

Product Information Note

MXIR Transmission Infrared Moisture Measurement, Model Q4405-50 Opacity Measurement, Model Q4240-50



**Excellent scanning moisture measurement. Easy to use, maintain and service.
Lowest cost of ownership.**

MXIR Transmission Infrared Moisture Measurement

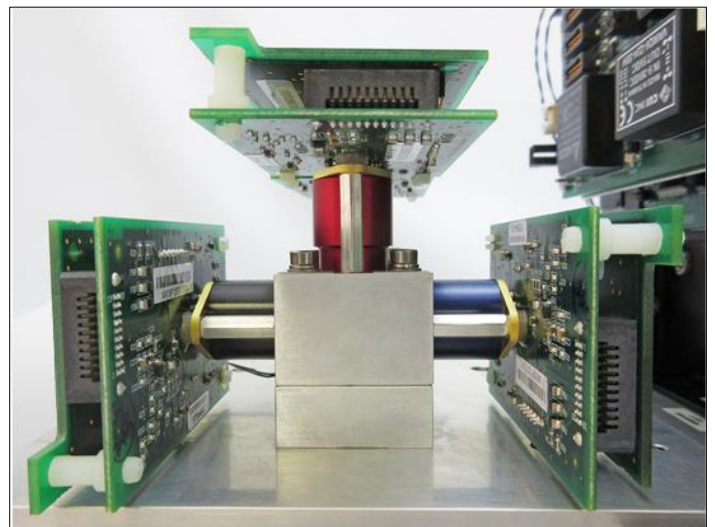
MXIR model Q4405-50 provides scanning transmission measurement of infrared energy absorption of water and other sheet properties to report moisture content for paper grades ranging from lightweight tissue to heavy board. Based on an ingenious optical design, developed by Honeywell and proven in thousands of installations, MXIR leverages state-of-the-art measurement technologies with the signal processing and communications power of the Experion MX Quality Control System to deliver a new higher level of moisture measurement excellence.

Accurate Measurement for Superior MD Control Results

MXIR's elegant design provides significantly higher sensitivity to moisture than other devices, yet exhibits inherent insensitivity to measurement error that can result from variations in basis weight, ash content, fiber furnish, refining, coat weight, passline, and moisture stratification. Papermakers can have confidence in MXIR measurement accuracy to perform faster startups and grade changes, utilize multivariable MD and CD controls, and realize tangible economic results by shifting targets closer to quality limits to reduce raw material and energy costs, and, in some cases, by increasing production rates.

Response, Repeatability and Resolution for Superior CD Control Results

Fast scanning is the strategy that most quickly and clearly separates MD and CD variability. MXIR delivers the fast response, small measurement spot, and high repeatability to support the industry's fastest scanning and finest profile resolution. In conjunction with Experion MX QCS fast scanning, at up to 1.2 meters/sec (47 in/sec), with profile resolution as fine as 2 mm (0.08 in), MXIR resolves moisture profile changes more quickly than other scanning schemes. This promotes responsive and effective CD control to reduce start-up, grade-change, and



Offset receiver stack, including beam splitter, center, and, clockwise from left, reference, cellulose and water detectors

process-upset recovery times, enabling incremental target shifts to reduce costs, and, in some cases, enabling increased production rates.

Description

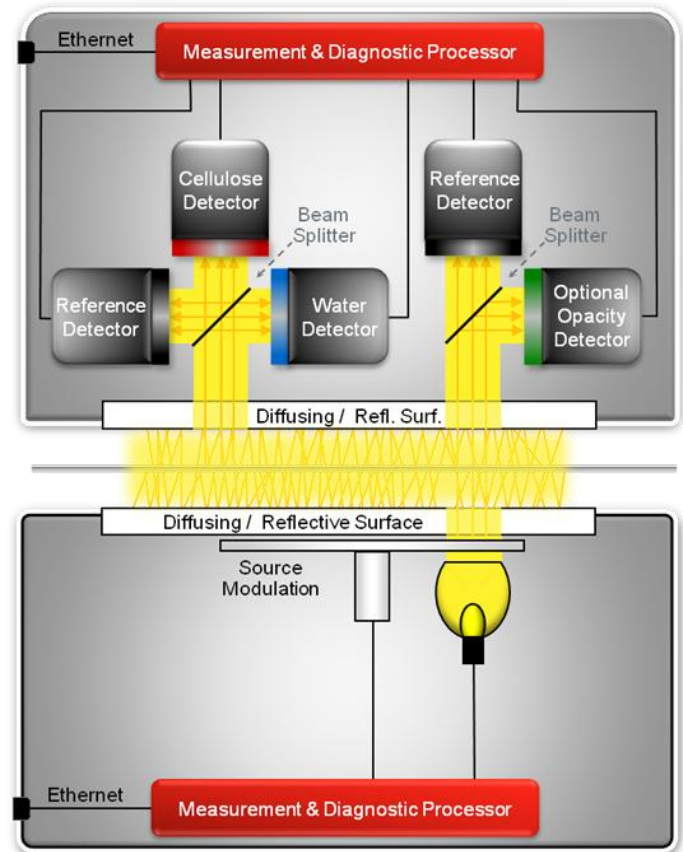
MXIR's source lamp emits broadband infrared and visible energy into the sheet gap, where it is widely scattered and reflected between diffuse-reflecting quartz / PTFE plates, flush-mounted in the sensor enclosures on both sides of the sheet gap. These INFRAND optics (named for the INFinite, RANDom source-energy scattering that they create) include a 50 mm machine-direction offset between the source and detector ports. This optical arrangement forces the source energy to make numerous passes through the sheet before entering the receiver, resulting in increased absorption that significantly increases MXIR's sensitivity to moisture.

In the receiver module, beam splitters distribute the energy entering the receiver port among multiple filter/detector pairs.

This highly efficient arrangement, termed Wavelength-Division Multiplexing, enables MXIR to support up to six filter/detector channels, for moisture measurement, with optional additional measurements of opacity, dry weight, direct percent moisture, and/or synthetic polymers.

Features / Benefits (*new capability in MXIR)

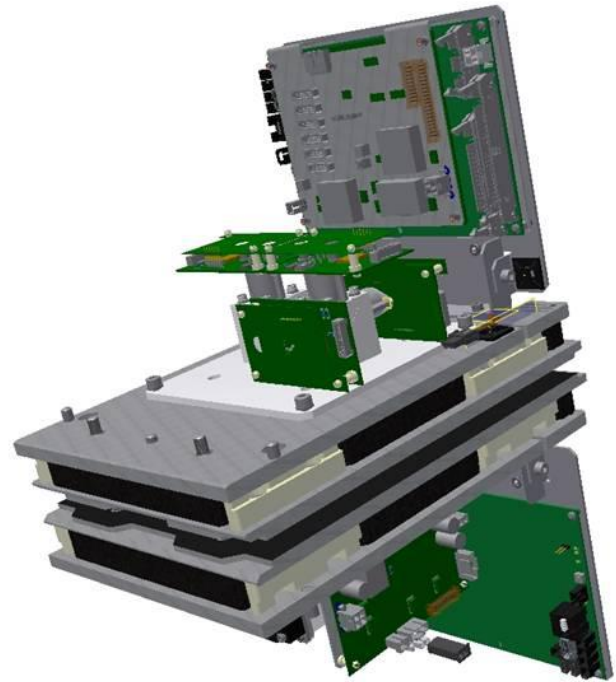
- Factory calibration, on paper samples from the target process, enables papermakers to have complete confidence in the accuracy of MXIR's moisture measurement from the first scan.
- Easy verification of accuracy and support for new grades result from:
 - A newly developed, intuitive moisture measurement algorithm* that incorporates easy-to-comprehend, additive correction terms;*
 - Simplified Experion MX-resident calibration displays,* including step-by-step procedures.*
- Innovative sensor design* expands application to grades ranging from lightweight tissue to heavy board (0 to 700 g/m² [0 to 143 #/1000ft²] on clean furnishes).
- High-frequency 2kHz source modulation:*
 - Maximizes signal while eliminating noise from ambient infrared energy sources, for unmatched signal-to-noise performance;*
 - Provides one millisecond measurement response,* three to ten times faster* than conventional designs.
- Extended indium gallium arsenide (InGaAs) detectors,* integrated with two-stage, solid-state temperature controls, provide extremely fast response and highly stable performance.
- Experion MX data-acquisition and signal-processing strategy reads each detector at 4000Hz, integrates all samples and computes a unique moisture measurement for each high-resolution profile zone, producing accurate, low-noise measurements.
- MXIR's fast response and small, 6mm* measurement spot support:
 - The industry's fastest scanning, to deliver the most responsive profile measurement available;
 - Resolution of narrow streaks, with multiple moisture measurements in even the narrowest profile-control zones, enabling superior profile-control results;
 - Capability to scan past the sheet edges, for uncompromised visibility of critically important sheet-edge quality.
- Developed using Honeywell's Design for Reliability process, MXIR has only one moving part,* with MTBF greater than 20 years for electronic components.*
- MXIR's modular design* provides flexible service options: quick, easy sensor removal for replacement or bench-top service, or easy access for service in-place.



Internal architecture of MXIR moisture measurement

- MXIR's Ethernet Data Acquisition (EDAQ) processors afford:
 - Continuous detector gain control,* ensuring highest measurement resolution and precision over MXIR's wide application range of grades and weights;
 - Fast, redundant Ethernet communications between MXIR and the Experion MX Application Server;
 - Continuous monitoring, control, alarming, and communication of such critical sensor variables as source voltage and current, modulation frequency, detector temperature, and more;*
 - Remote monitoring and control of all internal sensor components and functions from any operator station or PC on the Experion MX LAN – requiring no physical access to the sensor.*
- Automatic standardization at regular intervals eliminates the effect of debris buildup on sensor windows.
- Noncontacting measurement ensures freedom from sheet marking or damage.

- Unique INFRARED optics induce multiple source-energy passes through the sheet, enhancing absolute accuracy by:
 - Creating significantly higher sensitivity to moisture than single-pass optical designs;
 - Minimizing scattering (measurement) error that can result from variations in the sheet's weight, ash content, fiber species, refining, coat weight, passline, and moisture stratification.
- Unique, modular, stacked-detector design provides:
 - Faster, more accurate measurement – all detectors measure the same spot on the sheet, avoiding formation-induced sampling error;
 - Support for up to six channels,* enabling optional measurement of additional qualities, such as opacity, weight, direct percent moisture and/or synthetic polymer weight;
 - Significantly greater receiver efficiency than multi-detector or fiber-optic designs.
- Experion MX's Scanner Diagnostics and Maintenance Utility (SDMU) supports extended moisture measurement excellence and long service life:
 - Automatically creates a task schedule for future maintenance or service opportunities, for all installed scanners and sensors;
 - Lists, for each task, required scanner access time, number and expertise of service personnel, parts, tools, duration, and procedures to be performed before and after;
 - Provides a link from each task to more detailed information in the appropriate user's manual, residing in the Experion MX Application Server.
- Experion MX displays, supporting all scanning measurements and presenting a complete picture of product quality, include Quality Data, Trends (with historic trending), Profiles, Advanced Color Map, MD Power Spectrum, Profile Power Spectrum, Fixed Point Power Spectrum, Histograms, Profile Stability, displays of Reel, Grade, Shift and Day Reports, and more.



MXIR source (bottom) and receiver (top) modules

Opacity Measurement (Optional)

MXIR optionally supports continuous noncontacting measurement of the intensity of visible light transmitted through the sheet to report opacity. Transmitted visible light is highly sensitive to opacity changes, resulting in fast and accurate measurement that provides a solid foundation for opacity control.

Visible light emitted from the MXIR source-lamp passes through the sheet and enters the detector stack located directly opposite the source port, where a silicon photodetector measures signal intensity. The detector output is read at a 4kHz rate and all measurements are averaged within each high-resolution measurement zone. Digital zone-average values are communicated to the Experion MX Application Server for conversion to opacity units. Opacity measurements are presented to the papermaker using the same displays and reports as MXIR moisture measurements, and made available for opacity control in a traditional or multivariable control strategy.

Specifications

Moisture Measurement, Model Q4405-50

Category	Specification
Basis weight range*	0 to 700 g/m ² (0 to 430 lb/3000ft ²)
Measurement range	0% to 30% moisture
Ash range	Any ash level
Repeatability, 2σ**	± 0.05% moisture
Accuracy, 2σ	± 0.1% moisture
Measurement rate	1kHz (1 msec.)
Measurement aperture	6 mm diameter
Sheet passline sensitivity	< ± 0.125% moisture across the entire sheet gap
Maximum ambient temp.	(See sensor enclosure specifications)
Sheet gap	10 mm
Prerequisite measurements	Basis weight

* Basis weight range is approximate. Actual basis weight range depends on characteristics of the measured product. Contact Honeywell Sensor Application Engineering Department for recommendations on special applications.

** On “stirred” samples, sealed in moisture-impermeable bags

Opacity Measurement (optional), Model Q4240-52

Category	Specification
Basis weight range	Any basis weight for which the opacity is within the specified range
Measurement range	70 to 100 TAPPI opacity units
Repeatability, 2σ	Better than ± 0.1 TAPPI opacity units
Accuracy, 2σ	± 0.5 TAPPI opacity units
Measurement rate	1 kHz (1 msec.)
Measurement aperture	6 mm diameter
Maximum ambient temp.	(See sensor enclosure specifications)

For More Information

Learn more about how Honeywell's MXIR Transmission Moisture Measurement can improve paper quality and increase economic results, visit our website

www.honeywellprocess.com or contact your Honeywell account manager.

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