

WISE-4610

Advanced Industrial LoRa/LoRaWAN Wireless I/O Module



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.

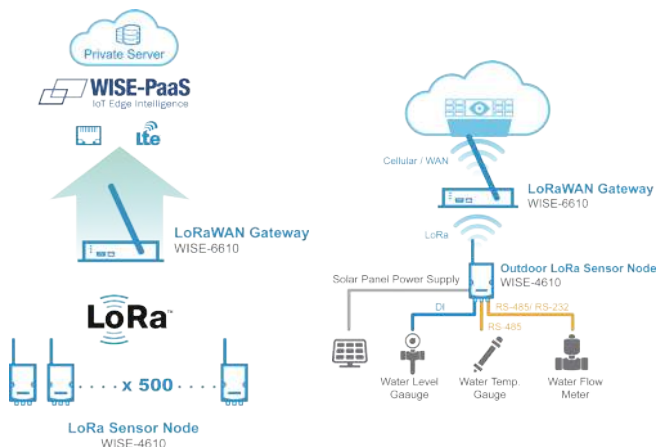


Star Topology

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.



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 10–50V_{DC} input
- GPS/Galileo/BeiDou/GLONASS support

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
21.9 kbps at SF7 mode US915
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
- **Max. Update Rate** Single GNSS: up to 18 Hz
Concurrent GNSS: up to 10 Hz
- **Accuracy** Position: 2.5 m CEP (50% confidence)
With SBAS: 2.0 m CEP (50% confidence)
- **Acquisition** Cold starts: 57 s
Aided starts: 7 s
- **Antenna Type** Internal

General

- **Power Input** **WISE-4610P**
Built-in 4100mAh Lithium rechargeable battery pack
10~50V_{DC} external power
17~50V_{DC} Solar Panel
- **Battery Life** **WISE-4610**
10~50V_{DC} external power
6 months (1 hour data update and 1 day GPS update)
- **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
- **Supports 200Hz Counter Input (32-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports Inverted DI Status**

WISE-S615 (4 RTD)

Analog Input

- **Channels** 4 differential
- **Input Connections** 2, 3-wire
- **Input Impedance** 10 MΩ
- **Resolution** 15 bits
- **Sampling Rate** 1 Sample/s (MAX)

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)

Digital Input

- **Channel** 2
- **Logic Level (Dry Contact)** 0: Open
1: Close to DI COM

- **Non-isolation**
- **Supports 32-bit counter input function (maximum signal frequency: 200 Hz)**
- **Supports keep/discard counter value when power OFF**
- **Supports frequency input function (maximum signal frequency: 200 Hz)**
- **Supports inverted digital input status**

Analog Input

- **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 Output

- **Channel** 1 (Sink Type)
- **Non-isolation**
- **Output Current** 100mA

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 32 addresses with a maximum of 8 instructions)

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

COM Port

- **Port Number** 2
- **Type** COM1: RS-485
COM1: RS-485/232
- **Serial Signal** RS-485: DATA+, DATA-
RS-232: Tx, Rx, GND
- **Data Bits** 7, 8
- **Stop Bits** 1, 2
- **Parity** None, Odd, Even
- **Baud Rate (bps)** 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
- **Protection** 15 kV ESD
- **Protocol** Modbus/RTU (Total 32 address)

Digital Input

- **Channels** 6
- **Input Type** Dry Contact
- **Logic Level** 0: Open
1: Close to DI COM
- **Supports 200Hz Counter Input (32-bit + 1-bit overflow)**
- **Keep/Discard Counter Value when Power-off**
- **Supports Inverted DI 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 w/ 2ch 12V_{DC} power output
- **WISE-S672-A** 6DI/1RS-485/1RS-485 or RS-232

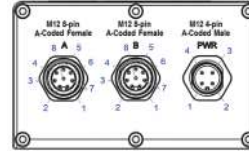
WISE-S600T I/O Module with Terminal Block

- **WISE-S614T-A** 4AI/4DI
- **WISE-S615T-A** 4RTD
- **WISE-S617T-A** 2AI/2DI/1DO/1RS-485 w/ 2ch 12V_{DC} 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
- **PWR-242-AE** DIN Rail Power Supply (2.1A Output Current)
- **PWR-244-AE** Panel Mount Power Supply (4.2A Output Current)

Pin Assignment



| Model Name | M12 Cable | WISE-S614 | WISE-S615 | WISE-S617 | WISE-S672 |
|------------|--|-------------|-------------|--------------|-------------|
| Pin Number | | | | | |
| P/N | 4Pin : 1700028162-01 8Pin : 1700028163-01 | WISE-S614-A | WISE-S615-A | WISE-S617-A | WISE-S672-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 |
| 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 |
| 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 |

Dimensions

Unit: mm

