Wireless IoT Sensing Solutions

Modularized and Ready-to-Use Solutions High Adaptability for IoT Sensing

- IoT Sensing Applications
- IoT Technology
- IoT Architecture
- Product Highlights
- Selection Guide
- Case Studies

ADVANTECH

Enabling an Intelligent Planet

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Jump Start to **IoT Solution**...

Data acquisition has played a key role throughout the IoT era. Increasingly more devices are being interconnected and wireless applications have become the preferred network solution.

As a leading provider of IoT solutions, Advantech continues to develop a wide range of wireless sensing devices for various application fields in order to offer customers the latest solutions to complete their IoT application systems.

Be WISE, Make Sense, Boost Your IoT

Factory Environment

Machine Room

Food & Beverage Product Line

Warehouse

Data Center

Water Treatment

Agriculture

Renewable Energy

IoT Sensing
Simply but Complex

Is Wireless Transmission Reliable?

The WISE-4000 addresses concerns over low-quality wireless networks by utilizing local data storage to store data in the node, ensuring zero data loss when connections are weak or even broken.

Will IoT Complicate System Architecture?

To send data from devices to the cloud or widely deployed aggregate devices, one might be afraid that an IoT system would become overly complex. However, with WISE-4000's cloud access ability, data can be transmitted directly to the cloud without the need for a gateway.

How to Connect Data to the Cloud?

In IoT, the purpose of data acquisition is to connect data to the cloud in order to improve managerial efficiency. The WISE-4000 provides a wireless communication interface, IoT protocols, and pre-integrated major cloud service connectivity to facilitate connecting data to the cloud.

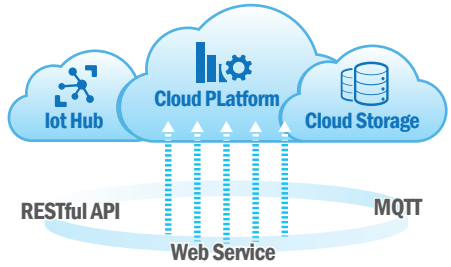
Overcome Barriers to Connectivity with

IoT and Big Data Technology

As the primary source of big data, data sensing plays a key role in the realization of IoT systems. To obtain different types of data for different IoT applications, conventional automation architecture and basic data acquisition alone are no longer sufficient, which is why Advantech has developed the WISE-4000 wireless I/O modules (WSN) and EVA-2000 smart sensors. Based on the latest IoT concepts and technology, the WISE and EVA series are a cloud-ready data sensing and communication tool that can help you realize your IoT system.

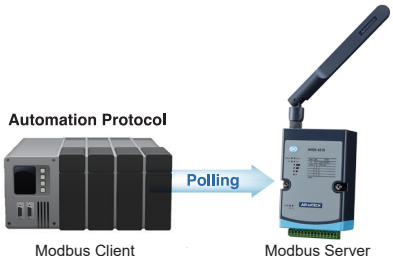
Cloud Integration

To provide complete IoT sensing solution, the WISE-4000 series goes beyond providing a wireless communication interface for sensors—it also provides cloud connectivity for additional user applications. With support for IoT protocols such as REST and MQTT, the WISE-4000 series can communicate with cloud services or other web services via secure web sockets. The WISE-4000 series comes with pre-integrated APIs for major cloud service providers (e.g., Dropbox) and IoT cloud services (e.g., Azure IoT Hub) and provides support for both private cloud platforms (e.g., private file servers or databases) and ERP/MES systems.



Modbus

Modbus is an automation protocol widely used in PLC communication and SCADA systems. It adopts client-server system architecture, in which the client polls individual server devices to determine their status. In such systems, servers do not send messages unless they have been polled.



RESTful

The REST communication approach can take advantage of not having to leverage much bandwidth while transmitting data. With RESTful web API in JSON format, data can be easily integrated to IoT services and optimized for use over the Internet. Additionally, REST support HTTPS or TLS, which improve security while publishing or retrieving data between devices and the cloud. Furthermore, it also enables end devices to publish data actively.

Determine which product is right for you!

What's the first consideration of your IoT application?

Smart Sensors

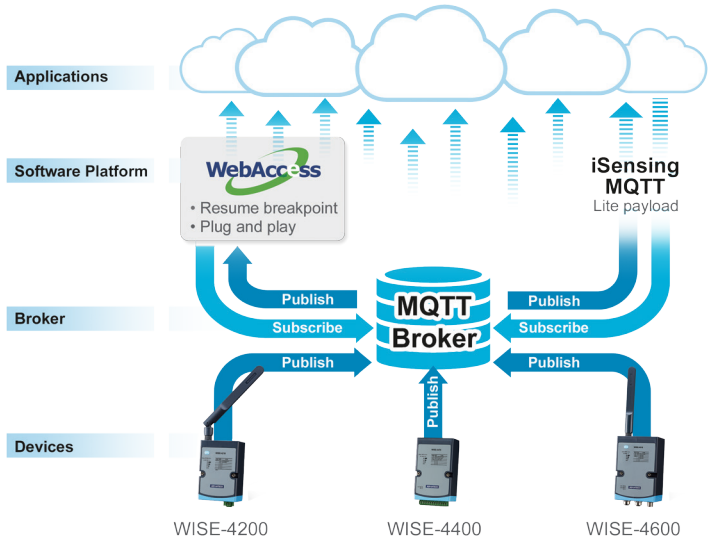
Wireless I/O

More information

MQTT Protocol

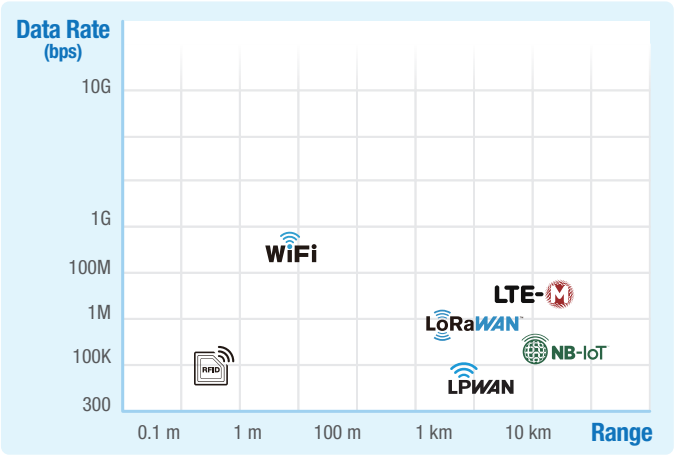
WISE-4000 series leverages MQTT—a publish/subscribe messaging protocol for constrained IoT devices in low-bandwidth, high-latency, or unreliable networks—to communicate directly with the cloud or ERP/MES systems without a gateway or converter.

With this device-to-cloud architecture, lite payload, and low bandwidth, the WISE-4000 is the ideal solution for high-volume data collection applications because it can simplify the communication and hardware complexity of IoT systems.



Wireless Communication

Advancements in IoT have led to the development of many wireless technologies that can be implemented in various hardware products. The WISE-4000 and EVA-2000 series utilize Wi-Fi, LPWAN, and LoRaWAN to meet specific wireless communication requirements.



- Vibration sensors
  - Explosive proof
    - YES → WISE-2410X p.13
    - NO → WISE-2410 p.13
- Current, temperature & humidity, or water leakage sensor → EVA-2000 p.15
- High-volume, real-time data in seconds → WISE-4250 p.07
- Minutes-level data update cycle, long range, low power consumption
  - Private network
    - Single RS-485 I/O → WISE-2200-M p.11
    - Multiple I/O solutions → WISE-4610 p.09
  - Public network → WISE-4671 p.09

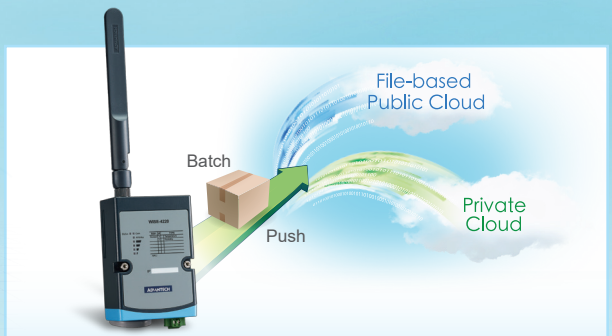
The First Consideration:

Wireless IoT Architecture

Wireless Ethernet Architecture

Wireless Ethernet is the simplest interface for IoT applications. It can be easily integrated with existing data or web servers. The WISE-4250 supports Wi-Fi for organizing wireless networks with access points that can be extended to WANs via a cellular router. Moreover, the WISE-4471 and WISE-4671 provide direct support for cellular interfaces for distributed data acquisition. With MQTT and RESTful web services, the WISE-4000 series can connect to cloud services without the need for individual IP addresses.

Data Storage with RTC Time Stamp



Public and Private Cloud Connectivity

Wireless Ethernet Architecture

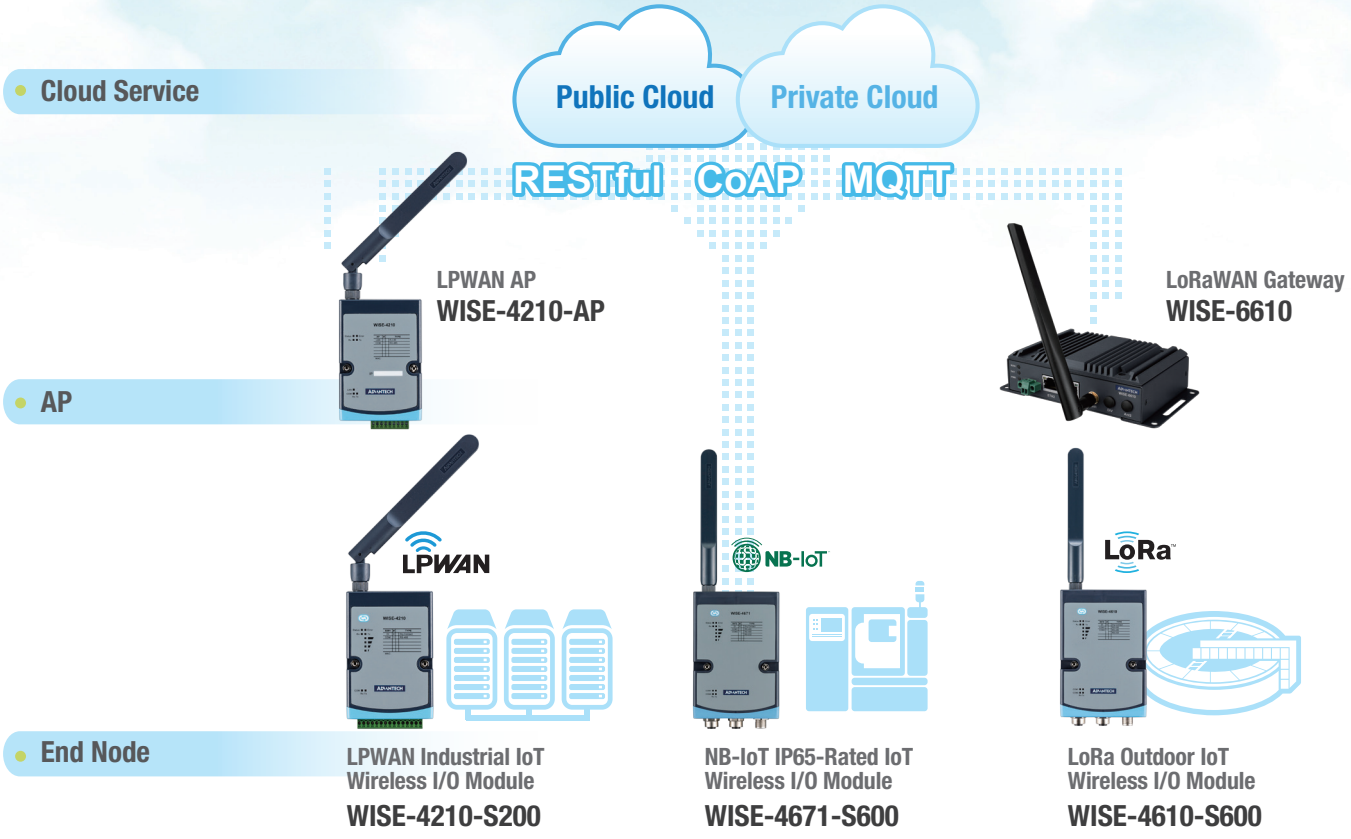
Low-Power Wide-Area Network (LPWAN) Architecture

LPWAN technology, including LoRa, SigFox, and NB-IoT, is suitable for applications requiring low-volume, long-range data transmission while maintaining a long battery life, minimal cost, and low levels of interference.
The WISE-4000 series provides both standard LPWAN, NB-IoT, and LoRa devices to meet different long-range sensing requirements. For the WISE-4210, and WISE-4610 I/O modules, Advantech also provides LPWAN access points or LoRa gateways, enabling users can easily build up an LPWAN or LoRa network.

Up to 5-km Communication Range

Better Coverage and Less Interference

LPWAN Architecture



WISE-4200

Industrial IoT Wireless I/O Modules

The WISE-4200 series comprises sensor-integrated WSNs that offer modularized sensor and I/O interface configuration options. With this series, data can be easily collected via a single node without additional development or assembly. WISE-4200 nodes are suitable for environmental monitoring and management applications in factories, pipelines, data centers, and warehouses.

LPWAN WiFi

Built-In Sensor and I/O

Combination of I/O and sensors makes it a ready-to-use node for various applications.

Battery-Powered

Utilizing LPWAN technology means that the WISE-4210 can be powered by 3.6-V AA lithium battery.

Flexible Mounting

DIN-Rail, wall and pole mounting enable fitting in any installation environment.

IoT Protocols

MQTT and RESTful web API in JSON format for IoT or cloud service integration.

WISE-4210

LPWAN Industrial IoT Wireless I/O Modules

The WISE-4210 utilizes LPWAN technology to provide modularized nodes that can transmit data over long distances without interference.

With low power consumption and wide area communication features, this solution can provide coverage up to 2 km.

- Sub-1-GHz LPWAN with 2-km line-of-sight communication
- 3 x 3.6-V AA lithium batteries for a 5-year lifetime
- Easy to organize LPWAN data access via wireless access points

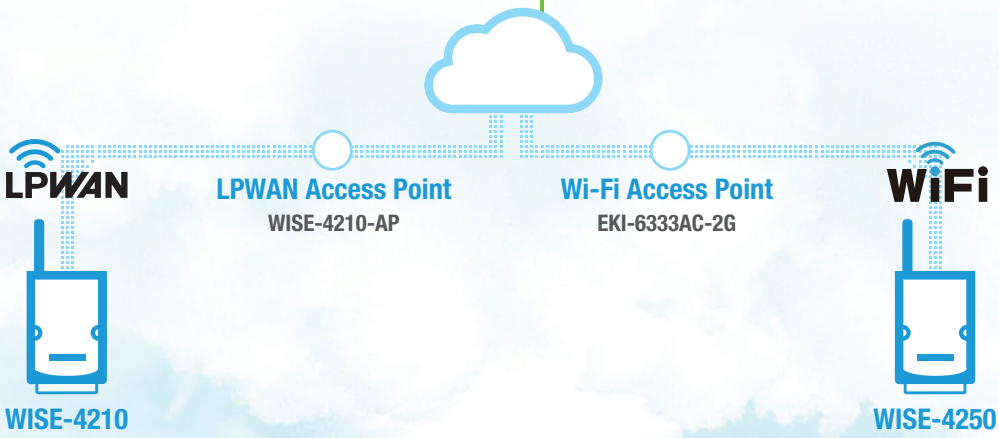
WISE-4250

WLAN Industrial IoT Wireless I/O Modules

Adopting Wi-Fi technology, the WISE-4250 is a modularized node that can be easily integrated into existing networks.

With the high compatibility and universality of Wi-Fi technology, this solution requires no extra infrastructure cost or implementation effort.

- 2.4/5-GHz IEEE 802.11b/g/n/ac WLAN for 110-m line-of-sight communication
- Local logging of 10,000 samples with RTC time stamp and SNTP time synchronization
- Access point mode with an HTML5 webpage for direct access and device configuration via mobile devices



WISE-4600

Outdoor IoT Wireless I/O Modules

The WISE-4600 series are solar-powered and designed for wide-area outdoor applications. In addition to a solar rechargeable battery, the WISE-4600 nodes support a wide input power voltage and come with optional GPS for locating and tracking functions, ensuring sustainable operation in outdoor applications such as water treatment, renewable energy, and agriculture.

LoRaWAN NB-IoT

Location Tracking

Optional GPS for obtaining location information in wide-area applications.

IP65, Anti-UV Housing and M12 Connector

Protection against water and dust penetration and UV resistant.

Flexible Mounting

DIN-Rail, wall and pole mounting enable fitting in any installation environment.

Continuous Power Supply

Solar rechargeable battery and external power source ensure continuous power in outdoor areas.

WISE-4610 & WISE-4610P

LoRaWAN Outdoor IoT Wireless I/O Modules

The WISE-4610 series adopts LoRaWAN technology, providing outdoor nodes that consume little power when transmitting data over long distances. This means that it can be powered by a solar rechargeable battery, enabling continuous data acquisition.

LoRaWAN with 5-km line-of-sight communication

Superior penetration, low interference

Easy to organize LoRaWAN network data access

WISE-4671

NB-IoT Outdoor IoT Wireless I/O Modules

The WISE-4671 node utilizes NB-IoT cellular networks and comes with an IP65-rated housing that can transmit data over long distances without interference. With superior signal coverage and low degradation, signals can have wide coverage in open space, making this solution ideal for outdoor environment or machine monitoring.

MQTT and CoAP for IoT or cloud service integration

Superior signal coverage, low interference

Reliable cellular network using licensed band radio frequency

WISE-2200

LPWAN Wireless I/O Modules

WISE-2200 series is using reliable LPWAN wireless solution, it has better wireless transmission capability, and provides a cost-effective private network environment for users. WISE-2210 series has 3 analog input channels for facility monitoring applications. WISE-2200-M is a LoRaWAN Modbus read/write communication device and can easily connect to Modbus sensors and meters for different kinds of applications.

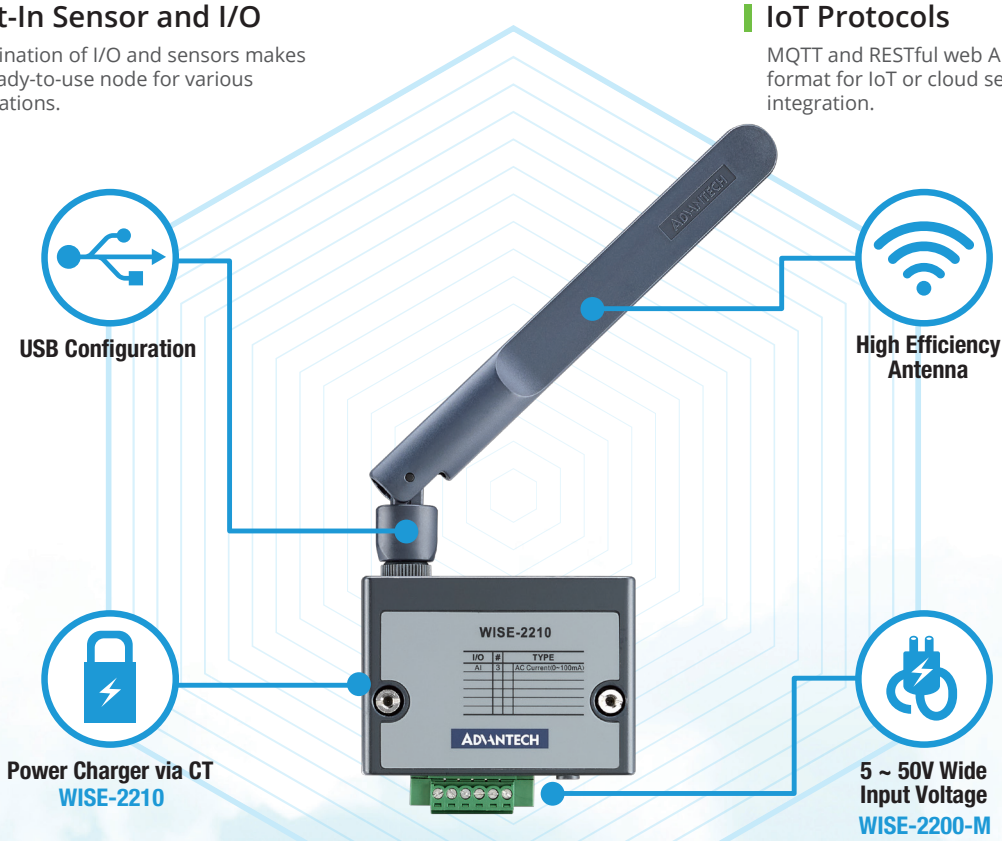
LoRaWAN LPWAN

Built-In Sensor and I/O

Combination of I/O and sensors makes it a ready-to-use node for various applications.

IoT Protocols

MQTT and RESTful web API in JSON format for IoT or cloud service integration.



Flexible Mounting

DIN-Rail, wall and pole mounting enable fitting in any installation environment.

USB Configuration Port

USB port for quick configuration during installation and maintenance.

WISE-2200-M

LoRaWAN Single RS-485 I/O Module

WISE-2200-M is a LoRaWAN Modbus read/write communication device powered by Advantech. WISE-2200-M supports maximum 128 address and 30 rule setting can easily connect to Modbus sensors and meters for different kinds of applications.

LoRa LPWAN with 5-km line-of-sight communication

Superior penetration, low interference

Easy to organize LoRa network data access

WISE-2210 & WISE-2211

LPWAN Wireless I/O Modules

WISE-2210 series has 3 analog input channels for facility monitoring applications. WISE-2210 is using for facility 3-phase power current detection. WISE-2211 is using for 4-20mA sensor connections for different kinds of facility monitoring applications.

Power over AI channel design, no extra power wired installation needed.

Superior signal coverage, low interference

WISE-2400

Smart Vibration Sensors

Monitoring vibration and implementing preventive maintenance is crucial for equipment operation and maintenance. WISE-2400 series can detect the vibration of equipment 24 hours a day. Also, it makes immediate diagnosis that meets ISO 10816 standards, a vibration monitoring standard to evaluate machine vibration by measurements, without coding and algorithm implementation.

LoRaWAN

Battery-Powered

Utilizing LPWAN technology means that the WISE-2410 series can be powered by 3.6-V AA lithium battery.

Easy Operation with WISE Studio

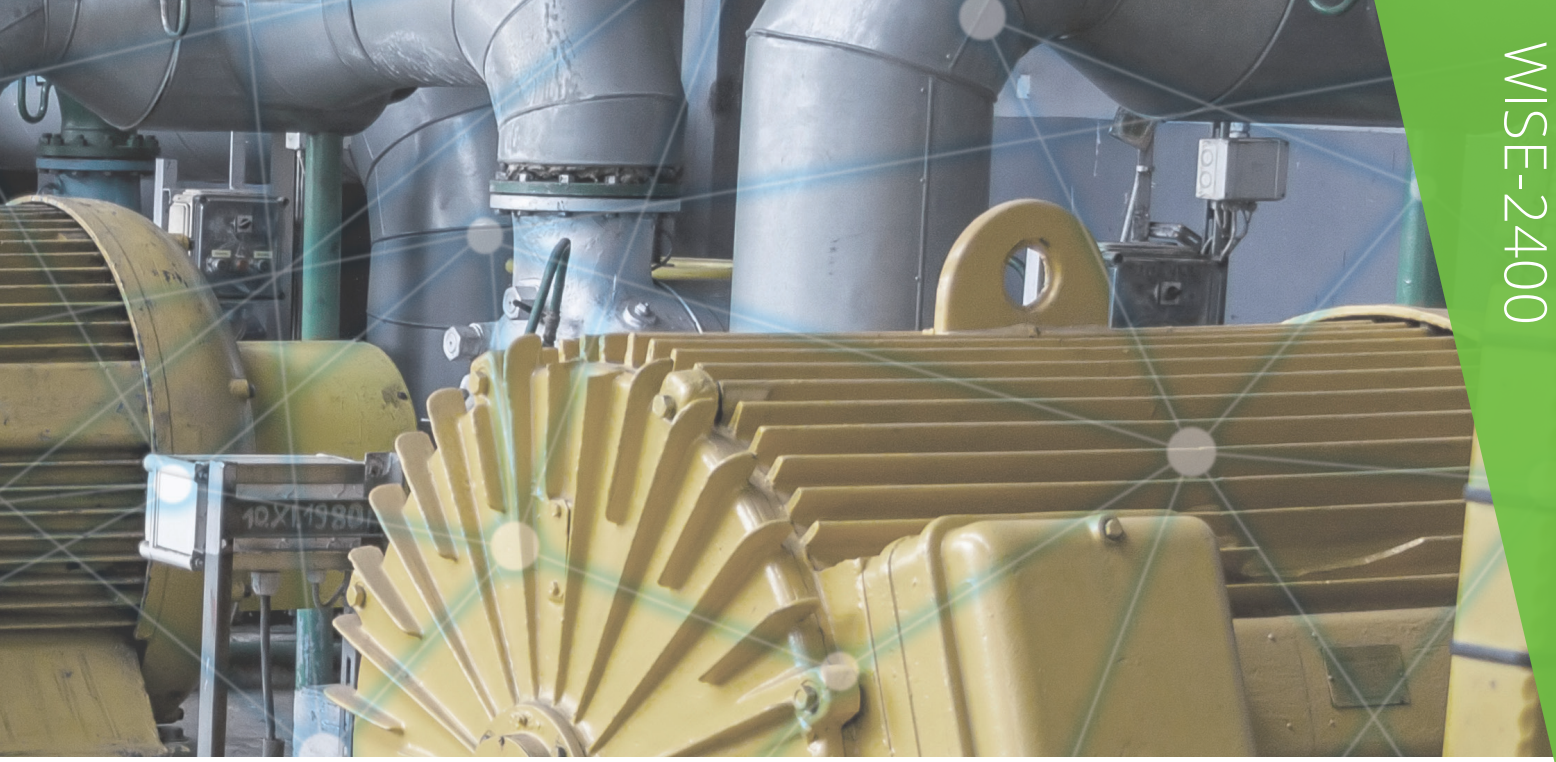
With Advantech WISE Studio, you can set up operation parameters for frequency, report intervals, and alarms and more.

3-axis Vibration Inspection

WISE-2410 series uses 3-axis composite measurements to detect vibration and transfers those characteristic values.

Explosion Proof

WISE-2410X is CID2, ATEX and IECEx (Zone 2 and Zone 21) certified for installation in hazardous and explosive environments.



WISE-2410 & WISE-2410X

LoRaWAN Smart Vibration Sensor

The WISE-2410 series is a LoRaWAN wireless condition monitoring sensor featuring an ARM Cortex-M4 processor, LoRa transceiver, 3-axis accelerometer, and temperature sensor. The WISE-2410X offers the same features with added explosion-proof capabilities.

LoRa LPWAN with 5-km line-of-sight communication

Superior penetration, low interference

Easy to organize LoRa network data access

WISE-2460

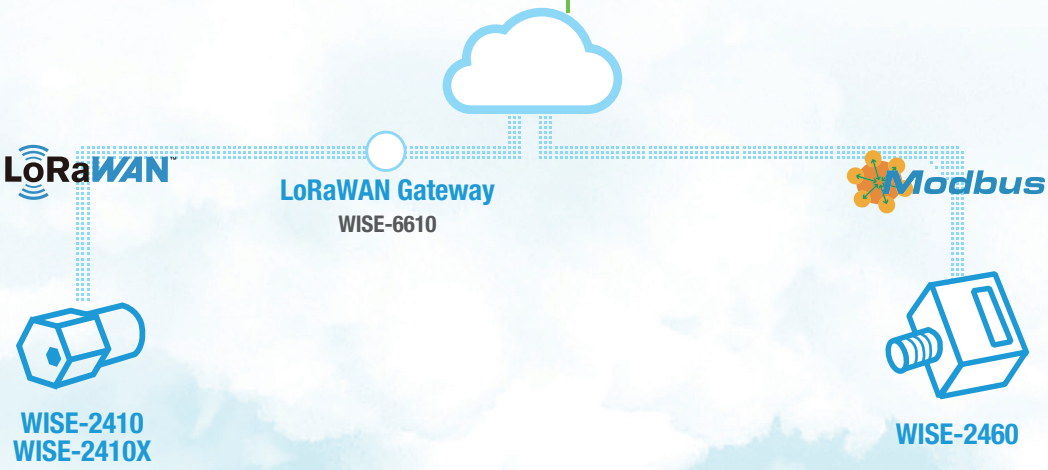
Smart Vibration Sensors

WISE-2460 is a robust RS-485 smart vibration sensor integrated with an ARM Cortex-M7 processor, 10KHz@1-axis high detection range accelerometer and temperature sensor. This powerful computing device balances the bandwidth between edge devices and the application service on the user side.

RS-485 serial communication through Modbus/RTU protocols

10KHz@1-axis frequency detection range

Support max 10 customize detection ranges between 5 ~ 10,000Hz



EVA-2000

Smart Sensors

EVA-2000 smart sensors feature LoRaWAN technology for extended-range data transmission and energy efficiency. Specifically designed for environmental data acquisition, the series is well-suited for applications in industrial automation, equipment monitoring, and environmental monitoring. EVA-2000 opens the door to improved operational insights and sustainable practices.

LoRaWAN

Internal Antenna

Saves installation space and prevents damage while maintaining communication quality.

Battery-Powered

Utilizing LPWAN technology means that the EVA-2000 series can be powered by 3.6-V AA lithium battery.

QR Code Configuration

Simply scan the QR code to gain instant access to device information, ensuring a seamless deployment process.

Flexible Mounting

Wall, magnetic, and pole mounting enable fitting in any installation environment.

EVA-2210

3-Phase Current Meter with 3 x 75A Clamp-On CT

EVA-2210 is capable to measure equipment current at different kinds of application, such like pumps, fan motors, compressors, computers, servers, etc.

EVA-2510

LoRaWAN Wireless Water Leakage Sensor

EVA-2510 is a water leak detection sensor, can be used in cooling system, water treatment system, etc. It can reduce the risk by alerting you to problems quickly so you can act to prevent severe damage.

EVA-2310

LoRaWAN Temperature and Humidity Sensor

EVA-2310 is capable to measure temperature and humidity at different kinds of application, such like office, hospital, classroom, warehouse, etc.

EVA-2311

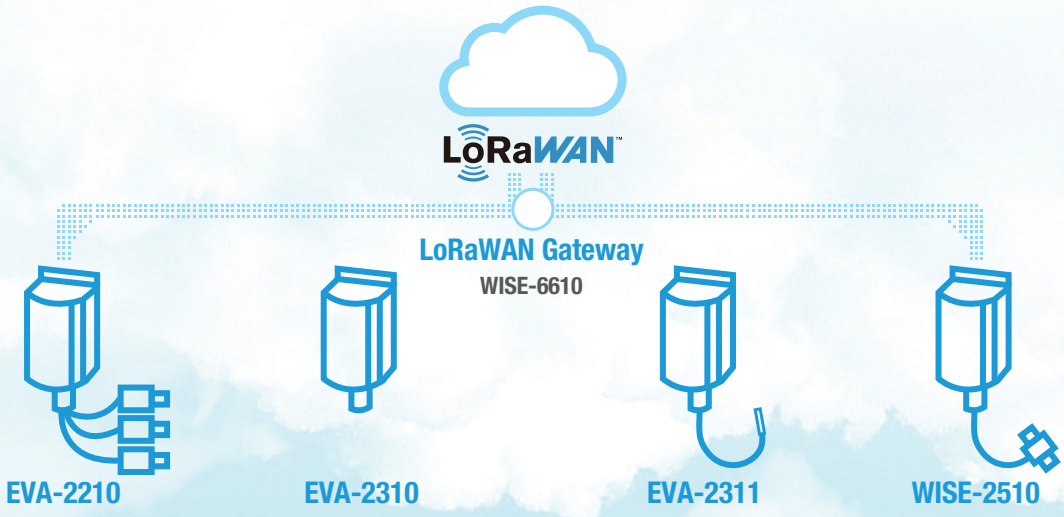
LoRaWAN Temperature PT1000 Round Head Probe Sensor

EVA-2311 is a LoRaWAN PT1000 round head probe sensor. The extended sensor itself has 2m length cable, IP67 rating design with -70°C to 200°C temperature detection range.

LoRa LPWAN with 5-km line-of-sight communication

Superior penetration, low interference

Easy to organize LoRa network data access



WISE-6610

Industrial LoRaWAN Gateway

The WISE-6610 has high-performance that offers reliable connectivity for industrial environments. It supports the LoRaWAN protocol for building LoRaWAN private and public networks, as well as various industrial protocols including Modbus, OPCUA, BACnet/IP, MQTT, etc. The hardware and software flexibility of the WISE-6610 provides rich features for edge intelligence systems, and also supports VPN tunneling with various protocols ensures safe communications. The WISE-6610 also runs a embedded LoRaWAN network server (LNS) that can decode the LoRaWAN data directly in our device.

LoRaWAN

EdgeLink Node-RED

Simplify Network Management

Support embedded LoRaWAN Network Server for both private and public system application.

IoT Protocols

Supports Modbus/TCP, MQTT, BACnet/IP, OPCUA protocols.

Flexible Mounting

DIN-Rail, wall and pole mounting enable fitting in any installation environment.

Customizable Software Package

OpenWRT enables the users to tailor the LoRaWAN gateway's functionality to specific needs and applications.

WISE-6610/P

Industrial LoRaWAN Gateway

The WISE-6610 ensures reliable industrial connectivity with LoRaWAN support, various protocols like Modbus and MQTT, and secure VPN communication. It also features an embedded LoRaWAN network server for direct data decoding.

LoRa LPWAN with 5-km line-of-sight communication

Superior penetration, low interference

Easy to organize LoRa network data access

WISE-R311

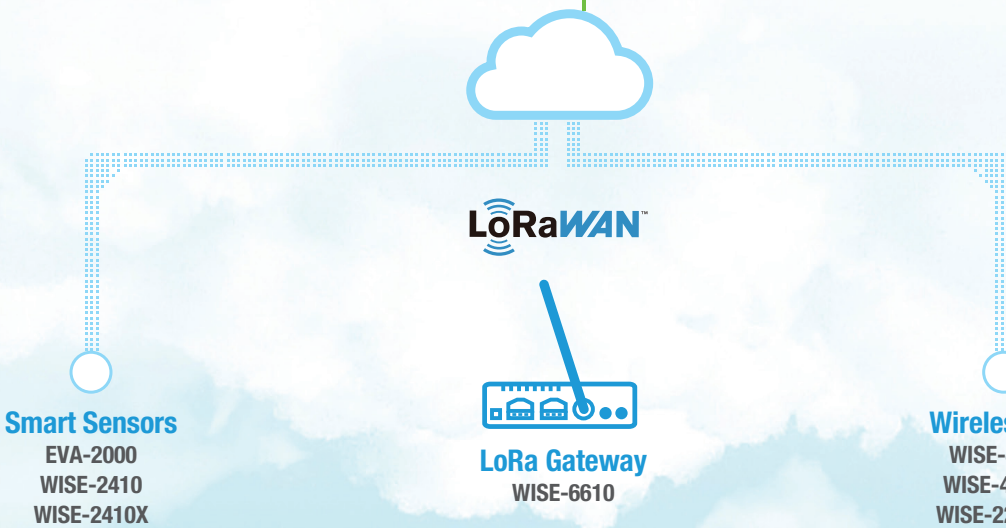
LoRaWAN Gateway Module

The WISE-R311, with a mini-PCIe form factor and Semtech SX1302 chipset, ensures reliable connectivity, reduces power consumption, and lowers costs. Advantech provides a Linux-based LoRaWAN server for easy device management via a web interface.

Support embedded LNS software for Linux-based OS.

Superior penetration, low interference

Easy to organize LoRa network data access



Smart Sensors
EVA-2000
WISE-2410
WISE-2410X

LoRa Gateway
WISE-6610

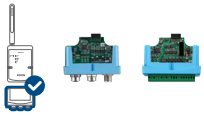
Wireless I/O
WISE-4610
WISE-4610P
WISE-2200-M

Industrial Wireless I/O & Sensors

LoRaWAN I/O Modules

LoRaWAN

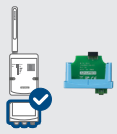
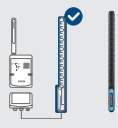


Category	Industrial LoRa/LoRaWAN Wireless Module				Industrial LoRa/LoRaWAN Wireless Module			Industrial LoRa/LoRaWAN Wireless Module	Industrial LoRaWAN Node
Model	WISE-4610P				WISE-4610			WISE-2200-M	BB-WSW
Frequency Range	EU 863-870 (MHz) / RU 864-870 (MHz) US 902-928 (MHz) / AU 915-928 (MHz) AS 919-924 (MHz) / TH 920-925 (MHz) JP 920-928 (MHz)								EU 863-870 (MHz) US 902-928 (MHz) AS 919-924 (MHz)
Function	Wireless board				Wireless board			Wireless I/O Module	Wireless I/O Module
Positioning	GPS/Galileo/BeiDou/GLONASS				–			–	–
Power Input	4100 mAh Lithium rechargeable battery 10~50 V_{DC} external power 17~21 V_{DC} solar panel				– 10~50 V_{DC} external power 17~21 V_{DC} solar panel			– 5~50 V_{DC} –	9~36 V_{DC} / 2*3.6V AA Batteries
Configuration Interface	Micro-B USB				Micro-B USB			Micro-B USB	Micro-B USB
I/O Module								–	–
Model	WISE-S614-A	WISE-S614T-A	WISE-S615-A	WISE-S615T-A	WISE-S617-A	WISE-S617T-A	WISE-S672-A	–	–
Spec	4AI&4DI (M12)	4AI&4DI (terminal block)	4RTD (M12)	4RTD (terminal block)	2AI, 2DI, 1 DO & 1 RS-485 with 12V power output (M12)	2AI, 2DI, 1 DO & 1 RS-485 with 12V power output (terminal block)	6DI, 1 RS-485 & 1 RS-485/ 232	1 RS-485	2AI, 2DI, 1DO
WISE-4610 Optional	1654011516-01 M12, A-code, 8-pin, male 1655005903-01 M12, A-code, 4-pin, female 1700028162-01 M12, A-code, 4-pin, female with 1m cable 1700028163-01 M12, A-code, 8-pin, male with 1m cable							–	

✓ : supported, – : not supported, △ : optional

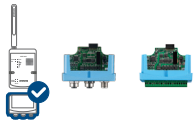
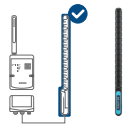
Wi-Fi I/O Modules

Wi-Fi

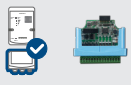
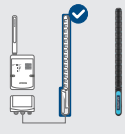
Category	Dual-band Wi-Fi 2.4/5G Wireless Module			
Model	WISE-4250			
Standard	802.11 a/b/g/n/ac			
Frequency	2.4/5GHz			
Function	Wireless board			
Power Input	10~50 V_{DC} external power			
Configuration Interface	–			
Antenna Gain	(Peak) 2.4G 3.64 dBi / 5G 5.65 dBi			
I/O Module				
Model	WISE-S214-A	WISE-S250-A	WISE-S251-A	WISE-S100-A
Spec	4AI&4DI	6DI, 2DO&1RS-485	6DI &1RS-485	Stack Light Monitoring Sensor

✓ : supported, – : not supported, △ : optional

NB-IoT/LTE-M I/O Modules

Category	Advanced Industrial Cat.NB1/Cat.M1 Wireless Module								
Model	WISE-4671								
Standard	3GPP release13								
Band	B2,3,4,5,8,12,13,20,28								
SIM Type	Nano SIM/4FF								
Function	Wireless board								
Positioning	GPS/Galileo/BeiDou/GLONASS								
Power Input	4100 mAh Lithium Rechargeable Battery 10~50 V_{DC} External Power 17~21 V_{DC} Solar Panel								
Configuration Interface	Micro-B USB								
I/O Module									
Model	WISE-S614-A	WISE-S614T-A	WISE-S615-A	WISE-S615T-A	WISE-S617-A	WISE-S617T-A	WISE-S672-A	WISE-S600/ WISE-S600T	WISE-S100-A
Spec	4AI & 4DI (M12)	4AI & 4DI (Terminal Block)	4RTD (M12)	4RTD (Terminal Block)	2AI,2DI, 1DO & 1RS-485 (M12)	2AI,2DI, 1DO & 1RS-485 (Terminal Block)	6DI, 1RS-485 & 1RS-485/232	Upon Customization Request *MOQ required	Stack Light Monitoring Sensor
WISE-4671 Optional	1654011516-01 M12, A-code, 8-pin, male 1655005903-01 M12, A-code, 4-pin, female 1700028162-01 M12, A-code, 4-pin, female with 1m cable 1700028163-01 M12, A-code, 8-pin, male with 1m cable								

✓ : supported, – : not supported, △ : optional

Category	Industrial Cat.NB1/Cat.M1 Wireless Module				
Model	WISE-4471				
Standard	3GPP release 13				
Band	B2,3,4,5,8,12,13,20,28				
SIM Type	Micro SIM/3FF				
Function	Wireless board				
Power Input	10~50 V_{DC} external power				
Configuration Interface	Micro-B USB				
I/O Module					
Model	WISE-S214-A	WISE-S250-A	WISE-S251-A	WISE-S200-A	WISE-S100-A
Spec	4AI & 4DI	6DI, 2DO & 1RS-485	6DI &1RS-485	Customization upon request *MOQ required	Stack light monitoring sensor

✓ : supported, – : not supported, △ : optional

Industrial Wireless I/O & Sensors

Proprietary LPWAN I/O Modules

SUB-G LPWAN Proprietary




Category	Proprietary LPWAN(SUB-G) Wireless Module		Proprietary LPWAN(SUB-G) Built-in Temperature & Humidity Sensor*	Propriety LPWAN (SUB-G) Wireless CT Node	Propriety LPWAN (SUB-G) Wireless Analog Input Modules
Function	AP	Node/Wireless Board	Sensor Node	Self-Powered Node	
Model	**WISE-4210AP**	**WISE-4210**	**WISE-4210-S231**	**WISE-2210**	**WISE-2211**
Frequency	868/923MHz	868/923MHz	868/923MHz	868/923MHz	868/923MHz
Standard	IEEE 802.15.4g FSK/GFSK modulation				
Data Rate	625 bps, 2.5k bps, 5k bps, 50k bps	625 bps, 50k bps		625 bps, 2.5k bps, 5k bps, 50k bps	
Power Input	10~50V_{DC} external power			Self powered	
Configuration Interface	Micro-B USB				
Network Capacity	64 clients				
Outdoor Range (LOS)	5KM @ 625bps				
I/O Module					
Model	WISE-S214-A	WISE-S250-A	WISE-S251-A	WISE-S200-A	WISE-S100-A
Spec	4AI&4DI	6DI, 2DO & 1RS-485	6DI & 1RS-485	Customization upon request *MOQ required	Stack light monitoring sensor

*Modularization doesn't effect WISE-4210-S231 and WISE-221x series

✓ : supported, – : not supported, △ : optional

Wi-Fi All-In-One I/O





Model Name		WISE-4012E	WISE-4012	WISE-4050	WISE-4060	WISE-4051
Description		6-ch Input/Output IoT Wireless I/O Module for IoT Developer	4-ch Universal Input and 2-ch Digital Output IoT Wireless I/O Module	4-ch Digital Input and 4-ch Digital Output IoT Wireless I/O Module	4-ch Digital Input and 4-ch Relay Output IoT Wireless I/O Module	8-ch Digital Input IoT Wireless I/O Module with 1-port RS-485
Wireless Network	IEEE Standard	IEEE 802.11b/g/n				
	Frequency Band	2.4GHz				
	Outdoor Range	110m (L.O.S.)				
Analog Input	Channel	2-ch (Differential)	4-ch	–	–	–
	Input Type	V	V, A, Dry contact DI	–	–	–
	Voltage Range	0~10V	±5V, ±V, 0~5V, 0~10V	–	–	–
	Current Range	–	±0~20mA, 4~20mA	–	–	–
	Resolution	12-bit	16-bit	–	–	–
	Sampling Rate	10 Hz (Total)	10 Hz (Total)	–	–	–
	Accuracy	±0.1 V_{DC}	Voltage: ±0.1% of FSR Current: ±0.2% of FSR	–	–	–
	Burn-out Detection	–	Yes (4~20 mA only)	–	–	–
	Isolation	–	3,000 Vrms	–	–	–
Digital Input	Channel	2-ch Dry Contact	Shared with AI	4-ch	4-ch	8-ch
	Counter Input	3kHz	2Hz	3kHz	3kHz	3kHz
	Frequency Input	0.1~3 kHz	0.1~2 kHz	0.1~3 kHz	0.1~3 kHz	0.1~3 kHz
	Isolation	–	3,000 Vrms	3,000 Vrms	3,000 Vrms	3,000 Vrms
Digital Output	Channel	2-ch Relay	2-ch (Sink Type)	4-ch (Sink Type)	4-ch Power Relay	–
	Output Rating (Resistive Load)	120 V_{AC} @ 0.5 A 30V_{DC} @ 1 A	Open collector to 30 V_{DC}, 400mA max.		250 V_{AC} @ 5 A 30 V_{DC} @ 3 A	–
	Pulse Output	60 operations/minute	5 kHz	5 kHz	60 operations/minute	–
	Isolation	1,500 Vrms	3,000 Vrms	3,000 Vrms	3,000 Vrms	–
Serial Port	Port Number	–				1 (RS-485)
General	Real-time Clock	✓	Yes, with battery backup	Yes, with battery backup	Yes, with battery backup	Yes, with battery backup
	Dimension (W x H x D)	80 x 148 x 25 mm				
Environment	Operating Temperature	-25 ~ 70°C (-13 ~ 158°F)				
	Operating Humidity	20~95% RH (non-condensing)				
Power	Input Range	Micro USB 5 V_{DC}	10~30 V_{DC}	10~30 V_{DC}	10~30 V_{DC}	10~30 V_{DC}
	Protection	–	Power Reversal Protection	Power Reversal Protection	Power Reversal Protection	Power Reversal Protection
	Power Consumption	1.5 W @ 5 V_{DC}	2.5 W @ 24 V_{DC}	2.2 W @ 24 V_{DC}	2.5 W @ 24 V_{DC}	2.2 W @ 24 V_{DC}

✓ : supported, – : not supported, △ : optional

Industrial Wireless I/O & Sensors

RS-485 Smart Vibration Sensors

Model		WISE-2460
Communication	Interface	RS-485
	protocol	Modbus/RTU
Vibration Sensor	Axis	Z
	Frequency Range	1-10,000Hz
	Amplitude Range	±50 g
	Output Data Rate	32000Hz
	Accuracy	1-4000Hz (5%); 4001~10000Hz (35%)
	Noise	25 μg/√Hz in ±50 g range
Mechanical	Enclosure	IP68
	Mounting	Mounting stud; curved surface magnet base; metal base with epoxy
	Dimension (W x H x D)	58.4 x 36.7 x 40 mm
General	Power input	10~30 V_{DC}
	Configuration Interface	RS-485
	Operating Temperature	-20 ~ 105°C (-4 ~ 221°F)
	Storage Temperature	-25 ~ 120°C (-13 ~ 248°F)
	Operating Humidity	10~95% RH
	Storage Humidity	5~95% RH

✓ : supported, – : not supported, △ : optional

LoRaWAN Smart Vibration Sensors

Category		LoRaWAN Smart Vibration Sensor	Explosion Proof LoRaWAN Smart Vibration Sensor
Model		WISE-2410	WISE-2410X
Wireless Communication	Topology	Star (LoRaWAN)	
	Frequency Band	EU 863-870 (MHz) / RU 864-870 (MHz) US 902-928 (MHz) / AU 915-928 (MHz) AS 919-924 (MHz) / TH 920-925 (MHz) JP 920-928 (MHz)	
	Spreading Factor	7~12	
	Transmit Power	Up to +18dBm	
	Data Rate	50 kbps at FSK mode EU868;21.9 kbps at SF7 mode US915;5.47 kbps at SF7 mode JP923	
Vibration Sensor	Axis	X-Y-Z	
	Frequency Range	10~1000Hz	
	Amplitude Range	±2/4/8/16 g	
	Output Data Rate	6600Hz	
	Noise (MAX. TA = 25°C. 0g)	±40 mg	
Temperature Sensor	Operating Range	-20 ~ 85°C (-4 ~ 185°F) (USB powered); -20 ~ 70°C (-4 ~ 158°F) (Battery powered)	0 ~ 70°C (32 ~ 158°F) (Battery powered)
	Resolution	12-bit	
	Accuracy	±2.0°C (±35.6°F) (vertical installation)	
Mechanical	Enclosure	IP66	IP65
	Mounting	Mounting stud; curved surface magnet; adhesives	
	Dimension (L x W x H)	42 x 40.2 x 84.7 mm	42 x 63.5 x 84.7 mm
General	Power Input	3.6V AA battery *2pcs (not included)	WISE-2410X-E21NA: 3.6V AA battery *1pcs (not included) WISE-2410X-A02NA/ WISE-2410X-A02EA/ WISE-2410X-C12NA: 3.6V AA battery *2pcs (not included)
	Configuration Interface	Micro-B USB	
	Operating Temperature	-20 ~ 85°C (-4 ~ 185°F) (USB powered); -20 ~ 70°C (-4 ~ 158°F) (Battery powered)	0 ~ 70°C (32 ~ 158°F) (Battery powered)
	Storage Temperature	-25 ~ 90°C (-13 ~ 194°F)	
	Operating Humidity	10~95% RH	
	Storage Humidity	5~95% RH	

✓ : supported, – : not supported, △ : optional

LoRaWAN Smart Sensors




Model		EVA-2210	EVA-2310	EVA-2311	EVA-2510
Description		3-Phase Current Meter with 3 x 75A Clamp-On CT	LoRaWAN Temperature and Humidity Sensor	LoRaWAN Temperature PT1000 Round Head Probe Sensor	LoRaWAN Wireless Water Leakage Sensor
Wireless Communication	Topology	Star (LoRaWAN)			
	Frequency Band	EU 863-870 (MHz) / US 902-928 (MHz) / AU 915-928 (MHz) /AS 919-924 (MHz)			
	Spreading Factor	7~12			
	Transmit Power	Up to +18dBm			
	Data Rate	50 kbps at FSK mode EU868;21.9 kbps at SF7 mode US915;5.47 kbps at SF7 mode			
Sensor	Type	Current Transformer	Temperature & humidity	PT1000	Leakage detector
	Quantity	3			
	Spec	100mA to 75A (<±1%@300mA to 75A)			
Mechanical	Mounting	Magnetic; Wall; Pole mount			
	Dimension (L x W x H)	112 x 51 x 71.5 mm			
General	Power Input	2 x 3.6V AA batteries (not included)			
	Configuration Interface	Via downlink commands			
	Operating Temperature	-20 ~ 55°C (-4 ~ 131°F)			
	Storage Temperature	-40 ~ 85°C (-40 ~ 185°F)			
	Operating Humidity	0~90% RH			
	Storage Humidity	0~90% RH			

✓ : supported, - : not supported, △ : optional

Wireless LoRaWAN Gateway

Model Name		WISE-6610-B
Description		LoRaWAN Gateway support up to 500 nodes with 868/915/923MHz
Specifications	Mobile Wireless	LoRaWAN
	Communication Interface	LoRaWAN
	Operating Temperature	-40 ~ 75°C (-40 ~ 167°F)
	Power Input	10~30 V_{DC}
	Dimension (W x H x D)	150 x 37.5 x 83 mm
	Weight	500 g

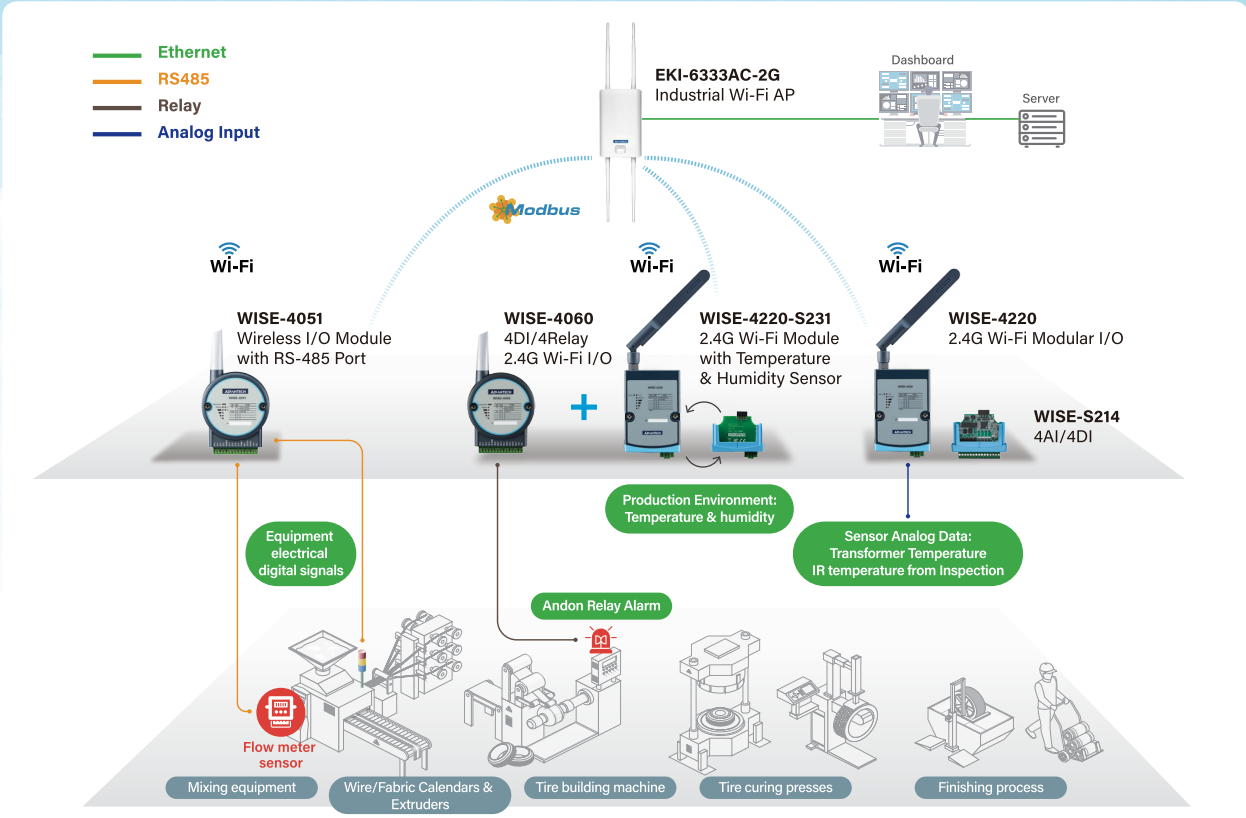
✓ : supported, – : not supported, △ : optional

Case Study

Industrial Wireless Solutions Drive Digitalization and Connectivity in Tire Factory Transformation

Requirement

To enhance on-site management efficiency, a tire manufacturer sought a digitalized, real-time solution for visualizing equipment and environment data without adding network cables. With OT data on energy use and transformer operations essential to boosting production efficiency, the manufacturer required wireless I/O modules for remote monitoring of key parameters, equipment status, and environmental conditions across widely spaced, mostly offline production equipment. By choosing a cost-effective, easy-to-install wireless solution, the manufacturer aimed to streamline data acquisition, enabling smarter factory operations without costly disruptions or manual record-keeping.



Features

- Wireless I/O modules for versatile data acquisition.
- WISE-4060 module for alarm management via relay output.
- Modbus and MQTT protocols for seamless integration with MES/SCADA and cloud servers.
- Supports remote monitoring of temperature, humidity, energy, and equipment status.
- RS-485, Modbus TCP, and analog sensor compatibility.

Benefits

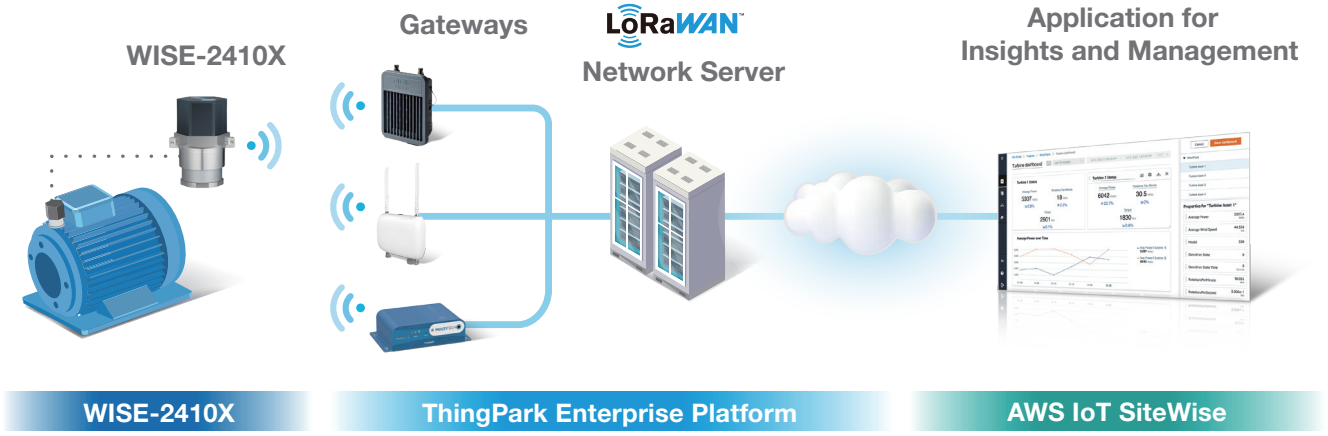
- Reduces energy use and boosts system uptime.
- Enhances product quality and workplace safety.
- Enables real-time process alarms and flexible remote monitoring.
- Quick, cable-free installation for legacy equipment networking.
- Scalable solution for multi-site deployment.

Case Study

Explosion Proof LoRaWAN Smart Vibration Sensor in Oil Refinery

Requirement

Due to the refinery's large premises and the long list of equipment requiring monitoring, it would be too costly to physically wire sensor nodes to local gateways. The many metal surfaces throughout the entire site would also make it difficult to install cabling. Furthermore, all devices had to be rated for use in outdoor and hazardous environments in order to meet safety requirements. Therefore, an explosion-proof wireless vibration sensor integrated with LoRaWAN private networking solution and data management service was required in order to overcome the growing management and operational challenges of manual inspections and reduce maintenance costs.



Features

- WISE-2410X sensor with IP65 rating and ATEX2/IECEx certification for hazardous environments.
- Monitors vibration and temperature in rotating equipment, compliant with ISO 10816 and ISO 20816 standards.
- Long-range, bidirectional LoRaWAN communication (up to 15 km) for fewer field devices.
- ThingPark Enterprise IoT platform for private LoRaWAN network management.
- AWS IoT SiteWise for local and cloud-based industrial data organization and analysis.

Benefits

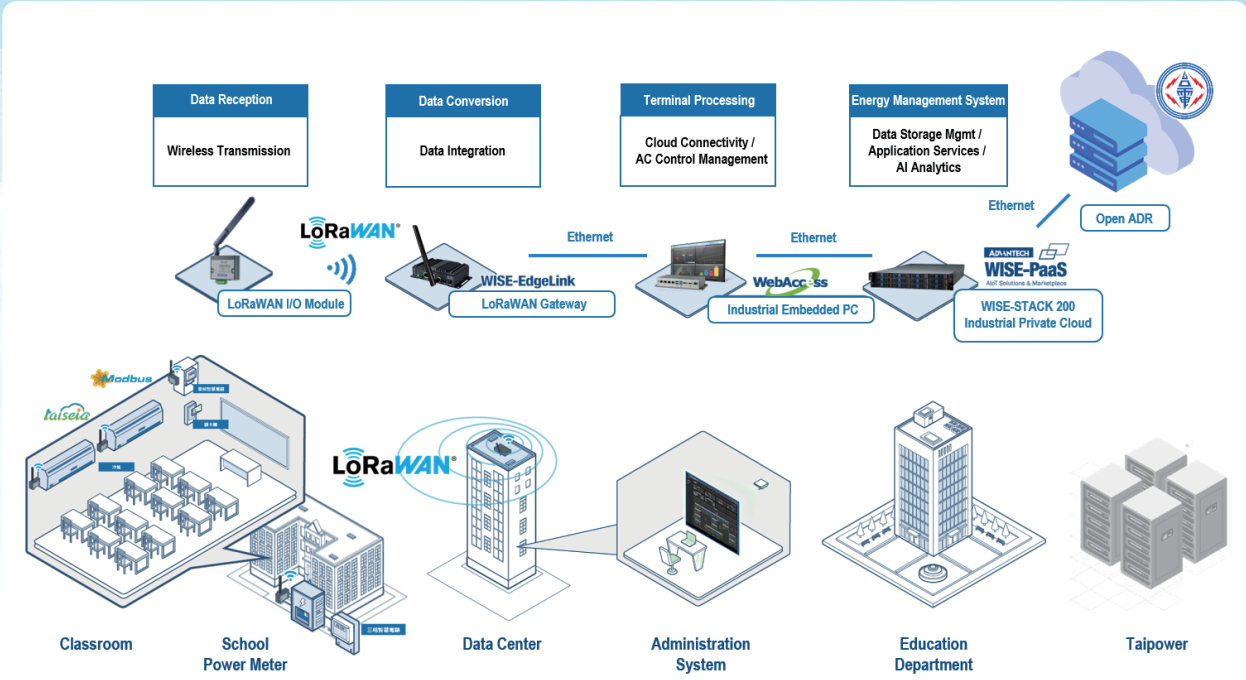
- Boosts productivity and reduces labor needs in oil refining.
- Enables remote monitoring and frequent data recording of equipment.
- Centralized, accessible management from any location.

Case Study

Accelerate Campus Energy Management by Building a LoRaWAN Network

Requirement

Faced with the challenge of deploying a wireless network across over a hundred schools in a large county within a six-month timeline, the government sought a quick-install wireless solution to avoid extensive cabling and minimize classroom disruption. The energy management system (EMS) needed to support functions such as electricity monitoring, automated demand response, real-time information display, and data security. Key requirements included a standalone network to address base station limitations, stable coverage across campuses, secure outdoor installations, data encryption, and a cloud-based platform for remote management.



Features

- LoRaWAN for long-range, high-penetration wireless connectivity.
- WISE-2200-M I/O module: compact, plug-and-play, wide temperature support.
- WISE-6610 gateway: supports VPN, MQTT, and secure communication.
- UNO2484G computer for data visualization and integration.
- Centralized data analysis via WISE-STACK 200.

Benefits

- Wide coverage with fewer gateways, reducing equipment and installation costs.
- Fast, easy installation without cabling, ideal for both indoor and outdoor setups.
- Secure data transmission for remote monitoring and control of energy usage.
- Compatible with existing systems for seamless data integration and analysis.

Case Study

Slope Monitoring Systems with LoRaWAN for the Stability of Sloped Areas

Requirement

The project spans over 10 regions with 30-40 monitoring points per area, totaling around 500 completed points. Key equipment includes high-resolution tiltmeters and soil moisture meters, which collect data every 15 minutes, with adjustable frequency for adverse conditions like typhoons or earthquakes. Each monitoring device operates independently with rechargeable batteries and solar panels. A cloud-based IoT platform serves as the central management system for slope monitoring.

Features

- WISE-4610P modules with solar-powered, rechargeable batteries and IP65 protection.
- Energy-efficient with automatic sensor activation
- Long-range, low-power LoRaWAN protocol for remote monitoring.
- Integrated with GIS and weather data for real-time analysis.

Benefits

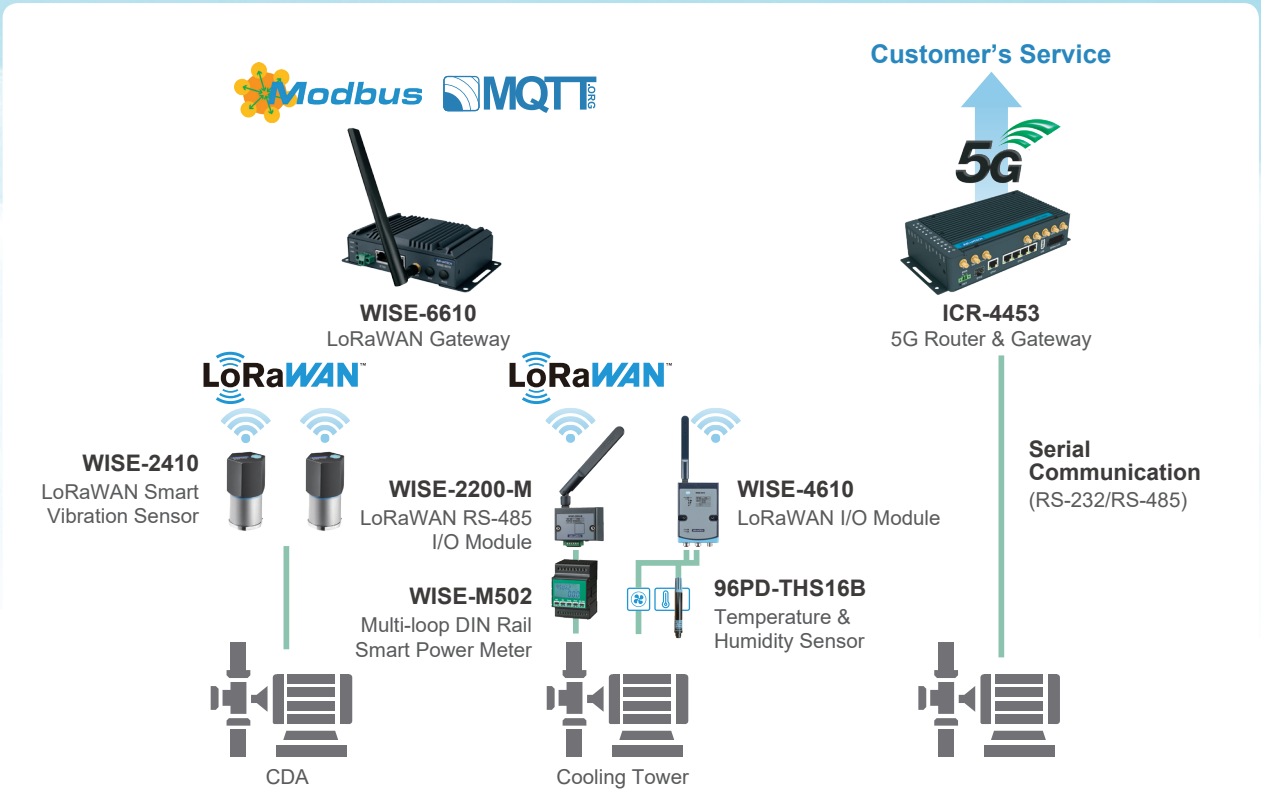
- Reduces installation and maintenance costs by eliminating the need for cabling.
- Provides reliable, independent monitoring with solar power and durable design.
- Increases management efficiency with real-time data for disaster prevention.
- Enables remote monitoring of slope stability in varied weather conditions.

Case Study

Smart Condition-based Monitoring Solution in Compressed/Clean Dry Air (CDA) System

Requirement

In the competitive semiconductor industry, efficient facility monitoring is essential, and a reliable wireless solution can greatly enhance operations. In Taiwan's semiconductor fabs, compressed/clean dry air (CDA) is used for equipment functions, requiring continuous monitoring by facility maintenance teams. The customer needed a plug-and-play, remote wireless monitoring system, for which an industrial LoRaWAN solution was deployed. This included the WISE-2410 vibration sensor for compressor inspection, WISE-4610 LoRaWAN I/O module with WISE-S617 for flexible I/O, and WISE-2200-M LoRaWAN RS-485 I/O module for current monitoring of CDA systems.



Features

- WISE-2410: ISO 10816 compliant, 3-axis vibration detection, IP66, wide temperature range for tough environments.
- WISE-2200-M: Plug-and-play RS-485 LoRaWAN I/O with Modbus/RTU support, operates from -25 to 70°C.
- WISE-4610 + WISE-S617: Flexible I/O with control channels for versatile remote monitoring and control.
- WISE-6610: LoRaWAN gateway connects to SCADA for streamlined facility management.

Benefits

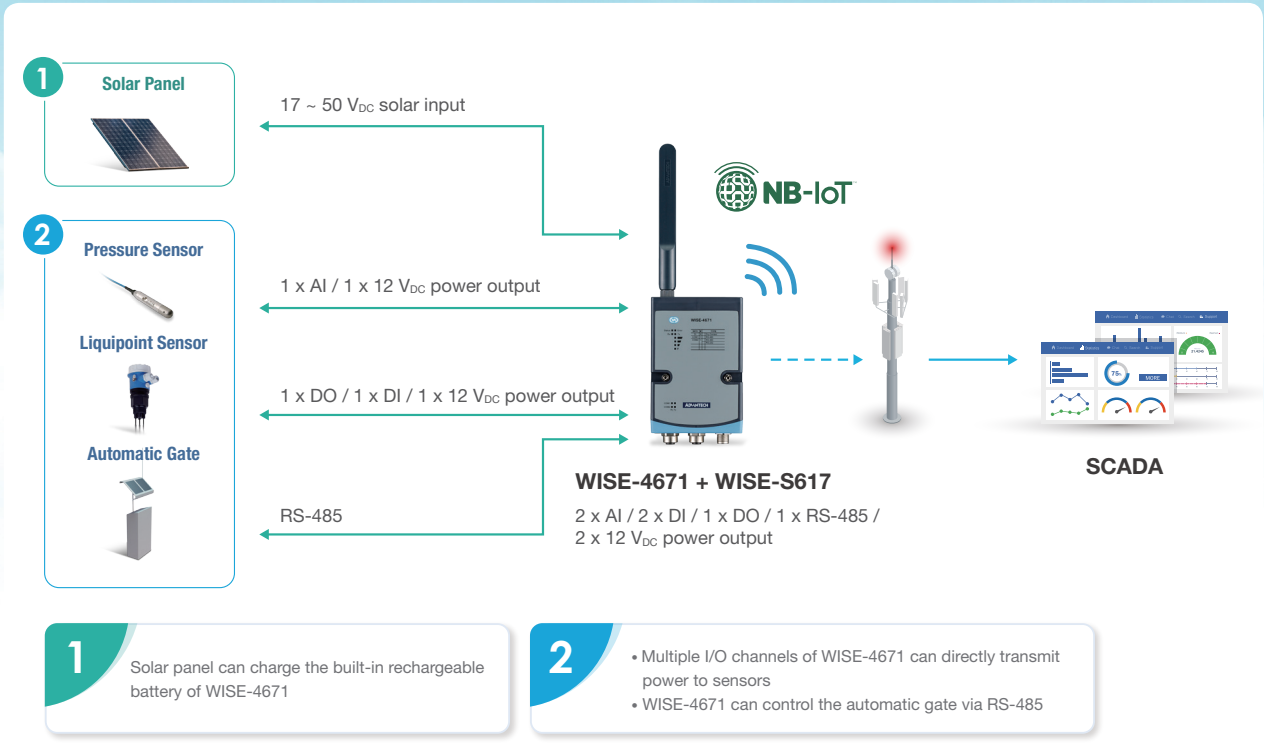
- Reliable, cost-effective private LoRaWAN network for facility monitoring.
- Long-range, high-penetration signals ensure stable connectivity.
- Quick deployment with flexible, easy-to-install WISE devices.
- High-performance solution for efficient, stable facility management.

Case Study

Industrial NB-IoT/LTE-M Solution Enables the Remote Control of Canals

Requirement

An agricultural operator managing over 100,000 hectares of gravity-fed irrigation through canals, faced significant challenges due to the extensive travel required for personnel to inspect and manually adjust various canal structures, often covering up to 300 km per day. This approach was costly and inefficient, particularly as many access roads became impassable in wet weather. To address these issues, the customer sought a wireless solution that would enable sensors to report data to their SCADA system at regular intervals. The solution needed to include rechargeable batteries within the gateway to power the sensors, facilitate remote control of canal gates to manage flow rates, and ultimately reduce travel costs while enhancing responsiveness and flexibility during adverse weather conditions.



1 Solar panel can charge the built-in rechargeable battery of WISE-4671

2
- Multiple I/O channels of WISE-4671 can directly transmit power to sensors
- WISE-4671 can control the automatic gate via RS-485

Features

- Utilizes NB-IoT for reliable wireless canal monitoring with wide coverage and low power consumption.
- Connects sensors directly to the Internet via WISE-4671 and WISE-S617 modules.
- IP65-rated for dust and moisture resistance; features solar charging and GPS support.
- Flexible I/O options ensure sensor compatibility without cabling.

Benefits

- Enables remote management of canal systems, reducing on-site visits.
- Cost-effective with installation and ongoing expenses covered by the telecom provider.
- Offers quick access to remote engineering support for rapid response.
- Allows real-time gate adjustments based on water demand, optimizing resources.
- Minimizes travel and weather-related disruptions, saving time and labor costs.

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