

MESA MOISTURE MEASUREMENT EQUIPMENT



MESA TRIME GW MOISTURE TRANSMITTER AND ROD-TYPE PROBE HEAD

OVERVIEW

MESA TRIME GW offers process moisture measurement equipment for the continuous monitoring and control in dryers and kilns at temperatures up to 150°C (302°F). The rugged MESA TRIME GW module includes a probe head (located at the measurement point) and a dedicated transmitter offering an unprecedented operating range of 0 to 50% wet-weight moisture. Simultaneously the materials temperature is also being measured.

Each moisture transmitter has a digital ID and a 2-wire Databus connection. The digital interfacing and Databus communications offer extensive adjustment and control advantages in a process environment and simplifies the wiring. To compliment the digital interface up to 16 transmitters can be connected to one MESA M-PIM-0212 Process Interface Module. The M-PIM can multiplex measurement data communicate with most common PLCs or SCADA systems using the serial interface or Ethernet protocol and our library of drivers.

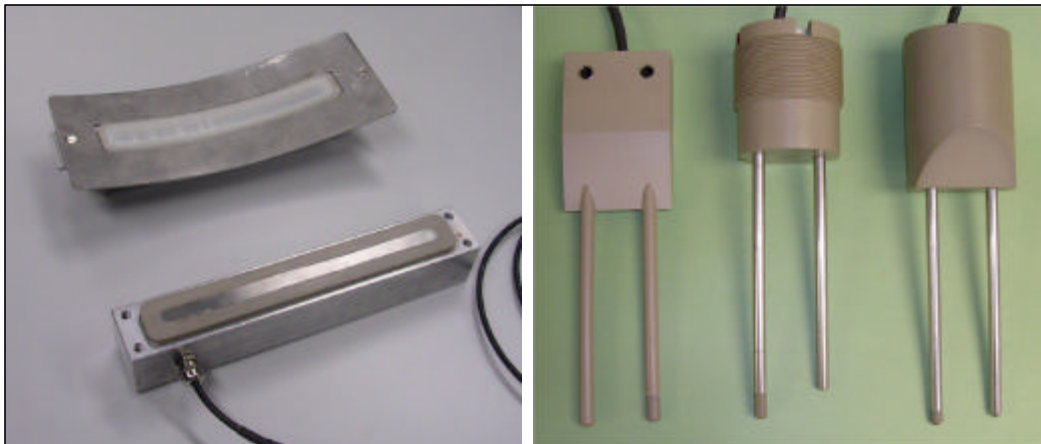
The M-PIM communicates product specific or individual selectable settings with each connected transmitters for product calibration selections, sample averaging rates, offset adjustment, and other convenient process management and setup variables. Configuration of the M-PIM and transmitters setting are from and PC with a standard TCP/IP Ethernet connection and a browser like Internet Explorer.

MEASUREMENT TECHNOLOGY

The MESA TRIME GW is based on proven TDR (Time-Domain-Reflectometry) measurement approach that measures the dielectric constant (water content) of a material. The probe head's stainless steel rods are used as wave-guides for the transmission of the TDR signal. The TRIME electronics generates a high frequency pulse (up to 1GHz) that propagates along the cable to the wave-guides generating an electromagnetic field around the rods of plates of a probe head. At the end of the wave-guides, the pulse is reflected back to the source electronics. The resulting transit time is dependent on the moisture content of the material.

The moisture content of a material is calculated based the transit times relationship to a calibration curve, Material specific calibrations are stored inside the transmitter and selected as required The MESA TRIME-GW measuring method supplies exact data about the percent water content of the material regardless of the temperature or mineral content of the material.

The MESA TRIME-GW technical data for organic materials	
Moisture measurement range %:	0-50% (wet-weight)
Repeatability:	0.1% of reading
Accuracy, Moisture:	+/- 0.5% (range 2 to 40%) +/- 1.0% (range 40 to 50%)
Probe operating range:	-20 to 150°C, (-4 to 305°F)
Transmitter operating range:	-20 to 50°C , (-4 to 122°F)
Measurement interval:	0.5-sec. single reading
Temperature sensor operating range:	-55°C (-67°F) up to +125°C (+257°F)
Accuracy by range:	
-10°C (+14°F) up to +85°C (+185°F):	+/- 0.5°C (+/-0.9°F) accuracy
-55°C (-67°F) up to +125°C (+257°F):	+/- 2.0°C (+/-3.6°F) accuracy
Digital Interface:	IMPbus and RS-232 (moisture and temperature)
Analog output (moisture only):	0-20 mA or 4-20 mA
Power / current:	24 V dc @ 250 mA

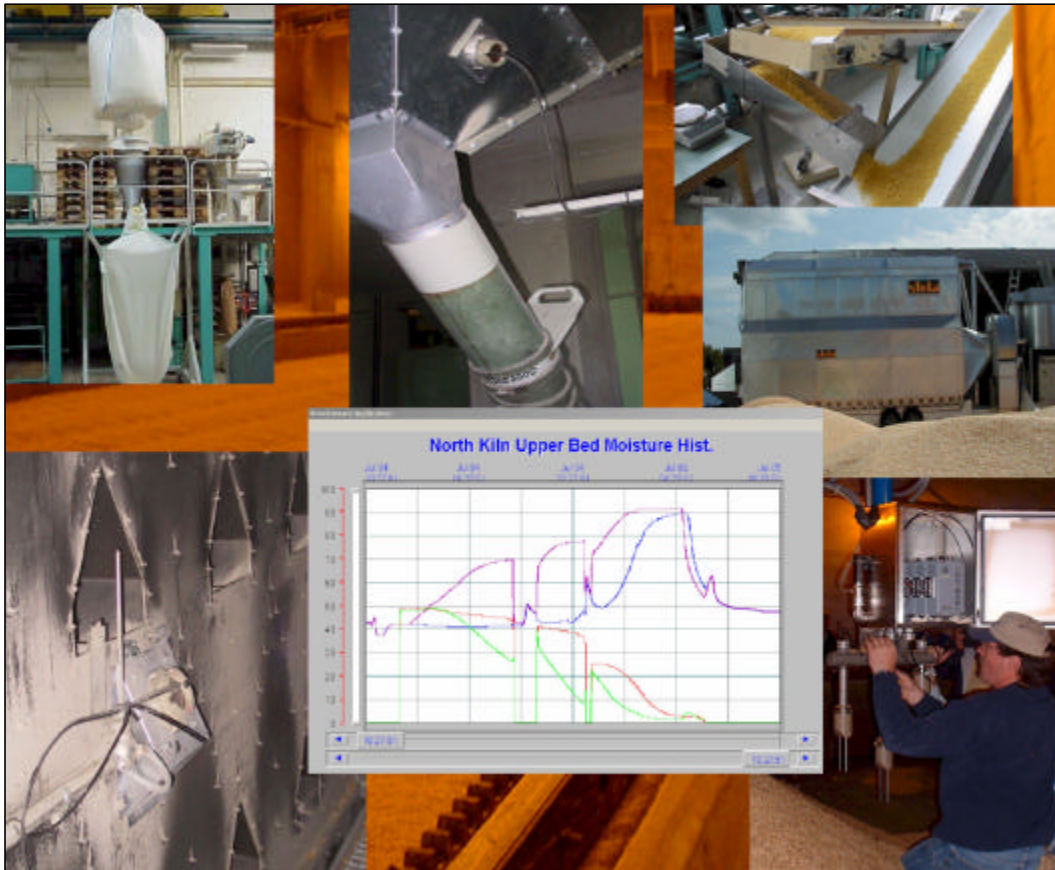


Important Features and Benefits

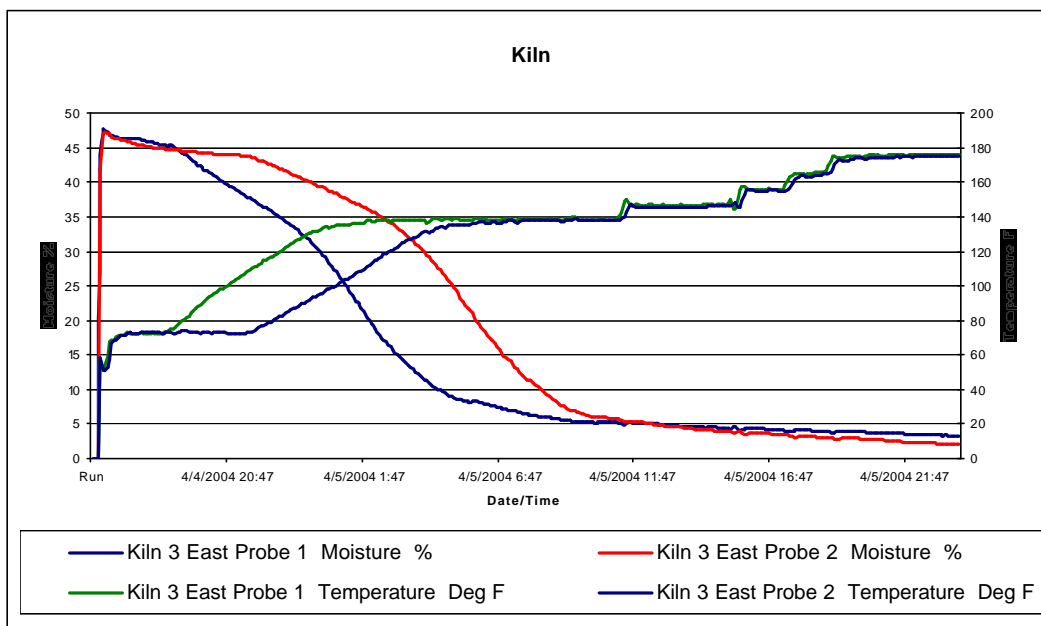
Every dryer, kiln and auger has a unique process environment. Having experience and equipment with both electrically and mechanical flexibility assures a successful projects. The MESA TRIME GW can be adapted to most process by using a wide selection of rugged probe heads, process interfaces and adjustable setting and features. Some of the most commonly used features are as follows:

FEATURES	BENEFITS
<p>Wide Range of Probe head configurations:</p> <ol style="list-style-type: none"> 1. Rod-type (stainless steel and PEEK): 2. Coated rod-type probe: 3. Surface probes (flat face): 4. Radius-formed (for Allan Screw conveyors) 5. Special probe designs (for new applications) 	<p>Each probe head has unique features and requires a TRIME GW transmitter to operate.</p> <p>Standard probe for grains (< 40% Moisture).</p> <p>For material with surface moisture of High EC</p> <p>For material where a flat probe is needed</p> <p>For Allan Screw conveyers</p> <p>For your unique application environment</p>
<p>Moisture measurement <u>averaging time</u> is adjustable:</p>	<p>Easy adjustment of the averaging time from a few seconds to minutes base on the drying rate allows for precise control or change in moisture.</p>
<p><u>Calibration curves for different types of products</u> can be programmed into each transmitter. Additional calibration can be uploaded on the fly without any down time:</p>	<p>Select up to 15 unique or similar material calibrations when using different recipes or drying a range of products. Digital communication allows for continuous verification of the selected calibration setting.</p>
<p><u>Adjustable offset</u> for high accuracy:</p>	<p>Based on the mechanical mounting of the probe head in the dryer, auger or kiln a large of small offset may be required. Each transmitter has adjustment setting to 0.01% moisture.</p>
<p><u>Intelligent measure error and statistical information reporting</u> is important when controlling a dryer, auger or kiln:</p>	<p>Detecting the presents of material in the probes measurement field, the stability or rate of change of the measurement and the control over error reporting rates offer wide many options and flexibility when process moisture is being controlled.</p>
<p>The MESA TRIME GW detects when a probe is in contact with the material being measured . We refer to this as the <u>Queue-filling time and Queue-discharge time settings</u>:</p>	<p>When working with a batch process, the filling and emptying of the material is detected and the measured moisture readings are paused and started using the Queue-filling time and Queue-discharge time. The moisture data output available for process control is an uninterrupted signal.</p>
<p><u>HaltM</u>– external control of measurement data:</p>	<p>Using a binary input to the transmitter it is possible to interrupt moisture measurements based on a desired event.</p>
<p><u>2-Wire IMPbus (Databus)</u> wiring for long distance wiring:</p>	<p>The parallel IMPbus (Databus) wiring between transmitters and the M-PIM helps to reduce wiring complexity and cost.</p>

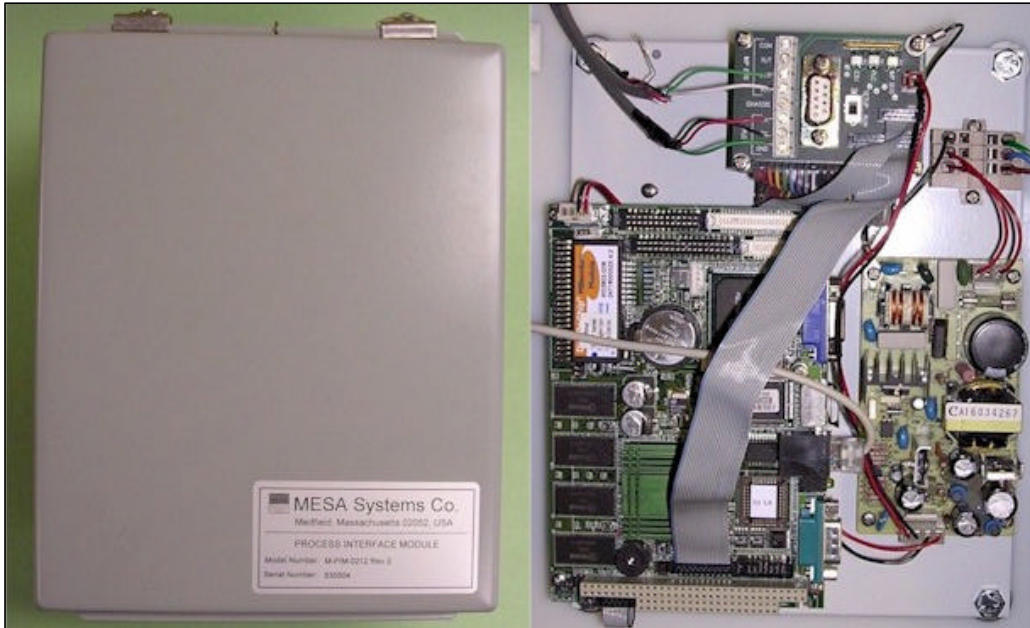
Applications: The measurement of grains and processed organic material moisture in dryers, kilns or handling systems are some of the common applications for the MESA TRIME GW equipment.



The graph below shows two moisture probes at different depths measuring barley malt drying from 48% (saturated) moisture to 4% (dry) moisture. The temperature recipe in the kiln starts at 75°F and finishes at 178°F.



M-PIM 0212 PROCESS INTERFACE DEVICE



M-PIM Process Interface Module (housing and electronics)

The MESA M-PIM-0212 Process Interface Module (M-PIM) is designed to interfacing a network of TRIME GW moisture and temperature measurement transmitters to a process control systems. Up to 16-MESA TRIME-GW Moisture Transmitters can be connected using the 2-wire, parallel-wired Databus.

The measured moisture and temperature data is transmitted to the process control system via one of two methods: push or pull. The "push" method is used with all common PLCs. The M-PIM writes the measured moisture and temperature data directly to the PLC data table via a client protocol (such as Allen-Bradley DF1, Ethernet or Modicon Modbus, etc). The "pull" method is used with SCADA systems, such as Wonderware and Honeywell DCS, etc. The M-PIM emulates a Modicon PLC at its Ethernet and/or serial port and the external process polls the M-PIM for the data it wants.

The M-PIM has two separate operator interface systems: a video screen interface for diagnostics and troubleshooting and a Web-based interface for configuration and monitoring.

The M-PIM control software runs on an internal IBM-compatible Single Board Computer (SBC). The SBC has all the functions of a full-sized PC, except that it has no rotating media – it uses an 8 Mb MSys-tems DiskOnChip instead of a hard drive. The M-PIM SBC has 2 serial ports, an Ethernet port, a mouse port and a VGA video port.