Research grade Metabolic cart for Cardio Pulmonary Exercise Testing in clinical and sport applications

"Assess, Measure, Improve my Performance"
The Quark CPET is a state-of-the-art metabolic cart for gas exchange analysis (VO₂, VCO₂) either during exercise testing or resting protocols. Its high quality components and super-fast analyzers assure unsurpassed accuracy, reliability, and real breath-by-breath analysis of pulmonary gas exchange, even at high intensity exercises.

The Quark CPET is a stationary system with both breath-by-breath and, optionally, mixing chamber sampling technology. The system has been scientifically validated for both techniques and in a wide range of exercise intensities.

The Quark CPET can be integrated with additional modules including fully integrated 12-lead ECG Stress testing, canopy hood for REE measurements, pulseoximetry and more.

**Design & Main Features**

- **Unsurpassed accuracy**, fast-response stable and durable paramagnetic technology for O₂ sensor, and rapid infrared for the CO₂. Both analyzers can assure long periods of accurate measurements without the need of periodical replacement.

- **Breath by Breath & Mixing Chamber.** Both sampling technologies are available either during exercise or at rest conditions.

- **CPET made easy.** Thanks to OMNIA, the new generation of COSMED software designed for the entire COSMED product's portfolio. The intuitive, beautiful, and innovative user interface has brought the complex CPET procedure to a new simpler stage.

- **Low running costs and easy maintenance.** The design architecture has been conceived to reduce ordinary maintenance and to easily and rapidly solve any technical problem through the replacement of a board.

- **Independently validated.** Quark CPET is the only Metabolic cart in the market that has been validated both on different gas exchange methods (Breath by Breath and Mixing Chamber), and on the whole human physiological range (from resting to a wide range of exercise intensities).

- **Wide selection of ergometers,** available from COSMED, including treadmills, cyclergometers, armergometers and recumbent bikes, suitable for any clinical and research application.

- **Integrated diagnostic quality 12lead Stress ECG** (available either in wireless or patient cable configuration) with full disclosure and scroll back during test. High resolution ECG processing produces an exceptionally clear on-screen display and allows detailed, reliable analysis of ST segments and minimal arrhythmia changes. Available with Resting and Exercise ECG interpretation.

- **During exercise, Quark CPET can perform pulmonary gas exchange measurements with integrated ECG data**

**Designed for any kind of cardio pulmonary exercise testing including exercise physiology, sports science and clinical exercise testing**
Data Management & Software

Quark CPET is provided with the OMNIA Metabolic Modules, designed by COSMED for CPET and REE testing and data management. Compatible with the entire COSMED product range OMNIA allows users to operate complex testing procedures with just a few training.

- Easy-to-use beautifully designed touchscreen (native) graphic user interface with intuitive workflow and hierarchy.
- Display data and charts through standard (9 panel plot, etc.) or user defined Dashboards.
- Built-in Exercise Protocol editor to design and save any type of protocol.
- Easy, quick and fully assisted calibration for high accuracy measurements, either for flowmeters (calibration and linearity check) or for gas sensors (zero, gain and delay).
- Real time acquisition and capture of Exercise Flow-Volume loops (EFVL) for the evaluation of ventilatory limitation.
- Powerful post-test editing phase for data filtering, calculation of thresholds (AT, RCP), VO₂ max, EFVL, VE/VCO₂ slope, intercept and other parameters requested for interpretation.
- Comprehensive interpretation tool automatically elaborates CPET tests and provides interpretation including text strings and numerical results based on latest scientific guidelines.


- Export data in .pdf, .xml, and xls formats. Import data in .xml format.
- Custom user rights management (Principal Investigator, Physician, Technician, Administrator...) with event logging.
- Compatible with Windows 7, 8, 8.1, 10 (32 or 64 bit). Mac OS compatibility when installed in Virtual PC OS (Parallels, VMware).
- Network version with full Client-Server architecture.

Possibility to manage/display in real time data and plots via dashboards (default and user defined)
Bibliography

- Gullstrand L., et al. Validation of the Quark CPET Respiratory gas analyser in the BHB mode. 2013; Elite Sport Centre, Bosön
- Gullstrand L., et al. Validation of the Quark CPET Respiratory gas analyser (Mixing Chamber). 2013; Elite Sport Centre, Bosön
- Blond E. et al. “A new indirect calorimeter is accurate and reliable for measuring basal energy expenditure, thermic effect of food and substrate oxidation in obese and health” e-SPEN e-Journal of Clinical Nutrition and Metabolism 6 (2011) e7ee15
- more scientific studies on www.cosmed.com/bibliography

Technical Specifications

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<th>Product</th>
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<td>Quark CPET</td>
<td>Metabolic cart</td>
<td>C09073-02-99</td>
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- **Standard packaging**
  - Quark CPET unit, VO₂max flowmeter (2 pcs), RMR flowmeter, HR Belt (Ant-c), Face Masks (3 pcs XS, S, M), Head caps (1 adult, 1 pediatric), Calibration Syringe (3 Liters), antibacterial filters (10 pcs), nose clips (2 pcs), adult paper mouthpieces (50 pcs), pediatric paper mouthpieces (50 pcs), OMNIA PC software, cables, probes and user manual

- **Standard Tests**
  - Cardiac Pulmonary Exercise Test (CPET)
  - Indirect Calorimetry

- **Optional Tests**
  - Spirometry

Gas Analyzers

- **Oxygen (O₂)** Carbon Dioxide (CO₂)
- Type: Paramagnetic
- Range: 0-100% (user selectable)
- Response time t₉₀: 100 ms
- Accuracy: ±0.02%
- Warm-up time: 5 min

Flowmeter

- **VO₂max** RMR/REE
- Type: Digital Turbine (Ø 28 mm)
- Flow Range: 0-16 l/s
- Accuracy: ±2% or 20 ml/s (flow) ±2% or 200 ml/min (vent.)
- Resistance: <0.6 cmH₂O l/s @ 14 l/s
- Ventilation range: 0-300 l/min

Hardware

- Dimensions & Weight: 17 x 30 x 45 cm / 6 Kg
- Interface ports: USB A-B, RS-232, HR-TTL, SpO₂
- Software: OMNIA

Languages

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

PC Requirements

- I3 or higher processor speed. Compatible with Windows 7, 8, 8.1, 10 (32 or 64 bit). RAM 4GB (8GB recommended). HD with 4GB of free space (plus tools)

Options

- Mixing Chamber: 7 liters Mixing Chamber (physical)
- REE with Canopy Hood: Kit including transparent canopy hood with blower for “gold standard” indirect calorimetry measurements at rest
- Quark C12x with TTL: Diagnostic quality 12 lead stress test ECG with patient cable
- Quark T12x with TTL: Diagnostic quality wireless 12 lead stress test ECG
- High/Low FiO₂ Kit: Kit for hypoxic and hyperoxic gas mixtures
- Oximeter (Xpod): Nonin Oximeter integrated in the cable and attachable to different sensors (finger, earlobe and forehead)
- Oximeter (ipod): Nonin Oximeter with integrated finger probe

Accessories

- Gas Calibration Kit: Gas cylinder 16% O₂, 5% CO₂, 5% N₂, bal and pressure regulator
- Ethanol Burning Kit: Kit consists of a glass ampoule for the verification of RQ
- Medical Grade Cart: 1 cylinder holder (either 120V or 240V)
- Medical Grade Cart: 3 cylinder holder with drawer (either 120V or 240V)

Safety & Quality Standards

- MDD (93/42 EEC); FDA 510(k); EN 60601-1 (safety) / EN 60601-1-2 (EMC)