Quark CPET
Metabolic Cart

"Assess, Monitor, Evaluate Exercise Capacity..."



State-of-the-art metabolic cart for clinical Cardio Pulmonary Exercise Testing

COSMED
The Metabolic Company

- Breath by breath gas exchange analysis (VO_2, VCO_2)
- Powerful software for data analysis (thresholds, slopes, 9-Panel Plots, Auto-interpretation etc.)
- Spirometry and Exercise Flow Volume Loops
- Optional Walk Test Module (6MWT, Shuttle, etc.)
- Integrated wireless or cable 12-lead Stress Testing ECG (option)
- Interface to HIS via HL7®, DICOM® or GDT protocols





The Quark CPET is a state-of-the-art metabolic cart for gas exchange analysis (VO_2, VCO_2) during exercise or resting protocols. High quality components and super-fast analyzers assure unsurpassed accuracy, reliability, and real time analysis of pulmonary gas exchange, even at high intensity exercises.

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

Quark CPET carries several built in features and can be integrated with additional modules for both clinical and performance testing.

Quark CPET at a glance	
Cardio Pulmonary Exercise Testing (CPET), by "Breath by Breath"	●
Cardio Pulmonary Exercise Testing (CPET), by "Physical Mixing Chamber"	○
Resting Energy Expenditure (REE) with Mask	●
Spirometry (FVC, SVC, MVV etc.)	●
Exercise Flow Volume Loops	●
Advanced CPET data analysis (VO_2max, thresholds, steady state, O_2 kinetics, etc.)	●
Training Zones and FatMax	●
Diagnostic 12-leads Stress testing ECG	○
SpO_2 during exercise	○
6MWT and walk tests	○
High/Low FiO_2 (altitude simulation)	○
Automatic blood pressure monitor	○
Wide range of ergometers (bikes and treadmills)	○
Aquatrainer (gas exchange snorkel for swimming application)	○

● Standard ○ Optional

Design & Main Features

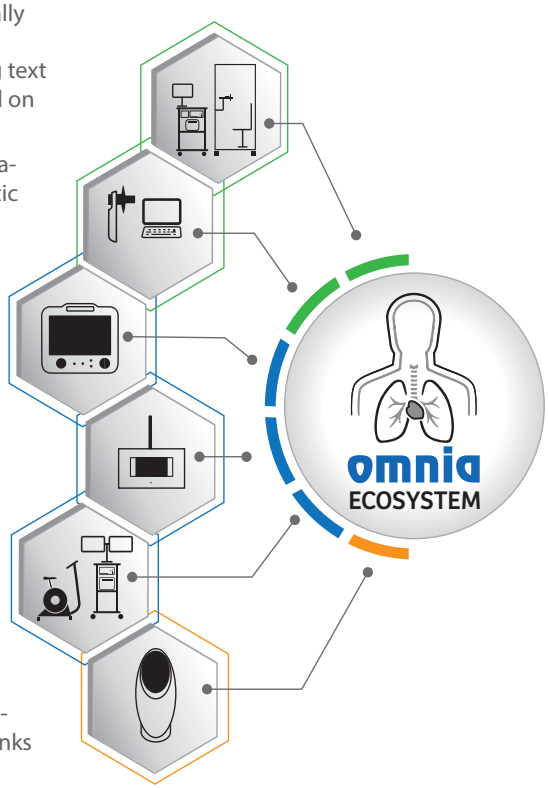
- **Unsurpassed accuracy**. Fast-response, stable and durable paramagnetic or GFC technology for O_2 sensor and rapid infrared for the CO_2 sensor.
- **Breath by Breath & Mixing Chamber.** Choice of two sampling technologies for both exercise and resting conditions.
- **CPET made easy** thanks to **OMNIA**, the new generation of COSMED software designed for the entire COSMED products portfolio. The intuitive and innovative user interface has taken the complexities of CPET interpretation and combined simplicity and clarity with ultimate reporting flexibility.
- **Low running costs and easy maintenance.** The design architecture has been conceived to reduce ordinary maintenance and to easily and rapidly resolve most technical problems with the replacement of plug-and-play boards.
- **Independently validated.** Quark CPET is the only Metabolic cart in the market that has been validated with different gas exchange methods (breath by breath and mixing chamber) throughout the whole physiological range (rest to maximal intensity exercise).
- Complete your **CPET solution** with several otpions and accessories (Blood Pressure, ABG integration, SpO2 etc.)
- Wide selection of **ergometers**, available from COSMED, including treadmills, cycle-ergometers, arm-ergometers and recumbent bikes, suitable for any clinical and research application.



Software Features

Quark CPET is provided with the **OMNIA Software**, 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 minimal training.

- Easy-to-use touch-screen graphic user interface with intuitive workflow and hierarchy.
- Manage and display data and charts with conventional layouts (9-Panel Plot, POETTS etc.) or user defined layouts with OMNIA 'Dashboards'.
- Built-in exercise protocol editor to design and save any type of protocol.
- Easy, quick and fully guided calibration for high accuracy measurements, both for flowmeters (calibration and linearity check) and for gas sensors (response time, 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 provides for data filtering, calculation of thresholds (VT1, VT2), VO_2max, EFVL, VE/VCO_2 slope and intercept, VO_2/WR, OUES and other parameters required for interpretation.
- O_2 kinetics analysis with the possibility to select unlimited O_2 debt and/or deficit intervals.
- Automatic steady state identification within multiple stages provides for more detailed analysis of the physiological response to the exercise.
- Training zones to personalise exercise prescription according to metabolic reference parameters including VO_2max, VO_2@VT1, VO_2@VT2 and VO_2 reserve.
- Integration with NONIN 3150 WristOx2 oximeter (Bluetooth® Low Energy) and pre-defined protocols to provide physiological data during standardized, non-metabolic tests such as 6MWT, Incremental and Endurance Shuttle Walk Tests, Titration and the High Altitude Simulation Test, as well as user-defined protocols. Exclusive features include: plethysmographic pulse oximetry signal for visual feedback and steps quality control.
- Comprehensive tools automatically elaborate CPET tests results and provides interpretation including text strings and numerical data based on latest scientific guidelines.
- Custom comments and interpretation with user-definable automatic placeholders.
- Control and receive data from ergometers using standard or custom protocols, including ECG, blood pressure, ABG and flow-volume loop captures triggers.
- Export data in pdf, xml, and xls formats.
- Custom user rights management (Physician, Technician, Administrator,...) with event logging.
- The software features can be configured to meet the needs of any user from small clinical settings to big hospital infrastructures or research institutions, thanks to OMNIA's scalability.
- Define the real time display of parameters and graphical detail with the possibility to switch views while testing.
- Single test, multi test and trend report layouts configurable by the user at any time.

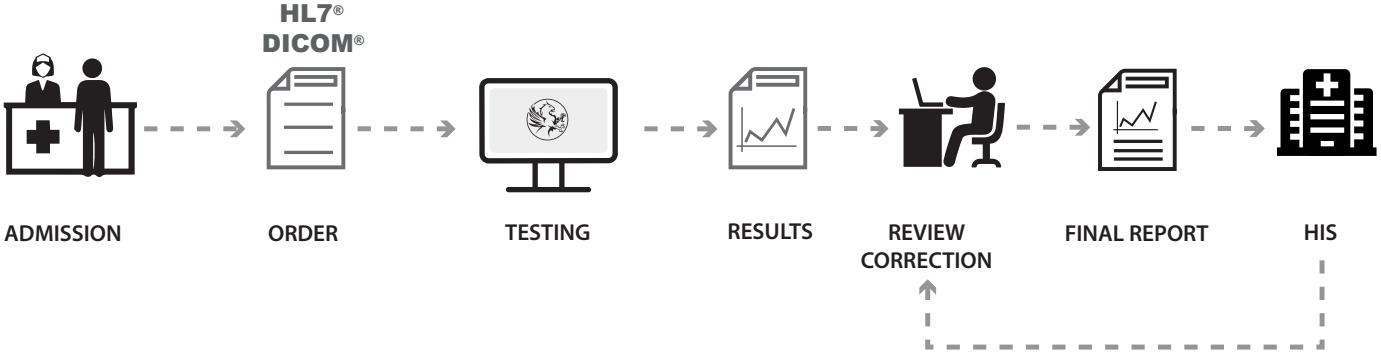


Networking

OMNIA Network allows to share a single database in either a small network (LAN) or a large network (WAN) environment.

OMNIA Network is based on a Client-Server architecture and allows to run different COSMED devices through simultaneous access of data and run tests via a virtually unlimited number of COSMED products.

- Based on standard SQL database to store data securely.
- Access and security compliance according to international guidelines.
- Standard network license supports up to five clients and can be extended to unlimited clients.
- User management system allows to define users' profiles and rights to each software feature.
- With the optional OMNIA Connector module, OMNIA can exchange data with Hospital Information Systems (HIS) or Electronic Medical Records (EMR) via HL7® or DICOM® protocols. Shared data are managed through a dedicated worklist with visit status always updated.





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



Powerful post editing for calculation and reviewing of main parameters (edit Thresholds, EFVL, VE/VCO$_2$ etc.)



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



COSMED C12x/T12x ECGs (wireless or patient cable)

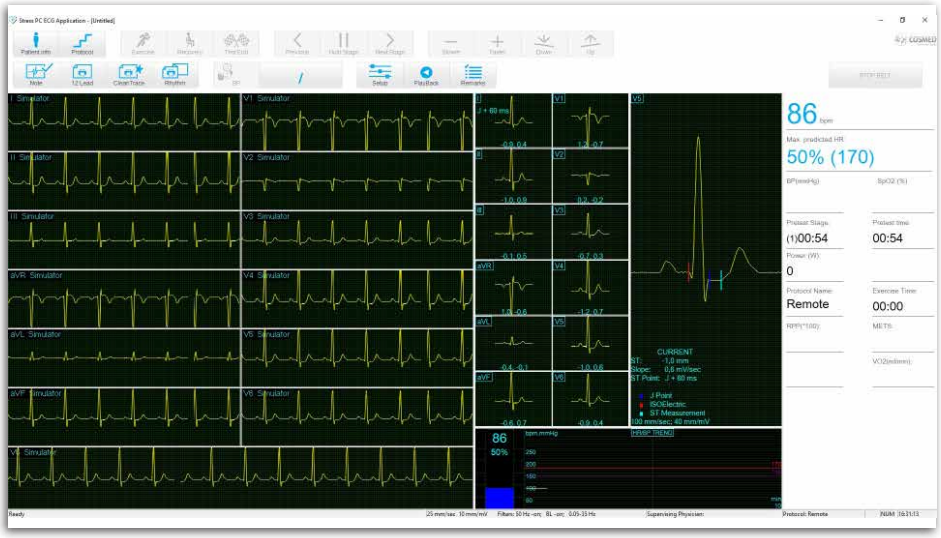
Integrated 12-leads ECGs

Integration with COSMED C12x/T12x diagnostic quality rest and stress **12-lead ECGs**

- Available either in wireless or patient cable configuration
- Full disclosure and scroll back during test
- High resolution ECG processing produces an exceptionally clear on-screen display and allows detailed analysis.
- Reliable analysis of ST segments and minimal arrhythmia changes
- Available with Resting and Exercise ECG interpretation.

The following integrations with other ECG manufacturers are available:

- GE CardioSoft®
- Norav 1200W, 1200HR
- Cardiolex EC Sense™
- Amedtec CardioPart 12



Real-time display of 12-lead waveforms for a synchronous recording of ECG and ergospirometry parameters



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

Options and Accessories

Quark CPET and OMNIA Software can be interfaced with many devices. Data from different analyses are united in a single collector for a complete patient assessment.

- **Mixing chamber.** 7-Liters physical mixing chamber is the ideal solution for highly accurate measurements during exercise in research and sport applications.
- **Ergometers.** Several COSMED and third-party modular ergometers available, including cycle ergometers, arm ergometers, recumbent bikes, reclining ergometers and treadmills. Optional accessories are available for many applications, such as emergency stop button, safety arch, safety harness, handrail crossbar, wheelchair ramp, wheelchair stabilizer.
- **Non- Invasive Blood Pressure monitor.** Suntech® Tango® M2 specifically designed to overcome noise, motion and physical difficulties associated with cardiac stress and exercise testing.
- **SpO2.** Continuous SpO_2 measurement during CPET through Nonin® Xpod oximeter (several probes available).
- **Walk test.** Nonin® WristOx 3150 for walking and titration tests.
- **Transcutaneous blood gas monitors.** SenTec® Digital Monitoring System, Radiometer® TCM5.
- **Cardiac Output.** PhysioFlow® Q-Link™ and PhysioFlow® Enduro™. Portable, battery powered, non-invasive hemodynamic monitor for reliable and repeated cardiac output measurements during exercise.
- **High/Low FiO_2 option.** Exercise gas exchange measurements with enriched gas mixture.
- **Lactate Pro2.** Blood lactate analyzer to determine the time and intensity of individual endurance training.
- **COSMED Aquatrainer®.** Respiratory snorkel for real time gas analysis during swimming.



Mixing Chamber



Tango® blood pressure monitor



Nonin® WristOx 3150 pulse oximeter for walking and titration tests

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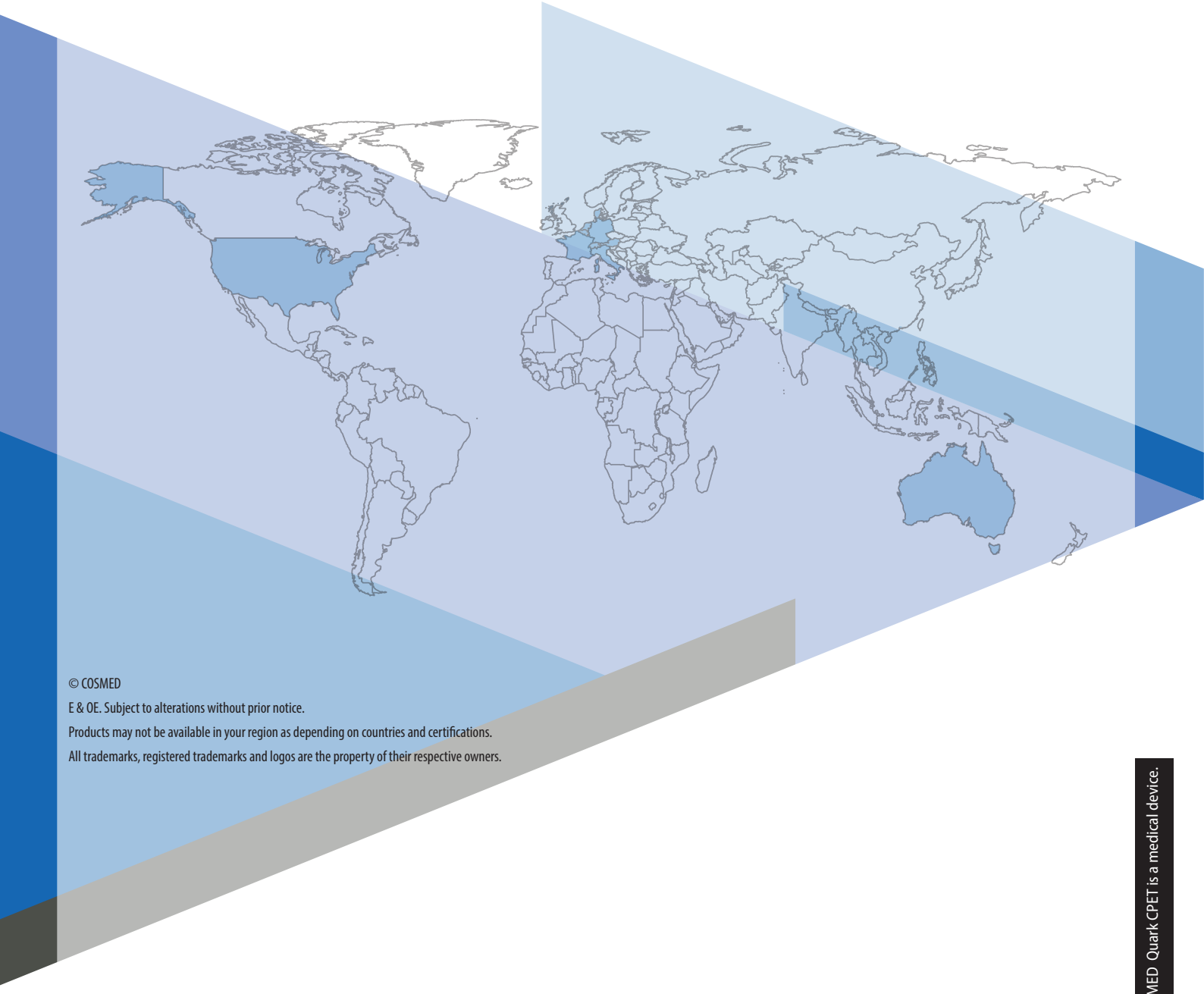
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COSMED Quark CPET is a medical device.

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