LoRaWAN Weather Station

Introduction

OVERVIEW:

Dragino LoRaWAN weather station series products are designed for measuring atmospheric conditions to provide information for weather forecasts and to study the weather and climate. They consist of a main process device (WSC1-L) and various sensors.

The sensors include various type such as: Rain Gauge, Temperature/Humidity/Pressure sensor, Wind Speed/direction sensor, Illumination sensor, CO2 sensor, Rain/Snow sensor, PM2.5/10 sensor, PAR(Photosynthetically Available Radiation) sensor, Total Solar Radiation sensor and so on.

User can also add 3rd party weather sensor to the system for more parameters.

Main process device WSC1-L is an outdoor LoRaWAN RS485 end node. It is powered by external 12v solar power and have a built-in li-on backup battery. WSC1-L reads value from various sensors and upload these sensor data to IoT server via LoRaWAN wireless protocol.

WSC1-L is full compatible with LoRaWAN Class C protocol, it can work with standard LoRaWAN gateway.

Features:

- LoRaWAN v1.0.3 Class C
- Bands: EU868/AS923/AU915/IN865/CN470/EU433/KR920/US915
- Solar Powered
- One Main Process unit with several weather sensors
- Default weather sensors or 3rd party weather sensors

Applications:

- Weather forecasts
- Smart Agriculture

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Main Process Unit

WSC1-L

Overview:

WSC1-L is the main process unit in Dragino Weather Station solution. WSCL-1 is an an outdoor LoRaWAN RS485 end node. It is powered by external 12v solar power and have a built-in li-on backup battery.

WSC1-L reads value from various sensors and upload these sensor data to IoT server via LoRaWAN wireless protocol.

WSC1-L is full compatible with LoRaWAN Class C protocol, it can work with standard LoRaWAN gateway.

Each WSC1-L is pre-load with a set of unique keys for LoRaWAN registration, register these keys to local LoRaWAN server and it will auto connect after power on.

Features:

- Wall Attachable
- Bands: EU868/AS923/AU915/IN865/CN470/EU433/KR920/US915
- IP Rating: IP65
- LoRaWAN v1.0.3 Class A protocol
- RS485 / Modbus protocol
- AT Commands to change parameters
- Firmware upgradable via program port
- Powered by external 12v battery
- Back up rechargable 1000mAh battery
- Remote configure parameters via LoRaWAN Downlink
- Support default sensors or 3rd party RS485 sensors

Order Info:WSC1-L-XX

XX:

- XX: Frequency Bands, options: EU433,CN470,EU868,IN865,KR920 AS923,AU915,US915

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Rain Gauge

WSS-01

Overview:

WSS-01 RS485 Rain Gauge is a weather monitor instrument to monitor rainfall.

WSS-01 uses a tipping bucket to detect rainfall. The tipping bucket use 3D streamline shape to make sure it works smoothly and is easy to clean.

WSS-01 is designed to auto support the Dragino Weather station solution. Users just need to connect WSS-01 RS485 interface to WSC1-L. The weather station main processor WSC1-L can auto-detect and upload the rainfall to the LoRaWAN Server.

The tipping bucket of WSS-01 is adjusted to the best angle. When installation, user just needs to screw up and adjust the bottom horizontally.

WSS-01 package includes screw which can be installed to ground. If user want to install WSS-01on pole, they can purchase WS-K2 bracket kit.

Features:

- RS485 Rain Gauge
- ABS enclosure
- Horizontal adjustable
- Small dimension, easy to install
- Vents under funnel, avoid leaf or other things to avoid rain flow.

Specification:

- Resolution: 0.2mm
- Accuracy： ±3%
- Rainfall strength: 0mm～4mm/min (max 8mm/min)
- Input Power: DC 5~24v
- Interface: RS485
- Working Temperature: 0℃～70℃ (incorrect below 0 degree, because water become ICE)
- Working Humidity: <100% (no dewing)
- Power Consumption: 4mA @ 12v.

Order Part：

- WSS-01 : Rain Gauge
- WS-K2 : Bracket Kit for Pole installation

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Wind speed and direction sensor

WSS-02

Overview:

WSS-02 is a RS485 wind speed and wind direction monitor designed for weather station solution.

WSS-02 shell is made of polycarbonate composite material, which has good anti-corrosion and anti-corrosion characteristics, and ensure the long-term use of the sensor without rust. At the same time, it cooperates with the internal smooth bearing system to ensure the stability of information collection .

Users only need to connect WSS-02 RS485 interface to WSC1-L. The weather station main processor WSC1-L can detect and upload the wind speed and direction to the IoT Server via wireless LoRaWAN protocol.

Features:

- RS485 wind speed / direction sensor
- PC enclosure, resist corrosion

Specification:

- Wind speed range: 0 ~ 30m/s
- Wind direction range: 0 ~ 360°
- Start wind speed: ≤0.3m/s
- Interface: RS485
- Accuracy: ± （0.3＋0.03V） m/s , ±1°
- Input Power: DC 5~24v
- Working Temperature: -30℃ ~70℃
- Working Humidity: <100% (no dewing)
- Power Consumption: 13mA @ 12v.
- Cable Length: 2 meters

Order Part #- WSS-02

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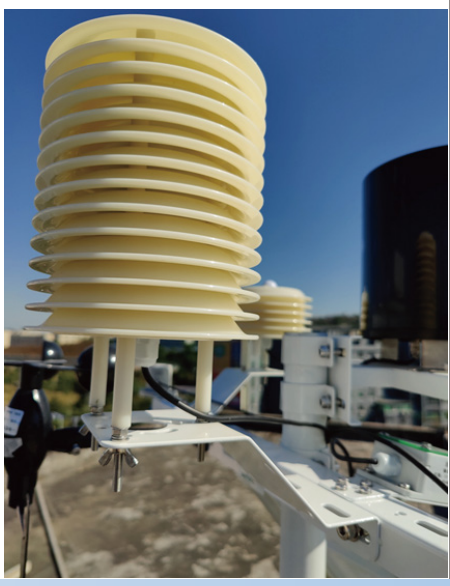
CO2/PM2.5/PM10

WSS-03



Overview:

WSS-03 is a RS485 Air Quality sensor. It can monitor CO2, PM2.5 and PM10 at the same time.

WSS-03 uses weather proof shield which can make sure the sensors are well protected against UV & radiation.

WSS-03 is designed to support the Dragino Weather station solution. Users only need to connect WSS-03 RS485 interface to WSC1-L. The weather station main processor WSC1-L can detect and upload the environment CO2, PM2.5 and PM10 to the IoT Server via wireless LoRaWAN protocol.

Features:

- RS485 CO2, PM2.5, PM10 sensor
- Laser Beam Scattering to PM2.5 and PM10
- NDIR to measure CO2 with Internal Temperature Compensation

Specification:

- CO2 Range: 0～5000ppm, accuracy: ±3%F•S（25℃）
- CO2 resolution: 1ppm
- PM2.5/PM10 Range: 0～1000μg/m3 , accuracy ±3%F•S（25℃）
- PM2.5/PM10 resolution: 1μg/m3
- Input Power: DC 7 ~ 24
- Preheat time: 3min
- Interface: RS485
- Working Temperature: CO2: 0℃～50℃; PM2.5/PM10: -30 ~ 50℃.
- Working Humidity: PM2.5/PM10: 15～80%RH (no dewing), CO2: 0～95%RH.
- Power Consumption: 50mA@ 12v.

Order Part #- WSS-03

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Rain and Snow Detect

WSS-04

Overview:

WSS-04 is a RS485 rain / snow detect sensor. It can monitor Rain or Snow event.

WSS-04 has auto heating feature, this ensures measurement more reliable.

WSS-04 is designed to support the Dragino Weather station solution.
Users only need to connect WSS-04 RS485 interface to WSC1-L. The weather station main processor WSC1-L can detect and upload the SNOW/Rain Event to the IoT Server via wireless LoRaWAN protocol.

Features:

- RS485 Rain/Snow detect sensor
- Surface heating to dry
- grid electrode uses Electroless Nickel/Immersion Gold design for resist corrosion

Specification:

- Detect if there is rain or snow
- Input Power: DC 12 ~ 24v
- Interface: RS485
- Working Temperature: -30℃～70℃
- Working Humidity: 10～90%RH
- Power Consumption:
  No heating: 12mA @ 12v,
  heating: 94ma @ 12v.

Order Part #- WSS-04

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Temperature/Humidity/Illuminance/ Pressure

WSS-05

Overview:

WSS-05 is a 4 in 1 RS485 sensor which can monitor Temperature, Humidity, Illuminance and Pressure at the same time.

WSS-05 is designed to support the Dragino Weather station solution.
Users only need to connect WSS-05 RS485 interface to WSC1-L. The weather station main processor WSC1-L can detect and upload environment Temperature, Humidity, Illuminance, Pressure to the IoT Server via wireless LoRaWAN protocol.

Features:

- RS485 Temperature, Humidity, Illuminance, Pressure sensor

Specification:

- Input Power: DC 12 ~ 24v
- Interface: RS485
- Temperature Sensor Spec:
  Range: -30 ~ 70℃,resolution 0.1℃,
  Accuracy: ±0.5℃.
- Humidity Sensor Spec:
  Range: 0 ~ 100% RH,resolution 0.1 %RH,
  Accuracy: 3% RH
- Pressure Sensor Spec:
  Range: 10～1100hPa,Resolution: 0.1hPa,
  Accuracy: ±0.1hPa
- Illuminate sensor:
  Range: 0～2/20/200kLux,
  Resolution: 10 Lux,
  Accuracy: ±3%FS
- Working Temperature: -30℃～70℃
- Working Humidity: 10～90%RH
- Power Consumption: 4mA @ 12v

Order Part #- WSS-05

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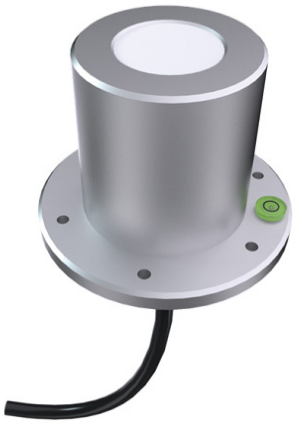
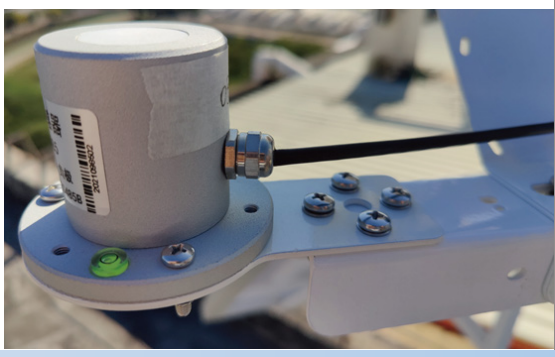
Total Solar Radiation sensor

WSS-06





Overview:

WSS-06 is Total Radiation Sensor can be used to measure the total solar radiation in the spectral range of 0.3 to 3 μm (300 to 3000 nm). If the sensor face is down, the reflected radiation can be measured, and the shading ring can also be used to measure the scattered radiation.

The core device of the radiation sensor is a high-precision photosensitive element, which has good stability and high precision; at the same time, a precision-machined PTTE radiation cover is installed outside the sensing element, which effectively prevents environmental factors from affecting its performance.

WSS-06 is designed to support the Dragino Weather station solution.

Users only need to connect WSS-06 RS485 interface to WSC1-L. The weather station main processor WSC1-L can detect and upload Total Solar Radiation to the IoT Server via wireless LoRaWAN protocol.

Features:

- RS485 Total Solar Radiation sensor
- Measure Total Radiation between 0.3～3μm（300～3000nm）
- Measure Reflected Radiation if sense area towards ground.

Specification:

- Input Power: DC 5 ~ 24v
- Interface: RS485
- Detect spectrum: 0.3～3μm（300～3000nm）
- Measure strength range: 0～2000W/m2
- Resolution: 0.1W/m2
- Accuracy: ±3%
- Yearly Stability: ≤±2%
- Cosine response: ≤7% (@ Sun angle 10°)
- Temperature Effect: ±2%(-10℃～40℃)
- Working Temperature: -40℃～70℃
- Working Humidity: 10～90%RH
- Power Consumption: 4mA @ 12v

Order Part #- WSS-06

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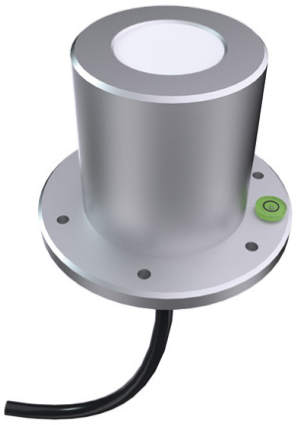
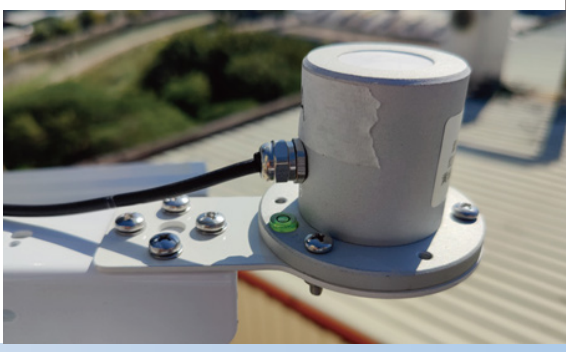
PAR (Photosynthetically Available Radiation)

WSS-07





Overview:

WSS-07 photosynthetically active radiation sensor is mainly used to measure the photosynthetically active radiation of natural light in the wavelength range of 400-700nm.

WSS-07 use precision optical detectors and has an optical filter of 400-700nm, when natural light is irradiated, a voltage signal proportional to the intensity of the incident radiation is generated, and its luminous flux density is proportional to the cosine of the direct angle of the incident light.

WSS-07 is designed to support the Dragino Weather station solution.

Users only need to connect WSS-07 RS485 interface to WSC1-L. The weather station main processor WSC1-L can detect and upload Photosynthetically Available Radiation to the IoT Server via wireless LoRaWAN protocol.

Features:

- PAR (Photosynthetically Available Radiation) sensor measure 400 ~ 700nm wavelength nature light's Photosynthetically Available Radiation.
- When nature light shine on the sense area, it will generate a signal base on the incidence radiation strength.

Specification:

- Input Power: DC 5 ~ 24v
- Interface: RS485
- Response Spectrum: 400～700nm
- Measure range: 0～2500μmol/m2•s
- Resolution: 1μmol/m2•s
- Accuracy: ±2%
- Yearly Stability: ≤±2%
- Working Temperature: -30℃～75℃
- Working Humidity: 10～90%RH
- Power Consumption: 3mA @ 12v

Order Part #- WSS-07

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