

SolarPaq

...profiling the high temperature vacuum coating process in manufacture of CiGs photovoltaic panels

BUILDING ON THE BEST



The Datapaq® SolarPaq system has been designed specifically to monitor the temperature of the glass substrate as it passes through the vacuum coating process. The profiling system passes through the multichamber process measuring the temperature profile from up to 4 positions on the glass; even with the plasma activated. This feature combined with the unique reflective plate thermal barrier enables the system to be used without disrupting normal production flow.

Monitoring this deposition process is key to optimizing it. Due to the nature of the processing equipment, this process was very difficult and costly to measure. Now for the first time there is a system that can pass through the process and obtain full product temperature profiles. The thermal barrier is based on multiple reflective radiation shields combined with a central heat sink. This combination ensures the logger is both kept cool in the process and also, crucially, at the end of the process when the vacuum is released. The use of reflective shields eliminates outgassing ensuring minimal disruption when profiling.

A COMPLETE SOLUTION



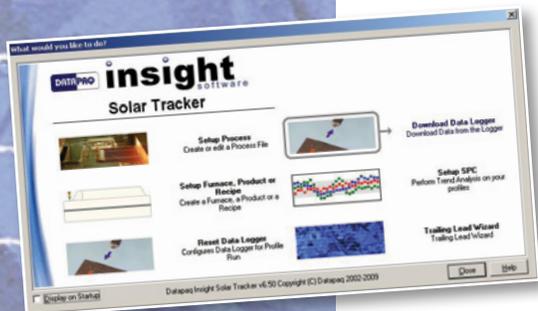
The low height logger and thermal barrier can be located directly in the glass carrier. The barrier is only 35 mm (1.37 in) high and 105 mm (4.15 in) wide so it can be located in a small pocket within the carrier. The system then passes through the entire process measuring the glass temperature profile as it develops. When the system exits the datalogger can be retrieved from the thermal barrier and the profile information downloaded and analyzed. The system has been specifically designed to withstand the harsh environments within the plasma chambers and can be used repeatedly for both process set-up and regular monitoring. The external surfaces of the thermal barrier are coated with a high temperature ceramic coating that ensures the surface will not darken with use and hence guarantees continued consistent thermal performance.

BENEFITS

- Profiles glass temperature with the plasma energized, for accurate reporting of process conditions during production
- Small size and no outgassing enable it to pass through the process with minimal disruption to production flow.
- Provide accurate, repeatable results for optimizing the process
- Saves time and money when setting-up or fine tuning the process

SOLAR INSIGHT™ SOFTWARE

This all new software has been designed specifically for use within the photovoltaic (PV) solar industry and contains many process-specific analysis displays. Wizards guide the users step-by-step to quickly obtain the data and analysis of the required results. This ensures that both experienced and novice users can obtain maximum benefit in the shortest possible time.



TECHNICAL SPECIFICATIONS

THERMAL BARRIER

VB2040 High temperature vacuum barrier

A 35mm high reflective plate thermal barrier designed specifically for use in CIGs coating process. It features an external ceramic coating and internal steel heat-sink. It is designed for use with the DQ1840 datalogger. We recommend the use of mineral insulated thermocouples in processes where the thermocouples are directly exposed to the plasma, this ensures correct operation of the system even with the coating plasma energized.



Dimensions (H x W x L) 35 x 105 x 386 mm (1.37 x 4.15 x 15.2 in)

Weight 6 kg (13.2 lb)

Material All stainless steel construction with exterior high temperature ceramic coating.

Thermal Duration

Temperature	300°C (572°F)	400°C (752°F)	600°C (1112°F)
Duration (mins)	150	100	50

Note: these values are guide lines of expected performance in high vacuum applications please contact Datapaq with exact process details if known.

DATA LOGGER

The Datapaq Q18 data logger features rugged reliable and accurate data acquisition circuits, clear status indicators and an intelligent battery management system. It is housed inside a machined steel case that provides exceptional thermal and mechanical protection.



Model number DQ1840

Number of channels 4

Sampling interval 0.05 seconds to 10 minutes

Accuracy ±0.5°C (±0.9°F)

Resolution 0.1°C (0.2°F)

Maximum internal operating temperature 85°C (185°F)

Temperature range -150°C to 1370°C (-238°F to 2498°F)

Memory 32,000 readings per channel (4 channels active)

Data collection start Start/stop buttons, time or temperature trigger

Battery NiMH rechargeable with fast charge

Thermocouples Type K

RECOMMENDED THERMOCOUPLES

PA0710 1.0m (3.3 ft) length

PA0711 2.0m (6.6 ft) length

PA0712 3.0m (9.8 ft) length

Mineral insulated thermocouples, type K, Microbell™ sheath. Fitted with miniature high temperature plug for direct connection into data logger.

Diameter: 1.6 mm (0.06 in)
Operating Range: 0 to 1250°C (32 to 2282°F)

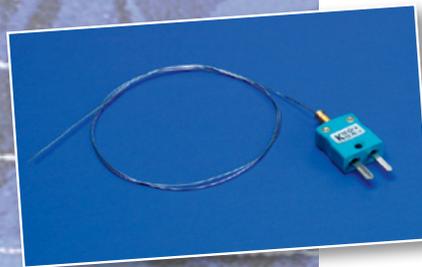
PA0920 1.0m (3.3 ft) length

PA0921 2.0m (6.6 ft) length

PA0922 3.0m (9.8 ft) length

Mineral insulated thermocouples, type K, Inconel™ sheath. Terminated with miniature high temperature plastic plug for direct connection to the datalogger.

Diameter: 1.0 mm (0.04 in)
Operating Range: 0 to 1000°C (32 to 1832°F)



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