



BA210 CO₂ Sensor

Product Introduction

The BA210 is a highly integrated mainstream CO₂ Sensor which developed by CAREMED, who had tens of years IR measurement instrument development experience. It's the one step capnography solution for patient monitoring system. Within a very compact size, it provides measurement of End-Tidal Carbon Dioxide (ETCO₂), respiration rate, capnogram, which can cover most of requirement from the patient monitoring system. With a very simple RS232 interface and industry compatible protocol, it's fairly easy to connect BA210 to any patient monitoring system and other medical treatment system where CO₂ sensor is needed.

With the stability, flexibility and easy to use as the built in essence, BA210 is your ideal choice for your capnography subsystem.

Product Features

- Real time CO₂ monitoring and data upload
- Dual wavelength, non-dispersive infrared (NDIR) with single beam optics
- With fast electrical modulation MEMS IR source, moving part was avoid and long lifetime was achieved
- Includes temperature control system, to prevent airway adapter condensing
- Barometer pressure and Gas temperature compensation
- Patent on calibration algorithm, no routine user calibration required
- Small size and lightweight

Stability Easy to use Flexibility

Technical Specifications

Transducer Type	Mainstream CO ₂ Sensor	
Principle of Operation	Non-dispersive infrared (NDIR) single beam optics, dual wavelength, no moving parts	
Initialization Time	Capnogram displayed in less than 3 seconds, full specifications within 3 minutes.	
CO ₂ Measure Range	0 - 114 mmHg 0 - 15% 0 - 15.2kPa	
Rise Time	Less than 60 ms - Adult Reusable or Single-Patient-Use Airway Adapter Less than 60 ms - Infant Reusable or Single-Patient-Use Airway Adapter	
CO ₂ Resolution	0.1 mm Hg 0.25 mm Hg	0 to 59 mm Hg 60 to 114 mm Hg
CO ₂ Accuracy	0 – 40mm 41 – 76 mmHg 77 – 114 mmHg Above 80 BPM	±2 mmHg ±5% of reading ±8% of reading ±12% of reading
CO ₂ Stability	Short term drift: Drift over four hours shall not exceed 1 mmHg maximum Long term drift: Accuracy specification will be maintained over a 120-hour period	
Sampling Frequency	100 Hz	
Respiration Rate Range	2 to 150 Breaths Per Minute (BPM)	
Respiration Rate Accuracy	±1 breath	
Compensations (Supplied)	Barometric pressure: 400 mmHg to 800 mmHg Operator selectable O ₂ , N ₂ O, He and agent compensation	
Calibration	No routine user calibration required. An airway adapter zero is required when changing	
Airway Adapters	Single-patient-use or reusable, < 5 cc dead space (adult), < 1 cc dead space infant	
Voltage Requirements	5.0 VDC ±5%	
Power Consumption	1.2 Watts typical (Steady State) Up to 2 Watts maximum on power up (Warm up)	
Interconnection	Standard Pin out: 1. VA 5.0V 2.Shield Shield 3.DGND Digital return 4. VSRC 5.0V 5.TxD Serial data from Sensor 6. RxD Serial data from Host 7.AGND Analog return 8.SYNC Unused	
Data Interface	RS232, bi-directional, 19200 baud rate, standard N-8-1.	
Data Output	CO ₂ gas concentration(mmHg), End-tidal CO ₂ , Inspired CO ₂ , Respiratory Rate. Gas and barometric pressure compensated when supplied by host.	
Temperature and Humidity	Operating: 0 to 45°C, 10 to 90% RH, non-condensing Storage: -40 to 70°C, <90% RH, non-condensing	
Water Resistance	IPX4 – Splash-proof (sensor head only)	



BA230 CO₂ Sensor

Product Introduction

The BA230 sensor is a highly integrated side stream CO₂ sensor which developed by CAREMED, who had tens of years IR measurement instrument development experience. It provides measurement of End-Tidal Carbon Dioxide (ETCO₂), respiration rate, capnogram. With a sample flow rate as low as 50 mL/min, it is ideal for use on adult, pediatric and infant patients. All measurement and analysis functions integrated inside the sensor, data output used a simple RS232 signal. It's fairly easy to connect BA230 to any patient monitoring system and other medical treatment system where CO₂ sensor is needed.

With the stability, flexibility and easy to use as the built in essence, BA230 is your ideal choice for your CO₂ monitoring subsystem.

Product Features

- Real time CO₂ monitoring and data upload
- Dual wavelength, non-dispersive infrared (NDIR) with single beam optics
- Robust and long life pump reduces periodic maintenance
- Includes temperature control system, to prevent sample cell condensing
- Low sampling rate down to 50ml/min
- Barometer pressure and gas temperature compensation
- Oxygen, N₂O and anesthetic compensation for accurate measurement
- Patent on calibration algorithm, no calibration required

Technical Specifications

Transducer Type	Sidestream CO ₂ Sensor	
Sample Rate	50 mL/min, ± 10 mL/min.	
Principle of Operation	Non-dispersive infrared (NDIR) single beam optics, dual wavelength, no moving parts	
Initialization Time	Capnogram displayed in less than 4 seconds full specifications within 2 minutes	
CO ₂ Measure Range	0 - 114 mmHg 0 - 15% 0 - 15.2kPa	
CO ₂ Resolution	0.1 mm Hg 0.25 mm Hg	0 to 59 mm Hg 60 to 114 mm Hg
CO ₂ Accuracy	0 – 40mm 41 – 76 mmHg 77 – 114 mmHg Above 80 BPM $\pm 12\%$ of reading	± 2 mmHg $\pm 5\%$ of reading $\pm 8\%$ of reading
CO ₂ Stability	Short term drift: Drift over four hours shall not exceed 1 mmHg maximum Long term drift: Accuracy specification will be maintained over a 120-hour period	
Sampling Frequency	100 Hz	
Respiration Rate Range	2 to 150 Breaths Per Minute (BPM)	
Respiration Rate Accuracy	± 1 breath	
Compensations	Automatic Barometric pressure 400 mmHg to 800 mmHg Operator selectable O ₂ , N ₂ O, He and agent compensation	
Calibration	No routine user calibration required.	
Voltage Requirements	5.0 VDC $\pm 5\%$	
Power Consumption	Less than 1.2 Watts typical (Steady State) Up to 2 Watts maximum on power up (Warm up)	
Interconnection	Standard Pin out: 1. VCC 2. GND 3. GND 4. RxD 5. TxD	5.0V Serial data from Sensor Serial data from Host
Data Interface	RS232, bi-directional, 19200 baud rate, standard N-8-1.	
Data Output	CO ₂ gas concentration (mmHg), End-tidal CO ₂ , Inspired CO ₂ , Respiratory Rate. Gas and barometric pressure compensated when supplied by host.	
Temperature and Humidity	Operating: 0 to 45°C, 10 to 90% RH, non-condensing Storage: -40 to 70°C, <90% RH, non-condensing	



BA220 CO₂ Sensor

Product Introduction

The BA220 sensor is a highly integrated side stream CO₂ Sensor which developed by CAREMED, who had tens of years IR measurement instrument development experience. It provides measurement of End-Tidal Carbon Dioxide (ETCO₂), respiration rate, capnogram. With a sample flow rate as low as 50 mL/min, it is ideal for use on adult, pediatric and infant patients. All measurement and analysis functions integrated inside the sensor, data output used a simple RS232 signal. It's fairly easy to connect BA220 to any patient monitoring system and other medical treatment system where CO₂ sensor is needed.

With the stability, flexibility and easy to use as the built in essence, BA220 is your ideal choice for your CO₂ monitoring subsystem.

Product Features

- Real time CO₂ monitoring and data upload
- Dual wavelength, non-dispersive infrared (NDIR) with single beam optics
- Robust and long life pump reduces periodic maintenance
- Includes temperature control system, to prevent sample cell condensing
- Low sampling rate down to 50ml/min
- Barometer pressure and gas temperature compensation
- Oxygen, N₂O and anesthetic compensation for accurate measurement
- Patent on calibration algorithm, no calibration required

Technical Specifications

Transducer Type	Sidestream CO ₂ Sensor	
Sample Rate	50 mL/min, ± 10 mL/min.	
Principle of Operation	Non-dispersive infrared (NDIR) single beam optics, dual wavelength, no moving parts	
Initialization Time	Capnogram displayed in less than 4 seconds full specifications within 2 minutes	
CO ₂ Measure Range	0 - 114 mmHg 0 - 15% 0 - 15.2kPa	
CO ₂ Resolution	0.1 mm Hg 0.25 mm Hg	0 to 59 mm Hg 60 to 114 mm Hg
CO ₂ Accuracy	0 – 40mm 41 – 76 mmHg 77 – 114 mmHg Above 80 BPM $\pm 12\%$ of reading	± 2 mmHg $\pm 5\%$ of reading $\pm 8\%$ of reading
CO ₂ Stability	Short term drift: Drift over four hours shall not exceed 1 mmHg maximum Long term drift: Accuracy specification will be maintained over a 120-hour period	
Sampling Frequency	100 Hz	
Respiration Rate Range	2 to 150 Breaths Per Minute (BPM)	
Respiration Rate Accuracy	± 1 breath	
Compensations	Automatic Barometric pressure 400 mmHg to 800 mmHg Operator selectable O ₂ , N ₂ O, He and agent compensation	
Calibration	No routine user calibration required.	
Voltage Requirements	5.0 VDC $\pm 5\%$	
Power Consumption	Less than 1.2 Watts typical (Steady State) Up to 2 Watts maximum on power up (Warm up)	
Interconnection	Standard Pin out: 1. VA 5.0V 2. Shield Shield 3. DGND Digital return 4. VSRC 5.0V 5. TxD Serial data from Sensor 6. RxD Serial data from Host 7. AGND Analog return 8. SYNC Unused	
Data Interface	RS232, bi-directional, 19200 baud rate, standard N-8-1.	
Data Output	CO ₂ gas concentration (mmHg), End-tidal CO ₂ , Inspired CO ₂ , Respiratory Rate. Gas and barometric pressure compensated when supplied by host.	
Temperature and Humidity	Operating: 0 to 45°C, 10 to 90% RH, non-condensing Storage: -40 to 70°C, <90% RH, non-condensing	
Water Resistance	IPX4 – Splash-proof (sensor head only)	