

The Thermo Scientific RM 130 Pinhole Detector helps verify the integrity of your opaque sheet as it is being rolled. By detecting even the smallest holes, you give your customers the assurance the sheet will provide a solid barrier against the smallest contaminants.

Thermo Scientific RM 130 Pinhole Detector

High Speed Verification of Sheet Integrity



Typical Applications

- Tin plate
- Tin-free steel
- Galvanized sheet
- Titanium
- Copper
- Brass
- Aluminum sheet

Features

- Ultraviolet light sources with Photomultiplier detectors
- Large/small pinhole size discriminator
- 4-channel/zone operation
- Remote operator's interface station
- Edge follower control

The Thermo Scientific RM 130 Pinhole Detector is a line-mounted instrument that senses the light passing through any through-the-strip holes. It uses simple yet sophisticated sensor technology with decades of proven performance. The instrument relies on the principle that any hole in an opaque material will allow light, both visible and ultraviolet (UV), to be transmitted through it. With appropriate masking of ambient light, photo detectors will see the light and output a signal.

The housing of the RM 130 contains both the light source and detectors in a matte-black scanner box. The standard box is designed for installation on a horizontal pass line. However, vertical mounting is available when mill space is a concern.

Digital Control Box

The UV lamp drive, edge tracking and light detector electronics are all contained in one digital control box mounted on the side of the scanner mechanism. The proprietary UV lamp drive supplies a constant current to ensure consistent brightness and longer lamp life. A separate circuit monitors lamp

output and will generate an alarm in the event of a lamp failure.

A closed-loop edge tracking system uses capacitive sensors to follow the sheet edge and feed back to a pair of servo motors, which automatically move light shields that mask the unused portion of the detector bank. This configuration eliminates the need for brushes or pads that wear out and require frequent replacement.

The control box also contains a self-calibration system which uses low light LEDs mounted in the detector housing. This feature will verify detector operation and compare the present output to data stored from a known pinhole.

Operator Station

The small, rugged operator station is sealed from the environment and can be mounted either on the mill or in the operator pulpit. The logical interface utilizes just five buttons to configure and control the pinhole detector. The station has built-in password protection for calibration data and access to maintenance screens.

Specifications

Upgrade Program

The RM 130 electronics can be used as an upgrade for the older Model K2 pinhole detector. Much of the K2 scanner housing is re-used, but the large electronics cabinet is replaced by the small digital control box and operator station. The upgrade includes new interconnect cabling and a new reflector tray assembly. The entire upgrade process typically takes two days, including calibration and commissioning.

Measurement Principle

The source of the UV light used by the RM 130 Pinhole Detector is a custom-built fluorescent tube modulated at a high frequency (8000 Hz). The 3650 Angstrom UV wavelength ensures the high sensitivity for the detection of small pinholes at very high line speeds for all opaque sheet materials.

When a pinhole occurs in the sheet, the UV photons pass through the hole, then through a darkened UV optical light filter to the detector portion of the scanner. Even light passing through angled pinholes will reach the detector by means of a highly reflective light guide. The photomultiplier tubes (PMTs) mounted in the lower section of the scanner box will convert even the smallest amount of light to an electrical signal.

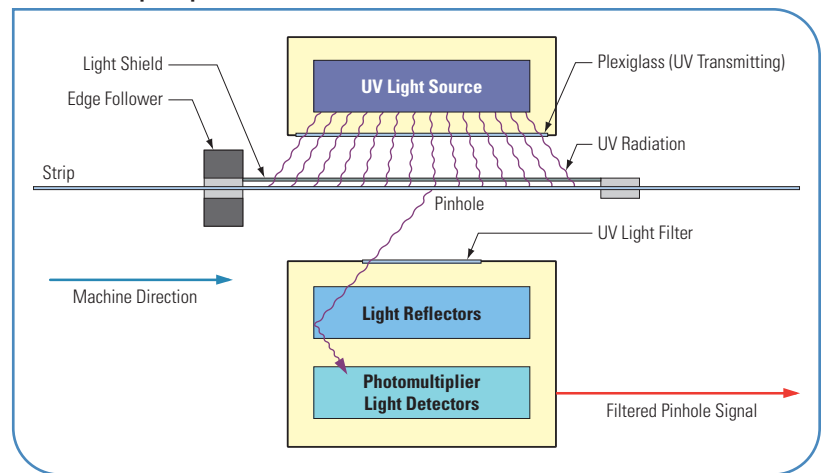
The PMT output is passed through a band pass filter to detect only the modulated 8000 Hz light. This feature provides additional immunity to any ambient light that may pass through the UV light filter.

Flexible Output

The RM 130 Pinhole Detector will also indicate the size of the hole in the material. The hole size discriminator feature uses the light level detected to classify a hole as large or small. The operator can set the position of that threshold to whatever level is appropriate for the application.

Three sets of digital output are used to alert the user to a detected pinhole. Each of the three outputs can be independently configured to indicate a large or small hole. The outputs will interface with any number of control systems. From a 5 volt TTL signal to a single pole double-throw relay capable of switching AC power, nearly any type of mechanism can be used to mark or record the length location of the pinhole in the sheet. Additionally, the total number of PMTs can be divided into "zones" to determine the cross-sheet location of detected pinholes. This feature can help focus trouble-shooting efforts to eliminate the source of any holes.

Measurement principle schematic



RM 130 Pinhole Detector

General Specifications

Standard Window Widths	710 mm (28 in) for strip widths from 609 mm to 381 mm (24 in to 15 in) 1,016 mm (40 in) for strip widths from 914 mm to 381 mm (36 in to 15 in) 1,320 mm (52 in) for strip widths from 1,219 mm to 381 mm (48 in to 15 in) 1,625 mm (64 in) for strip widths from 1,524 mm to 381 mm (60 in to 15 in) 1,829 mm (72 in) for strip widths from 1,727 mm to 584 mm (68 in to 23 in) 2,438 mm (96 in) for strip widths from 2,337 mm to 1,194 mm (92 in to 47 in)
Maximum Line Speed	1,830 mpm (6,000 fpm)
Minimum Hole Size	12.7 micron (0.0005 in)
Minimum Time Interval Between Holes	5 ms for a 25 µm (0.001 in) hole
Edge Mask	Guaranteed to 6.3 mm (0.25 in). When strip wander and/or width changes are kept to less than 1 mm per edge, the edge mask can be reduced to as low as 3 mm (0.125 in).
Total Average Power Input	250 VA
Peak Power	500 VA
Input Voltage	115 or 220 VAC; 50 or 60 Hz

Output Options

Actual Hole Duration	+5V TTL compatible pulse; Optically coupled pulse (positive or negative)
Adjustable Pulse Duration (2 sets)	5 to 500 ms; +5V TTL compatible pulse; Optically coupled pulse (positive or negative); SPDT Power relays (10A at 250V to a resistive load)

©2007 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific Inc. and its subsidiaries. Results may vary under different operating conditions. Specifications, terms and pricing are subject to change. Not all products are available in all countries. Please consult your local sales representatives for details. Literature Code PI.9028.0407

China
+86 (0) 21 6865 4588
+86 (0) 21 6445 1101 fax

Germany
+49 (9131) 998-0
+49 (9131) 998-230 fax

Latin America
+52 (81) 8400-7375
+52 (81) 1257-6440 fax

USA
+1 (800) 488-4399
+1 (858) 452-9250 fax

France
+33 (0) 160 92 48 00
+33 (0) 160 92 49 00 fax

India
+91 (20) 6626 7000
+91 (20) 6626 7001 fax

United Kingdom
+44 (1452) 337-800
+44 (1452) 415-156 fax

www.thermo.com/metals