

SenseCAP LoRaWAN Sensor

Product Catalogue

- 18

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About SenseCAP

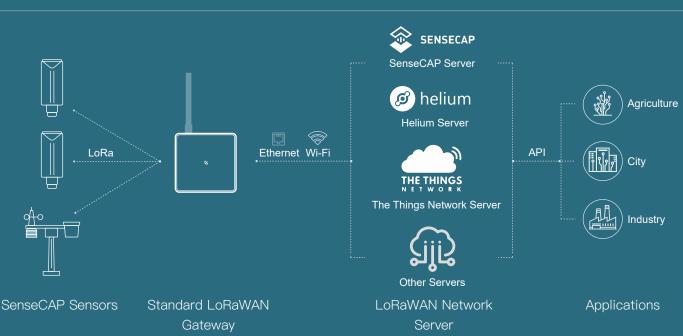
Among the first launch of Seeed IIoT product series, SenseCAP is focusing on wireless environmental sensing applications: smart agriculture, precision farming, and smart city, to name a few. It consists of hardware products (sensors, data–loggers & gateways, etc.), software services (SenseCAP portal, mobile App, open dashboard), and API for device & data management.

About S21XX/A110X Series

The next generation of LoRa sensors, the S21XX/A110X series offers users' industrial long-distance data acquisition via LoRaWAN. This series is suitable for a wide variety of different industries such as smart agriculture, smart buildings and industrial control.

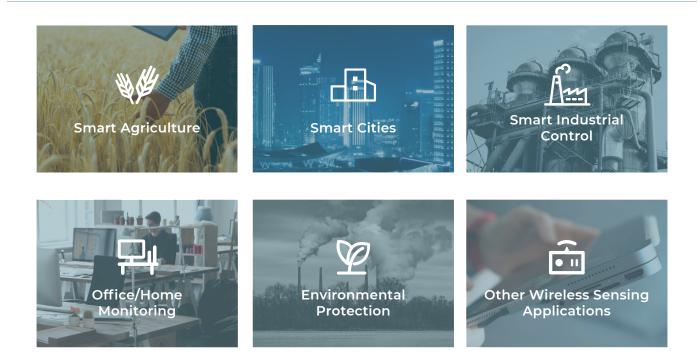
With the IP66 rating, $-40 \sim +85$ C $^{\circ}$ operating temperature and built–in 19Ah high–capacity battery, combined with the

devices' low power consumption, the series can operate in harsh outdoor environments for up to 10 years with a range of up to 10km. The built-in Bluetooth facilitates setup and greatly reduces large-scale deployment costs. Users can focus on application development with the easy set-up, and start retrieving data in a few steps. Just install the device, bind it using the QR code and configure the network, then data can be viewed from the SenseCAP portal, which supports popular IoT protocols such as HTTP and MQTT.



Architecture

Application



How to Select Gateway and LoRaWAN® Network Server

LoRaWAN network coverage is required when using sensors, there are two options.

Option 1

Sensors are used out of the box with the Helium network

Make sure you are covered by Helium Network.

2 Add Sensor to your account by scanning sensor QR code

3 Get the data from SenseCAP Portal and App







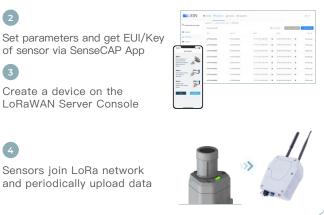
Option 2

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Sensors are used with standard LoRaWAN network

Deploy gateway and select LoRaWAN Network Server





* The LoRaWAN® name and the associated logo are licensed by the LoRa Alliance.

Features - S210X/A110X Series



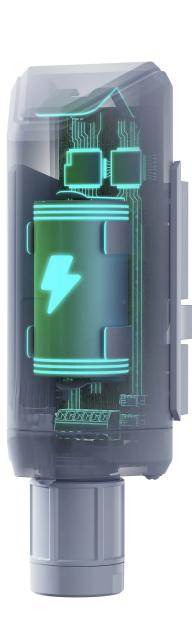
High accuracy sensor Fast response and superior stability



Ultra-low power consumption Battery life of up to 10 years with built–in 19Ah battery



Industrial design −40 ~ 85°C operating temperature and IP66 rating





Quick configuration User-friendly set-up with built-in Bluetooth



Easy deployment Easy to mount via brackets



Efficient integration

SenseCAP cloud services with Open API support further development



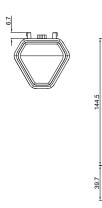
Compatible with multiple NS (Helium, TTN) and IoT platforms

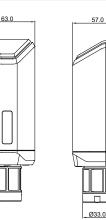


Weather resistant

Suitable for indoor, outdoor and harsh environments such as high UV exposure, heavy rain, dusty conditions etc.







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SenseCAP S2101 Air Temperature and Humidity Sensor

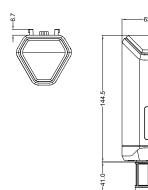
Specifications

Air Temperature	
Range	–40 to +85 °C
Accuracy	±0.2 °C
Resolution	0.01 °C
Long–term Drift	<0.03 °C/year
Air Humidity	
Range	0 to 100 %RH
Accuracy	±1.8 %RH
Resolution	0.01 %RH
Long-term Drift	<0.25 %RH/year
General Parameters	
Product Model	S2101
Microcontroller	Wio-E5
Support Protocol	LoRaWAN v1.0.3 Class A
Built-in Bluetooth	App Tool to change parameters
LoRaWAN Channel Plan	IN865/EU868/US915/AU915/
	AS923/KR920/RU864 *
Max Transmitted Power	19dBm
Sensitivity	-136dBm@SF12 BW=125KHz
Communication	2 to10km (depending on gateway
Distance	antenna and environments)
IP Rating	IP66
Operating Temperature	–40 to +85 °C
Operating Humidity	0 to 100 %RH (non-condensing)
Device Weight	280g
Certification	CE / FCC / RoHS
Battery (Contained in e	quipment)
Battery Life	Up to 10 years**
Battery Capacity	19Ah (non-rechargeable)
Battery Type	Standard D-size SOCI2 Battery

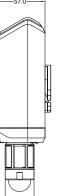
* A device supports different frequencies and can be configured via the Bluetooth App.

** The battery life varies from data upload interval and distance between gateway.









SenseCAP S2102

Light Intensity Sensor

Specifications

Light Intensity	
Range	0 to 160000 Lux
Accuracy	±5%
Resolution	1 Lux
General Parameters	
Product Model	S2102
Microcontroller	Wio-E5
Support Protocol	LoRaWAN v1.0.3 Class A
Built-in Bluetooth	App Tool to change parameters
LoRaWAN Channel Plan	IN865/EU868/US915/AU915/
	AS923/KR920/RU864 *
Max Transmitted Power	19dBm
Sensitivity	-136dBm@SF12 BW=125KHz
Communication	2 to 10 km (depending on gateway
Distance	antenna and environments)
IP Rating	IP66
Operating Temperature	–40 to +85 °C
Operating Humidity	0 to 100 %RH (non-condensing)
Device Weight	280g
Certification	CE / FCC / RoHS
Battery (Contained in ed	quipment)
Battery Life	Up to 10 years**
Battery Capacity	19Ah (non-rechargeable)
Battery Type	Standard D-size SOCI2 Battery

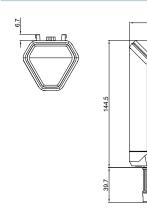
 $\star~$ A device supports different frequencies and can be configured via the Bluetooth App.

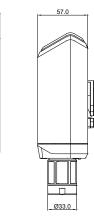
** The battery life varies from data upload interval and distance between gateway.



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Dimension





SenseCAP S2103

CO2, Temperature, and Humidity Sensor

Specifications

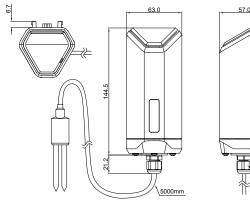
CO2	
Range	400 to 10000 ppm
Accuracy	400 to 5000 ppm: ±(30+3%MV)
	5000 to 10000 ppm: ±10%MV
Resolution	1 ppm
Air Temperature	
Range	−40 to +85 °C
Accuracy	±0.2 °C
Resolution	0.01 °C
Long–term Drift	<0.03 °C/year
Air Humidity	
Range	0 to 100 %RH
Accuracy	±1.8 %RH
Resolution	0.01 %RH
Long–term Drift	<0.25 %RH/year
General Parameters	
Product Model	S2103
Microcontroller	Wio-E5
Support Protocol	LoRaWAN v1.0.3 Class A
Built-in Bluetooth	App Tool to change parameters
LoRaWAN Channel Plan	IN865/EU868/US915/AU915/
	AS923/KR920/RU864 *
Max Transmitted Power	19dBm
Sensitivity	-136dBm@SF12 BW=125KHz
Communication	2 to 10 km (depending on gateway
Distance	antenna and environments)
IP Rating	IP66
Operating Temperature	0 to 50 °C **
Operating Humidity	0 to 90 %RH (non-condensing)
Device Weight	285g
Certification	CE / FCC / RoHS
Battery (Contained in e	quipment)
Battery Life	Up to 10 years***
Battery Capacity	19Ah (non-rechargeable)
Battery Type	Standard D-size SOCI2 Battery

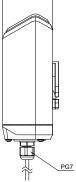
* A device supports different frequencies and can be configured via the Bluetooth App.

** It is limited to the operating temperature of the CO2 chip, beyond which CO2 value may be inaccurate or have incorrect values

***The battery life varies from data upload interval and distance between gateway.







SenseCAP S2104

Soil Temperature and Moisture Sensor

SenseCAP S2105

Soil Temperature, Moisture and EC Sensor

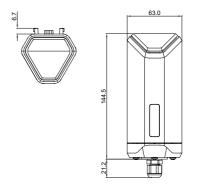
Specifications

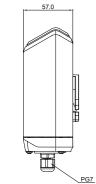
Soil Temperature	
Range	-40 to +80 °C
Accuracy	0 to 50°C: ±0.5 °C
	−40 to 0, 50 to 80°C: ±1 °C
Resolution	0.1 °C
Soil Moisture (VWC-Vo	olumetric Water Content)
Range	0 to 100% (air – water)
Accuracy	0 to 50%: ±3%
	50 to 100%: ±5%
Resolution	0 to 50%: 0.1%
	50 to 100%: 0.5%
Electrical Conductivity	(Only supported in S2105)
Range	0 to 23 dS/m
Accuracy(0~50°C)	0 to 5 dS/m: ±5%
	5 to 23 dS/m: ±10%
Resolution	0 to 5 dS/m: 0.01dS/m
	5 to 23 dS/m: 0.1dS/m
General Parameters	
Product Model	S2104/S2105
Microcontroller	Wio-E5
Support Protocol	LoRaWAN v1.0.3 Class A
Built-in Bluetooth	App Tool to change parameters
LoRaWAN Channel Plan	IN865/EU868/US915/AU915/
	AS923/KR920/RU864 *
Max Transmitted Power	19dBm
Sensitivity	-136dBm@SF12 BW=125KHz
Communication	2 to 10 km (depending on gateway
Distance	antenna and environments
IP Rating	IP66
Operating Temperature	–40 to +85 °C
Operating Humidity	0 to 100 %RH (non-condensing)
Device Weight	405g
Cable Length	5 meters
Certification	CE / FCC / RoHS
Battery (Contained in e	equipment)
Battery Life	Up to 10 years**
Battery Capacity	19Ah (non-rechargeable)
Battery Type	Standard D-size SOCI2 Battery

 $\ast~$ A device supports different frequencies and can be configured via the Bluetooth App.

** The battery life varies from data upload interval and distance between gateway.







SenseCAP S2100 LoRaWAN Data Logger

Specifications

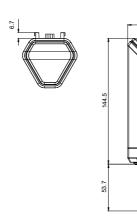
Interface*	- 1/2
Current Input	4 to 20 mA (2 channel)
Voltage Input	0 to 5 V (2 channel)
RS485	RS485 Modbus-RTU Protocol
GPIO	1xGPIO(Pulse or Level Mode)
General Parameters	
Product Model	SenseCAP S2100
Microcontroller	Wio-E5
Support Protocol	LoRaWAN v1.0.3 Class A
Built–in Bluetooth	App Tool to change parameters
	and set data conversion algorithm
LoRaWAN Channel Plan	IN865/EU868/US915/AU915/
	AS923/KR920/RU864 **
Max Transmitted Power	19dBm
Sensitivity	-136dBm@SF12 BW=125KHz
Communication	2 to 10 km (depending on gateway
Distance	antenna and environments)
IP Rating	IP66
Operating Temperature	–40 to +85 °C
Operating Humidity	0 to 100 %RH (non-condensing)
Device Weight	280g
Certification	CE / FCC / RoHS
Power Supply***	
Sensor Power	3V / 5V, 12V(DC only)
PCBA Power	12V DC or Battery(contained)
Battery Life	Depends on the power
	consumption of the sensor
Battery Capacity	19Ah (non-rechargeable)
Battery Type	Standard D-size SOCI2 Battery

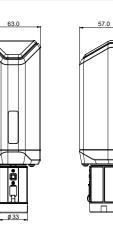
* Hardware supports all interfaces, but the software supports only one interface type to collect data simultaneously. For example, if the analog interface is selected, the RS485 interface cannot be used at the same time.

** A device supports different frequencies and can be configured via the Bluetooth App.

*** Both external power supply and battery power supply are supported. If 12V is connected to an external power supply, the external power supply is preferred and the battery is used as the backup power supply. The device supports 3V and 5V sensors, which can support the 12V sensor when the PCBA is powered by 12V DC.







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SenseCAP A1101

LoRaWAN Vision Al Sensor

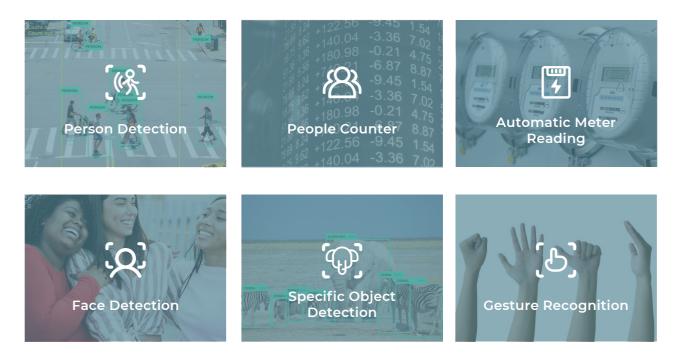
Specifications

Vision Al	
ML Framework	TensorFlow Lite/PyTorch
Al Hardware Acceleration	400Mhz DSP
Model Resolution	192*192 pixel
Camera	
Field of view	Diagonal 82°
Camera Resolution	30W pixel
General Parameters	
Product Model	A1101
Microcontroller	Wio-E5
Support Protocol	LoRaWAN v1.0.3 Class A
Built–in Bluetooth	App Tool to change parameters
LoRaWAN Channel Plan	IN865/EU868/US915/AU915/
	AS923/KR920/RU864
Max Transmitted Power	19dBm
Sensitivity	-136dBm@SF12 BW=125KHz
Communication Distance	2 to 10 km (depending on gateway
	antenna and environments)
IP Rating	IP66
Operating Temperature	−40 to +85 °C
Operating Humidity	0 to 100 %RH (non-condensing)
Device Weight	280g
Certification	CE / FCC / RoHS
Battery (Contained in eq	uipment)
Battery Life	Varies depending on model and
	recognition wake frequency
Battery Capacity	19Ah (non-rechargeable)
Battery Type	Standard D-size SOCI2 Battery



TinyML+LoRaWAN Perfect Combination

Application



Customizable Vision Al

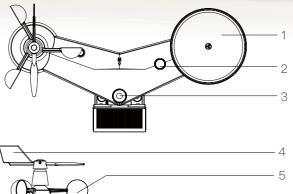


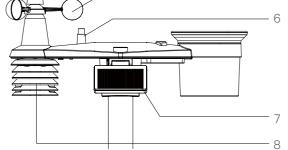






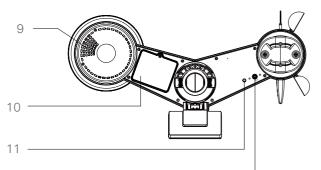
SenseCAP S2120 LoRaWAN 8-in-1 Weather Station



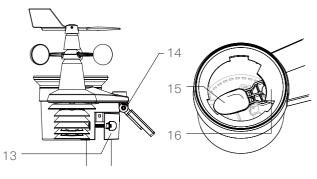


Diagram

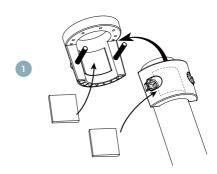
- 1. Rain gauge
- 2. Balance indicator
- 3. UV and light Intensity sensor
- 4. Wind vane
- 5. Wind cups
- 6. Antenna
- 7. Solar panel
- 8. Radiation shield, temperature and humidity sensor, barometric pressure sensor
- 9. Drain holes
- 10. Built-in battery box
- 11. Red LED indicator
- 12. Config button
- 13. Mounting clamp
- 14. Adjustable hinge of solar panel
- 15. Tipping bucket

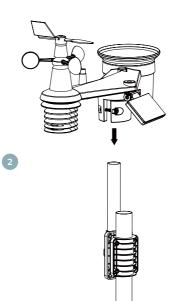


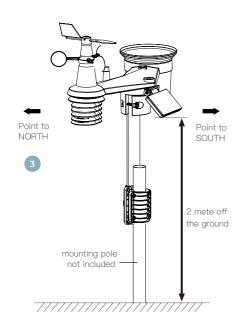




Installation Steps







Specifications

Air Temperature		Support Protocol	LoRaWAN v1.0.3 Class A
Range	−40.0 ~ 80.0 °C	Built–in Bluetooth	App Tool to change parameters
Accuracy	±0.5°C (0~80°C); ±0.6°C (-40~0°C)	LoRaWAN Channel Plan	IN865/EU868/US915/AU915/
Resolution	0.1°C		AS923/KR920/RU864*
Air Humidity		GPS	Need to customize
Range	1~99 %RH	LoRaWAN Max	21dBm
Accuracy	±3% (1~90%RH); ±4% (90~99%RH)	Transmitted Power	
Resolution	1%RH	LoRa Sensitivity	–141dBm@SF12 BW=125KHz
Barometric Pressure	e	Communication Distance	2 to 10 km (depending on gateway
Range	540 ~ 1100hPa		antenna and environments)
Accuracy	±5hPa(700~1100hPa);	Protection grade	Suitable for outdoor scenes
	±8hPa (540 ~ 699hPa)	Operating Temperature	–20 to +60 °C (Alkaline battery)
Resolution	1hPa		–40 to +60 °C (Lithium battery)
Wind Speed		Operating Humidity	0~99%RH
Range	0~50.0m/s	Device Weight	1.5kg
Accuracy	±0.5m/s(<5m/s); ±10% (> 5m/s)	Certification	CE / FCC / RoHS
Resolution	0.1 m/s	Power Supply	
Wind Direction		Solar Panel	0.5W (When there is sunlight, solar
Range	0~360°		panels will be used first, otherwise
Accuracy	± 8°		batteries will be used)
Resolution	1°	Battery Type**	AA size, 1.5V batteries (alkaline or
Light Intensity			non-rechargeable Lithium battery)
Range	0 ~ 200000 lux	Number of Battery	Option1, built-in battery box:
Accuracy	± 10%		3 * AA battery ;
Resolution	1lux		Option2, external battery box:
UV Index			6 * AA battery
Range	0 ~ 16.0	Battery Life	2 years (Solar Panel + 6*AA Battery
Accuracy	±1.5		1h/uplink)
Resolution	0.1	External Battery Box	Support 6 * AA 1.5V batteries
Rain Hourly			Cable: 2m
Range	0 ~ 450 mm/h		IP Rating: IPX6
Accuracy	± 7%	* A device supports different frequence	ies and can be configured via the Bluetooth App.
Resolution	0.254 mm/h		bad interval and distance between gateway.
General Parameters	;		
Product Model	S2120		

WM-LR1110

Microcontroller

SenseCAP Mate App

SenseCAP Mate is a standalone Bluetooth configuration tool, which can modify sensor parameters like EUI, key, frequency plan, etc.





Configure sensor and do OTA

Dashboard for various scene



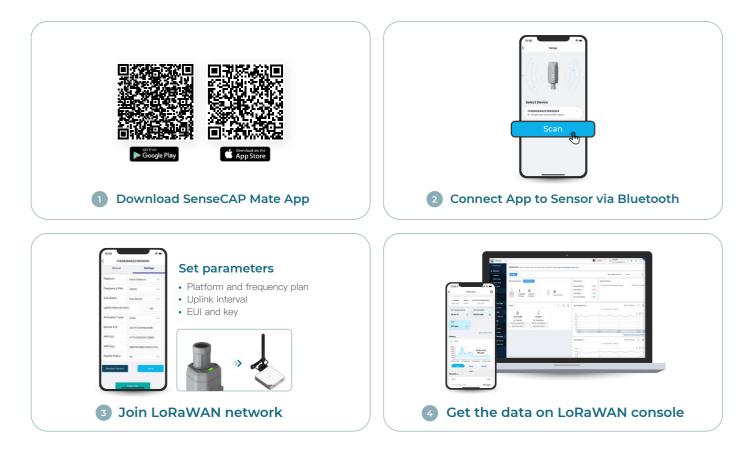
Real-time data monitoring

D/W/M history data review



Manage devices remotely

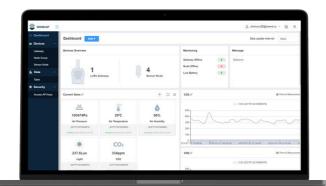
How to Use the Sensor



SenseCAP Portal

SenseCAP Portal is a web-based platform which enables

- · Device management
- · Data management
- · API Access Key management



Dashboard

Including Device Overview, Data Upload Interval, Announcement, Scene Data, and Data Chart, etc.

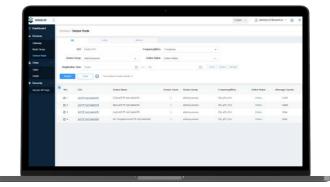
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Data Management

Manage data, including Data Table and Graph section, providing methods to search for data.

Visit SenseCAP Portal: https://sensecap.seeed.cc

For more info, please visit: https://solution.seeedstudio.com



Device Management

Manage SenseCAP devices

SINGLAP =					eladory 5240 second as -
a Devices	Decarity / Access API keys Une amount keys to make secure PEST or HT Organization to Apresident	19° Quety protocol sequenti in 62 ND	CAP service APIs, as keep them suffic.		
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		ten Noteman N	Only Please Full Access	Active principal 2016-06-24 (0.00 AT)	2010-00-24 10:00:45

Access Key Management

Manage Access Key (to access API service), including: Key Create, Key Update, and Key Check.

Application Programming Interface (API)

SenseCAP also provides API to support further development.

Please visit this link for more info: https://sensecap-docs.seeed.cc

Sens	eCAP Documer	nt Center		
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API		SenseCAP	Portal	
API	> List of Sunsor		Portal Data Managament	0



SENSECAP

- Website: solution.seeedstudio.com
- □ Sales: iot@seeed.cc
- Support: sensecap@seeed.cc
- Section Section 5 State Section 5 Section