Industrial Fieldbus

Product Catalog

Vol. IFB 2.0.00

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Introduction

1.1 Overview

Fieldbus 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

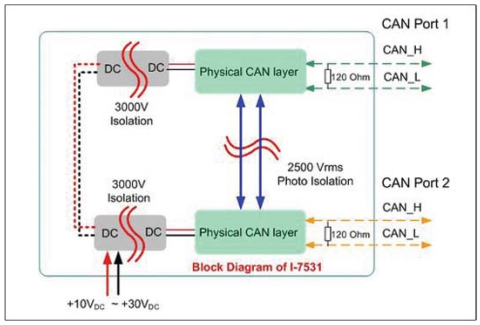
ICP DAS provides a wide range of PC-based, PAC, converter, gateway, and remote I/O solutions for a rich selection of communication protocols, meaning that the appropriate solution is always available regardless of the application field. Whatever your requirements, ICP DAS offers the complete solution.

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. There 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.

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 µPAC 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

µPAC	WP-5000	LP-5000	µPAC-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 I/O Modules for 8000 Series PAC and ViewPAC
- I/O Expansion Units
- µPAC-5000 Series
- WP-5000 Series
- LP-5000 Series
- 7188 7186 Series uPAC
- Redundant System

ViewPAC	VP-25W1	VP-4131	VP-2111 VP-2117	TPD-703	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	10.4" TFT LCD with Touch Panel	128 x 64 Dot Matrix STN LCD	7" TFT LCD with Touch Panel	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-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			

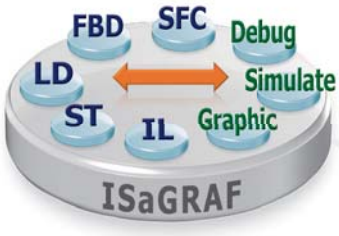
For more details of  **, refer to PAC Product Catalog** 

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. 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)

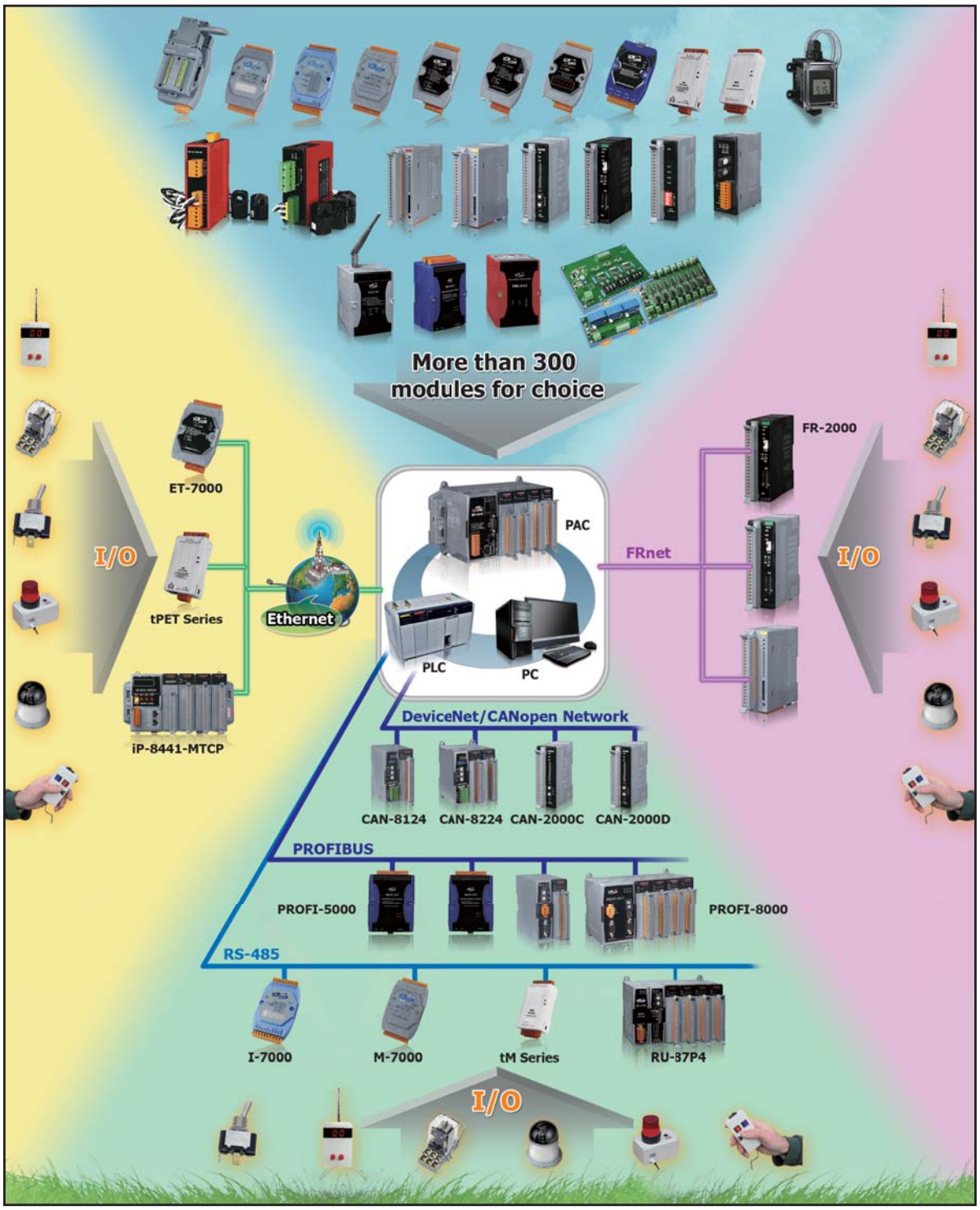
Introduction :

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/root/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.

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/root/support/catalog/catalog.html

RS-485 Products

2

2.1 Communication Cards for PC/IPC

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.

Selection Guide

Universal PCI → VXC -
PCI Express → VEX -

1

X — 1: RS-232; 4: RS-422/485; 8: RS-232, RS-422/485

X — Port Number

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	NEW	8	-	2.5 kV	+/-4 kV	115.2 K	128	Female DB-62
	VXC-118iU	NEW	8	-	-	-	115.2 K	256	Female DB-62
	VXC-148U-5w	NEW	-	8	2.5 kV	+/-4 kV	115.2 K	256	Female DB-62
	VXC-148iU-5w	NEW	-	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	NEW	8	-	2.5 kV	+/-4 kV	115.2 K	256	Female DB-62
	VEX-118i	NEW	8	-	-	-	115.2 K	256	Female DB-62
	VEX-148-5w	NEW	-	8	2.5 kV	+/-4 kV	115.2 K	256	Female DB-62
	VEX-148i-5w	NEW	-	8	-	-	115.2 K	256	Female DB-62

2.2 Communication Modules 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					
Communication					
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				
System					
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°

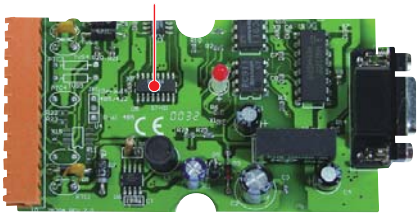
DN-09-2F
I/O Connector Block with DIN-Rail Mounting and two 9-pin Male Header
Includes : 2 x CA-0910F (9-pin Female-Female D-sub Cable 1.0 M)

2.3 Converter/Repeater/Hub/Splitter

U.S. Patent

ICP DAS Self-Tuner ASIC Features:
- Multiple Baud Rate
- Multiple Data Format
- Automatic RS-485 Direction Control

Self-Tuner Chip

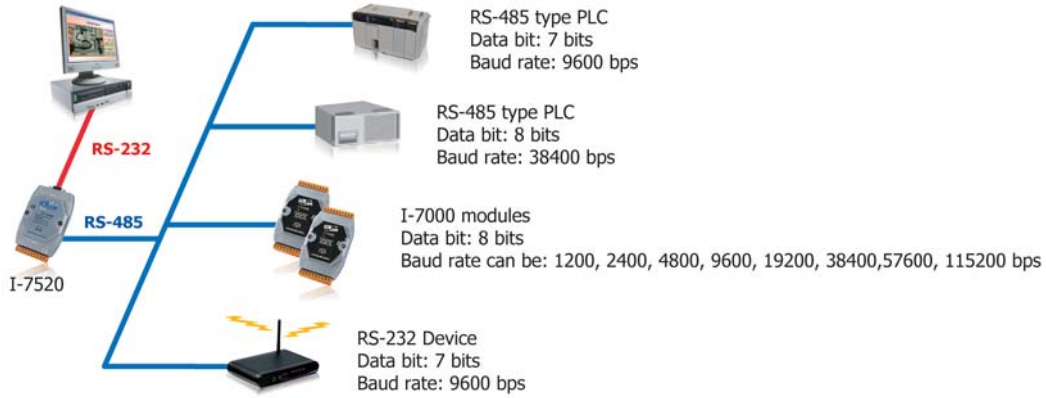


▲ I-7520

"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.

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.



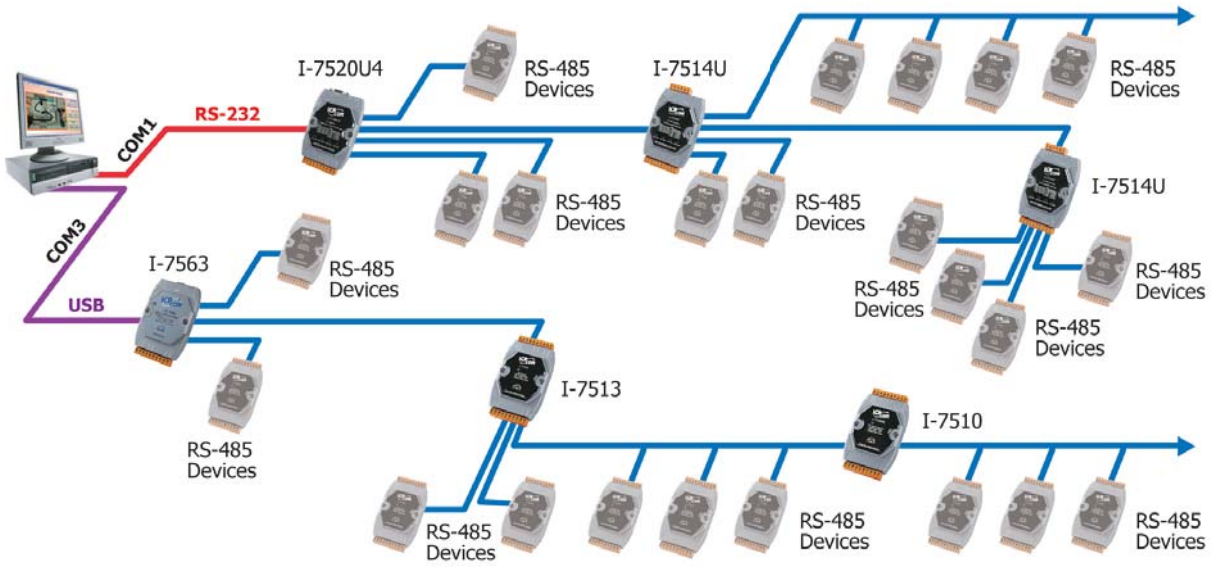
▲ I-7520U4

▲ I-7514U

High Quality Isolated RS-485 Repeater/Hub/Splitter

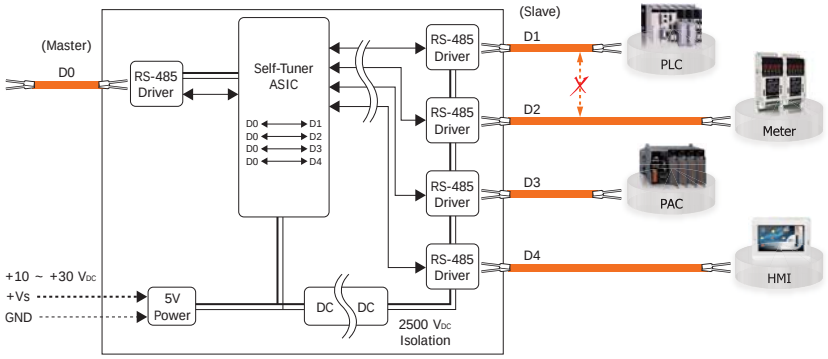
The maximum effective distance of RS-485 without repeater is 1200 meters (4000 feet) at baud rates up to 9.6 Kbps and up to 32 (256) nodes can be connected. With the professional design, the repeater I-7510 solves the problem of signal weakening and extends the maximum effective distance by 1200m and 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	NEW 						NEW 			
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	USB-2514	I-7561	tM-7561
Pictures		NEW 		NEW 
Function	Converter	Converter	Converter	Converter
Interface	USB to RS-232	USB to 4-Port 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			NEW 	NEW 
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

tM-SG4

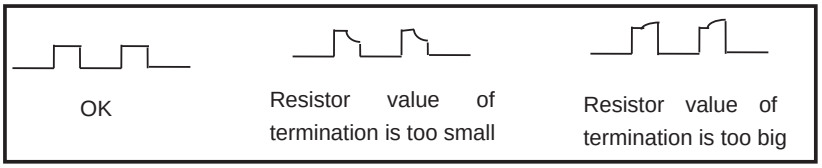
The RS-485 Bias and Termination Resistors Module

Features

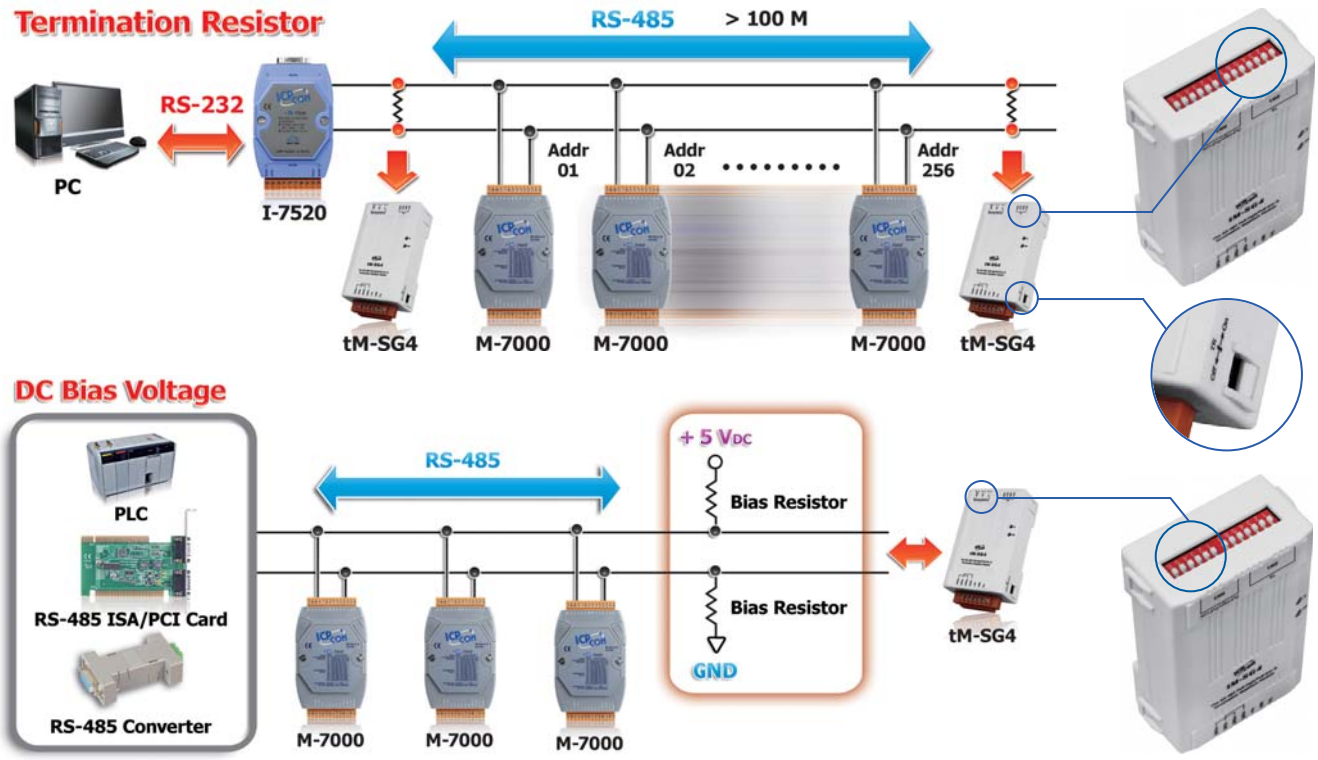
- Switch-selectable Bias Resistors
- 15-step Switch-selectable Termination Resistor
- LED Indicator for Power/Termination
- DIN-Rail Mountable
- Cost-effective
- Wide Operating Temperature Range: -25 ~ +75°C

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



2.5 RS-485 I/O Modules

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.

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				
Communication				
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 KΩ	No (Note1)	
Dual Watchdog		Yes, Module (2.3 second), Communication (Programmable)	Yes, Module (1.6 second), Communication (Programmable)	
I/O				
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	
Display				
Power and Communication LED		Yes	Yes	
I/O Status LED		-	Yes (for D version only)	
7-Segment LED		-	Yes (for D version only)	
Mechanical				
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 Units

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
Interface Type (RS-485)				
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)			
Switch				
Rotary Switch	x2, For RS-485 address			
DIP Switch	8-bit × 1, For auto configuration, check sum and baud rate			
LED Indicators				
Power	Yes			
System Ready	Yes			
Auto Configuration	Yes			
Slot Status	Yes			
I/O Expansion Slots				
Hot Swap	Yes			
Auto Configuration	Yes			
Support Module Type	High profile I-87K module only			
Slots Numbers	1	2	4	8
Mechanical				
Dimensions (W x L x H)	64 mm x 120 mm x 110 mm	95 mm x 132 mm x 111 mm	188 mm x 132 mm x 111 mm	312 mm x 132 mm x 111 mm
Installation	DIN-Rail or Wall Mounting			
Environmental				
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			
Ambient Relative Humidity	10 ~ 90% RH (non-condensing)			
Power				
Input Range	+10 ~ +30 VDC			
Reverse Polarity Protection	Yes			
Isolation	1000 VDC			
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

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

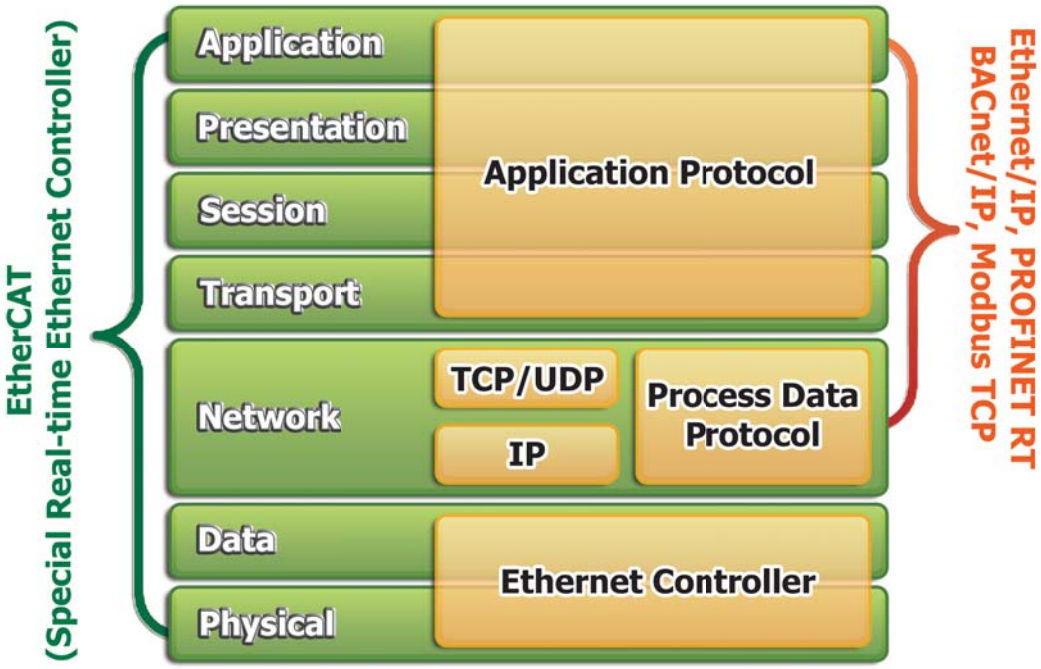
Industrial Ethernet Products

3

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	Modbus	EtherCAT	EtherNet/IP	PROFINET	BACnet
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

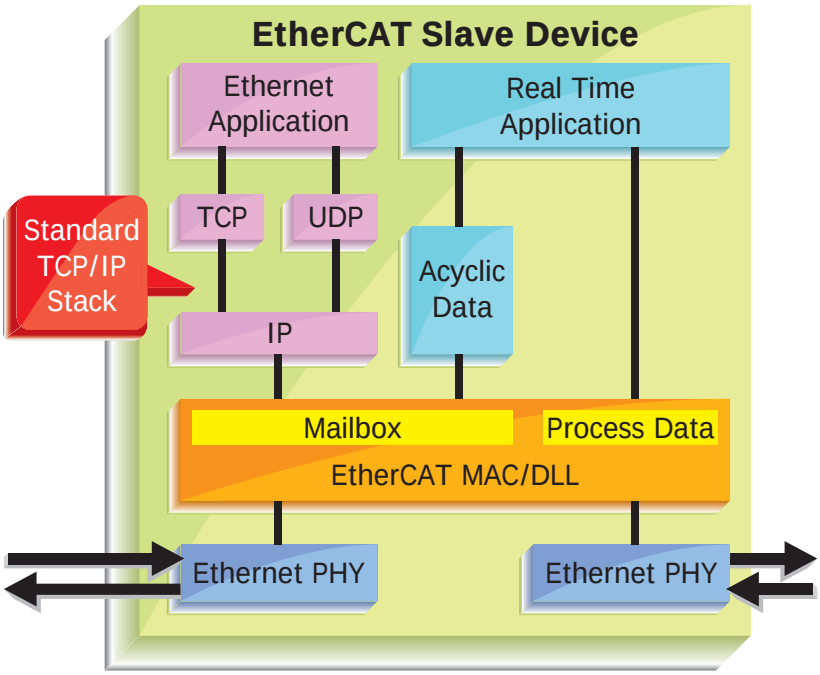
3.2 EtherCAT Products

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



Selection Guide

Model Name		Description
EtherCAT I/O Modules	ECAT-2045	EtherCAT I/O Module with 16-Ch DO
	ECAT-2051	EtherCAT I/O Module with 16-Ch DI
	ECAT-2055	EtherCAT I/O Module with 8-Ch DI, 8-Ch DO
	ECAT-2060	EtherCAT I/O Module with 6-Ch DI, 6-Ch Relay

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

Applications

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

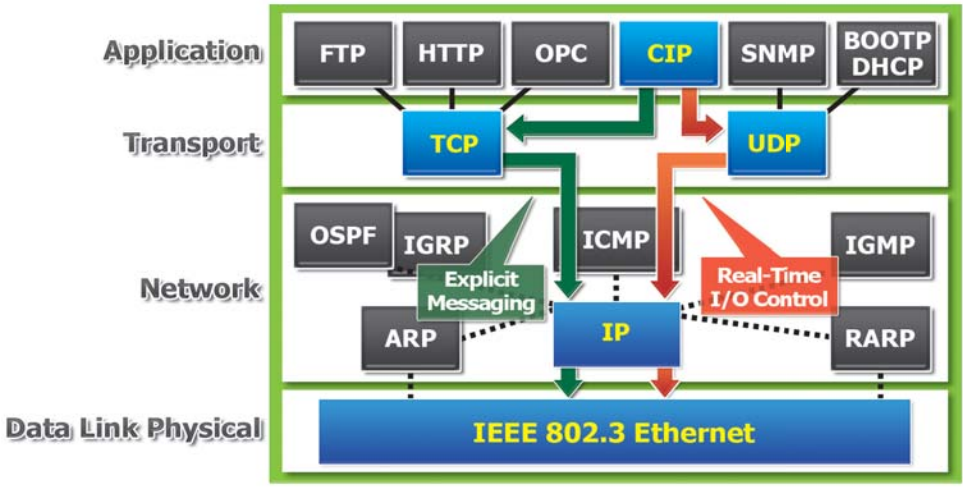
EtherCAT Digital I/O Modules

Model Name	ECAT-2045	ECAT-2051	ECAT-2055	ECAT-2060
	16-Ch DO Module	16-Ch DI Module	8-Ch DI, 8-Ch DO Module	6-Ch DI, 6-Ch Relay Module
Pictures				
Digital Input				
Channels	-	16	8	6
Contact	-	Wet		
Sink/Source (NPN/PNP)	-	Sink/Source		
ON Voltage Level	-	+10 ~ +50 VDC		+4 ~ +30 VDC
OFF Voltage Level	-	+4 VDC Max.		+1 VDC Max.
Isolation Voltage	-	3750 Vrms		
Digital Output				Relay Output
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	-
Communication				
Ethernet Port	2 x RJ-45, 10/100 Base-TX			
Protocol	EtherCAT			
System				
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	3 W			
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.



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

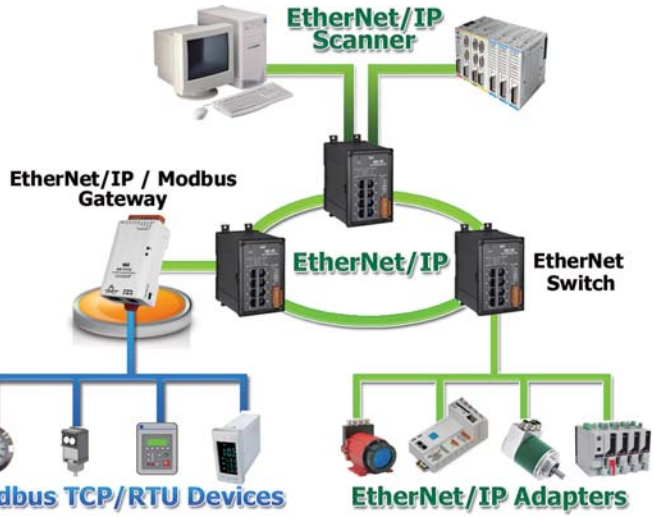
Selection Guide

Model Name		Description
EtherNet/IP Gateways	GW-7472	Ethernet/IP Adapter to Modbus TCP/RTU Master Gateway
	GW-7473	Modbus TCP/RTU Slave to EtherNet/IP Scanner Gateway
EtherNet/IP I/O Modules	EIP-2019	Ethernet/IP I/O Module with 8-Ch Thermocouple Inputs
	EIP-2024	Ethernet/IP I/O Module with 4-Ch Voltage/Current Outputs
	EIP-2042	Ethernet/IP I/O Module with 16-Ch DO
	EIP-2051	Ethernet/IP I/O Module with 16-Ch DI
	EIP-2055	Ethernet/IP I/O Module with 8-Ch DI, 8-Ch DO
	EIP-2060	Ethernet/IP I/O Module with 6-Ch DI, 6-Ch Relay

EtherNet/IP Adapter to Modbus TCP/RTU Master Gateway

GW-7472

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

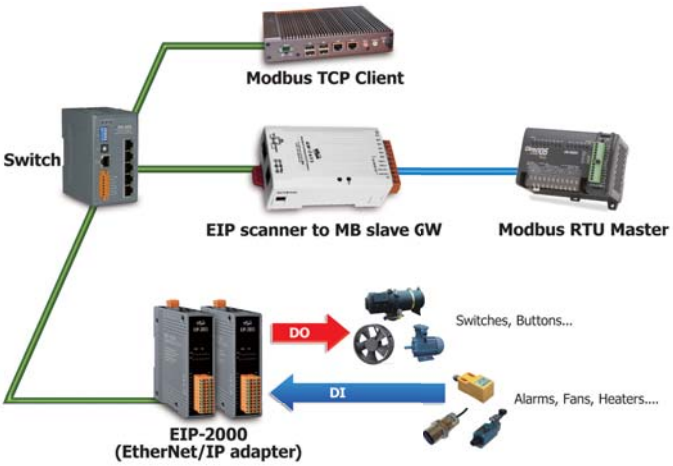
Modbus Features:

- 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

Modbus TCP/RTU Slave to EtherNet/IP Scanner Gateway

GW-7473

The GW-7473 (Modbus TCP/RTU Slave to EtherNet/IP Scanner Gateway) is helpful for data-exchanging between Modbus Master and EtherNet/IP adapter. It reads the register data from the EtherNet/IP adapter and publishes these data to the input register data of the Modbus TCP client as well as Modbus RTU Master. The output data transmitted by the Modbus TCP/RTU Master are updated to the register data of EtherNet/IP adapter. In order to save the installation space, the GW-7473 is also 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 Scanner
- Scanner Class Functionality
  - ★ Class 1 (connected) I/O Server and Client
  - ★ Class 3 (connected) Message Server and Client
- Supported Objects according to CIP Standard
  - ★ Assembly Object
  - ★ Connection Manager Object
  - ★ Ethernet Link Object
  - ★ Message Router Object
  - ★ TCP/IP Interface Object

Modbus Features:

- Modbus Protocol: Modbus TCP Server/RTU Slave protocols
- Maximum support 15 Modbus TCP clients
- Supported Modbus Function Code 01, 02, 03, 04, 05, 06, 15, and 16

EtherNet/IP Remote I/O Modules

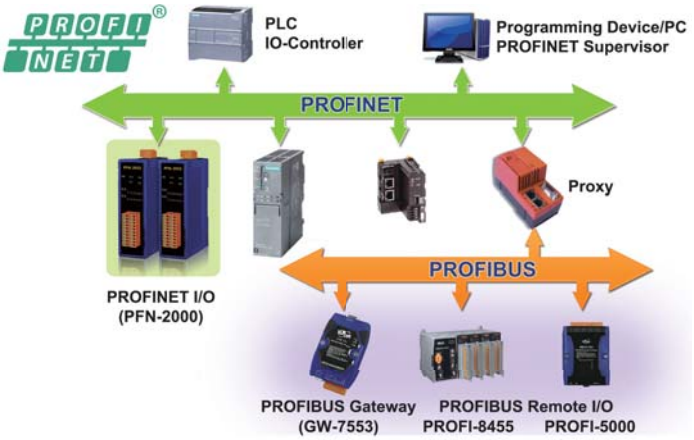
Analog Input & Output Module

Model Name		EIP-2019	EIP-2024
Pictures		8-Ch Thermocouple Input Module 	4-Ch 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-Ch DO Module 	16-Ch DI Module 	8-Ch DI, 8-Ch DO Module 	6-Ch DI, 6-Ch 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.

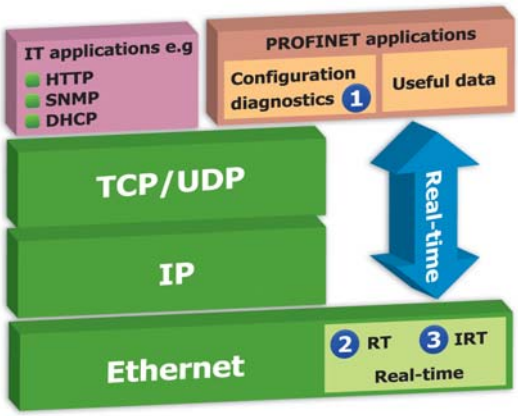
The PROFINET standard defines three different performance levels which cover the various requirements from different applications.

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 µs are possible.

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



1 TCP/IP
- Device parameterization and configuring
- Reading of diagnostic data
- Negotiating the useful data channel

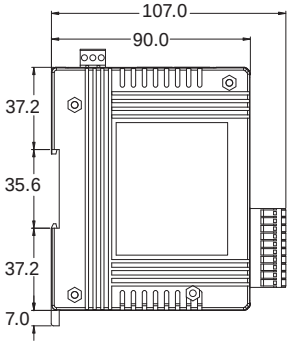
2 Real-time RT
- Effective cyclic transmission of useful data
- Event-driven messages/alarms

3 Isochronous real-time IRT
- Useful data transfer in isochronous mode
- Hardware support through ERTEC
- Jitter < 1 µs

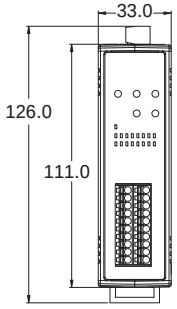
• Features

- Transfer protocol: PROFINET IO
- 10/100 Base-TX Ethernet, RJ-45 x 2
- PROFINET Conformance Class B and RT Class 1
- Cyclic Time: 1 ms (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)

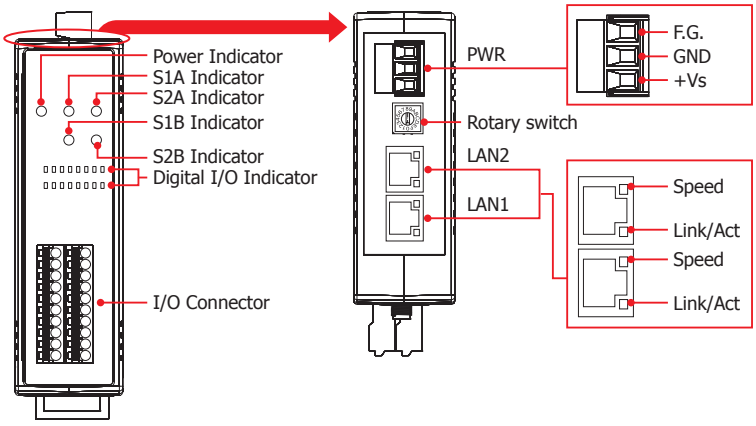


Left Side View



Front View

• Appearance



Selection Guide

Model Name		Description
PROFINET Converter	I-7580	PROFINET to RS-232/422/485 Converter
PROFINET I/O Module	PFN-2019	PROFINET I/O Module with 8-Ch universal AI
	PFN-2042	PROFINET I/O Module with 16-Ch DO
	PFN-2051	PROFINET I/O Module with 16-Ch DI
	PFN-2052	PROFINET I/O Module with 8-Ch DI
	PFN-2053	PROFINET I/O Module with 16-Ch DI
	PFN-2055	PROFINET I/O Module with 8-Ch DI, 8-Ch DO
	PFN-2060	PROFINET I/O Module with 6-Ch DI, 6-Ch Relay

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

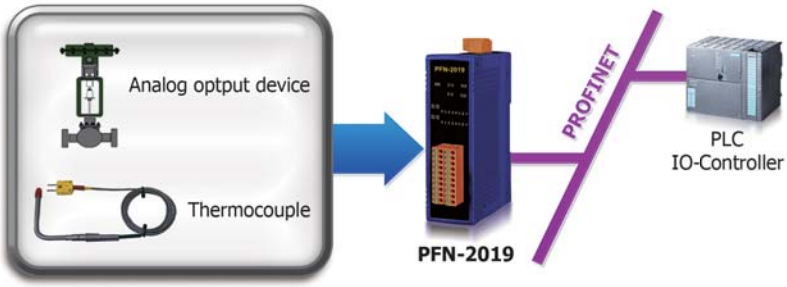
8-Ch Universal Analog Input Module with High Voltage Protection

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-Ch 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 240 Vrms 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)

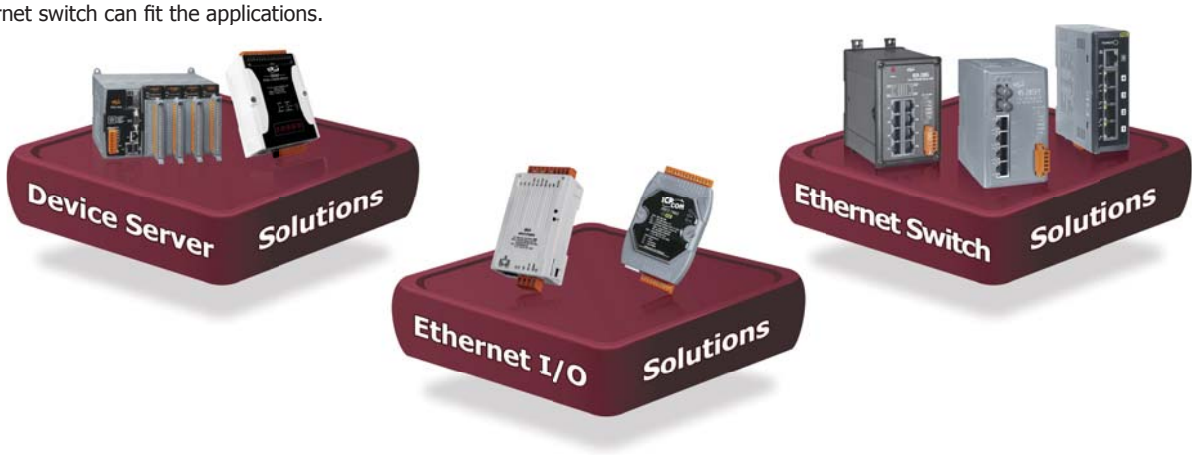


Digital Input & Output Modules

Digital Input & Output Module							
Model Name		**PFN-2042**	**PFN-2051**	**PFN-2052**	**PFN-2053**	**PFN-2055**	**PFN-2060**
Pictures		16-Ch DO Module	16-Ch DI Module	8-Ch DI Module	16-Ch DI Module	8-Ch DI, 8-Ch DO Module	6-Ch DI, 6-Ch Relay Module
							
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					

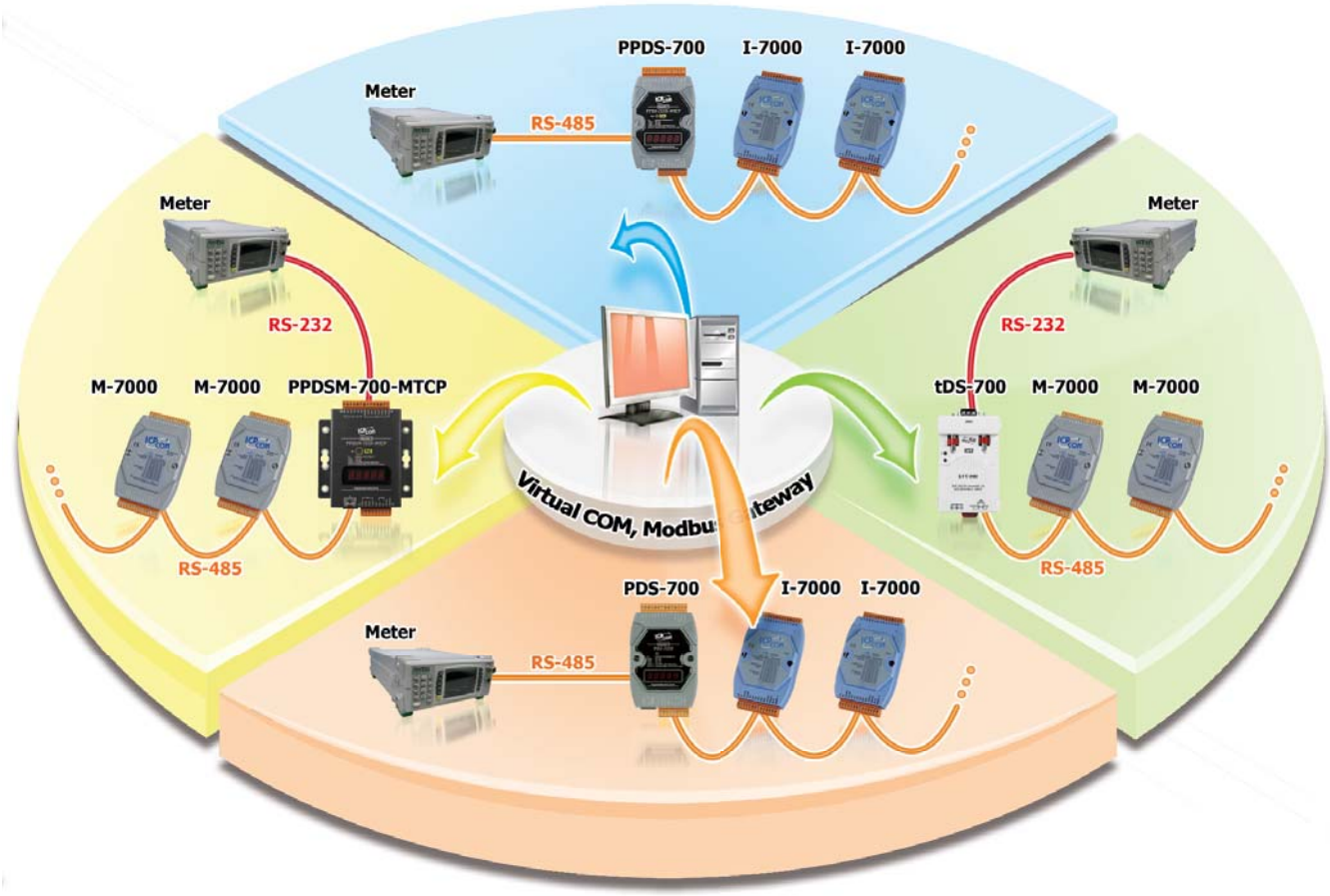
3.5 Ethernet Device Servers

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.



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, 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.



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		I/O Slots			Fire-Retardant Plastic
 **PDS-8x2**	Dual 10/100 M Ethernet					
 **PDS-220Fx**	100 Base-FX, Fiber					
 **PDS-5000-MTCP**	10/100 M Ethernet Switch				Yes	Fire-Retardant Plastic
 **DS-700**	10/100 M	Yes	–	Yes	–	Fire-Retardant Plastic
 **tDS-700**	10/100 M, PoE			–		
 **tGW-700**		–		–	Yes	

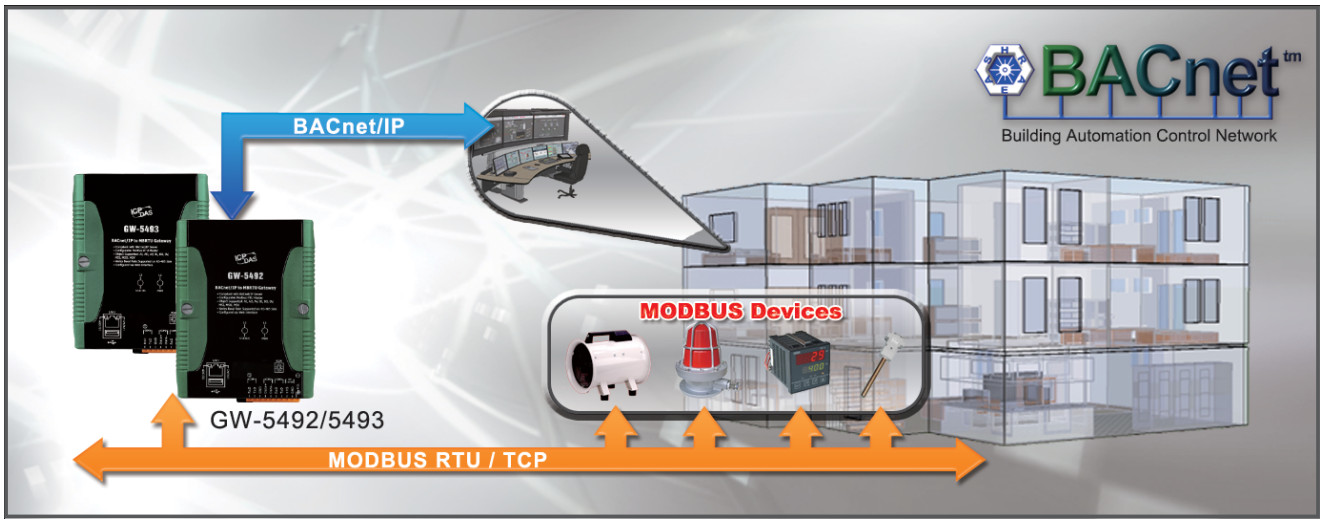
More products refer to Industrial Communication & Networking Products Catalog

- 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/root/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.



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

BACnet Defined

<table>
<tr><td colspan="5">BACnet Application Layer</td></tr>
<tr><td colspan="5">BACnet Network Layer</td></tr>
<tr><td colspan="2" rowspan="2">ISO 8802-2 (IEEE 8802.3) Type 1</td><td rowspan="2">MS/TP</td><td rowspan="2">PTP</td><td rowspan="3">LonTalk</td><td>BVLL</td></tr>
<tr><td>UDP/IP</td></tr>
<tr><td>ISO 8802-3 Ethernet</td><td>ARCNET</td><td>EIA 485</td><td>EIA 232</td><td>IP Supporting Data link</td></tr>
</table>

OSI Layer

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

Selection Guide

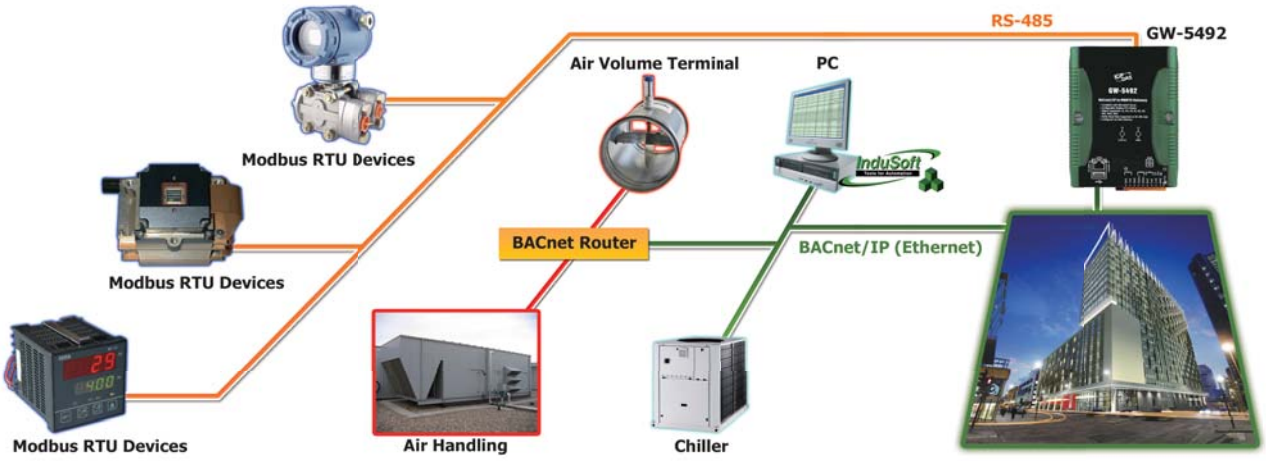
Model Name		Description
BACnet/IP Gateway	GW-5492	BACnet/IP to Modbus RTU Gateway
	GW-5493	BACnet/IP to Modbus TCP Gateway
BACnet/IP I/O Modules	BNET-5304	BACnet/IP I/O Module with 6-Ch AI, 1-Ch AO, 4-Ch DI, 4-Ch DO
	BNET-5310	BACnet/IP I/O Module with 4-Ch AI, 2-Ch AO, 3-Ch DI, 3-Ch DO

Case Studies

Commercial Building Automation System

Product: GW-5492

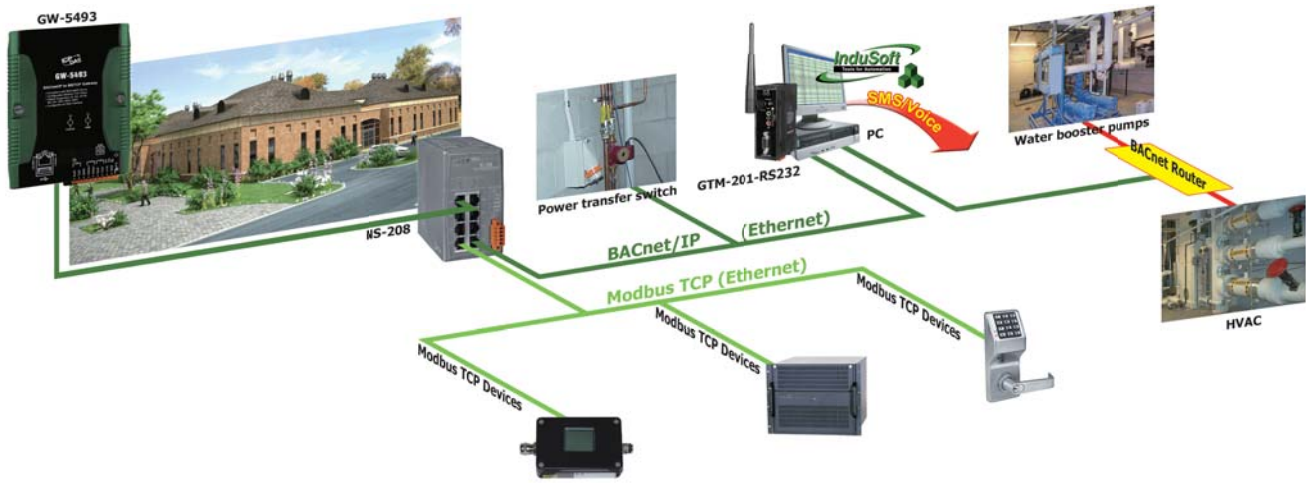
The user used the SCADA, InduSoft Web Studio, with BACnet/IP driver to integrate with BACnet/IP devices and controllers in a commercial building including 210 air volume terminals, 22 air handling units, 3 chillers…etc. Using GW-5492, the user was able to integrate those Modbus RTU devices to BACnet/IP 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.



Building Automation of a Medical Center

Product: GW-5493

The user form 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 user 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 Gateways

BACnet/IP Server to Modbus RTU Master Gateway

GW-5492
GW-5493

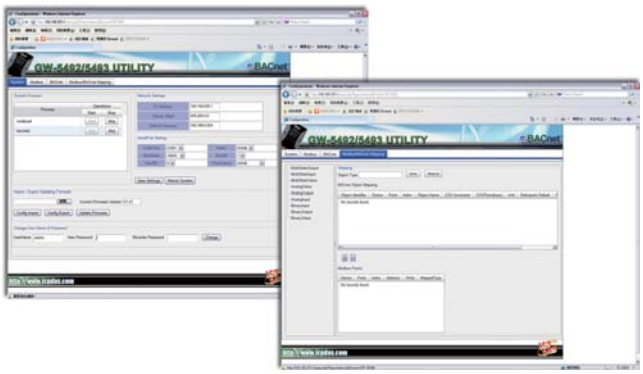
NEW

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. 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

Utility Features



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

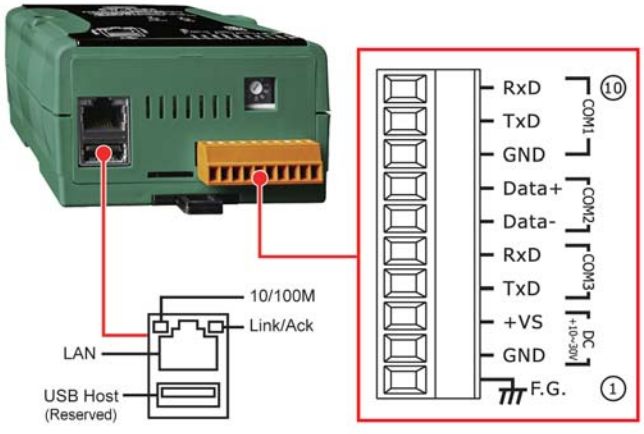
BACnet Support

Object	Binary Input, Binary Output, Binary Value, Analog Input, Analog Output, Analog Value, Multi-State Input, Multi-State Output, Multi-State Value, Device
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

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

Pin Assignments



BACnet/IP I/O Modules

Model Name		BNET-5304	BNET-5310
		Multi-function BACnet/IP Module	Multi-function BACnet/IP Module
Pictures		Available soon 	Available soon 
System			
COM1		Reserved	
Ethernet		10/100 Base-TX	
Security		ID and Password	
Built-in Watchdog		Yes	
LED Indicator		Power and Status	
Protocol			
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	
Analog Input			
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	
Analog Output			
Channel		1	2
Range		+/- 5 V	+/- 10 V
Resolution		12-bit	
Output Capacity		20 mA	
Isolation		Non-isolated	
Digital Input			
Channels		4	3
Contact		Dry	
Dry Contact	On Voltage Level	Close to GND	
	Off Voltage Level	Open	
Overvoltage Protection		30 VDC	
Digital Output			
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	
Environmental			
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-condesing	
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 Switchs

Unmanaged Industrial PoE Ethernet Switch						
Model Name	**NS-105PSE**	**tNS-200IN-24V**	**NS-205PSE-24V**	**NSM-205PSE-24V**	**NSM-205GHP**	**NSM-208PSE-M12**
Pictures						
Speed	10/100 M				10/100/1000 M	10/100 M
Ethernet Port	1	1	1	1	1	-
Ethernet Port with PoE	4	1	4	4	4	8
Casing	Plastic			Metal with IP30		Metal with IP40
Operating Temperature	-40 ~ +75°C					
Power Input	+46 VDC~ +53 VDC	+18 VDC ~ +32 VDC			+18 VDC ~ +60 VDC	+46 VDC ~ +53 VDC
Dimensions (W x L x H) (Units: mm)	76 x 38 x 118	52 x 86 x 27	31 x 113 x 157	25 x 119 x 168	25 x 119 x 168	190 x 56 x 100

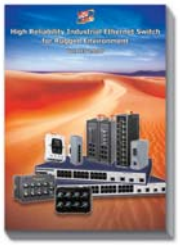
Unmanaged Industrial Ethernet Switch						
Model Name	**NS-205AG**	**NS-208-IP67**	**NS-105A**	**NS-208A**	**NSM-216**	**NSM-208-M12**
Pictures						
Speed	10/100/1000 M	10/100 M				
Port	5	8	5	8	16	8
Casing	Plastic				Metal	Metal with IP40
Operating Temperature	-40 ~ +75°C	-10 ~ +60°C	-40 ~ +75°C			
Power Input	+12 VDC ~ +48 VDC	+12 VDC ~ +53 VDC	+12 VDC ~ +48 VDC			+12 VDC ~ +53 VDC
Dimensions (W x L x H) (Units: mm)	33 x 78 x 107	190 x 155 x 104	76 x 38 x 118	31 x 113 x 157	47 x 128 x 160	190 x 56 x 100

Unmanaged Industrial 10/100 Base-T(X) with 100 Base-FX Fiber Switch							
Model Name		**NSM-205AFT-T**	**NSM-205AFC-T**	**NSM-205AFCS-T**	**NSM-206AFT-T**	**NSM-206AFC-T**	**NSM-206AFCS-T**
Pictures							
Fiber Port	Mode	Mulit-mode	Mulit-mode	Single-mode	Mulit-mode	Mulit-mode	Single-mode
	Connector	ST	SC	SC	ST	SC	SC
	Speed	100 M					
	Port	1			2		
Ethernet	Speed	10/100 M					
	Port	4					
Casing		Metal					
Operating Temperature		-30 ~ +75°C					
Power Input		+12 VDC ~ +48 VDC					
Dimensions (W x L x H) (Units: mm)		25 x 133 x 168					

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/root/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

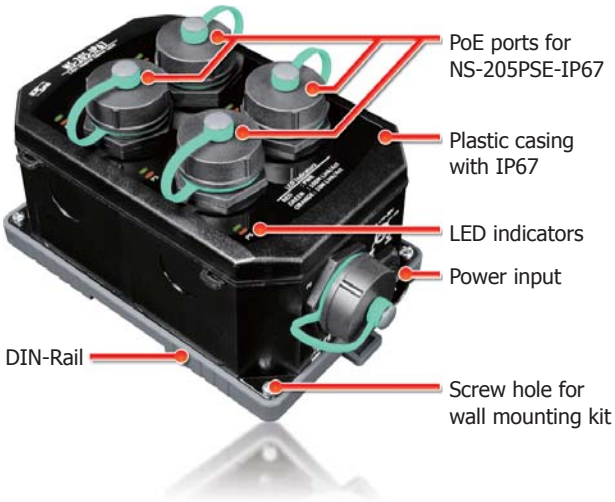
Introduction

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.

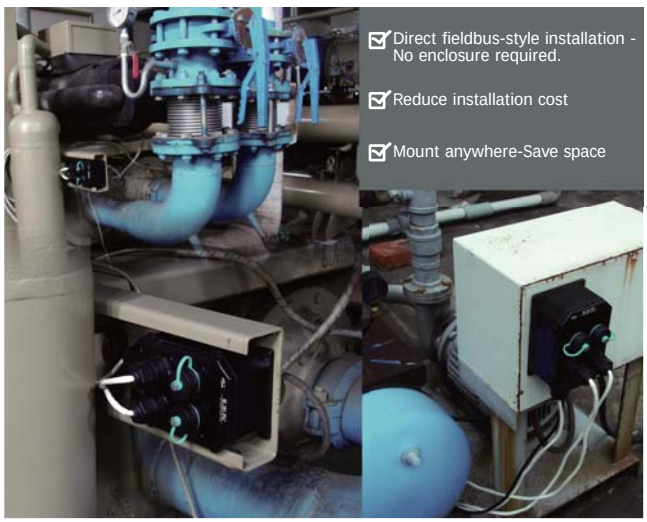
The NS-205PSE-IP67 PoE switch provides 5 fast Ethernet with 4 IEEE 802.3af compliant PoE ports. The switch is classified as power source equipment (PSE) and provides up to 15.4 W of power per port.

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

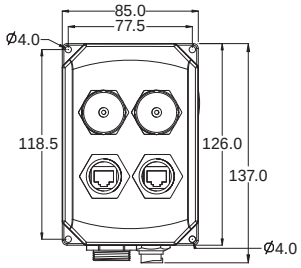


Specifications

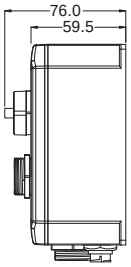
Models	NS-205PSE-IP67	NS-205PSE-IP67/DIN	NS-205-IP67	NS-205-IP67/DIN
Technology				
Standards	IEEE 802.3, 802.3u, 802.3x, 10/100 Base-T(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection			
Processing Type	Store & forward; wire speed switching			
MAC Addresses	1024			
Memory Bandwidth	2 Gbps		1.4 Gbps	
Frame Buffer Memory	512 Kbit		256 Kbit	
Flow Control	IEEE 802.3x flow control, back pressure flow control			
Interface				
LED Indicators	PWR, Link/Act , Power Device is detected		PWR, 10/100M, Link/Act	
Ethernet Isolation	1500 Vrms 1 minute			
Connector	Rugged RJ-45			
Power Input				
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			
PoE Technology				
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		–	
Mechanical				
Casing	Plastic (Flammability UL 94V-0)			
Environmental Rating	Protection rating IP67 for Operating Temperature -10 ~ +60°C			
	Protection rating IP66 for Operating Temperature -40 ~ +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
Environment				
Operating Temperature	-10 ~ +60°C (Protection rating IP67)			
	-40 ~ +75°C (Protection rating IP66)			
Storage Temperature	-10 ~ +60°C (Protection rating IP67)			
	-40 ~ +75°C (Protection rating IP66)			
Ambient Relative Humidity	100% RH for Operating Temperature -10 ~ +60°C			
	10 ~ 90% RH, non-condensing for Operating Temperature -40 ~ +75°C			

Dimensions (Units: mm)

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



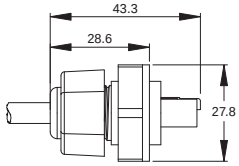
Front View



Right Side View

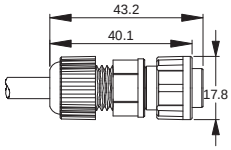
IP67 Ethernet Plug

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

NS-205PSE-IP67 CR	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)
NS-205PSE-IP67/DIN CR	NS-205PSE-IP67 with DIN-Rail Mounting (RoHS)
NS-205-IP67 CR	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)
NS-205-IP67/DIN CR	NS-205-IP67 with DIN-Rail Mounting (RoHS)

IP67 RJ-45 Plug	IP67 Power Plug	Cap with Tether
		
4SASO-001	4SIO1K0000016	4SASO-0004

Accessories

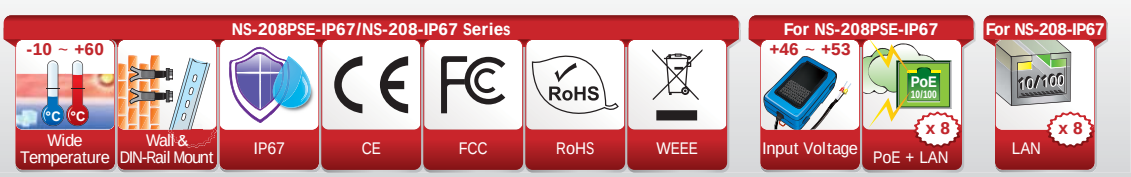
MDR-60-48	48 V/1.25 A, 60 W Power Supply with DIN-Rail Mounting
DIN-KA52F-48	48 V/0.52 A, 25 W Power Supply with DIN-Rail Mounting
DR-120-48	48 V/2.5 A, 120 W Power Supply with DIN-Rail Mounting

NS-208PSE-IP67 NEW

Industrial 8-Port Unmanaged IP67 Ethernet Switch with PoE

NS-208-IP67 NEW

Industrial 8-Port Unmanaged IP67 Ethernet Switch



Introduction

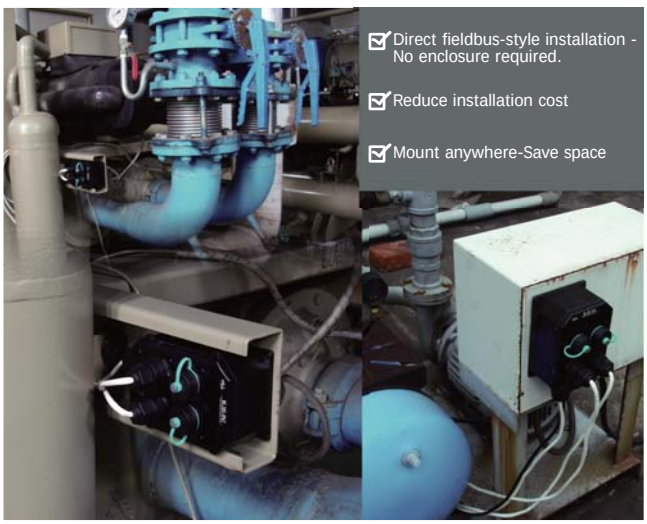
The NS-208PSE-IP67/NS-208-IP67 is designed for industrial applications in harsh environments. The rugged RJ-45 ensures tight, robust connections, and guarantees reliable operation, even for applications that are subject to high vibration and shock.

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

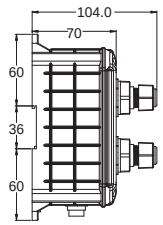


Specifications

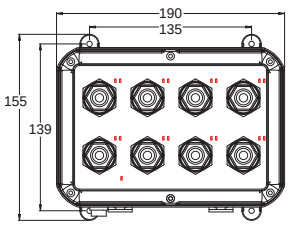
Models	NS-208PSE-IP67	NS-208-IP67
Technology		
Standards	IEEE 802.3, 802.3u, 802.3x, 10/100 Base-T(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection	
Processing Type	Store & forward; wire speed switching	
MAC Addresses	1024	
Memory Bandwidth	2 Gbps	
Frame Buffer Memory	512 Kbit	
Flow Control	IEEE 802.3x flow control, back pressure flow control	
Interface		
LED Indicators	PWR, Link/Act , Power Device is detected	PWR, Link/Act
Ethernet Isolation	1500 V_{rms} 1 minute	
Connector	Rugged RJ-45	
Power Input		
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	
PoE Technology		
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	–
Mechanical		
Casing	Plastic (Flammability UL 94V-0)	
Environmental Rating	Protection rating IP67 for Operating Temperature -10 ~ +60°C	
	Protection rating IP66 for Operating Temperature -40 ~ +75°C	
Dimensions (W x L x H)	190 mm x 155 mm x 104 mm	
Installation	DIN-Rail Mounting or Wall Mounting	
Environment		
Operating Temperature	-10 ~ +60°C (Protection rating IP67)	
	-40 ~ +75°C (Protection rating IP66)	
Storage Temperature	-10 ~ +60°C (Protection rating IP67)	
	-40 ~ +75°C (Protection rating IP66)	
Ambient Relative Humidity	100% RH for Operating Temperature -10 ~ +60°C	
	10 ~ 90% RH, non-condensing for Operating Temperature -40 ~ +75°C	

Dimensions (Units: mm)

NS-208PSE-IP67/NS-208-IP67



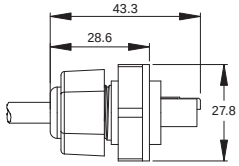
Front View



Left Side View

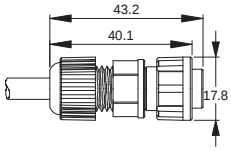
IP67 Ethernet Plug

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

NS-208PSE-IP67 CR	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)
NS-208-IP67 CR	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)

IP67 RJ-45 Plug	IP67 Power Plug	Cap with Tether
		
4SASO-001	4SIO1K0000016	4SASO-0004

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

Introduction

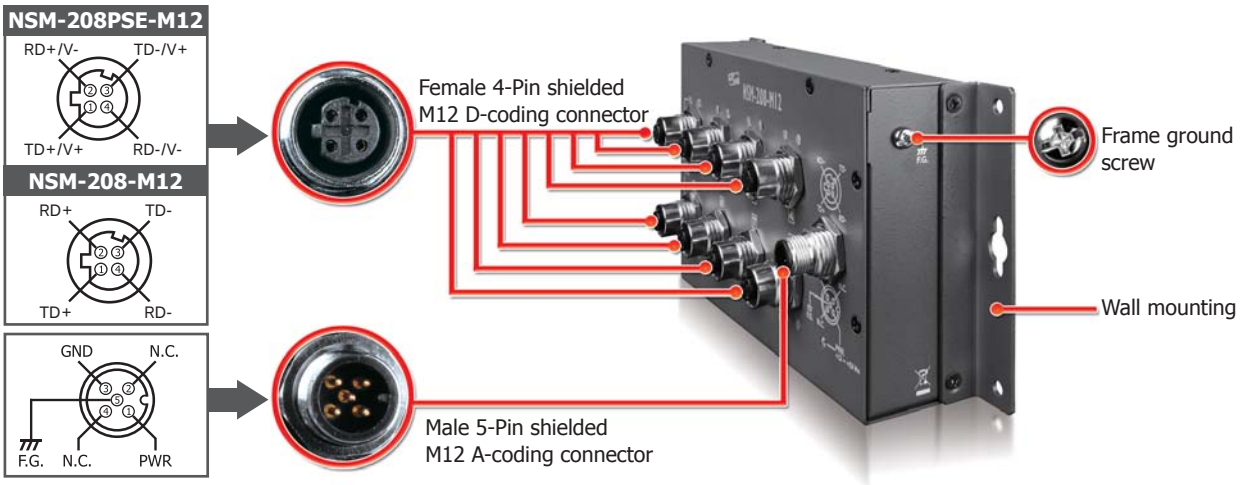
The NSM-208PSE-M12/NSM-208-M12 is designed for industrial applications in harsh environments. The M12 connectors ensure tight, robust connections, and guarantees reliable operation, even for applications that are subject to high vibration and shock.

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 VDC ~ +53 VDC 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.

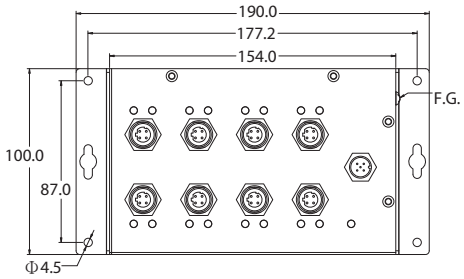
Appearance



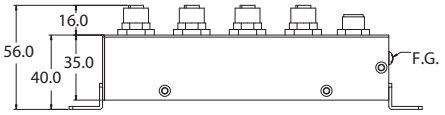
Specifications

Models	NSM-208PSE-M12	NSM-208-M12
Technology		
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	
Interface		
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	
Power Input		
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	
PoE Technology		
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	–
Mechanical		
Casing	Metal with IP40	
Dimensions (W x L x H)	190 mm x 56 mm x 100 mm	
Installation	Wall Mounting	
Environmental		
Operating Temperature	-40 ~ +75°C	
Storage Temperature	-40 ~ +85°C	
Ambient Relative Humidity	10 ~ 95% RH, non-condensing	

Dimensions (Units: mm)



Front View



Bottom View

Ordering Information

NSM-208-M12 CR	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
NSM-208PSE-M12 CR	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

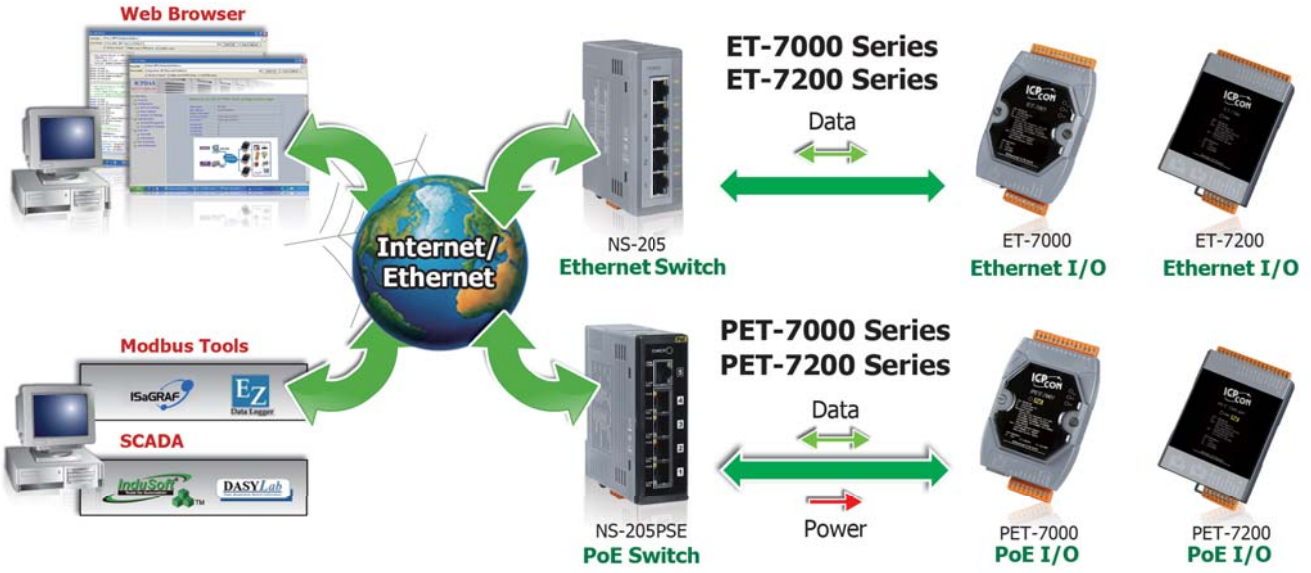
M12D-4P-IP68	A-CAP-M12M	M12A-5P-IP68	A-CAP-M12F
			
4PIO1K0000001	4PIO1K0000002	4PIO1K0000003	4PIO1K0000004

To get high quality M12 cable, please refer to
http://www.balluff.com

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 Modules (Modbus TCP/UDP Slave)



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. 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	ET-7200 PET-7200
Pictures			
Communication			
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)	
I/O			
I/O pins	10 pins	23 pins	26 pins
DI Counter	32-bit, 3.5 kHz	32-bit, 500 Hz	
Pair Connection	Yes (Polling/Push Mode)	Yes (Polling Mode)	
Mechanical			
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/root/support/catalog/catalog.html

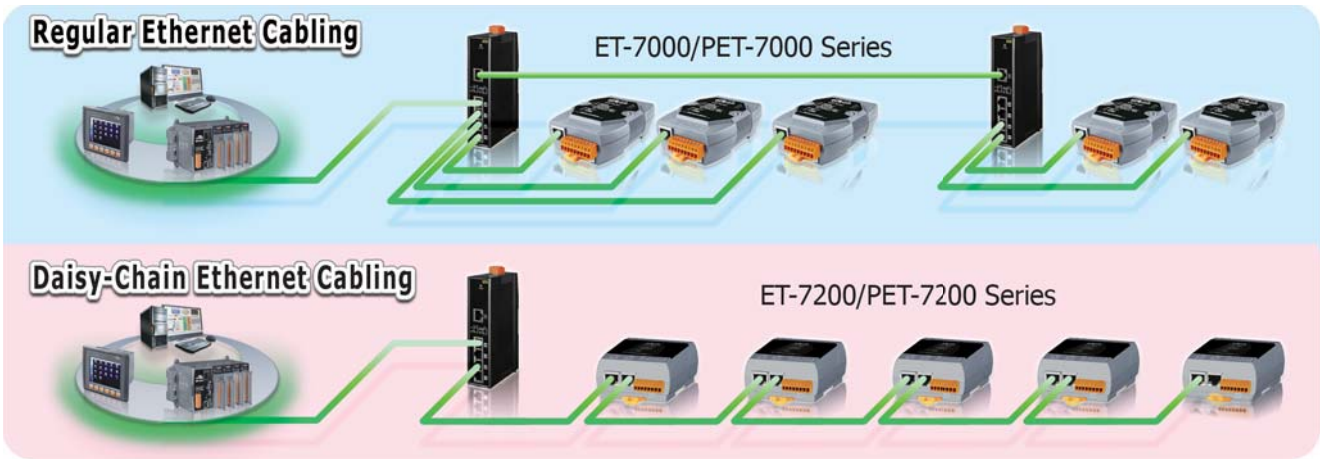
• Features

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 looses 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 is 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 proprgrammable, 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 unpredicatable damage of the connected devices.

8. Highly Reliable Under Harsh Environment

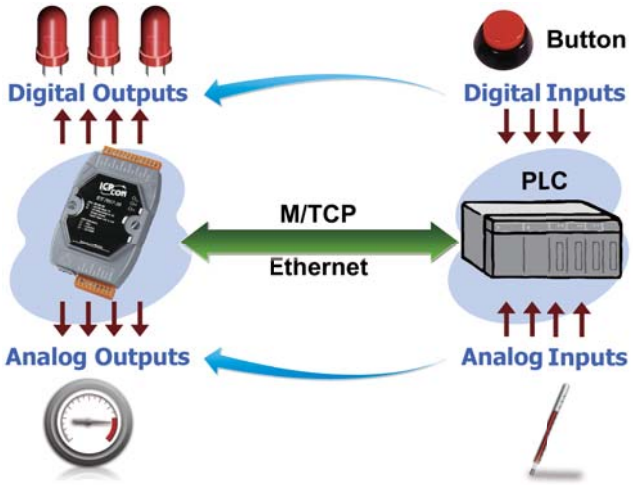
- Wide Operating Temperature Range: -25 ~ +75°C
- Storage Temperature: -30 ~ +80°C
- Humidity 10 ~ 90% RH (Non-condensing)

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.

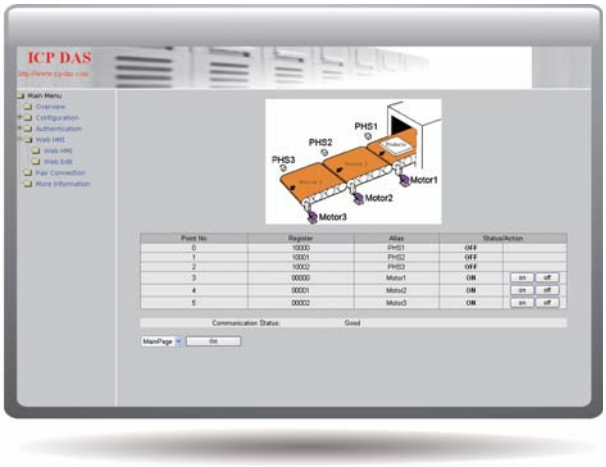


10. I/O Pair Connection

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.

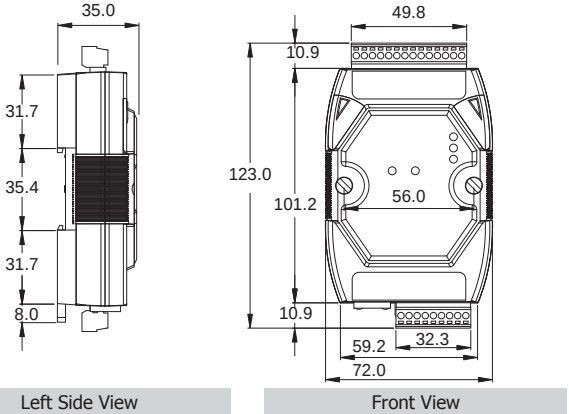


12. Built-in Web Server

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.

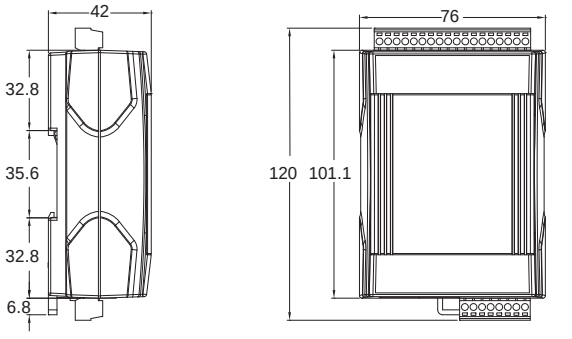
13. Dimensions (Units: mm)

ET-7000/PET-7000 Series



Left Side View | Front View

ET-7200/PET-7200 Series



Left Side View | Front View

Selection Guide

Analog Input Model

Model Name	AI			DO		
	Channel	Voltage and Current Input	Sensor Input	Channel	Type	Sink/Source
ET-7005 PET-7005	8	-	Thermistor	4	Open Collector	Sink
ET-7015 PET-7015 ET-7215 PET-7215	7	-	RTD: Pt100, Pt1000, Ni120, Cu100, Cu1000	-	-	-
ET-7017 PET-7017 ET-7217 PET-7217	8	+/-150 mV, +/-500 mV, +/-1 V, +/-5 V, +/-10 V, +/-20 mA, 0 ~ 20 mA, 4 ~ 2 0mA	-	4	Open Collector	Sink
ET-7017-10 PET-7017-10 ET-7217-10 PET-7217-10	10/20	+/-150 mV, +/-500 mV, +/-1 V, +/-5 V, +/-10 V, +/-20 mA, 0 ~ 20 mA, 4 ~ 20 mA	-	-	-	-
ET-7018Z PET-7018Z ET-7218Z PET-7218Z	10	+/-15 mV, +/-50 mV, +/-100 mV, +/-500 mV, +/-1 V, +/-2.5 V +/-20 mA, 0 ~ 20 mA, 4 ~ 20 mA	Thermocouple: J, K, T, E, R, S, B, N, C, L, M, and $L_{DIN43710}$	6	Open Collector	Sink
ET-7019 PET-7019	8	+/-15 mV, +/-50 mV, +/-100 mV, +/-150 mV, +/-500 mV, +/-1 V,+/-5 V, +/-10 V +/-20 mA, 0 ~ 20 mA, 4 ~ 20 mA	Thermocouple: J, K, T, E, R, S, B, N, C, L, M, and $L_{DIN43710}$	4	Open Collector	Sink
ET-7019Z PET-7019Z ET-7219Z PET-7219Z	10			6		

Note: We recommend to choose ET-7018Z/PET-7018Z and ET-7019Z/PET-7019Z for extremely accurate thermocouple measurement.

Multi-function I/O

Model Name	AI			AO		DI/Counter		DO	
	Channel	Voltage and Current Input	Sensor Input	Channel	Voltage and Current Output	Channel	Contact	Channel	Type
ET-7002 PET-7002 ET-7202 PET-7202	3	+/-150 mV, +/-500 mV, +/-1 V, +/-5 V, +/-10 V, +0 mA ~ +20 mA, +/-20 mA, 4 ~ 20 mA	-	-	-	6	Wet (Sink,Source)	3	Power Relay (Form A)
ET-7016 PET-7016	2	+/-15 mV, +/-50 mV, +/-100 mV, +/-500 mV, +/-1 V, +/-2.5 V, 0 ~ 20 mA, +/-20 mA, 4 ~ 20mA	Strain Gague, Load Cell, Full-Bridge, Half-Bridge, Quarter-Bridge	1 (Note)	0 ~ 10V	2	Wet (Sink,Source)	2	Open Collector (Sink)
ET-7026 PET-7026 ET-7226 PET-7226	6	+/-150 mV, +/-500 mV, +/-1 V, +/-5 V, +/-10 V, 0 ~ 20 mA, +/-20 mA, 4 ~ 20mA	-	2	0 ~ 5 V, +/-5 V, 0 ~ 10 V, +/-10 V, 0 ~ 20 mA, 4 ~ 20 mA	2	Dry (Source), Wet (Sink,Source)	2	Open Collector (Sink)

Note: The AO is configured as a volage excitation source for the strain gauge.

Digital I/O

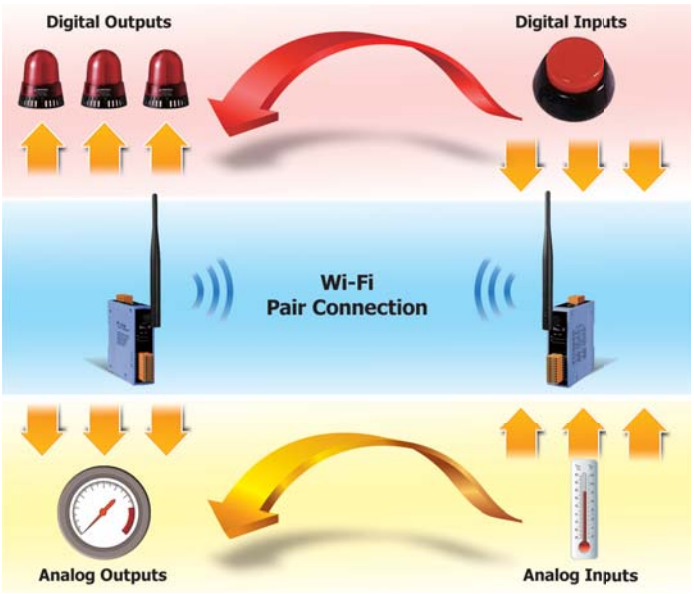
Model Name	DI/Counter			DO			
	Channel	Contact	Sink/Source	Channel	Type	Sink/Source	Max. Load Current @ 25°C
ET-7042 PET-7042 ET-7242 PET-7242	-	-	-	16	Open Collector	Sink	100 mA/channel
ET-7044 PET-7044 ET-7244 PET-7244	8	Wet	Sink, Source	8	Open Collector	Sink	300 mA/channel
ET-7050 PET-7050 ET-7250 PET-7250	12	Wet	Sink, Source	6	Open Collector	Sink	100 mA/channel
ET-7051 PET-7051 ET-7251 PET-7251	16	Wet	Sink, Source	-	-	-	-
ET-7052 PET-7052 ET-7252 PET-7252	8	Wet	Sink, Source	8	Open Collector	Source	650 mA/channel
ET-7053 PET-7053 ET-7253 PET-7253	16	Dry	Source	-	-	-	-
ET-7055 PET-7055 ET-7255 PET-7255	8	Dry, Wet	Sink, Source	8	Open Collector	Source	650 mA/channel

Relay Output & Digital Input

Model Name	Relay Output				DI/Counter		
	Channel	Relay	Type	Max. Load Current @ 25°C	Channel	Contact	Sink/Source
ET-7060 PET-7060 ET-7260 PET-7260	6	Power Relay	Form A (SPST N.O.)	5.0 A/channel	6	Wet	Sink, Source
ET-7065 PET-7065	6	PhotoMOS Relay	Form A	1.0 A/channel	6	Wet	Sink, Source
ET-7066 PET-7066	8	PhotoMOS Relay	Form A	1.0 A/channel	-	-	-
ET-7067 PET-7067 ET-7267 PET-7267	8	Power Relay	Form A (SPST N.O.)	5.0 A/channel	-	-	-

3.9 Wi-Fi I/O Modules

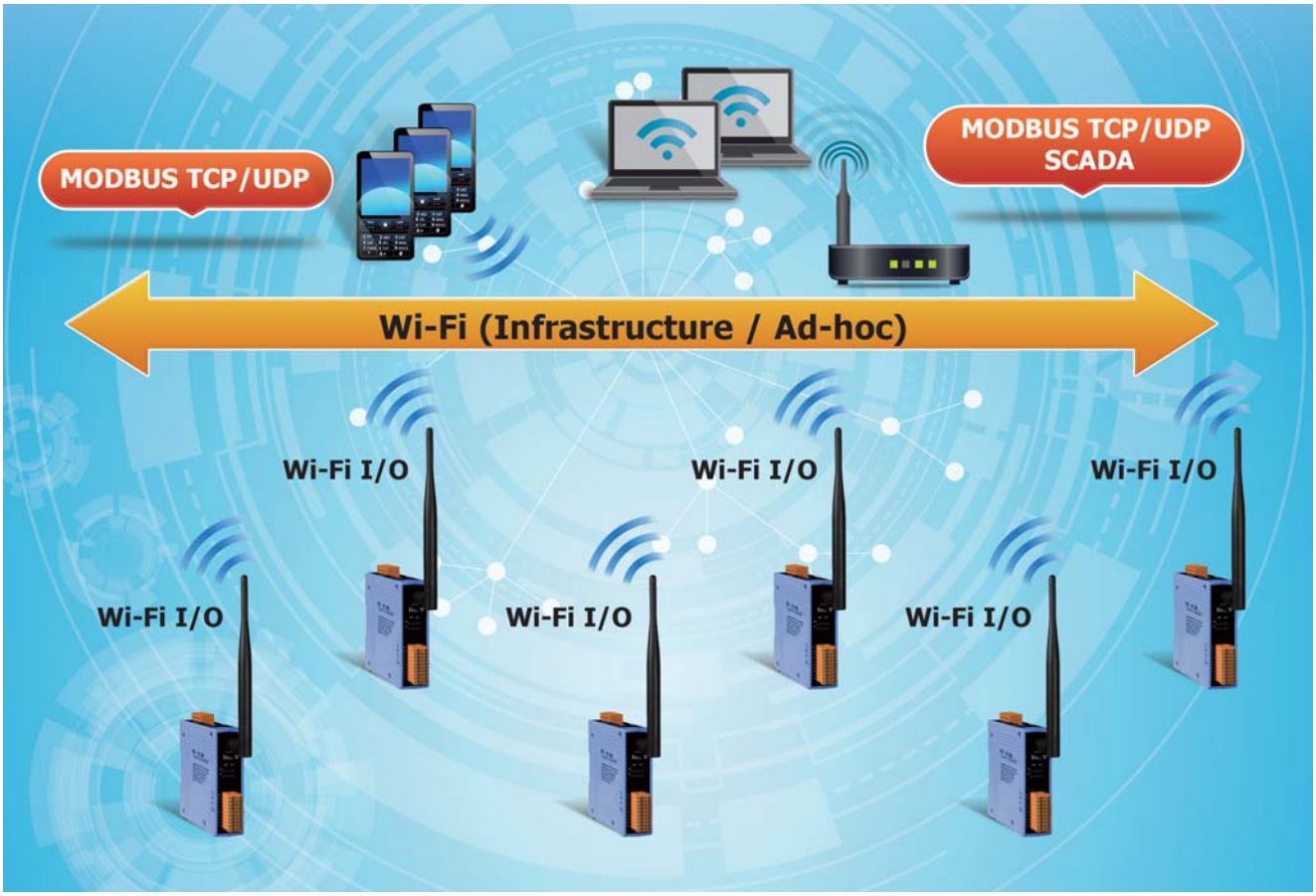
The WF-2000 series I/O modules in WLAN connection complies with the IEEE802.11b/g standards. With the popularity of 802.11 network infrastructure, they make an easy way to incorporate wireless connectivity into monitoring and control systems. WF-2000 series products support Modbus TCP/UDP protocol and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



Features

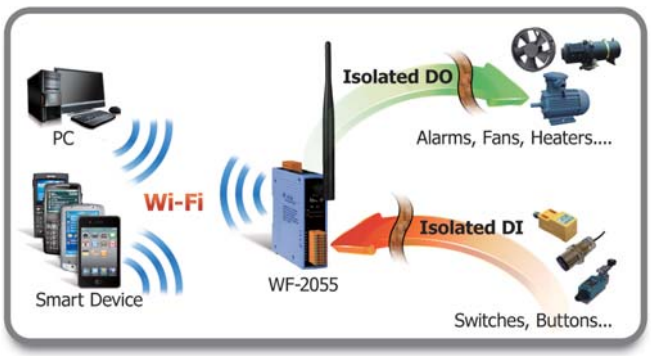
- Compatible with IEEE 802.11b/g standards
- Support Infrastructure and Ad-hoc mode for wireless network
- Support WEP, WPA and WPA2 wireless encryption
- Support Modbus TCP/UDP protocol
- Support Pair Connection mode
- Support Power on value & Safe value mechanism
- Built-in Watchdog

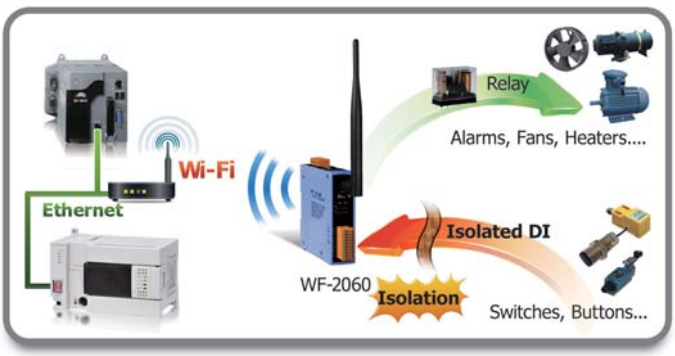
Applications



Wi-Fi Digital & Analog I/O Modules

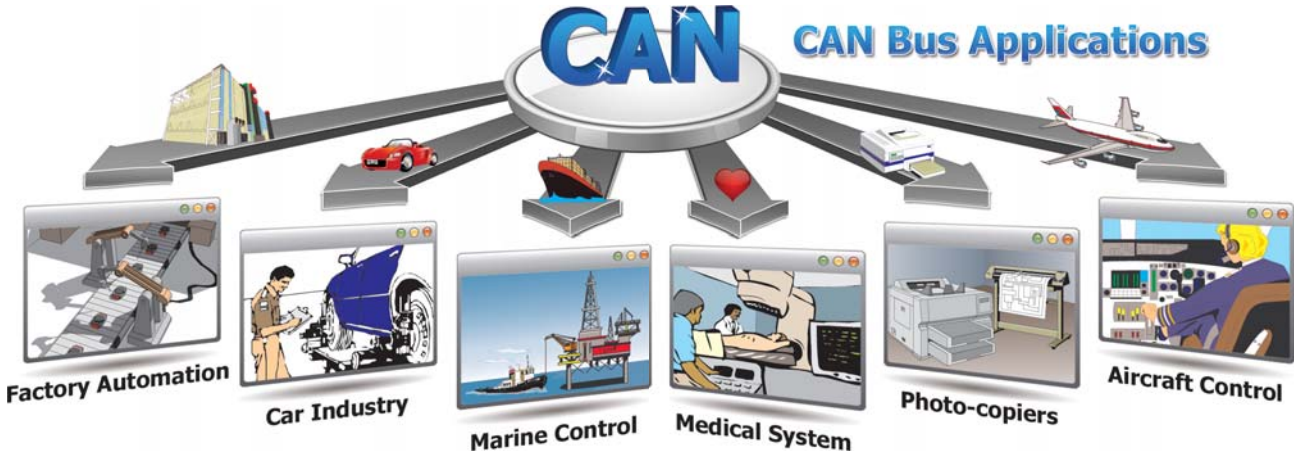
Model Name		WF-2042	WF-2051	WF-2055	WF-2060	WF-2019
Pictures						
Digital Input						
Channels		-	16	8	6	-
Input Type			Dry Contact: Source Wet Contact: Sink / Source			
Counters	Channels		16	8	6	
	Max. Counts		32-bit			
	Max. Input Frequency		10K Hz			
Photo-Isolation			3750 Vrms			
Digital Output						
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	-	
Analog Input						
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
Wi-Fi Interface						
Standard Supported		IEEE 802.11b/g				
Wireless Mode		Infrastructure & Ad-hoc				
Encryption		WEP, WPA and WPA2				
Power						
Input Voltage Range		10 VDC ~ 30 VDC				
Environment						
Operating Temperature		-25 ~ +75°C				



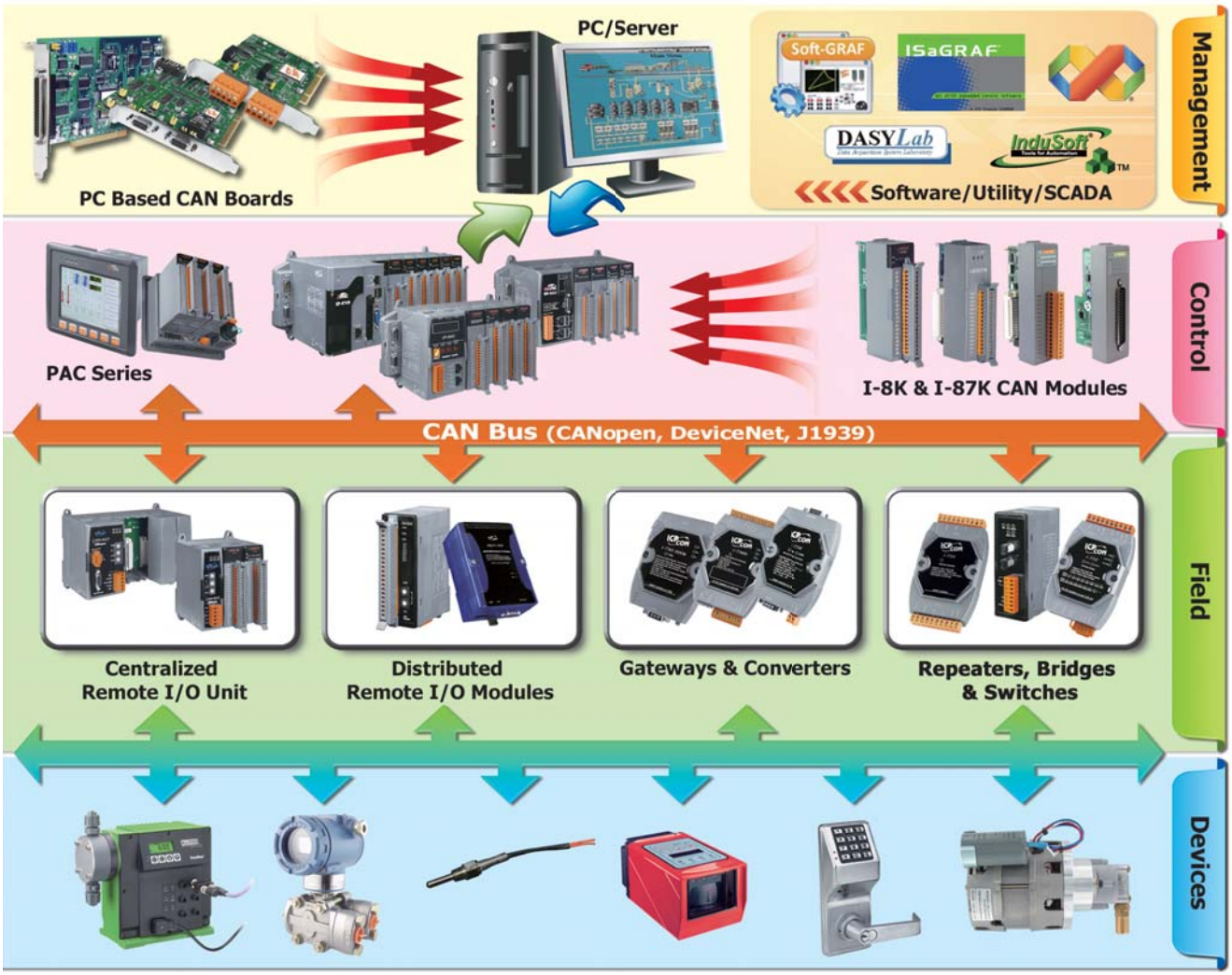


CAN Bus Products

4.1 Overview



ICP DAS has been developing rich **CAN-based/DeviceNet/CANopen/J1939** products for 10 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.



Selection Guide

Model Name			Description
CAN Bus Repeater/ Bridge/Switch (Ch 4.2)		I-7531	Isolated CAN Bus Repeater
		I-7532	Isolated Two-channel CAN Bus Bridge
		I-2534	4-Port CAN Bus Switch
		I-5534-M	4-Port CAN Bus Switch with Metal Casing
CAN Converter (Ch 4.3)	USB to CAN Converter	I-7565	1-Port Cost Effective USB to CAN Converter
		I-7565-H1	1-Port High Performance USB to CAN Converter
		I-7565-H2	2-Port High Performance USB to CAN Converter
		I-7565-CPM	Intelligent USB to CANopen Converter
		I-7565-DNM	Intelligent USB to DeviceNet Converter
	CAN to Fiber Converter/ Bridge	I-2532	CAN to Multi-mode Fiber Converter
		I-2533	CAN to Multi-mode Bridge
		I-2533CS	CAN to Single-mode Fiber Bridge
		I-2533CS-60	CAN to Single-mode Fiber Bridge
	Ethernet/Wi-Fi to CAN Converter	I-7540D-MTCP	Modbus TCP to CAN Converter
		I-7540D	Ethernet to CAN Converter
		I-7540D-WF	Wi-Fi to CAN Converter
	Uart to CAN converter	I-7530-FT	RS-232 to Fault-Tolerance CAN Converter
		I-7530	RS-232 to CAN Converter
		I-7530A	RS-232/422/485 to CAN Converter
		I-7530A-MR	Modbus RTU to CAN Converter
Gateway/ Protocol Converter (Ch 4.4)	CANopen Gateway	I-7231D	CANopen Slave to DCON Master Gateway
		I-7232D	CANopen Slave to Modbus RTU Master Gateway
		GW-7433D	Modbus TCP/RTU Slave to CANopen Master Gateway
	DeviceNet Gateway	I-7241D	DeviceNet Slave to DCON Master Gateway
		I-7242D	DeviceNet Slave to Modbus RTU Master Gateway
		GW-7243D	DeviceNet Slave to Modbus TCP/RTU Master Gateway
		GW-7434D	Modbus TCP/RTU Slave to DeviceNet Master Gateway
	J1939 Gateway	GW-7228	Modbus RTU Slave to J1939 Master Gateway
		GW-7238D	Modbus TCP/RTU Slave to J1939 Master Gateway
Palm-size Programmable CAN Controller (Ch 4.5)		I-7188XBD-CAN	1-Port programmable CAN controller with RS-232/485
		uPAC-7186EXD-CAN	1-Port programmable CAN controller with Ethernet and RS-232/485
		uPAC-5001D-CAN1	1-Port programmable CAN controller with Ethernet and RS-232/485
		uPAC-5001D-CAN2	2-Port programmable CAN controller with Ethernet and RS-232/485
PC-based CAN Bus Boards (Ch 4.6)		PEX-CAN200i	2-Port PCI Express CAN Communication Board
		PISO-CAN100U	1-Port Universal PCI CAN Communication Board
		PISO-CAN200U	2-Port Universal PCI CAN Communication Board
		PISO-CAN400U	4-Port Universal PCI CAN Communication Board
		PISO-CAN800U	8-Port Universal PCI CAN Communication Board
		PCM-CAN100	1-Port PCI-104 CAN Communication Module
		PCM-CAN200	2-Port PCI-104 CAN Communication Module
		PCM-CAN200P	2-Port PCI-104 + CAN Communication Module
		PISO-CM100U	1-Port Universal PCI CAN Board with Built-in Programmable CPU
		PCM-CM100	1-Port PCI-104 CAN Board with Built-in Programmable CPU
		PISO-DNM100U	1-Port Universal PCI CAN Board with Built-in DeviceNet Master Firmware
		PISO-DNS100U	1-Port Universal PCI CAN Board with Built-in DeviceNet Slave Firmware
		PISO-CPM100U	1-Port Universal PCI CAN Board with Built-in CANopen Master Firmware
		PCM-CPM100	1-Port PCI-104 CAN Board with Built-in Programmable CPU

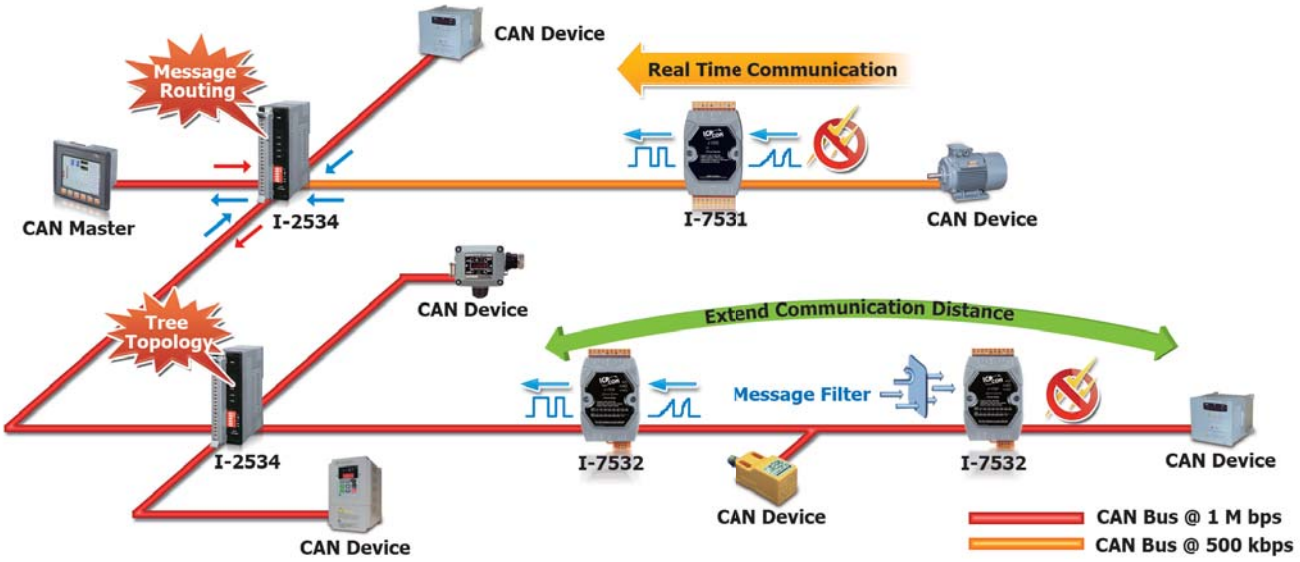
Selection Guide

Model Name			Description
PAC-based CAN Modules (Ch 4.7)		I-8120W	1-Port Intelligent CAN Bus Communication Module
		I-87120	1-Port Programmable CAN Bus Communication Module
		I-8123W	1-Port High Performance CANopen Master Module
		I-87123	1-Port High Performance CANopen Master Module
		I-8124W	1-Port High Performance DeviceNet Master Module
		I-87124	1-Port High Performance DeviceNet Master Module
I/O Module and Unit (Ch 4.8)	Analog Input Modules	CAN-2015C	8-Ch RTD Input Module with CANopen Protocol
		CAN-2015D	8-Ch RTD Input Module with DeviceNet Protocol
		CAN-2017C	8-Ch AI Module with CANopen Protocol
		CAN-2017D	8-Ch AI Module with DeviceNet Protocol
		CAN-2018C	8-Ch Thermocouple Input Module with CANopen Protocol
		CAN-2018D	8-Ch Thermocouple Input Module with DeviceNet Protocol
	Analog Output Modules	CAN-2024C	4-Ch AO Module with CANopen Protocol
		CAN-2024D	4-Ch AO Module with DeviceNet Protocol
		CAN-2028C	8-Ch AO Module with CANopen Protocol
		CAN-2028D	8-Ch AO Module with DeviceNet Protocol
	Digital I/O Modules	CAN-2053C	16-Ch DI Module with CANopen Protocol
		CAN-2053D	16-Ch DI Module with DeviceNet Protocol
		CAN-2054C	8-Ch DI, 8-Ch DO Module with CANopen Protocol
		CAN-2054D	8-Ch DI, 8-Ch DO Module with DeviceNet Protocol
		CAN-2057C	16-Ch DO Module with CANopen Protocol
		CAN-2057D	16-Ch DO Module with DeviceNet Protocol
		CAN-2088C	8-Ch DI, 8-Ch PWM Output Module with CANopen Protocol
		CAN-2088D	8-Ch DI, 8-Ch PWM Output Module with DeviceNet Protocol
	CANopen I/O Units	CAN-8123	CANopen Remote I/O Unit with 1 I/O Slot
		CAN-8223	CANopen Remote I/O Unit with 2 I/O Slots
		CAN-8423	CANopen Remote I/O Unit with 4 I/O Slots
		CAN-8823	CANopen Remote I/O Unit with 8 I/O Slots
	DeviceNet I/O Units	CAN-8124	DeviceNet Remote I/O Unit with 1 I/O Slot
		CAN-8224	DeviceNet Remote I/O Unit with 2 I/O Slots
		CAN-8424	DeviceNet Remote I/O Unit with 4 I/O Slots
		CAN-8824	DeviceNet Remote I/O Unit with 8 I/O Slots

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
	Isolated CAN Bus Repeater	Isolated Two-channel CAN Bus Bridge	4-Port CAN Bus Switch	4-Port CAN Bus Switch with Metal Casing
Pictures			NEW 	
CAN Interface				
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 Mbsp)	Depends on the CAN baud rate (Max. 440 us @ 1 Mbsp)	
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			
LED				
Round LED	CAN Status LED	PWR LED, Rx LED, ERR LED	PWR LED, CAN1 LED, CAN2 LED, CAN3 LED, CAN4 LED	
Power				
Power supply	Unregulated +10 ~ +30 VDC			
Protection	Power reverse polarity protection, Over-voltage brown-out protection			
Power Consumption	2 W		3 W	
Mechanism				
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
Environment				
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.

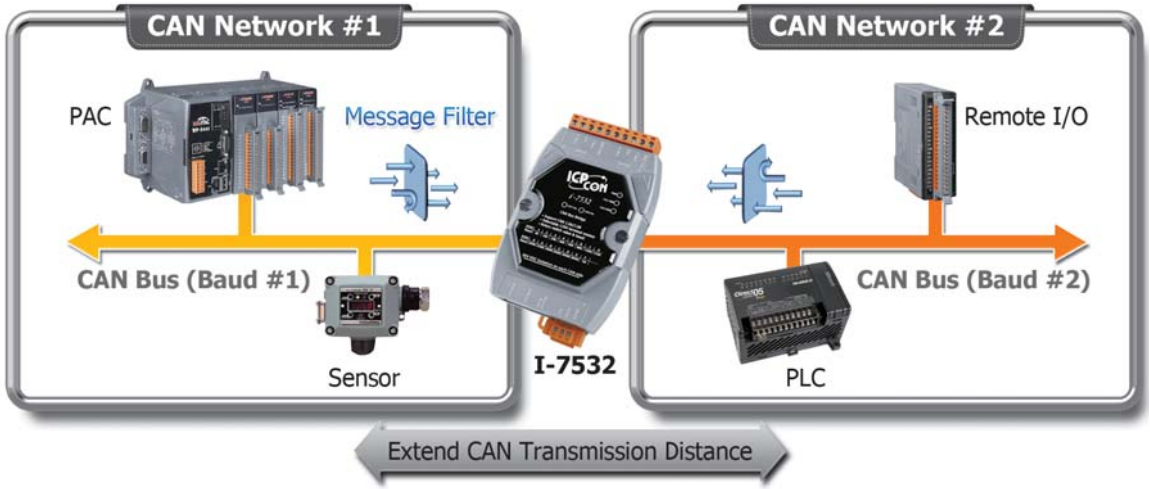
- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898-2 standard
- Supports a wide range of baud rates from 5 kbps ~ 800 kbps
- 2500 Vrms photocoupler isolation on the CAN side
- Jumper for the 120 Ω terminator resistor of the CAN bus
- Automatic baud rate detection
- 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

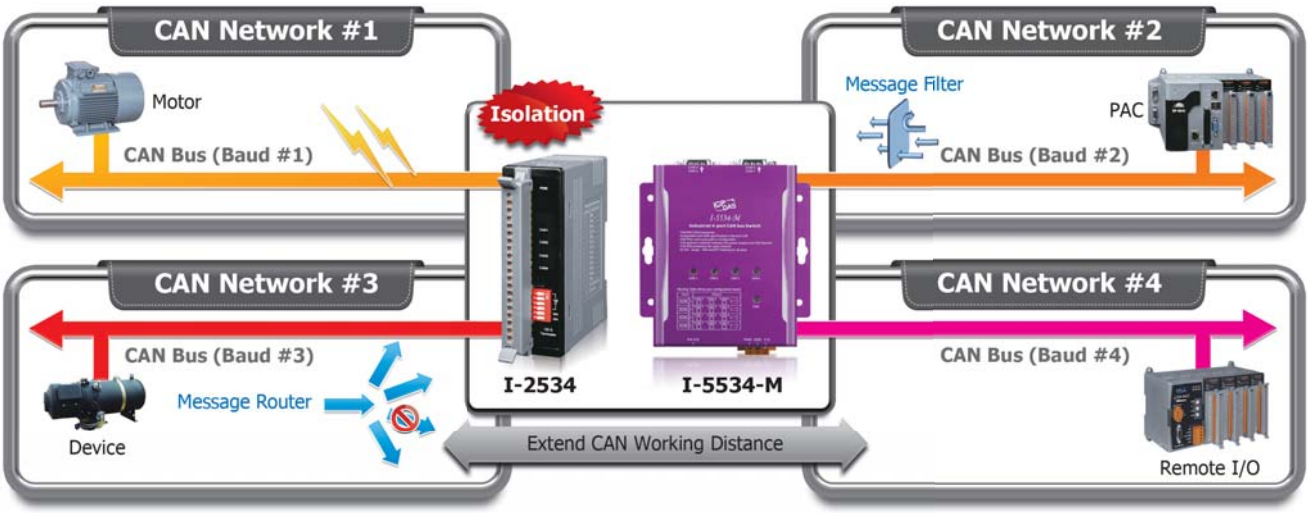


Isolated 4-Port CAN Bus Switch

I-2534 NEW
I-5534-M NEW

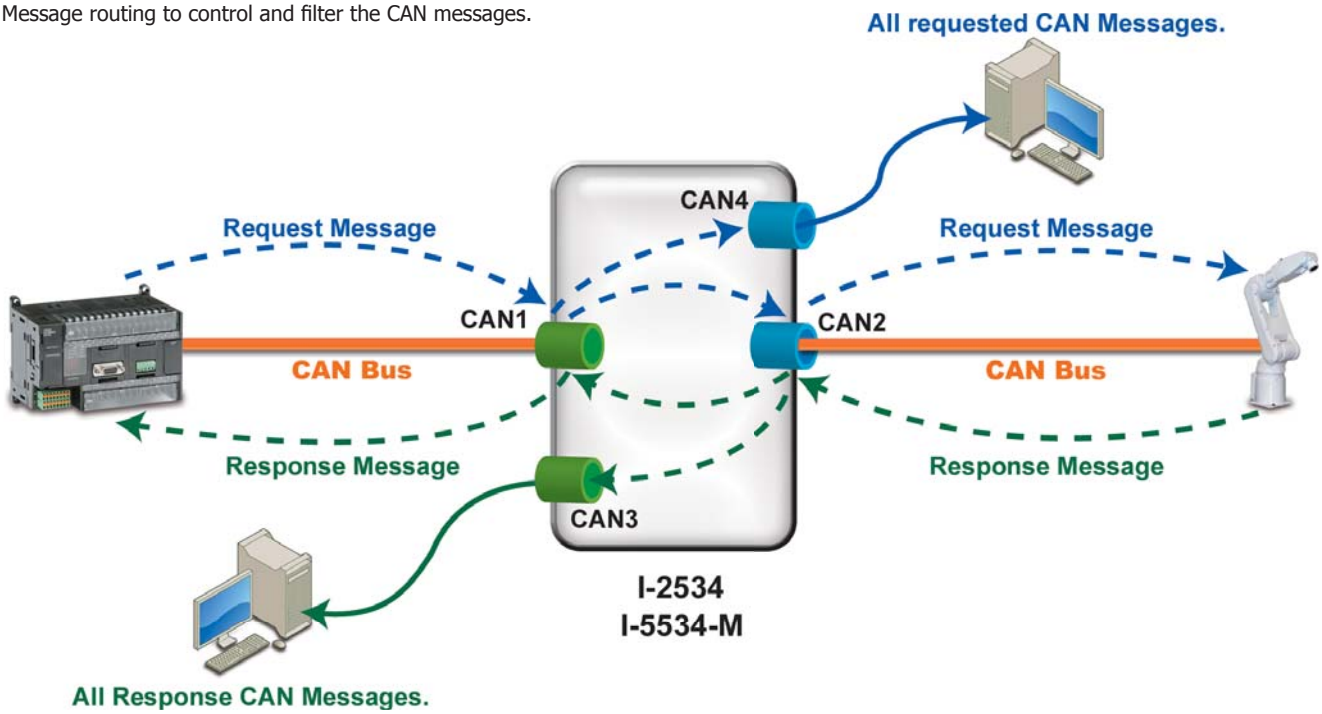
The I-2534/I-5534-M provides 4 isolated independent CAN ports that can be used to link 4 CAN networks. The I-2534/I-5534-M follows the ISO 11898-2 specification which is applied in widely range of CAN-based protocols. In order to fit the industrial application, this module provides the functions of reshaping 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 VDC ~ +30 VDC



Applications

Message routing to control and filter the CAN messages.



4.3 CAN Converters

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 Converters

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
Pictures	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
					
USB Interface					
Connector	USB Type B				
Compatibility	USB 1.1 and 2.0 standard				
Compatibility					
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	-	-
System					
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

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 resister 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

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 resister 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

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

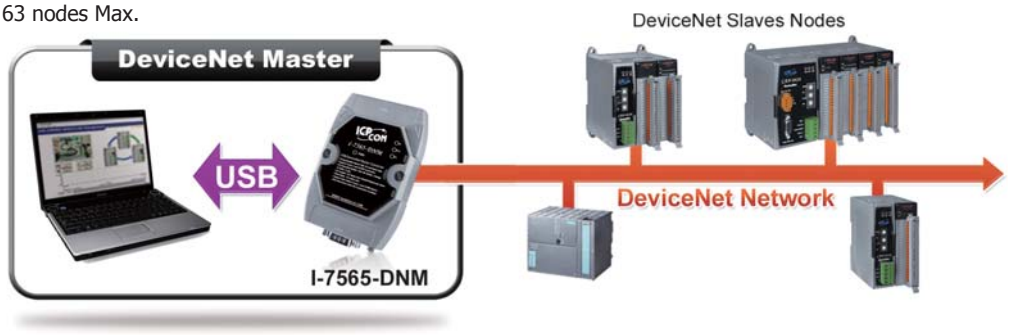
Intelligent USB to DeviceNet Converter

I-7565-DNM

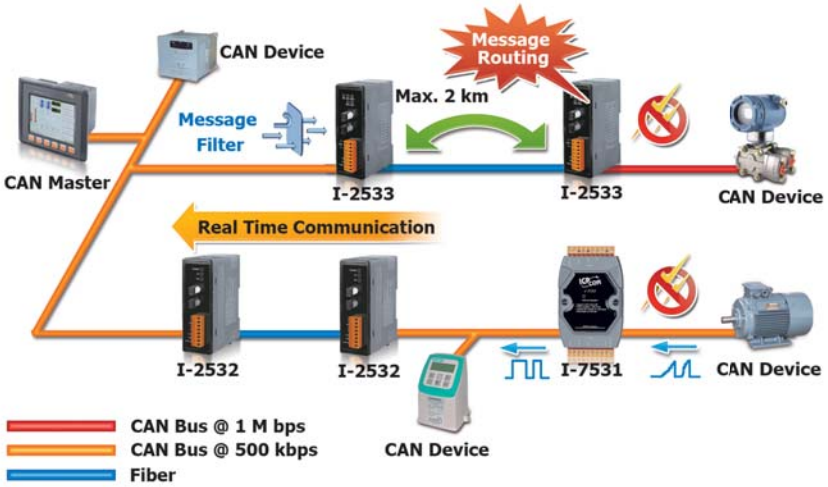
I-7565-DNM can represent an economic solution of DeviceNet application and be a DeviceNet master device on the DeviceNet network. It is a "Predefined Master-Slave connection Set". I-7565-DNM supports Group 2 only Server and UCMM functions to communication with slave devices. It has an independent CAN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

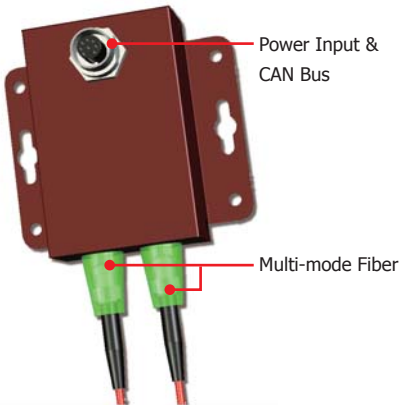
- Fully compliant with USB 1.1/2.0 (Full Speed)
- No external power supply is required as I-7565 takes it's power from the USB bus
- DeviceNet Version: Volume I & II, Release 2.0
- Programmable Master MAC ID and Baud Rate.
- Baud Rate: 125k, 250k, 500k
- Support Group 2 and UCMM connection
- I/O Operating 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



Metal Housing Product



I-2532-M is a CAN to multi-mode fiber converter that with the same speficications as I-2532 but with metal housing.

If you need other products with metal housing, call us.

The dimensions are W x H x D = 77 x 81 x 28 mm

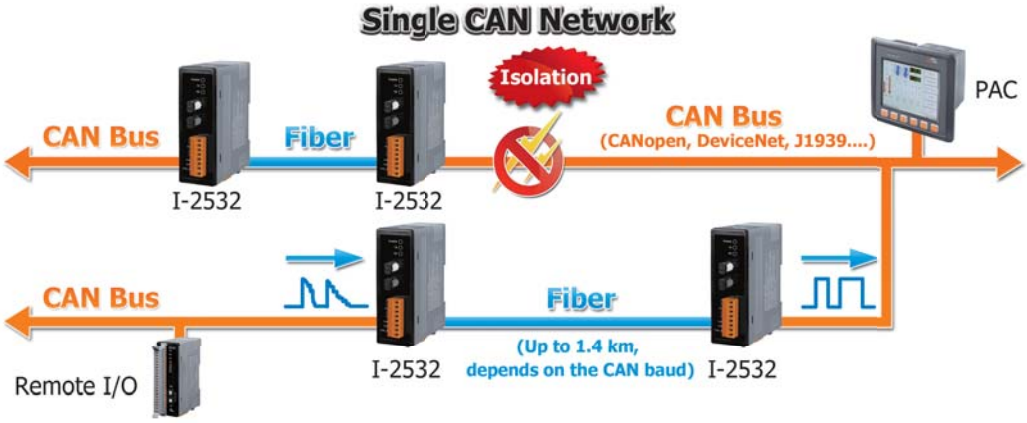
Model Name	I-2532	I-2533	I-2533CS	I-2533CS-60
	CAN to Multi-mode Fiber Converter	CAN to Multi-mode Fiber Bridge	CAN to Single-mode Fiber Bridge	CAN to Single-mode Fiber Bridge
Pictures				
CAN Interface				
Connector	8-pin screwed terminal block (CAN_GND, CAN_L, CAN_H, N/A for others)	Screwed terminal 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 Mbsp)		
Terminator Resistor	DIP switch for the 120 Ω terminator resistor			
Isolation	3000 V_{DC} for DC-to-DC, 2500 V_{rms} for photo-couple			
Specification	ISO 11898-2, CAN 2.0A and CAN 2.0B			
Fiber Interface				
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
UART Interface				
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		
LED				
Round LED	PWR LED, TD LED, RD LED	PWR LED, CAN_Tx LED, CAN_Rx LED, CAN_Err LED, FB_Err LED		
Power				
Power supply	Unregulated +10 ~ +30 V_{DC}			
Protection	Power reverse polarity protection, Over-voltage brown-out protection			
Power Consumption	0.5 W	3 W		
Mechanism				
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	
Environment				
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 Ω terminator resistor of the CAN bus
- 3 kV galvanic isolation
- Fiber Port: ST (Multi-mode)
- Wavelength: 850 nm
- Fiber Cable: 62.5/125 μm
- One CAN and one fiber channel



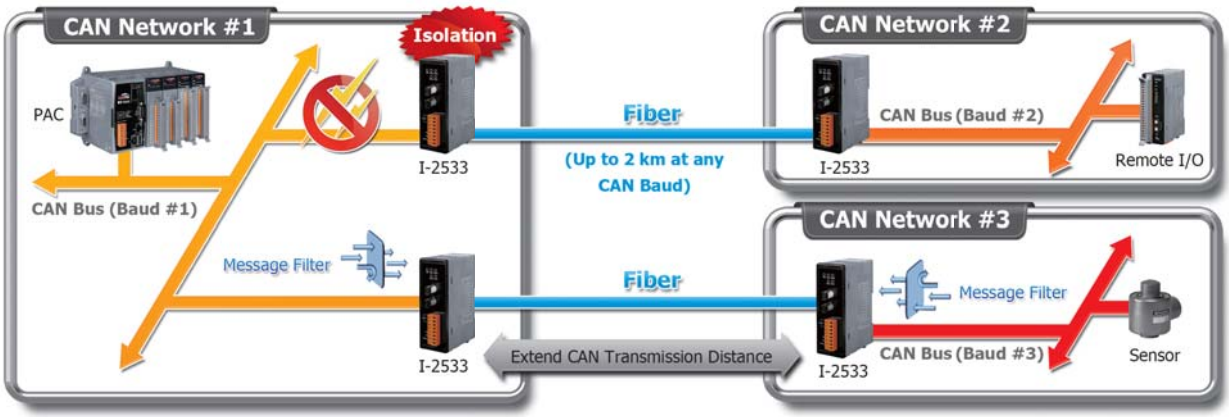
CAN to Multi-mode Fiber Bridge

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 μm
- 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 Ω 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



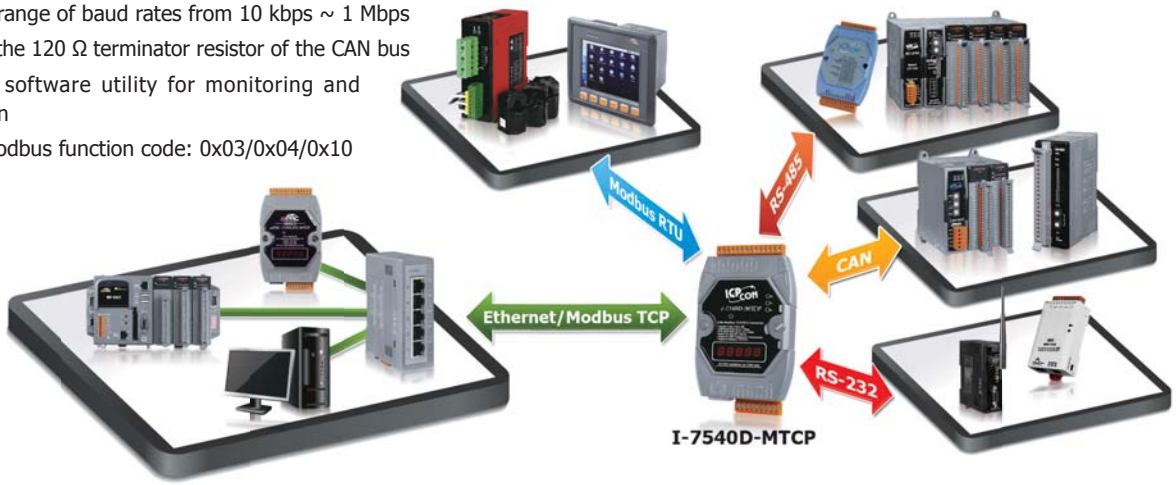
4.3.3 Ethernet/Wi-Fi to CAN Converters

Modbus TCP to CAN Converter

I-7540D-MTCP

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



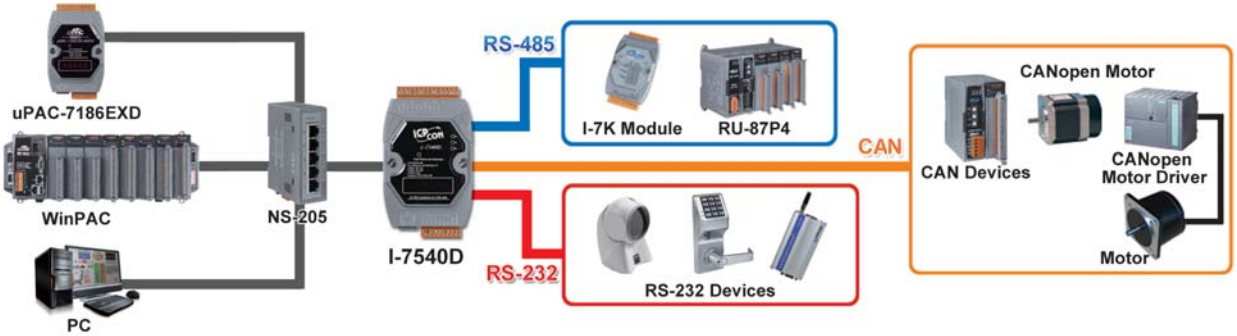
Ethernet to CAN Converter

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



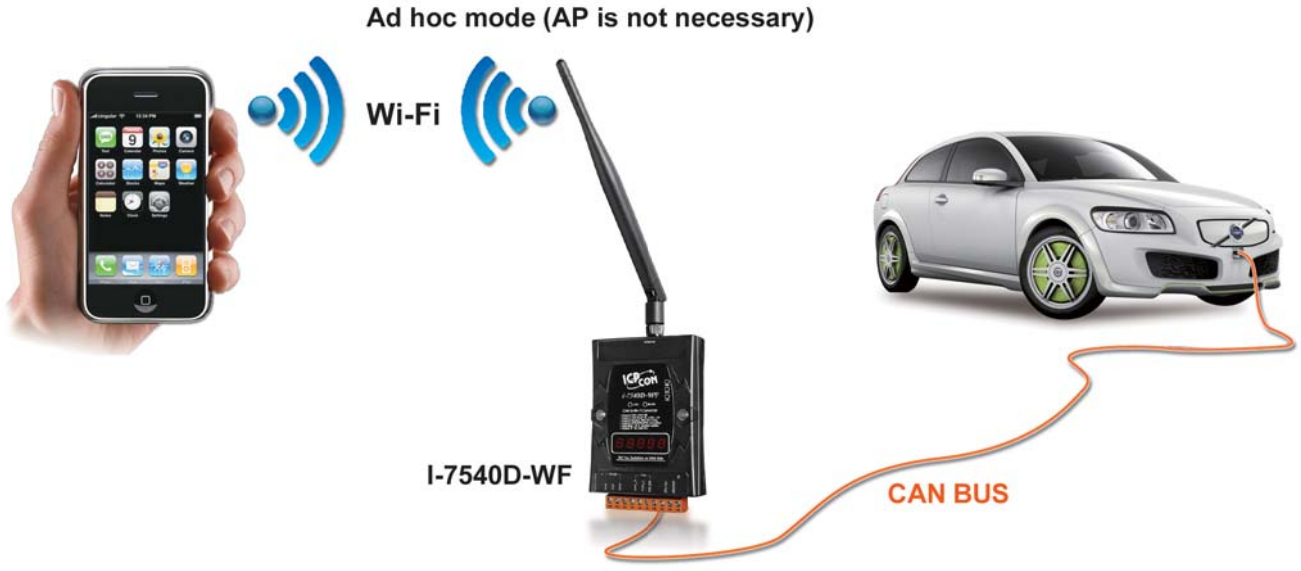
Wi-Fi to CAN Converter

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



4.3.4 Uart to CAN Converters

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
Pictures	RS-232 to Fault-Tolerance CAN Converter	RS-232 to CAN Converter	RS-232/422/485 to CAN Converter	Modbus RTU to CAN Converter
				
CAN Interface				
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		
UART Interface				
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			
System				
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.

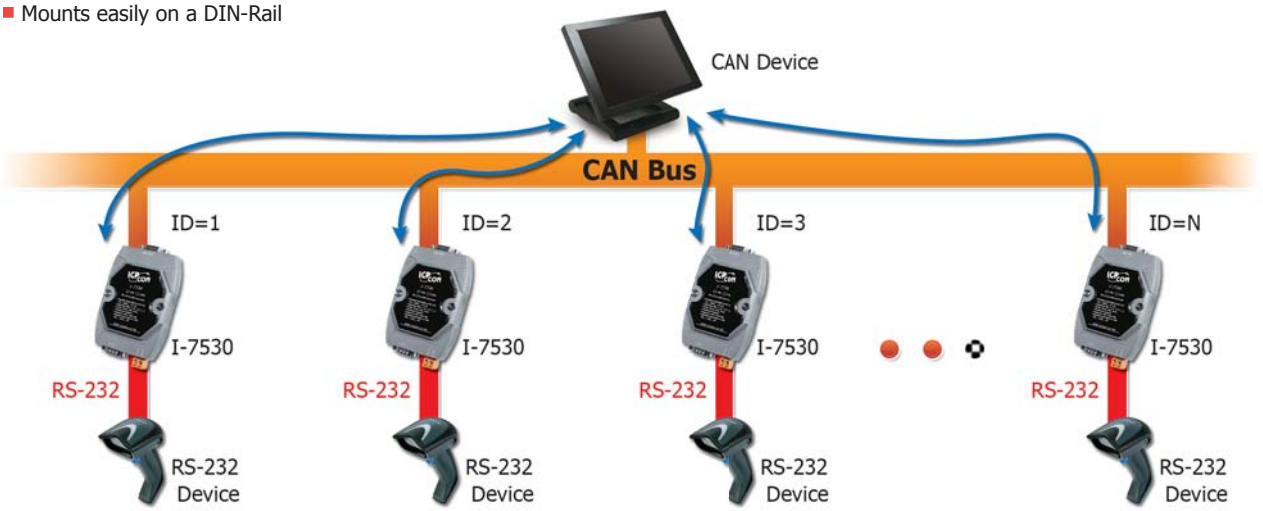
- Built-in CAN/RS-232 converter firmware
- Fully compatible with the ISO 11898-3 standard
- Max. transmission speed of up to 125 kbps for CAN and 115.2 kbps for RS-232
- Compatible with CAN specification 2.0 parts A and B
- Built-in RS-232/CAN FIFO buffers
- Power, data flow and error indicator for CAN 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-232/422/485 Converter

I-7530A

The I-7530A is an RS-232/422/485 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

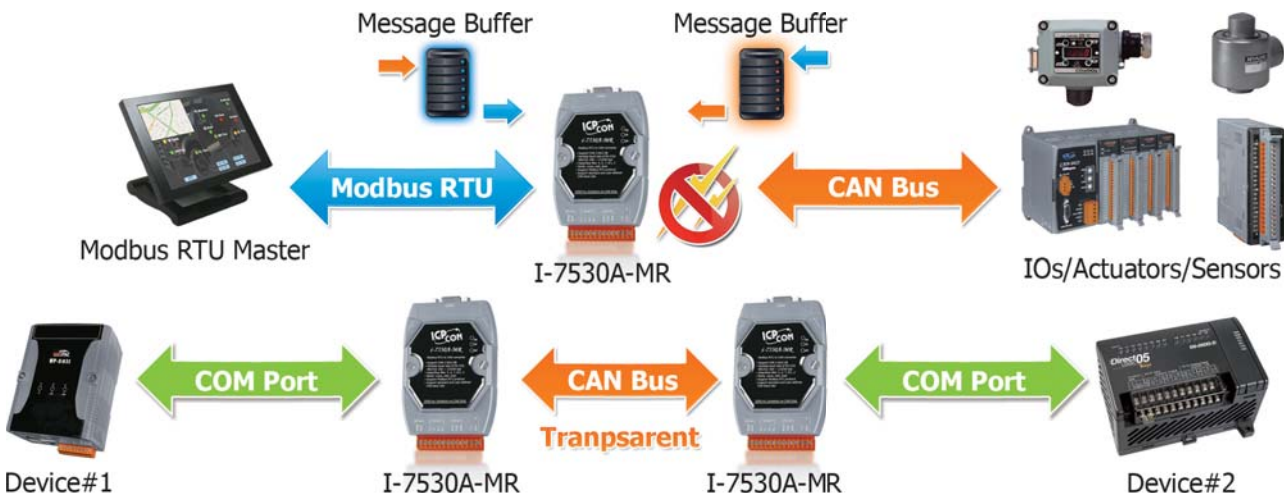
CAN to Modbus RTU Slave Converter

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 netowrks 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

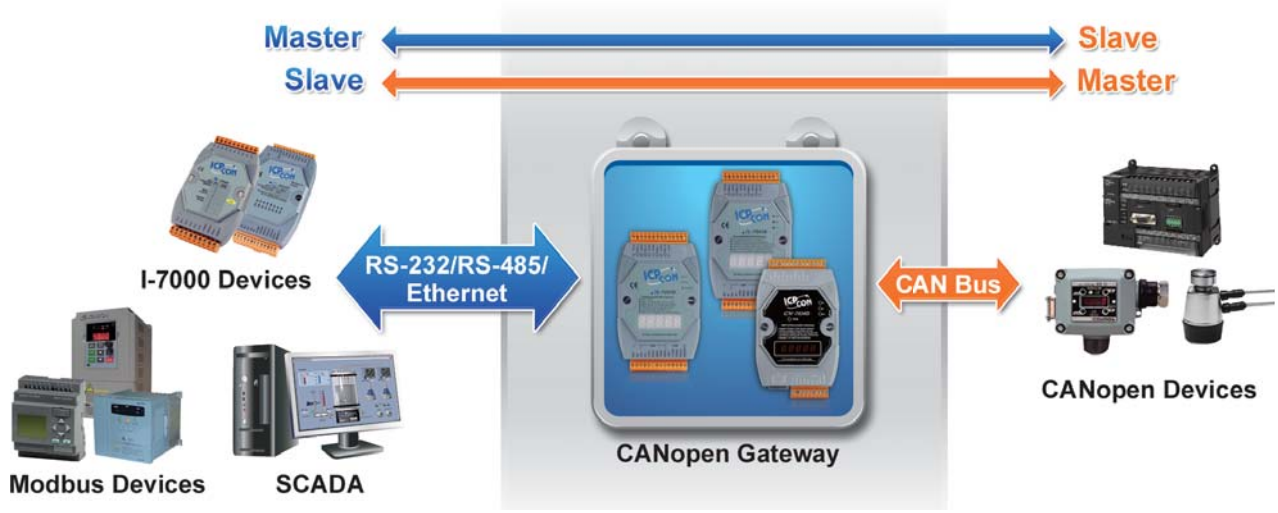


4.4 Gateway/Protocol Converters

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 Gateways



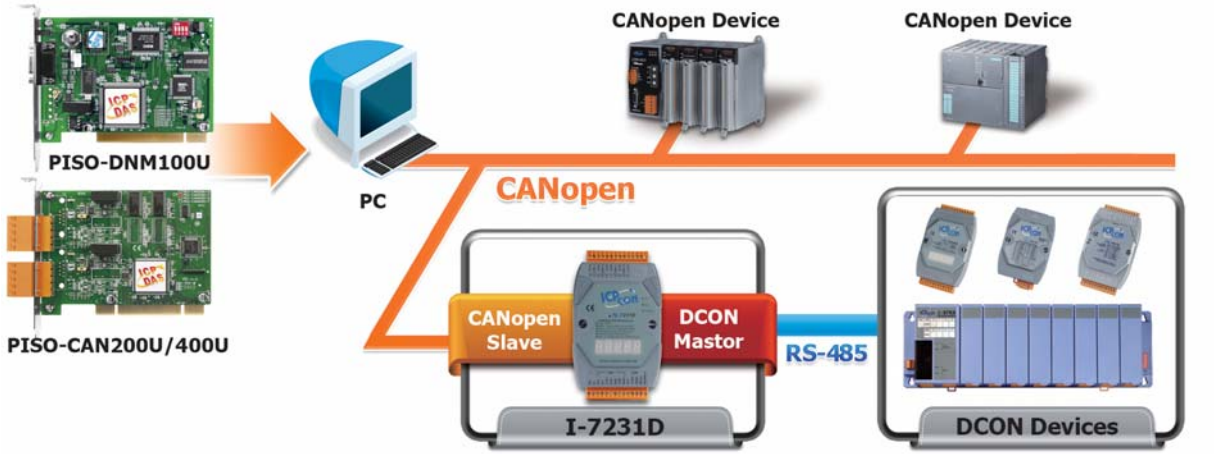
Model Name	I-7231D	I-7232D	GW-7433D
Pictures	CANopen Slave to DCON Master Gateway	CANopen Slave to Modbus RTU Master Gateway	Modbus TCP/RTU Slave to CANopen Master Gateway
			
CANopen Interface			
CANopen Interface	1 channel (CAN_H, CAN_L), and the other is for bypass		
CANopen Function	CANopen slave		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		-
UART Interface			
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
Ethernet Interface			
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
System			
Power Consumption	3 W		
Power Input	10 ~ 30 V_{DC}		
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 Slave to DCON Master 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

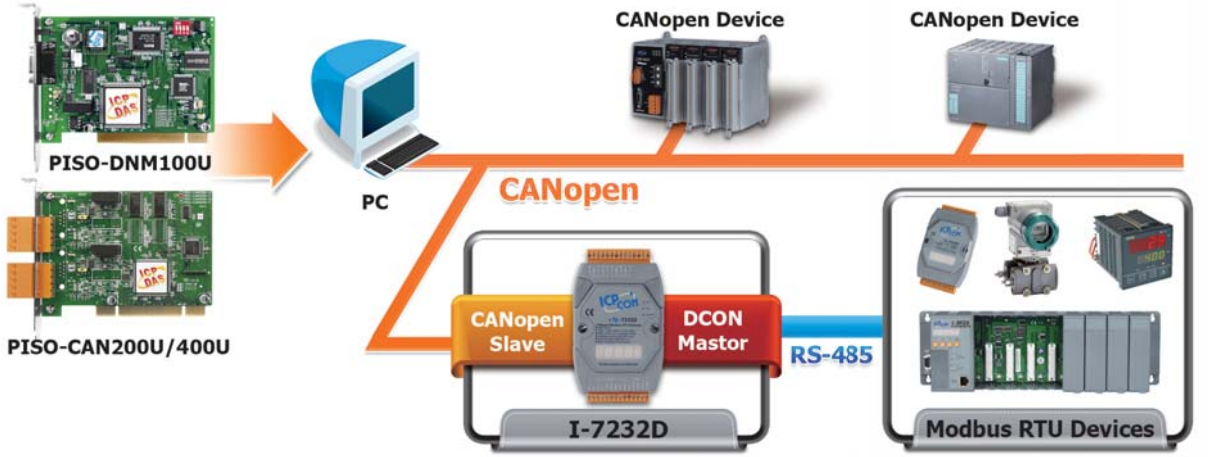


CANopen Slave to Modbus RTU Master Gateway

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

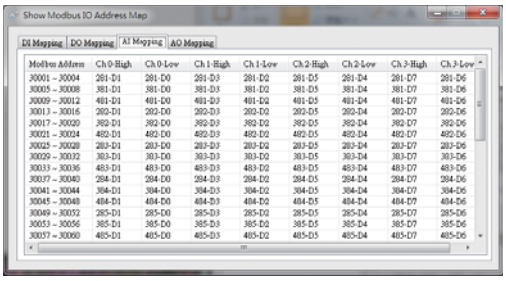


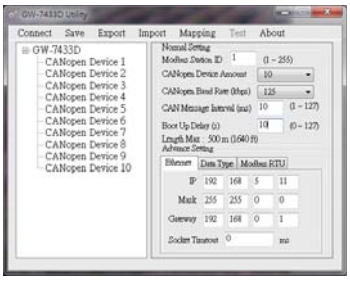
Modbus TCP/RTU Slave to CANopen Master Gateway

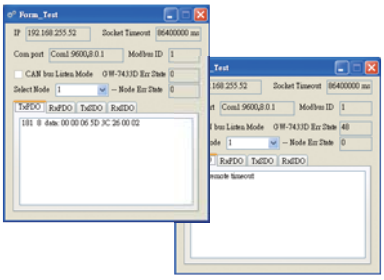
GW-7433D

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

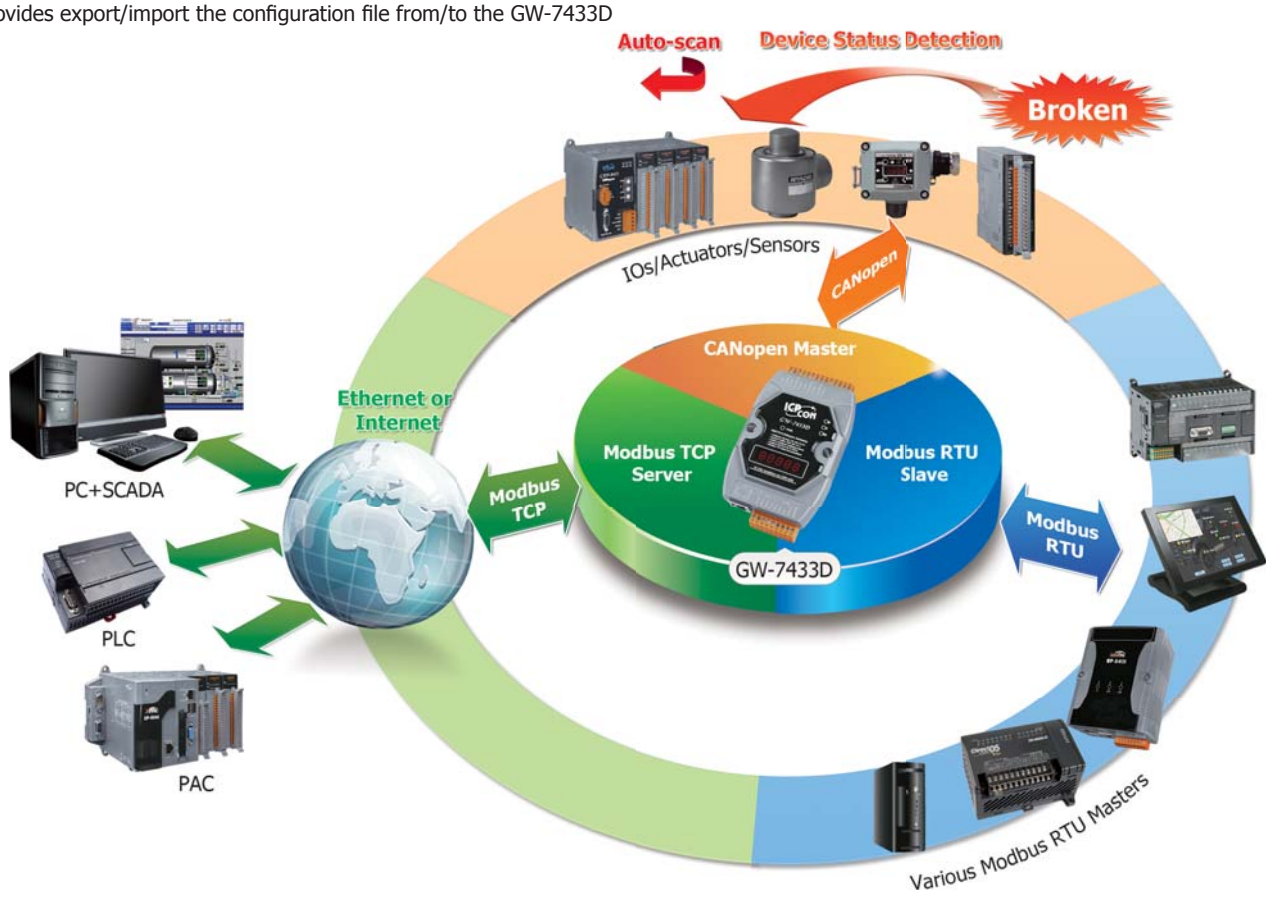




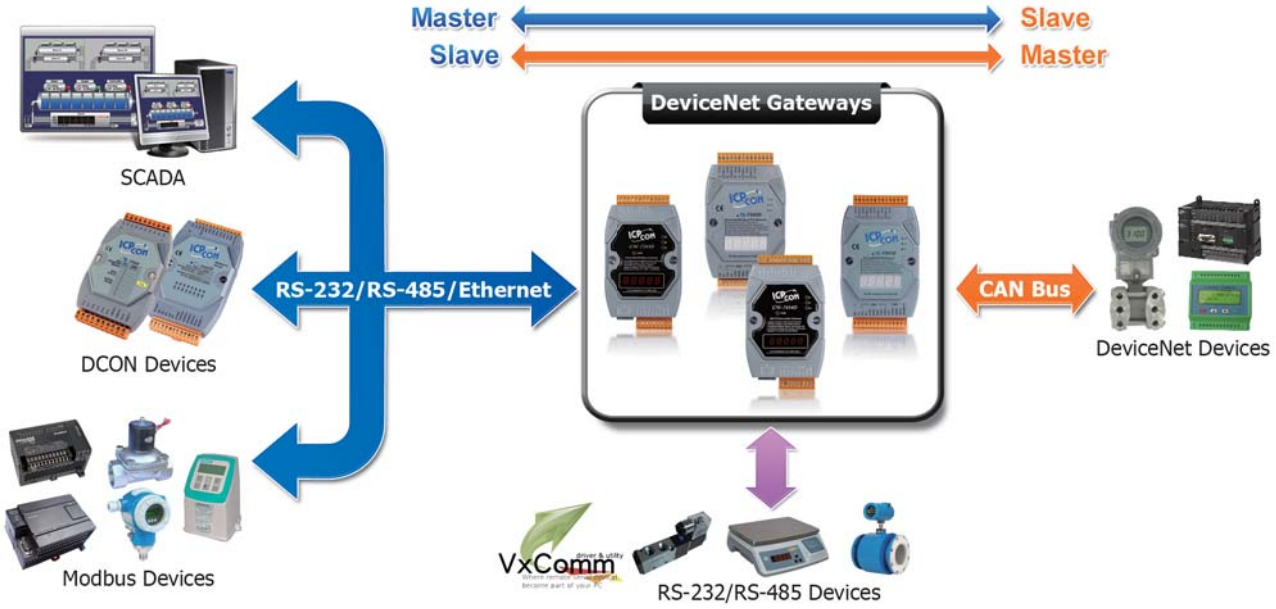


Utility Features

- 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 Gateways



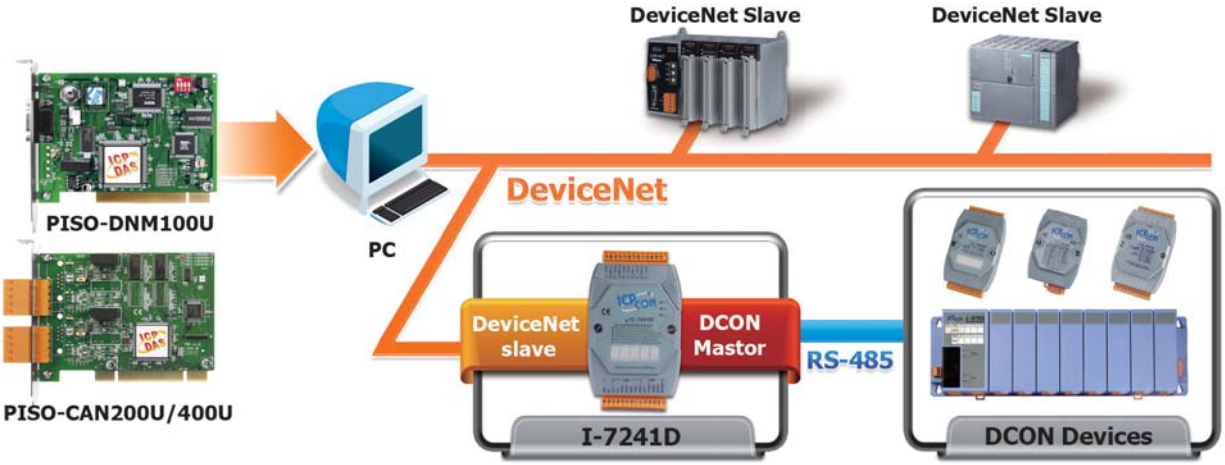
Model Name	I-7241D	I-7242D	GW-7243D	GW-7434D
	DeviceNet Slave to DCON Master Gateway	DeviceNet Slave to Modbus RTU Master Gateway	DeviceNet Slave to Modbus TCP/RTU Master Gateway	Modbus TCP/RTU Slave to DeviceNet Master Gateway
Pictures				
DeviceNet Interface				
DeviceNet Connector	1 channel (CAN_H, 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/Cycclic		Polling	Polling, Bit-Strobe, Change of State/Cyclic
Heartbeat Function	Yes			-
Shutdown Message	Yes			-
Shutdown Message	Yes			-
Shutdown Message				
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
Ethernet Interface				
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	
System				
WDT	Yes (0.8 second)			
Power Consumption	3 W		2.5 W	
Power Input	10 ~ 30 V_{DC}			
Dimension (W x L x H)	72 mm x 122 mm x 33 mm			
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			

DeviceNet Slave to DCON Master 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)
- Support Offline Connection Set, Device Heartbeat message and Device Shutdown message
- I/O operating modes: Polling, Bit-Strobe, Change of State/Cyclic
- Provide dynamic Assembly Objects mapping
- Support Max. 15 I-7000/I-87K I/O series modules

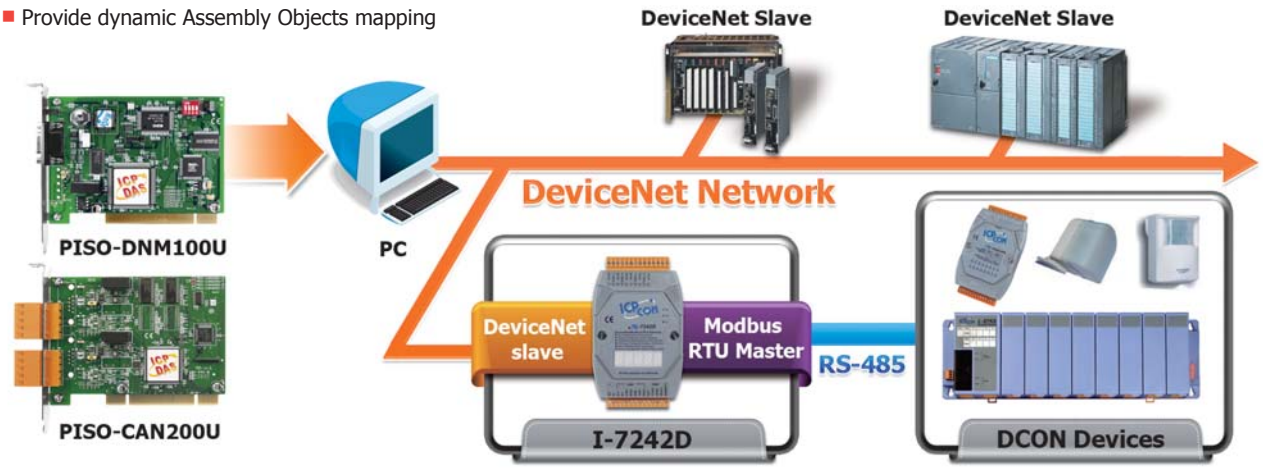


DeviceNet Slave to Modbus RTU Master Gateway

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

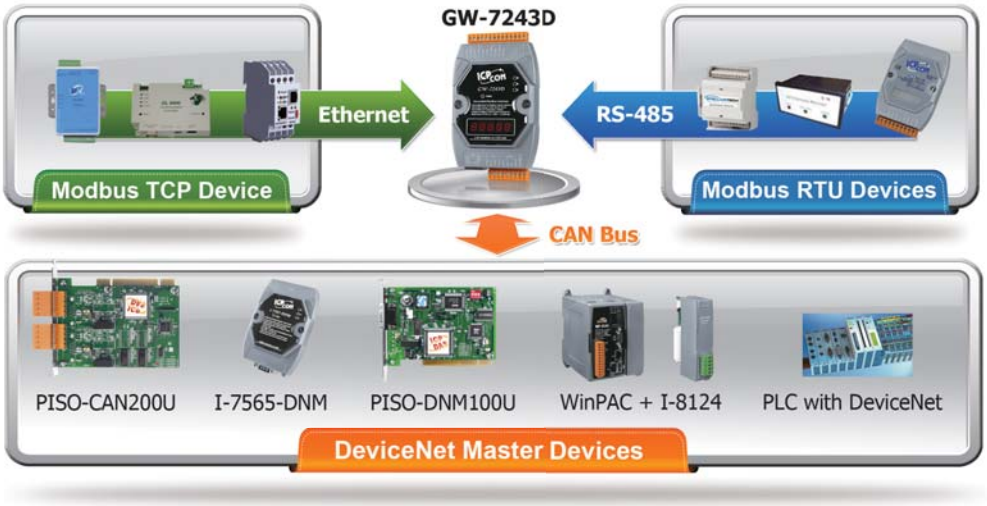


DeviceNet Slave to Modbus TCP/RTU/ASCII Master Gateway

GW-7243D

The GW-7243D offers the DeviceNet slave and Modbus mater 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 4 Modbus TCP devices
- Maximum support 5 Modbus TCP commands for each Modbus TCP device
- Maximum support 10 Modbus RTU/ASCII commands for each COM port
- Support Modbus function codes: 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x0F and 0x10

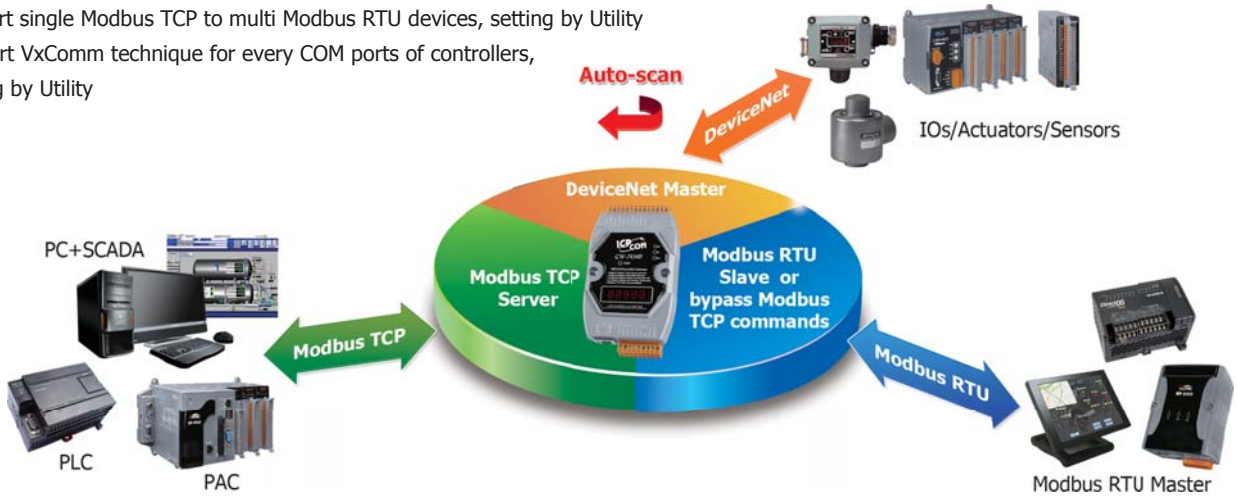


Modbus TCP/RTU/ASCII Slave to DeviceNet Master Gateway

GW-7434D

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 Gateways

Modbus RTU Slave to J1939 Master Gateway

GW-7228

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 resister
- Built-in watchdog

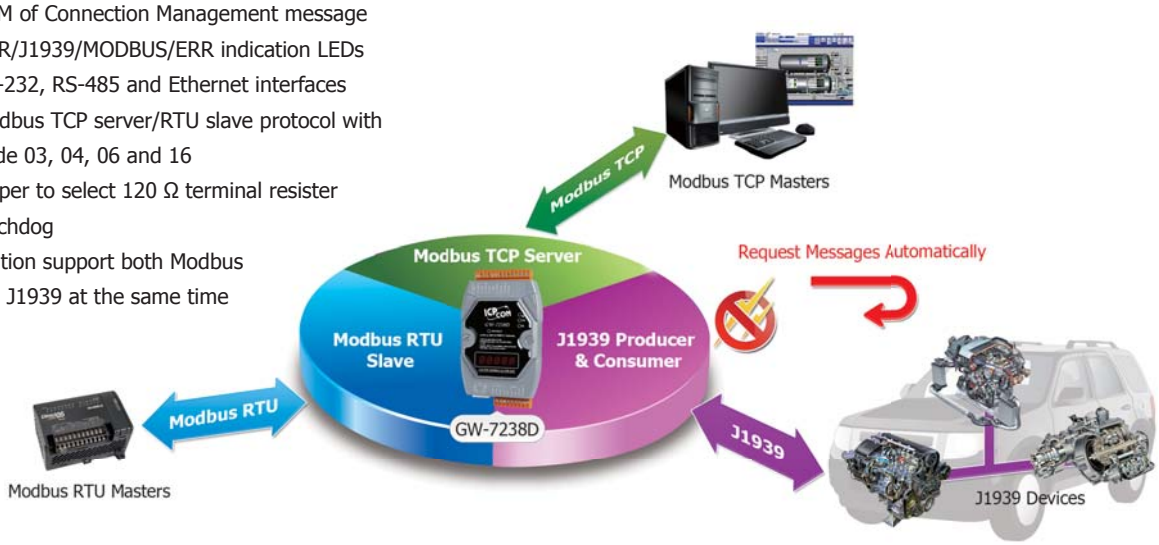
Modbus TCP/RTU Slave to J1939 Master Gateway

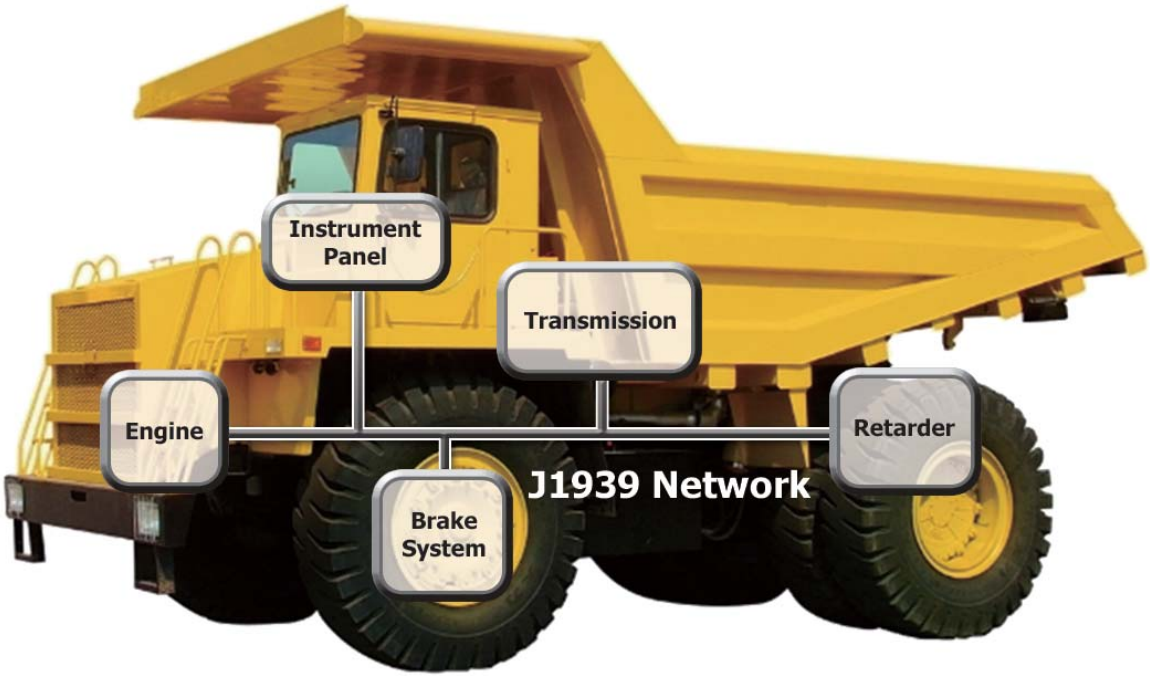
GW-7238D

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.

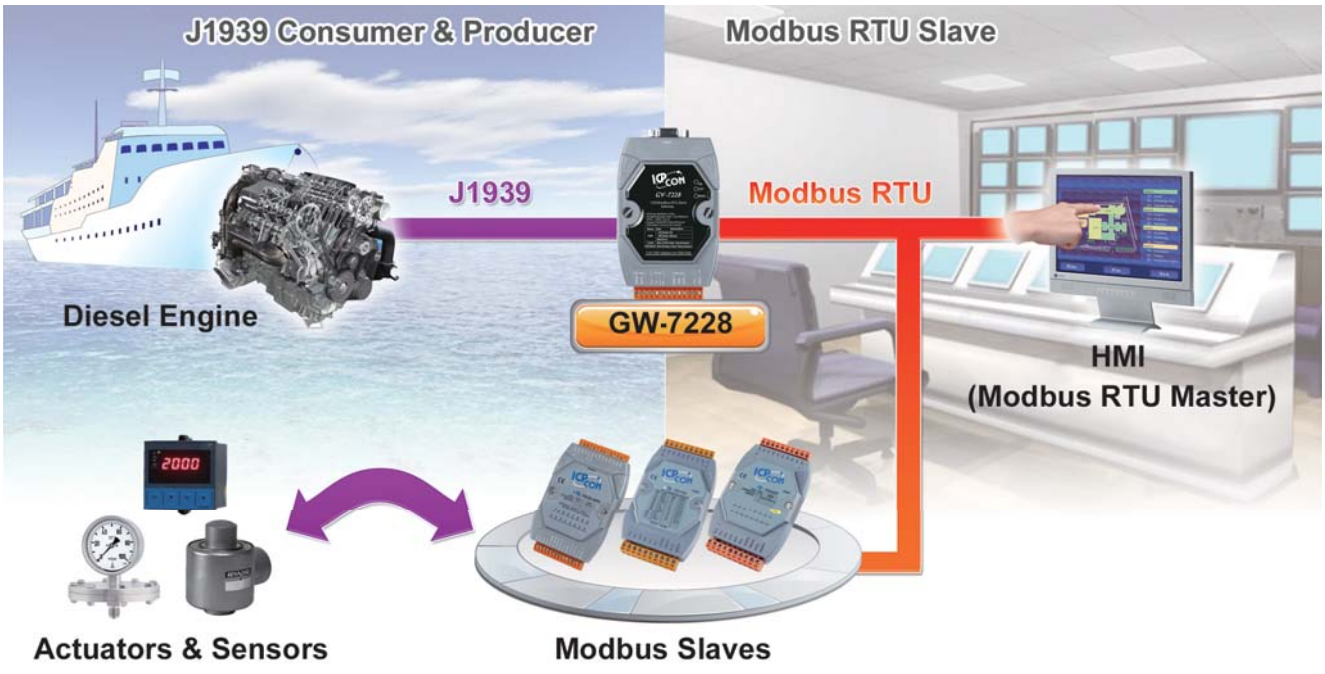
- Transmission and reception of all types of J1939 messages, including PDU1, PDU2, broadcast and destination specific
- Support BAM of Connection Management message
- Provide PWR/J1939/MODBUS/ERR indication LEDs
- Support RS-232, RS-485 and Ethernet interfaces
- Support Modbus TCP server/RTU slave protocol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





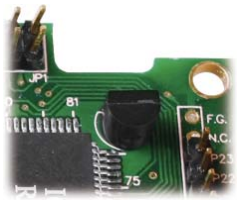
Case Studies

The user 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 user would like to control and monitor the engine parameters, such as the engine oil temperature, the engine coolant temperature, the engine rotational speed, the toque 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 user 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 toque that is corresponding to the content of the Modbus commands.



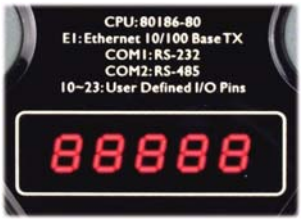
4.5 Palm-size Programmable CAN Controllers

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	uPAC-5001D-CAN1	uPAC-5001D-CAN2
Pictures				
System Software				
OS	MiniOS7 (DOS-like embedded operating system)			
Development Software				
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)			
CPU Module				
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)			
Communication Ports				
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
LED Indicator				
7-Segment LED	Yes			
Programmable LED Indicators	4		5	
Mechanical				
Dimension (W x L x H)	72 mm x 122 mm x 33 mm		91 mm x 123 mm x 52 mm	
Installation	DIN-Rail Mounting			
Environmental				
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			
Ambient Relative Humidity	10 ~ 90% RH (non-condensing)			
Power				
Input Range	10 ~ 30 VDC		12 ~ 48 VDC	
Redundant Power Inputs	-		Yes	
Power Consumption	3 W			

4.6 PC-based CAN Bus Boards

To access the CAN sensors, acturators, 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 Boards

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

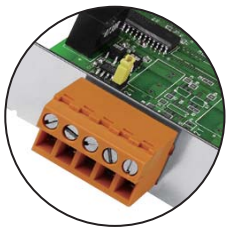
Model Name	PCM-CAN100	PCM-CAN200	PCM-CAN200P
Pictures			
CAN Channel	1, and the other for bypass	2	
Bus Interface	PCI-104		PC/104-Plus
On-board CPU	-		
Baud Rate	Programmable transfer rate up to 1 Mbps		
Terminator Resistor	Jumper for 120 Ω terminator resistor		
Galvanic Isolation	2 kV		
PC APIs	API 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:

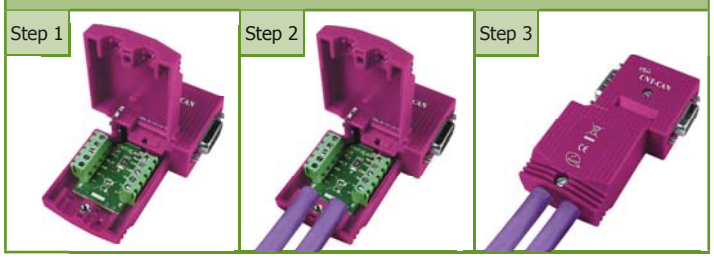
DB-37 Male (D-sub) to 4-Port DB-9 Male (D-sub) cable. 0.3 M (90°)

CA-9-3715D:

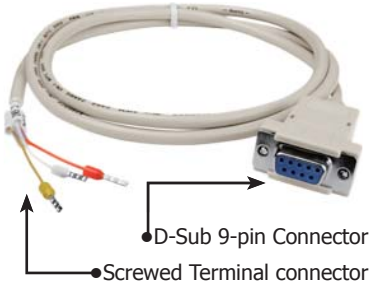
DB-37 Male (D-sub) to 4-Port DB-9 Male (D-sub) cable. 1.5 M (180°)

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

Installation

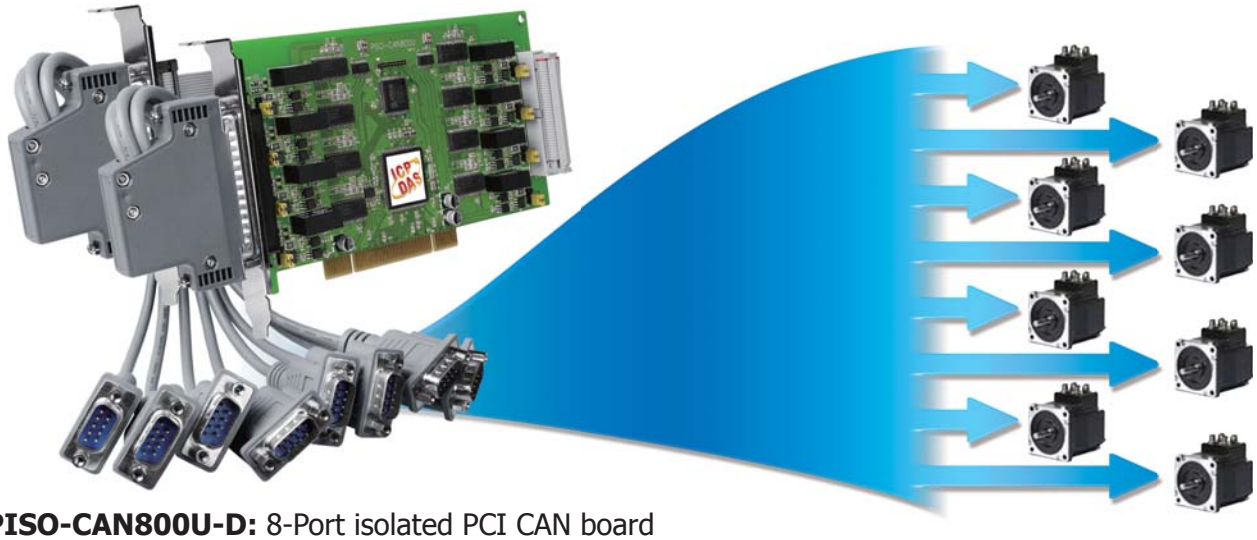


CA-0910-C



CAN bus boards

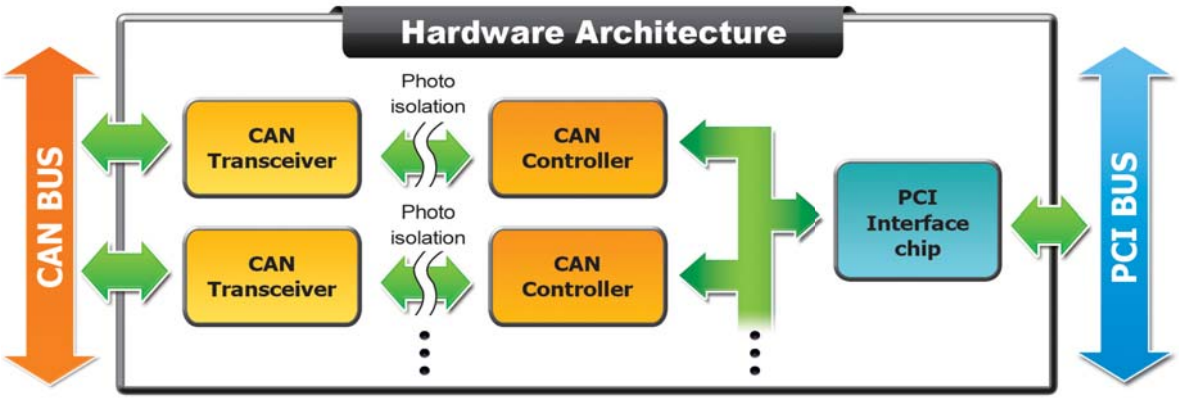
The PCI and PCI Express CAN bus boards use the new CAN controller Phillips SJA1000T and transceiver TJA1042, which provide bus arbitration, error detection with auto correction and re-transmission function. It can be installed in a 5V or 3.3V PCI slot and supported truly "Plug & play".

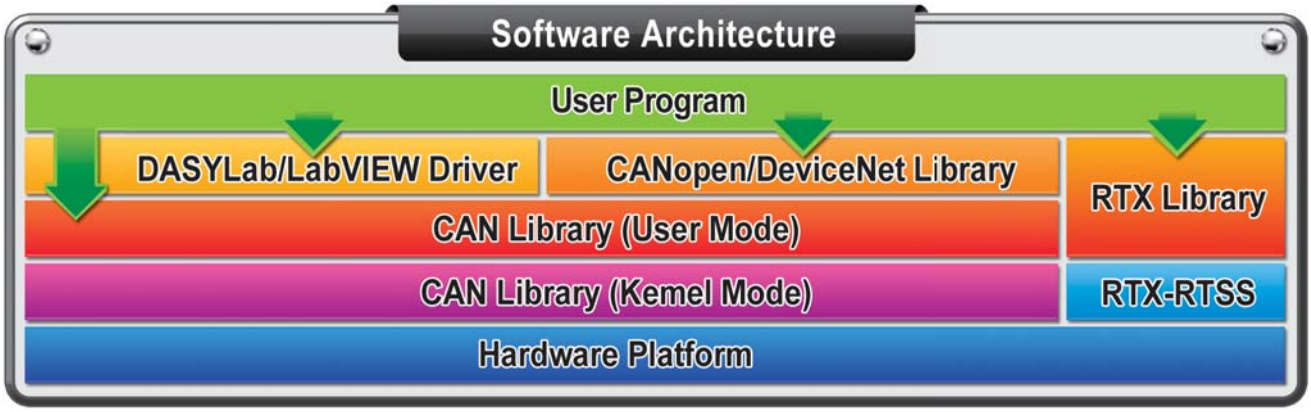


PISO-CAN800U-D: 8-Port isolated PCI CAN board

Common features

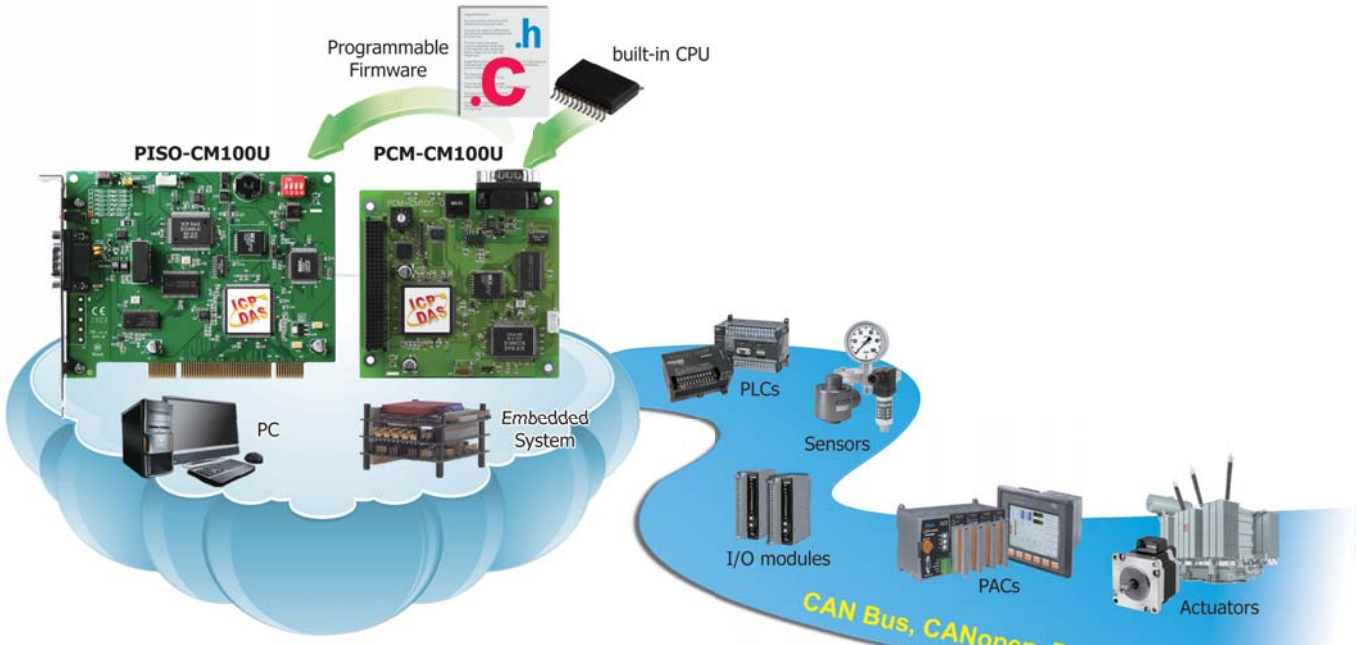
- Universal PCI card, supports both the 5 V and the 3.3 V PCI bus
- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898 -2 standard
- Support a range of baud rates from 10 kbps ~ 1 Mbps
- 2500 Vrms photocoupler isolation on the CAN side
- Built-in jumper for the 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

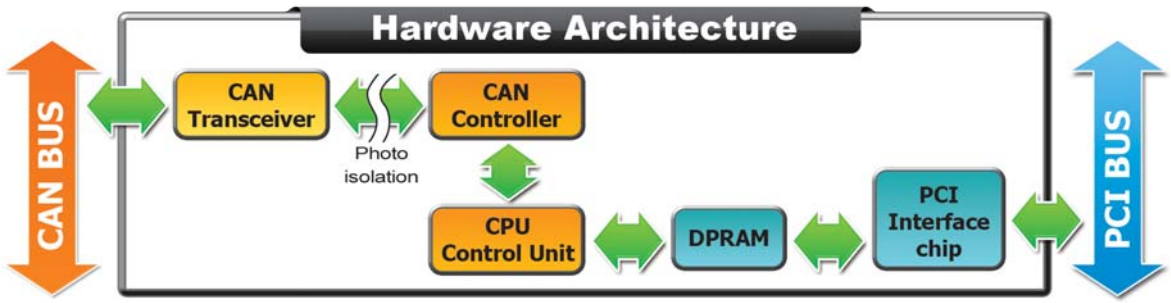




PISO-CM100U, PCM-CM100: CAN board with built-in programmable CPU

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 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.

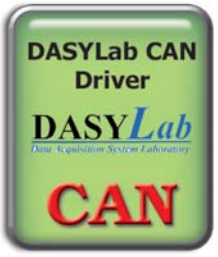
- OS environment: Windows 2000 / XP
- NI LabVIEW support version 8.0 or later
- Supports CAN specification 2.0A and 2.0B
- Provides 3000-record Rx buffer for each CAN port
- Offers functions for directly accessing SJA1000 register
- Supports timestamp information for each received CAN messages

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 Drvier helps users to develop the hightly 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

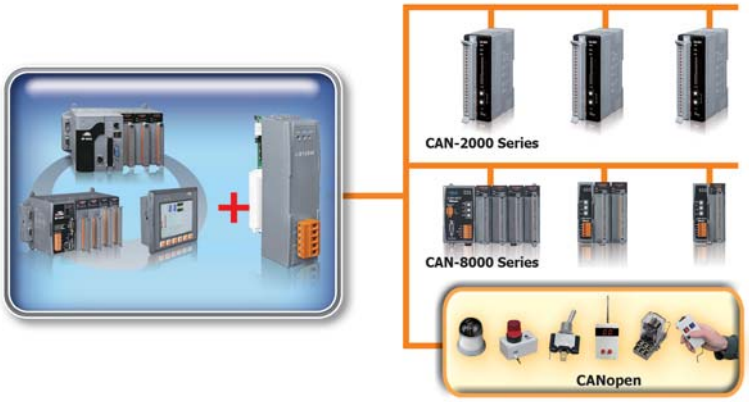
SocketCAN driver is a kind of device driver based on the Linux operating system, and it contains the implementation interface of the network stack and the hardware driver. The hardware manufacturers develop the hardware driver of SocketCAN driver for their hardware interface, and the network stack provides 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						
Communication						
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	
System						
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 V_{rms}					
Power Consumption	2 W					
Connector	5-pin Terminal Block					
Optional Accessories	CA-0904 Cable					

CA-0904

Model Name	**I-8120W**	**I-87120**	**I-8123W**	**I-87123**	**I-8124W**	**I-87124**
PAC Driver Support						
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 Modules and Units

▲ CAN-2000 series ▲ CAN-8000 series

CAN-2000 series and CAN-8000 series are designed for combining sensors and actuators into CCON, CANopen or DeviceNet network. All of them provide corresponding EDS files for standard CANopen or DeviceNet master interfaces. The mainly 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-along 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 CCON, CANopen or DeviciceNet firmware. The product names are classified as

CCON: CAN-2xxx

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

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

CCON Protocol

CCON protocol is one of the application layer protocol on the CAN bus. It was developed by the ICP DAS Co., LTD. CCON protocol is a simple and effective protocol for industrial automation applications. Based on the CAN bus layer, it could provide many safe and robust communication mechanisms like arbitration, error detection, error correction and etc. It could help to establish the CAN networking application fast and easily. The CCON I/O modules could reply their own real-time I/O information to the controller at regular intervals automatically. In other word, the controller could acquire all remote modules in short time. It makes the communication more efficient when collecting a lot of remote I/O information. We also provide a lot of demos which show the users how to design the CCON master. We have provided a series of I/O modules like CAN-2053, CAN-2054 and CAN-2057.

• Features

1. Heartbeat Messaging

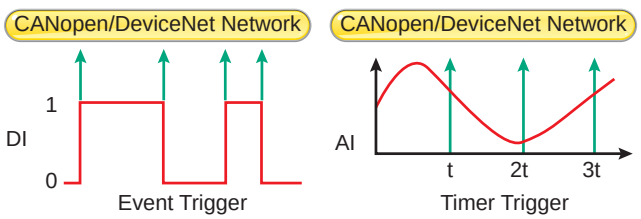
The heartbeat protocol is generally used to negotiate and monitor the availability of remote I/O devices. It is a message like the heartbeat sent by CANopen/DeviceNet remote I/O modules at a regular time. The users could use this mechanism to indicate the health of the remote I/O. The health information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

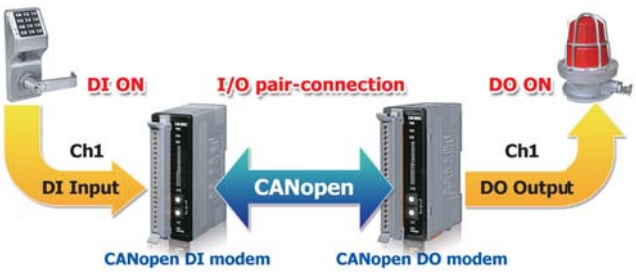
3. Auto Response of Input Data

The input data of CANopen/DeviceNet I/O modules allows to be responded automatically by event trigger or timer trigger. For example, DI data will be responded to the master when the DI data is changed. The AI data can be responded cyclically by predefined time period.



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

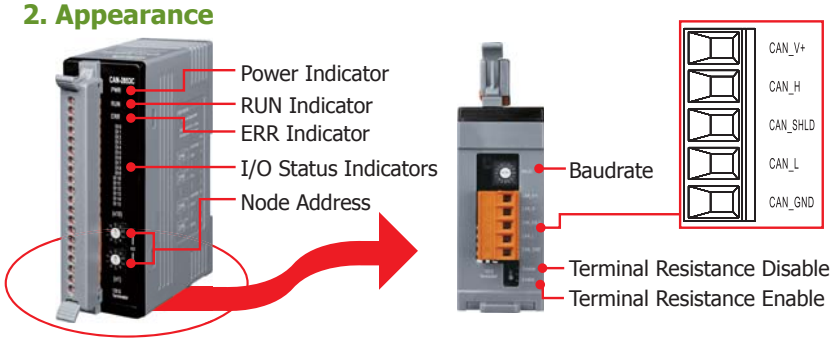
	CCON I/O Modules	CANopen I/O Modules	DeviceNet I/O Modules
Communication			
Connector	5-pin screwed terminal block (CAN_GND, CAN_L, CAN_SHLD, CAN_H, CAN_V+)	5-pin screwed terminal block (CAN_GND, CAN_L, CAN_SHLD, CAN_H, CAN_V+)	5-pin screwed terminal block (CAN_GND, CAN_L, CAN_SHLD, CAN_H, CAN_V+)
Baud Rate (bps)	10 k, 20 k, 50 k, 125 k, 250 k, 500 k, 800 k, 1 M	10 k, 20 k, 50 k, 125 k, 250 k, 500 k, 800 k, 1 M	125 k, 250 k, 500 k
Terminator Resistor	Switch for 120 Ω terminator resistor	Jumper or Switch for 120 Ω terminator resistor	Jumper or Switch for 120 Ω terminator resistor
Node ID	0~99 selected by rotary switch	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	CCON 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	Yes
Shutdown message	-	-	Yes

• Hardware

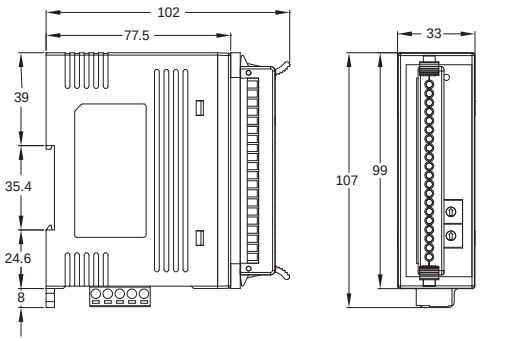
1. Installation

DIN-Rail Mounting

2. Appearance

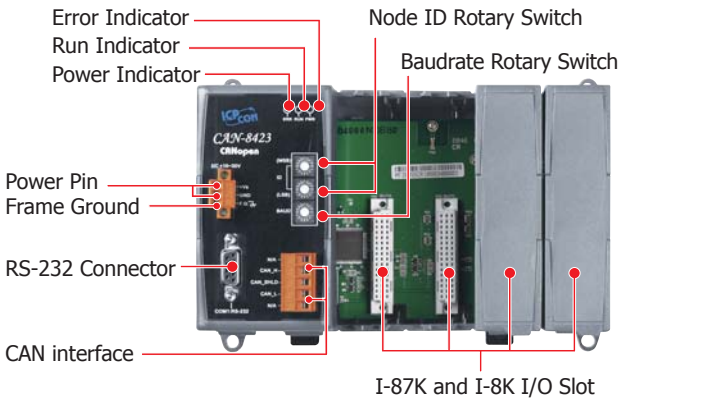


3. Dimensions (Units: mm)



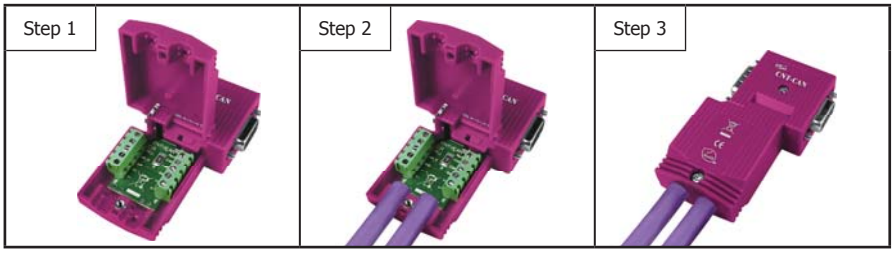
Left View | Front View

CAN-8423



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 temperaturemeasurement in industrial environments, especially around motors, generators and other high voltage equipments.

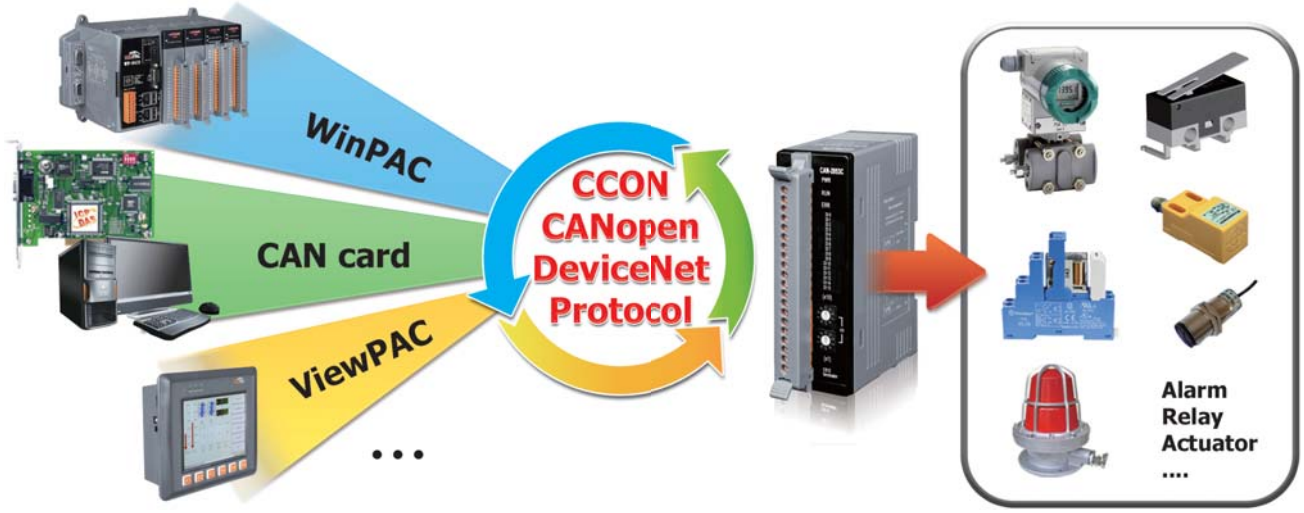
Thermocouple Introduction

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	CCON	Available soon CAN-2015	Available soon CAN-2017	Available soon CAN-2018
	CANopen	CAN-2015C	CAN-2017C	CAN-2018C
	DeviceNet	Available soon CAN-2015D	Available soon CAN-2017D	CAN-2018D
Pictures		8-Ch RTD Input Module	8-Ch AI Module	8-Ch Thermocouple Input Module
				
Channels		8	8	8
Wiring		2/3 wire	Differential	Differential
Individual Channel		Yes	Yes	Yes
Sensor Type		**RTD** (Pt100, Pt1000, Ni120, Cu100, Cu1000, JPT100)	-	**Thermocouple** (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
Overvoltage 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
System				
ESD Protection		4 kV Contact for each channel		
Isolation		3000 VDC for DC-to-DC, 3000 Vrms for bus-to-logic		
Watchdog		Yes		
Power				
Input range		Unregulated +10 ~ +30 VDC		
Power Consumption		1.5 W	2 W	1.5 W
Mechanism				
Installation		DIN-Rail		
Dimensions (W x L x H)		33 mm x 107 mm x 102 mm		
Environment				
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., +/-10 V, +/-5 V, 0~20 mA, 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	CCON	Available soon CAN-2024	Available soon CAN-2028
	CANopen	CAN-2024C	Available soon CAN-2028C
	DeviceNet	CAN-2024D	Available soon CAN-2028D
Pictures		4-Ch AO Module	8-Ch AO Module
			
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
System			
ESD Protection		4 kV Contact for each channel	
Isolation		3000 VDC for DC-to-DC, 3000 Vrms for bus-to-logic	
Watchdog		Yes	
Power			
Input range		Unregulated +10 ~ +30 VDC	
Power Consumption		1.5 W	1.4 W
Mechanism			
Installation		DIN-Rail	
Dimensions (W x L x H)		33 mm x 107 mm x 102 mm	
Environment			
Operating Temperature		-25 ~ +75°C	
Storage Temperature		-30 ~ +80°C	
Relative Humidity		10 ~ 90% RH, non-condensing	

4.8.3 Digital I/O Modules

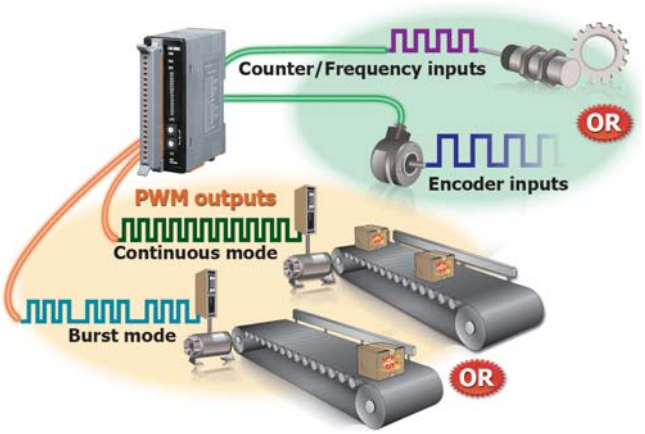
PWM Introduction

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	CCON	CAN-2053	CAN-2054	CAN-2057	Available soon CAN-2088
	CANopen	CAN-2053C	CAN-2054C	CAN-2057C	CAN-2088C
	DeviceNet	CAN-2053D	CAN-2054D	CAN-2057D	CAN-2088D
		16-Ch DI Module	8-Ch DI, 8-Ch DO Module	16-Ch DO Module	8-Ch DI, 8-Ch PWM Output Module
Pictures					
DI					
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.
DO					
Channels		-	8	16	8
Isolation Voltage			3750 Vrms	3750 Vrms	2500 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	-
System					
ESD Protection		4 kV Contact for each channel			
Isolation		3000 VDC for DC-to-DC, 2500 Vrms for bus-to-logic			
Watchdog		Yes			
Power					
Input range		Unregulated +10 ~ +30 VDC			
Power Consumption		1.5 W	1.5 W	1.5 W	2 W
Mechanism					
Installation		DIN-Rail			
Dimensions (W x L x H)		33 mm x 107 mm x 102 mm			
Environment					
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
CAN Interface				
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 ver4.02, CiA 401 ver2.1			
I/O Expansion Slot				
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
Mechanism				
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		
Environmental				
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			
Humidity	10 ~ 90% RH (non-condensing)			
Power				
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

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

4.8.5 DeviceNet I/O Units

CAN-8124

CAN-8424

CAN-8224

CAN-8824

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
CAN Interface				
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			
I/O Expansion Slot				
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
Mechanism				
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		
Environmental				
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			
Humidity	10 ~ 90% RH (non-condensing)			
Power				
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

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

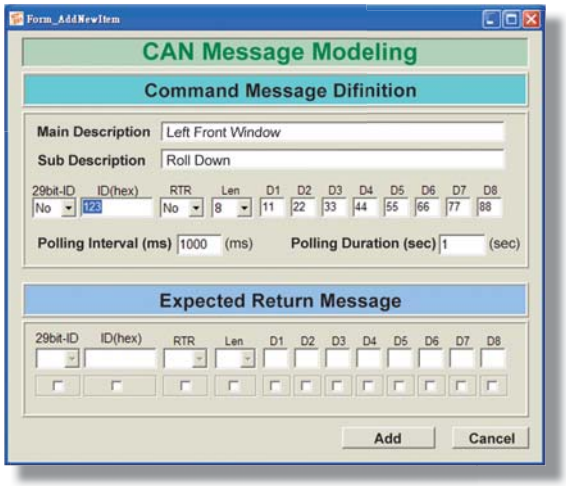
4.8.6 I/O Module Support List of CAN-8000 Units

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

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

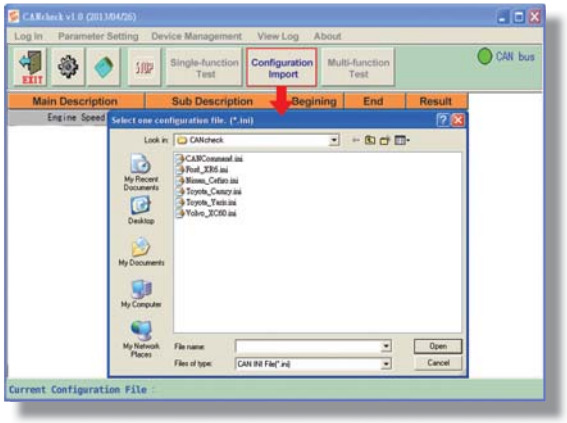
4.9 CANcheck

CANcheck – the software is developed by ICP DAS for CAN device detection and diagnosis. It is consisted of three parts.



• CAN Message Modeling

Users can model the vehicle CAN protocol or other special CAN protocol, set to the CANcheck software, the software will be able to follow the CAN command set and command transfer cycle. Users could provide the meaningful description for each CAN command. This helps to manage and identify all the complex CAN commands.



• CAN Message Management

Different CAN message sets can be stored in different configuration files. The user can easily pipe different configuration files for different test cases. For example, a car factory can store several different cars' data in different configuration files, and then call the corresponding one as needed to test each car.

• CAN Message Verification

Different CAN instruments have different command sets; correspondingly, the return messages also differ. CANcheck can be used to perform verification of expected return messages – an easy way of error-checking operations. This feature does away with manual log-checking, and with it human error and tedium.

The detailed features are:

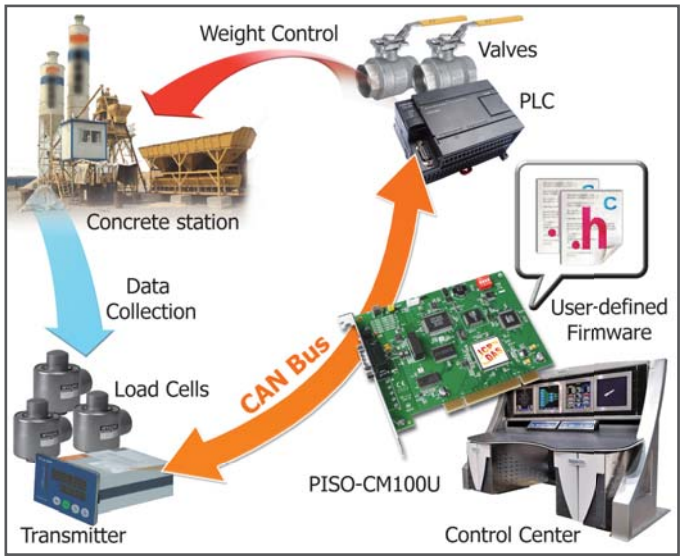
(1) No need to write any programs. The graphical interface is ready-made and easy to operate.
(2) Limited to neither the vehicle nor instrument brand; it's interoperable.
(3) The CAN communication protocol settings file protects against security leaks, ensuring safe operation.
(4) Can set the returned CAN discrimination, eliminating the hassle of wading through logs and manually interpreting results.
(5) Can be used to operate and diagnose lights, windows, dashboard or other vehicular electronic systems and components.
(6) Supports CAN 2.0A and CAN 2.0B specifications.
(7) The test command planning interface to set the test command, the transfer cycle, detecting the reply command and users' description.
(8) Can store commands to the specific file.
(9) Supports both the single- and multi-function tests.
(10) Provides time stamps for the beginning and end of each test.
(11) Displays real-time CAN status

Supported OS: Windows XP, 7
Supported CAN board, converter: PISO-CAN100U,PISO-CAN200U, PISO-CAN400U, PISO-CAN-800U, PEX-CAN200i, PCM-CAN200, PCM-CAN200P, I-7530, I-7530-FT, I-7530A, I-7530A-MR, I-7540D, I-7540D-MTCP, I-7565, I-7565-H1, I-7565-H2

Ordering Information

CANcheck	Software for CAN device detection and diagnosis, USB keypro included.

4.10 Case Studies

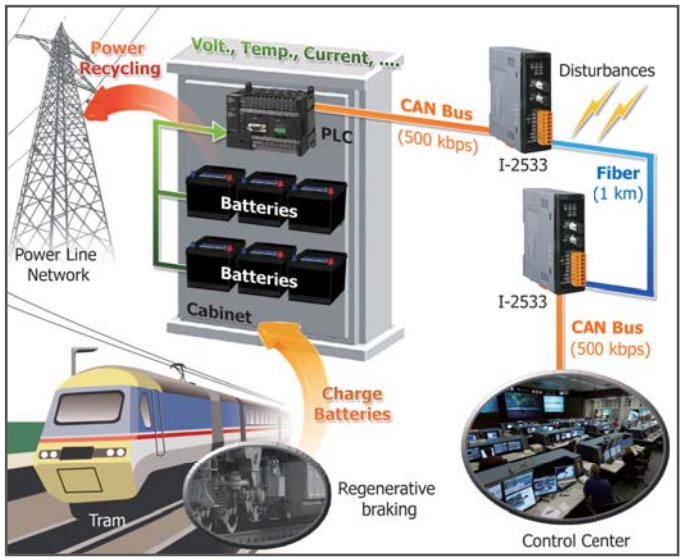


Concrete Station Monitoring & Control System

- **Location**: China
- **Product**: PISO-CM100U
- **Description**: The result of the quantity control for each recipe material seriously affects the quality of the concrete. In order to adjust each quantity promptly, CAN bus is applied. In this system, the PISO-CM100U is used to monitor the weight of each material from the load cells and send the recipe to the PLC. As the same time, the PC updates all the data on the screen. By utilizing the user-defined firmware in the CPU of the PISO-CM100U, the PC loading can be effectively reduced, and the system becomes more efficient and reliable.

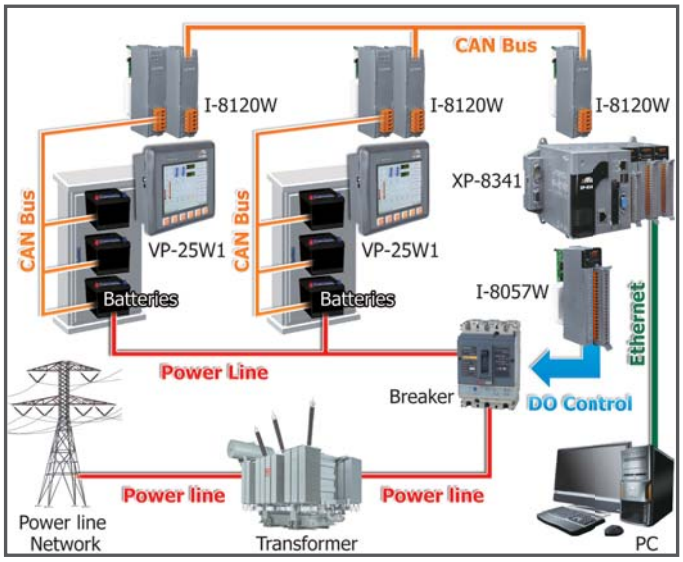
Cash-in-transit Vehicle

- **Location**: England, United Kingdom
- **Product**: I-7530-FT
- **Description**: A telematics and vehicle control system need to be closely integrated with each other by implementing data exchange interface. LSFT (Low Speed/Fault Tolerance) CAN is a familiar type of interface in the application of automotive electronics systems. The I-7530-FT is specially designed for solving the problem of interface transformation between LSFT CAN and RS-232. In this way, the cash-in-transit of the manufacturer can efficiently control the door of the cash safe and directly monitor the status of the rear access vehicle door on the telematics.



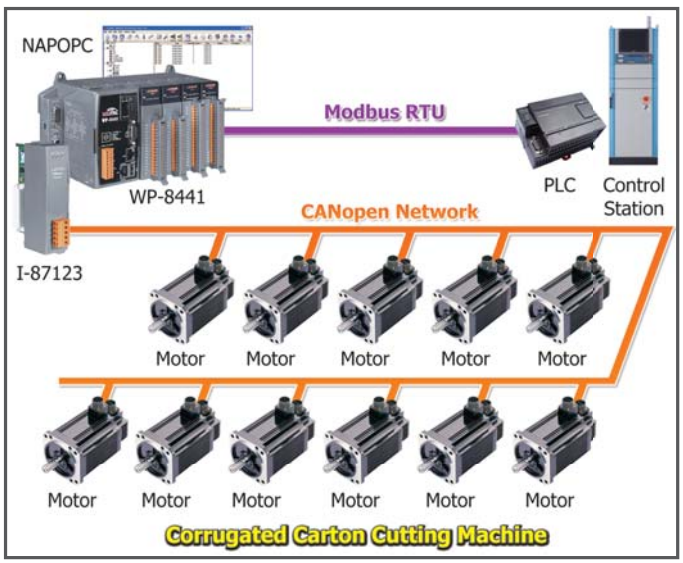
Tram Energy Recycling System

- **Location**: Hyogo, Japan
- **Product**: I-2533
- **Description**: Energy saving and carbon reduction have become a goal that every government is striving for. In order to achieve this, the user has implemented regenerative braking so that the kinetic energy of the tram produced while its braking can be recycled. In order to provide resistance to environmental disturbances, extend the CAN bus operating range and deliver a higher CAN transmission speed, two I-2533 modules are used.



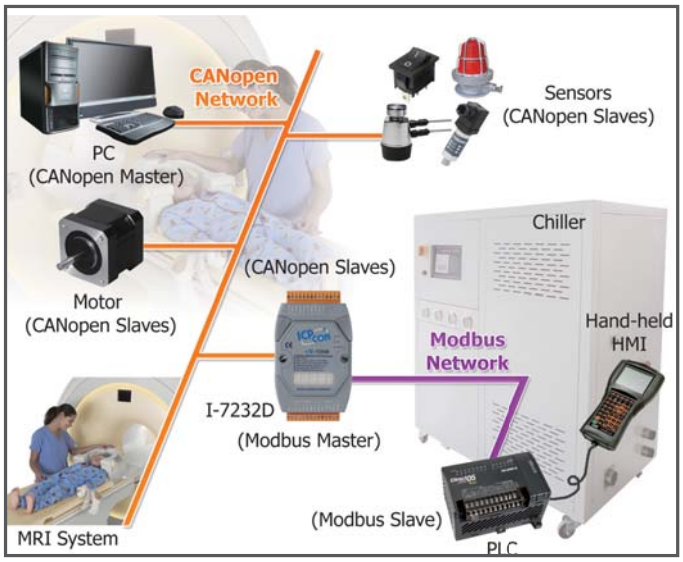
Energy Storage System

- **Location:** China
- **Product:** I-8120W, I-8057W, VP-25W1, XP-8341
- **Description**: This system improves the usage efficiency of electrical power. During the off-peak time for electricity use, the unused electricity can be stored in batteries. During peak time, these batteries then supply power to the electricity grid. The user has utilized two I-8120W modules plugged in one VP-25W1 in each subsystem. One is for obtaining the battery status, and another is for transmitting the data to the XP-8341. The XP-8341 then transmits the status information to the PC via the Ethernet and controls the charge time using a breaker.



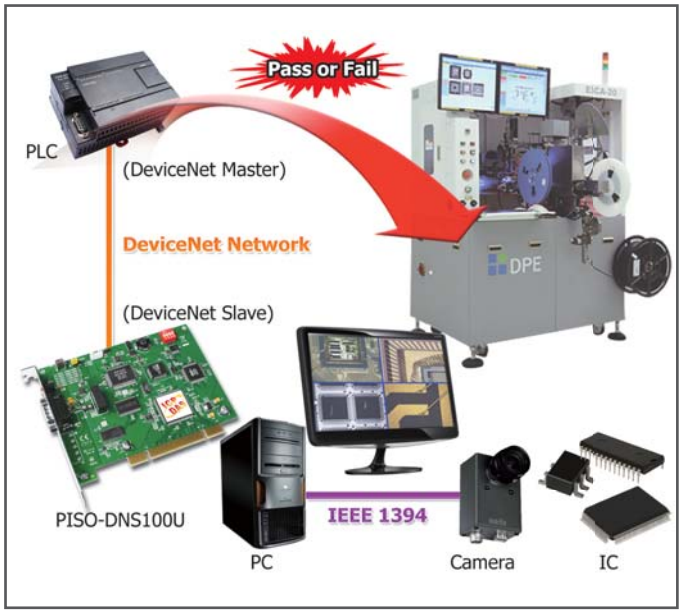
Corrugated Carton Cutting Machine

- **Location**: Taichung, Taiwan
- **Product**: WP-8441, I-87123
- **Description**: In this case, the orientation and speed of the cutting knives and rollers seriously affects the quality of the output. Because all of the knives and rollers are controlled by 31 motors, the user selected CANopen-based motors in order to achieve that. The WP-8441 and I-87123 together act as a CANopen master to simultaneously control all of the motors, taking advantage of the CANopen features of synchronization and high communication performance. By using this architecture, all of the motors are able to be quickly moved to the target position at the same time by simply sending a single command.



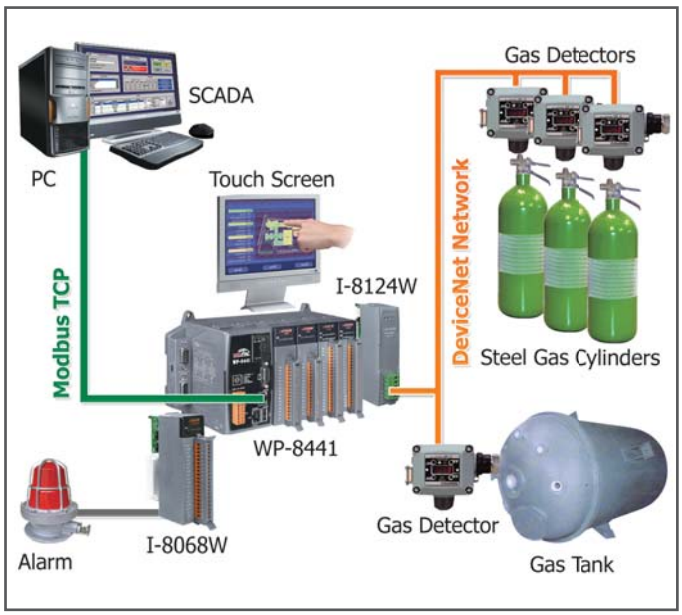
MRI Cooling System

- **Location**: China
- **Product**: I-7232D
- **Description**: In order to reduce costs, an MRI manufacturer uses a chiller made in China instead of a more expensive German product. However, the user experienced difficulties due to the different communication interfaces. By using the I-7232D, this problem was solved. The I-7232D was able to be used as a Modbus RTU master while communicating with the chiller. In contrast, in the CANopen network, the I-7232D can be used as a CANopen slave. As a result, the I-7232D is able to easily pass information from the chiller to the CANopen master, and conversely transfer CANopen commands to the chiller.



IC Inspection Machine

- **Location**: Hsinchu, Taiwan
- **Product**: PISO-DNS100U
- **Description**: The IC inspection process is necessary for good quality control. Though PLCs are cheap and stable, IC inspection is a difficult task for a PLC. The user uses a PC plus a camera together with a PISO-DNS100U to perform the IC inspection, and uses a PLC to control the mechanism used to reject defective ICs. After completing the inspection, the PC writes the result to the PISO-DNS100U. Because the PLC is used as a DeviceNet master, it can easily retrieve the information from the PISO-DNS100U via the DeviceNet network.



Semiconductor Gas Detection System

- **Location**: Kaohsiung, Taiwan
- **Product**: WP-8441, I-8124W
- **Description**: In semiconductor manufacturing facilities, a large numbers of poisonous and inflammable gases are commonly used in various processes. In order to ensure employee safety, gas detectors are routinely installed to detect the gas concentration near the Lithography or Photographic Etching facilities. In this case, the user uses a combination of WP-8441 and I-8124W modules as the DeviceNet master in order to obtain the concentration level information from the gas detectors. In addition, the on-duty personnel can continuously monitor the air quality via the touch screen of the WP-8441.

PROFIBUS Products

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.

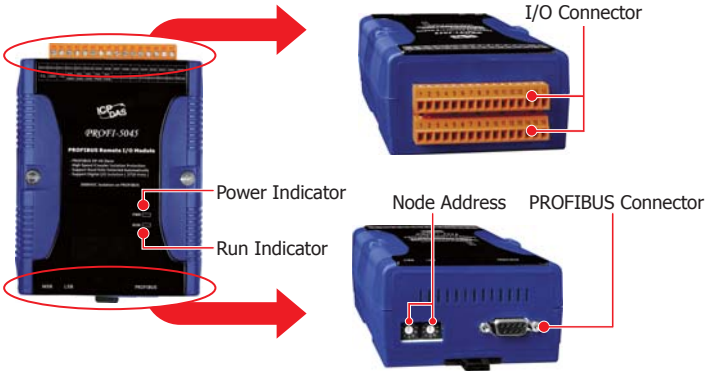
ICP DAS has been developing various PROFIBUS DP Slave products for several years. We offer converters, gateways, and remote I/O to our customers, and help them to solve technology problems.

• Features

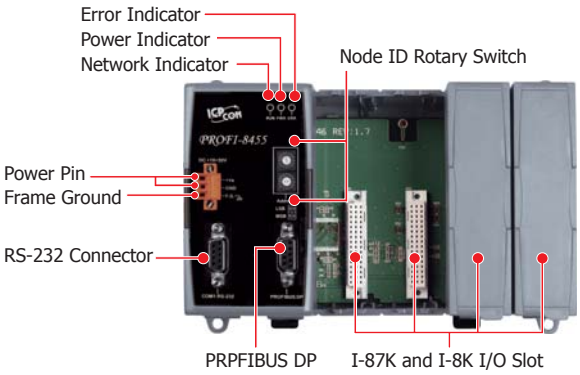
- Baudrate up to 12Mbit/s.
- Maximum 244 bytes input and 244 bytes output per slave.
- Fast Cyclic data communication between master and slave.
- Slave configuration and parameters are set from the master side by GSD file.
- Allow Multi-master system.
- 124 slaves can be put in Data Exchange.
- 32 stations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

• Appearance

PROFI-5000



PROFI-8455

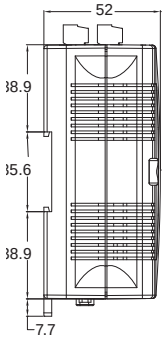


• Hardware

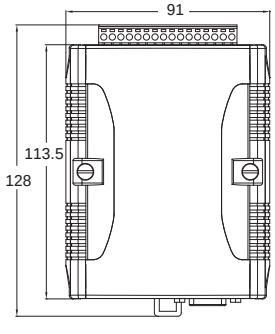
1. Installation

DIN-Rail Mounting

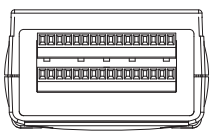
2. Dimensions (Units: mm)



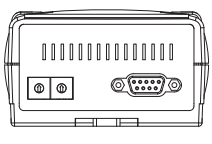
Left View



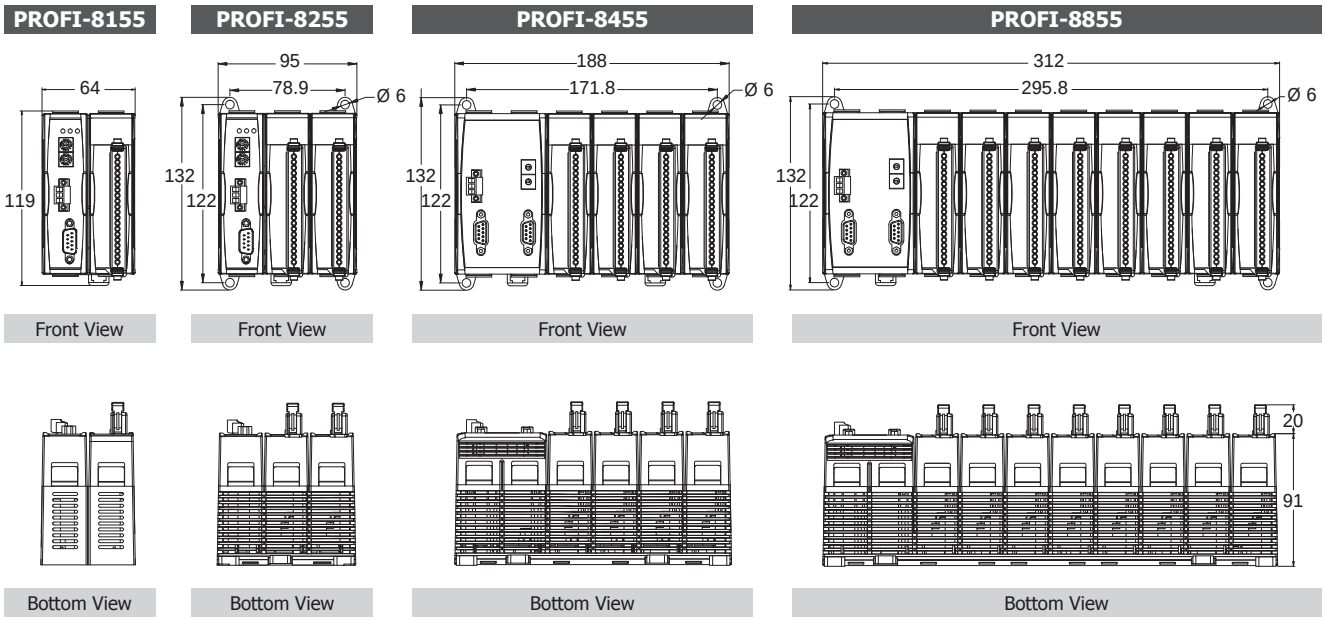
Front View



Top View



Bottom View



Selection Guide

Model Name		Description
Converters	I-7550	PROFIBUS to RS-232/422/485 Converter
	PROFI-2510	Isolated PROFIBUS Repeater
	PROFI-2541	PROFIBUS to Fiber (ST connector) Converter
	PROFI-2541-SC	PROFIBUS to Fiber (SC connector) Converter
Gateway	GW-7552	PROFIBUS DP Slave to Modbus RTU Master Gateway
	GW-7553	PROFIBUS DP Slave to Modbus TCP/RTU Master Gateway
	GW-7553-CPM	PROFIBUS DP Slave to CANopen Master Gateway
	GW-7557	PROFIBUS DP Slave to HART Master Gateway
Remote I/O Modules	PROFI-5017	PROFIBUS-DP I/O Module with 8-Ch Voltage Inputs
	PROFI-5017C	PROFIBUS-DP I/O Module with 8-Ch Current Inputs
	PROFI-5018	PROFIBUS-DP I/O Module with 10-Ch Thermocouple Inputs
	PROFI-5024	PROFIBUS-DP I/O Module with 4-Ch Voltage/Current Outputs
	PROFI-5045	PROFIBUS-DP I/O Module with 24-Ch DO
	PROFI-5050	PROFIBUS-DP I/O Module with 16-Ch DI, 8-Ch DO
	PROFI-5051	PROFIBUS-DP I/O Module with 24-Ch DI
	PROFI-5052	PROFIBUS-DP I/O Module with 12-Ch DI
	PROFI-5053	PROFIBUS-DP I/O Module with 24-Ch DI
	PROFI-5055	PROFIBUS-DP I/O Module with 8-Ch DI, 8-Ch DO
	PROFI-5060	PROFIBUS-DP I/O Module with 8-Ch DI, 6-Ch Relay
Remote I/O units	PROFI-8155	PROFIBUS-DP I/O Unit with 1 I/O slot
	PROFI-8255	PROFIBUS-DP I/O Unit with 2 I/O slots
	PROFI-8455	PROFIBUS-DP I/O Unit with 4 I/O slots
	PROFI-8855	PROFIBUS-DP I/O Unit with 8 I/O slots
Accessories	CNT-PROFI	PROFIBUS 9-pin D-Sub Male Connector

5.2 PROFIBUS Converters & Repeaters

The PROFIBUS repeater is used to solve the issues of the PROFIBUS segment, transmission distance and disturbance when setting up a PROFIBUS network. If it is necessary to integrate the different communication interface, the PROFIBUS converter is helpful. The application architectures as following figures provide the examples to show when and how to apply these products.

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 converter 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

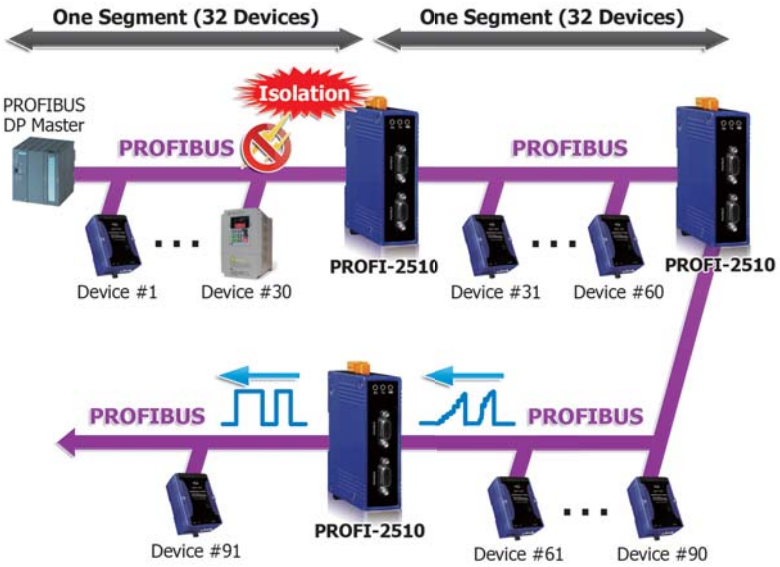
Isolated PROFIBUS Repeater

PROFI-2510

NEW

The PROFI-2510 is a PROFIBUS repeater adaptor. According to the RPOFIBUS 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 solve 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)

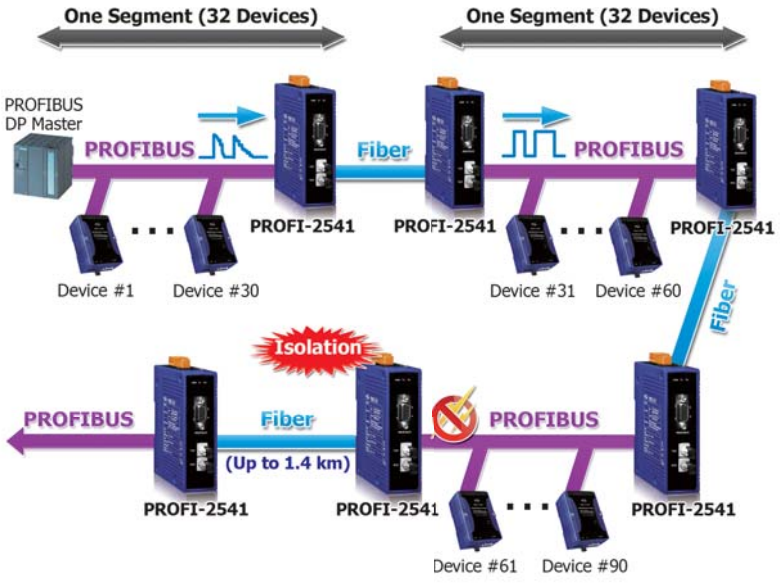


PROFIBUS to Fiber Converter

PROFI-2541
PROFI-2541-SC

Similar to the PROFI-2510, the PROFI-2541 can reshape the PROFIBUS waveform 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
- DIN-rail mounting
- 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 Gateways

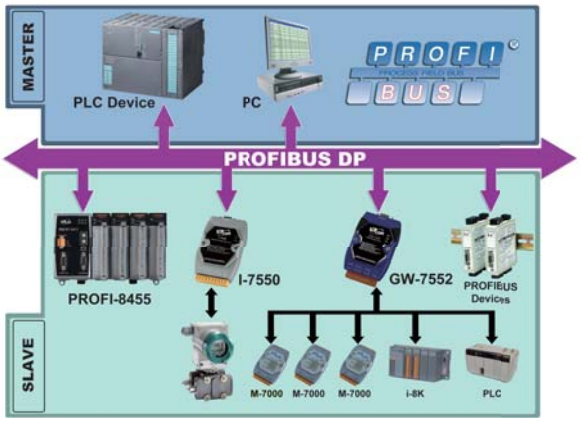
Model Name		GW-7552	GW-7553	GW-7553-CPM	GW-7557
Pictures					
		PROFIBUS DP Slave to Modbus RTU Master Gateway	PROFIBUS DP Slave to Modbus TCP/RTU Master Gateway	PROFIBUS DP Slave to CANopen Master Gateway	PROFIBUS DP Slave to HART Master Gateway
PROFIBUS	Channel	1			
	Baud Rate (bps)	9.6 k ~ 12 M			
	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 DP Slave to Modbus RTU Master 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

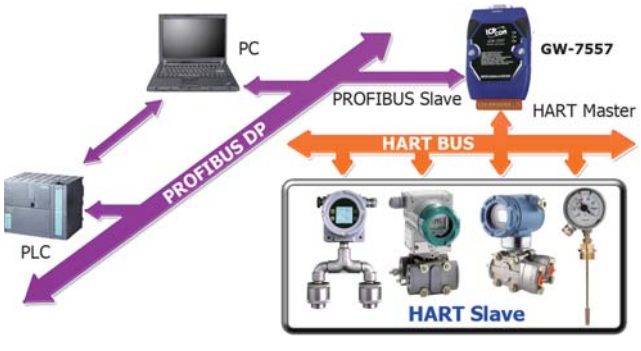


PROFIBUS DP Slave to HART Master Gateway

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

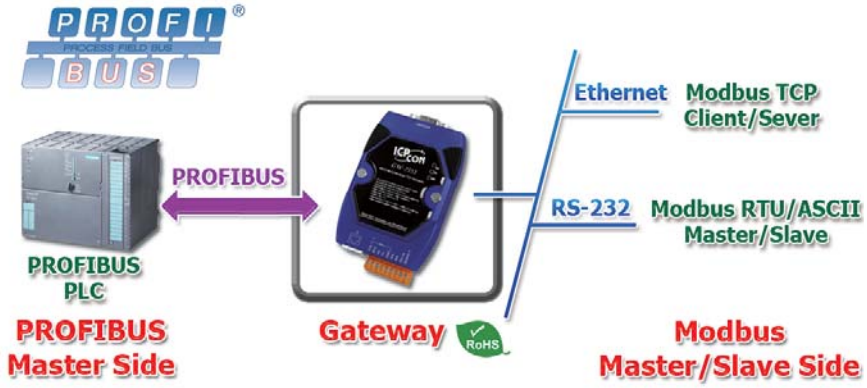


PROFIBUS DP Slave to Modbus TCP/RTU Master Gateway

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

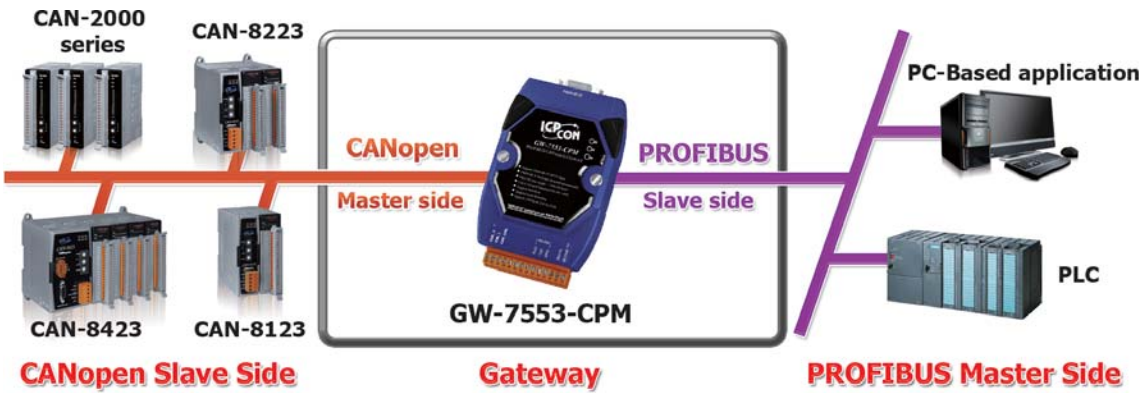


PROFIBUS DP Slave to CANopen Master Gateway

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, acturators, 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

PROFIBUS Analog Input Modules			
Model Name	**PROFI-5017**	**PROFI-5017C**	**PROFI-5018**
Pictures	8-Ch Voltage Input Module	8-Ch Current Input Module	10-Ch Thermocouple Input Module
			
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 V_{DC} / 110 V_{AC}	240 V_{rms}	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

PROFIBUS Analog Output Modules		
Model Name	**PROFI-5024**	
Pictures	4-Ch Voltage/Current Output Module	
		
Channels	4	
Wiring	Differential	
Voltage Output Range	±10 V	
Current Output Range	0 ~ 20 mA, 4 ~ 20 mA	
Resolution	12-bit	
Accuracy – For Voltage Output	±0.1% of FSR	
Accuracy – For Current Output	±0.2% of FSR	
Isolation	3000 V_{DC}	

PROFIBUS Digital I/O Modules							
Model Name	**PROFI-5045**	**PROFI-5050**	**PROFI-5051**	**PROFI-5052**	**PROFI-5053**	**PROFI-5055**	**PROFI-5060**
Pictures							
DI							
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
DO							
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
Communication							
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 VPCLS2						
Transceiver	ADI ADM2486						
Protocol	DP-V0						
Node Address	0 ~ 99 selected by rotary switch						
System							
ESD Protection	4 kV Contact for each channel						
Isolation	3000 VDC for DC-to-DC, 2500 Vrms for bus-to-logic						
Watchdog	Yes						
Power							
Input range	Unregulated +10 ~ +40 VDC						
Power Consumption	1 W	1 W	1 W	1 W	1 W	1 W	1 W
Mechanism							
Installation	DIN-Rail						
Dimensions (W x L x H)	91 mm x 128 mm x 52 mm						
Environment							
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 Units

Features

- Protocol & hierarch y: 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 VDC 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
UART Interface				
COM 1	On-Board at JP1 (RS-232 for Update Firmware purpose). Note 1.		at Front Panel	
I/O Expansion Slot				
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
LED				
Round LED	PWR LED, RUN LED, ERR LED			
PROFIBUS Features				
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 VDC 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			
Mechanism				
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
Environmental				
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			
Humidity	10 ~ 90% RH (non-condensing)			
Power				
Input Range	Unregulated +10 ~ +30 VDC			
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

PROFI-8155-G CR	PROFIBUS Remote I/O Unit with 1 Expansion Slot (RoHS)
PROFI-8255-G CR	PROFIBUS Remote I/O Unit with 2 Expansion Slots (RoHS)
PROFI-8455-G CR	PROFIBUS Remote I/O Unit with 4 Expansion Slots (RoHS)
PROFI-8855-G CR	PROFIBUS Remote I/O Unit with 8 Expansion Slots (RoHS)

I/O Module Support List of PROFIBUS-8000 Units

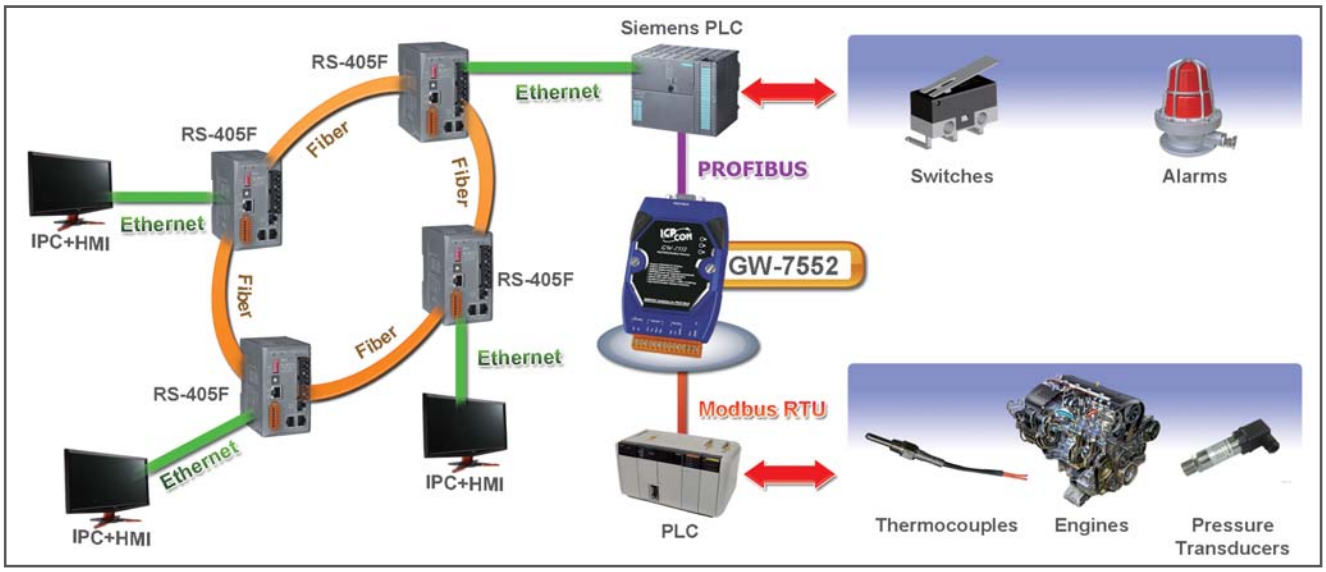
Type	I-8K Series I/O		I-87K Series I/O		Description
	High Profile	Low Profile	High Profile	Low Profile	
AI module			I-87013W	I-87013	4-Ch RTD Input Module
			I-87015W		7-Ch RTD Input Module
			I-87015PW		7-Ch RTD Input Module
	I-8017HW	I-8017H	I-87017W	I-87017	8-Ch Voltage/Current Input Module
			I-87017W-A5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

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

5.6 Case Studies

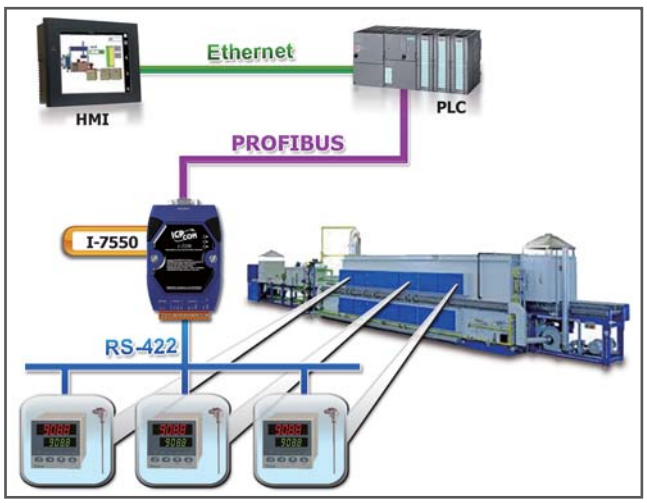
Vessel Propulsion Control and Monitor System

- **Location**: Kaohsiung, Taiwan
- **Product**: GW-7552
- **Description**: 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 user 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.



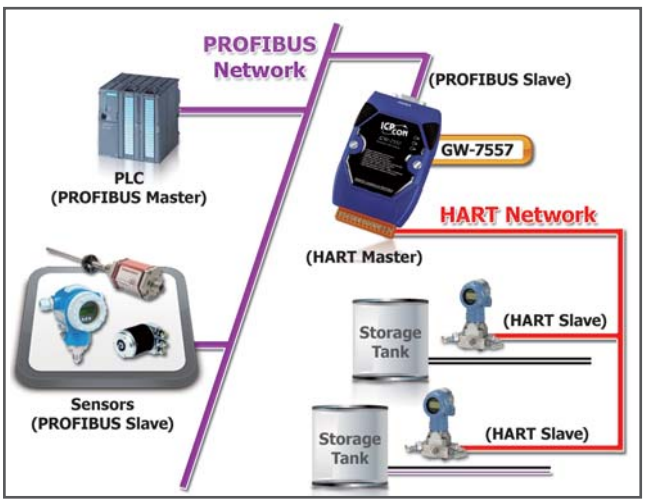
High Temperature Industrial Furnaces Monitoring System

- **Location**: China
- **Product**: I-7550
- **Description**: An industrial furnace refers to equipment which is used to provide heat for a certain process or reaction. Precise temperature profiles are absolutely mandatory for the often highly complex processes involved in firing, annealing and hardening of different materials. In order to achieve accurate and stable temperature control, the user use I-7550 to collect temperature information to ensure energy-optimized control of the processes.



Flow Control System

- **Location**: Kaohsiung, Taiwan
- **Product**: GW-7557
- **Description**: Beverage manufacturers use flow meters whose communication interface of flow meter is HART to monitor flow production line. However, the other end communication interface of main controller is PROFIBUS. In order to integrate the information from flow meters, customer can use the GW-7557 to acquire data quickly and easily between main controller and flow meters.

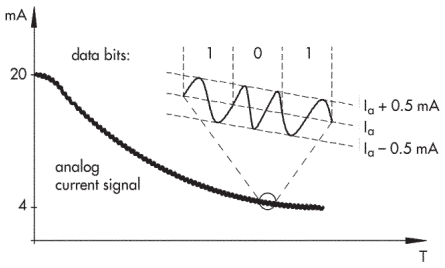


HART Products

6

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

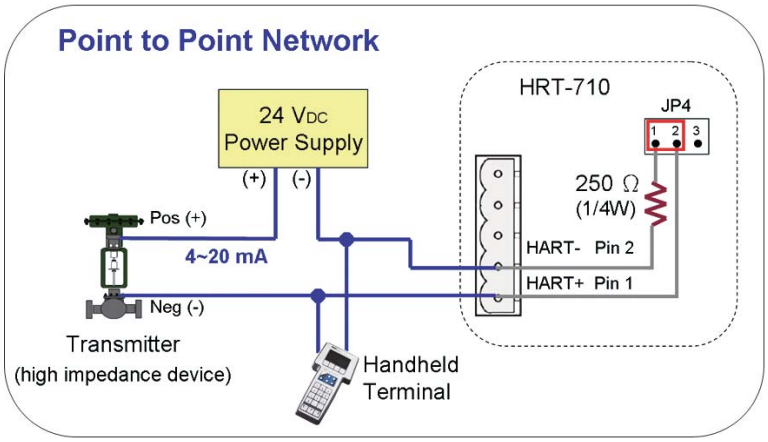


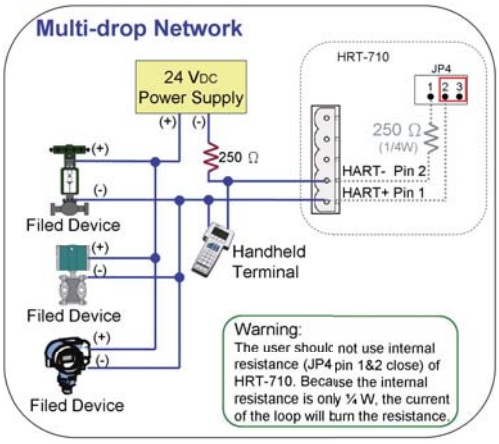
Peer-to-Peer mode

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.





Features

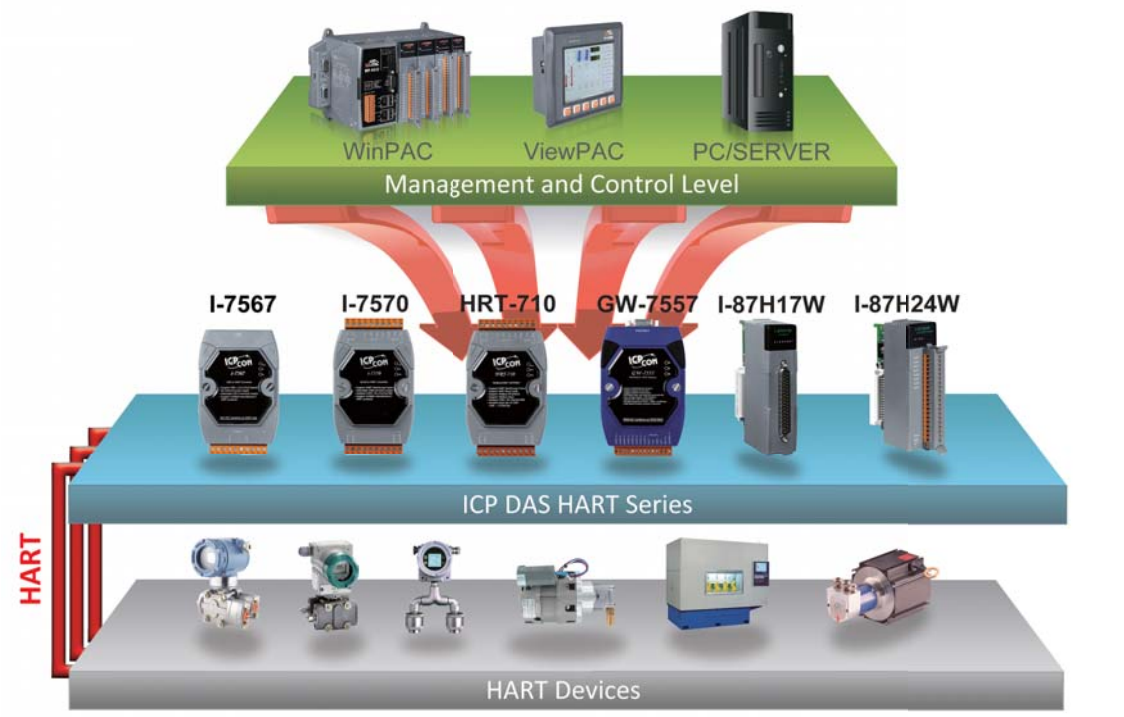
- Relatively easy to understand and use, the HART protocol provides access to the wealth of additional information (variables, diagnostics, calibration, etc.)
- HART is a no risk solution for enhanced field communication
- Compatibility with standard 4 ~ 20 mA wiring
- Simultaneous transmission of digital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

Selection Guide

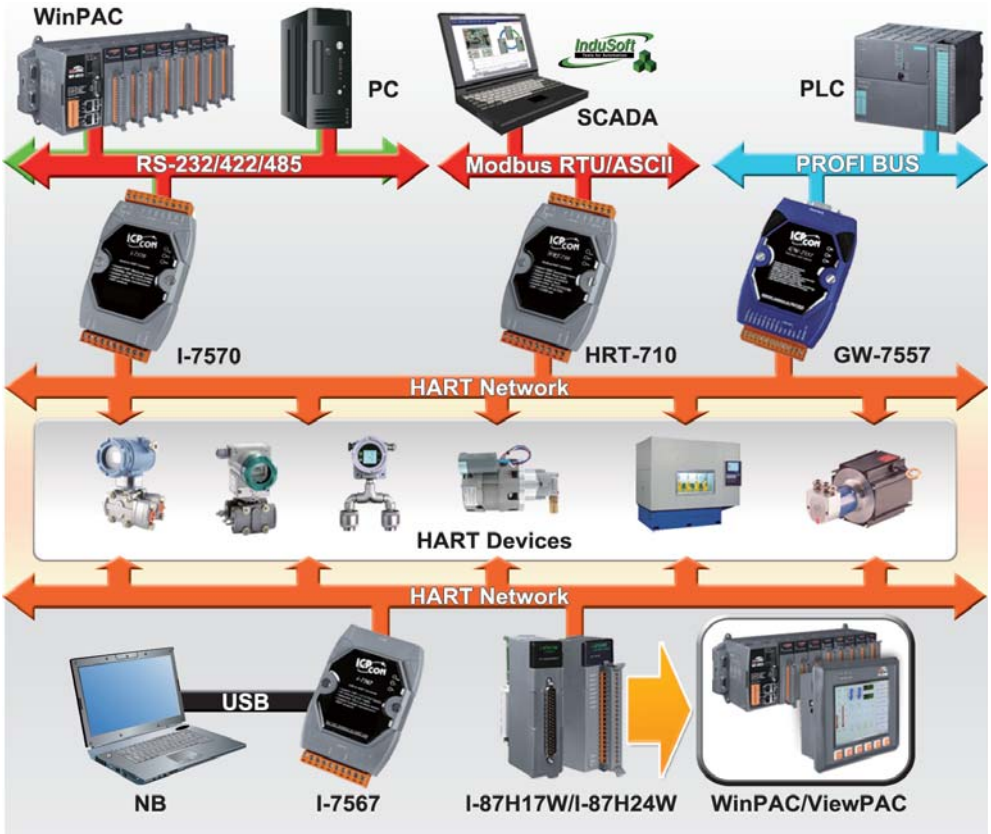
Model Name		Description
Converter	I-7547	Ethernet to HART Converter
	I-7567	USB to HART Converter
	I-7570	RS-232/422/485 to HART Converter
Gateway	HRT-710	Modbus RTU/ASCII Slave to HART Master Gateway
	GW-7437	Modbus TCP Slave to HART Master Gateway
	GW-7557	PROFIBUS DP Slave to HART Master Gateway
Remote I/O Unit	I-87H17W	8-Ch Current Input HART Master Module, for PAC
	I-87H24W	4-Ch Current Output HART Master Module, for PAC

6.2 HART System Integration Solution

ICP DAS have deeply researched on the HART bus technology for many years. The total HART products have been developed by ICP DAS including HART converter, HART gateway and HART I/O modules. The HART converter can be used to access HART devices via COM, USB or Ethernet interface. The HART gateway can integrate HART communication to the different protocols like Modbus, PROFIBUS etc. The HART I/O module can be used to access or control HART devices directly. Therefore, by using ICP DAS HART products, users can easily and quickly integrate HART devices and complete the data acquisition to SCADA, HMI or PLC system.



The following diagram will illustrate the HART bus applications and understand the roles of ICP DAS HART communication modules in HART network.



6.3 HART Products

HART Converters

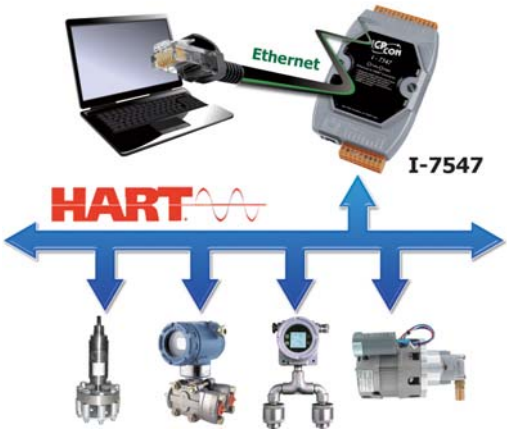
Ethernet to HART Converter

I-7547

NEW

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 Ω load resistor
- Provide four HART channels



USB to HART Converter

I-7567

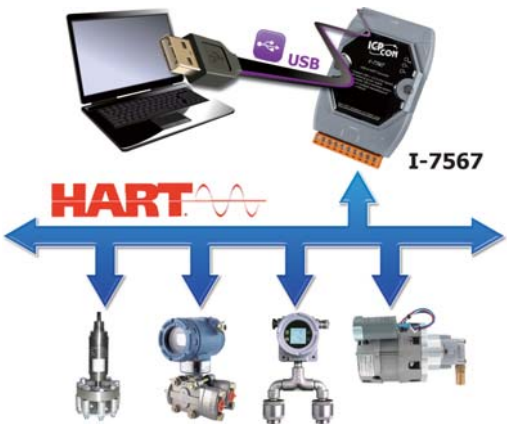
The USB interface is comprehensive applied in PCs and notebooks. In order to meet the users' requirements more closely, the I-7567 is presented. It is a USB to HART converter specially designed as the master device of HART protocol. Through it, users can easily to access the HART network via USB port 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 Ω 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



RS-232/422/485 to HART Converter

I-7570

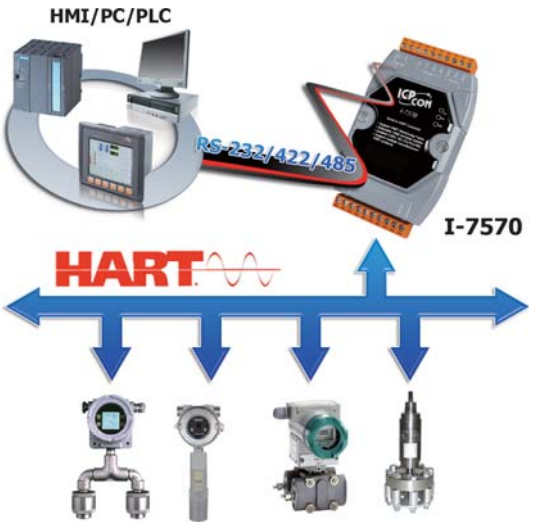
The I-7570 is a Serial to HART converter specially designed as the master device of HART protocol. By using I-7570, the HART devices, such transmitters, actuators, gauges, meters, and the current output devices, can be easily integrated into the HMI/PLC/PC devices via serial port which may be RS-232/RS-422/RS-485 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



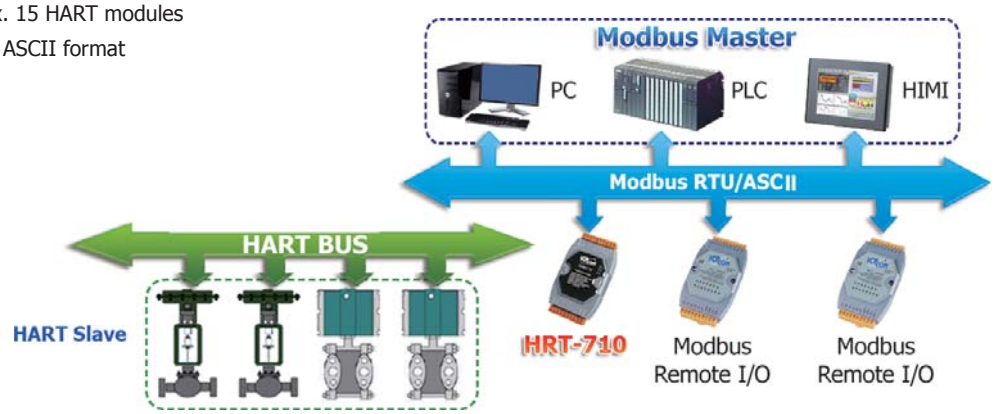
HART Gateways

Modbus RTU/ASCII Slave to HART Master Gateway

HRT-710

The HRT-710 is a Modbus RTU/ASCII slave to HART master 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.

- 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 Modbus RTU and ASCII format
- Modbus Function Code: 01, 02, 03, 04, 05, 06, 15 and 16
- Isolated COM 1: 3-wire RS-232/RS-422/RS-485
- Built-in watchdog
- Mountable on DIN Rail



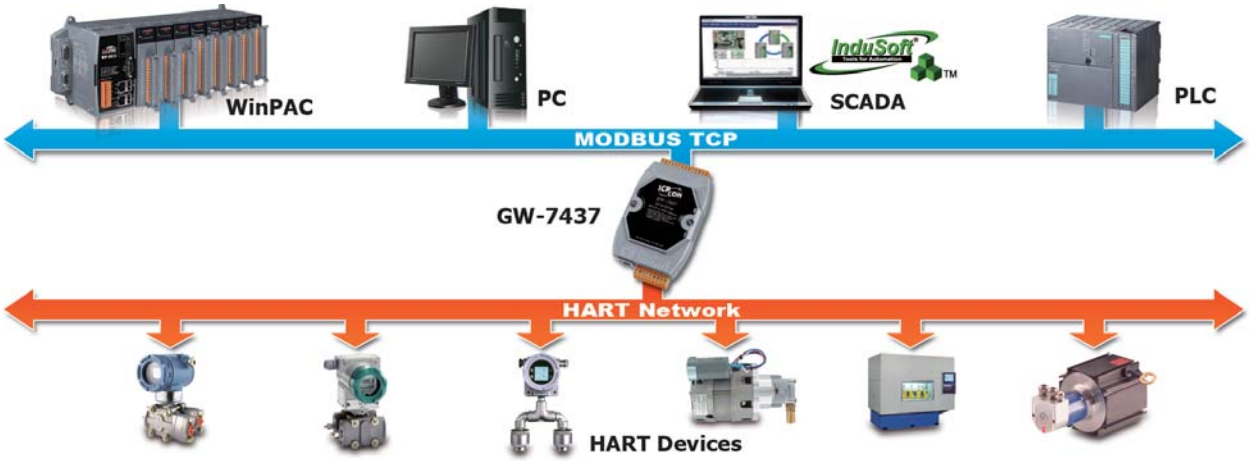
Modbus TCP Slave to HART Master Gateway

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 Ω load resistor
- Provide four HART channels

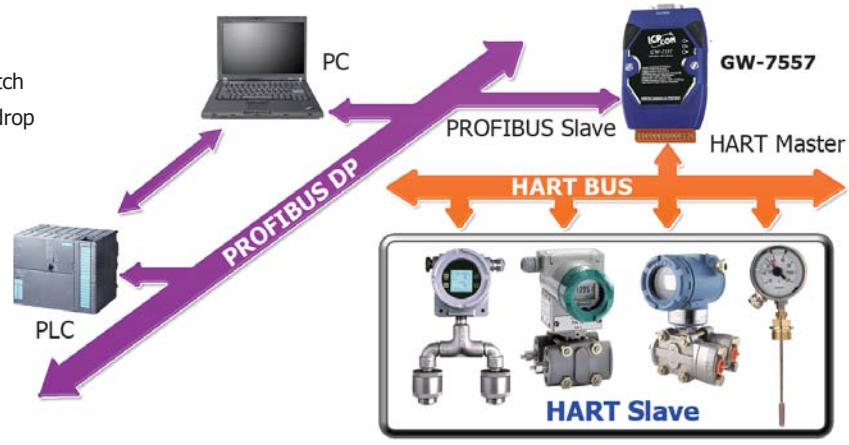


PROFIBUS DP Slave to HART Master Gateway

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 V_{DC} isolation protection on PROFIBUS side



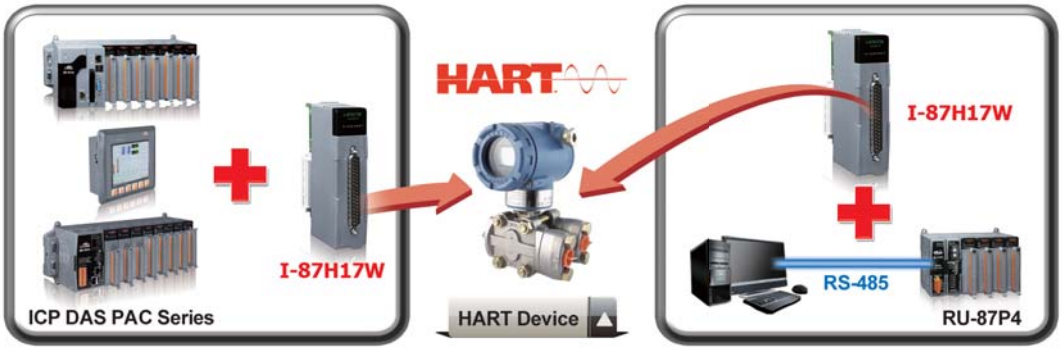
HART I-8000 I/O Modules

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



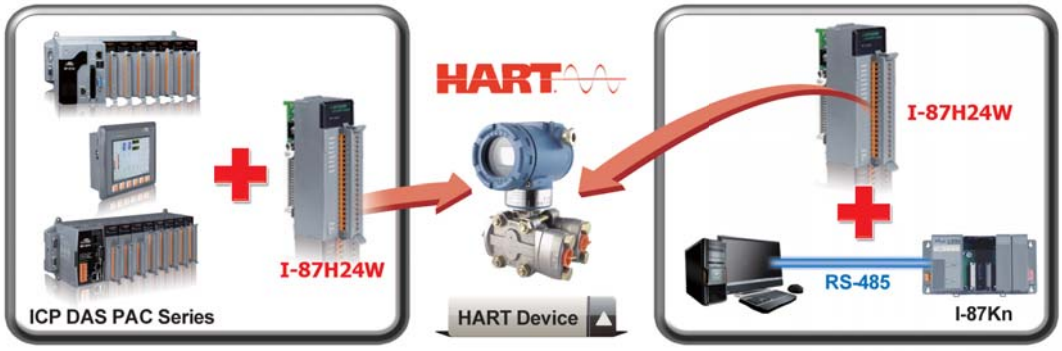
4-Ch Current Output HART Master Module

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 m aster, 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.

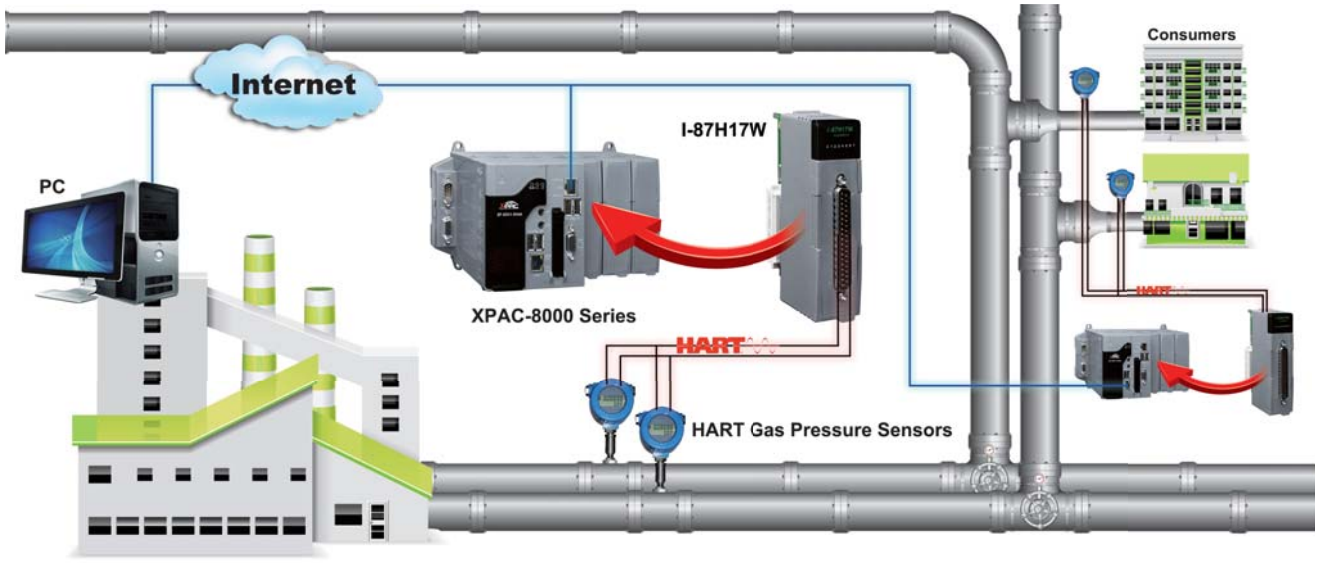
- Support HART Short/Long frame
- Support HART Burst mode
- Allow two HART masters
- Support the in point-to-point or multi-drop HART network mode
- Allow to connect with Max. 15 HART modules
- Support 4 ~ 20 mA current output
- 2-wire transmitters of HART
- Support DCON protocol
- Open wire detection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



6.4 Case Studies

Pressure Detection of Gas Pipeline

In general, the process of the natural gas transported to users' families requires long-distance pipeline. The gas pressure in the pipeline will be reduced gradually from high to medium until low. If the gas pipeline ruptures and no body knows it, it will cause the great loss of company. Further, it even causes the more serious disaster. So the most important mission for gas transportation system is strict control of the gas pipeline pressure. The gas company uses HART bus manometer for stable measurement and easy maintenance. The XPAC-8000 controller and I-87H17W with eight HART AI channels are used to collect these HART manometers data quickly and easily. Through Ethernet, the control center can monitor all gas pipeline pressure remotely.



Accessories

7.1 Signal Conditioning Modules (SG-3000 Series)

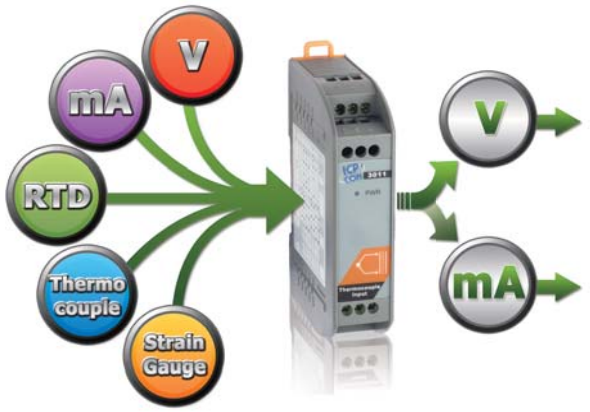
Introduction

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 configureable by swtich

Applications



Description

Analog Conditioning Modules

Models	SG-3011	SG-3013	SG-3016	SG-3071	SG-3081
Pictures					
Analog Input					
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 α=0.00385, Pt100 α=0.003916, Ni 120, Pt1000 α=0.00385	±10 mV, ±20 mV, ±30 mV, ±50 mV, ±100 mV	±5 V, ±10 V	0 ~ 20 mA, 4 ~ 20 mA
Resolution	12-bit	12-bit	-	-	-
Accuracy	±0.2% of FSR	±0.1% of FSR	±0.1% of FSR	±0.1% of FSR	±0.1% of FSR
Input Impedance	1.8 MΩ	-	-	1.6 MΩ	250 Ω
Excitation Voltage	-	-	0 ~ 10 V	-	-
Analog Output					
Channel	1	1	1	1	1
Current Output	0 ~ 20 mA	0 ~ 20 mA, 4 ~ 2 0mA	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	±5 V, ±10 V, 0 ~ 5 V, 0 ~ 10 V	±5 V, ±10 V	0 ~ 5 V, 0 ~ 10 V
System					
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)

SG-770

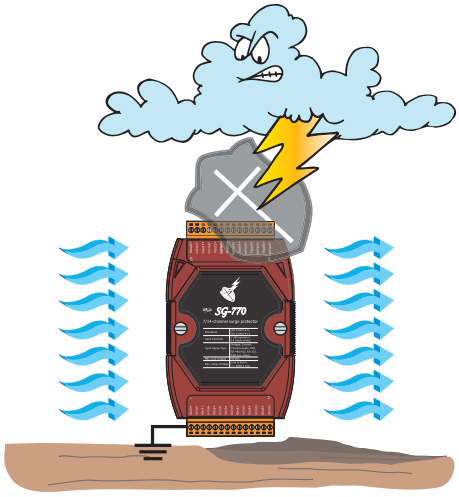
Features

- 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

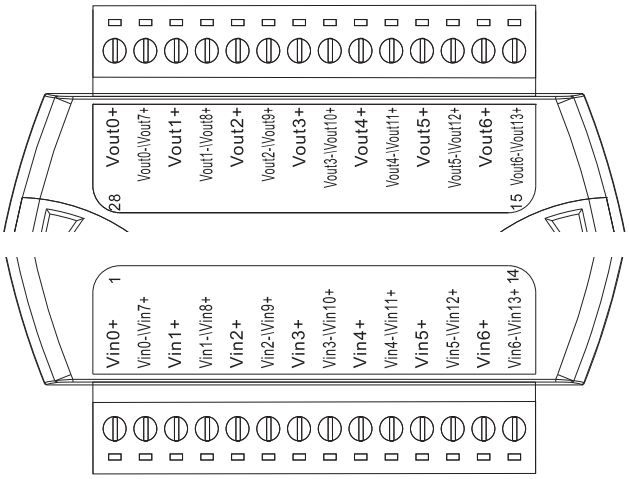
Introduction

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.

Applications



Pin Assignments



Specifications

Models	SG-770
General	
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
Surge Protection Performance	
Standard	IEC 61000-4-5 IEC 61000-4-12
Max. Surge Voltage	Line to Earth: ±6000 VDC Max.
Environment	
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

SG-770 CR	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~ 75°C

RoHS

Introduction

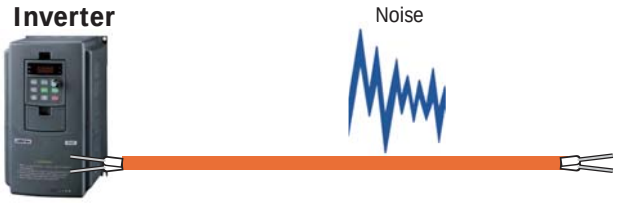
The split ferrite cable cores are designed to significantly reduce EMI/RFI for round cables.
The hinged plastic case surrounding the split core is designed to clamp onto the cable to provide a secure fixture of the ferrite onto the cable. The cores can be retrofitted onto existing installations or used 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.

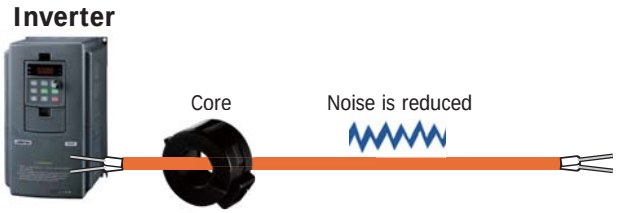
Specifications

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

Applications

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

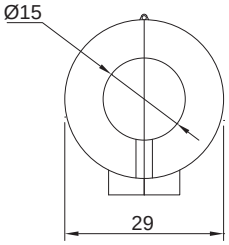




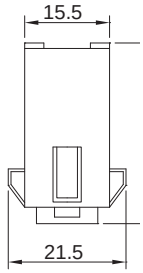

RS-232


PROFIBUS

Dimensions (Units: mm)

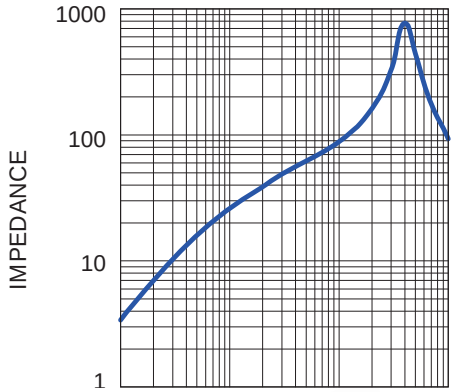


Front View

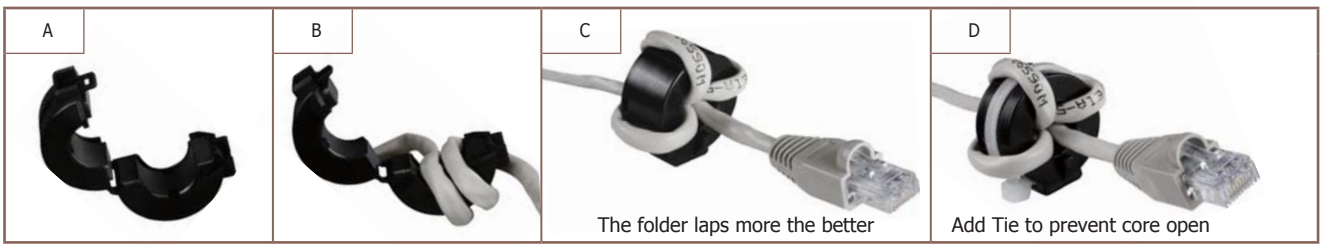


Left Side View

Characteristic



Installation



Clip-on Ferrite Core Installation

Ordering Information

4PCD-002	10 ferrite cores and cable ties in one package

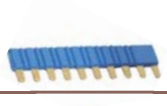
7.4 Relay Modules

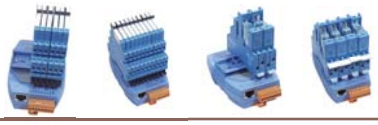
Models	DN-PR4	RM-104, RM-108, RM-116	RM-204, RM-208, RM-216
Pictures			
Relay	VE-24H5-K	FINDER - 40.61.7.024.0000	FINDER - 44.52.7.024.0000
Type	Power Relay		
Channel	4	RM-104: 4 channels RM-108: 8 channels RM-116: 16 channels	RM-204: 4 channels RM-208: 8 channels RM-216: 16 channels
Contact	Form C	Form 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)		
Mechanical			
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)	
Mechanical		
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	-				
Mechanical					
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

Specifications

Models	KA-52F	DIN-KA52F	KA-52F-48	DIN-KA52F-48
Input				
Range	100 ~ 250 VAC			
Frequency	50 ~ 60 Hz			
Output				
Power	24 VDC/1.04 A Max., 25 W		48 VDC/0.52 A Max., 25 W	
Mechanical				
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
Environmental				
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)

GPSU06U-6

GPSU06E-6 (2 pole EURO plug)

GPSU06U-6/GPSU06E-6

Specifications

Models	GPSU06U-6	GPSU06E-6
Input		
Range	100 ~ 240 VAC or 127 ~ 370 VDC	
Frequency	50 Hz ~ 60 Hz	
Output		
Power	24 VDC/0.25 A Max., 6 W	
Mechanical		
Dimensions (W x H x D)	32 mm x 66 mm x 68 mm	
Installation	No-mounting	
Environmental		
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)

MDR-20-24 MDR-60-24/MDR-60-48

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

Specifications

Models	MDR-20-24	MDR-60-24	MDR-60-48
Input			
Range	100 ~ 250 VAC		
Frequency	50 ~ 60 Hz		
Output			
Power	24 VDC/1 A Max., 24 W	24 VDC/2.5 A Max., 60 W	48 VDC/1.25 A Max., 60 W
Mechanical			
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		
Environmental			
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)

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

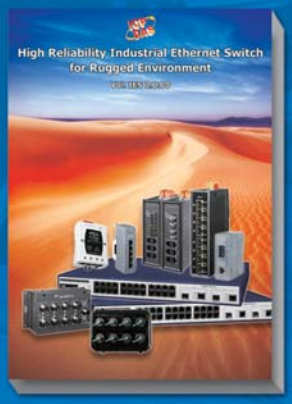
Power Saving PAC for M2M Applications

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

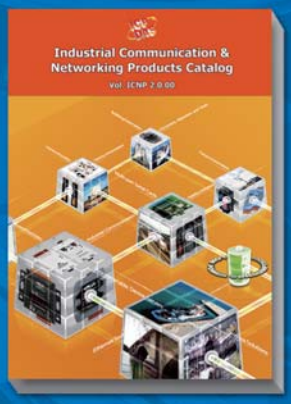
Go Green!

ICP DAS Catalogs & Brochure



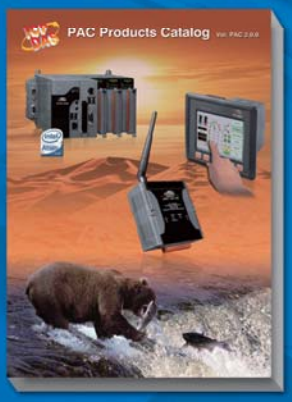
High Reliability Industrial Ethernet Switch Catalog

- 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 Technlolgy



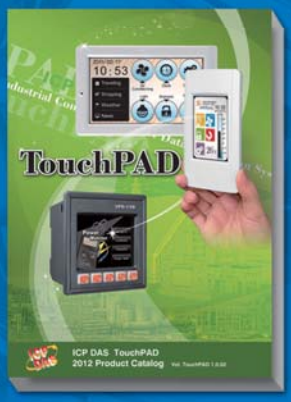
Industrial Communication & Networking Products Catalog

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



PAC Products Catalog

- XP-8000-Atom Series
- 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
- Redundant System



Touch HMI Devices Brochure

- TPD-280 Series
- TPD-430 Series
- VPD-130 Series

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

ICP DAS CO., LTD.

Taiwan (Headquarters)
Website: http://www.icpdas.com
E-mail: sales@icpdas.com
TEL : +886-3-597-3366 FAX : +886-3-597-3733

China
Website: http://www.icpdas.com.cn
E-mail: sales_sh@icpdas.com.cn
TEL : +86-21-6247-1722 FAX : +86-21-6247-1725

Europe
Website: http://www.icpdas-europe.com
E-mail: info@icpdas-europe.com
TEL : +49 (0) 7121-14324-0 FAX : +49 (0) 7121-14324-90

USA
Website: http://www.icpdas-usa.com
E-mail: sales@icpdas-usa.com
TEL : +1-310-517-9888 FAX : +1-310-517-0998

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