



## Description

The internal VOC sensor detects a wide range of VOCs gases come from several sources as cleaning and maintenance supplies, carpets, fabrics, finishes and furniture, microbial action, renovations, pesticides, odorous substances, tobacco smoke, human occupancy odours (exhalation and perfume)...

Additionally to internal VOC, sensor measures the temperature and relative humidity in indoor environments as schools, hotels, commercial buildings, offices, homes...

- intelligent detection algorithms to monitor VOCs and CO2 equivalent variations in confined spaces
- Calibration free
- Low cost solution for DCV applications
- Wide VOCs detection range
- Detectable gases: Volatic Organic Compounds VOCs and Equivalent Carbon Dioxide CO2 (equiv)
- Temperature measurement
- Relative Humidity measurement



## Applications

- HVAC applications for building management
- Air conditioning
- Small restaurants, pubs, bistros
- Lounges
- Recreation spaces and smoking areas
- Kitchens
- Changing rooms and cloakrooms
- Controlled ventilation of living spaces

## Technical Specifications

VOC Detection method	
Monitoring Range	Semiconductor gas, wide range of VOCs 400-2000 ppm equivalent CO2 0-1000 ppb isobutylene equivalent tVOCs
Response Time	< 5 seconds for tVOC
Operational Time	60 seconds
Warm up time	15 min

VOC Output Perfomance	
tVOC (isobutylene equiv)	< 220 ppb Air quality GOOD < 90 ppb EXCELLENT
	220-440 ppb Air quality MEDIUM
	> 440 ppb Air quality POOR BAD
CO2 equiv	< 800 Air quality GOOD
	800-1200 Air quality MEDIUM
	> 1400 Air quality POOR

Humidity	
sensing principle	capacitive
Measuring Range	0 to 100% RH
Accuracy Typ.	± 3% (0% ≤ rH ≤ 80%)
resolution min.	0.2 %

Temperature	
sensing principle	capacitive
Measuring Range	- 40°C to +125°C
Accuracy Typ.	± 0.3°C (- 10°C ≤ ta ≤ +85°C)
resolution min.	0.08°C

Electrical Specifications	
Power supply	24 Vdc (7-28 Vdc)
Power consumption	160 mW
Operating Temperature	0° ~ +50° C
Storage Temperature	-40 ~ +80 °C
Operating Humidity	0 ~ 95% non-condensing
Electrical connection	screw terminals max. 1.5 mm2
MODBUS output	EIA-485 physical layer RTU Default: 9600, even, 1 bit, address 7

General Specifications	
Regulatory Compliance	CE Mark: EMC 2004/108/EC, RoHS 2011/65/EU, WEEE EN61000-6-1/2/3/4
Casing Material	ABS UL94-V0
Protection Class	IP20
Housing color	White
Dimensions	80x80x25 mm 3.15x3.15x0.98 "
Weight	0.087 kg



## MODBUS

### MODBUS REGISTERS

INPUT REGISTERS [100-101-102-103-104-105-106-107-108] i.e. if protocol-message address and counts from 0

HOLDING REGISTERS [101-102-103-104-105-106-107-108-109] i.e. if device address counts from 1

Unsigned integer 16 bits [100-101-102-103-104] i.e. HOLDING REGISTERS

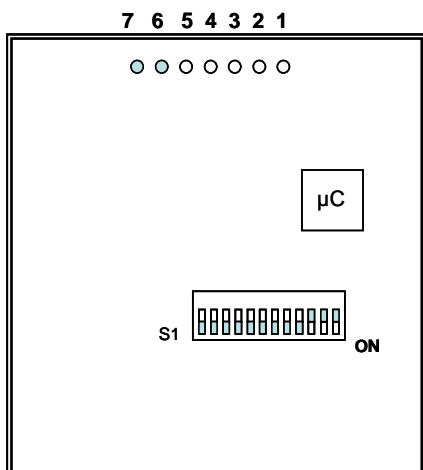
100	Last measured Humidity value (Integer value)
101	Last measured temperature value (Integer value)
102	Last measured Humidity sensor value (Integer value) %RH= (125* [102])/(65536) - 6
103	Last measured Temperature sensor value (Integer value) °C = (175,72* [103])/(65536) - 46,85
104	TIME REFERENCE
105 & 106	Last Measured temp value in IEEE-754 <b>float big endian</b> -single precision 4 bytes - Swap Words <i>Example: if the number were 1,2345678 in hex 0x3f9e0651 then the transmitted number will be</i> <i>105: 0x0651</i> <i>106:0x3f9e</i>
107 & 108	Last measured humidity value in IEEE-754 <b>float big endian</b> - single precision 4 bytes - Swap Words
109	Last measured <b>tVOC</b> (isobutylene equiv) value (Integer); units ppb; range [0...1000]
110	Last measured <b>CO2equ</b> value (Integer); units ppm; range [400...2000]



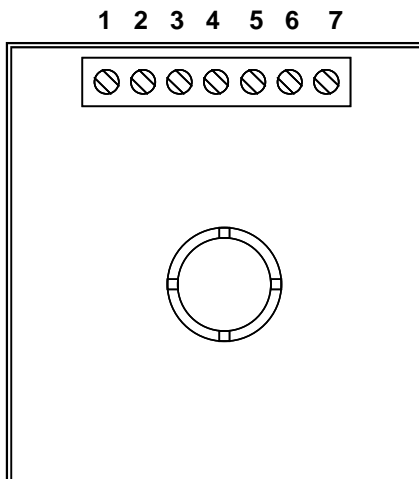
# Triple MODBUS sensor VOC+temp+rH

## Installation Diagram - Cabling

**Back View  
Front Plate**

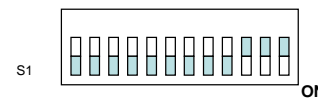


**Back plate View**



PIN	Signal
1	A-RS485
2	B-RS485
3	LT
4	
5	
6	<b>GND</b>
7	<b>24V dc</b>

## DIP switch configuration – MODBUS settings



DIP switch NR	12	11	10	9	8	7	6	5	4	3	2	1				
SIGNAL	PARITY1	PARITY0	BAUD1	BAUD0	ADD7	ADD6	ADD5	ADD4	ADD3	ADD2	ADD1	ADD0	PARITY	STOP BITS	BAUDRATE	ADDRESS *(1)
	ON	ON											EVEN	1		
	ON	OFF											ODD	1		
	OFF	ON											NONE	1		
	OFF	OFF											EVEN	2		
			ON	ON											9600	
			ON	OFF											19200	
			OFF	ON											38400	
			OFF	OFF											57600	
					ON	ON	ON	ON	ON	ON	OFF	ON				2
					ON	ON	ON	ON	ON	OFF	OFF	OFF				7
					ON	ON	ON	ON	OFF	ON	ON	ON				8
					ON	ON	ON	ON	OFF	ON	ON	OFF				9
					ON	ON	ON	ON	OFF	ON	OFF	ON				10
					ON	ON	ON	ON	OFF	ON	OFF	OFF				11
					ON	ON	ON	ON	OFF	OFF	ON	ON				12
					ON	ON	ON	OFF	ON	OFF	ON	OFF				21
					ON	OFF	OFF	OFF	ON	ON	ON	OFF				115
					ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF				127
					OFF	OFF	ON	OFF	ON	ON	OFF	OFF				211
					OFF	OFF	OFF	OFF	OFF	OFF	ON	ON				252

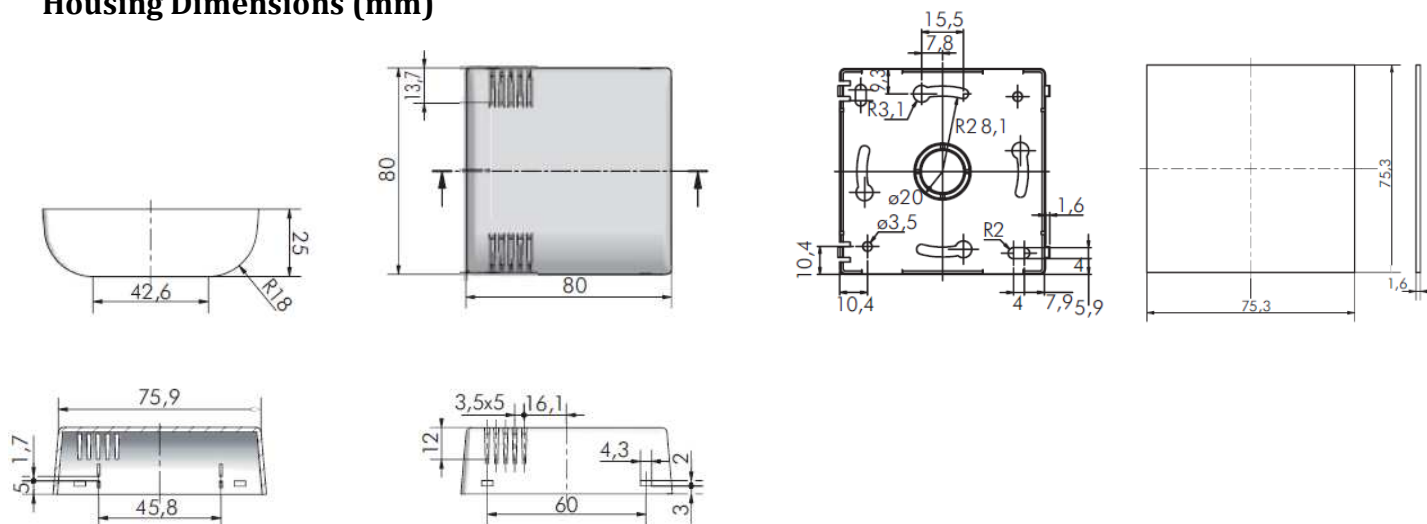
Default Values-Configuration by factory  
 \*(1) Address= Binary DIP switch combination from 0 to 257 address

ON=0  
 OFF=1



# Triple MODBUS sensor VOC+temp+rH

## Housing Dimensions (mm)



## Ordering Info Codes

Product Name	Reference	EAN-nr
Triple MODBUS sensor (VOC+temp+rH) ref. NBB-VOCTH33	EN233102	8437013200264