# 5.3. Ethernet I/O Expansion Unit

● Introduction

The ET-87Pn series Ethernet remote I/O expansion unit is designed to acquire and control remote I/O through Ethernet connections. It comprises

- A CPU module with none-volatile memory to backup/restore I/O module configurations; LED indicators to diagnose the I/O module; and a two-port Ethernet switch for long distance communication.
- A power module
- A backplane with a number of I/O slots for flexible I/O configuration.

With its patent-pending technologies, namely auto configuration and hot swap, it saves lots of labor on the set up and maintenance of the automation systems. Reliable 3-piece construction enables users to hot swap modules during operation, without rewiring. All I/O module data are backed up in the non-volatile memory of the ET-87Pn. After hot-swapping a module, all settings are automatically loaded to recover.

Furthermore, with the Ethernet network communication interface and more than 30 I/O modules for choice, users can apply the unit to nearly any automation system.

Daisy-Chain Ethernet Cabling
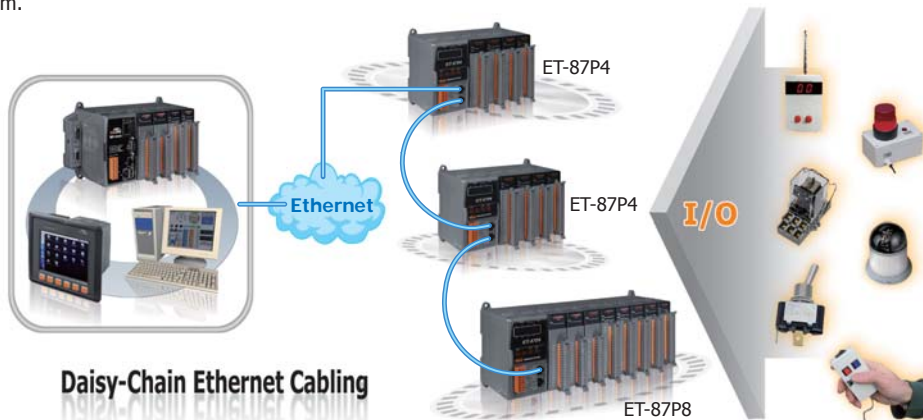
● Features

1. Hot Swap

Reliable 3-piece construction enables users to hot swap modules during operation, without rewiring. All I/O module data are backed up in the non-volatile memory of the ET-87Pn. After hot-swapping a module, all settings are automatically loaded to recover.

2. Auto Configuration

The I-87K I/O modules can be pre-configured and backed up in the non-volatile memory of the RU-87Pn. When the ET-87Pn is power on or plugged in, the ET-87Pn will automatically checks and restores these configurations to each I-87K I/O modules on it.
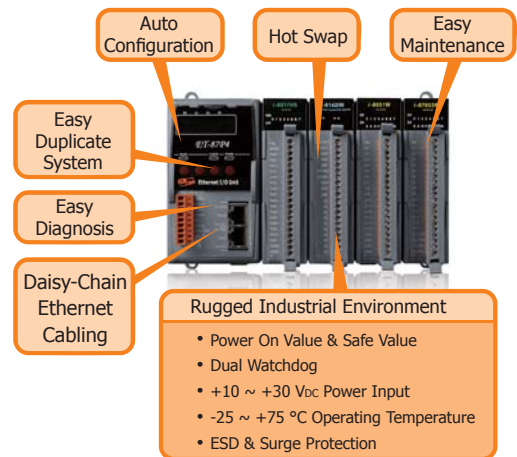
3. Easy Duplicate System

Using the DCON Utility, you can easily make a backup of the I-87K module configurations and write to another RU-87Pn. This design can easily and quickly duplicate many ET-87Pn.

4. Easy Maintenance and Diagnosis

The basic configurations (includes IP settings) are set by the push buttons and 7-segment LED display. The operator can easily set the ET-87Pn. And there are several LED status indicators to show whether I-87K modules are configured and work properly.

If one I-87K module fails, the operator just needs to replace it with one good I-87K module with the same item number. And then checks the LED indicators to know whether the replacement is performed correctly. The push buttons and LED display design makes it easy for maintenance. There is no PC and Notebook needed.

5. Communication

- Daisy-Chain Ethernet topology
  The ET-87Pn has a built-in two-port Ethernet switch to implement daisy-chain topology. The cabling is much easier and total costs of cable and switch are significantly reduced.
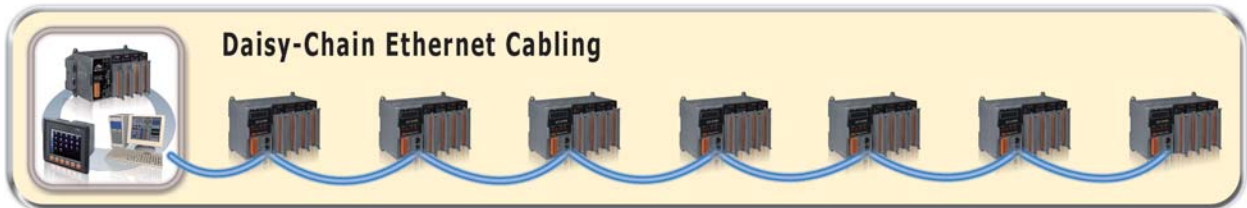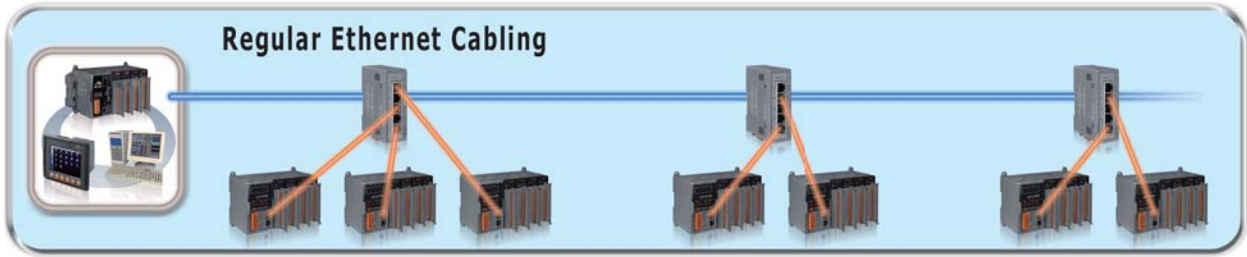
- LAN Bypass Feature
  LAN Bypass feature guarantees the Ethernet communication. It will automatically active to continue the network traffic when ET-87Pn looses its power.

- DCON protocol
  I-87K series I/O modules plugged in a ET-87Pn provide a simple command/response protocol (Called DCON protocol) for communication.
 All command/response are in easy used ASCII format.
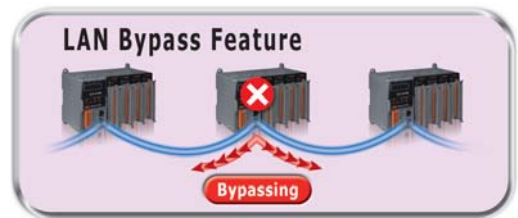
6. Rugged Industrial Environment

- Dual watchdog design
  The I-87K series I/O modules provides module watchdog and host watchdog. The module watchdog is a hardware watchdog; the host watchdog is a software watchdog. The module watchdog is designed to automatically reset the microprocessor when the module hangs. The host watchdog monitors the host controller (PC or PLC). The output of module can go to the safe value state when the host fails.

- Programmable Power On Value & Safe Value
  The DO and AO type I-87K I/O modules provide programmable Power On Value & Safe Value. When RU-87Pn is power on or plugged in, the DO or AO modules output preconfigured Power On Value. When host watchdog is acted, DO or AO modules output preconfigured Safe Value.

- Wide range power input (10 ~ 30 V$_{DC}$)

- Wide range operating temperature (-25°C ~ +75°C)

7. Fully Software Support

The free charge software utility and development kits include

- DCON Utility: for configuration

- OPC Servers:
  OPC is an industrial standard interface based on OLE technology.
  With the OPC server, I/O modules can be easily integrated to any software that has OPC client capability.
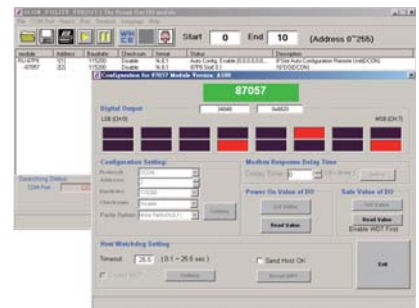
8. EZ Data Logger

EZ Data Logger is a small data logger software. It can be applied to small remote I/O system. With its user-friendly interface, users can quickly and easily build a data logger software without any programming skill.

9. Various Software Develop Toolkits

DLL, ActiveX, Labview driver, Indusoft driver, DasyLab driver, Linux driver
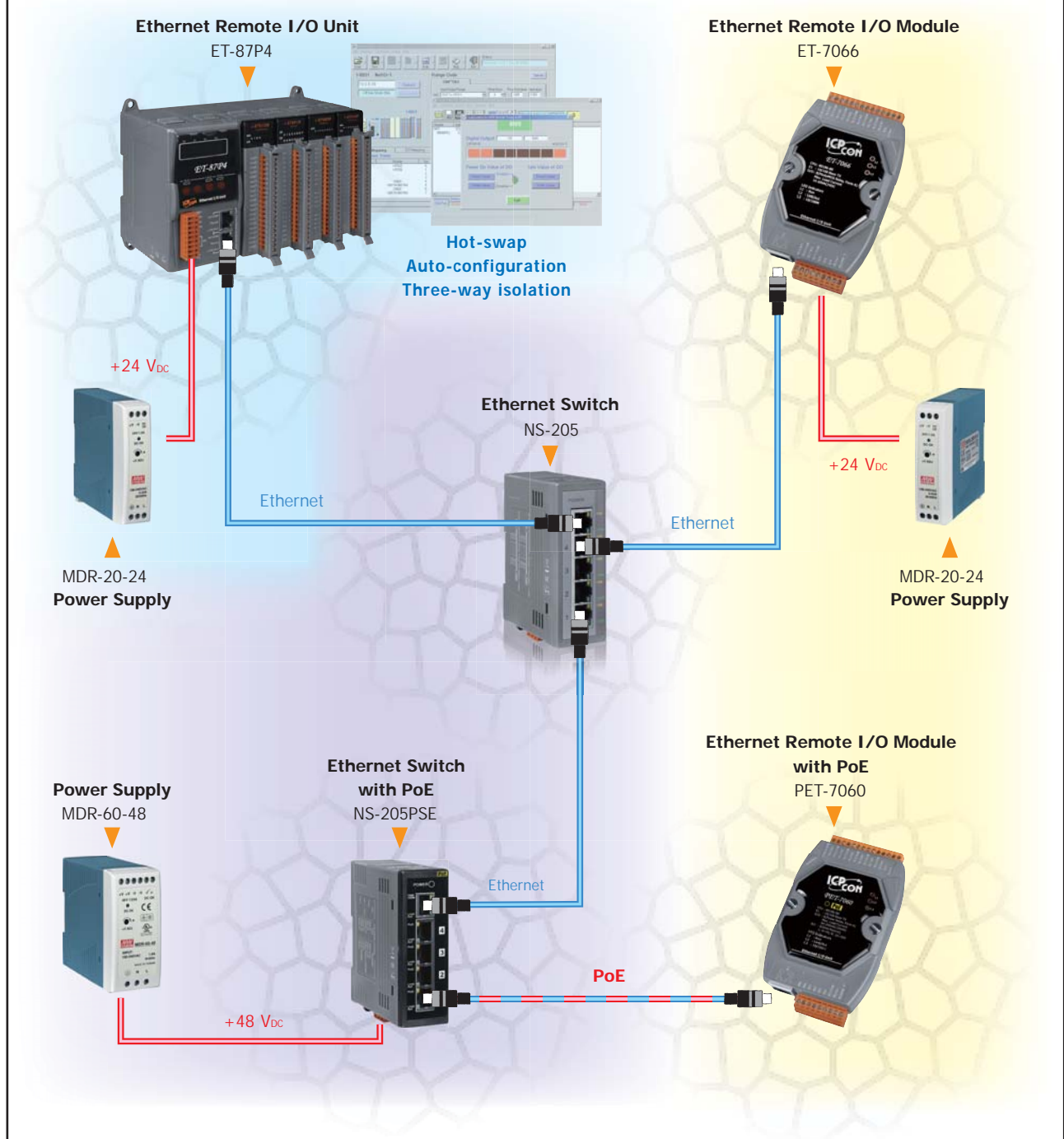
Ethernet Remote I/O unit & I/O Module

Ethernet Remote I/O Unit

The ET-87Pn series, Ethernet remote I/O unit, consists of a power supply, CPU module and a backplane with 4, 8 I/O expansion slots. The ET-87Pn unit supports DCON protocol and has a 10/100 Base-T port to connect to the main control unit directly or via Ethernet switch.

Ethernet Remote I/O Module

Both of ET-7000 series and PET-7000 series, Ethernet remote I/O module, support Modbus protocol. Those remote I/O modules are equipped with a 10/100 Base-T port, which link the remote I/O modules to the main control unit directly or via switch. PET-7000 series needs a PoE switch, such as NS-205PSE.

Ethernet Remote I/O Unit
ET-87P4

Ethernet Remote I/O Module
ET-7066

Hot-swap
Auto-configuration
Three-way isolation

+24 V$_{DC}$

Ethernet Switch
NS-205

+24 V$_{DC}$

Ethernet

Ethernet

MDR-20-24
Power Supply

MDR-20-24
Power Supply

Ethernet Remote I/O Module
with PoE
PET-7060

Power Supply
MDR-60-48

Ethernet Switch
with PoE
NS-205PSE

Ethernet

PoE

+48 V$_{DC}$

5

I/O Expansion Units

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Ethernet I/O Expansion Unit

Available soon ET-87P2   **NEW** ET-87P4

NEW ET-87P8

Highlight Information

- Two Ethernet Ports for Daisy-Chain Topology
- LAN Bypass Feature
- Hot Swap Allowed
- Auto Configuration
- LED Indicators for Fault Detection
- Push Buttons to Configure IP Address
- DCON Protocol
- 2/4/8 I/O Slots for I-87K Modules
- Operating Temperature: -25 ~ +75 °C

Introduction

ET-87Pn series is a remote intelligent I/O expansion unit to expand I-87K series I/O modules over the Ethernet for industrial monitoring and controlling applications. It offers two Ethernet switch ports to form a daisy-chain topology. The daisy-chain feature allows ET-87Pn to connect in series to each other or other Ethernet devices. Uses can easily simplify the cabling and save installation space with the feature.

ET-87Pn is designed to be used in harsh and noisy environment, so the hardware is manufactured with wide power input range (10 ~ 30 V_{DC}), isolated power input and can operate under wide temperature (-25 ~ +75 °C). To simplify installation and maintenance of I/O modules, it provides many useful features, such as: hot swap allowed, auto configuration, LED indicators for fault detection, dual watchdog to keep alive, programmable power on and safe values for safety.

There are more than 30 I/O modules supported with the unit, including analog input/output, digital input/output, counter, frequency I/O modules. We provide various software development kits (SDK) and demos, such as DLL, ActiveX, Labview driver, InduSoft driver, Linux driver, OPC server, etc. The I-87K series I/O modules plugged in the ET-87Pn can be easily integrated into variant software system.
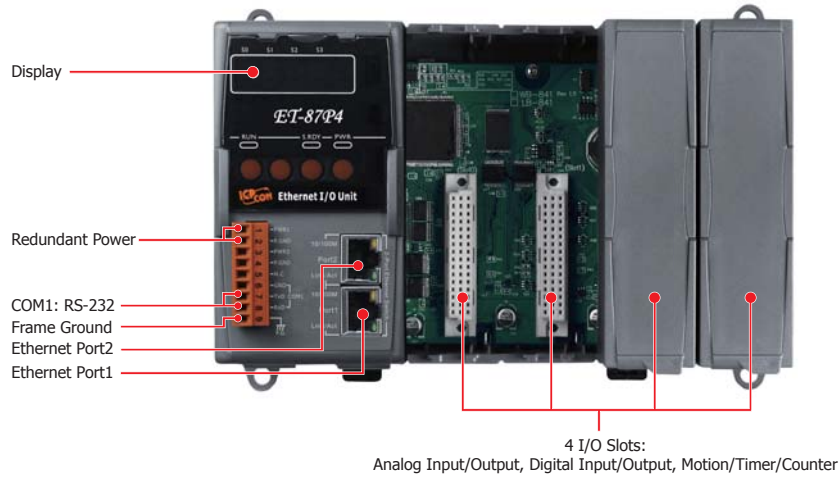
Applications

Rich I/O Expansion Ability

ET-87P4
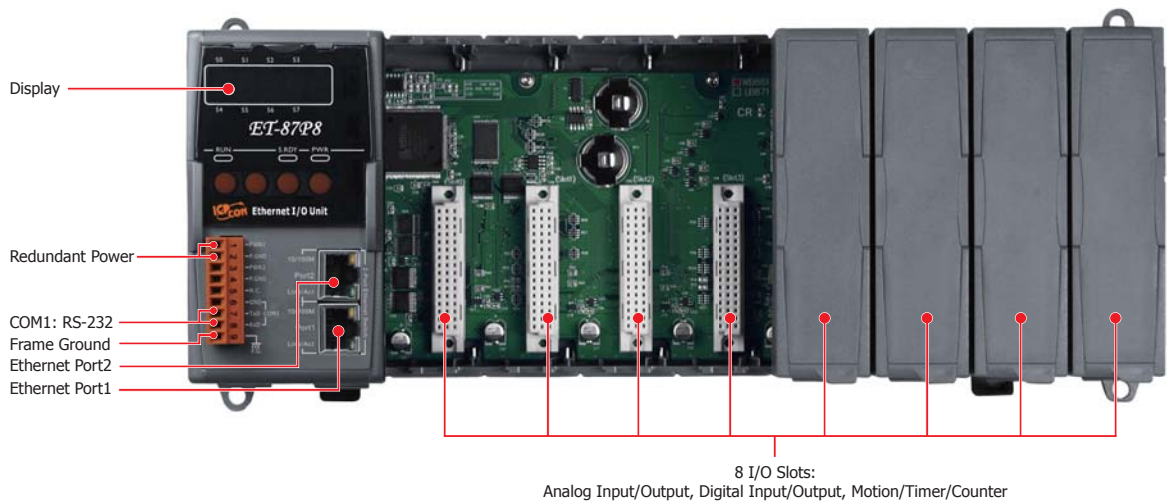
Ethernet

ET-87P4

I/O

Daisy-Chain Ethernet Cabling
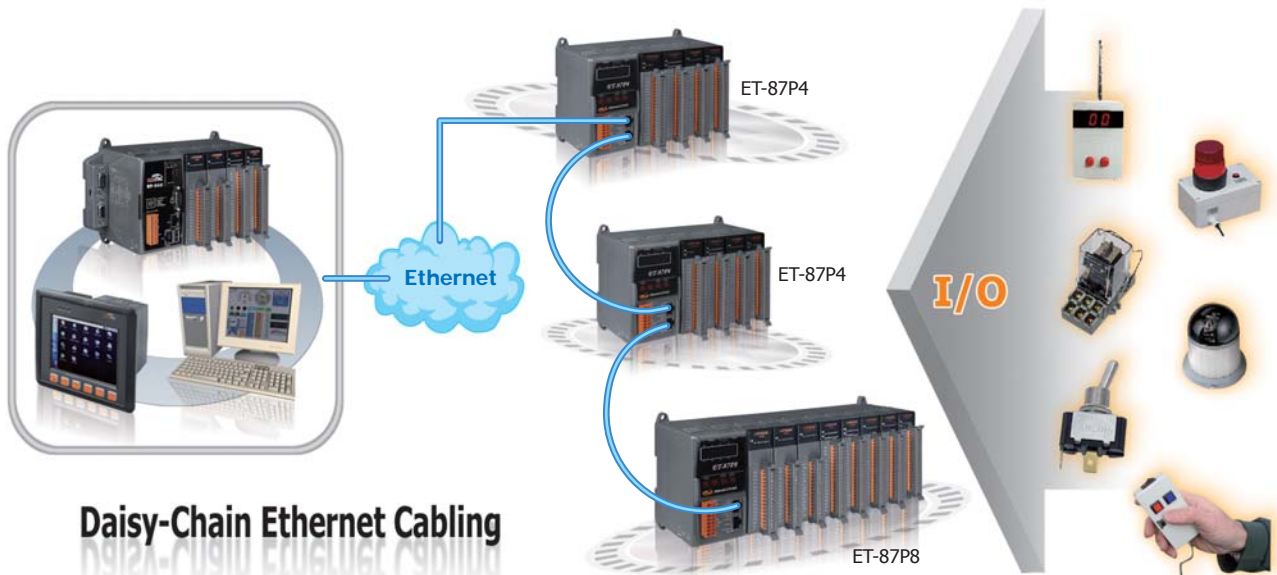
ET-87P8

Specifications

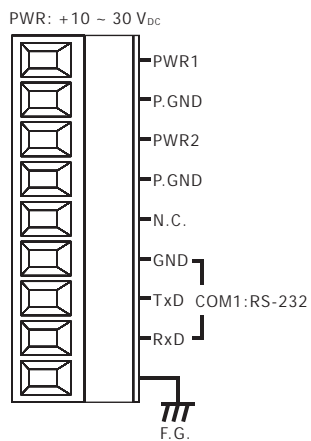| Models	ET-87P2	ET-87P4	ET-87P8
Interface Type: Ethernet			
Port	RJ-45 × 2 10/100Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)		
Cabling	Daisy-Chain Ethernet Cabling		
Isolation	1500 V_{DC}		
ESD Protection	+/- 4 K Contact Discharge and +/- 8 K Air Discharge		
Communication Protocol	DCON Protocol (ASCII format)		
LED Display/Indicators			
Power	Yes		
System Ready	Yes		
Auto Configuration	Yes		
Slot Status	Yes		
IP Address	Yes (with push buttons to configure IP address)		
I/O Expansion Slots			
Hot Swap	Yes		
Auto Configuration	Yes		
Support Module Type	High profile I-87K module only		
Slots Numbers	2	4	8
Mechanical			
Dimensions (W x H x D)	126 mm x 132 mm x 111 mm	188 mm x 132 mm x 111 mm	312 mm x 132 mm x 111 mm
Environmental			
Operating Temperature	-25 ~ +75 °C		
Storage Temperature	-30 ~ +80 °C		
Ambient Relative Humidity	10 ~ 90% RH (non-condensing)		
Power			
Input Range	+10 ~ +30 V_{DC}		
Redundant Input	Yes		
Reverse Polarity Protection	Yes		
Isolation	1000 V_{DC}		
Frame Ground	Yes		
Consumption	2 W	2 W	2.4 W
Power Board Driving	30 W		

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I/O Expansion Units

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Ethernet I/O Expansion Unit

ET-87P2/87P4/87P8

Appearance

ET-87P4

Display

Redundant Power

COM1: RS-232
Frame Ground
Ethernet Port2
Ethernet Port1

4 I/O Slots:
Analog Input/Output, Digital Input/Output, Motion/Timer/Counter

ET-87P8

Display

Redundant Power

COM1: RS-232
Frame Ground
Ethernet Port2
Ethernet Port1

8 I/O Slots:
Analog Input/Output, Digital Input/Output, Motion/Timer/Counter

Pin Assignments

ET-87P2/ET-87P4/ET-87P8 Terminal Block

PWR: +10 ~ 30 V$_{DC}$

PWR1
P.GND
PWR2
P.GND
N.C.
GND
TxD COM1:RS-232
RxD

F.G.

Dimensions (Units: mm)

ET-87P2	ET-87P4	ET-87P8
Front View	Front View	Front View
Top View	Top View	Top View
Bottom View	Bottom View	Bottom View
Rear View	Rear View	Rear View
Left Side View	Left Side View	Left Side View
Right Side View	Right Side View	Right Side View
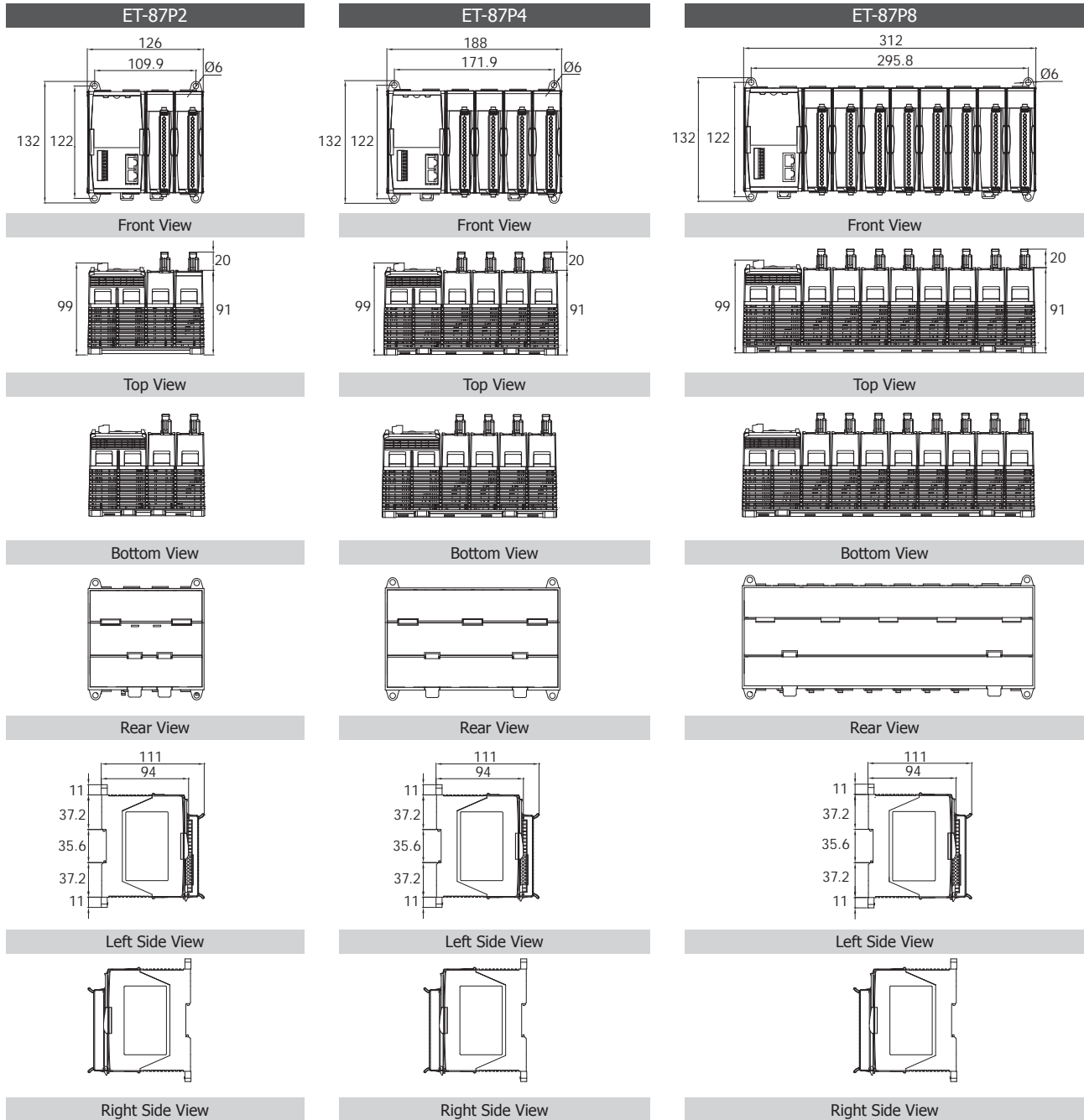
Ordering Information

ET-87P2 CR	2 slots I/O Expansion Unit
ET-87P4 CR	4 slots I/O Expansion Unit
ET-87P8 CR	8 slots I/O Expansion Unit

Accessories

DP-660	24 V_{DC}/2.5 A, 60 W and 5 V_{DC}/0.5 A, 2.5 W Power Supply with DIN-Rail Mounting
DP-665	24 V_{DC}/2.7 A, 65 W Power Supply with DIN-Rail Mounting
DP-1200 CR	24 V_{DC}/5.0 A, 120 W Power Supply with DIN-Rail Mounting (RoHS)
MDR-20-24 CR	24 V_{DC}/1.0 A, 24 W Power Supply with DIN-Rail Mounting (RoHS)
I-7560 CR	USB to RS-232 Converter (RoHS)