

Experion MX O-Frame Scanner



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.

O-Frame Scanner

The Q4000 O-Frame Scanner with the Experion MX Quality Control System (QCS) provides a high-speed, accurate and robust platform for the full-line of Honeywell quality sensors. The Q4000 builds on more than 40 years of leading the industry with breakthrough measurement technology, including enhanced mechanical performance, significant improvements in signal handling, state of the art engineering tools and advanced diagnostics. The net result is a scanner that is easier and more cost-effective to operate, service and maintain. The Q4000 with Experion MX is capable of delivering full-width, high-resolution profiles at high scanning speeds for every key quality parameter important to the

papermaker. It can scan every ten seconds or faster for most machines, enhancing your business performance by improving paper quality, reducing raw materials and energy consumption, and increasing production efficiency.



Features and Benefits

- Engineered beams with integrated thermal equalization channels provide a rigid foundation for precise measurement for the widest processes and most extensive sensor complements.
- Heavy-duty, stainless steel beam covers with individually removable sides allow easy access to internal components while protecting them from dust, moisture, process spray and heat.
- Superior measurement head stability and alignment is achieved with a robust track, head carriage and vector drive system, ensuring reliable operation and easy maintenance.
- Precision signal processing ensures highly accurate profiles with narrow measurement zones and fast scanning rates. Full-width, fast-scanning at up to 1,200 mm/sec [48 in/s], detects profile changes many times faster than conventional slow-scanning systems.
- A comprehensive set of maintenance tools and diagnostic displays provide a sound environment for service and maintenance.
- Experion MX leverages the full-width fast-scan capability of the Q4000 to simultaneously support the needs of advanced MD & CD multivariable process control, process diagnostics and SPC analysis, high resolution profile displays, site-specific quality & MES reporting, and data collection for mill-wide historian systems, etc., all without changing "mode". In addition to normal full-width scanning mode, single point, narrow scan and variable scan speed are all available at the user's request.
- Measuring heads are designed for continuous operation in hostile paper machine environments to ensure reliable,

low-maintenance operation and provide the optimum environment for accurate measurements under any process conditions.

- Flexible mounting arrangements for self-identifying sensor modules within and around the measuring heads accommodates all desired on-line measurements even in confined process spaces.
- Redundant Ethernet communications provide fast, easy, low-cost scanner installation and bring system reliability to a new level.
- Dynamic Z-axis (vertical) correction continuously eliminates residual error in weight measurement for sheet gap changes.
- Dynamic X-and Y-axis alignment measurements continuously monitor the alignment of upper and lower measuring head enclosures, providing at-a-glance verification of the overall physical performance.
- Accelerometers integrated into the upper and lower measuring heads provide immediate visibility of any abnormal behavior or drive system mechanical problems.
- The Embedded Thermal Equalization System (T.E.S.) effectively eliminates thermally-induced beam deflection and enhances measurement accuracy in non-uniform or changing thermal environments.

Stable Support for Measurements

The Q4000 O-Frame Scanner is an integral component of the Experion MX measurement and control system. It is designed for fast, accurate measurement with any complement of sensors, for the widest processes and most hostile production environments.

The scanner spans the process with highly engineered beams that have embedded thermal equalization channels in the design. Steel roller bearings ride on replaceable bearing inserts set into a track engineered to constrain travel to a linear motion. The wear resistant track and roller design provides a stable and long lasting base for measuring heads movement. During scanner manufacturing, the carriage tracks are laser aligned with exacting tolerances; in the field, dynamic X-Y-Z-axis displacement and three axis accelerometer measurements track changes in head alignment on-line and in real-time. A unique configuration of load-bearing and "capture" wheels effectively lock the carriages onto the tracks to counter lateral forces and maintain precise machine-direction sensor alignment. Smooth but fast motor speed ramping is provided

by a state-of-the-art vector drive and steel-reinforced, stretch resistant drive belts, which minimize cross-direction measurement head misalignment. Individually removable covers with integral seals exclude dust, moisture and other contaminants, minimize process-heat induced thermal gradients across the beams, and also allow the pressurization of beam covers and end columns in extreme environments.

Basis weight measurements are corrected for sheet gap height changes by the dynamic Z-axis sensor. Accelerometers integrated into the heads provide immediate feedback of any abnormality in the measuring head transport system. For high-temperature gradient environments, the embedded T.E.S. provides closed-loop liquid circulation within the beams to prevent thermally induced beam deflection by moving heat from high temperature locations to cooler temperature locations.



Two versions of measuring head enclosure support either four or six sensors inboard, with the flexibility to mount up to four additional sensors outboard, in machine-direction and/or cross-direction positions enabling a full complement of measurements even in confined process spaces. The measurement heads' internal temperature is stabilized, ensuring accurate measurement under all conditions. Heated sheet guides and heated air wipes prevent condensation in the sheet gap and ensure accurate standardization of measurement.

Fast, Precise Measurement

Self identifying sensor modules enable any measurement to be located in any head location, providing maximum flexibility combined with ease of maintenance. The system shows you where each sensor module is and automatically prevents sensor module mismatches causing unsafe operation. Each sensor head signal is anti-alias filtered and then oversampled at 1 MHz providing a 16 bit averaged sample every 250 μ s [4 kHz]. This technique effectively integrates 100% of the sensor module signal while precisely preserving visibility of the

smallest, high-frequency process variations. Experion MX accurately allocates readings to measurement databoxes using the measuring head position encoder data stream and each sensor module's time constant, spot size and physical position within the measurement heads. Strict synchronization of sensor module and head-position-encoder sampling ensures superior precision. The resultant raw-signal values are communicated from the sensor module across the measurement LAN to the Experion MX Application Server, where profile values are calculated and engineering unit conversions are made to end-user units. These form measurements for display, control, reporting, alarming and other applications. The redundant Ethernet communication system ensures outstanding reliability.

To provide the clearest picture of the process, the entire web is presented in 2-5 mm [0.08-0.20 in] databoxes to reveal the narrowest streaks. The profile is also available in wider mapped zones to reveal gross profile characteristics. The Experion MX O-Frame Scanner scans up to 1,200 mm/sec [48 in/s] to resolve profile changes many times faster than slow scanning systems. This results in faster measured profile response to profile changes, enabling faster control actions and increased productivity.

The fast response of Experion MX measurements, coupled with the Q4000 scanner's unique signal processing, enables the sensor modules to scan off the sheet edge, providing the industry's clearest picture of sheet-edge quality for improved profile control, where rejects are typically the highest. To accommodate any measurement strategy or process constraint, separate measuring head turn-around criteria can be defined by the user for both sheet edges, including turn-around at a specified position, a specified distance before the sheet edge, or a specified distance past the sheet edge.

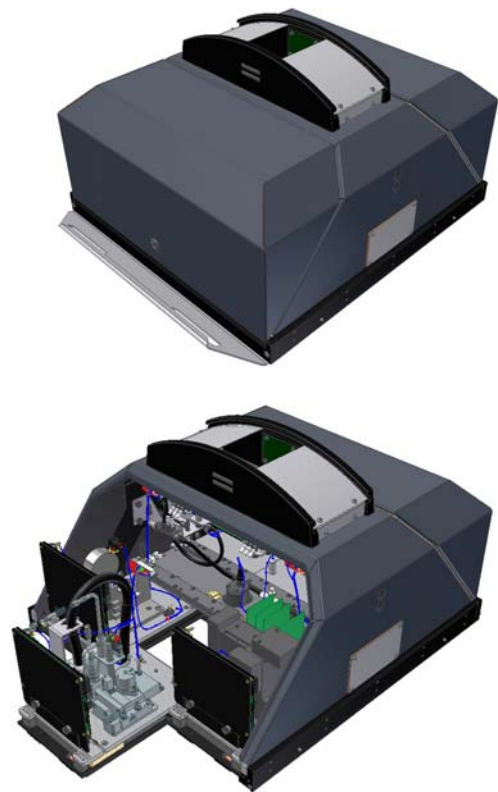
Lowest Life-cycle Cost

The O-Frame Scanner design leverages well-proven techniques to deliver reliable performance. New technologies have undergone extensive testing before implementation, including extended operation in a scanner test chamber at 100°C [212°F] and 95% relative humidity.

The brushless AC drive motor, vector drive controller, and belt-and-pulley transmission are designed specifically for long life and low maintenance. The drive belts are horizontally oriented for low belt-tension operation and extended belt and bearing life. The scanner end column enclosure design provides easy

access to wiring terminations, electronics, drive motor and belts.

To allow easy access to all components, the scanning measuring heads have removable covers aligned to give easy access to each sensor without obstruction. Individual Experion MX sensor modules slide on mounting rails into the measuring heads for fast insertion and removal. Plug-and play / self-identifying sensor modules can be installed into any location and the system automatically recognizes which sensor module is in a particular location. No messy cooling fluid connections are required for sensor modules.



Upper and lower measurement heads are easily separated using a convenient end-column-mounted key-switch to facilitate cleaning and service of sensor windows. The Experion MX measuring head internal temperature and relative humidity measurements are continuously monitored by the system, with alarms for out-of range conditions; over-temperature protection circuitry disconnects power.

All scanners in a system communicate with the Experion MX Application Server via a standard Ethernet measurement LAN using TCP/IP protocol, making scanner installation inexpensive, fast and easy. In addition to standard operator

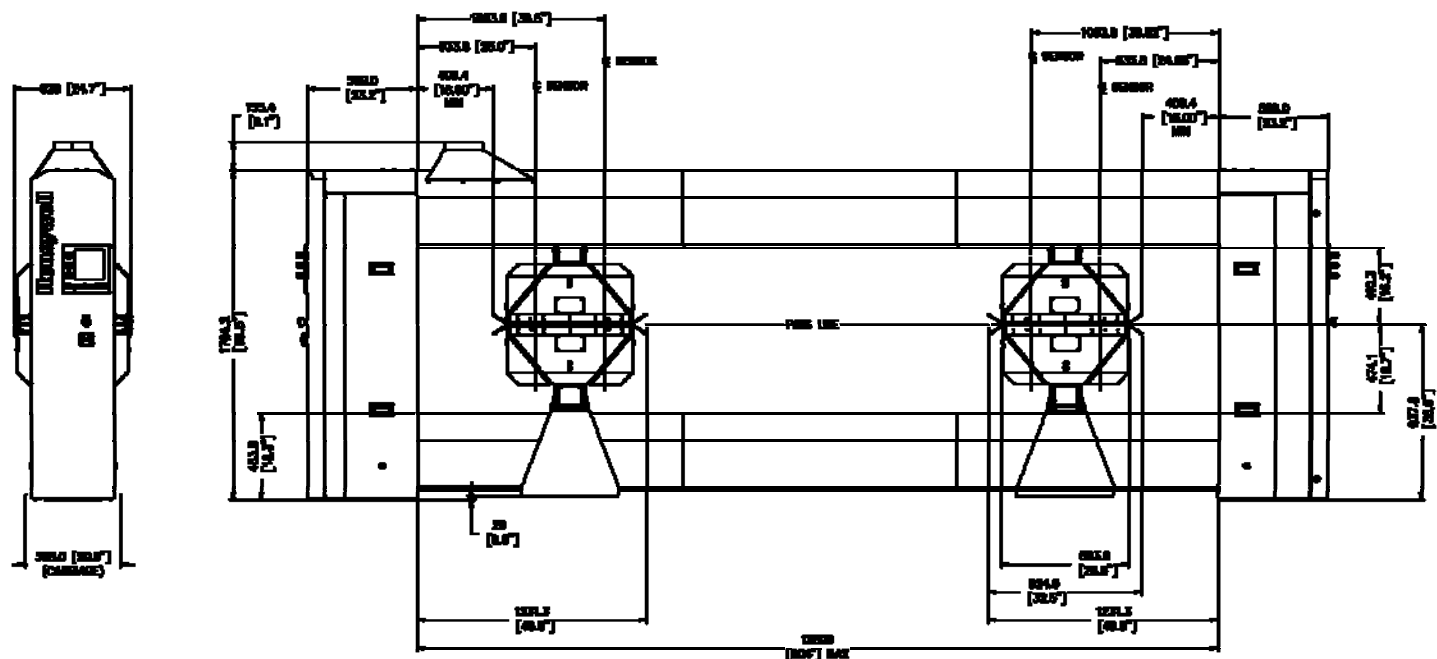
displays, all scanner and sensor module installation and maintenance functions, including setup and alignment, communications, signal monitoring, measurement calibration

and verification and reports, are supported by interactive system-resident video displays.

Specifications: Experion MX O-Frame Scanner - Model Q4000

Category	Specification
Beam Covers	2 mm [14 ga] brushed stainless steel (AISI 304)
Passline	939 mm [36.9 in] from top of mounting pad
Passline Angle	Up to $\pm 45^\circ$
Traversing System	38 mm [1.5 in] wide steel-reinforced drive belts. Vector drive motor
Measuring Head MD Dimension	4 Pack: 443 mm [17.4 in] incl. air wipes 6 Pack: 628 mm [24.7 in] incl. air wipes
Measuring Head Position Resolution	± 0.015 mm [0.0006 in]
Sensor Signal Digitization	400 Hz 2 nd order anti-alias filter, 4000 samples per second
Signal Resolution	16 bit
Scan Speed	Up to 1200 mm/s [48 in/s]
Single Point Positioning Accuracy	± 1 mm [0.04 in]
Profile resolution	2–5 mm [0.08–0.20 in] databoxes across full web width
Communication	Redundant Ethernet, TCP/IP protocol
Environment	Ambient temperature: 93°C [199°F] max Sheet temperature: 100°C [212°F] max Relative humidity up to 95%, non-condensing
Scanner Air Purge	Air pressure: 25 mm [1 in] water Air quantity: 680 m ³ /hr [400 SCFM] Air quality : filtered air Air temperature: 49°C [120.2°F] max Duct connection at Cable End 208 mm [8 in] diameter
Electrical Power	208 to 240 VAC, 15 A, 50–60 Hz; $\pm 3\%$, single phase
Instrument Air	425 l/min @ 4.8 bar [15 cfm @ 70 psi] Actual usage depends on sensor complement
Sensor Enclosure Coolant Requirements	Quality: potable water or ethylene glycol/potable water solution Max flow rate: 7.6 l/min [2 gal/min]* Pressure: 2.8–4.1 bar [40–60 lb/in ²] Max coolant temperature: 30°C [86°F] *Coolant flow depends upon coolant temperature, sensor heat load and ambient temp

Model Q4000 O-Frame Scanner is offered for sale in a variety of configurations according to the requirements of each application. Some features described in this Product Information Note are considered optional and may not be necessary for every system. Please refer to the specific commercial proposal for a complete listing of features and options included in any offer.



More Information

For more information on Experion MX O-Frame Scanner, visit www.ExperionMX.com or contact your Honeywell account manager.

Automation & Control Solutions

Process Solutions

Honeywell

1860 W. Rose Garden Lane

Phoenix, AZ 85027

Tel: 800-822-7673

www.honeywell.com/ps

PN-10-24-ENG
November 2010
© 2010 Honeywell International Inc.

Honeywell