



# Canāree Air Quality Monitor

## A-Series / I-Series

### Compact and Complete Air Quality Monitoring

#### Product Specification

### Product Summary

Canāree is a compact Air Quality Monitor (AQM) that monitors air quality in real-time. A-Series models are USB-only devices that can be IoT enabled when connected to a networked device such as Wireless Access Points or any Windows PC / Mac running SenseiAQ Software. I-Series models support Wireless-LAN (802.11n) for standalone operation. Additional environmental sensors are available depending on models including: Biogenic Volatile Compounds (BVOC), temperature, relative humidity, pressure, and NDIR-based CO<sub>2</sub> sensor. Please refer to the product lineup section for more details.

All Canāree models collect real-time air quality data locally and send that data to the cloud for remote monitoring and analysis. SenseiAQ™ software displays the data on a dashboard including Air-Quality-Index (AQI) scores, color-coded for EPA Standards along with vape/smoke/AQ alerts. APIs are available to support third party integrations such as Air Quality Management Systems (AQMS), Building Management Systems (BMS) and IoT Device Management.

Canāree utilizes Piera's Intelligent Particle Sensor IPS-7100, calibrated to the US EPA approved FEM equipment GRIMM EDM180. Other environment sensors may be included. Using data from the sensors and unique algorithms to identify different particulate sources, Canāree can classify sources of air-pollution such as smoke (tobacco, wildfire), vape, cooking, dust and noxious gas detection for indoor applications. Embedded gas sensor within Canāree is also capable of measuring the sum of VOCs/contaminants in the surrounding air, providing orthogonal information regarding the ambient air quality in addition to particulate matter.

### Features

- Ultra-high sensitivity for detecting airborne particulates (PM<sub>0.1</sub> – PM<sub>10</sub>), BVOC, CO<sub>2</sub> \*
- Fast data acquisition and sampling
- Easy plug-and-play
- Wireless network \*
- Power saving and cleaning mode
- OTA firmware update capability \*
- Built-in VSD (Vape/Smoke Detection) module
- High accuracy and reliability
- LED air quality status indicator
- Support for wireless and wired ethernet \*

\* Features may be only available for specific models.



- ⚠ Do not obstruct the air inlet and outlet during operation.
- ⚠ Do not operate in a heavily contaminated environment.
- ⚠ Intended for indoor use. Outdoor conditions may affect the sensor performance.

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## Applications

- Indoor air quality monitoring & management systems
- Hospitals, office spaces, college campuses, hotel/shared living and industrial environments
- Smoke/vape detection with real-time alerts and notifications
- Air quality mitigation (air purifiers, HVAC systems)
- Smart buildings and Building Management Systems (BMS)



Fig 1. SenseiAQ user Interface

## 1. Sensor Specifications

### 1.1. Hardware

Specifications	A/I - Series
USB-serial driver	Silicon Labs CP2102 UART Bridge
Power consumption	100mA @ 5.5v (Continuous Operation)
USB connector type	Type A – USB 2.0 (Max 10' cable extension)
Physical dimensions	9cm x 7cm x 2cm (3.54" x 2.76" x 0.79")
Weight	50g (1.76 oz)
Software supported	SenseiAQ (Windows / MacOS) Application
Cloud reporting support	Microsoft Azure IoT Hub, BMS Web Polling
MTBF (24-hour operation)	8 Years <sup>1</sup>
Power saving and cleaning mode	Supported (through SenseiAQ)
Storage temperature range	-40°C to +80°C

Table 1. Canaree hardware specifications

### 1.2. Embedded Sensors

	Parameter	Conditions	Value	Units
Particle Sensor	Particle Count (PC) Resolution	Default	1	#/L
	Mass Concentration (PM) Resolution	-	0.1	ug/m <sup>3</sup>
	Effective Particle Count Concentration (PC) Range <sup>1</sup>	-	0 – 100,000	#/cm <sup>3</sup>
	Particle Count (PC) Precision <sup>2</sup> (PC0.1, 0.3, 0.5, 1.0, 2.5)	0 – 200 #/cm <sup>3</sup>	±20	#/cm <sup>3</sup> Ave.
		> 200 #/cm <sup>3</sup>	±10	% Ave.
	Particle Count (PC) Precision <sup>2</sup> (PC5.0, 10)	0 – 1,000 #/cm <sup>3</sup>	±100	#/cm <sup>3</sup> Ave.
		> 1,000 #/cm <sup>3</sup>	±10	% Ave.
	Effective Mass Concentration (PM) Range <sup>1</sup>	-	0 – 6,000	ug/m <sup>3</sup>
Mass Concentration (PM) Precision <sup>2</sup> (PM0.1, 0.3, 0.5, 1.0, 2.5)	0 – 50 ug/m <sup>3</sup>	±5	ug/m <sup>3</sup> Ave.	
	>50 ug/m <sup>3</sup>	±10	% Ave.	

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	Mass Concentration (PM) Precision <sup>2</sup> (PM5.0, 10)	0 – 50 ug/m <sup>3</sup>	±10	ug/m <sup>3</sup> Ave.	
		>50 ug/m <sup>3</sup>	±20	% Ave.	
	Particle Size Bin Allocation (PC: differential, PM cumulative)	PC0.1 <sup>3</sup>	0.05 to < 0.1		um
		PC0.3	0.1 to < 0.3		um
		PC0.5	0.3 to < 0.5		um
		PC1.0	0.5 to < 1.0		um
		PC2.5	1.0 to < 2.5		um
		PC5.0	2.5 to < 5.0		um
		PC10	5.0 to < 10		um
	Start-up Time <sup>4</sup>	Default: 5 (until stable output)	>2.5		s
	Count Sampling Time	Default: 0.2	≥0.1		s
	Data Output Interval	Default: 1 (0.2 in debug mode)	≥0.1		s
	Lifetime <sup>5</sup>	-	>8		Years
	Air flow rate	Standard atmosphere	0.13		LPM
Laser Wavelength	Typical	658		nm	
Laser Diode Power Consumption <sup>6</sup>	Typical	3.5		mW	
Coverage area	3m height	30		m <sup>2</sup>	
Operating range	-10 to +60°C, 0 to 95% RH				
Gas	Unit-to-unit deviation	IAQ	±15	%	
	Gas scanning interval	-	10.8	s/scan	
	Sensor outputs	BVOC	-		ppm
		CO <sub>2e</sub>	-		ppm
CO <sub>2</sub>		-		ppm	
Temp, RH, Pressure	Response time	τ0-63%	8	s	
	Accuracy tolerance	-	±3	%	
	Hysteresis	-	≤1.5	%	
	RMS noise	-	0.12	Pa	
	Sensitivity error	-	±0.25	%	
	Temperature coefficient offset	-	±1.3	Pa/K	
	Absolute accuracy	-	±0.5	°C	

Table 2. Canāree sensor specifications

1. Device will report data with precision specified on this datasheet within the respective range. The precision is not guaranteed beyond the range.
2. Device-to-device variation based on average readings over multiple sampling concentration levels using 1.5% potassium chloride solution at 25 °C and 50%RH. Piera uses GRIMM EDM180 for individual device calibration. Different reference instruments may yield different data under various conditions.
3. Extrapolated data. Contact Piera Systems for further details.
4. Start-up time is 5 second by default. Any data output during this period should be discarded. Subject to change depending on the user settings for the count sampling time. The start-up time may be longer if the concentration level is high.
5. Lifetime may vary depending on different operating conditions.
6. Complies with the IEC60825-12 specification.

## 2. Installation

### 2.1. Using Host Device via USB

Canāree A-Series devices can be plugged into any host device. Host devices include PCs, Wireless Access points, Smart TV's, iOS/Android phones. Canāree A1 has been validated and works with HPE-Aruba Wireless Access Points (ArubaOS V8.8 or later). Piera Systems is an HPE-Aruba Solution Partner. Canāree I series models can also be connected in the same manner.

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## 2.2. Using Wireless LAN

Canāree I series models (operate stand-alone IoT devices if they are connected to power via USB, and communication can be established via WIFI to the Sensei Cloud Service. I-Series support 802.11n and WPA2 PSK security modes with AES encryption as well as DHCP or static IP addressing.

## 2.3. Using Wired Ethernet / PoE

Canāree I6\* will support Wired Ethernet connectivity for quick deployment in existing enterprise networks. Using standard Cat5 cable and Power-over-Ethernet (48V PoE+) a Canaree device can be deployed up to 300' away from an Ethernet switch. Solutions for BMS/BACNet integration are available on the I6 models.

## 2.4. Configuration

Via SenseiAQ Software running on host device or remotely. Device automatically registers on Piera Systems MS Azure Cloud service and is ready for use after it is plugged into Host's USB port, or manual configuration from SenseiAQ is required for WIFI and Bluetooth.

## 3. Hardware Settings

### 3.1. Microsoft Azure

Standard 90 days of SenseiAQ Cloud Monitoring included with the purchases of product.

### 3.2. Other Public and Private Cloud Services

Contact Piera Systems at [support@pierasystems.com](mailto:support@pierasystems.com).

## 4. Ordering Information

Please visit [www.pierasystems.com](http://www.pierasystems.com) or email to [info@pierasystems.com](mailto:info@pierasystems.com).

## 5. Product Lineup

Canāree Models & Features		A Series		I Series			
		A1	A6*	I1	I5	I6*	I-X*
Sensors	Particle count (0.1um–10um)	o	o	o	o	o	o
	Mass concentration (0.1um–10um)	o	o	o	o	o	o
	VOC (AQI or ppm)		o		o	o	o
	Temperature (°C/°F)		o		o	o	o
	Relative humidity (%)		o		o	o	o
	Pressure (hPa)		o		o	o	o
	CO <sub>2</sub> (ppm)		o			o	o

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	CO						o
	NOx						o
	SOx						o
	O2						o
	O3						o
	Noise/ Tampering						o
Other Features	Vape/Smoke detection	o	o	o	o	o	o
	USB/UART mode	o	o	o	o	o	o
	Aruba AP USB support	o	o	o	o	o	o
	Wired network	o	o	o	o	o	o
	Wireless ethernet			o	o	o	o
	Bluetooth			o	o	o	o
	PoE						o
	Static IP support						o
	Dual power mode						o
	BMS support						o
	LED indicator					o	o
	802.11AF * (PoE + 48V)					o	o
	Micro HDMI output *					o	o
	SD Card local storage *					o	o
	Battery backup *					o	o
Configurable sensor module option*						o	
Touch display option*						o	
Easy particle sensor module replacement						o	

Table 3. Canāree product lineup and features

\* Under development. Please contact Piera Systems.

## 6. Important Notices

### 6.1. Warning, Personal Injury

**Do not use this product as safety or emergency stop devices or in any other application where failure of the product could result in personal injury. Do not use this product for applications other than its intended and authorized use. Before installing, handling, using or servicing this product, please consult the data sheet and application notes. Failure to comply with these instructions could result in death or serious injury.**

If the Buyer shall purchase or use IPS for any unintended or unauthorized application, Buyer shall defend, indemnify and hold harmless Piera and its officers, employees, subsidiaries, affiliates and distributors against all claims, costs, damages and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if Piera shall be allegedly negligent with respect to the design or the manufacture of the product.

### 6.2. ESD Precautions

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The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation, take customary and statutory ESD precautions when handling this product.

### **6.3. Warranty**

Piera warrants solely to the original purchaser of this product for a period of 12 months (one year) from the date of delivery that this product shall be of the quality, material and workmanship defined in Piera's published specifications of the product. Within such period, if proven to be defective, Piera shall repair and/or replace the product, in Piera's discretion, free of charge to the Buyer, provided that:

- notice in writing describing the defects shall be given to Piera within 14 (fourteen) days after their appearance;
- such defects shall be found, to Piera's reasonable satisfaction, to have arisen from Piera's faulty design, material, or workmanship;
- the defective product shall be returned to Piera at the Buyer's expense; and
- the warranty period for any repaired or replaced product shall be limited to the unexpired portion of the original period.

This warranty does not apply to any equipment which has not been installed and used within the specifications recommended by Piera for the intended and proper use of the equipment.

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