QCM-I Mini

Quartz Crystal Microbalance with Impedance Analysis

The **QCM-I Mini** is a high-sensitivity, mass sensing instrument, which probes the interactions of molecules, polymers and biological assemblies with surfaces, label-free and in real time. The measurement can be used to determine the hydrated mass and rigidity of nm to micron scale layers at the sensor surface, as well as fluid properties.

The measurement principle is based on impedance analysis of a quartz crystal sensor to determine the resonant frequency and bandwidth of the resonant conductance curve; fundamental and overtones. The bandwidth or full width at half maximum (FWHM) is directly correlated to the well-known dissipation (D.)

Main features:

- Measures frequency and FWHM (or dissipation)
- Measures fundamental frequency and overtones up to 80 MHz
- Temperature control from 15°C to 65°C (± 0.02 °C)
- Electrochemical measurement options
- Modular sensor-holder for different sensor sizes
- Second Channel for a variety of External Modules
- Compact Instrument and PC with Windows® 10 Pro

QCM Sensors and Holders

- Quartz crystal sensors with Au, Pt or high quality ITO electrodes and a wide range of coatings. SiO_2, TiO_2, PDMS etc
- The modular sensor-holder can accept 14 mm or 1” diameter quartz crystals and other custom sizes.
- Electrochemical Flow-cell with a Pt-disc counter and leak-free Ag/AgCl reference electrode.
- External sensor-holder modules are available for a range of uses including: Pipette-filling, Immersion, Microscopy, Vacuum, High-pressure, Low-profile, etc.

Diameter 1”

Diameter 14mm

Front Sensing side Back side

Control & Measurement

The **BioSense** software is a fully-functioned application platform, common to the whole analytical instrument range. It provides full control of the **QCM-I Mini** instrument, User accounts, data acquisition and display, storage and management, data processing and export. Addition of the electrochemical module incorporates control of the potentiostat and allows synchronized data acquisition.

Application Areas

- Biosensor Development
- Protein aggregation
- Biofilms / Surface fouling
- Lipid bilayers
- Cells
- Electropolymerisation
- Battery
- Coatings under industrial conditions: Vacuum, Dip, Inkjet printing
- Glove-box processing
- Layer by layer deposition
- and many more…….

Specification of QCM-I Mini

Technical Information	QCM-I Mini
Measurement Channels	2 1st : Temperature controlled 2nd : Connection for a variety of external sensor-holder modules
Frequency Range	1-80 MHz, up to the 13th overtone for a 5 MHz Crystal
Resonance Frequency sensitivity in Liquid	≤ 2 x 10^{-1} Hz
Dissipation Sensitivity in Liquid	≤ 1 x 10^{-7}
Mass Sensitivity in Liquid *	≤ 1 ng/ cm^{-1}
Parameters Recorded for each Overtone	Resonance Curve, Frequency, ΔFrequency, FWHM, ΔFWHM, Q, Dissipation, ΔDissipation, Temperature, etc.
Temperature Control	
Working Temperature	15 °C to 65 °C
Temperature Stability	± 0.02 °C
Temperature control	Set manually or via software
Fluidic and Sample	
Flow Cell Volume	~ 40 µl (typical with Ø14 mm crystals)
Wetted Parts	PTFE, PEEK, SS, VITON (or Kalrez)
Sample Loading	Customer Supplied or Integrated Options
Pump	Customer Supplied, Syringe Pump or Integrated Peristaltic Options
Other Sample Cell Options	Electrochemical flow-cell, Open Cuvette, Immersion, Vacuum, High-pressure, Remote Low-profile, Ellipsometry, Microscopy, Custom...
Physical Dimensions (without the computer)	
Dimensions, weight	180 mm x 175 mm x 68mm, 1.35 Kg
Software	
BioSense	Universal software platform for QCM & EC measurements
Import / Export of data	Export to third party software Excel, JPG, BPM, WMF etc.
PC Control	USB 2.0, Windows® 10
Electrical	
Power Supply	12VDC power supply with universal input voltage (100V-240V AC / 50-60 Hz)

* The Sauerbrey relation is assumed to be valid.

All specifications are subject to change without notice.