ICP DAS

IoTstar Supported

Microsoft **Azure Certified Device**

PMC-284xM

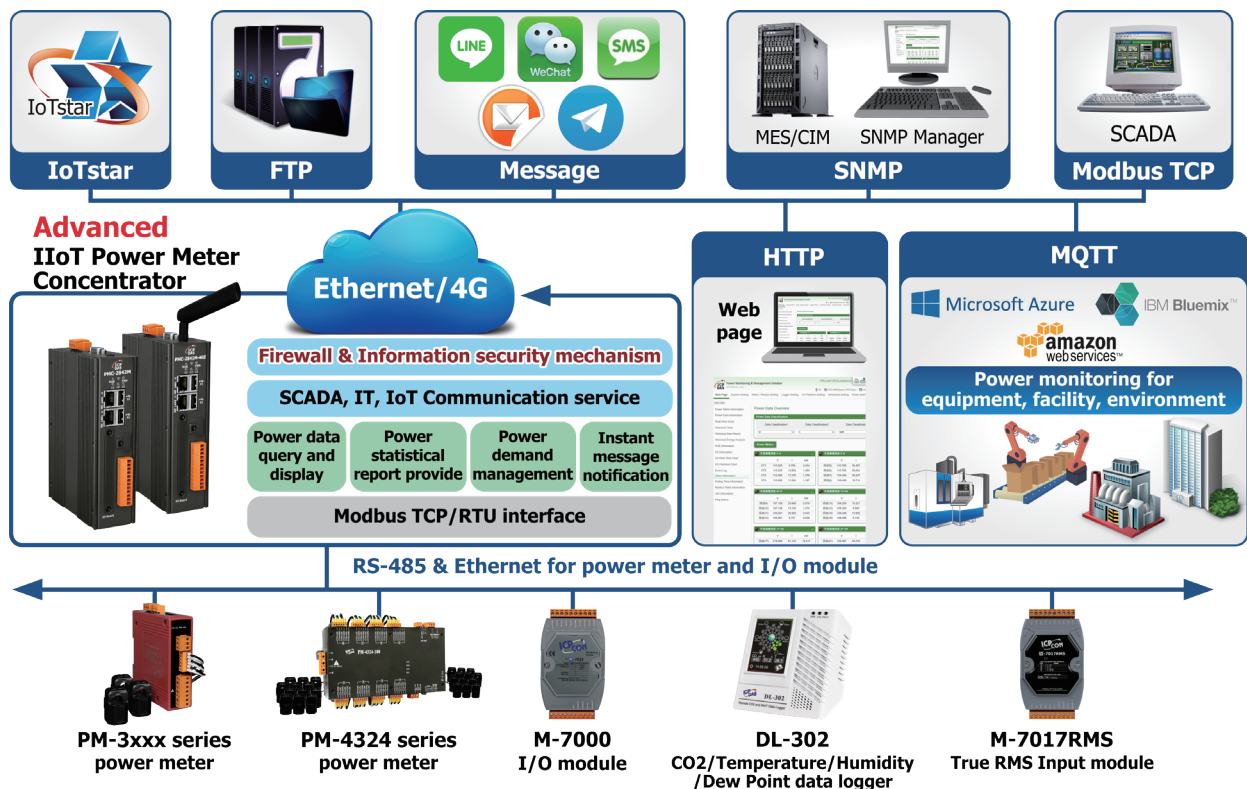Advanced IIoT Power Meter Concentrator

Features

- No extra software tool is required, using browsers to perform system operations
- Support at most 48 modules (Include ICP DAS Modbus Power Meters and Modbus I/O modules)
  * COM3 and COM4 can connect to Max. 16 Modbus RTU modules individually.
  * LAN can connect to Max. 16 Modbus TCP modules.
  * Support at most 4 ICP DAS PM-4324 series Power Meters
- Display real-time or historical power data; Provide power data statistics report
- Power data logger and data files send back function supported.
- Built-in IF-THEN-ELSE logic engine for power demand management
- Support LINE, Telegram, WeChat, SMS and Email message notification
- Support Modbus TCP/RTU, SNMP, MQTT, FTP and CGI protocols.
- Support connection with IoT Cloud Platform (Microsoft Azure, IBM Bluemix, Amazon Web Services) and IoTstar Cloud Management Software
- Support 4G wireless data communication
- Complete information security protection mechanism - HTTPS, VPN, SNMP v3, SFTP, FTPS, and Blacklist/Whitelist.

RoHS

Introduction

PMC-284xM is the IIoT Power Meter Concentrator ICP DAS provide for the era of IoT and Cloud computing. It provides flexible integration with the ICP DAS power meters via RS-485 or Ethernet interface, and features various functions such as: measure the power consumption of the devices, energy usage analysis, power data log operation, power demand management and alarm notification functions. PMC-284xM offers a user-friendly and intuitive web site interface that allows users to implement the Energy monitoring system just a few clicks away; no programming is required. By working with the power meters, IF-THEN-ELSE logic rule execution ability, and LINE/WeChat/Telegram/Email/SMS alarm message notification functions, PMC-284xM offers more thought-out power demand management functions, and is able to perform load shedding of the devices if required. In addition, PMC-284xM supports VPN Client, SNMP agent v3, SFTP, FTPS and HTTPS. With a variety of Security mechanism and protocols provided by PMC-284xM, it can meet the requirements of information Security when building an IoT Cloud power monitoring system.

System Architecture

| IoTstar | FTP | Message | SNMP | Modbus TCP |

MES/CIM   SNMP Manager   SCADA

Advanced IIoT Power Meter Concentrator

Ethernet/4G

HTTP — Web page

MQTT — Microsoft Azure, IBM Bluemix, amazon web services

Power monitoring for equipment, facility, environment

Firewall & Information security mechanism

SCADA, IT, IoT Communication service

| Power data query and display | Power statistical report provide | Power demand management | Instant message notification |

Modbus TCP/RTU interface

RS-485 & Ethernet for power meter and I/O module

| PM-3xxx series power meter | PM-4324 series power meter | M-7000 I/O module | DL-302 CO2/Temperature/Humidity /Dew Point data logger | M-7017RMS True RMS Input module |

In order to meet the requirements of information security protection for IIoT system, ICP DAS has launched the Advanced IIoT Power Meter Concentrator: PMC-284xM series. In addition to inheriting the functions of the original PMC-5231x/224x, PMC-284xM also supports the information security protection mechanism and encrypted communication protocols as below:

🔲 Network Security

PMC-284xM series features the VPN communication function (supports 4 VPN protocols : PPTP, L2TP, OpenVPN and SoftEther), which allows users to set up a secure communication tunnel between PMC and the internet, and the security of the network through VPN can also prevent the PMC and its connected power meters from being invaded by external threats.

🔲 System Security

PMC-284xM series uses web interface for system configuration and sensor monitoring, therefore the web interface is the entry point for the entire system operation, and its security needs to be strengthened. PMC-284xM supports the HTTPS encrypted communication protocol, which can encrypt the communication content between the browser and PMC to protect the settings and operations performed on PMC from being interpreted. SNMP v3 encryption communication protocol and the authentication mechanism of user management are also provided to ensure the security of connections between PMC and IT system to ensure the security.

🔲 Data Security

PMC-284xM is equipped with a microSD card, which can be used to perform the periodic or event-driven data log operations for the power meters connected to PMC. The data log files can be automatically sent back to back-office through the FTPS protocol, or actively downloaded by user through SFTP, FTPS or web protocols. The transmission of data log files is protected by TLS encryption to ensure the data log files not being captured or tampered during the transmission process.

■ Identity Authentication Security

PMC-284xM features the mechanism of password authentication for each communication connection interface. Administrator is required to enter accurate password before setting up the operations of PMC. In addition, PMC-284xM also supports the function of Blacklist/Whitelist, which allows users to filter and exclude the accessible domains. It can also perform the dynamic blacklist function to automatically add the IP address with too many wrong login attempts to PMC to blacklist to protect PMC from the brute force password attacks.

■ Cloud Backup Mechanism

However, no matter how robust the security mechanism is, the threat of being breached is always exist. Therefore, in addition to the security mechanism, the system recovery function is also indispensable, so that the original system setting can be quickly restored to PMC after being damaged by the network attack. PMC-284xM can connect to the IoT Cloud Management Software-IoTstar launched by ICP DAS. In addition to collecting the power data sent by PMC, and importing them to Database, IoTstar can also perform the system setting backup operation automatically for the PMC controllers connect to IoTstar. In this way, even if PMC-284xM is attacked and damaged, as long as a new PMC is replaced, the original system setting can be restored to the new PMC, so that the operations on PMC will return to normal immediately without worrying about the loss of downtime caused by system damage.

Cloud Backup

The Advanced IIoT Edge Controller - PMC-284xM inherits the features of the original PMC series controllers: perform system setting, power information monitoring by browser, powerful IF-THEN-ELSE logic operation capability for power demand management, connect a variety of power meters, and provide instant messaging notification operation. Now it also features greatly improved information security mechanism. The PMC-284xM is perfect to serve as the operational core of the industrial IoT power monitoring system.
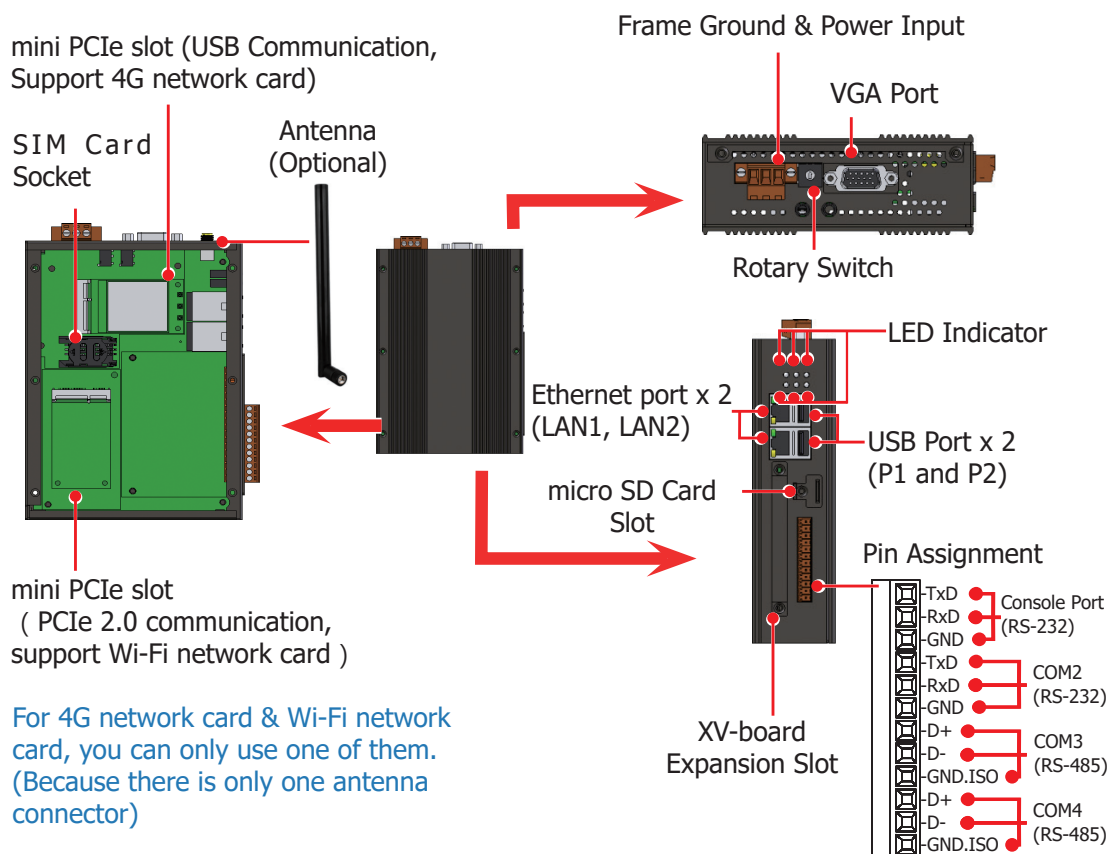
■ Hardware Specifications

Model	PM-284xM
System	
CPU	Quad-core ARM CPU, 1.6 GHz/Core
VGA port	Yes (Only for system diagnostic and recovery operations)
SDRAM/Flash	DDR3 2 GB / 8 GB
microSD	Built-in one 4 GB microSD card (support up to 32 GB microSDHC card or 2 TB microSDXC card)
Communication Interface	
Ethernet	RJ-45 x 2, 10/100/1000 Base-TX (Auto-negotiating, Auto MDI/MDI-X)
COM 2	RS-232 (TxD, RxD, GND), non-isolated, Speed: 115200 bps max
COM 3/COM 4	RS-485 (Data+, Data-), Speed: 115200 bps max. Support 2500 VDC isolation.
Module Support	
Local Side	Support ICP DAS XV-board
Remote Side	• Support at most 48 modules (Include ICP DAS Modbus Power Meters and Modbus I/O modules) * COM3 and COM4 can connect to Max. 16 Modbus RTU modules individually. * LAN can connect to Max. 16 Modbus TCP modules. * Support at most 4 ICP DAS PM-4324 series Power Meters
Mechanical	
Casing	Metal
Dimensions (W x L x H; mm)	42 x 164 x 129
Installation	Wall Mounting Installation or DIN-Rail Installation (Optional)
Environmental	
Temperature/ Humidity	Operating Temperature: -25 °C to +75 °C; Storage Temperature: -40 °C to +80 °C; 10 to 90% RH, Non-condensing
Power Requirements	
Input Range/ Consumption	12 to 48 VDC Ethernet version: 4.8 W; -4GE/4GC/3GWA version: 6.5 W
Mobile Network Communication	
PMC-284xM-4GE	3G：WCDMA 850/900/2100 MHz 4G：FDD LTE: B1/B3/B5/B7/B8/B20 bands (Frequency Band for EMEA, Korea, Thailand, India and Taiwan)
PMC-284xM-4GC	3G：WCDMA: 900/2100 MHz, TD-SCDMA 1900/2100 MHz, CDMA2000 (BC0) 800 MHz 4G：FDD LTE: B1/B3/B8 bands (Frequency Band for China); TDD LTE: B38/B39/B40/B41 bands (Frequency Band for China)

■ Software Specifications

Function	Description
Operation Interface	• Web Page
Power data collection	• Power data collection; Real-time and Historical power data displayed • Power data logging and historical power data statistics report provided • PUE information provided and displayed
Power demand management	• Built-in IF-THEN-ELSE logic engine for thought-out power demand management • Adjust equipment operation by its power status via Modbus I/O modules • Provide Schedule function to manage the equipment's operation(via the Modbus TCP/RTU protocol) • Provide message notifcation function via Email, LINE, Telegram, WeChat (4G version PMC provides SMS message notification function)
Integrate with SCADA/ IT/IoT/ System	• Support Modbus TCP/RTU, MQTT, SNMP(v2c, v3) & CGI protocols to transmit real-time power data • Power data logging and power data file auto send-back (by FTP protocol) & recovery when network is resumed after disconnection • Support DDNS (Dynamic DNS) system • Support Microsoft Azure, IBM Bluemix and Amazon Web Service • Support ICP DAS IoTstar Cloud software
Information Security Mechanism	• Support HTTPS encryption protocol for Web interface operation • Support VPN Client function (PPTP, L2TP, OpenVPN and SoftEther protocols) • Support SNMP v3 encryption protocol to ensure the security of the connection with IT system • Support SFTP & FTPS mechanisms to ensure that file transfers are encrypted through TLS • Support Blacklist and Whitelist setting to filter and exclude the accessible domains

■ Appearance

mini PCIe slot (USB Communication, Support 4G network card)

SIM Card Socket

Antenna (Optional)

Frame Ground & Power Input

VGA Port

Rotary Switch

mini PCIe slot (PCIe 2.0 communication, support Wi-Fi network card)

For 4G network card & Wi-Fi network card, you can only use one of them. (Because there is only one antenna connector)

Ethernet port x 2 (LAN1, LAN2)

micro SD Card Slot

XV-board Expansion Slot

LED Indicator

USB Port x 2 (P1 and P2)

Pin Assignment

TxD / RxD / GND — Console Port (RS-232)
TxD / RxD / GND — COM2 (RS-232)
D+ / D- / GND.ISO — COM3 (RS-485)
D+ / D- / GND.ISO — COM4 (RS-485)

■ Ordering Information

PMC-2841M CR	Advanced IIoT Power Meter Concentrator (Metal casing)
PMC-2841M-4GE CR	Advanced IIoT Power Meter Concentrator (Metal casing; Built-in 4G Wireless module; Frequency Band for EMEA, Korea, Thailand, India and Taiwan; **Asia only**)
PMC-2841M-4GC CR	Advanced IIoT Power Meter Concentrator (Metal casing; Built-in 4G Wireless module; Frequency Band for China; **Asia only**)