

The Thermo Scientific 21Plus! quality control system for the continuous web processes supports a comprehensive measurement and control portfolio that offers a combined suite of over thirty specialized application packages. The system provides a fast return on investment through improved product quality, process efficiency and raw material savings.

Thermo Scientific 21Plus! Measurement and Control System



Features

- Supports up to 6 frames and 15 sensors
- 2000 point profile resolution (8000 for Biax film)
- Advanced applications controls
- Windows® operating system
- OPC link capability
- Intuitive FLEX HMI operator displays
- Integrated maintenance diagnostics
- Multiple language support

Applications

- Extrusion lines
- Biax lines
- Coating lines
- Plastics and rubber calendering lines
- Nonwoven lines
- Building products
- Carpet coating lines
- Abrasives lines
- Glass/mineral/rock wool lines

The Thermo Scientific 21Plus! system provides a wide range of application solutions for the continuous web industry. Its scalable distributed system architecture is designed for seamless modular expansion to ensure maximum profitability from the process, both now and in future. Low cost of system ownership is assured through a combination of reliable performance and ease of maintenance.

Sensors

21Plus! supports the full complement of Thermo Scientific web gauging sensor technologies such as nuclear, X-ray, caliper, near infrared, full spectrum infrared, as well as compliant third party sensors.

A family of nuclear basis weight gauges are available in either backscatter or transmission configurations. These are application-matched to the measurement requirements according to the source type, source strength and measurement gap. In addition, the Thermo Scientific X-Ray Master transmission sensor can measure either the weight or thickness of a material, for example plastic sheet or building products. Both the nuclear and X-ray basis sensors are designed to provide fast, high-resolution measurement without compromising absolute sensor accuracy.

Our advanced infrared measurement technologies provide a unique set of solutions for a wide range of materials. The Thermo Scientific IR Master sensor is designed to measure single polymer structures or moisture, while the advanced Thermo Scientific SpectraBeam Full Spectrum InfraRed (FSIR) family is intended for demanding measurement applications. This includes the measurement of individual layers in a multilayer product structure, complex coated multilayer extruded products and measurement of cavitated films of varying density. Also, very thin films between 1 to 8 microns can be measured with the Thermo Scientific MicroBeam sensor that utilizes an interference technique. Finally, an extended range MicroBeam sensor is able to automatically switch between interference and absorbance modes in order to measure very thin to thick films that are common to the biax process.

There are two non-contacting Thermo Scientific thickness sensors available to measure various materials depending on their structure.

First, the Thermo Scientific Air Caliper gauge can measure rigid materials up to 12,700 microns (0.5 in) based on the principle of magnetic inductance. Alternatively, flexible materials and foam-structured products in the range of 200-6500 microns can be measured with the Thermo Scientific ShadowMaster optical caliper sensor.

Operator Stations

Operator stations are available for either environmental or control room operations, depending on process requirements. Both include 17-inch flat panel monitors with high-resolution graphics and powerful processing capability for the system's interactive displays and supervisory controls. The operator stations are PC-based and communicate with other system modules across an Ethernet Local Area Network (LAN). System communication speeds of up to 100-mega baud ensure fast response and provide adequate bandwidth for the most demanding application requirements.

Thermo Scientific FLEX Operator Interface

Process visibility, ease of interpretation and operational responsiveness are assured with the system's intuitive human-machine interface (HMI). The FLEX operator interface functionality includes recipe management, HMI displays, automatic control initiation, quality and process alarm annunciation, process analysis monitoring, system maintenance and diagnostics.

Process analysis display



Biax mass map display



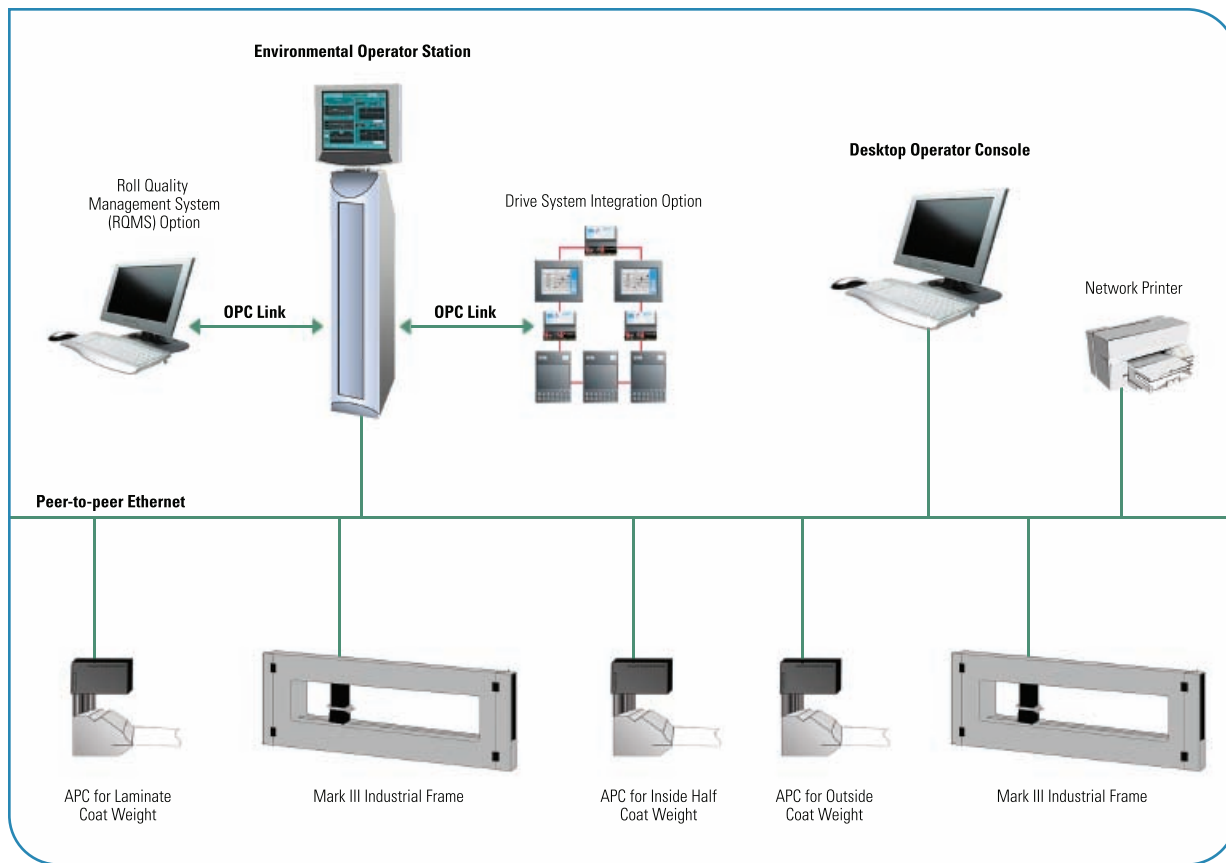
Product quality/alarm display



Product full profile display



Thermo Scientific 21Plus! system configuration for extrusion coating



The system supports optional de-facto links to programmable logic controllers (PLC) such as Allen Bradley,® Modbus and Siemens. Specific link products are also available as options for both information and control purposes. The system can be further expanded with an optional Roll Quality Management System (RQMS) for customized reporting and data archiving using an OPC server to communicate the information. An OPC interface is available with 21Plus! to communicate data with other compliant systems.

Advanced Application Controls

A complete portfolio of Thermo Scientific Advanced Application Controls is available to improve quality, productivity and raw material savings. These include machine direction, cascaded, profile and target optimization controls.

The 21Plus! system incorporates many application-specific control algorithms for fast attenuation of process upsets. These control strategies can greatly leverage the potential benefits of the system when interfaced to suitable process actuators.

Machine direction (MD) control maintains the average thickness or weight of the product to a desired value at the end of each scan by supervising either the line speed or screw speed setpoints. Enhanced MD controls for biax processes include cascade

strategies that supervise the cast-end average sheet target to control the final film weight or thickness. Also plastics and rubber controls are available with three-zone cross direction strategies including roll-screwdowns, roll-bend or cross-axis control.

Target Management Control (TMC) provides further process optimization potential for raw material savings by supervising the average weight or thickness target to a minimum acceptable quality value, commonly referred to as down-gauging.

Auto Profile Control (APC) maintains flat thickness or weight profiles of the final product by supervising the heating power of the extrusion die bolts at the cast end of the process. Features such as Accelerated Time Response (ATR) and randomization for gauge band reduction further enhance APC performance.

Intelligent Measurement

Each scanning frame is part of an intelligent network and performs its measurement and control functions with an iBox that is based on a Pentium® class processor.

The Thermo Scientific scanner platforms include the MARK III industrial scanners, L220 low profile scanners, C-Frame scanners and Box Beam scanners for backscatter sensors.

The MARK III Industrial Scanner design incorporates a proven rigid tubular steel exoskeleton structure that provides high stability while isolating the internal components from hostile environments such as high temperature, moisture, dust and fiber.

The L-220 scanner combines a rugged scanning platform with a low profile design for tight installation spaces. The entire beam structure is welded, heat treated and precision-machined for measurement accuracy and sensor alignment.

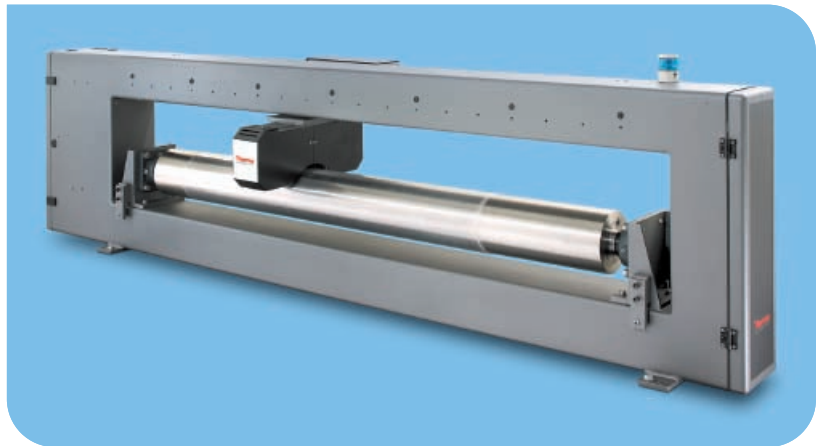
The C-frame scanning platform is available for installations with restricted space, harsh environments, or when all of the measurement hardware must be retracted from the machine. C-frames can be configured for upright or suspended mounting, horizontal, vertical or angled passes lines.

The Thermo Scientific Box Beam scanner is a unique design for back-scatter sensors. This closed-beam mount is intended for demanding 21Plus! applications such as compact, hostile and dirty environments.

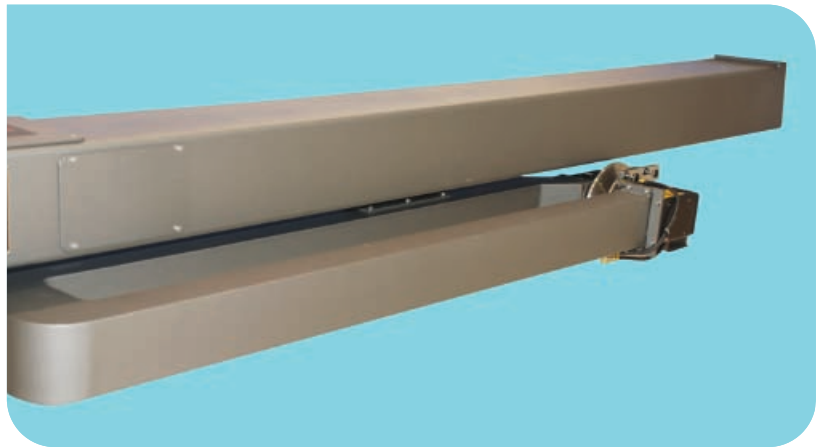
Thermo Scientific MARK III Industrial Scanner



Thermo Scientific L220 Scanner



Thermo Scientific C-Frame Scanner



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