

“ *Maximize your
Performance...* ”



Introducing The New Generation of Metabolic Monitor
for VO_2 Max and Resting Energy Expenditure



COSMED
The Metabolic Company

“Reshaping Metabolic Assessment for Peak Performance...”

- ▶ Full Metabolic Testing (VO₂ Max, REE)
- ▶ Gold Standard Technology (VO₂, VCO₂, RQ...)
- ▶ Compact Design, Battery Powered
- ▶ 10" LCD Touch Screen with Intuitive User Interface
- ▶ RS-232, BLE and ANT+ to connect with a wide range of external devices (Ergometers, Power meters...)
- ▶ No Warm-up time and seamless calibration procedures



Discover the future of metabolic testing with the ground-breaking Q-NRG Max, an innovative metabolic system designed by COSMED, a worldwide leader in the development of Research grade and Clinical devices for metabolic and body composition assessment.

Say goodbye to the limitations and frustrations of conventional metabolic carts, as Q-NRG Max redefines the user experience, making metabolic testing easier and more efficient than ever before.

Q-NRG Max is the ultimate solution for assessing VO₂ Max and resting energy with unparalleled precision.

Utilizing **Gold Standard** VO₂ and VCO₂ measurements, this cutting-edge device provides individualized assessments that empower athletes, fitness enthusiasts alike to optimize their performance and reach their goals.

One of the key advantages of Q-NRG Max is its remarkable portability. Its sleek and **Compact Design** allows for effortless transportation to any location, making it the ideal choice for on-site metabolic testing. Whether you're at a training centre, research lab, or private facility, Q-NRG Max ensures accurate measurements are readily available, without compromising on quality or reliability. The system can be operated by both **Battery** power and mains, allowing usage in almost any condition.

Navigating the Q-NRG Max is a breeze, thanks to its **Intuitive** 10" LCD touch screen. All operations are streamlined and trouble-free, enabling users to focus on the assessment process rather than grappling with complex interfaces. From data input to result analysis, Q-NRG Max empowers users with a seamless and efficient testing experience.

What sets Q-NRG Max apart is its **Seamless Integration** with external devices such as treadmills, bikes, smart trainers, and ANT+ devices.

Calibrating the device has never been easier. Prior to each test, the gas sensors undergo an **Automatic Calibration** process lasting a minute. Calibration of the flowmeter is accomplished by connecting the turbine to the blower situated on the device's front panel. The blower generates a known flow, facilitating calibration without necessitating the use of a calibration syringe.

One of the most remarkable aspects of Q-NRG Max is its affordability. Breaking the barriers of cost, this innovative metabolic system is available at less than half the price of typical metabolic carts, making it accessible to a wider range of users. COSMED is committed to ensuring that cutting-edge technology is within reach, enabling more individuals and organizations to benefit from advanced metabolic assessment.

Experience the convenience, accuracy, and affordability that only COSMED can provide. Discover the power of Q-NRG Max today and elevate your metabolic assessment to new heights.

Main Features

Q-NRG Max offers a comprehensive range of Metabolic Testing, covering everything from Resting Energy to VO₂ Max. Q-NRG Max is designed to meet users' needs, by adding any of the available testing modes. VO₂ Max enables to perform exercise testing at Max or Sub-max intensities, while Resting Energy Expenditure can be assessed using the Canopy and Hose modes.

Gas exchange is assessed using the patented technology **Dynamic Mixing Chamber** (DMC), which utilizes O₂ (GFC) and CO₂ (NDIR) sensors. This setup allows for the measurement of gas concentrations every 30 seconds. The **Turbine Flowmeter** is employed to provide readings of airflow and volume. The measurement offered by the flowmeter covers the entire physiological range of 0-300 L/min.

RESTING ENERGY EXPENDITURE

Resting metabolism refers to the amount of energy your body needs to carry out basic functions like breathing, circulating blood, and maintaining body temperature while at rest. This energy is used to fuel the body's vital organs and tissues, and is measured in calories.

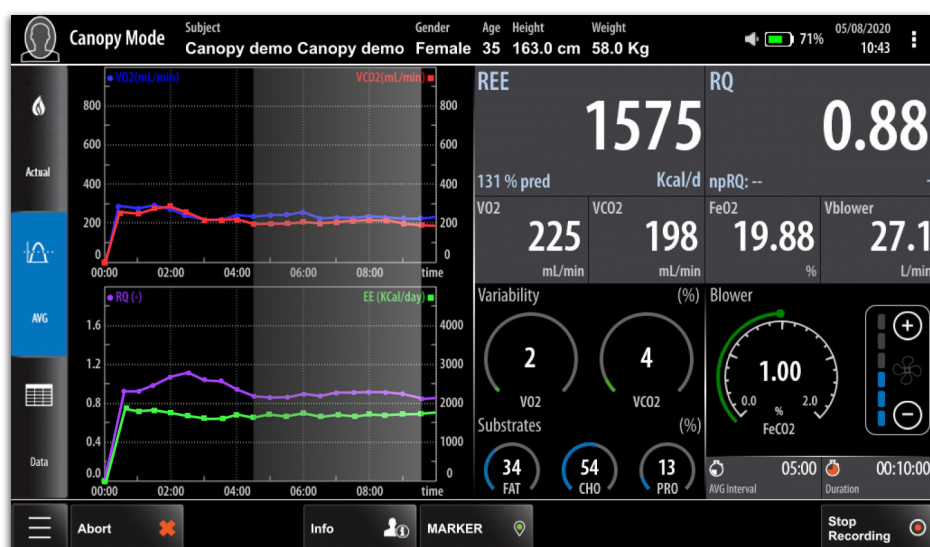
Two different options are available to perform REE measurements with the Q-NRG Max: a canopy hood, the Gold Standard method in both pediatric and adult population, or a Hose with a reusable 2-way valve protected by a filter.

An essential concept is that changes in body weight occur when there is an imbalance between the energy obtained from food consumed and the energy expended by the body to sustain vital functions and engage in physical activity. This **Energy Balance** framework serves as a valuable tool for studying how the body regulates its weight. Q-NRG Max provides a simple but effective tool to calculate Energy Balance and providing individual weight loss/gain programs based on the actual measurement of REE and the estimation of lifestyle and exercise activities.

Q-NRG Max has been extensively validated by a number of publications both in-vitro and in-vivo ⁽¹⁾.

Features	VO ₂ Max	REE Canopy	REE Hose	OMNIA
VO ₂ Max/Sub Max	●			
Resting Energy Expenditure		●	●	
Energy Balance		●	●	
Thresholds	●			
Training Zones	●			
FatMax	●			
Anthropometry	●	●	●	
Data Export	●	●	●	●
Advanced Data Analysis				●
Trends				●
Advanced Reporting				●
ANT+ Connector	○			

● Standard ○ Optional



1 Evaluation of the accuracy and precision of a new generation indirect calorimeter in canopy dilution mode. Delsoglio M, et al. Clin Nutr 2020

The Resting Metabolic Testing dashboard displays charts and main parameters along with QC gauges and a digital knob to adjust canopy blower.

VO₂ MAX

VO₂ Max, or maximal oxygen uptake, is a measure of the body's ability to transport and use oxygen during exercise. It is an important indicator of cardiovascular fitness and overall health. A higher VO₂ Max means that the body is able to deliver more oxygen to the muscles, which in turn allows for greater endurance and performance during physical activity.

With Q-NRG Max you can setup a maximal test in minutes; select the most appropriate protocol available in the list or create a new one. Prepare the subject by selecting the right mask and start collecting data. Q-NRG Max displays charts and parameters in real time, additional information can be entered during testing (RPE, Lactate, etc.).

At the end of a test, the system displays charts and tools to set the key parameters (Peak VO₂ Max, **Thresholds**, FATMAX etc.).

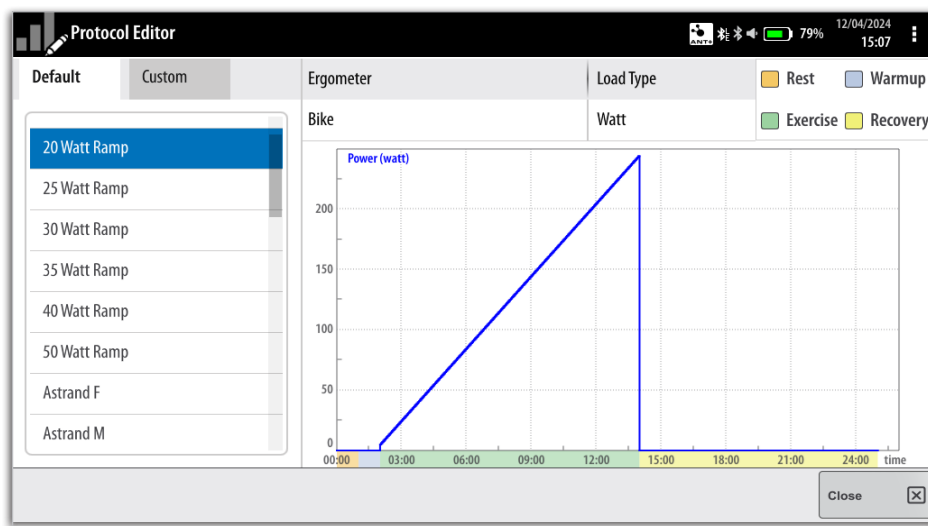
Q-NRG Max provides a comprehensive **Training Zones** management tool that can be customized for exercise recommendations based on metabolic reference parameters such as VO₂ Max, VO₂@VT1, VO₂@VT2, etc.

SUB-MAX VO₂

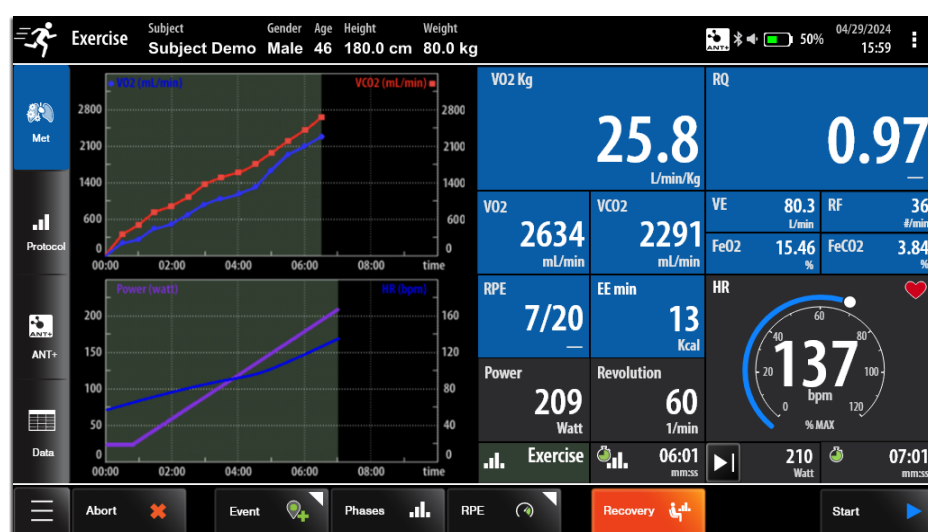
Sub-maximal VO₂ testing refers to assessing an individual's aerobic capacity at sub-maximal levels of exercise intensity. While VO₂ Max testing remains the gold standard for evaluating an individual's maximum aerobic capacity, sub-maximal testing offers practicality, safety, and efficiency in various settings, making it a valuable alternative for assessing aerobic fitness and guiding exercise prescription.

Safety: It involves exercising at a lower intensity, which reduces the risk of over-exertion, injuries, or complications that may arise during intense exercise.

Time efficiency: Sub-maximal testing requires less time compared to VO₂ Max testing as individuals do not need to exercise until exhaustion.



Select your desired protocol from a list of pre-defined ones (Ramps, Bruce, Balke etc.) or create your owns.



Q-NRG Max displays a clear dashboard with all relevant parameter to monitor in real time. Tabs on the left allow users to switch from different dashboards.

	Very Light		Light		Moderate		Vigorous		Maximal	
	VO2Max 0%	VO2Max 37%	VO2Max 37%	VO2Max 45%	VO2Max 45%	VO2Max 63%	VO2Max 63%	VO2Max 90%	VO2Max 90%	VO2Max 100%
HR (bpm)	81	119	119	128	128	147	147	175	175	182
VO2Kg (ml/min/kg)	---	24.3	24.3	29.5	29.5	41.3	41.3	59.0	59.0	65.6
VO2 (ml/min)	---	1823	1823	2213	2213	3098	3098	4425	4425	4920
Estimated Power(Watt)	---	118	118	154	154	234	234	355	355	400
Estimated Speed(Kmh)	---	6.2	6.2	7.8	7.8	11.3	11.3	16.6	16.6	18.6
Race Pace (mm:ss/km)	---	09:36	09:36	07:42	07:42	05:18	05:18	03:36	03:36	03:12
EEh (kcal/h)	---	547	547	664	664	929	929	1328	1328	1476

Training prescription can be set up to 6 zones. Intensities are shown with colors for easy interpretation.

Practicality: For example, when assessing a large group of individuals, such as in a research study or fitness assessment, allowing faster testing of multiple participants.

Accurate Estimation: Sub-maximal testing provides a good estimation of an individual's aerobic fitness level².

ANTHROPOMETRY

Anthropometric measurements provide valuable information about an individual's body composition, including information such as height, weight, body mass index (BMI), waist circumference, and skin-fold thickness. These measurements help assess an individual's unique body composition and provide a baseline for evaluating fitness levels and tracking progress over time. Q-NRG Max is provided with the most common formulas for Body Composition assessment, together with WHR and BMI. This feature will be available in future Firmware releases.

Connectivity

Q-NRG Max is provided with a wide range of protocols to communicate with additional hardware and software.

RS-232. Connect with a wide range of ergometers that can be controlled automatically by standard of user defined protocols.

BLE. Bluetooth Low Energy is a standard communication protocol with Q-NRG Max. HR Monitors (Polar) or additional hardware can be interfaced with Q-NRG Max.

ANT+. It is a standardized platform that allows different devices and applications to communicate and work together. Q-NRG Max can be provided optionally with 5 different ANT+ profiles that enable integration with a number of ergometers, sensors and smart trainers.

Connectivity Matrix	Type	RS-232	BLE	ANT+
COSMED	Treadmills, Bikes	●		
HP COSMOS	Treadmills (all line)	●		
MONARK	Bikes	●		●
Woodway	Treadmills (all line)	●		
LODE	Bikes, Treadmills (all line)	●		
Wattbike	Atom X		●*	●
Smart Trainers	All ANT+ and BLE compatible		●*	●
NONIN	SPO2, Wrist Oxy		●*	
MOXY	NIRS			●
POLAR	HR Monitors		●	
GARMIN	HR Monitors, Smart Trainers			●

Partial list

* Feature available through OMNIA



Results of the test are prompted in a comprehensive way. Calculated VO2 Max is compared with several predicted (ACSM, etc.)

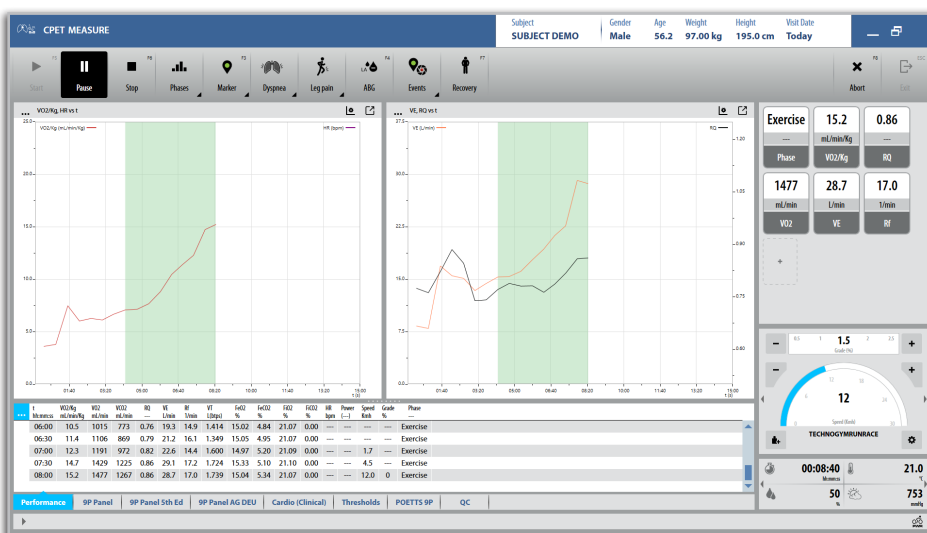
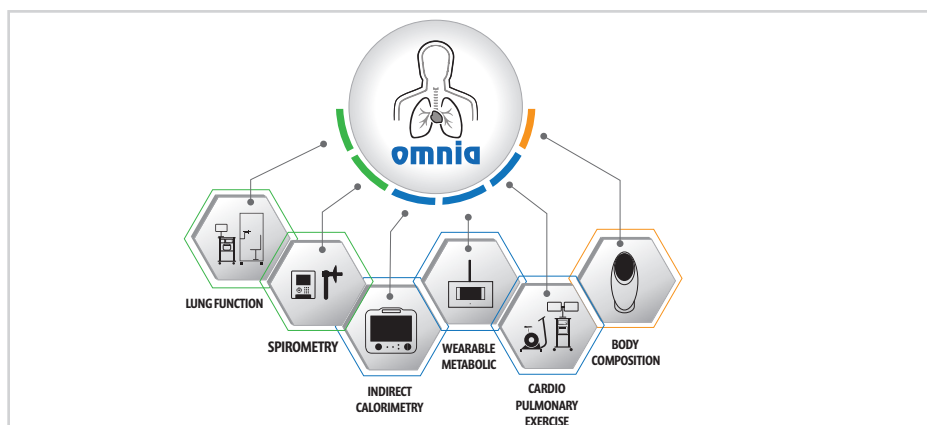


² Lee, J., Bassett et al (2009). Validation Of The Cosmed Fitmate For Predicting Maximal Oxygen Consumption.

OMNIA Software

Q-NRG Max can be optionally provided with **OMNIA**, the software designed to work with the entire COSMED product ecosystem. Thanks to its intuitive interface OMNIA allows users to operate complex testing procedures with minimal training.

- Easy-to-use touch-screen graphic user interface with intuitive work-flow and hierarchy.
- **Download data** stored in the Q-NRG by BLE or USB.
- Whether via USB or Bluetooth, the Q-NRG Max device can be operated and controlled remotely by software. This enables the transformation of the device into a metabolic cart that can be controlled and monitored using PC software.
- Manage and display data and charts with conventional layouts or user defined layouts (9-Panel Plot, POETTS etc.) with OMNIA 'Dashboards'.
- Powerful post test editing provides for data filtering, calculation of **thresholds** (VT1, VT2), VO₂ Max, VE/VCO₂ **slopes**, VO₂/WR, and other parameters required for interpretation.
- **Advanced Steady State** analysis for the examination of the physiological response to exercise at various workloads.
- Advanced **Training zones** to personalize exercise prescription according to metabolic reference parameters including VO₂ Max, VO₂@VT1, VO₂@VT2, VO₂ reserve and HR.
- Integration with NONIN 3150 WristOx2 oximeter (Bluetooth® Low Energy) during standardized, non-metabolic tests such as 6MWT, or Shuttle Walk Tests.
- Custom comments and interpretation with user-definable automatic placeholders.
- Export data in pdf, xml, and xls formats.
- Custom printouts.
- OMNIA is available in both a stand-alone or network version.



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

Options and Accessories

ANT+ MODULE

With this optional module, Q-NRG Max extends ANT+ capabilities up to 5 profiles in addition to standard HR profile.

X1 CART

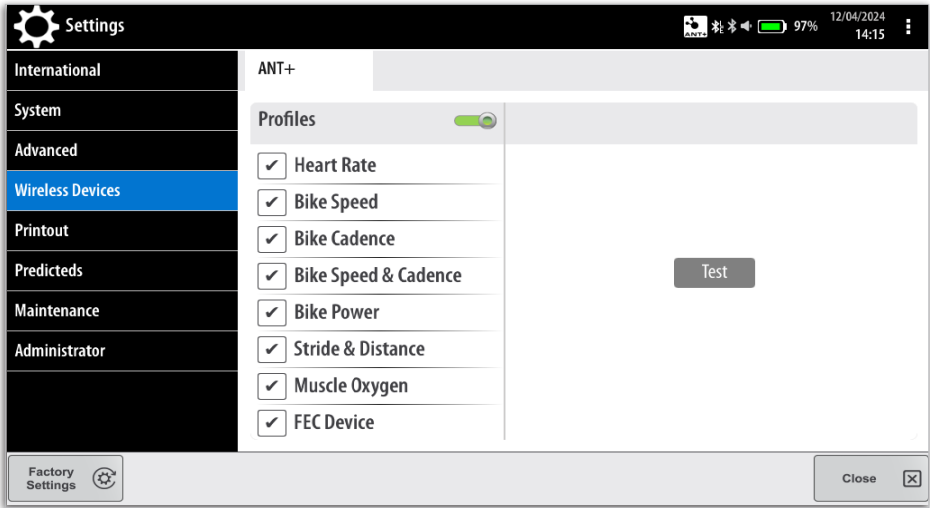
Q-NRG Max can be combined with a modern design, sturdy, functional cart with wheels and a basket, that can accommodate the Q-NRG, and a gas cylinder, if needed.

CALIBRATION KIT

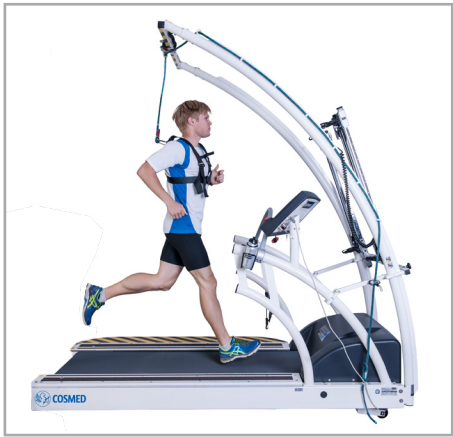
A periodical calibration of the device is required. Gas sensors are calibrated by using a gas cylinder with a certified gas mixture.

ERGOMETERS

COSMED provides a wide range of bikes and treadmills from clinical to high performance that can be combined with Q-NRG Max.



ANT+ PROFILE	
 HR	Heart Rate (standard)
 PWR	Bike Power
 STP	Step Count
 S & C	Bike Speed & Cadence
 FE-C	Fitness Equipment Control
 MO2	Muscle Oxygen





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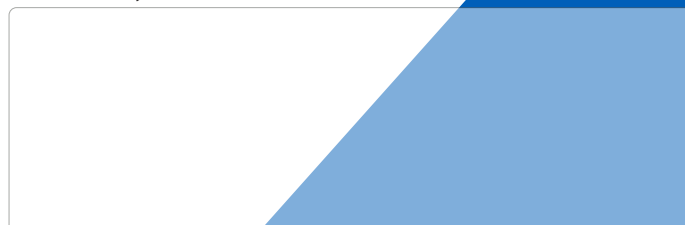


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