



IndustriaComputerProducts
DataAcquisitionSystem

ET-7019Z/PET7019Z

User Manual



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ET-7019Z/PET7019Z User Manual, version 0.0.

Warranty

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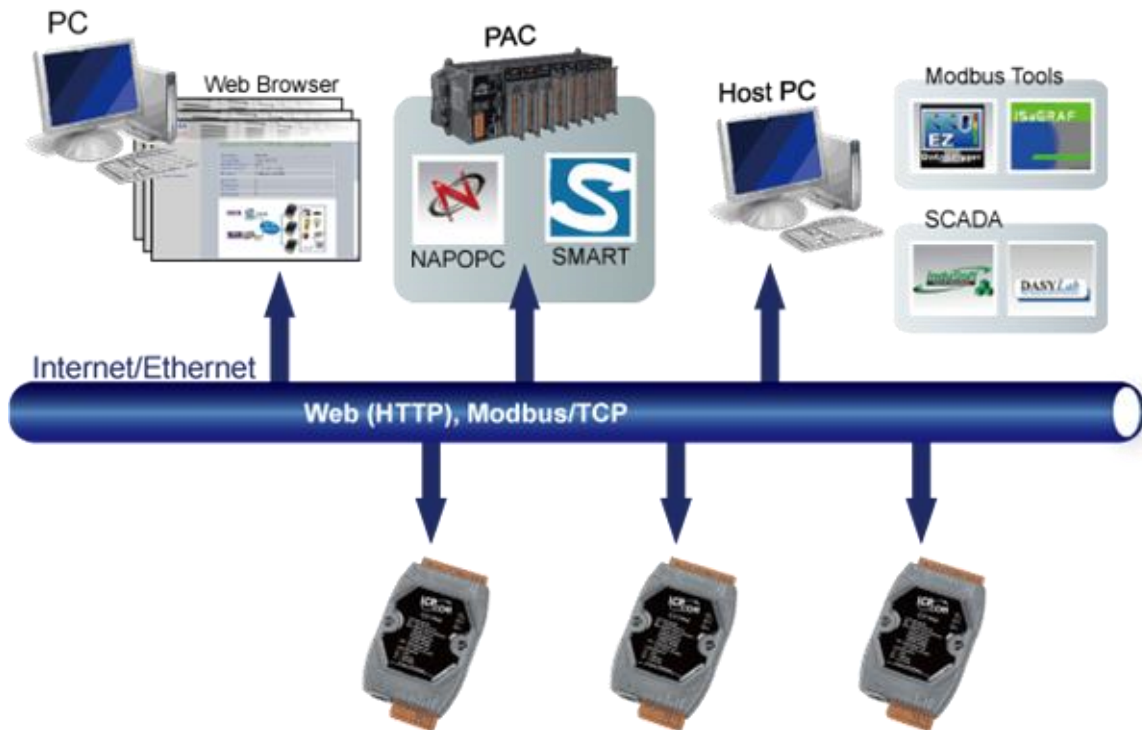
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1. Introduction



The ET7019Z/PET7019Z is a web-based Ethernet I/O module that features a built-in web server, which allows remote configuration, I/O monitoring and I/O control simply by using a regular web browser. Remote control is as easy as surfing the Internet on the web HMI function means that programming or HTML skills are no longer required so creating dynamic and attractive web pages for I/O monitoring and I/O control purposes will be more fun for engineers in the future. The ET7019Z/PET7019Z offers easy and safe access for users at anytime and from anywhere, and also supports the Modbus/TCP protocol to ensure perfect integration with SCADA software. Furthermore, the ET7019Z/PET7019Z features a unique design that allows power and Ethernet cable but also power making installation of the ET7019Z/PET7019Z a piece of cake. Imagine no more unnecessary wires with only an Ethernet cable being required to take care of everything in the field.

The ET7019Z/PET7019Z is a member of the thermocouple series and is a testament to the excellence of ICP DAS products. The ET7019Z/PET7019Z is specifically designed for extremely accurate thermocouple measurement and features automatic cold junction compensation for each channel to ensure temperature output consistency and stable temperature output in the field. Current input and voltage input are both supported. An intuitive design is kept in this model; choosing to measure current or voltage is simply a jumper. An external resistor is no longer needed.

Another feature is that its ten input channels can be individually be configured for different kinds of analog input. Open thermocouple detection and ESD/EFT/Surge protection mechanisms are also included.

The Comparison between ET-7019Z and PET-7019Z

The PET-7019Z has some unique features differ from ET-7019Z

Ø PET-7019Z Power over Ethernet

The PET-7019Z has integrated Power over Ethernet (PoE), it allows power and data to be carried over a single Ethernet cable. The device can operate solely from the power it receives through the data cable. This innovation allows greater flexibility in office design, higher efficiency in systems design, and faster turnaround time and set implementation. The PET-7019Z features true IEEE 802.3 compliant (classification, Class 1) Power over Ethernet (PoE) using both Ethernet pairs (Category 5 Ethernet cable). The PET-7019Z can receive power from an auxiliary power sources like AC adapters and battery in addition to the PoE network. This is a desirable feature when the total system power requirements exceed the PSE's load capacity. Furthermore, with the auxiliary power option, the PET-7019Z can be used in a standard Ethernet PoE system.

Ø Industrial PoE Solution



When using the NS-205PSE PoE Switch as a power source, the NS-205PSE automatically detects the connected devices whether they are PoE devices or not. This mechanism ensures the NS-205PSE to work with both PoE and non-PoE devices coordinately at the same time.

Being as a power source for PoE devices, the NS-205PSE requires its power input ranging from +46 ~ +55V.

Ø More information about ET-7019Z

There are two ways for ET-7019Z getting the power. One is through Ethernet PoE Switch; the other is as usual through wiring by an external power. External power should range from +12_{dc} V to 48_{dc} V. The reason we keep the second way is because it might be useful if someday or somehow you have different applications. ET-7019Z is equipped with a LED, which indicates whether the power is supplied by a PoE Switch.

1.1. Features

The ET-7019Z/PET-7019Z module offers the most comprehensive configuration to meet specific application requirements. The following list shows its features to simplify installation, configuration and application.

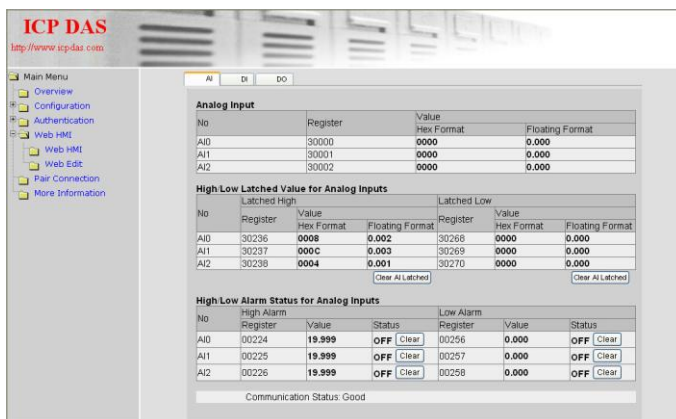
Built-in Web Server

Each ET-7019Z/PET-7019Z module has a built-in web server that allows users to easily configure, monitor and control the module from a remote location using a regular web browser.



Web HMI

The Web HMI function allows the users to create dynamic and attractive web pages to monitor and control the I/O points. Users can upload specific I/O layout pictures (bmp, jpg, gif format) and define a description for each I/O point. No HTML or Java skills are needed to create the web pages.



Communication Security

Account and password are required when logging into the ET-7019Z/PET-7019Z web server. An IP address filter is also included, which can be used to allow or deny connections with specific IP addresses.

Modbus/TCP, Modbus/UDP Protocol

The Modbus/TCP, Modbus/UDP slave function on the ET-7019Z/PET-7019Z can be used to provide data to remote HMI/SCADA software built with Modbus/RTU Driver. Also provides NAPOPC_ST Data for Modbus/TCP to integrate ET-7019Z/PET-7019Z I/O real time data value with OPC client enabled software.

Built-in Multifunction I/O

Various I/O components are mixed with multiple channels in a single module, which provides the most cost effective usage and enhances performance of the I/O operations.

Automatic MDI / MDI-Crossover for Plug-play

RJ45 Ports supports automatic MDI/MDI-Crossover that can automatically detect the type of connection to the Ethernet device without requiring special crossover cables.

Built-in Dual Watchdog

The Dual Watchdog consists of a Module Watchdog and a Host Watchdog. The action of DO is also associated to the Dual Watchdog.

Module Watchdog is a built-in hardware circuit that monitors the operating status of the module and will reset the module if a failure occurs in the hardware or the software.

Host Watchdog is a software function that monitors the operating status of the host, and is used to prevent network communication problems or host failures. When host watchdog timeout occurs, the module will reset to safe status in order to prevent any erroneous operations of the controlled target.

Highly Reliable Under Harsh Environment

ET-7019Z/PET-7019Z is housed in a plastic shell/cabinet with a column-like ventilator that helps to cool the working environment inside the shell/case.

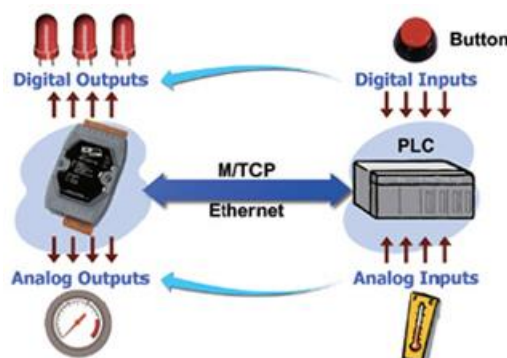
Operating Temperature: $-25 \sim +75 \text{ }^{\circ}\text{C}$

Storage Temperature: $-30 \sim +80 \text{ }^{\circ}\text{C}$

Humidity: $10 \sim 90\% \text{ RH}$ (non-condensing)

I/O Pair Connection

This function is used to create a DO pair through the Ethernet. Once the configuration is completed, the ET-7019Z/PET-7019Z module can poll the status of remote DI devices using the Modbus TCP protocol and then continuously write to a local DO channels in the background.



1.2. Specifications

1.2.1. System Specifications

The table below summarizes the specifications of ET-7019Z/PET7019Z

Models	ET-7019Z	PET7019Z
Software		
Built-in Web Server	Yes	
Web HMI	Yes	
I/O Pair Connection	Yes	
Communication		
Ethernet Port	10/100 Base-T with Auto-MDI/MDX	
PoE	-	Yes
Protocol	Modbus/TCPIP/Modbus/UDP	
Security	ID, Password and IP Filter	
Dual Watchdog	Yes, Module (0.8 sec), Communication (Programmable)	
LED Display		
L1 (System Running)	Yes	
L2 (Ethernet Link/Act)	Yes	
L3 (Ethernet 10/100 Speed)	Yes	
PoE Power	-	Yes
2 Way Isolation		
Ethernet	1500V _{DC}	-
I/O	2500V _{DC}	
EMS Protection		
ESD (IEC 61000-4)	4 kV Contact for each terminal and 8 kV Air for point	
EFT (IEC 61000-4)	+/-4 kV for Power	
Surge (IEC 61000-6)	+/-3 kV for Power	

Power Requirements		
Reverse Polarity Protection	Yes	
Powered from Terminal Block	Yes, 10 ~ 30 V	Yes, +12 ~ +48 V
Powered from PoE	-	Yes, IEEE 802.3af, Class1
Consumption	25W	3.5W
Mechanical		
Dimensions (W x H x D)	72 mm x 16 mm x 35 mm	
Installation	DIN-Rail or Wall Mounting	
Environment		
Operating Temperature	-25 C ~ +75 C	
Storage Temperature	-30 C ~ +80 C	
Humidity	10 ~ 90 % RH, non-condensing	

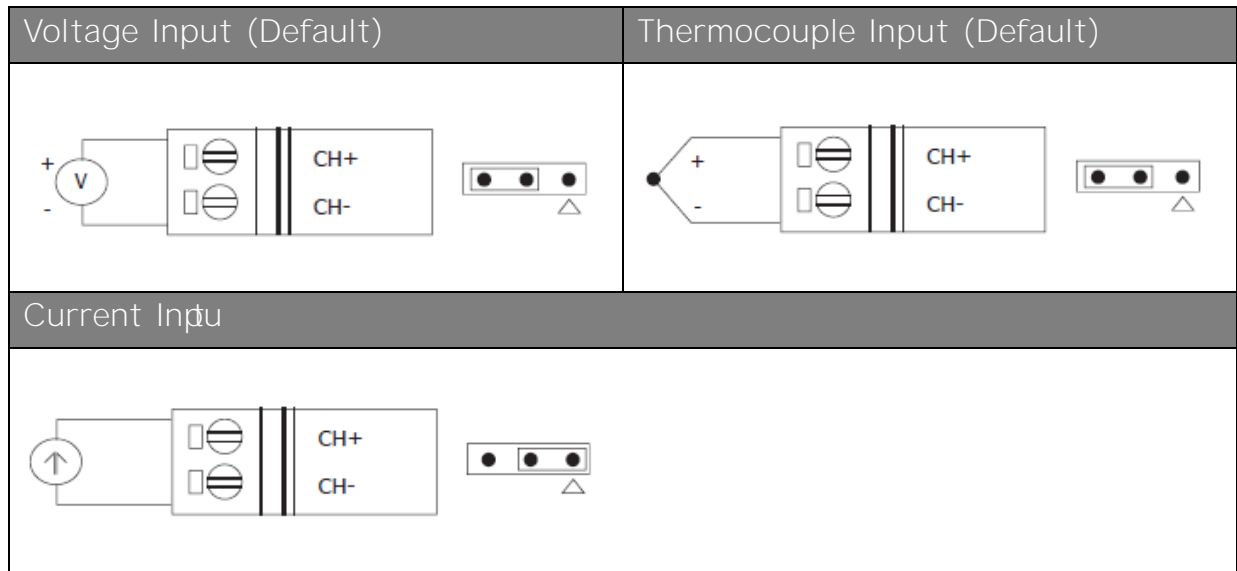
1.2.2.I/O Specifications

Analog Input	
Channels	10(Differential)
Sensor Type	+/-15 mV, +/-50 mV, +/-100 mV, +/-150 mV, +/-500 mV, +/-1V, +/-2.5 V, +/-5 V, +/-10 V
	+/-20 mA, 0 ~ 20 mA, 4 ~ 20 mA (Jumper Selectable)
	Thermocouple (J, K, T, E, R, S, B, N, C, I and BIN43710)
Individual Channel Configuration	Yes
Resolution	16bit
Sampling Rate	10 Samples/Sec. (Total)
Accuracy	+/- 0.1 % of FSR or better
Zero Drift	+/- μ V/yr
Span Drift	+/-25 ppm/yr
Over voltage Protection	240 Vrms
Input Impedance	> 100 M Ω
Common Mode Rejection	86 dB Min.
Normal Mode Rejection	100 dB
Temperature Output Consistency	Yes
Stable Temperature Output in the Field	Yes
Open Wire Detection	Yes
Digital Output	
Channels	6
Type	Isolated Open Collector
Sink/Source (NPN/PNP)	Sink
Max. Load Current	700 mA/Channel
Load Voltage	5 V _{DC} ~ 50V _{DC}
Overvoltage Protection	60 V _{DC}
Overload Protection	+4 V _{DC} max.
Shortcircuit Protection	Yes
Power-on Value	Yes, Programmable
Safe Value	Yes, Programmable

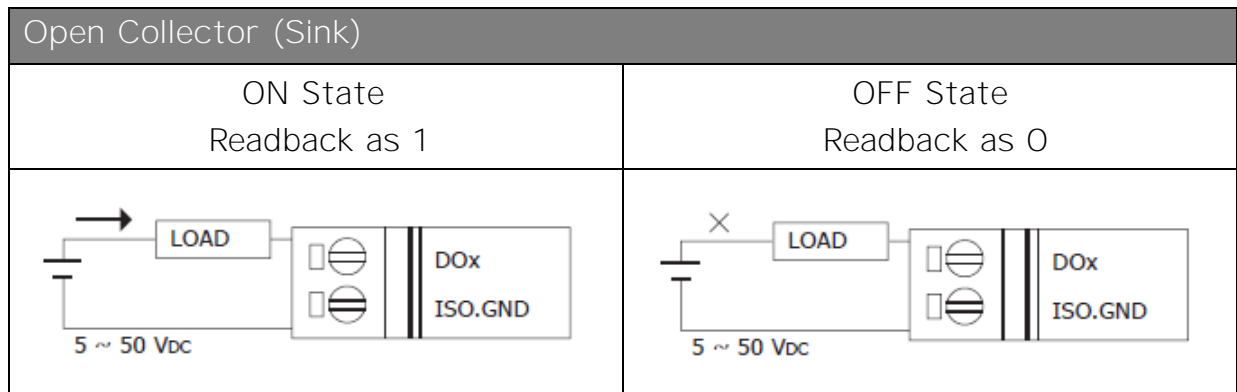
1.2.3. Wiring Specifications

The wiring diagram of ET-7019Z/PET-7019Zs illustrated on the following figure.

Analog Input



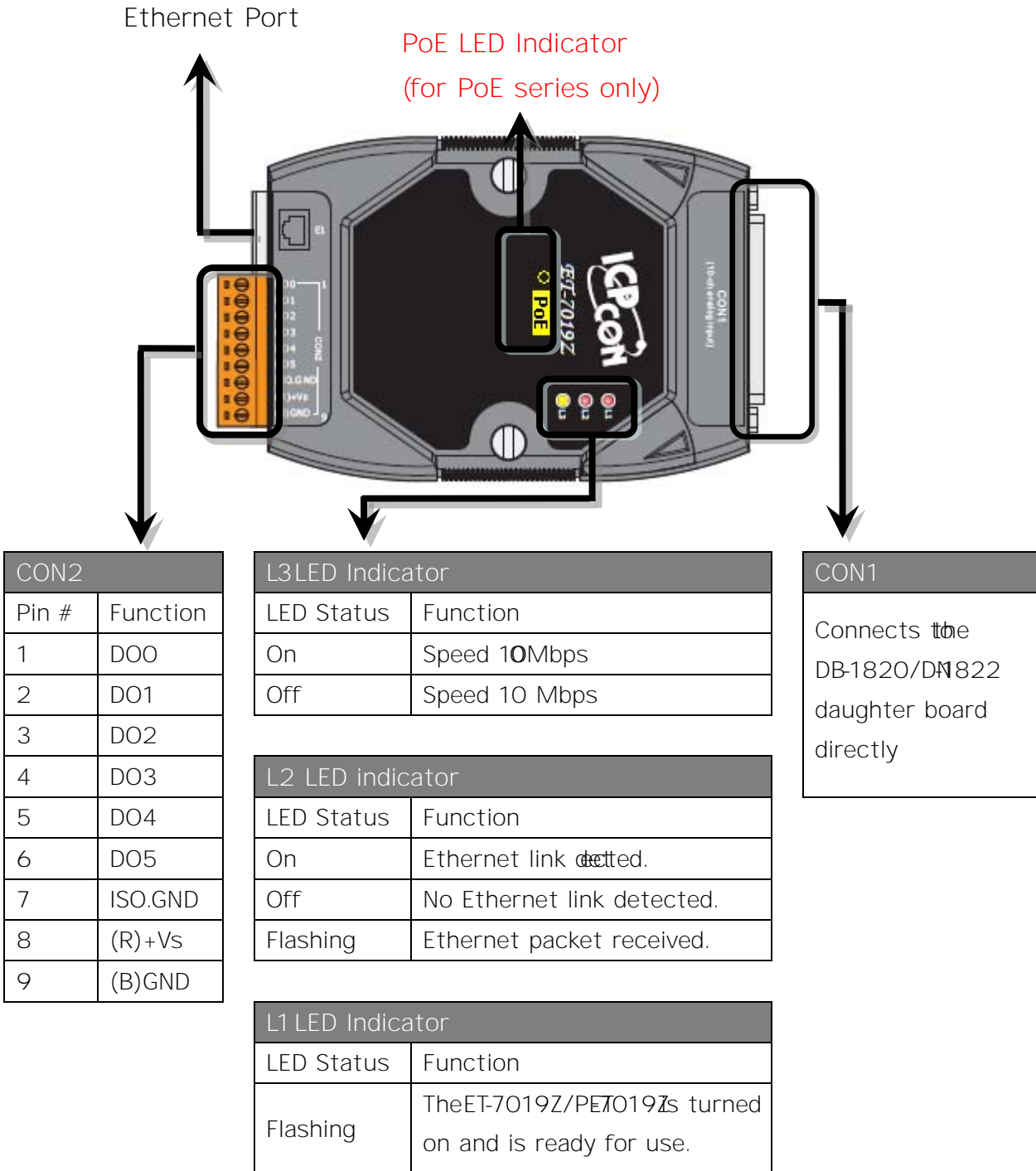
Digital Output



1.3. Overview

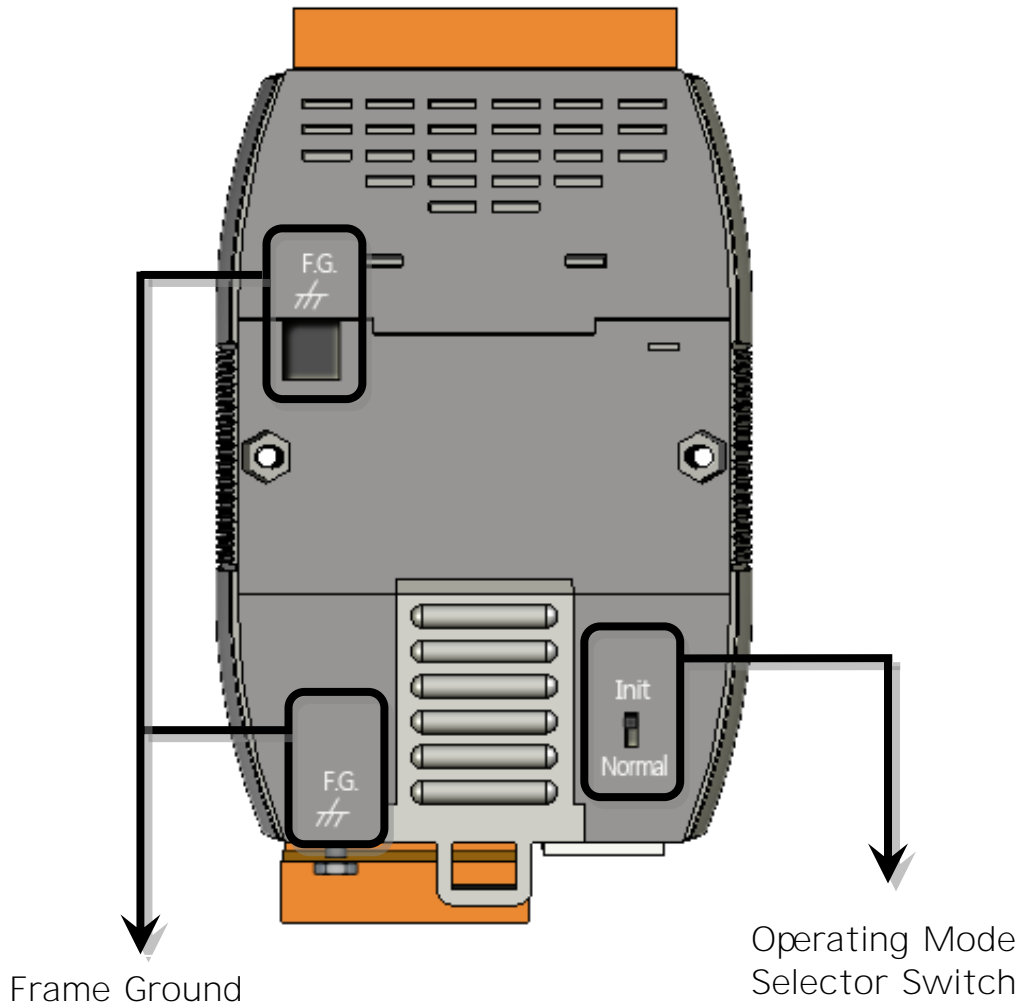
1.3.1. Front Panel

The ET-7019Z/PET-7019Z front panel contains the Ethernet connectors and LEDs.



1.3.2. Back Panel

The ET-7019Z/PET-7019Z back panel contains the frame ground and Init/Normal switch.



Operating Mode Selector Switch

Init mode MiniOS7 configuration mode

Normal mode Firmware running mode

In the ET-7019Z/PET-7019Z the switch is always in the Normal position. Only when updating the ET-7019Z/PET-7019Z firmware or OS, the switch can be moved from the Normal position to the Init position.

Move the switch to the Normal position after the upgrade is complete.

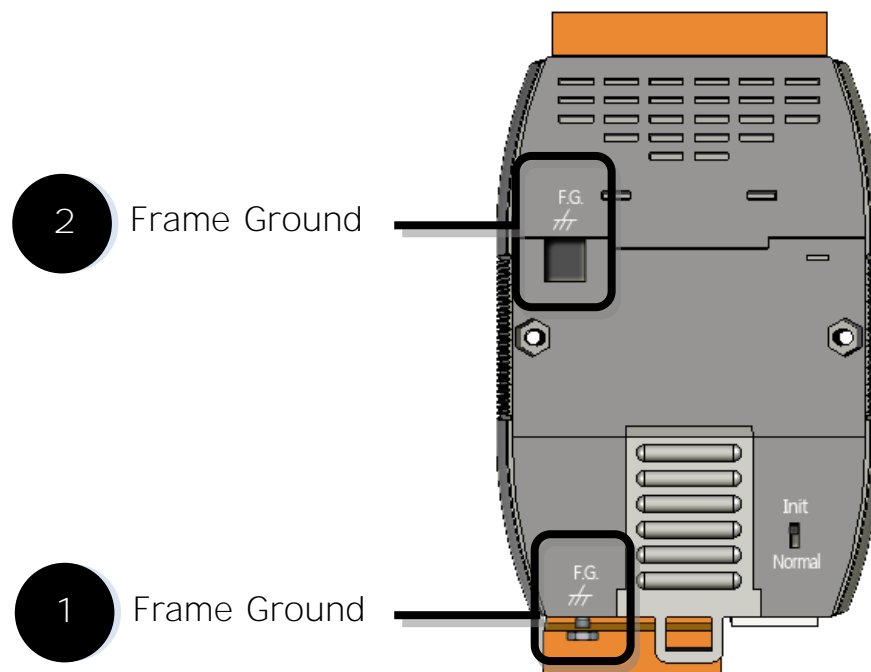
Frame Ground

Electronic circuits are constantly vulnerable to Electrostatic Discharge (ESD), which become worse in a continental climate. The ET-7019Z/PET-7019Z features a new design for the frame ground, which provides a path for bypassing ESD, allowing enhanced static protection (ESD) capability and ensures that the module is more reliable.

The following options will provide a better protection for the module:

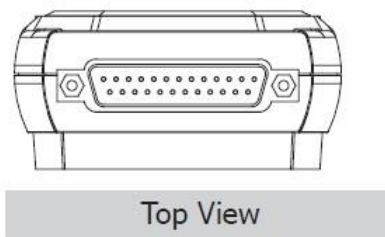
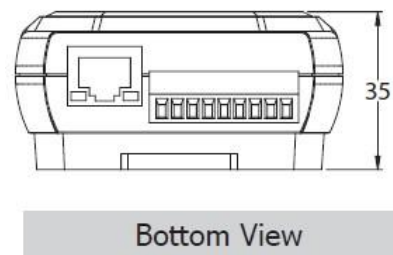
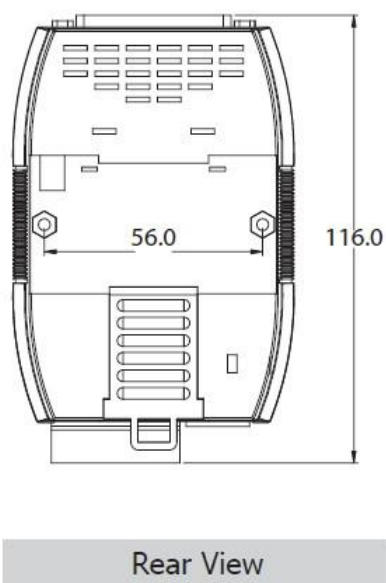
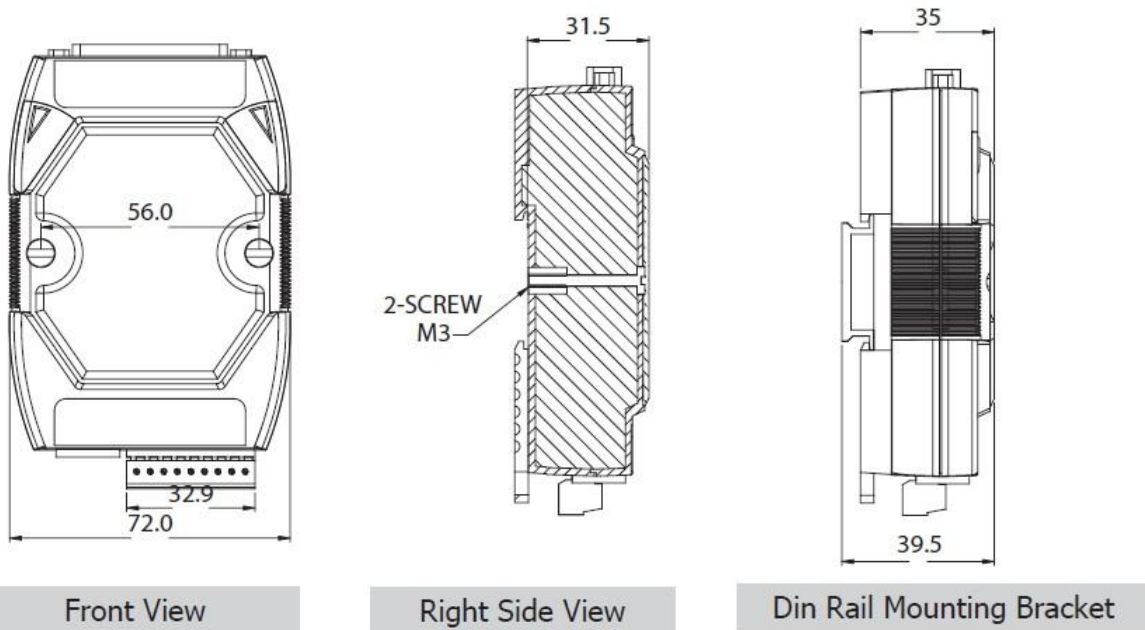
The ET-7019Z/PET-7019Z has a metallic board attached to the back of the plastic basket as shown in the figure, point 1.

When mounted to the DIN, connect the DIN-Rail to the earth ground because the DIN-Rail is in contact with the upper frame ground as shown in the figure below, point 2.



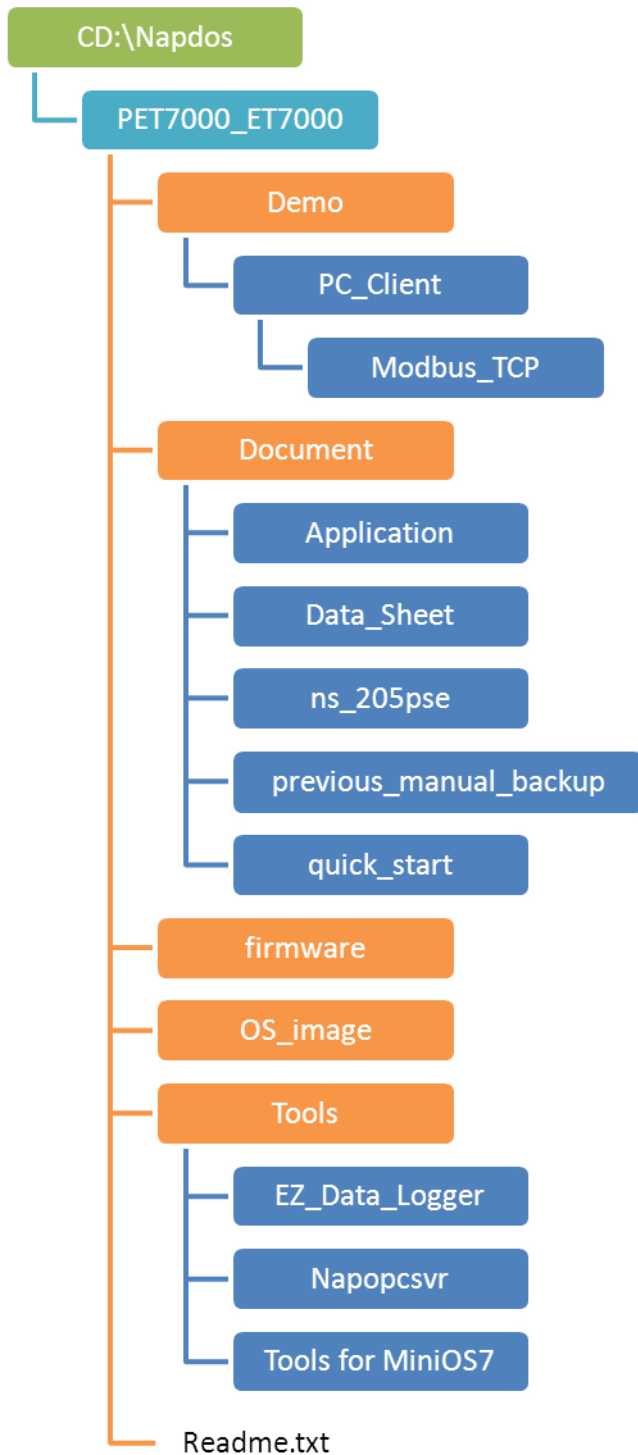
1.4. Dimensions

The diagrams below provide the dimensions for the ET7019/PET7019Z to use in defining your enclosure specifications. All dimensions are in millimeters.



1.5. Companion CD

This package comes with a CD that provides drivers, software utility, all of the required documentations, etc. All of them are listed below.



2. Getting Started

If you are a new user, begin with this chapter, it includes a guided tour that provides a brief overview of installing, configuring and using the ET-7019Z/PET-7019Z.

Before starting any task, please check the package contents. If any of the following package contents are missing or damaged, contact your distributor.



ET-7019Z/PET-7019Z

Software Utility CD

Quick Start Guide

Before you work with the ET-7019Z/PET-7019Z, you should have a basic understanding of hardware specification, such as the dimensions, the voltage range of the power supply, and the type of communication interfaces.

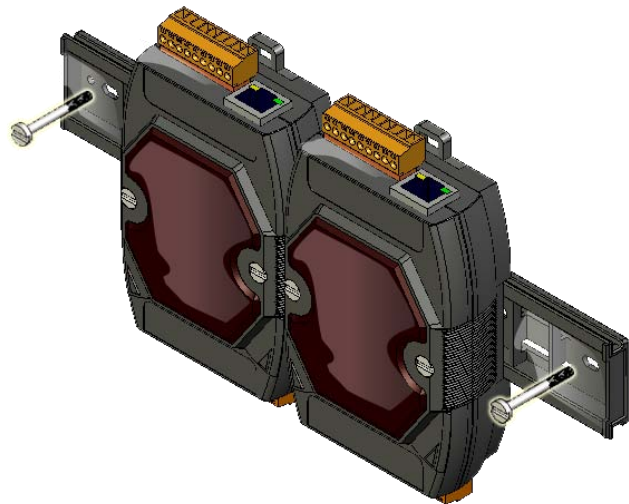
7	·	·	·	·	1.2.Specifications	·
7	·	·	·	·	1.4.Dimensions	·

2.1. Mounting the Hardware

The ET-7019Z/PET-7019Z can be mounted with bottom of the chassis on a DIN-Rail, the wall or piggyback.

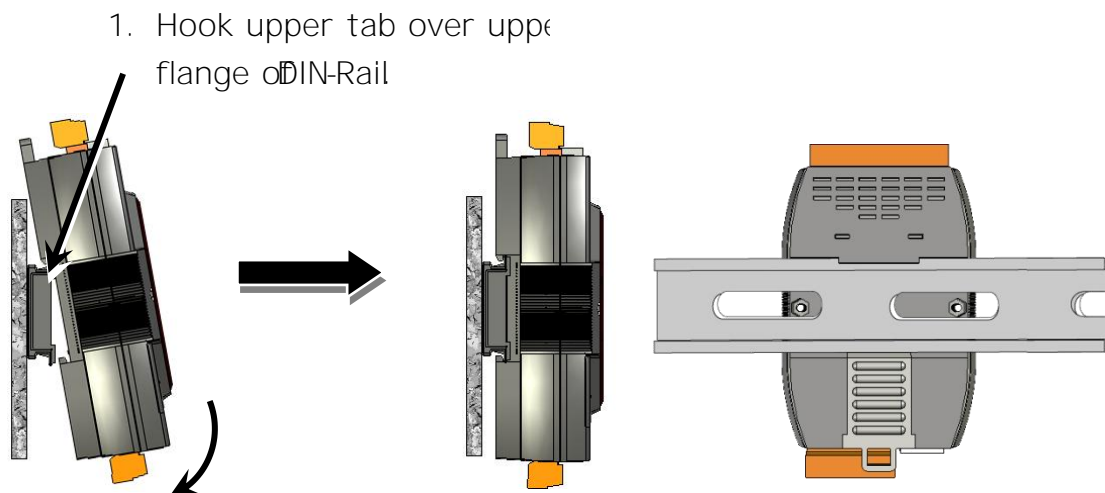
DIN-Rail Mounting

The ET-7019Z/PET-7019Z has simple rail clips for mounting reliably on a standard 35mm DIN-Rail.

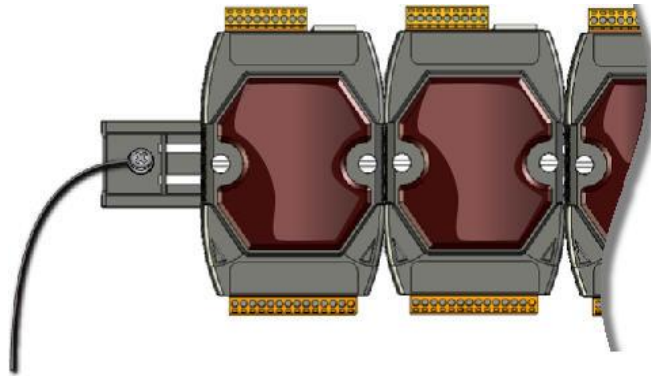


Mount the Chassis on DIN-Rail

- i. Hook upper tab over upper flange of DIN-Rail
- ii. Tilt the module toward DIN-Rail until it snaps securely to DIN-Rail



2. Tilt the module toward DIN-Rail until it snaps securely to DIN-Rail



Part number	Number of modules	Dimensions
DRS-125	2	125 mm x 35 mm
DRS-240	3	240 mm x 35 mm
DRS-360	5	360 mm x 35 mm

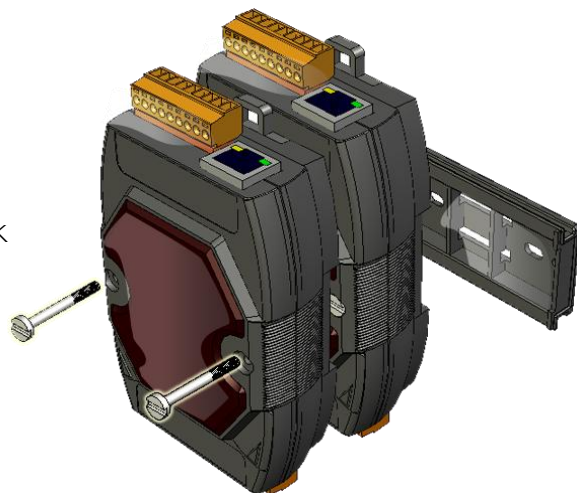
Three DIN-Rail mountable models are available to mount a variety of ICP DAS devices. Each is made of stainless steel and has a ground wire at the end.

For more information, please refer to

<http://www.icpdas.com/products/Accessories/din125.htm>

Piggyback Mounting

The ET-7019Z/PET7019Z has two holes on both sides for piggyback mounting.

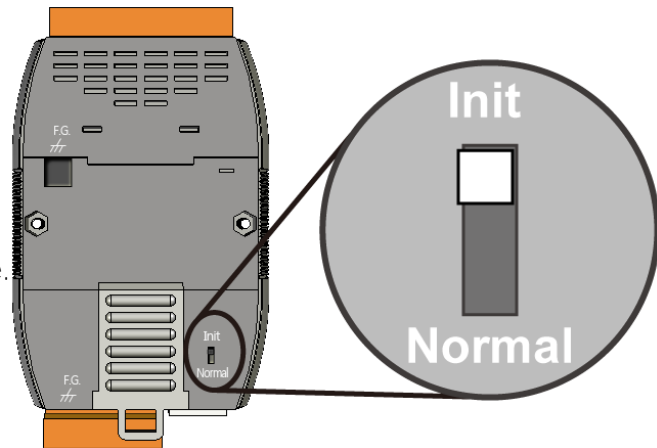


2.2. Configuring the Boot Mode

The ET-7019Z/PET019Z has the following two operating modes that can be determined by the switch mechanism on the chassis.

Init Mode

Init mode is a way to use MiniOS7 configuration mode.



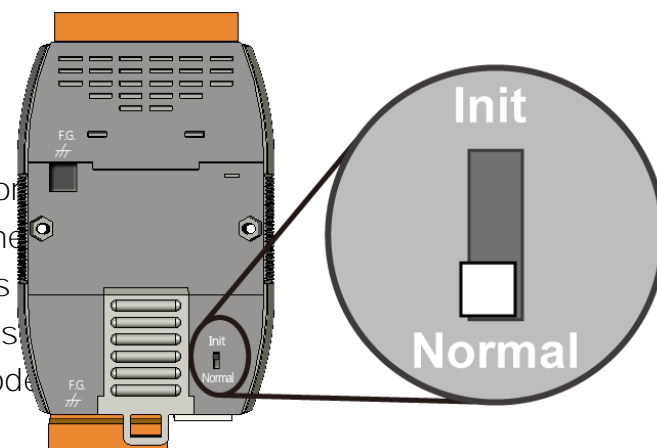
Tips & Warnings



Init mode is a method to use MiniOS7 configuration mode and update the program. After the update is completed, set the switch to the Normal position.

Normal Mode

Normal mode is the default mode of operation and the one you will use most of the time. Use this mode for more tasks and configurations. Programs also are executed in this mode.

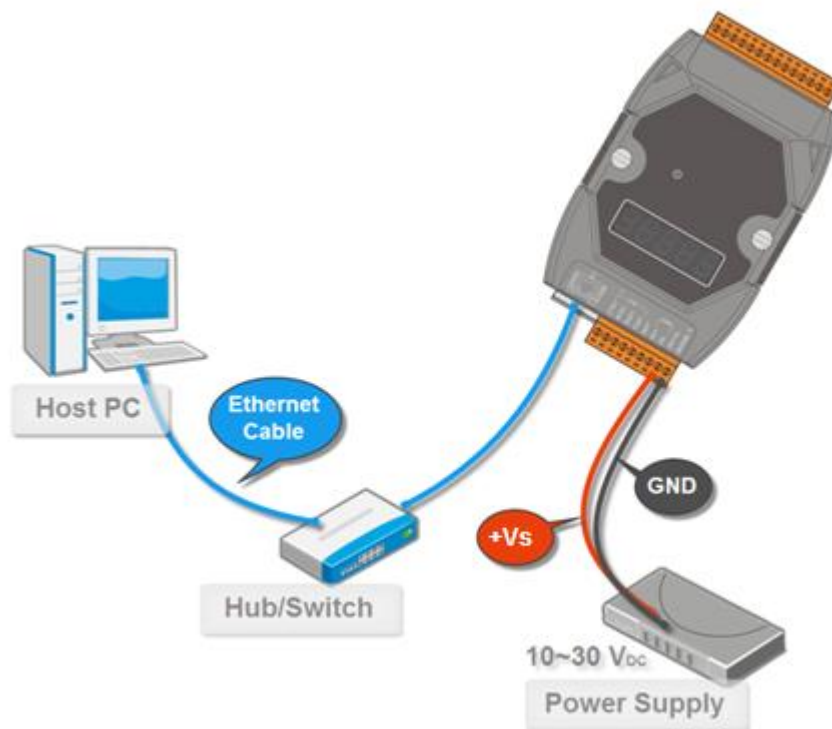


2.3. Deploying a Basic ET-7019Z/PET-7019Z Application

The ET-7019Z/PET-7019Z provides a variety of communication interface to suit a range of applications. Here is a simple application for using ET-7019Z/PET-7019Z that is shown below.

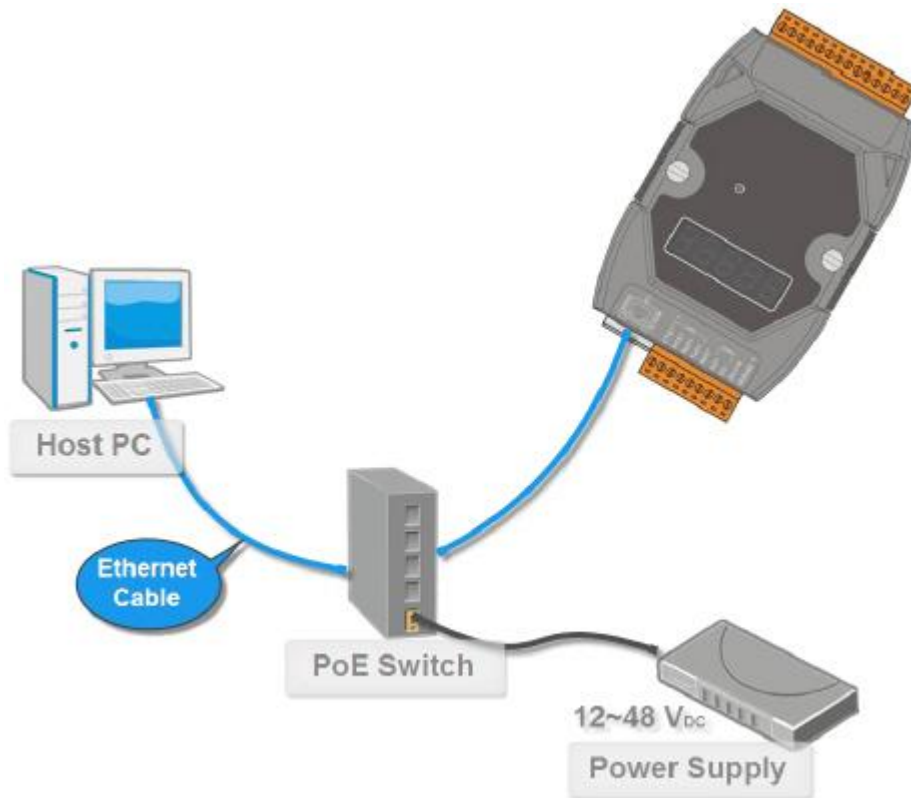
Non-PoE

- i. Connect PC to the Ethernet via the Hub/Switch.
- ii. Connect the positive of the power supply to the terminal marked (+Vs)
Connect the negative of the power supply to the terminal marked (GND)



PoE

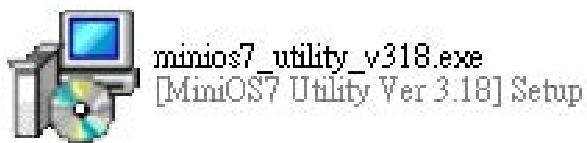
- i. Connect PC to the Ethernet Port via the PoE Switch.
- ii. Connect the power supply to the PoE Switch, which supplies power to the PET-7019Z



2.4. Installing the MiniOS7 Utility

The MiniOS7 Utility is a user tool that provides a quick and easy way to update OS image or firmware, configure Ethernet settings, and download ET-7019Z/PET-7019Z from PC.

Step 1 Get the MiniOS7 Utility tool



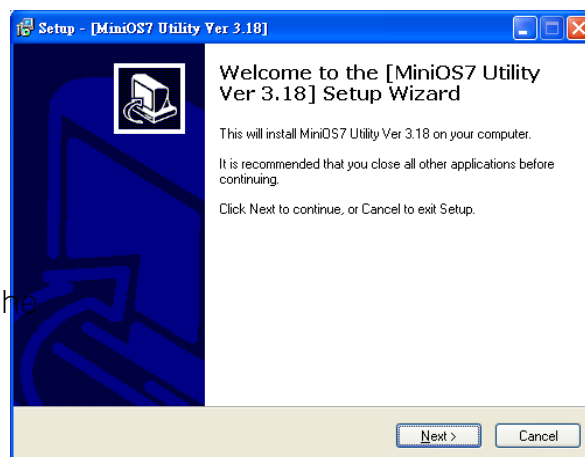
The MiniOS7 Utility can be obtained from companion CD or our FTP site:
CD:\Napdos\minios7\utility\minios7_utility

http://ftp.icpdas.com/pub/cd/8000cd/napdos/minios7/utility/minios7_utility/

Step 2 Follow the prompts to complete the installation



After the installation has been completed, there will be a new shortcut for MiniOS7 Utility on the desktop.



2.5. Using MiniOS7 Utility to Assign an IP address

The ET-7019Z/PET7019Z are web-based devices, which comes with a default IP address, therefore, you must first assign a new IP address to ET-7019Z/PET7019Z.

The factory default IP settings are as follows:

Item	Default
IP Address	192.168.255.1
Subnet Mask	255.255.0.0
Gateway	192.168.0.1

Step 1 Run the MiniOS7 Utility



Doubleclick the MiniOS7 utility shortcut on your desktop.

