

# IoT Cloud Software -IoTstar



**Easy to use**

**No programming**

# IoT Cloud Software - IoTstar

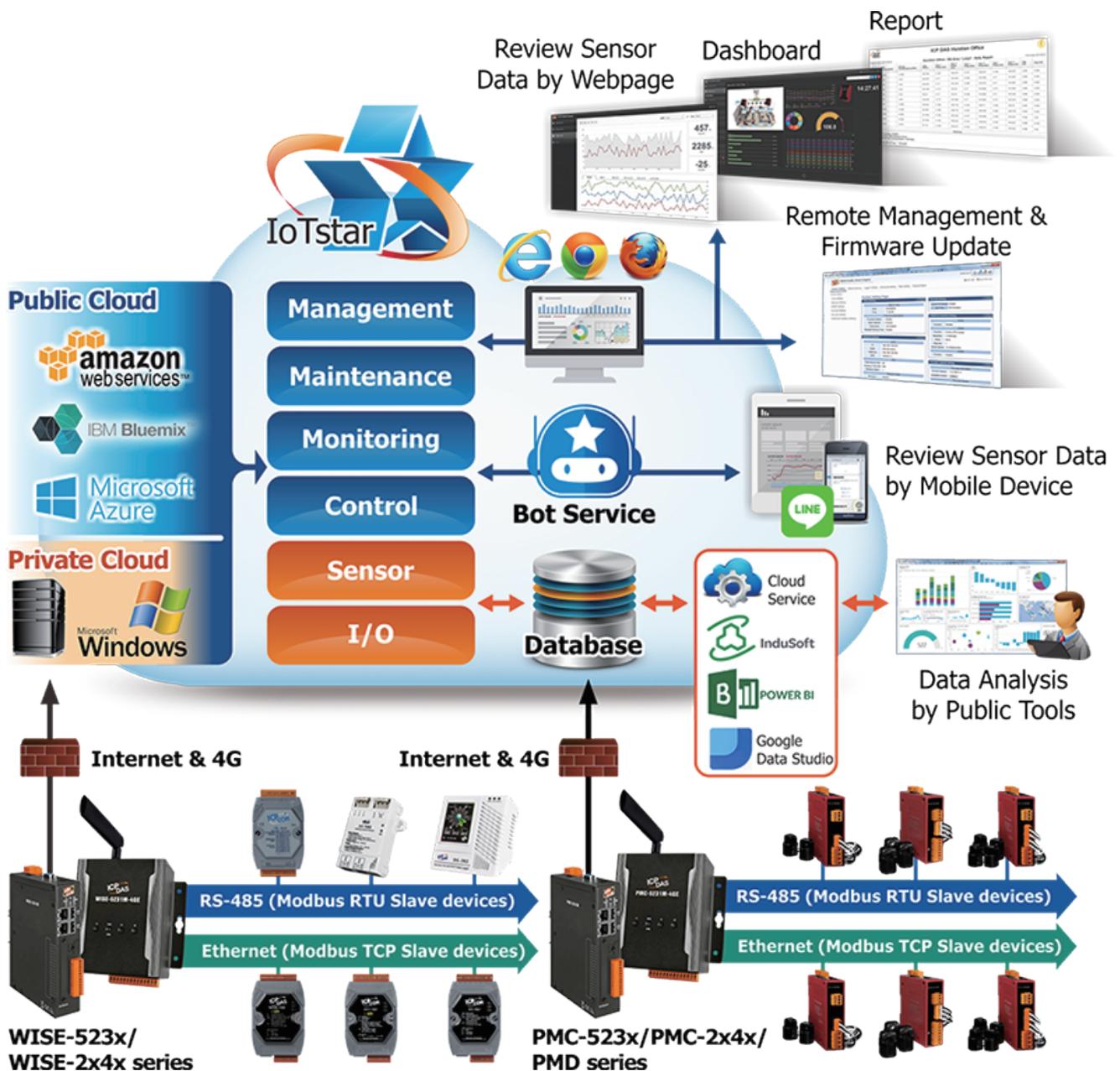
## Introduction

IoTstar is a software developed by ICP DAS for WISE/PMC/PMD controllers in a variety of Industrial IoT applications. IoTstar can be installed on a general PC platform and works as a Private IoT Cloud system, or on the VM (Virtual Machine) platform of Microsoft Azure, IBM Bluemix, Google Cloud or Amazon AWS, etc. and works as a Public IoT Cloud system. Using IoTstar to build the IoT Cloud system, it can provide the following services:



During the IoT Cloud system development, there is no-programming-required, and the system setting can be completed through the web interface. In addition, through the SQL command, IoTstar can be quickly integrated with the Cloud platforms, data analysis tools (Power BI, Google Data Studio or SCADA system etc.) to help users quickly build the "IoT + Big Data" Cloud application and significantly reduce the time and cost in implementing the "IoT + Big Data" Cloud application.

## System Architecture



## Features

### Support Flexible installation environment to quickly set up IoT Cloud system

According to the needs of the field site, the installation environment can be flexibly selected.

IoTstar can be installed on the VM (Virtual Machine) platform of the Public Cloud platform such as: Microsoft Azure, IBM Bluemix, Google Cloud or Amazon AWS to implement the Public IoT Cloud system on WISE/PMC/PMD controllers. It can reduce the loading for maintaining the IoT Cloud operating environment.



If the user concerns about the environment of the system operation or data storage, the IoTstar can also be installed on a private Windows PC (Windows 7/8/10, Windows Server) to implement the Private IoT Cloud solutions on the WISE/PMC/PMD controllers, and then the user can manage the environment by himself.

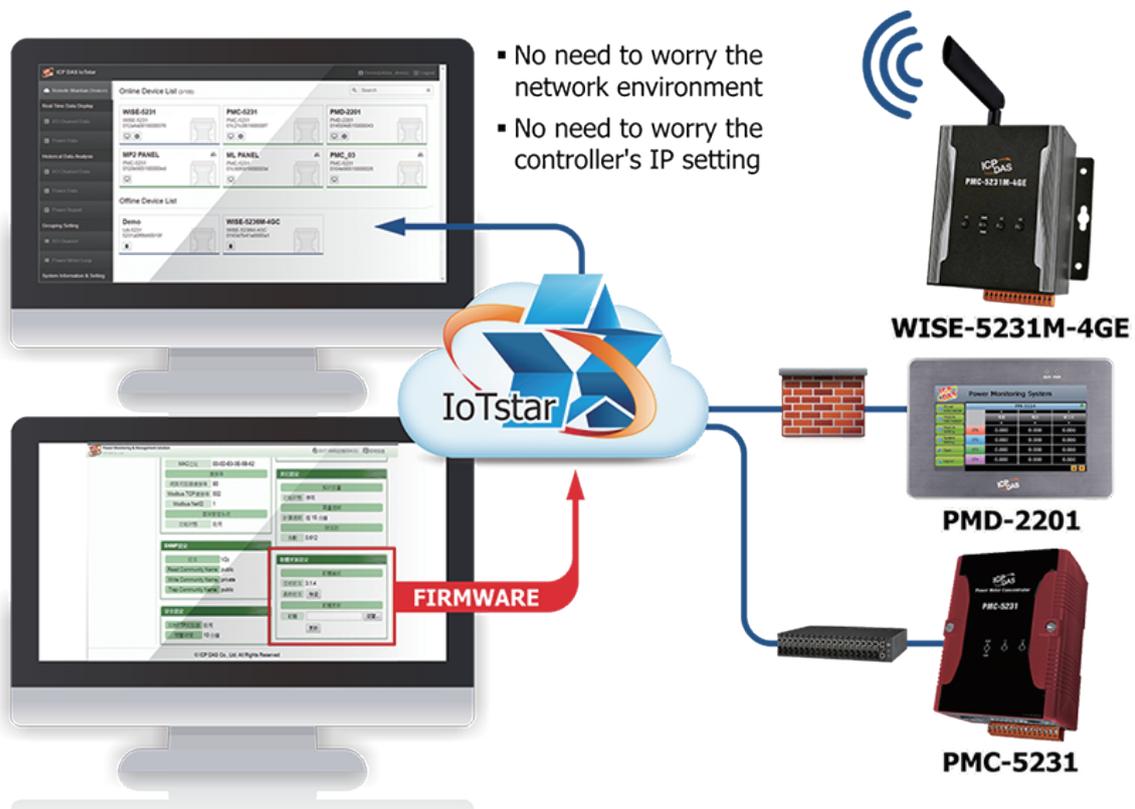
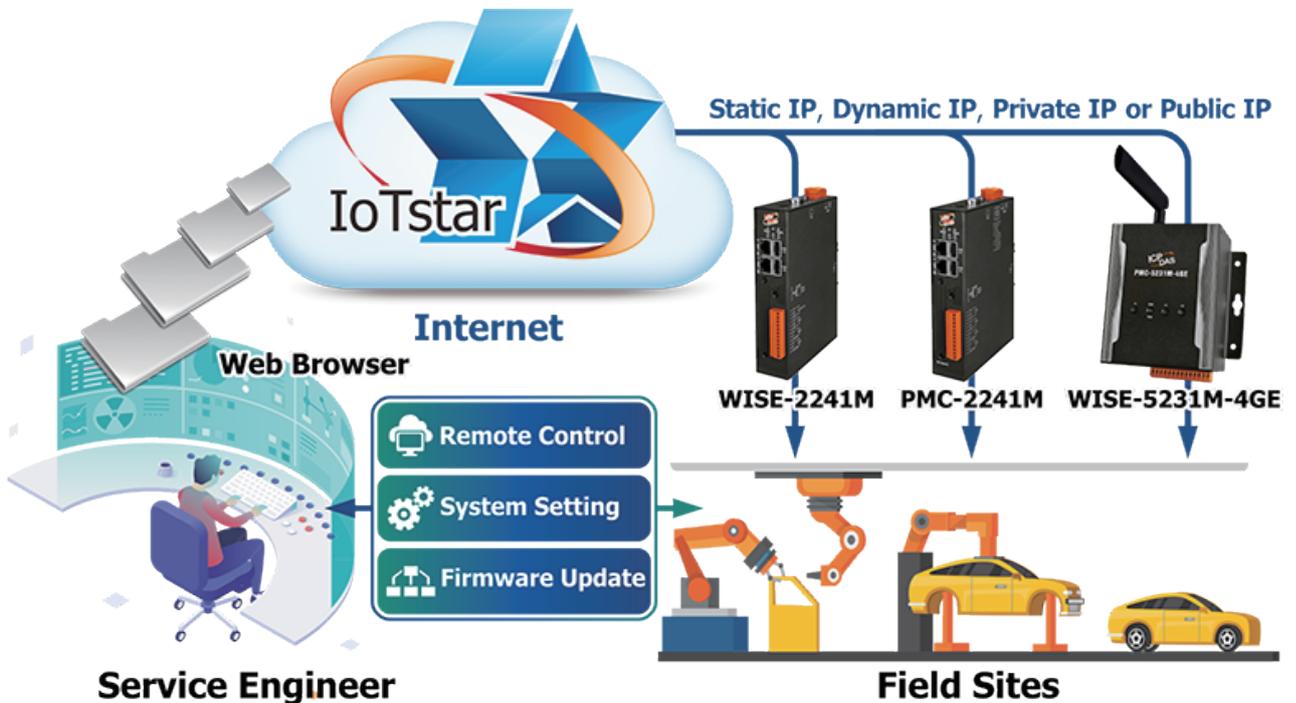
### No more programming! Use a Browser to set up the IoT Cloud system

Only by a few clicks on Web page of IoTstar and WISE/PMC/PMD controller to complete the setting of IoT Cloud system.



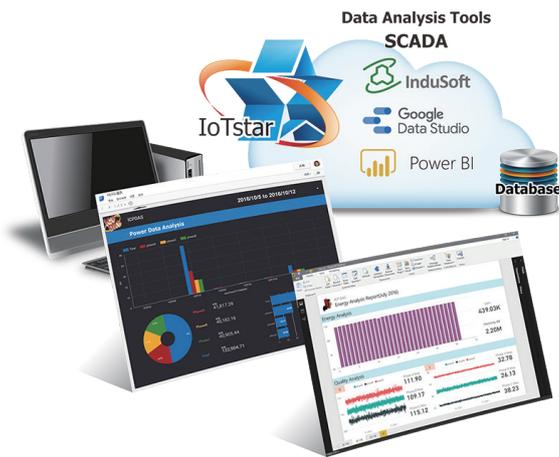
## ■ Controller Remote Access/Maintenance Service

With IoTstar, users do not need to worry about the network environment of the WISE/PMC/ PMD controller, whether the controller uses the static IP, dynamic IP, virtual IP or physical IP, the user can perform the status monitoring, system setting adjusting, and update the firmware of the controllers through the web interface provided by IoTstar. It can reduce the time and cost of personnel travel due to performing the maintenance operations of controllers.



## ■ Sensor Data Collection Service

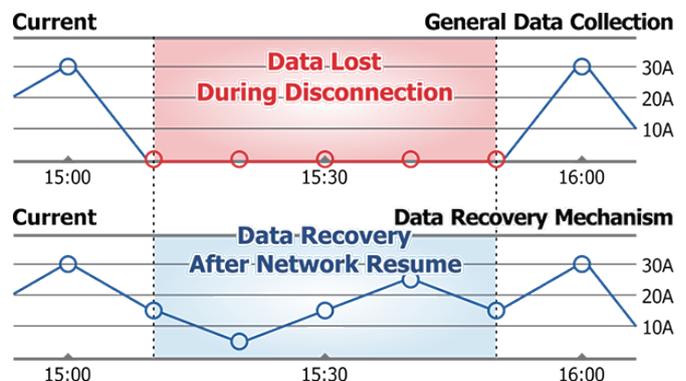
With IoTstar, the Sensor Data Collection Service can be performed to collect the Historical and Real-Time sensor data (and/or Power data) from the WISE/PMC/PMD controllers, and import the data to the Database in the Cloud. The users can quickly setup the Data Lake for the IoT and Big Data applications. The users can also modify the data in the database to change the status of the DO/AO channel of the sensor connected to controllers through the SQL command.



With the support of SQL command interface, the sensor data stored by IoTstar can be connected easily with the third-party data analysis tools (such as: Power BI, Google Data Studio, SCADA system), and ERP/MES systems. It can assist user to integrate the OT(Operational Technology) and IT(Information Technology) systems quickly and seamlessly, so that comprehensive and complete information regarding system operations can be collected with ease.

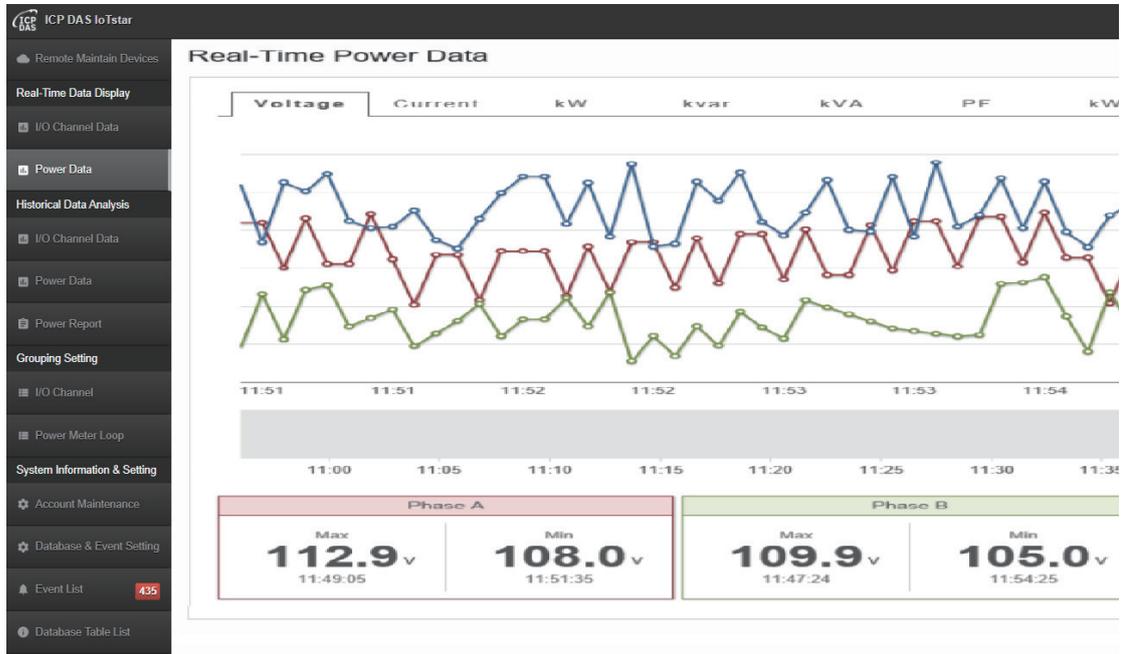
## ■ Sensor Data Recovery Mechanism

For general data collection, the sensor data will be sent to the control center and imported into the Database at cloud. But when the network experience a disconnection, the data transmitted during the disconnection period will be lost. "IoTstar (with WISE/PMC/PMD)" supports the Sensor Data Recovery Mechanism. When experiences network disconnection, all data will be stored in the SD cards in WISE/PMC/PMD. And when the network return to normal status, the data stored in SD card will be re-sent to IoTstar, and imported into Database to ensure the integrity of historical data.



## ■ Sensor Data Visualization Service

With the built-in standard web page of IoTstar, user can directly query and review the real-time or historical sensor data (and/or Power data) collected from the WISE/PMC/PMD controllers.



IoTstar also provides IoTstar Dashboard Service package. Through the Dashboard editor and a variety of Widget components provided by IoTstar, user can quickly setup the Dashboard page for the Real-Time sensor data (and Power data) collected from the WISE/PMC/PMD controllers according to their needs to review the operation status of the application system in real time.



## ■ Sensor Data Report Service

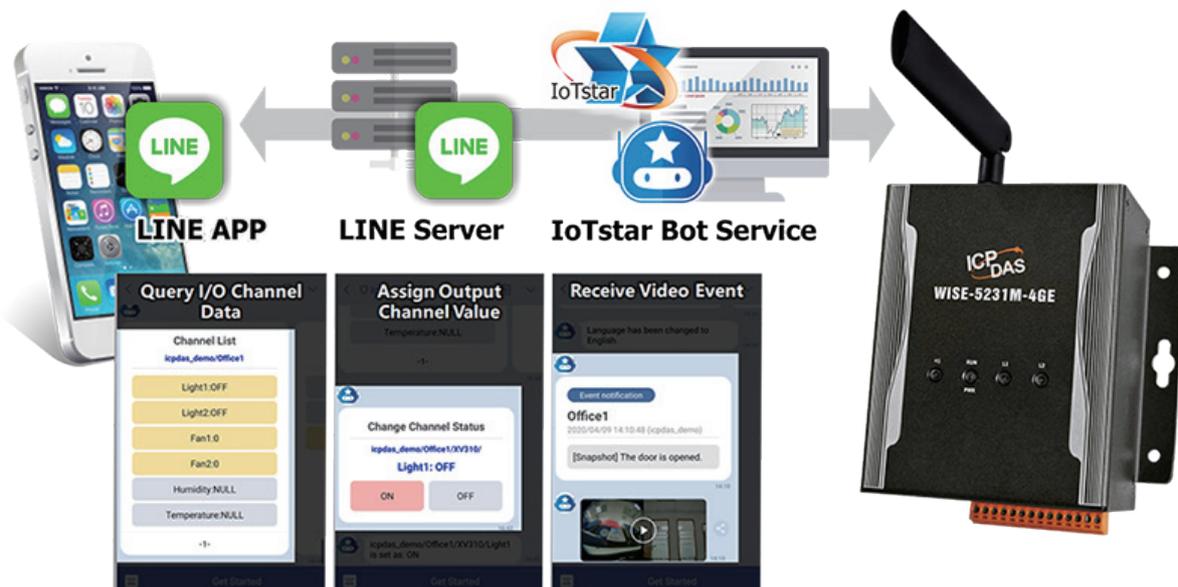
IoTstar features IoTstar Report Service which provides statistic report service for the sensors connected to WISE/PMC/PMD controllers. By using IoTstar Report Service, the data measured by the sensors can be converted into valuable statistical reports, so that the statistical reports of the operation status of the machines, equipment and facilities monitored by WISE/PMC/PMD controllers can be provided as the basis for making decisions, avoid biases and blind spots in decision-making.

Power meter loop report PMC-5231(Xindian office) / PM-4324-MTCP(Power meter of Area A) / Loop1(wall socket 1)

| Day  | Week            | Month                   | Quarter    | Year              | >                 | Single Mode       | >                 | Today             | 2021/10/19        | >        | Data Shown | Template Management | Download PDF | Download Excel |
|--|-----------------|-------------------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------|------------|---------------------|--------------|----------------|
| Time   | Max. Demand(kW) | Energy Consumption(kWh) | Avg. PF(%) | Avg. I Phase A(A) | Avg. V Phase A(V) | Avg. I Phase B(A) | Avg. V Phase B(V) | Avg. I Phase C(A) | Avg. V Phase C(V) | Avg. kVA | Avg. kvar  |                     |              |                |
| 0  | 0.05            | 0.05                    | 89.713     | 0.169             | 110.354           | 0.169             | 110.35            | 0.17              | 110.358           | 0.055    | 0.024      |                     |              |                |
| 1  | 0.05            | 0.05                    | 89.566     | 0.169             | 110.557           | 0.168             | 110.553           | 0.169             | 110.562           | 0.056    | 0.025      |                     |              |                |
| 2  | 0.05            | 0.05                    | 89.562     | 0.169             | 110.776           | 0.169             | 110.771           | 0.17              | 110.78            | 0.056    | 0.025      |                     |              |                |
| 3  | 0.05            | 0.05                    | 89.628     | 0.17              | 110.975           | 0.17              | 110.972           | 0.17              | 110.982           | 0.056    | 0.025      |                     |              |                |
| 4  | 0.051           | 0.05                    | 89.375     | 0.17              | 111.112           | 0.169             | 111.108           | 0.17              | 111.118           | 0.056    | 0.025      |                     |              |                |
| <b>Summary</b>   |                 |                         |            |                   |                   |                   |                   |                   |                   |          |            |                     |              |                |
| Daily Highest Usage: 0.051kW<br>Occurrence Time: 2021-10-19 04:59:00<br>Daily Total Electricity Consumption: 0.41kWh |                 |                         |            |                   |                   |                   |                   |                   |                   |          |            |                     |              |                |

## ■ Bot Service on Controller by using Mobile Device

IoTstar provides IoTstar Bot Service package for two-way message interactions between the WISE/PMC/PMD controller managed by IoTstar and LINE chat rooms. Users can query the real-time sensor data (and/or Power data) collected from the WISE/PMC/PMD controllers and be able to change the value of DO/AO output channels anytime and anywhere by LINE App. In addition, with the ICP DAS iCAM IP Camera, it can also receive the video recording events on the application site, so that the users can review the operating status of the equipment through their mobile phones even they are not close by.



## ■ Software package support (Optional package for IoTstar, 90 days free trial)

### ■ IoTstar Dashboard Service

IoTstar Dashboard Service is an optional software package for IoTstar that provides users the Dashboard editor and a variety of Widget components. Based on the functions the IoTstar Dashboard Service provides, users can setup the Dashboard pages to review the real-time sensor data (or Power data) from the Sensor and Power Meter connected to WISE/PMC/PMD controllers, and it can also change the values of the DO/AO output channels of the Sensor (or power meters) connected to WISE/PMC/PMD controllers immediately.



## Features

- Provide Dashboard editor for user to edit a specific Dashboard pages flexibly.
- Provide a variety of built-in Widgets to display the sensor data (or power data) in different formats.
- Display the sensor data (or power data) in real-time, and the status of output channels also can be changed.
- Support "Dark Mode" to turn the browser to dark for better visibility during night time.
- Receive on-site snapshots or video files sent by the controller. User can browse and review the snapshots or video files received by IoTstar (For the sending of on-site snapshots or video files, please use WISE with iCAM IP camera).
- Provide Rich Content Widget (WYSIWYG editor), and allow user to edit the content of the Widget by himself (Such as import HTML code, text, Webpage, image, video file, etc.).

## Examples of Dashboard



Example of Air quality monitoring (Using Line Chart, Gauge, Plot Bar, Value Table, Value Label Overlay widgets).

Example of Power monitoring (Using Line Chart, Value, Value Output and Rich Content widgets).

## Widget provided:



Line Chart



Bar Chart



Pie Chart



Gauge



Plot Bar



Value



Value Table



Value Label Overlay



Value Output (Slider)



Value Output (Button)



Video Event List



Time Clock



Countdown Timer



Map



Rich Content



Example of Environmental monitoring (Using Line Chart, Value, Value Output, Map and Video Event List widgets).

## ■ IoTstar Bot Service (Supported LINE App)

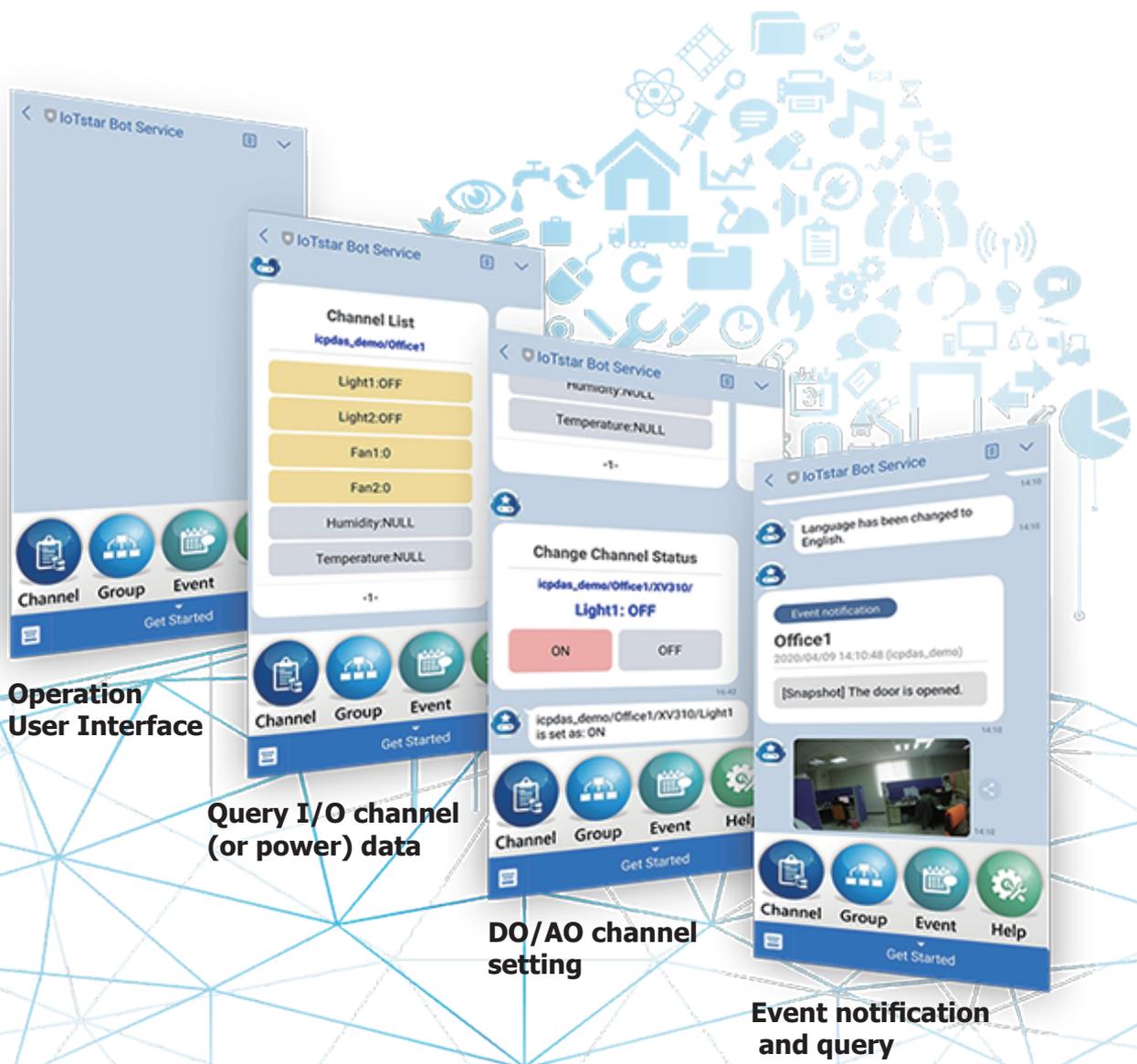
IoTstar Bot Service is an optional software package for IoTstar that provides users two-way message interactions between the WISE/PMC/PMD controller managed by IoTstar and LINE chat rooms. IoTstar Bot Service provides an easier and convenient mechanism for user to manage his/her remote controllers with LINE App. It does not like the traditional Chatbot which get the information or service by entering the text message; it provides a friendly user interface that includes buttons and dialogue menu to perform the monitoring of remote controllers in an easy way.

With IoTstar Bot Service, users can query the real-time I/O Channel data (or power data) of the on-site I/O modules or power meters and be able to change the value of DO/AO output channels anytime and anywhere. IoTstar Bot Service also provides functions to receive, store, and query the event messages. The controllers can be triggered to send event messages to IoTstar Bot Service by IF-THEN-ELSE rules. After IoTstar Bot Service receive these event messages, it would process and send them to relative LINE users for real-time alarm notification.



## Features

- Monitor WISE/PMC/PMD controllers anytime and anywhere by LINE App.
- Query real-time I/O channel (power meter) data and change output channels.
- Receive real-time event messages with text, pictures or videos (WISE can work with the iCAM IP camera to send the picture or video files).
- Review and query the historical event messages.
- Secure and reliable communication mechanism between LINE and controllers.
- Easy to Maintain; only need the upgrade of LINE App.



**Operation User Interface**

**Query I/O channel (or power) data**

**DO/AO channel setting**

**Event notification and query**

## ■ IoTstar Report Service

IoTstar Report Service is an optional software package for IoTstar that provides statistic report service for the sensors connected to WISE/PMC/PMD controllers. By using IoTstar Report Service, the data measured by the sensors can be converted into valuable statistical reports, so that the statistical reports of the operation status of the machines, equipment and facilities monitored by WISE/PMC/PMD can be provided as basis for making decisions, avoid biases and blind spots in decision-making.

### Features

- Provide a variety types of statistical reports for sensors and power meters.
- In addition to the report for single I/O channel (or power meter loop), it also provides the report for group of I/O channels (or power meter loops).
- Support the query of the "Daily/Weekly/Monthly/Quarterly/Yearly" statistical report with customized date.
- Provide data comparison function for comparing values of I/O channel (or power meter loop).
- Built-in editor for users to flexibly edit the report content (header and footer) to create desired report format.
- PDF & Excel file format supported for report output.

### Examples of the function provided:

Power meter loop report

PMC-5231(Xindian office) / PM-4324-MTCP(Power meter of Area A) / Loop1(wall socket 1)

| Day   | Week            | Month                   | Quarter    | Year              | >                 | Single Mode       | >                 | Today             | 2021/10/19        | >        | Data Shown | Template Management | Download PDF | Download Excel |
|---|-----------------|-------------------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------|------------|---------------------|--------------|----------------|
| Time  | Max. Demand(kW) | Energy Consumption(kWh) | Avg. PF(%) | Avg. I Phase A(A) | Avg. V Phase A(V) | Avg. I Phase B(A) | Avg. V Phase B(V) | Avg. I Phase C(A) | Avg. V Phase C(V) | Avg. kVA | Avg. kvar  |                     |              |                |
| 0   | 0.05            | 0.05                    | 89.713     | 0.169             | 110.354           | 0.169             | 110.35            | 0.17              | 110.358           | 0.055    | 0.024      |                     |              |                |
| 1   | 0.05            | 0.05                    | 89.566     | 0.169             | 110.557           | 0.168             | 110.553           | 0.169             | 110.562           | 0.056    | 0.025      |                     |              |                |
| 2   | 0.05            | 0.05                    | 89.562     | 0.169             | 110.776           | 0.169             | 110.771           | 0.17              | 110.78            | 0.056    | 0.025      |                     |              |                |
| 3   | 0.05            | 0.05                    | 89.628     | 0.17              | 110.975           | 0.17              | 110.972           | 0.17              | 110.982           | 0.056    | 0.025      |                     |              |                |
| 4   | 0.051           | 0.05                    | 89.375     | 0.17              | 111.112           | 0.169             | 111.108           | 0.17              | 111.118           | 0.056    | 0.025      |                     |              |                |
| <b>Summary</b>  |                 |                         |            |                   |                   |                   |                   |                   |                   |          |            |                     |              |                |
| Daily Highest Usage: 0.051kW<br>Occurrence Time: 2021-10-19 04:59:00<br>Daily Total Electricity Consumption: 0.41kW |                 |                         |            |                   |                   |                   |                   |                   |                   |          |            |                     |              |                |

▲ Report for "Power Meter Loop"

Power meter loop group report

PM Group

| Day  | Week                                       | Month                                      | Quarter                                    | Year                                       | >  | Today                                      | 2021/10/19 | > | Loop Comparison | > | Max. Demand(kW) | Template Management | Download PDF | Download Excel |
|--|--|--|--|--|--|--|------------|---|-----------------|---|-----------------|---------------------|--------------|----------------|
| Time                                       | Xindian office Power meter of Area B Loop1 | Xindian office Power meter of Area A Loop2 | Xindian office Power meter of Area A Loop3 | Xindian office Power meter of Area A Loop5 | Xindian office Power meter of Area A Loop6 | Xindian office Power meter of Area A Loop7 |            |   |                 |   |                 |                     |              |                |
| 0  | 0  | 0  | 0  | 0  | 0  | 0  |            |   |                 |   |                 |                     |              |                |
| 1  | 0  | 0  | 0  | 0  | 0  | 0  |            |   |                 |   |                 |                     |              |                |
| 2  | 0  | 0  | 0  | 0  | 0  | 0  |            |   |                 |   |                 |                     |              |                |
| 3  | 0  | 0  | 0  | 0  | 0  | 0.051                                      |            |   |                 |   |                 |                     |              |                |
| 4  | 0  | 0  | 0  | 0  | 0  | 0.051                                      |            |   |                 |   |                 |                     |              |                |
| <b>Summary</b>                             |  |  |  |  |  |  |            |   |                 |   |                 |                     |              |                |
| Daily electricity consumption of each loop | 0  | 0  | 0  | 0  | 0  | 0.416                                      |            |   |                 |   |                 |                     |              |                |
| Daily Total Electricity Consumption        | 0.416                                      |  |  |  |  |  |            |   |                 |   |                 |                     |              |                |

▲ Report for "Power Meter Loop Group (Loop Comparison mode)"

I/O Channel report

PMC-5231(Xindian office) / DL-1023(Air quality for factory) / AI2(PM2.5)

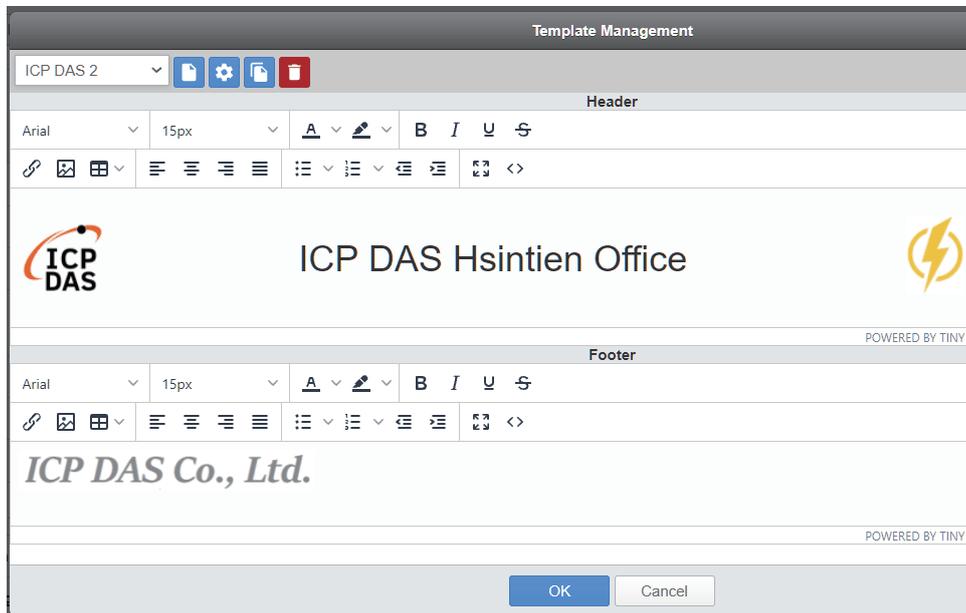
Day Week Month Quarter Year > Single Mode > Today 2021/10/19 > Data Shown > [Template Management](#) [Download PDF](#) [Download Excel](#)

| Time | Maximum(ug/m3) | Minimum(ug/m3) | Average(ug/m3) | Final Value(ug/m3) | Total Value(ug/m3) |
|------|----------------|----------------|----------------|--------------------|--------------------|
| 0    | 1              | 0              | 0.283          | 0                  | 17                 |
| 1    | 1              | 0              | 0.116          | 0                  | 7                  |
| 2    | 1              | 0              | 0.118          | 1                  | 7                  |
| 3    | 1              | 0              | 0.066          | 0                  | 4                  |
| 4    | 1              | 0              | 0.083          | 0                  | 5                  |

**Summary**

|   |   |   |
|---|---|---|
| Daily maximum: 1 ug/m3<br>Time of maximum daily value occurs: 2021-10-19 00:01:00 | Daily minimum: 0 ug/m3<br>Time of minimum daily value occurs: 2021-10-19 00:00:00 | Daily average: 0.098 ug/m3<br>Daily total value: 49 ug/m3 |
|---|---|---|

▲ Report for "I/O Channel"



▲ "Template Management (Editing for Report header and footer)" of Report



## ICP DAS Hsintien Office



Report Date: 2021/09/29

### Hsintien Office / RD Area / Loop1 - Daily Report

Print Date: 2021/09/29

| Time | Max. Demand(kW) | Energy Consumption(kWh) | Avg. PF(%) | Avg. I Phase A(A) | Avg. V Phase A(V) | Avg. I Phase B(A) | Avg. V Phase B(V) | Avg. I Phase C(A) | Avg. V Phase C(V) | Avg. kVA | Avg. kvar |
|------|-----------------|-------------------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------|-----------|
| 0    | 0.049           | 0.049                   | 89.708     | 0.167             | 109.391           | 0.167             | 109.387           | 0.168             | 109.397           | 0.055    | 0.024     |
| 1    | 0.05            | 0.05                    | 89.397     | 0.17              | 110.203           | 0.169             | 110.199           | 0.17              | 110.209           | 0.056    | 0.025     |
| 2    | 0.05            | 0.05                    | 89.244     | 0.17              | 110.278           | 0.169             | 110.274           | 0.17              | 110.284           | 0.056    | 0.025     |
| 3    | 0.05            | 0.05                    | 89.196     | 0.171             | 110.45            | 0.17              | 110.446           | 0.171             | 110.456           | 0.056    | 0.025     |

**Summary**

Daily Highest Usage: 0.05kW  
Occurrence Time: 2021-09-29 03:18:00  
Daily Total Electricity Consumption: 0.527kWh

*ICP DAS Co., Ltd.*

▲ Report Download (PDF file format)

## Applications

### Monitoring and maintenance of devices in a factory

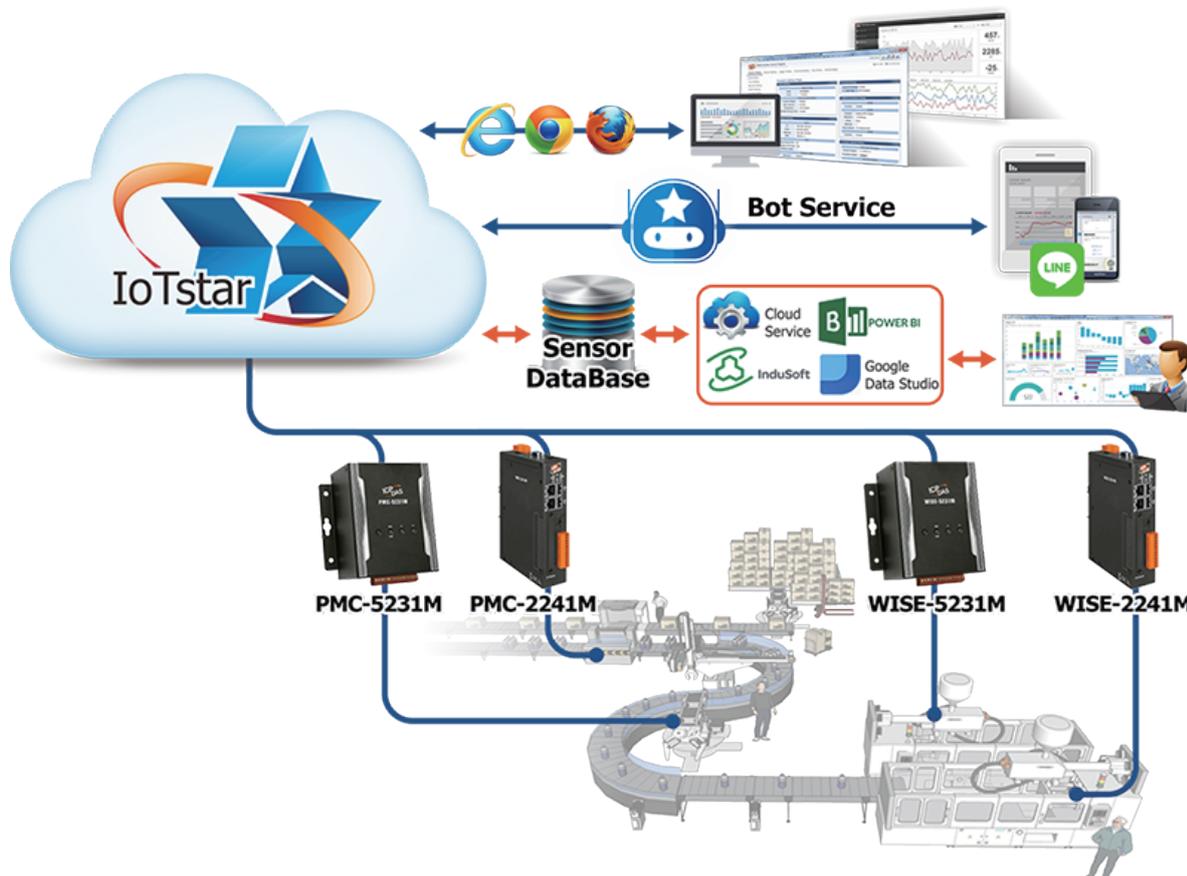
ICP DAS "IoTstar with WISE/PMC" solution meets the key concept of "Smart Factory" as "Collect information of devices in factory " and "Real-time management the settings of devices in the factory". Therefore it is perfect for use to achieve the goal of production capacity optimization of "Smart Factory", and brings the following benefits:

#### Collect the information of devices in the factory

- ✓ From the collection of operation information of devices to the import of the information into the Database, there is no need to write program during the whole process. The settings can be completed by a few clicks on a general Browser.
- ✓ Quickly integrate OT and IT systems via the SQL command interface to provide comprehensive and complete operation information of the devices.
- ✓ Analyze the sensor data from the devices, and take the corresponding action in advance to ensure the stable operation of the devices.

#### Real-time monitoring and adjusting the settings of the devices in the factory

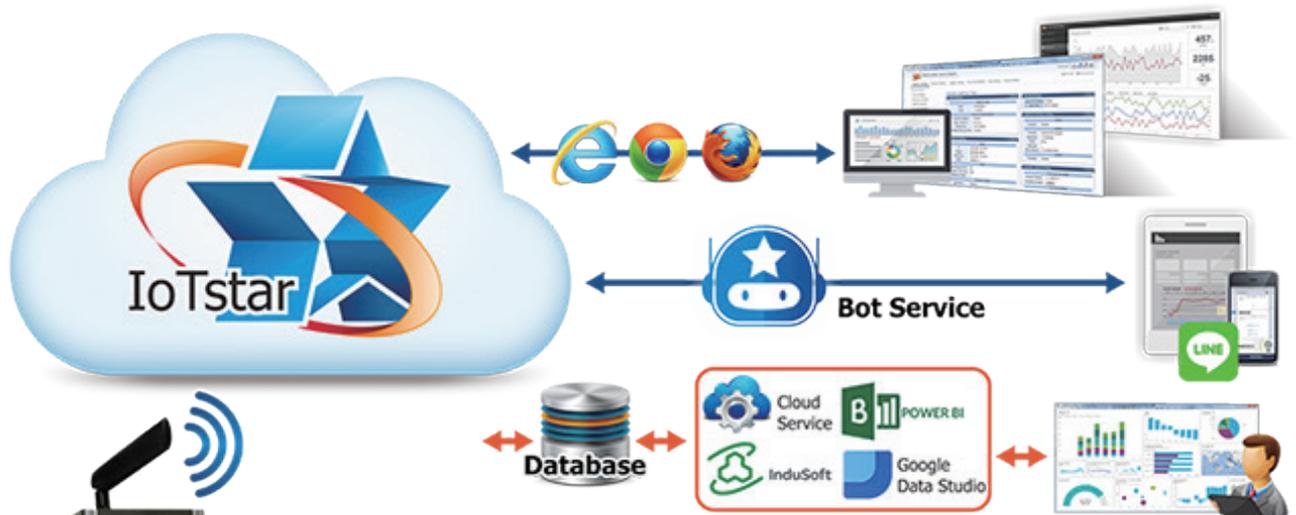
- ✓ Use IoTstar Dashboard Service and IoTstar Bot Service to query and review the operating status of the devices in real time.
- ✓ IoTstar Remote Access Service provide the status monitoring, system setting adjustment and firmware update for the devices (WISE/PMC controller). It can reduce the time and cost of personnel travel due to performing the maintenance operations of the equipment.



## ■ Environment Monitoring

ICP DAS "IoTstar with WISE/PMC" solution features the following benefits and is perfect for use in an Environment monitoring system:

- From the collection of sensor data of the Environment monitoring to the import of the data into the database, there is no need to write program during the whole process. The settings can be completed by a few clicks on a general Browser.
- Quickly integrate OT and IT systems via the SQL command interface to provide comprehensive and complete environmental monitoring information.
- Analyze sensor data from the Environment monitoring system, and take the corresponding action in advance to prevent the "environmental pollution".
- Use IoTstar Dashboard Service and IoTstar Bot Service to query and review the status of environmental monitoring system in real time.
- IoTstar Remote Access Service provide the status monitoring, system setting adjustment and firmware update for the environmental monitoring facility (WISE/PMC controller). It can reduce the time and cost of personnel travel due to performing the maintenance operations of the facility.



## Urban Water Drainage System

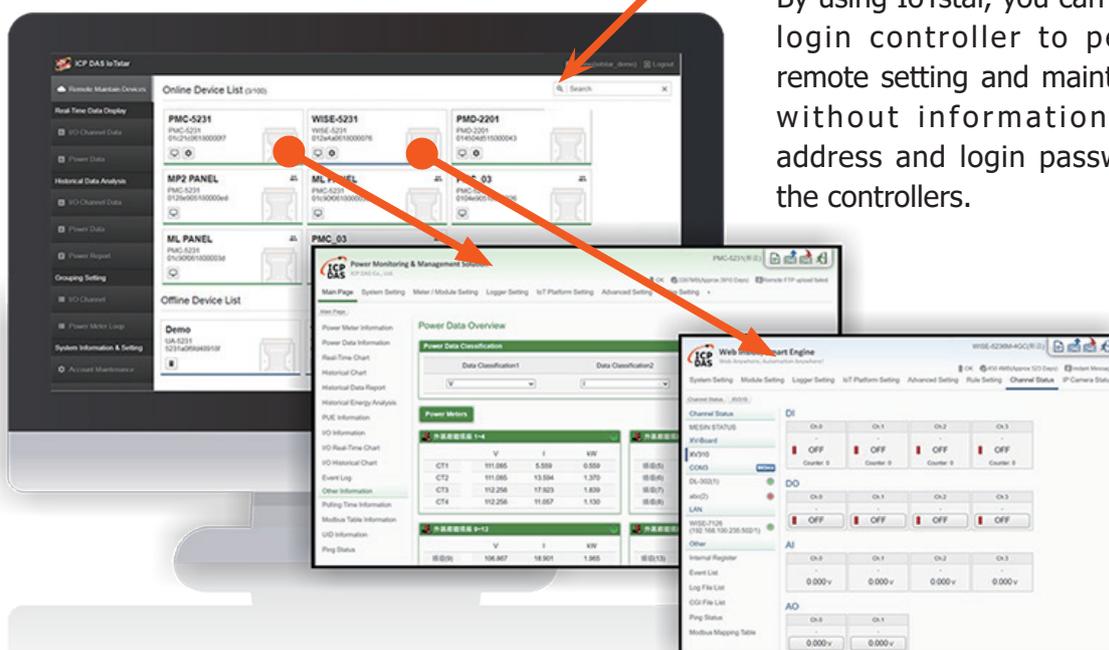
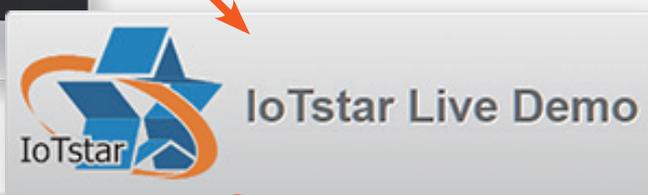
WISE-5231M-4GE



## IoTstar Live Demo (iotstar.icpdas.com)

IoTstar Live Demo allows users to fully experience the function of IoTstar, such as:

- Provide Sensor data visualization dashboard.
- Real-Time and Historical sensor data query and display.
- Provide Sensor data Statistical report
- Query and display video/image event
- Remote setting and maintenance for controller.



By using IoTstar, you can directly login controller to perform remote setting and maintenance without information of IP address and login password of the controllers.

## Controller Supported List

| Controller Type | Model                           |
|-----------------|---------------------------------|
| WISE Series     | WISE-523x, WISE-224x, WISE-284x |
| PMC Series      | PMC-523x, PMC-224x, PMC-284x    |
| PMD Series      | PMD-220x, PMD-420x              |

### I/O Module Specification for WISE Controller

| I/O Module Specification   |                        | Description  | Max. Connection Allowed   |
|----------------------------|------------------------|--|---|
| I/O Module for Local site  | Local Bus              | ICP DAS: XV-Board series module  | 1   |
| I/O Module for Remote site | DCON by RS-485         | ICP DAS : I-7000/DL series module  | COM3 and COM4 can connect up to 16 modules individually.                              |
|                            | Modbus RTU by RS-485   | ICP DAS : M-7000/tM/DL/LC/IR series module<br>Others : modules that support Modbus RTU Slave Protocol              |   |
|                            | Modbus TCP by Ethernet | ICP DAS : WISE-7100/(P)ET-7000/DL/WF-2000 series module<br>Others : modules that support Modbus TCP Slave Protocol | LAN interface can connect up to 16 modules.   |
| IP Camera                  |                        | ICP DAS : iCAM series module   | LAN interface can connect up to 4 cameras (WISE-523x/224x) or 12 cameras (WISE-284x). |

### List of Supported I/O Modules for WISE Controller

| Function             |                           | Module List  |
|----------------------|---------------------------|--|
| <b>I-7000 Module</b> |                           |  |
| AI/AO                | Voltage & Current         | I-7012, I-7012D, I-7012F, I-7012FD, I-7017, I-7017F, I-7017R, I-7017C, I-7017FC, I-7017RC, I-7017R-A5, I-7017Z |
|                      | Thermocouple              | I-7011, I-7011D, I-7011P, I-7011PD, I-7018, I-7018P, I-7018R, I-7018Z, I-7019R                                 |
|                      | RTD                       | I-7013, I-7013D, I-7015, I-7015P, I-7033, I-7033D  |
|                      | Thermistor                | I-7005   |
|                      | Transmitter               | I-7014D  |
|                      | Strain Gauge              | I-7016, I-7016D, I-7016P, I-7016PD   |
|                      | Analog Output             | I-7021, I-7021P, I-7022, I-7024, I-7024R   |
| DI/DO                | DC Digital Input          | I-7041, I-7041D, I-7041P, I-7041PD, I-7051, I-7051D, I-7052, I-7052D, I-7053_FG, I-7053D_FG                    |
|                      | AC Digital Input          | I-7058, I-7058D, I-7059, I-7059D   |
|                      | DC Digital Output         | I-7042, I-7042D, I-7043, I-7043D, I-7045, I-7045D, I-7045-NPN, I-7045D-NPN                                     |
|                      | DC Digital Input & Output | I-7044, I-7044D, I-7050, I-7050D, I-7050A, I-7050AD, I-7055, I-7055D, I-7055-NPN, I-7055D-NPN                  |
| Relay Output         | Power Relay Output        | I-7060, I-7060D, I-7061, I-7061D, I-7063, I-7063D, I-7065, I-7065D, I-7067, I-7067D                            |
|                      | Solid State Relay Output  | I-7063A, I-7063AD, I-7063B, I-7063BD, I-7065A, I-7065AD, I-7065B, I-7065BD                                     |
|                      | Photomos Relay Output     | I-7066, I-7066D  |
| Others               | Counter/Frequency         | I-7080, I-7080D, I-7080B, I-7080BD, I-7088, I-7088D  |

| Function                 |                           | Module List  |
|--------------------------|---------------------------|--|
| <b>M-7000 Module</b>     |                           |  |
| AI/AO                    | Voltage & Current         | M-7017, M-7017C, M-7017R, M-7017R-A5, M-7017RC, M-7017Z  |
|                          | Thermocouple              | M-7011, M-7011D, M-7018, M-7018R, M-7018Z, M-7019R, M-7019Z  |
|                          | RTD                       | M-7015, M-7015P  |
|                          | Thermistor                | M-7005   |
|                          | Strain Gauge              | M-7016, M-7016D  |
|                          | Analog Output             | M-7022, M-7024, M-7024R, M-7024L, M-7028, M-7028D  |
|                          | RMS Input                 | M-7017RMS  |
| DI/DO                    | DC Digital Input          | M-7041, M-7041D, M-7041P, M-7041PD, M-7041-A5, M-7041D-A5, M-7046, M-7046D, M-7051, M-7051D, M-7052, M-7052D, M-7053, M-7053D            |
|                          | AC Digital Input          | M-7058, M-7058D, M-7059, M-7059D   |
|                          | DC Digital Output         | M-7043, M-7043D, M-7045, M-7045D, M-7045-NPN, M-7045D-NPN  |
|                          | DC Digital Input & Output | M-7050, M-7050D, M-7055, M-7055D, M-7055-NPN, M-7055D-NPN  |
| Relay Output             | Power Relay Output        | M-7060, M-7060D, M-7060P, M-7060PD, M-7061, M-7061D, M-7064, M-7064D, M-7065, M-7065D, M-7067, M-7067D, M-7068, M-7068D, M-7069, M-7069D |
|                          | Solid State Relay Output  | M-7065B, M-7065BD  |
|                          | Photomos Relay Output     | M-7066P, M-7066PD  |
| Others                   | Counter/Frequency         | M-7080, M-7080D, M-7080B, M-7080BD, M-7084, M-7088, M-7088D  |
|                          | Multi-Function            | M-7002, M-7003, M-7024U, M-7024UD, M-7026  |
| <b>tM Module</b>         |                           |  |
| AI/AO                    | Voltage & Current         | tM-AD2, tM-AD5, tM-AD5C, tM-AD8, tM-AD8C   |
|                          | Thermistor                | tM-TH8   |
| DI/DO                    | DC Digital Input          | tM-P8  |
|                          | DC Digital Output         | tM-C8  |
|                          | DC Digital Input & Output | tM-P4A4, tM-P4C4   |
| Relay Output             | Power Relay Output        | tM-P3R3, tM-R5   |
|                          | Photomos Relay Output     | tM-P3POR3  |
| Others                   | Multi-Function            | tM-DA1P1R1, tM-AD4P2C2   |
| <b>(P)ET-7000 Module</b> |                           |  |
| AI/AO                    | Voltage & Current         | (P)ET-7017, (P)ET-7217, (P)ET-7017-10, (P)ET-7217-10   |
|                          | Thermocouple              | (P)ET-7018Z, (P)ET-7019Z, (P)ET-7218Z, (P)ET-7219Z   |
|                          | RTD                       | (P)ET-7015, (P)ET-7215   |
|                          | Thermistor                | (P)ET-7005   |
| DI/DO                    | DC Digital Input          | (P)ET-7051, (P)ET-7053, (P)ET-7251, (P)ET-7253   |
|                          | DC Digital Output         | (P)ET-7042, (P)ET-7242   |
|                          | DC Digital Input & Output | (P)ET-7044, (P)ET-7050, (P)ET-7052, (P)ET-7244, (P)ET-7250A, (P)ET-7252, (P)ET-7255  |
| Relay Output             | Power Relay Output        | (P)ET-7060, (P)ET-7067, (P)ET-7260, (P)ET-7261, (P)ET-7267   |
|                          | Photomos Relay Output     | (P)ET-7065, (P)ET-7066   |
| Others                   | Multi-Function            | (P)ET-7002, (P)ET-7016, (P)ET-7024, (P)ET-7026, (P)ET-7202, (P)ET-7224, (P)ET-7226   |

| Function   |                                       | Module List  |
|--|---------------------------------------|--|
| <b>t(P)ET Module</b>   |                                       |  |
| DI/DO  | DC Digital Input                      | t(P)ET-P6, t(P)ET-PD6                                |
|  | DC Digital Output                     | t(P)ET-C4, t(P)ET-A4                                 |
|  | DC Digital Input & Output             | t(P)ET-P2C2, t(P)ET-P2A2                             |
| Digital Input & Relay Output                                     | Digital Input & Power Relay Output    | t(P)ET-P2R2, t(P)ET-PD2R1                            |
|  | Digital Input & Photomos Relay Output | t(P)ET-P2POR2, t(P)ET-PD2POR2                        |
| <b>WISE-7000 Module</b>  |                                       |  |
| AI/AO  | Voltage & Current                     | WISE-7117  |
|  | Thermocouple                          | WISE-7118Z   |
|  | RTD                                   | WISE-7115  |
|  | Thermistor                            | WISE-7105  |
| DI/DO  | DC Digital Input                      | WISE-7151, WISE-7153                                 |
|  | DC Digital Output                     | WISE-7142  |
|  | DC Digital Input & Output             | WISE-7144, WISE-7150, WISE-7152, WISE-7255           |
| Relay Output   | Power Relay Output                    | WISE-7160, WISE-7167                                 |
| Others   | Multi-Function                        | WISE-7102, WISE-7126                                 |
| <b>WF-2000 Module</b>  |                                       |  |
| AI/AO  | Voltage & Current                     | WF-2017  |
|  | Thermocouple                          | WF-2019/S  |
| DI/DO  | DC Digital Input                      | WF-2051  |
|  | DC Digital Output                     | WF-2042  |
|  | DC Digital Input & Output             | WF-2055  |
| Relay Output   | Power Relay Output                    | WF-2060  |
| Others   | Multi-Function                        | WF-2026  |
| <b>LC Module</b>   |                                       |  |
| DI/DO  | AC Digital Input                      | LC-101H, LC-103H                                     |
|  | DC Digital Output                     | LC-131   |
| <b>DL Module</b>   |                                       |  |
| Temperature / Humidity   |                                       | DL-10, DL-100  |
| CO / CO2 / Temperature / Humidity                                |                                       | DL-301, DL-302, DL-303                               |
| PM1 / PM2.5 / PM10 / CO / CO2 / Temperature / Humidity           |                                       | DL-1020, DL-1021, DL-1022, DL-1023, DL-1038, DL-1050 |
| <b>IR Module</b>   |                                       |  |
| IR Learning Remote Module  |                                       | IR-210, IR-712A, IR-712-MTCP                         |
| <b>XV-Board Module</b>   |                                       |  |
| DI/DO  | DC Digital Input                      | XV110  |
|  | DC Digital Output                     | XV111, XV111A  |
|  | DC Digital Input & Output             | XV107, XV107A  |
| Relay Output   | Power Relay Output                    | XV116  |
| Others   | Multi-Function                        | XV306, XV307, XV308, XV310                           |
| <b>Modbus RTU/TCP Slave Module</b>                               |                                       |  |
| Coil Output / Discrete Input / Input Register / Holding Register |                                       |  |

## ■ Power Meter & I/O Module Specification for PMC/PMD Controller

**\*\*\*One PMC/PMD support at most "24 ICP DAS Modbus Power Meter modules + 8 Modbus I/O modules" (Max. total of 16 TCP type modules)**

| I/O Module Specification |                        | Description   | Max. Connection Allowed   |
|--------------------------|------------------------|---|---|
| Module for Local site    | Local Bus              | ICP DAS: XV-Board series module   | 1<br>(Not apply to PMD series controller )  |
| Module for Remote site   | Modbus RTU by RS-485   | ICP DAS : PM-2xxx/3xxx/4xxx series Power Meter<br>ICP DAS : M-7000/DL/IR series module<br>Others : modules that support Modbus RTU Slave Protocol | COM3 and COM4<br>can connect up to 16 modules individually.<br>(PMD is [COM1/COM2] interface) |
|                          | Modbus TCP by Ethernet | ICP DAS : PM-2xxx-MTCP/ 3xxx-MTCP/4xxx-MTCP series Power Meter<br>Others : modules that support Modbus TCP Slave Protocol                         | LAN interface can connect up to 16 modules.   |

## ■ List of Supported Power Meters for PMC/PMD Controller

| Function                  |            | Module List   |
|---------------------------|------------|---|
| Single-phase Power Meter  | Modbus RTU | PM-3112-100, PM-3112-160, PM-3112-240, PM-3114-100, PM-3114-160, PM-3114-240  |
|                           | Modbus TCP | PM-3112-MTCP-100, PM-3112-MTCP-160, PM-3112-MTCP-240, PM-3114-MTCP-100, PM-3114-MTCP-160, PM-3114-MTCP-240  |
| 3 Phases Power Meter      | Modbus RTU | PM-3033, PM-3133P, PM-3133-100, PM-3133-160, PM-3133-240, PM-3133-100P, PM-3133-160P, PM-3133-240P, PM-3133-360P, PM-3133-400P, PM-3133i-100P, PM-3133i-160P, PM-3133i-240P, PM-3133i-360P, PM-3133i-400P, PM-3133-RCT500P, PM-3133-RCT1000P, PM-3133-RCT2000P, PM-3133-RCT4000P, PM-2133D-100P, PM-2133D-160P, PM-2133D-240P, PM-2133D-360P, PM-2133D-400P   |
|                           | Modbus TCP | PM-3033-MTCP, PM-3133P-MTCP, PM-3133-100-MTCP, PM-3133-160-MTCP, PM-3133-240-MTCP, PM-3133-100P-MTCP, PM-3133-160P-MTCP, PM-3133-240P-MTCP, PM-3133-360P-MTCP, PM-3133-400P-MTCP, PM-3133i-100P-MTCP, PM-3133i-160P-MTCP, PM-3133i-240P-MTCP, PM-3133i-360P-MTCP, PM-3133i-400P-MTCP, PM-3133-RCT500P-MTCP, PM-3133-RCT1000P-MTCP, PM-3133-RCT2000P-MTCP, PM-3133-RCT4000P-MTCP, PM-2133D-100P-MTCP, PM-2133D-160P-MTCP, PM-2133D-240P-MTCP, PM-2133D-360P-MTCP, PM-2133D-400P-MTCP |
| Multi-circuit Power Meter | Modbus RTU | PM-4324P, PM-4324-100P, PM-4324-160P, PM-4324-240P, PM-4324-360P, PM-4324-400P, PM-4324A-100P, PM-4324A-160P, PM-4324A-240P, PM-4324A-360P, PM-4324A-400P, PM-4324D-100P, PM-4324D-160P, PM-4324D-240P, PM-4324D-360P, PM-4324D-400P  |
|                           | Modbus TCP | PM-4324P-MTCP, PM-4324-100P-MTCP, PM-4324-160P-MTCP, PM-4324-240P-MTCP, PM-4324-360P-MTCP, PM-4324-400P-MTCP, PM-4324A-100P-MTCP, PM-4324A-160P-MTCP, PM-4324A-240P-MTCP, PM-4324A-360P-MTCP, PM-4324A-400P-MTCP, PM-4324D-100P-MTCP, PM-4324D-160P-MTCP, PM-4324D-240P-MTCP, PM-4324D-360P-MTCP, PM-4324D-400P-MTCP  |

## ■ List of Supported I/O Modules for PMC/PMD Controller

| Function   |                           | Module List   |
|--|---------------------------|---|
| <b>M-7000 Module</b>   |                           |   |
| AI/AO  | Voltage & Current         | M-7017, M-7017C, M-7017R, M-7017R-A5, M-7017RC, M-7017Z   |
|  | Thermocouple              | M-7011, M-7011D, M-7018, M-7018R, M-7018Z, M-7019R, M-7019Z   |
|  | RTD                       | M-7015, M-7015P   |
|  | Thermistor                | M-7005  |
|  | Strain Gauge              | M-7016, M-7016D   |
|  | Analog Output             | M-7022, M-7024, M-7024R, M-7024L, M-7024U, M-7028, M-7028D  |
|  | RMS Input                 | M-7017RMS   |
| DI/DO  | DC Digital Input          | IM-7041, M-7041D, M-7041P, M-7041PD, M-7041-A5, M-7041D-A5, M-7046, M-7046D, M-7051, M-7051D, M-7052, M-7052D, M-7053, M-7053D            |
|  | AC Digital Input          | M-7058, M-7058D, M-7059, M-7059D  |
|  | DC Digital Output         | M-7043, M-7043D, M-7045, M-7045D, M-7045-NPN, M-7045D-NPN   |
|  | DC Digital Input & Output | M-7050, M-7050D, M-7055, M-7055D, M-7055-NPN, M-7055D-NPN   |
| Relay Output   | Power Relay Output        | IM-7060, M-7060D, M-7060P, M-7060PD, M-7061, M-7061D, M-7064, M-7064D, M-7065, M-7065D, M-7067, M-7067D, M-7068, M-7068D, M-7069, M-7069D |
|  | Solid State Relay Output  | M-7065B, M-7065BD   |
|  | Photomos Relay Output     | M-7066P, M-7066PD   |
| Others   | Counter/Frequency         | M-7080, M-7080D, M-7080B, M-7080BD, M-7084, M-7088, M-7088D   |
|  | Multi-Function            | M-7002, M-7003, M-7024U, M-7024UD, M-7026   |
| <b>DL Module</b>   |                           |   |
| Temperature / Humidity   |                           | DL-10, DL-100, DL-110, DL-120   |
| CO / CO2 / Temperature / Humidity                                |                           | DL-301, DL-302, DL-303  |
| PM1 / PM2.5 / PM10 / CO / CO2 / Temperature / Humidity           |                           | DL-1020, DL-1021, DL-1022, DL-1023, DL-1038, DL-1050  |
| <b>IR Module</b>   |                           |   |
| IR Learning Remote Module  |                           | IR-210, IR-712, IR-712A   |
| <b>XV-Board Module</b>   |                           |   |
| DI/DO  | DC Digital Input          | XV110   |
|  | DC Digital Output         | XV111, XV111A   |
|  | DC Digital Input & Output | XV107, XV107A   |
| Relay Output   | Power Relay Output        | XV116, XV119  |
| Others   | Multi-Function            | XV306, XV307, XV308, XV310  |
| <b>Modbus RTU/TCP Slave Module</b>                               |                           |   |
| Coil Output / Discrete Input / Input Register / Holding Register |                           |   |

## ■ Installation Platform Requirement

|                  | Specification Suggestions   |
|------------------|---|
| <b>CPU</b>       | 64-bit (x64); 3.0 GHz or higher GHz Processor   |
| <b>RAM</b>       | Minimum 8 GB for RAM. When the number of controllers or sensors, or the size of Database is increased, upgrade the RAM space as needed to ensure the best performance of the system.  |
| <b>Hard Disk</b> | Minimum 64GB for Hard Disk space. When the number of controllers or sensors, or the size of Database is increased, upgrade the Hard Disk space as needed to ensure the best performance of the system.  |
| <b>OS System</b> | Windows 7, Windows 8, Windows 10, Windows Server 2012 or later OS system (64-bit Windows required).   |
| <b>Notes</b>     | <ul style="list-style-type: none"> <li>• Support WISE-523x/2x4x, PMC-523x/2x4x and PMD controllers.</li> <li>• Need to work with IIS Web Server.</li> <li>• Need to work with Database system such as Microsoft SQL Server, MySQL Server or Oracle Database. (For detailed version information, please refer to IoTstar user manual)</li> </ul> |

## ■ Ordering Information

### ■ IoTstar

| Model                | Description  |
|----------------------|--|
| <b>IoTstar-RC050</b> | IoTstar - IoT Cloud Management Software (Max. 50 controllers can be connected.)  |
| <b>IoTstar-RC200</b> | IoTstar - IoT Cloud Management Software (Max. 200 controllers can be connected.) |
| <b>IoTstar-RC500</b> | IoTstar - IoT Cloud Management Software (Max. 500 controllers can be connected.) |

### ■ IoTstar Upgrade Package (Optional package for IoTstar)

| Model                    | Description   |
|--------------------------|---|
| <b>IoTstar-UC050-200</b> | IoTstar Upgrade Package (Upgrade the maximum number of controllers connected to IoTstar from 50 to 200.)  |
| <b>IoTstar-UC200-500</b> | IoTstar Upgrade Package (Upgrade the maximum number of controllers connected to IoTstar from 200 to 500.) |

### ■ IoTstar Bot Service (Optional package for IoTstar; Support Bot Service & LINE App)

| Model                              | Description   |
|------------------------------------|---|
| <b>IoTstar Bot Service-RC050-L</b> | IoTstar Bot Service Package (Used with IoTstar-RC050) |
| <b>IoTstar Bot Service-RC200-L</b> | IoTstar Bot Service Package (Used with IoTstar-RC200) |
| <b>IoTstar Bot Service-RC500-L</b> | IoTstar Bot Service Package (Used with IoTstar-RC500) |

### ■ IoTstar Dashboard Service (Optional package for IoTstar; Support Dashboard service)

| Model                                  | Description   |
|--|---|
| <b>IoTstar Dashboard Service-RC050</b> | IoTstar Dashboard Service (Used with IoTstar-RC050) |
| <b>IoTstar Dashboard Service-RC200</b> | IoTstar Dashboard Service (Used with IoTstar-RC200) |
| <b>IoTstar Dashboard Service-RC500</b> | IoTstar Dashboard Service (Used with IoTstar-RC500) |

### ■ IoTstar Report Service (Optional package for IoTstar; Support Report service)

| Model                               | Description                                      |
|-------------------------------------|--|
| <b>IoTstar Report Service-RC050</b> | IoTstar Report Service (Used with IoTstar-RC050) |
| <b>IoTstar Report Service-RC200</b> | IoTstar Report Service (Used with IoTstar-RC200) |
| <b>IoTstar Report Service-RC500</b> | IoTstar Report Service (Used with IoTstar-RC500) |



## PAC 9000 Series

- AXP/ALX-9000 Series
- XP-9000-WES7/XP-9000-IoT/LX-9000/LP-9000 Series
- e-9K Series Module
- I-9K Series Module
- 2000 Series PAC
- iBPC Series BoxPC
- Touch Monitor



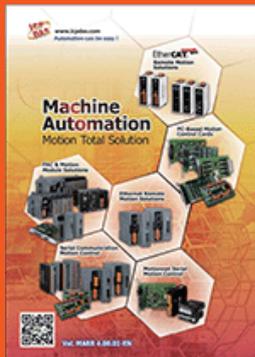
## IIoT Products

- IIoT Software and Hardware
- Security Identification and Monitoring System
- Environmental Monitoring
- Factory Automation
- Energy Management Solution
- Vibration Measurement Solution



## Energy Management Solution

- Introduction and features
- Applications
- InduSoft
- Power Meter Concentrator
- Smart Power Meter
- True RMS Input Module
- Voltage Attenuator and Current Transformer
- iWSN Solution
- Portable Power Monitoring Suitcase



## 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



## Intelligent IIoT Edge Controller & I/O Module

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



## 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



## PC-based I/O Boards

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



## TouchPAD HMI Solutions

- Introduction
- TPD/VPD Products Series
- Video Intercom & Access Control Series
- TPD/VPD Application

