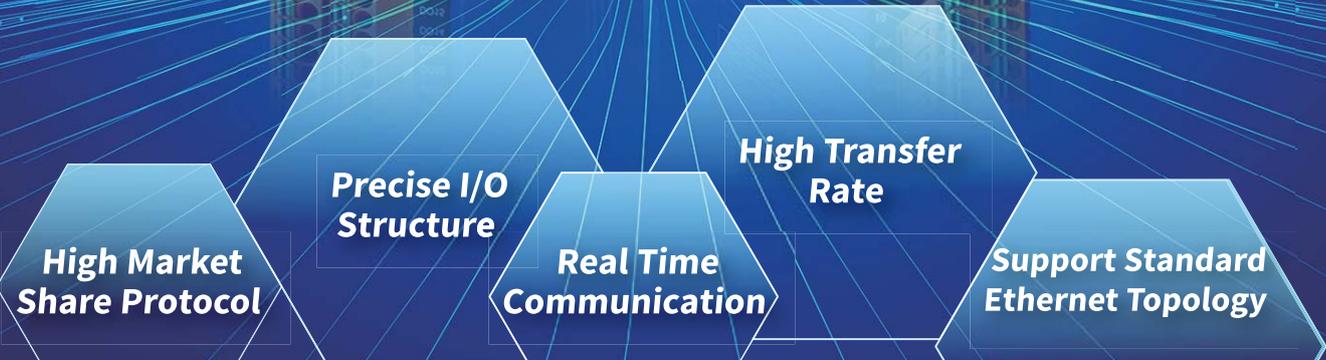


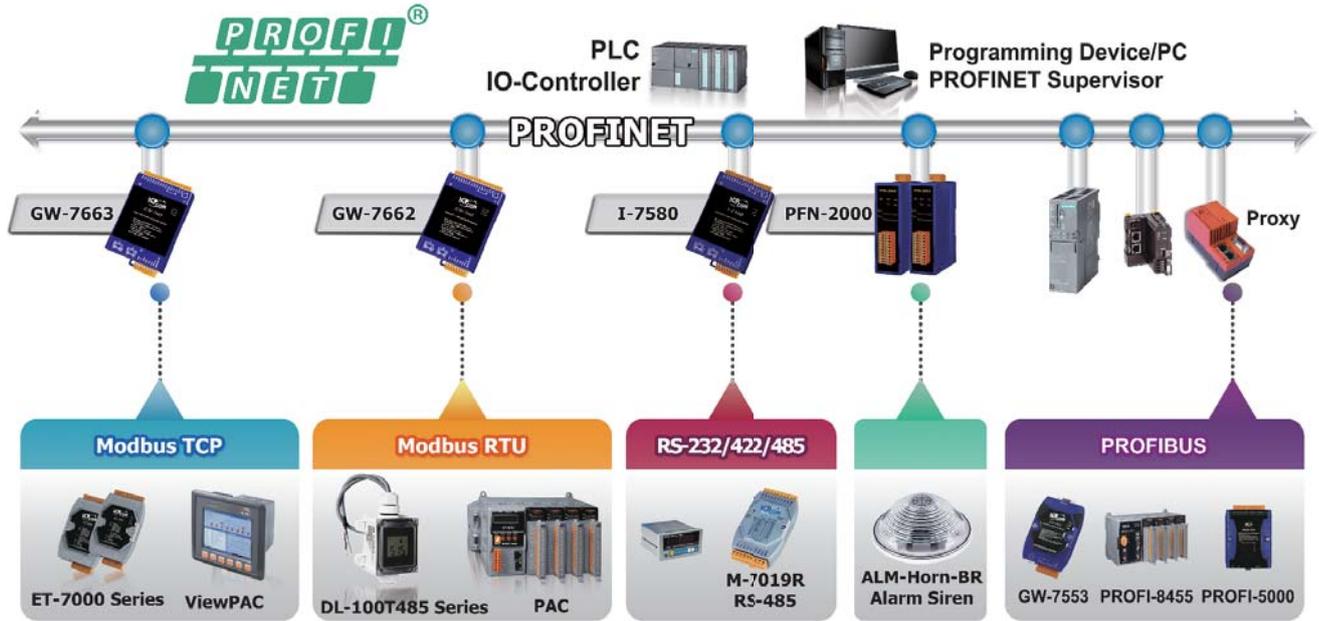


Compliant with IEEE802.3U standard,  
compatible with future tense of IT & Ethernet



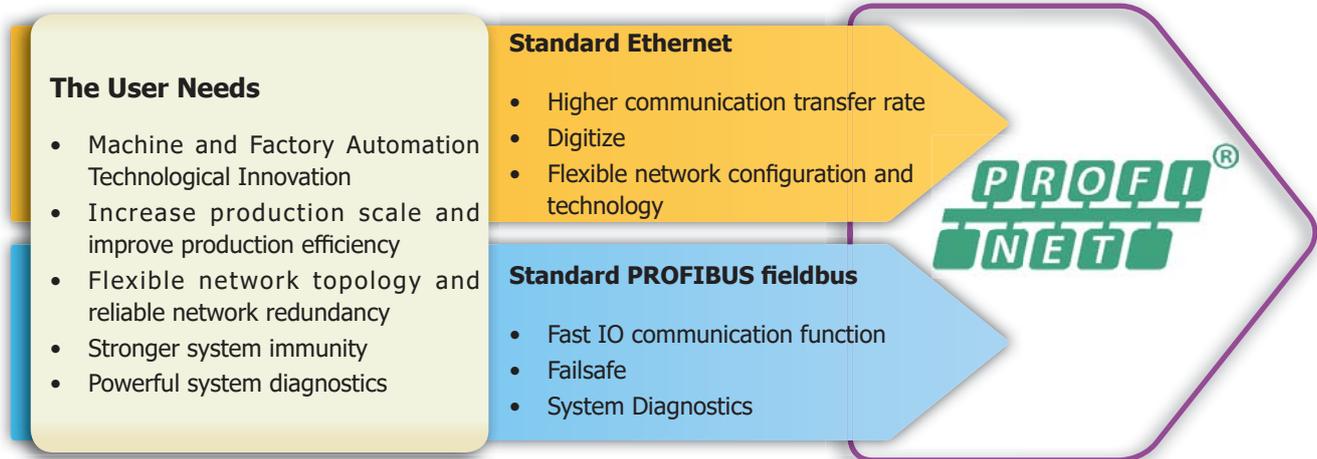
# PROFINET Product Solutions

ICP DAS has been deeply involved in PROFINET technology for many years, and has developed a series of PROFINET products, including converters, gateways and remote I/O modules. We provide complete hardware solutions to meet various PROFINET applications, help you solve problems related to data acquisition, communication protocol conversion and communication interface conversion, etc., so that you can easily complete various PROFINET application projects.



# PROFINET Introduction and Benefits

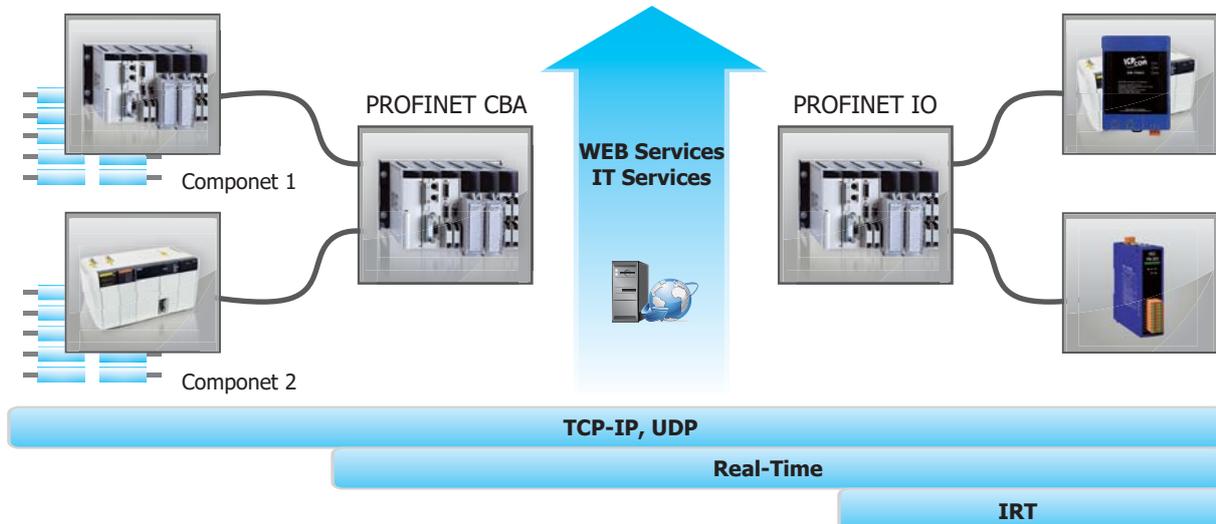
PROFINET is an open Industrial Ethernet solution based on international standards. It is a communication protocol designed to exchange data between controllers and devices in an automation setting. It was introduced by PROFIBUS International (PI) with four decisive advantages: openness, flexibility, high efficiency and high performance. PROFINET provides a complete network solution in the field of automation, which integrates applications such as Ethernet, motion control, distributed systems, process automation, and factory automation. In addition, it is compatible with Ethernet and various field bus systems, such as: PROFIBUS DP, PROFIBUS PA, Interbus, etc., without changing the field equipment.



## PROFINET Component Model

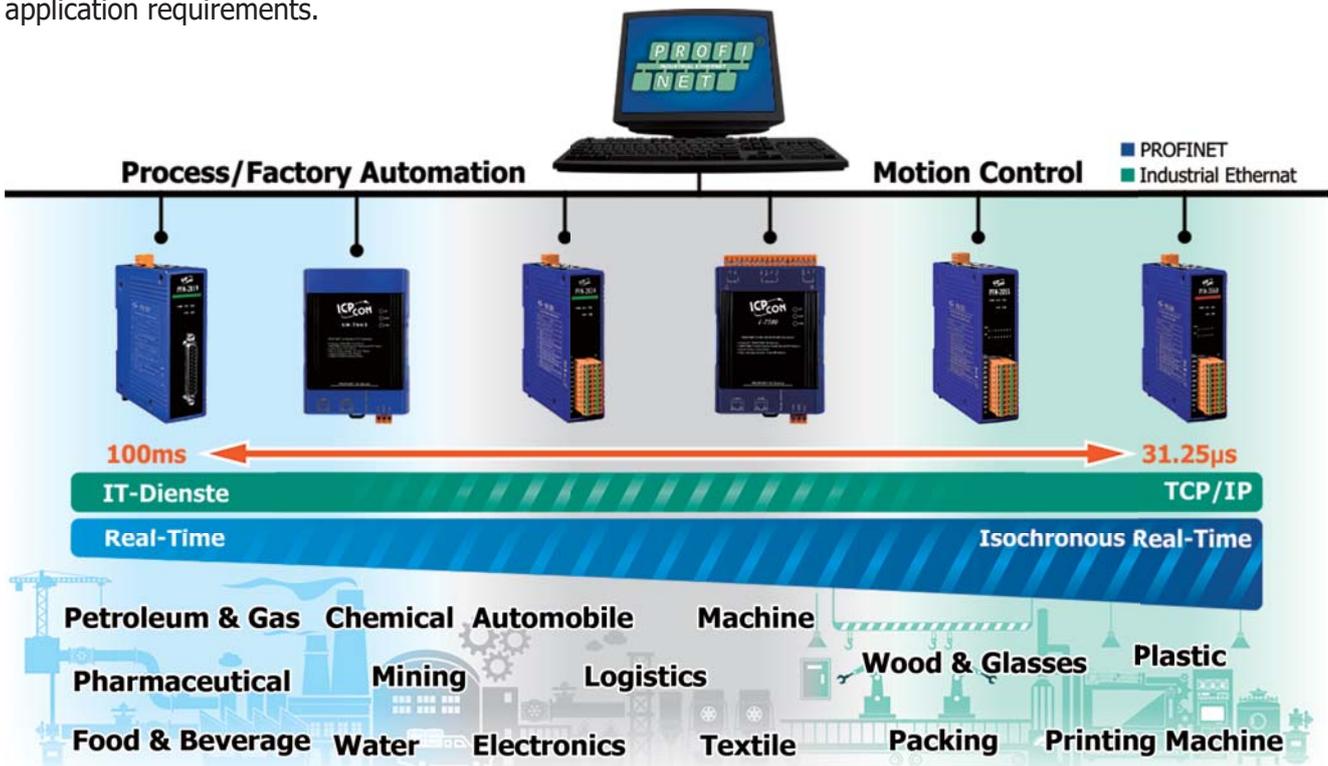
PROFINET is divided into two models:

- PROFINET CBA includes many automation components in the decentralized automation system, each component is connected through the PROFINET network, suitable for self-executing equipment or machine communication.
- PROFINET IO is suitable for the communication of peripheral devices such as IO and drives. ICP DAS PROFINET series products are classified as PROFINET IO devices.



## PROFINET Communication Channels

PROFINET's combination of high performance and openness stems from its data channel design. It includes a reasonable design of three communication channels, which can realize the transmission of various data on one network cable and perform their respective functions effectively according to the application requirements.



## PROFINET Channel Description

### PROFINET NRT (Non-Real-Time)

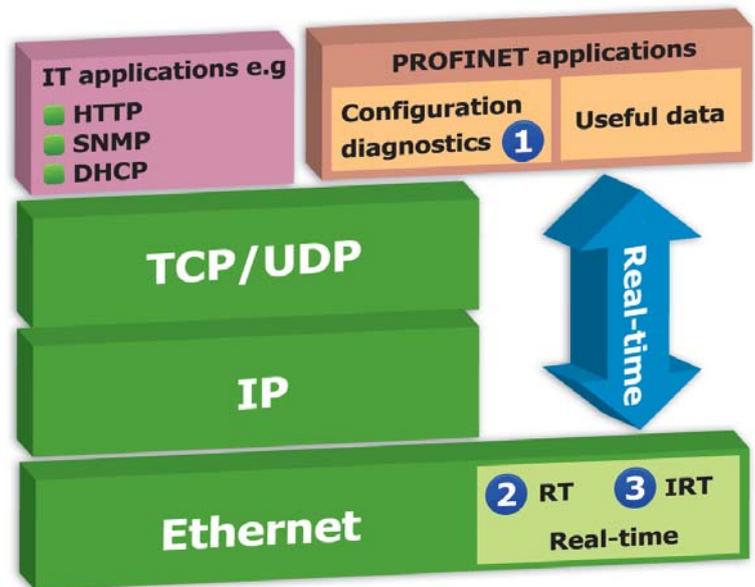
It uses standard protocols as UDP/IP. With response time approx. 100 ms PROFINET NRT targets for applications in process automation.

### 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.



#### 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

## PROFINET Product Features

- ⦿ Transfer protocol: PROFINET IO
- ⦿ Supported Ethernet services: ICMP, IGMP, ARP, DHCP, TELNET, TFTP, SNMP, VLAN Priority Tagging
- ⦿ Supported PROFINET services: RTC, RTA, CL-RPC, DCP, LLDP, I&M
- ⦿ PROFINET Conformance Class B and RT Class 1
- ⦿ Cyclic Time: 1ms (min)
- ⦿ Generic GSDML File Provided
- ⦿ Automatic MDI / MDI-X Crossover for Plug-and-play

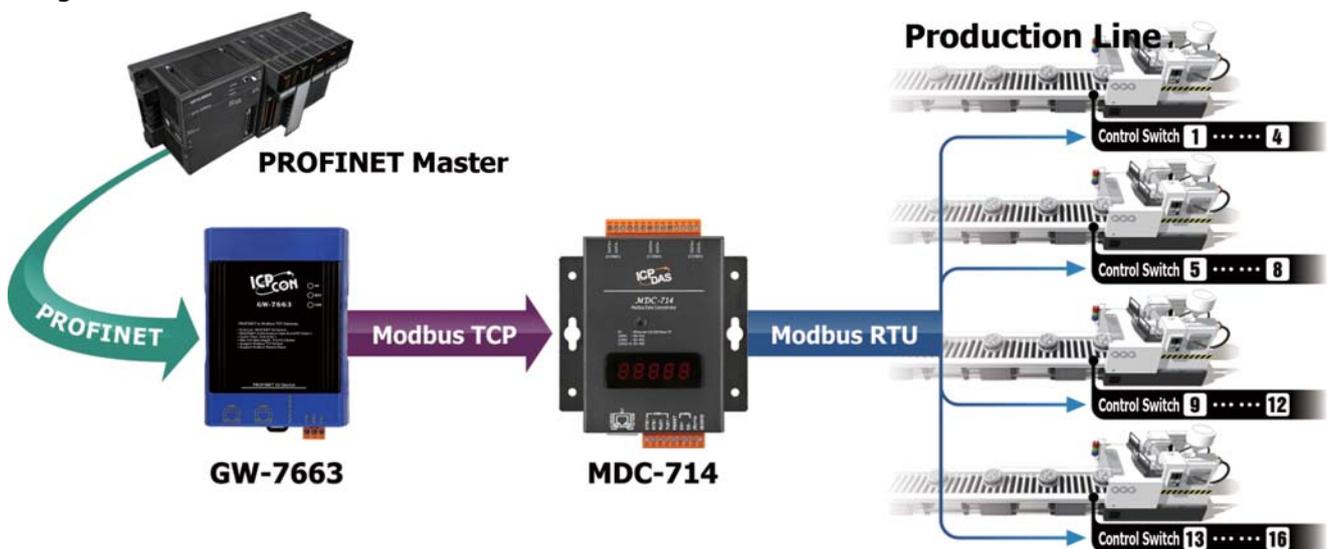


## PROFINET Product Selection Guide

Product		Description			
Converter	<b>I-7580</b>	PROFINET to RS-232/422/485 Converter			
Gateway	<b>GW-7662</b>	PROFINET to Modbus RTU/ASCII Gateway			
	<b>GW-7663</b>	PROFINET to Modbus TCP Gateway			
I/O Module	<b>PFN-2019</b>	10-Ch AI	<b>PFN-2024</b>	4-Ch AO	
	<b>PFN-2042</b>	16-Ch DO	<b>PFN-2051</b>	16-Ch DI	
	<b>PFN-2052</b>	8-Ch DI	<b>PFN-2053</b>	16-Ch DI	
	<b>PFN-2055</b>	8-Ch DI, 8-Ch DO	<b>PFN-2060</b>	6-Ch DI, 6-Ch Relay	

## Application Case Description

In a factory that manufactures automobile wheel drums, it is necessary to quickly control the switch of the conveyor belt to ensure that the wheel drum stops in a fixed area for the convenience of operation. In this application case, the upper end adopts PROFINET PLC for drum production operation, and the lower end conveyor belt adopts Modbus support Control switch for RTU. It takes more time to control the conveyor belt switch one by one in a polling manner. Therefore, MDC-714 is selected for the lower conveyor belt, and all conveyor belt switches can be evenly allocated to the 4 COM Ports of MDC-714 to reduce the time required for round-robin. The resulting data can be integrated on the PROFINET PLC in a shorter time.



## Application Features

- ④ PROFINET Gateway allows users to quickly integrate Modbus devices
- ④ Continuous communication with multiple communication ports to solve the delay problem of Modbus RTU simplex communication
- ④ Maximum input/output data length: 512/512 bytes

# PROFINET Converter



**I-7580**

## Features

- 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 input/output data is 512/384 Bytes
- 4 kV Contact ESD protection for any terminal

## Introduction

The I-7580 is a PROFINET IO device with RT functionality that supports RS-232, RS-422 and RS-485 serial interfaces. Users can choose one of these serial communication interfaces to apply. It is easy to allow users to take almost serial device to a PROFINET network including serial remote I/O devices, sensors, actuators, HMI, barcode readers and RFID, etc.



Module Name	I-7580
WDT Timer	YES (CPU Built-in)
COM Port	RS-232 / 422 / 485 (Can not be used simultaneously)
Ethernet Services	ICMP / IGMP / ARP / DHCP / TELNET / TFTP / SNMP / VLAN Priority Tagging
<b>PROFINET</b>	
Conformance Classes	Class B
Services	RTC / RTA / CL-RPC / DCP / LLDP / I&M
Cycle Time	1ms(Min)
Protocol	PROFINET IO Device
<b>System</b>	
Power / Consumption	+10 ~ +30 VDC / 3.4W (Reverse polarity protection, Over-voltage brown-out Protection)
Dimensions / Installation	42mm x 76mm x 119mm (W x L x H), DIN-Rail
Environment	Operating Temp.: -25~75 °C, Storage Temp.: -30~80 °C, Humidity: 10 ~ 90%, Non-condensing

# PROFINET Protocol Gateways

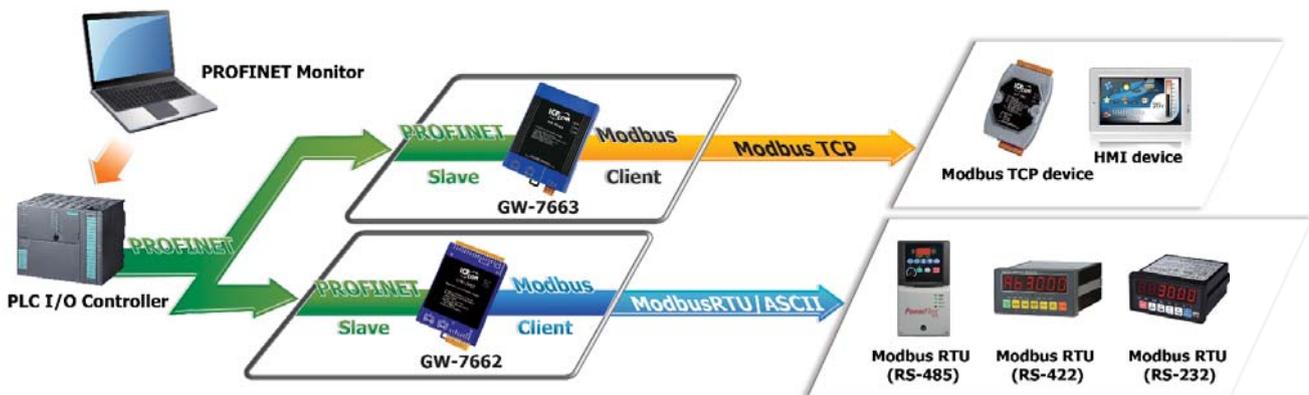


**Features**

- Protocol: PROFINET IO Device
- PROFINET Conformance Class B and RT Class 1
- Max length of input/output data is 512/512 Bytes
- Cyclic Time: 1ms(min)
- Support Modbus RTU or Modbus TCP Master and Slave Mode

## Introduction

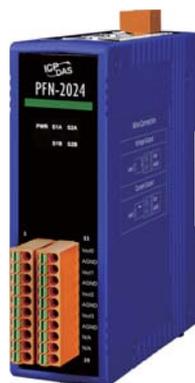
GW-7662 / GW-7663 specially designed for PROFINET IO device. It allows PROFINET controller to access Modbus RTU (GW-7662 only) or Modbus TCP (GW-7663 only) Master or Slave devices. These Modbus devices maybe a PLC, a sensor, ICPDAS M-7000 series modules and so forth. We also provide a utility software for users to configure GW-766x. By using this module, users can put their Modbus devices into PROFINET network easily.



Module Name		GW-7662	GW-7663
Description		PROFINET to Modbus RTU/ASCII Gateways	PROFINET to Modbus TCP Gateways
PROFINET	Protocol	IO Device	
	Conformance Classes	ClassB	
	Services	RTC, RTA, CL-RPC, DCP, LLDP, I&M	
	Cycle Time	1 ms	
Port	Type	RS-232/RS-422/RS-485	Ethernet(10/100 Base-TX)
	Protocol	Modbus RTU/ASCII Master/Slave	Modbus TCP Server/Client
System	Power / Consumption	+10 ~ +30 VDC / 3.4W (Reverse polarity protection, Over-voltage brown-out Protection)	
	Dimensions	42mm x 76mm x 119mm (W x L x H), DIN-Rail	
	Environment	Operating Temp.: -25~75 °C, Storage Temp.: -30~80 °C, Humidity: 10 ~ 90%, Non-condensing	

The PFN-2000 series are PROFINET I/O modules, each PROFINET I/O module supports the PROFINET IO communication protocol, can be connected to the PROFINET IO controller, and provides  $\pm 4\text{kV}$  protection against electrostatic interference. ICP DAS currently provides several PROFINET analog and digital I/O modules, which users can choose according to their needs. And through the GSDML file, users can easily configure each PROFINET I/O module to any PROFINET engineering tool.

## PROFINET I/O Analog Modules


**PFN-2019**

**PFN-2024**

### Features

- Protocol: PROFINET IO Device
- PROFINET Conformance Class B and RT Class 1
- Generic GSDML File Provided (Version 2.25)
- Cyclic Time: 1ms (min)
- PFN-2019 provide 10-CH Universal Analog Input
- PFN-2024 provide 4-CH Isolated Analog Output

Module Name	PFN-2019	PFN-2024
<b>Analog Input</b>		
Channels	10 ( Differential )	
Sensor Type	Thermocouple (J, K, T, E, R, S, B, N, C)	
Voltage Input Range (V)	$\pm 15\text{m}$ , $\pm 50\text{m}$ , $\pm 100\text{m}$ , $\pm 500\text{m}$ , $\pm 1$ , $\pm 2.5$ , $\pm 5$ , $\pm 10$	
Current Input Range (mA)	$\pm 20$ , $0\sim+20$ , $+4\sim+20$	
Resolution / Sample Rate	16 bit / 10Hz	
Accuracy	$\pm 0.1\%$ ( FSR)	
<b>Analog Output</b>		
Channels		4
Voltage Input Range (V)		$0\sim 5$ 、 $\pm 5$ 、 $0\sim 10$ 、 $\pm 10$
Current Input Range (mA)		$0\sim 20$ 、 $4\sim 20$
Resolution / Sample Rate		16 bit / $\pm 0.1\%$ ( Single Channel)
Accuracy		Voltage : $\pm 0.1\%$ / Current : $\pm 0.2\%$
<b>PROFINET Interface</b>		
Connector	RJ-45 x 2 (LED indicators), Integrated 2-Port Switch	
Protocol / Services	PROFINET IO / RTC, RTA, CL-RPC, DCP, LLDP, I&M	
Conformance Classes / RT	Class B / RT Class, 1 ms (min)	
<b>System</b>		
Power / Consumption	$+10 \sim +30 \text{ VDC} / 5\text{W}$	$+10 \sim +30 \text{ VDC} / 7\text{W}$
Dimensions	33mm x 93mm x 126mm (W x L x H), DIN-Rail	
Environment	Operating Temp.: $-25\sim 75 \text{ }^\circ\text{C}$ 、Storage Temp.: $-30\sim 80 \text{ }^\circ\text{C}$ 、Humidity: 10 ~ 90%, Non-condensing	

# PROFINET Digital I/O Modules



**PFN-2042/2051/2052/2053/2055/2060**

## Features

- Protocol: PROFINET IO Device
- PROFINET Conformance Class B & RT Class 1
- Generic GSDML File Provided (Version 2.25)
- Cyclic Time: 1ms (min)
- 4 kV Contact ESD protection for any terminal

Module Name	PFN-2042	PFN-2051	PFN-2052	PFN-2053	PFN-2055	PFN-2060
<b>Digital Input</b>						
Channels		16	8	16	8	6
Contact		Dry + Wet	Wet	Dry	Dry + Wet	Dry + Wet
Sink / Source		Dry: Source Wet: Sink/Source	Sink/Source	Source	Dry: Source Wet: Sink/Source	Dry: Source Wet: Sink/Source
Wet Contact	On Voltage Level	--	+4~30VDC	--	+10~50VDC	+10~50VDC
	Off Voltage Level		+4VDC Max.		+4VDC Max.	+4VDC Max.
Dry Contact on Voltage Level		Close to GND	--	Close to GND	Close to GND	Close to GND
Input Impedance		10kΩ,0.5W	3kΩ,0.3W	3KΩ, 0.3W	10kΩ,0.5W	10kΩ,0.5W
<b>Digital Output</b>						
Channels	16				8	6
Type	Open Collector				Open Collector	Power Relay
Sink / Source	Sink				Sink	Form A
Load Voltage	+3.5~50VDC				+3.5~50VDC	30VDC/125VAC
Max. Load Current	700mA / Ch	--			700mA / Ch	2A@30VDC 0.6A@125VAC
Overvoltage Protection	60VDC				60VDC	--
Overload Protection	Yes				Yes	
Power-On-Value	Yes				Yes	Yes
Safe Value	Yes				Yes	Yes
<b>PROFINET</b>						
Connector	RJ-45 x 2 (LED indicators), Integrated 2-Port Switch					
Protocol / Services	PROFINET IO / RTC, RTA, CL-RPC, DCP, LLDP					
Conformance Class / RT	Class B / RT Class, 1 ms (min)					
<b>Power</b>						
Power Supply	+10 ~ +30 VDC					
Consumption	4W	3.5W	3.5W	4W	4.5W	4.5W



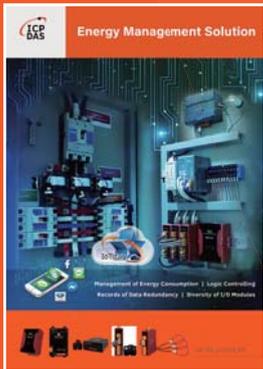
## Industrial Fieldbus

- RS-485
- Industrial Ethernet
- Profinet
- CAN bus
- CANopen
- Devicenet
- J1939
- PROFIBUS
- HART
- Ethernet/IP
- BACnet



## PC-based I/O Boards

- PCI Express Bus Data Acquisition Boards
- PCI Bus Data Acquisition Boards
- ISA Bus Data Acquisition Boards



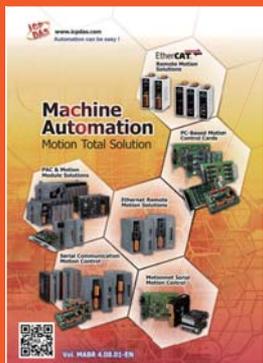
## Energy Management Solution

- InduSoft SCADA Software
- Smart Power Meter Concentrator
- Smart Power Meter
- True RMS Input Module
- TouchPAD Devices - VPD Series



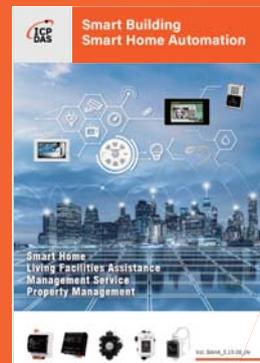
## IIoT Cloud Solution - UA SERIES : IIoT Communication Server

- Built-in OPC UA Server Service
- Built-in MQTT Broker Service
- Support Logic Control IFTTT
- Support IoT Cloud Platforms Connection and IoTstar Cloud Management
- IIoT Factory Application of MES
- Pumping Station IoT Application
- BA Smart Building IoT Application
- Robotic Arm Co-operation Application



## Machine Automation

- Motionnet Solutions
- EtherCAT Motion Control Solutions
- Ethernet Motion Control Solutions
- Serial Communication Motion Control Solutions
- PC-based Motion Control Cards
- PAC Solutions - Motion Modules



## Smart Building, Smart Home Automation

- Video Intercom & Access Control
- Touch HMI - TouchPAD Series
- Smart Lighting Control
- Energy Saving - PM/PMC Series
- Environmental - DL/CL Series
- Motion Detector - PIR Series
- Wi-Fi Wireless - WF Series
- Infrared Wireless - IR Series
- ZigBee Wireless - ZT Series
- IIoT Server & Concentrator
- LED Display - iKAN Series



## Intelligent IIoT Edge Controller & I/O Module

- WISE IIoT Edge Controller & I/O Module
- Cloud Management
- Applications
- Product Specification
- Intelligent Surveillance Solution



## Wireless Solution

- WLAN Products
- Radio Modems
- 3G/4G Products
- NB-IoT Solution
- GPS Products
- Bluetooth LE Converters
- ZigBee Products
- Infrared Wireless Modules
- Wireless Modbus Data Concentrators
- WLS (Wireless Locating System)

