Glove-Box QCM-I

Quartz Crystal Microbalance with Impedance Analysis

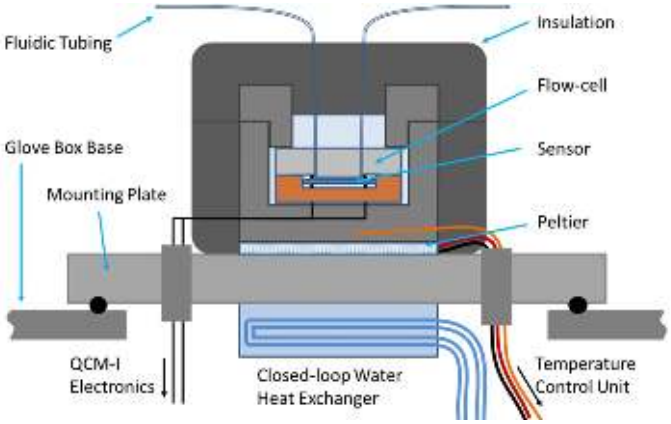
The **Glove-Box QCM-I** takes the high performance **QCM-I** instrument into a format suitable for mounting in a Glove-box or controlled atmosphere chamber and also includes the option of a wider temperature range e.g. between -30 °C and 80 °C.

The **QCM-I** 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 in solution, changes in thin films under a controlled atmosphere, 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 dissipation (D.)

Main features:

- Measures frequency and FWHM (or dissipation) at fundamental frequency and overtones to 80 MHz
- Temperature control 4 to 80°C (± 0.02 °C), with option for wider range e.g. -30 to 80°C



- Electrochemical measurement options
- Mounting Plate configurations for coupling to Glove-Box, including feedthroughs for electrical connections and/or fluidic tubing.
- Electronics, control modules and PC outside glovebox

QCM Sensors and Holders

- Modular sensor holders for a variety of sensor types, metal elecrodes and coatings.
- Electrochemical Flow-cell with a Pt-disc counter and leak-free Ag/AgCl reference electrode.
- External sensor-holder modules are also available for a range of uses

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** 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

- Glove-box Processing
- Battery Development
- Low Temperature Measurement
- Low Humidity Electrochemistry
- Thin Film Characterisation
- Environmental Chamber Operation
- and many more…….

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Specification of Glove-Box QCM-I

Technical Information	Glove-Box QCM-I
Measurement Channels	1 : Temperature controlled
Frequency Range	1-80 MHz, up to the 13th overtone for a 5 MHz Crystal
Measurement Modes	Frequency Scan, Resonance Spectra, QCM(t), QCM(t)-EC, EC
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^{-2}
Parameters Recorded for each Overtone	Resonance Curve, Frequency, ΔFrequency, FWHM, ΔFWHM, Q, Dissipation, ΔDissipation, Temperature, etc.
Temperature Control	
Working Temperature	4 to 80 ^{O}C (wider range options also available e.g. -30 to 80 ^{O}C)
Temperature Stability	± 0.02 ^{O}C
Temperature control	Set via software
Fluidic and Sample	
Flow Cell Volume	~ 40 µl (typical with Ø14 mm crystals)
Wetted Parts	PTFE, PEEK, SS, VITON (or Kalrez), Titanium
Sample Loading	Customer Supplied or Integrated Options
Pump	Integrated Peristaltic Options
Other Sample Cell Options	Electrochemical flow-cell, Open Cuvette, Adaptor for External Sensor Holders: External Immersion, Remote Low-profile, Ellipsometry, Microscopy, Custom...
Physical Dimensions (without the computer)	
Electronics	450mm x 260mm x 185mm; 5.5kg
Mounting Plate	290mm x15mm thick or Custom, various fastening available
QCM Sensor Holder +Insulator	100mm dia. x 80mm heigh, transparent protecting dome optional
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 and 24VDC 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.

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