

## Experion MX Basis Weight Measurement



Experion MX will help improve your business performance in today's challenging economic environment. This fully integrated quality control and process knowledge system provides superior visibility into the papermaking process while it simplifies your operational efforts and is easy and cost effective to maintain and service. Improve paper quality, reduce raw material, energy, services and maintenance costs, and increase production efficiency with a package of solutions that provides the lowest total lifecycle cost available – Experion MX.

### Basis Weight Measurement

The Q4201 series of Basis Weight Measurements are based on the principle of absorption of beta particles from a Krypton 85 source to measure the mass per unit area of a moving web. With accurate basis weight measurement, your business performance will be enhanced by increasing product quality, minimizing energy consumption and increasing production efficiency. The sensor's high beta flux levels are achieved using high-efficiency source and receiver designs to provide superior repeatability for low-noise measurement. These features, along with fast-response electronics and complete compensation for environmental sources of error, provide excellent accuracy for machine-direction (MD) and cross-direction (CD) control and for accurate reporting of product quality and productivity. All this provides superior visibility into the papermaking process.



### Features & Benefits

- Source body and detector positioning have been optimized to minimize source and detector separation for maximum sensor efficiency, providing the repeatability required for superior MD and CD control performance at high scanning speeds.
- Shutterless, proprietary air-actuated rotating source body with fail-safe design precisely positions the source for reliable operation, and ensures safety for operators and service personnel.
- Universal sensor calibration algorithm ("UniCal") enables measurement of all grades on a process using a single calibration, for greater measurement accuracy and easier addition of new grades.
- Optional dynamic Z-axis correction improves accuracy by measuring and correcting for variations in air column height between the source and receiver caused by any residual vertical scanner misalignment.
- Small measurement spot size (<15 mm), one millisecond sensor response, and 4 KHz high speed data collection rate provide precise, high-resolution profile and edge-of-sheet measurement, even at fast scan rates of up to 1,200 mm/s.
- Air gap temperature correction eliminates error resulting from variations in air density between the source and receiver caused by ambient air temperature changes over time and across the paper machine width.
- Full-range Standardization eliminates errors resulting from dirt buildup on sensor windows.
- Factory calibration on customer samples is easily verified after sensor installation using sensor status and

verification video displays accessible from any operator station.

### Description

The Q4201 Basis Weight Measurement consists of a source body with Krypton 85 source, an ionization chamber receiver and signal processing electronics. Honeywell's universal calibration algorithm ("UniCal") is an integral component of the measurement, as are dynamic techniques to eliminate environmental sources of error. The sensor's rotating source body positions the source 40 percent closer to the sheet than conventional, shuttered source designs, to maximize beta flux to the sheet and minimize source air column height. Honeywell's high flux geometry positions the receiver 80 percent closer to the sheet than conventional designs, enhancing signal strength at the receiver and minimizing the receiver air column height. These features increase the flux to the receiver by 2.5 to 20 times over conventional sensor designs, significantly improving sensor repeatability. The result is higher accuracy, particularly with high speed data collection, as required for high speed scanning with high-resolution profile databoxes and narrow CD control zones. The high-energy beta emission of the 85Kr source, coupled with beam-shaping technology makes possible three versions of the Q4201 85Kr Basis Weight Measurement, to obtain the best performance for specific applications:

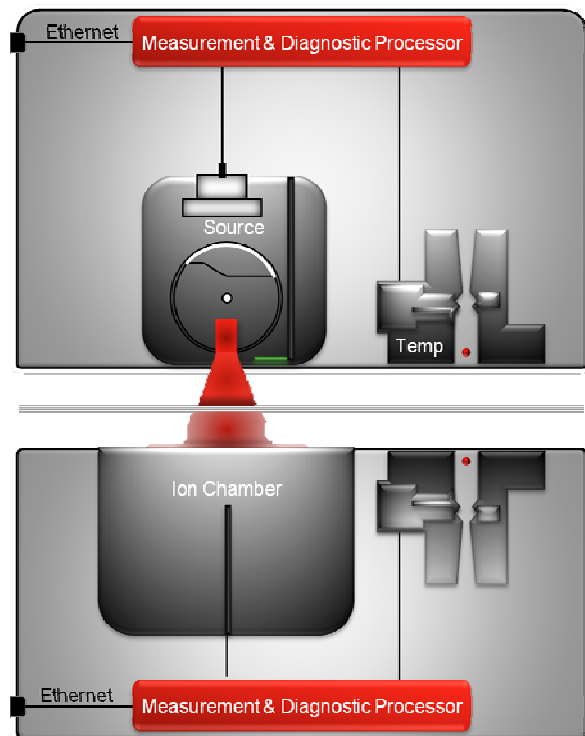
- Model Q4201-62 delivers five times greater flux than conventional designs with improved sensitivity for high flux, low-noise measurement on low-ash, heavy-weight paper, such as linerboard.
- Model Q4201-63 provides insensitivity to sheet ash and sheet flutter for superior performance on a broad product range.
- Model Q4201-64 provides superior ash insensitivity for accurate basis weight measurement on heavily filled or coated papers.

### Full-range Standardization

Sensor standardization occurs automatically, at an interval defined for each system, correcting for source decay, electrical drift, dirt buildup on sensor windows, and changes in air temperature and barometric pressure. Honeywell's full-range standardization technique does all of this and automatically redefines the calibration across the sensor's complete operating range from air mass to infinite mass.

### Three-Zone Air Temperature Correction

To prevent errors resulting from changes in air temperature (air density) during scanning, the measurement algorithm corrects the basis weight measurement using signals from fast-response air temperature sensors. Air temperature in the sheet gap above and below the sheet are monitored using air gap temperature sensors located in the upper and lower sensor enclosure at the sensor windows. Internal air column temperature between the source and the source window is also monitored. During sensor standardization, temperature-controlled air wipes purge the sheet gap with heated air to match the on-sheet air temperature, to minimize the air temperature correction required while scanning. During scanning, the positive pressure and flow of the air wipes combat dirt and contaminant buildup on the sensor windows, and prevent moisture condensation in the sheet gap.



Shows unique rotating Krypton 85 source capsule and minimal distance between source and receiver

### Dynamic Z-axis Correction

Errors resulting from changes in the height of the air column between the source and receiver enclosures are eliminated by an optional continuous, on-line Z-axis (vertical) measurement and correction at each high-resolution profile measurement zone. This technique ensures accurate basis weight measurement at each profile control zone, under all conditions in the dynamic production environment.

## Scanning Profile Measurement Resolution

The Basis Weight Measurement uses a small, highly concentrated measurement spot diameter of 15 mm for high profile resolution. The combination of this small measurement area, the sensor's one millisecond response, and high speed

data collection & signal processing provides precision profile resolution and accurate full sheet measurement, including the sheet-edges, even when scanning at speeds of up to 1,200 mm/s. These advantages are achieved without compromising fast scanning for fast-response profile measurement

## Specifications: Experion MX Basis Weight Measurement - Model Q4201

Category	Model Q4201-62	Model Q4201-63	Model Q4201-64
Sheet gap:	10 mm		
Basis weight range: (Grams / sq. meter)	127-800 g/m <sup>2</sup>	10-1000 g/m <sup>2</sup>	10-1000 g/m <sup>2</sup>
Sheet ash:	<5%	2-20%	>20%
Accuracy, 2 $\sigma$ , 16 sec. integration:	$\pm 0.25\%$ of reading, or 0.1 g/m <sup>2</sup> , whichever is greater.		
Dynamic Correlation, 2 $\sigma$ :	$\pm 0.25\%$ of reading or 0.1 g/m <sup>2</sup> , using the roll check method, whichever is greater		
Repeatability, 2 $\sigma$ , on internal standard, 16 sec. integration:	$\pm 0.05\%$ of reading		
Dynamic Repeatability (Profile Stability), Unfiltered, 2 $\sigma$	For 250 msec. Dwell Time in Slice: $\pm 0.6\%$ of reading		
Measurement Spot Diameter:	15 mm		
Resolution:	Better than 0.01 g/m <sup>2</sup>		
Sensor Response Time:	1 millisecond (time constant) to see 63% of a step change in the process		
Sensor Frequency Response, -3dB:	160 Hz		
Standardization:	Automatic, at interval that is selectable for each system.		
Environment:	(See specification for sensor enclosure)		

## More Information

For more information on Experion MX Basis Weight Sensor, visit [www.honeywell.com/ps](http://www.honeywell.com/ps) or contact your Honeywell account manager.

## Automation & Control Solutions

Process Solutions

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