

TCM CombiM

Continuous blood gas monitoring

tc Sensor 54 and tc Sensor 84

The condition of an infant or child can rapidly take a turn for the worse. By continuously monitoring ventilation and oxygenation, you can detect and quickly react to these changes, which might avoid adverse patient outcomes. The TCM CombiM gives you a valuable trending tool in monitoring $tcpCO_2$ and $tcpO_2$ levels, in the incubator or at the bedside.

Radiometer's tc Sensor 54 and tc Sensor 84 provide continuous non-invasive monitoring of $tcpCO_2$ and $tcpO_2$ levels in infants and children. These two versatile sensors work with Radiometer's TCM4 Series monitor equipped with the CombiM module.

tc Sensor 54

- Variety of fixation options, including fixation ring and double adhesive tape
- Up to 12 hours of continuous monitoring

tc Sensor 84

- Low height (only 8 mm) for increased patient comfort

BOTH SENSORS FEATURE:

- Choice of fixation ring size (20 or 32 mm)
- Gold-plated membrane protection for optimal robustness and performance
- Fit-and-click membranizing tool for simple and easy remembraning

ONE MONITOR, MANY APPLICATIONS

Radiometer's TCM4 Series monitor may be configured with different sensors and parameters to meet the needs of various clinical applications, including non-invasive monitoring in respiratory care, pediatric intensive care, neonatal intensive care, adult monitoring and sleep medicine. The TCM4 series offers easy-to-use, touch-screen technology and accuracy with automatic calibration and real-time trending of critical parameters.

tc Sensor 54
 $tcpCO_2$



tc Sensor 84
 $tcpCO_2$
 $tcpO_2$



TCM CombiM Specifications

Hardware

Computer specifications

CPU: AMD ETX LX800, 500 MHz (Pentium Class)
Software platform: Windows CE 5.0

Operating conditions

Operating environment: 10-40 °C
Built-in barometer:
Range: 375-825 mmHg or 50-110 kPa
Accuracy: ± 5 mmHg or 0.67 kPa
Power: 100-240 V, 50-60 Hz
Built-in battery:
Rechargeable Pb battery
Typical operating time: 1 hour per charge

Software

Measuring range

Transcutaneous carbon dioxide tension/ $tcpCO_2$:
5-200 mmHg or 0.7-26.7 kPa
Transcutaneous oxygen tension/ $tcpO_2$:
0-800 mmHg or 0.0-99.9 kPa
Sensor heating power: 0-1000mW +/- 20%

Calibration

Automatic calibration
Calibration gas: 7.5% CO_2 and 20.9% O_2 , balanced N_2
Integrated calibration chamber

Patient data storage

Up to 48 hours of measuring data in 2-sec data intervals
Reviewing trends on screen
Download of stored patient data to PC, printer or memory stick

Dimensions

TCM monitor

Width	30.8 cm	12.1 in
Depth	23 cm	8.7 in
Height	16 cm	6.3 in
Weight	4 kg	8.8 lbs

Display

Screen: 6.5 color touch TFT, full VGA (640 x 480)
Display options: normal view (numeric), trend table, trend curve
Display update period: every 2 seconds

Interface connections

Serial output: EIA232 (RS232)
Analog output: 0-1000 mV
Printer output: USB 2.0 (compliant with USB 1.1)
Printer protocol: HP PCL3
Printer reports: trend table, trend curve
Data protocol: VueLink and Monlink

Site timer

Indication of remaining measuring time
Measuring time elapsed: clock triggers an alarm and sensor temperature is off

Alarm level

Alarm sound: high 83 dBA
low 65 dBA
Alert tone: high 73 dBA
low 58 dBA

Languages

Chinese, Danish, Dutch, English, French, German, Greek, Italian, Japanese, Polish, Portuguese, Russian, Spanish and Swedish

CombiM module

Width	14.5 cm	5.7 in
Depth	14.8 cm	5.8 in
Height	10.7 cm	4.2 in
Weight	0.575 kg	1.3 lbs

tc Sensor 54 (tcpCO₂) and tc Sensor 84 (tcpCO₂, tcpO₂)

Sensor specifications

Measuring principle

tc Sensor 54: Stow-Severinghaus-type pCO₂ sensor
tc Sensor 84: Stow-Severinghaus-type pCO₂ combined with Clark-type pO₂ sensor

Sensor temperature

Selectable between 37.0-44.0 °C in steps of 0.5 °C
Reliable safe control by two independent circuits
Accuracy: ±0.2 °C
Automatic temperature off when site time is elapsed

Sensor performance (in vitro)

tc Sensor 54
Conditions: sensor temperature of 42.0 °C, calibration interval: 12 h
tcpCO₂:
Response time (10-90%): ≤ 60sec
Drift: ≤ 0.5%/h
Linearity: at 10% CO₂: better than 1 mmHg (0.13 kPa)
at 33% CO₂: better than 3 mmHg (0.4 kPa)

Sensor remembraning requirements

Every 14 days
Built-in alert when sensor needs remembraning
Protected membrane

Sensor memory

Sensor has a built-in memory for calibration values, remembraning date and other sensor data

tc Sensor 84
Conditions: sensor temperature of 44.0 °C, calibration interval: 4 h
tcpCO₂:
Response time (10-90%): ≤ 60sec
Drift: ≤ 1%/h
Linearity: at 1 and 10% CO₂: better than 1 mmHg or 0.13 kPa
at 33% CO₂: better than 5 mmHg or 0.67 kPa
tcpO₂:
Response time (10-90%): ≤ 25 sec
Drift: ≤ 1%/h
Linearity: at 0% O₂: better than 1 mmHg or 0.13 kPa
at 21% O₂: better than 3 mmHg or 0.4 kPa
at 50% O₂: better than 5 mmHg or 0.67 kPa
at 90% O₂: better than 25 mmHg or 3.33 kPa

Interference by anesthetic gases (in vitro)

tcpCO₂:
75% N₂O, 2% Halothane, 2% Enflurane
and 2% Isoflurane: negligible
tcpO₂:
75% N₂O: <10mmHg or 1.33 kPa
2% Halothane: approx. 200 mmHg or 26.67 kPa
2% Enflurane and 2% Isoflurane: negligible

Sensor dimensions

Diameter: 15 mm or 0.6 in
Height: 8 mm or 0.3 in
Weight: 3 g or 0.1 oz
Sensor cable length: 3 m or 9.8 ft, shielded, flexible, polyurethane coated

Accessories

962-187 Cal gas 1 (962-188 for US and Canada)	tc Sensor 54
905-873 fixation kit N20	905-868 membraning kit 54
905-872 adhesive rings N20 kit	5601300 sensor attachment clips
5601500 fixation rings 32	tc Sensor 84
	905-871 membraning kit 84

Biocompatibility

Not made with natural rubber latex

Patient safety The instrument complies with IEC 60601-1 and IEC 60601-2-23. The following test house has approved the instrument:



Medical equipment With respect to electrical shock, fire and mechanical hazards only in accordance with CAN/CSA-C22.2 No. 601.1-M90/S1-94/1B-98, UL 60601-1, IEC 60601-1 ed. 2 UL file E480193

EMC Compliance with EMC requirements is ensured by fulfilling the requirements of the standards IEC 60601-1-2, IEC 60601-2-23.

Performance This product complies with the IEC 60601-2-23, IEC 60601-3-1.

Data subject to change without notice.

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