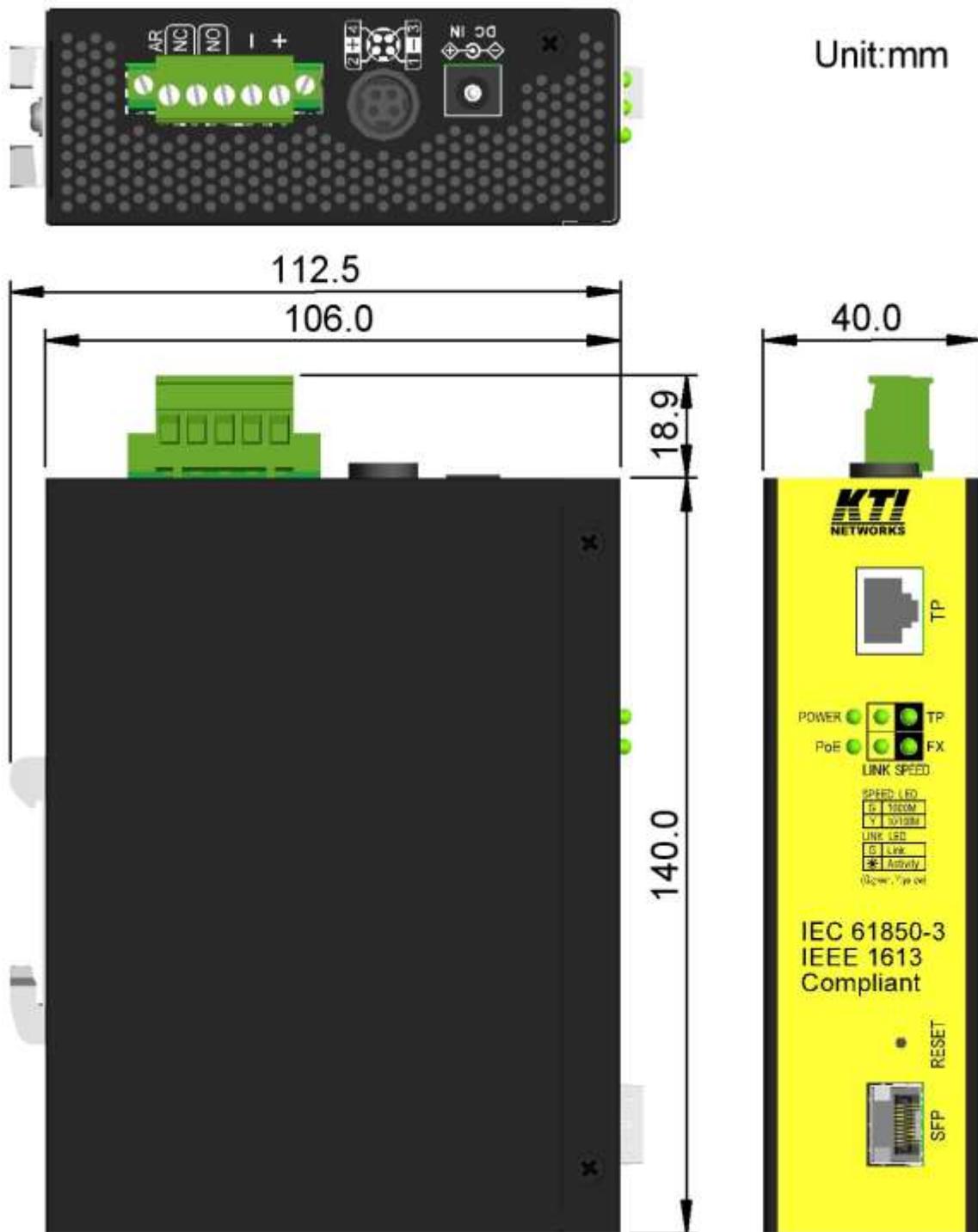
1. Install the mounting bracket onto the back of the device with screws as shown below:



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.



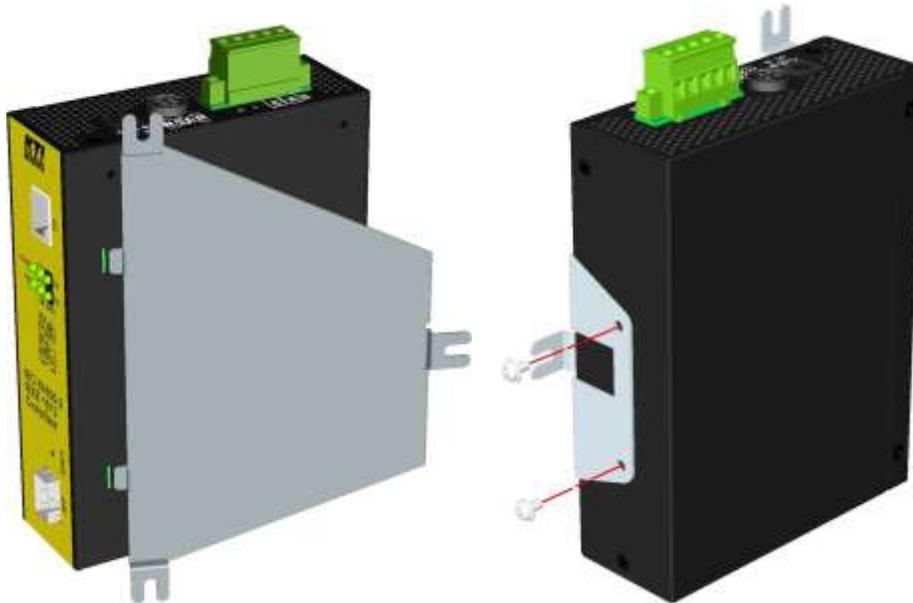
Both models are with same dimension. The final dimension after DIN-rail bracket is installed is:



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:

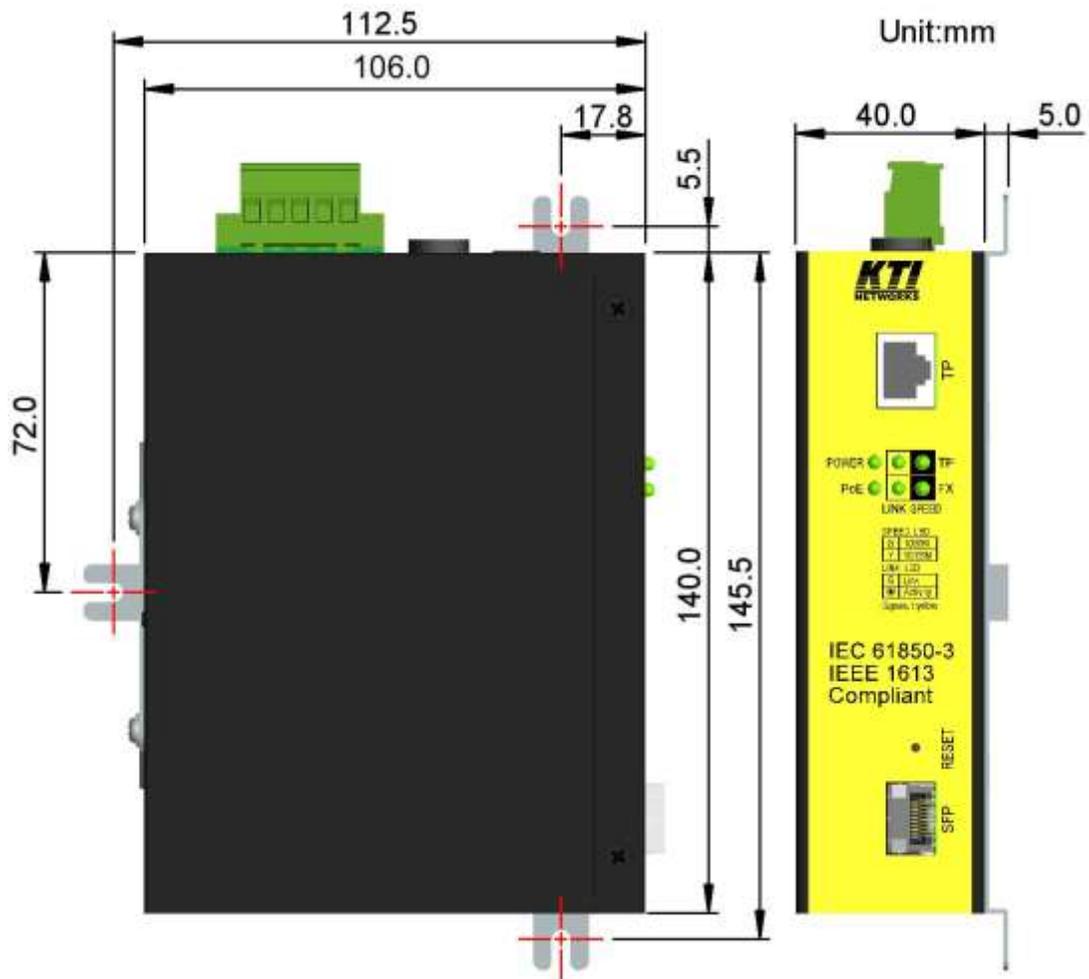
1. Install the mounting bracket on the device.
2. Screw the bracket on the device.



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

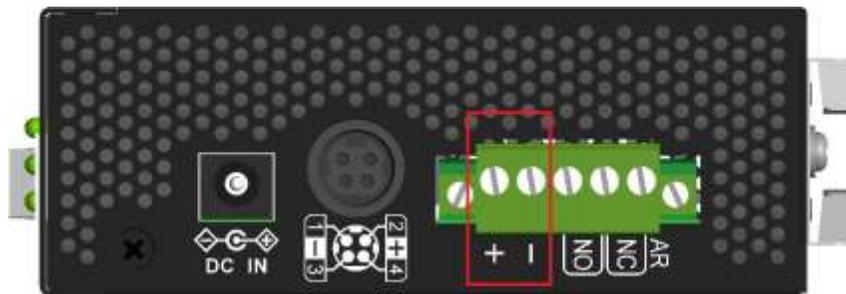
The device is featured with three different DC power input connectors for supporting different types of external AC-DC power supply or AC-DC power adapters.

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

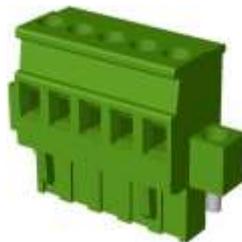


Connector: European 5P flange terminal block

DC Power input contacts:

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

Terminal Plug: A 5P flange terminal plug

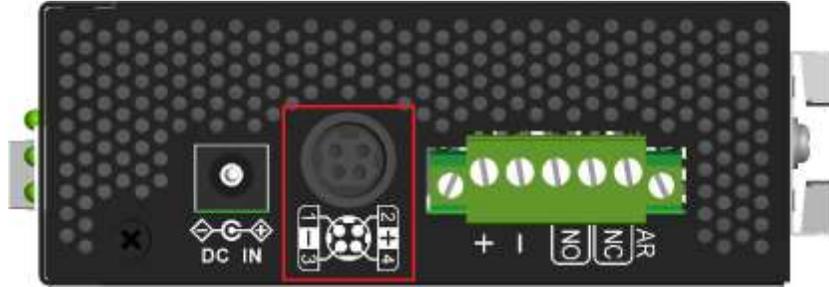


Power wires: 24 ~ 12AWG (IEC 0.5~2.5mm²)

Wire length: 1 meter max.

Contact rating: 15A +57V

2.5.2 DC Power DIN



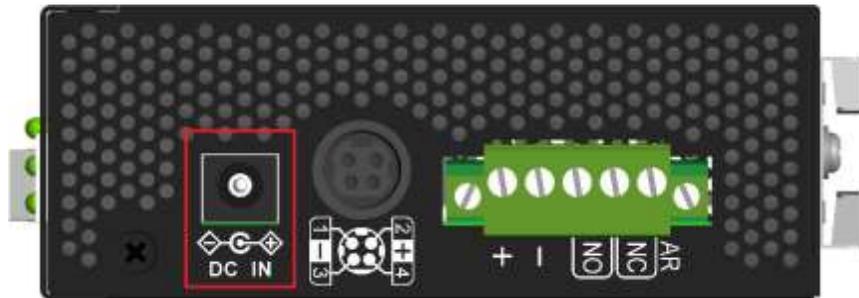
Connector: Female power DIN for external AC-DC power adapter

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 ($-\varnothing 6.3\text{mm}/+\varnothing 2.0\text{mm}$) for external AC-DC power adapter

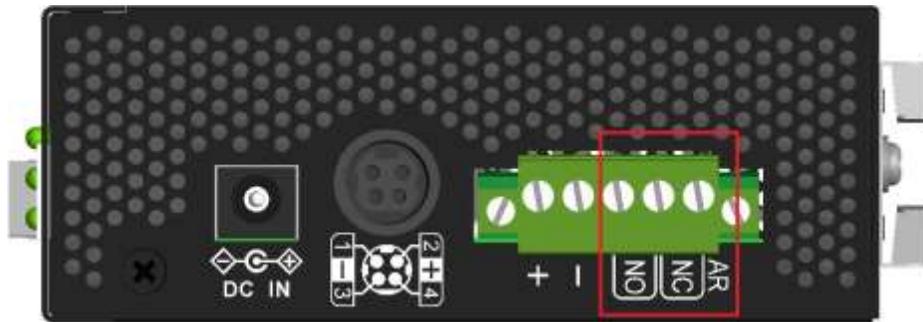
Contacts:

| Contact | Marking | Remark |
|---------------------------------------|---------|--------------------|
| Center ($\varnothing 2.0\text{mm}$) | <+> | DC power input (+) |
| Outer ($\varnothing 6.3\text{mm}$) | <-> | 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 relay 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 |
| Pin | 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

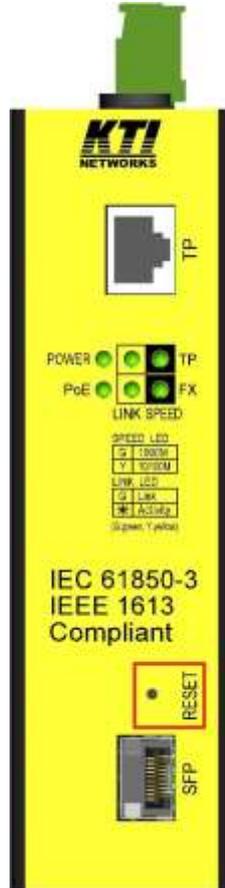
- Input power failure
- Configured port link fault
- OPA alarm

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.



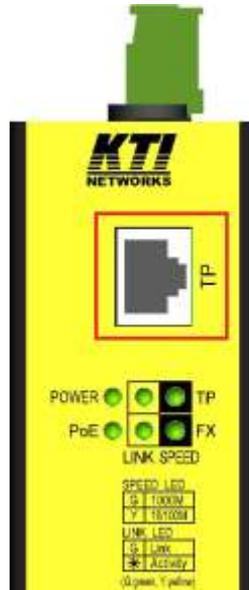
The button can also be used to restore the software configuration settings to factory default values.

The operations are:

| Operation | Function |
|--|--|
| Press the button and release during switch operation | Reset & boot up the switch. The boot-up takes about 10 seconds and ends with all LED yellow ON then all OFF once. |
| Press the button until all LED yellow, then all OFF. | 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

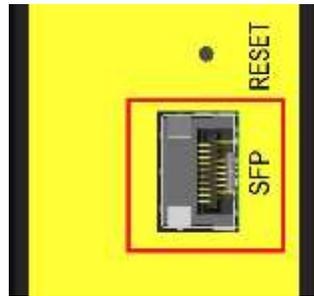
This function allows the port to auto-detect the twisted-pair signals and adapts itself to form a valid MDI to MDI-X connection with the remote connected device automatically. No matter a straight through cable or crossover cable are connected, the ports can sense the receiving pair automatically and 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. Hold the bail and make insertion.



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

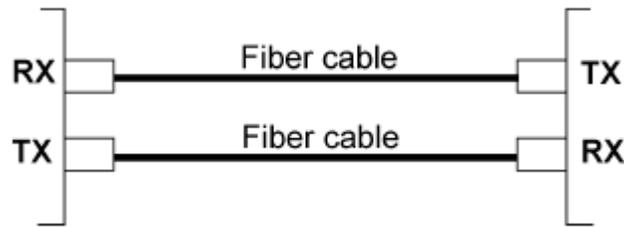


Dual Speed Support

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:



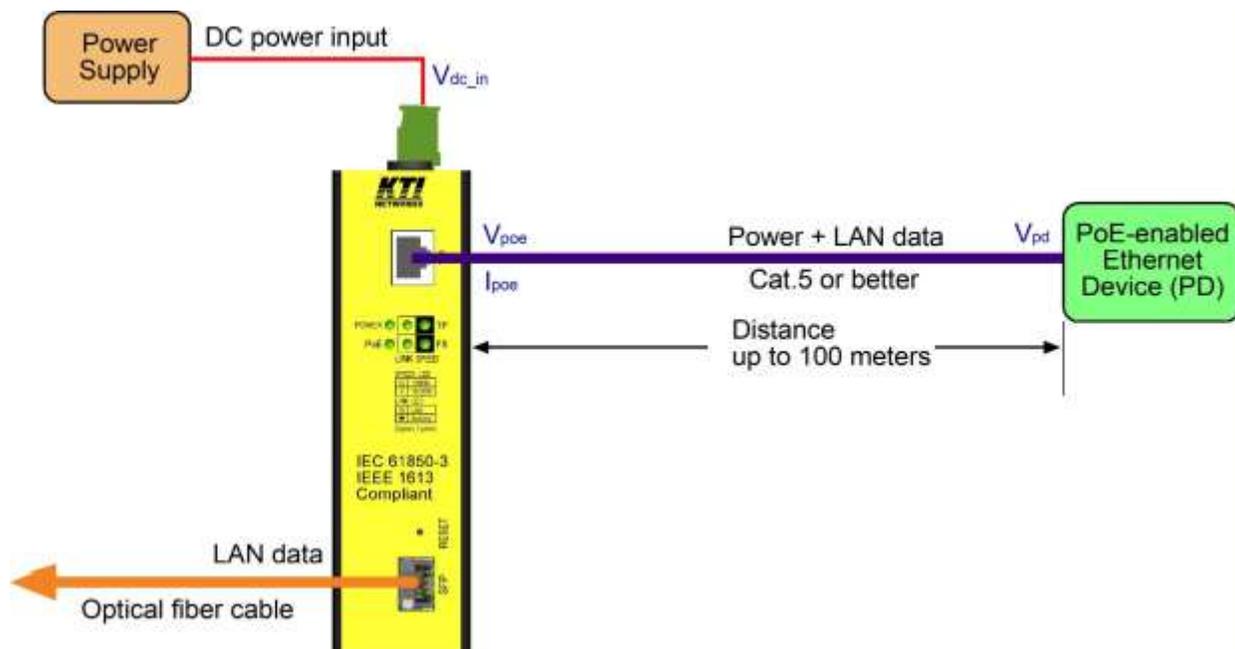
Make sure the Rx-to-Tx connection rule is followed on the both ends of the fiber cable.

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:

IEEE 802.3 standard: PoE Classification for the Compliant PD Types and Power Level

| Compliant PD classes | IEEE std. | | | PSE output power max. | PD available power min. |
|----------------------|-----------|---------|---------|-----------------------|-------------------------|
| | 802.3af | 802.3at | 802.3bt | | |
| Class 1 | √ | √ | √ | 4W | 3.84W |
| Class 2 | √ | √ | √ | 7W | 6.49W |
| Class 3 | √ | √ | √ | 15.4W | 13W |
| Class 4 | | √ | √ | 32W | 25.5W |
| Class 5 | | | √ | 45W | 40W |
| Class 6 | | | √ | 60W | 51W |
| Class 7 | | | √ | 75W | 62W |
| Class 8 | | | √ | 90W | 71.3W |

PoE power pins on TP port of the device

| 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

The device specifications: DC power input vs. PoE power output

| Requested PD classes | DC power min. *1 | PSE output power max. *2 | Cable power pairs *3 | PD available power min. *4 |
|----------------------|------------------|--------------------------|----------------------|----------------------------|
| Class 1 | 45 ~ 57V | 5.3W | 2 | 3.84W |
| Class 2 | 45 ~ 57V | 8.5W | 2 | 6.49W |
| Class 3 | 45 ~ 57V | 19W | 2 | 13W |
| Class 4 | 45 ~ 57V | 36W | 4 | 25.5W |
| Class 5 | 51 ~ 57V | 51W | 4 | 40W |
| Class 6 | 51 ~ 57V | 68W | 4 | 51W |
| Class 7 | 53 ~ 57V | 83W | 4 | 62W |
| Class 8 | 53 ~ 57V | 95W | 4 | 71.3W |

*1: The minimum DC power voltage to support the specified maximum PSE output

*2: The maximum output power at the PSE end for the requested PD class

*3: Cable pairs that deliver PSE power

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

Note:

1. For Type 3 PD, V_{dc} 51 ~ 57V support the maximum power received at the PD end as specified in IEEE 802.3 standard.
2. For Type 4 PD, V_{dc} 53 ~ 57V support the maximum power received at the PD end as specified in IEEE 802.3 standard.
3. The V_{pd} measured at the PD end may be in the range of 36 ~ 57VDC.
4. $V_{pd} \approx V_{dc} - \text{Voltage drop over Cat.5}$

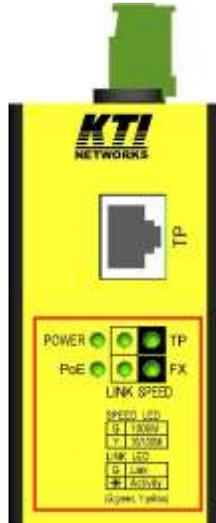
Typical voltage drop over standard Cat.5 (Wire: 24AWG, Length: 100m):

| Current | Cable pairs | Voltage drop |
|---------|-------------|--------------|
| 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. Over-load
5. 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 LINK | Port link status | Green | ON | TP Port link is established. |
| | | | 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 LINK | Port link status | Green | ON | FX Port link is established. |
| | | | 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:

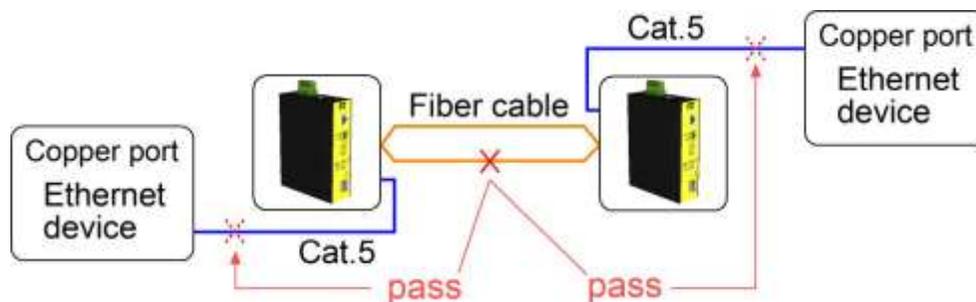


The data rate on twisted-pair segment depends on the link speed finally established with the link partner.

4.2 Link Fault Pass Through Function

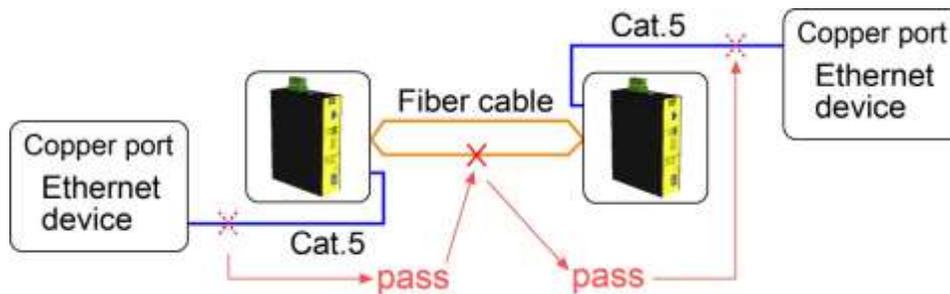
When the Link Fault Pass Through (LFPT) function is enabled and the media converter detects a link fault on one port segment, it will force the other port segment link down. It looks like that a link fault is passed from one port to the other.

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.

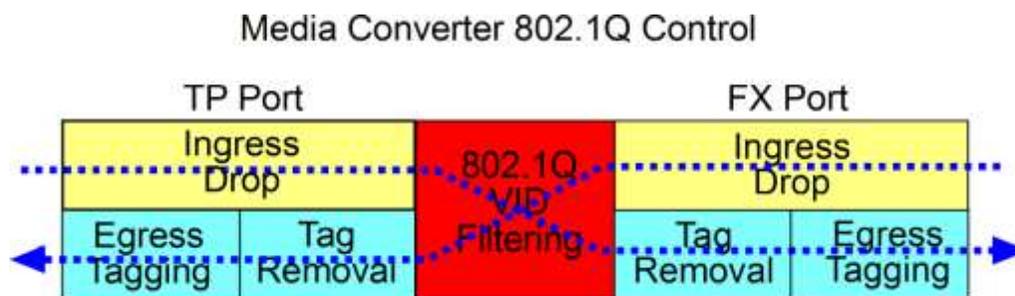
Methods to enable the function

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

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

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.

[SNMP Trap destination]

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

[SNMP Trap community]

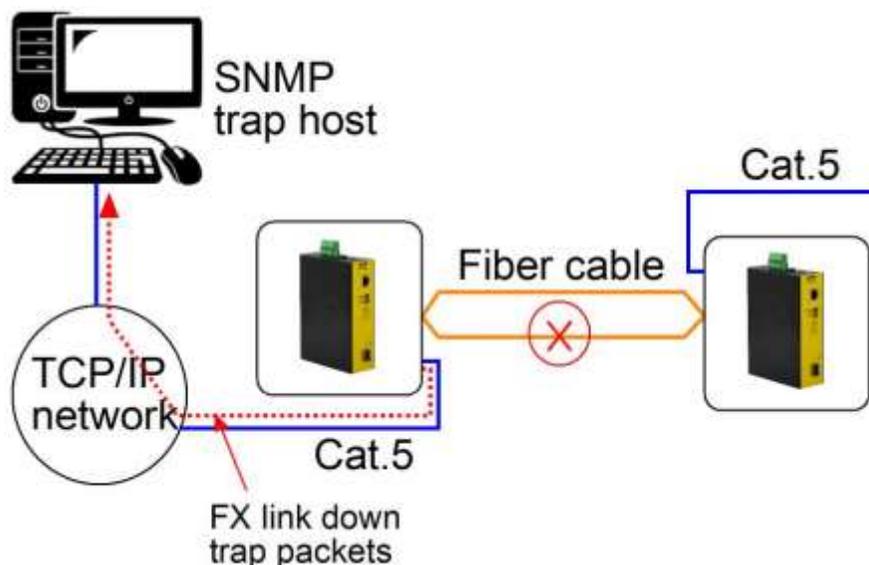
The community string bound in a trap message

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:

Please enter password to login

| | |
|-----------|----------------------|
| Password: | <input type="text"/> |
|-----------|----------------------|

Apply

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

Gigabit Media Converter

Configuration

System
Ports
LLDP
OPA
ALS

Monitoring

Statistics Overview
LLDP Statistics
LLDP Table
SFP DDM
PoE
Ping

Maintenance

Reboot System
Restore Default
Update Firmware
Configuration File
Transfer
Logout

System Configuration

| | |
|--------------------|-------------------|
| MAC Address | 00-40-F6-CF-00-00 |
| S/W Version | 1.0 |
| H/W Version | 1.0 |
| Active IP Address | 192.168.0.2 |
| 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 | <input type="checkbox"/> |
| Fallback IP Address | <input type="text" value="192.168.0.2"/> |
| Fallback Subnet Mask | <input type="text" value="255.255.255.0"/> |
| Fallback Gateway | <input type="text" value="0.0.0.0"/> |
| WDT | <input type="radio"/> Enable <input type="radio"/> Disable |
| Management VLAN | <input type="text" value="0"/> |
| Name | <input type="text"/> |

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 |

Maintenance

| | |
|---------------|-----------------------------------|
| 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 | <input type="checkbox"/> |
| Fallback IP Address | <input type="text" value="192.168.0.210"/> |
| Fallback Subnet Mask | <input type="text" value="255.255.255.0"/> |
| Fallback Gateway | <input type="text" value="0.0.0.0"/> |
| WDT | <input type="radio"/> Enable <input checked="" type="radio"/> Disable |
| Management VLAN | <input type="text" value="0"/> |
| Name | <input type="text"/> |
| Password | <input type="password" value="•••"/> |
| Inactivity Timeout (secs) | <input type="text" value="300"/> (0 or 60~10000) |
| SNMP enabled | <input type="checkbox"/> |
| SNMP Trap destination | <input type="text" value="0.0.0.0"/> |
| SNMP Read Community | <input type="text" value="public"/> |
| SNMP Write Community | <input type="text" value="private"/> |
| SNMP Trap Community | <input type="text" value="public"/> |

| | |
|-------------------------|---|
| Operating Mode | Advanced Mode <input type="button" value="Change"/> |
| 802.1Q Control | <input type="radio"/> Enable <input checked="" type="radio"/> Disable |
| Jumbo Mode | <input type="radio"/> Enable <input checked="" type="radio"/> Disable |
| Link fault pass through | <input type="radio"/> Enable <input checked="" type="radio"/> Disable |
| Power Saving Mode | <input type="radio"/> Enable <input checked="" type="radio"/> Disable |

| 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 <i>Basic</i> – Configuration for transparent conversion (no packet modification) [802.1Q Control] disabled [802.1Q Filtering] disabled [Jumbo Frame] enabled [LLDP] disabled [Management VLAN] disabled <i>Advanced</i> – user is free to configure all above function settings |
| 802.1Q Control | 802.1Q Control function main configuration <i>Disable</i> - all packets are allowed to pass with no 802.1Q control. |

| | |
|-------------------------|---|
| | <i>Enable</i> - 802.1Q control mechanism is activated for the conversion. |
| Jumbo Mode | Enable / disable Jumbo mode to support jumbo packets <i>Disable</i> - support maximum packet size up to 1526 bytes <i>Enable</i> - 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 :

Operating Mode Configuration

▾

Remark

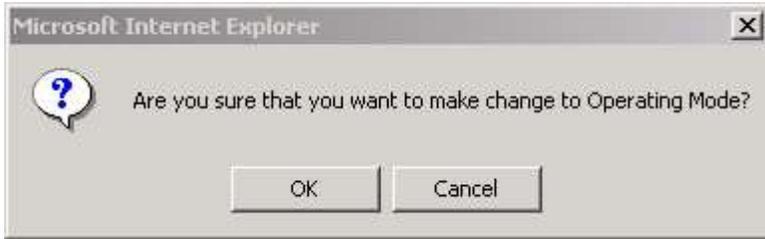
Operating Mode :

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 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 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Link Fault Relay Alarm | <input type="checkbox"/> | <input type="checkbox"/> |
| PoE | <input type="checkbox"/> | - |

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

| <i>TP Mode</i> | <i>Auto-negotiation</i> | <i>Speed capability</i> | <i>Duplex</i> |
|------------------------|-------------------------|-------------------------|-------------------|
| <i>Auto</i> | <i>Enable</i> | <i>10, 100, 1000M</i> | <i>Full, Half</i> |
| <i>Forced 10 Half</i> | <i>Disable</i> | <i>10M</i> | <i>Half</i> |
| <i>Forced 10 Full</i> | <i>Disable</i> | <i>10M</i> | <i>Full</i> |
| <i>Forced 100 Half</i> | <i>Disable</i> | <i>100M</i> | <i>Half</i> |
| <i>Forced 100 Full</i> | <i>Disable</i> | <i>100M</i> | <i>Full</i> |
| <i>Auto 1000 Full</i> | <i>Enable</i> | <i>1000M</i> | <i>Full</i> |

| <i>FX Mode</i> | <i>Auto-negotiation</i> | <i>Speed capability</i> | <i>Duplex capability</i> |
|----------------|-------------------------|-------------------------|--------------------------|
|----------------|-------------------------|-------------------------|--------------------------|

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 |

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) | <input type="text" value="1"/> | <input type="text" value="1"/> |
| Default Tag - DEI | <input type="text" value="0"/> | <input type="text" value="0"/> |
| Default Tag - PCP | <input type="text" value="0"/> | <input type="text" value="0"/> |
| Ingress Drop | <input type="text" value="Disable"/> | <input type="text" value="Disable"/> |
| Tag Removal | <input type="text" value="Keep All tags"/> | <input type="text" value="Keep All tags"/> |

| Port | TP | FX |
|----------------------------------|--|--|
| Egress Tagging Rule | <input type="text" value="Type 0"/> | <input type="text" value="Type 0"/> |
| Tagging Exceptional VID (Type 2) | <input type="text" value="1"/> | <input type="text" value="1"/> |
| Egress Tag TPID | <input type="text" value="0x8100(c-tag)"/> | <input type="text" value="0x8100(c-tag)"/> |
| Custom TPID | <input type="text" value="0x8100"/> | |

| | |
|------------------|--------------------------------------|
| 802.1Q Filtering | Rejected (VLAN-aware) |
| | <input type="text" value="Setting"/> |

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

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

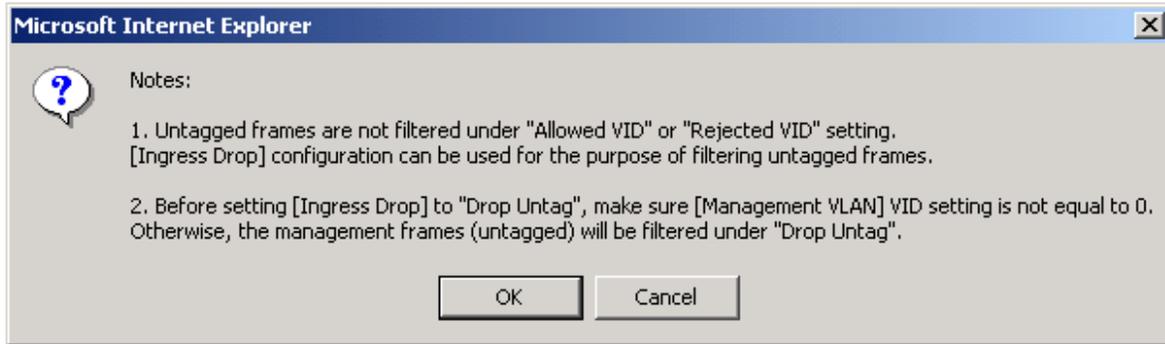
VID TABLE:

| 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 |

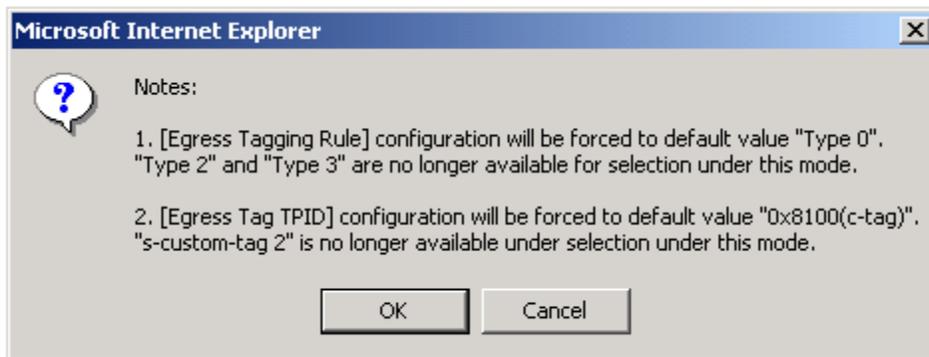
[Apply] [Refresh] [Back]

| Configuration | Description |
|---------------|---|
| VID TABLE | Specify the characteristic of the VID table. <i>Disable</i> - set to disable 802.1Q filtering function. <i>Allowed VID</i> - the VID table specifies the allowed VIDs <i>rejected VID</i> - the VID table specifies the rejected VIDs * <i>Both Allowed VID and rejected VID are used to "Enable" 802.1Q filtering.</i> |
| 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 | <input checked="" type="checkbox"/> |
| System Name | <input checked="" type="checkbox"/> |
| System Description | <input checked="" type="checkbox"/> |
| System Capabilities | <input checked="" type="checkbox"/> |
| Management Address | <input checked="" type="checkbox"/> |

| Parameters | |
|--------------|---------------------------------|
| Tx Interval | <input type="text" value="10"/> |
| Tx Hold | <input type="text" value="4"/> |
| Tx Delay | <input type="text" value="2"/> |
| Reinit Delay | <input type="text" value="2"/> |

| Port | LLDP State |
|-------|------------|
| 1(TP) | Disabled ▾ |
| 2(FX) | Disabled ▾ |

| 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: <i>5 – 32768 seconds</i> |
| 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: <i>2 – 10 times</i> |

| | |
|--------------|---|
| 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: <i>1 – 8192 seconds</i> |
| 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: <i>1 – 10 seconds</i> |

| Port Configuration | Description |
|--------------------|---|
| Port | Local port number (Port #1: TP port, Port #2: FX port) |
| LLDP State | Set port LLDP mode: <i>Disabled</i> : The device will not send out LLDP information, and will drop LLDP information received from neighbors. <i>Tx and Rx</i> : The device will send out LLDP information, and will analyze LLDP information received from neighbors. <i>Tx only</i> : The device will drop LLDP information received from neighbors, but will send out LLDP information. <i>Rx only</i> : 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: $dBm(N \mu W) = -30 dBm + \log_{10}(N) \times 10$

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) | <input type="checkbox"/> |

Apply Refresh

| Configuration | Description |
|---------------|--|
| Port | Port 2 (FX port) |
| Mode | <i>Disable</i> - disable ALS function. <i>Manual</i> – enable ALS and force to turn on transmitter manually. <i>Auto</i> – 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: <ol style="list-style-type: none">1. <i>Other</i>2. <i>Repeater</i>3. <i>Bridge</i>4. <i>WLAN Access Point</i>5. <i>Router</i>6. <i>Telephone</i>7. <i>DOCSIS cable device</i>8. <i>Station only</i>9. <i>Reserved</i> 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

$\text{dBm}(N \mu\text{W}) = -30 \text{ dBm} + \log_{10}(N) \times 10$

| 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 – <i>Enabled, Disabled</i> |
| Power Status | <i>Good</i> – PoE power is ON. <i>Off</i> – PoE power is off. |
| PD Detect | <i>Compliant</i> - A compliant PD is detected. <i>Incompliant</i> – Incompliant PD detected <i>Under_detection</i> – 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 | <input type="text"/> |
| 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

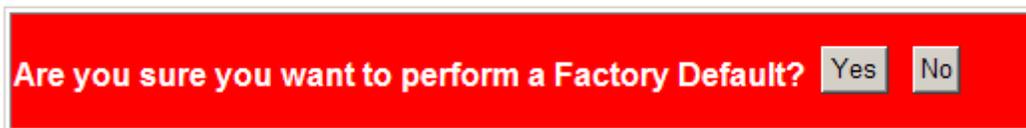
Reboot System



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



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

A form for software upload. It consists of a text input field, a "Browse" button to its right, and an "Upload" button centered below the input field.

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

Configuration 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

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 | <i>Disabled</i> |
| Fallback IP Address | <i>192.168.0.2</i> |
| Fallback Subnet Mask | <i>255.255.255.0</i> |
| Fallback Gateway | <i>0.0.0.0</i> |
| Management VLAN | <i>0</i> |
| Name | <i>Null</i> |
| Password | <i>123</i> |
| Inactivity Timeout (secs) | <i>300</i> |
| SNMP enabled | <i>Disabled</i> |
| SNMP Trap destination | <i>0.0.0.0</i> |
| SNMP Read Community | <i>public</i> |
| SNMP Write Community | <i>private</i> |
| SNMP Trap Community | <i>public</i> |

| | |
|-------------------------|----------------------|
| Operating Mode | <i>Advanced Mode</i> |
| 802.1Q Control | <i>Disabled</i> |
| Jumbo Mode | <i>Disabled</i> |
| Link fault pass through | <i>Disabled</i> |
| Power Saving Mode | <i>Enabled</i> |

Ports Configuration

| | |
|-------------------------|--|
| Mode | <i>Auto for TP port, 1000 Full for FX port</i> |
| Flow Control | <i>v: Enabled</i> |
| Link Fault Relay Alarm | <i>Disabled</i> |
| PoE | <i>Disabled (TP port only)</i> |
| Default Tag - VID(PVID) | <i>1</i> |
| Default Tag – DEI | <i>0</i> |
| Default Tag – PCP | <i>0</i> |
| Ingress Drop | <i>Disabled</i> |

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

802.1Q Filtering

| | |
|----------------|-----------------|
| VID TABLE | <i>Disabled</i> |
| VID n (n=1-16) | <i>0</i> |

LLDP Configuration

Transmitted TLVs

| | |
|---------------------|----------------|
| Port Description | <i>Enabled</i> |
| System Name | <i>Enabled</i> |
| System Description | <i>Enabled</i> |
| System Capabilities | <i>Enabled</i> |
| Management Address | <i>Enabled</i> |

LLDP Parameters

| | |
|--------------|-----------|
| Tx Interval | <i>10</i> |
| Tx Hold | <i>4</i> |
| Tx Delay | <i>2</i> |
| Reinit Delay | <i>2</i> |

LLDP Port Configuration

| | |
|------------|-----------------|
| LLDP State | <i>Disabled</i> |
|------------|-----------------|

OPA

| | |
|----------|----------------------------|
| MinMode | <i>Disabled</i> |
| MinLimit | <i>1 μW</i> |
| MaxMode | <i>Disabled</i> |

MaxLimit *6553 μW*

ALS

Mode *Disabled*

Interval *100 sec.*

Width *2 sec.*

Appendix B. Models & Optical Specifications

Model Definition

| | |
|----------------------|--|
| KGC-261-DP-BT/G | Basic model with no pre-installed SFP transceiver |
| KGC-261-DP-BT/G-xxxx | Basic models with pre-installed SFP transceiver |
| KGC-261-DP-BT/I | IEC 61850-3 enhanced model with no pre-installed SFP transceiver |
| KGC-261-DP-BT/I-xxxx | IEC 61850-3 enhanced models with pre-installed SFP transceiver |

SFP with 1000BASE-X fiber transceiver

| <u>Model Ext.</u> | <u>FiberCon.</u> | <u>Reference Fiber Distance (Typ.)</u> |
|-------------------|------------------|--|
| -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

| <u>Model Ext.</u> | <u>Wavelength</u> | <u>Tx Power*1</u> | <u>Rx Sen.*2</u> | <u>Max.Rx*3</u> |
|-------------------|-------------------|-------------------|------------------|-----------------|
| -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

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

Optical Specifications

| <u>Model Ext.</u> | <u>Wavelength</u> | <u>Tx Power*1</u> | <u>Rx Sen.*2</u> | <u>Max.Rx*3</u> |
|-------------------|-------------------|-------------------|------------------|-----------------|
| -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)