Quark CPET

Cardio Pulmonary Exercise Testing

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

"Assess, Measure, Improve my Performance"

COSMED

The Metabolic Company

“Designed for any kind of cardio pulmonary exercise testing including exercise physiology, sports science and clinical exercise testing”

- **Breath by breath gas exchange analysis (VO_2, VCO_2)**
- **Fully integrated with 12-lead Stress Testing ECG (option)**
- **Automatic CPET Clinical Interpretation**
- **Resting Energy Expenditure with mask**
- **Mixing chamber for sport science and research applications (option)**
- **Independently validated**

The Quark CPET is a state-of-the-art metabolic cart for gas exchange analysis (VO_2, VCO_2) 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. It has been scientifically validated for both sampling 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, pulseoximetry and more.

Design & Main Features

- **Unsurpassed accuracy**. fast-response stable and durable paramagnetic technology for O_2 sensor, and rapid infrared for the CO_2. 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).
- Integrated diagnostic quality **12-lead 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.
- Wide selection of **ergometers**, available from COSMED, including treadmills, cycle-ergometers, arm-ergometers and recumbent bikes, suitable for any clinical and research application.

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

COSMED stress ECGs (wireless or patient cable)

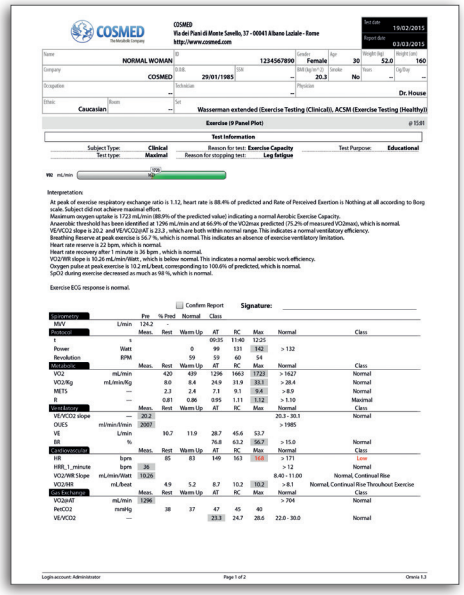
Data Management & Software

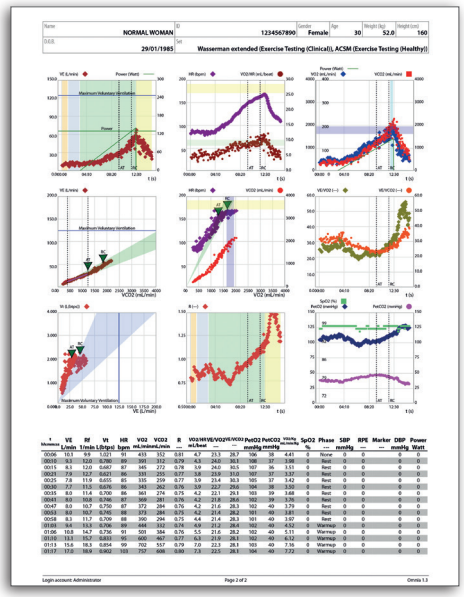
Quark CPET is provided with the **OMNIA Metabolic** Modules, designed by COSMED for CPET and REE testing and data management. Compatible with the entire COSMED product range OMNIA allows users to operate complex testing procedures with just a few training.

- Easy-to-use beautifully designed touch-screen (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), VO_2max, EFVL, VE/VCO_2 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[1].

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

- Ergometer control: **standard** (COSMED Bike, COSMED Treadmill, Ergoline, HPCosmos, Monark, Trackmaster) and **optional** (Archimed, BCube, BikeMax, Bosh 601, CatEye, clubLine, CSafe Treadmill, CT100-ErgocardII, Cyclus 2, ErgoFit Bike, Excalib.Sport, Excalibur, Excite-Bike, Excite-Treadmill, Imbramed-Bike, Imbramed-Treadmill, Lodebike, Powerjog, RAM770, TechnogymRun-Race, Tecmachine1800, TrackEmul, Woodway).
- 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).
- Network version with full Client-Server architecture.





Custom printout reporting with pictograms, comprehensive interpretation statements, editable charts and tabular data

Powerful post editing for calculation and reviewing of main parameters (edit Thresholds, EFVL, VE/VCO_2 etc.)

1 *ATS/ACCP 2001, ESC 2009, EACPR/AHA 2012, AHA 2010*

Bibliography

- *Ashcraft C.M. et al. "A Test of Validity of a New Open-Circuit Indirect Calorimeter. " J Parenter Enteral Nutr. 2014 Mar 10*
- *Gullstrand L., et al. Validation of the Quark CPET Respiratory gas analyser in the BBB 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*
- *Nieman DC, et al. Validity of COSMED's Quark CPET mixing chamber system in evaluating energy metabolism during aerobic exercise in healthy male adults. Res Sports Med. 2013;21(2):136-45*
- *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

Product	Description	REF
Quark CPET	Metabolic cart	C09073-02-99
Standard packaging	Quark CPET unit, opto-reader 2000, turbine 2000 (2 pcs), HR Belt (Ant+), Face Masks (3 pcs XS, S, M), Head caps (1 adult, 1 pediatric), Calibration Syringe (3 Liters), permapure (2 pcs), OMNIA PC software, adapters, cables, probes and user manual	
Standard Tests		
Cardio Pulmonary Exercise Test (CPET)	Pulmonary Gas Exchange (VO_2, VCO_2), VO_2max, Sub-max VO_2, Thresholds (AT, RCP), EFVL, Heart Rate	
Indirect Calorimetry	Resting Energy Expenditure (REE, RMR), w/ face masks or mouthpieces. Respiratory Quotient (RQ) & Substrates Analysis	
Optional Tests		
Spirometry	Forced Vital Capacity (FVC) Pre/Post, Slow Vital Capacity (SVC) Pre/Post, Maximum Voluntary Ventilation (MVV), Broncho-challenge - Bronchial Dilator/Constrictor test	
Gas Analyzers	**Oxygen (O_2)**	**Carbon Dioxide (CO_2)**
Type	Paramagnetic	NDIR
Range	0-100%	0-10%
Response time t90	120 ms	100 ms
Accuracy	±0.1%	±0.02%
Warm-up time	5 min	10 min
Flowmeter	**Turbine 2000**	**RMR/REE (option)**
Type	Digital Turbine (Ø 28 mm)	Digital Turbine (Ø 18 mm)
Flow Range	0-20 l/s	0-8 l/s
Accuracy	± 2% or 20 ml/s (flow) ± 2% or 100 ml/min (vent.)	± 2% or 20 ml/s (flow) ± 2% or 100 ml/min (vent.)
Resistance	<0.6 cmH_2O /l/s @ 14l/s	<0.7 cmH_2O l/s @ 3l/s
Ventilation range	0.08-300 l/min	0.04-50 l/min
Hardware		
Dimensions & Weight	33x41x16 cm / 11 Kg	
Interface ports	USB A-B, RS-232, HR-TTL, SpO_2	
Electrical requirements	100-240V ±10%; 50/60 Hz	
Software	**OMNIA**	
Languages	Italian, English, Spanish, French, German, Portuguese, Greek, Dutch, Turkish, Russian, Chinese (Traditional & Simplified), Korean, Romanian, Polish, Czech, Norwegian, Hebrew	
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	**Description**	**REF**
Mixing Chamber	8,6 liters Mixing Chamber (physical)	C03261-02-11
Quark C12x with TTL	Diagnostic quality 12 lead stress test ECG with patient cable	C09080-01-99
Quark T12x with TTL	Diagnostic quality wireless 12 lead stress test ECG	C09081-01-99
High/Low FiO_2 Kit	Kit for hypoxic and hyperoxic gas mixtures	C03471-01-11
Oximeter (Xpod)	Nonin Oximeter integrated in the cable and attachable to different sensors (finger, earlobe and forehead)	C02600-01-05
Physioflow Q-Link	Non-invasive cardiac output monitor	A-661-200-069
Physioflow Enduro	Wireless non-invasive cardiac output monitor	A-661-200-067
Tango	Automated non-invasive blood pressure monitor t	A-661-200-035
Accessories	**Description**	**REF**
Gas Calibration Kit	Gas cylinder 16% O_2, 5% CO_2, N_2 bal and pressure regulator	A-860-000-004 (Gas) A-870-150-005 (Reg)
Medical Grade Cart	1 cylinder holder (either 120V or 240V)	C03550-0*-04
Medical Grade Cart	3 cylinder holder with drawer (either 120V or 240V)	C02900-0*-04
Safety & Quality Standards		
MDD (93/42 EEC); FDA 510(k); EN 60601-1 (safety) / EN 60601-1-2 (EMC)		

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