IoT Cloud Software -IoTstar

Easy to use **No programming**

Vol. IoTstar_2.24.02_EN

Content

IoT Cloud Software - IoTstar

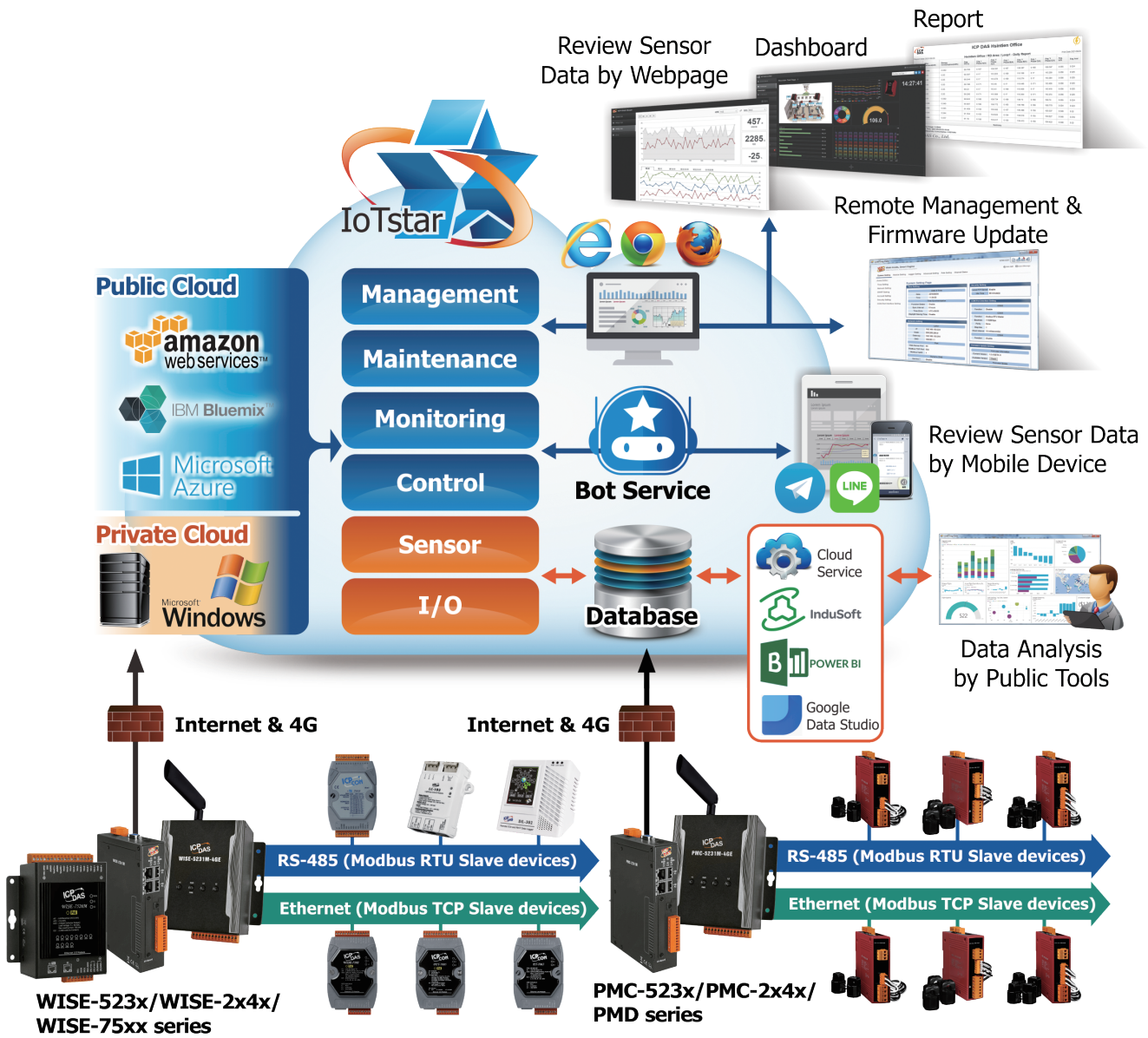
Introduction

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 additon, 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

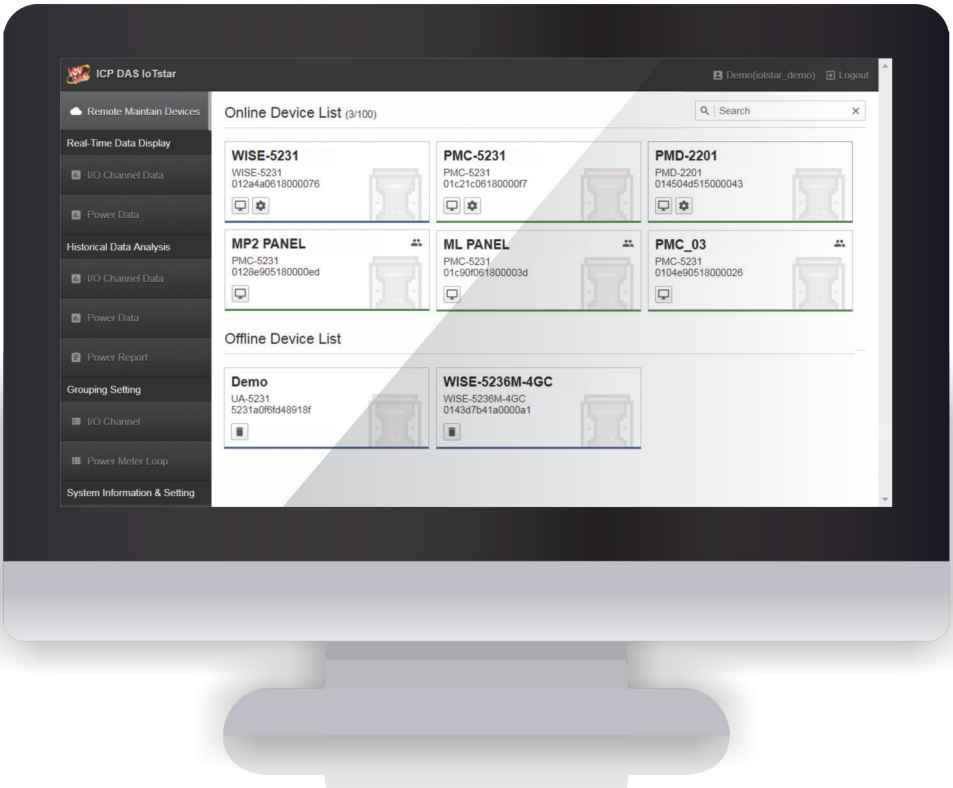
According to the needs of the field site, the installation environment can be flexibly selected.

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.

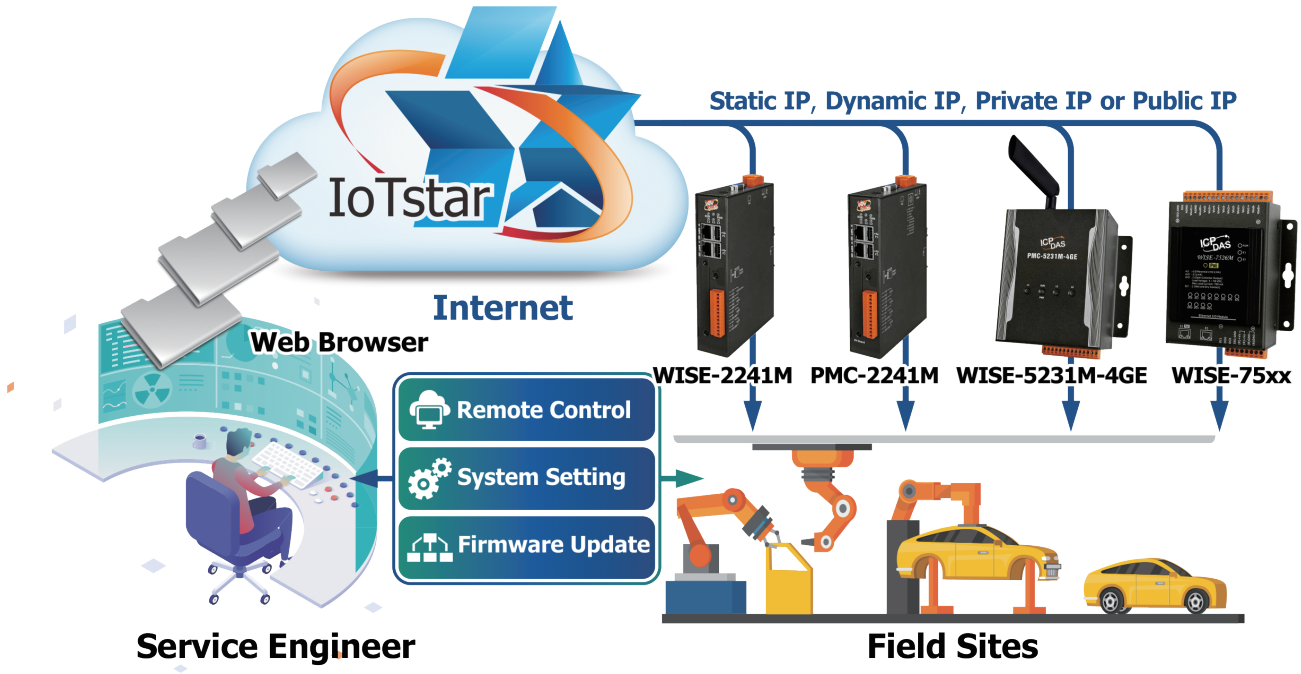
No more programming! Use a Browser to set up the IoT Cloud system

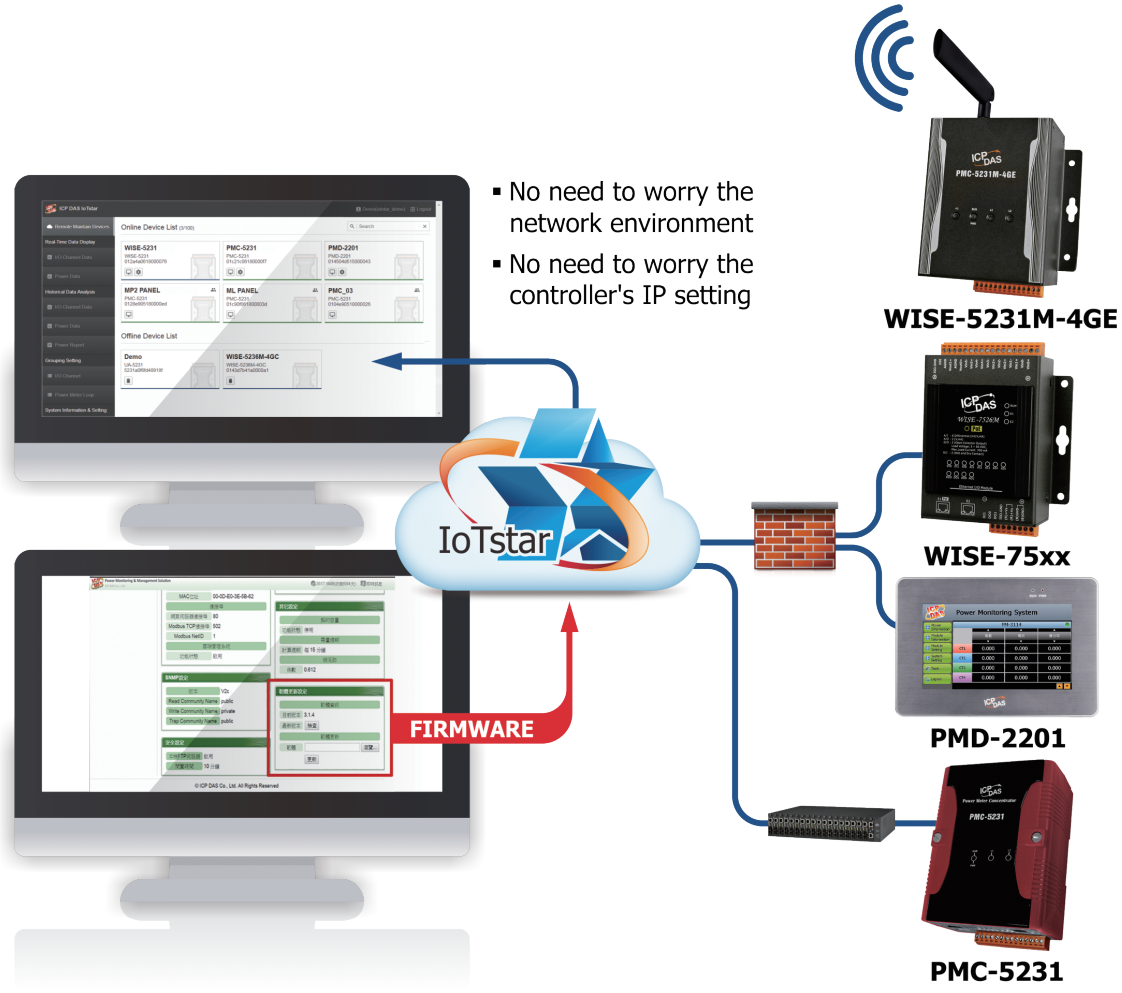
Only by a few clicks on Web page of IoTstar and WISE/PMC/PMD controller to complete the setting of IoT Cloud system.



■ Controller Remote Access/Maintenance Service

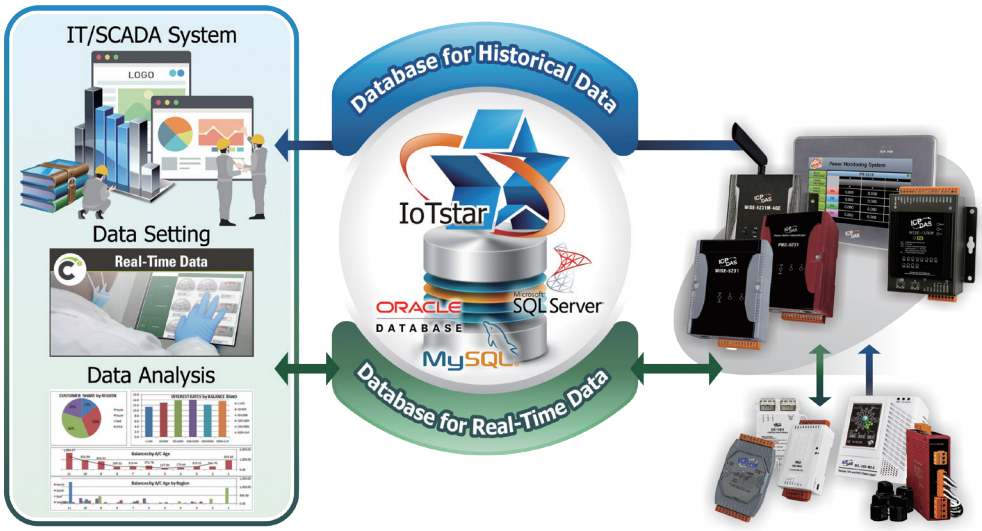
With IoTstar, users do not need to worry about the network environment of the WISE/PMC/PMD controller, whether the controller uses the static IP, dynamic IP, virtual IP or physical IP, the user can perform the status monitoring, system setting adjusting, and update the firmware of the controllers through 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

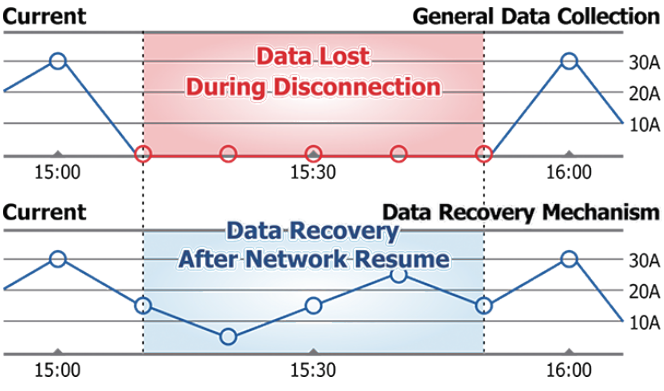
With IoTstar, the Sensor Data Collection Service can be performed to collect the Historical and Real-Time sensor data (and/or Power data) from the WISE/PMC/PMD controllers, and import the data to the Database in the Cloud. The users can quickly setup the Data Lake for the IoT and Big Data applications. 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.

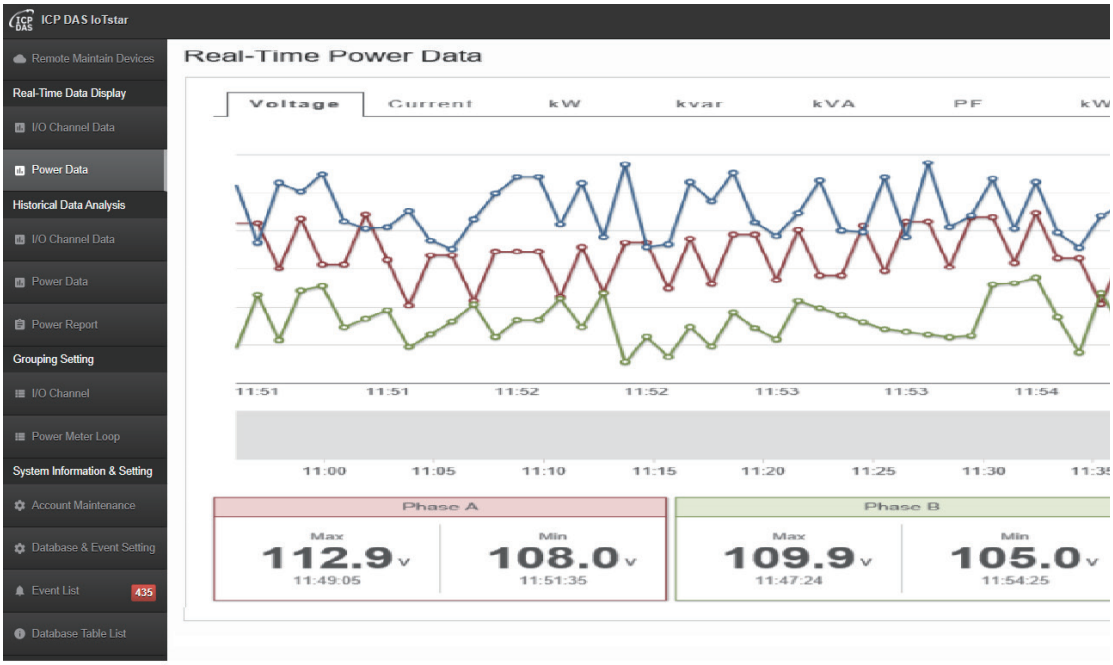
Sensor Data Recovery Mechanism

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

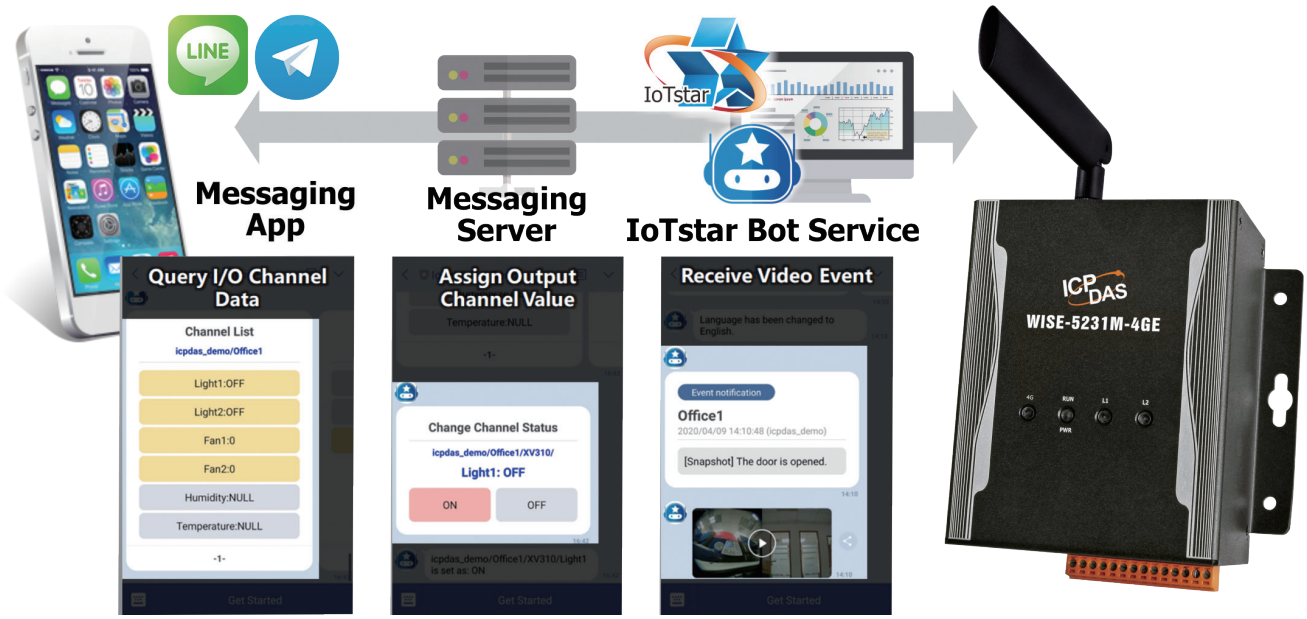
Time	Max. Demand(kW)	Energy Consumption(kWh)	Avg. PF(%)	Avg. I Phase A(A)	Avg. V Phase A(V)	Avg. I Phase B(A)	Avg. V Phase B(V)	Avg. I Phase C(A)	Avg. V Phase C(V)	Avg. kVA	Avg. kvar
0	0.05	0.05	89.713	0.169	110.354	0.169	110.35	0.17	110.358	0.055	0.024
1	0.05	0.05	89.566	0.169	110.557	0.168	110.553	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

Summary

Daily Highest Usage: 0.051kW
Occurrence Time: 2021-10-19 04:59:00
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/Telegram 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/Telegram 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.



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.

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

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/ Telegram chat rooms. IoTstar Bot Service provides an easier and convenient mechanism for user to manage his/her remote controllers with LINE/Telegram 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/Telegram users for real-time alarm notification.

Features

- Monitor WISE/PMC/PMD controllers anytime and anywhere by LINE/Telegram 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/Telegram and controllers.
- Easy to Maintain; only need the upgrade of LINE/Telegram App.

***The interface below displays using **LINE App.**

■ 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
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Summary

Daily Highest Usage: 0.051kW
Occurrence Time: 2021-10-19 04:59:00
Daily Total Electricity Consumption: 0.41kWh

▲ 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	0.05
1	0	0	0	0	0	0.05
2	0	0	0	0	0	0.05
3	0	0	0	0	0	0.051
4	0	0	0	0	0	0.051

Summary

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

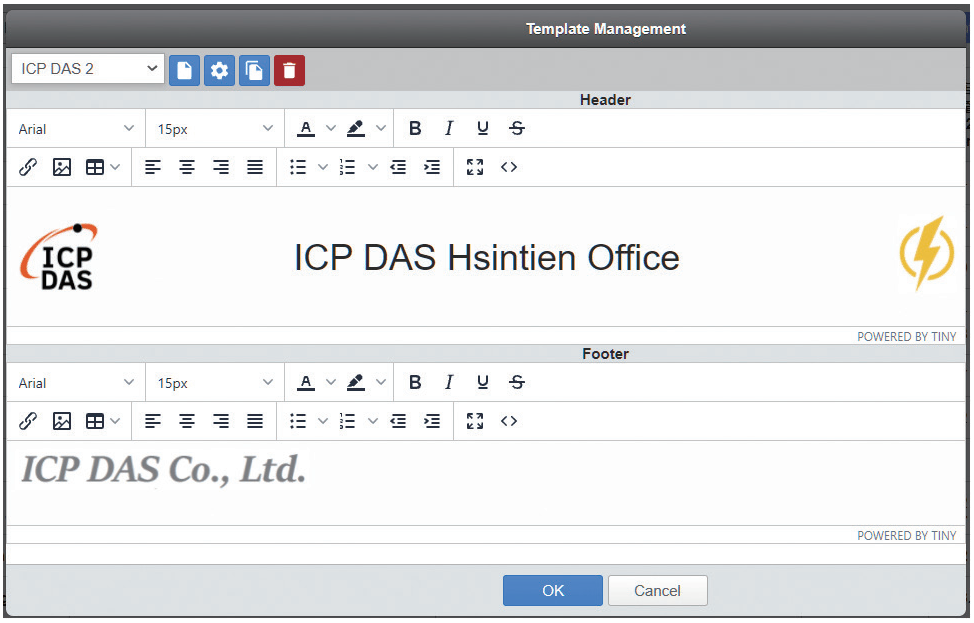
Summary

Daily maximum: 1 ug/m3
Time of maximum daily value occurs: 2021-10-19 00:01:00

Daily minimum: 0 ug/m3
Time of minimum daily value occurs: 2021-10-19 00:00:00

Daily average: 0.098 ug/m3
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.

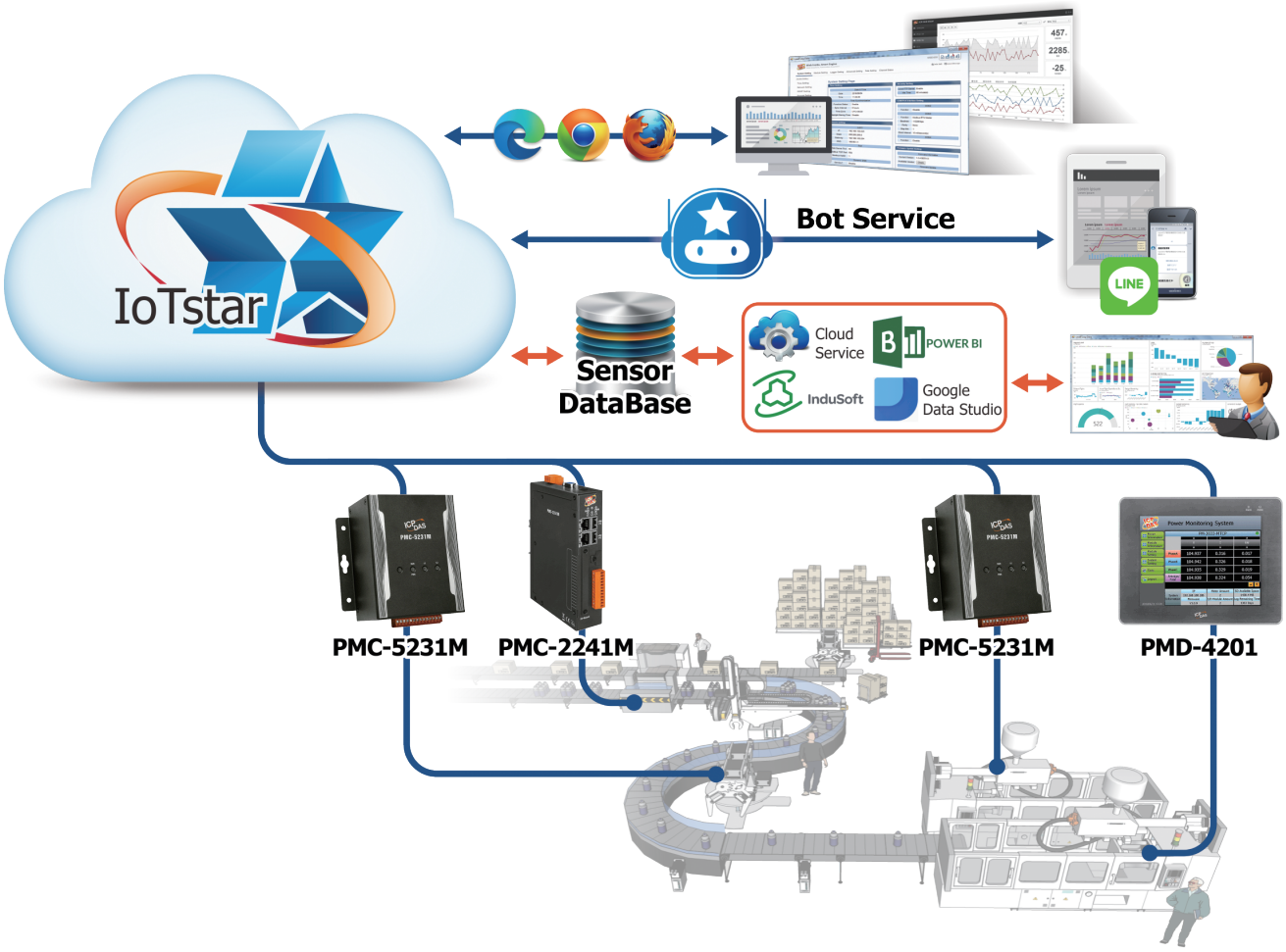
▲ Report Download (PDF file format)

Applications

■ Cloud-based Power Monitoring Application for Factory

Using ICP DAS "IoTstar + PMC/PMD" solution, user can quickly build a cloud-based power monitoring system for factory. In the solution, PMC/PMD power meter concentrator can connect with ICP DAS power meters to collect, organize and record the power consumption information of the factory equipment. In addition to sending the collected power information back to IoTstar, PMC/PMD can also perform the power demand management for the equipment, monitor the operation of equipment to perform the corresponding actions, and immediately send LINE/ Telegram/WeChat/Email/SMS alarm message according to the pre-set edge computing mechanism (IF-THEN-ELSE logic rules). After IoTstar receives the power information sent by PMC/PMD, it can provide services such as:"Controller Remote Access Service", "Sensor Data Collection Service", "Sensor Data Visualization Service", "Sensor Data Report Service" and "Bot Service with Mobile Phone", as well as the following benefits:

- No need to write programs in the whole process, power information can be collected and stored in the cloud database automatcially.
- Through SQL Database interface, quickly integrate the IT system to understandthe trend and change of the power usage status of the factory equipment comprehensively.
- Perform remote monitoring and maintenance of the factory equipment, take corresponding actions proactively to ensure operational optimization.
- Provide status monitoring, system setting and firmware update for the PMC/PMD controllers from Cloud. It can reduce the time and cost of personnel travel due to performing maintenance of the equipment.



■ Cloud-based Environment Monitoring Application

Using ICP DAS "IoTstar + WISE" solution, user can quickly build a Cloud-based environment monitoring system. In the solution, WISE IIoT edge controller can connect with the Modbus TCP/RTU sensors to collect, organize and record the information of the environemnt. In addition to sending the collected environemnt information back to IoTstar, WISE can also monitor the operation of environemnt facilities to perform the corresponding actions, and immediately send LINE/Telegram/WeChat/Email/SMS alarm message according to the pre-set edge computing mechanism (IF-THEN-ELSE logic rules). After IoTstar receives the environemnt information sent by WISE, it can provide services such as: "Controller Remote Access Service", "Sensor Data Collection Service", "Sensor Data Visualization Service", "Sensor Data Report Service" and "Bot Service with Mobile Phone" services, as well as the following benefits:

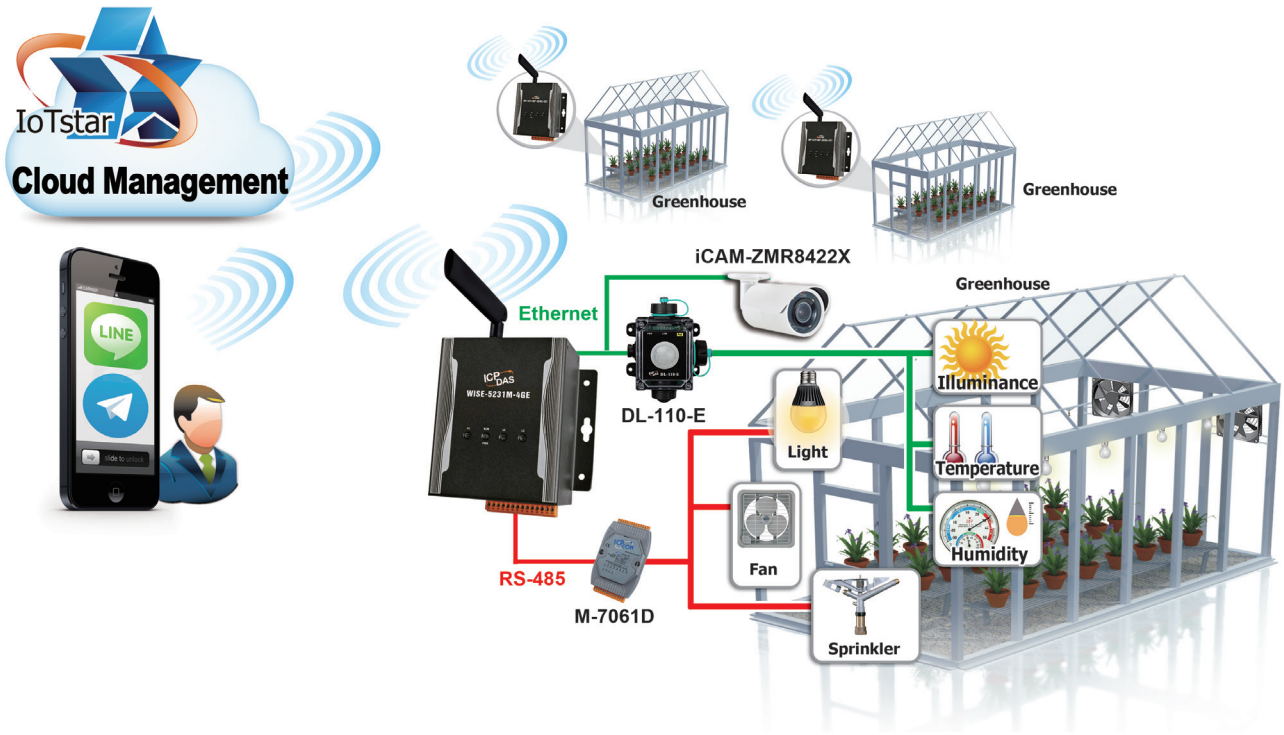
- No need to write programs in the whole process, environment information can be collected and stored in the cloud database automatcially.
- Through SQL Database interface, quickly integrate the IT system to understand the trend and change of the environment status comprehensively.
- Perform remote monitoring and maintenance of the environment facilities, take corresponding actions proactively to ensure operational optimization.
- Provide status monitoring, system setting and firmware update for the WISE controllers from Cloud. It can reduce the time and cost of personnel travel due to performing maintenance of the facilities.

■ Cloud-based Indoor Air Quality Monitoring Application

Using ICP DAS "IoTstar+WISE+DL/CL module" solution, user can quickly build a Cloud-based air quality monitoring system. In the solution, DL/CL series modules can be used to measure the concentration of aerosols in the air (Such as: PM2.5, PM1, PM10 and the number of particles (0.3μm, 0.5μm, 1μm, 2.5μm, 5μm, 10μm), as well as the fume concentrations related to human health (Such as: CO/CO2/HCHO/NH3/H2S/TVOC), and then transmit the measurement of air quality information to WISE IIoT edge controller. WISE is used to collect the air quality information from DL/CL modules and send back the information to the IoTstar. To response to any unusual situation and to maintain the safety of personnel in the field, WISE also can take the corresponding actions (Such as: turn on the exhaust fan and warning light, activate the access control equipment, send LINE/Telegram/WeChat/Email/SMS alarm messages, etc.) automatically in real time according to the status of the air quality by the pre-set edge computing mechanism (IF-THEN-ELSE logic rules). After IoTstar receives the air quality information sent by WISE, it can provide services such as: "Controller Remote Access Service", "Sensor Data Collection Service", "Sensor Data Visualization Service", "Sensor Data Report Service" and "Bot Service with Mobile Phone" services, and help users quickly build a Cloud-based air quality monitoring system.

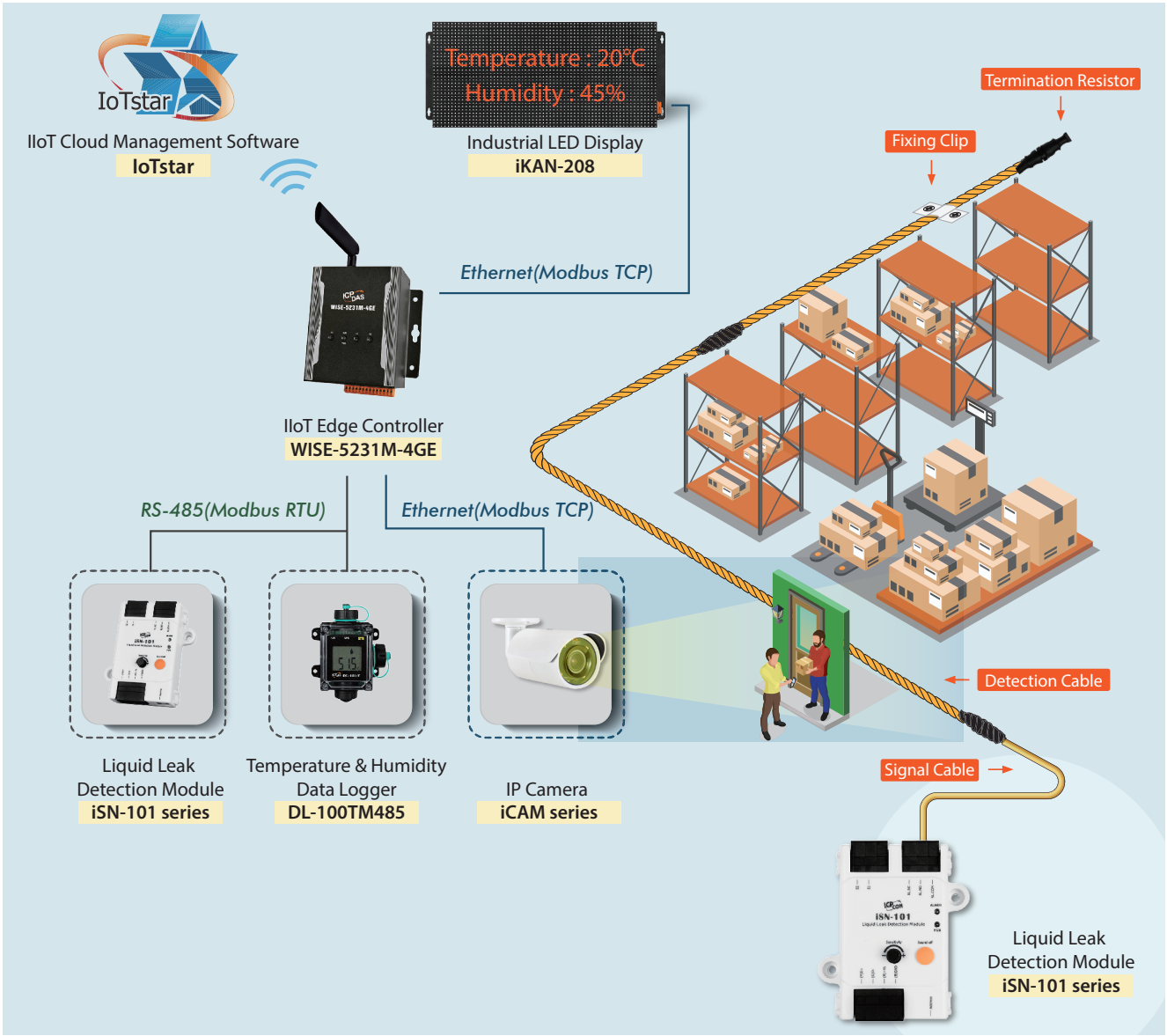
Cloud-based Greenhouse Monitoring Application

In the development trend of agricultural refinement and technology, intelligent greenhouse planting has always played an important role. The ICP DAS "IoTstar+WISE+DL module" solution work as an automated intelligent greenhouse monitoring system, it can perform real-time cloud monitoring of illuminance/temperature/humidity for the greenhouse, and automatically execute the corresponding scheduled tasks (such as: turning on the air conditioner, adjusting lighting, activating sprinklers, fertilizing etc.), or send LINE/Telegram/WeChat/Email/SMS alarm messages to related personnel to take immediate actions in response to abnormal status notification. WISE can also connect to ICP DAS iCAM series IP cameras to perform real-time video monitoring of the greenhouse. When an unusual intrusion is detected, WISE will automatically send text and video messages to the security personnel through LINE/Telegram/WeChat to take immediate actions. In addition, with the services provided by IoTstar such as "Controller Remote Access Service", "Sensor Data Collection Service", "Sensor Data Visualization Service", "Sensor Data Report Service" and "Bot Service with Mobile Phone", user can easily build a cloud-based greenhouse monitoring system to grasp the environmental status of each greenhouse anytime, anywhere and take actions accordingly, so as to move towards the era of intelligent agriculture with high efficiency, high productivity, safety and low operating risks.



■ Cloud-based Building, Warehouse, Factory Monitoring Application

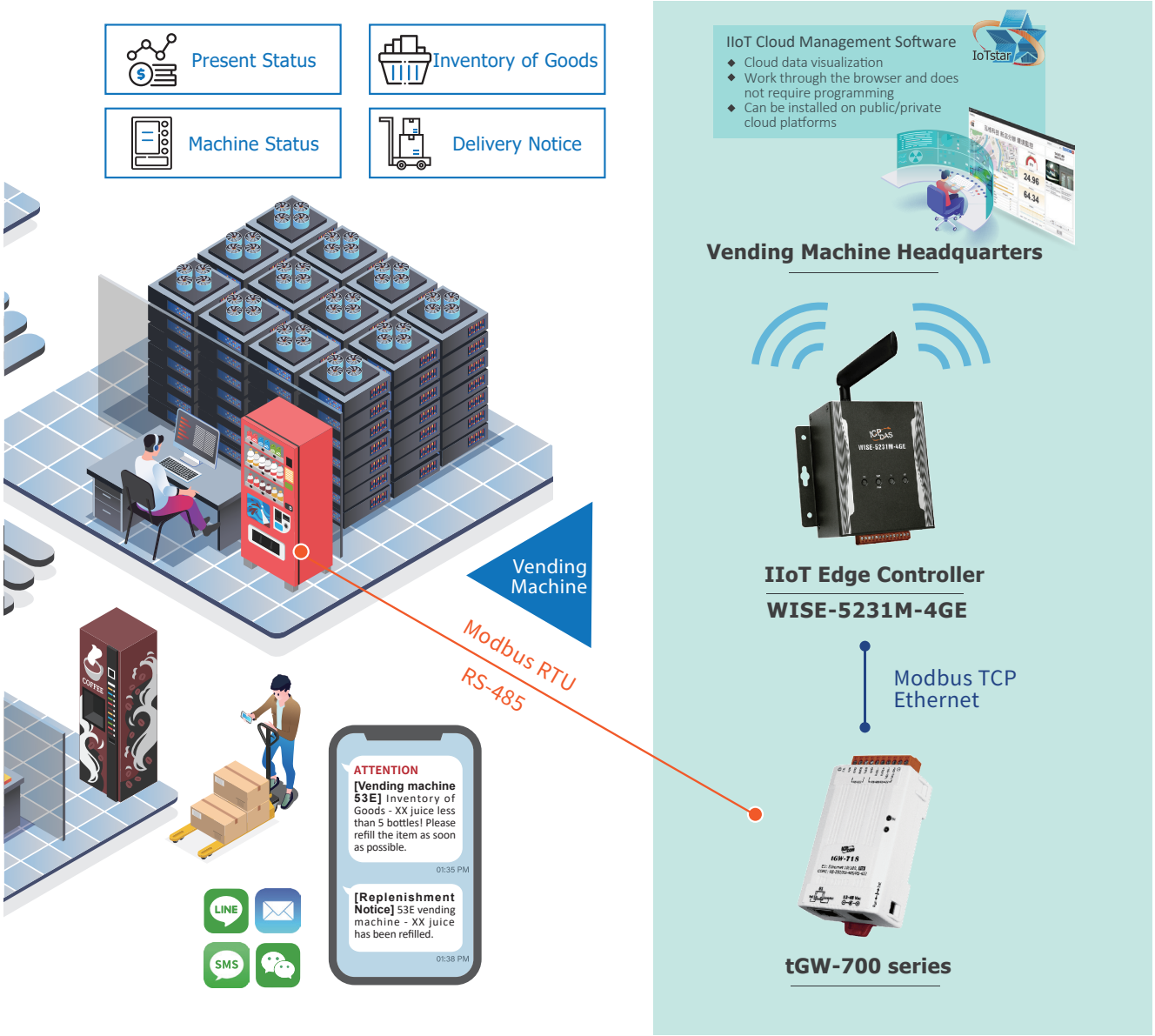
Using ICP DAS "IoTstar+WISE+iSN/DL/CL module" solution, it can help enterprises quickly establish a Cloud-based monitoring system for Building, Warehouse, and Factory facilities. The iSN modules can assist in the detection of liquid leakage, and the DL modules can measure the temperature and humidity data of the environment. After the iSN and DL modules transmit the measured data to the WISE IIoT edge controller for sorting and recording, WISE can transmit the collected data to IoTstar, and perform the preset edge computing mechanism (IF -THEN-ELSE logic rules), and then automatically take real-time actions in response to status of liquid leakage/ temperature/humidity in the environment(such: turn on the exhaust fan, turn on the warning light). It can also send LINE/Telegram/WeChat/Email/SMS alarm messages to related personnel for the unusual status notification, and work as an automated intelligent warehouse monitoring system. WISE can also connect with ICP DAS iCAM series IP cameras to perform real-time video monitoring of the warehouse. When an unusual intrusion is detected, WISE will automatically send text and video messages to the security personnel through LINE/Telegram/WeChat, to take immediate actions. In addition, with the services provided by IoTstar such as "Controller Remote Access Service", "Sensor Data Collection Service", "Sensor Data Visualization Service", "Sensor Data Report Service" and "Bot Service with Mobile Phone", user can easily build a cloud-based warehouse monitoring system to grasp the environmental suatus of each warehouse anytime, anywhere and take actions accordingly.



■ Cloud-based Monitoring Application for Traditional Devices

Using ICP DAS "IoTstar+WISE+tGW module" solution, it can assist users to quickly build an Cloud-based IoT monitoring system for traditional devices that cannot connect to Network. Users can use tGW-700(Modbus RTU/ASCII to TCP converter) to connect to traditional devices via RS-485 interface, and convert the Modbus RTU/ASCII protocol on the traditional devices to Modbus TCP protocol, and the device status can be sent to WISE IIoT edge controller through Ethernet for data sorting and recording, and then send back to IoTstar to quickly build the cloud-based IoT monitoring system for the traditional equipment.

Take the traditional vending machines that are common on the street as an example, for these device lack the networking capability, the replenishment and equipment maintenance operations usually need to rely on inspection (replenishment) personnel to check regularly according to a fixed route. It is time-consuming, labor-intensive and causes additional cost. Through the solution provided by ICP DAS, information such as inventory and device status in the vending machine can be sent to the headquarter in real time for statistical analysis, and headquarter can timely dispatch the inspection (replenishment) personnel to the vending machine in need to adjust the device status of the vending machine so that the burden of inspection (replenishment) personnel can be reduced and then the manpower and transportation costs can be saved.



Controller Supported List

Model	WISE-284xM	WISE-224xM	WISE-523x(M)	WISE-75xxM
System				
CPU	Quad-core ARM CPU, 1.6 GHz/Core	ARM CPU, 1.0 GHz		32 bits CPU (400MHz)
microSD	Yes (Built-in one 4 GB microSD card)			-
Ethernet	10/100/1000 Base-TX * 2		10/100/1000 Base-TX * 1	10/100 Base-TX * 2 (for Daisy-Chain Topology)
Casing	Metal(WISE-523x is Plastic)			Metal
Mobile Network	Support 3G/4G Mobile Network(*1)			-
I/O Module Support				
Local Side	Support ICP DAS XV-board			Built-in I/O module
Remote Side	Support at most 48 I/O modules			-
iCAM IP Camera	up to 12	up to 4		-
Software function				
Intelligent logic operation	Yes (Full Function)			Yes (Basic function)
Information Security Enhancement	Yes	-		-

Model	PMC-284xM	PMC-224xM	PMC-523x(M)	PMD
System				
CPU	Quad-core ARM CPU, 1.6 GHz/Core	ARM CPU, 1.0 GHz		
microSD	Yes (Built-in one 4 GB microSD card)			
Ethernet	10/100/1000 Base-TX * 2		10/100/1000 Base-TX * 1	
TFT LCD (with Touch Panel)	-			PMD-220x: 7" Display PMD-420x: 10" Display
Casing	Metal (PMC-523x is Plastic)			Metal
Mobile Network	Support 3G/4G Mobile Network (*1)			-
Power Meter & I/O 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)	Support at most "24 ICP DAS Modbus Power Meter + 8 Modbus I/O modules"		
Software function				
Intelligent logic operation	Yes (Full Function)			
Information Security Enhancement	Yes	-		

Note 1:

3G/4G version of WISE-523xM, WISE-224xM, WISE-284xM, PMC-523xM, PMC-224xM & PMC-284xM	
3G system (-3GWA)	WCDMA: 850/900/1900/2100 MHz
3G/4G system (-4GE)	FDD LTE: B1/B3/B5/B7/B8/B20 bands (Frequency Band for EMEA, Korea, Thailand, India and Taiwan) WCDMA: 850/900/2100 MHz
3G/4G system (-4GC)	FDD LTE: B1/B3/B8 bands (Frequency Band for China) TDD LTE: B38/B39/B40/B41 bands (Frequency Band for China) WCDMA: 900/2100 MHz, TD-SCDMA 1900/2100 MHz, CDMA2000 (BC0) 800 MHz

■ Built-in I/O Channel Specifications for WISE-75xx

Model	Local I/O Channel				Specifications
	DI	DO	AI	AO	
WISE-7502M	6	3	3	-	AI :+/- 150 mV, +/- 500 mV, +/- 1V, +/- 5 V, +/- 10 V, +0 ~ +20 mA,+/- 20 mA, 4 ~ 20mA DO : Power Relay (Form A); DI : Wet (Sink,Source)
WISE-7504M	4	-	4	4	AI : +/- 500 mV, +/- 1V, +/- 5 V, +/- 10 V, +0 ~ +20 mA, +/- 20 mA, 4 ~ 20mA AO : 0 ~ 5 V, +/- 5 V, 0 ~ 10 V, +/- 10 V, 0 ~ 20 mA, 4 ~ 20 mA DI : Dry (Source), Wet (Sink)
WISE-7515M	-	-	7	-	RTD (AI) : Pt100, Pt1000, Ni120, Cu100, Cu1000
WISE-7517M	-	4	8	-	AI : +/-150 mV, +/-500 mV, +/-1 V, +/-5 V, +/-10 V, +/-20 mA, 0 ~ 20 mA, 4 ~ 2 0mA DO : Open Collector (Sink)
WISE-7517M-10	-	-	10/20	-	AI : +/-150 mV, +/-500 mV, +/-1 V, +/-5 V, +/-10 V, +/-20 mA, 0 ~ 20 mA, 4 ~ 20 mA
WISE-7518ZM	-	3	10	-	AI : +/-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, LDIN43710) DO : Open Collector (Sink)
WISE-7519ZM	-	3	10	-	AI : +/-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, LDIN43710) DO : Open Collector (Sink)
WISE-7524M	5	5	-	4	AO : 0 ~ 5 V, +/- 5 V, 0 ~ 10 V, +/- 10 V, 0 ~ 20 mA, 4 ~ 20 mA DI : Dry (Source), Wet (Sink,Source); DO : Open Collector (Sink)
WISE-7526M	2	2	6	2	AI : +/- 500 mV, +/- 1 V, +/- 5 V, +/-10 V, 0 ~ 20 mA, +/- 20 mA, 4~20mA AO : 0 ~ 5 V, +/- 5 V, 0 ~ 10 V, +/- 10 V, 0 ~ 20 mA, 4 ~ 20 mA DI : Dry (Source), Wet (Sink,Source); DO : Open Collector (Sink)
WISE-7528M	-	-	-	8	AO : 0 ~ 5 V, +/- 5 V, 0 ~ 10 V, +/- 10 V, 0 ~ 20 mA, 4 ~ 20 mA
WISE-7542M	-	16	-	-	DO : Open Collector (Sink)
WISE-7544M	8	8	-	-	DI : Wet (Sink,Source); DO : Open Collector (Sink)
WISE-7551M	16	-	-	-	DI : Wet (Sink,Source)
WISE-7552M	8	8	-	-	DI : Wet (Sink,Source); DO : Open Collector (Source)
WISE-7553M	16	-	-	-	DI : Dry (Source)
WISE-7555M	8	8	-	-	DI : Dry (Source), Wet (Sink,Source); DO : Open Collector (Source)
WISE-7560M	6	6	-	-	DI : Wet (Sink,Source); DO : Power Relay Form A (SPST N.O.)
WISE-7561M	-	11	-	-	DO : Power Relay Form A (SPST N.O.)
WISE-7567M	-	8	-	-	DO : Power Relay Form A (SPST N.O.)

■ I/O Module Specification for WISE-284x/224x/523x

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 Others : modules that support Modbus RTU Slave Protocol	
	Modbus TCP by Ethernet	ICP DAS : WISE-7100/(P)ET-7000/ DL/WF-2000 series module 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-284x/224x/523x

Function		Module List
I-7000 Module		
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
M-7000 Module		
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
tM Module		
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
(P)ET-7000 Module		
AI/AO	Voltage & Current	(P)ET-7017, (P)ET-7217, (P)ET-7017-10, (P)ET-7217-10, (P)ET-7217-A5
	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
WISE-7000 Module		
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
WF-2000 Module		
AI/AO	Voltage & Current, Thermocouple	WF-2017,WF-2019/S
DI/DO	DC Digital Input, DC Digital Output	WF-2051, WF-2042
	DC Digital Input & Output	WF-2055
Relay Output	Power Relay Output	WF-2060
Others	Multi-Function	WF-2026
iSN Module		
Liquid Leakage Detection Module		iSN-101, iSN-104
LC Module		
DI/DO	AC Digital Input	LC-101H, LC-103H
DL Module		
Temperature/Humidity/Illumination		DL-10, DL-100, DL-110, DL-120
Temperature/Humidity/O2		DL-1050
Temperature/Humidity/CO/CO2		DL-301, DL-302, DL-303
Temperature/Humidity/CO/CO2/PM1/PM2.5/PM10/TVOC		DL-1020, DL-1021, DL-1022, DL-1023, DL-1038
DLW Module		
Mini Weather Station Module		DLW-1023, DLW-1100, DLW-1120, DLW-1200, DLW-1243
IR Module		
IR Learning Remote Module		IR-210, IR-712A, IR-712-MTCP
XV-Board Module		
DI/DO	DC Digital Input	XV110
	DC Digital Output	XV111, XV111A
	DC Digital Input & Output	XV107, XV107A
Relay Output	Power Relay Output	XV116
	Signal Relay Output	XV119
Others	Multi-Function	XV306, XV307, XV308, XV310
Modbus RTU/TCP Slave Module		
Coil Output / Discrete Input / Input Register / Holding Register		

■ Power Meter & I/O Module Specification for PMC-284x/224x/523x & PMD

***PMC-284x support at most 48 modules (Include ICP DAS Modbus Power Meters and Modbus I/O modules)**

*** PMC-224x/523x & PMD support "24 ICP DAS Modbus Power Meter + 8 Modbus I/O modules"**

*** PMD/PMC support at most 4 ICP DAS PM-4324 series Power Meters.**

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

■ List of Supported Power Meters for PMC-284x/224x/523x & PMD

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 Module for PMC-284x/224x/523x & PMD

Function		Module List
M-7000 Module		
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
DL Module		
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
IR Module		
IR Learning Remote Module		IR-210, IR-712, IR-712A
XV-Board Module		
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
Modbus RTU/TCP Slave Module		
Coil Output / Discrete Input / Input Register / Holding Register		

Installation Platform Requirement

	Specification Suggestions
CPU	64-bit (x64); 3.0 GHz or higher GHz Processor
RAM	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.
Hard Disk	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.
OS System	Windows 7, Windows 8,Windows 10, Windows Server 2012 or later OS system (64-bit Windows required).
Notes	• Support WISE-523x/2x4x/75xx, PMC-523x/2x4x and PMD controllers. • Need to work with IIS Web Server. • 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)

Ordering Information

IoTstar

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

IoTstar Upgrade Package (Optional package for IoTstar)

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

Model	Description
IoTstar Bot Service-RC050-L	IoTstar Bot Service Package (Used with IoTstar-RC050; Support LINE App)
IoTstar Bot Service-RC200-L	IoTstar Bot Service Package (Used with IoTstar-RC200; Support LINE App)
IoTstar Bot Service-RC500-L	IoTstar Bot Service Package (Used with IoTstar-RC500; Support LINE App)
IoTstar Bot Service-RC050-T	IoTstar Bot Service Package (Used with IoTstar-RC050; Support Telegram App)
IoTstar Bot Service-RC200-T	IoTstar Bot Service Package (Used with IoTstar-RC200; Support Telegram App)
IoTstar Bot Service-RC500-T	IoTstar Bot Service Package (Used with IoTstar-RC500; Support Telegram App)

IoTstar Dashboard Service (Optional package for IoTstar; Support Dashboard Service)

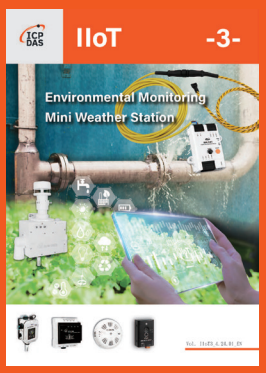
Model	Description
IoTstar Dashboard Service-RC050	IoTstar Dashboard Service (Used with IoTstar-RC050)
IoTstar Dashboard Service-RC200	IoTstar Dashboard Service (Used with IoTstar-RC200)
IoTstar Dashboard Service-RC500	IoTstar Dashboard Service (Used with IoTstar-RC500)

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

Model	Description
IoTstar Report Service-RC050	IoTstar Report Service (Used with IoTstar-RC050)
IoTstar Report Service-RC200	IoTstar Report Service (Used with IoTstar-RC200)
IoTstar Report Service-RC500	IoTstar Report Service (Used with IoTstar-RC500)

IIoT 1
Software . Controller/Server
- Cloud Management Software: IoTstar
- SCADA System Software: AVEVA Edge
- Condition Monitoring Solution: ExoWISE
- Edge Controller WISE Series
- Communication Server: UA Series
- MQTT Communication Server: BRK Series

IIoT 2
Access Control Security/ Factory Automation
- WISE Surveillance Solution
- IP Camera iCAM Series
- Smart Access Control
- IIoT and Smart Phone Integration
- MQTT I/O Module MQ Series
- Stack Light Monitoring Module
- Emergency Voice/Visual Alert Module
- Industrial LED Message Display
- Bluetooth LE Gauge Master
- Temperature Data Logger
- Signal Conditioning Modules
- No-touch Infrared Sensor Switch



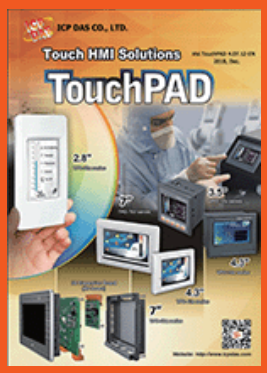
IIoT 3
Environmental Monitoring/ Mini Weather Station
- Smart Environmental Monitoring: CL Series
- Air Box: DL Series
- Mini Weather StationMotion: DLW Series
- Detector: PIR Series
- Industrial Sensor Network Detection: iSN Series
- Wireless Environmental Solution: iWSN/iXN/iSOS Series

Energy Management Solution
- Energy Management Solutions
- Energy Management Applications
- InduSoft
- Power Meter Concentrator
- Smart Power Meter
- True RMS Input Module
- DN-800 Series
- iWSN/iXN Solution
- Infrared Thermography Temperature Monitoring
- Portable Power Monitoring Suitcase
- RPS-4M Redundant Power Supply

WISE
Intelligent IIoT Edge Controller & I/O Module
- WISE IIoT Edge Controller I/O Module
- Cloud Management
- WISE Applications
- IIoT Edge Controller
- Intelligent I/O Module
- Intelligent Surveillance Solution
- Smart Phone Integration Solution
- Condition Monitoring 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

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