



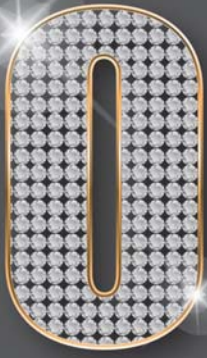
Industrial

# Fieldbus

Product Catalog

Vol. IFB 2.0.00 (Beta Version)





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# Introduction



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# 1.1 Overview

Field bus is known as family of industrial network protocols for real-time distributed control. An automated industrial system usually requires Fieldbus solutions in order to overcome connectivity issues between the various, such as controllers, sensors and actuators. Fieldbus works on a network structure which typically allows daisy-chain, star, ring, branch, and tree type network topologies, providing a range of major advantages to all kinds of automation applications.

In order to provide a variety of Fieldbus solutions, ICP DAS has devoted signification resources for many years into developing Fieldbus products based on different protocols. In additional to Modbus TCP, Modbus RTU and Modbus ASCII, these products comprehensively cover the majority of industrial communication protocols, such as CAN Bus, CANopen, DeviceNet, J1939, PROFIBUS, HART, EtherCAT, Ethernet/IP, BACnet/IP, and PROFINET, for process and factory automation, as illustrated.

ICP DAS also offers a diverse range of PACs incorporating different sizes and features. These powerful PACs provide a method of assembling private protocols based on RS-232, RS-485, industrial Ethernet, CAN bus, Wi-Fi, 2.5G and 3G interfaces. By using a PAC, it is possible to integrate various communication protocols into a single controller, meaning that constructing a multi-function automation system becomes quicker and easier.



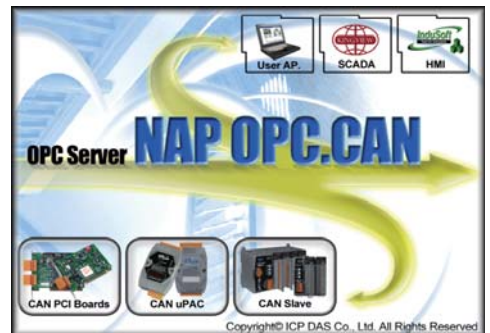
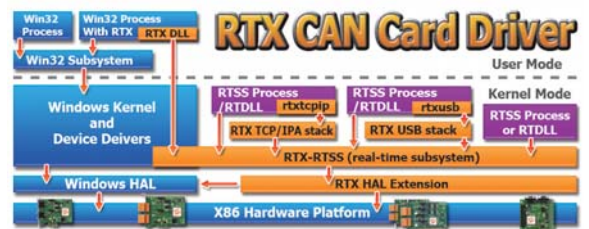
➤ **Solutions for various Fieldbus applications**

ICP DAS provides a wide range of PC-based, PAC, converter, gateway, and remote I/O solutions for a rich selection of communication protocols, meaning that the appropriate solution is always available regardless of the application field. Whatever your requirements, ICP DAS offers the complete solution.



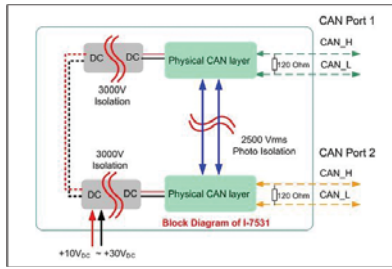
➤ **User-friendly software and tools**

ICP DAS has developed a large numbers of user-friendly and convenient libraries and development tools based on VB, VC, BCB, Delphi, VB.Net, and C#.Net that enable users to develop custom applications for these Fieldbus products. For SCADA software, we also provide InduSoft, LabVIEW, and DASyLab drivers. For real time applications, the RTX driver is also useful. These features provide the necessary resources to allow you to efficiently establish or debug your system.



### ➤ High protection hardware design

In order to protect against harsh environments, many protection mechanisms are built in to the hardware, such as galvanic isolation, photocoupler isolation, power reverse polarity protection, over-voltage brown-out protection, EMI, ESD, EFT, surge protection, and so forth. All ICP DAS products are certified as CE and FCC compliant.



### ➤ DIN-Rail Mounting



### ➤ ODM and Technology Service

ICP DAS has been focused on Fieldbus products for several years and has accumulated a rich development experience on Fieldbus applications, and have recently announced a variety of new Fieldbus projects for different applications. Whether it is software or hardware, ICP DAS always provides the best product for our customers.



**ICP  
DAS**  
WIN-WIN



**ODM  
&  
Best Service**

### ➤ Perfect for Harsh Environments

ICP DAS products can be operated in a wide range of temperatures and humidity levels, providing you with high reliability.









### ➤ RoHS and WEEE Directive

versions for many of our existing range of products together with all new models. However, in certain OEM cases that are outside the scope of the RoHS Directive, we will also maintain normal supplies of lead-based products for customers who place their electrical and electronic equipment into non-EU markets. ICP DAS lead-free RoHS-compliant products are identified by using a unique part number and by adding the suffix CR to the product name.



## 1.2 Related PAC

The PAC family of ICP DAS is a modular network-based PAC with the capability of connecting I/O either through its own dual backplane bus or alternatively through remote I/O units and remote I/O modules. This new exciting PAC family offers a flexible, versatile and economical solution to a wide range of applications from data acquisition, process control, test and measurement, motion control to energy and building management. Our PAC family includes XPAC, WinPAC, ViewPAC, LinPAC, iPAC, ViewPAC, Motion PAC and  $\mu$ PAC for different requirements in OS, CPU and development platform.

Compact PAC	XP-8000-Atom	XP-8000-Atom-CE6	XP-8000	XP-8000-CE6	WP-8000	iP-8000
Pictures						
CPU	Intel Atom Z520 (1.33 GHz)	Intel Atom Z510 (1.1 GHz)	AMD LX800 (500 MHz)	AMD LX800 (500 MHz)	Marvell PAX270 (500 MHz)	80186 (80 MHz)
OS	WES 2009	WinCE 6.0	WES 2009	WinCE 6.0	WinCE 5.0	MiniOS7
I/O Expansion	I/O Slots, RS-232/485, Ethernet					
Software Development Tool	VS .NET 2005/2008, VC6, CB6, Delphi, BCB	VS .NET 2005/2008 ISaGRAF, InduSoft	VS .NET 2005/2008, VC6, VB6, Delphi, BCB	VS .NET 2005/2008 ISaGRAF, InduSoft	VS .NET 2005/2008 ISaGRAF, InduSoft	C language, ISaGRAF

$\mu$ PAC	WP-5000	LP-5000	$\mu$ PAC-5000	I-7188E/uP-7186E	I-7188XA/B/C
Pictures					
CPU	Marvell PXA270 (520 MHz)		80186 (80 MHz)	80186 (80 MHz)	80186 (40 MHz)
OS	WinCE 5.0	Linux kernel 2.6	MiniOS7	MiniOS7	MiniOS7
I/O Expansion	XW-board, RS-232/485, Ethernet			X-board, RS-232/485, Ethernet	
Software Development Tool	VS .NET 2005/2008 ISaGRAF, InduSoft	C language	C language, ISaGRAF	C language, ISaGRAF	C language, ISaGRAF

### For more details, refer to PAC Product Catalog

- XP-8000-Atom Series
- XP-8000 Series
- WP-8000 Series
- LP-8000 Series
- iP-8000 Series
- ViewPAC
- MotionPAC
- Industrial IO Modules for 8000 Series PAC and ViewPAC
- I/O Expansion Units
- $\mu$ PAC-5000 Series
- WP-5000 Series
- LP-5000 Series
- 7188 7186 Series  $\mu$ PAC
- Redundant System



ViewPAC	VP-25W1	VP-23W1	VP-2111 VP-2117	TPD-430	TPD-280/283	VPD-130
Pictures						
CPU	Marvell PXA270 (520 MHz)		80186 (80 MHz)	32-bit RISC CPU		
OS	WinCE 5.0		MiniOS7	N/A		
LCD	5.7" TFT LCD with Touch Panel	3.5" TFT LCD w/o Touch Panel	128 x 64 Dot Matrix STN LCD	4.3" TFT LCD with Touch Panel	2.8" TFT LCD with Touch Panel	3.5" TFT LCD with Touch Panel
I/O Expansion	I/O Slots, RS-232/485, Ethernet		I/O Slots, RS-232/485, Ethernet	RS-485	RS-485 or Ethernet	RS-232/485
Software Development Tool	VS .NET 2005/2008 ISaGRAF, InduSoft		C language, ISaGRAF	C language, Ladder		

For more details of



, refer to PAC Product Catalog



For more details of



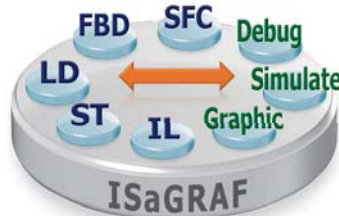
, refer to TouchPAD brochure



## Software Development Tool

### 1. ISaGRAF (SoftPLC Solution)

ISaGRAF is a powerful SoftLogic package on the industrial market. ISaGRAF Workbench is a PLC-like development software running on Windows 95/98/NT/2000/XP/Vista/7 and its ISaGRAF Runtime application programs can run on any ISaGRAF PACs such as WP-8xx7, VP-2xx7, XP-8xx7-CE6, iP-8xx7, μPAC-7186(P)EG etc. Using ISaGRAF PACs, the control/monitor systems can easily implement industrial level of real-time data acquisition and data/devices control via wiring or wireless network in various industries.



### 2. InduSoft (SCADA Solution)

**InduSoft** Tools for Automation

**IWS with ICP DAS**

Easy Steps to Meet Your Satisfaction

(WinPAC) (ViewPAC) (XPAC)

#### Introduction :

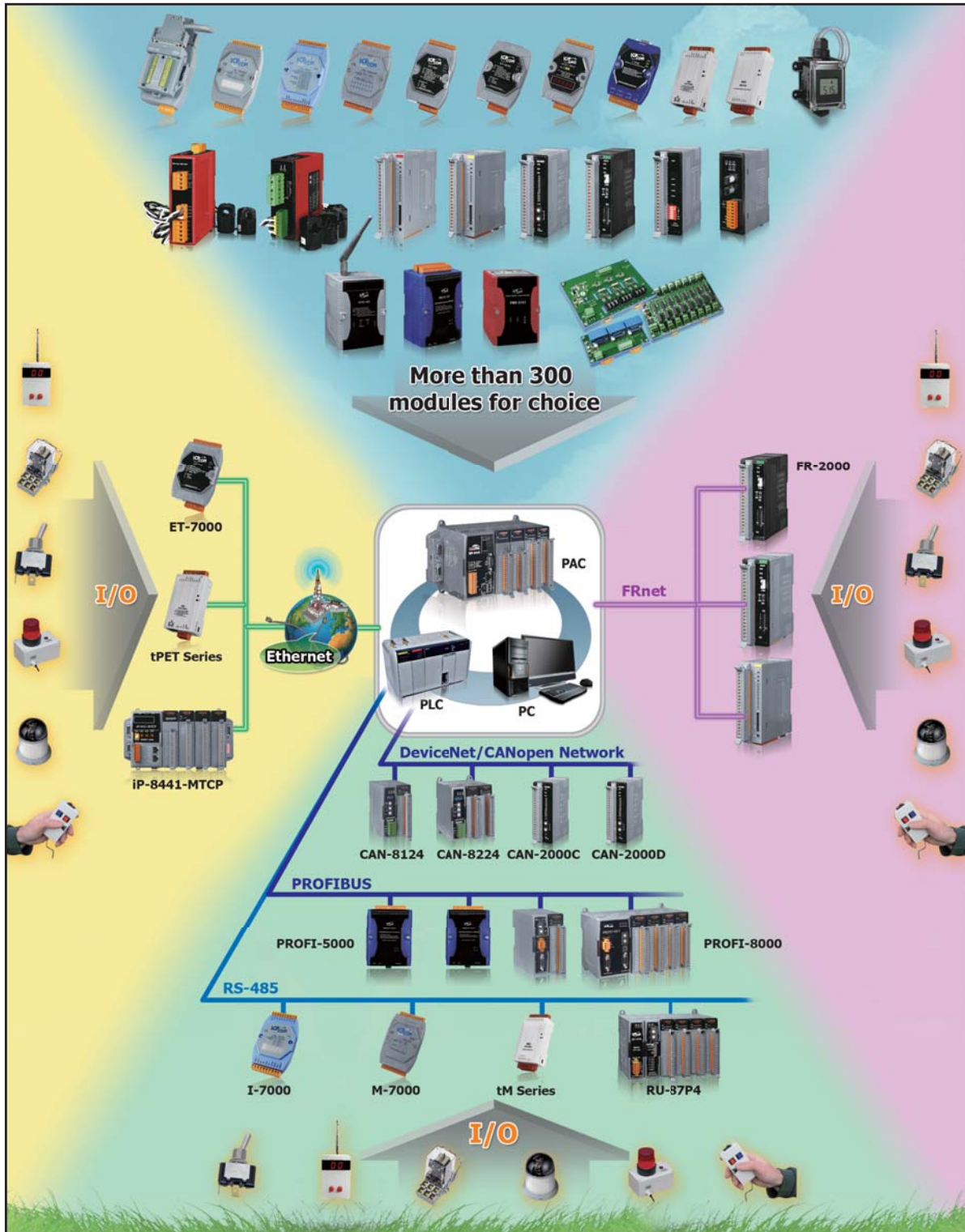
InduSoft Web Studio is a powerful, integrated collection of automation tools that includes all the building blocks needed to develop modern Human Machine Interfaces (HMI), Supervisory Control and Data Acquisition (SCADA) systems, and embedded instrumentation and control applications.

InduSoft Web Studio's application runs in native Windows NT, 2000, XP, CE and CE .NET environments and conforms to industry standards such as Microsoft .NET, OPC, DDE, ODBC, XML, and ActiveX. We provide the InduSoft bundled driver to integrate InduSoft software into ICP DAS products (IO Modules: I-7000, I-8000, I-87K ; PACs: WinPAC, WinPAC, XPAC) for SCADA system.



## 1.3 Remote I/O Modules and I/O Expansion Units

ICP DAS launches a series of remote I/O modules and I/O expansion units for industrial monitoring and controlling applications. The I/O modules are highly flexible and compatible, thus reduce your I/O modules inventory. Furthermore, various communication interfaces, such as **RS-485, Ethernet, EtherCAT, EtherNet/IP, Profinet, FRnet, CAN bus, Profibus and Hart** are available for PAC, PC and PLC.



For more details, refer to Remote I/O Products Catalog

- RS-485 Remote I/O Modules
- Ethernet Remote I/O Modules
- FRnet I/O Modules
- CAN BUS Remote I/O Modules
- PROFIBUS Remote I/O Modules

Or refer to <http://www.icpdas.com.tw/support/catalog/catalog.html>



# 1.4 Industrial Wireless Communication Products

Industrial Wireless Communication creates new prospects for automation. In the harsh environment, chemicals, vibrations, or moving parts could potentially damage cabling. Industrial Wireless Communication system substantially reduces cost and time for the installation and maintenance of the large number of cable. Thus it makes plants setup and reconfiguration easy and safe.

ICP DAS provides a great variety of wireless products with modular and universal solution. They are specially designed for industrial harsh environment.

1

Introduction

**ICP DAS Wireless and Mobile Total Solution**

The diagram illustrates a total solution architecture for industrial wireless communication, organized into four main functional layers:

- APPLICATION:** Includes software and utility products such as SMART, VxComm Utility, NAPOPC, Software/SCADA/Utility, InduSoft, EZ Data Logger, Soft-GRAF, and Web HMI.
- CONTROL:** Features Programmable Automation Controllers (PAC) including WP/LP-5000, WP/LP-8000, IPAC-8000, ViewPAC-2xWx, and XPAC-8000. It also includes IO Modules, μPAC/PDS, and PCI/ISA Cards.
- COMMUNICATION:** This layer is divided into several wireless technologies:
  - DSSS RF:** SST-2450, RF-87Kn, CNC Machine, Meters.
  - 2G/3G:** GTM-201 Series, G-4500 Series, GT-500 Series, Truck.
  - WLAN:** Wi-Fi AP, I-7540-WF, M2M-711D, Barcode Reader.
  - ZigBee:** ZigBee Converters, ZigBee I/O, ZigBee Repeater, Remote Controller.
  - GPS:** GPS Receivers, Train, Public Transportation, Cruise.
- Device:** This layer includes PROFIBUS / CAN Bus components: Converter / Gateway, CAN-8000, CAN Device, PROFIBUS Device, and PROFI-8000.

At the bottom, the supported technologies are summarized as: **DSSS RF/2G/3G/WLAN/GPS/Zigbee**.

For more details, refer to **Industrial Wireless Communication Products Catalog**

- Industrial Wireless Series
- DSSS RF Modems
- 2G/3G Mini-PAC/Modules/Modems
- ZigBee Converters & I/O Modules
- GPS Solutions

Or refer to <http://www.icpdas.com.tw/support/catalog/catalog.html>



# RS-485 Products



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## 2.1 Communication Card for PC/IPC

2

RS-485 Products



The VXC/VEX multi-port serial card enables user to increase additional communication ports on PCs. It's the on-top-of-the-list choice while you are managing to connect lots of outer devices through your PC; every VXC/VEX card ensures you smooth communication in both time-critical applications and industrial fields. With simply a VXC card, it has never been that easy to integrate a PC with lots of devices, such as PLCs, machines, meters, controller devices, laboratory instruments, modems, card readers, serial printers, RFID readers, bar code readers, sensors, etc.

### Selection Guide

Universal PCI →

PCI Express →

**VXC** - **1**  
**VEX** - **1**



**1: RS-232**  
**4: RS-422/485**  
**8: RS-232, RS-422/485**






Model Name		RS-232	RS-422/485	Isolation	ESD Protection	Max. Speed (bps)	FIFO Size (bytes)	Connector
	VXC-112AU	2	-	-	-	115.2 K	128	Male DB-9
	VXC-112iAU	2	-	2.5 kV	+/-4 kV	115.2 K	128	Male DB-9
	VXC-142AU	-	2	-	-	115.2 K	128	Male DB-9
	VXC-142iAU	-	2	2.5 kV	+/-4 kV	115.2 K	128	Male DB-9
	VXC-182iU	1	1	2.5 kV	+/-4 kV	115.2 K	128	Male DB-9
	VXC-114U	4	-	-	-	115.2 K	128	Female DB-37
	VXC-114iAU	4	-	2.5 kV	+/-4 kV	115.2 K	128	Female DB-37
	VXC-144U	-	4	-	-	115.2 K	128	Female DB-37
	VXC-144iU	-	4	2.5 kV	+/-4 kV	115.2 K	128	Female DB-37
	VXC-164AU	Available Soon	4	-	-	115.2 K	128	Female DB-37
	VXC-118U	8	-	2.5 kV	+/-4 kV	115.2 K	128	Female DB-62
	VXC-118iU	8	-	-	-	115.2 K	256	Female DB-62
	VXC-148U-5w	Available Soon	8	2.5 kV	+/-4 kV	115.2 K	256	Female DB-62
	VXC-148iU-5w	Available Soon	8	-	-	115.2 K	256	Female DB-62

Model Name		RS-232	RS-422/485	Isolation	ESD Protection	Max. Speed (bps)	FIFO Size (bytes)	Connector
	VEX-112	2	-	-	-	115.2 K	128	Male DB-9
	VEX-112i	2	-	2.5 kV	+/-4 kV	115.2 K	128	Male DB-9
	VEX-142	-	2	-	-	115.2 K	128	Male DB-9
	VEX-142i	-	2	2.5 kV	+/-4 kV	115.2 K	128	Male DB-9
	VEX-114	4	-	-	-	115.2 K	128	Female DB-37
	VEX-114i	4	-	2.5 kV	+/-4 kV	115.2 K	128	Female DB-37
	VEX-144	-	4	-	-	115.2 K	128	Female DB-37
	VEX-144i	-	4	2.5 kV	+/-4 kV	115.2 K	128	Female DB-37
	VEX-118	8	-	2.5 kV	+/-4 kV	115.2 K	256	Female DB-62
	VEX-118i	8	-	-	-	115.2 K	256	Female DB-62
	VEX-148-5w	Available Soon	8	2.5 kV	+/-4 kV	115.2 K	256	Female DB-62
	VEX-148i-5w	Available Soon	8	-	-	115.2 K	256	Female DB-62

## 2.2 Communication Module for PAC



The communication modules offer the possibility to add several serial ports into a XPAC, WinPAC, ViewPAC and iPAC . Up to 4 ports, optionally isolated, RS-232, RS-422 or RS-485 ports.

Model Name	I-8112iW	I-8114W	I-8114iW	I-8142iW	I-8144iW
Pictures					
<b>Communication</b>					
Interface	RS-232	RS-232	RS-232	RS-422/485	RS-422/485
Port	2	4	4	2	4
Max. Speed (K bps)	115.2				
Controller Chip	16C950				
<b>System</b>					
Hot Swap	-	-	-	-	-
Isolation	2500 Vrms	-	2500 Vrms	2500 Vrms	
Power Consumption	1.5 W	1.25 W	1.75 W	1.5 W	1.75 W
Connector	Male D-Sub 9 x 2	Female D-Sub 37		Terminal Block	
Optional Accessories	CA-0915 CA-0910F	CA-9-3705 CA-9-3715D	CA-9-3705 CA-9-3715D	-	-



**CA-0910F**  
9-pin Female-Female D-sub cable, 1 M



**CA-0915**  
9-pin Male-Female D-sub cable, 1.5 M



**CA-9-3705**  
DB-37 Male(D-sub) to 4-Port DB-9 Male(D-sub) cable, 0.3 M, 90°



**CA-9-3715D**  
DB-37 Male(D-sub) to 4-Port DB-9 Male(D-sub) cable, 1.5 M, 180°



**DN-09-2F**  
I/O Connector Block with DIN-Rail Mounting and two 9-pin Male Header  
Includes : 2 x CA-0910F (9-pin Female-Female D-sub Cable 1.0 M)

## 2.3 Converter/Repeater/Hub/Splitter



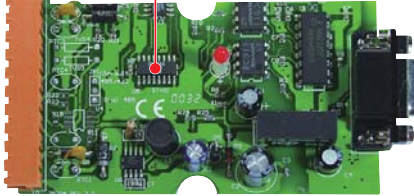
### ICP DAS Self-Tuner ASIC Features:

- Multiple Baud Rate
- Multiple Data Format
- Automatic RS-485 Direction Control

### "Self-Tuner"

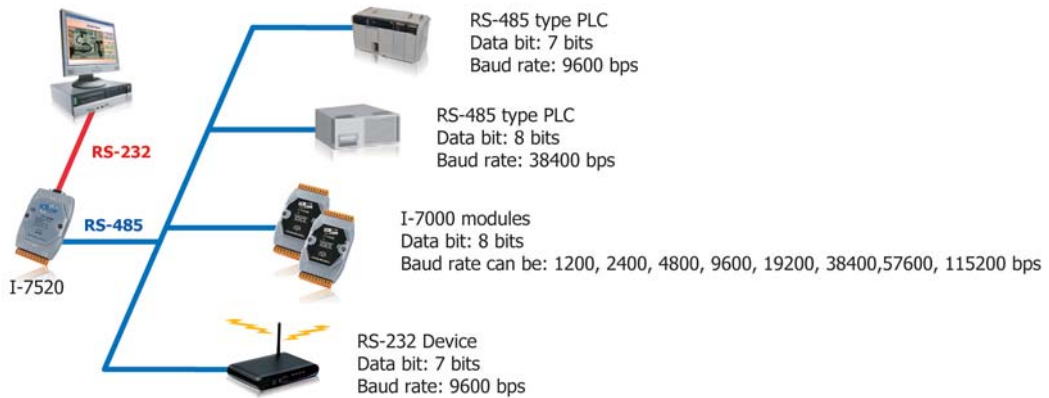
A conventional RS-232 to RS-485 converter uses the DIP switch to select the baud rate and data format for the whole RS-485 network. All modules, devices and equipments in the network should be configured to the same baud rate and data format. Unfortunately most real world applications can't be implemented in such a simple way. The Self-Tuner is an innovative chip designed to solve this problem. Every converter contains a Self-Tuner chip. The chip automatically tunes the baud rate and data format to the whole network. Therefore the I-7520 can connect to modules, devices and equipments with different baud rates and data formats in a network.

Self-Tuner Chip



▲ I-7520

Furthermore, the RS-485 is a 2-wire half-duplex network. To transmit and receive data via the twiced pair wire, a transmission direction control for the RS-485 is needed. In conventional designs, software has to switch a hardware handshaking signal such as RTS (Request To Send) to control the transmission direction. The Self-Tuner chip automatically detects and controls the direction of the transmission of the RS-485 network. So the application program does not have to care about the direction control.



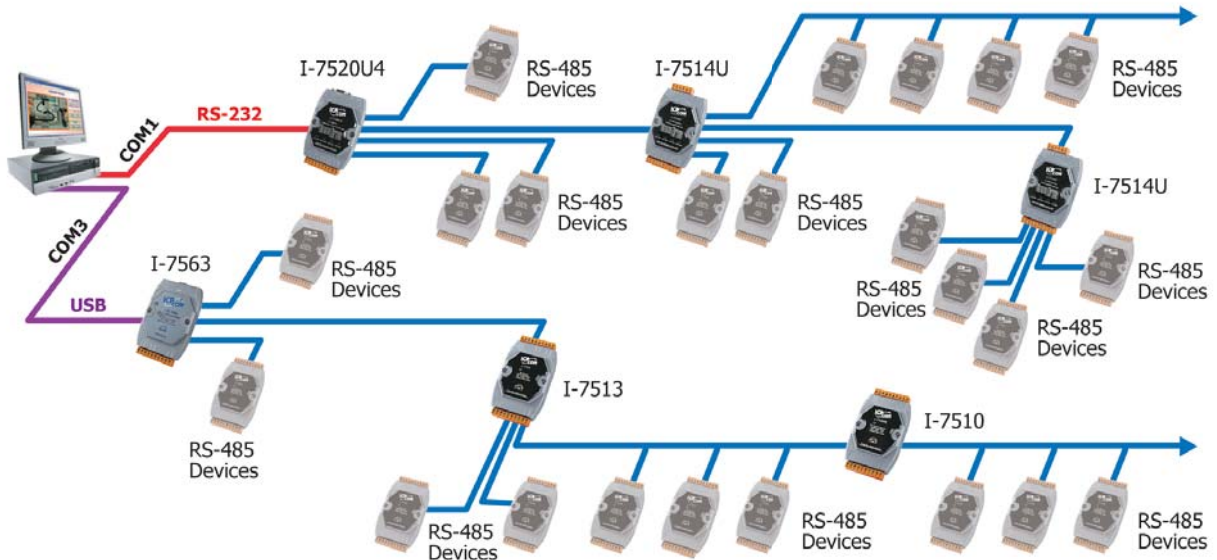
▲ I-7520U4

▲ I-7514U

### High Quality Isolated RS-485 Repeater/Hub/Splitter

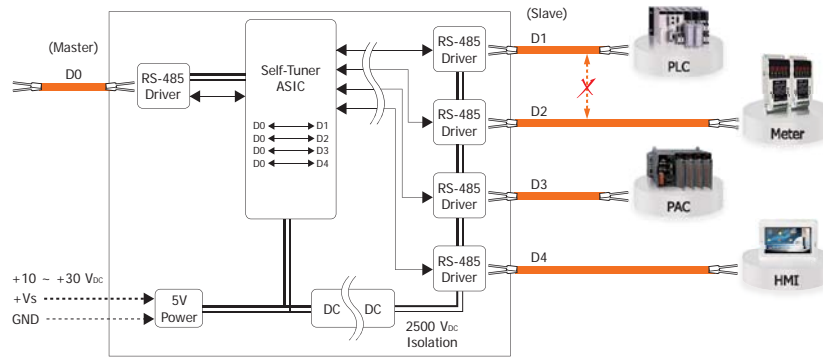
The maximum effective distance of RS-485 without repeater is 1200 meters (4000 feet) at baud rates up to 9.6 Kbps and up to 32 (256) nodes can be connected. With the professional design, the repeater I-7510 solves the problem of signal weakening and extends the maximum effective distance by 1200m and connects 32 (256) nodes more. And it has optical isolation design for lightning and surge protection. If the RS-485 topology is too complex to make the communicating well, a RS-485 hub or splitter is recommended.

I-7520U4 and I-7514U are multichannel RS-485 repeater/hub/splitter. Each channel is independent and has optical isolation, short circuit and open circuit protection. Thus when one channel fails, it will not affect another channel of the hub. The features make it perfect to star type or mixed type topology in complex and large scale RS-485 network.



The following block diagram shows how I-7514U was designed as independent channel. Data coming from the master input will be transmitted to all four RS-485 slave channels. But data coming from the slave channels will be returned to the master input only. Thus reduces the possibility of interference between each RS-485 slave loop and makes the RS-485 networks more robust and reliable.

► I-7514U Block Diagram



**RS-232/422/485 Converter/Repeater**

Model Name	tM-7520U	I-7520	I-7520R	I-7520A	I-7520AR	I-7551	tM-7510U	I-7510	I-7510A	I-7510AR
Pictures										
Function	Converter						Repeater			
Interface	RS-232 to RS-485			RS-232 to RS-422/485		RS-232 to RS-232	RS-485	RS-485	RS-422/485	
Isolation	2500 Vdc RS-232 side	3000 Vdc RS-232 side	3000 Vdc RS-485 side	3000 Vdc RS-232 side	3000 Vdc RS-422/485 side	3000 Vdc 3 ways	2500 Vdc	3000 Vdc		3000 Vdc 3 ways
Operating Temperature	-25 ~ +75°C									

**USB to RS-232/422/485 Converter**

Model Name	I-7560	I-7561	tM-7561
Pictures			
Function	Converter	Converter	Converter
Interface	USB to RS-232	USB to RS-232/422/485	USB to RS-485
Isolation	-	3000 Vdc	2500 Vdc
Operating Temperature	-25 ~ +75°C		

**USB RS-232/485 to RS-485 Hub**

Model Name	I-7563	I-7513	I-7520U4	I-7514U
Pictures				
Function	3-CH Hub/Splitter	3-CH Hub/Splitter/Repeater	4-CH Hub/Splitter	4-CH Hub/Splitter/Repeater
Interface	USB to 3-CH RS-485	RS-485 to 3-CH RS-485	RS-232 to 4-CH RS-485	RS-485 to 4-CH RS-485
Isolation	3000 Vdc	3000 Vdc 3 ways	2500 Vdc RS-232 side	2500 Vdc CH1-CH4 side
Operating Temperature	-25 ~ +75°C			

More products refer to Industrial Communication & Networking Products Catalog

- Multi-port Serial Cards
- Programmable Device Servers (Serial-to-Ethernet)
- Converters, Repeaters and Hubs
- Fieldbus Solutions
- Ethernet Switches



## 2.4. Termination Resistor/DC Bias Voltage



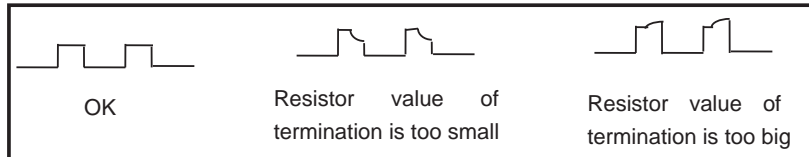
### Features

- Switch-selectable Bias Resistors
- 15-step Switch-selectable Termination Resistor
- LED Indicator for Power/Termination
- DIN-Rail Mountable
- Cost-effective
- Wide Operating Temperature Range: -25 ~ +75°C



### Introduction

The tM-SG4 is an optional module that is used to improve the communication of RS-485 network. It provides switch selectable bias resistors on RS-485 network. It also has 15-step switch selectable termination resistor such that the user can select a proper termination resistor to be connected to the RS-485 network easily. If the RS-485 network is not over 100 meters, the termination resistors are not needed. Otherwise, it may be necessary to insert two termination resistors at both end of the RS-485 network. It is not easy to calculate the value of a termination resistor on the RS-485 network. The best way to do this is to use an oscilloscope to check the RS-485 signal directly. If the impedance match of RS-485 network is OK, the oscilloscope will show a very nice square wave. If these square wave signals are distorted, the user will need to insert two termination resistors at both end of the RS-485 network.

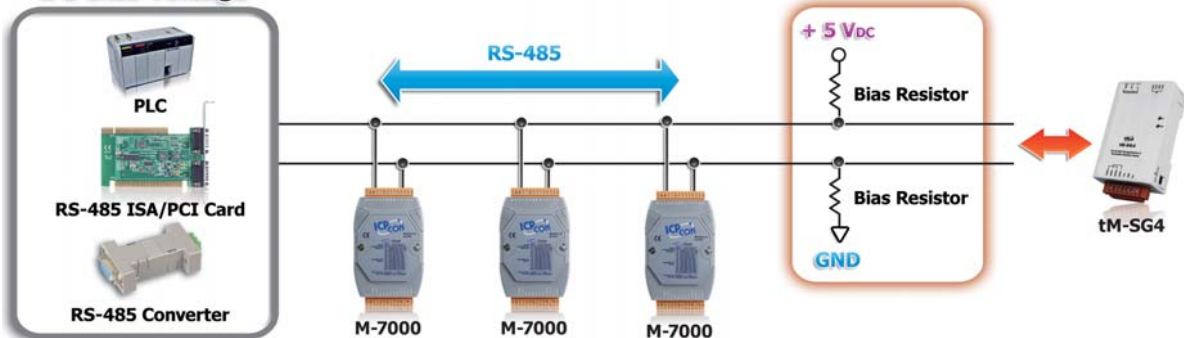


### Applications

#### Termination Resistor



#### DC Bias Voltage








## 2.5 RS-485 I/O Module

Although RS-485 is a very old technology, it is still a good choice to establish a cost-effective remote I/O system. Our RS-485 remote I/O module supports DCON protocol, Modbus RTU/ASCII protocol. According to different application, we have developed various RS-485 I/O modules, such as palm-size I-7000/M-7000 series (Ch 2.2) and tiny-size tM series (Ch2.3). The module has diversified I/O interface, such as overvoltage-protection analog input module, relay output, digital input/output, counter, timer...etc.

The brief comparison is as the following table. Besides those regular RS-485 I/O modules, we can also provide some ODM modules.

Model Name	tM series	I-7000	M-7000
Pictures			
<b>Communication</b>			
Protocol	DCON, Modbus RTU, Modbus ASCII	DCON	DCON, Modbus RTU
Data Format	(N, 8, 1), (N, 8, 2), (O, 8, 1), (E, 8, 1)	(N,8,1)	
Max. Nodes	32	256	
Bias resistor	Yes, 10 K $\Omega$	No (Note1)	
Dual Watchdog	Yes, Module (2.3 second), Communication (Programmable)	Yes, Module (1.6 second), Communication (Programmable)	
<b>I/O</b>			
DIO max. channel	8	16	
AIO	Resolution	12/14 bits	12/16 bits
	Max. channel	8 (tM-AD8)	20 (I-7017Z, M-7017Z)
	Individual Channel Configuration	-	Yes
<b>Display</b>			
Power and Communication LED	Yes	Yes	
I/O Status LED	-	Yes (for D version only)	
7-Segment LED	-	Yes (for D version only)	
<b>Mechanical</b>			
Dimensions (W x L x D)	52 mm x 98 mm x 27 mm	72 mm x 123 mm x 35 mm	

**Note1:** The RS-485 master is required to provide the bias. Otherwise, the tM-SG4 or SG-785 should be added to provide the bias. All ICP DAS controllers and converters provide the bias.

Furthermore, we also developed RU-87Pn, a series of RS-485 remote I/O unit for compact and modular I/O expansion. It comprises a CPU, a power module and a backplane with a number of I/O slots for flexible I/O configuration. With its patented technology, 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 RU-87Pn. After hot-swapping a module, all settings are automatically loaded to recover.



### Features

- Hot Swap
- Auto Configuration
- Easy Duplicate System
- Easy Maintenance and Diagnosis
- DCON Protocol



For more details of, refer to **PAC Product Catalog**

## 2.6 RS-485 I/O Unit



### Features

- One RS-485 Port for Multi-Drop Topology
- Hot Swap Allowed
- Auto Configuration
- LED Indicators for Fault Detection
- Switches to Configure Communication
- DCON Protocol
- 1/2/4/8 I/O Slots for I-87K Modules
- Operating Temperature: -25 ~ +75°C



### Specifications






Model Name	RU-87P1	RU-87P2	RU-87P4	RU-87P8
<b>Interface Type (RS-485)</b>				
Baud Rate	115200 bps maximum			
Distance	1.2 km (4000 ft) maximum			
Isolation	3000 Vdc			
ESD Protection	+/-4 K Contact Discharge and +/-8 K Air Discharge			
Communication Protocol	DCON Protocol (ASCII Format)			
<b>Switch</b>				
Rotary Switch	x2, For RS-485 address			
DIP Switch	8-bit x 1, For auto configuration, check sum and baud rate			
<b>LED Indicators</b>				
Power	Yes			
System Ready	Yes			
Auto Configuration	Yes			
Slot Status	Yes			
<b>I/O Expansion Slots</b>				
Hot Swap	Yes			
Auto Configuration	Yes			
Support Module Type	High profile I-87K module only			
Slots Numbers	1	2	4	8
<b>Mechanical</b>				
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			
<b>Environmental</b>				
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			
Ambient Relative Humidity	10 ~ 90% RH (non-condensing)			
<b>Power</b>				
Input Range	+10 ~ +30 Vdc			
Reverse Polarity Protection	Yes			
<b>Isolation</b>				
Frame Ground	Yes			
Consumption	1 W	1 W	2 W	2.4 W
Power Board Driving	5 W	8 W	30 W	30 W

### Ordering Information

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

# Industrial Ethernet Products

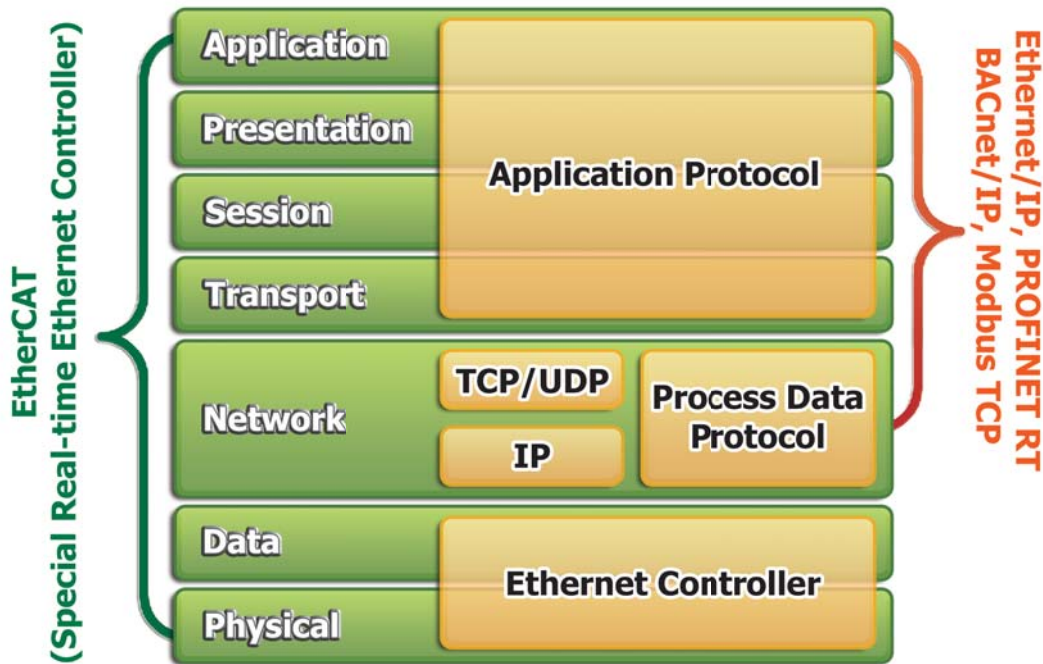


<b>3.1</b>	<b>Overview</b>	<b>P 3-1</b>
<b>3.2</b>	<b>EtherCAT Products</b>	<b>P 3-2</b>
	<ul style="list-style-type: none"> <li>EtherCAT Digital I/O Modules - - - - - P 3-3</li> </ul>	
<b>3.3</b>	<b>EtherNet/IP Products</b>	<b>P 3-4</b>
	<ul style="list-style-type: none"> <li>EtherNet/IP Series Selection Guide- - - - - P 3-4</li> <li>Application Case Studies - - - - - P 3-5</li> <li>EtherNet/IP Remote I/O - - - - - P 3-6</li> </ul>	
<b>3.4</b>	<b>PROFINET Products</b>	<b>P 3-7</b>
	<ul style="list-style-type: none"> <li>PROFINET Converters - - - - - P 3-8</li> <li>Analog Input Modules - - - - - P 3-8</li> <li>Digital Input &amp; Output Module - - - - - P 3-9</li> </ul>	
<b>3.5</b>	<b>Ethernet Device Server</b>	<b>P 3-10</b>
	<ul style="list-style-type: none"> <li>Device Server Introduction - - - - - P 3-10</li> </ul>	
<b>3.6</b>	<b>BACnet/IP Products</b>	<b>P 3-12</b>
	<ul style="list-style-type: none"> <li>BACnet Case Studies- - - - - P 3-13</li> <li>BACnet Gateways- - - - - P 3-14</li> <li>BACnet/IP I/O Module- - - - - P 3-15</li> </ul>	
<b>3.7</b>	<b>Industrial Ethernet/Fiber Switch</b>	<b>P 3-16</b>
<b>3.8</b>	<b>Ethernet I/O</b>	<b>P 3-23</b>
	<ul style="list-style-type: none"> <li>Features- - - - - P 3-24</li> </ul>	
<b>3.9</b>	<b>Wi-Fi I/O Module</b>	<b>P 3-26</b>
	<ul style="list-style-type: none"> <li>Wi-Fi Digital &amp; Analog I/O Modules - - - - - P 3-27</li> </ul>	

### 3.1 Overview

Industrial Ethernet is a kind of technology, which uses the Ethernet family of computer network technologies in an industrial environment, for automation and process control. By using standard Ethernet interface, the automation units from different manufacturers can be easy to interconnect with each other throughout an application system. Industrial Ethernet takes advantage of the relatively larger marketplace because the comprehensive usage of the Ethernet interconnections could reduce cost and improve performance of communications between industrial controllers.

ICP DAS foresees the market trend and have announced several Industrial Ethernet products. In addition to the Modbus TCP series, ICP DAS also offers different product lines of the EtherCAT, EtherNet/IP, PROFINET and BACnet/IP application protocols. Through them, to construct a multi-function automation system can be more flexible and be easy to integrate the computers and the Industrial Ethernet products from different manufactures.



Protocol	Modbus TCP	EtherCAT	EtherNet/IP	PROFINET RT	BACnet/IP
Trademark					
Organization	Modbus	ETG	ODVA	PI	SSPC
Special Hardware	No	Yes	No	No	No
Ethernet Switch	Yes	No	Yes	Yes	Yes
Cycle Time	Normal	Fast	Normal	Good	Normal
Topology Flexibility	Normal	Good	Normal	Normal	Normal
Data Integration	Easy	Normal	Easy	Easy	Easy

## 3.2 EtherCAT Products

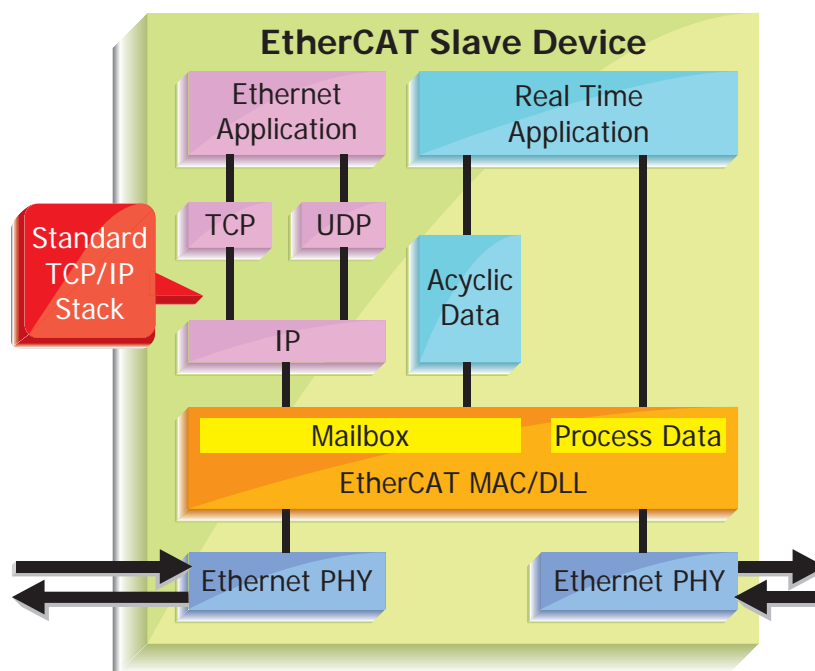
EtherCAT (Ethernet for Control Automation Technology) is an open, high-performance Ethernet-based fieldbus system that makes Internet technologies available at the I/O level. With EtherCAT, the controller can update the input and/or output information at the time when the data is needed.

The ECAT-2000 is an Industrial EtherCAT Remote I/O module series. It is equipped with the EtherCAT protocol, and allows daisy chain connection, making it possible to transfer data much faster during process control and other industrial automation applications. Daisy chain connectivity provides a more scalable system with fewer wires to help avoid interference common in factory settings.



### ► EtherCAT is Industrial Ethernet

- EtherCAT uses Standard Ethernet Frames: IEEE 802.3
- Alternatively via UDP/IP (if IP Routing is needed)
- No shortened frames
- Fully transparent for TCP/IP
- All Internet technologies (HTTP, FTP, Web server,...) available without restricting the real time capabilities
- Full tool access to devices at real time operation with and without TCP/IP







### ➤ EtherCAT Features

- Full compliance with the Ethernet standard
- High Performance
- Flexible Topology
- Easy configuration and maintenance
- Inexpensive implementation & infrastructure
- Safety communication integrated
- Great variety of available EtherCAT products

### ➤ EtherCAT Application Fields

- Packaging machines
- High speed presses
- Injection molding machines
- Woodworking machines
- Machine tooling(CNC)
- Robotics
- Materials handling
- Data acquisition

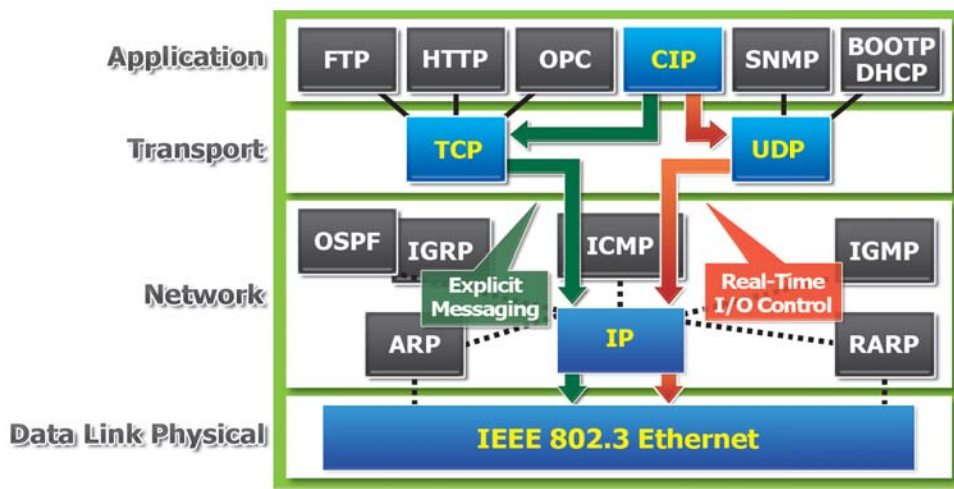
### EtherCAT Digital I/O Modules

Model Name	ECAT-2045	ECAT-2051	ECAT-2055	ECAT-2060
Pictures	16 x DO Module 	16 x DI Module 	8 x DI, 8 x DO Module 	6 x DI, 6 x Relay Module 
<b>Digital Input</b>				
Channels	-	16	8	6
Contact	-	Wet		
Sink/Source(NPN/PNP)	-	Sink/Source		
ON Voltage Level	-	+10 ~ +50 VDC		+4 ~ +30 VDC
OFF Voltage Level	-	+4VDC max.		+1VDC max.
Isolation Voltage	-	3750 Vrms		
<b>Digital Output</b>				<b>Relay Output</b>
Channels	16	-	8	6
Type	Open Collector	-	Open Collector	Form A (SPST-NO)
Sink/Source(NPN/PNP)	Sink	-	Sink	-
Load Voltage	+10 ~ +40 VDC	-	+10 ~ +40 VDC	-
Max. Load Current	700 mA/channel	-	700 mA/channel	5A @ 250 VAC, 5A @ 30 Vdc /channel
Isolation Voltage	3750 Vrms	-	3750 Vrms	-
<b>Communication</b>				
Ethernet Port	2 x RJ-45, 10/100 Base-TX			
Protocol	EtherCAT			
<b>System</b>				
ESD (IEC 61000-4-2)	4 kV Contact for Each Channel			
EFT (IEC 61000-4-4)	Signal: 1 KV Class A, Power: 1 KV Class B.			
Surge (IEC 61000-4-5)	1 KV Class B			
Power Input	+10 ~ +30 VDC			
Power Consumption				
Dimensions(W x H x D)	33 mm x 110 mm x 90 mm			
Operating Temperature	-25 ~ +75°C			

### 3.3 EtherNet/IP Products

EtherNet/IP is one of the open network standards, like DeviceNet and ControlNet. It is an industrial application layer protocol for industrial automation applications. EtherNet/IP uses all of the protocols of traditional Ethernet including the Transport Control Protocol (TCP), the Internet Protocol (IP) and the media access and signaling technologies. Building on standard Ethernet technologies means that EtherNet/IP will work transparently with all the standard Ethernet devices found today. EtherNet/IP application layer is based on the "Common Industrial Protocol" (CIP) which is used in both DeviceNet and ControlNet. This standard organizes networked devices as a collection of objects. It defines the access, behavior and extensions, which allow vastly different devices to be accessed using a common protocol. Based on these protocols, EtherNet/IP provides a seam-less integrated system from the Industrial floor to the enterprise network.

EtherNet/IP uses all the transport and control protocols of standard Ethernet including the Transport Control Protocol (TCP), the User Datagram Protocol (UDP), the Internet Protocol (IP) and the media access and signaling technologies found in off-the-shelf Ethernet technology. Building on these standard communication technologies means that EtherNet/IP works transparently with all the standard Ethernet devices found in today's market-place.



#### ► EtherNet/IP Features

- Offer Producer-consumer service that enable users to control, configure and collect data
- Uses exiting IEEE standards for Ethernet physical layer and data link layer
- Provide flexible installation options leveraging commercially available industrial infrastructure products, including copper, fiber, fiber ring and wireless solutions
- Provide robust physical layer options for industrial environments and includes the use of sealed RJ45 and M12 D-coding connector.
- Compatible with general communication standards, including OPC, TCP/IP, HTTP, FTP, SNMP, DHCP
- Use TCP port number 44818 for explicit messaging and UDP port number 2222 for implicit messaging
- Transfer of basic I/O data via UDP-based implicit messaging
- Uploading and downloading of parameters, programs and recipes via TCP
- Polled, cyclic and change-of-state monitoring via UDP
- One-to-one (unicast), one-to-many (multicast), and one-to-all (broadcast) communication via TCP



#### EtherNet/IP Series Selection Guide

Model Name	Interface	Description
EtherNet/IP Gateways	GW-7472	EtherNet/IP adapter <--> Modbus TCP/RTU Master
EtherNet/IP I/O Modules	EIP-2019	EtherNet/IP adapter, 8 TC Inputs
	EIP-2024	EtherNet/IP adapter, 4 AOV / 4 AOI
	EIP-2042	EtherNet/IP adapter, 16 DOs
	EIP-2051	EtherNet/IP adapter, 16 DIs
	EIP-2055	EtherNet/IP adapter, 8 DIs, 8 DOs
	EIP-2060	EtherNet/IP adapter, 6 DIs, 6 Relays

## EtherNet/IP Adapter to Modbus TCP/RTU Gateway

### GW-7472

**NEW**



The GW-7472 (Ethernet/IP adapter to Modbus TCP/RTU Gateway) is helpful for data-exchanging between the Modbus RTU Network, Modbus TCP Network, and the Ethernet/IP Network. It reads the register data from the Modbus RTU slaves as well as Modbus TCP servers and publishes these data to the input register data of the Ethernet/IP scanner. The output data transmitted by the Ethernet/IP scanner are updated to the register data of Modbus TCP/RTU slaves via the GW-7472. In order to save the installation space, the GW-7472 is offered in an amazing tiny form-factor that makes it easy to install in anywhere, even directly attached to a serial device or embedded into a machine.



#### General Features:

- 10/100 Base-TX Ethernet, RJ-45 x1
- Automatically RS-485 direction control
- Redundant power inputs: PoE (IEEE 802.3af, Class 1) and DC jack
- Tiny form-factor and low power consumption



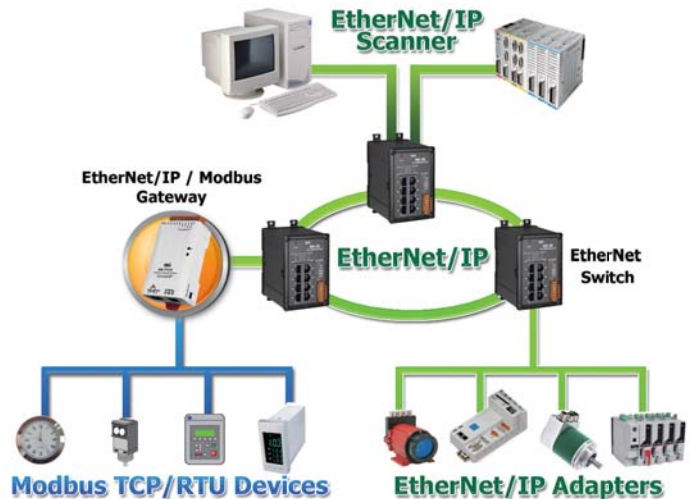
#### EtherNet/IP Features:

- Ethernet Protocol: Ethernet/IP adapter
- Maximum number of connections for Explicit Messages: 6
- Maximum number of connections for Implicit Messages: 1
- Supported I/O connection methods:
  - ★ Transport and trigger: Exclusive-Owner, Cyclic
  - ★ Originator to Target Type: POINT2POINT
  - ★ Target to Originator Type: POINT2POINT, MULTICAST
- EtherNet/IP Input/Output command data size: maximum 500 bytes



#### Modbus Features:

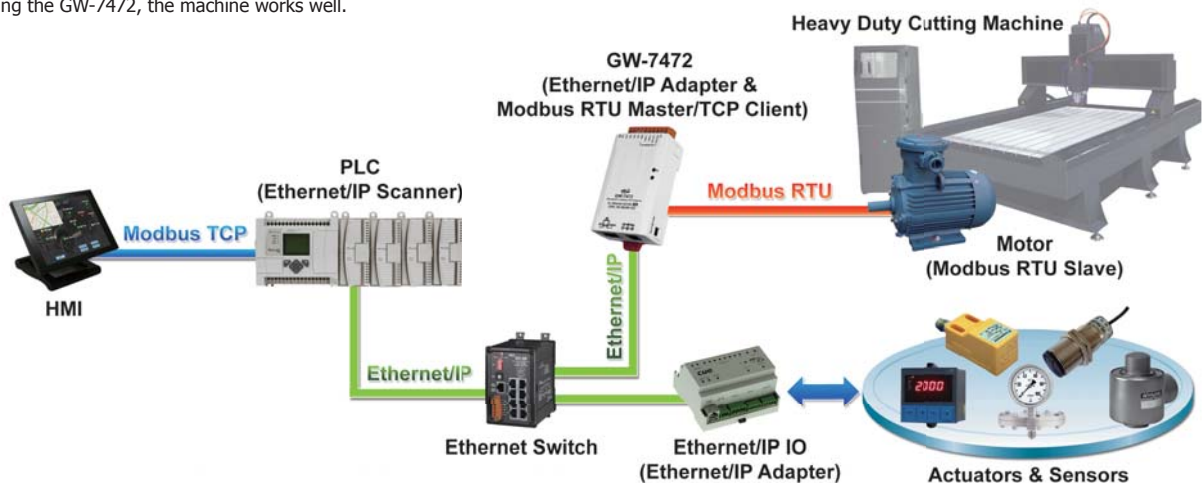
- Modbus Protocol: Modbus TCP/RTU master protocols
- Maximum support 30 Modbus RTU commands
- Maximum support 10 Modbus TCP servers
- Maximum support 8 Modbus commands for each one Modbus TCP server
- Modbus Input/Output command data size: maximum 500 bytes
- Supported Modbus Function Code 01, 02, 03, 04, 05, 06, 15, and 16



## Application Case Studies

### Heavy Duty Cutting Machine



A heavy duty cutting machine always uses an AC motor for the main axis motor because AC motors can output more power than DC motors. The machine manufacturer chose the AB PLC, the Micrologix 1100 controller, for the main control unit of the heavy duty cutting machine, which provides the Ethernet/IP communication interface and acts as an Ethernet/IP scanner. The AC motor of the cutting machine is controlled by the DURA pulse AC motor driver, which provides the Modbus communication interface as a Modbus RTU slave. In order to seamlessly exchange the data between the AB PLC and the AC motor driver, the customer utilized the GW-7472 to resolve the problem. The GW-7472 is an Ethernet/IP adapter to Modbus TCP/RTU master gateway. It collects the necessary information from the AC motor driver periodically, and returns the information to the AB PLC while the AB PLC commands the GW-7472. If the AB PLC needs to control the driver, the Ethernet/IP commands can be immediately interpreted to the corresponding Modbus RTU commands to handle the driver. After using the GW-7472, the machine works well.









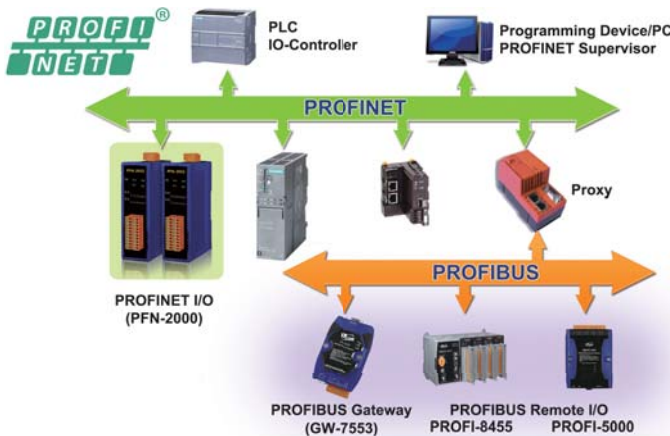


## EtherNet/IP Remote I/O

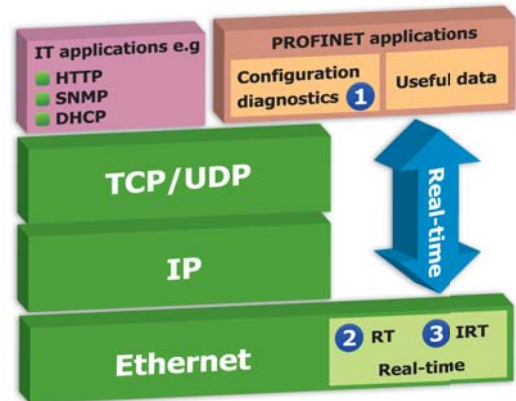
Analog Input & Output Module		
Model Name	EIP-2019	EIP-2024
Pictures	8 Thermocouple Input Module 	4 Voltage/Current Output Module 
Analog Input		
Channels	8 (Differential)	
Sensor Type	Thermocouple (J, K, T, E, R, S, B, N, C)	
Voltage Input Range	±15mV, ±50mV, ±100mV, ±500mV, ±1V, ±2.5V, ±5V, ±10V	
Current Input Range	±20mA, 0~+20mA, +4mA~+20mA (Required External 125Ω Resistor)	
Resolution	16-bit	
Sampling Rate	10 Hz	
Accuracy	±0.1% of FSR	
Overvoltage Protection	240 Vrms	
Input Impedance	400 kΩ	
EDS Protection	4 kV Contact for each channel	
Intra-Module Isolation	3000 Vdc	
Analog Output		
Channels		4
Voltage Output Range		0 ~ 5V, +/-5V, 0 ~ 10V, +/-10 V
Current Output Range		0 ~ 20 mA, 4 ~ 20 mA
Resolution		14-bit
Accuracy	For Voltage Output	+/-0.1% of FSR
	For Current Output	+/-0.2% of FSR
ESD Protection		4 kV Contact for each channel
Intra-Module Isolation		3000 Vdc

Digital Input & Output Module				
Model Name	EIP-2042	EIP-2051	EIP-2055	EIP-2060
Pictures	16 x DO Module 	16 x DI Module 	8 x DI, 8 x DO Module 	6 x DI, 6 x Relay Module 
Digital Input				
Channels		16	8	6
Contact		Dry + Wet	Dry + Wet	Dry + Wet
Sink/Source (NPN/PNP)		Sink/Source	Sink/Source	Sink/Source
Wet Contact	On Voltage Level	+10 ~ 50 Vdc	+10 ~ 50 Vdc	+10 ~ 50 Vdc
	Off Voltage Level	+4 Vdc Max.	+4 Vdc Max.	+4 Vdc Max.
Dry Contact	On Voltage Level	Close to GND	Close to GND	Close to GND
	Off Voltage Level	Open	Open	Open
Input Impedance		10 kΩ, 0.5W	10 kΩ, 0.5W	10 kΩ, 0.5W
Digital Output				
Channels	16		8	6
Type	Open Collector		Open Collector	Power Relay
Sink/Source (NPN/PNP)	Sink (NPN)		Sink (NPN)	Form A
Load Voltage	+3.5 ~ +50 Vdc		+3.5 ~ +50 Vdc	30 Vdc/125 VAC
Max. Load Current	700 mA/Channel		700 mA/Channel	5 A @ 30 Vdc, 5 A @ 125 VAC
Overvoltage Protection	60 Vdc		60 Vdc	-
Overload Protection	Yes		Yes	-
Power-on Value	Yes		Yes	Yes
Safe Value	Yes		Yes	Yes

### 3.4 PROFINET Products



PROFINET is the Ethernet based standard for real-time automation that specified and published by PI (PROFIBUS & PROFINET International – <http://www.profibus.com>). PROFINET uses Ethernet standard as well as TCP, UDP and IP as protocols for communication, configuration and diagnosis in the network. Therefore, it is easy to be integrated to existing fieldbus systems, like PROFIBUS DP, PROFIBUS PA, Interbus, DeviceNet and other technologies to an open Ethernet based network without changes to existing field devices.



#### 1 TCP/IP

- Device parameterization and configuring
- Reading of diagnostic data
- Negotiating the useful data channel

#### 2 Real-time RT

- Effective cyclic transmission of useful data
- Event-driven messages/alarms

#### 3 Isochronous real-time IRT

- Useful data transfer in isochronous mode
- Hardware support through ERTEC
- Jitter < 1  $\mu$ s

The PROFINET standard defines three different performance levels which cover the various requirements from different applications.

**PROFINET NRT (Non Real Time):** It uses standard protocols as UDP/IP. With response time approx. 100 ms PROFINET NRT targets for applications in process automation.

**PROFINET RT (Real Time):** For applications with higher requirements on cycle time like factory automation, it directly uses the Ethernet protocol to exchange I/O data, while diagnosis and configuration uses standard UDP/IP. PROFINET RT enables applications With response time approx. > 10 ms.

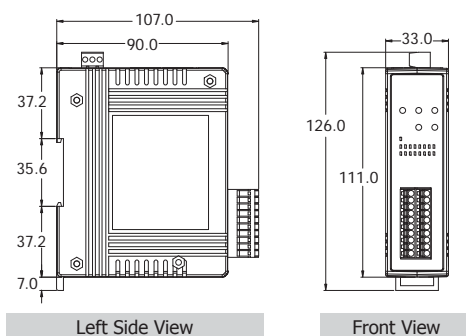
**PROFINET IRT (Isochronous Real Time):** The highest requirements come from the control of complex industrial drive systems, like packaging machines or robotics. With applications with cycle time < 1 ms and jitter < 1  $\mu$ s are possible.

The PFN-2000 series provides various I/O modules that meet PROFINET RT for process automation, factory automation.

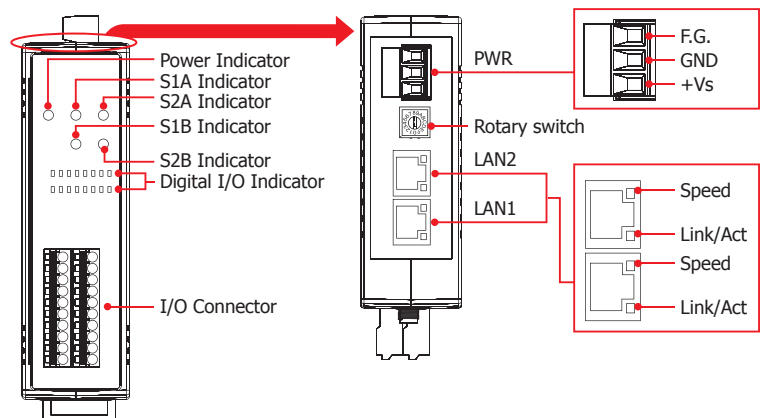
#### • Features

- Transfer protocol: PROFINET IO
- 10/100 Base-TX Ethernet, RJ-45 x 2
- PROFINET Conformance Class B and RT Class 1
- Cyclic Time: 1ms (min)
- Generic GSDML (V 2.25) File Provided
- Supported Ethernet services: ICMP, IGMP, ARP, DHCP, TELNET, TFTP, SNMP, VLAN Priority Tagging
- Supported PROFINET services: RTC, RTA, CL-RPC, DCP, LLDP, I & M

#### • Dimensions (Units: mm)



#### • Appearance





## PROFINET Converters

### PROFINET to RS-232/422/485 Converter

#### I-7580

**Available soon**



The I-7580 is specially designed for PROFINET IO device. It offers RS-232, RS-422, and RS-485 three kinds of communication way. With the Hybrid COM 1 design, users can readily choose one type of com port to use. Through the GSDML file, it is easy to communicate with any standard PROFINET IO controller.

- Protocol: PROFINET IO Device
- PROFINET Conformance Class B and RT Class 1
- Cyclic Time: 1ms (min)
- Generic GSDML File Provided (Version 2.25)
- Max length of in/output data is 1024/1024 Bytes
- Provide LED indicators
- 4 kV Contact ESD protection for any terminal
- Wide range of power input (+10 ~ +30 VDC) and operating temperature (-25 ~ +75°C)



## Analog Input Modules

### 8-channel Universal Analog Input Module with High Voltage Protection

#### PFN-2019

**Available soon**








The PFN-2019 is a standard PROFINET IO device. It provides the GSDML file for standard PROFINET Engineering tool. It is an 8-channel voltage, current, and thermocouple input module, with the ability to connect various types of inputs to a single module. It is designed for industrial plant environments and has special input circuits to provide 240Vrms continuous overload protection.

- Protocol: PROFINET IO Device
- PROFINET Conformance Class B and RT Class 1
- Cyclic Time: 1ms (min)
- Generic GSDML File Provided (Version 2.25)
- Support thermocouple type: J, K, T, E, R, S, B, N, C
- Provide voltage overload protection
- Provide LED indicators
- 4 kV Contact ESD protection for any terminal
- Wide range of power input (+10 ~ +30 VDC) and operating temperature (-25 ~ +75°C)



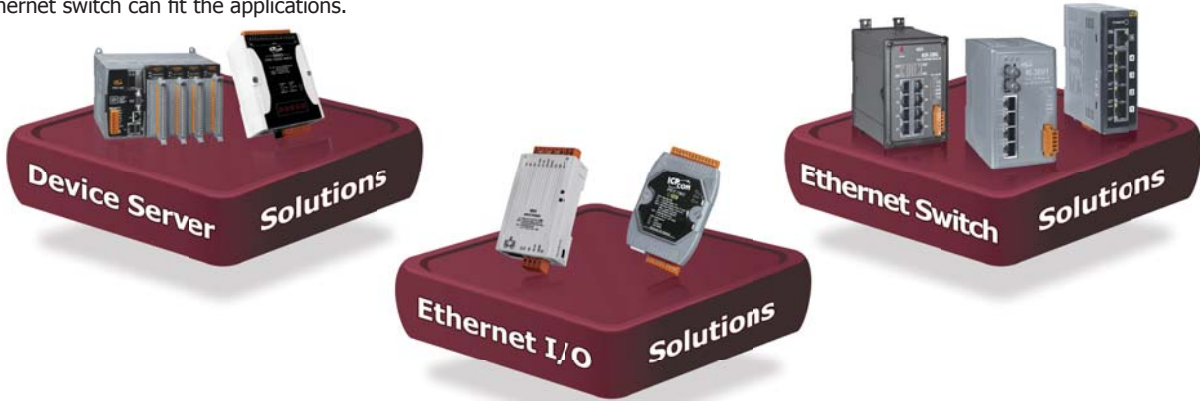


## Digital Input & Output Module

Digital Input & Output Module						
Model Name	PFN-2042	PFN-2051	PFN-2052	PFN-2053	PFN-2055	PFN-2060
	16 x DO Module	16 x DI Module	8 x DI Module	16 x DI Module	8 x DI, 8 x DO Module	6 x DI, 6 x Relay Module
Pictures						
Digital Input						
Channels		16	8	16	8	6
Contact		Dry + Wet	Wet	Dry	Dry + Wet	Dry + Wet
Sink/Source (NPN/PNP)		Sink/Source	Sink/Source	Source	Sink/Source	Sink/Source
Wet Contact	On Voltage Level	+10 ~ 50 Vdc	+4 ~ 30 Vdc	-	+10 ~ 50 Vdc	+10 ~ 50 Vdc
	Off Voltage Level	+4 Vdc Max.	+1 Vdc Max.	-	+4 Vdc Max.	+4 Vdc Max.
Dry Contact	On Voltage Level	Close to GND	-	Close to GND	Close to GND	Close to GND
	Off Voltage Level	Open	-	Open	Open	Open
Input Impedance		10 kΩ, 0.5W	3KΩ, 0.3W	-	10 kΩ, 0.5W	10 kΩ, 0.5W
Digital Output						
Channels	16				8	6
Type	Open Collector				Open Collector	Power Relay
Sink/Source (NPN/PNP)	Sink				Sink	Form A
Load Voltage	+3.5 ~ +50 Vdc				+3.5 ~ +50 Vdc	30 Vdc/125 Vac
Max. Load Current	700 mA/Channel	-	-	-	700 mA/Channel	2 A @ 30 Vdc, 0.6 A @ 125 Vac
Overvoltage Protection	60 Vdc				60 Vdc	-
Overload Protection	Yes				Yes	-
Power-on Value	Yes				Yes	Yes
Safe Value	Yes				Yes	Yes
PROFINET						
Connector	2 × RJ-45, 10/100 BaseTX					
Protocol	PROFINET IO					
Service	RTC, RTA, CL-RPC, DCP, LLDP					
Conformance	Class B					
RT	Class 1					
Cycle Time	1 ms (min.)					
Generic GSDML File	Ver. 2.25					
System						
ESD (IEC 61000-4-2)	4 kV					
EFT (IEC 61000-4-4)	1 kV					
Surge (IEC 61000-4-5)	1 kV					
Intra-Module Isolation, Field-to-Logic	3750 Vrms					
Power Input	+10 ~ +30 Vdc					

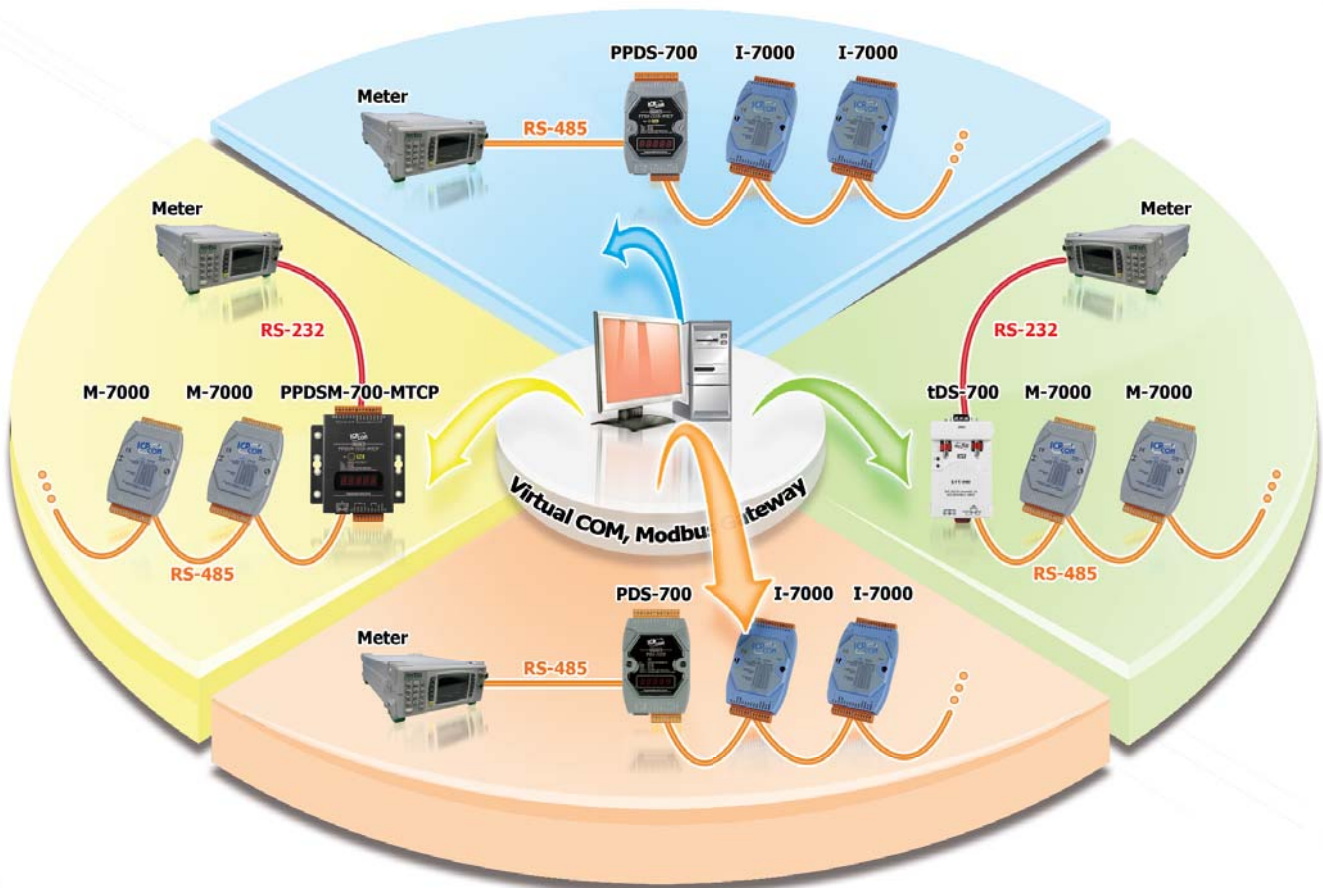
## 3.5 Ethernet Device Server

In order to integrate the information from the field into the enterprise systems easily, the Ethernet communication is widely applied in the industrial and automation applications. Beside the Ethernet/IP, PROFINET, and EtherCAT, ICP DAS also announces a series of the general purpose products and Modbus-related products as the converters, gateways, I/O modules and switches. The device server series products let the serial communication products quickly join the Ethernet network. For the I/O control and monitor requirements, the Modbus I/O slaves and intelligent I/O modules provides simple methods to achieve the purposes. If you need to deploy an Ethernet network, the Ethernet switch can fit the applications.



### Device Server Introduction

The ICP DAS Programmable Device Server is designed to bring network connectivity to your serial devices. The programmable features allow developers to quickly build custom applications that turn "dull" serial devices into "intelligent" devices right away without modifying their hardware or software configuration. With extensive experience accumulated over many years, a great number of serial devices such as PLCs, bar code readers, RFID readers, meters and motion controllers, etc., have been widely used in various applications. As the advances in communication technologies in recent years, continue to drive optimization of data accessibility and remote operation ability, a wide variety of industries have begun to feel the urge to upgrade their latency serial communications to Ethernet network connections. The ICP DAS PDS series of products are your best choice for implementing this scenario in a robust, reliable and cost-effective way.



## Device Server Comparison Table

Features	PPDS	PDS	DS	tDS	tGW
Virtual COM	Yes	Yes	Yes	Yes	–
Programmable	Yes	Yes	–	–	–
PoE	Yes	–	–	Yes	Yes
Modbus Gateway	Yes	– (Except the PDS-5000-MTCP)	–	–	Yes
Multi-client	Yes	Yes	Yes	–	–
Remarks	Professional	Powerful	Isolation for DS-715	Cost-effective, Entry-level	Cost-effective, Entry-level

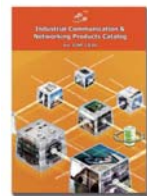
## Selection Guide

Series	Ethernet	Virtual COM	I/O Type	Programmable	Modbus	Casing
PPDS-700-MTCP	10/100 M, PoE	Yes	Internal DIOs	Yes	Yes	Fire-Retardant Plastic
PPDSM-700-MTCP						Metal
PPDS-700-IP67			–		–	IP67 Waterproof Plastic
PDS-700	10/100 M	Yes	Internal DIOs	Yes	–	Fire-Retardant Plastic
PDSM-700						Metal
PDS-8x1	10/100 M Ethernet Switch		Yes			I/O Slots
PDS-8x2	Dual 10/100 M Ethernet					
PDS-220Fx	100 Base-FX, Fiber					
PDS-5000-MTCP	10/100 M Ethernet Switch					
DS-700	10/100 M	Yes	–	Yes	–	Fire-Retardant Plastic
tDS-700	10/100 M, PoE					
tGW-700						

### More products refer to Industrial Communication & Networking Products Catalog

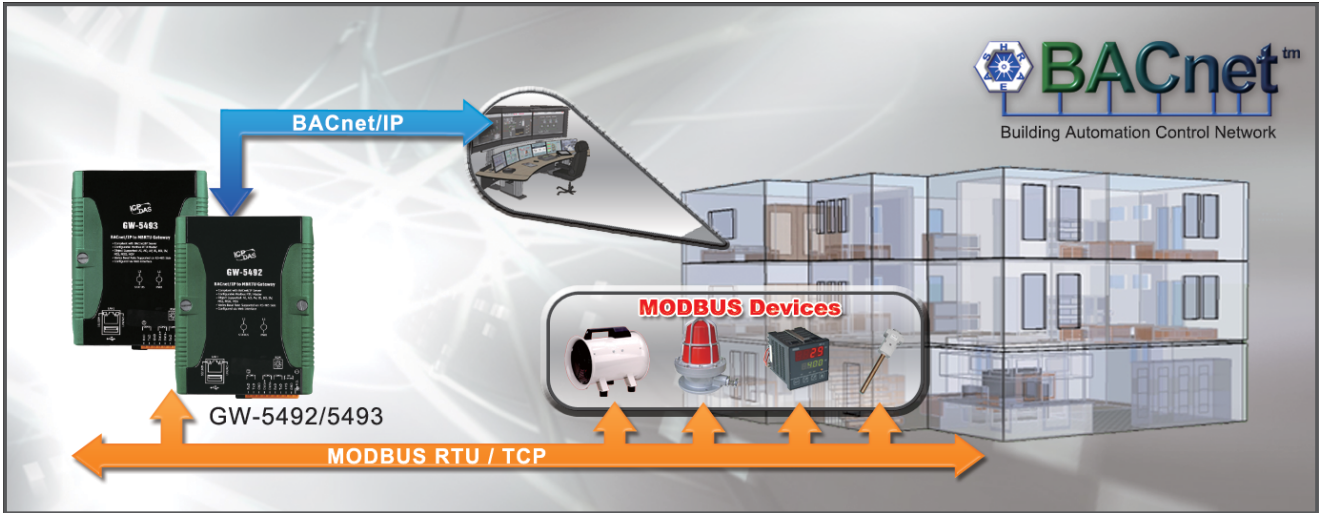
- Multi-port Serial Cards
- Programmable Device Servers (Serial-to-Ethernet)
- Converters, Repeaters and Hubs
- Fieldbus Solutions
- Ethernet Switches

Or refer to <http://www.icpdas.com.tw/support/catalog/catalog.html>



### 3.6 BACnet/IP Products

BACnet, a data communication protocol for building automation and control networks, is developed under the auspices of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). It is an American national standard, a European standard, an national standard in more than 30 countries, and an ISO global standard. This protocol is comprehensive applied in vastly different applications such as heating, ventilating, and air-conditioning control, lighting control, access control, and fire detection systems. The BACnet protocol also provides mechanisms for computerized building automation devices to exchange information, regardless of the particular building service they perform.



#### ➤ BACnet Features

- Designed specifically for building automation control
- Conformance to ANSI/ASHRAE standard 135-2008 or ISO 16484-5
- A completely non-proprietary open communication software standard
- Support several different physical and link layers (BACnet/IP, Ethernet, ARCNET, MS/TP, PTP and LonTalk)
- All data in a BACnet system is represented in terms of "objects", "properties" and "services"

**BACnet Stack Layers**

**OSI Layer**

BACnet Defined

BACnet Application Layer				
BACnet Network Layer				
ISO 8802-2 (IEEE 8802.3) Type 1	MS/TP	PTP	LonTalk	BVLL
ISO 8802-3 Ethernet	ARCNET	EIA 485		UDP/IP
		EIA 232		IP Supporting Data link

Application (7)	Handles the actual interface with the user's application program
Network (3)	Establishes logical circuits and routing between two machines
Data-Link (2)	Controls orderly access to the physical medium
Physical (1)	Transmits and receives individual bits on the physical medium



Object_Name	SAMPLE OBJECT
Object_Type	ANALOG INPUT
Present_Valus	72.3
Status_Flags	Out-of Service
High_Limit	78.0
Low_Limit	68.0

## BACnet Case Studies

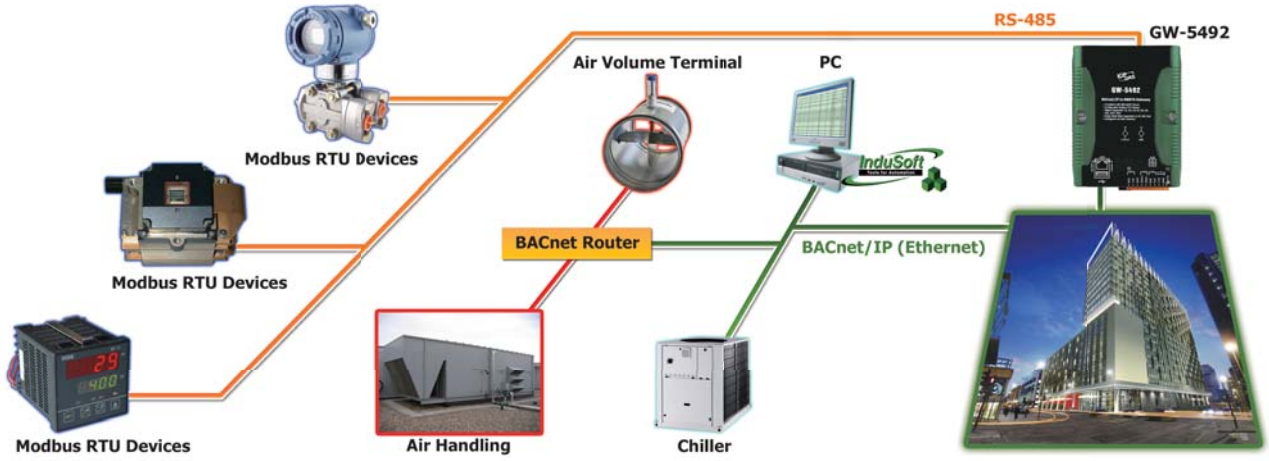
### Commercial Building Automation System

**Product: GW-5492**

The customer used the SCADA, InduSoft Web Studio, with BACnet/IP driver to integrate with BACnet/IP devices and controllers in a commercial building including 210 air volume terminals, 22 air handling units, 3 chillers...etc. Using GW-5492, the customer was able to integrate those Modbus RTU devices to BACnet/IP network. By doing these is to eliminate multiple protocols on the network and easy maintenance in the future. The system monitors and controls nearly 2500 physical inputs and outputs which are connected to the InduSoft residing on the BACnet/IP networks. InduSoft also configured a powerful feature that showed facility personnel peak demand trends on energy usage and sequence unit operations to minimize energy consumption. The building retains 10% energy savings each month after new system installed.

3

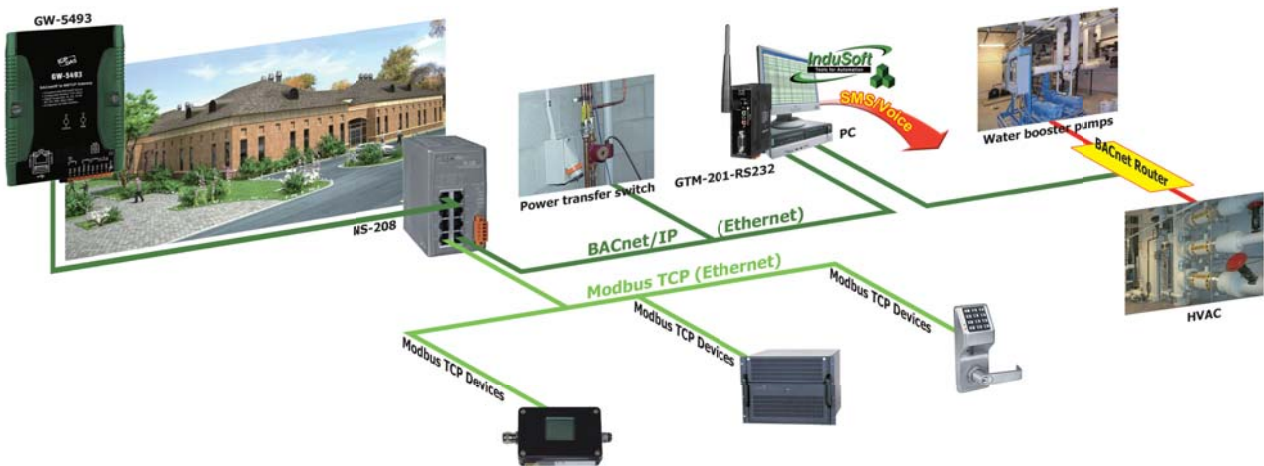
Industrial Ethernet



### Building Automation of a Medical Center

**Product: GW-5493**

The customer from a medical center used the SCADA, InduSoft Web Studio, to integrate numerous third party devices using BACnet/IP protocol – including the hospital emergency power transfer switches, water booster pumps, and HVAC system. For those existing Modbus TCP devices, the customer added the GW-5493 BACnet/IP to Modbus gateway in order to make the devices accessible using BACnet/IP protocol. The system integration provides the information necessary to make complex decisions driving energy savings and properly monitor the equipment. With GTM-201, the system allows the operator to receive alarms and monitoring points via SMS messages. The building automation system also trends data regularly so that the client can use the information to track costs and troubleshoot equipment from historical data.







## BACnet/IP Server to Modbus RTU Master Gateway

**GW-5492**  
**GW-5493**

**NEW**



GW-5492 and GW-5493 is a fully configurable universal BACnet/IP to Modbus RTU/TCP gateway. The GW-549x includes BACnet/IP Server and Modbus RTU Master (GW-5492) or TCP Client (GW-5493) which is used to make Modbus devices accessible on a BACnet network. BACnet (Building Automation and Control Networking) protocol has been designed specifically to meet the communication needs of building automation and control systems for applications such as heating, ventilating...etc. The GW-549x contains a large number of BACnet objects gives you flexibility in mapping Modbus registers to any combination of BACnet objects. Multiple BIBBs are supported. All the data transfer is configurable using a standard Web browser.



### Features

- Read/Write Standard Modbus RTU Register via BACnet/IP
- No Programming Required
- Modbus register mapping configured via web interface
- Fully compliant with BACnet/IP server
- Fully user configurable Modbus RTU slave
- Quickly and cost effectively integrate networks



### BACnet Support

<b>Object</b>	Binary Input, Binary Output, Binary Value, Analog Input, Analog Output, Analog Value, Multi-State Input, Multi-State Output, Multi-State Value, Device
<b>BIBB</b>	DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DS-COV-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-TS-B, DM-UTC-B, DM-RD-B

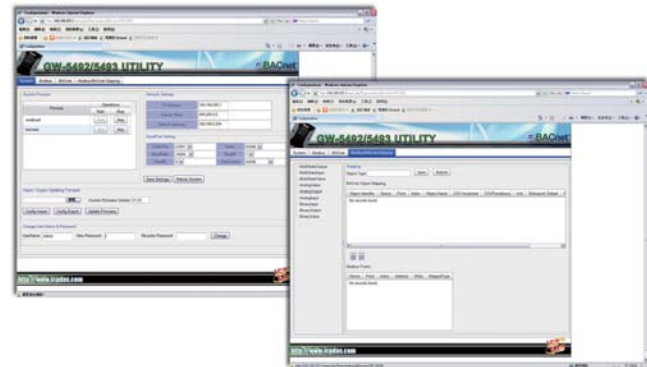


### Modbus Support

Code	Type	Description
01	Read Coil Status	Read the ON/OFF status of discrete outputs in the slave
02	Read Input Status	Read the ON/OFF status of discrete inputs in the slave
03	Read Holding Registers	Read the binary contents of holding registers in the slave
04	Read Input Registers	Read the binary contents of input registers in the slave
05	Force Single Coil	Write a single output to either ON or OFF in the slave
06	Preset Single Register	Write an integer value into a single register in the slave
15	Force Multi Coils	Write each coil in the sequence of coils to either ON or OFF in the slave
16	Preset Multi Registers	Write a block of contiguous registers in the slave



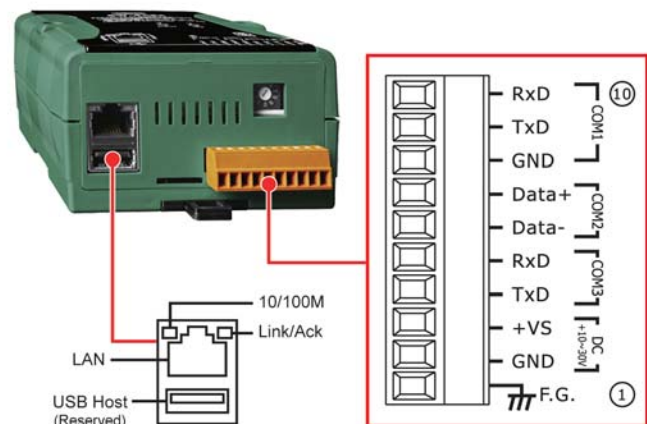
### Utility Features



- Configured via standard Web browser
- Provide Modbus and BACnet configuration interface
- Update firmware remotely
- Easily mapping Modbus Register to BACnet object





### Pin Assignments




















## BACnet/IP I/O Module










Model Name	BNET-5304	BNET-5310
	Multi-function BACnet/IP module	Multi-function BACnet/IP module
Pictures	<i>Available soon</i> 	<i>Available soon</i> 
<b>System</b>		
COM1	Reserved	
Ethernet	10/100 Base-TX	
Security	ID and Password	
Built-in Watchdog	Yes	
LED Indicator	Power and Status	
<b>Protocol</b>		
BACnet	BACnet/IP	
BACnet Objects	1 Device, 6 AI, 1 AO, 4 BI, 4 BO	1 Device, 4 AI, 2 AO, 3 BI, 3 BO
BIBB	DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DS-COV-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-TS-B, DM-UTC-B, DM-RD-B	
<b>Analog Input</b>		
Channel	6	4
Wiring	Single-Ended	Differential
Range	+/- 5 V, 0 ~ +5 V	+/- 10 V
Resolution	12-bit	
Sampling Rate	4 KHz	
Input Impedance	1 MΩ	
Overvoltage Protection	+/- 30 Vdc	
Isolation	Non-isolated	
<b>Analog Output</b>		
Channel	1	2
Range	+/- 5V	+/- 10V
Resolution	12-bit	
Output Capacity	20 mA	
Isolation	Non-isolated	
<b>Digital Input</b>		
Channels	4	3
Contact	Dry	
Dry Contact	On Voltage Level	Close to GND
	Off Voltage Level	Open
Overvoltage Protection	30 Vdc	
<b>Digital Output</b>		
Channels	4	3
Type	Open Collector	
Sink/Source (NPN/PNP)	Sink	
Load Voltage	+10 Vdc ~ 40 Vdc	
Max. Load Current	200 mA/channel at 25 °C	
Overload Protection	1.4 A	
<b>Environmental</b>		
Dimensions (W x L x H)	91 mm x 132 mm x 52 mm	
Operating Temp	-25 ~ +75 °C	
Storage Temp.	-30 ~ +85 °C	
Humidity	5 ~ 90% PH, non-condensing	
Power Input Range	+10 V to +30 +10 V to +30 Vdc	
Power Consumption	4.8 W (0.2 A @ 24 Vdc)	

## 3.7 Industrial Ethernet/Fiber Switch

Unmanaged Industrial PoE (Power over Ethernet) Ethernet Switch							
Model Name	NS-205PSE	NS-205PD	NS-208PSE	NS-208PSE-4	NSM-208PSE	NSM-208PSE-4	NS-208PD
Pictures		<i>Available soon</i> 					<i>Available soon</i> 
Speed	10/100 M		10/100 M		10/100 M		10/100 M
Ethernet Port	1	4	-	4	-	4	7
Ethernet Port with PSE	4	-	8	4	8	4	-
Ethernet Port with PD	-	1	-		-		1
Casing	Plastic		Plastic		Metal		Plastic
Operating Temperature	-40 ~ +75°C		-40 ~ +75°C		-40 ~ +75°C		-40 ~ +75°C
Power Input	+46 ~ 55 Vdc	+12 ~ 60 Vdc	+46 ~ 55 Vdc		+46 ~ 55 Vdc		+12 ~ 60 Vdc
Dimensions (W x H x D, Unit: mm)	33 x 107 x 78		31 x 157 x 113		25 x 168 x 119		31 x 157 x 113

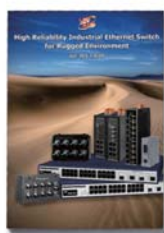
Note1: PSE stands for Power Sourcing Equipment.  
Note2: PD stands for Powered Device. It features automatic power management and auto detection of PD.

Unmanaged Industrial Ethernet Switch									
Model Name	NS-205-IP67	NS-205	NS-205G	NS-208	NS-208G	NS-208AG	NSM-108	NSM-208G	NSM-208AG
Pictures									
Speed	10/100 M	10/100 M	10/100/1000 M	10/100 M	10/100/1000 M		10/100 M	10/100/1000 M	
Port	5			8			8	8	
Casing	Plastic with IP67	Plastic		Plastic			Metal	Metal	
Operating Temperature	-40 ~ +75°C			-40 ~ +75°C			-40 ~ +75°C	-40 ~ +75°C	
Power Input	+10 ~ 30 Vdc			+10 ~ 30 Vdc		+12 ~ 48 Vdc	+10 ~ 30 Vdc	+10 ~ 30 Vdc	+12 ~ 48 Vdc
Dimensions (W x H x D, Unit: mm)	85 x 126 x 75.5	33 x 107 x 78		64 x 118 x 98			73 x 132 x 102	73 x 132 x 102	

Unmanaged Industrial 10/100 Base-T(X) with 100 Base-FX Fiber Switch										
Model Name	NS-205FC	NS-205FCS	NS-205FT	NS-206FC	NS-206FCS	NS-206FT	NS-209FC	NS-209FCS	NS-209FT	
Pictures										
Fiber Port	Mode	Multi-mode	Single-mode	Multi-mode	Multi-mode	Single-mode	Multi-mode	Multi-mode	Single-mode	Multi-mode
	Connector	SC		ST	SC		ST	SC		ST
	Speed	100 M			100 M			100 M		
Ethernet	Port	1			2			1		
	Speed	10/100 M			10/100 M			10/100 M		
Ethernet	Port	4			4			8		
	Speed	10/100 M			10/100 M			10/100 M		
Casing	Plastic			Plastic			Plastic			
Operating Temperature	0 ~ +70°C			0 ~ +70°C			0 ~ +70°C			
Power Input	+10 ~ 30 Vdc			+10 ~ 30 Vdc			+12 ~ 48 Vdc			
Dimensions (W x H x D)	64 mm x 110 mm x 98 mm			64 mm x 110 mm x 98 mm			64 mm x 110 mm x 98 mm			

### 1.) High Reliability Industrial Ethernet Switch Catalog 2.) Industrial Ethernet Switch Additional Products Catalog

- Managed Ethernet Switches
  - Unmanaged Ethernet Switches PoE Ethernet Switches
  - Media Converters
  - Real-time Redundant Ring Ethernet Switches
  - IP67 Waterproof Switches
  - Cyber-Ring Ethernet Self-healing Technology
- Or refer to <http://www.icpdas.com.tw/support/catalog/catalog.html>



# NS-205PSE-IP67 Series

Industrial 5-port Unmanaged IP67 Ethernet Switch with PoE

# NS-205-IP67 Series

Industrial 5-port Unmanaged IP67 Ethernet Switch



NS-205PSE-IP67  
NS-205-IP67

NS-205PSE-IP67/DIN  
NS-205-IP67/DIN

NS-205PSE-IP67 Series/NS-205-IP67 Series							For NS-205PSE-IP67/ NS-205PSE-IP67/DIN			For NS-205-IP67/ NS-205-IP67/DIN		For NS-205-IP67/DIN/ NS-205PSE-IP67/DIN	
-10 ~ +60							+46 ~ +53	x1	x4	x5			
Wide Temperature	Wall Mount	IP67	CE	FCC	RoHS	WEEE	Input Voltage	LAN	PoE + LAN	LAN	DIN-Rail Mount		

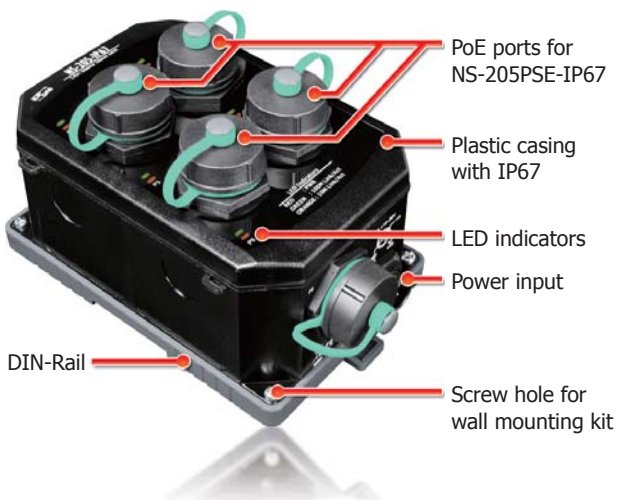
## Introduction

The NS-205PSE-IP67/NS-205-IP67 is designed for industrial applications in harsh environments. The rugged RJ-45 ensure tight, robust connections, and guarantee reliable operation, even for applications that are subject to high vibration and shock.

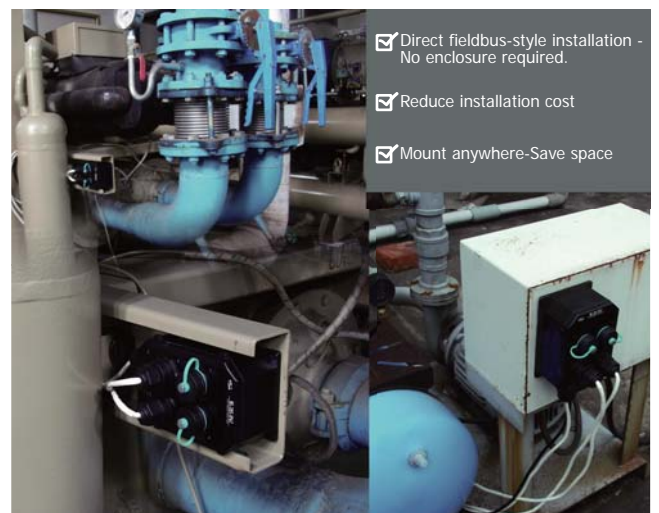
The NS-205PSE-IP67 PoE switch provides 5 fast Ethernet with 4 IEEE 802.3af compliant PoE ports. The switch is classified as power source equipment (PSE) and provides up to 15.4 W of power per port.

The Ethernetswitch supports IEEE 802.3/802.3u/802/3x with 10/100M, full/half-duplex, MDI/MDI-X auto-sensing, and provide an economical solution for your industrial Ethernet network.

## Appearance



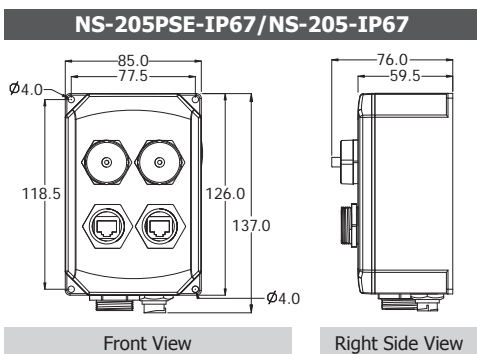
## Applications



## Specifications

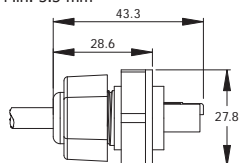
Models	NS-205PSE-IP67	NS-205PSE-IP67/DIN	NS-205-IP67	NS-205-IP67/DIN
<b>Technology</b>				
Standards	IEEE 802.3, 802.3u, 802.3x, 10/100 Base-T(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection			
Processing Type	Store & forward; wire speed switching			
MAC Addresses	1024			
Memory Bandwidth	2 Gbps		1.4 Gbps	
Frame Buffer Memory	512 Kbit		256 Kbit	
Flow Control	IEEE 802.3x flow control, back pressure flow control			
<b>Interface</b>				
LED Indicators	PWR, Link/Act, Power Device is detected		PWR, 10/100M, Link/Act	
Ethernet Isolation	1500 Vrms 1 minute			
Connector	Rugged RJ-45			
<b>Power Input</b>				
Input Voltage Range	+46 VDC ~ +53 VDC for PoE output		+10 VDC ~ +30 VDC (1 kV Isolated)	
Power Consumption	0.05 A @ 48 VDC without PD loading; 1.45 A @ 48 VDC with PD full loading		0.12 A @ 24 VDC	
Protection	Power reverse polarity protection			
Connector	IP67 PWR Plug			
<b>PoE Technology</b>				
PoE Compliance	100% IEEE 802.3af compliant		-	
PoE Classification	PSE (Power Sourcing Equipment)		-	
PoE Voltage	+48 VDC depending on power input		-	
PoE Power	Up to 15.4 watts per channel		-	
PoE Operation	Automatic detection and power management		-	
PoE Pin Assignments	V+ (Pin 1, 2), V- (Pin 3, 6)		-	
PoE Disconnect Mode	DC disconnect		-	
<b>Mechanical</b>				
Casing	Plastic (Flammability UL 94V-0)			
Environmental Rating	Protection rating IP67 for Operating Temperature -10 °C ~ +60 °C			
	Protection rating IP66 for Operating Temperature -40 °C ~ +75 °C			
Dimensions (W x L x H)	85 mm x 76 mm x 137 mm	89 mm x 90 mm x 138 mm	85 mm x 76 mm x 137 mm	89 mm x 90 mm x 138 mm
Installation	Wall mounting	DIN-Rail Mounting or Wall Mounting	Wall mounting	DIN-Rail Mounting or Wall Mounting
<b>Environment</b>				
Operating Temperature	-10 °C ~ +60 °C (Protection rating IP67)			
	-40 °C ~ +75 °C (Protection rating IP66)			
Storage Temperature	-10 °C ~ +60 °C (Protection rating IP67)			
	-40 °C ~ +75 °C (Protection rating IP66)			
Ambient Relative Humidity	100% RH for Operating Temperature -10 °C ~ +60 °C 10% ~ 90% RH, non-condensing for Operating Temperature -40 °C ~ +75 °C			

## Dimensions (Units: mm)



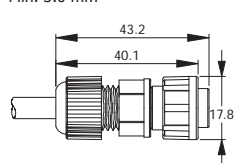
### IP67 Ethernet Plug

Cable Dia:  
Max. 7.0 mm  
Min. 5.5 mm



### IP67 PWR Plug

Cable Dia:  
Max. 6.5 mm  
Min. 5.0 mm



## Ordering Information

<b>NS-205PSE-IP67 CR</b>	Industrial 5-port unmanaged IP67 Ethernet switch with PoE Includes IP67 RJ-45 Plug x 5, IP67 Power Plug x 1, Cap with Tether x 5 (RoHS)
<b>NS-205PSE-IP67/DIN CR</b>	NS-205PSE-IP67 with DIN-Rail Mounting (RoHS)
<b>NS-205-IP67 CR</b>	Industrial 5-port unmanaged IP67 Ethernet switch Includes IP67 RJ-45 Plug x 5, IP67 Power Plug x 1, Cap with Tether x 5 (RoHS)
<b>NS-205-IP67/DIN CR</b>	NS-205-IP67 with DIN-Rail Mounting (RoHS)

 IP67 RJ-45 Plug 4SASO-001	 IP67 Power Plug 4SI01K0000016	 Cap with Tether 4SASO-0004
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## Accessories

MDR-60-48	48 V/1.25 A, 60 W Power Supply with DIN-Rail Mounting
DIN-KA52F-48	48 V/0.52 A, 25 W Power Supply with DIN-Rail Mounting
DR-120-48	48 V/2.5 A, 120 W Power Supply with DIN-Rail Mounting

# NS-208PSE-IP67 *Available soon*

Industrial 8-port Unmanaged IP67 Ethernet Switch with PoE

# NS-208-IP67 *NEW*

Industrial 8-port Unmanaged IP67 Ethernet Switch



NS-208PSE-IP67/NS-208-IP67 Series							For NS-208PSE-IP67		For NS-208-IP67	
-10 ~ +60 Wide Temperature	Wall & DIN-Rail Mount	IP67	CE	FCC	RoHS	WEEE	+46 ~ +53 Input Voltage	PoE 10/100 x 8 PoE + LAN	10/100 x 8 LAN	

## Introduction

The NS-208PSE-IP67/NS-208-IP67 is designed for industrial applications in harsh environments. The rugged RJ-45 ensures tight, robust connections, and guarantees reliable operation, even for applications that are subject to high vibration and shock.

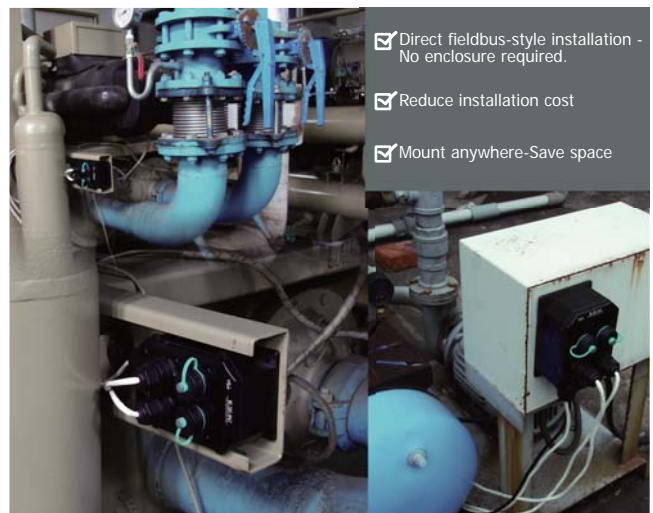
The NS-208PSE-IP67 PoE switch provides 8 fast Ethernet with 8 IEEE 802.3af compliant PoE ports. The switch is classified as power source equipment (PSE) and provide up to 15.4 W of power per port.

The Ethernet switch supports IEEE 802.3/802.3u/802/3x with 10/100M, full/half-duplex, MDI/MDI-X auto-sensing, and provides an economical solution for your industrial Ethernet network.

## Appearance



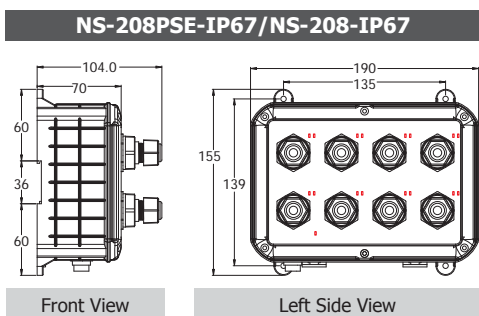
## Applications



## Specifications

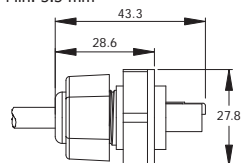
Models	NS-208PSE-IP67	NS-208-IP67
<b>Technology</b>		
Standards	IEEE 802.3, 802.3u, 802.3x, 10/100 Base-T(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection	
Processing Type	Store & forward; wire speed switching	
MAC Addresses	1024	
Memory Bandwidth	2 Gbps	
Frame Buffer Memory	512 Kbit	
Flow Control	IEEE 802.3x flow control, back pressure flow control	
<b>Interface</b>		
LED Indicators	PWR, Link/Act, Power Device is detected	PWR, Link/Act
Ethernet Isolation	1500 Vrms 1 minute	
Connector	Rugged RJ-45	
<b>Power Input</b>		
Input Voltage Range	+46 VDC ~ +53 VDC for PoE output	+12 VDC ~ +53 VDC
Power Consumption	0.05 A @ 48 VDC without PD loading; 1.45 A @ 48 VDC with PD full loading	0.12 A @ 24 VDC
Protection	Power reverse polarity protection	
Connector	IP67 PWR Plug	
<b>PoE Technology</b>		
PoE Compliance	100% IEEE 802.3af compliant	-
PoE Classification	PSE (Power Sourcing Equipment)	-
PoE Voltage	+48 VDC depending on power input	-
PoE Power	Up to 15.4 watts per channel	-
PoE Operation	Automatic detection and power management	-
PoE Pin Assignments	V+ (Pin 1, 2), V- (Pin 3, 6)	-
PoE Disconnect Mode	DC disconnect	-
<b>Mechanical</b>		
Casing	Plastic (Flammability UL 94V-0)	
Environmental Rating	Protection rating IP67 for Operating Temperature -10 °C ~ +60 °C	
	Protection rating IP66 for Operating Temperature -40 °C ~ +75 °C	
Dimensions (W x L x H)	190 mm x 155 mm x 104 mm	
Installation	DIN-Rail Mounting or Wall Mounting	
<b>Environment</b>		
Operating Temperature	-10 °C ~ +60 °C (Protection rating IP67)	
	-40 °C ~ +75 °C (Protection rating IP66)	
Storage Temperature	-10 °C ~ +60 °C (Protection rating IP67)	
	-40 °C ~ +75 °C (Protection rating IP66)	
Ambient Relative Humidity	100% RH for Operating Temperature -10 °C ~ +60 °C 10% ~ 90% RH, non-condensing for Operating Temperature -40 °C ~ +75 °C	

## Dimensions (Units: mm)



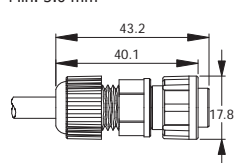
### IP67 Ethernet Plug

Cable Dia:  
Max. 7.0 mm  
Min. 5.5 mm



### IP67 PWR Plug

Cable Dia:  
Max. 6.5 mm  
Min. 5.0 mm



## Ordering Information

<b>NS-208PSE-IP67 CR</b>	Industrial 8-port unmanaged IP67 Ethernet switch with PoE Includes IP67 RJ-45 Plug x 8, IP67 Power Plug x 1, Cap with Tether x 8 (RoHS)
<b>NS-208-IP67 CR</b>	Industrial 8-port unmanaged IP67 Ethernet switch Includes IP67 RJ-45 Plug x 8, IP67 Power Plug x 1, Cap with Tether x 8 (RoHS)

<p>IP67 RJ-45 Plug</p> <p>4SASO-001</p>	<p>IP67 Power Plug</p> <p>4SIO1K0000016</p>	<p>Cap with Tether</p> <p>4SASO-0004</p>
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## Accessories

MDR-60-48	48 V/1.25 A, 60 W Power Supply with DIN-Rail Mounting
DIN-KA52F-48	48 V/0.52 A, 25 W Power Supply with DIN-Rail Mounting
DR-120-48	48 V/2.5 A, 120 W Power Supply with DIN-Rail Mounting

# NSM-208-M12 **NEW**

EN50155 8-port M12 Unmanaged Ethernet Switch

# NSM-208PSE-M12 **NEW**

EN50155 8-port M12 Unmanaged PoE Ethernet Switch



NSM-208-M12/NSM-208PSE-M12 Series						For NSM-208PSE-M12		For NSM-208-M12	
-40 ~ +75 Wide Temperature	Wall Mount	IP40	EN50155	CE	FCC	+46 ~ +53 Input Voltage	PoE + LAN x 8	LAN x 8	

## Introduction

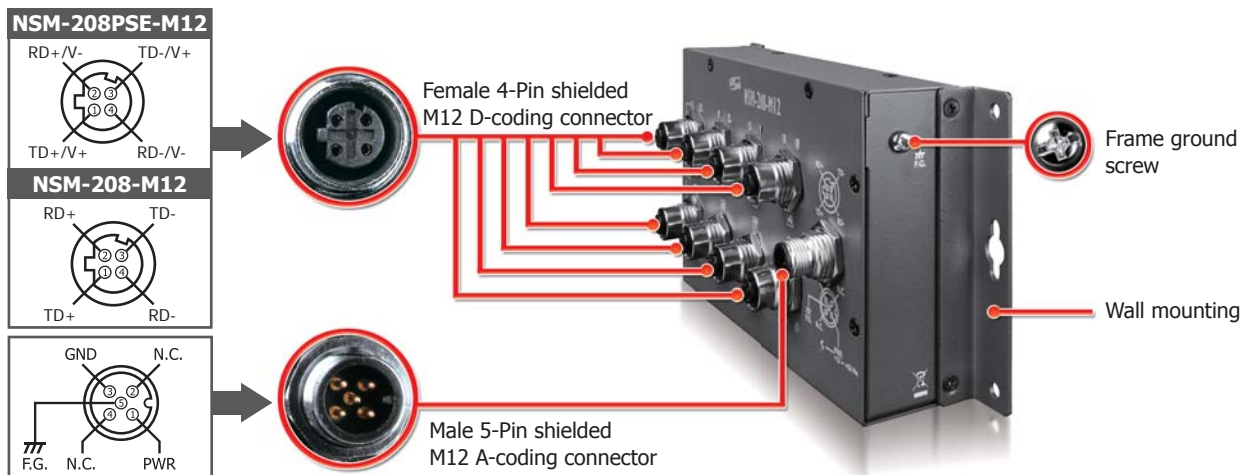
The NSM-208PSE-M12/NSM-208-M12 is designed for industrial applications in harsh environments. The M12 connectors ensure tight, robust connections, and guarantees reliable operation, even for applications that are subject to high vibration and shock.

The NSM-208PSE-M12 PoE switch provides 8 fast Ethernet M12 ports with 8 IEEE 802.3af compliant PoE ports. The switch is classified as power source equipment (PSE) and provide up to 15.4 W of power per port.

The Ethernet switch supports IEEE 802.3/802.3u/802/3x with 10/100M, full/half-duplex, MDI/MDI-X auto-sensing, and provides an economical solution for your industrial Ethernet network.

The NSM-208-M12 provides a wide +12 V<sub>DC</sub> ~ +53 V<sub>DC</sub> power range to fit all the common power standards found in industrial automation, without external power converters. The wide power input lowers installation and maintenance costs.

## Appearance

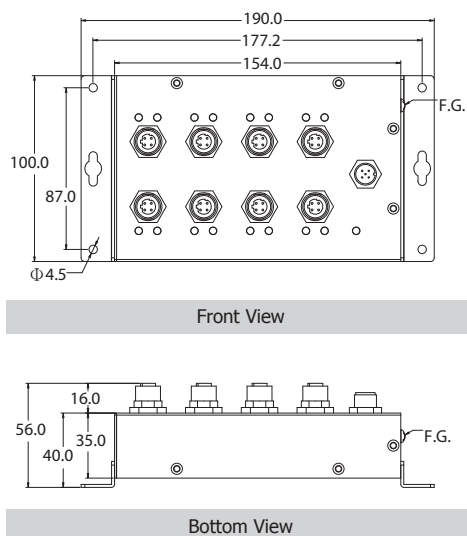




## Specifications

Models	NSM-208PSE-M12	NSM-208-M12
<b>Technology</b>		
Standards	IEEE 802.3, 802.3u, 802.3x, 10/100 Base-T(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection	
Processing Type	Store & forward	
MAC Addresses	1024	
Memory Bandwidth	3.2 Gbps	
Frame Buffer Memory	512 Kbit	
Flow Control	IEEE 802.3x flow control, back pressure flow control	
<b>Interface</b>		
LED Indicators	PWR, Link/Act, Power Device is detected	PWR, Link/Act
Ethernet Isolation	1500 Vrms 1 minute	
Connector	Female 4-Pin shielded M12 D-coding connector x 8	
<b>Power Input</b>		
Input Voltage Range	+46 VDC ~ +53 VDC	+12 VDC ~ +53 VDC
Power Consumption	0.12 A @ 48 VDC without PD loading 3.0 A @ 48 VDC with PD full loading	0.12 A @ 48 VDC
Protection	Power reverse polarity protection	
Connector	Male 5-Pin shielded M12 A-coding connector x 1	
<b>PoE Technology</b>		
PoE Compliance	100% IEEE 802.3af compliant	-
PoE Classification	PSE (Power Sourcing Equipment)	-
PoE Voltage	+48 VDC depending on power input	-
PoE Power	Up to 15.4 W per port	-
PoE Operation	Automatic detection and power management	-
PoE Pin Assignments	V+ (Pin 1, 3), V- (Pin 2, 4)	-
PoE Disconnect Mode	DC disconnect	-
<b>Mechanical</b>		
Casing	Metal with IP40	
Dimensions (W x L x H)	190 mm x 56 mm x 100 mm	
Installation	Wall Mounting	
<b>Environmental</b>		
Operating Temperature	-40 °C ~ +75 °C	
Storage Temperature	-40 °C ~ +85 °C	
Ambient Relative Humidity	10 ~ 95% RH, non-condensing	

## Dimensions (Units: mm)



## Ordering Information

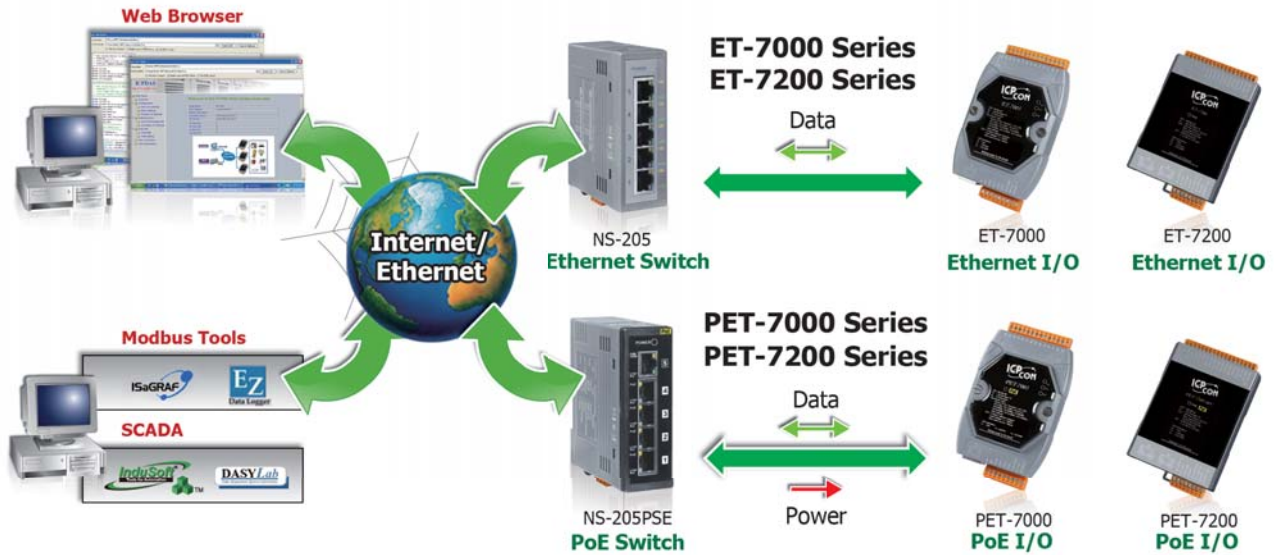
<b>NSM-208-M12 CR</b>	EN50155 8-port M12 Unmanaged Ethernet Switch (RoHS) Includes M12D-4P-IP68 x 8, A-CAP-M12M x 8, M12A-5P-IP68 and A-CAP-M12F x 1		
<b>NSM-208PSE-M12 CR</b>	EN50155 8-port M12 Unmanaged PoE Ethernet Switch (RoHS) Includes M12D-4P-IP68 x 8, A-CAP-M12M x 8, M12A-5P-IP68 and A-CAP-M12F x 1		
M12D-4P-IP68	A-CAP-M12M	M12A-5P-IP68	A-CAP-M12F
4PIO1K0000001	4PIO1K0000002	4PIO1K0000003	4PIO1K0000004
To get high quality M12 cable, please refer to <a href="http://www.balluff.com">http://www.balluff.com</a>			

## Accessories

MDR-60-48	48 V/1.25 A, 60 W Power Supply with DIN-Rail Mounting
DIN-KA52F-48	48 V/0.52 A, 25 W Power Supply with DIN-Rail Mounting
DR-120-48	48 V/2.5 A, 120 W Power Supply with DIN-Rail Mounting

### 3.8 Ethernet I/O

#### ► Modbus TCP/UDP Slaves : ET-7000 and PET-7000 series



Although the RS-485 remote I/O module is still selling well, we found more and more demand of Ethernet based remote I/O modules. Our Ethernet remote I/O modules support Modbus TCP, Modbus UDP protocol. We also provide web HMI, Web server, OPC server, security mechanism..etc. According to different application, we have developed various Ethernet I/O modules, such as palm-size ET-7000/PET-7000 series, ET-7200/PET-7200 series and tiny-size tET/tPET series. The module has diversified I/O interface, such as overvoltage-protection analog input module, relay output, digital input/output, counter, timer...etc. The brief comparison is as the following table. Besides those regular Ethernet I/O modules, we can also provide some ODM modules.

Model Name	tET/tPET Series	ET-7000 PET-7000 PET-7000-48V	ET-7200 PET-7200 PET-7200-48V
Pictures			
<b>Communication</b>			
Ethernet	10/100 M, RJ-45 x 1		10/100 M, RJ-45 x 2
Protocol	Modbus TCP, Modbus UDP		
Security	Web Password and IP Filter	ID, Password and IP Filter	
Max. Sockets	5	12	
Web Server	Yes	Yes	
User-defined Web pages	-	Yes (Web HMI)	
<b>I/O</b>			
I/O pins	10 pins	21 pins	26 pins
DI Counter	32-bit, 3.5 kHz	32-bit, 500 Hz	
Pair Connection	Yes (Polling/Push Mode)	Yes (Polling Mode)	
<b>Mechanical</b>			
Dimensions (W x L x D)	52 mm x 98 mm x 27 mm	72 mm x 123 mm x 35 mm	76 mm x 120 mm x 42 mm

**More products refer to Industrial Remote I/O Products Catalog**

- RS-485 Remote I/O Modules
- Ethernet Remote I/O Modules
- CAN bus Remote I/O Modules
- PROFIBUS Remote I/O Module

Or refer to <http://www.icpdas.com.tw/support/catalog/catalog.html>



## • Features

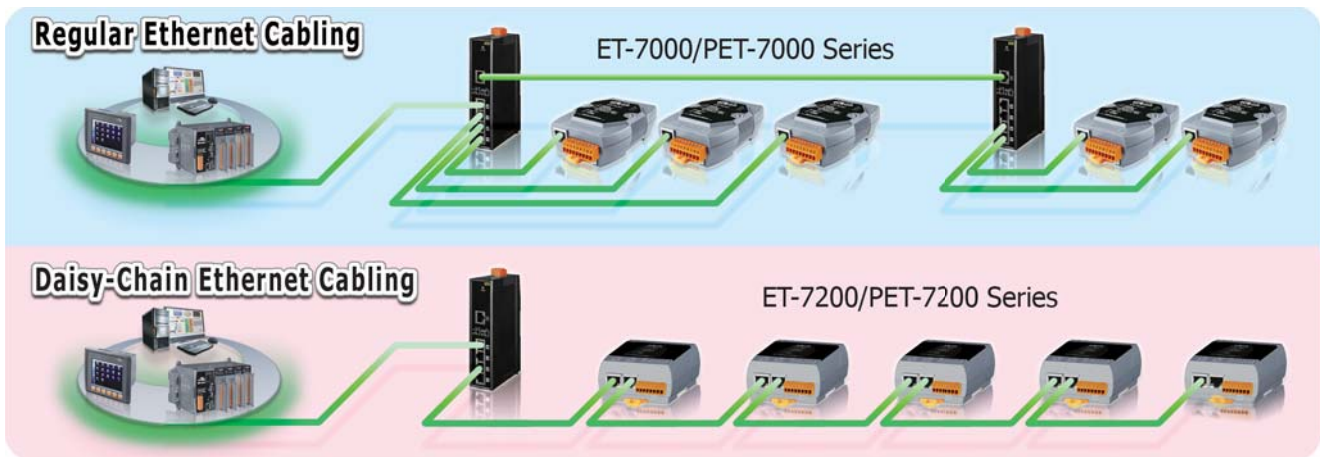
### 1. Power over Ethernet (PoE)

The PET-7000/PET-7200/ series module can be powered by an IEEE802.3af compliant PoE switch. Both Ethernet and power can be carried by an Ethernet cable eliminating the need for additional wiring and power supply.



### 2. Daisy-Chain Ethernet Cabling

The ET-7200/PET-7200 Series 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.



### 3. LAN Bypass

LAN Bypass feature guarantees the Ethernet communication. It will automatically active to continue the network traffic when the ET-7200/PET-7200 loses its power.



### 4. Communication Security

Account and password are needed when logging into the web server. An IP address filter is also included, which can be used to allow or deny connections with specific IP addresses.

### 5. Support for both Modbus TCP and Modbus UDP Protocols

The Modbus TCP, Modbus UDP slave function on the Ethernet port can be used to provide data to remote SCADA software.

### 6. Built-in I/O

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

### 7. Dual Watchdog

The Dual Watchdog consists of a Module Watchdog and a Communication Watchdog. The action of AO,DO are also associated to the Dual Watchdog.

**Module Watchdog** is a built-in hardware circuit to monitor the operation of the module and will reset the CPU if a failure occurs in the hardware or the software. Then the Power-on Value of AO,DO will be loaded.

**Communication Watchdog** is a software function to monitor the communication between the host and the I/O module. The timeout of the communication Watchdog is programmable, when the I/O doesn't receive commands from the host for a while, the watchdog forces the AO,DO to pre-programmed Safe Value to prevent unpredictable damage of the connected devices.

### 8. Highly Reliable Under Harsh Environment

- Wide Operating Temperature Range: -25 ~ +75°C
- Storage Temperature: -30 ~ +80°C
- Humidity 10 ~ 90% RH (Non-condensing)

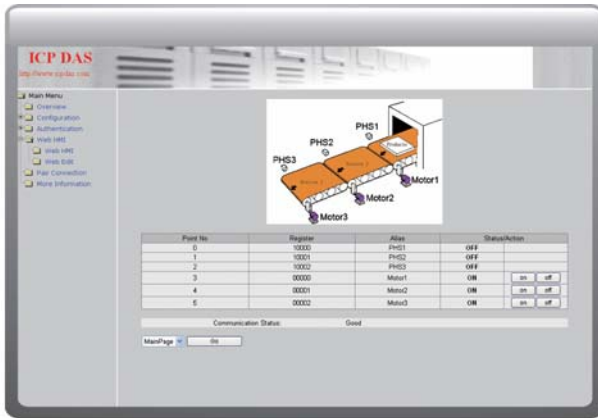


### 10. I/O Pair Connection

This function is used to create a AI/DI to AO/DO pair through the Ethernet. Once the configuration is completed, the I/O module can poll the status of remote AI/DI devices and then use the Modbus TCP protocol to continuously write to a local AO/DO channels in the background.

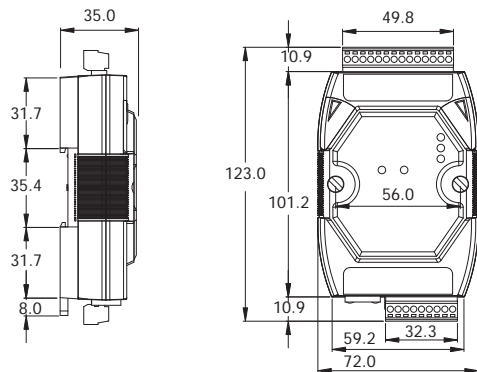
### 11. Web HMI

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.



### 13. Dimensions (Units: mm)

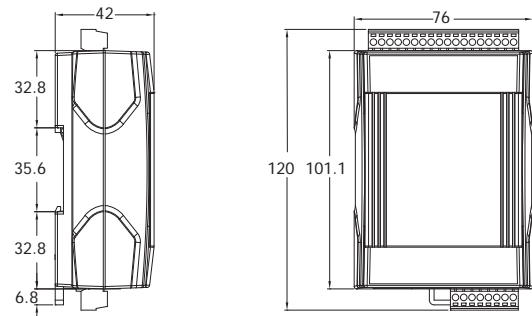
ET-7000/PET-7000/PET-7000-48V Series



Left Side View

Front View

ET-7200/PET-7200/PET-7200-48V Series



Left Side View

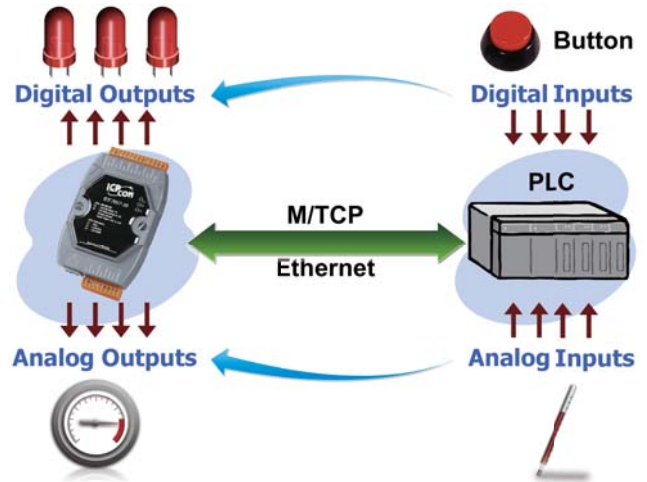
Front View

### 9. Power-on Value and Safe Value

Besides setting by the set AO,DO commands, the AO,DO can be set under two other conditions.

**Power-on Value:** The Power-on Value is loaded into the AO,DO under 3 conditions: Power-on, reset by Module Watchdog, reset by reset command.

**Safe Value:** When the Communication Watchdog is enabled and a Communication Watchdog timeout occurs, the "safe value" is loaded into the AO,DO.



### 12. Built-in Web Server

Each I/O module has a Built-in web server that allows the users to easily configure, monitor and control the module from a remote location using a regular web browser.

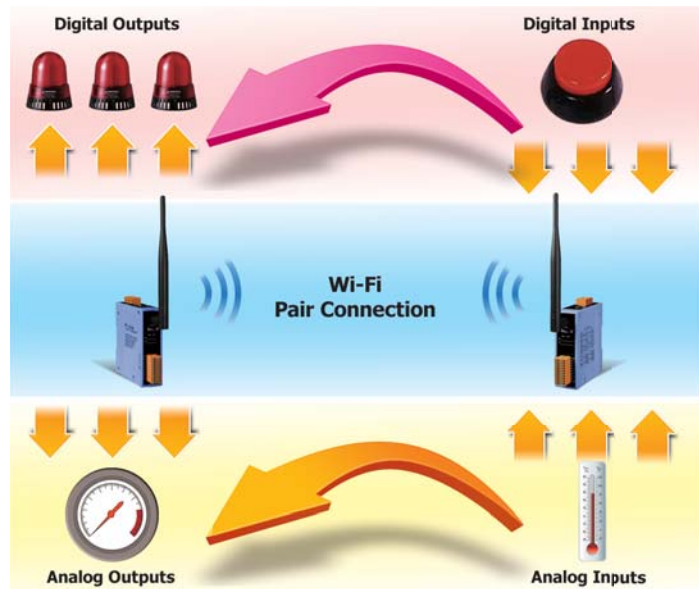


### 3.9 Wi-Fi I/O Module

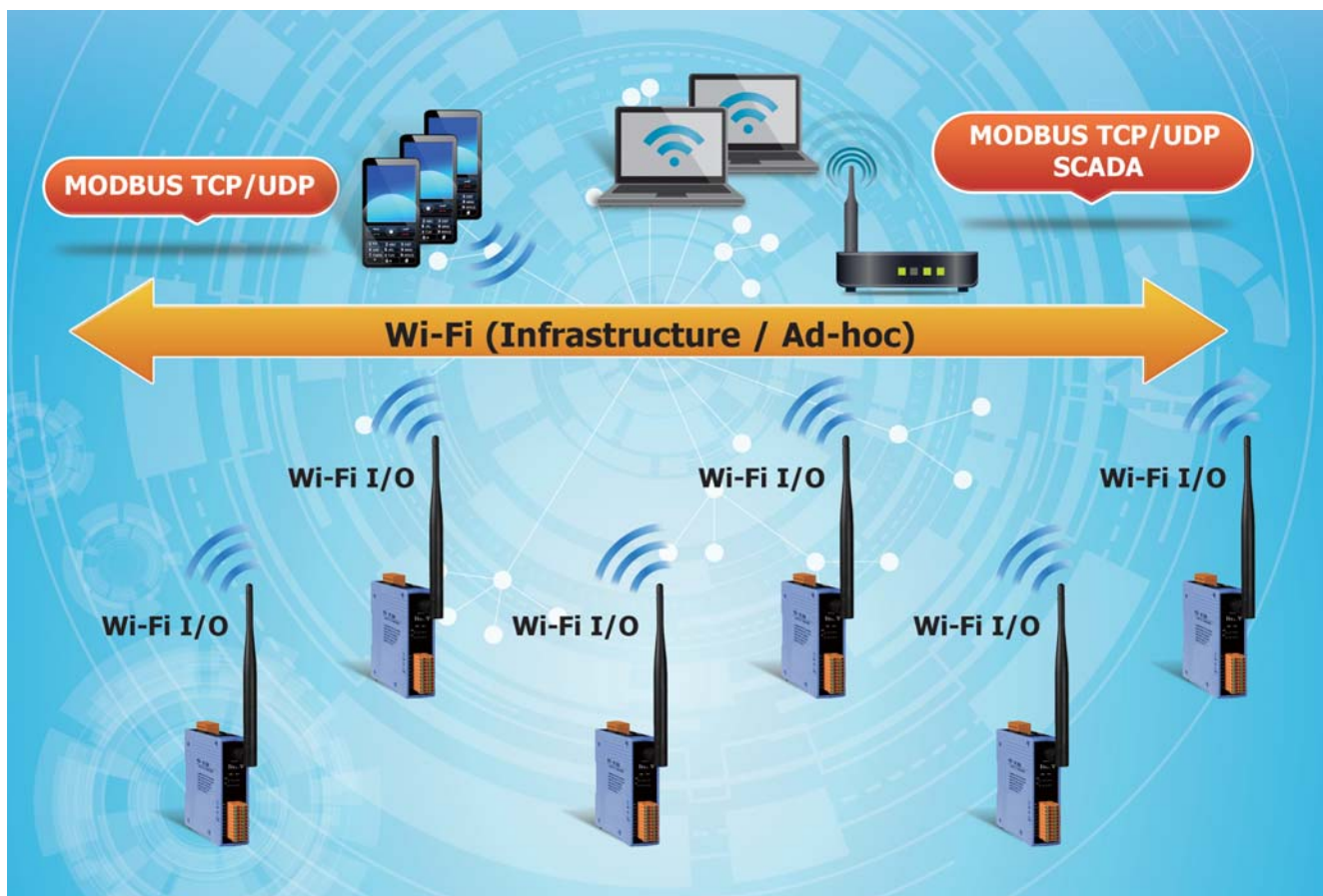
The WF-2000 series I/O modules in WLAN connection complies with the IEEE802.11b/g standards. With the popularity of 802.11 network infrastructure, they make an easy way to incorporate wireless connectivity into monitoring and control systems. WF-2000 series products support Modbus TCP/UDP protocol and network encryption configuration, which makes perfect integration to SCADA software and offer easy and safe access for users from anytime and anywhere.

#### Features

- Compatible with IEEE 802.11b/g standards
- Support Infrastructure and Ad-hoc mode for wireless network
- Support WEP, WPA and WPA2 wireless encryption
- Support Modbus TCP/UDP protocol
- Support Pair Connection mode
- Support Power on value & Safe value mechanism
- Built-in Watchdog

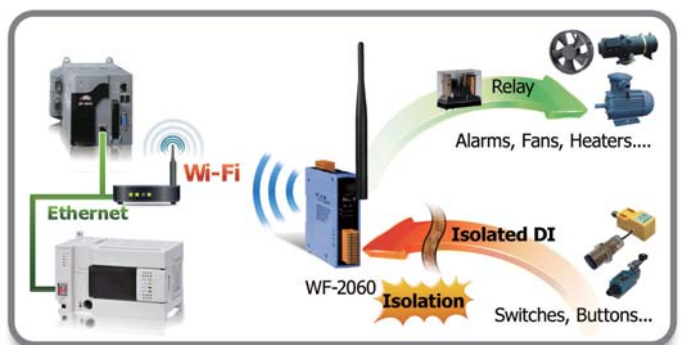
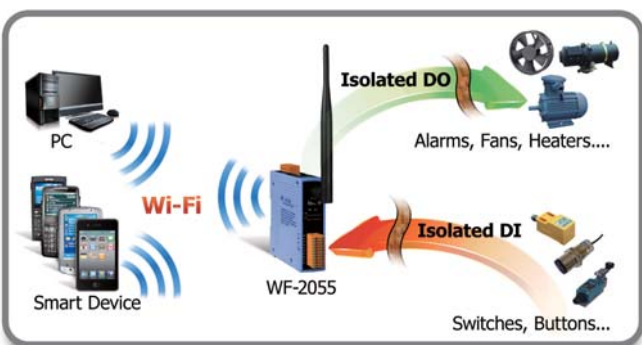


#### Applications



## Wi-Fi Digital & Analog I/O Modules

Model Name	WF-2042	WF-2051	WF-2055	WF-2060	WF-2019
Pictures					
<b>Digital Input</b>					
Channels		16	8	6	
Input Type		Dry Contact: Source Wet Contact: Sink / Source			
Counters	Channels	16	8	6	-
	Max. Counts	32-bit			
	Max. Input Frequency	10K Hz			
Photo-Isolation		3750 Vrms			
<b>Digital Output</b>					
Channels	16		8	6	
Type	Sink (NPN)		Sink (NPN)	Form A	
Load Voltage	+3.5 ~ +50 Vdc		+3.5 ~ +50 Vdc	30 Vdc/125 Vac	
Load Current	700 mA/channel		700 mA/channel	5 A/channel	
Intra-module Isolation	3750 Vrms		3750 Vrms	-	
Overvoltage Protection	60 Vdc		60 Vdc	-	
<b>Analog Input</b>					
Channels					10 (Differential)
Input Type	Voltage				±15 mV, ±50 mV, ±100 mV, ±500 mV, ±1 V, ±2.5 V, ±5 V, ±10 V
	Current				±20 mA, 0 ~ +20 mA, +4 ~ +20 mA (External resistor is required)
	Thermocouple				J, K, T, E, R, S, B, N, C, L, M
Resolution					16-bit
Accuracy					±0.1% of FSR
Sampling Rate					10 Hz (Total)
Overvoltage Protection					240 Vrms
<b>Wi-Fi Interface</b>					
Standard Supported			IEEE 802.11b/g		
Wireless Mode			Infrastructure & Ad-hoc		
Encryption			WEP, WPA and WPA2		
<b>Power</b>					
Input Voltage Range			10 Vdc ~ 30 Vdc		
<b>Environment</b>					
Operating Temperature			-25 °C ~ +75 °C		



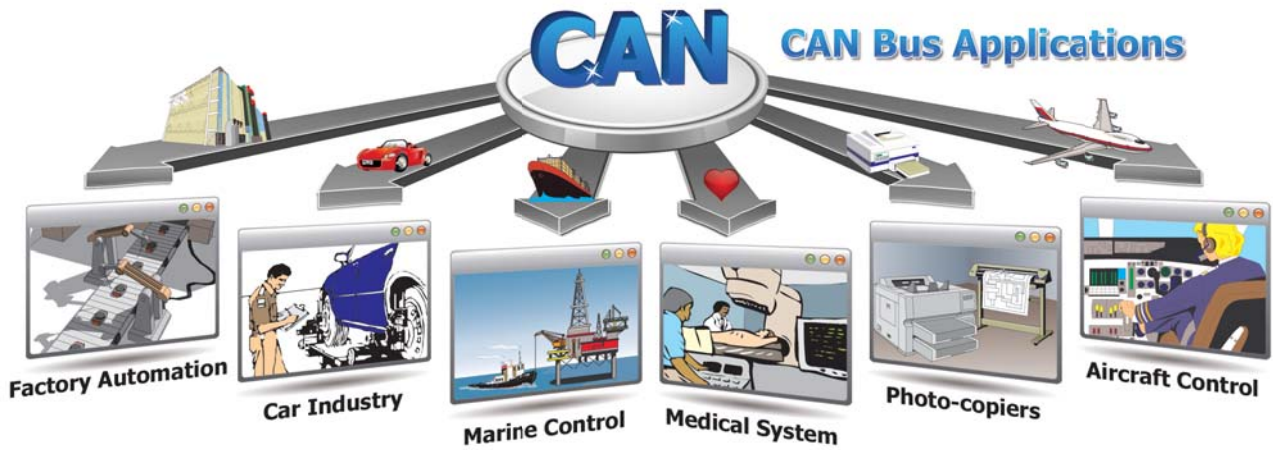
# CAN Bus Products



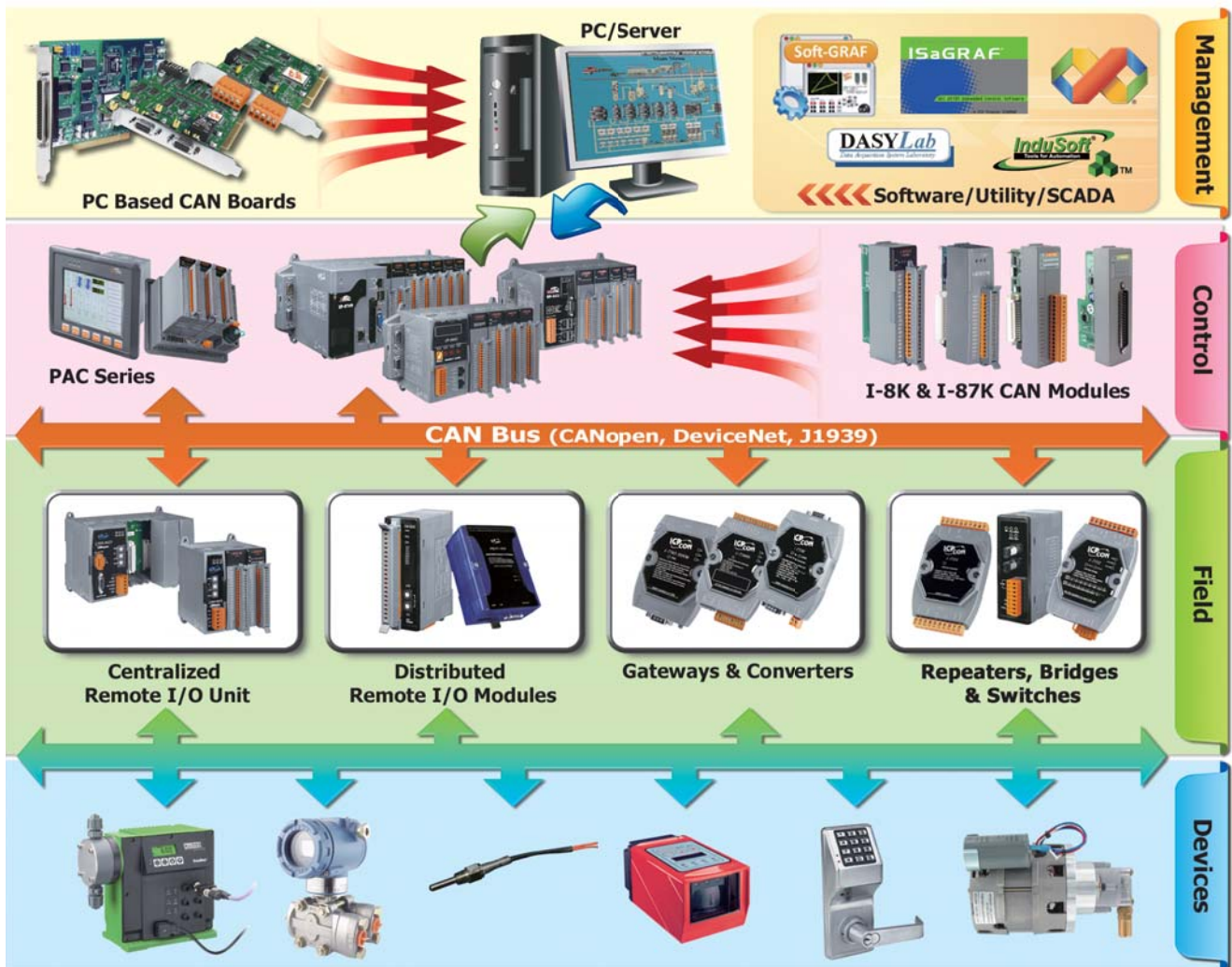
<b>4.1</b>	<b>Overview</b>	<b>P 4-1</b>
<b>4.2</b>	<b>CAN Bus Repeater/Bridge/Switch</b>	<b>P 4-2</b>
<b>4.3</b>	<b>CAN Converter</b>	<b>P 4-5</b>
	● 4.3.1 USB to CAN Converter - - - - -	P 4-5
	● 4.3.2 CAN to Fiber Converter/Bridge- - - - -	P 4-8
	● 4.3.3 Ethernet/Wi-Fi to CAN Converter - - - - -	P 4-10
	● 4.3.4 Uart to CAN converter - - - - -	P 4-12
<b>4.4</b>	<b>Gateway/ Protocol Converter</b>	<b>P 4-15</b>
	● 4.4.1 CANopen Gateway - - - - -	P 4-15
	● 4.4.2 DeviceNet Gateway- - - - -	P 4-18
	● 4.4.3 J1939 Gateway- - - - -	P 4-21
<b>4.5</b>	<b>Palm-Size programmable CAN controller</b>	<b>P 4-23</b>
<b>4.6</b>	<b>PC Based CAN Bus Boards</b>	<b>P 4-24</b>
<b>4.7</b>	<b>PAC Based CAN Modules</b>	<b>P 4-29</b>
<b>4.8</b>	<b>I/O Module and Unit</b>	<b>P 4-30</b>
	● 4.8.1 Analog Input Modules - - - - -	P 4-32
	● 4.8.2 Analog Output Modules - - - - -	P 4-33
	● 4.8.3 Digital I/O Modules - - - - -	P 4-34
	● 4.8.4 CANopen I/O Units - - - - -	P 4-35
	● 4.8.5 DeviceNet I/O Units - - - - -	P 4-36
	● 4.8.6 Module Support List of CAN-8000 I/O Unit - - - - -	P 4-37



## 4.1 Overview



ICP DAS has been developing rich **CAN-based/DeviceNet/CANopen/J1939** products for several years, including PCI interface cards, Fieldbus converters, PACs, gateways and remote I/O modules. We provide complete hardware solutions to satisfy a wide variety of CAN-based applications that can effectively solve issues related of data acquisition and calculation, transmission distance extension, network topology limitations, communication interface transformation, and noise resistance. In addition, ICP DAS supplies a large ranges of software resource, such as utility tools, APIs, demo programs, OPC, ActiveX and third-party drivers, which can help users to develop complex custom control and monitoring systems more easily and quickly. For certain special applications, we can offer flexible OEM/ODM projects to match the different requirements of our customers. Through ICP DAS's efficient and reliable service, you can easily complete your complex CAN-based projects.

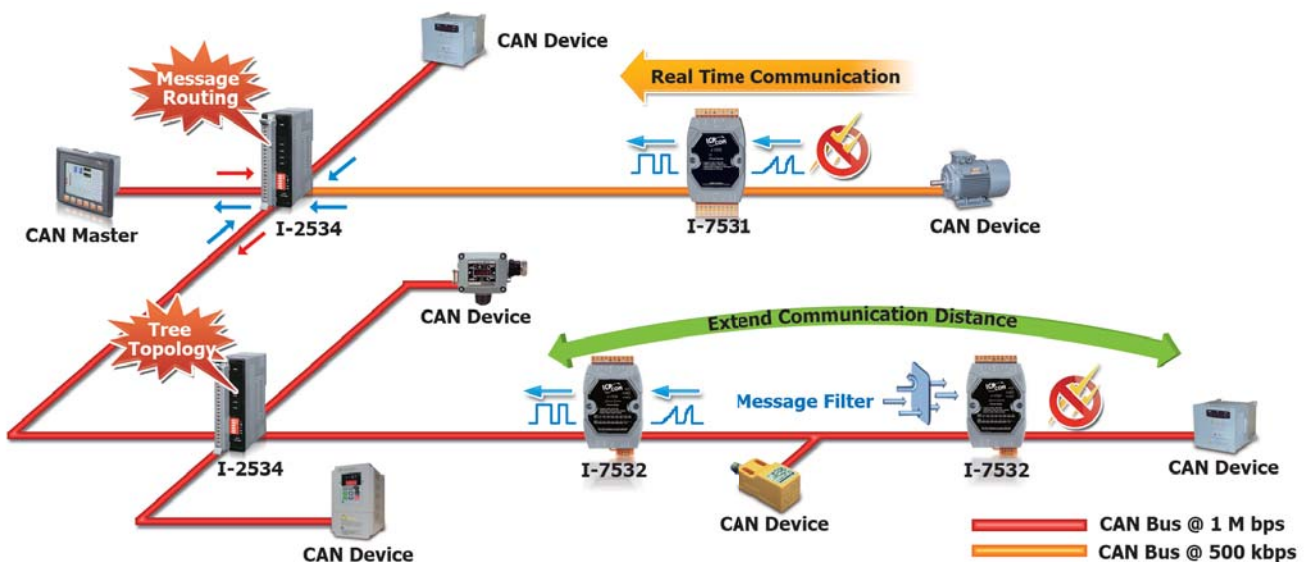




## 4.2 CAN Bus Repeater/Bridge/Switch

The CAN Bus Repeater/Bridge/Switch is used to enhance the signal quality, extend the communication distance, isolate CAN Bus network. ICP DAS provides following products.

Model Name	I-7531	I-7532	I-2534	I-5534-M
Pictures			<b>NEW</b> 	
<b>CAN Interface</b>				
Transceiver	NXP 82C250		NXP TJA1042	
Channel number	2		4	
Connector	3-pin screwed terminal block (CAN_GND, CAN_L, CAN_H)	4-pin screwed terminal block (CAN_GND, CAN_L, CAN_SHLD, CAN_H)	9-pin male D-Sub with CAN_GND, CAN_SHLD, CAN_H, CAN_L	
Transmission speed (bps)	5 k ~ 800 k with auto baud rate detection	5 k ~ 1 M selected by rotary switch or utility tool		
Transmission Distance (m)	Depends on the CAN baud rate	Duplicates the transmission distance depended on the CAN baud rate		
Propagation Delay	Max. 200ns (shortens the transmission distance by ~ 40 m)	Depends on the CAN baud rate (max. 134 us @ 1 Mbps)	Depends on the CAN baud rate (max. 440 us @ 1 Mbps)	
Terminator Resistor	Jumper for 120 Ω terminator resistor		DIP switch for the 120 Ω terminator resistor	Jumper for 120 Ω terminator resistor
Isolation	3000 Vdc for DC-to-DC, 2500 Vrms for photo-couple			
Specification	ISO 11898-2, CAN 2.0A and CAN 2.0B			
<b>LED</b>				
Round LED	CAN Status LED	PWR LED, Rx LED, ERR LED	PWR LED, CAN1 LED, CAN2 LED, CAN3 LED, CAN4 LED	
<b>Power</b>				
Power supply	Unregulated +10 ~ +30 Vdc			
Protection	Power reverse polarity protection, Over-voltage brown-out protection			
Power Consumption	2 W		3 W	
<b>Mechanism</b>				
Installation	DIN-Rail			
Casing	Plastic			Metal
Dimensions (W x L x H)	72 mm x 118 mm x 33 mm		32.3 mm x 99 mm x 77.5 mm	116.5 mm x 127 mm x 61.3 mm
<b>Environment</b>				
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			
Relative Humidity	10 ~ 90% RH, non-condensing			



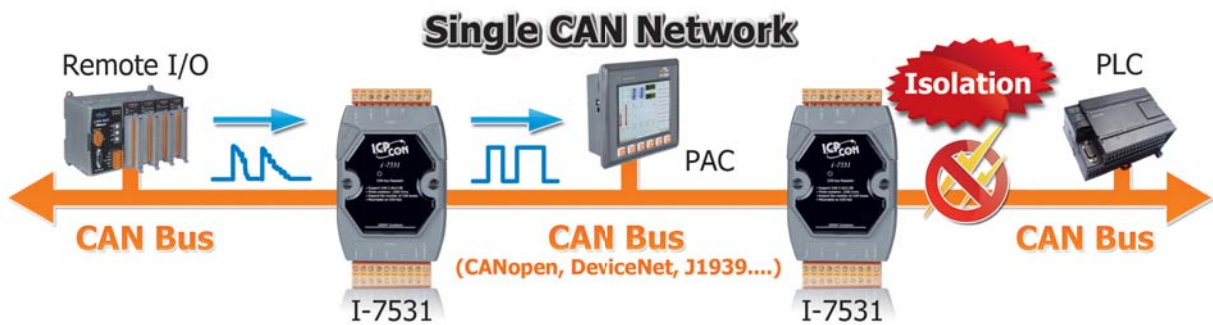
### Isolated CAN Bus Repeater

#### I-7531



The I-7531 is an isolated CAN repeater that can be used to establish a physical coupling of two segments of a CAN bus system. This module is designed to isolate the noise and disturbance between the two CAN ports of the I-7531. When the CAN single is decayed because of the rough bus cable or noise, the I-7531 can recover the shape of the CAN singles to the original ones. Tree topologies can be implemented as well as long drop lines using the I-7531. In order to use the I-7531 easily, the module can automatically adjust the baud rate by itself to match the CAN network. Users just connect the I-7531 with the CAN buses, check the terminator resistor and power it on, subsequently the I-7131 enable to work normally.

- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898-2 standard
- Supports a wide range of baud rates from 5 kbps ~ 800 kbps
- 2500 Vrms photocoupler isolation on the CAN side
- Jumper for the 120 Ω terminator resistor of the CAN bus
- Automatic baud rate detection
- 3 kV galvanic isolation between the power supply and the two CAN channels
- Up to 100 nodes on each CAN port



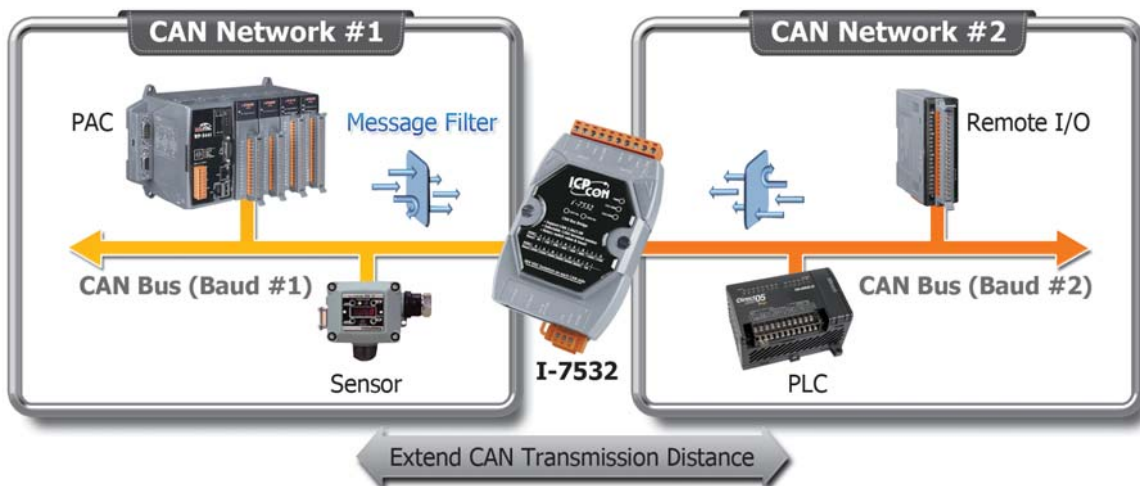
### Isolated two-channel CAN Bus Bridge

#### I-7532



The I-7532 is a CAN bus bridge that can be used to integrate two CAN networks even they implement different CAN baud rate. Compared with the I-7531, the I-7532 offers more than 3 useful features. First, the transmission distance limitation of the CAN bus system on each side of the I-7532 is independent, which means the total CAN network distance can be extended. Second, when some errors (e.g. bit error) happened on one CAN port of the I-7532, the other CAN port of the I-7532 will not be affected and can still work correctly. Last, the baud rate and CAN message filter configuration of these two CAN ports on the I-7532 is able to be tuned following users' applications. These features mean that users can design their applications more flexible and efficient.

- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898-2 standard
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- 2500 Vrms photocoupler isolation on the CAN side
- Jumper for the 120 Ω terminator resistor of the CAN bus
- Extends the CAN transmission distance
- Two CAN channels
- 3 kV galvanic isolation between the two CAN channels
- Able to configure the CAN baud rate for each channel using a rotary switch
- Up to 100 nodes on each CAN port
- Mounts easily on a DIN-Rail



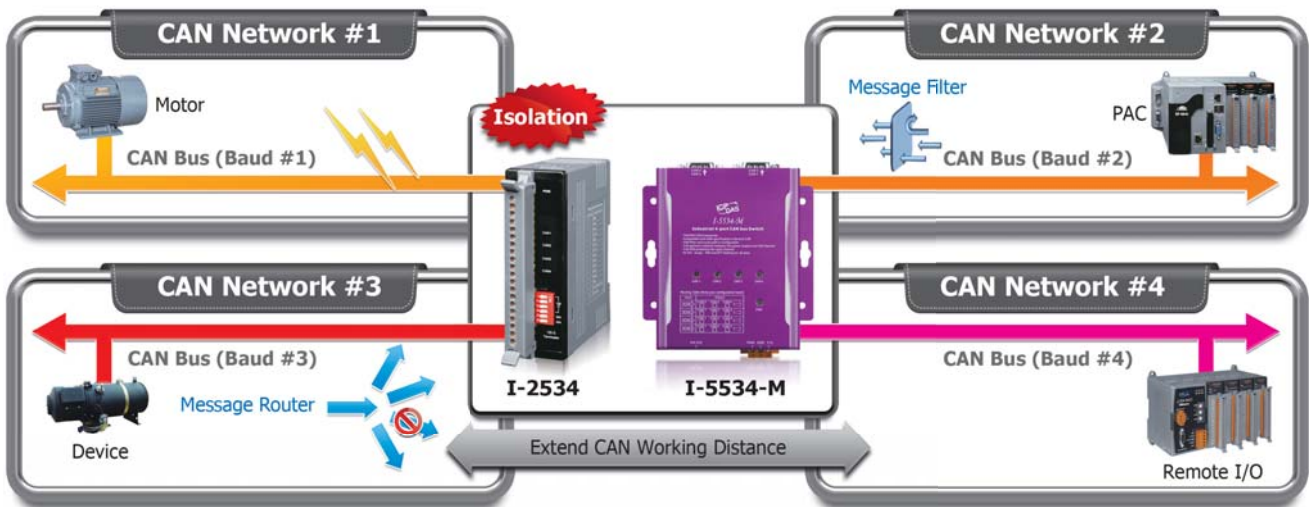
## Isolated 4-port CAN Bus Switch

**I-2534** **NEW**  
**I-5534-M** **NEW**



The I-2534/I-5534-M provides 4 isolated independent CAN ports that can be used to link 4 CAN networks. The I-2534/I-5534-M follows the ISO 11898-2 specification which is applied in widely range of CAN-based protocols. In order to fit the industrial application, this module provides the functions of reshaping the CAN signals and isolating the disturbance among 4 CAN ports. When users apply the I-2534/I-5534-M in the CAN networks which use different baud rate, the I-2534/I-5534-M offers the baud rate configuration, CAN message filters, and message router, and effectively help users solve the problems related to network-to-network data exchanging, message filtering and routing, and tree topology for the CAN bus. The transmission distance limitation for each CAN port of the I-2534/I-5534-M is independent, which means that the total length of the network can be extended.

- 4 CAN communication ports
- Fully compatible with the ISO 11898-2 standard
- Compatible with CAN specification 2.0 parts A and B
- Rotary switch used to select the baud rate for each CAN port
- Supports baud rates from 5 kbps ~ 1 Mbps
- The message filter for each CAN port is configurable
- DIP switch for the 120 Ω terminator resistor of the CAN bus
- I-5534-M is for the metallic casing
- 3 kV DC-DC isolation and 2500 Vrms isolation
- Power requirements: Unregulated +10 V<sub>DC</sub> ~ +30 V<sub>DC</sub>

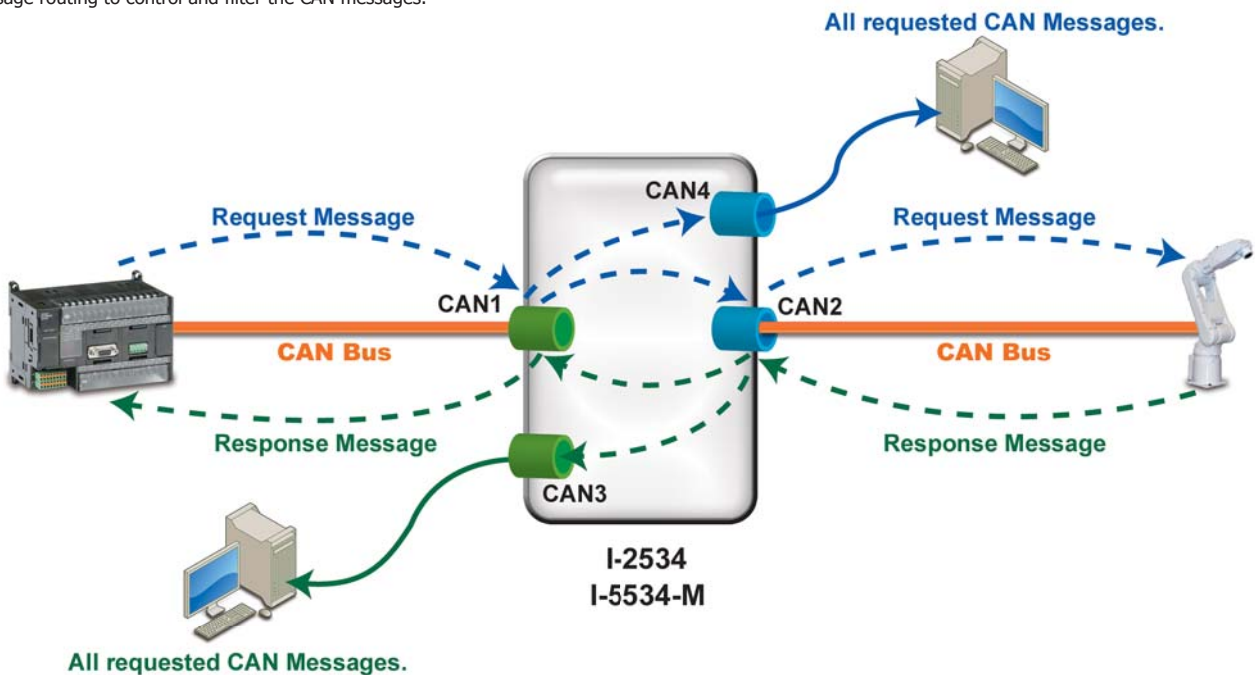


4

CAN Bus

## Applications

Message routing to control and filter the CAN messages.



## 4.3 CAN Converter

ICP DAS CAN converters are used to establish a physical coupling of two or more communication interface, and are infrastructure components with which complex network structures can be implemented. They can be used to implement the data conversion between CAN and USB, Uart, Ethernet or Wi-Fi interface.

- CAN to USB: I-7565 series
- CAN to Fiber: I-253x series
- CAN to Ethernet or Wi-Fi: I-7540 series
- CAN to Uart: I-7530 series



### 4.3.1 USB to CAN Converter



The I-7565 series is the USB to CAN converter with a maximum of two independent CAN channels that supports CAN protocols 2.0A and 2.0B. It becomes very convenient and easy to access and control the CAN devices via the USB port of the PC.

Model Name	I-7565	I-7565-H1	I-7565-H2	I-7565-CPM	I-7565-DNM
	1-port cost effective USB to CAN converter	1-port high performance USB to CAN converter	2-port high performance USB to CAN converter	Intelligent USB to CANOpen converter	Intelligent USB to DeviceNet converter
Pictures					
<b>USB Interface</b>					
Connector	USB Type B				
Compatibility	USB 1.1 and 2.0 standard				
<b>Compatibility</b>					
Cannel	1	1	2	1	1
Transceiver	Philips 82C250	NXP TJA1042		NXP 82C250	NXP 82C250
Connector	9-pin male D-Sub		10-pin terminal block	9-pin male D-Sub	
Baud Rate	10k, 20k, 50k, 100k, 125k, 250k, 500k, 800k, 1M				125k, 250k, 500k
Isolation	3000 Vrms			3000 Vdc	
Terminator Resistor	Selectable 120 Ω terminator resistor by a jumper				
Protocol	CAN 2.0A/2.0B			CIA 301 V4.02	DeviceNet Volumn I ver2.0, Volumn II ver2.0
Receive Buffer	1000 data frames	256 data frames	128 data frames for each CAN port	1000 data frames	256 data frames
Max. Data Flow	250 fps	3000 fps	1500 fps for each CAN port	-	-
<b>System</b>					
Software Drivers	Windows 2K/XP/7, Linux				
Software SDK	N/A			VB6, VC++ 6.0, C#, VB .NET	VB6, VC++ 6.0, BCB 6.0
LED Indicators	PWE, RUN, ERR	PWE, RUN, ERR	PWE, RUN, ERR	PWR, ACT, ERR, Tx/Rx	PWR, RUN, NS, MS
Power Consumption	1.5 W			3 W	3 W
Dimensions (W x W x D)	108 mm x 72 mm x 35 mm				

## USB to CAN Converter

### I-7565



The I-7565 is a cost-effective device that can be used for connecting a CAN bus to a PC via a standard USB interface.

Operating systems supported include Windows 2K/XP/Vista/7 (32 or 64 bit), and Linux.

- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898-2 standard
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- 2500 Vrms photocoupler isolation on the CAN side
- Jumper for the 120 Ω terminator resistor of the CAN bus
- Fully compliant with USB 1.1/2.0 (Full Speed)
- 3 kV galvanic isolation for the CAN port
- Powered by the USB port (no external power supply required)
- One CAN port and one USB channel



## High-performance 2-port USB to CAN Converter

### I-7565-H2

**NEW**



The I-7565-H2 is a high-performance intelligent USB to CAN converter with two CAN channel that can help make data collection and processing on a CAN bus network easier and quicker.

Operating systems supported include Windows 2K/XP/Vista/7 (32 or 64 bit), and Linux.

- Fully compatible with the ISO 11898-2 standard
- Compatible with CAN specification 2.0 parts A and B
- No external power supply required (powered by the USB port)
- Provides two CAN ports
- Programmable CAN bus baud rate from 5 kbps ~ 1 Mbps
- Built-in jumper for the 120 Ω terminal resistor of the CAN bus
- 2500 Vrms photocoupler isolation on the CAN side
- 3 kV galvanic isolation for each CAN port
- Supports CAN bus acceptance filter configuration
- Provides a configuration utility that enables transmit/receive CAN messages
- Max. data flow for a single channel is 3000 fps (standard frame)



## High-performance 1-port USB to CAN Converter

### I-7565-H1

**NEW**



The I-7565-H1 is a high-performance intelligent USB to CAN converter with one CAN port that can help to make data collection and to process on a CAN bus network easier and quicker. It improves the transformation speed of the I-7565, and allows receiving max. 3000 standard 2.0A CAN frames per second. The powerful CPU of the I-7565-H1 provides the accurately time-stamp for each CAN message that is useful to analysis and diagnostic the CAN network. In order to enhance the portability of the I-7565-H1, this module is powered by the USB interface. No power supply is necessary. The I-7565-H1 uses the standard USB driver of the Windows system. It means that users just need to plug the I-7565-H1 in the USB port of the PC or notebook, and subsequently the I-7565-H1 enable to work normally.

Operating systems supported include Windows 2K/XP/Vista/7 (32 or 64 bit), and Linux.

- Fully compatible with the ISO 11898-2 standard
- Compatible with CAN specification 2.0 parts A and B
- No external power supply required (powered by the USB port)
- Provides one CAN port
- Programmable CAN bus baud rate from 5 kbps ~ 1 Mbps
- Built-in jumper for the 120 Ω terminal resistor of the CAN bus
- 2500 Vrms photocoupler isolation on the CAN side
- 3 kV galvanic isolation for the CAN port
- Supports CAN bus acceptance filter configuration
- Provides a configuration utility that can be used to transmit/receive CAN messages
- Max. data flow for a single channel is 3000 fps (standard frame)
- Removable terminal block.



### Intelligent USB to CANopen converter

#### I-7565-CPM

**NEW**



The I-7565-CPM is an USB to CANopen master convertor, and can be applied with the USB port of the PC or notebook easily without any extra power. It follows CIA-301 specification such as, SDO, PDO, NMT, SYNC and so on. Besides, I-7565-CPM supports EDS file interpretation, Heartbeat, Guarding, Slave Boot-up detection, and EMCY event functions. These functions help users to handle important processes more conveniently. The I-7565-CPM is suited for portable diagnostic tool or main control unit of a CANopen network.

- Allow CiA DS-301 V4.02
- Support EDS File
- Support 8 kinds baud: 10Kbps, 20Kbps, 50Kbps, 125Kbps, 250Kbps, 500Kbps, 800Kbps, and 1Mbps
- Support Node Guarding and Heartbeat protocol
- Support NMT, PDO, SDO, SYNC and EMCY protocol
- Fully compliant with USB 1.1/2.0 (Full Speed)
- Support Auto-Search slave device functions.
- Support on-line adding and removing devices
- Free software development tools for windows.
- Four indication LEDs (Pwr, Tx/Rx, Act and Err LEDs)
- Provide demos and utility
- Support event trigger, such as EMCY event, Guarding event, Heartbeat event, and Slave Boot-up events
- Support VC6, VB6, VB.net, and C# development



### Intelligent USB to DeviceNet converter

#### I-7565-DNM

**NEW**



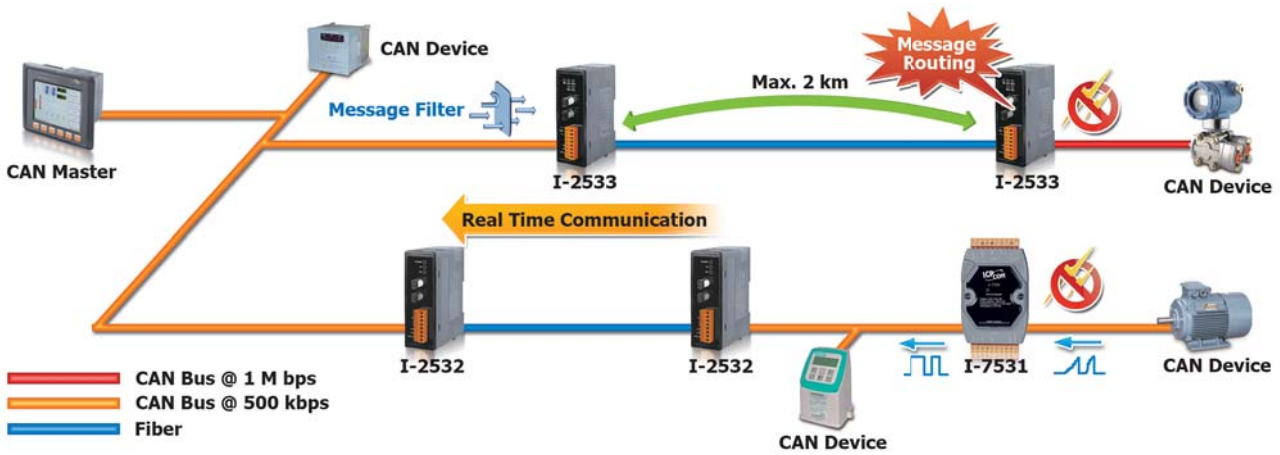
I-7565-DNM can represent an economic solution of DeviceNet application and be a DeviceNet master device on the DeviceNet network. It is a "Predefined Master-Slave connection Set". I-7565-DNM supports Group 2 only Server and UCMM functions to communication with slave devices. It has an independent CAN bus communication port and has the ability to cover a wide range of DeviceNet applications.

Besides, I-7565-DNM uses the new CAN controller Phillips SJA1000T and transceiver 82C250, which provide bus arbitration, error detection with auto correction and re-transmission function. It can be installed on almost any windows-based system, for example Win98/Win2000/WinXP. It is popularly applied in the industrial automation, building automation, vehicle, marine, and embedded control network. In order to expand the DeviceNet functions of ICPDAS products, I-7565-DNM is developed for this purpose.

- Fully compliant with USB 1.1/2.0(Full Speed)
- No external power supply is required as I-7565 takes it's power from the USB bus
- DeviceNet Version: Volume I & II, Release 2.0
- Programmable Master MAC ID and Baud Rate.
- Baud Rate: 125k, 250k, 500k
- Support Group 2 and UCMM connection
- I/O Operating Modes: Poll, Bit-Strobe, Change of State / Cyclic
- I/O Length: 512 Bytes max (Input/Output) per slave
- Slave Node : 63 nodes max
- Support Auto-Search slave device function.
- Support on-line adding and removing devices
- Support Auto-detect Group 2 and UCMM device
- Auto-Reconnect when the connection is broken
- Status LED: RUN, MS, NS
- Free Software development tools for Windows
- Windows 7 32-bit / 64-bit drivers supported
- Windows 98/ME/2000/XP drivers supported
- Linux drivers supported



## 4.3.2 CAN to Fiber Converter/Bridge



Model Name	I-2532	I-2533	I-2533CS	I-2533CS-60
Pictures				
<b>CAN Interface</b>				
Connector	8-pin screwed terminal block (CAN_GND, CAN_L, CAN_H, N/A for others)	Screwed terminal block (CAN_GND, CAN_L, CAN_H)		
Baud Rate (bps)	10 k ~ 500 k	10 k ~ 1 M		
Transmission Distance (m)	Depends on baud rate	Duplicates the transmission distance depended on baud rate		
Propagation Delay	CAN to fiber or fiber to CAN: 125ns max. (125ns delay shortens bus line length by ~ 25 m)	CAN to fiber or fiber to CAN: depends on the CAN baud rate (max. 120 us @ 1 Mbps)		
Terminator Resistor	DIP switch for the 120 Ω terminator resistor			
Isolation	3000 Vdc for DC-to-DC, 2500 Vrms for photo-couple			
Specification	ISO 11898-2, CAN 2.0A and CAN 2.0B			
<b>Fiber Interface</b>				
Connector	ST (Multi-mode)		SC (Single-mode)	
Wave Length	850 nm		1300 or 1310 nm	
Fiber Cable	Multi-mode 50 / 125 μm , 62.5 / 125 μm, 100 / 140 μm (62.5 / 125μm is recommended)		Single-mode 8.3/125, 8.7/125, 9/125 or 10/125 μm	
Transmission Distance (m)	Max. 1.4 km, depend on the CAN baud rate	Max. 2 km (no matter what CAN baud rate it is)	30 km	60 km
<b>UART Interface</b>				
COM1	-	RS-232 (for configuration)		
COM 1 Connector	-	3-pin screwed terminal block (RxD, TxD, GND)	9-pin female D-Sub	
Transmission speed (bps)	-	115200		
Data bit	-	8		
Stop bit	-	1		
Parity	-	None		
<b>LED</b>				
Round LED	PWR LED, TD LED, RD LED	PWR LED, CAN_Tx LED, CAN_Rx LED, CAN_Err LED, FB_Err LED		
<b>Power</b>				
Power supply	Unregulated +10 ~ +30 Vdc			
Protection	Power reverse polarity protection, Over-voltage brown-out protection			
Power Consumption	0.5 W	3 W		
<b>Mechanism</b>				
Installation	DIN-Rail			
Dimensions (W x L x H)	32.3 mm x 107 mm x 102 mm		33.0 mm x 126.8 mm x 104.5 mm	
<b>Environment</b>				
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			
Relative Humidity	10 ~ 90% RH, non-condensing			

## CAN to Multi-mode Fiber Converter

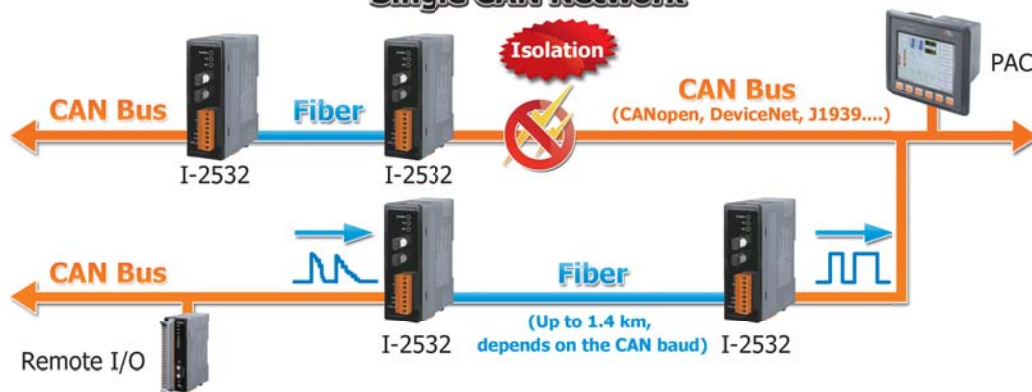
### I-2532



The I-2532 is a CAN to fiber optic converter, and fits to various CAN-based applications, such as CANopen, DeviceNet, J1939, and so forth. The module is designed not only to convert CAN bus signals to optical signals on a fiber optic cable, to reshape the CAN signal to compensate for distortion, but to isolate the bus error due to the wire short or disturbance. With the advantage of fiber optic, the I-2532 enables secure data transmission via fiber optic transmission, and helps the CAN network to prevent the noise from EMS/RFI interference. In order to use the I-2532 easily and conveniently, the converter is designed to automatically tune the baud rate by itself to match the CAN network. Users just connect the I-2532 with the fiber optic cable and CAN bus, check the terminator resistor and power it on, subsequently the I-2532 enable to work normally.

- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898-2 standard
- Supports a range of baud rates from 10 kbps ~ 500 kbps
- 2500 Vrms photocoupler isolation on the CAN side
- DIP switch for the 120  $\Omega$  terminator resistor of the CAN bus
- 3 kV galvanic isolation
- Fiber Port: ST (Multi-mode)
- Wavelength: 850 nm
- Fiber Cable: 62.5/125  $\mu$ m
- One CAN and one fiber channel

### Single CAN Network



## CAN to Multi-mode Fiber Bridge

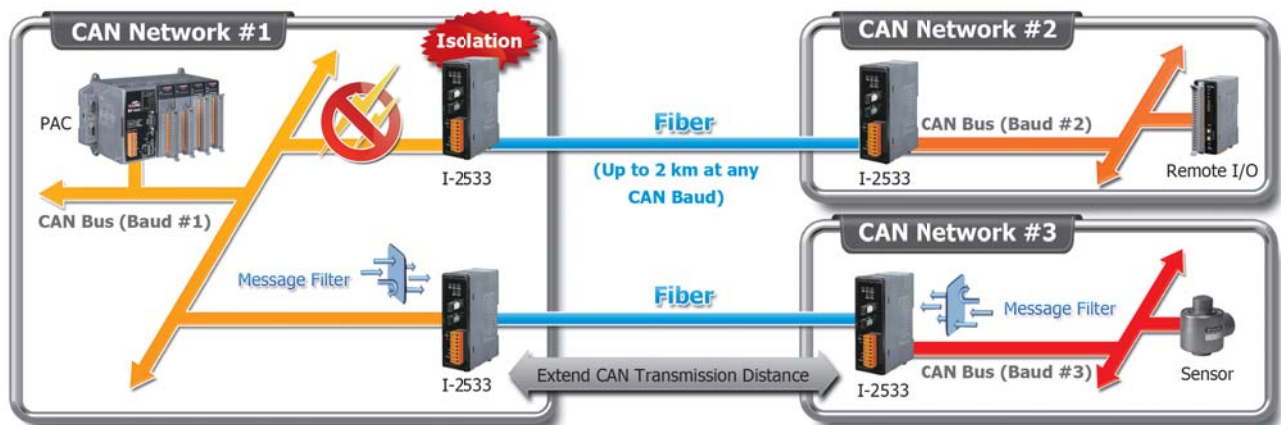
### I-2533

**NEW**



The I-2533 is an intelligent CAN bridge that can be used to establish the connection between two CAN bus systems via fiber optic cable. Similar to the I-2532, the I-2533 can also apply in various CAN-based protocols, convert CAN bus signals to optical signals, and reshape the CAN signals. The difference between the I-2532 and I-2533 is the CAN configuration functions and the CAN bus length limitation. The I-2533 offers the functions to configure the CAN baud rate and CAN message filters. These are useful when using the I-2533 to link two CAN networks which may have different baud rates. By using the I-2533, the transmission distance limitation of the CAN bus system will not be reduced because of the CAN baud rate, which means that the total network length can be extended. This feature means that users can develop the applications more powerful and flexible.

- Fiber Port: ST (Multi-mode)
- Wavelength: 850 nm
- Fiber Cable: 62.5/125  $\mu$ m
- Max. transmission distance of up to 2 km at any CAN baud rate
- 2500 Vrms iCoupler isolation on the CAN side
- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898-2 standard
- Built-in switch for the 120  $\Omega$  terminator resistor
- Up to 100 CAN nodes on each channel
- Rotary switch for CAN baud rate configuration
- Broken line detection for fiber cable
- Software utility tool for message filter configuration





### 4.3.3 Ethernet/Wi-Fi to CAN Converter

#### Modbus TCP to CAN Converter

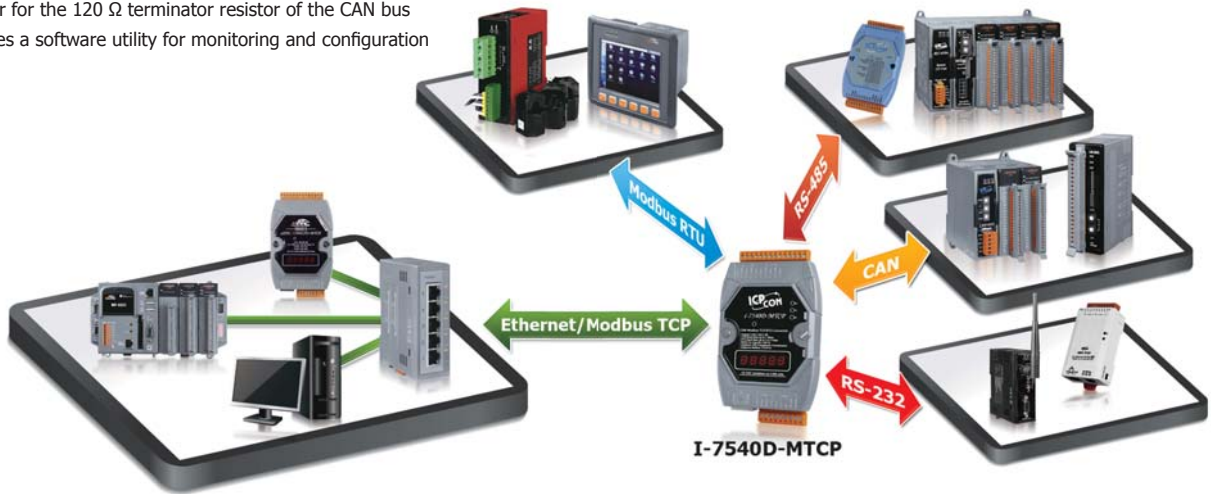
##### I-7540D-MTCP

**NEW**



Inheriting to the most of all features of the I-7540D, the I-7540D-MTCP enables CAN networks to be combined with the Internet/Ethernet. It can be used to not only access the CAN network via the Ethernet, but can also realize Ethernet transparent transmission on the CAN network. In order to connect the PLCs, HMIs and SCADAs with the CAN devices more easily and conveniently, the I-7540D-MTCP supports the Modbus TCP and Modbus RTU communication interface. This module can act as a Modbus TCP server, and wait for the commands from the Modbus TCP client. When the controller is a Modbus RTU master, the I-7540D-MTCP is able to be the Modbus RTU slave, and transfer the Modbus RTU commands to the CAN messages. These features mean that users can setup their applications more flexibly and conveniently.

- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898-2 standard
- Provides one channel each for CAN, RS-232, RS-485 and 10/100 Base-T Ethernet
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- Jumper for the 120 Ω terminator resistor of the CAN bus
- Includes a software utility for monitoring and configuration
- Supports Modbus function code: 0x03/0x04/0x10
- Built-in watchdog
- 2500 Vrms photocoupler isolation on the CAN side
- 1 kV galvanic isolation



#### Ethernet to CAN Converter

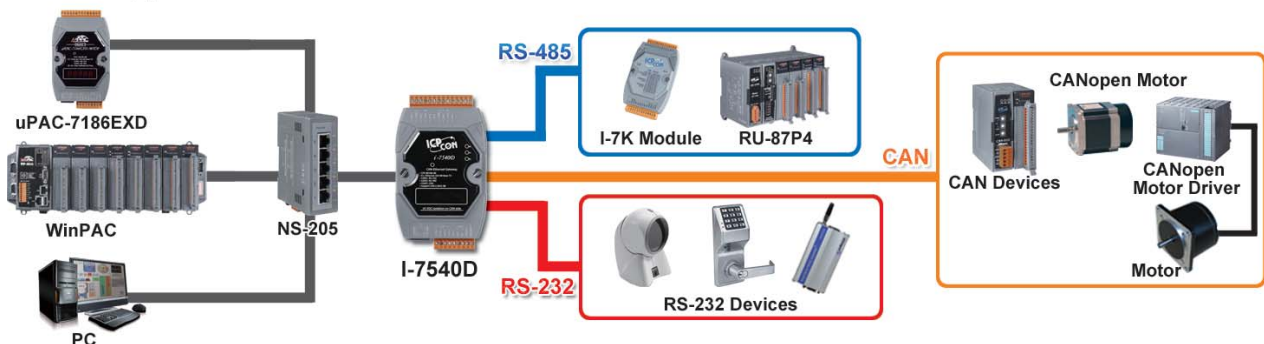
##### I-7540D



The I-7540D is a CAN to Ethernet converter, and is usually applied as an Ethernet to CAN/RS-232/485 Device Server. It supports socket access functions and virtual COM port technology which helps users to get the CAN, RS-232, RS-485 data via virtual COM port. The I-7540D also provides transparent mode, which enables CAN networks to be coupled together over the Internet/Ethernet, whereby remote monitoring and control is possible. By the features of tiny operating system, protocol independence, small casing and flexibility, it is able to widely fit various RS-232, RS-485 and CAN applications, which may be based on private RS-232 protocol, private CAN protocol, Modbus protocol, CANopen protocol, DeviceNet protocol or J1939 protocol.

- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898-2 standard
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- 2500 Vrms photocoupler isolation on the CAN side
- Jumper for the 120 Ω terminator resistor of the CAN bus
- Built-in watchdog
- 10/100 Base-T Ethernet port
- 1 kV galvanic isolation
- Provide one channel each for CAN, RS-232, RS-485 and Ethernet
- Provides connections for a maximum of 25 Ethernet clients
- Supports the Virtual COM technology

#### General Application



## Wi-Fi to CAN Converter

### I-7540D-WF NEW



The I-7540D-WF supports the wireless transmission of CAN data between a CAN network and a WLAN network according to the 802.11b/g standard. It provides CAN to WLAN converter functionality together with wireless transparent transmission on the CAN network. The I-7540D-WF is highly suitable for connecting mobile (e.g., vehicles or machines) or stationary CAN networks and is often used in short ranges up to 100 m. Using an appropriately configured router, CAN data can be determined to pass or filter from the CAN networks to the Ethernet. The wireless connection that is established between two I-7540D-WF units can be used instead of a cable, and enables the connection of CAN networks that would otherwise be difficult to link such as rotational machineries.

- IEEE 802.11 b/g compliant
- Wireless data transmission via WLAN
- Two different operation modes: infrastructure and ad-hoc
- Point to point or point to multi-point connection via wireless LAN
- Supports WEP, WPA and WPA2 encryption for wireless LAN
- Compatible with CAN specification 2.0 parts A and B
- Connects CAN networks via a WLAN bridge
- Communication efficiency (peak value): one-way is up to 700 fps (client->server, server->client), two-way 350 fps (client<=>server)
- Wireless transmission distance: up to 100 meters

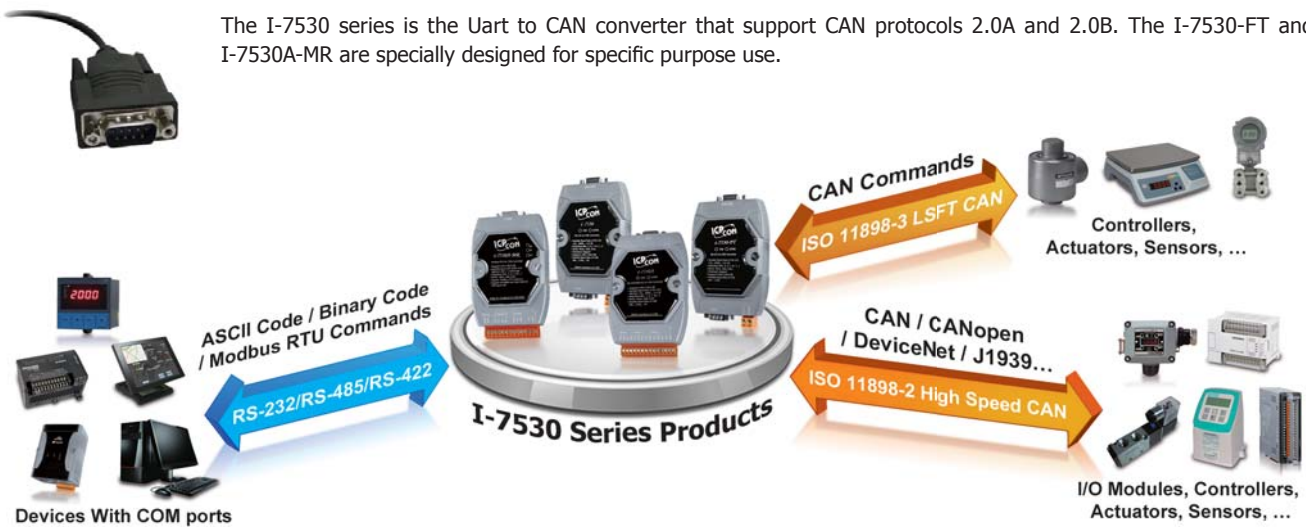


### Ad hoc mode (AP is not necessary)



### 4.3.4 Uart to CAN converter

The I-7530 series is the Uart to CAN converter that support CAN protocols 2.0A and 2.0B. The I-7530-FT and I-7530A-MR are specially designed for specific purpose use.



Model Name	I-7530-FT	I-7530	I-7530A	I-7530A-MR
	RS-232 to Fault-Tolerance CAN converter	RS-232 to CAN converter	RS-232/422/485 to CAN converter	Modbus RTU to CAN converter
Pictures				
<b>CAN Interface</b>				
Transceiver	AMIS 41682		NXP 82C250	
Connector	9-pin male D-sub			
Baud Rate	10k, 20k, 50k ,125k bps	10k, 20k, 50k ,125k, 250k, 500k, 800k, 1M bps		
Protocol	ISO 11898-3 (low speed fault tolerance), CAN 2.0A and CAN 2.0B	ISO 11898-2, CAN 2.0A and CAN 2.0B		
Receiver Buffer	1000 data frames			
Isolation	-	3000 Vdc for DC-to-DC		
<b>UART Interface</b>				
Type	RS-232	RS-232	RS-232/422/485	RS-232/422/485
Protocol	-	-	-	Modbus RTU slave
Connector	9-pin female D-sub		14-pin terminal block	
Baud Rate	110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 ,115200 bps			300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 ,115200, 230400 bps
Receiver Buffer	900 data frames			
<b>System</b>				
Power Consumption	1 W	1 W	1 W	1 W
Power Input	10 ~ 30 VDC			
Dimensions (W x L x H)	72 mm x 118 mm x 33 mm			
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			



#### Accessory



Optional CAN bus connector: CNT-CAN



Installation

## Low-Speed/Fault-Tolerance CAN to RS-232 Converter

### I-7530-FT



The I-7530-FT is a low speed but reliable CAN to RS-232 converter. The "FT" stands for "Fault Tolerance". It follows ISO 11898-3 standard, and is suited for the applications which may have a lot of noise in the harsh environment. Generally, the I-7530-FT communicates with other CAN devices by two-line CAN bus. As one of the CAN bus lines is malfunction, the I-7530-FT even uses a single line of the CAN bus to access the CAN devices. The utility tool supports sending or receiving CAN messages, and the configuration of the I-7530-FT. This tool is free, and is helpful to diagnostic the CAN networks.

- Built-in CAN/RS-232 converter firmware
- Fully compatible with the ISO 11898-3 standard
- Max. transmission speed of up to 125 kbps for CAN and 115.2 kbps for RS-232
- Compatible with CAN specification 2.0 parts A and B
- Built-in RS-232/CAN FIFO buffers
- Power, data flow and error indicator for CAN and RS-232 transmission



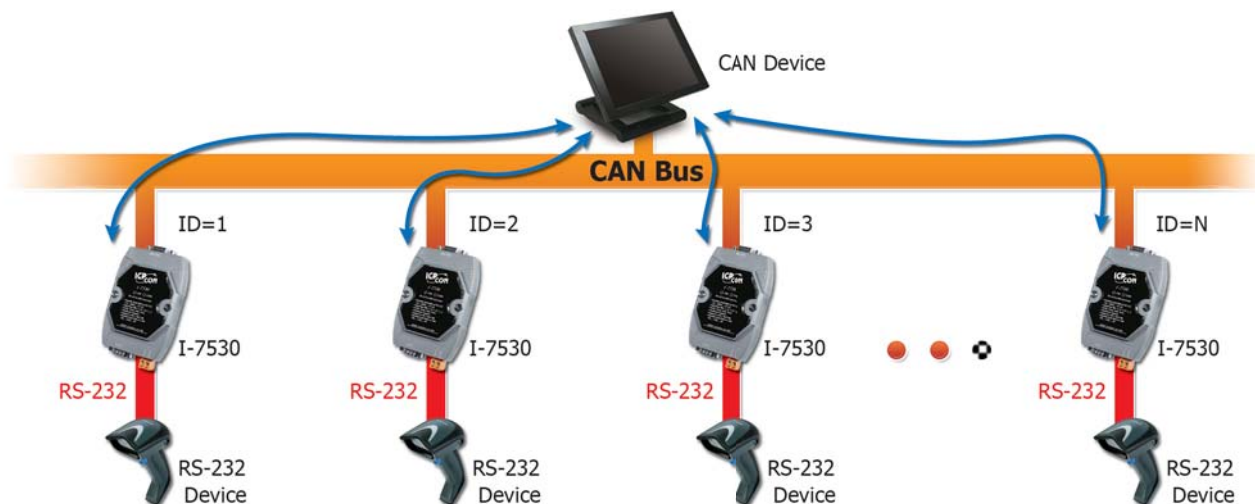
## CAN to RS-232 Converter

### I-7530



The I-7530 is designed for integrating the traditional RS-232 devices into the CAN network. It is a RS-232 to CAN converter which unleashes the power of the CAN bus via an RS-232 communication interface, converting messages between a CAN network and an RS-232 device. The CAN interface of the I-7530 follows ISO 11898-2 specification, the maximum CAN baud is up to 1 Mbps. Sometimes, users need to control several RS-232 devices at the same time. In this case, the I-7530 provides the station ID for the RS-232 device which is connected with the I-7530. These RS-232 devices can be grouped in a CAN network, and be controlled by one CAN master.

- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898-2 standard
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- 2500 Vrms photocoupler isolation on the CAN side
- Jumper for the 120 Ω terminator resistor of the CAN bus
- Built-in watchdog
- 3 kV galvanic isolation
- One CAN port and one RS-232 port
- CAN and RS-232 parameters can be configured via software
- Support transparent communication mode
- Mounts easily on a DIN-Rail



## CAN to RS-232/RS-422/RS-485 Converter

### I-7530A



The I-7530A is an RS-232/RS-422/RS-485 to CAN converter. It is a member of the I-7530 serial family, and inherits all of the features of the I-7530. The CAN interface of the I-7530A follows ISO 11898-2 specification, the maximum CAN baud is up to 1 Mbps. There is one COM port in the I-7530A. As the I-7530A runs, the I-7530A only receives the commands from one of these COM interfaces (i.e. from the RS-232, RS-485 or RS-422 interface) at the same time, but the CAN messages will be forwarded to all of these COM interfaces.

- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898-2 standard
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- 2500 Vrms photocoupler isolation on the CAN side
- Jumper for the 120 Ω terminator resistor of the CAN bus
- 3 kV galvanic isolation
- Provides one channel each for CAN, RS-232, RS-422 and RS-485
- CAN and serial COM parameters can be configured via software
- Supports transparent communication mode



4

CAN Bus

## CAN to Modbus RTU Slave Converter

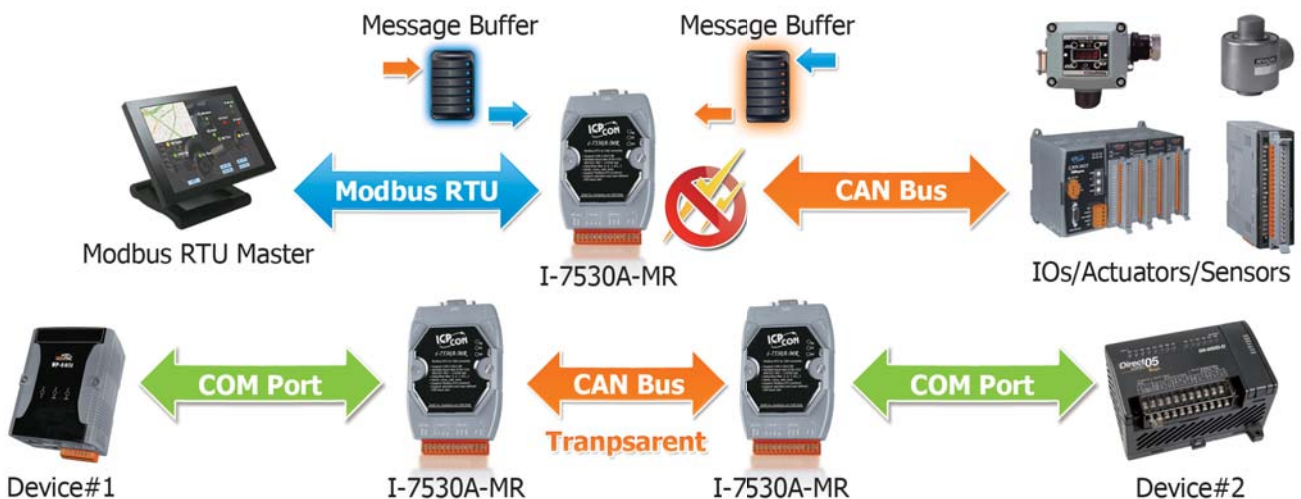
### I-7530A-MR



The PLC, HMI and SCADA are popular in the various industrial control applications, but most of them don't provide CAN interfaces. Users always experienced difficulties due to connecting the sensors or actuators which only have a CAN interface. The I-7530A-MR supports Modbus RTU protocol on its RS-232/422/485 port. Modbus RTU is popular and widely supported by most of the PLCs, HMIs, and SCADAs. I-7530A-MR is helpful to use standard Modbus RTU protocol to access CAN networks without difficulties.

The "MR" stands for "Modbus RTU". The I-7530A-MR supports Modbus RTU protocol on its RS-232/422/485 port. And with the special designed firmware, beside normal received CAN message buffer, it offers special memory space to save up to 10 kinds of CAN messages which are urgent and must be processed immediately. The feature helps the PLC, HMI and SCADA to use Modbus RTU function code 3,4,16 to access CAN devices in a easy way.

- Compatible with CAN specification 2.0 parts A and B
- Programmable CAN bus baud rate from 10 kbps ~ 1 Mbps, or a user-defined baud rate
- Supports CAN bus acceptance filter configuration
- Include a software utility that enables users to easily configure module settings and test CAN bus communication
- Converts CAN messages to specific ASCII command string
- Provides pair-connection communication between RS-232/RS-485/RS-422 devices via the CAN bus
- Supports Modbus RTU function codes 0x03/0x04/0x10 for reading/writing CAN messages

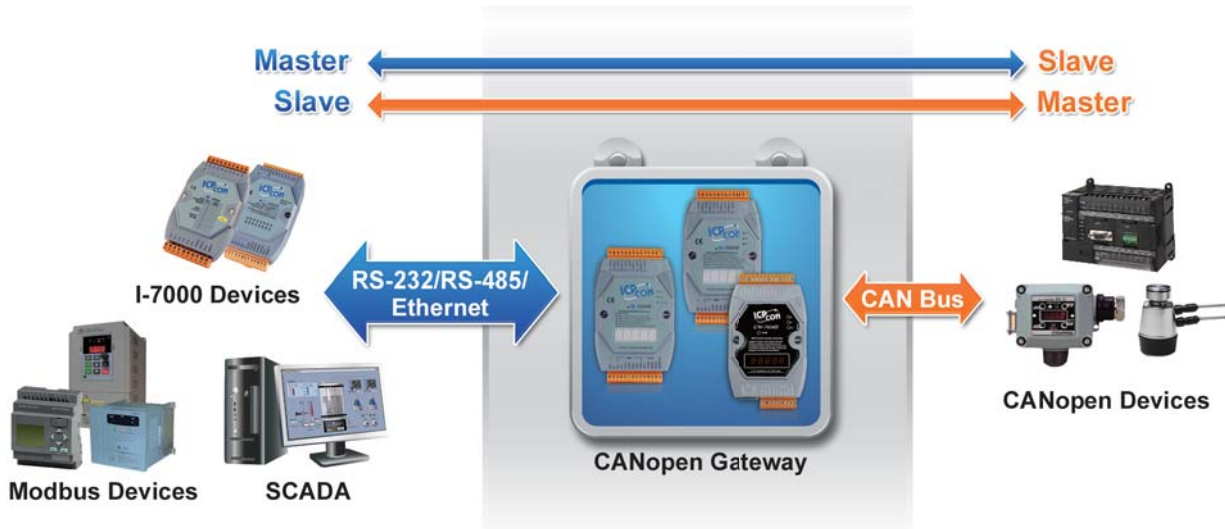


## 4.4 Gateway/ Protocol Converter

The stand alone industrial gateways are designed to connect existing devices to the fieldbus via the serial bus or the Ethernet. Easy to use and setup, no programming required. Following protocols are supported by ICP DAS gateways

- **DCON protocol:** a kind of protocol based on the RS-485 network. It is special for ICP DAS I-7000 and I-87K series modules.
- **Modbus RTU:** a kind of protocol based on the RS-232/485 network. The Modbus RTU devices may be a PLC, a Modbus RTU sensor, ICPDAS M-7000 series modules and so fourth.
- **Modbus TCP:** a kind of protocol based on the Ethernet. The Modbus TCP devices may be a PLC, a Modbus TCP sensor, ICPDAS ET-7000 series modules and so fourth.

### 4.4.1 CANopen Gateway



4

CAN Bus

Model Name	I-7231D	I-7232D	GW-7433D
	CANopen to DCON Gateway	CANopen to Modbus RTU Gateway	Modbus TCP/RTU to CANopen Gateway
Pictures			
<b>CANopen Interface</b>			
CANopen Interface	1 channel (CAN_H, CAN_L), and the other is for bypass		
CANopen Function	CANopen slave		CANopen master (Supports at least 120 CANopen commands)
CANopen Baud Rate	10 k, 20 k, 50 k, 125 k, 250 kbps, 500 k, 800 k, 1M		
CANopen Version	CiA 301 v 4.02 and CiA 401 v2.01		
Guarding Function	Yes		
Heartbeat Function	Heartbeat Producer		Heartbeat Consumer
Emergency Message	Yes		
<b>UART Interface</b>			
COM1 Connector	RS-232 (TxD, RxD, RTS, CTS, GND) or RS-485(Data+, Data-), non-isolated		RS-232 (TxD, RxD, RTS, CTS, GND), non-isolated
COM1 Function	Only for configuration		Modbus RTU Slave
COM2 Connector	RS-485 (Data+, Data-) with internal self-tuner ASIC; non-isolated		
COM2 Function	DCON Master (Supports max. 15 I-7K or I-87K modules)	Modbus RTU Master (Supports max. 10 Modbus RTU commands)	Modbus RTU Slave
<b>Ethernet Interface</b>			
Ethernet	-		10/100 Base-TX
Ethernet Function	-		Configuration or Modbus TCP Server
Modbus Function Code	-	01, 02, 03, 04, 06, 15	01, 02, 03, 04, 05, 06, 15, 16
<b>System</b>			
Power Consumption	3 W		
Power Input	10 ~ 30 Vdc		
Dimension (W x L x H)	72 mm x 122 mm x 33 mm		
Operating Temperature	-25 ~ +75°C		
Storage Temperature	-30 ~ +80°C		

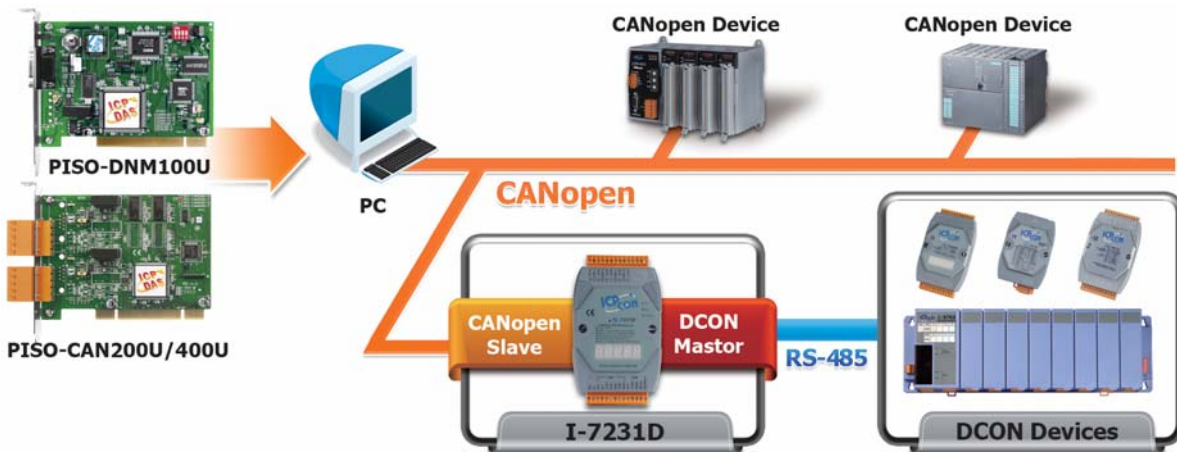
## CANopen to DCON Gateway

### I-7231D



DCON protocol is a kind of application protocols to ICP DAS I/O modules, such as I-7000 series and I-87K series modules. By way of applying the I-7231D, the DCON I/O modules can be integrated to the CANopen network. From the view of CANopen applications, the I-7231D is a CANopen slave device. It can produce or consume the PDO messages, receive the SDO message with proper responses, and deal with the NMT messages from the NMT master. In the DCON network, it is a DCON master device which collects all of the I/O statuses of the I-7000 and I-87K series modules. The utility tool is given to configure the device parameters and build EDS file. Users can easily apply I-7k and I-87K IO modules in any CANopen master interface via this EDS file.

- CANopen Version: DS-301 v4.02 , DSP-401 v2.1
- Error Control: Node Guarding protocol
- NMT: Slave
- PDO: Event-triggered, RTR, cyclic, acyclic SYNC and dynamic PDO mapping
- No of SDOs: 1 server, 0 client
- Product EDS file dynamically by utility
- Support max. 15 I-7000/I-87K I/O series modules



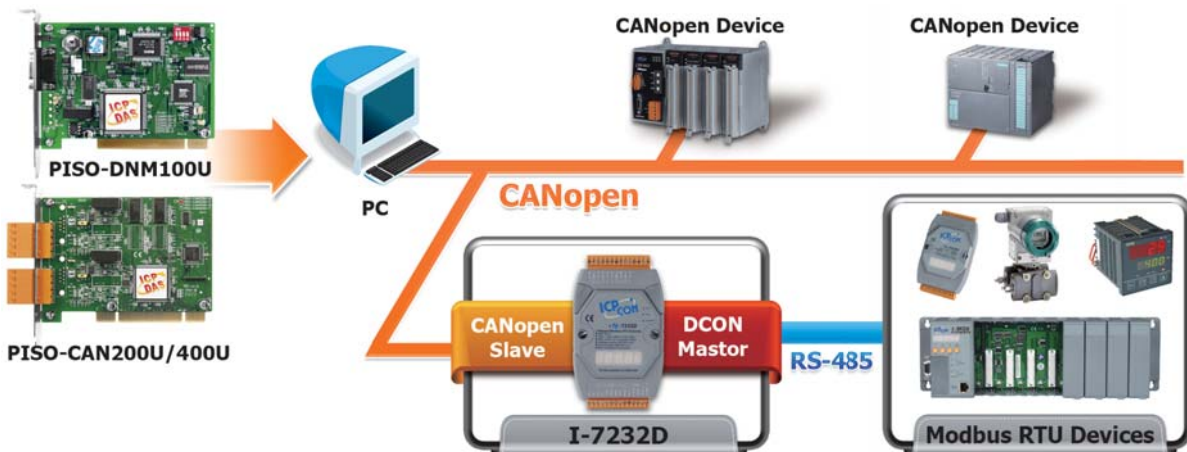
## CANopen to Modbus RTU Gateway

### I-7232D



The I-7232D is a CANopen slave to Modbus RTU master gateway, and allows a CANopen master to have ability to access the Modbus slave devices. In the CANopen network, the I-7232D is a NMT slave, SDO server, PDO producer, and PDO consumer. From the view of the Modbus network, it is a Modbus RTU master which polling all the predefined data of the Modbus RTU slaves, and bypass the CANopen control commands to the Modbus slaves. The I-7232D follows the CANopen Spec CiA-301 v4.02 and CiA-401 v2.1, and supplies many features of CANopen protocols, such as dynamic PDO, EMCY object, error output value, SYNC cyclic and acyclic. Like the I-7231D, the EDS file is also provided by the utility tool. Users can easily apply the I-7232D in the standard CANopen master with the EDS file.

- CANopen Version: DS-301 v4.02 , DSP-401 v2.1
- Error Control: Node Guarding protocol
- NMT: Slave
- PDO: Event-triggered, RTR, cyclic, acyclic SYNC and dynamic PDO mapping
- No of SDOs: 1 server, 0 client
- Product EDS file dynamically by utility
- Support max. 10 Modbus RTU commands



## Modbus TCP/RTU to CANopen Gateway

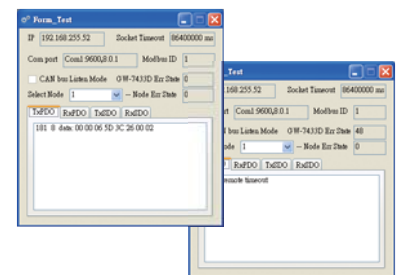
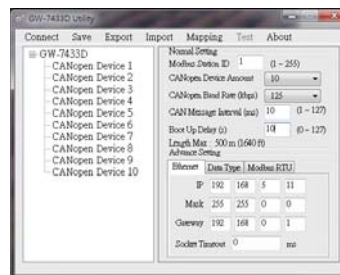
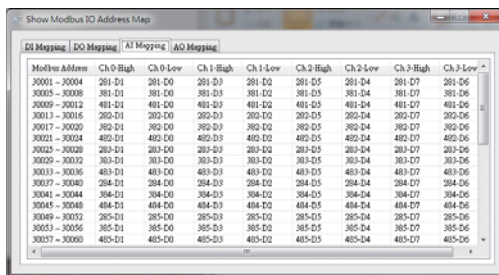
### GW-7433D

**NEW**



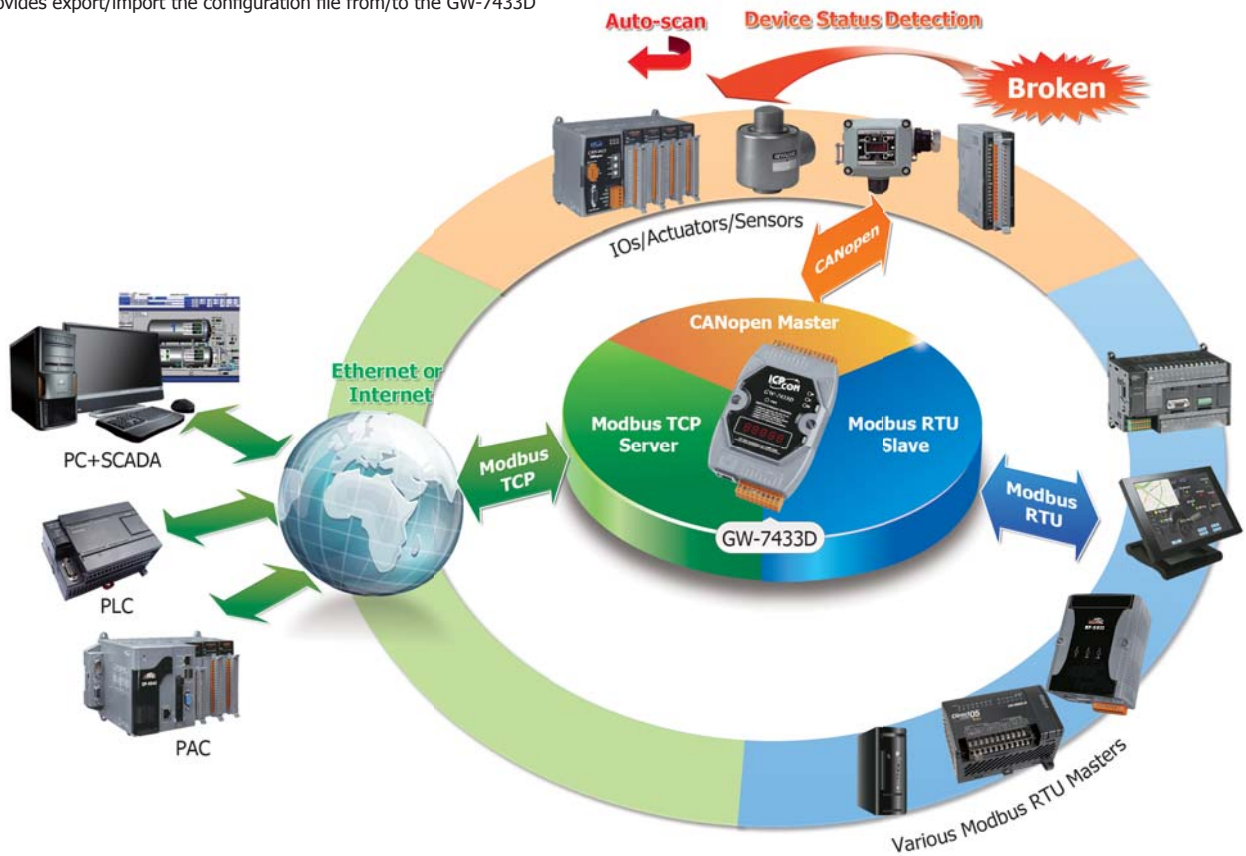
The GW-7433D is an economic Fieldbus solution that provides the communication transformation mechanisms between the Modbus protocol and the CANopen protocol. This module is able to collect the information of the CANopen slaves periodically, and returns these data to the Modbus TCP client or Modbus RTU master while receiving the Modbus commands. When the Modbus TCP client or Modbus RTU master needs to output data to the CANopen slaves, the GW-7433D transfers the received Modbus commands to the CANopen messages to handle the CANopen slaves. Both of the Modbus TCP server and the Modbus RTU slave functions can work on the GW-7433D simultaneously. The GW-7433D also offers the Modbus registers for recording the life statuses of the CANopen slaves. These features mean that users can set up their applications more reliably and flexibly.

- CANopen Version: DS-301 v4.02
- Error Control: Node Guarding protocol
- Emergency Message: Yes
- NMT: Master
- PDO: Event-triggered, RTR
- Support max. 50 TxPDOs, 50 RxPDOs, 15 SDOs to SDO server
- Allow 5 Modbus TCP masters to access GW-7433D simultaneously
- Configuration by utility via Ethernet



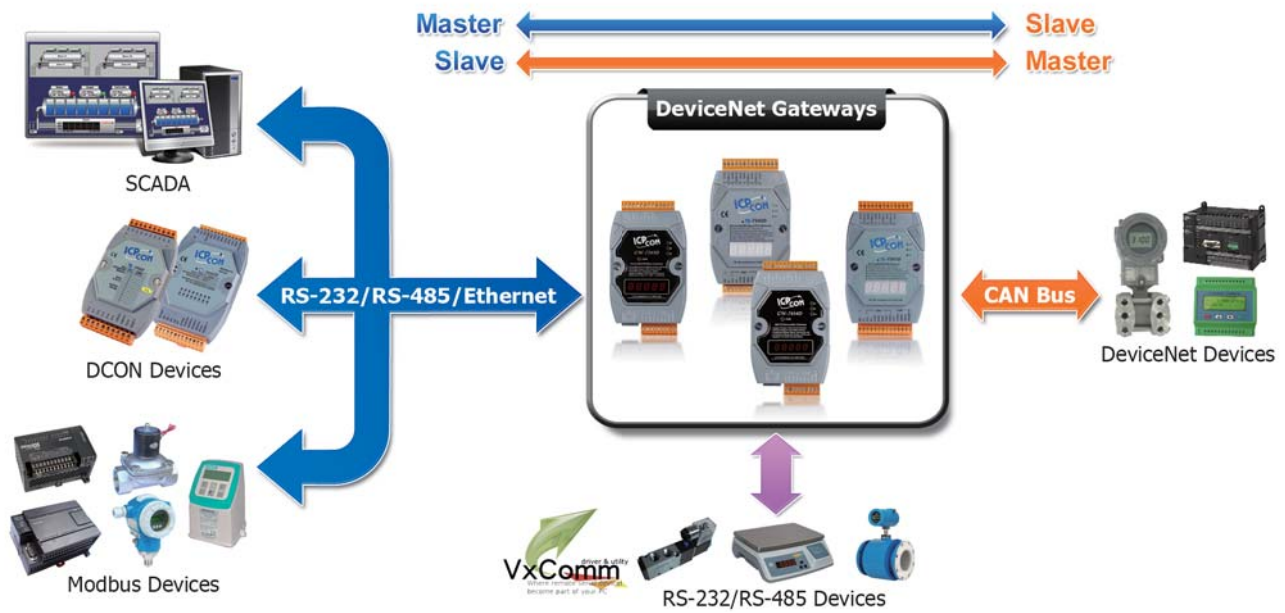
### Utility Features

- User-friendly GUI for CANopen and Modbus configuration
- The CANopen EDS file production
- The Modbus TCP and CANopen network diagnosis while setting up the applications
- Automatic data mapping between the Modbus registers and CANopen objects
- Provides export/import the configuration file from/to the GW-7433D





## 4.4.2 DeviceNet Gateway



Model Name	I-7241D	I-7242D	GW-7243D	GW-7434D
Pictures				
<b>DeviceNet Interface</b>				
DeviceNet Connector	1 channel (CAN_H, CAN_L), and the other is for bypass			
DeviceNet Function	DeviceNet slave		DeviceNet master	
DeviceNet Baud Rate	125k, 250k, 500k bps			
DeviceNet Specification	DeviceNet specification Volume I/II, Release 2.0			
I/O operating modes	Polling, Bit-Strobe, Change of State/Cyclic		Polling	Polling, Bit-Strobe, Change of State/Cyclic
Heartbeat Function	Yes		-	
Shutdown Message	Yes		-	
Shutdown Message	Yes		-	
<b>Shutdown Message</b>				
COM1 Connector	RS-232 (TxD, RxD, RTS, CTS, GND) or RS-485(Data+, Data-), non-isolated		RS-232 (TxD, RxD, RTS, CTS, GND), non-isolated	
COM1 Function	Only for configuration			Modbus RTU Master/Slave, VxComm
COM2 Connector	RS-485 (Data+, Data-) with internal self-tuner ASIC; non-isolated			
COM2 Function	DCON Master (Supports max. 15 I-7K or I-87K modules)	Modbus RTU Master (Supports max. 10 Modbus RTU commands)	Modbus RTU/ASCII Master	Modbus RTU Master/Slave, VxComm
<b>Ethernet Interface</b>				
Ethernet	-		10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)	
Ethernet Function	-		Modbus TCP Client	Configuration, Modbus TCP Server, VxComm
Modbus Function Code	-	0x01, 0x 02, 0x 03, 0x04, 0x0F, 0x10	0x01, 0x 02, 0x 03, 0x04, 0x05, 0x06, 0x0F, 0x10	
<b>System</b>				
WDT	Yes (0.8 second)			
Power Consumption	3 W		2.5 W	
Power Input	10 ~ 30 Vdc			
Dimension (W x L x H)	72mm x 122mm x 33mm			
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			

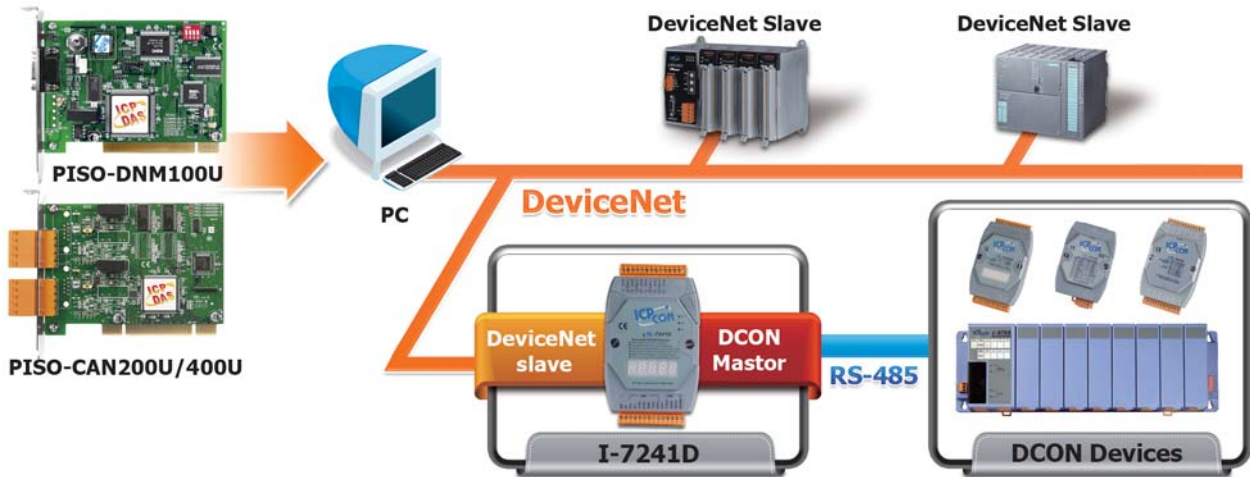
### DeviceNet to DCON Gateway

#### I-7241D



The I-7241D is the communication gateway between DeviceNet and DCON protocols. It is a DeviceNet slave device in the DeviceNet network, which functions as a "Group 2 Only Slave" device, and supports "Predefined Master/slave Connection Set". In the DCON network, the I-7241D is a DCON master and can access the data of the I-7000 or I-87k series modules. The utility software is given to configure the device parameters and build EDS file for the DeviceNet slave device. Through the I-7241D, the DeviceNet master can quickly integrate the I-7000 and I-87K series modules into the DeviceNet network.

- Comply with DeviceNet specification volume I, release 2.0 & volume II, release 2.0
- Support Predefined Master/Slave Connection Set(Group 2 Only Server)
- I/O operating modes: Polling, Bit-Strobe, Change of State/Cyclic
- Provide dynamic Assembly Objects mapping
- Support Offline Connection Set, Device Heartbeat message and Device Shutdown message
- Support max. 15 I-7000/I-87K I/O series modules



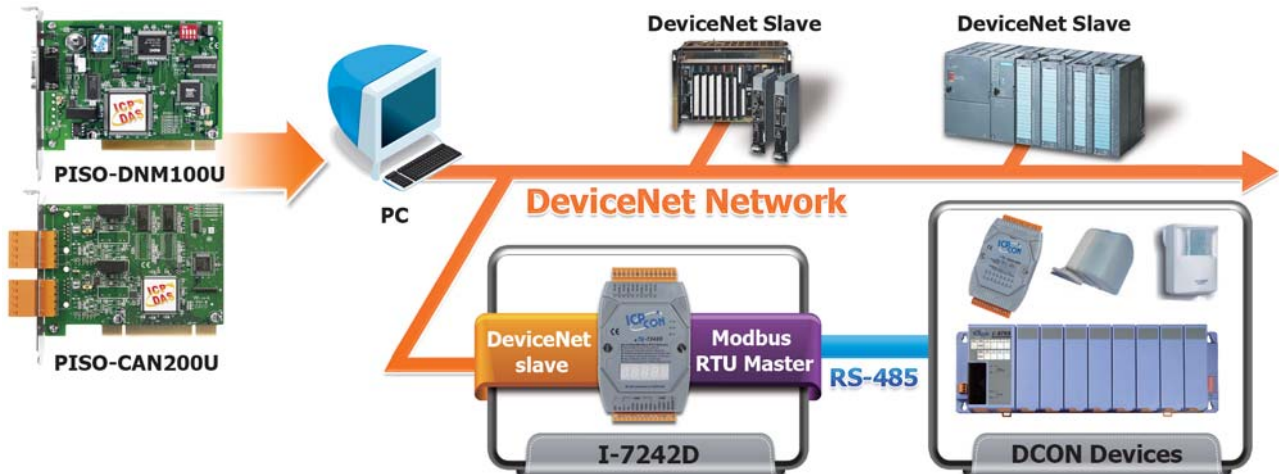
### DeviceNet to Modbus RTU Gateway

#### I-7242D



The I-7242D allows a master located on a DeviceNet network to enter into a dialogue with the slaves on a Modbus RTU network. It's a "Group 2 Only Slave" device in the DeviceNet network, and supports "Predefined Master/Slave Connection Set". From the view of the Modbus network, it is a Modbus RTU master which polling all the predefined data of the Modbus RTU slaves, and bypass the DeviceNet control commands to the Modbus slaves. This device is widely used in the application of building automation, remote data acquisition, environment control and monitoring, laboratory equipment & research, factory automation, etc. The I-7242D also has the utility tool which is used to configure the I-7242D's parameters and build the EDS file. Through the EDS file to the I-7241D, it is easy to apply the Modbus RTU devices in DeviceNet applications.

- Comply with DeviceNet specification volume I, release 2.0 & volume II, release 2.0
- Support Predefined Master/Slave Connection Set (Group 2 Only Server)
- I/O operating modes: Polling, Bit-Strobe, Change of State/Cyclic
- Provide dynamic Assembly Objects mapping
- Support Offline Connection Set, Device Heartbeat message and Device Shutdown message
- Support max. 10 Modbus RTU series modules



## DeviceNet to Modbus TCP/RTU/ASCII Gateway

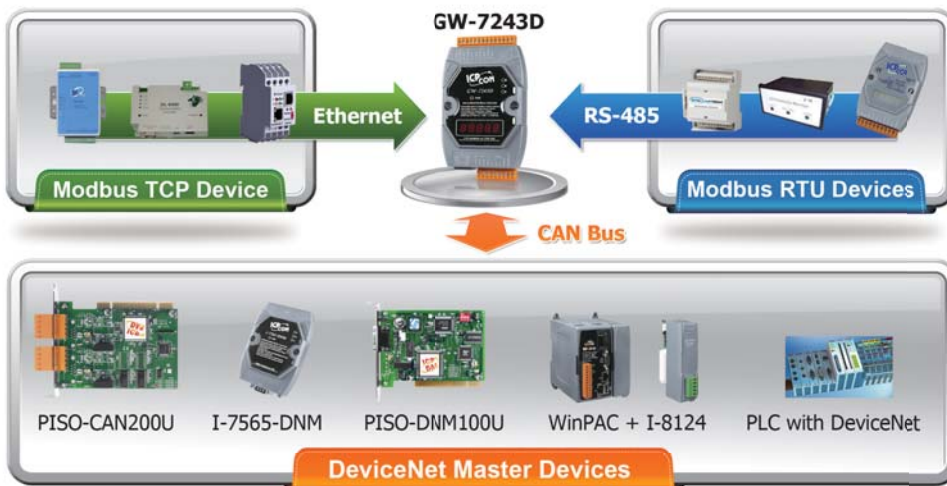
### GW-7243D

**NEW**



The GW-7243D offers the DeviceNet slave and Modbus master functions, and enables the DeviceNet master to access the Modbus slave devices. In the DeviceNet network, the module acts as a Group 2 Only Server device, and waits to build the connection with the DeviceNet master. In the Modbus network, the GW-7243D is a master device, and cyclically sends the commands to access the Modbus slave devices. Both the Modbus TCP client and Modbus RTU/ASCII master interfaces of the GW-7243D can work simultaneously. This feature means that users are able to integrate different kinds of Modbus slave devices together into the DeviceNet network no matter these devices provide Ethernet, RS-232 or RS-485 communication interfaces. In order to simplify the use of the GW-7243D, the GW-7243D Utility tool for configuration and EDS file production is given. This is helpful to build the applications easily and quickly.

- Group 2 Only Server DeviceNet subscriber
- Support Explicit and Poll Connection
- Maximum support 10 Modbus RTU/ASCII commands for each COM port
- Maximum support 4 Modbus TCP devices
- Maximum support 5 Modbus TCP commands for each Modbus TCP device
- Support Modbus function codes: 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x0F and 0x10



## Modbus TCP/RTU/ASCII to DeviceNet Gateway

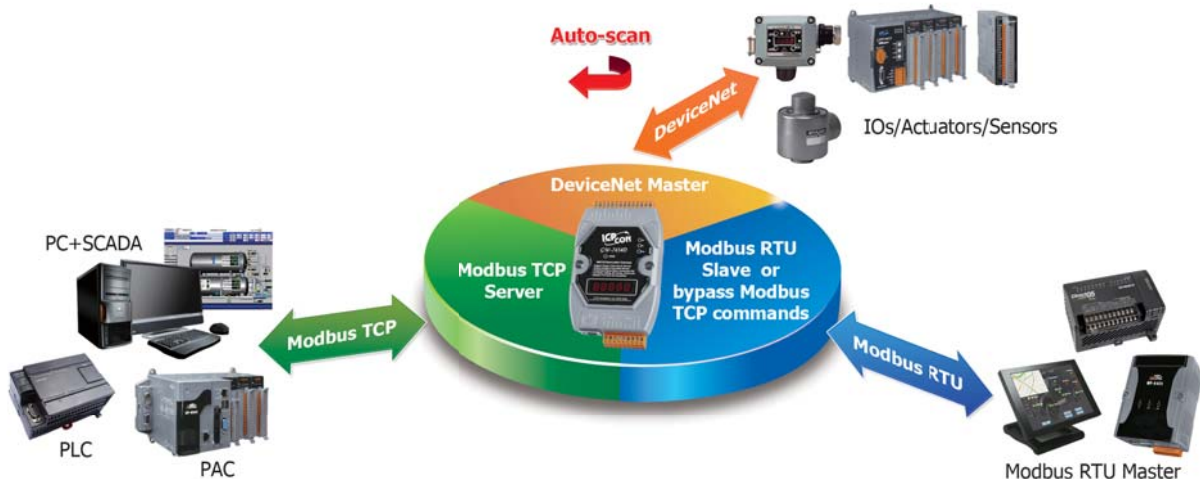
### GW-7434D

**NEW**



The GW-7434D is an economic solution that provides a communication protocol transformation between the DeviceNet protocol and the Modbus TCP protocol. This module solves the problem to connect an existing DeviceNet network to the Ethernet-based PLC, HMI or SCADA for setting up a control or monitoring system. Different to the GW-7243D, the GW-7434D offers the Predefined Master connection Set function and Group 2 only Server function as a DeviceNet master, and enables accessing the DeviceNet slaves automatically and cyclically. If the PLC, HMI or SCADA would like to access the DeviceNet slaves and simultaneously communicate with the Modbus slaves or COM-based devices connected with the RS-232 or RS-485 ports of the GW-7434D, the GW-7434D can be the Modbus TCP server or VxComm server to exchange the data with those devices.

- Support maximum DeviceNet devices up to 63
- Predefined Master/Slave Connection Set
- Support one Poll, one Bit-Strobe, one COS or one Cyclic IO connection for each DeviceNet device
- Convert single Modbus TCP to multi Modbus RTU devices, setting by Utility
- Support VxComm technique for every COM ports of controllers, setting by Utility



### 4.4.3 J1939 Gateway

#### J1939 to Modbus RTU Slave Gateway

##### GW-7228

**NEW**



The GW-7228 enables the Modbus RTU master to exchange the data with the devices in the J1939 network. This module provides the Modbus slave functions on the RS-232, RS-422, and RS-485 ports so that the Modbus RTU master can easily control and monitor the J1939-based devices. If users use one of the communication ports for application, the other two ports can be used to monitor the Modbus communication situations between the Modbus master and the GW-7228. This feature is helpful for diagnosis while setting up an application system. For J1939 CAN networks, the GW-7228 supports PDU1, PDU2, broadcast and destination specific type of J1939 messages, and is widely applied in the Diesel power-train, in-vehicle networks for trucks and buses or where the Modbus RTU and J1939 protocols transformation is needed.

- Transmission and reception of all types of J1939 messages, including PDU1, PDU2, broadcast and destination specific
- Support BAM of Connection Management message
- Provide PWR/J1939/MODBUS indication LED
- Support RS-232, RS-485 and RS-422 interfaces
- Support Modbus RTU slave protocol with function codes 03, 04, 06 and 16
- Built-in jumper to select 120 Ω terminal resistor
- Built-in watchdog



#### J1939 to Modbus TCP Server/RTU Slave Gateway

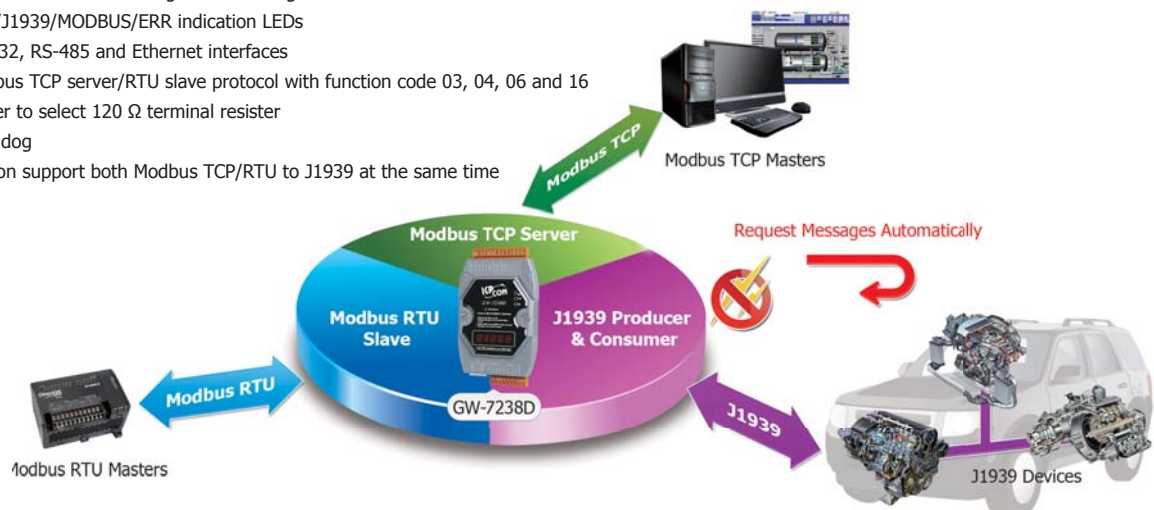
##### GW-7238D

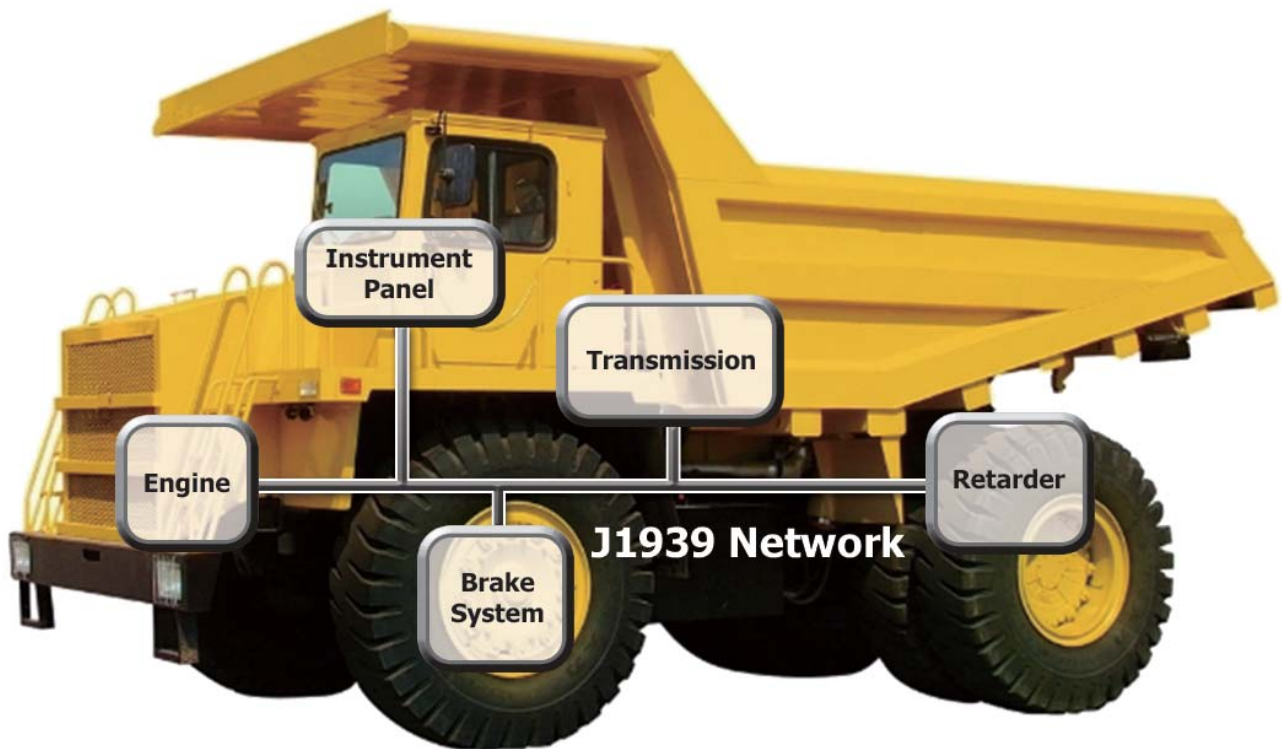
**NEW**



Similar to the GW-7228, the GW-7238D is a J1939 to Modbus master gateway. The main difference is that the GW-7238D has an Ethernet port as the Modbus TCP server, and allows connecting with up to 5 Modbus TCP clients. The GW-7238D also offers an RS-232 and RS-485 ports which are the Modbus RTU slaves and enable the Modbus RTU master to exchange the data with the devices in the J1939 network. Both the Modbus TCP server and the Modbus RTU slave functions of the GW-7238D can work simultaneously. This feature means that users can apply the GW-7238D in their applications more flexibly and more economically. For J1939 CAN networks, the GW-7238 supports PDU1, PDU2, broadcast and destination specific type of J1939 messages, and is widely applied in the various J1939-based applications.

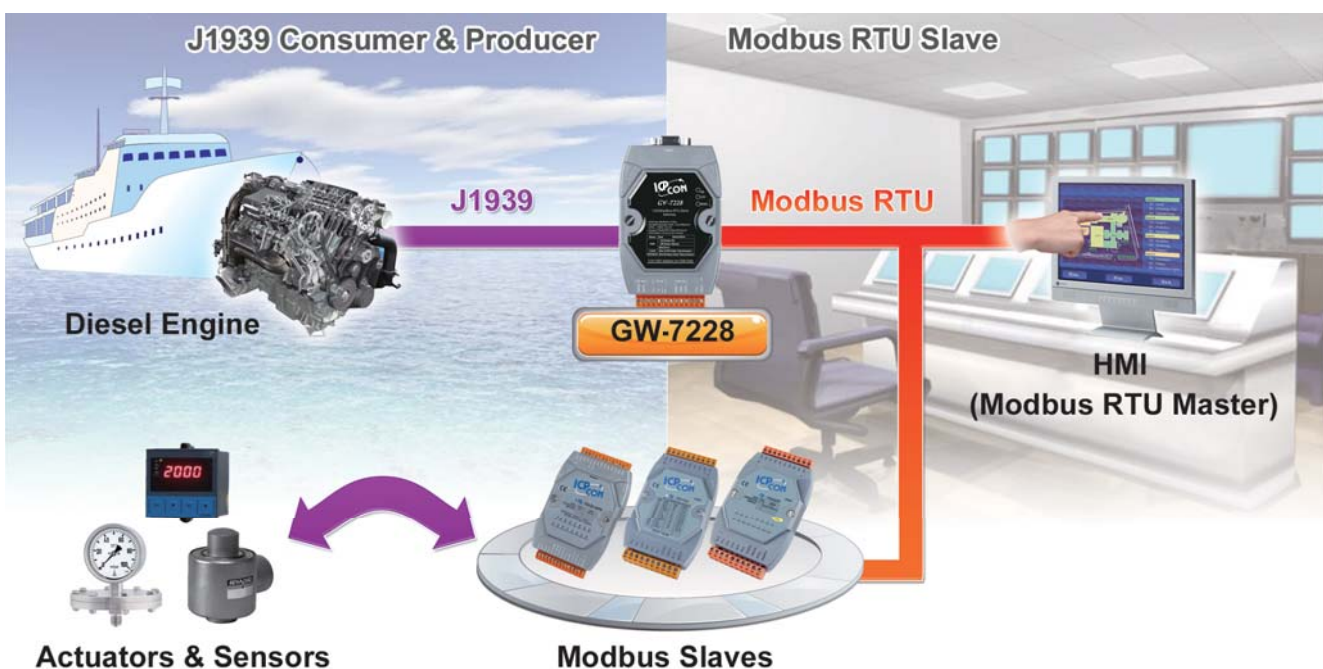
- Transmission and reception of all types of J1939 messages, including PDU1, PDU2, broadcast and destination specific
- Support BAM of Connection Management message
- Provide PWR/J1939/MODBUS/ERR indication LEDs
- Support RS-232, RS-485 and Ethernet interfaces
- Support Modbus TCP server/RTU slave protocol with function code 03, 04, 06 and 16
- Built-in jumper to select 120 Ω terminal resistor
- Built-in watchdog
- Communication support both Modbus TCP/RTU to J1939 at the same time





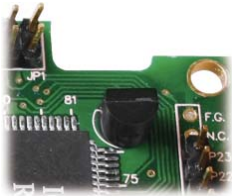
## Application Case Studies

The customer from the vessel power research institute needs to set up an engine test system to adjust the performance of the vessel engines. In this system, the Volvo Penta Diesel engine which offers the J1939 communication interface is used. The customer would like to control and monitor the engine parameters, such as the engine oil temperature, the engine coolant temperature, the engine rotational speed, the torque speed and the value of the frequency switch, on the touch screen which provides the RS-485 interface as a Modbus RTU master. In order to overcome the problem of the data exchange between the J1939 network and the Modbus RTU network, the customer applies the GW-7228 to resolve this issue. The GW-7228 provides the J1939 interface and the Modbus RTU slave function. In the J1939 network, the GW-7228 listens to the J1939 network and obtains all of the J1939 messages automatically sent from the engine. When receiving the Modbus RTU messages from the touch screen, the GW-7228 returns the data of the engine or commands the engine to change the rotational speed and torque that is corresponding to the content of the Modbus commands.



## 4.5 Palm-Size programmable CAN controller

The palm size PACs (Programmable Automation Controller) includes I-7188XBD-CAN, uPAC-7186EXD-CAN, μPAC-5001D-CAN1 and μPAC-5001D-CAN2. With abundant and various peripherals and communication ports, the PAC can integrate different communication interface, like CAN bus, RS-232, RS-485, Ethernet and so on. In order to increase the modules openness and applications flexibility, the PAC provides MiniOS7, a DOS-like real-time single-task operation system for adapting to all kinds of needs. Users can develop application programs via C/C++ compiler.



**Unique 64-bit Hardware Serial Number**



**Built-in RTC - Real Time Clock**



**5-Digit 7-Segment LED Display**



**microSD expansion**

Model Name	I-7188XBD-CAN	uPAC-7186EXD-CAN	μPAC-5001D-CAN1	μPAC-5001D-CAN2
Pictures				
<b>System Software</b>				
OS	MiniOS7 (DOS-like embedded operating system)			
<b>Development Software</b>				
Download Interface	RS-232 (COM1) or Ethernet			
Language	C language			
Compilers	TC++ 1.01, TC 2.01, BC++3.1 ~ 5.2x, MSC 6.0, MSVC++ (before version 1.5.2)			
<b>CPU Module</b>				
CPU	80188, 40 MHz or compatible	80186, 80 MHz or compatible		
SRAM	512 KB	512 KB	512 KB	
Flash	512 KB	512 KB	512 KB	
microSD Expansion	-		Up to 2 GB	
EEPROM	2 KB	16 KB		
NVRAM	31 Bytes (battery backup, data valid up to 10 years)			
RTC (Real Time Clock)	Provide second, minute, hour, date, day of week, month, year			
64-bit Hardware Serial Number	Yes, for Software Copy Protection			
Watchdog Timers	Yes (0.8 second)			
<b>Communication Ports</b>				
Ethernet	-	10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)		
COM 1	RS-232 (TxD, RxD, RTS, CTS, GND) or RS-485(Data+, Data-), non-isolated	RS-232 (TxD, RxD, RTS, CTS, GND), non-isolated		
COM 2	RS-485 (Data+, Data-) with internal self-tuner ASIC; non-isolated			
CAN	1 channel	1 channel	1 channel	2 channels
<b>LED Indicator</b>				
7-Segment LED	Yes			
Programmable LED Indicators	4		5	
<b>Mechanical</b>				
Dimension (W x L x H)	72mm x 122mm x 33mm		91 mm x 123 mm x 52 mm	
Installation	DIN-Rail Mounting			
<b>Environmental</b>				
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			
Ambient Relative Humidity	10 ~ 90% RH (non-condensing)			
<b>Power</b>				
Input Range	10 ~ 30 Vdc		12 ~ 48 Vdc	
Redundant Power Inputs	-		Yes	
Power Consumption	3 W			

## 4.6 PC Based CAN Bus Boards

To access the CAN sensors, actuators, and I/O modules we provide communication boards for PC based solution.

### Communication Boards:

The following CAN bus communication boards are designed for different interface and different CAN port number. The common features are:

1. Compatible with CAN specification 2.0 parts A and B
2. Fully compatible with ISO 11898-2 standard
3. Supports baud rate from 10 kbps to 1 Mbps
4. 2 kV galvanic isolated
5. Direct memory mapping to the CAN controller

### Software Support:

#### ► For Windows:

- ✓ LabView CAN Driver
- ✓ DASyLab CAN Driver
- ✓ RTX CAN Driver
- ✓ PISOCNX Active Object
- ✓ NAPOPC.CAN DA Server
- ✓ InduSoft Driver
- ✓ Power Meter Driver

#### ► For Linux:

- ✓ SocketCAN Device Driver



### PC-based CAN Communication Cards

Model Name	PEX-CAN200i	PISO-CAN100U	PISO-CAN200U	PISO-CAN400U	PISO-CAN800U
Pictures					
CAN Channel	2	1	2	4	8
Bus Interface	X1 PCI Express	Universal PCI			
On-board CPU	-				
Baud Rate	Programmable transfer rate up to 1 Mbps				
Terminator Resistor	Jumper for 120 Ω terminator resistor				
Galvanic Isolation	2 kV				
PC APIs	API for VB, VC, BCB, VB.Net, C#.Net				
RTX Driver	Yes				-
LabVIEW Driver				Yes	
InduSoft Driver				Yes	
OPC Server				Yes	
OCX				Yes	
SocketCAN Driver	Yes				-
Device Driver	Windows XP/7, Linux				Windows XP/7

Model Name	PCM-CAN100	PCM-CAN200	PCM-CAN200P
Pictures			
CAN Channel	1, and the other for bypass	2	
Bus Interface	PCI-104		PC/104-Plus
On-board CPU	-		
Baud Rate	Programmable transfer rate up to 1 Mbps		
Terminator Resistor	Jumper for 120 Ω terminator resistor		
Galvanic Isolation	2 kV		
PC APIs	API for VB, VC, BCB, VB.Net, C#.Net		
RTX Driver	Yes		
LabVIEW Driver	Yes		
InduSoft Driver	Yes		
OPC Server	Yes		
OCX	Yes		
SocketCAN Driver	Yes		
Device Driver	Windows XP/7, Linux		

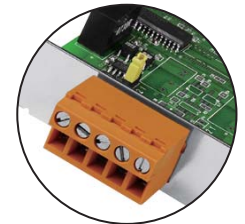
Model Name	PISO-CM100U	PCM-CM100	PISO-DNM100U	PISO-DNS100U	PISO-CPM100U	PCM-CPM100
Pictures						
CAN Channel	1					
Bus Interface	Universal PCI	PCI-104	Universal PCI			PCI-104
On-board CPU	Yes					
On-board CPU OS	MinIOS7					
On-board CPU APIs	C/C++			-		
Default Firmware	CAN 2.0A/2.0B		DeviceNet Master	DeviceNet Slave	CANopen Master	
EDS File Support	-			Yes		
Baud Rate	Programmable transfer rate up to 1 Mbps		125 k, 250 k, and 500 kbps		10 k, 20 k, 50 k, 125 k, 250 k, 500 k, 800 k, 1 Mbps	
Terminator Resistor	Jumper for 120 Ω terminator resistor					
Galvanic Isolation	2 kV					
PC APIs	API for VB, VC++, BCB, Delphi			API for VB, VC++, VB.Net, C#.Net		
LabVIEW Driver	-		Yes	-		
InduSoft Driver	Yes		-		Yes	
Power Meter Driver	Yes		-		Yes	
Device Driver	Windows XP/7, Linux					

**Connector Types: -T/-D**

Each CAN bus board provide two type of connectors, ie., DB9 and Terminal Block.



PISO-xxxxx-D



PISO-xxxxx-T

**Accessory**

**Optional Cable for PISO-CAN800U**

**CA-9-3705:**

DB-37 Male (D-sub) to 4-Port DB-9 Male (D-sub) cable. 0.3 M (90°)



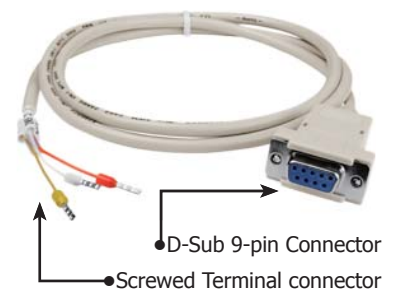
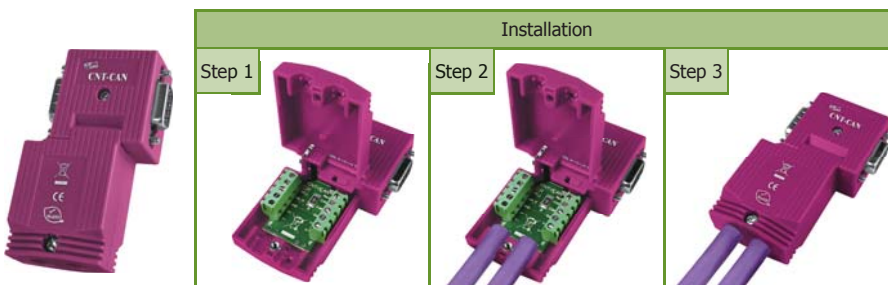
**CA-9-3715D:**

DB-37 Male (D-sub) to 4-Port DB-9 Male (D-sub) cable. 1.5 M (180°)



**Optional CAN bus connector: CNT-CAN**

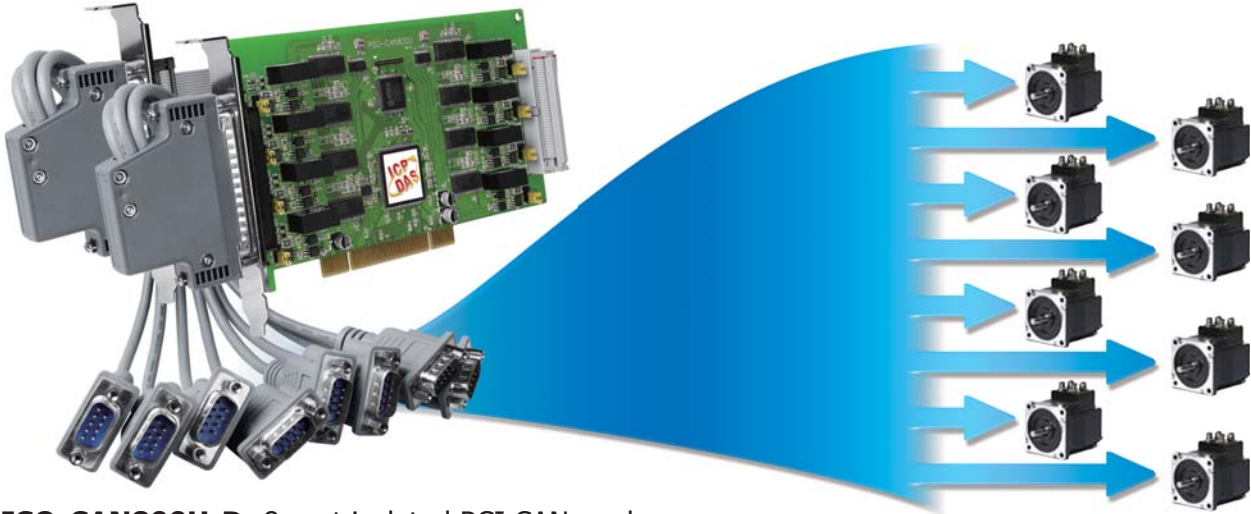
**CA-0910-C**





## CAN bus boards

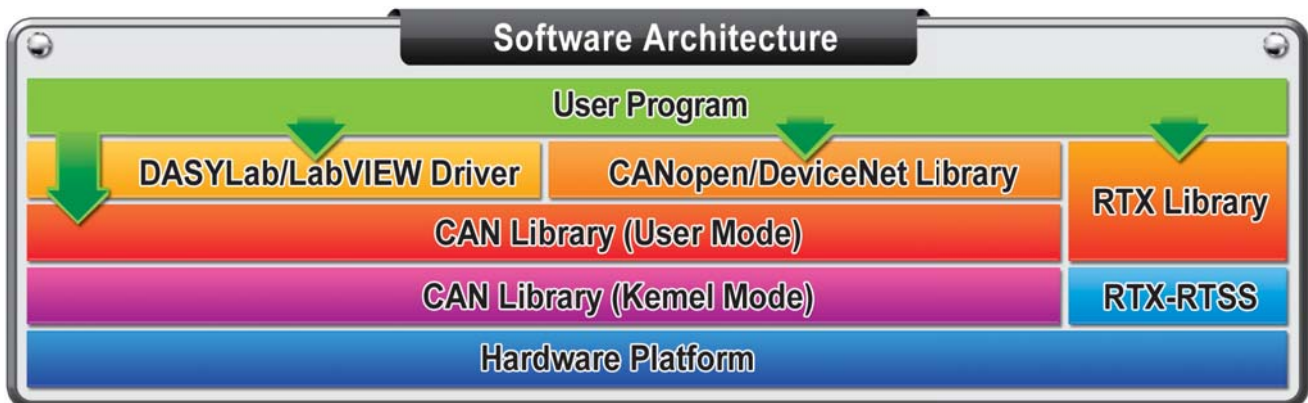
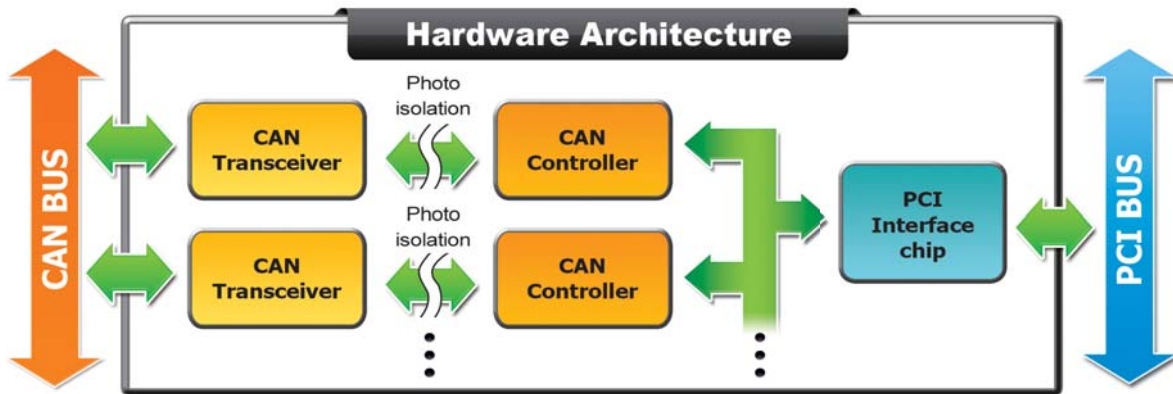
The PCI and PCI Express CAN bus boards use the new CAN controller Phillips SJA1000T and transceiver TJA1042, which provide bus arbitration, error detection with auto correction and re-transmission function. It can be installed in a 5V or 3.3V PCI slot and supported truly "Plug & play".



**PISO-CAN800U-D: 8-port isolated PCI CAN card**

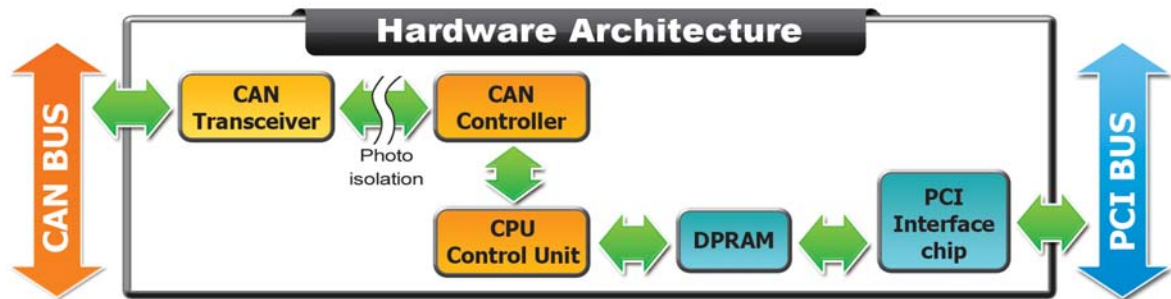
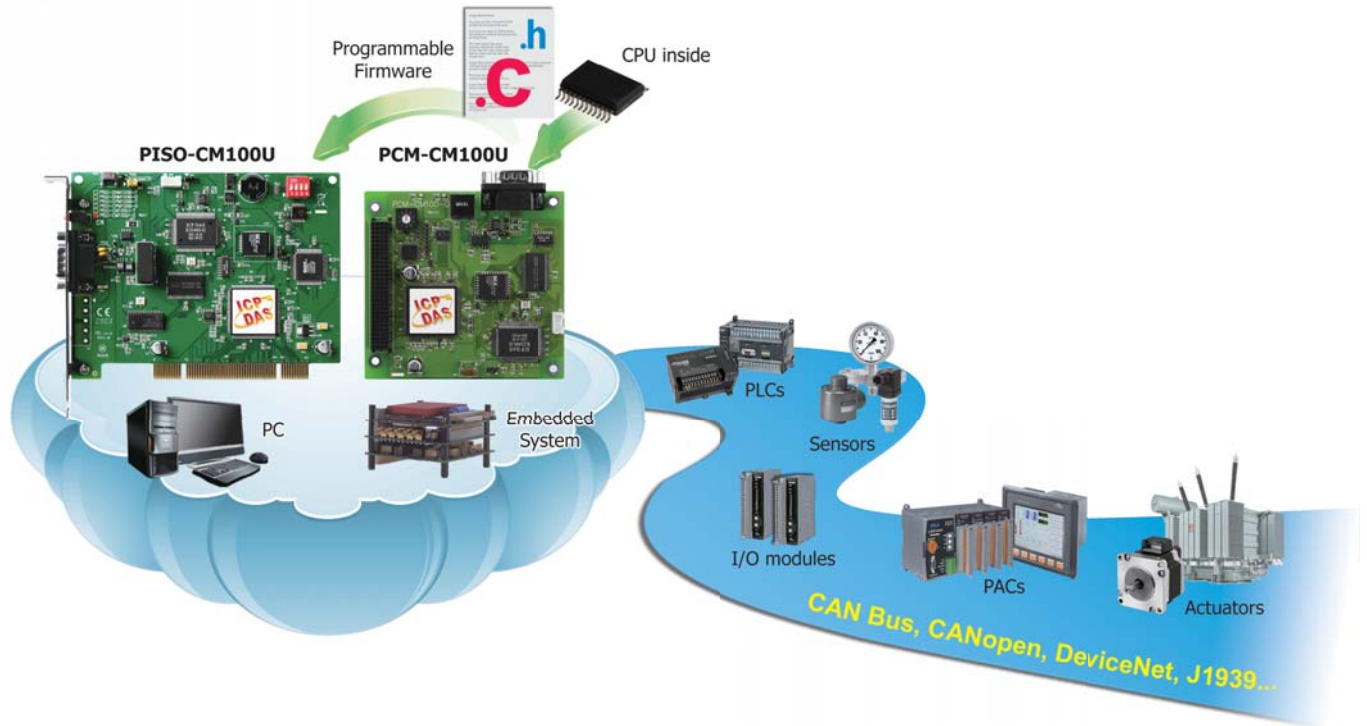
### Common features

- Universal PCI card, supports both the 5 V and the 3.3 V PCI bus
- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898 -2 standard
- Support a range of baud rates from 10 kbps ~ 1 Mbps
- 2500 Vrms photocoupler isolation on the CAN side
- Built-in jumper for the 120 Ω terminator resistor of the CAN bus
- Provide 1/2/4/8 independent CAN channels
- 2 kV galvanic isolation for each CAN port
- Direct memory mapping to the CAN controller
- VB, VC++, Delphi, and Borland C++ builder demos are provided
- Supports LabVIEW and DASyLab drivers



## PISO-CM100U, PCM-CM100: CAN card with built-in programmable CPU

As a stand-alone CAN controller, the PISO-CM100U/PCM-CM100 represents a powerful and economic solution. It has an internal 16-bit 80186 compactable CPU for the complex protocol interpretations and implementations. Owing to the real-time DOS-like OS, MiniOS7, the PISO-CM100U/PCM-CM100 can cover most of all time-critical CAN-based applications, such as self-define CAN protocol, CANopen, DeviceNet, J1939, and so forth. Therefore, when users develop their projects, the PISO-CM100U/PCM-CM100 is helpful to handle the process of the CAN messages, and share the CPU loading of the PC or embedded system. Besides, the PISO-CM100U/PCM-CM100 allows users designing the firmware of the PISO-CM100U/ PCM-CM100. Through the library and demos, it is easy to finish the user-defined firmware to satisfy the users' requirements.



### Built-In 80186 CPU Specifications

System Software	
OS	MiniOS7 (DOS-like embedded operating system)
Program Download Interface	RS-232 (needs an optional cable: CA-0904)
Programming Language	C language
Compilers to create.exe Files	TC++ 1.01 TC 2.01 BC++3.1 ~ 5.2x MSC 6.0 MSVC++ (before version 1.5.2)
CPU Module	
CPU	80186, 80 MHz
SRAM	512 KB
Flash	512 KB
EEPROM	16 KB
DPRAM	8 KB
NVRAM	31 Bytes (battery backup, data valid up to 10 years)
RTC (Real Time Clock)	Provides second, minute, hour, date, day of week, month, year
Watchdog Timers	Yes (0.8 second)



The LabVIEW driver includes a configuration utility to configure the ICP DAS's DeviceNet hardware in your PC. By means of this driver, you don't need to have the complex and abstruse technology of the DeviceNet protocol.

- ✓ OS environment: Windows 2000 / XP
- ✓ NI LabVIEW support version 8.0 or later
- ✓ Supports CAN specification 2.0A and 2.0B
- ✓ Provides 3000-record Rx buffer for each CAN port
- ✓ Offers functions for directly accessing SJA1000 register
- ✓ Supports timestamp information for each received CAN messages



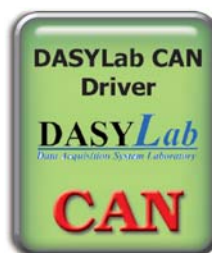
PISOCANX uses ActiveX technology to simply the procedure while developing the application by using PISO-CAN series CAN card. The ActiveX object (OCX) can be not only used in general program development environment, but used in the SCADA software which supports the ActiveX technology.

- ✓ OS environment: Windows 2000 / XP
- ✓ Allows polling mode and interrupt mode
- ✓ Provides 3000-record Rx buffer for each CAN port
- ✓ Supports functions for directly accessing SJA1000 register
- ✓ Allows users to read the card No. and relative information
- ✓ Supports timestamp information for each received CAN messages
- ✓ VC6, VB demos are given



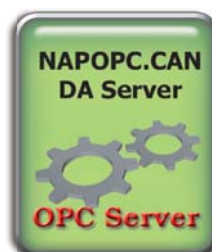
The RTX CAN Driver helps users to develop the highly real-time CAN bus applications on Windows OS by PISO-CAN series boards. The name and parameters of the APIs in the RTX driver are the same as the ones in the Windows driver. Users don't need to pay more efforts to study how to use the APIs of the RTX driver.

- ✓ OS environment: Windows2000 SP4, and Windows XP SP2
- ✓ Supports interrupt function if the PISO-CAN series CAN card can get the independent IRQ
- ✓ Direct I/O control and highly real-time feature
- ✓ Supports RTX version 8.0 and RTX 2012
- ✓ Provides VC 6.0 demos
- ✓ The performance of the RTX driver is increased by 13.8% then the one of the windows driver. The floating ratio of each time schedule in RTX driver is only one tenth of the one in windows driver.
  - ★ Platform: Windows XP SP2+PISO-CAN200E
  - ★ Send and receive 10000 CAN 2.0B 8-byte messages. Repeat this procedure for 10 times



DASYLab is a kind of data acquisition software. It lets you interactively develop PC-based applications by simply attaching functional icons. DASYLab offers real-time analysis, control, and the ability to create custom graphical user interfaces. Besides, it can require weeks of training to master. This is useful in some application cases.

- ✓ OS environment: Windows 2000/XP
- ✓ Supports DASYLab support version 8.0
- ✓ Follows CAN specification 2.0A and 2.0B
- ✓ Supports maximum 64 CAN ports
- ✓ Block size range is 1 ~ 4096
- ✓ Provides Intel mode and Motorola mode for remote CAN device
- ✓ Offers two kinds of languages, German and English



NAPOPC.CAN DA Server is a CAN OPC server to be as an expert bridge between ICP DAS CAN products and the OPC client of the third party software. Besides, it also provides the easy-to-use integral APIs to access the different CAN ports without through the OPC server.

- ✓ OS environment: Windows 2000 / XP
- ✓ Follows OPC 1.0, OPC 2.0 Data Access Standards
- ✓ Configures CAN hardware filter by the APIs of the Virtual CAN Driver
- ✓ Provides CAN Engine Utility to monitor the CAN messages
- ✓ Collects the data from the different CAN devices in one OPC server
- ✓ Provides the CAN devices and the virtual CAN port No. mapping table
- ✓ Loads previous configuration or scans all CAN devices manually while the Virtual CAN Driver boots up
- ✓ Provides the APIs of the Virtual CAN Driver



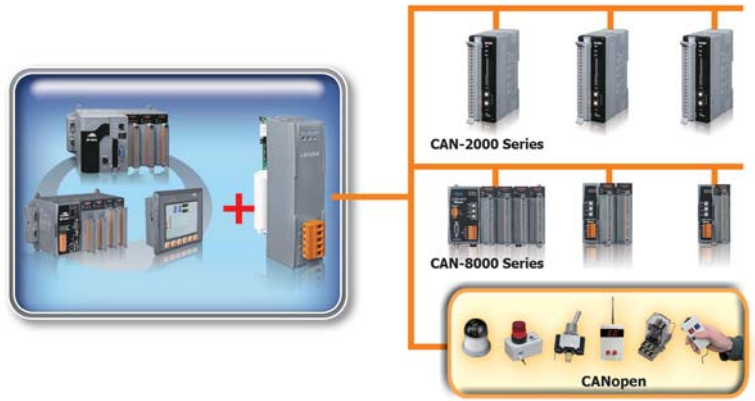
SocketCAN driver is a kind of device driver based on the Linux operating system, and it contains the implementation interface of the network stack and the hardware driver. The hardware manufacturers develop the hardware driver of SocketCAN driver for their hardware interface, and the network stack provides the standard BSD Socket APIs for users.

- ✓ OS environment: Linux kernel version 2.6.31~2.6.34 (x86 hardware platform only)
- ✓ Provides CANopen/DeviceNet master static library Standard interface for SocketCAN package. Users can use extended BSD socket APIs, you can program the CAN application as building a socket program
- ✓ Supports Virtual CAN interface. Users can map several virtual CAN port into one physical CAN port. Each virtual CAN port has its own socket. Through these sockets, users can build the multi-thread application more easily
- ✓ Provides the RAW socket, CANopen master and DeviceNet master demos

## 4.7 PAC Based CAN Modules

These CAN bus communication modules are the solutions to the various CAN application requirements in PAC family with rich CAN bus protocols. The I-8123W, I-87123W, I-8124W, and I-87124W separately support CANopen and DeviceNet master protocols. Users can apply them in PAC to connect to CANopen and DeviceNet devices to reach various CANopen/DeviceNet systems easily.

For the especial CAN bus applications, the I-8120W and I-87120W are designed for users to apply in PAC series. The default firmware of I-8120W and I-87120W provides the transmission and reception of CAN bus messages in PAC. In addition, users can design the specific firmware in these modules to reduce the loading of the PAC in C language.



CAN/CANopen/DeviceNet Communication Module (Parallel/Serial Bus)						
Model Name	I-8120W	I-87120	I-8123W	I-87123	I-8124W	I-87124
Pictures						
<b>Communication</b>						
Interface	ISO 11898-2 CAN					
Port	1					
Terminator	120 Ω Selected By Jumper					
Max. Speed (K bps)	1000		1000		500	
Controller Chip	SJA1000T					
Transceiver Chip	82C250					
Protocol	CAN 2.0 A/2.0 B		CANopen CIA 301 ver 4.02, CIA 401 ver 2.1		DeviceNet Volumn I ver 2.0, Volumn II ver 2.0	
<b>System</b>						
Hot Swap	-	Yes	-	Yes	-	Yes
Data Communication	Parallel Interface	Serial Interface	Parallel Interface	Serial Interface	Parallel Interface	Serial Interface
User-defined Firmware	Yes		-		-	
Isolation	2500 Vrms					
Power Consumption	2 W					
Connector	5-pin Terminal Block					
Optional Accessories	CA-0904 Cable					
<p>CA-0904</p>						
Model Name	I-8120W	I-87120	I-8123W	I-87123	I-8124W	I-87124
<b>PAC Driver Support</b>						
I-8000, iP-8000	-	BC, TC	-	BC, TC	-	BC, TC
VP-2111						
WP-8000	eVc++ 4.0, VB.Net 2005, C#.Net 2005					
VP-2000						
XP-8000-CE6, XP-8000-Atom-CE6	VB.Net 2005, C#.Net 2005, VC 2005					
XP-8000, XP-8000-Atom	VB.Net 2005, C#.Net 2005, VC 6					
LP-8000	-	GCC	-	GCC	-	GCC

## 4.8 I/O Module and Unit



▲ CAN-2000 series

▲ CAN-8000 series

CAN-2000 series and CAN-8000 series are designed for combining sensors and actuators into CANopen or DeviceNet network. All of them provide corresponding EDS files for standard CANopen or DeviceNet master interfaces. The main differences between CAN-2000 series and CAN-8000 series are the product size and the capabilities of I/O expansion. CAN-2000 series is a palm-size and stand-alone slave device. It specially suits for distribution control system, and can be placed in a limited space even in the case of machine. CAN-8000 series is useful for centralizing control system. It provides 1/2/4/8 slots for flexible I/O selections to match various applications. Each slot allows you plugging one I-8000/I-87K series I/O module to expand I/O channels, and hot-swap technique is supported.

With the same hardware, the CAN-2000 series and CAN-8000 series can be installed either of CANopen or DeviceNet firmware. The product names are classified as

**CANopen:** CAN-8x2**3**, CAN-2xxx**C**

**DeviceNet:** CAN-8x2**4**, CAN-2xxx**D**

### • Features

#### 1. Heartbeat Messaging

The heartbeat protocol is generally used to negotiate and monitor the availability of remote I/O devices. It is a message like the heartbeat sent by CANopen/DeviceNet remote I/O modules at a regular time. The users could use this mechanism to indicate the health of the remote I/O. The health information is most important in the industrial applications. All the CANopen/DeviceNet remote I/O series from ICP DAS has the heartbeat protocol to increase the reliability of the remote data.

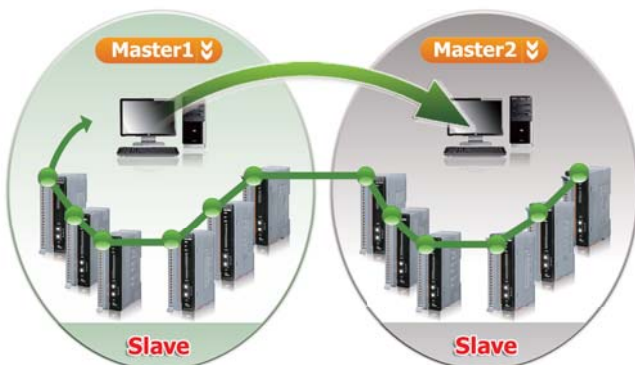


#### 2. Safety & Arbitration

CAN bus provides five mechanisms for achieving the utmost safety of data transfer. There are powerful for error detection, signaling and self-checking are implemented in every CAN node. If two or more nodes start transmitting messages at the same time, the arbitration mechanism is applied to guarantee that one of these messages can be sent successfully according to the priority.

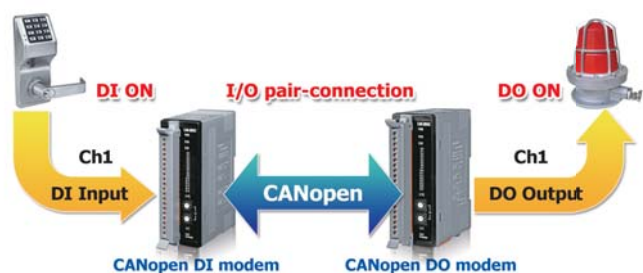
#### 3. Multi-Master Network

A CAN bus network features a multi-master system that broadcasts transmissions to all of the nodes in the system. If one multi master malfunctions, the control authority can be handed over to another master to keep the system running.



#### 4. CANopen Digital I/O Pair-Connection

CANopen Digital I/O Pair-Connection is a special function for CANopen remote I/O. It can send the DI value that detected by the CANopen DI slave to other CANopen DO slaves through the CANopen network, and then these CANopen DO slaves will output the value. It is useful for users who need to detect a DI signal and output a DO alarm in time.



• Communication

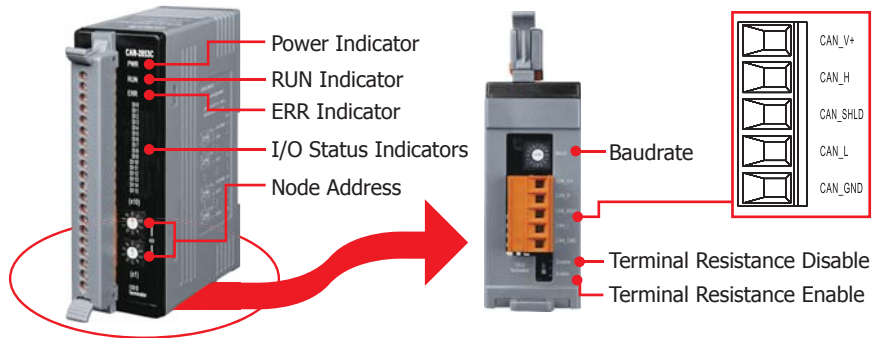
	CANopen I/O Modules	DeviceNet I/O Modules
<b>Communication</b>		
Connector	5-pin screwed terminal block (CAN_GND, CAN_L, CAN_SHLD, CAN_H, CAN_V+)	5-pin screwed terminal block (CAN_GND, CAN_L, CAN_SHLD, CAN_H, CAN_V+)
Baud Rate (bps)	10 k, 20 k, 50 k, 125 k, 250 k, 500 k, 800 k, 1 M	125 k, 250 k, 500 k
Terminator Resistor	Jumper or Switch for 120 Ω terminator resistor	Jumper or Switch for 120 Ω terminator resistor
Node ID	CAN-2000C series: 1 ~ 99 selected by rotary switch CAN-8x23 series: 1~127 selected by rotary switch	0~63 selected by rotary switch
Protocol	CANopen CiA 301 ver4.02, CiA 401 ver2.1	Volume I, Release 2.0 & Volume II, Release 2.0, Errata 5
No. of PDOs	10 Rx, 10 Tx (support dynamic PDO)	-
PDO Mode	Event Triggered, Remotely requested, Cyclic and acyclic SYNC	-
Error Control	Node Guarding protocol and Heartbeat Producer protocol	-
Emergency Message	Yes	-
DeviceNet subscribe	-	Group 2 Only Server
Explicit Connection	-	Yes
Polled I/O Connection	-	Yes
Bit-Strobe I/O Connection	-	Yes
Heartbeat message	Yes	Yes
Shutdown message	-	Yes

• Hardware

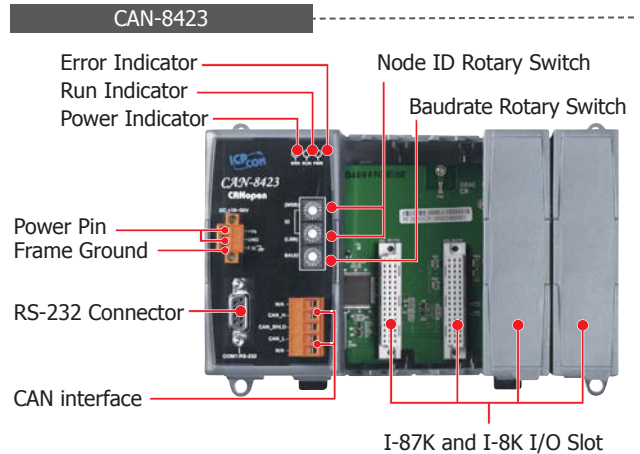
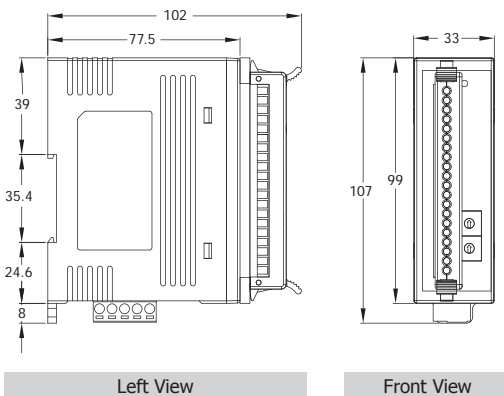
1. Installation



2. Appearance



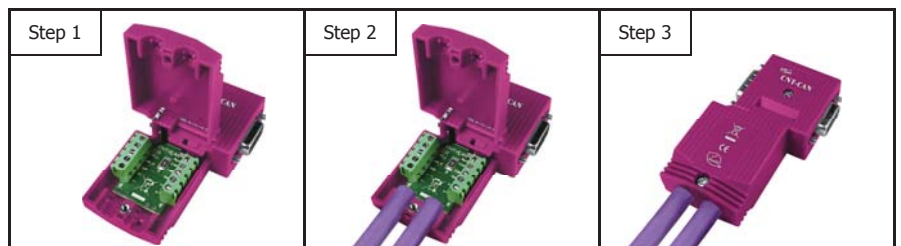
3. Dimensions (Units: mm)



4. Optional Accessory



Optional CAN bus connector: CNT-CAN



Installation

## 4.8.1 Analog Input Modules

### RTD Introduction

Resistance Temperature Detectors (RTD), as the name implies, are sensors used to measure temperature by correlating the resistance of the RTD element with temperature. Most RTD elements consist of a length of fine coiled wire wrapped around a ceramic or glass core. The element is usually quite fragile, so it is often placed inside a sheathed probe to protect it. The RTD element is made from a pure material whose resistance at various temperatures has been documented. RTDs are also relatively immune to electrical noise and therefore well suited for temperature measurement in industrial environments, especially around motors, generators and other high voltage equipments.



### Thermocouple Introduction

A thermocouple is a temperature sensor which consists of two wires of different conductors.

Based on the Seebeck effect in thermoelectricity, the temperature difference results voltage difference on the two wires.

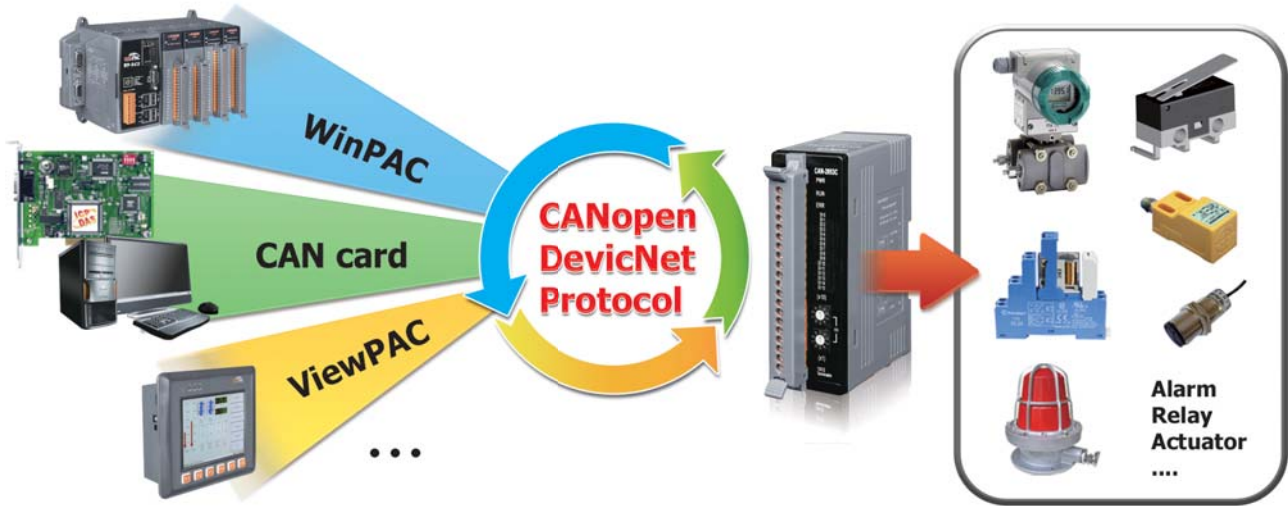
Thermocouples are widely used in scientific and industrial applications because they're generally accurate and can operate over wide range of temperature.





Model Name	CANopen	CAN-2015C		CAN-2017C		CAN-2018C	
	DeviceNet	Available soon	CAN-2015D	Available soon	CAN-2017D		CAN-2018D
Pictures		8 x RTD Input Module		8 x AI Module		8 x Thermocouple Input Module	
							
Channels		8		8		8	
Wiring		2/3 wire		Differential		Differential	
Individual Channel		Yes		Yes		Yes	
Sensor Type		<b>RTD</b> (Pt100, Pt1000, Ni120, Cu100, Cu1000, JPT100)		-		<b>Thermocouple</b> (J, K, T, E, R, S, B, N, C)	
Voltage Input Range		-		±10 V ±5 V ±1 V ±500 mV ±150 mV		±2.5 V ±1 V ±500 mV ±100 mV ±50 mV ±15 mV	
Current Input Range		-		±20 mA (Required External 125Ω Resistor)		±20 mA (Required External 125Ω Resistor)	
Resolution		16-bit		16-bit		16-bit	
Sampling Rate		10 Hz		10 Hz		10 Hz	
Accuracy		±0.05 % of FSR		±0.1 % of FSR		±0.1 % of FSR	
Zero Drift		±0.5 μV/ °C		±10 μV/ °C		±10 μV/ °C	
Span Drift		±20 μV/ °C		±25 μV/ °C		±25 μV/ °C	
Oversvoltage Protection		120 Vdc / 110 Vac		240 Vrms		240 Vrms	
Input Impedance		20 MΩ		2 MΩ		400 kΩ	
Common Mode Rejection		150 dB		86 dB		86 dB	
Normal Mode Rejection		100 dB		100 dB		100 dB	
<b>System</b>							
ESD Protection		4 kV Contact for each channel					
Isolation		3000 Vdc for DC-to-DC, 3000 Vrms for bus-to-logic					
Watchdog		Yes					
<b>Power</b>							
Input range		Unregulated +10 ~ +30 Vdc					
Power Consumption		1.5 W		2 W		1.5 W	
<b>Mechanism</b>							
Installation		DIN-Rail					
Dimensions (W x L x H)		33 mm x 107 mm x 102 mm					
<b>Environment</b>							
Operating Temperature		-25 ~ +75°C					
Storage Temperature		-30 ~ +80°C					
Relative Humidity		10 ~ 90% RH, non-condensing					

## 4.8.2 Analog Output Modules

All of the CAN-2000 modules provide the EDS files for the standard CANopen and DeviceNet master. The analog output has various output ranges, i.e., +/-10V, +/-5V, 0~20mA, etc. Each channel can be individually configured to the same or different output range. It is very convenient for applying the CAN-2000 modules into the CANopen and DeviceNet network.



Model Name	CANopen	CAN-2024C	CAN-2028C
	DeviceNet	CAN-2024D	CAN-2028D
Pictures		4 x AO Module 	8 x AO Module <i>Available soon</i> 
	Channels	4	8
Wiring		Bipolar/Unipolar	Unipolar
Voltage Output Range		0 ~ +5 V ±5 V 0 ~ +10 V ±10 V	-
Current Output Range		0 ~ 20 mA +4 ~ 20 mA	0 ~ 20 mA +4 ~ 20 mA
Resolution		14-bit	12-bit
Accuracy		Voltage : ±0.1 % of FSR Current : ±0.2 % of FSR	±0.2 % of FSR
Output Capacity		Voltage : 10 V @ 5 mA Current : External +24 V : 1050 Ω	External +24 V : 1050 Ω
Power on Value		Yes	Yes
Safe Value		Yes	Yes
<b>System</b>			
ESD Protection		4 kV Contact for each channel	
Isolation		3000 Vdc for DC-to-DC, 3000 Vrms for bus-to-logic	
Watchdog		Yes	
<b>Power</b>			
Input range		Unregulated +10 ~ +30 VDC	
Power Consumption		1.5 W	1.4 W
<b>Mechanism</b>			
Installation		DIN-Rail	
Dimensions (W x L x H)		33 mm x 107 mm x 102 mm	
<b>Environment</b>			
Operating Temperature		-25 ~ +75°C	
Storage Temperature		-30 ~ +80°C	
Relative Humidity		10 ~ 90% RH, non-condensing	



## 4.8.3 Digital I/O Modules

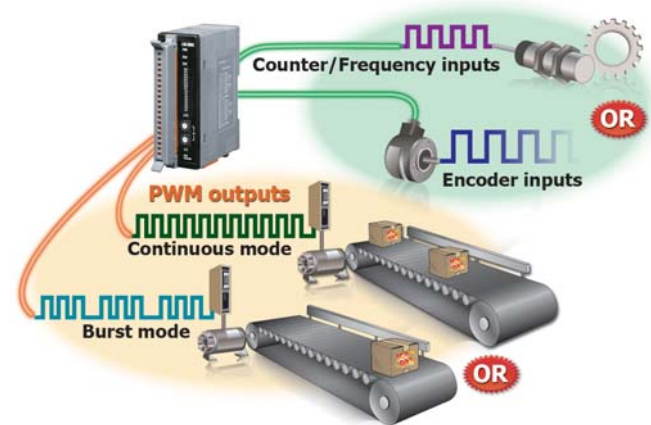
### PWM Introduction





PWM (Pulse width modulation) is a powerful technique for controlling analog circuits. It uses digital outputs to generate a waveform with variant duty cycle and frequency to control analog circuits. CAN-2088C and CAN-2088D have 8 PWM output channels and 8 digital inputs. It can be used to implement powerful and cost effective analog control systems.

### PWM Features

- Automatic generation of PWM outputs by hardware, without software intervention.
- Software and hardware trigger mode for PWM output
- Individual and synchronous PWM output
- Burst mode PWM operation for standby
- DI channel can be configured as simple digital input channel or hardware trigger source of the PWM output.

### Applications



Model Name	CANopen	CAN-2053C	CAN-2054C	CAN-2057C	CAN-2088C
	DeviceNet	CAN-2053D	CAN-2054D	CAN-2057D	CAN-2088D
Pictures		16 x DI Module 	8 x DI, 8x DO Module 	16 x DO Module 	8 x DI, 8x PWM Output Module 
<b>DI</b>					
Channels		16	8		8
Isolation Voltage		3750 Vrms			2500 Vrms
Contact		Wet			Wet
Sink/Source(NPN/PNP)		Sink/Source		-	Sink/Source
ON Voltage Level		+3.5 ~ +30 Vdc			+5.5 ~ 30 Vdc
OFF Voltage Level		+1 Vdc Max.			+3 Vdc Max.
Counter					500 kHz Max.
<b>DO</b>					
Channels			8	16	8
Isolation Voltage			3750 Vrms	3750 Vrms	??
Type			Open Collector	Open Collector	PWM, TTL
Sink/Source(NPN/PNP)			Sink	Sink	Sink
Load Voltage			+5 ~ +30 Vdc	+5 ~ +30 Vdc	+3.5 ~ +5 Vdc
Max. Load Current			700 mA/channel	100 mA/channel	10 mA/Channel
Power on Value			Yes	Yes	-
Safe Value			Yes	Yes	-
<b>System</b>					
ESD Protection		4 kV Contact for each channel			
Isolation		3000 Vdc for DC-to-DC, 2500 Vrms for bus-to-logic			
Watchdog		Yes			
<b>Power</b>					
Input range		Unregulated +10 ~ +30 Vdc			
Power Consumption		1.5 W	1.5 W	1.5 W	2 W
<b>Mechanism</b>					
Installation		DIN-Rail			
Dimensions (W x L x H)		33 mm x 107 mm x 102 mm			
<b>Environment</b>					
Operating Temperature		-25 ~ +75°C			
Storage Temperature		-30 ~ +80°C			
Relative Humidity		10 ~ 90% RH, non-condensing			

## 4.8.4 CANopen I/O Units



**CAN-8123**



**CAN-8423**



**CAN-8223**



**CAN-8823**

### Features

- 80186, 80 MHz CPU
- One ISO 11898-2 High Speed CAN Port
- Hot Swap Allowed
- Auto Configuration
- Standard CANopen LED Indicator
- Rotary Switch For Baud Rate and Node ID
- CANopen DS 301 Ver 4.02 Specification
- CANopen DS 401 Ver 2.1 Specification
- 1/2/4/8 I/O Slots for I-87K and I-8K Series Modules
- Operating Temperature: -25 ~ +75°C



### Specifications

Models	CAN-8123	CAN-8223	CAN-8423	CAN-8823
<b>CAN Interface</b>				
Controller	NXP SJA1000T with 16 MHz clock			
Transceiver	NXP 82C250			
Connector	5-pin screwed terminal block (GND, CAN_L, CAN_SHLD, CAN_H, V+)		5-pin screwed terminal block (N/A, CAN_L, CAN_SHLD, CAN_H, N/A)	9-pin screwed terminal block (N/A, CAN_L, CAN_SHLD, CAN_H, N/A)
Node ID	1~127 (By rotary switch)			
Baud Rate (bps)	10 k, 20 k, 50 k, 125 k, 250 k, 500 k, 800 k, 1 M (By rotary switch)			
Transmission Distance (m)	Depend on baud rate (for example, max. 1000 m at 50 kbps )			
Isolation	1000 Vdc for DC-to-DC, 2500 Vrms for photo-couple			
Terminator Resistor	Jumper for 120 Ω terminator resistor			
Specification	ISO 11898-2, CAN 2.0A and CAN 2.0B			
Protocol	CANopen CiA 301 ver.4.02, CiA 401 ver.2.1			
<b>I/O Expansion Slot</b>				
Hot Swap	Only for I-87K modules			
Auto Configuration	Yes			
Support Module Type	High profile I-87K module, low profile I-87K module and I-8K module			High profile I-8K and I-87K module
Slots Numbers	1	2	4	8
<b>Mechanism</b>				
Dimensions (W x L x H)	64 mm x 119 mm x 91 mm	95 mm x 132 mm x 91 mm	188 mm x 132 mm x 91 mm	312 mm x 132 mm x 91 mm
Installation	DIN-Rail Mounting	DIN-Rail or Wall Mounting		
<b>Environmental</b>				
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			
Humidity	10 ~ 90% RH (non-condensing)			
<b>Power</b>				
Input Range	20 W unregulated +10 ~ +30 Vdc			
Reverse Polarity Protection	Yes			
Frame Ground	No		Yes	
Consumption	1 W	2 W	2.5 W	3 W
Power Board Driving	20 W			

### Ordering Information

<b>CAN-8123-G</b>	CANopen I/O unit with 1 I/O Expansion Slot
<b>CAN-8223-G</b>	CANopen I/O unit with 2 I/O Expansion Slots
<b>CAN-8423-G</b>	CANopen I/O unit with 4 I/O Expansion Slots
<b>CAN-8823-G</b>	CANopen I/O unit with 8 I/O Expansion Slots

## 4.8.5 DeviceNet I/O Units



### Features

- 80186, 80 MHz CPU
- One ISO 11898-2 High Speed CAN Port
- Hot Swap Allowed
- Auto Configuration
- Standard DeviceNet LED Indicator
- Rotary Switch For Baudrate and Node ID
- DeviceNet Volume I Ver 2.0, Volumn II Ver 2.0
- Predefined Master/Slave Connection Set
- 1/2/4/8 I/O Slots for I-87K and I-8K Series Modules
- Operating Temperature: -25 ~ +75°C



### Specifications

Models	CAN-8124	CAN-8224	CAN-8424	CAN-8824
<b>CAN Interface</b>				
Controller	NXP SJA1000T with 16 MHz clock			
Transceiver	NXP 82C250			
Connector	5-pin screwed terminal block (GND, CAN_L, CAN_SHLD, CAN_H, V+)		5-pin screwed terminal block (N/A, CAN_L, CAN_SHLD, CAN_H, N/A)	9-pin screwed terminal block (N/A, CAN_L, CAN_SHLD, CAN_H, N/A)
Node ID	1~63 (By rotary switch)			
Baud Rate (bps)	125 k, 250 k, 500 k (By rotary switch)			
Transmission Distance (m)	Depend on baud rate (for example, max. 500 m at 125 kbps)			
Isolation	1000 Vdc for DC-to-DC, 2500 Vrms for photo-couple			
Terminator Resistor	Jumper for 120 Ω terminator resistor			
Specification	ISO 11898-2, CAN 2.0A and CAN 2.0B			
Protocol	DeviceNet Volume I ver2.0, Volumn II ver2.0 Predefined Master/Slave Connection set			
<b>I/O Expansion Slot</b>				
Hot Swap	Only for I-87K modules			
Auto Configuration	Yes			
Support Module Type	High profile I-87K module, low profile I-87K module and I-8K module			High profile I-8K and I-87K module
Slots Numbers	1	2	4	8
<b>Mechanism</b>				
Dimensions (W x L x H)	64 mm x 119 mm x 91 mm	95 mm x 132 mm x 91 mm	188 mm x 132 mm x 91 mm	312 mm x 132 mm x 91 mm
Installation	DIN-Rail Mounting	DIN-Rail or Wall Mounting		
<b>Environmental</b>				
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			
Humidity	10 ~ 90% RH (non-condensing)			
<b>Power</b>				
Input Range	Unregulated +10 ~ +30 Vdc			
Reverse Polarity Protection	Yes			
Frame Ground	No		Yes	
Consumption	1.7 W	2 W	2.5 W	3 W
Power Board Driving	20 W			

### Ordering Information

<b>CAN-8124-G</b>	DeviceNet I/O unit with 1 I/O Expansion Slot
<b>CAN-8224-G</b>	DeviceNet I/O unit with 2 I/O Expansion Slots
<b>CAN-8424-G</b>	DeviceNet I/O unit with 4 I/O Expansion Slots
<b>CAN-8824-G</b>	DeviceNet I/O unit with 8 I/O Expansion Slots

## 4.8.6 Module Support List of CAN-8000 I/O Unit

Type	I-8K Series I/O		I-87K Series I/O		Description
	High Profile	Low Profile	High Profile	Low Profile	
AI module			I-87005W		8 x Thermister Input Modue
			I-87013W	I-87013	4 x RTD Input Module
			I-87015W		7 x RTD Input Module
			I-87015PW		7 x RTD Input Module
			I-87016W		2 x Strain Gauge Input Module
	I-8017HW	I-8017H	I-87017W	I-87017	8 x Voltage/Current Input Module
			I-87017W-A5		8 x Voltage/Current Input Module
			I-87017RW		8 x Voltage/Current Input Module
			I-87017RCW		8 x Current Input Module
			I-87018W	I-87018	8 x Thermocouple Input Module
			I-87018RW		8 x Thermocouple Input Module
			I-87018ZW		10 x Thermocouple Input Module
			I-87019RW		8 x Universal AI Module
AO module				I-87022	2 x Voltage/Current Output Module
	I-8024W	I-8024	I-87024W	I-87024	4 x Voltage/Current Output Module
				I-87026	6 x AI, 2x AO, 2x DI, 2x DO Module
DI module	I-8040W	I-8040	I-87040W	I-87040	32 x DI (wet, sink/source) Module
	I-8040PW		I-87040PW		32 x DI (wet, sink/source) Module
	I-8046W		I-87046W		16 x DI (dry, source) Module
	I-8051W	I-8051	I-87051W	I-87051	16 x DI (dry, source) Module
	I-8052W	I-8052	I-87052W	I-87052	8 x DI (wet, sink/source) DI Module
	I-8053W	I-8053	I-87053W	I-87053	16 x DI (wet/dry, sink/source) Module
	I-8053PW		I-87053PW		16 x DI (wet/dry, sink/source) Module
			I-87053W-A5		16 x DI (wet/dry, sink/source) Module
			I-87053W-E5		16 x DI (wet/dry, sink/source) Module
			I-87053W-AC1		16 x DI (VAC) Module
	I-8058W	I-8058	I-87058W	I-87058	8 x DI (VAC) Module
			I-87059W		8 x DI (VAC) Module
DO module	I-8037W	I-8037			16 x DO (Open Collector, source) Module
	I-8041W	I-8041	I-87041W	I-87041	32 x DO (Open Collector, sink) Module
	I-8041AW				32 x DO (Open Collector, source) Module
	I-8056W	I-8056			16 x DO (Open Collector, sink) Module
	I-8057W	I-8057	I-87057W	I-87057	16 x DO (Open Collector, sink) Module
	I-8060W	I-8060			6 x Power Relay Module
	I-8064W	I-8064	I-87064W	I-87064	8 x Power Relay Module
		I-8065	I-87065W	I-87065	8 x AC SSR Relay Module
		I-8066	I-87066W	I-87066	8 x DC SSR Relay Module
	I-8068W	I-8068	I-87068W	I-87068	8 x Power Relay Module
I-8069W	I-8069	I-87069W	I-87069	8 x PhotoMOS Relay Module	
DI & DO module	I-8042W	I-8042			16 x DI (wet, sink/source), 16x DO (Open Collector, sink) Module
	I-8050W	I-8050			16x universal DIO (wet, sink) Module
	I-8054W	I-8054	I-87054W	I-87054	8 x DI (wet, sink/source), 8x DO (Open Collector, sink) Module
	I-8055W	I-8055	I-87055W	I-87055	8 x DI (dry, source), 16x DO (Open Collector, sink) Module
	I-8063W	I-8063	I-87063W	I-87063	4 x DI (wet, sink/source), 4x Power Relay Module
Counter module	I-8084W	I-8080			8 x Counter/Frequency Input Module
PWM module	I-8088W				8 x DI, 8x PWM Output Module

Note: CAN-8823 and CAN-28824 only support high profile I-8K and I-87K modules.

# PROFIBUS Products

# 5

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## 5.1 Overview



**PROFIBUS** (Process Field Bus) is a standard for fieldbus communication in automation technology and was first promoted (1989) by BMBF (German department of education and research). It is the world's most successful fieldbus, with more than 31 million devices installed by the end of 2009. Over 5.4 million of these were in the process industries.

There are two variations of PROFIBUS in use today. The most commonly used PROFIBUS DP, and the lesser used PROFIBUS PA.

### ➤ PROFIBUS DP (Decentralized Peripherals)

It is used to operate sensors and actuators via a centralized controller in production (factory) automation applications.

### ➤ PROFIBUS PA (Process Automation)

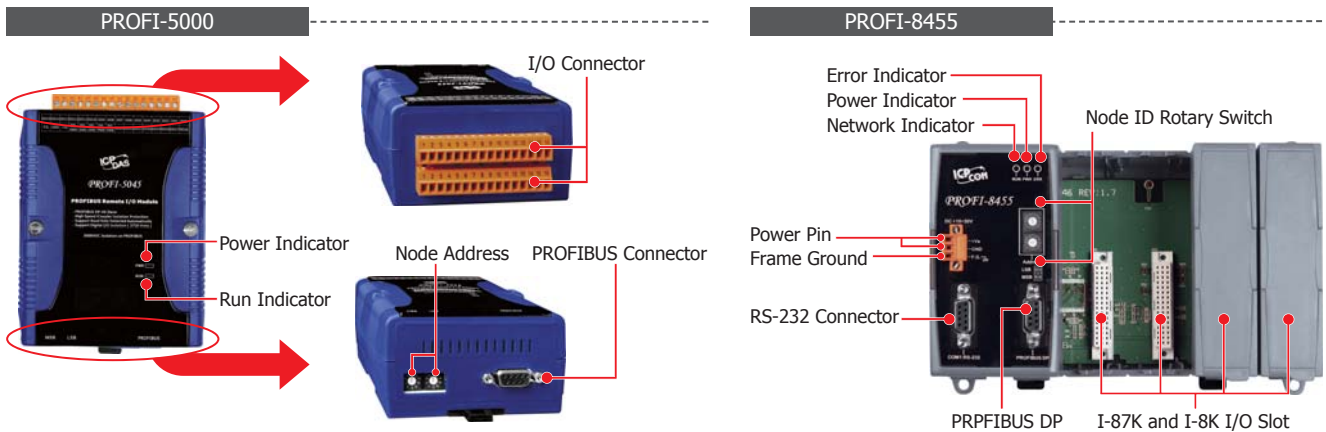
It is used to monitor measuring equipment via a process control system in process automation applications. This variant is designed for use in explosion/hazardous areas.

ICP DAS has been developing various PROFIBUS DP Slave products for several years. We offer converters, gateways, and remote I/O to our customers, and help them to solve technology problems.

## • Features

- Baudrate up to 12Mbit/s.
- Maximum 244 bytes input and 244 bytes output per slave.
- Fast Cyclic data communication between master and slave.
- Slave configuration and parameters are set from the master side by GSD file.
- Allow Multi-master system.
- 124 slaves can be put in Data Exchange.
- 32 stations on one segment.

## • Appearance



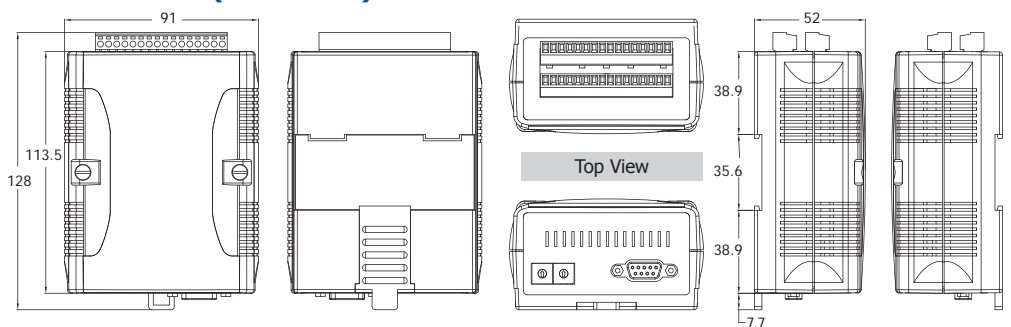
## • Hardware

### 1. Installation



DIN-Rail Mounting

### 2. Dimensions (Units: mm)



Front View

Rear View

Bottom View

Left View

Right View



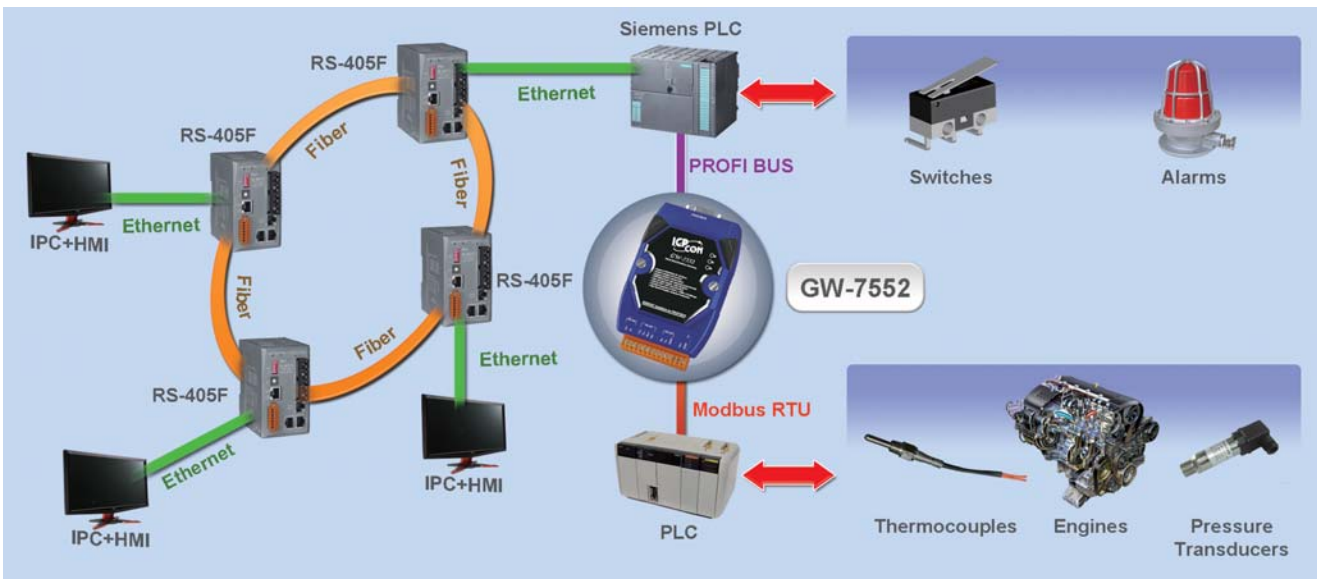
## PROFIBUS Series Selection Guide

Model Name		Interface	Description
Converters	PROFI-2510	PROFIBUS DP <--> PROFIBUS DP	Isolated PROFIBUS repeater
	PROFI-2541 PROFI-2541-SC	PROFIBUS DP <--> Fiber	PROFIBUS to fiber converter
	I-7550	PROFIBUS DP slave <--> RS-232/RS-485/RS-422	PROFIBUS to RS-232/RS-485/RS-422 converter
Gateway	GW-7552	PROFIBUS DP slave <--> RS-232/RS-485/RS-422	PROFIBUS slave to Modbus RTU gateway
	GW-7553	PROFIBUS DP slave <--> Ethernet/RS-232	PROFIBUS slave to Modbus TCP/RTU gateway
	GW-7553-CPM	PROFIBUS DP slave <--> CANopen master	PROFIBUS slave to CANopen master gateway
	GW-7557	PROFIBUS DP slave <--> HART master	PROFIBUS slave to HART master gateway
Remote I/O Modules	PROFI-5045	PROFIBUS DP slave, 24 DOs	Isolated 24-ch DO PROFIBUS slave module
	PROFI-5050	PROFIBUS DP slave, 16 DIs, 8 DOs	16-ch DI & 8-ch DO PROFIBUS slave module
	PROFI-5051	PROFIBUS DP slave, 24 DIs	Isolated 24-ch DI PROFIBUS slave module
	PROFI-5052	PROFIBUS DP slave, 12 DIs	Ch-to-ch Isolated 12-ch DI PROFIBUS slave module
	PROFI-5053	PROFIBUS DP slave, 24 DIs	24-ch DI PROFIBUS slave module
	PROFI-5055	PROFIBUS DP slave, 8 DIs, 8 DOs	Isolated 8-ch DI & 8-ch DO PROFIBUS slave module
	PROFI-5060	PROFIBUS DP slave, 8 DIs, 4 relay outputs	Isolated 8-ch DI & 4 relay output PROFIBUS slave module
	PROFI-5017	PROFIBUS DP slave, 8 voltage inputs	8-ch voltage input PROFIBUS slave module
	PROFI-5017C	PROFIBUS DP slave, 8 current inputs	8-ch current input PROFIBUS slave module
	PROFI-5018	PROFIBUS DP slave, 10 Thermocouple inputs	10-ch Thermocouple input PROFIBUS slave module
	PROFI-5024	PROFIBUS DP slave, 4 voltage/current outputs	4-ch voltage/current output PROFIBUS slave module
Remote I/O units	PROFI-8155	PROFIBUS DP slave, 1 I/O expansion slot	1-slot PROFIBUS slave I/O unit
	PROFI-8255	PROFIBUS DP slave, 2 I/O expansion slots	2-slot PROFIBUS slave I/O unit
	PROFI-8455	PROFIBUS DP slave, 4 I/O expansion slots	4-slot PROFIBUS slave I/O unit
	PROFI-8855	PROFIBUS DP slave, 8 I/O expansion slots	8-slot PROFIBUS slave I/O unit
Accessories	CNT-PROFI	9-pin D-Sub male connector	PROFIBUS Connector



## Application Case Studies

The propulsion system is the most important and complex part of one ocean fishing vessels. It is composed of many electronic devices to control and monitor the engine speed, cooling system, residual fuel content, exhaust gas temperature, engine oil pressure, and so forth. Each of these devices may be handled by several PLCs via the different communication interfaces. In order to integrate the information from these devices, the customer uses the GW-7552 for data-exchange between the Siemens PLC and the Modbus PLC. Therefore, the HMI can collect and configure the important parameters of the propulsion systems quickly and easily through the GW-7552.



## 5.2 PROFIBUS Converters & Repeater

Model Name	I-7550	PROFI-2510	PROFI-2541	PROFI-2541-SC
Pictures				
	PROFIBUS to RS-232/422/485 Converter	Isolated PROFIBUS Repeater	PROFIBUS to Fiber Converter	PROFIBUS to Fiber Converter
PROFIBUS Channel	1	2	1	
PROFIBUS Baud Rate (bps)	9.6 k ~ 12 M		9.6 k ~ 3 M	
PROFIBUS Protocol	DP-V0 Slave	DP-V0/DP-V1/DP-V2		
PROFIBUS Address	0~126 set by DIP switch	-		
PROFIBUS Transmission Distance (m)	Depend on baud rate			
COM 1	RS-232/RS-485/RS-422	-		
COM 1 Baud Rate (bps)	1.2 K ~ 115.2 K	-		
Fiber Channel			1	
Fiber Connector	-		ST (Multi-mode)	SC (Multi-mode)
Fiber Transmission Distance (m)	1.4 km max (in 62.5/125 μm fiber cable)			

### PROFIBUS to RS-232/422/485 Converter

#### I-7550



The I-7550 convert is specially designed for the slave device of PROFIBUS DP protocol. It offers RS-232, RS-422, and RS-485 communication ports. With the hybrid design of the COM 1, you can choose one type of this COM port for implement. Through the I-7550, applying RS-232/RS-422/RS-485 devices into PROFIBUS network is getting easily.

- Protocol PROFIBUS DP-V0 slave
- Detect transmission rate (9.6 to 12000 kbps) on PROFIBUS automatically
- 128 bytes max. input data length
- 128 bytes max. output data length
- PROFIBUS address 0 ~ 126 set by DIP switch
- Support several kinds of baud for COM1 from 1.2 ~ 115.2 kbps
- Network isolation Protection: 2500 Vrms high speed iCoupler
- 3000 Vdc isolation protection on PROFIBUS side





## Isolated PROFIBUS Repeater

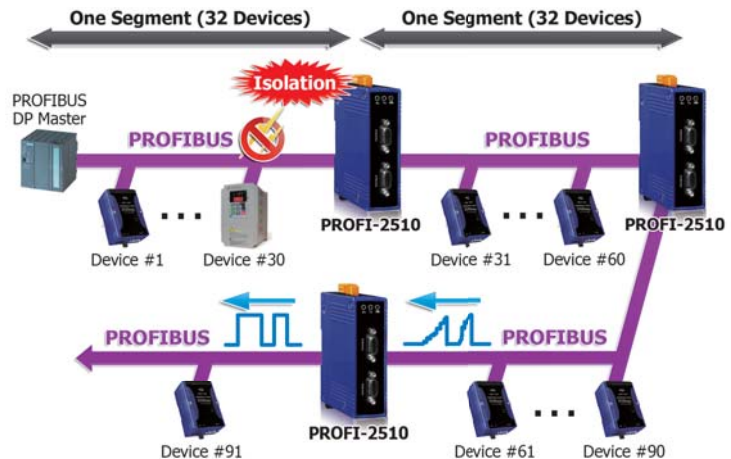
### PROFI-2510

**Available soon**



The PROFI-2510 is a PROFIBUS repeater adaptor. According to the PROFIBUS DP specification, there are maximum 32 devices in one PROFIBUS network segment. The maximum bus length of one segment is decided by the network baud rate. Any two segments need to be connected with each other by a repeater adaptor. If the users' application structure includes more than 32 PROFIBUS devices in the network or has more than 1 network segment in order to extend the total bus length, the PROFI-2510 is helpful to resolve the issue of the bus length or device number expansion. As other Fieldbus networks, the PROFIBUS network also follows daisy-chain topology. Through the PROFI-2510, it is allowed that users are able to set up their PROFIBUS networks by using various topologies, such as stub lines, tree topology, and star topology.

- Detect transmission rate (9.6 k ~ 12000 kbps) automatically
- No additional space needed in the cabinet
- Can be used as a bus extension or spur line
- Increases the number of nodes
- System expansion
- Provide status LEDs
- 2500 VDC isolation protection on PROFIBUS side
- 4 kV Contact ESD protection for any terminal
- Wide range of power input (10 ~ 30 VDC) and
- operating temperature (-25 ~ +75°C)



5

PROFIBUS

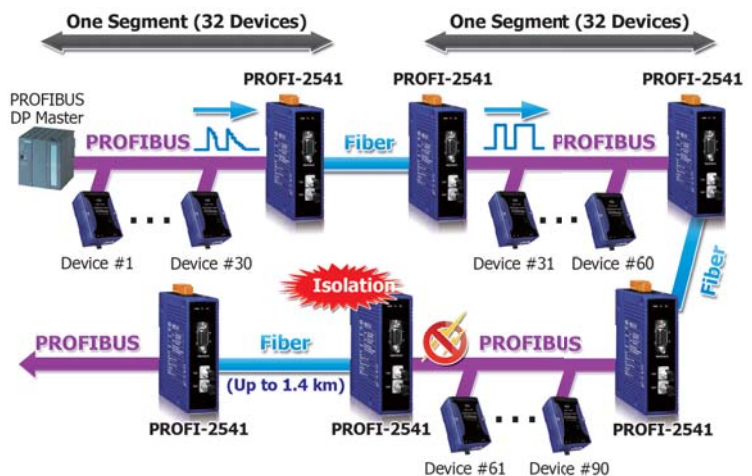
## PROFIBUS to Fiber Converter

### PROFI-2541 PROFI-2541-SC



Similar to the PROFI-2510, the PROFI-2541 can reshape the PROFIBUS messages disturbed by the noise, and expand the connectable number of the PROFIBUS devices in the network. The difference is that the PROFI-2541 offers the fiber optic interface which can transfer the PROFIBUS messages to fiber signals, and users can extend the PROFIBUS bus length as the maximum transmission distance of the applied fiber optic. Users can use one pair of the PROFI-2541s instead of more repeaters while extending the bus length. The PROFI-2541 has passed the test of the 4 kV contact ESD, and provides the isolation protections on each PROFIBUS communication port. This feature means that the PROFIBUS-2541 can offer effective protection, and prevent the devices of one segment from the noise of the other segments.

- Detect transmission rate (9.6 k ~ 3000 kbps) automatically
- Fiber Port: ST (Multi-mode)
- Wave Length: 850 nm
- Provide status LEDs
- Mount easily on DIN-rail
- 2500 VDC isolation protection on PROFIBUS side
- 4 kV Contact ESD protection for any terminal
- Wide range of power input (10 ~ 30 VDC) and operating
- temperature (-25 ~ +75°C)



## 5.3 PROFIBUS Gateway

Model Name		GW-7552	GW-7553	GW-7553-CPM	GW-7557
Pictures					
		PROFIBUS to Modbus RTU Gateway	PROFIBUS to Modbus TCP/RTU Gateway	PROFIBUS to CANopen Gateway	PROFIBUS to HART Gateway
PROFIBUS	Channel	1			
	Baud Rate (bps)	9.6 k ~ 12 M			
	Protocol	DP-V0 Slave	DP-V0 Slave/DP-V1 Slave	DP-V0 Slave	
	Input/Output Data Length	128/131 Bytes	240/240 Bytes		
COM port	Type	1x RS-232/422/485	1x RS-232		
	Baud Rate (bps)	2.4 k ~ 115.2 k			
	protocol	Modbus RTU/ASCII, Master/Slave		Only for configuration	
Ethernet Port	Speed	-	10/100 M	-	-
	Protocol	-	Modbus TCP Server/Client	-	-
HART	Channel	-	-	-	4
	Protocol	-	-	-	HART Master
CANopen	Channel	-	-	1	-
	Baud Rate (bps)	-	-	10K, 20K, 50K, 125K, 250K, 500K, 800K, 1M	-
	Protocol	-	-	CANopen master	-

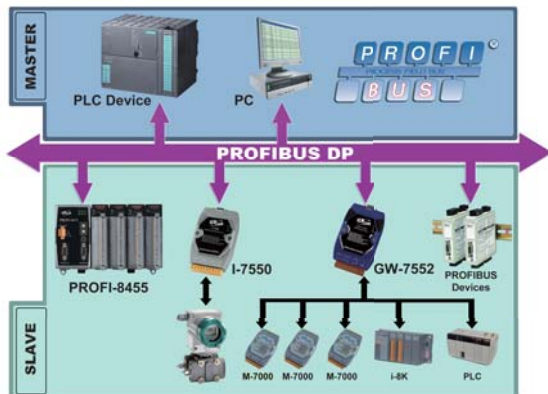
### PROFIBUS to Modbus RTU Gateway

#### GW-7552



The GW-7552 gateway is a PROFIBUS DP slave. It allows the PROFIBUS master to access the Modbus RTU devices. In the Modbus network, the GW-7552 can be a master to access the Modbus slaves, or be a slave to provide the data from the PROFIBUS master. The flexible design lets the GW-7552 widely applying in the many applications.

- Protocol PROFIBUS DP-V0 Slave
- Detect transmission rate (9.6 to 12000 kbps) on PROFIBUS automatically
- 128 bytes max. input data length
- 131 bytes max. output data length
- Support Modbus master mode and slave mode
- PROFIBUS address 0 ~ 126 set by DIP switch
- Support several kinds of baud for COM1 from 2.4 ~ 115.2 kbps
- Network Isolation Protection: 2500 Vrms High Speed iCoupler
- 3000 Vdc isolation protection on PROFIBUS side



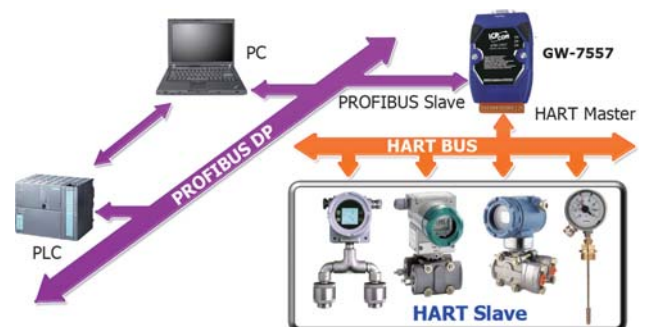
### PROFIBUS to HART Gateway

#### GW-7557



The GW-7557 is designed for the slave device of PROFIBUS DP protocol. It allows the PROFIBUS master to access the HART slave devices. These HART devices may be a transmitter, an actuator, a current output device and so forth. Owing to the GW-7557, you can put the HART slave devices into PROFIBUS network very easily.

- Protocol: PROFIBUS DP-V0 slave
- Detect transmission rate (9.6 to 12000 kbps) on PROFIBUS automatically
- 240 bytes max. input data length
- 240 bytes max. output data length
- PROFIBUS address 0 ~ 126 set by DIP switch
- Support HART mode: point-to-point/multi-drop
- Support 4 HART channels, each for max. 15 HART modules
- Support HART Short/Long frame
- Network isolation protection: 2500 Vrms high speed iCoupler
- 3000 Vdc isolation protection on PROFIBUS side



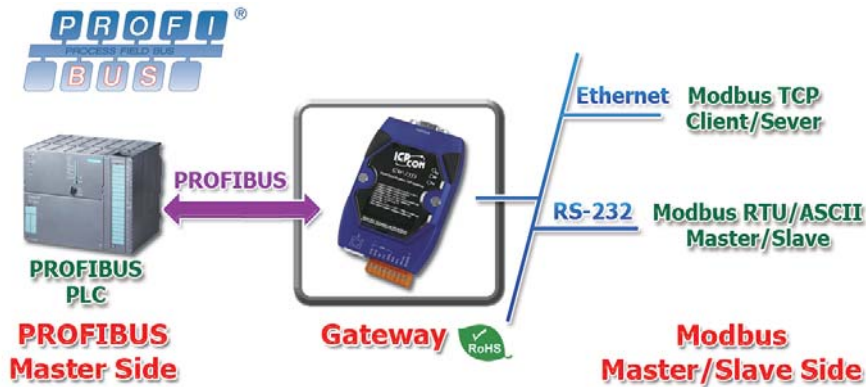
## PROFIBUS to Modbus TCP/RTU Gateway

### GW-7553



The GW-7553 is used for data-exchange between the Modbus TCP/RTU network and the PROFIBUS network. It provides not only the Modbus TCP client and server functions, but the Modbus RTU master and slave functions. Therefore, the GW-7553 can satisfy most of the applications of the data transfer between Modbus and PROFIBUS.

- Protocol PROFIBUS DP-V0 & DP-V1 slave
- Detect transmission rate (9.6 to 12000 kbps) on PROFIBUS automatically
- Support one 10/100 Base-TX Ethernet port
- Support one RS-232 port
- 240 bytes max. input data length
- 240 bytes max. output data length
- Support Modbus TCP/RTU/ASCII protocol
- PROFIBUS address 0 ~ 126 set by DIP switch
- Network isolation protection: 2500 Vrms high speed iCoupler
- 3000 Vdc isolation protection on PROFIBUS side



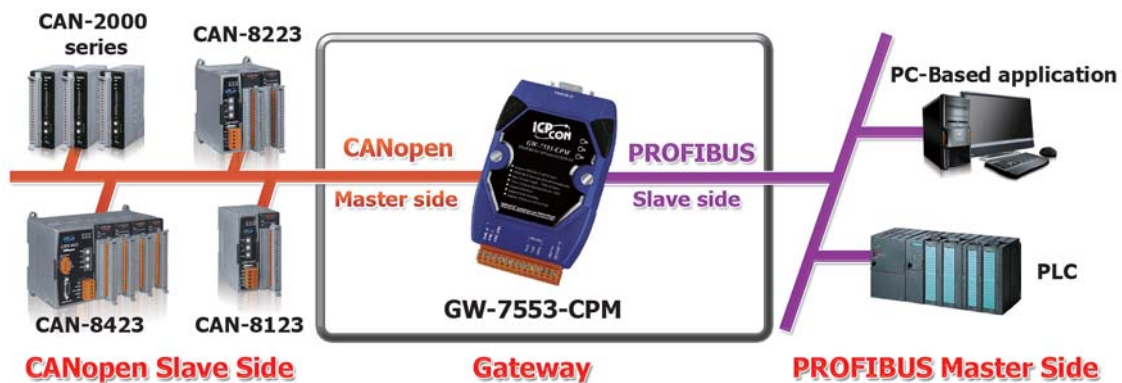
## PROFIBUS to CANopen Gateway

### GW-7553-CPM



The GW-7553-CPM is designed for the slave device of PROFIBUS DP protocol. It allows PROFIBUS master to access CANopen slave devices. These CANopen slave device may be a sensor, actuators, ICPDAS CAN-2000 series modules and so forth. In addition, we also provide the utility software for users to configure the GW-7553-CPM. By using this module, users can put their CANopen slave devices into PROFIBUS network very easily.

- Protocol: PROFIBUS DP-V0 slave
- Detect Transmission rate (9.6 to 12000kbps) on PROFIBUS automatically
- 240 bytes max. input data length
- 240 bytes max. output data length
- PROFIBUS address 0 ~ 126 set by DIP switch
- Follow the CiA CANopen Standard DS-301 v4.02
- Support Heartbeat function
- Support Node Guarding
- Support 230 Rx & 230 Tx PDO
- Network isolation protection: 2500 Vrms high speed iCoupler
- 3000 Vdc isolation protection on PROFIBUS side



## 5.4 PROFIBUS Remote I/O Modules




### Thermocouple Introduction


A thermocouple is a temperature sensor which consists of two wires of different conductors. Based on the Seebeck effect in thermoelectricity, the temperature difference results voltage difference on the two wires. Thermocouples are widely used in scientific and industrial applications because they're generally accurate and can operate over wide range of temperature.

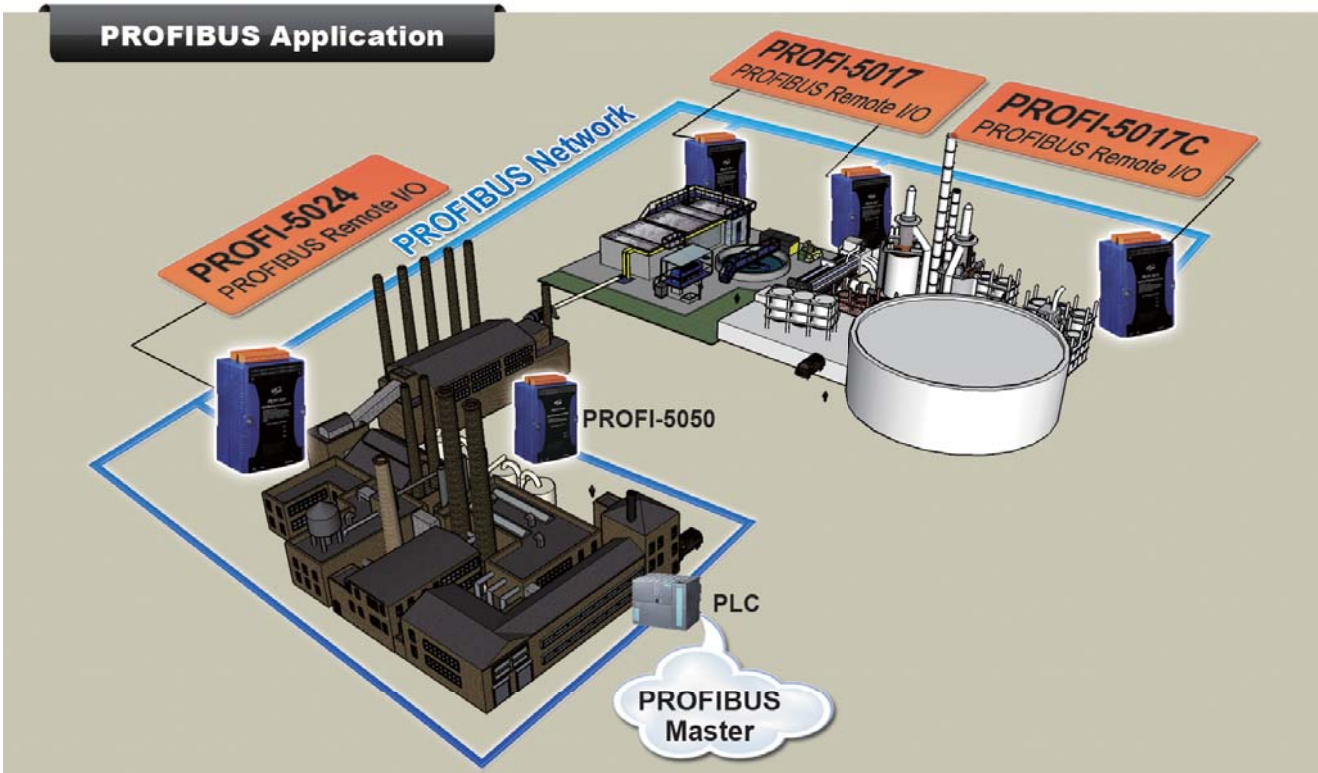


### Applications



Model Name	PROFI-5017	PROFI-5017C	PROFI-5018
	8 x Voltage Input Module	8 x Current Input Module	10 x Thermocouple Input Module
Pictures			
Channels	8	8	10
Wiring	Differential	Differential	Differential
Individual Channel	Yes	Yes	Yes
Sensor Type	-	-	Thermocouple (J, K, T, E, R, S, B, N, C)
Voltage Input Range	±10 V ±5 V ±2.5 V ±1.25 V	-	±2.5 V ±1 V ±500 mV ±100 mV ±50 mV ±15 mV
Current Input Range	-	±20 mA (Required External 125Ω Resistor)	±20 mA (Required External 125Ω Resistor)
Resolution	14-bit	14-bit	16-bit
Sampling Rate	10 Hz	10 Hz	10 Hz
Accuracy	±0.1 % of FSR	±0.2 % of FSR	±0.1 % of FSR
Zero Drift	±0.5 μV/ °C	±10 μV/ °C	±0.5 μV/ °C
Span Drift	±20 μV/ °C	±25 μV/ °C	±25 ppm
Overvoltage Protection	120 VDC / 110 VAC	240 Vrms	N/A
Input Impedance	20 MΩ	2 MΩ	20 kΩ
Common Mode Rejection	150 dB	86 dB	150 dB
Normal Mode Rejection	100 dB	100 dB	100 dB
<b>System</b>			
ESD Protection	4 kV Contact for each channel		
Isolation	3000 VDC for DC-to-DC, 3000 Vrms for bus-to-logic		
Watchdog	Yes		
<b>Power</b>			
Input range	Unregulated +10 ~ +30 VDC		
Power Consumption	1.5 W	2 W	3.5 W
<b>Mechanism</b>			
Installation	DIN-Rail		
Dimensions (W x L x H)	33 mm x 107 mm x 102 mm		
<b>Environment</b>			
Operating Temperature	-25 ~ +75°C		
Storage Temperature	-30 ~ +80°C		
Relative Humidity	10 ~ 90% RH, non-condensing		

Model Name		PROFI-5024
		4 x Voltage/Current Output Module
Pictures		
<b>Channels</b>		
Channels		4
<b>Wiring</b>		
Wiring		Differential
<b>Voltage Output Range</b>		
Voltage Output Range		+/- 10 V
<b>Current Output Range</b>		
Current Output Range		0 ~ 20 mA, 4 ~ 20 mA
<b>Resolution</b>		
Resolution		12-bit
<b>Accuracy</b>		
Accuracy	For Voltage Output	+/- 0.1% of FSR
	For Current Output	+/- 0.2% of FSR
<b>Isolation</b>		
Isolation		3000 Vdc
<b>System</b>		
ESD Protection		4 kV Contact for each channel
Isolation		3000 VDC for DC-to-DC, 3000 Vrms for bus-to-logic
Watchdog		Yes
<b>Power</b>		
Input range		Unregulated +10 ~ +30 Vdc
Power Consumption		1.5 W
<b>Mechanism</b>		
Installation		DIN-Rail
Dimensions (W x L x H)		33 mm x 107 mm x 102 mm
<b>Environment</b>		
Operating Temperature		-25 ~ +75°C
Storage Temperature		-30 ~ +80°C
Relative Humidity		10 ~ 90% RH, non-condensing



PROFIBUS Digital I/O Modules							
Model Name	PROFI-5045	PROFI-5050	PROFI-5051	PROFI-5052	PROFI-5053	PROFI-5055	PROFI-5060
Pictures							
<b>DI</b>							
Channels	-	16	24	12	24	8	8
Isolation Voltage	-	-	3750 Vrms	5000 Vrms	-	3750 Vrms	3750 Vrms
Contact	-	Dry	Wet	Wet	Dry	Wet	Wet
Sink/Source(NPN/PNP)	-	Sink/Source	Sink/Source	Sink/Source	-	Sink/Source	Sink/Source
ON Voltage Level	-	+4~ +30 VDC	+10~ +50 VDC	+4~ +30 VDC	Open	+10~ +50 VDC	+4~ +30 VDC
OFF Voltage Level	-	+1 VDC Max.	+4 VDC Max.	+1 VDC Max.	Close to IN.GND	+4 VDC Max.	+1 VDC Max.
Input Impedance	-	-	10 KΩ	3 KΩ	-	10 KΩ	3 KΩ
<b>DO</b>							
Channels	24	8	-	-	-	8	4
Isolation Voltage	3750 Vrms	-	-	-	-	3750 Vrms	-
Type	Open Collector	Open Collector	-	-	-	Open Collector	Relay (Form C)
Sink/Source(NPN/PNP)	Sink	Sink	-	-	-	Sink	-
Load Voltage	+10 ~ +40 Vdc	+10 ~ +30 VDC	-	-	-	+10 ~ +40 Vdc	0 ~ 125 Vdc 0 ~ 30 Vdc
Max. Load Current	650mA/channel	30 mA/channel	-	-	-	650 mA/channel	0.6 A @ 125 Vdc 2 A @ 30 Vdc
<b>Communication</b>							
Connector	9-pin female D-Sub						
Baud Rate (bps)	9.6 k, 19.2 k, 45.45 k, 93.75 k, 187.5 k, 500 k, 1.5 M, 3 M, 6 M, 12 M						
Controller	Profichip VPCL52						
Transceiver	ADI ADM2486						
Protocol	DP-V0						
Node Address	0~99 selected by rotary switch						
<b>System</b>							
ESD Protection	4 kV Contact for each channel						
Isolation	3000 Vdc for DC-to-DC, 2500 Vrms for bus-to-logic						
Watchdog	Yes						
<b>Power</b>							
Input range	Unregulated +10 ~ +40 VDC						
Power Consumption	1 W	1 W	1 W	1 W	1 W	1 W	1 W
<b>Mechanism</b>							
Installation	DIN-Rail						
Dimensions (W x L x H)	91 mm x 128 mm x 52 mm						
<b>Environment</b>							
Operating Temperature	-25 ~ +75°C						
Storage Temperature	-30 ~ +80°C						
Relative Humidity	10 ~ 90% RH, non-condensing						

### Application



Optional PROFIBUS connector: CNT-PROFI



Installation

## 5.5 PROFIBUS Remote I/O Unit



### Features

- Protocol & hierarchy: DP-V0 & DP-V1 Slave
- Detect transmission Rate Automatically (Max.12 Mbps)
- Support Device-Related & Channel-Related Diagnosis
- Address 0 ~ 126 Set by Rotary Switches or SSA-Telegram
- Support Hot-Swap for I-87K High-Profile I/O Modules
- 3000 V<sub>DC</sub> Isolation Protection on PROFIBUS side
- 1/2/4/8 I/O Slots for I-87K and I-8K Series I/O Modules
- 4 KV ESD Protection (contacting for any terminal)
- Operating Temperature: -25 ~ +75°C



### Introduction

The PROFI-8x55 Remote I/O Unit is designed for the slave device of PROFIBUS DP protocol. It supports up to 1/2/4/8 slots for ICPDAS I-8k, I-87k series I/O modules. In addition, we also provide hot-swap function for I-87k High Profiles series I/O modules. To setup network, users can choose and configure I/O modules by using the GSD file without any other setting tools.

### System Specifications

Models	PROFI-8155	PROFI-8255	PROFI-8455	PROFI-8855
<b>UART Interface</b>				
COM 1	On-Board at JP1 (RS-232 for Update Firmware purpose). Note 1.		at Front Panel	
<b>I/O Expansion Slot</b>				
Hot Swap	Yes			
Auto Configuration	Yes			
Support Module Type	High/low profile I-8K & I-87K I/O module			High profile I-8K & I-87K I/O module
Slots Numbers	1	2	4	8
<b>LED</b>				
Round LED	PWR LED, RUN LED, ERR LED			
<b>PROFIBUS Features</b>				
Protocol & Hierarchy	DP-V0 & DP-V1 (Read/Write)		DP-V0 Slave	DP-V0 Slave
Address Setting	0~126 set by Rotary Switches or SSA-telegram set by DP-Master (Class 2)		0~126 set by Rotary switches	
Supports Transmission Rate (Kbps)	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000, 12000			
Transmission Rate Setting	detected automatically			
Indicators	PWR, ERR, and RUN LEDs			
I/O modules Configuration	Configured by GSD file			
Network Isolation Protection	High Speed iCoupler			
DC Isolation Protection	3000 V <sub>DC</sub> on PROFIBUS side			
Max. Input/Output Data Length	128 Bytes		240 Bytes	
Number of Channel of Diag.	32		39	
Device-Related Diag. Type	Offline Detection			
Programmable Diag. period	Supported			
<b>Mechanism</b>				
Dimensions (W x L x H)	64 mm x 119 mm x 91 mm	95 mm x 132 mm x 91 mm	188 mm x 132 mm x 91 mm	312 mm x 132 mm x 91 mm
<b>Environmental</b>				
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			
Humidity	10 ~ 90% RH (non-condensing)			
<b>Power</b>				
Input Range	Unregulated +10 ~ +30 V <sub>DC</sub>			
Reverse Polarity Protection	YES			
Frame Ground	YES			
Consumption	3 W	3 W	5 W	5.5 W
Power Board Driving	8 W	8 W	25 W	25 W

Note 1: CA-0904 : transform from 4-pin connector to 9-pin Female D-Sub connector.

### Ordering Information

<b>PROFI-8155-G CR</b>	PROFIBUS Remote I/O Unit with 1 Expansion Slot (RoHS)
<b>PROFI-8255-G CR</b>	PROFIBUS Remote I/O Unit with 2 Expansion Slots (RoHS)

<b>PROFI-8455-G CR</b>	PROFIBUS Remote I/O Unit with 4 Expansion Slots (RoHS)
<b>PROFI-8855-G CR</b>	PROFIBUS Remote I/O Unit with 8 Expansion Slots (RoHS)



## Module Support List of PROFIBUS-8000 I/O Unit

Type	I-8K Series I/O		I-87K Series I/O		Description
	High Profile	Low Profile	High Profile	Low Profile	
AI module			I-87013W	I-87013	4 x RTD Input Module
			I-87015W		7 x RTD Input Module
			I-87015PW		7 x RTD Input Module
	I-8017HW	I-8017H	I-87017W	I-87017	8 x Voltage/Current Input Module
			I-87017W-A5		8 x Voltage/Current Input Module
			I-87017RW		8 x Voltage/Current Input Module
			I-87017RCW		8 x Current Input Module
			I-87018W	I-87018	8 x Thermocouple Input Module
			I-87018RW		8 x Thermocouple Input Module
			I-87018ZW		10 x Thermocouple Input Module
			I-87019RW		8 x Universal AI Module
AO module				I-87022	2 x Voltage/Current Output Module
	I-8024W	I-8024	I-87024W	I-87024	4 x Voltage/Current Output Module
				I-87026	6 x AI, 2x AO, 2x DI, 2x DO Module
DI module	I-8040W	I-8040	I-87040W	I-87040	32 x DI (wet, sink/source) Module
	I-8040PW		I-87040PW		32 x DI (wet, sink/source) Module
			I-87046W		16 x DI (dry, source) Module
	I-8051W	I-8051	I-87051W	I-87051	16 x DI (dry, source) Module
	I-8052W	I-8052	I-87052W	I-87052	8 x DI (wet, sink/source) DI Module
	I-8053W	I-8053	I-87053W	I-87053	16 x DI (wet/dry, sink/source) Module
	I-8053PW		I-87053PW		16 x DI (wet/dry, sink/source) Module
			I-87053W-A5		16 x DI (wet/dry, sink/source) Module
			I-87053W-E5		16 x DI (wet/dry, sink/source) Module
			I-87053W-AC1		16 x DI (VAC) Module
	I-8058W	I-8058	I-87058W	I-87058	8 x DI (VAC) Module
			I-87059W		8 x DI (VAC) Module
DO module	I-8037W	I-8037			16 x DO (Open Collector, source) Module
	I-8041W	I-8041	I-87041W	I-87041	32 x DO (Open Collector, sink) Module
	I-8041AW				32 x DO (Open Collector, source) Module
	I-8056W	I-8056			16 x DO (Open Collector, sink) Module
	I-8057W	I-8057	I-87057W	I-87057	16 x DO (Open Collector, sink) Module
	I-8060W	I-8060			6 x Power Relay Module
	I-8064W	I-8064	I-87064W	I-87064	8 x Power Relay Module
		I-8065	I-87065W	I-87065	8 x AC SSR Relay Module
		I-8066	I-87066W	I-87066	8 x DC SSR Relay Module
	I-8068W	I-8068	I-87068W	I-87068	8 x Power Relay Module
	I-8069W	I-8069	I-87069W	I-87069	8 x PhotoMOS Relay Module
DI & DO module	I-8042W	I-8042			16 x DI (wet, sink/source), 16x DO (Open Collector, sink) Module
	I-8050W	I-8050			16x universal DIO (wet, sink) Module
	I-8054W	I-8054	I-87054W	I-87054	8 x DI (wet, sink/source), 8x DO (Open Collector, sink) Module
	I-8055W	I-8055	I-87055W	I-87055	8 x DI (dry, source), 16x DO (Open Collector, sink) Module
	I-8063W	I-8063	I-87063W	I-87063	4 x DI (wet, sink/source), 4x Power Relay Module
Counter module		I-8080			8 x Counter/Frequency Input Module
			I-87082W	I-87082	2 x Counter/Frequency Input Module

Note: PROFI-8855 only support high profile I-8K and I-87K series I/O modules.



# HART Products



## 6.1 Overview

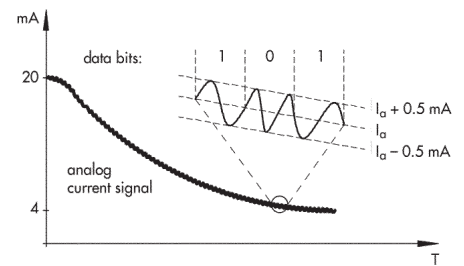
P 6-1

- HART Series Selection Guide----- P 6-1
- HART Converters ----- P 6-2
- HART Gateways----- P 6-3
- HART Remote I/O Unit ----- P 6-5



## 6.1 Overview

HART Field Communications Protocol extends this 4 ~ 20 mA standard to enhance communication with smart field instruments. The protocol preserves the 4 ~ 20 mA signal and enables two-way digital communications to occur without disturbing the integrity of the 4 ~ 20 mA signal. Unlike other communication technologies, the HART protocol can maintain compatibility with existing 4 ~ 20 mA systems with a uniquely backward compatible solution. Here are two main operational modes of HART instruments: analog/digital mode, and multi-drop mode

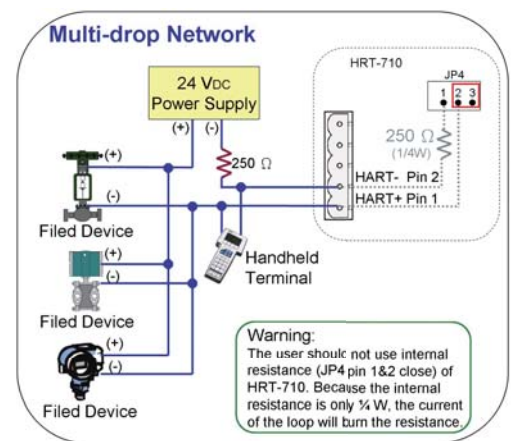
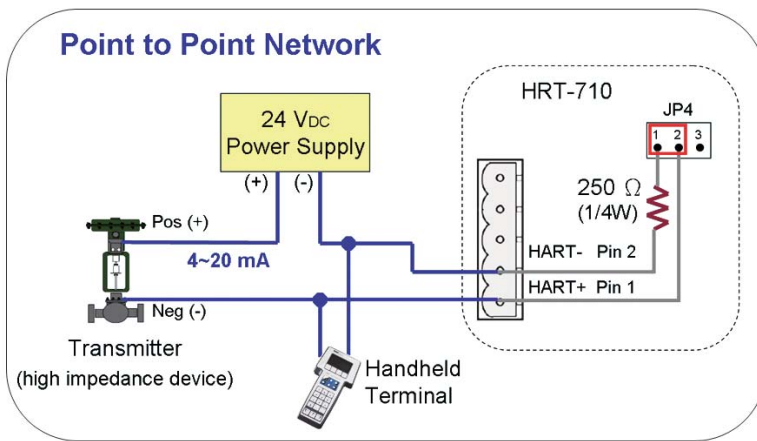


### ► Peer-to-Peer mode

The analog and digital signals can be communicated in this mode. Here the digital signals are overlaid on the 4 ~ 20 mA loop current. Both the 4 ~ 20 mA current and the digital signal are valid output values from the instrument. The polling address of the instrument is set to "0". Only one instrument can be put on each instrument cable signal pair.

### ► Multi-drop mode (digital)

In this mode, only the digital signals are used. The analog loop current is fixed at 4 mA. In multi-drop mode it is possible to have up to 15 instruments on one signal cable. The polling addresses of the instruments will be in the range 1 ~ 15. Each meter needs to have a unique address.



### ► HART Features

- Relatively easy to understand and use, the HART protocol provides access to the wealth of additional information (variables, diagnostics, calibration, etc.)
- HART is a no risk solution for enhanced field communication
- Compatibility with standard 4 ~ 20 mA wiring
- Simultaneous transmission of digital data
- Risk reduction through a highly accurate and robust protocol
- Increase plant Availability
- Improve regulatory compliance

### HART Series Selection Guide

Module	Type	Description
<b>Converter</b>		
I-7547	Ethernet to HART converter	Remote to acquire HART information and send/receive HART command via Ethernet.
I-7567	USB to HART converter	Convenient for users to acquire HART information quickly and send/receive HART command via USB.
I-7570	Serial to HART converter	Easily integrate HART devices via serial port including RS-232 / 422 / 485 interface with HMI / PLC / PC.
<b>Gateway</b>		
HRT-710	Modbus/RTU & ASCII to HART gateway	Designed as the HART master and allows Modbus/RTU & ASCII master to access the HART devices.
GW-7437	Modbus/TCP to HART gateway	Designed as the HART master and allows Modbus/TCP client to access the HART devices.
GW-7557	PROFIBUS to HART gateway	Designed as the HART master and allows PROFIBUS DP master to access the HART devices.
<b>Remote I/O Unit</b>		
I-87H17W	HART AI module with 8 ch. for PAC	I-87K module for AI signal acquisition and send/receive HART command.
I-87H24W	HART AO module with 4 ch. for PAC	I-87K module for AO signal output and send/receive HART command.



## HART Converters

### Ethernet to HART Converter

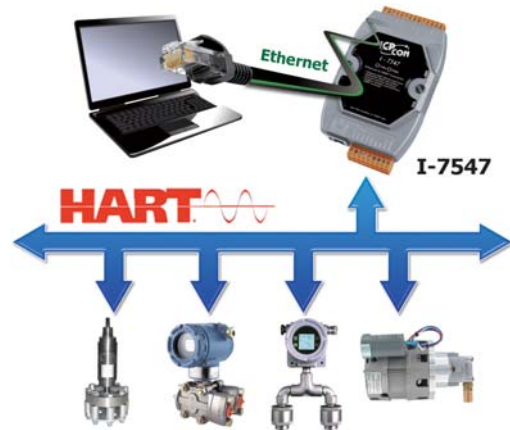
#### I-7547

**Available soon**



The I-7547 is an Ethernet to HART converter designed as the master device of HART protocol. It allows users to access the HART slave via Ethernet. These HART slave devices may be a transmitter, actuator, current output device and so forth. In addition, by using the HC\_Tool utility, users can configure module and test HART communication easily and quickly.

- Support HART Short / Long frame.
- Support HART Burst mode.
- Support point-to-point or multi-drop HART mode.
- Support connecting up to 15 HART slave devices.
- Allow two HART masters.
- Provide HC\_Tool utility for module configuration and HART communication.
- Support firmware update via Ethernet.
- Provide PWR / TxRx indication LED
- 4 KV ESD Protection
- Built-in Watchdog
- Selectable 250  $\Omega$  load resistor
- Provide four HART channels



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### USB to HART Converter

#### I-7567



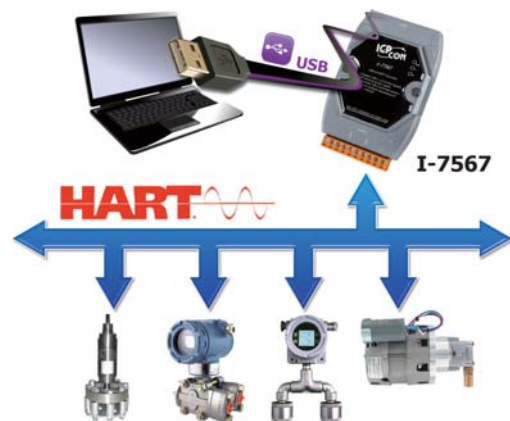
The USB interface is comprehensive applied in PCs and notebooks. In order to touch the users' requirements more closely, the I-7567 is presented. It is a USB to HART converter specially designed as the master device of HART protocol. Through it, users can easily to access the HART network via USB port which is implemented as a virtual COM port on PCs or notebooks. Because the I-7567 is powered by the USB interface, the external power is not necessary. Moreover, the I-7567 provides the Utility tool which is helpful for diagnosing and configuring the HART network. If you would like to develop a HART network, the I-7567 will be a good tool to reduce your setup costs.

#### Features

- Support HART Short/Long frame
- Support HART Burst mode
- Allow two HART masters
- Support the in point-to-point or multi-drop HART network mode
- Allow to connect with max. 15 HART modules
- Provide selectable 250  $\Omega$  load resistor
- Compatible with USB 1.1 and 2.0 standards
- Powered by USB (external power is not necessary)
- Support firmware update via USB
- Provide utility tool for module configuration
- Built-in watchdog
- 4 kV ESD protection
- 3000 Vdc intra-module isolation

#### Utility Features

- Easily transmit/receive HART command for testing
- Provide HART device diagnostic information
- Provide module parameter configuration



HART

## RS-232/422/485 to HART converter

### I-7570



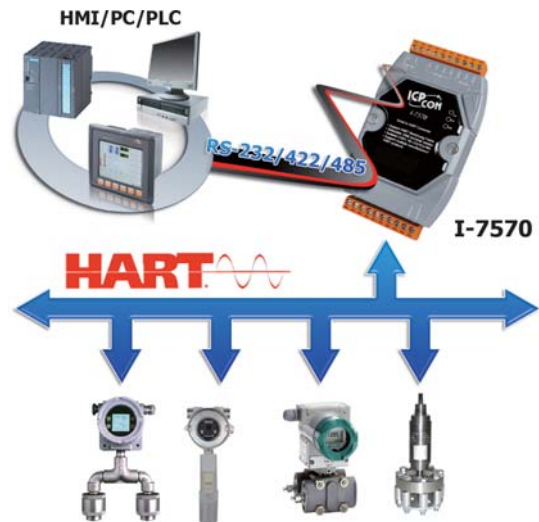
The I-7570 is a Serial to HART converter specially designed as the master device of HART protocol. By using I-7570, the HART devices, such transmitters, actuators, gauges, meters, and the current output devices, can be easily integrated into the HMI/PLC/PC devices via serial port which may be RS-232/RS-422/RS-485 interface. In order to diagnose and configure the HART network more easily, the I-7570 Utility tool with friendly configuration interface is given. It is helpful for diagnosing and configuring the HART network. Through it, you can build a HART network more easily and quickly.

### Features

- Support HART Short/Long frame
- Support HART Burst mode
- Allow two HART masters
- Support the in point-to-point or multi-drop HART network mode
- Allow to connect with max. 15 HART modules
- Provide selectable 250 Ω load resistor
- Isolated COM 1: 3-wire RS-232/RS-422/RS-485
- Support firmware update via COM1
- Provide utility tool for module configuration
- Provide PWR/RUN/ERR LED indicators
- Built-in watchdog
- 4 kV ESD protection
- Mountable on DIN Rail

### Utility Features

- Easily transmit/receive HART command for testing
- Provide HART device diagnostic information
- Provide module parameter configuration



## HART Gateways

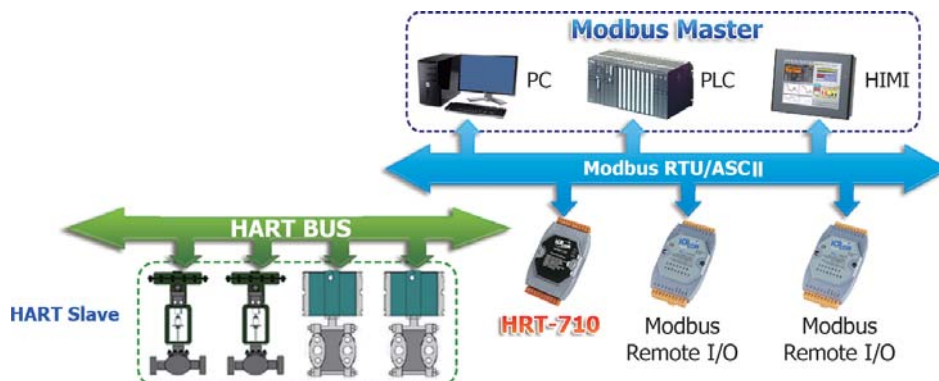
### Modbus RTU/ASCII to HART gateway

### HRT-710



The HRT-710 is a HART master to Modbus slave gateway. It provides an economic solution for Modbus master device to access the HART slave devices. In order to diagnose and configure the HART network more easily, the HRT-710 Utility tool with friendly configuration interface is given.

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>■ Support HART Short/Long frame</li> <li>■ Support HART Burst mode</li> <li>■ Allow two HART masters</li> <li>■ Support the in point-to-point or multi-drop HART network mode</li> <li>■ Allow to connect with max. 15 HART modules</li> </ul> | <ul style="list-style-type: none"> <li>■ Support Modbus RTU and ASCII format</li> <li>■ Modbus Function Code: 01, 02, 03, 04, 05, 06, 15 and 16</li> <li>■ Isolated COM 1: 3-wire RS-232/RS-422/RS-485</li> <li>■ Built-in watchdog</li> <li>■ Mountable on DIN Rail</li> </ul> |
|---|---|



## MB/TCP to HART Gateway

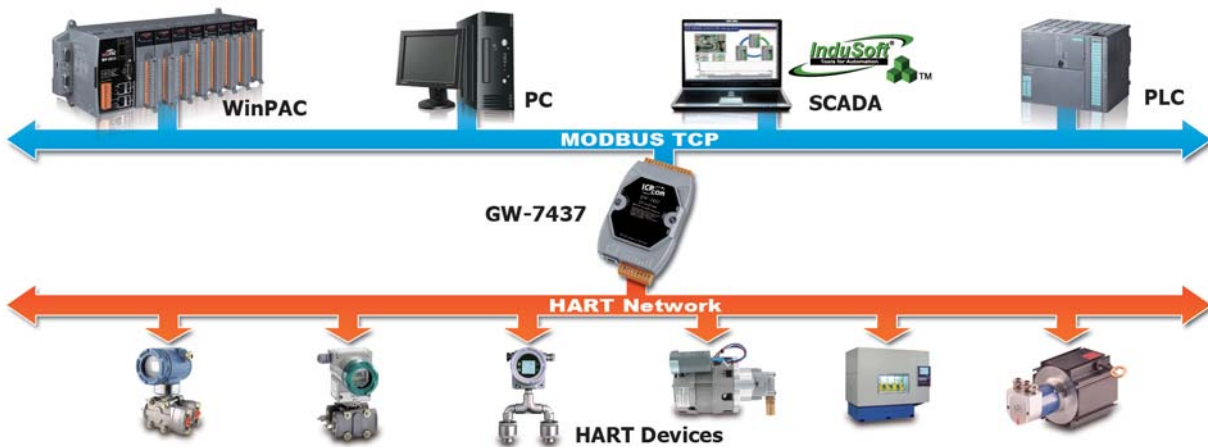
### GW-7437

**Available soon**



The GW-7437 gateway is specially designed for the master device of HART protocol. It allows the Modbus TCP master to access the HART devices. These HART devices may be a transmitter, an actuator and so forth. In addition, we also provide the utility software for users to configure the GW-7437. By using this module, users can integrate their HART devices into Modbus TCP network easily and quickly.

- Support HART Short / Long frame.
- Support HART Burst mode.
- Support point-to-point or multi-drop HART mode.
- Support connecting up to 15 HART slave devices.
- Allow two HART masters.
- Support firmware update via Ethernet.
- Provide PWR / TxRx indication LED
- 4 KV ESD Protection
- Built-in Watchdog
- Selectable 250  $\Omega$  load resistor
- Provide four HART channels



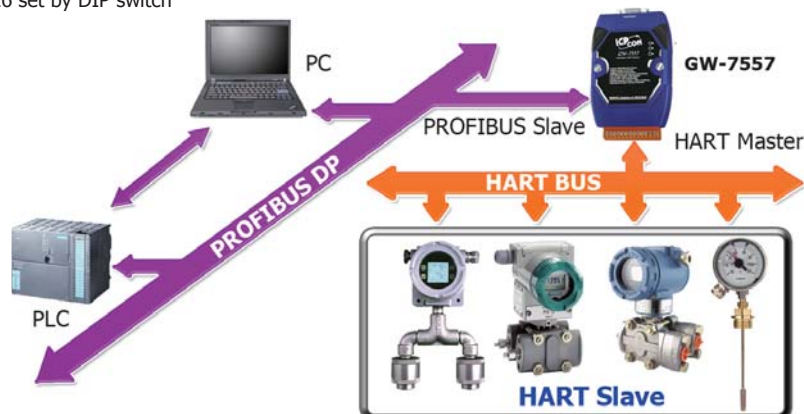
## PROFIBUS to HART Gateway

### GW-7557



The GW-7557 is designed for the slave device of PROFIBUS DP protocol. It allows the PROFIBUS master to access the HART slave devices. These HART devices may be a transmitter, an actuator, a current output device and so forth. Owing to the GW-7557, you can put the HART slave devices into PROFIBUS network very easily.

- Protocol: PROFIBUS DP-V0 slave
- Detect transmission rate (9.6 to 12000 kbps)
- on PROFIBUS automatically
- 240 bytes max. input data length
- 240 bytes max. output data length
- PROFIBUS address 0 ~ 126 set by DIP switch
- Support HART mode: point-to-point/multi-drop
- Support 4 HART channels, each for max. 15 HART modules
- Support HART Short/Long frame
- Network isolation protection: 2500 Vrms high speed iCoupler
- 3000 Vdc isolation protection on PROFIBUS side



## HART Remote I/O Unit

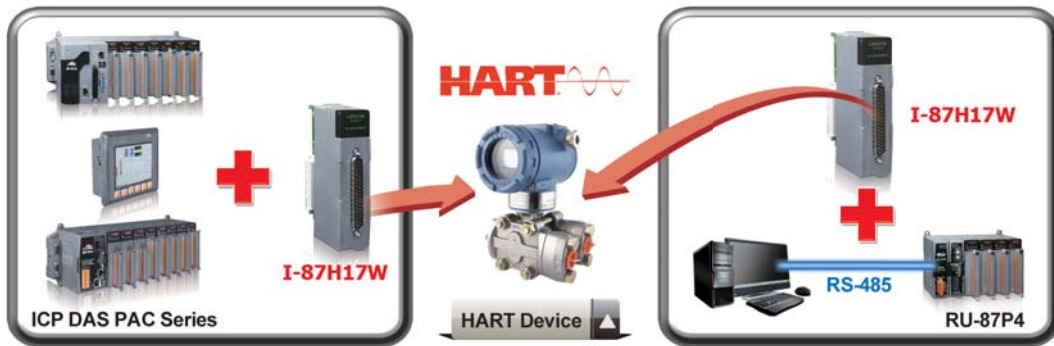
### 8-ch Current Input HART Master Module

#### I-87H17W



The I-87H17W is an 8-ch HART analog input module. It can measure 4~20 mA current and act as a HART master, allowing communication with HART field devices. Users can measure current directly without any external resistor. The I-87H17W adopts DCON protocol and can be used in WinPAC, ViewPAC, XPAC, LinPAC and iPAC series PAC.

- Support HART Short/Long frame
- Support HART Burst mode
- Allow two HART masters
- Support the in point-to-point or multi-drop HART network mode
- Allow to connect with max. 15 HART modules
- Support 4 ~ 20 mA current input
- 2-wire or 4-wire transmitters of HART
- Support DCON protocol
- Open wire detection
- 4 kV ESD protection, and 2500 Vdc intra-module isolation



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HART

### 4-ch Current Output HART Master Module

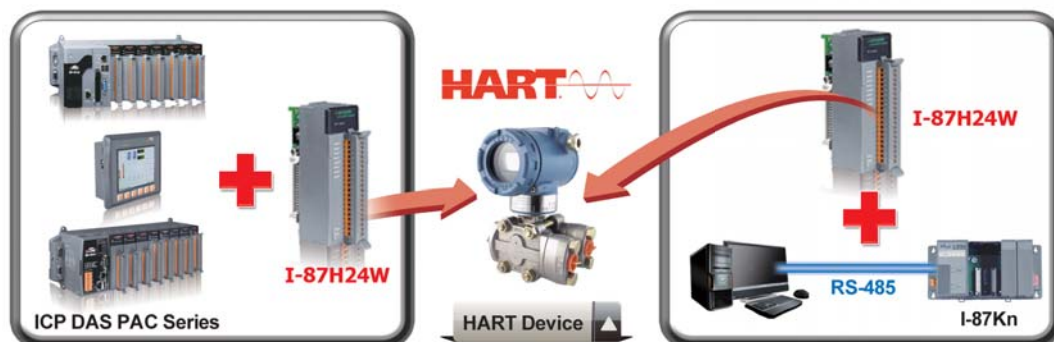
#### I-87H24W

**Available soon**



The I-87H24W is a 4-ch HART analog output module. It can output 4~20 mA current and be as a HART master, allowing communication with HART field devices. The I-87H24W supports DCON protocol defined by ICP DAS, and can be used in WinPAC, ViewPAC, XPAC, LinPAC and iPAC series PAC.

- Support HART Short/Long frame
- Support HART Burst mode
- Allow two HART masters
- Support the in point-to-point or multi-drop HART network mode
- Allow to connect with max. 15 HART modules
- Support 4 ~ 20 mA current output
- 2-wire transmitters of HART
- Support DCON protocol
- Open wire detection
- 4 kV ESD protection, and 2500 Vdc intra-module isolation





# 7.1 Signal Conditioning Modules (SG-3000 Series)

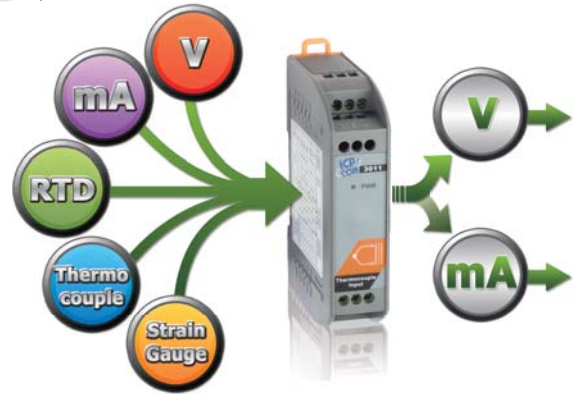
## Introduction

SG-3000 series signal conditioning modules are used to accept wide range of input signals, such as voltage, current, temperature (thermocouple and RTD) and provide 0 ~ 10 VDC , 0 ~ 20 mA, 4 ~ 20 mA output signals.

It gives following good features for industrial applications

- 3-way (power/input/output) isolation (1000 VDC)
- Wide operating temperature (-25 ~ +75°C)
- DIN-Rail mounting
- Input and output connectors on the opposite side
- Signal range configurable by switch

## Applications



## Description

Analog Conditioning Modules					
Models	SG-3011	SG-3013	SG-3016	SG-3071	SG-3081
Pictures					
<b>Analog Input</b>					
Channel	1	1	1	1	1
Wiring	Differential	2/3/4 wires	Differential	Differential	Differential
Signal	Thermocouple	RTD	Strain Gauge	Voltage	Current
Type	Type J, K, T, E, R, S, B, N, C, L, M, L2	Pt100 $\alpha=0.00385$ , Pt100 $\alpha=0.003916$ , Ni 120, Pt1000 $\alpha=0.00385$	$\pm 10$ mV, $\pm 20$ mV, $\pm 30$ mV, $\pm 50$ mV, $\pm 100$ mV	$\pm 5$ V, $\pm 10$ V	0 ~ 20 mA, 4 ~ 20 mA
Resolution	12-bit	12-bit	-	-	-
Accuracy	$\pm 0.2\%$ of FSR	$\pm 0.1\%$ of FSR	$\pm 0.1\%$ of FSR	$\pm 0.1\%$ of FSR	$\pm 0.1\%$ of FSR
Input Impedance	1.8 M $\Omega$	-	-	1.6 M $\Omega$	250 $\Omega$
Excitation Voltage	-	-	0 ~ 10 V	-	-
<b>Analog Output</b>					
Channel	1	1	1	1	1
Current Output	0 ~ 20 mA	0 ~ 20 mA, 4 ~ 20 mA	0 ~ 20 mA	0 ~ 20 mA, 4 ~ 20 mA	0 ~ 20 mA, 4 ~ 20 mA
Voltage output	0 ~ 10 V	0 ~ 5 V, 0 ~ 10 V	$\pm 5$ V, $\pm 10$ V, 0 ~ 5 V, 0 ~ 10 V	$\pm 5$ V, $\pm 10$ V	0 ~ 5 V, 0 ~ 10 V
<b>System</b>					
3-way Isolation	1000 Vdc				
Power Input	10 ~ 30 Vdc				
Power Consumption	1.44 W	1.2 W	1.44 W	1.8 W	1.61 W
Operating Temperature	-25 ~ +75°C				
Dimensions (W x H x D)	25 mm x 114 mm x 71 mm				

Power Conditioning Modules				
Models	PW-3090-24S	PW-3090-12S	PW-3090-5S	PW-3090-4824S-12
Pictures				Available soon
Input	18 ~ 36 V (non-regulated)	18 ~ 36 V (non-regulated)	18 ~ 36 V (non-regulated)	48 V (non-regulated)
Output	24 V @ 0.4 A (Max.)	12 V @ 0.8 A (Max.)	5 V @ 2 A (Max.)	24V @ 0.5 A (Max.)
Isolation	1000 Vdc			
Efficiency	83% Typical			
Operating Temperature	-25 ~ +75°C			
Dimensions (W x H x D)	25 mm x 114 mm x 71 mm			



## 7.2 Surge Protection Module (SG-770)



### Features

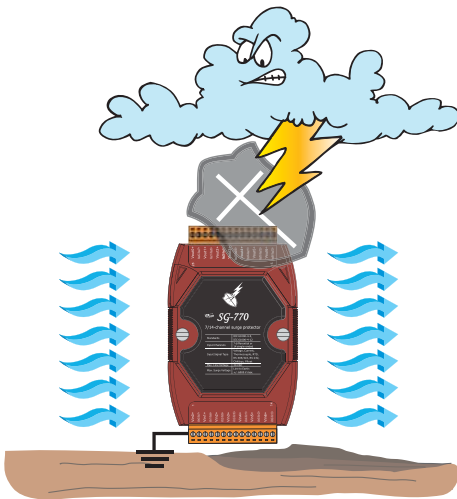
- IEC 61000-4-5, IEC 61000-4-12
- 6 kV Surge Protection
- RoHS Compliance
- A Wide Range of Operating Temperature: -25 ~ +75°C
- Easy Wiring



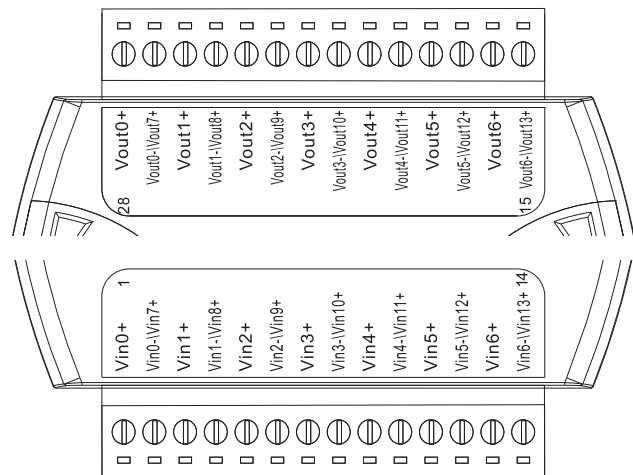
### Introduction

SG-770 offers 7 differential or 14 single-ended for surge protection. SG-770 is approved with IEC 61000-4-5 and IEC 61000-4-12 standards. Each of channels supports 0 ~ ±30 VDC signal and each of channels is protected for surge achieves 6 kV.

### Application



### Pin Assignments



### Specifications

Models	SG-770
<b>General</b>	
Input Channels	7 differential or 14 single-ended
Input Signal Type	Voltage, Current, Thermocouple, RTD, RS-485/RS-422/RS-232, CAN
Max. Line Voltage	30 VDC
<b>Surge Protection Performance</b>	
Standard	IEC 61000-4-5 IEC 61000-4-12
Max. Surge Voltage	Line to Earth: ±6000 VDC Max.
<b>Environment</b>	
Operating Temperature	-25 ~ +75°C
Storage Temperature	-30 ~ +75°C
Humidity	5 ~ 95% RH, Non-condensing
Dimensions (W x H x D)	123 mm x 72 mm x 33 mm

### Ordering Information

<b>SG-770 CR</b>	7 channel differential or 14 channel single-ended surge protector (RoHS)
------------------	--

## 7.3 EMI Ferrite Split/Snap-On Core



### Features

- Aimed to suppress low frequency noise generated by engine control units, inverters, and motors
- Split type
- Operation Temperature: -25°C ~ 75°C



### Introduction

The split ferrite cable cores are designed to significantly reduce EMI/RFI for round cables.

The hinged plastic case surrounding the split core is designed to clamp onto the cable to provide a secure fixture of the ferrite onto the cable. The cores can be retrofitted onto existing installations or used in post-assembly operations on the data and power cables of electronic equipment. Ferrite cores are important for ensuring strong electronic signals through cables in environments where EMI or RFI can be an issue.

### Applications

RS-232, RS-422, RS-485, CAN bus, FRnet, PROFIBUS, Ethernet, USB, AC/DC Power line..etc

#### Inverter



#### Inverter

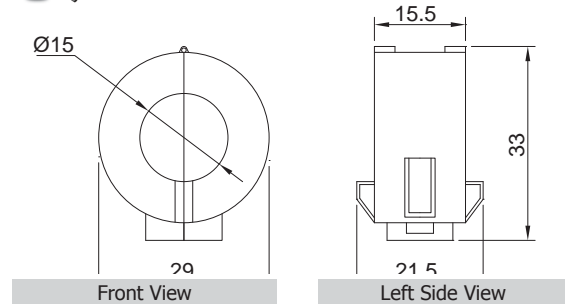


### Specifications

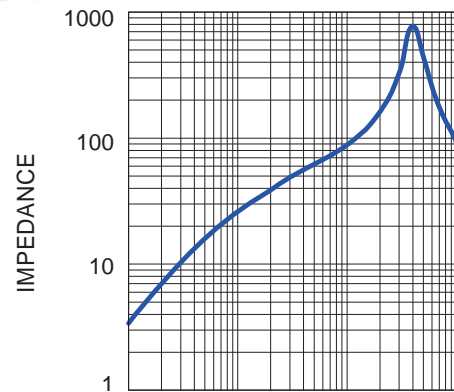
#### Mechanical

Max. Cable Diameter	Ø15 mm
Material Type	Board Band Material
Additional Description	Plastic Case
Case Color	Black

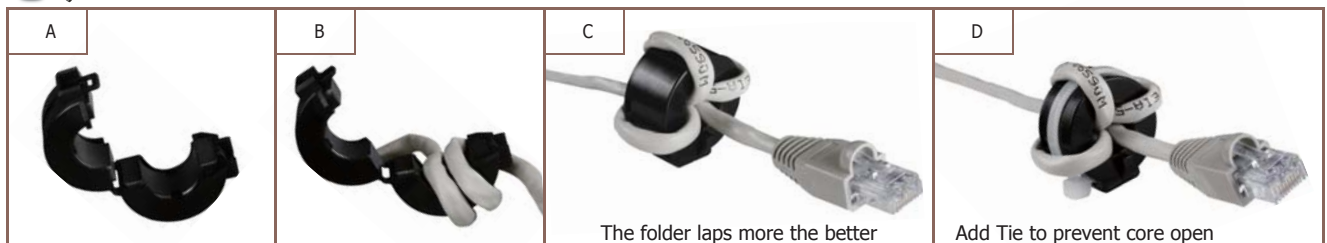
### Dimensions (Units: mm)



### Characteristic



### Installation






Clip-on Ferrite Core Installation



### Ordering Information






4PCD-002

10 ferrite cores and cable ties in one package

## 7.4 Relay Modules

Models	DN-PR4	RM-104, RM-108, RM-116	RM-204, RM-208, RM-216
Pictures			
Relay	VE-24H5-K	FINDER - 40.61.7.024.0000	FINDER - 44.52.7.024.0000
Type	Power Relay		
Channel	4	RM-104: 4 channels RM-108: 8 channels RM-116: 16 channels	RM-204: 4 channels RM-208: 8 channels RM-216: 16 channels
Contact	Form C	Form C (SPDT)	Form C (DPDT)
Operating Voltage Range	250 VAC / 30 Vdc	250 VAC	250 VAC
Max. Load Current	5 A	16 A	6 A
Operate Time	10 ms (Typical)	7 ms (Typical)	8 ms (Typical)
Release Time	5 ms (Typical)	3 ms (Typical)	5 ms (Typical)
LED Indicator	Yes (for Relay status)		
<b>Mechanical</b>			
Dimensions (W x L x D)	96 mm x 103 mm x 34 mm	RM-104: 79 mm x 87 mm x 63 mm RM-108: 135 mm x 87 mm x 63 mm RM-116: 270 mm x 87 mm x 63 mm	RM-204: 90 mm x 87 mm x 63 mm RM-208: 169 mm x 87 mm x 63 mm RM-216: 327 mm x 87 mm x 63 mm
Installation	DIN-Rail Mounting		

Models	DN-SSR4	DN-SSR4DC
Pictures		
Relay	A5P-204U	D3P-054
Type	Solid-State Relay	
Channel	4 channels	
Contact	Form A (SPST)	
Operating Voltage Range	250 VAC / 30 Vdc	50 Vdc
Max. Load Current	4 A	
Operate Time	1/2 Cycle + 1 ms and below	0.5 ms and below (Resistance load)
Release Time	1/2 Cycle + 1 ms and below	0.5 ms and below (Resistance load)
LED Indicator	Yes (for Relay status)	
<b>Mechanical</b>		
Dimensions (W x L x D)	101 mm x 77 mm x 66 mm	
Installation	DIN-Rail Mounting	

Models	RM-20.22	RM-22.22	RM-38.61	RM-48.61	RM-48.62
Pictures					
Relay	Finder 20.22.9.024.4000	Finder 22.22.9.024.4000	Finder 34.51.7.024.0010	FINDER - 40.61.7.024.0000	FINDER - 44.62.7.024.0000
Type	Step Relay		Power Relay		
Channel	1				
Contact	Form A (DPST)	Form A (DPST)	Form C (SPDT)	Form C (SPDT)	Form C (SPDT)
Operating Voltage Range	230 VAC	230 VAC	250 VAC	250 VAC	250 VAC
Max. Load Current	16 A	20 A	6 A	16 A	10 A
Operate Time	15 ms	15 ms	5 ms	7 ms	7 ms
Release Time	8 ms	8 ms	3 ms	3 ms	3 ms
LED Indicator	-				
<b>Mechanical</b>					
Dimensions (W x L x D)	17.5 mm x 84 mm x 62.7 mm		76.5 mm x 6.5 mm x 89 mm	75 mm x 15.5 mm x 78.5 mm	
Installation	DIN-Rail Mounting				

**Note1:** RM-38.61: 5 pcs in one package

RM-48.61: 4 pcs in one package

RM-48.62: 4 pcs in one package

**Note2:** RM-38-093.20 is a 20-way jumper link for RM-38.61



## 7.5 Power Supplies



KA-52F  
KA-52F-48

DIN-KA52F  
DIN-KA52F-48

**KA-52F/DIN-KA52F  
KA52F-48/DIN-KA52F-48**

CE FC RoHS

### Specifications

Models	KA-52F	DIN-KA52F	KA-52F-48	DIN-KA52F-48
<b>Input</b>				
Range	100 ~ 250 VAC			
Frequency	50 ~ 60 Hz			
<b>Output</b>				
Power	24 Vdc/1.04 A Max., 25 W		48 Vdc/0.52 A Max., 25 W	
<b>Mechanical</b>				
Dimensions (W x H x D, Units: mm)	54 x 93 x 36	68 x 107 x 50	54 x 93 x 36	68 x 107 x 50
Installation	No-mounting	DIN-Rail Mounting	No-mounting	DIN-Rail Mounting
<b>Environmental</b>				
Operating Temperature	0 ~ +50°C			
Storage Temperature	-20 ~ +85°C			

### Ordering Information

KA-52F CR	24 Vdc/1.04 A, 25 W Power Supply (RoHS)
DIN-KA52F CR	24 Vdc/1.04 A, 25 W Power Supply with DIN-Rail Mounting (RoHS)
KA-52F-48 CR	48 Vdc/0.52 A, 25 W Power Supply (RoHS)
DIN-KA52F-48 CR	48 Vdc/0.52 A, 25 W Power Supply with DIN-Rail Mounting (RoHS)

### Specifications

Models	GPSU06U-6	GPSU06E-6
<b>Input</b>		
Range	100 ~ 240 VAC or 127 ~ 370 Vdc	
Frequency	50 Hz ~ 60 Hz	
<b>Output</b>		
Power	24 Vdc/0.25 A Max., 6 W	
<b>Mechanical</b>		
Dimensions (W x H x D)	32 mm x 66 mm x 68 mm	
Installation	No-mounting	
<b>Environmental</b>		
Operating Temperature	0 ~ +40°C	
Storage Temperature	-20 ~ +85°C	

### Ordering Information

GPSU06U-6 CR	24 Vdc/0.25 A, 6 W Power Supply (RoHS)
GPSU06E-6 CR	24 Vdc/0.25 A, 6 W Power Supply (RoHS)

### Specifications

Models	MDR-20-24	MDR-60-24	MDR-60-48
<b>Input</b>			
Range	100 ~ 250 VAC		
Frequency	50 ~ 60 Hz		
<b>Output</b>			
Power	24 Vdc/1 A Max., 24 W	24 Vdc/2.5 A Max., 60 W	48 Vdc/1.25 A Max., 60 W
<b>Mechanical</b>			
Dimensions (W x H x D)	22.5 mm x 90 mm x 100 mm	40 mm x 90 mm x 100 mm	40 mm x 90 mm x 100 mm
Installation	DIN-Rail Mounting		
<b>Environmental</b>			
Operating Temperature	-20 ~ +70°C		
Storage Temperature	-20 ~ +85°C		

### Ordering Information

MDR-20-24 CR	24 Vdc/1 A, 24 W Power Supply with DIN-Rail Mounting (RoHS)
MDR-60-24 CR	24 Vdc/2.5 A, 60 W Power Supply with DIN-Rail Mounting (RoHS)
MDR-60-48 CR	48 Vdc/1.25 A, 60 W Power Supply with DIN-Rail Mounting (RoHS)



GPSU06U-6

GPSU06E-6 (2 pole EURO plug)

**GPSU06U-6/GPSU06E-6**

CE FC RoHS



MDR-20-24

MDR-60-24/MDR-60-48

**MDR-20-24  
MDR-60-24  
MDR-60-48**

CE FC RoHS



# G-4511-2G/G-4511P-2G

M2M Power Saving Mini-Programmable Automation Controller



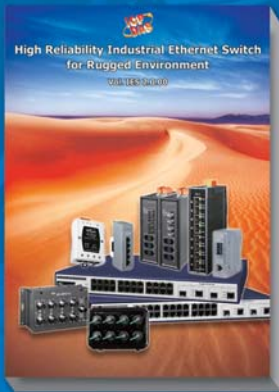
## FEATURES

- ⌚ Sleep mode for energy saving and backup battery
- ♻️ Built-in Solar Panel charging circuit
- ☑️ Configurable sleep mode for maximum power savings.
- ❓ Automatic power supply selection - constant power supply, solar cell, or backup battery
- 📡 Integrated GPS/GPRS function in the controller

Go Green!

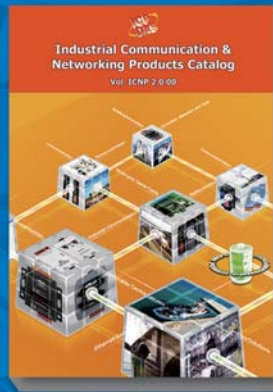


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## High Reliability Industrial Ethernet Switch Catalog

- Managed Ethernet Switches
- Unmanaged Ethernet Switches
- PoE Ethernet Switches
- Media Converters
- Real-time Redundant Ring Ethernet Switches
- IP67 Waterproof Switches
- Cyber-Ring Ethernet Self-healing Technology



## Industrial Communication & Networking Products Catalog

- Multi-port Serial Cards
- Programmable Device Servers (Serial-to-Ethernet)
- Converters, Repeaters and Hubs
- Fieldbus Solutions
- Ethernet Switches



## PAC Products Catalog

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- XP-8000 Series
- WP-8000 Series
- LP-8000 Series
- iP-8000 Series
- ViewPAC Series
- MotionPAC Series
- I/O Expansion Units
- I/O Modules
- 5000 Series
- 7188/7186 Series



## Touch HMI Devices Brochure

- TPD-280 Series
- TPD-430 Series
- TPD-433 Series
- VPD-130 Series
- VPD-132 Series
- VPD-133 Series
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- Intelligent Power Meter
- IR Wireless Solutions



## Remote I/O Modules and I/O Expansion Units Products Catalog

- RS-485 Products
- Ethernet Remote I/O Modules
- FRnet I/O Modules
- CAN Bus Products
- PROFIBUS Remote I/O Modules
- HART Products
- Smart Power Meter
- WISE I/O Module



## Industrial Wireless Communication Products Catalog

- Industrial Wireless series
- DSSS RF modems
- 2G/3G mini-PAC/Modules/Modems
- ZigBee converters & I/O modules
- GPS solutions



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