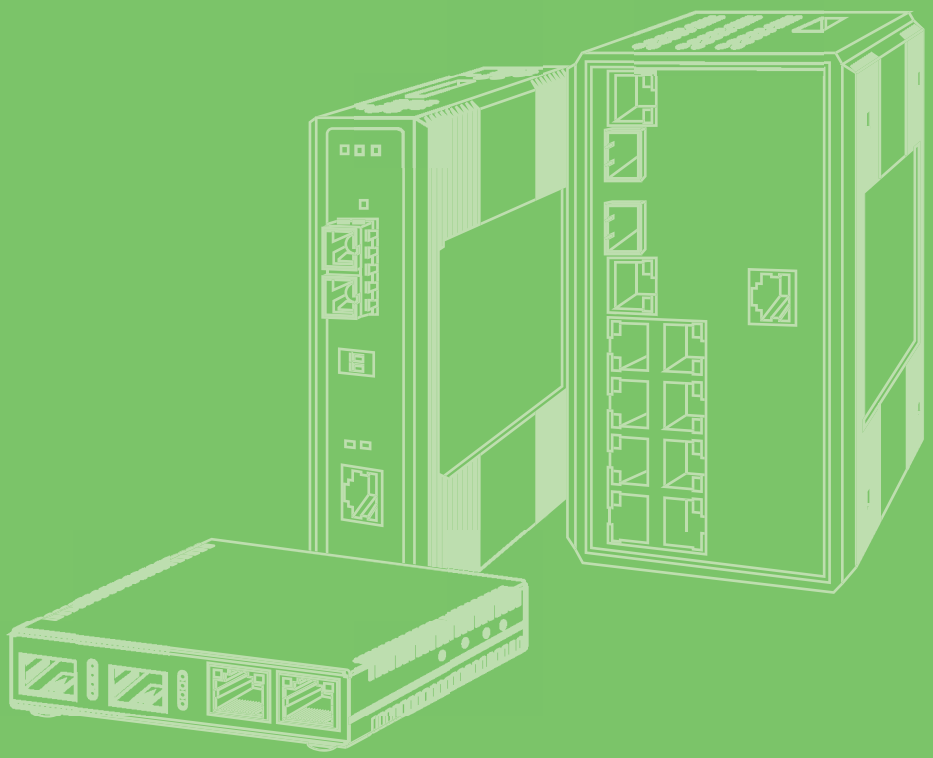
User Manual



# IE-Giga-MiniMc

## Industrial Miniature Media Converter

ADVANTECH

*Enabling an Intelligent Planet*

# Copyright



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# Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any on screen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Edition 1

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# Declaration of Conformity

### CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

### FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

# Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

# Warnings, Cautions and Notes

***Warning!*** *Important safety instructions save these instructions - this manual contains important safety instructions.*

***Caution!*** *For use in a controlled environment. Refer to manual for environmental conditions.*

***Note!*** *Notes provide optional additional information.*

# Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to:
ICG.Support@advantech.com

# Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

- 1 x IE-Giga-MiniMc device
- 1 x Universal power adapter with US/EU/UK/AU/JP plugs (optional)
- 1 x 2P Pluggable Terminal Block, DC Jack

# Safety Instructions

- Read these safety instructions carefully.
- Keep this User Manual for later reference.
- Disconnect this equipment from any DC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
- For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
- Keep this equipment away from humidity.
- Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
- The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Position the power cord so that people cannot step on it. Do not place anything over the power cord.
- All cautions and warnings on the equipment should be noted.
- If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
- Never pour any liquid into an opening. This may cause fire or electrical shock.
- Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
- If one of the following situations arises, get the equipment checked by service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment does not work well, or you cannot get it to work according to the user's manual.
  - The equipment has been dropped and damaged.
  - The equipment has obvious signs of breakage.
- DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO -40°C (-40°F) ~ 85°C (185°F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.

# Wichtige Sicherheishinweise

- Bitte lesen sie Sich diese Hinweise sorgfältig durch.
- Heben Sie diese Anleitung für den späteren Gebrauch auf.
- Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Verwenden Sie Keine Flüssig-oder Aerosolreiniger. Am besten dient ein angefeuchtetes Tuch zur Reinigung.
- Die NetzanschluBsteckdose soll nahe dem Gerät angebracht und leicht zugänglich sein.
- Das Gerät ist vor Feuchtigkeit zu schützen.
- Bei der Aufstellung des Gerätes ist auf sicheren Stand zu achten. Ein Kippen oder Fallen könnte Verletzungen hervorrufen.
- Die Belüftungsöffnungen dienen zur Luftzirkulation die das Gerät vor überhitzung schützt. Sorgen Sie dafür, daB diese Öffnungen nicht abgedeckt werden.
- Beachten Sie beim. AnschluB an das Stromnetz die AnschluBwerte.
- Verlegen Sie die NetzanschluBleitung so, daB niemand darüber fallen kann. Es sollte auch nichts auf der Leitung abgestellt werden.
- Alle Hinweise und Warnungen die sich am Geräten befinden sind zu beachten.
- Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.
- Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. elektrischen Schlag auslösen.
- Öffnen Sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von authorisiertem Servicepersonal geöffnet werden.
- Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einer qualifizierten Servicestelle zu überprüfen:
  - Netzkabel oder Netzstecker sind beschädigt.
  - Flüssigkeit ist in das Gerät eingedrungen.
  - Das Gerät war Feuchtigkeit ausgesetzt.
  - Wenn das Gerät nicht der Bedienungsanleitung entsprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.
  - Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.
  - Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.

# Safety Precaution - Static Electricity

Static electricity can cause bodily harm or damage electronic devices. To avoid damage, keep static-sensitive devices in the static-protective packaging until the installation period. The following guidelines are also recommended:

- Wear a grounded wrist or ankle strap and use gloves to prevent direct contact to the device before servicing the device. Avoid nylon gloves or work clothes, which tend to build up a charge.
- Always disconnect the power from the device before servicing it.
- Before plugging a cable into any port, discharge the voltage stored on the cable by touching the electrical contacts to the ground surface.

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# Chapter 1

## Product Overview

## 1.1 Features and Configuration

The IE-Giga-MiniMc provides a single conversion between 10/100/1000 Base-T twisted pair and 1000 Base-SX/FX fiber. This device auto negotiates speed and duplex on the copper port and the fiber is 1000Mbps, FDX. The IE-Giga-MiniMc supports jumbo frames up to 9216 MTU.

The IE represents the unit's use as an Industrial Ethernet device, which allows for extended temperature operation of -25°C to +85°C for DC power and -10°C to +50°C when using the included AC adapter.

The IE-Giga-MiniMc, a fixed fiber transceiver model, provides one 10/100/1000 Mbps Ethernet port with a RJ-45 connector and one 1000 Mbps fiber port with SC, ST, or SFP type connector.

The IE-Giga-MiniMc can use either the included universal, external power adapter with 100 to 240 ±10% VAC input or can be wired directly to the 7-50 VDC terminal block (for extended temperature configuration). There is an optional IE-PowerTray/18 whereby up to 18 IE-Giga-MiniMcs can be installed.

## 1.2 Operations, Administration, Maintenance (OAM)

OAM is a general term used in network management and typically applied to a series of standard protocols for installing, monitoring, and troubleshooting Metropolitan Area Networks (MANs).

When applied to Ethernet, OAM is typically assumed to refer to the layer 2 (MAC layer), management protocols (specifically 802.3ah and 802.1ag). Layer 2 management protocols do not need higher level transport protocols to operate, OAM data is transferred in standard multicast Ethernet frames.

- 802.3ah OAM (LINK-OAM):

  A point-to-point protocol designed to verify a specific link between two directly connected devices (over copper or fiber), that support 802.3ah OAM. One device must be configured as an active OAM device; the other as passive (typically a core switch would be the active device; the end device passive). 802.3ah OAM provides link status, remote fault detection and the ability to initiate a loopback circuit.
- 802.1ag (SERVICE-OAM):

  Often referred to as Connectivity Fault Management (CFM), is an end-to-end protocol designed to verify a specific network path between two devices that may be in different geographical locations. CFM allows the network operator to administer, monitor and debug the network using continuity check (a "heart beat" message), link trace (similar to traceroot, but operating at the MAC layer) and loopback (can be likened to a layer 2 ping).
-

**DC Input Voltage**

7 to 50 VDC on DC terminal block

5 VDC on DC jack

**AC Wall Adapter**

100 to 240 ±10% VAC input, 5 VDC output, 2 A max.

**Power Tray 18-Slot AC for Miniature Converters (option)**

125W, 20A@5V

**Operating Temperature**

-25 to +85 °C (-13 to +185 °F) DC terminal block

-10 to +50 °C (+14 to +122 °F) with supplied AC wall adapter

**Storage Temperature**

-40 to +85 °C (-40 to +185 °F)

**Humidity**

5 to 95% (non-condensing); 0 to 10000 ft. altitude

**Power Consumption**

600 mA @ 5 VDC

**Dimensions**

2.11H x 4.57W x 8.51D cm (0.83H x 1.80W x 3.35D inches)

## 1.3 Specifications

| Specifications | Description | |
|---|---|---|
| Communications | Standard | IEEE 802.3, 802.3u, 802.3ab, 802.3z |
| | LAN | 10/100/1000Base-TX, 1000Base-FX |
| | Transmission Distances | ■ Ethernet RJ-45: U p to 100m<br>■ Mulit-Mode: Up to 550m, 50/125um~62.5/125um<br>■ Single-Mode: Up to 80km, 9/125um<br>■ SFP: Up to 110km (depends on SFP) |
| Interface | Connectors | 1 x RJ-45, 1 x Fiber or 1 x SFP |
| | LED Indicators | ■ |
| Physical | Enclosure | metal |
| | Dimensions (W x H x D) | 21 x 45 x 85.1mm (1.83 x 1.77 x 3.35 in.) |
| | Mounting | Wall, DIN-rail |
| | Weight | |
| Environment | Operating Temperature | ■ DC terminal: -25 ~ 85°C (-13 ~ 185°F)<br>■ AC wall adapter: -10 ~ 50°C (14 ~ 122°F) |
| | Storage Temperature | -40 ~ 85°C (-40 ~ 185°F) |
| | Operating Humidity | -40 ~ 85°C (-40 ~ 185°F) |
| | Storage Humidity | 10 ~ 95% (non-condensing) |
| Certification | Safety | UL62368 |
| | EMC | ■ CE, FCC Class A<br>■ NEMA TS2 for traffic control |

## 1.4 Dimensions

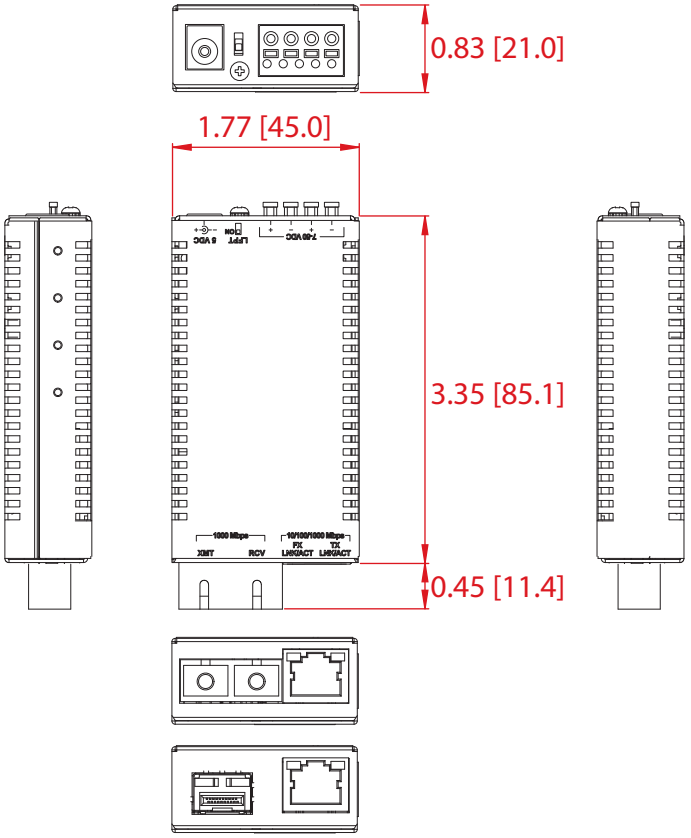


**Figure 1.1 Dimension**

# 1.5 Hardware Views

## 1.5.1 Front View

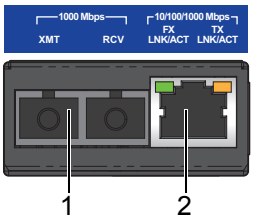


**Figure 1.2 Front View**

| No. | Item | Description |
|---|---|---|
| 1. | ETH port | 1 x RJ45, see “System LED Panel” on page 5 for further details. |
| 2. | ETH port | 1 x SFP or 1 x Fiber, see “System LED Panel” on page 5 for further details. |

## 1.5.2 Rear View

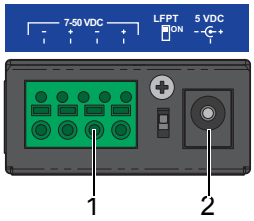


**Figure 1.3 Rear View**

| No. | Item | Description |
|---|---|---|
| 1. | DC terminal block | Connect cabling for power wiring.<br>7 to 50 VDC on DC terminal block 5 VDC on DC jack |
| 2. | AC power in | 100 to 240 ±10% VAC input, 5 VDC output, 2 A max. |

## 1.5.3 System LED Panel

Each IE-Giga-MiniMc converter includes two LEDs, located on the RJ-45 connector. LED functions are as follows:

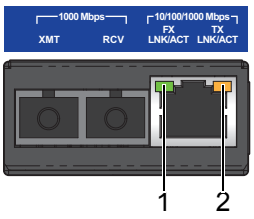


**Figure 1.4 System LED View**

LED functions are as follows (above illustration is representative):

| No. | Item | Description |
|---|---|---|
| 1. | FX LNK/ACT | Glows green when a link is established on the fiber port; blinks green when activity is detected on the fiber port. |
| 2. | TX LNK/ACT | Glows amber when a link is established on the copper port; blinks amber when activity is detected on the copper port. |

***Otto's###

## 1.6 Installing the IE-GIGA-MINIMC

The IE-Giga-MiniMc installs virtually anywhere as a standalone device in locations with extremely limited space. Installation options include:

- Velcro strips
- DIN rail mounting with DIN rail clips
- Wall mount bracket
- IE-PowerTray/18 for high density applications

***Note!*** ***Installation Tip***

*Several models of the IE-Giga-MiniMc support single-strand fiber for operation. Since single-strand fiber products use fiber optics that transmit and receive on two different wavelengths, single-strand fiber products must be deployed in pairs.*

***Note!*** *Some options require items that are sold separately.*

## 1.7 Hardware Mounting

The IE-Giga-MiniMc can be mounted on a DIN rail or using wall mount brackets as seen in the following figure.

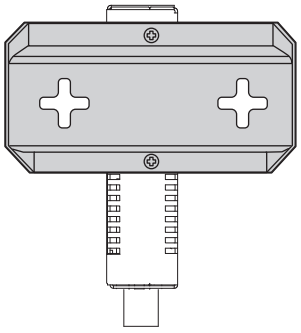

**Figure 1.5 Wall Mount Bracket**

The DIN rail clips part number#806-39105 include screws to allow the installation onto a DIN rail. part Install the screws into DIN rail clips, which should be mounted parallel or perpendicular to the DIN rail. Snap the converter onto the clips. To remove

the converter from the DIN rail, use a flat-head screwdriver inserted into the slot to gently pry the converter from the rail.

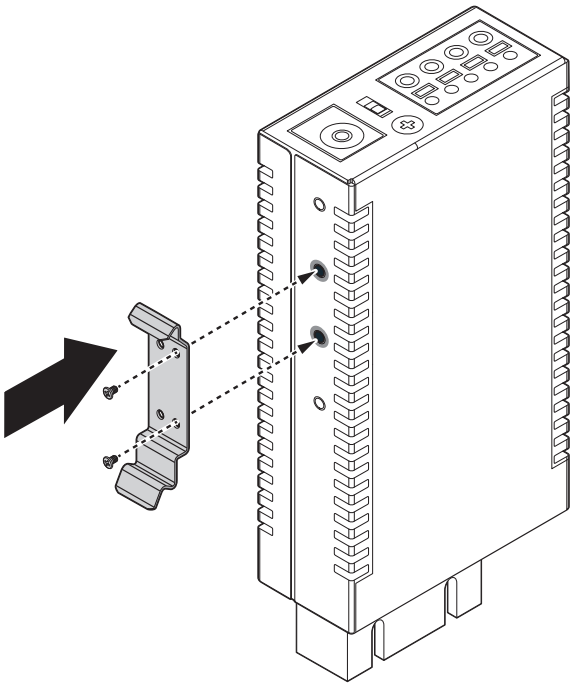

**Figure 1.6 Installing a DIN Rail Clip**

***Note!*** *The DIN clips are designed for use on a DIN-35 rail.*

## 1.8 Powering the IE-GIGA-MINIMC

The IE-Giga-MiniMc supports multiple powering options:

- Country-specific AC power adapter (included)
- 4-terminal DC power block
- IE-PowerTray/18
- Dual USB cable
- IE-Power/5V DIN rail mount power supply

***Note!*** *Some options require items that are sold separately, available from Advantech.*

# Chapter 2

## Device Installation

## 2.1 Installation Guidelines

The following guidelines are provided to optimize the device performance. Review the guidelines before installing the device.

- Make sure cabling is away from sources of electrical noise. Radios, power lines, and fluorescent lighting fixtures can interference with the device performance.
- Make sure the cabling is positioned away from equipment that can damage the cables.
- Operating environment is within the ranges listed range, see “Specifications” on page 3.
- Relative humidity around the converter does not exceed 95 percent (noncondensing).
- Altitude at the installation site is not higher than 10,000 feet.
- In 10/100 and 10/100/1000 fixed port devices, the cable length from the converter to connected devices can not exceed 100 meters (328 feet).
- Make sure airflow around the converter and respective vents is unrestricted. Without proper airflow the converter can overheat. To prevent performance degradation and damage to the converter, make sure there is clearance at the top and bottom and around the exhaust vents.

## 2.2 Installing the IE-GIGA-MINIMC

The IE-Giga-MiniMc installs virtually anywhere as a standalone device in locations with extremely limited space. Installation options include:

- Velcro strips
- DIN rail mounting with DIN rail clips
- Wall mount bracket
- IE-PowerTray / 18 for high density applications

***Note!*** ***Installation Tip***

*Several models of the IE-Giga-MiniMc support single-strand fiber for operation. Since single-strand fiber products use fiber optics that transmit and receive on two different wavelengths, single-strand fiber products must be deployed in pairs.*

***Note!*** *Some options require items that are sold separately.*

The IE-Giga-MiniMc can be mounted with a DIN rail clip. The DIN rail clips include screws to allow the installation on a DIN rail. Install the screws into DIN rail clip. Snap the converter onto the clips. To remove the converter from the DIN rail, use a flat-head screwdriver into the slot to gently pry the converter from the rail.

## 2.3 Wall-Mounting

The IE-Giga-MiniMc can be mounted on a DIN rail or using wall mount bracket as seen in the following figure.

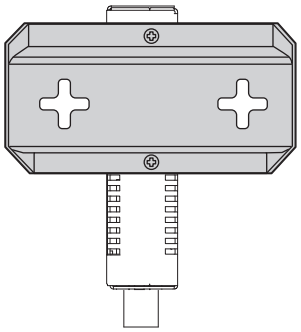

**Figure 2.1 Wall Mount Bracket**

The DIN rail clips include screws to allow the installation onto a DIN rail. Install the screws into DIN rail clips, which should be mounted parallel or perpendicular to the DIN rail. Snap the converter onto the clips. To remove the converter from the DIN rail, use a flat-head screwdriver inserted into the slot to gently pry the converter from the rail.

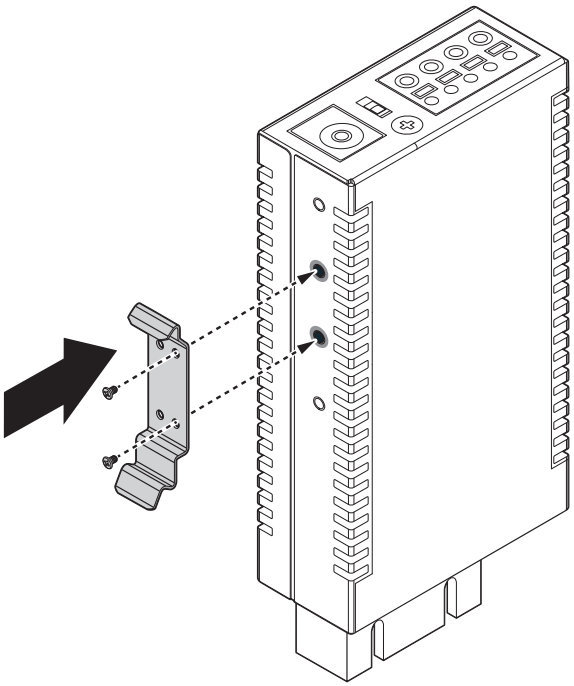

**Figure 2.2 Installing a DIN Rail Clip**

***Note!*** *The DIN clips are designed for use on a DIN-35 rail.*

## 2.4 Installing and Removing SFP Modules

IE-Giga-MiniMc SFP ports support a Gigabit fiber SFP / 100Mbps fiber SFP, with or without Digital Diagnostics Monitoring Information (DDMI), as well as a copper SFP in 10/100/1000Mbps and 1000Mbps. DDMI statistics provide real-time access to transceiver operating parameters such as voltage, temperature, laser bias current, and both transmitter and receive optical power. This information can be accessed via the management system. The SFP must be MSA-compliant.

### 2.4.1 Installing SFP Modules

To connect the fiber transceiver and fiber cable, use the following guidelines:

1. Position the SFP transceiver with the handle on top, see the following figure.
2. Locate the triangular marking in the slot and align it with the bottom of the transceiver.
3. Insert the SFP transceiver into the slot until it clicks into place.
4. Make sure the module is seated correctly before sliding the module into the slot. A click sounds when it is locked in place.

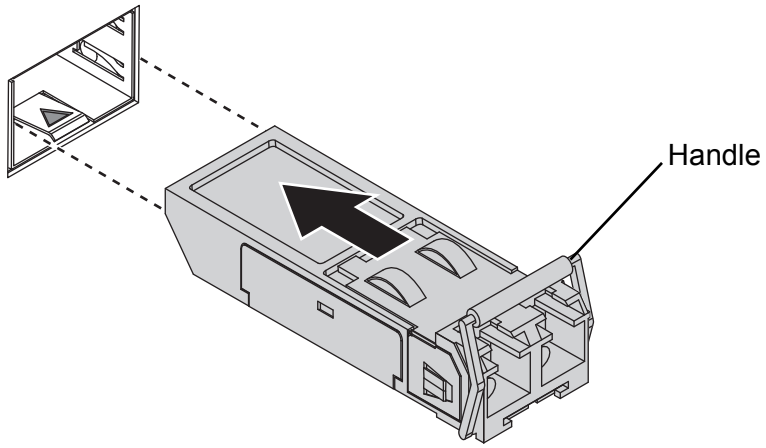


**Figure 2.3 Installing an SFP Transceiver**

***Note!*** *If you are attaching fiber optic cables to the transceiver, continue with the following step. Otherwise, repeat the previous steps to install the remaining SFP transceivers in the device.*

5. Remove the protective plug from the SFP transceiver.

***Note!*** *Do not remove the dust plug from the transceiver if you are not installing the fiber optic cable at this time. The dust plug protects hardware from dust contamination.*

6. Insert the fiber cable into the transceiver. The connector snaps into place and locks.

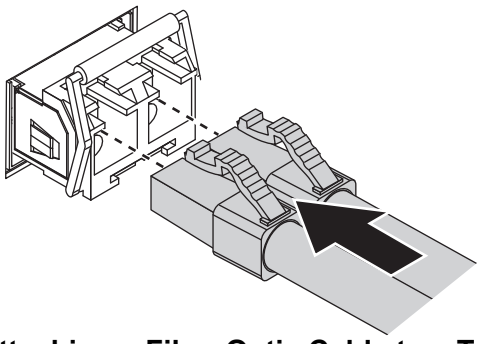

**Figure 2.4 Attaching a Fiber Optic Cable to a Transceiver**

7. Repeat the previous procedures to install any additional SFP transceivers in the converter.

   The fiber port is now setup.

### 2.4.2 Removing SFP Modules

To disconnect an fiber connector, use the following guidelines:

1. Press down and hold the locking clips on the upper side of the optic cable.
2. Pull the optic cable out to release it from the transceiver.

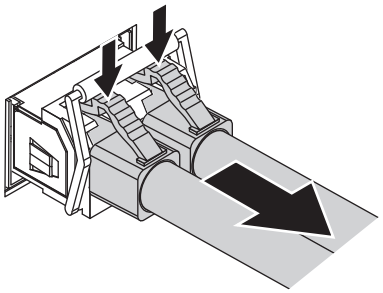

**Figure 2.5 Removing a Fiber Optic Cable to a Transceiver**

3. Hold the handle on the transceiver and pull the transceiver out of the slot.

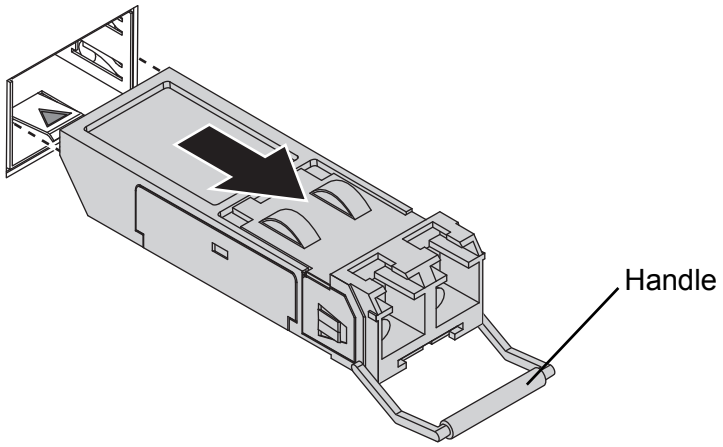


**Figure 2.6 Removing an SFP Transceiver**

# 2.5 Connecting the Converter to Ethernet Ports

## 2.5.1 RJ45 Ethernet Cable Wiring

The following table lists the pin configuration for the RJ45 data connector.

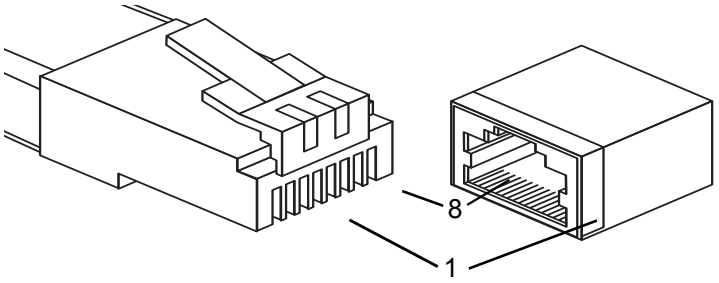


**Figure 2.7 Ethernet Plug & Connector Pin Position**

| Pin | Signal Name 1000M | Signal Direction 10/100M |
|---|---|---|
| 1 | TXD1+ | Out* |
| 2 | TXD1- | Out* |
| 3 | RXD2+ | In* |
| 4 | D3+ | |
| 5 | D3- | |
| 6 | RXD2- | In* |
| 7 | D4+ | |
| 8 | D4- | |

* The MDI/MDIX function will automatically adjust the direction of these signals to match the connected unit when running 10/100Base-T. 1000Base-T will use all 4 pairs in full duplex mode.

# 2.6 DC Terminal Block Wiring Instructions

## 2.6.1 DC Power Supply Precautions

The following precautions should be observed when installing chassis with DC power supplies.

1. Check nameplate ratings to assure there is no overloading of supply circuits that could have an effect on overcurrent protection and supply wiring.
2. When installing 7 to 50 rated equipment, it must be installed only per the following conditions:
   a. Connect the equipment to a 7 to 50VDC supply source that is electrically isolated form the alternating current source. The 7 to 50 VDC source must be connected to a 7 to 50 VDC SELV source.
   b. The maximum terminal voltage is 50 VDC.
   c. Input wiring to terminal block must be routed and secured in such a manner that it is protected from damage and stress. Do not route wiring past sharp edges or moving parts.
   d. A readily accessible disconnect device, with a 3mm minimum contact gap, shall be incorporated in the fixed wiring.

Grounding: reliable grounding of this equipment must be maintained. Particular attention should be given to supply connections when connecting to power strips, rather than direct connections to the branch circuit. The Negative Terminal is common to the grounded case.

The IE-Giga-MiniMc can be powered via the DC terminal block. From a power source, connect to any one positive and any one negative terminal on IE-Giga-MiniMc.

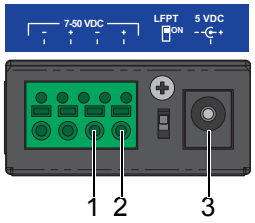


**Figure 2.8 Connected to Chassis:**

***Note!*** *When using stranded wire, the leads must be tinned and equivalent to a 16 AWG solid conductor. The DC terminal block is protected against mis-wiring. If the unit is mis-wired, positive power lead to the negative terminal and negative power lead to the positive terminal, it will not function. When powering a unit with voltages near the upper limit of the device's specification (for example: 48 Volts) take precautions to limit the voltage at the units terminal block. When turning on high voltage DC circuits, initial voltages may momentarily exceed the unit's specification.*

| No. | Item | Description |
|---|---|---|
| 1. | Ground (common) | |
| 2. | +7 to 50 VDC | |
| 3. | +5 to 20 VDC | |

### 2.6.2 Cascading Power

When installing multiple IE-Giga-MiniMc units on a DIN rail, connect to one DC input source and then cascade from one DC block to the next, until reaching the maximum electrical current available.

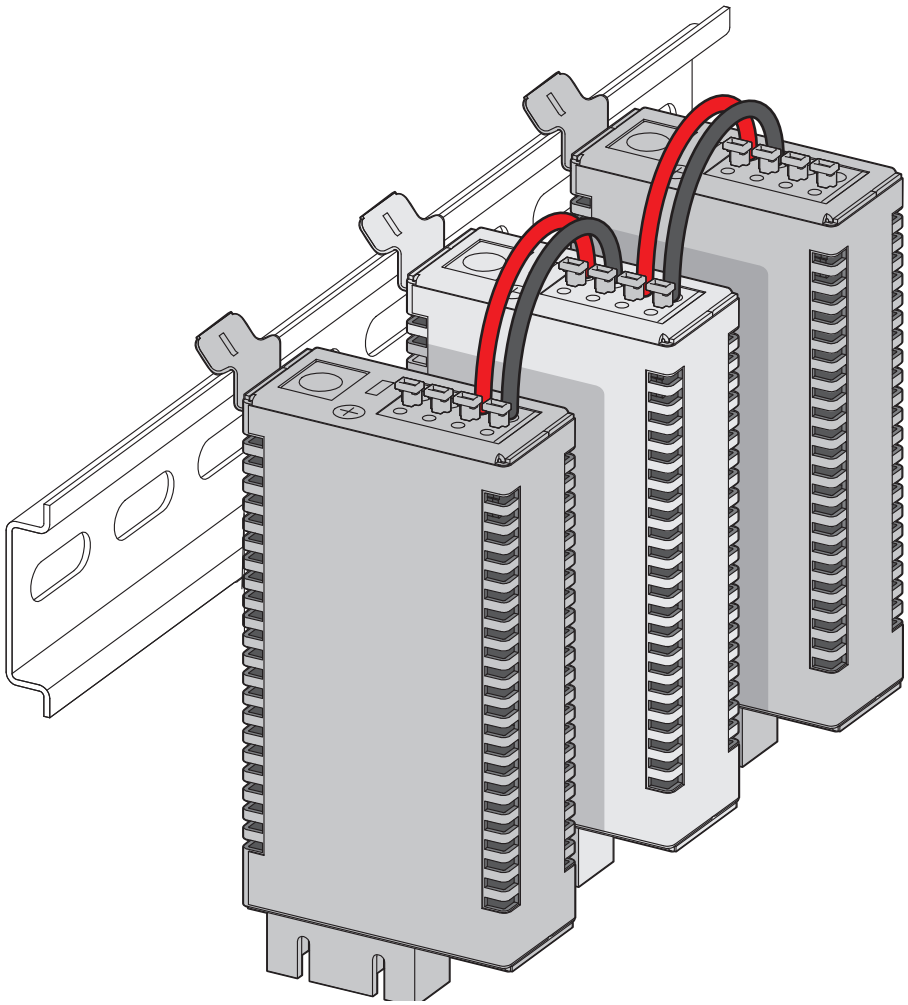

**Figure 2.9 Connecting Multiple IE-Giga-MiniMc Devices**

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Please verify specifications before quoting. This guide is intended for reference purposes only.