Introducing The New Generation of Metabolic Monitors for Indirect Calorimetry in Clinical and Critical Care Practice
In critically ill mechanically ventilated patients, EE should be determined by using indirect calorimetry.


Individual
Gold Standard
Quick
Easy
Compact
Affordable

Introduced by COSMED, worldwide leader in the design of metabolic systems for clinical and human performance applications, Q-NRG is the first Indirect Calorimeter specifically intended for the measurement of Resting Energy Expenditure (REE) in patients who are mechanically ventilated or spontaneously breathing and for healthy subjects.

Indirect calorimetry remains the Gold Standard in measuring energy expenditure in clinical settings, proven to have enormous advantages compared to Predictive Equations. In fact, this measuring technology provides an individual and dynamic metabolic assessment based on the actual physical status of the subject rather than estimating it on anthropometric data.

Q-NRG is a unique product, the result of COSMED’s collaboration with world-class institutes in the field of nutrition support in intensive care units. Product concept and specifications have been designed together with the ICALIC Trial study group. This collaboration made possible the development of an accurate metabolic system simple to use and at the same time able to solve all typical pitfalls of Indirect Calorimetry technology.

Individual Metabolic Assessment
Q-NRG uses the Gold Standard Indirect Calorimetry technique to measure metabolic parameters. The technique itself guarantees that the results reflect the metabolic alterations during illness and repeated measurements may correspond with disease progression or resolution. Q-NRG is the ultimate tool to develop individual nutrition support plans and optimize them to prevent over/underfeeding, to reduce length of stay and, ultimately, to decrease costs in ICU.

Indirect Calorimetry, a Gold Standard
Q-NRG is the result of more than 30 years of experience in the design of metabolic systems. The new calorimeter has been validated in-vitro by international multicentre study showing the greatest accuracy with excellent agreement vs. mass spectrometer measurements.

Quick to operate, clean and maintain
Q-NRG has been designed to reduce operations and measurement time. System does not require warm-up time nor user-assisted calibrations, all operations can be performed with a few taps on the screen and cleaning procedures are simplified thanks to rounded surfaces and single-use accessories.

Designed for Clinical Practice
Q-NRG usability has been designed according to best clinical practice. An intuitive workflow supports the user through all operations with main instructions prompted along the procedures and test information always accessible. Designed to be portable, the device can be easily transported between rooms.

Latest Technologies in a Compact Device
Q-NRG is a compact, lightweight, battery operating device. The 10” inches LCD touch-screen simplify access to all operations. Bluetooth, USB, RS-232 and LAN interfaces allow to connect the system to any hub (PC, printers, etc.).

Affordable
Q-NRG has been designed to compete with conventional metabolic system, at a fraction of the cost.
One tool for many applications

Q-NRG provides flexibility in a variety of clinical settings, assessing different patient's conditions (mechanically ventilated for spontaneous breathing) and with different techniques (Canopy Hood and/or Face Mask), from pediatric to adult.

**Ventilator Mode.** Q-NRG can measure REE in mechanically ventilated patients (FiO₂ up to 75%). A single-use flowmeter is placed in series in the patient circuit to measure ventilatory parameters. Two sampling lines are connected to patient circuit and ventilator outlet for the measurement of inspired/expired gases.

**Canopy Mode.** Indirect Calorimetry through Canopy Hood is the “Gold Standard” technique to measure REE in spontaneously breathing subjects. Exhaled gases are diluted within a “Canopy Hood” (small or large size). Measurement of dilution flow and O₂/CO₂ concentrations allow the calculation of VO₂ and VCO₂.

**Face Mask Mode.** REE measurements can be performed using an oronasal face mask on spontaneously breathing subjects whenever Canopy Hood cannot be used (special subjects, claustrophobic, etc.). A flowmeter and a sampling line are connected to the mask (5 sizes) for VO₂ and VCO₂ measurement.

### Accessories & Options

- **Canopy Hood Kit.** Available in two sizes (large or small), includes hood w/ adapter and corrugated tube.
- **Face Mask Kit.** Includes two oronasal masks in silicone (S/M sizes), 1 head cap, and external flowmeter.
- **Gas Calibration Kit.** Required for the monthly gas calibration. It includes a 3,6 Liter cylinder with certified gas mix (16% O₂, 5% CO₂, N₂ bal) and pressure regulator.
- **Flow/Volume Calibration Kit.** Required for the monthly calibration, includes a 3L certified calibration syringe and adapters.
- **Cart.** Compact Cart with medical grade wheels, includes gas cylinder holder and accessory basket, perfect for moving the system between beds or hospital departments.
- **Clamp.** Pole/rail clamp with 100 mm VESA mounting plate to be used for securing Q-NRG on any Pole or Rail setting within an hospital setting.

Real Time dashboard of Ventilator test shows metabolic and ventilatory data as well as widgets to verify Quality Control and understand whenever test is completed.

### PDF Printout

PDF printout of Ventilator test shows test results in a comprehensive format to facilitate metabolic assessment. Tabular data may also be included.
Bibliography


4 Indirect calorimetry as point of care testing. Singer P, Rattanachaiwong S. Clinical Nutrition. 2019


* More scientific studies on www.cosmed.com/bibliography

Technical Specifications

Product
Part Number C09092-02-99
Intended use Resting Energy Expenditure (REE) measurement on mechanically ventilated and spontaneously breathing subjects.

Standard packaging Q-NRG+, USB cable, power cable, User Manual
Test kit (Single-use) Flow-REE, FiO2, and FeO2/CO2, sampling lines, FiO2 Vent Adapter, HME or standard filter

Measurement Modes
Ventilator Standard
Canopy Hood Option
Face Mask Option

Main Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
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<tbody>
<tr>
<td>VO2</td>
<td>10-1000 mL/min</td>
<td>±3% or 5mL/min</td>
</tr>
<tr>
<td>VCO2</td>
<td>10-1000 mL/min</td>
<td>±3% or 5mL/min</td>
</tr>
<tr>
<td>RQ</td>
<td>0-2.00</td>
<td>±5% or 0.04</td>
</tr>
<tr>
<td>REE</td>
<td>0-7200 kcal/day</td>
<td>±5% or 36 kcal/day</td>
</tr>
</tbody>
</table>

Flowmeter

| Type | Ventilator Canopy/Mask
|------|------------------------|
| Range | 0.01 – 1.6 L/s | 0.05 – 2 L/s
| Accuracy | ±2% or 100mL/min @1-25 L/min | ±2% or 100mL/min @1-25 L/min
| Resistance | 2.3 cmH2O s/L @ 1 L/min | <0.25 cmH2O s/L @ 1 L/min
| Calibration | Automatic via Internal Blower | With 3L calibration syringe (monthly)

Gas Sensors

<table>
<thead>
<tr>
<th>Gas</th>
<th>O2</th>
<th>CO2</th>
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<tbody>
<tr>
<td>Type</td>
<td>Galvanic Fuel Cell (GFC)</td>
<td>Digital NDIR</td>
</tr>
<tr>
<td>Range</td>
<td>0-75%</td>
<td>0-10%</td>
</tr>
<tr>
<td>Accuracy</td>
<td>&lt;0.05% Vol</td>
<td>&lt;0.05% Vol</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.01% Vol</td>
<td>0.01% Vol</td>
</tr>
<tr>
<td>Calibration</td>
<td>Automatic via gas cylinder (monthly)</td>
<td></td>
</tr>
</tbody>
</table>

Report

Export modes USB, Bluetooth*
Export formats PDF, CSV, XML

Hardware

Display 10.1" Transmissive TFT LCD, 1024x600, 65k colors, capacitive touch screen
Power Battery: Li-Ion “smart” (3 hours autonomy) Main: 100V-240V ±10%; 50/60Hz, 1.5A @100VAC, 1.0A @240VAC

Wireless Connectivity Bluetooth (2.1 + EDR Class II – Range 10 m line-of-sight)
Wired Connectivity 1 USB-device (5kV galvanic-insulated), 2 x USB Host, RS-232, LAN

Weight & Dimensions 4.65 kg (10.3lb), 31x21x27cm (12.2x8.3x10.6in)

Environmental ranges Temp. +10°C to +35°C. Humidity: 5-93% (non condensing). Atmospheric pressure: up to 3011m

PC Software (optional) OMNIA

Languages Italian, English, Spanish, French, German, Portuguese, Greek, Dutch, Turkish, Russian, Chinese (Traditional & Simplified), Korean, Romanian, Polish, Czech, Norwegian, Hebrew

OS Requirements Windows 7, 8, 10

Security & Quality Standards

MDD (93/42/EEC Class IIa), Safety (Class I IEC 60601-1), EMC (IEC 60601-1-2), Telemetry (ETSI EN 301 489-17)

* This device is intended for the measurement of REE with some limitations in accordance with labeling, within the following population: Ventilator: ventilated subjects > age 10 and 10Kg (22lb) Canopy: spontaneously breathing subjects >15Kg (33lb) Mask: spontaneously breathing subjects > age 6 and 10Kg (22lb)

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Q-NRG can be mounted either on the optional cart (with cylinder holder and accessory basket) or on any hospital rail with the optional clamp.