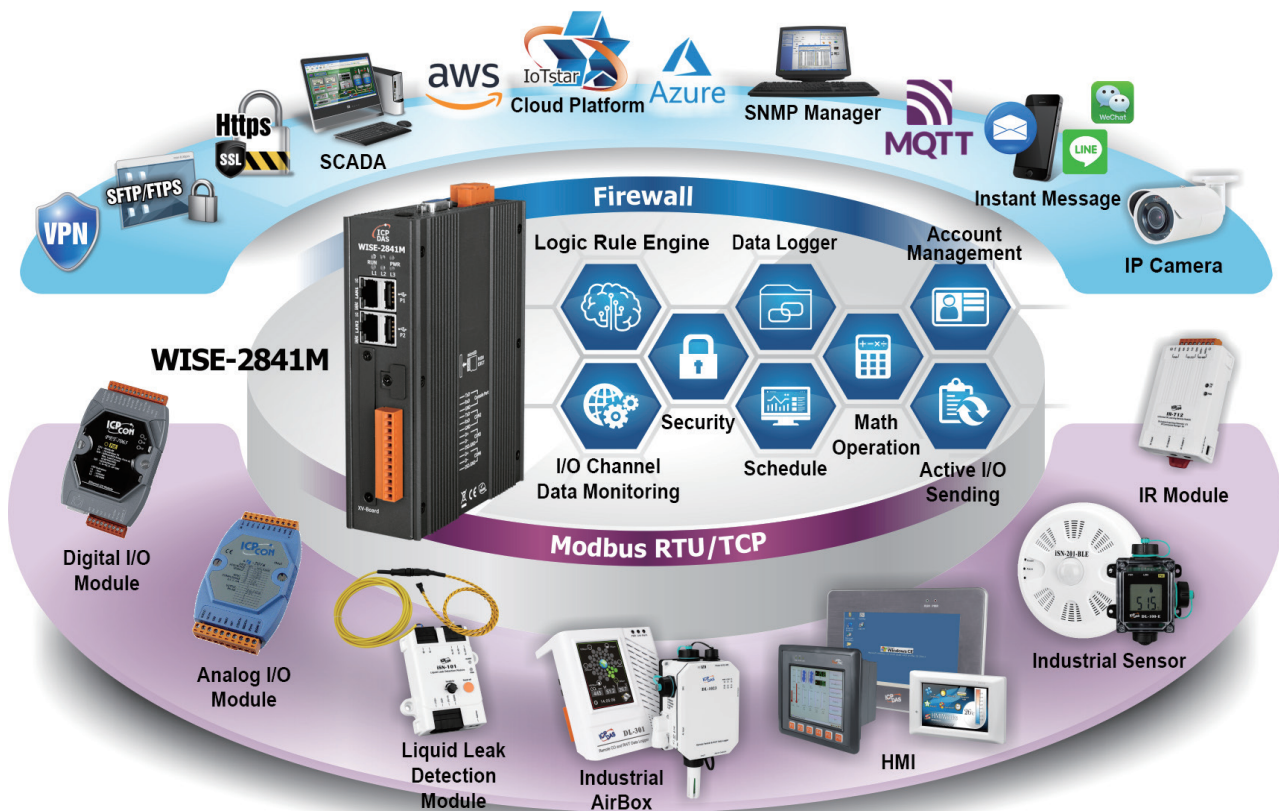**WISE-284xM**

Features

- No more programming, Web pages provided for system and logic rule setting
- Support XV-board, DCON, & Modbus TCP/RTU Slave modules
- IF-THEN-ELSE logic rules execution ability
- Data logger and data files send back function supported
- Timer and Schedule functions supported
- Support Line, WeChat, SMS and Email message notification
- Support Modbus TCP/RTU, SNMP, MQTT, FTP and CGI protocols
- Support connection with IoT Cloud Platform (Microsoft Azure, IBM Bluemix, Amazon Web Services) and IoTstar Cloud Management Software
- Support 4G wireless data communication
- Complete information security protection mechanism - HTTPS, VPN, SNMP v3, SFTP, FTPS, and Blacklist/Whitelist

Introduction

The Advanced IIoT Edge Controller - WISE-284xM inherits the features of the original WISE series controllers: perform system setting and monitoring by browser, powerful IF-THEN-ELSE logic operation capability, connection ability to a variety of I/O modules, support data computing and real-time message notification functions. In order to meet the requirement of high level information security protection of the IoT(Internet of Things) system, WISE-284xM provides a variety of encrypted communication protocols as below. With the HTTPS protocol supported by WISE-284xM, users can securely access the WISE web page without worrying about the setting being stolen. Through the SNMP v3 protocol, WISE-284xM can be perfectly integrated with the IT and Network management system. Users can securely download data log files stored from WISE through SFTP and FTPS protocols. WISE-284xM supports the setting of blacklist and whitelist, which allows users to filter and block the specific domains. With the equipped VPN function, WISE-284xM can connect to devices in a specific secure network domain to completely isolated from the threats of information security outside. In the integration with Cloud Platform, WISE-284xM can connect to the IoT services of Amazon Web Services, Microsoft Azure and IBM Bluemix cloud platforms. It also can integrate with the IoTstar Cloud Management software provided by ICP DAS. Based on the powerful integration capabilities with IT/IoT network environment, it make WISE-284x series modules as the best IIoT Edge controller in the IoT Age.
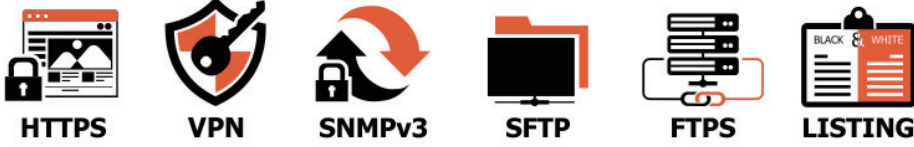
System Architecture

Advanced
IIoT Edge Controller

A comprehensive upgrade of information security mechanism

HTTPS · **VPN** · **SNMPv3** · **SFTP** · **FTPS** · **LISTING**

WISE-2841M

I/O Module

Industrial AirBox

Liquid Leak Detection Module

IP Camera

In the era of Internet of things, information security has become the key point of the IIoT system that cannot be ignored. In the past, people frequently assume "Hackers will not target devices within industrial networks, they are only interested in attacking PCs and enterprise networks", "The industrial equipment is old, so it is relatively safe". However, with the increasing demand of networking connection capability for industrial equipment, old industrial equipment may be vulnerable once being connected to the network. When a hacker penetrates and takes over the industrial system, it may be subjected to a huge amount of extortion, or the system will be shut down and data will be destroyed. Therefore, improving the overall information security of the industrial system and strengthen the reliability of cloud connections are the core in building an industrial IoT system.

In order to meet the high level requirements of information security for the Industrial IoT system, ICP DAS has launched the Advanced IIoT Edge Controller: WISE-284xM series. It supports a variety of information security functions and encrypted data communication protocols, and provides the following information security mechanism according to the different levels of protection requirements:

Network Security

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

System Security

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

Data Security

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

◾ Identity Authentication Security

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

◾ Cloud Backup Mechanism

However, no matter how robust the security mechanism is, the threat of being breached is always exist. Therefore, in addition to the security mechanism, the system recovery function is also indispensable, so that the original system setting can be quickly restored to WISE after being damaged by the network attack. WISE-284xM can connect to the IoT Cloud Management Software-IoTstar launched by ICP DAS. In addition to collecting the sensor data sent by WISE, and importing them to Database, IoTstar can also perform the system setting backup operation automatically for the WISE controllers connect to IoTstar. In this way, even if WISE-284xM is attacked and damaged, as long as a new WISE is replaced, the original system setting can be restored to the new WISE, so that the operations on WISE will return to normal immediately without worrying about the loss of downtime caused by system damage.
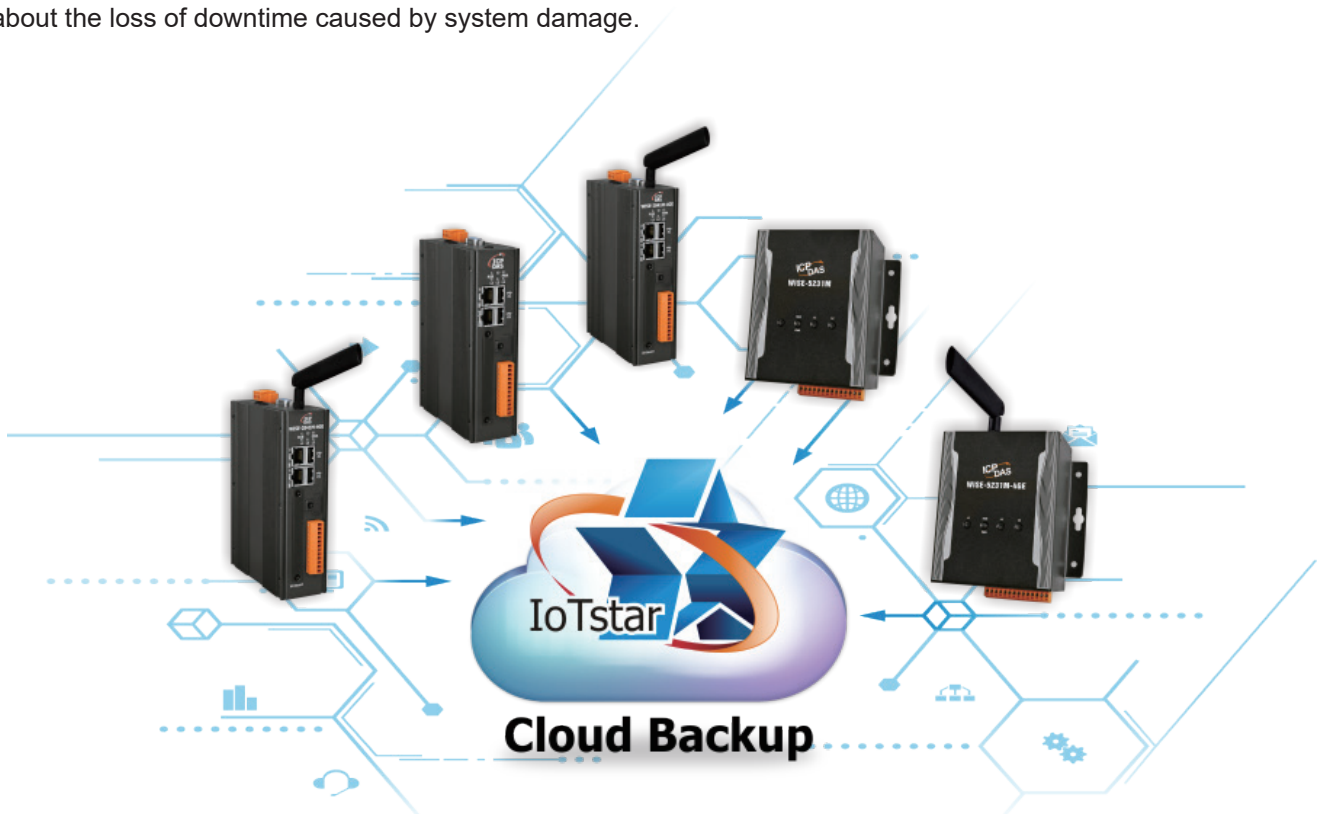
The Advanced IIoT Edge Controller - WISE-284xM inherits the features of the original WISE series controllers: perform system setting and monitoring by browser, powerful IF-THEN-ELSE logic operation capability, connection ability to a variety of I/O modules, support data computing and real-time message notification functions. Now it also features greatly improved information security mechanism. The WISE-284xM is perfect to serve as the operational core of the industrial IoT system.

Hardware Specifications

Model	WISE-284xM Series
System	
CPU	Quad-core ARM CPU, 1.6 GHz/Core
VGA port	Yes (Only for system diagnostic and recovery operations)
SDRAM/Flash	DDR3 1 GB / 8 GB
microSD	Built-in one 4 GB microSD card (support up to 32 GB microSDHC card or 2 TB microSDXC card)
Communication Interface	
Ethernet	RJ-45 x 2, 10/100/1000 Base-TX (Auto-negotiating, Auto MDI/MDI-X)
COM 2	RS-232 (TxD, RxD, GND), non-isolated, Speed: 115200 bps max
COM 3/COM 4	RS-485 (Data+, Data-), Speed: 115200 bps max. Support 2500 VDC isolation.
I/O Module Support	
Local Side	Support ICP DAS XV-board
Remote Side	* 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)
iCAM IP Camera	up to 12
Power Requirements	
Input Range	12 to 48 VDC
Consumption	Ethernet version: 4.8 W; -4GE/4GC/3GWA version: 6.5 W
Mechanical	
Casing	Metal
Dimensions (W x L x H; mm)	44 x 164 x 129
Installation	Wall Mounting Installation or DIN-Rail Installation (Optional)
Environmental	
Temperature/ Humidity	Operating Temperature: -25 ° C to +75 ° C; Storage Temperature: -40 ° C to +80 ° C; 10 to 90% RH, Non-condensing
Mobile Network Communication	
WISE-284xM-4GE	FDD LTE: B1/B3/B5/B7/B8/B20 bands (Frequency Band for EMEA, Korea, Thailand, India and Taiwan) WCDMA: 850/900/2100 MHz
WISE-284xM-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

Software Specifications

Function		Description
Easy to use	Web Page Interface	● No more programming ! Runs on browsers for system and logic rule setting. (Supports HTTPS Protocol)
Options for Sensor Integration	Local Side	● Support XV-board(XV107, XV107A, XV110, XV111, XV111A, XV116, XV306, XV307, XV308, XV310).
	Remote Side (RS-485)	● Support ICP DAS I-7000/M-7000/tM/DL/LC/IR/iSN and Modbus RTU Slave module.
	Remote Side (Ethernet)	● Support ICP DAS WISE-7100/(P)ET-7000/WF-2000 and Modbus TCP Slave module.
Edge Computing Ability at Field Sites	IF-THEN-ELSE Logic Operation	● Built-in advanced IF-THEN-ELSE logic engine provides for the execution of logic rules.
	I/O Channel Monitoring & Control	● Provides real-time monitoring and setting of I/O channel of sensor.
	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 tasks. The status of Schedule can be included in IF condition statements to trigger the THEN/ELSE actions. "Calendar" and "Weekly repeat" setting UI are provided.
	Instant Message Sending	● Support LINE, WeChat, SMS, and Email 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 sensor data by Period or Event Trigger operation.
	Internal Register	● Work as a variable to hold the temporary value, and provide the basic mathematical operation. (Supports "Retain Variable" function for all Internal Registers)
Seamless Integration with SCADA/ IT/IoT Systems	Real-Time Sensor Data	● Support Modbus TCP/RTU, CGI, SNMP(v1, v2c & v3) and MQTT protocols for the integration with SCADA/IT/IoT systems. Active I/O sending mechanism supported.
	Historical Sensor Data Files	● FTP, SFTP & FTPS protocols supported for the maintenance of data log files and the data files automatically send back & recovery when disconnected network is resumed. ● Provide alarm notification mechanism so that when microSD card is damaged, the data log file will be stored in WISE to prevent data loss.
	Communication Service	● DDNS (Dynamic DNS) service supported. ● Supports VPN Client operation. ● 4G version WISE-284xM controller support 4G wireless data communication.
	IoT Gateway Capability	● Support connection with IoT Cloud Platform (Microsoft Azure, IBM Bluemix & Amazon Web Services) and IoTstar Cloud Management Software.

Supported I/O Module

► Module Specification

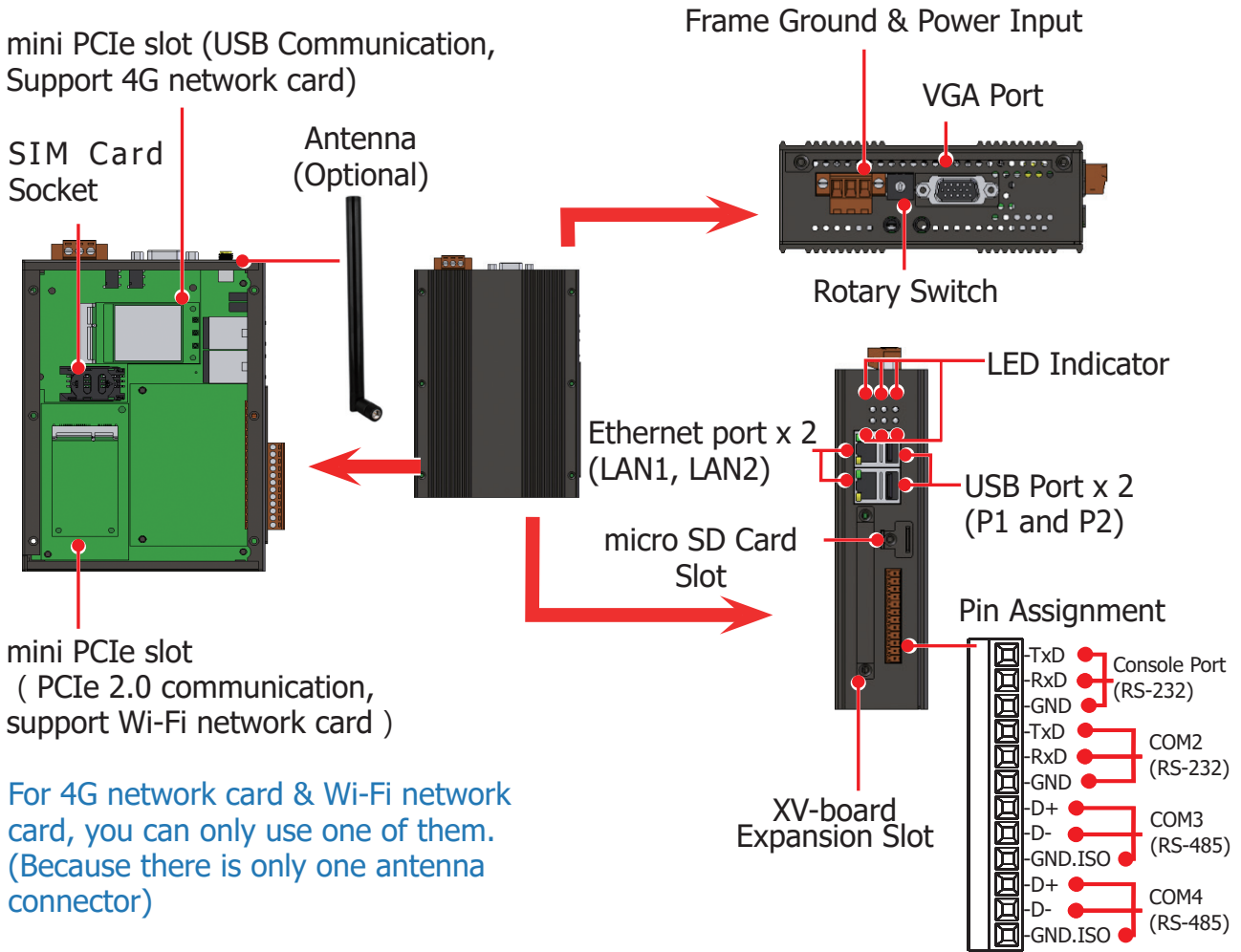| I/O Module Specification		Description	Max. Connection Allowed
I/O Module for Local site	Local Bus	ICP DAS: XV-Board series module	1
I/O Module for Remote site	DCON by RS-485	ICP DAS : I-7000/DL series module	COM3 and COM4 can connect up to 16 modules individually.
	Modbus RTU by RS-485	ICP DAS : M-7000/tM/DL/LC/IR 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 12 cameras.

► List of Supported Modules

Function		Model 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		Model 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
	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		Model List
t(P)ET Module		
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
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	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
LC Module		
DI/DO	AC Digital Input	LC-101H, LC-103H
	DC Digital Output	LC-131
DL Module		
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
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
Others	Multi-Function	XV306, XV307, XV308, XV310
Modbus RTU/TCP Slave Module		
Coil Output / Discrete Input / Input Register / Holding Register		

Appearance

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

SIM Card Socket

Antenna (Optional)

Frame Ground & Power Input

VGA Port

Rotary Switch

Ethernet port x 2 (LAN1, LAN2)

LED Indicator

USB Port x 2 (P1 and P2)

micro SD Card Slot

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

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

XV-board Expansion Slot

Pin Assignment

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

Ordering Information

■ Advanced IIoT Edge Controller

Module	Description
WISE-2841M CR	Advanced IIoT Edge Controller (Metal casing; China only)
WISE-2841M-4GE CR	Advanced IIoT Edge Controller (Metal casing; Built-in 4G Wireless module;; Frequency Band for EMEA, Korea, Thailand, India and Taiwan; **Asia only**)
WISE-2841M-4GC CR	Advanced IIoT Edge Controller (Metal casing; Built-in 4G Wireless module; Frequency Band for China; **Asia only**)

Accessories

ANT-Base-01	5 dBi 4G External Antenna Base (1.5 Meter)	3S001-2	RG58A/U (1 Meter; SMA male to SMA Female)
EC25-E	4G IoT LTE Category 4 Module ; Frequency Band for EMEA, Korea, Thailand, India and Taiwan	EC20-CE	4G IoT LTE Category 4 Module; Frequency Band for China