



Seamless Integration of

IT & OT

Connect Devices to the Cloud





**IIoT
Cybersecurity**

UA Series

IIoT Communication Server

 Supports OPC UA, MQTT, SNMP, and RESTful API Communication


 Direct OT Data Logging to Databases with Data Recovery

 Mobile Notifications



Cybersecurity I/O Module

 Supports OPC UA, MQTT, and RESTful API Communication

 Mobile Notifications



Advanced



UA-2841M

Standard



UA-2241M Series

UA-5231 Series

Compact



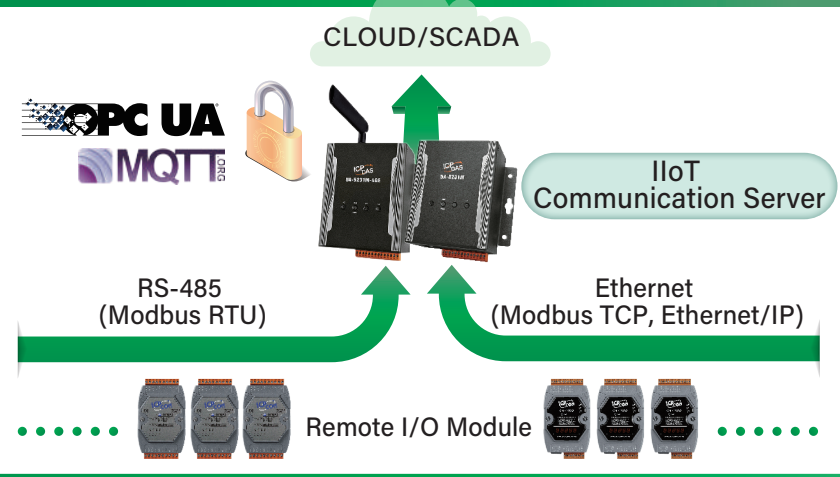
UA-7231M



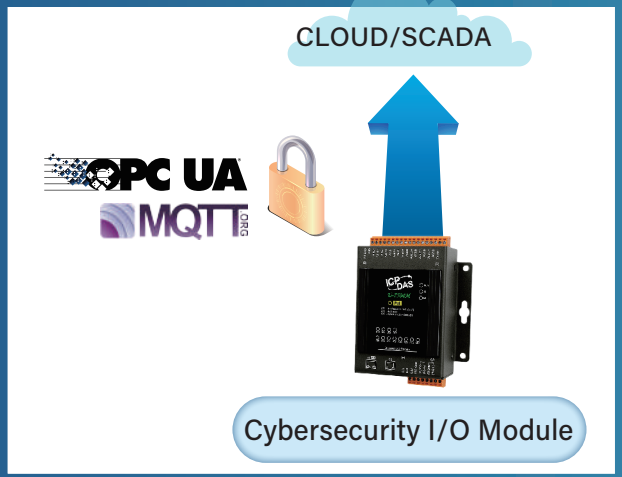
U-7500 Series

Product Selection Based on Application Needs

Applications with High-Density I/O

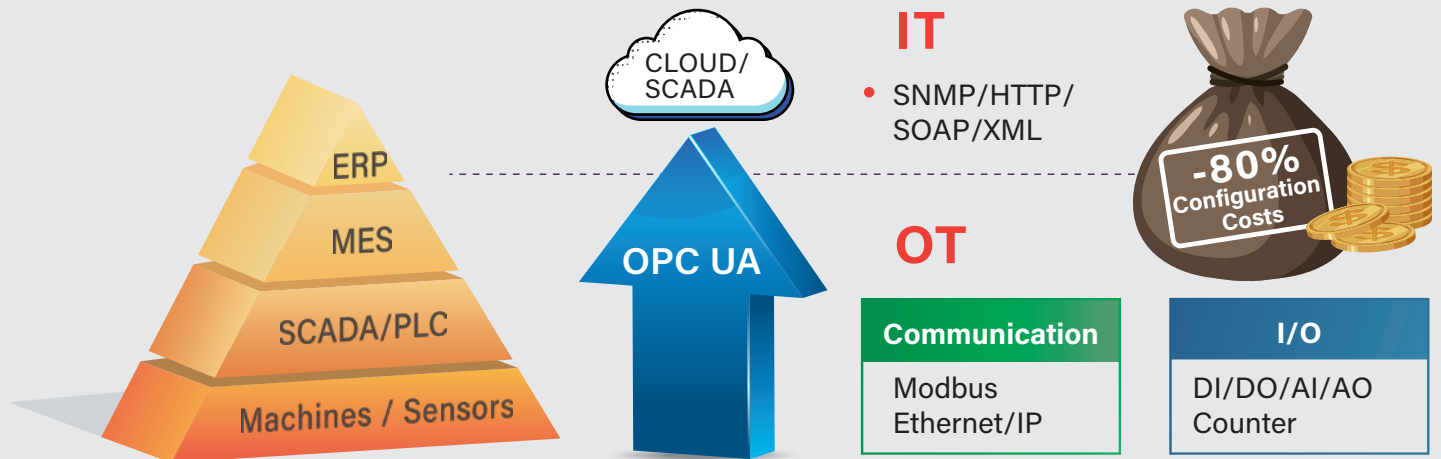


Applications with Low-Density I/O



OPC UA vs Modbus

Reduce up to 80% of configuration costs with the OPC UA communication protocol—helping MES and software engineers work more efficiently, and giving your company a significant competitive advantage.



OPC UA Easy Configuration

- ▶ Step 1: Obtain the OPC UA Server URL
- ▶ Step 2: Connect to the Server via the OPC UA Client
- ▶ Step 3: Browse or subscribe to tags and information on the Server — displayed in a tree structure

Modbus Complicated Configuration

- Step 1: Check the device IP list to obtain the IP address of the connected device
- Step 2: Configure the Modbus Master software to establish an IP connection
- Step 3: Refer to the device register map to get supported function codes and address ranges
- Step 4: Set up the Modbus Master software to acquire data from the device
- Step 5: Create a tag list in the software and assign identifiable tag names
- Step 6: Convert device data into real engineering values and map them to tags

IIoT Communication Server

Seamless IT/OT Integration
Real-Time Equipment-to-Cloud Connectivity



Model	Advanced	Standard		Compact
	UA-2841M	UA-2241 Series	UA-5231 Series	UA-7231M
				
Hardware Specifications				
Ethernet Interface	10/100/1000 Base-TX x 2	10/100/1000 Base-TX x 2	10/100/1000 Base-TX x 1	10/100 Base-TX x 1 PoE
RS-232/RS-485	1 x RS-232 (console) 1 x RS-232 2 x RS-485 (2500 VDC Isolation)			1 x RS-232 (console) 1 x 5-wire RS-232/485 (2500 VDC Isolation)
XV Expansion Board Slot	Optional: Add one XV511i to expand 4 RS-485 ports or Optional: Add one XV107 / 107A / 110 / 111 / 111A / 116 / 119 / 303 / 306 / 307 / 310 to expand I/O channels			-
Wireless Communication	-	4G Model Available	4G Model Available	-
Dimensions (mm)	42 x 164 x 130	35 x 167 x 119	117 x 126 x 58	97 x 114 x 38
IT Communication Protocols				
OPC UA Server	Up to 50 Sessions Up to 8000 Tags	Up to 20 Sessions Up to 8000 Tags		
MQTT Broker	non-SSL & SSL / WebSocket			
	Up to 2100 Connections	Up to 400 Connections		
MQTT Client	non-SSL & SSL			
	Up to 500 Connections	Up to 200 Connections		
SNMP v3 Agent	Read 10 Commands & Write 10 Commands	-		
RESTful	Read 20 Commands & Write 1 Command	-		
OT Communication Protocols				
Modbus RTU/ASCII Master	32x3 Ports=96 Devices			32x1 Ports=32 Devices
Modbus TCP Master	Up to 250 Devices	Up to 100 Devices		
EtherNet/IP	Up to 125 Devices	Up to 50 Devices		
Support EIP-2000 Series and Universal Robots Products				

Direct OT Data Logging to Databases with Data Recovery Function

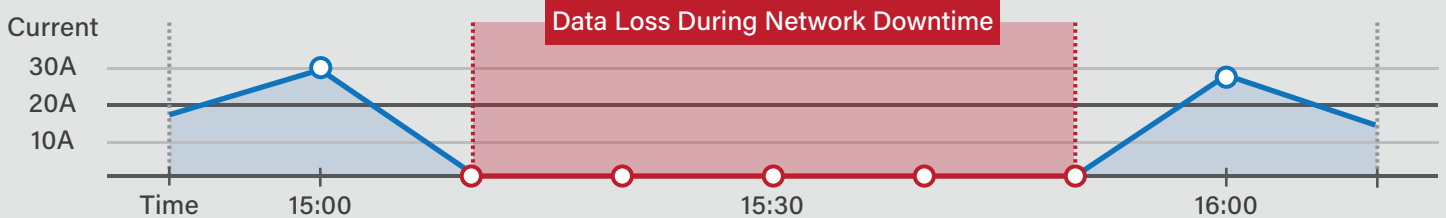
The UA Series Communication Servers support data logging, allowing collected data to be periodically saved in CSV format on a local microSD card and written to a remote database.



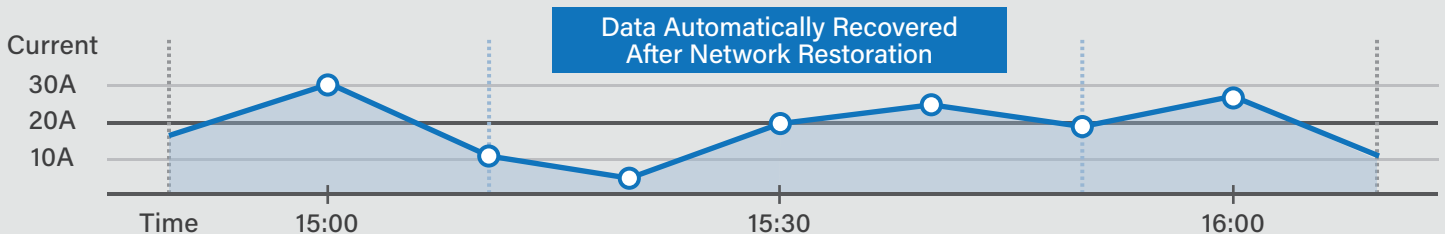
Data Recovery Function

In typical data logging, values are collected at fixed intervals and stored in a database. However, if a network disconnection occurs, all data during the downtime is lost and cannot be recovered. The IIoT Communication Server addresses this issue with a data recovery function. During a network outage, all collected data is saved to the server's SD card. Once the connection is restored, the server retrieves the stored data and uploads it to the database, ensuring no historical data is lost.

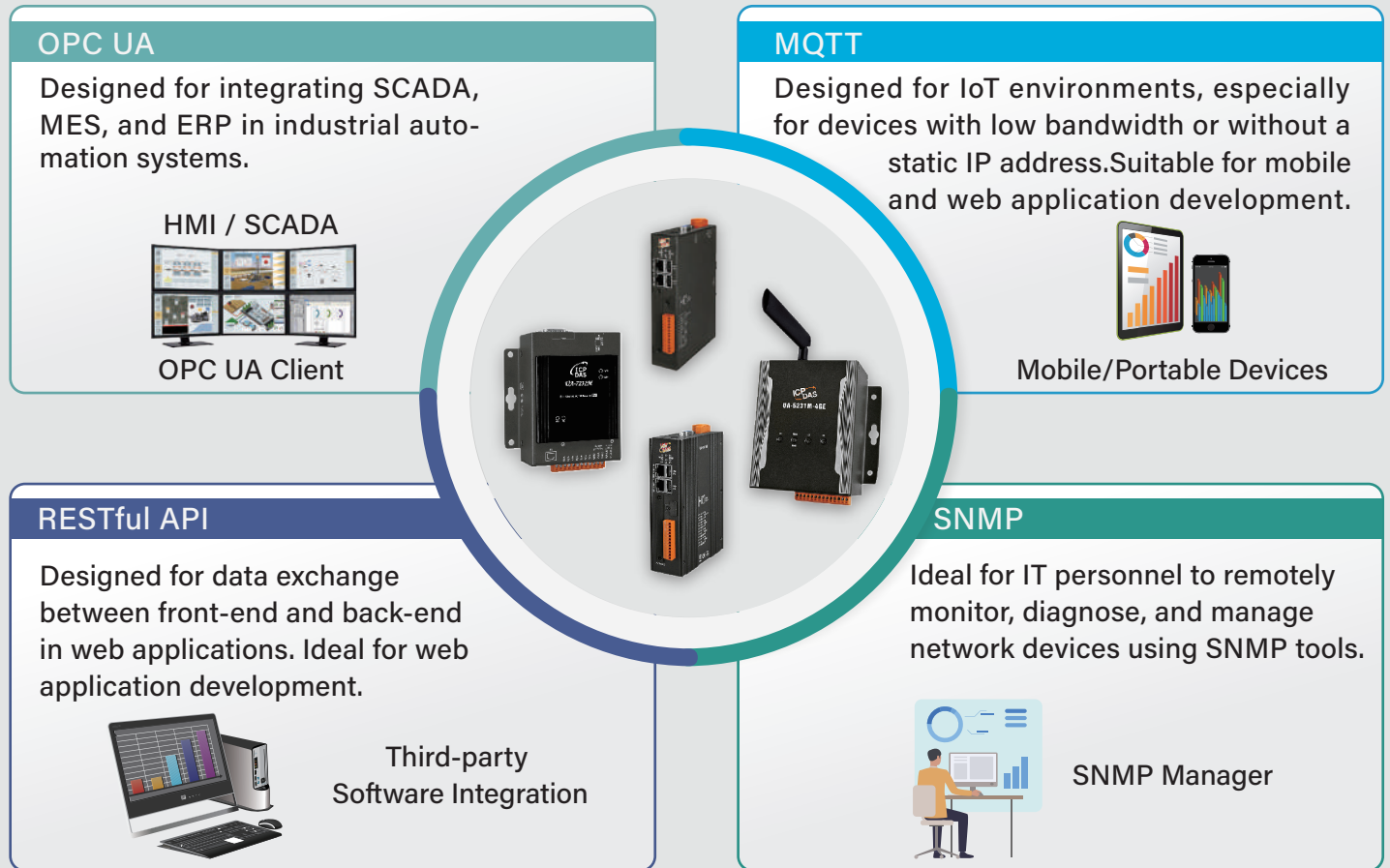
Typical Data Logging



Data Logging with Recovery Function



Supports OPC UA, MQTT, SNMP, and RESTful API Communication Protocols



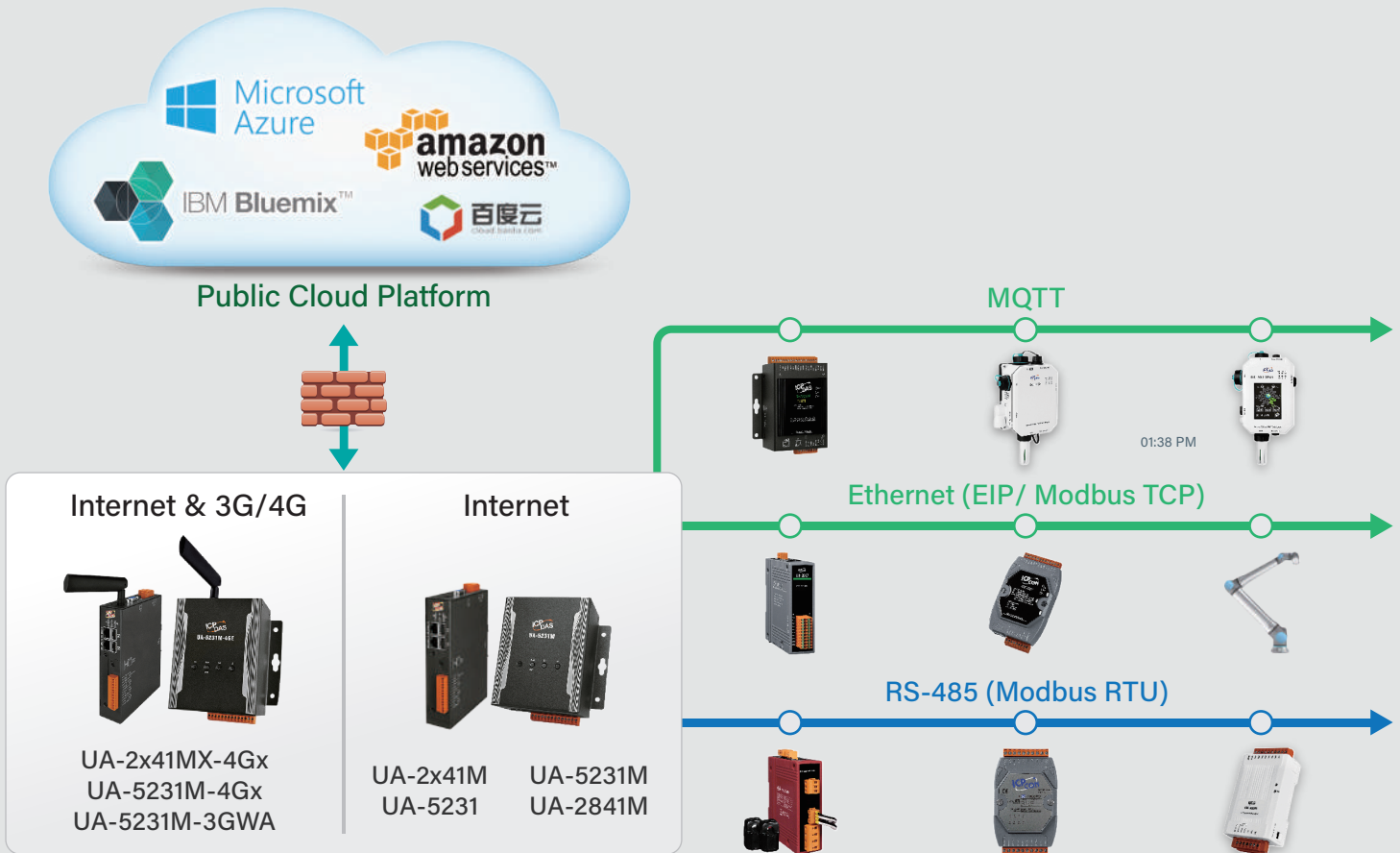
IIoT Security (Certificates and Encryption)

Communication Methods	Data Security Measures	Preventable Security Risks
OPC UA	<ul style="list-style-type: none"> ✓ X.509 User Authentication ✓ AES, RSA Message Encryption ✓ Message Signing and Encryption 	Man-in-the-middle Attacks, Unencrypted Transmissions, and Privilege Abuse
MQTT	<ul style="list-style-type: none"> ✓ Username/Password Authentication ✓ AES Message Encryption 	Man-in-the-Middle Attacks, Unencrypted Transmissions, Weak Authentication, and Topic Hijacking
RESTful API	<ul style="list-style-type: none"> ✓ TLS 1.2 Message Encryption 	Man-in-the-Middle Attacks, API Misuse, and Sensitive Data Leakage
SNMP V3	<ul style="list-style-type: none"> ✓ MD5 User Authentication ✓ DES/AES Message Encryption 	Unencrypted Community Strings and Outdated Protocol Vulnerabilities

Note: Man-in-the-Middle Attacks include IP Spoofing, DNS Spoofing, ARP Spoofing, and Wi-Fi Sniffing.

Connection to IoT Cloud Platforms

The IIoT Communication Servers can upload I/O data to cloud platforms in real time for analysis. Additionally, the Communication Servers allow users to edit MQTT messages (JSON) and publish them to a specific Broker.



Mobile Notifications

When anomalies in I/O values are detected, IFTTT (If This, Then That) logic control sends real-time notifications to management personnel via over 100 apps, such as LINE, Twitter, Gmail, Weibo, etc.



Cross-border Server Room Environmental Monitoring

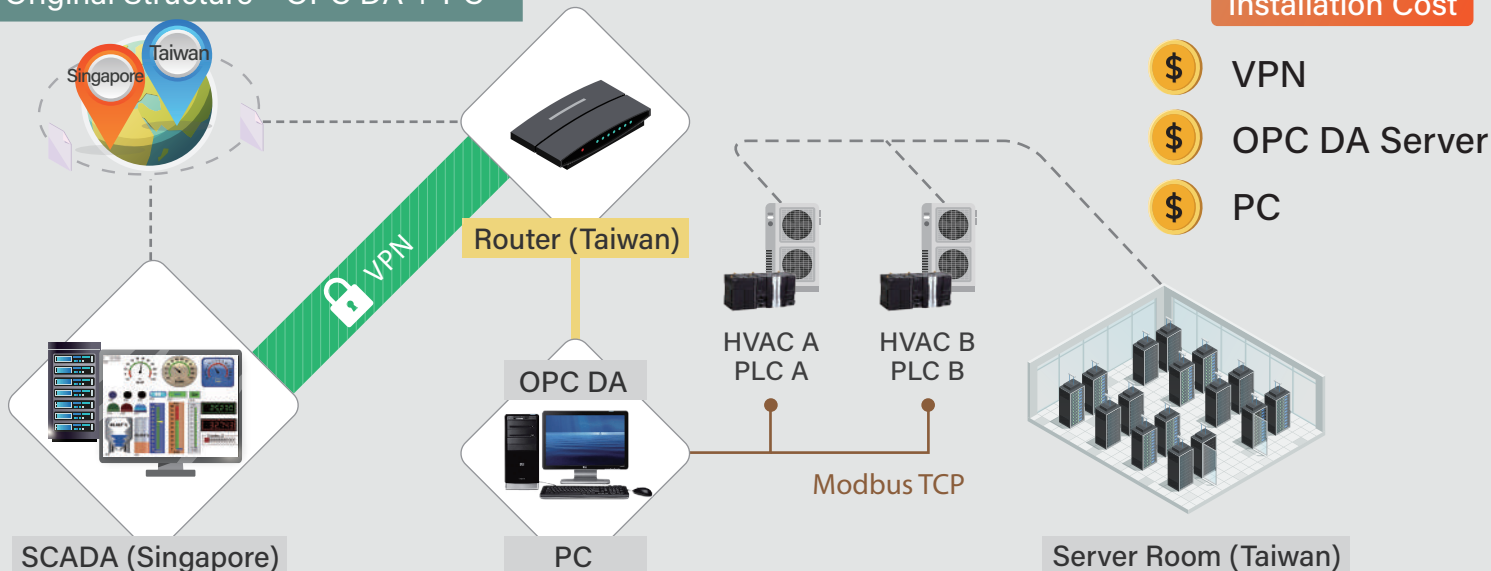
Simplified Architecture

OPC UA Security

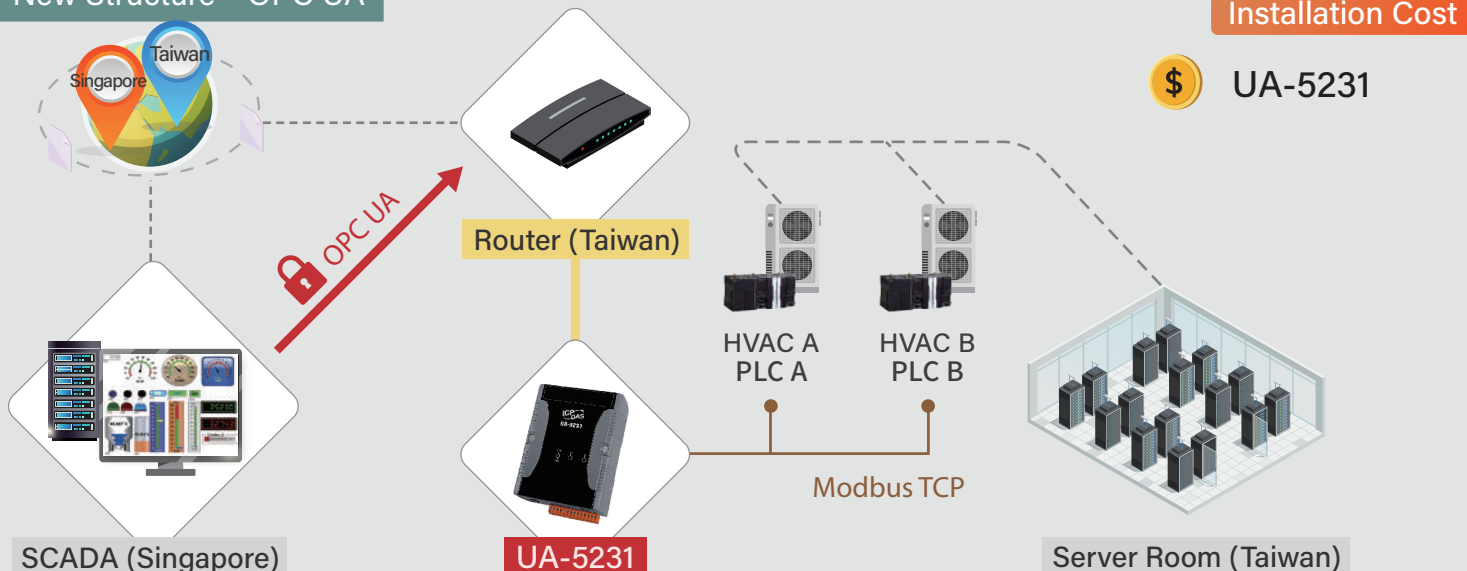
A transnational tech firm employed a PC+OPC DA server architecture to monitor PLCs used for HVAC Controls in the Taiwan server room. The headquarters in Singapore could access the data via VPN while incurring higher overall system costs. The new architecture, with UA-5231 OPC UA Server, replaces the PC+OPC DA. Benefits are as follows.

1. Low power consumption, long-term stability, less manual inspections for maintenance.
2. OPC UA offers secure connections, eliminating the need for a VPN previously used to enhance OPC DA security.
3. Staff at headquarters can quickly convert OPC DA to OPC UA with easy and quick setup using SCADA.

Original Structure : OPC DA + PC



New Structure : OPC UA



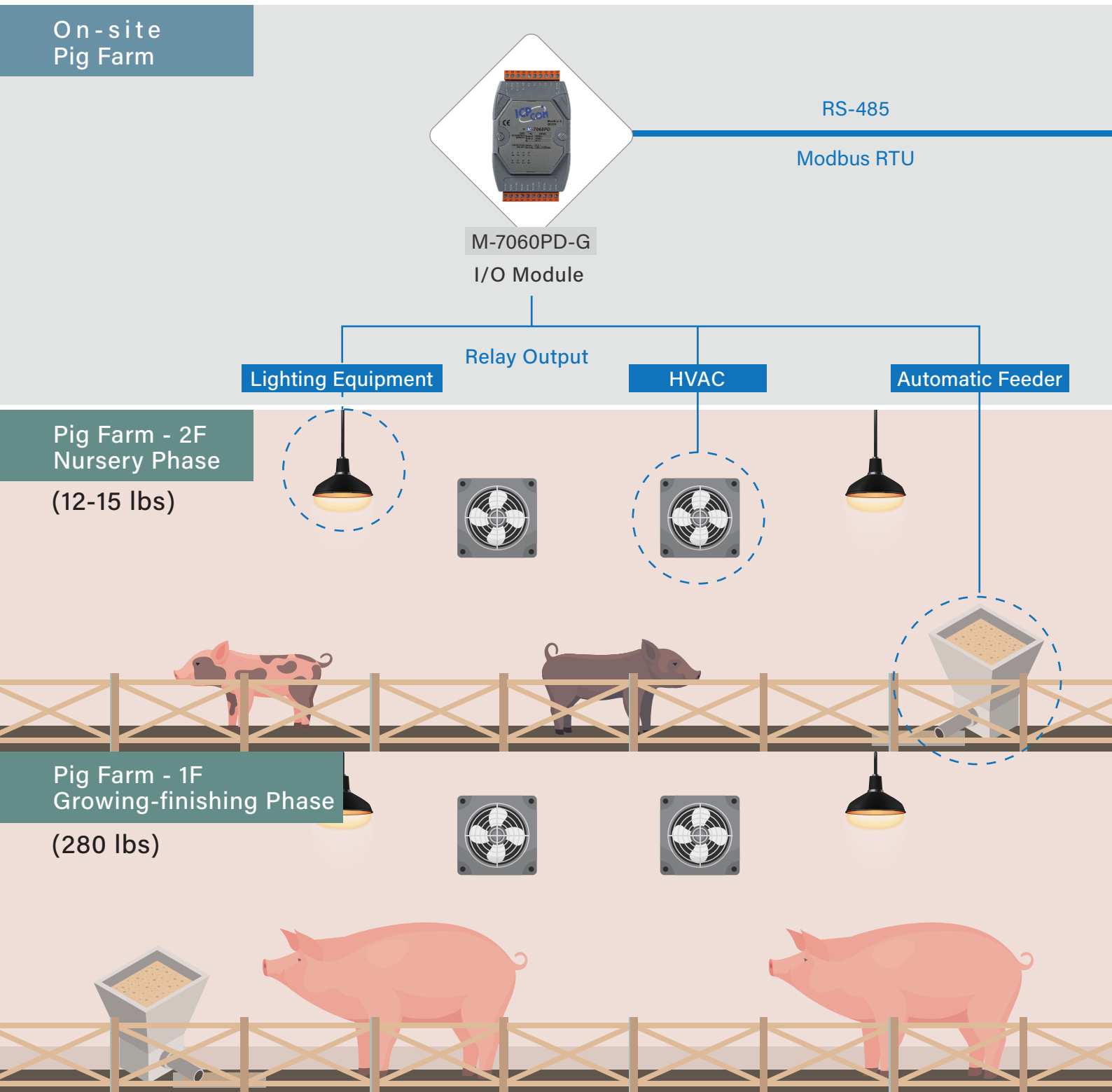
Large-Scale Automated Farming System Environmental Control & Feed Management

Real-time Data Collection

Unified Management

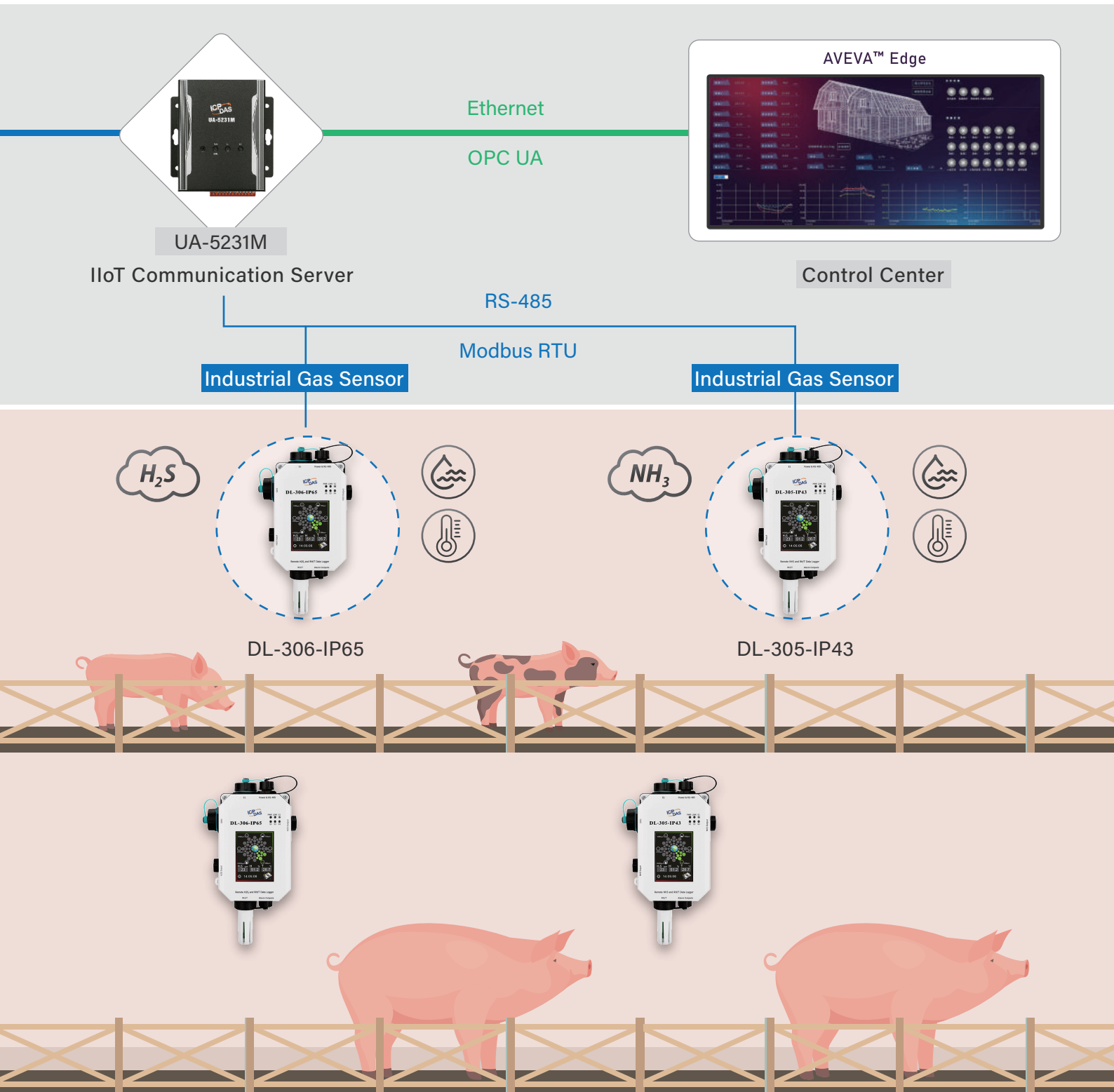
Conducive pig farming environments enhance pork quality, while unhealthy environments lead to stunted growth and death. Managing feeding on large farms is laborious, and improper feed quantities can result in feed waste and health problems for pigs.

On-site
Pig Farm



DL-305-IP43 and DL-306-IP65 Industrial Gas Sensors monitor temperature, humidity, NH₃, and H₂S levels on the large farm. When detecting anomalies, UA-5231M Communication Server, featuring multi-site control, adjusts ventilation and lighting equipment via M-7060PD-G I/O module. UA-5231M and M-7060PD-G also activate the feeder system at regular intervals, enabling precise environmental control and feeding. AVEVA Edge facilitates data analysis and unified management.

AVEVA Edge HMI/SCADA offers essential tools, allowing users to develop full-featured HMI and SCADA applications. The platform supports data collection and charting for analysis and creates reports in CSV, PDF, and Excel. Besides, AVEVA Edge also notifies the management personnel promptly upon anomaly detection.



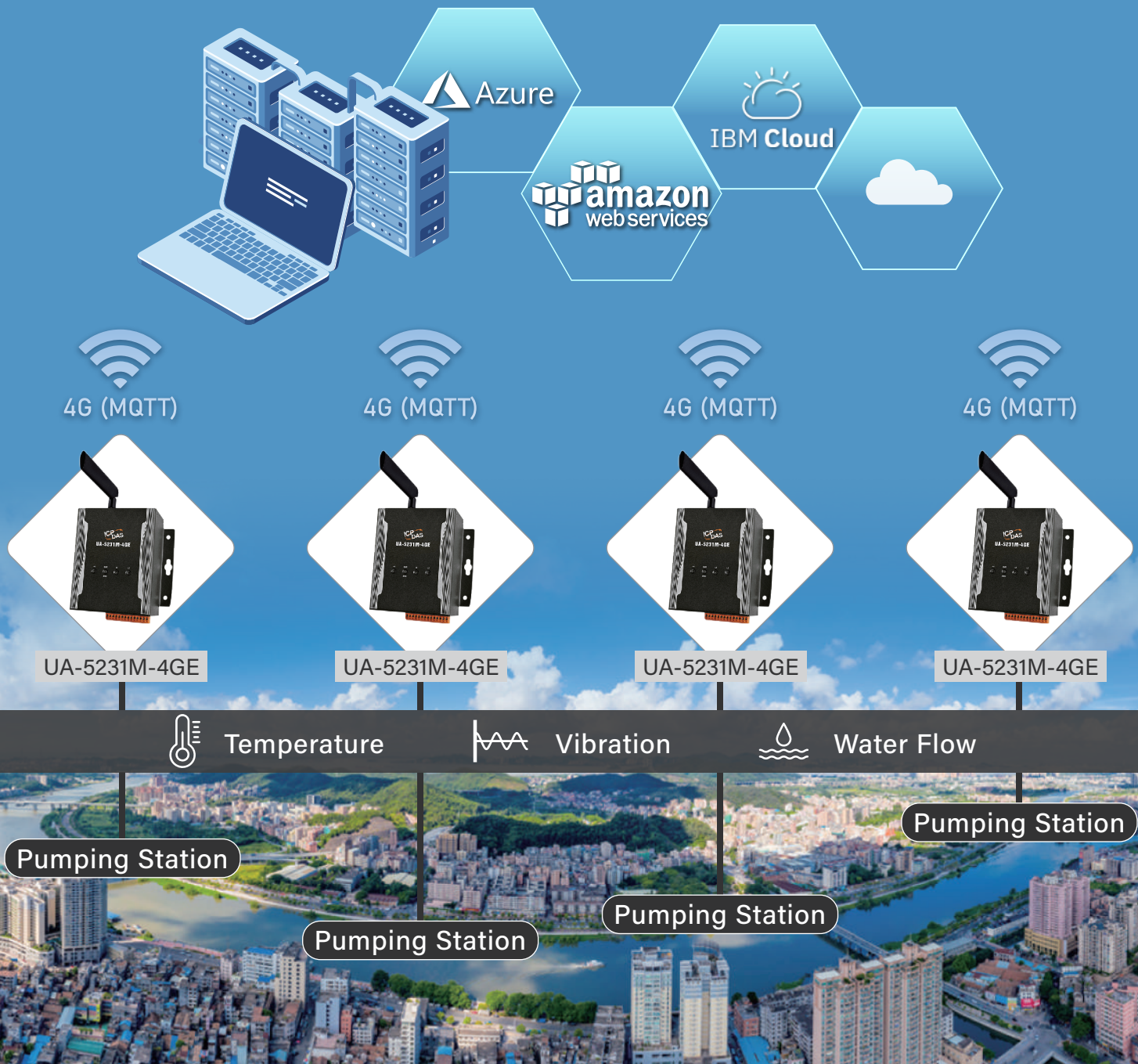
Urban Drainage System Monitoring & Control

Flexible Deployment via 4G Wireless Communication

Cloud Integration with Azure, AWS, and Other Platforms

Downpours often cause urban flooding, posing risks to life and property. Hence, governments increasingly prioritize integrating and monitoring urban drainage systems. The customer installs UA-5231M-4GE Communication Servers at pumping stations where internet deployment is difficult. The servers collect data on temperature, vibration, and flow of the drainage system via a 4G wireless network. The data is securely sent to the cloud using the MQTT protocol. This ensures secure and real-time data monitoring while reducing manual inspection costs.

Urban Water Management System

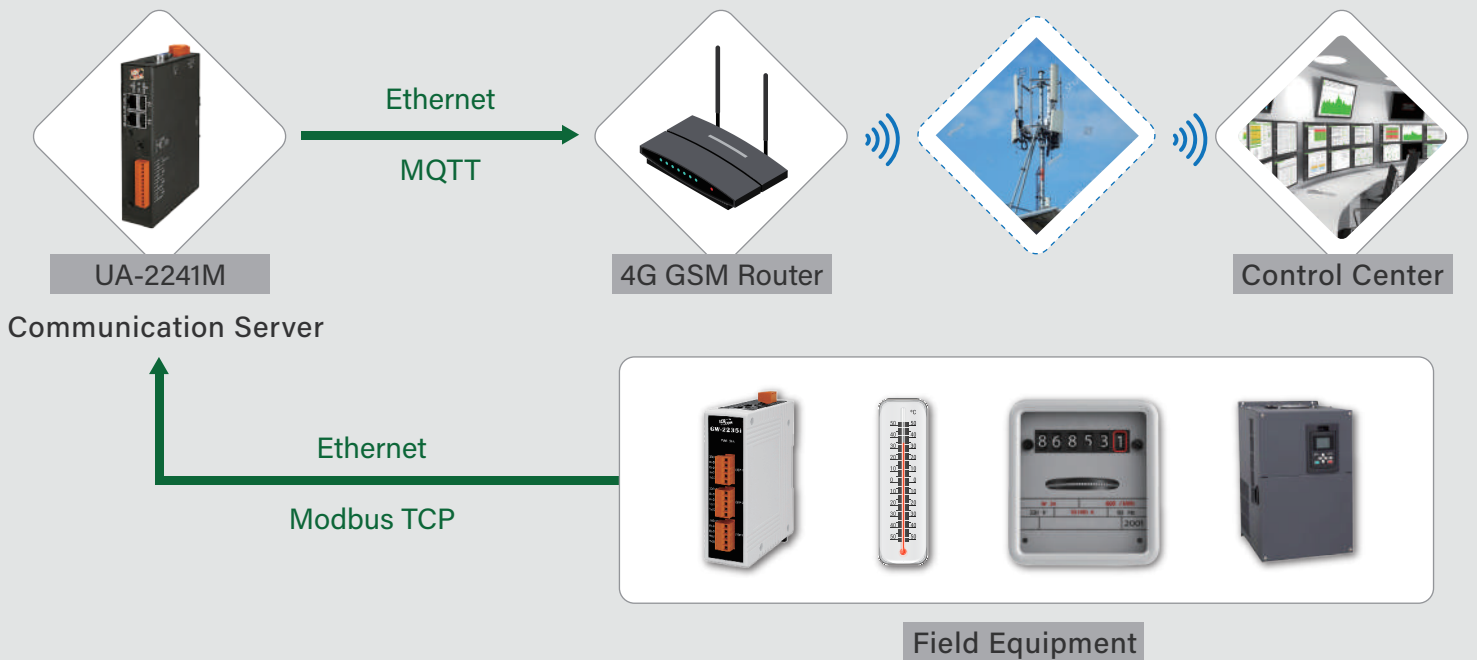


Photovoltaic Power Plant

Cross-Network Segment Communication

Secure Field-to-Cloud Data Exchange & Recovery

The Indian government has actively developed solar energy to tackle the energy crisis. However, the scattered locations of solar power plants make equipment monitoring and maintenance labor-intensive. For smooth operation of the power plants, ICP DAS adopts IIoT technologies to collect equipment data via Modbus TCP and sends it to the UA-2241M communication server. With secure MQTT transmission, the data is delivered to the control center for real-time visualization and analysis, enabling preventive maintenance and reducing unexpected downtime costs. The UA-2241M also supports data recovery, ensuring complete data transfer.

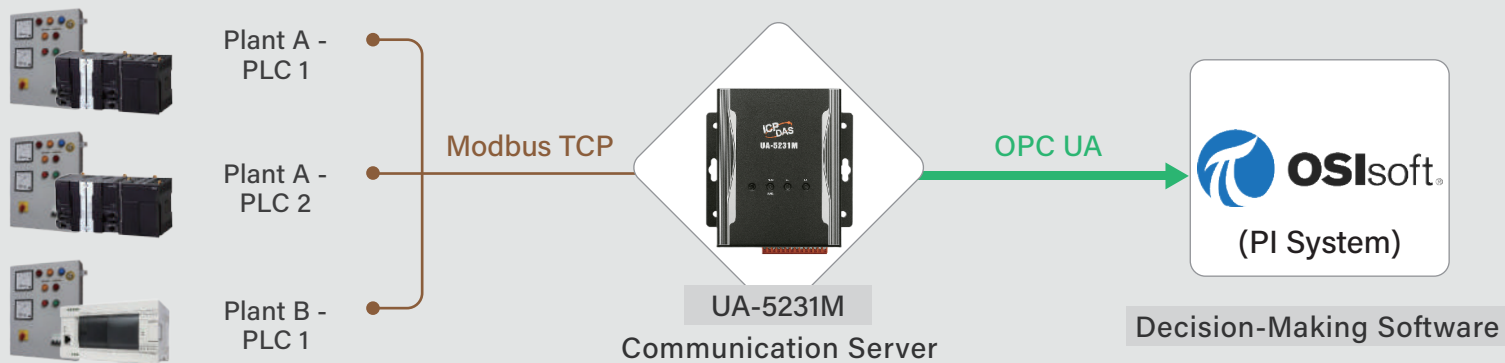


Water Filtration Systems in Chemical Plants

Easy Access to Field PLC Data

Save Time and Effort on IT-OT Integration

Before analyzing industrial discharge, chemical plants must record data on water flow, pressure, quality, etc. obtained from water filtration systems. Challenges include reading critical data from PLCs in the control panel and integrating it into the IT system. ICP DAS UA-5231M can transmit PLC data to the IT system using the OPC UA protocol, allowing data visualization, real-time analysis, and decision-making for IT. The data is also remotely logged to databases for future reference.



Campus Information Displays

Display Weather Data, Announcements & Emergency Instructions

Data Encryption for Enhanced Cybersecurity

Digital displays are widely used on campuses due to their convenience and accessibility for transmitting information. In this case, ICP DAS utilizes the DL-300 Series Industrial Gas Sensors to collect environmental data. The UA-2241M communication servers, with built-in OPC UA protocol, then publish the data to the corresponding iKAN Series LED displays. The system provides encryption for enhanced security and reliability compared to traditional architectures. Additionally, data can be integrated into databases through an information management platform.



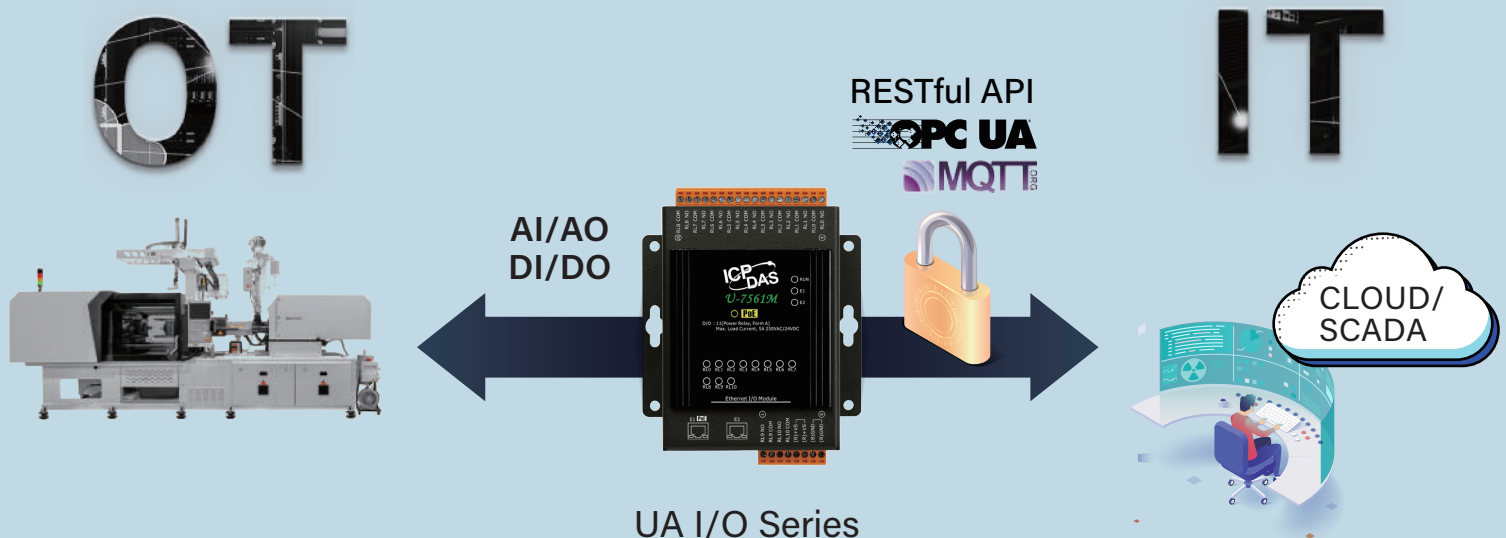
Cybersecurity I/O Module



**Comprehensive Data Protection
Security Starts at the I/O Level**

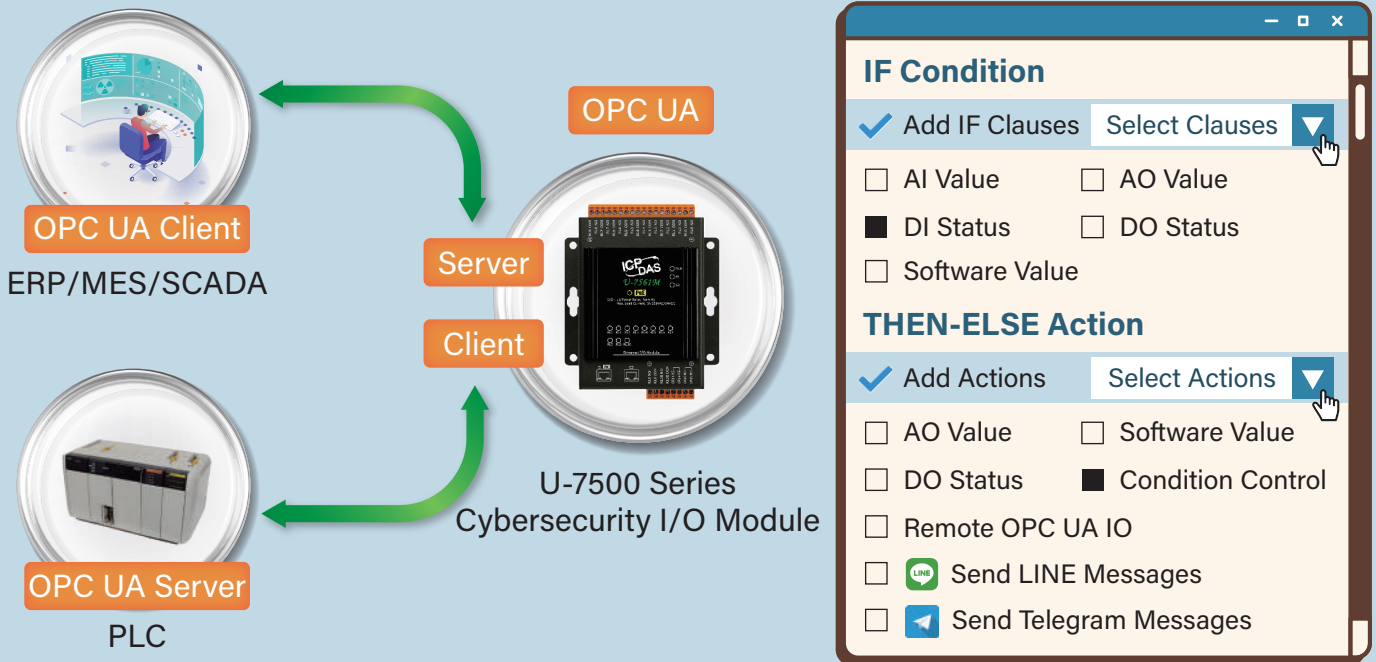
Comparison Item	Cybersecurity I/O Module (U-7500 Series)			Traditional I/O Module
Communication Protocol	OPC UA	MQTT	RESTful API	Modbus TCP
Communication Method	Publish / Subscribe (No Additional Broker Required)	Publish / Subscribe (Requires Additional Broker)	Request / Response	Request / Response
Network Traffic	Low (Data sent only on change)	Low (Data sent only on change)	High (Scheduled Polling)	High (Scheduled Polling)
Data Format	Converted Values (Directly usable by the host system)			Hexadecimal (Requires conversion on the host system)
User Authentication	Account Password & Certificates	Account Password & Certificates	Certificates	N/A
Communication Encryption	Yes	Yes	Yes	N/A
Anti-Snooping / Man-in-the-Middle Attacks	Yes	Yes	Yes	N/A
Application	Open Networks, Cloud Environments, or Multi-site Operations			Closed OT Networks or VPN-protected Internal/External Communication

Support OPC UA (Server/Client), MQTT (Client) & RESTful API



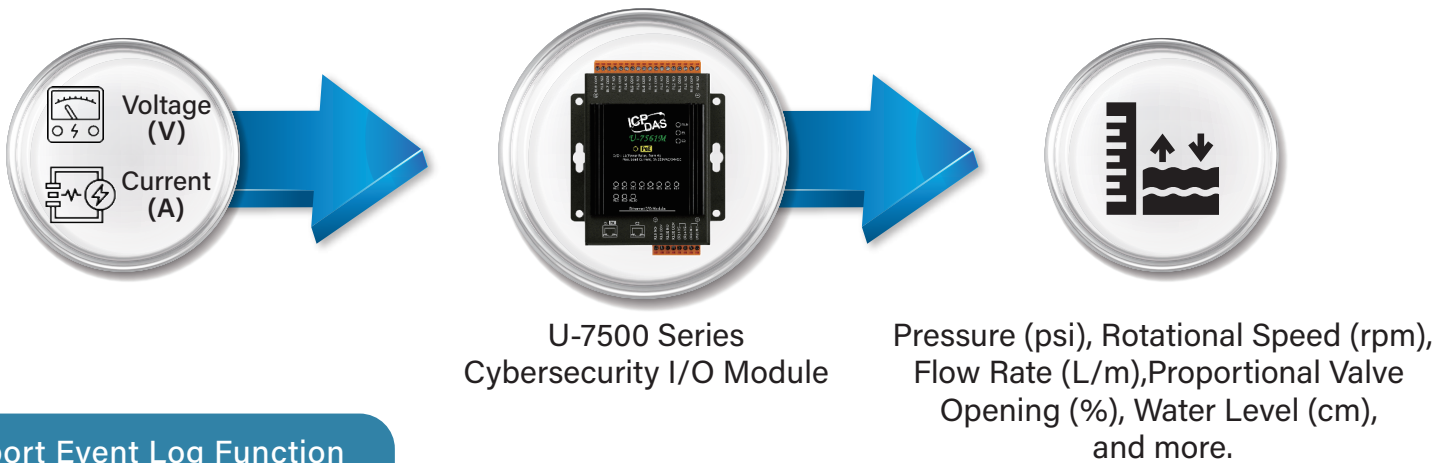
Built-in OPC UA Client/Server & IF-THEN-ELSE Logic Capability

The U-7500 Series Cybersecurity I/O Module enables fast configuration of I/O control logic with just a few clicks on the web interface. The logic is automatically executed in a loop, allowing both remote and local I/O controls without the need for additional programming.



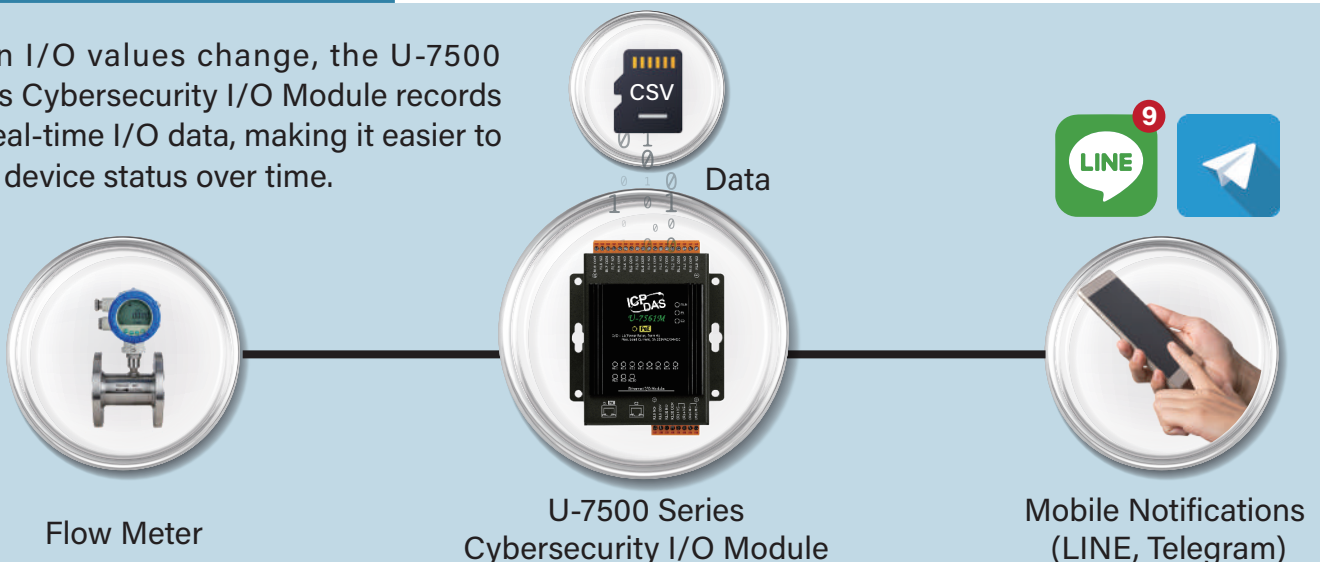
Support for Scaling

The AI/AO modules support the scaling function, converting analog signals into more easily interpretable values.



Support Event Log Function

When I/O values change, the U-7500 Series Cybersecurity I/O Module records the real-time I/O data, making it easier to track device status over time.



Factory Motor Current Monitoring

Special Motor Current Monitoring



Data Transmission Security

Wireless Monitoring

Receive Special Motor Output Current On Factory Floors

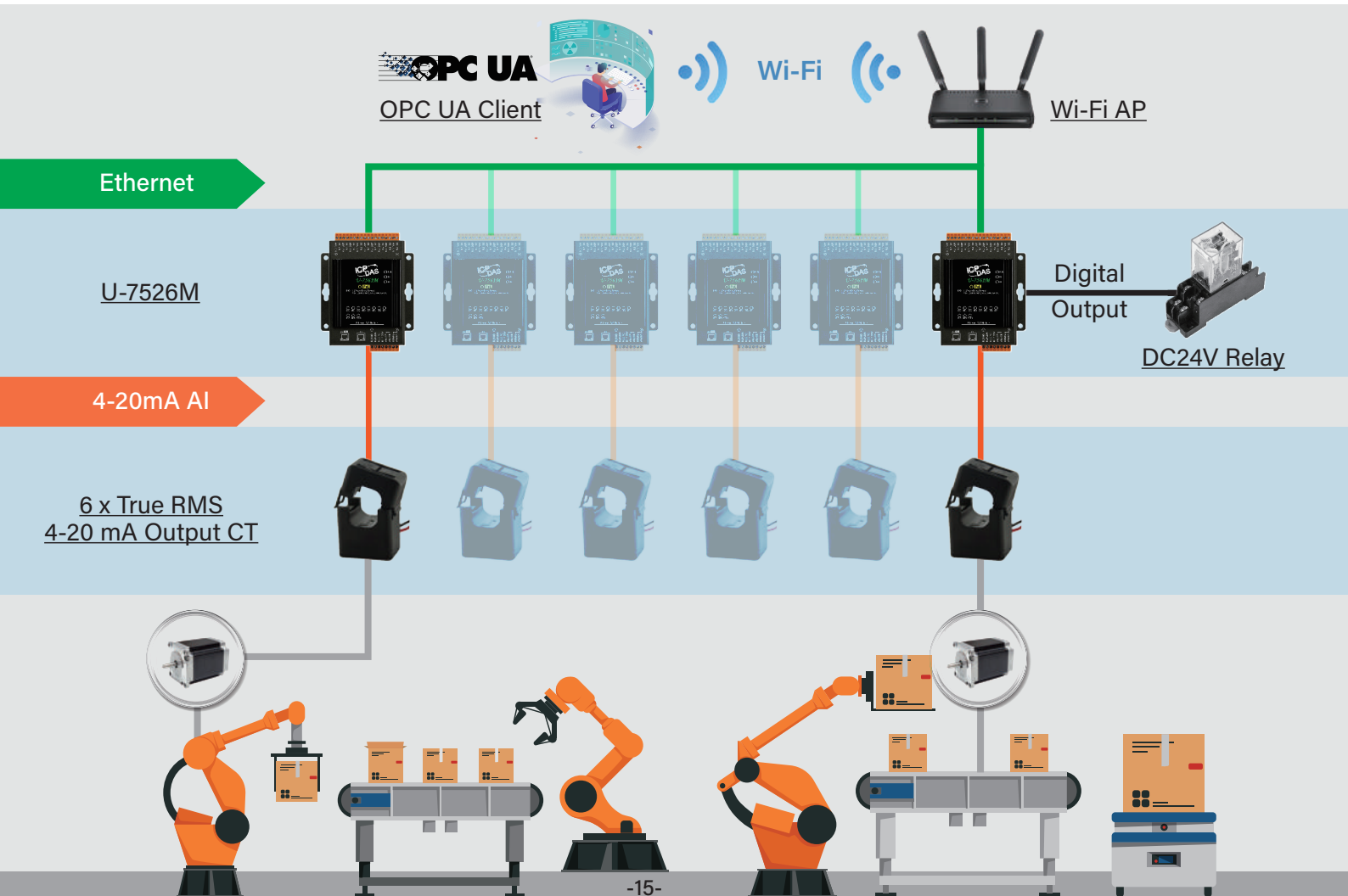
The standard power meter input frequency is 50/60Hz, while the motor output frequency on-site ranges from 50Hz to 6000Hz. Using a standard power meter to monitor the motor would result in insufficient precision. Therefore, high-frequency CTs are employed to monitor the motor's output current.

Enhance Data Transmission Security

The U-7500 Series Cybersecurity I/O Modules transmit motor current data using the secure OPC UA and MQTT communication protocols, enhancing data security on the factory floor.

Implement Wireless Factory Site Monitoring

By using a Wi-Fi AP, wired signals are converted into wireless ones, allowing personnel to monitor motor operations from anywhere on the factory floor.





Cybersecurity I/O Module



Supports OPC UA, MQTT and RESTful API Communication

Mobile Notifications (LINE, Telegram)



	AI		AO		DI		DO	
	Ch.	Type	Ch.	Type	Ch.	Type	Ch.	Type
U-7502M	3	±150 mV, ±500 mV, ±1 V, ±5V, ±10 V, +0 mA ~ +20 mA, ±20 mA, 4 ~ 20 mA	-	-	6	Wet (Sink/Source)	3	Power Relay Form A (SPST N.O.)
U-7504M	4	±500mV, ±1V, ±5V, ±10V, 0~20mA, ±20mA, 4~20mA	4	0~5V, ±5V, 0~10V, ±10V, 0~20mA, 4~20mA	4	Dry (Source), Wet (Sink)	-	-
U-7515M	7	Pt100, Pt1000, Ni120, Cu100, Cu1000	-	-	-	-	-	-
U-7517M	8	±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V, ±20 mA, 0 ~ 20 mA, 4 ~ 20 mA	-	-	-	-	4	Isolated Open Collector (Sink)
U-7517M-10	10/20	±150mV, ±500mV, ±1V, ±5V, ±10V, ±20mA, 0~20mA, 4~20mA	-	-	-	-	-	-
U-7518ZM/S	10	±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	-	-	-	-	3	Isolated Open Collector (Sink)
U-7518ZM/S2								
U-7519ZM/S	10	±15mV, ±50mV, ±100mV, ±150mV, ±500mV, ±1V, ±2.5V, ±5V, ±10V, ±20mA, 0~20mA, 4~20mA, Thermocouple: J, K, T, E, R, S, B, N, C, L, M, LDIN43710	-	-	-	-	3	Isolated Open Collector (Sink)
U-7519ZM/S2								
U-7524M	-	-	4	0~5V, ±5V, 0~10V, ±10V, 0~20mA, 4~20mA	5	Dry (Source), Wet (Sink)	5	Isolated Open Collector (Sink)
U-7526M	6	±500 mV, ±1V, ±5V, ±10V, 0~20mA, ±20mA, 4~20mA	2	0~5V, ±5V, 0~10V, ±10V, 0~20mA, 4~20mA	2	Dry (Source), Wet (Sink)	2	Isolated Open Collector (Sink)
U-7528M	-	-	8	0~5V, ±5V, 0~10V, ±10V, 0~20mA, 4~20mA	-	-	-	-
U-7542M	-	-	-	-	-	-	16	Isolated Open Collector (Sink)
U-7544M	-	-	-	-	8	Wet (Sink,Source)	8	Isolated Open Collector (Sink)
U-7545M	-	-	-	-	-	-	16	Isolated Open Collector (Source)
U-7550AM	-	-	-	-	12	Dry (Source), Wet (Sink)	6	Isolated Open Collector (Sink)
U-7551M	-	-	-	-	16	Wet (Sink,Source)	-	-
U-7552M	-	-	-	-	8	Wet (Sink,Source)	8	Isolated Open Collector (Source)
U-7553M	-	-	-	-	16	Dry (Source)	-	-
U-7555M	-	-	-	-	8	Dry (Source), Wet (Sink,Source)	8	Dry (Source), Wet (Sink,Source)
U-7558M	-	-	-	-	8	Wet (Sink/Source)	-	-
U-7559M	-	-	-	-	8	Wet (Sink/Source)	-	-
U-7560M	-	-	-	-	6	Wet (Sink/Source)	6	Power Relay Form A (SPST N.O.)
U-7561M	-	-	-	-	-	-	11	Power Relay Form A (SPST N.O.)
U-7567M	-	-	-	-	-	-	8	Power Relay Form A (SPST N.O.)



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