Duct Mount Air Lab Sensor

Descriptions

Duct Mount Air Lab Sensor with humidity,temperature,CO2 ,TVOC,PM2.5,WIFI and light level sensors helps with free cooling strategies and other energy saving routines.The sensor communicates over both Ethernet and RS485, using BOTH Bacnet and Modbus protocols so there are many ways to integrate into the system.The modbus interface is documented and integrator friendly. They also have transducer outputs for connecting as analog inputs to all popular control systems.

Highlights

- sensor has a long life fan rated for > 10 years maintenance free.
- Fast Response : response time less than 10 seconds.
- Supports ModBus TCP/IP & BACnet IP protocol over WIFI.
- Supports ModBus RTU & BACnet MSTP protocol over RS485
- TVOC sensor can detect Glycerin (Vape smoke).
- The SPS30 dust sensor in the AirLab is MCERTS certified to DIN EN 15267 air quality standard.

Specifications

General	
Power	15-24V +/- 10%, AC or DC,3VA@24VAC
Temperature Limt	-20~+50°C, 0~95% RH(Non condensing)
Plastic Housing	Flammability rating UL 94 file E56070
Particulate Matter Sensor Life time	8 years continuous, adjustable to decades intermittent
Communications	ModBus TCP/IP & BACnet IP protocol over WIFI ModBus RTU & BACnet MSTP protocol over RS485
Accuracy	
Relative Humidity	5%RH (25℃,20-80%,RH)
Temperature	<±0.5℃@25℃
CO2	±70PPM OR ±5% of reading
PM2.5	0 to 100 ug/m3 100 to 1000 ug/m3
Respouse-Time	
Relative Humidity	<10s(25℃,in slow air)
Temperature	<10s
CO2	20s
PM2.5	<8s

Total volatile organic compounds (TVOC) and why this quantity is related to indoor air quality (IAQ) and the so called IAQ levels. Since Sensirion's SGP gas sensor is responsive to a broad range of volatile organic compounds (VOC) and other gases relevant for indoor air quality, the present gas sensing technology is well suited for monitoring TVOC concentrations and for translating those into IAQ levels. In order to meet Sensirion's high quality standards, each SGP sensor is production calibrated.

TVOC (= Total Volatile Organic Compounds) corresponds to the sum of volatile organic co pounds (VOC1). The sum of VOC concentrations, or simply TVOC2, is used as an indication for VOC contamintation. VOC contamination is an established concept in regulatory and scientific literature. Note that the specfic TVOC composition varies between different ambient indoor environments and indoor air is always composed of different volatile organic substances3. Therefore, it is helpful to consider TVOC concentrations as statistical reference values which help to indicate indoor air quality

Indoor air quality(IAQ)Levels and how they are related to Tvoc Concentration

Level	Hygienic Rating	Recommendation	TVOC (mg/m ^{3})	TVOC (ppb)^8
5 Unhealty	Situation not acceptable	Intense Ventilation necessary	10-25	2200-5500
4 Poor	Major objections	Intensified Ventilation/ airing necessary	3-10	660-5500
3 Moderate	Some objections	Intensified Ventilation recommended	1-3	220-660
2 Good	No relevant objections	Ventilation/airing recommended	>0.3-1	65-220
1 Excellent	No objections	Target Value	<0.3	0-65

Indoor air quality Levels for Europe according to WHO

Level	Recommendation	TVOC (mg/m ^{3})	TVOC (ppb)^8
Outside quality classes	Greatly increased (not acceptable)	>3.0	>610
4	Significantly increased Only temporary exposure	1.0-3.0	200-610
3	Slightly increased (harmless)	0.5-1.0	100-200
2	Average(harmless)	0.25-0.5	50-100
1	Target value	>0.25	0-50

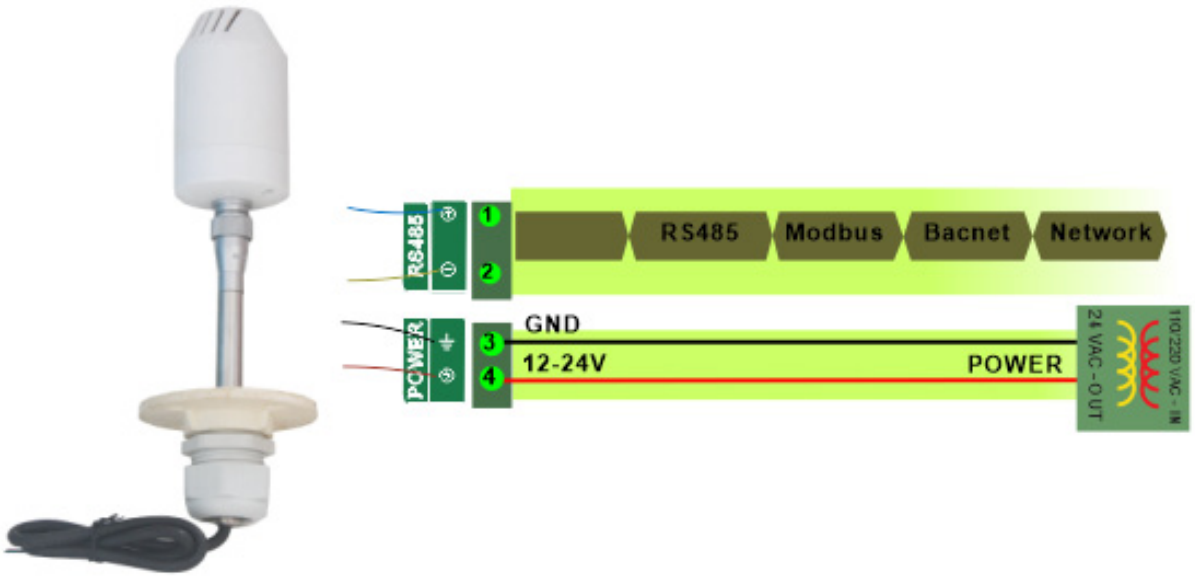
IAQ Performance Targets for ambient Tvoc Conerntration Expressed in mass concentration (ug/m³)

TVOC concentration regarding RESET target	(ug/m ³)	(ppb)[8]
Acceptable	<500	<250
High Performance	<400	<200

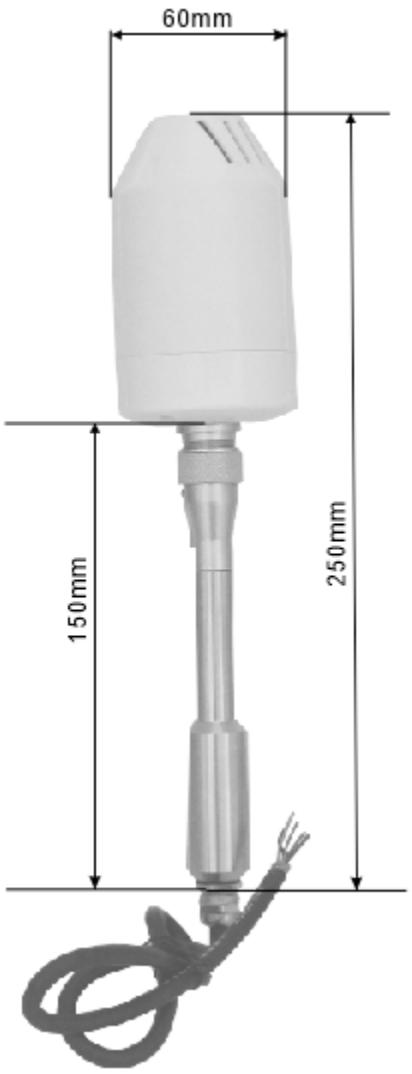
Maximum Average TVOC Concentration according to LEED Standard for Green Buildings

Green building standard LEED	(ug/m ³)	(ppb)[8]
TVOC limit	<500	<250

Wiring Diagram



Dimensions



Part Number Scheme

DUTAIR – CO2 – TVOC – W

Code	Description
DUCTAIR	Duct Mount Air Lab

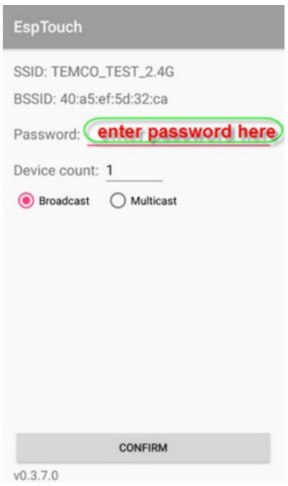
Code	Description
CO2	CO2Sensor
----	No Co2 Sensor

Code	Description
W	RS485+Wifi
-	RS485

Code	Description
TVOC	Total Volatile Organic Compounds
----	NO Total Volatile Organic Compounds

Wifi SetUp

Visit https://temcocontrols.com/ftp/software/24esptouch.zip, download Androidwifisetup software and install it;
First install this application on any Android phone, it is only used during setup of the Wifi credentials after which you will be able to manage the device from a PC running the T3000.exe software.
First use your phone to log into your local Wi-Fi network, select your usual SSID that you would like the AirLab to also connect. Once your phone is connected to your local Wi-Fi lan, run the ESP-Touch utility and you will see this dialog below.
Enter the Wi-Fi password here and it will be sent to the Airlab device from your phone, the Airlab sensor can now log into your Wi-Fi network directly without assistance from your phone.
Note: If you plan to change the Wi-Fi password you can log into the device with the T3000 software and update the Airlab password before making the network change.
If you forget to keep the Airlab password up to date you can always redo the ESPTouch procedure from the beginning.



When the connection is made and password is successfully passed to the Airlab device you will see a message like this with the IP address obtained from your Wifi Lan, assuming there is a DHCP server active to assign IP addresses.

Modbus Object List

Sensor	Description
0	Serial Number-4 byte value,Read-only
4	Software version-2 byte value,Read-only
6	Address,Modbus device address
7	Product Model.This is a read-only register that is used by the microcontroller to determine the product
8	[INVALID_DATA]
9	PIC firmware version
10	PIC version of humidity module
11	[INVALID_DATA]
15	
16	Firmware update register ,used to show the status of firmware updates.Writing 143 sets the config back to out of the box except for modbus ID and baud rate. Write 159 to fix the current config as the user defaults,this is done automatically by T3000 any.
20	Hardware options register,starting with LSB: Bit 0=Clock present or not ,Bit1=humidity present or not,Bit2=CO2 Sensor,Bit3=COsensor,Bit4=Motion Sensor.
104	DEGC_OR_F,engineering units,Deg C=0,Deg F=1
121	Temperature reading in Deg C or F from the sensor used in the control loop PI 1which is configured in register 111.This can be internal sensor,external,or an avergae of the two. writing a temperature value to this register will calibrate the curren.
139	CO2 ppm
140	humidity %
142	Temperature sensor filter,Fil,weighted average of stored value to new raw value
151	CO2 filer
152	hum filer
382	Sensor to be used for the PID calculations, 1=external sensor analog input 1,2=internal thermistor,3=average the internal thermistor and analog input 1
612	CO2 sensor calibration data
628	value of light sensor,unit lux
629	PIR sensor select 1=PIR sensor enable 0=PIR sensor disable
630	PIR sensor real value
631	PIR sensor ZERO value
640	Sound sensor real value,unit dbm
760	PM1.0 real value,unit ug/m3
761	PM2.5 real value,unit ug/m3
762	PM4.0 real value,unit ug/m3
763	PM10 real value,unit ug/m3
764	PM0.5 real value,unit number
765	PM1.0 real value,unit number

766	PM2.5 real value,unit number
767	PM4.0 real value,unit number
768	PM10 real value,unit number
769	Humidity sensor calibration data

Bacnet Object List

AI	Description
AI1	TEM
AI2	HUM
AI3	CO2
AI4	VOC_m
AI5	VOC_s
AI6	PM2.5 ug/m3
AI7	PM10 ug/m3
AI8	PM2.5 number
AI9	PM10 number
AI10	Sound level
AI11	Light strength

AV	Description
1	baud rate
2	station number
3	protocol select 0:MODBUS 1:BACKED
4	Instance
5	Temperature unit 0:C 1: F