

## Forced Oscillations Technique (FOT), the reference method for respiratory mechanics in children



- ▶ Total Respiratory Impedance measurement by Pseudo Random Noise Signal
- ▶ No cooperation required from the patient
- ▶ Ideal for assessing lung function in pre-school children
- ▶ Quick and easy assessment
- ▶ Accurate, reliable and reproducible technique
- ▶ Several predicted available
- ▶ Suitable for Quark PFT, Q-Box and Quark Spiro

The Q-i2m module is a forced oscillation technique (FOT) system for the measurement of the mechanical properties of the respiratory system, total respiratory input impedance ( $Z_{rs}$ ), under tidal breathing conditions.

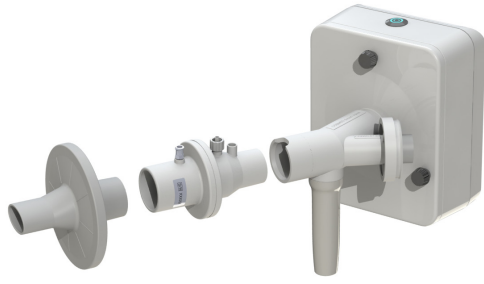
FOT employs small-amplitude pressure oscillations superimposed on the normal breathing and, therefore, has the advantage of not requiring the performance of complex respiratory manoeuvres.

The FOT test is simple and fast; it is performed with the patient breathing normally into the measuring device making the test ideal for uncooperative patients or for those unable to perform forced expiratory manoeuvres, such as children or elderly people.

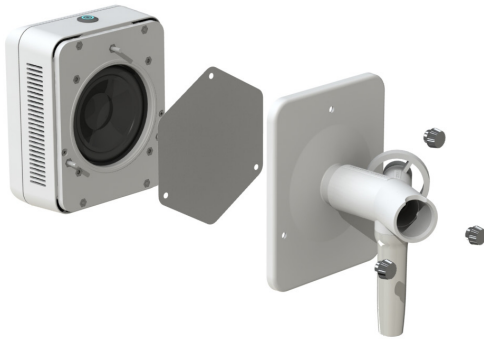
Q-i2m superimposes a random signal to the patient's breath and measure the respiratory apparatus response. The acoustic pulses are sent to the mouth at high frequency in casual sequence (Pseudo Random Noise - PRN).

Q-i2m measures pressure and flow at the subject's mouth while an imperceptible, low intense and high frequency (5-37 Hz) pressure signal is applied. Elaborating flow and pressure signals, Quark i2m provides respiratory impedance measurement ( $Z_{rs}$ ) and its two components: resistance (R) and reactance (X).

Q-i2m module is suitable for COSMED Quark PFT, Q-Box and Quark Spiro, allowing thus the operator to manage, with one single PC program, tests of respiratory mechanics, diffusing lung capacity, static and dynamic lung volumes.



Q-i2m FOT Module with flowmeter connection and patient filter.



Q-i2m FOT module assembly. The internal protection membrane can be easily cleaned or replaced by the user.

## Technical Specifications

Product	Description	REF
Q-i2m, FOT Module	Forced Oscillation Technique (FOT)	C05090-01-11
Standard packaging	Q-i2m unit, Q-i2m flowmeter, calibration unit, test loads, power supply, cord adapter, RS232 serial communication cable.	
<b>Standard Tests</b>		
Forced Oscillation & Technique	Total Respiratory System Impedance (Zrs), Resistance (Rrs) & Reactance (Xrs), Ax, Resonance frequency (fres)	
<b>FOT Technology</b>		
Signal Type	Optimized pseudorandom noise (PRN)	
Signal Frequencies	Between 5 and 37 Hz	
Peak Input Pressure	< 3cmH2O	
Measurement Accuracy	10% or 0.1 cmH2O/L/s	
Testing time	Up to 32 s	
<b>Mouth Pressure Sensor</b>		
Range	±12.7 cmH2O	
Resolution	±0.002 cmH2O	
Linearity	0.05% fs	
<b>Flow Sensor</b>		
Range	0-2 L/s	
Resolution	0.305 mL/s	
Linearity	0.05% fs	
<b>Calibration and Verification</b>		
Calibration Test Load	2 cmH2O/L/s	
Verification Test Load	15 cmH2O/L/s	
<b>Hardware</b>		
Dimensions & Weight	140x160x190 mm / 0,8 kg	
Interface ports	RS232	
Power Supply	Medical grade AC/DC 100-240 VAC, 50-60 Hz, OUT 12Vdc 1.5A	
Environmental conditions of use	Temperature 10-35 °C; Humidity 30-90%; Atmospheric Pressure 700-1060 hPa	
<b>Software</b>		
Languages	OMNIA English, Chinese (Traditional & Simplified), Czech, Danish, Dutch, French, German, Greek, Hebrew (interpretation only), Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Romanian, Russian, Spanish, Swedish, Turkish	
OS Requirements	Windows 8.x (32 bit, 64 bit), Windows 10 (32 bit, 64bit), Windows 11 (64bit)	
<b>Safety &amp; Quality Standards</b>		
MDD (93/42 EEC); MDR (2017/745) pending; EN 60601-1 (safety) / EN 60601-1-2 (EMC)		

## Bibliography:

- G.G. King et al. "Technical standards for respiratory oscillometry" *Eur Respir J* 2020 Feb 27;55(2):1900753
- Beyon et al. "An Official American Thoracic Society/European Respiratory Society Statement: Pulmonary Function Testing in Preschool Children" *Am J Respir Crit Care Med* Vol 175. pp 1304–1345, 2007
- E. Oostveen, et al. "The forced oscillation technique in clinical practice: methodology, recommendations and future developments ERS Task Force on Respiratory Impedance Measurements" *Eur Respir J* 2003; 22: 1026-1041



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