

Nube iO Droplet Specifications

Wireless LoRa Environmental Sensors



1 Introduction	3
1.1 Document Availability	3
1.2 Document Change Log	3
1.3 Abbreviation term and definitions	3
2 Model Name and Definition	5
3 Technical Specs	5
3.1 LoRa	5
3.2 Sensors	5
3.3 Power	6
4 Installing the Batteries	6
4 Installation and Enclosure	7
6 Dip Switch Settings	8
7 Test Button	9
8 About Nube iO	11

1 Introduction

The purpose of this document is to provide a technical overview of the Droplet Environmental Sensors.

1.1 Document Availability

Please email support to request a copy
support@nube-io.com

1.2 Document Change Log

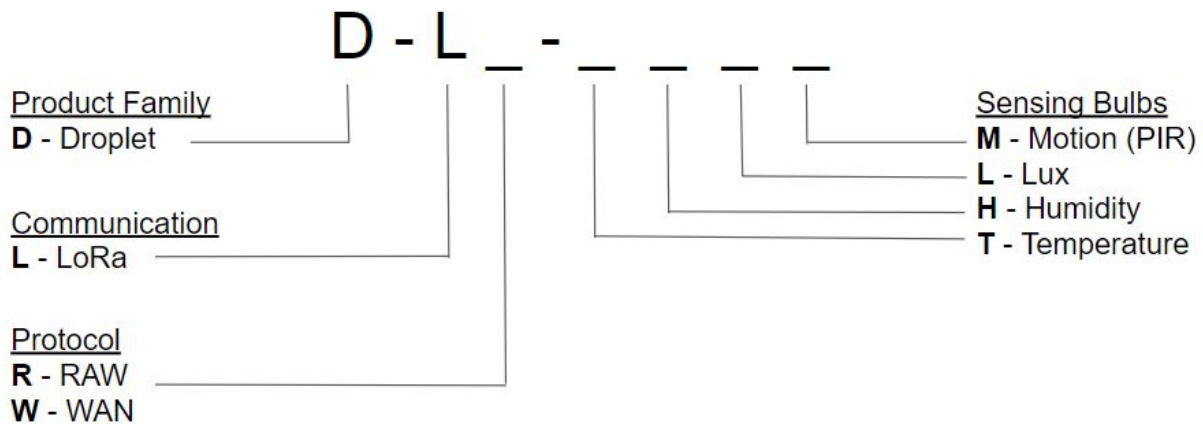
<u>Version Number</u>	<u>Issue Date</u>	<u>Description</u>
1.0	April 2018	First Version
2.0	April 2019	Updated Dip switch settings
3.0-5.0	Unknown	Unknown
5.1	December 2019	Minor updates/ design changes
5.2	March 2020	Added image of PCB

1.3 Abbreviation term and definitions

Name/Code	Explanation	External Reference
Edge Gateway / Device	Edge Gateway	Link
GCP	Google Cloud Platform	Link
Edge	Edge computing is a distributed computing paradigm	Link
IO (Input/Output)	Communication process between a computer or device	Link
VPN	A virtual private network (VPN) extends a private network across a public network	Link
Nube	Translates cloud in spanish	
BACnet	BACnet is a building automation protocol	Link
MQTT	A lightweight messaging protocol for small sensors	Link
Modbus	Modbus is a building automation protocol	Link
Zigbee	ZigBee is a smart office/home protocol	Link
NB-IoT	Low Power Wide Area Network (LPWAN) radio technology	Link
LoRa	LoRa is a long range, low power wireless chipset and protocol	Link

2 Model Name and Definition

Droplet	D-LR-THLM	LoRa RAW wall mount sensor. Temp, Humidity, Lux. PIR
Droplet	D-LR-THL	LoRa RAW wall mount sensor. Temp, Humidity, Lux.
Droplet	D-LR-TH	LoRa RAW wall mount sensor. Temp, Humidity



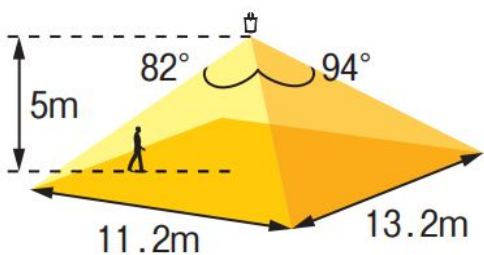
3 Technical Specs

3.1 LoRa

LoRa Capabilities:	
Supported Frequencies	868/915Mhz
Spreading Factor	6-12
Bandwidth	7.8 - 500 kHz
Effective Bitrate	.018 - 37.5 kbps
Est. Sensitivity	-111 to -148 dBm

3.2 Sensors

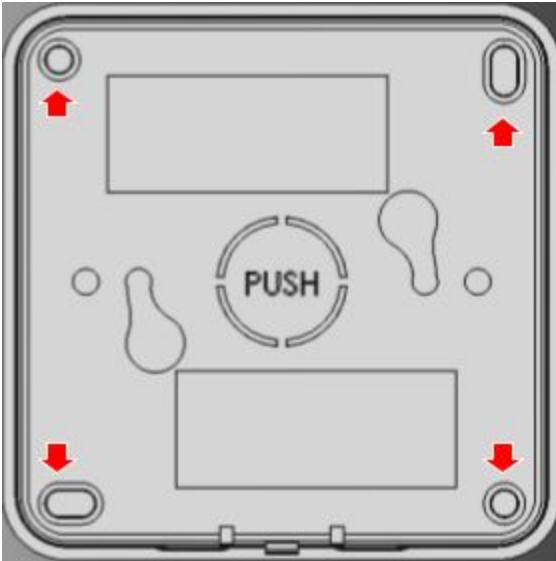
Sensor Specifications:	
Temperature Sensor	@25°C ± 0.5°C, from 0...65°C ±1°C
Humidity Sensor	-40°C -> 85°C, Resolution .008 %RH

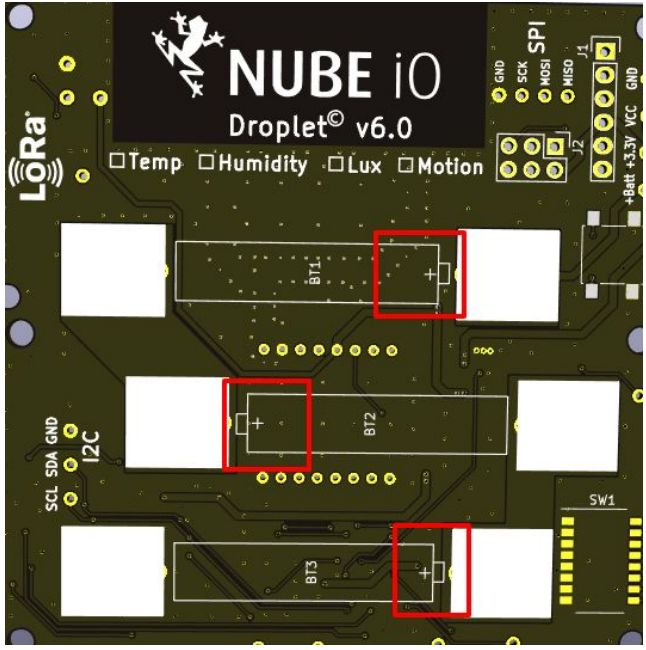
PIR Sensor	Detection Distance 5. Example Coverage for ceiling mounted scenario:  <small>Image Source: industrial.panasonic.com</small>
Light Sensor	Range of 1 - 65535lx

3.3 Power

Power Specifications:	
Batteries	3x AA (Alkaline, non-rechargeable)
Life Span	Dependant on push rate and environment conditions, from 3-5 Years.

4 Installing the Batteries

Step 1:	Remove the back cover on the sensor.	
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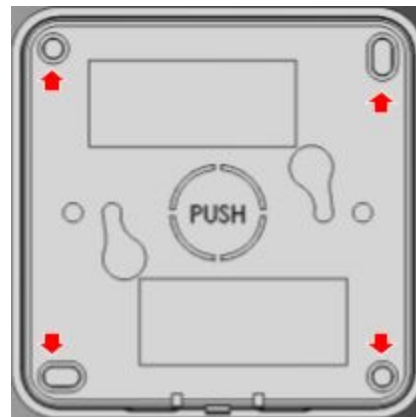
<p>Step 2:</p>	<p>Place the 3x AA (Alkaline, non-rechargeable) As marked in red for the positive position</p>	
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4 Installation and Enclosure

The Droplet can be mounted to the wall via screws on the backing plate, or simply via double-sided-tape if you want the convenience of a drill-less setup or being able to move sensors around a facility.

The backing plate is removable, to allow for access to the batteries and reset switch, and also so the wall plate can be mounted.

Height	86 mm
Width	86 mm
Depth	25.5 mm
Material Type	Plastic (ABS)
UL Rating	UL94-V0
IP Rating	IP40



Use the holes indicated to mount the backing plate onto the wall, with the “PUSH” word facing towards the wall.

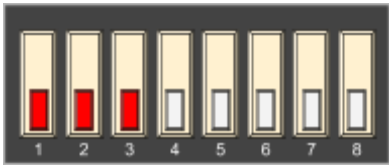



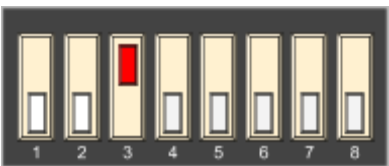
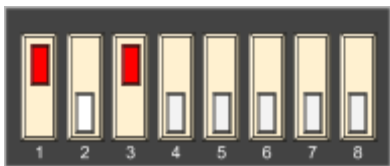
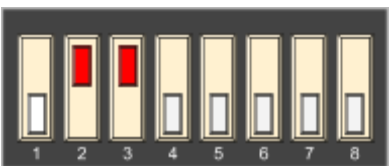
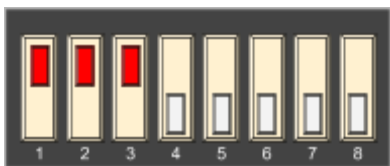
6 Dip Switch Settings

For general use, the dip switches define what frequency the droplet should transmit on and what "ID" should be used for the network. These settings would then need to be duplicated on the LoRa Connect Modem to enable communication between the two.


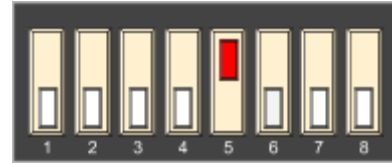




The rules for the settings are as follows:

The **first** DIP switch is to the special operation modes, so this should be off for general use.

1-3 is used for interval timing (push rate)

<p>1-3 0=15mins</p>		<p>1-3 1=30sec</p>	
<p>1-3 2=1 min</p>		<p>1-3 3=3 mins</p>	
<p>1-3 4=5 min</p>		<p>1-3 5=10mins</p>	
<p>1-3 6=30 min</p>		<p>1-3 7=1hr</p>	

2, 3 and 4 are for "Channel" (Used for separating close by networks):

4-Interrupt for PIR		5-Serial Print : will print the payload msg on the serial	
6-Node Hard reset (new Node ID)		7-8 Test mode Node ID AAB2AAAA 9 sec push rate	
7-8 Test mode Node ID BBB2BBBB 9 sec push rate		7-8 Test mode Node ID CCB2CCCC 9 sec push rate	

1-3 are for interval timing - 0-7 binary:

- 0 = 15min //000
- 1 = 30sec //100
- 2 = 1min //010
- 3 = 3min //110
- 4 = 5min //001
- 5 = 10min //101
- 6 = 30min //011
- 7 = 1hr //111

- 4 Interrupt for PIR : true to attach Interrupt

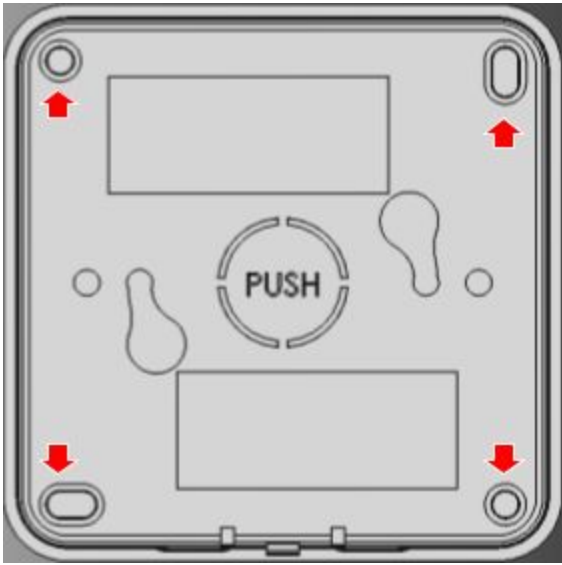
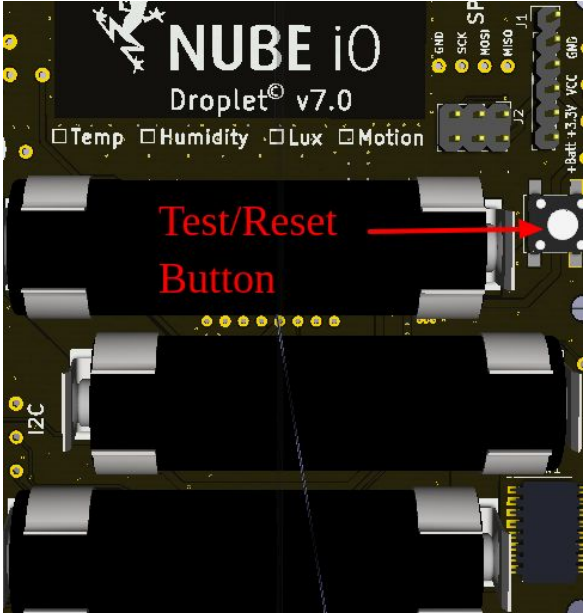
- 5 Serial Print : will print the payload msg on the serial

- 6 Hard Reset : will give device new ID every time it boots

- 7-8 are Testing Mode - 0-3 binary:

- 0 = normal mode ID set randomly from first boot or from hard_reset
- 1 = ID : AAB2AAAA - 6Sec Intervals //10
- 2 = ID : BBB2BBBB - 6Sec Intervals //01
- 3 = ID : CCB2CCCC - 6Sec Intervals //11

7 Test Button

<p>Step 1:</p>	<p>Remove the back cover on the sensor.</p>	
<p>Step 2:</p>	<p>Push the button to force a reset of the sensor and it will force a push of a lora packet to the gateway.</p>	

8 About Nube iO

Designed by HVAC controls experts, Nube iO provides a reliable and economical platform to control and monitor your HVAC system. With emphasis on utilizing open platforms and device security Nube iO allows you to break free from restrictive BMS platforms without the huge cost of having to replace existing controllers.

Born in the age of IoT, Nube iO provides you with the ability to access your data from the web. No longer do you need hundreds of sensors or a huge budget in order to get your data online. Whether you have one sensor or thousands, the scalability of the platform makes it economical regardless of the size of your system.

To learn more about our products and solutions, visit: [**nube-io.com**](http://nube-io.com)