Product Information Note

Honeywell

Experion MX Caliper Measurement



Experion MX will help improve your business performance in today's challenging economic environment. TTThis 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.

Caliper

Caliper Measurements operate on the principle of magnetic reluctance to measure paper thickness. The distance between the sensor elements follows the sheet thickness, providing a direct measurement of paper caliper.

Reliable Caliper Measurement is one of the most important steps to optimize product quality and runnability for many grades of paper. Honeywell's Caliper measurement has a proven record of results on virtually all paper grades with closed loop cross-direction caliper control. The result is improved paper quality and production efficiency.

Laboratory measurement of paper caliper is defined by TAPPI specification T 411 which subjects the paper sample to a high pressure to simulate converting processes. This pressure also helps achieve a trustworthy measurement in the lab, but it is not suitable for use for on-line.



Honeywell's Caliper Sensor provides a reliable and repeatable measurement with a light contact while the paper is running, with unique design features to overcome sheet flutter and machine speed effects. This assures optimum, runnability, and sensor robustness with correlation with the lab.

Features and Benefits

- Sensor support arm uses gimbaled joints and chamfered edges for complete freedom of movement, enabling the sensor to follow the exact variations in sheet thickness despite flutter or edge curl.
- Hard, smooth, wear-resistant contacting elements provide long life and excellent dimensional stability for accurate measurement.
- Small contact areas, slight pressure and low-mass sensing elements provide insensitivity to surface roughness, sheet flutter and web speed – allowing the sensor to follow the web's natural contours precisely and quickly.
- Positive sensor element contact ensures excellent correlation to TAPPI T 411 standard.
- Small measurement spot size, fast response and unique sensor signal processing resolve narrow streaks and facilitate measurement to the sheet edge for precise caliper profile control.
- Broad measurement range permits on-line caliper measurement on grades ranging from lightweight papers to heavy board.
- Automatic standardization compensates for the effects of foreign material buildup on the sensor contacts

 With Q4000 series scanners having EDAQ sensor interface, bellows pressure can be monitored and controlled remotely, enabling new diagnostics with gradedependent pressure setup.

Description

The Caliper Sensor has an upper and lower contact, and slides gently across a moving sheet to continuously measure caliper. Changes in web thickness alter the separation of the sensor elements. The upper measurement elements are machined from sapphire, one of the hardest natural substances. The lower measurement element is machined from high-density ferrite. These elements, which contact the top and bottom sides of the moving sheet, are extremely resistant to wear and provide exceptional dimensional stability for accurate measurement.

The sensor elements have a small contact area and very low mass. Each contact is fixed onto the trailing end of a gimbaled stainless steel ski to ensure precise alignment of upper and lower contacts under all conditions. Air pressure to the polymer bellows holds the elements lightly in contact with the sheet. Without breaking or marking the sheet, this technique gives excellent correlation to the standard.



Cross machine Direction Viewed from Reel

Bellows in column shape has the best flexibility to match sheet flutter shapes while scanning.



The sensor calibration extrapolates the measurement at this slight pressure to lab measurements.

With the Experion MX Q4000 scanner, sensors are linked to the system server via intelligent EDAQ modules (Ethernet Data AcQuisition) which provide on-board processing, two-way communications, and advanced diagnostics. For the Caliper sensor with EDAQ, bellows pressure is monitored as a diagnostic test, and the pressure level can be remotely controlled to provide grade-dependent settings.

Measurements of caliper, bulk, or density are displayed for the operator, and cross-direction profiles are used as an aid in manual reel building or automatic control of cross-direction caliper.

Model Q4293 is a proven round-button design, with a large range of application combinations. It is suited for use from boards to fine paper, in coated and uncoated applications.

Model Q4290 has a uniquely designed aerofoil (UniFoil) adapted for use with light weight sheets. It features a specially designed aerodynamic contact surface that counters the lifting force of the moving sheet's boundary air layer to provide uniform contact pressure at all process speeds. Ideal for lightweight high-speed machines (e.g. newsprint) and processes with varying process speed (e.g. supercalenders).

The aerodynamic foil in Model Q4290 induces a partial vacuum between the sensing elements and the sheet, allowing the sensor to operate at a very low contact pressure, minimizing the risk of sheet marking or damage.



Specification

Category	Model Q4290 – UniFoil	Model Q4293 – Round Button
Measurement range:	20 to 1270 micrometers (0.8 to 50 mils)	25 to 1270 micrometers (1 to 50 mils)
Repeatability, 2σ	\pm 0.25 percent of reading or 0.25 micrometer (0.01 mil), whichever is greater.	
Accuracy, 2σ	1 percent of reading or 1.0 micrometers (0.04 mil), whichever is greater.	1 percent of reading or 2.5 micrometers (0.10 mil), whichever is greater.
Dynamic Correlation, 2σ:	2 percent or reading or 2.0 micrometers (0.08 mil), whichever is greater. (Assumes proper test procedures and well-calibrated and maintained test equipment are used.	2 percent or reading or 2.5 micrometers (0.10 mil), whichever is greater. (Assumes proper test procedures and well-calibrated and maintained test equipment are used.
Measurement area, CD	19 millimeters (0.75 inch)	16 millimeters (0.625 inch)
Sensor Response Time:	1 millisecond (time constant) to see 63% of a step change in the process	
Maximum ambient temperature	 100°C (212°F) external temperature, if sensor is mounted in a temperature-controlled enclosure. 65°C (150°) in ambient-temperature outboard enclosure. 	

More Information

For more information on Experion MX, visit <u>www.honeywell.com/ps</u> or contact your Honeywell account manager or field service leader.

Automation & Control Solutions

Process Solutions Honeywell

1250 West Sam Houston Parkway South Houston, TX 77042

Lovelace Road, Southern Industrial Estate Bracknell, Berkshire, England RG12 8WD

Shanghai City Centre, 100 Junyi Road Shanghai, China 20051 www.honeywell.com/ps

PN-11-13-ENG May 2011 © 2011 Honeywell International Inc.

