uno® lite

BACnet User Guide

VER 0.4

DELTA

【Revision】

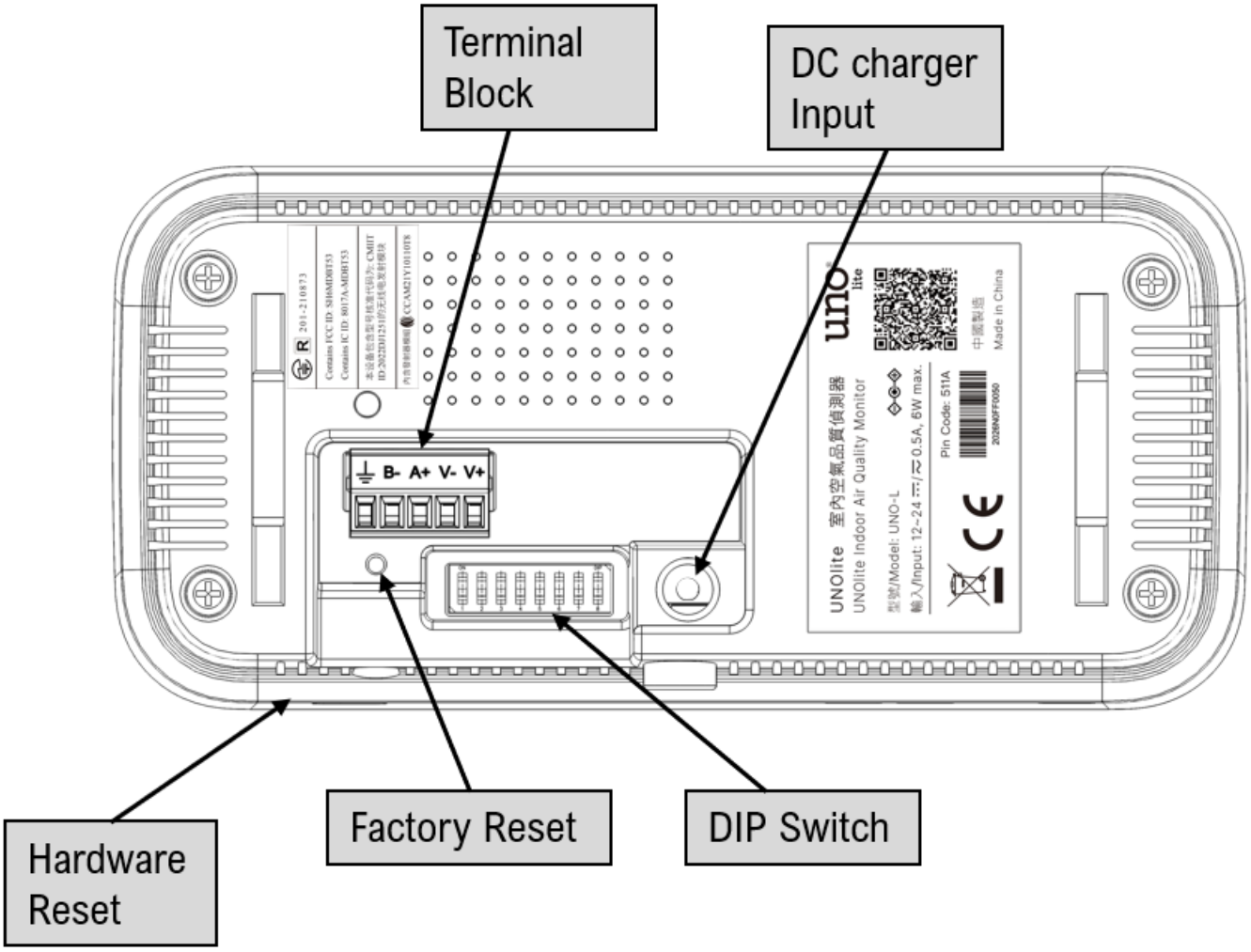
Date	Version	Description
2022/ 11 / 11	0.1	Initial Version
2022/ 02 /08	0.2	1. Add Particle Matter sensor calibration 2. Add Customized IAQ LED threashold
2024/ 01/ 15	0.3	1. Add new objects: Dim_mode, ECO_PWR, ECO_SPD, HUMI_cali, TVOC_cali
2024/ 06/ 13	0.4	1. Add low power mode 2.Add TVOC_ugm3, RVI and RVI_Label

【Overview】

unolite is an indoor air quality monitor to measure the space temperature / humidity / CO2 / PM2.5 / PM10 / PM1 / TVOC and expose the measurements directly onto a BACnet MS/TP or Modbus RTU network. Moreover, the measurements are also accessible with UNO apps through BLE or UNO web through Wi-Fi (Wi-Fi model). Please refer to unolite official website for more information.

This document is primarily concerned how to add unolite to BACnet MS/TP or Modbus network.

【Hardware Interface】



Buttons

Key	Description
Hardware reset	Push this button will trigger a power cycle.
Factory reset	After booting, press this button three times within 2 seconds will trigger factory reset. The values below will be restored to default: ♦ Modbus baudrate ♦ BACnet saved mac address ♦ Wi-Fi MQTT broker setting (Wi-Fi model)

NOTE: It's recommended to use a paper clip to press the keys.

Terminal block

Terminal	Description
V+	Power input. For more information, please refer to production specification.
V-	Power input. For more information, please refer to production specification.
A+	RS485(+) data pin. For Modbus/BACnet network.
B-	RS485(-) data pin. For Modbus/BACnet network.
GND	Ground terminal. Each RS485 driver in an installation is recommended to connect to the same ground to get a common reference.

DIP switch

DIPs	Description	ON	OFF
1 - 6	Refer to the later sections for the definition of each pin		■
7	BACnet mode switch. ON : BACnet mode OFF : Modbus mode		■
8	RS485 terminator resistor (120 ohm)		■

NOTE: The dips should be adjusted to proper position in power off state. ***Adjust the dips, then power on device.***

【BACnet mode】

unolite will run on BACnet MS/TP mode if the 7th pin is set to ON state.

The definition of the dips in BACnet mode as listed below:

DIP	Description	ON	OFF
1	BACnet slave position[3] *(check address table)*		■
2	BACnet slave position[2] *(check address table)*		■
3	BACnet slave position[1] *(check address table)*		■
4	BACnet slave position[0] *(check address table)*		■
5	BACnet MS/TP baudrate[1] *(check Baudrate table)*		■
6	BACnet MS/TP baudrate[0] *(check Baudrate table)*		■
7	BACnet mode switch. ON : BACnet mode OFF : Modbus mode	■	
8	RS485 terminator resistor (120 ohm)		■

NOTE: The definitions of dip are different from Modbus mode. Please make sure which mode is chosen.

BACnet MS/TP address and baudrate :

BACnet Address Table

Dip				BACnet MAC address
1	2	3	4	
↓	↓	↓	↓	0×00 [0]
↓	↓	↓	↑	0×01 [1]
↓	↓	↑	↓	0×02 [2]
↓	↓	↑	↑	0×03 [3]
↓	↑	↓	↓	0×04 [4]
↓	↑	↓	↑	0×05 [5]
↓	↑	↑	↓	0×06 [6]
↓	↑	↑	↑	0×07 [7]
↑	↓	↓	↓	0×08 [8]
↑	↓	↓	↑	0×09 [9]
↑	↓	↑	↓	0×0A [10]
↑	↓	↑	↑	0×0B [11]
↑	↑	↓	↓	0×0C [12]
↑	↑	↓	↑	0×0D [13]
↑	↑	↑	↓	0×0E [14]
↑	↑	↑	↑	0×0F [15]

BACnet Baudrate Table

Dip		baudrate
5	6	
↓	↓	76800
↓	↑	9600
↑	↓	19200
↑	↑	38400

BACnet Object Table				
Type	Identifier	Name	Unit	Descriptions
Analog Input	AI-0	Temperature	°C	Range: 0.00 - 50.00
	AI-1	Humidity	%	Range: 10.00 - 80.00
	AI-2	PM2.5	µg/m³	Range: 0 - 1000
	AI-3	PM10	µg/m³	Range: 0 - 1000
	AI-4	PM1	µg/m³	Range: 0 - 1000
	AI-5	CO2	ppm	Range: 400 - 5000
	AI-6	Temperature_F	°F	Range: 32.00 - 122.00
	AI-7	TVOC	ppm	Range: 0 – 30.00
	AI-8	IAQ	-	Give an index according to current PM and CO2 concentration. The index also be referenced by IAQ LED: ♦ GREEN: 0-80 ♦ YELLOW: 81-100 ♦ RED: 101-400 ♦ PURPLE: 400
	AI-9	TVOC_ugm3	µg/m³	Range : 0 – 7000 (factor 1 ppb = 4.5 µg/m³)
	AI-10	RVI	-	0-99 (%): RVI calculates the potential for infection based on the indoor air quality metrics. The higher the value, the better the air quality.
	AI-11	RVI_Label	-	0: Poor, RVI 0%~19% 1: Unsatisfactory, RVI 20%~39% 2: Needs Improvement, RVI 40%~54%

				3: Fair, RVI 55%~69% 4: Good, RVI 70%~84% 5: Excellent, RVI 85%~99%
Analog Value	AV-0	MAC Address	-	Range: 0 – 127 Set value on this object to configure the MAC address. The MAC address will be saved and overwritten the dip setting. The saved value will be cleaned by factory reset or write **255** to this object. Device will reboot after writing on this object
Analog Value	AV-1	Temperature_Cali	°C	Range: 0 – 5000 Write the ambient temperature(°C) to calibrate unolite's temperature. EX: unolite's temperature is 23°C, write 2300 to this object will calibrate unolite's temperature to 23°C
	AV-2	CO2_Cali	ppm	Range: 400 – 1500 Writing the current CO2 value to this node to calibrate unolite's CO2. It will take effect within 10 seconds. Write to this node will disable CO2 ASC.
	AV-3	CO2_ASC	-	CO2 Automatic Self-Calibration mode. By default, CO2 sensor ASC mode is running and the value presents "1". When the CO2_Cali have been written, the ASC mode will be disabled and the value will present "0". You still can activate ASC mode by this node.

	AV-4	Dim Mode	-	Control Dim mode: 0 : Auto-Dim (LWD only).The device will reduce screen brightness and turn off the front LED lights (excluding the power indicator) when idle. 1 : Disable Dim mode. All lights will be turned on. 2 : Dim mode. All lights will be turned off, except power indicator
	AV-5	PM_Cali	-	Range: 20 – 1000 give a reference value of PM2.5 levels in µg/m3. The calibration also applies to PM1 and PM10 measurement. 9999: reset to default
	AV-6	RESET_TVOC	-	Write “1” to reset TVOC sensor baseline.
	AV-7	EN_CUS_IAQ	-	Enable IAQ LED customized threshold feature. if any measurement is larger than its threshold, the IAQ LED will turn to red light.
	AV-8	IAQ_PM25	-	The IAQ LED threshold of PM2.5.
	AV-9	IAQ_PM10	-	The IAQ LED threshold of PM10.
	AV-10	IAQ_CO2	-	The IAQ LED threshold of CO2.

	AV-11	ECO_PWR	-	UNOLite can give ventilation control suggestion includes power and speed to another controller unit in building management system.
	AV-12	ECO_SPD	-	The UNOeco algorithm, serving as the control logic, continuously computes new commands influenced by the IAQ and ventilation system, with internal data storage capabilities.
	AV-13	Set_OLED_Fahrenheit	-	Set temperature unit on display. 0 : Celsius 1 : Fahrenhit
	AV-14	Set_Low_Power	-	Set power mode of device. Some sensors would slow down the refresh rate under lower power mode. 0 : normal mode 1 : low power mode
	AV-15	HUMI_Cali	%	Humidity calibration. Range: 1000 – 9000 (10% - 90%) Temperature can impact the measured values of relative humidity, it's better to perform temperature calibration first. 9999 : reset to default
	AV-16	TVOC_Cali	ppb	TVOC calibration. Give a reference level of TVOC levels in ppb. Range: 1 – 500 9999 : reset to default The written value is constrained within a range of 1% to 200% of the raw data. If the written value exceeds

				this range, it will cap at 200% of the raw data, thus preventing the TVOC number from increasing further.

NOTE:

1. *The property "Out of Service" of sensor object means the health state of sensors. If "Out of service" is true, try to power cycle device to recover it.*
2. *Notes before performing calibration:*
    - i. *It's recommended to operate in an environment with good air quality and ensure the sensor reading is stable*
    - ii. *For temperature, it's recommended to allow device to reach thermal equilibrium after power on one hour. (typically 1 minutes for other sensors)*
    - iii. *Approximately 30 seconds for changes to take effect after calibration.*
    - iv. *The device will compute new internal parameters and apply them. However the parameters has reasonable limits. If the new readings still significantly differ from the given value, consider replacing or repairing the sensor.*

BACnet Device information	
Object Name	Descriptions
Model Name	“UNOLite”
Max Master	127
Application Version	The firmware version of unolite version
Object Identifier	The identifier number is composed of serial number. EX: The SN of unolite is 2301L0170040. Then the BACnet object identifier number will be 3010040. The object identifier is also writeable and non-volatile. Running factory reset will set it to default value.
Vendor Name	Delta

【DIP example】

Num	1	2	3	4	5	6	7	8
ON	■	■	■				■	■
OFF				■	■	■		

Here is an example to demonstrate how to configure your unolite:

The pin 8 is ON, the 120ohm terminator resistor is enabled.

The pin 7 is ON, the unolite will run on BACnet mode.

The pin 5/6 is OFF/OFF and check the baudrate table, unolite will run on 76800

The pin 1/2/3/4 is ON/ON/ON/OFF and check the address table, the MAC address of unolite is 0xE(14)

【Modbus mode】

If the DIP-7 stays on OFF state, unolite will run on Modbus mode. Please refer to unolite Modbus document for more information.


DELTA
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