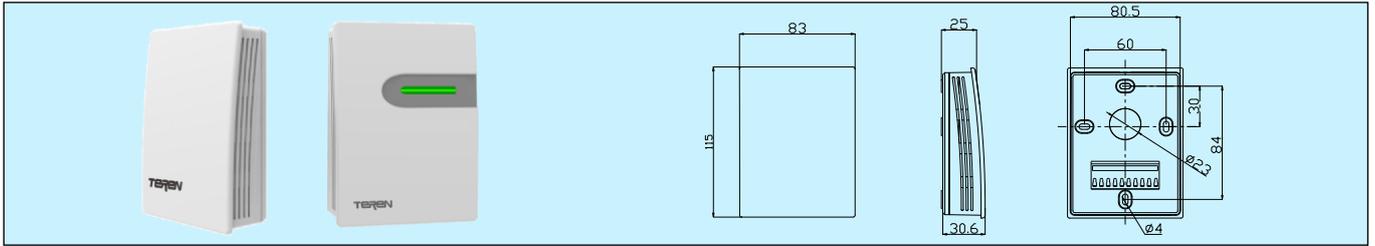# IAQM Multi-function Indoor Air Quality(VOC/CH$_2$O/PM2.5/PM10/CO$_2$/T/RH) Detector TEREN

Applications & Features

- Simultaneously detect indoor air quality, including multiple VOC, CH$_2$O, PM2.5/PM10, CO$_2$, T/RH, up to 7 parameters
- VOC: use high-performance metal oxide semiconductor integrated sensor to detect various contaminants(VOCs), including wood, paint and others produced by toluene, cigarette, ammonia odor, CO, alcohol, natural gas and even body smell, with 5~7 years sensor life, low power consumption and good T/RH compensation for high accuracy
- CH$_2$O: use good performance electrochemical gas sensor, high accuracy, fast response, excellent anti-interference, 3+ years sensor life, extremely low power consumption and good temperature and humidity characteristics, stable and reliable, no need for regular calibration
- PM2.5/PM10: use laser particulate matter sensor to detect the PM2.5 and PM10 concentration in the air, detected particle size is 0.3~10μm. The sensor has good long-term stability, high consistency accuracy, real-time response and supports continuous service mode. MBTF is 3+ years for continuous service (service life can be 8-10 years in typical stable concentration change working conditions and auto(intermittent) work mode), free maintenance
- CO$_2$: use NDIR sensor to detect the CO$_2$ concentration of the air, with ABC(Automatic Baseline Correction) algorithm, accurate measurement and temperature compensation, good long-term stability and reliability, fast response, 15 years sensor life without maintenance
- T/RH: use high-precision digital temperature and humidity sensor, high measurement accuracy
- Optional LED alarm, and the alarm point or interval can be flexibly set through RS485/Modbus
- Power and outputs have over voltage and reverse polarity protection, high reliability and anti-interference capability
- All electrical terminals are on the inside bottom, avoid any possible destroy to PCB when wiring

Specifications

VOC
Sensor: High performance metal oxide semiconductor sensor
Range: 0(400)~2000ppm equivalent CO$_2$
Accuracy: Typical consistency/accuracy ±10%FS@25°C

CH$_2$O
Sensor: High performance electrochemical sensor
Range: 0~1000ppb
Accuracy: ±10%FS@25°C

PM2.5/PM10
Sensor: Laser particulate matter sensor, detected size 0.3~10 um
Service Life: MBTF more than 3 years in continuous service mode, service life up to 8-10 years in auto (intermittent) service mode
Measuring range: >1000 μg/m^3
Range: PM2.5: 0~500 μg/m^3, particle size 0.3~2.5 μm
PM10: 0~600 μg/m^3, particle size 0.3~10 μm
Accuracy: +/-10 ug/m^3 @0~100ug/m^3, +/-10% reading @100~500ug/m^3@25°C/50%RH, see accuracy curve
Resolution: 1 μg/m^3
Response time: in continuous service mode, sample time＜1s, general response time＜10s

CO$_2$
Sensor: NDIR sensor, with ABC algorithm
Accuracy: ±50ppm±5% reading
Response time(T90): ＜120s (30cc/min, low airflow)
Drift: <±10ppm/year
Range: 0~2000ppm (measurement range 400~2000ppm)

Temperature
Sensor: Digital temperature sensor
measurement range: -40~125°C
Accuracy: typical ≤±1.0°C @10-40°C
Repeatability: 0.1°C
Response time: typical 10~30s (25°C, low airflow)
Drift: <±0.04°C /year

Relative Humidity
Sensor: Digital capacitance sensor
Range: 0~100%RH
Accuracy: typical ±5%RH @ 25°C/20~80%RH

Repeatability: 0.1%RH
Hysteresis: <±1.0%RH
Response time: typical 10s (25°C, low airflow)
Drift: <±0.25%RH/year
Power: 16~28VAC/16~35VDC
Output: RS485/Modbus, R/W enable, 9600 bps
Warm up time: 15 min
Working environment: 0~50°C, 10~90%RH (Non-cond.)
Storage temperature: -20~60°C
Housing: fire retardant ABS+PC (UL94V-0), Protection: IP30
Weight: 300-400g
Approval: CE

Models

Model	IAQM						Multi-function IAQ Detector
VOC		0					N/A
		1					VOC detection
CH$_2$O			0				N/A
			1				CH$_2$O detection
PM				0			N/A
				1			PM2.5/PM10 detection
CO$_2$					0		N/A
					1		CO$_2$ detection
T/RH						0	N/A
						1	T/RH detection

For LED alarm function, add the suffix -LED at the end of the model.

Note:
1. VOC volatile organic compounds, include over a thousand kinds of component, are widely used in various industries and has great impact on human health, may affect the human liver, kidney, brain and nervous system, resulting in memory loss and other serious consequences, and even cause cancer.
2. The VOC sensor could detect varies of VOC components. VOC measurement range 0~1000ppb (isobutene), equivalent to 400~2000ppm of carbon dioxide.
3. The CH$_2$O sensor could detect only Formaldehyde of 0~1000ppb.
4. Exposed to 0.5~1.0 ppm VOC concentration environment have little impact on most people health; exposed to 1.0~10 ppm may have obvious irritation symptoms on human and cancer rates rise 50% to 90%; exposed to above 10 ppm may have serious impact on human health or life threatening.
5. China regulations specified the average 8 hours TVOC limit 0.50~0.60 mg/m3 (equivalent to about 500 ppb) and CH$_2$O limit 0.08~0.10 mg/m3 (equivalent to about 60-75 ppb).
6. VOC concentration guidelines and recommendations, mainly refer formaldehyde for reference:

Source	Concentration	Associated Period of Exposure	Health Effect(s)
Based on sensory irritation			
California Environmental Protection Agency (EPA)	44 ppb	1 hour	Eye and airway irritation
Health Canada	100 ppb	1 hour	Eye irritation
National Institute for Occupational Safety and Health	100 ppb	15 minutes	
Occupational Safety and Health administration	750 ppb	8-hour PEL-TWA	Cancer and skin/eye/ respiratory irritation
World Health Organization	81 ppb	30 minutes	Sensory irritation
World Health Organization	100 ppb	short-and long- term	Sensory irritation
Based on respiratory and asthma-like symptoms			
Agency for Toxic Substance and Disease Registry	40 ppb 30 ppb 8 ppb	Daily:1-14 days 15-364 days > 1 year	Respiratory
California EPA	7 ppb 7 ppb	8-hour annual average	Respiratory symptoms Respiratory symptoms
Health Canada	40 ppb (target)	8 hour	Respiratory symptoms in children
Based on cancer risk			
National Institute for Occupational Safety and Health	16 ppb	8 hour	Nasal cancer
Occupational Safety and Health administration	750 ppb	8-hour PEL-TWA	Cancer and skin/eye/ respiratory irritation
World Health Organization	100 ppb	Long-term	Nasal cancer

PM2.5/10 Typical consistency accuracy curve: max deviation (%)