

microCAPSTAR CO₂ Analyzer

Fast response end-tidal Carbon Dioxide monitor for mice



The MICROCAPSTAR End-Tidal Carbon Dioxide Analyzer provides accurate end-tidal or continuous measurement of expired CO₂ in animals as small as mice. It features very low sample flow requirements, rapid response time, and long-term stability. Respiratory rate (RR) is computed using the excursions of the CO₂ waveform. The CO₂ and RR measurements, as well as a trend plot of the end-tidal values, are displayed on the graphics LCD screen.

The heart of the MICROCAPSTAR is a new temperature-controlled, miniature infrared CO₂ sensor with digital output. Low sample flow and rapid response is achieved with a carrier gas system employing digitally-controlled active flow management. This technique precisely and automatically maintains the ratio of carrier flow to sample flow, which is essential for accurate measurements. The heated measurement cell prevents water condensation, even during long-term measurement sessions.

The front-panel display shows CO₂ concentration (either instantaneous or ET-CO₂) in either percent or mmHg. Calibration is performed with a single calibration gas and room air. An adjustable ET-CO₂ alarm provides

a warning when end-tidal values fall out of a user-adjustable preset range. All adjustments are performed digitally using a single knob. Built-in diagnostics monitoring warn of plugged sample tubing or other fault conditions.

The advanced features, reliability, and ease of operation of the MICROCAPSTAR make it the perfect companion to our SAR-830 series Small Animal Ventilators for monitoring respiratory status. An accessory pack containing spare low-volume sample tubing and a variety of connectors and fittings is included with the instrument. A range of accessories is available to ensure easy setup and convenient operation. Windows-based monitoring software is included, which allows display of the measurements, and saving the data to a disk file.

CO₂ monitoring is widely recognized as an important measure of the respiratory status of experimental animals. It is useful in setting ventilator parameters, and serves to gauge depth of anesthesia in unassisted, spontaneously breathing animals as well. The MICROCAPSTAR extends this important technique to the realm of small experimental animals.

Standard Features:

- End-tidal peak or continuous readings
- Low sample flow requirements
- Accurate and stable monitoring
- Simple and easy one-gas calibration
- Linear output signal for recording

Applications:

- Suitable for mice and other small animals
- Respiratory monitoring
- Use with ventilated or unassisted animals
- Verifies proper ventilator operation

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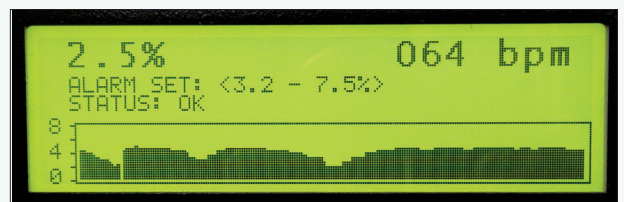
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Specifications: (Note 1)

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|--|---|
| Carbon dioxide measurement | single beam, non-dispersive infrared |
| Measurement range | 0 - 9.9% (0 - 76.0mmHg) CO ₂ |
| Accuracy | 0.15% (1.1mmHg) |
| Resolution (internal and analog output) | 0.01% (0.1mmHg) |
| Resolution (display) | 0.1% (1.0mmHg) |
| Linearity | 0.1% CO ₂ |
| Repeatability | 0.1% CO ₂ |
| Response time (T ₁₀ - T ₉₀) | 75mS at 70 ml/min through cell |
| Sample cell materials | sapphire and stainless steel |
| Analog output scaling | 1.1V/% (0-10V) |
| Response time (T ₁₀ - T ₉₀) | 150mS at 50 ml/min sampling |
| Zero stability | 0.2% (8 hours), 0.3% (24 hours) |
| Interference effects: 50% N ₂ O | 0.1% at 0% CO ₂ , 0.6% at 5% CO ₂ (uncomp.) |
| Maximum sample cell pressure | +5 psig |
| Interference effects: vaporized anaesthetic agents | negligible |
| Operating temperature range | 5-40° C |
| Optical bench temperature | 48° C, controlled |
| Warm-up time | 4 min to 0.2%, 10 min to 0.1% |
| ETCO ₂ trend display | 5 minute graphical scrolling display |
| Sample flow (sample inlet - carrier flow out) | 10ml/min nominal, adjustable from 5.0 - 20ml/min |
| Sample tubing connections (carrier flow, sample inlet) | Luer female |
| Calibration controls | Zero, Span |
| ETCO ₂ alarm adjustment range | 1.0 - 9.9% (8 - 75mmHg) |
| Respiratory rate measurement range | 5 - 200 breaths/min |
| Signal outputs (rear panel) | .BNC jacks |
| CO ₂ output scaling | 1.0V / %CO ₂ |
| Respiratory rate output scaling | 0.05V / bpm |
| Alarm output | 5V if alarm condition, 0V if no alarm |
| Serial data output format | 2400 baud, 8 data, no parity, 1 stop bit |
| Electrical requirements | 120VAC/220VAC switchable, 35VA |
| Dimensions | 19W x 5.25H x 16D in., 49W x 13H x 41D cm |
| Weight | 10 lbs. (4.5kg) |

The graphics LCD display panel (shown at right) provides the instantaneous CO₂ measurement (Fast Mode), or ETCO₂, as well as respiratory rate, alarm settings, system status, and operator messages. The graph at bottom shows the ETCO₂ history over a five minute period.



Ordering Information

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| 15-10000 | MICROCAPSTAR CO ₂ Analyzer, with sample set & accessories |
| 15-00100 | Sample tubing set, 1m long |
| 15-00110 | Sample tubing set, 2m long |
| 11-01108 | In-line miniature hydrophobic filter, 13mm dia, Luer fittings, pk of 5 |
| 11-01110 | Calibration gas, 4 liter aerosol can, 5% CO ₂ , 20% O ₂ , balance N ₂ |
| 11-02000 | Replacement sample air pump |

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