5.4. USB I/O Expansion Unit

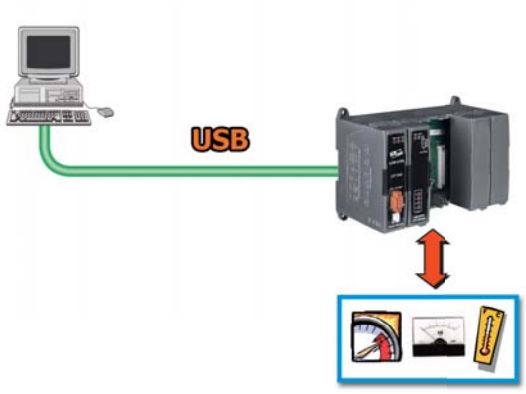
• Introduction

The USB-87Pn series USB I/O expansion unit is designed to acquire and control I/O through USB 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 USB port for 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 USB-87Pn. After hot-swapping a module, all settings are automatically loaded to recover.

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



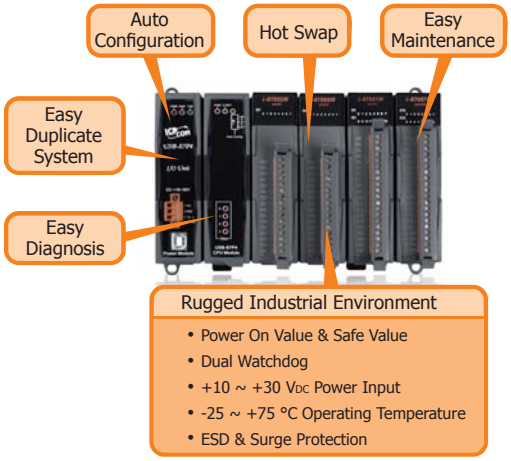
• Features

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 USB-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 USB-87Pn is power on or plugged in, the USB-87Pn will automatically checks and restores these configurations to each I-87K I/O modules on it.



3. Easy Diagnosis System

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

4. Easy Maintenance and Diagnosis

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 LED indicator design makes it easy for maintenance. There is no PC and Notebook needed.

5. Communication

- USB network
  The USB network connects the USB-87Pn to regular PC and notebook without any other media converter.
- DCON protocol
  I-87K series I/O modules plugged in a USB-87Pn provides a simple command/response protocol (named DCON protocol) for communication. All command/response are in easy use ASCII format.

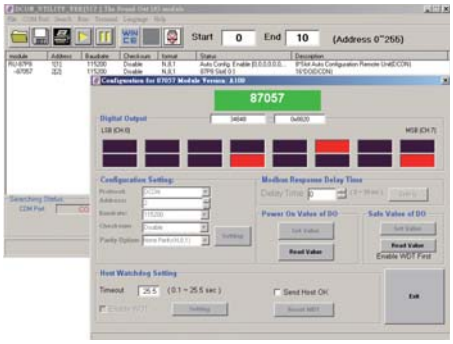
6. Rugged Industrial Environment

- 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 USB-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

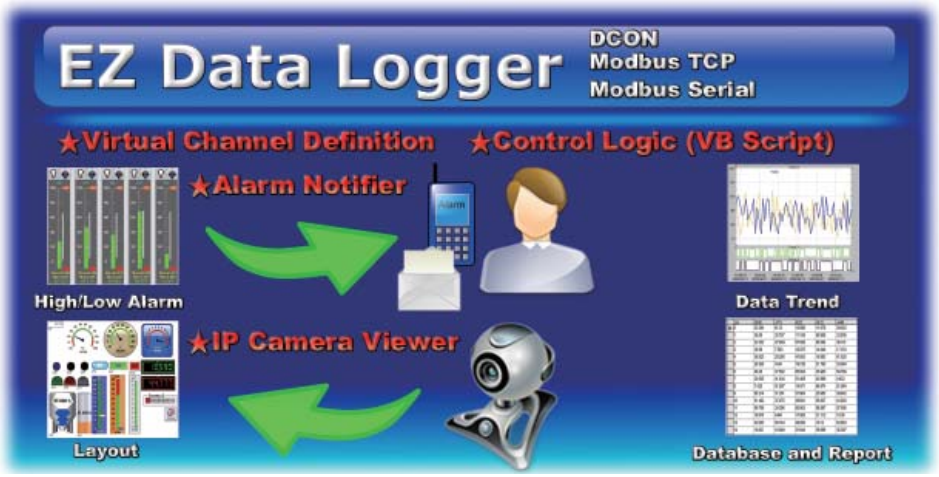
The free charge software utility and development kits include

- 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

Highlight Information

- One USB Port
- Hot Swap Allowed
- Auto Configuration
- LED Indicators for Fault Detection
- DCON Protocol
- 1/2/4/8 I/O Slots for I-87K Modules
- Operating Temperature: -25 ~ +75 °C

Introduction

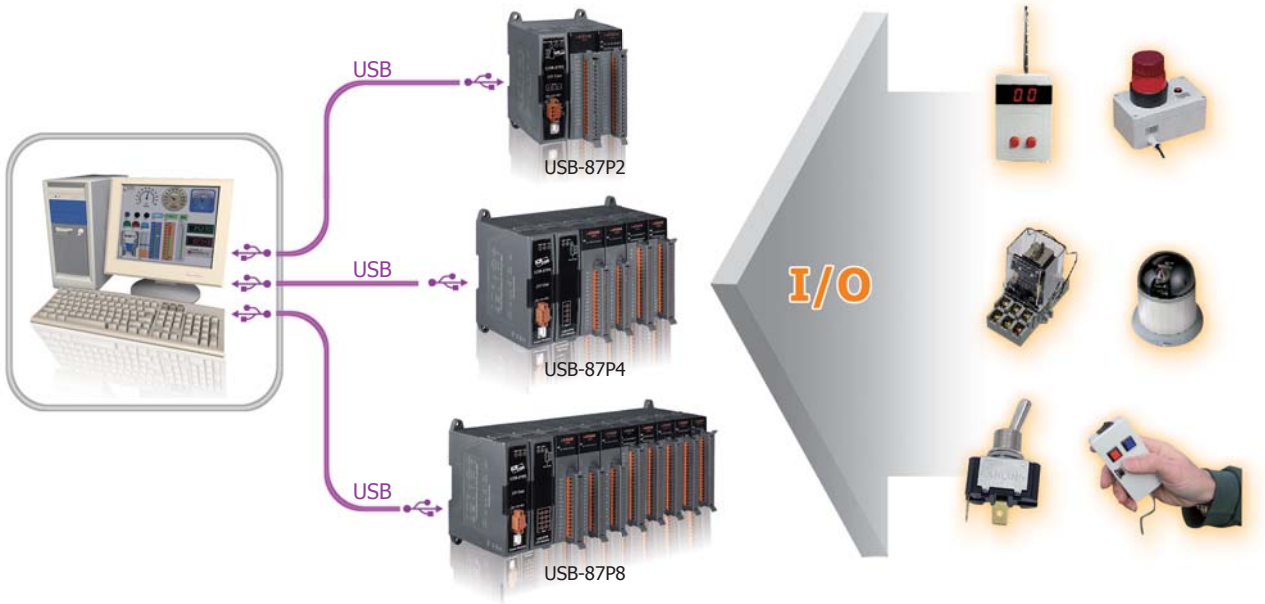
USB-87Pn series is an intelligent I/O expansion unit to expand I-87K series I/O modules over the USB for industrial monitoring and controlling applications.

USB-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 USB-87Pn can be easily integrated into variant software system.

Applications

Rich I/O Expansion Ability

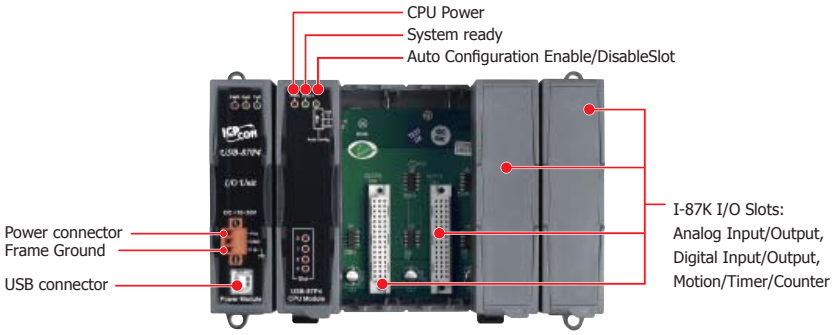


Specifications

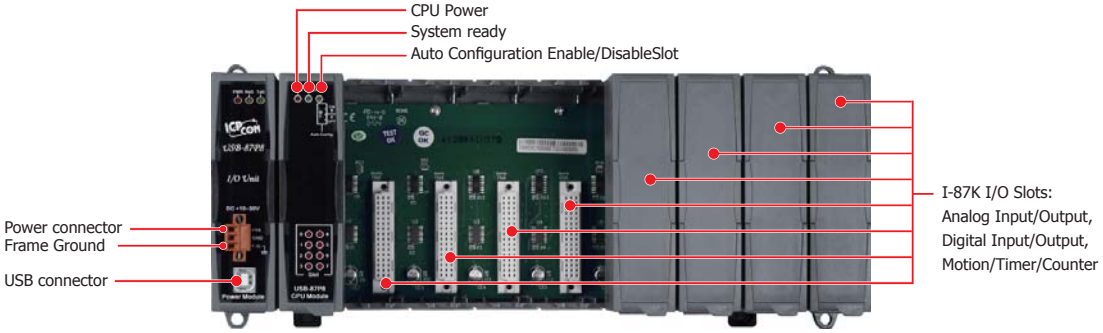
Models	USB-87P1	USB-87P2	USB-87P4	USB-87P8
Interface Type (Full speed with USB 1.1 specifications)				
Cable	USB type A connector			
Baud Rate	115200 bps Default			
Isolation	3000 V_{DC}			
ESD Protection	+/-4 K Contact Discharge and +/-8 K Air Discharge			
Communication Protocol	DCON Protocol (ASCII Format)			
Switch				
DIP Switch	8-bit × 1, For auto configuration			
LED Indicators				
Power	Yes			
System Ready	Yes			
Auto Configuration	Yes			
Slot Status	Yes			
I/O Expansion Slots				
Hot Swap	Yes			
Auto Configuration	Yes			
Support Module Type	High profile I-87K module only			
Slots Numbers	1	2	4	8
Mechanical				
Dimensions (W x L x H)	64 mm x 120 mm x 110 mm	95 mm x 132 mm x 111 mm	188 mm x 132 mm x 111 mm	312 mm x 132 mm x 111 mm
Installation	DIN-Rail or Wall Mounting			
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}			
Reverse Polarity Protection	Yes			
Isolation	1000 V_{DC}			
Frame Ground	Yes			
Consumption	1 W	1 W	2 W	2.4 W
Power Board Driving	5 W	8 W	30 W	

Appearance

USB-87P4

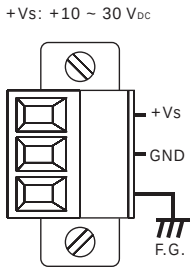


USB-87P8



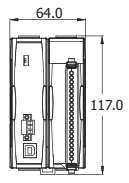
Pin Assignments

USB-87Px Terminal Block

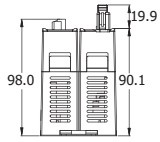


Dimensions (Units: mm)

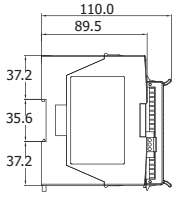
USB-87P1



Front View

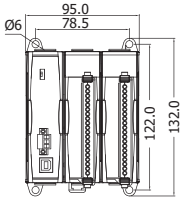


Top View

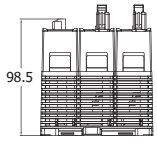


Right Side View

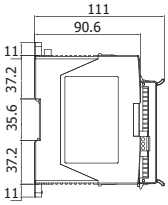
USB-87P2



Front View

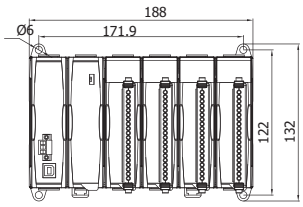


Top View

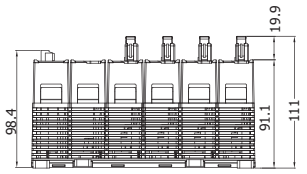


Right Side View

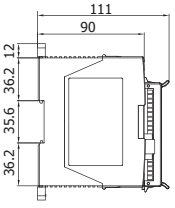
USB-87P4



Front View

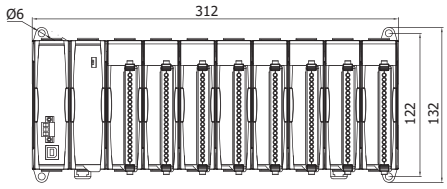


Top View

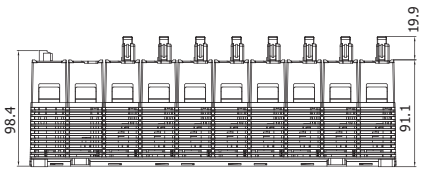


Right Side View

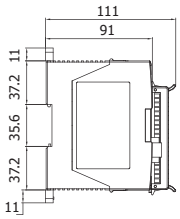
USB-87P8



Front View



Top View



Right Side View

Ordering Information

USB-87P1 CR	1 slot I/O Expansion Unit (RoHS)
USB-87P2 CR	2 slots I/O Expansion Unit (RoHS)
USB-87P4 CR	4 slots I/O Expansion Unit (RoHS)
USB-87P8 CR	8 slots I/O Expansion Unit (RoHS)

Accessories

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