TAIWAN EXCELLENCE 2016

Microsoft Azure — Certified

Microsoft Azure — Certified

WISE-5231
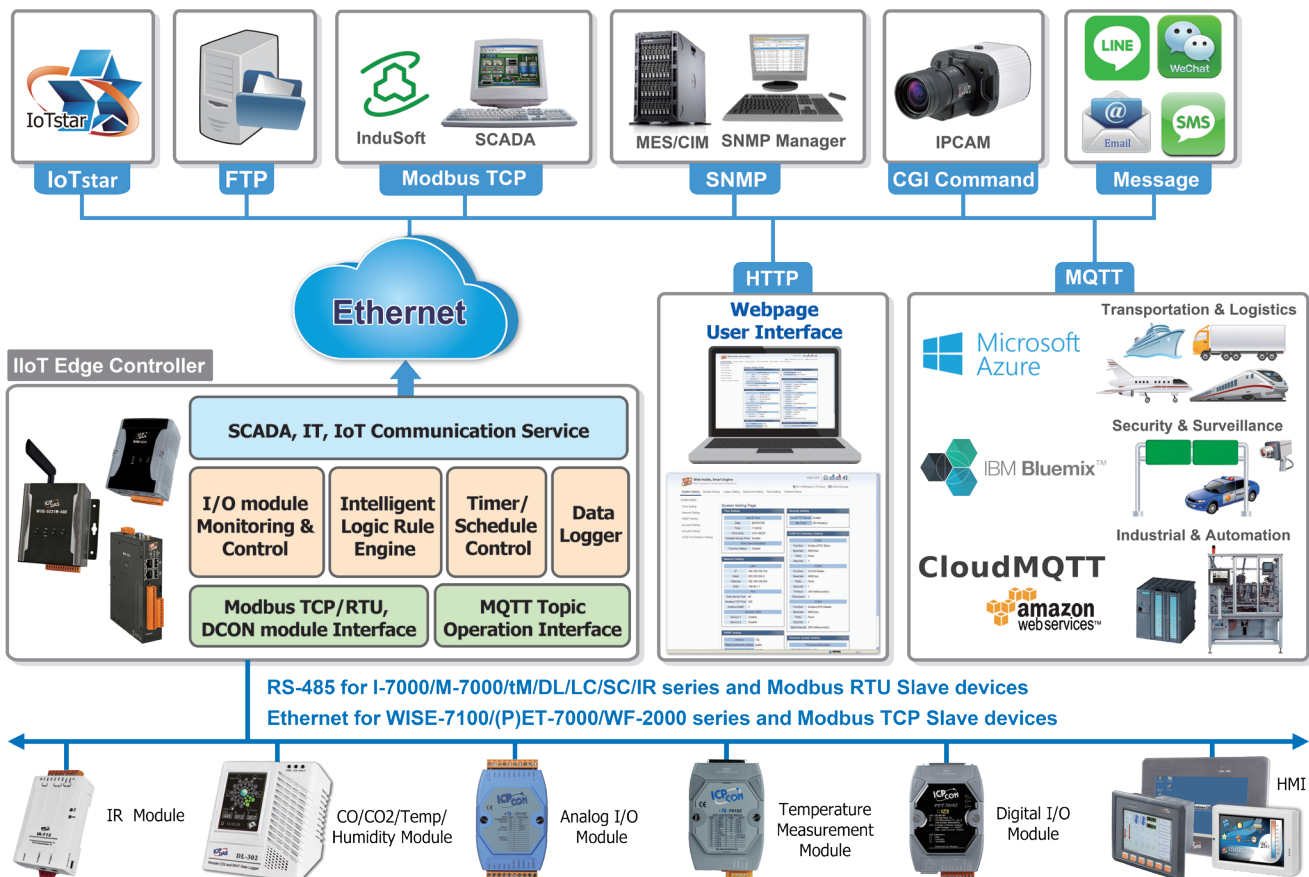
WISE-5231M-4GE

WISE-2241M

CE FC RoHS

IIoT Edge Controller: WISE-523x & WISE-224xM Series

◪ Features

- Runs on browsers, no extra software tool is required
- No more programming, Web pages provided for control logic editing
- IF-THEN-ELSE logic rules execution ability
- Support XV-board
- Support DCON or Modbus RTU Slave modules (Up to 32,COM3 and COM4 can connect to Max. 16 modules individually.); Support Modbus TCP Slave modules (Up to 16)
- Timer and Schedule functions supported
- Data logger and data files send back function supported

- Active I/O sending function for real-time data transfer
- CGI Command sending and receiving function supported for IP Camera and Network device
- Support Modbus TCP/RTU, SNMP, FTP and MQTT protocols
- Support Line, WeChat, SMS and Email real-time message transmission
- Support Connection with IoT Cloud Platform (Microsoft Azure and IBM Bluemix); Support IoTstar Cloud Management Software
- Support 4G/3G wireless data communication

▦ System Architecture

IoTstar

FTP

InduSoft / SCADA — Modbus TCP

MES/CIM / SNMP Manager — SNMP

IPCAM — CGI Command

LINE / WeChat / Email / SMS — Message

Ethernet

HTTP

MQTT

IIoT Edge Controller

SCADA, IT, IoT Communication Service

| I/O module Monitoring & Control | Intelligent Logic Rule Engine | Timer/ Schedule Control | Data Logger |

| Modbus TCP/RTU, DCON module Interface | MQTT Topic Operation Interface |

Webpage User Interface

Microsoft Azure

IBM Bluemix™

CloudMQTT

amazon web services™

Transportation & Logistics

Security & Surveillance

Industrial & Automation

RS-485 for I-7000/M-7000/tM/DL/LC/SC/IR series and Modbus RTU Slave devices

Ethernet for WISE-7100/(P)ET-7000/WF-2000 series and Modbus TCP Slave devices

IR Module

CO/CO2/Temp/ Humidity Module

Analog I/O Module

Temperature Measurement Module

Digital I/O Module

HMI

■ Introduction

WISE (Web Inside, Smart Engine) is a product series developed by ICP DAS that functions as control units for use in remote logic control and monitoring in various industrial applications. WISE offers a user-friendly and intuitive web site interface that allows users to implement IF-THEN-ELSE control logic on controllers just a few clicks away; no programming is required. With the built-in IF-THEN-ELSE logic engine, WISE can execute the automation logic in a stable and efficient way, and it also provides mathematic operation, Schedule and Email alarm message sending functions.

WISE provides more supports in I/O module connection, I/O data logging and IoT platform integration. It allows connection to XV-board, DCON I/O modules, and Modbus TCP/RTU Slave modules all together. The wide range of selection options enables flexibility in I/O module integration to meet the requirements from various applications. WISE provides the MQTT client, it can directly connect to the major public IoT Cloud platform (such as: Microsoft Azure or IBM Bluemix) and MQTT Broker. WISE also provide well thought-out CGI command functions to integrate with IP camera for the Access Control applications. Based on the ability as I/O module connection ability, Intelligent logic control, Data logging, and various communication protocols supported (SNMP, MQTT and Modbus TCP/RTU), WISE can help the IT/MIS/MES/SCADA system to manage the field side I/O modules and sensors efficiently in the application such as Unmanned Facility Room Monitoring, Intelligent Factory and Environment Monitoring. WISE is not just a Concentrator of I/O modules and Sensors; it is also a Gateway to transfer the sensor data to IoT Cloud platform. All of these make WISE the best choice in the IoT Age.

■ Features

▪ Simple, easy-to-use, no-programming-required for system development

WISE provides user-friendly Web UI pages for editing control logic on the controllers. To edit control logic, it only requires a browser to connect to the Web server on WISE. No extra software tool installation is needed. WISE enables implementation of logic edition by a few clicks on the mouse to set up and deploy logic rules without writing a single line of code.
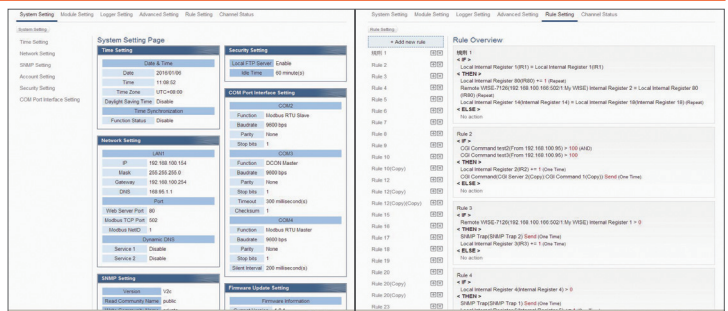

▲ WISE Web User Interface　　　　▲ Click and get done!

### ▪ IF-THEN-ELSE logic rules execution ability

WISE controller features an IF-THEN-ELSE logic rule engine; it offers IF-THEN-ELSE rules for users to set up the logic content. After completing rule edition and downloading rules to the WISE, the rule engine will loop execute the rules in accordance with the execution order under specific conditions.
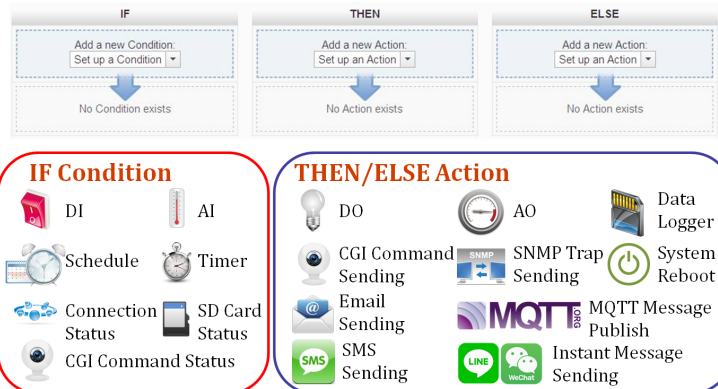
▲ The function overview of IF-THEN-ELSE rule engine

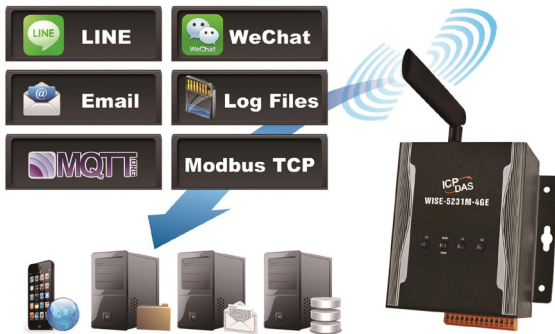### ▪ Connection ability to a variety of sensors and devices

WISE Controller allows to connect with sensors and devices that support Modbus TCP/RTU protocol for I/O monitoring. The ability to connect with Modbus TCP/RTU slave devices enables the flexibility and scalability for system implementation and allows to meet various requirements of the applications from the clients.
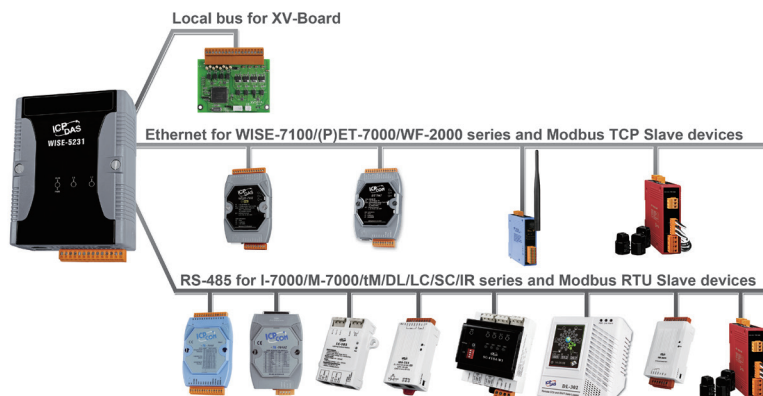
▲ Connect to a variety of sensors and devices

Support 4G/3G mobile network communication

In addition to Ethernet interface, WISE also provides 4G/3G mobile communication interface. It can send the real-time data of sensors and I/O modules, data logger files and alarm messages back to the control center by 4G/3G mobile network.

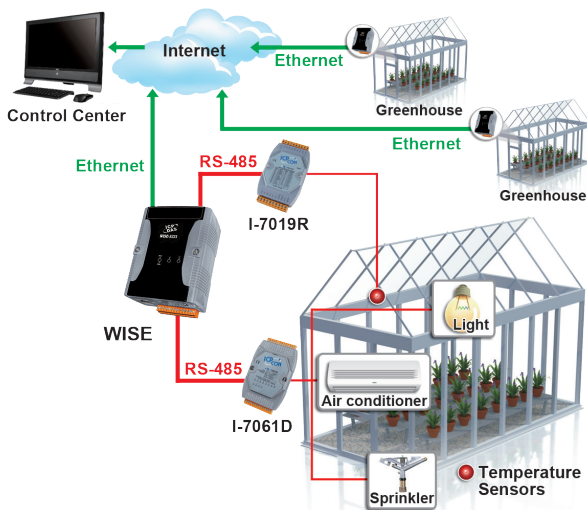## CGI Command sending & receiving for surveillance system integration

WISE supports full CGI command operations - CGI command sending and CGI command receiving. The CGI command sending action can be added to the logic edition as part of logic control in response to specific events. The CGI command receiving function enables WISE to receive the CGI commands from others network devices. The content of CGI command received can be used in IF condition statements to trigger the THEN/ELSE actions.

▲ 4G/3G Mobile Network Communication Function

▲ CGI Command Sending Function

Active I/O sending mechanism

In addition to the Modbus TCP/RTU slave function that enables SCADA system to poll the I/O channel data of the WISE, now WISE provides "Active I/O sending" mechanism (Modbus TCP master, SNMP Trap and MQTT publish). Based on the "Active I/O sending", WISE allows to send the I/O channel data of the controller actively to SCADA/IT system by event trigger (change of the I/O channel data) or periodic cycle. This function will improve the efficiency of the data communication between WISE and SCADA/IT system.

Data Logger operation

With the microSD card, WISE provides Data Logger function to real-time record the I/O channel data of the controller and sends the data files automatically by FTP to the control center for further administration management or data analysis.

▲ Data Logger function

▲ Active I/O sending mechanism
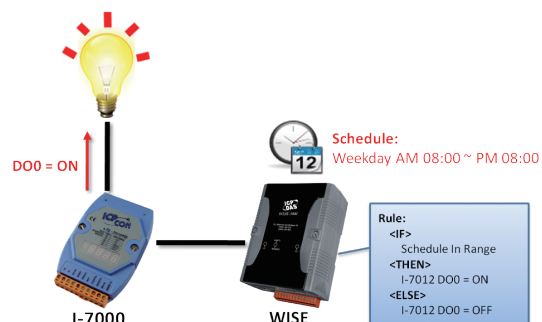
Provide Timer and Schedule operation

WISE features Timer and Schedule functions: It allows user to schedule specific date or time for control logic execution, or perform specific tasks such as time delay. With calendar user interface provided, Schedule setting can be more efficient and flexible.
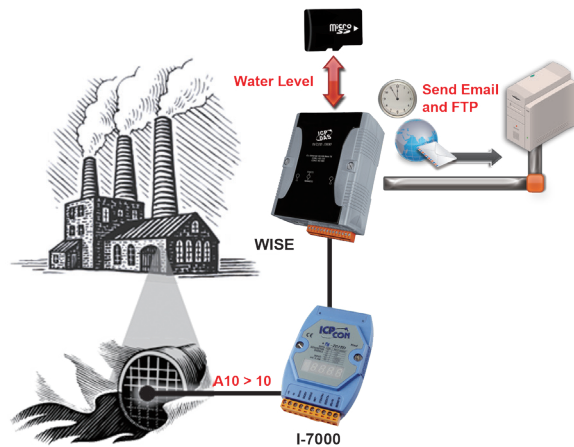
▲ Schedule function

Support LINE, WeChat, SMS and Email sending functions

WISE supports LINE, WeChat, SMS, and Email sending function for real-time message notification. The message sending action can be added to the logic edition as part of logic control to provide real-time message notification to the related personnel when an event occurs. In addition, when WISE connects with ICP DAS iCAM series IP cameras, WISE can send the pictures and videos to the manager by LINE and WeChat.


▲ LINE, WeChat, SMS and Email sending functions

A variety of protocols supported for integration with SCADA/IT/IoT System

Industry 4.0 is based on Internet of Things (IoT) that incorporates the technological concept of communicating and exchanging information between all facilities which brought manufacturing industry to a new era. The WISE Intelligent IoT Controller developed by ICP DAS is a perfect start point to facilitate the vision of the Smart Factory.
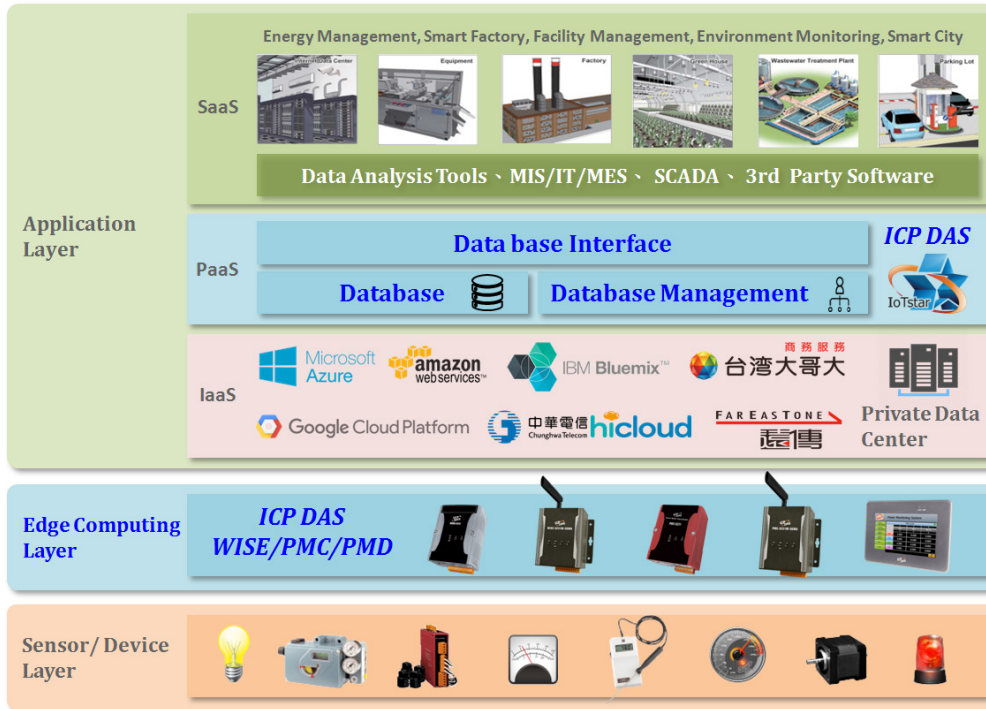
WISE provides powerful and flexible integration with the I/O modules and sensors at the field side, and also supports various IoT protocols for seamless integration with the SCADA/MIS/MES/IT/Network Management systems to transfer the real-time I/O information from the front-end modules (or sensors) to the back-end management systems. It also features reliable real-time I/O logic control and data logger functions. All of these features make WISE a perfect concentrator of sensor and I/O modules in the IoT age.
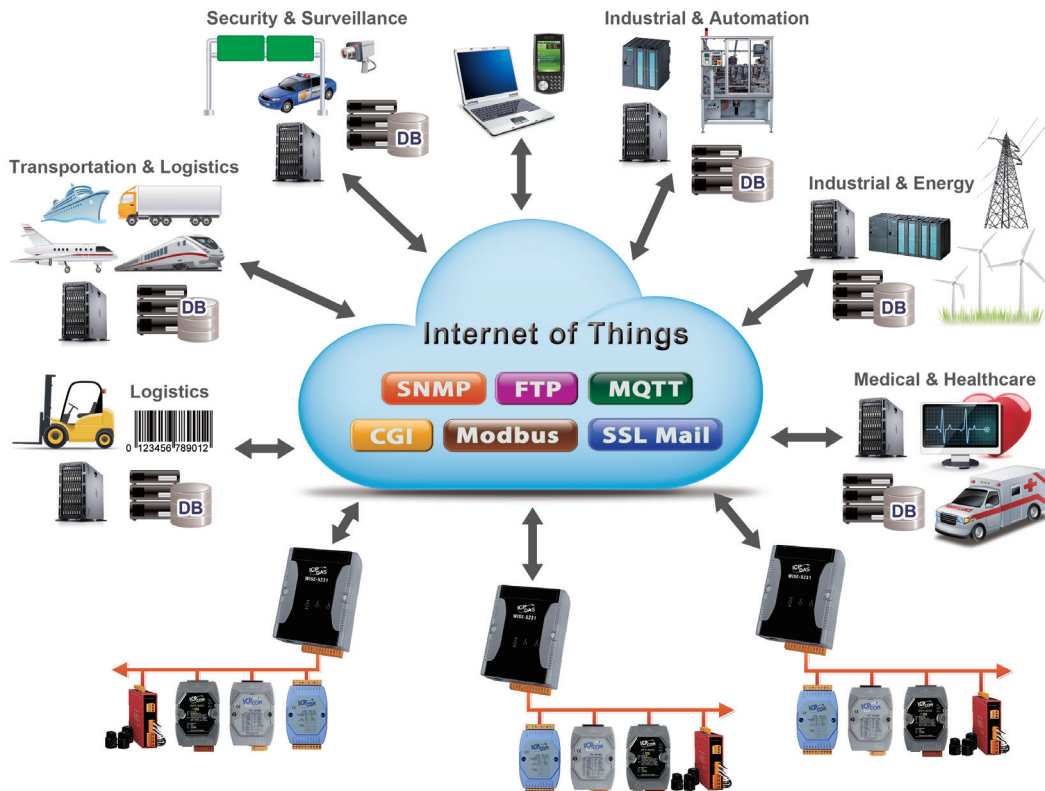
▲ A variety of protocols supported for SCADA/IT/IoT System

Connection with IoT Cloud Platform and ICP DAS IoTstar

WISE supports the connection ability with the IoT Cloud Platform as Microsoft Azure, IBM Bluemix, etc. It work as the concentrator in the IoT application to connect with sensors and I/O modules, collect and transfer the I/O channel data to the cloud platform for future data analysis. WISE also can receive the message which is published from the cloud platform for the corresponding actions at the field side. And besides, WISE supports to connect with ICP DAS IoTstar cloud management software. IoTstar enables the remote management service and firmware update to WISE, and the remote data service to receive the data log file of the sensors from the WISE and import the content of the data log file into the database.

Software Specifications

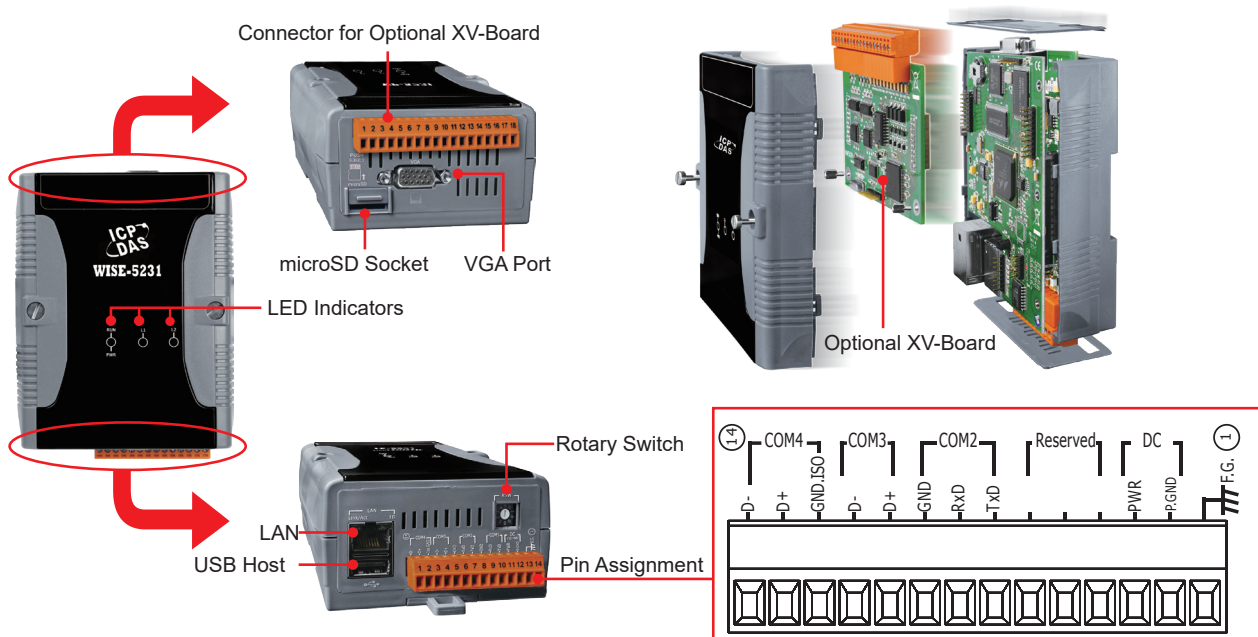| Function		Description
User-friendly and intuitive web site interface	Browser Interface	● Runs on browsers, no extra software tool is required ● No more programming, Web pages provided for control logic editing and system parameters setting.
Various options for easy I/O module integration	Local side I/O Interface	● Support XV-board (XV107, XV107A, XV110, XV111, XV111A, XV116, XV306, XV307, XV308, XV310)
	Remote side I/O Interface (RS-485)	● Support ICP DAS I-7000/M-7000/tM/DL/LC/SC/IR series module ● Support Modbus RTU Slave module
	Remote side I/O Interface (Ethernet)	● Support ICP DAS WISE-7100/(P)ET-7000/WF-2000 series module. ● Support Modbus TCP Slave module.
Intelligent Logic operation and data logger ability at field sites	IF-THEN-ELSE Logic operation	● Provide IF-THEN-ELSE logic rule editing, and the ability for IF-THEN-ELSE logic rules execution.
	I/O channel monitoring and control	● Offers various options for I/O channel settings; for example: deadband setting for AI signals, linear scale setting, temperature degree in Celsius or Fahrenheit setting, power on value setting for DO channel, pulseoutput setting and DI counter setting, etc.
	Timer	● Perform the timing function. The status of Timer can be included in IF condition statements to trigger the THEN/ELSE actions.
	Schedule	● Perform the prescheduled routine tasks. The status of Schedule can be included in IF condition statements to trigger the THEN/ELSE actions. "Calendar" and "Weekly repeat" schedule setting UI are provided.
	Realtime message sending function	● Support LINE, SMS, Email for realtime message sending. WISE-5236 & WISE-2246M support WeChat instant message sending function.
	CGI Command	● Perform CGI command sending and receiving functions. The content of CGI command receiving can be used in IF condition statements to trigger the THEN/ELSE actions.
	Data Logger	● Perform Data Logger function to real-time record the I/O channel data of the controller by Period or Event Trigger operation.
	Internal Register	● Work as a variable to hold the temporary value, and provide the basic mathematical operation.
Various protocols for seamless integration with SCADA/MIS/ MES/IT/ Network Management systems	Real-Time I/O channel data	● Support Modbus TCP/RTU protocol for SCADA system. ● Support SNMP and MQTT protocols for the integration with MIS/MES/IT/Network Management systems. ● CGI Command sending and receiving function supported for the integration with IP Camera and Network devices. ● Active I/O sending mechanism supported.
	Historical I/O channel data files	● FTP Server/Client ability for the maintenance of data logger files and the data logger files automatically send back operation. ● Provide data recovery mechanism so that when experiences network disconnection, the data log files will be kept in WISE, and be recovered after the network is resumed. ● Provide alarm notification mechanism so that when microSD card is damaged, the data log file will be stored in WISE to ensure zero data loss of the data logger.
	Communication Service	● DDNS (Dynamic DNS) service supported ● WISE-523xM-4GE/4GC support 4G Wireless data comm.; WISE-5231M-3GWA support 3G Wireless data comm.
	IoT Gateway Capability	● Connection with Microsoft Azure and IBM Bluemix IoT Cloud platform. ● Connection with ICP DAS IoTstar IoT Cloud Management Software

■ Hardware Specifications

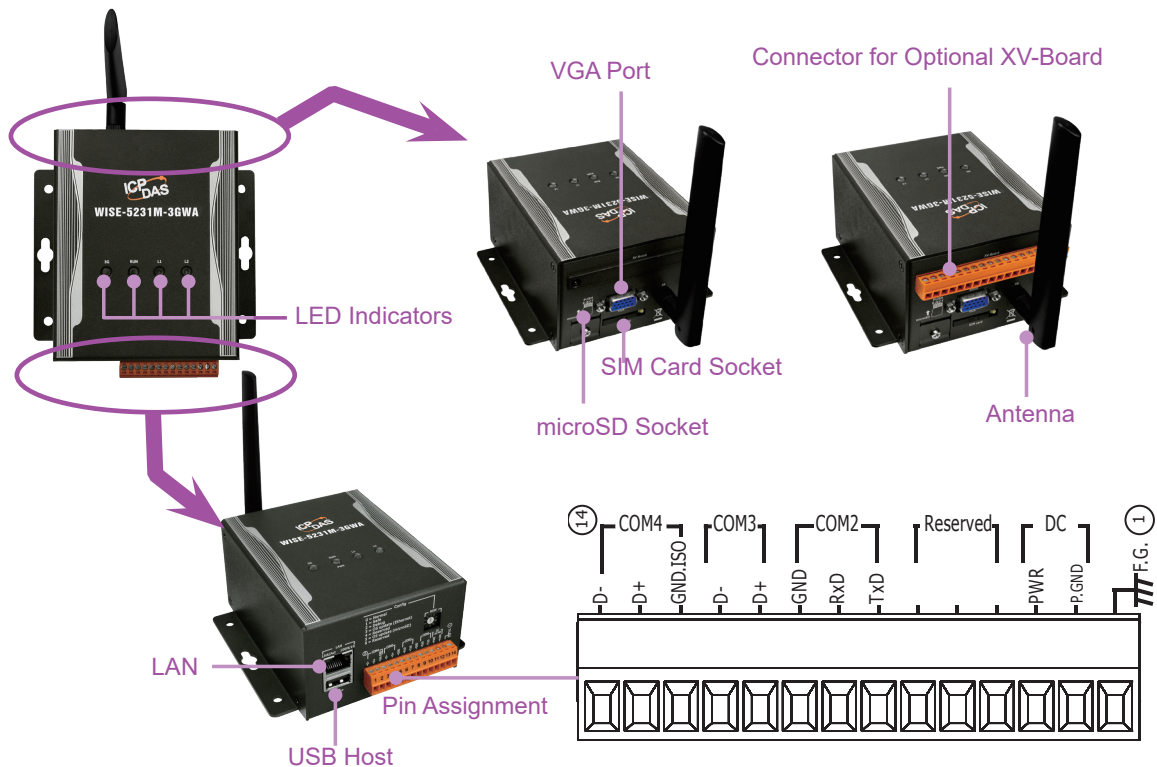| Model	WISE-523x	WISE-5231M-3GWA	WISE-523xM-4GE/4GC
System			
CPU	32-bit ARM CPU		
microSD Expansion	Built-in one 4 GB microSD card (support up to 32 GB microSDHC card)		
Communication			
Ethernet	RJ-45 x 1, 10/100/1000 Base-TX (Auto-negotiating, Auto MDI/MDI-X)		
COM 2	RS-232 (TxD, RxD, GND), non-isolated, Speed: 115200 bps max.		
COM 3/COM 4	RS-485 (Data+, Data-), Speed: 115200 bps max. COM 4 provides 2500 V_{DC} isolation		
LED Indicators			
Indicators	Power/Run LED(Green, Red), L1(Green), L2(Green)	Power/Run LED(Green, Red), 3G/4G LED(Green), L1(Green), L2(Green)	
I/O Module Support			
Local I/O Module	Yes, one XV-board		
Remote I/O Module	COM3 can connect to Max.16 DCON or Modbus RTU Slave modules; COM4 can connect to Max.16 DCON or Modbus RTU Slave modules; LAN interface can connect to Max. 16 Modbus TCP Slave modules.		
Power Requirements			
Input Range	12 to 48 V_{DC}		
Power Consumption	4.8 W	6.5W	
Mechanical			
Dimensions/Installation (W x L x H)	91 mm x 132 mm x 52 mm/ DIN-Rail Installation	117 mm x 126 mm x 58 mm / Wall Mounting / DIN-Rail Installation	
Environmental			
Temperature/Humidity	Operating Temperature: -25 °C to +75 °C; Storage Temperature: -40 °C to +80 °C; 10 to 90% RH, Non-condensing		
3G System			
Frequency Band	-	WCDMA 850/900/1800/1900 MHz	4GE : WCDMA 850/900/2100 MHz 4GC : WCDMA 900/2100 MHz;TD-SCDMA 1900/2100 MHz; CDMA2000 (BC0) 800 MHz
4G System			
Frequency Band	-		4GE : FDD LTE: B1/B3/B5/B7/B8/B20 MHz. 4GC : FDD LTE: B1/B3/B8 MHz; TDD LTE: B38/B39/B40/B41 MHz.

Model	WISE-224xM
System	
CPU	32-bit ARM CPU
microSD Expansion	Built-in one 4 GB microSD card (support up to 32 GB microSDHC card)
Communication	
Ethernet	RJ-45 x 2, 10/100/1000 Base-TX (Auto-negotiating, Auto MDI/MDI-X)
COM 2	RS-232 (TxD, RxD, GND), non-isolated, Speed: 115200 bps max.
COM 3/COM 4	RS-485 (Data+, Data-), Speed: 115200 bps max. COM 4 provides 2500 V_{DC} isolation
LED Indicators	
Indicators	Run LED(Green), 4G LED(Orange), Power LED(Red), L1(Green), L2(Orange), L3(Red)
I/O Module Support	
Local I/O Module	Yes, one XV-board
Remote I/O Module	COM3 can connect to Max.16 DCON or Modbus RTU Slave modules; COM4 can connect to Max.16 DCON or Modbus RTU Slave modules; LAN interface can connect to Max. 16 Modbus TCP Slave modules.
Power Requirements	
Input Range	12 to 48 V_{DC}
Power Consumption	4.8W
Mechanical	
Dimensions/Installation (W x L x H)	33 mm $\times$ 160 mm $\times$ 129mm DIN-Rail Installation
Environmental	
Temperature/Humidity	Operating Temperature: -25 °C to +75 °C; Storage Temperature: -40 °C to +80 °C; 10 to 90% RH, Non-condensing

■ Appearance

WISE-5231

Connector for Optional XV-Board

microSD Socket   VGA Port

LED Indicators

Optional XV-Board

Rotary Switch

LAN

USB Host   Pin Assignment

COM4   COM3   COM2   Reserved   DC

D- D+ GND.ISO   D- D+ GND RxD TxD   PWR P.GND   F.G.

WISE-5231M-4GE/4GC & WISE-5231M-3GWA

VGA Port   Connector for Optional XV-Board

LED Indicators

SIM Card Socket

microSD Socket   Antenna

LAN

Pin Assignment

USB Host

COM4   COM3   COM2   Reserved   DC

D- D+ GND.ISO   D- D+ GND RxD TxD   PWR P.GND   F.G.

WISE-224xM

Power Input
Rotary Switch
VGA Port

LED Indicators

2 × LAN
2 × USB 2.0

microSD Socket

TxD
RxD   COM1
GND
TxD
RxD   COM2
GND
D+
D-   COM3
ISO.GND
D+
D-   COM4
ISO.GND

Optional XV-board
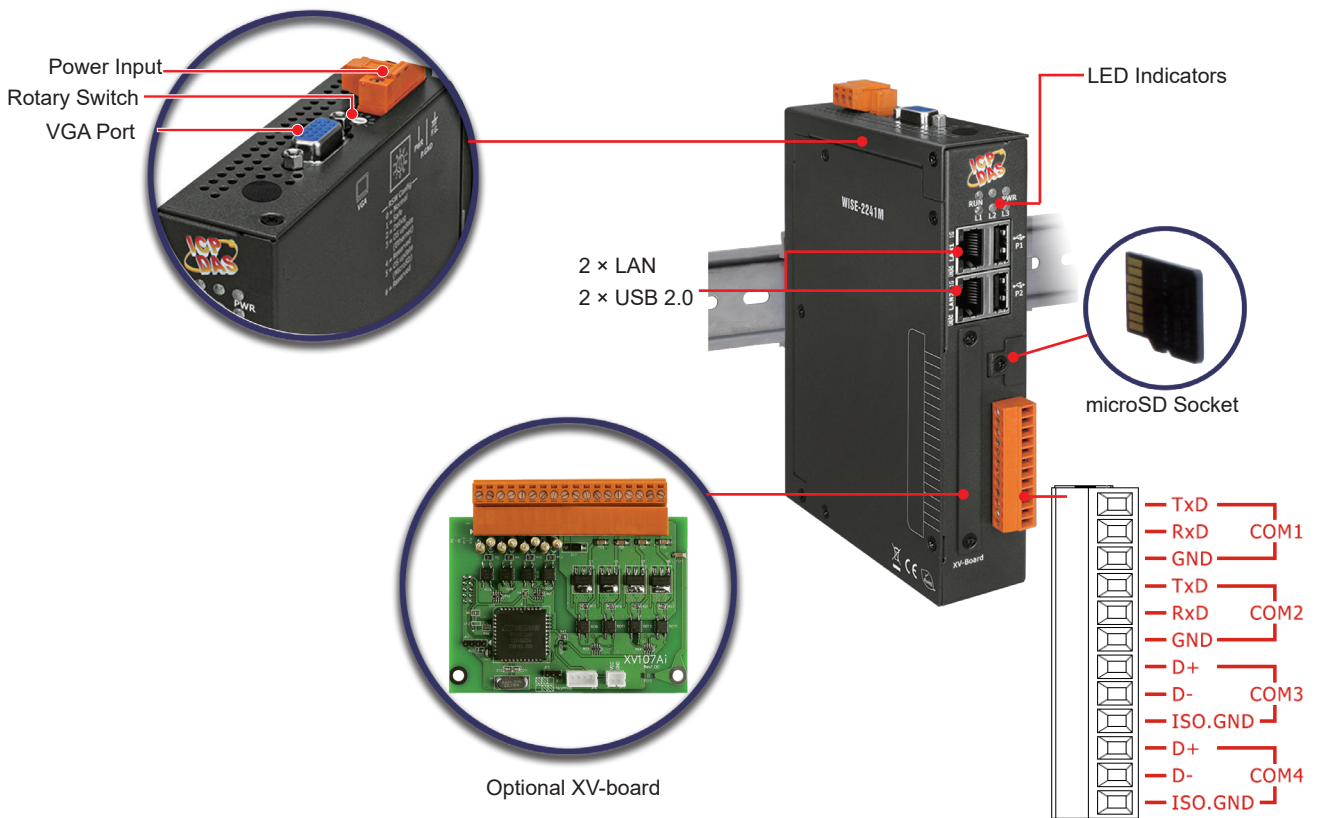
📁 Ordering Information

Module	Description
Standard Function	
WISE-5231 CR	IIoT Edge Controller
WISE-5231M-3GWA CR	IIoT Edge Controller (Support 3G Wireless data communication)
WISE-5231M-4GE CR	IIoT Edge Controller (Support 4G Wireless data communication; Frequency Band for EMEA, Korea, Thailand, India and Taiwan)
WISE-5231M-4GC CR	IIoT Edge Controller (Support 4G Wireless data communication; Frequency Band for China)
WISE-2241M CR	IIoT Edge Controller

Module	Description
Standard Function + Support WeChat Message Sending	
WISE-5236 CR	IIoT Edge Controller (For China only)
WISE-5236M-4GC CR	IIoT Edge Controller (Support 4G Wireless data communication; For China only)
WISE-2246M CR	IIoT Edge Controller (For China only)

Please note: An Enterprise WeChat account in China is required for WISE to send the messages to the members under the enterprise WeChat account.

📁 Accessories

NS-205 CR	Unmanaged 5-Port Industrial Ethernet Switch (RoHS)
MDR-20-24 CR	24V/1A, 24 W Power Supply with DIN-Rail Mounting (RoHS)
DIN-KA52F CR	24V/1.04A, 25 W Power Supply with DIN-Rail Mounting (RoHS)