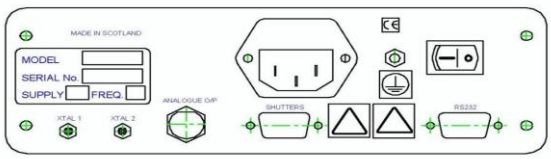
Thin Film Deposition

IL150 Quartz Crystal Film Growth Rate Monitor

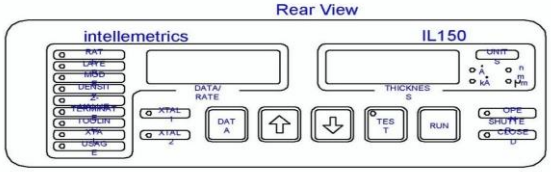
The IL150 thin film deposition monitor measures film thickness and deposition rate by the well-established crystal microbalance technique. Thickness and deposition rate are calculated from user- supplied data on density and acoustic impedance of the film material. Data for up to eight films can be stored in non-volatile memory. Up to two sensor heads may be connected to the instrument at any one time: two alternative modes allow the second crystal to be used either as a backup in the event of failure of the first sensor. or as an alternative primary sensor selectable according to the film being deposited. User specified 'Tooling Factors' compensate for different detector/substrate geometries so that the monitor may be used on a number of different deposition systems.

FEATURES

- **Thickness,Rate of deposition,paramenter and system information displayed on 4digit,7segment,0.7" LED's**
- **Thickness Range : 0.0nm to 999.9 microns**
- **Thickness Resolution : 0.1nm(1Å)**
- **Shutter Closure : Predictive termination using current rate and last thickness measured**
- **Film prarameters recordable in memory**
- **Density : 0.1 to 99.9 gm/cm^3**
- **Acoustic Impedance : 1.0 to 99.9*10^5 gm/cm^2/sec**
- **Terminal Thickness : 0.1 nm to 99.9 microns, autoranging**
- **Size : 260mm X 88mm X 205mm**



Rear View



Front View

*Single Crystal Oscillator

* Double Crystal Oscillator

* The Oscillator is shipped with the Sensor Head-NOT with the IL150

Fig.2

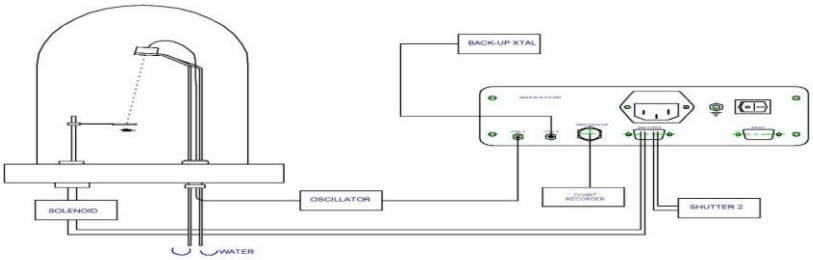


Fig 5 System Layout

Deposition Monitor / Controller

Accessory

Electron 12 Crystal Sensor Head

- 12 Point Sensing Head
- By utilizing an in-vacuum stepper motor system for crystal indexing

Electron 24 Crystal Sensor Head

- 24 Point Sensing Head
- By utilizing an in-vacuum stepper motor system for crystal indexing

Sensor Head with Thermocouple and Feedthrough

- CF 2.75"/ 1" Bolt/ KF40

Micro Coaxial Crystal Head Cable

- Each cable is 30" long
- Maximum of 250°C

RC Quartz Monitor Crystals

- Gold, Aluminium

RC Liquid Monitor Crystals

- 1 inch diameter

Deposition Monitor / Controller

PC-based Film-Thickness Monitor

Divice Parameter

Density	0.10 to 99.99 [g/cm3]
Z-Factor	0.00 to 15.00
Rate Setpoint	0.00 to 9999.99 [Å/s]
Thickness Set Point	0.00 to 9999.99 [KÅ]

Measurement

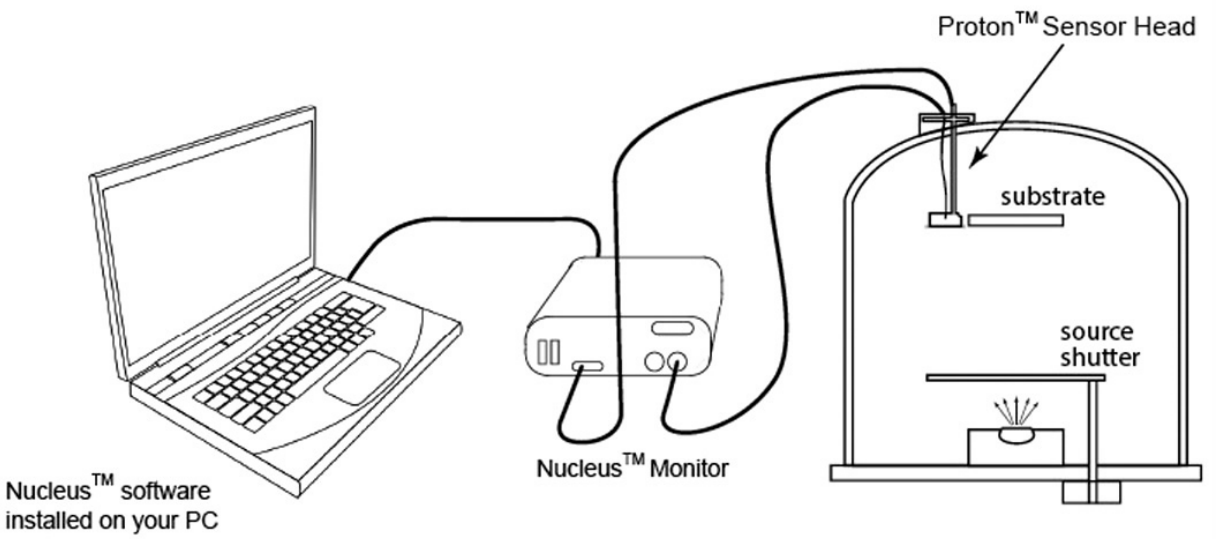
Frequency Resolution	+/-0.002 [Hz]
Display Rate	10×to 1×per second
Crystal Frequency Range	5 or 6 [MHz]

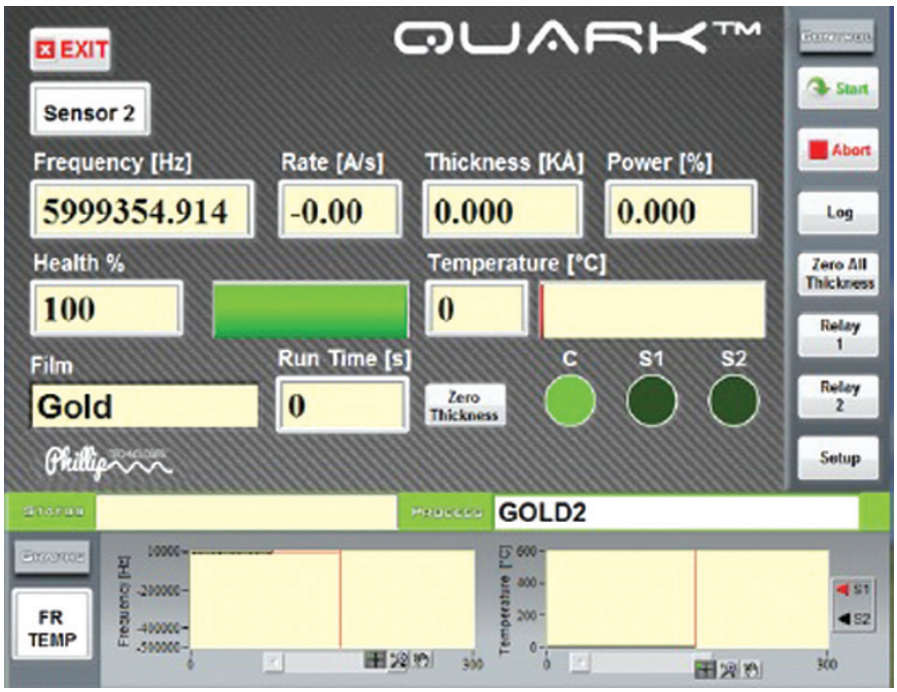
Process Display

Film	Selected Material
Rate	0.00 to 99.9 [Å/s]
Thickness	0.00 to 999.9 [KÅ]
Frequency	-3.00 to 6,500,000 [Hz]
Run Time	Hh/mm/ss
Temperature	0 to 999.9 [℃]
Health	0.00 to 100 [%]

Communications

Factory Set	RS-232 [PC version]





Display

Thickness	Auto ranging : 999 to 9999.9 kA
Rate	Auto ranging : 999 to 9999.9 A
Power	00.00 to 99.99%
Time	0 to 99:59:59 HH:MM:SS
Crystal Health	00 to 99%
Layer Number	0 to 999
Screen	800×480 Full Color Touch Screen

Comm

Standard	RS232
	USB (Process Programming)
Optional	Ethemet
Creating Programs	All settings can be programmed using the touchscreen and embedded keypad. Keyboard can be connected via the USB port. Cactus Prog TM software can be used on a PC to create layers and can be transferred using a USB flash drive.
Capabilities	Unlimited Layer and Process Programs

Analogue Mass Flow Meter / Controller

MASS FLOW CONTROLLER SFECIFICATIONS

MODEL	FULL SCALE N2(slpm)	ACCURACY (% FS)	REPEATABLLITY (%)	RESPONSE TIME(sec)	IN/OUT SIGNAL (Vdc/mA)	SUPPLYPOWER (Vdc)	OPERATING PRESSURE(psia)	OPERATING TEMP(℃)
M3030V M3030A	0.010~30	±1.0	±0.25	<2	0~5 or 4~20	+ 15 or 24	5~1300	0~50
M3050V M3050A	25~50	±1.0	±0.25	<2	0~5 or 4~20	+ 15 or 24	5~1300	0~50
M3100V M3100A	30~100	±1.0	±0.25	<2	0~5 or 4~20	+ 15 or 24	5~1300	0~50
M3300V M3300A	100~300	±1.0	±0.25	<2	0~5 or 4~20	+ 15 or 24	5~1300	0~50
M3500V M3500A	300~1000	±1.0	±0.25	<2	0~5 or 4~20	+ 15 or 24	5~1300	0~50

MASS FLOW METER SFECIFICATIONS

MODEL	FULL SCALE N2(slpm)	ACCURACY (% FS)	REPEATABLLITY (%)	RESPONSE TIME(sec)	IN/OUT SIGNAL (Vdc/mA)	SUPPLYPOWER (Vdc)	OPERATING PRESSURE(psia)	OPERATING TEMP(℃)
M2030V M2030A	0.010~30	±1.0	±0.25	<2	0~5 or 4~20	+ 15 or 24	5~1300	0~50
M2050V M2050A	25~50	±1.0	±0.25	<2	0~5 or 4~20	+ 15 or 24	5~1300	0~50
M2100V M2100A	30~100	±1.0	±0.25	<2	0~5 or 4~20	+ 15 or 24	5~1300	0~50
M2300V M2300A	100~300	±1.0	±0.25	<2	0~5 or 4~20	+ 15 or 24	5~1300	0~50
M2500V M2500A	300~1000	±1.0	±0.25	<2	0~5 or 4~20	+ 15 or 24	5~1300	0~50

Mass Flow Controllers

Features

- Accuracy at Low Flow
- Fast Response
- No Leakage
- Connection Compactible
- High stable removeable sensor
- Corrosion resistance Value
- Excellent Linerity
- Excellent long term Stability
- Modular design
- Wide pressure Range available
- Compact Flow Control System

Model M3030V

Mass Flow Controller

Specifications

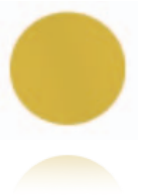
Model	M3030V	M3030A
Range(N2)	10 slpm~30 slpm	
Response Time	≤2 sec (option : ≤1 sec)	
Accuracy	±1% FS	
Repeatability	±0.25% FS	
In/out signal	0~5Vdc	0~5Vdc or 4~20mA
Supply Power	+15~+28Vdc, 350mA	
Max operating pressure	≦90 bar	
Max operating Temp.	0~50 ℃	
Leak rate	1×10^{-9}atm · cc/sec	
Control Range	2~100% for max range	

Model M3030A

Mass Flow Controller

Phillip Technologies QCM Guide

The #1 Thin-Film Vacuum Coating Source

	AT Crystals 20-100 °C	RC Crystals 20-300 °C
Inficon™ Type 	—Aluminum—Gold—Silver Frequency: 5.975-5.993 MHz Resistance: <15 Ohms Finish: 7 microns RMS Diameter: 14mm Contour: Plano-Convex Cut: AT +/-2′	Aluminum and Gold Frequency: 5.975-5.993 MHz Resistance: <40 Ohms Finish: 7 microns RMS Diameter: 14mm Contour: Plano-Convex Cut: RC +/-1′
Balzers™ 	—Aluminum—Gold—Silver Frequency: 4.960-4.975 MHz Resistance: <15 Ohms Finish: 7 microns RMS Diameter: 14mm Contour: Plano-Convex Cut: AT +/-2′	Aluminum and Gold Frequency: 4.960-4.975 MHz Resistance: <40 Ohms Finish: 7 microns RMS Diameter: 14mm Contour: Plano-Convex Cut: RC +/-1′
Ulvac™ Type 	—Aluminum—Gold—Silver Frequency: 4.990-5.900 MHz Resistance: <15 Ohms Finish: 7 microns RMS Diameter: 12.5mm Contour: Plano-Convex Cut: AT +/-2′	Aluminum and Gold Frequency: 4.990-5.900 MHz Resistance: <40 Ohms Finish: 7 microns RMS Diameter: 12.5mm Contour: Plano-Convex Cut: RC +/-1′

Gold is best suited for low stress coatings, metallization, and organic coatings
Silver is best suited for medium stress coatings and low stress optical films
Alloy is best suited for high stress coatings and dielectrics, refractory metals, CIGS and OLED
Nickel is best suited for high temperature applications of all films

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