# WISE-4610

## Advanced Industrial LoRa/LoRaWAN Wireless I/O Module

## Features

- Private LoRa and LoRaWAN selectable
- Longer communication range
- Better penetration through concrete and steel
- Less interference than 2.4GHz spectrum
- Application-ready I/O combination with IP65 enclosure
- Powered by solar rechargeable battery or 10~50$V_{DC}$ input
- GPS/Galileo/BeiDou/GLONASS support

## Introduction

LPWAN is a type of wireless telecommunication wide area network designed to allow long range communications at a low data rate among IoT applications, such as sensors operated on a battery. Its benefits is to offer multi-year battery lifetime for sensors/ applications to send small amounts of data over long distances a few times per hour suitable for different environments.

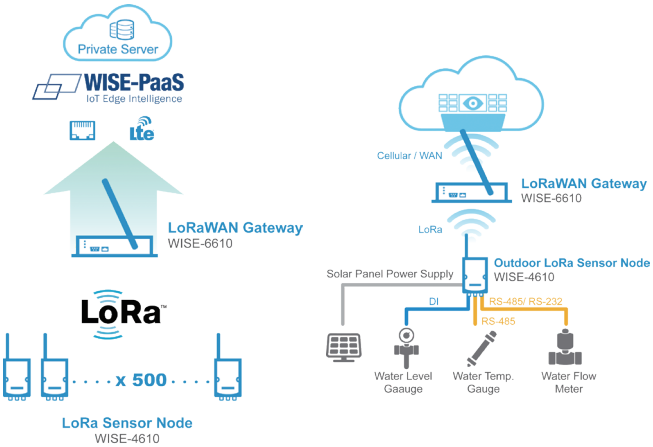
Private LoRa and LoRaWAN are one of category of LPWAN which belong to the non-cellular LPWAN wireless communication network protocols enables very long range transmissions with low power consumption, operating in the non-licensed spectrum.


### Star Topology

The LoRaWAN networks in a star topology have gateway relaying the data between the sensor nodes and the network server.

Communication between the sensor nodes and the gateway goes over the wireless channel utilizing the LoRa physical layer, whilst the connection between the gateways and the central server are handled over a backbone IP-based network.

The LoRaWAN end nodes(sensors) typically use Low Power and are battery powered (Class A and Class C). LoRa embedded sensors that run on batteries that lasts from 2–5 years typically. The LoRa sensors can transmit signals over distances from 1km—10km.




## Common Specification

### Wireless Communication

- **Standard** LoRaWAN or Private LoRa
- **Frequency Band** EU 863-870 (MHz) / US 902-928 (MHz) / AU 915-928 (MHz) / AS 919-924 (MHz) / JP 920-928 (MHz)
- **Spreading Factor** 7~12
- **Outdoor Range** 15Km (L.o.S) by pairing with WISE-6610 (with 2 dBi Antenna)
- **Transmit Power** Up to +18dBm
- **Receiver Sensitivity** Up to -136dBm at SF = 12 / 125KHz
- **Data Rate** 50 kbps at FSK mode EU868<br>21.9 kbps at SF7 mode US915<br>5.47 kbps at SF7 mode JP923
- **Topology** Star
- **Function** End Node
- **Antenna Type** External

### GPS (Only Supported on WISE-4610P)

- **GNSS Systems** GPS, GLONASS, Galileo, BeiDou, QZSS and SBAS signals
- **Update Interval** Configurable between 15 ~ 86400 s
- **Accuracy** Position: 2.5 m CEP (50% confidence)<br>With SBAS: 2.0 m CEP (50% confidence)
- **Acquisition** Cold starts: 57 s<br>Aided starts: 7 s
- **Antenna Type** Internal

ANATEL: 03308-21-05739



All product specifications are subject to change without notice.

Last updated: 31-May-2024

### General

- **Power Input** — **WISE-4610P**
  Built-in 4100mAh Lithium rechargeable battery pack
  10~50$V_{DC}$ external power
  17-50$V_{DC}$ Solar Panel
  **WISE-4610**
  10~50$V_{DC}$ external power
- **Battery Life** — 6 months (1 hour data update with WISE-S617T, RS-485 Enable only)
- **Configuration Interface** — Micro-B USB
- **LED Indicator** — Status, Error, Tx, Rx, Battery/Signal Level
- **Mounting** — DIN 35 rail, wall, pole, and stack
- **Dimension (W x H x D)** — 82 x 122 x 49 mm (without antenna)

### Operating Temperature

- **With rechargeable battery** — 0 ~ 60 °C (32 ~ 140 °F)
- **Without battery** — -25 ~ 70 °C (-13 ~ 158 °F)

### Storage Temperature

- **With rechargeable battery** — -20 ~ 60 °C (-4 ~ 140 °F)
- **Without battery** — -40 ~ 85 °C (-40 ~ 185 °F)
- **Operating Humidity** — 5 ~ 95% RH (non-condensing)
- **Storage Humidity** — 0 ~ 95% RH (non-condensing)

## WISE-S614 (4AI/4DI)

### Analog Input

- **Channels** — 4
- **Resolution** — 16-bit
- **Sampling Rate** — 1Hz per channel
- **Accuracy** — ±0.1% of FSR (Voltage)
  ±0.2% of FSR (Current)
- **Input Range** — ±150mV, ±500mV, ±1 V, ±5V, ±10V, 0 ~ 150mV, 0 ~ 500mV, 0 ~ 1V, 0 ~ 5V, 0 ~ 10V, 0 ~ 20mA, 4 ~ 20mA , ±20mA
- **Input Impedance** — > 2M Ω (Voltage)
  240 Ω (External resistor for current)
- **Isolation Voltage** — 2000 $V_{DC}$
- **Common Mode Voltage** — 350 $V_{DC}$
- **Drift** — Unipolar ±100ppm
  Bipolar ±50ppm
- **Burn-out Detection** — Yes (4~20mA only)
- **Supports Data Scaling and Averaging**

### Digital Input

- **Channels** — 4
- **Input Type** — Dry Contact (Wet Contact by request)
- **Logic Level** — 0: Open
  1: Close to DI COM
- **Compatibility** — 3.3V/TTL
- **Non-isolation**
- **Supports 32-bit counter input function (maximum signal frequency: 200 Hz)**
- **Supports keep/discard counter value when power OFF**
- **Supports inverted digital input status**

## WISE-S615 (4 RTD)

### Analog Input

- **Channels** — 4 differential
- **Input Connections** — 2, 3-wire
- **Input Impedance** — 10 MΩ
- **Resolution** — 15-bit
- **Sampling Rate** — 1 Hz per channel
- **RTD Types and Temperature Ranges**
  **Pt 100 RTD**
  **RTD 100 (a = 0.00385) -200°C to 600°C**
  **RTD 100 (a = 0.00392) -200°C to 600°C**
  **Pt 1000 RTD**
  **Pt -40°C to 160°C**
- **Accuracy** — ±0.1% FSR
- **CMR @ 50/60 Hz** — 90 dB
- **NMR @ 50/60 Hz** — 60 dB
- **Span Drift** — ± 100 ppm/°C

## WISE-S617 (2AI/2DI/1DO/1RS-485/2 12Vdc Power Output)

### Analog Input

* default is voltage mode, need to change the jumper setting from voltage to current mode on WISE-S617

- **Channels** — 2
- **Resolution** — 16-bit
- **Sampling Rate** — 1 Hz per channel
- **Accuracy** — ±0.1% of FSR (Voltage)
  ±0.2% of FSR (Current)
- **Input Range** — ±1 V, ±5V, ±10V, 0 ~ 1V, 0 ~ 5V, 0 ~ 10V, 0 ~ 20mA, 4 ~ 20mA, ±20mA
- **Input Impedance** — > 2M Ω (Voltage)
  120 Ω (External Resistor for Current)
- **Isolation Voltage** — 2000 $V_{RMS}$
- **Common Mode Voltage** — 350 $V_{DC}$
- **Drift** — Unipolar ±100ppm
  Bipolar ±50ppm
- **Burn-Out Detection** — Yes (4 ~ 20mA only)
- **Supports data scaling and averaging**

### Digital Input

- **Channels** — 2
- **Input Type** — Dry Contact (Wet Contact by request)
- **Logic Level (Dry Contact)** — 0: Open
  1: Close to DI COM
- **Compatibility** — 3.3V/TTL
- **Non-isolation**
- **Supports 32-bit counter input function (maximum signal frequency: 200 Hz)**
- **Supports keep/discard counter value when power OFF**
- **Supports inverted digital input status**

### Digital Output

- **Channel** — 1 (Sink Type)
- **Non-isolation**
- **Output Current** — 100mA
- **Max Load Voltage** — 50V
- **Supported Pules Output** — 5kHz

### COM Port

- **Port Type** — RS-485
- **Baud Rate (bps)** — 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
- **Data Bits** — 7, 8
- **Stop Bits** — 1, 2
- **Parity** — None, Odd, Even
- **Flow Control** — Auto flow control
- **Signals** — DATA+ and DATA-
- **Protection** — 15 kV ESD
- **Supported Protocols** — Modbus/RTU (Up to 128 addresses with a maximum of 30 instructions)

### Power Output

- **Channel** — 2
- **Output Voltage** — 12 $V_{DC}$
- **Voltage Accuracy** — ±5%
- **Output Current** — 2Ch Total max. 80mA

## WISE-S672 (6DI/1RS-485/1RS-485 or RS-232)

### COM Port

- **Port Number** 2
- **Type** COM0: RS-485
  COM1: RS-485/232
- **Baud Rate (bps)** 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
- **Data Bits** 7, 8
- **Stop Bits** 1, 2
- **Parity** None, Odd, Even
- **Flow Control** Auto flow control
- **Signals** RS-485 DATA+ and DATA-
  RS-232 Tx and Rx and GND
- **Protection** 15 kV ESD
- **Supported Protocols** Modbus/RTU (Up to 32 addresses with a maximum of 8 instructions)

### Digital Input

- **Channels** 6
- **Input Type** Dry Contact (Wet Contact by request)
- **Logic Level** 0: Open
  1: Close to DI COM
- **Compatibility** 3.3V/TTL
- **Non-isolation**
- **Supports 32-bit counter input function (maximum signal frequency: 200 Hz)**
- **Supports keep/discard counter value when power OFF**
- **Supports inverted digital input status**

## Ordering Information

### WISE-4610 Advanced Industrial LoRaWAN Module

- **WISE-4610-NA** Advanced Industrial LoRaWAN Module - NA915

| Firmware Image (Optional) | |
|---|---|
| 96634610J00 | WISE-4610 JA Patch |
| 96634610T00 | WISE-4610 TA AS923 Patch |
| 96634610Z00 | WISE-4610 ZA Patch |

- **WISE-4610-EA** Advanced Industrial LoRaWAN Module - EU868
- **WISE-4610P-NA** Advanced Industrial LoRaWAN I/O Module w/ GPS & battery - NA915

| Firmware Image (Optional) | |
|---|---|
| 96634610J00 | WISE-4610 JA Patch |
| 96634610T00 | WISE-4610 TA AS923 Patch |
| 96634610Z00 | WISE-4610 ZA Patch |

- **WISE-4610P-EA** Advanced Industrial LoRaWAN I/O Module w/ GPS & battery - EU868

### WISE-S600 IP65 I/O Module with M12 Connectors

- **WISE-S614-A** 4AI/4DI
- **WISE-S615-A** 4RTD
- **WISE-S617-A** 2AI/2DI/1DO/1RS-485/2 12Vdc Power Output
- **WISE-S672-A** 6DI/1RS-485/1RS-485 or RS-232

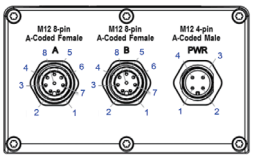
### WISE-S600T I/O Module with Terminal Block

- **WISE-S614T-A** 4AI/4DI
- **WISE-S615T-A** 4RTD
- **WISE-S617T-A** 2AI/2DI/1DO/1RS-485/2 12Vdc Power Output

### Accessories

- **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
- **96PSD-A30W24-DS** DIN Rail Power Supply (1.25A Output Current)
- **BB-RPS-V2-WR2-US** Power Supply, 12V/1A, US plug
- **BB-RPS-V2-WR2-EU** Power Supply, 12V/1A, EU plug

## Pin Assignment




| | Model Name | M12 Cable | WISE-S614 | WISE-S615 | WISE-S617 | WISE-S672 |
|---|---|---|---|---|---|---|
| | Pin Number | | | | | |
| | P/N | 4Pin : 1700028162-01<br>8Pin : 1700028163-01 | WISE-S614-A | WISE-S615-A | WISE-S617-A | WISE-S672-A |
| A | 1 | White | DI0 | RTD0+ | AI0+ | DI0 |
| | 2 | Brown | DI1 | RTD0- | AI0- | DI1 |
| | 3 | Green | DI2 | RTD0 COM | +12V Out0 | DI2 |
| | 4 | Yellow | DI3 | NC | +12V Out GND | DI3 |
| | 5 | Gray | NC | RTD1+ | AI1+ | DI4 |
| | 6 | Pink | NC | RTD1- | AI1- | DI5 |
| | 7 | Blue | NC | RTD1 COM | +12V Out1 | NC |
| | 8 | Red | DI COM | NC | +12V Out GND | DI COM |
| B | 1 | White | AI0+ | RTD2+ | DI0 | RS-485 D1- |
| | 2 | Brown | AI0- | RTD2- | DI1 | RS-485 D1+ |
| | 3 | Green | AI1+ | RTD2 COM | DI COM | RS-232 TX |
| | 4 | Yellow | AI1- | NC | DO0 | RS-232 RX |
| | 5 | Gray | AI2+ | RTD3+ | DO GND | RS-485 D2- |
| | 6 | Pink | AI2- | RTD3- | RS-485 D+ | RS-485 D2+ |
| | 7 | Blue | AI3+ | RTD3 COM | RS-485 D- | NC |
| | 8 | Red | AI3- | NC | RS-485 GND | RS-232 GND |
| PWR | 1 | Brown | +VS | +VS | +VS | +VS |
| | 2 | White | -VS | -VS | -VS | -VS/ SP- |
| | 3 | Blue | SP+ | SP+ | SP+ | SP+ |
| | 4 | Black | SP- | SP- | SP- | NC |

Note: SP means Solar Panel

## Dimensions

Unit: mm