

## SKYCLD1

### Skysens Temperature & Humidity Monitoring Device

Skysens SKYCLD1 is a LoRaWAN compatible, easy to use and cost-effective temperature and humidity monitoring device which can measure very high and very low temperatures with its additional temperature probe.



#### Highlights

- ✓ External probe usable temperature range -55°C and +125°C
- ✓ Internal temperature and humidity measurement chipset
- ✓ Precise humidity and temperature measurement.
- ✓ Excellent long-term stability.
- ✓ LED interface.
- ✓ Easy attachment with accessories.
- ✓ Adjustable sensor reading interval from network.
- ✓ Threshold alarm function available.
- ✓ 2 mode restart pin button.

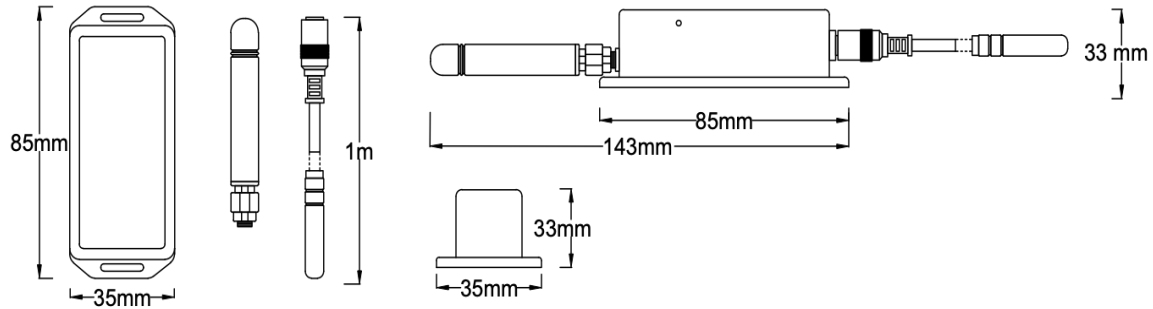
#### Application Areas

Restaurants, warehouses, supply chains, hospitals, industries, production lines, etc.

#### Technical Features

Dimensions	35 x 85 x 33 mm 120 gr (apprx)	Measurement Range (For internal sensors)	-10 °C to +80 °C 0% RH to 100% RH
Casing	ABS with RoHS Compliancy	Measurement Range (For temperature probe)	-55 °C to +125 °C 0% RH to 100% RH
Available Frequencies	All	Temperature Sensitivity	0.5 °C between -10 °C to +80 °C
Antenna	+1.5 dBi or +3 dBi external	Humidity Sensitivity	%1 RH between 20% RH to 80% RH
Expected Battery Life	Minimum 5 years with 30 min interval	Operating Conditions (For device)	-40 °C to +80 °C 0% RH to 100% RH
Probe Cable Length	1m (apprx)	Battery	3.6V LiSOC12 AA (Replaceable)

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### PRODUCT IMAGES, BUTTONS AND ACCESSORIES



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## DEVICE INTRODUCTION

- This device is designed to send temperature and humidity information regularly. When device start working, device sends temperature and humidity measurements to the server with specific interval
- SKYCLD1 also has got an alarm function, which sends the measurements immediately whenever measured temperature or humidity value exceeds predefined threshold values.
- The alarm function is disabled by default, it can be activated by a downlink message described in the downlink messages function. The alarm function is stored in the device's memory for operation as preset after a reset or power failure. Threshold values can be set via a downlink message. Device keeps these threshold values in its EEPROM. Thus, even the device gets reset or power-down, it keeps all the parameters in its memory, continue working as set before.
- Device goes into normal message period if the temperature and humidity values fall below threshold values.
- It is possible to factory reset the device. All parameters (thresholds, timers, etc.) can switch to factory settings by this way.

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## UPLINK STRUCTURE

### 1. Regular Uplink

The device regularly sends this type of uplink through port 4 to report temperature and humidity values.

Sample Payload:

0x00FC 01DD 0105 000000000000000000000000 0E10 00

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Temperature MSB	Temperature LSB	Humidity MSB	Humidity LSB	Probe Temp MSB	Probe Temp LSB
Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17
Reserved	Reserved	Reserved	Reserved	Battery MSB	Battery LSB
Byte 18					
Reserved					

- Note: Temperature and humidity information are given multiplied by 10 form. Divide them by 10 to find temperature and humidity information. Example (H00FC = 252,  $252/10 = 25.2$  °C)
- Battery information is given in mV form and must be between 3600 mV and 3200 mV. Please calibrate your dashboard accordingly.

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## UPLINK STRUCTURE

### 2. Report Actual Values Uplink

Device sends working parameters kept in its memory with this uplink from port 5. This uplink is only sent when user sends a specific downlink message to the device.

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
0xFF	Uplink Interval MSB	Uplink Interval LSB	Alarm Interval MSB	Alarm Interval LSB	Temperature Up Threshold
Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Temperature Down Threshold	Humidity Up Threshold	Humidity Down Threshold	Alarm Status	Memory Change Indicator	0x00

- **Note:** Uplink interval means regular message period in seconds when there is no alarm situation. Alarm interval means alarm message period in seconds. Alarm status byte shows if alarm function of the device activated or deactivated. Memory change indicator shows if any change happened on device parameters.

### 3. Change Parameters Success Uplink

When user make any changes on device parameters -except regular message period- device writes these parameters in its memory. Report this write operation success by 1-byte message from port 6. 00 Means parameters saved successfully; 01 means parameters not saved successfully.

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## DOWNLINK STRUCTURE

The port number is in decimal. Message numbers should be entered in hexadecimal.

### 1. Interval Change Downlink

Following message should be sent to the device to change message period of the device.

Interval Change Command	
Port	Message
0x0B	0x02T <sub>0</sub> T <sub>0</sub> T <sub>1</sub> T <sub>1</sub> T <sub>2</sub> T <sub>2</sub> T <sub>3</sub> T <sub>3</sub>

T values at the above table are time values in seconds and hexadecimal form. Must be sent in MSB first form. For example, 0x0200000384 message should be sent to the device in order to set message interval to 900 seconds. (0x384H = 900) These values can take from 1 minute to 6 hours.

**WARNING:** The interval time should not be less than the alarm time.

### 2. Reset Downlink

Following message should be sent to the device in order to reset the device.

Reset Command	
Port	Message
0xFA	0x01

### 3. Read Actual Parameters Downlink

Following message should be sent to the device to read actual parameters of the device.

Read Actual Values Downlink	
Port	Message
0x11	0x06

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### DOWNLINK STRUCTURE

#### 4. Change Device Parameters Downlink

Following message should be sent to set thresholds of the device.

Message port is 0x10 (16 in decimal)

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
0x05	Temp. Up Threshold	Temp. Down Threshold	Hum. Up. Threshold	Hum. Down Threshold	Alarm Period MSB	Alarm Period LSB

Send 01 in byte 1 to activate alarm function and 00 to deactivate alarm function.

Alarm timer can be minimum of 60 seconds and cannot be bigger than regular message period. Must be send in seconds. All information must be in hexadecimal integer form.

#### 5. Activate & Deactivate Alarm Function Downlink

Following message should be sent to the device to activate or deactivate alarm function.

Alarm Activation Command	
Port	Message
0x13	0x07XX

XX = 00 => Deactivates the alarm function, XX = 01 => activates the alarm function.

#### 6. Factory Reset Downlink

Following message should be sent to erase memory of the device and switch to the factory settings.

Factory Reset Command	
Port	Message
0x12	0xEE

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## Reset Operation

Push the reset button and hold, red LED must light for a while and start blinking. When you see the blinking release the button. The device gets reset by this operation and after every reset operation, the device goes into sleep mode automatically by blinking red and green LEDs once.

## Wake Up

To exit sleep mode and take the device to the normal operation mode, push the reset button until you see the red LED light. When you see red light release the button and the device will go into normal operation mode by blinking LEDs in a sequence of green-red-green.

It is also possible to wake the device up by inserting the probe jack. After the probe is inserted the sequence above happens in the same order.

## OTAA Mode

The device requests OTAA join to the server after the device wakes up and goes into the normal operation mode. OTAA requests are represented by the blinking green LED once per request. When the device successfully joins to OTAA mode green LED lights for a while.

## Communication

The device indicates uplink communication by blinking green LED once and downlink communication by blinking red LED once.

## ABP

For ABP please contact SKYSENS.

## Error Behaviour

If device has a hardware problem, at first start, it flashes the red led at the intervals of five hundred milliseconds, to indicate there is a hardware problem.





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Reset downlink is sent.

### DOWNLINK

**Scheduling** replace first last **FPort**   **Confirmed**

**Payload** bytes fields  1 byte

[Send](#)

### APPLICATION DATA

pause clear

Filters: uplink downlink activation ack error

time	counter	port	
17:08:53			dev addr: 26 01 47 52 app eui: 70 B3 D5 7E D0 03 83 E6 dev eui: 45 40 52 00 00 00 04 F5
17:08:45	250		confirmed payload: 01
17:08:45	9	4	payload: 00 E9 01 EC 00 E6 00 00 00 00 00 00 00 00 00 00 0E 00 00
17:08:05	250		scheduled confirmed payload: 01

Read actual parameters downlink is sent.

### DOWNLINK

**Scheduling** replace first last **FPort**   **Confirmed**

**Payload** bytes fields  1 byte

[Send](#)

17:28:23	3	5	payload: FF 03 84 00 B4 28 FB 50 0A 00 FF 00
17:13:24	17		confirmed ack app id: eu863
17:13:24	2	0	payload: [not provided]
17:13:06	17		confirmed payload: 06

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Temperature and humidity up threshold limit is 45. Down threshold limit is 5. And alarm period is 60 seconds. With these values change device parameter downlink is sent.

**DOWNLINK**

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**Scheduling** replace first last **FPort**   **Confirmed**

**Payload** bytes fields  7 bytes

Alarm alarm function downlink is sent.

**DOWNLINK**

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**Scheduling** replace first last **FPort**   **Confirmed**

**Payload** bytes fields  2 bytes

Factory reset downlink is sent.

**DOWNLINK**

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**Scheduling** replace first last **FPort**   **Confirmed**

**Payload** bytes fields  1 byte

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## EXPECTED BATTERY LIFE

Months	Interval (minutes)
12	5 (20 °C)
34	15 (20 °C)
111	60 (20 °C)
10	5 (-20 °C)
27	15 (-20 °C)
89	60 (-20 °C)

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## Release Notes

Date	Release Number	Note
10.01.2021	1.0.7	Initial Release
28.01.2021	1.0.7	Release Approval
11.03.2021	1.0.8	Battery life is added
07.04.2021	1.0.9	Downlink examples are added