MCT360
NIR Moisture Gauge
Operation Manual

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Warranty, Exclusions and Limitations

The workmanship and the materials of all products manufactured by Process Sensors Corp. are warranted for a period of one year from the date of shipment. This warranty covers parts and labor required to correct defects within the scope of the Corporation’s warranty.

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Software Updates

Future revisions of the software that correct errors will be made available to customers at no charge. Improvements and enhancements to the software will be available for a nominal fee.
1.0 Introduction

The MCT360 Moisture Gauge is a Near Infrared based gauge that uses the absorbance of discrete wavelengths of near infrared light as a measurement of the moisture content of the product.

2.0 Principle of Operation

The O-H bond in the water molecule and the C-H bond in oils and fats absorb infrared radiation at several specific wavelengths. The MCT generates these absorbance wavelengths and several other non-absorbing wavelengths using a rotating wheel containing up to 6 infrared filters. This chopped light is reflected from the surface of the product and collected by optical components inside the sensor. The resultant electrical pulses from the reflected light are mathematically treated in ratio-based algorithms to compute raw measurements of moisture and/or oil. These raw values are then scaled by offset and sensitivity factors to provide direct readings of % moisture and % oil. Compensation for aging of optical components and the variations in reflectivity’s of different products is provided in the algorithm treatment of the filter reflectance values.

3.0 Gauge Components

The MCT360 consists of an online sensor containing the near infrared optics and processing electronics. The sensor connects, via a 20 foot (6meter) to a wall-mountable Operator Interface. AC power and output signals all come from the MCT sensor.

3.1 Light Source

A quartz-halogen light bulb running at reduced voltage generates infrared energy.

3.2 Filter Wheel

Six infrared and visible filters are held in a circular disc. A single timing notch is machined in the edge of the disc

3.3 Filter Wheel Motor

A precision brushless DC motor is used to accurately rotate the filter disc in front of the infrared light beam.
3.4 Detector

A PbS detector is used to convert the infrared light energy into electrical pulses.

3.5 Gauge Electronics

The MCT360 gauge contains the following electronic components:

Power Supply: A 90-260-volt auto selection supply provides DC power to operate the gauge.

Sensor Electronics: Single PCB containing central processing system, analog and serial communications.

Operator Interface: A wall mountable enclosure with a 4.3” LCD touch screen color display providing all set up, calibration and diagnostic data from the sensor.

4.0 Installation

4.1 Sighting the sensor

The sensor is capable of operating at any orientation provided the light beam can reflect from the surface of the product.

4.2 Vibration

The sensor mounting support and any items in contact with the sensor should be free from excessive vibration.

4.3 Strong Light

Strong infrared light or direct sunlight should not be allowed to fall on the sensor window or erroneous reading may occur.

4.4 Temperature

The sensor is designed to give satisfactory measurements within a temperature range of 32 to 120 deg. F (0 to 50 deg. C).
4.5 Humidity and Dust – Window Air Purge

The head should be kept clear of excess humidity. It is important to prevent condensation on the sight window. Normal atmospheric dust will not affect the sensor reading but similar to humidity, accumulation of dust on the window will impair the sensor’s operation. The air purge attachment fitted to the sensor window requires a 1/4” (6mm) tube with a supply of clean oil free dry air at a pressure not exceeding 10 psi. at approximately 2 liters per minute.

4.6 Optimum Viewing Distance

The optimum viewing distance is 8” (200mm) from the bottom of the sensor but any distance between 6” and 12” (150 - 300mm) is acceptable. Variations in product pass height of +/- 1” (25mm) around the 8” (200mm) nominal are permissible.

4.7 Reflections from the Material Surface

It is essential to avoid specular reflections of the transmitted light from the product. Powdered and granular products cause no problems and the sensor light beam may be mounted at any angle to the top surface of the product. The closer the beam is to 90º from the surface the better the reflected signal strengths. Highly reflective and shiny sheet materials require that the sensor be angled so that the light beam is at approx. 80º-85º to the sheet surface.
5.0 Power and Cable Connections

5.1 AC Power Connection

The MCT360 Gauge is powered using the 6-foot (2mtrs) power cord connected to the rear of the sensor. The input is auto ranging and accepts 90-260VAC volts, 15 amps.

5.2 Analog and Serial Cable Connections

Customer data cables connect to the two industrial connectors on the rear of the sensor. Details of the respective connectors in these connectors are given in Sections 8.0 and 9.0

6.0 Operator Interface Touch Screen LCD

Human interaction with the MCT360 is made via the touch screen color LCD.

   **Home Screen – Single Constituent**

   ![Home Screen - Single Constituent](image)
Home Screen – Two Constituent

MOISTURE: %
5.6

CONSTIT2: %
9.3

CODE 1

Home Screen – Three Constituent

MOISTURE: %
5.3

CONSTIT2: %
11.2

CONSTIT3: %
-20.0

CODE 1
Home Screen Three Constituent and product Temperature

6.1 Grab Sample Averaging

A short term average of the MCT’s reading may be made using the hand symbol. Touch the hand symbol. This will initiate the averaging function. During this time a sample of the product moving under the sensor may be taken. After a preset time period the display will show the average moisture reading for the product viewed by the sensor during that time period. If the time period is set to 0 seconds then an average may be made by making two touches of the hand symbol. One touch starts and a second touch stops the average. After 10 seconds the display will automatically return to the live reading.

6.2 Graphical Trend Screens

A time based trend of any two of the four constituents measured by the MCt360 may be selected by simply touching the center of the respective numeric display. The first number touched will be presented on Trend 1 and the second number on Trend 2. Illustrations of these trend screens are as follows:
Single Constituent Trend Screen

The ‘Y’ Axis of the trends are auto-selected to match the analog output range of the MCT360

Two Constituent Trend Screen
Adjustment of Trend Time

The ‘X’ axis time is selectable via the Trend Time in the User Screen. The min and max times for these trends are:
Min: 1 minute
Max: 360 minutes

6.3 Changing Product Codes

Selection of the Product Code is made by touching the Current Code (Code 1). A code selection widow will pop up.
Select the new code by touching the desired code followed by the SAVE key.
6.4 User Screen

Pressing the ARROW symbol in the top right corner will allow access to an unprotected User Screen. In this screen the user may make a trim to the gauge’s zero setting and setup the Test Time over which the sample dish rotates.

Sample Value. Touch this number and use the pop up keypad to enter the true moisture of a sample and on pressing the Enter key the gauge display will be adjusted to match the value entered.

Test Time. Touch the number and use the pop up keypad to enter the test time over which the sample dish will rotate.
6.5 Menu Protection Password
To access the gauge setup touch the blue pad next to SETUP MENU on the LCD. The Password request screen will pop up. Enter the correct password and touch the ENTER key. This will allow access to the SETUP Menu.

6.6 Menu Selections
On entering the correct Password the Select Menu will be presented.
6.7 Calibration Parameters

Touch the blue button to access the menu. The display will present the calibration parameters for the fifty codes stored in the gauge. The display will present the parameters for the active code first. Selection of other codes is made by touching the Up/Down buttons. Selecting another non-active code will not change the active code.

Each Product Code has its individual zero and span settings but the Damp Time is a global setting that applies to all Product Codes.

To make a change to the values, touch the number, a numeric keypad will pop up. Type the new number and touch the ENT key.

Alarms: Setting High and Low alarms levels to each constituent will cause that constituent’s reading to turn RED when the high alarm is exceeded and YELLOW when the low alarm is exceeded. Fitting an optional alarm relay interface to the sensor will provide relay contacts that may be used to trigger external warning devices.
6.8 Calibration Routine

The Calibration Routine is a linear regression routine that adjusts the gauge’s calibration parameters (zero & span) so that the gauge readings match the moisture contents of a series of representative product sample that moisture contents cover the range to be measured.

The object of gauge calibration is to obtain a straight-line graphical relationship between the sensor’s reading and the true moisture value of a series of samples.

Select one of the unused Product Codes in the gauge

Make or collect from the process a series of sample (up to 25) with moisture contents covering the range expected in the process.

Set the Span value to 25.0 and set the damp time to a value of 1.0.

Present the lowest moisture sample to the sensor; adjust the zero setting to make the sensor’s reading agree with the true moisture content of the sample. Note the reading.

Continue to present each of the other samples in turn, noting the sensor reading for each sample.
Tabulate the results as follows:

<table>
<thead>
<tr>
<th>Sensor</th>
<th>True Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.7</td>
<td>3.7</td>
</tr>
<tr>
<td>4.5</td>
<td>5.2</td>
</tr>
<tr>
<td>7.6</td>
<td>8.3</td>
</tr>
<tr>
<td>9.5</td>
<td>10.3</td>
</tr>
<tr>
<td>8.2</td>
<td>8.9</td>
</tr>
</tbody>
</table>

Select the Calibration Routine in the main Menu Options

Use the Up/Down buttons to set the Product Code to the same as that used to collect the initial calibration data
Touch the Lab Value data box and enter the true moisture value for the first sample.
Touch the MT Value data box and enter the gauge reading for the first sample.
Repeat this procedure for all the samples.
When all sample pairs have been entered, touch the CALCULATE button. A widow will pop up with the regression statistics and the values of the zero and span setting that will correctly calibrate the gauge.
Touch SAVE to save the new calibration settings to the desired Product Code.
Linear Regression Statistics

The sensor’s computer calculates several statistics during its calibration routine; these statistics give a measure of the accuracy and quality of the calibration.

**Correlation Coefficient:** This is an expression of how well the sensor readings match the true moisture values.
- 1.0 is perfect
- Greater than 0.9 is acceptable
- Less than 0.9 is not acceptable

**Standard Error:** This is an indication of the accuracy of the calibration. A perfect value is 0.0. Acceptable values are in the 0.0 to 0.5 range depending on the moisture ranges being measured.
6.9 Diagnostics

Various gauge diagnostic values may be viewed in this menu choice. There are three pages of Diagnostic parameters group

<table>
<thead>
<tr>
<th>Status</th>
<th>Cooler</th>
<th>Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OK</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wheel Speed</th>
<th>Internal Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1500 rpm</strong></td>
<td><strong>22.0°C</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power Rails</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCC</td>
</tr>
<tr>
<td><strong>5.1 v</strong></td>
</tr>
<tr>
<td>VP</td>
</tr>
<tr>
<td><strong>14.8 v</strong></td>
</tr>
<tr>
<td>VN</td>
</tr>
<tr>
<td><strong>-14.9 v</strong></td>
</tr>
</tbody>
</table>

**STATUS:** This sub group presents the operational status of the gauge. The diagnostics presented are as follows:

Status: The sensor’s microprocessor continually monitors up to 13 sensor parameters. If all are correct the status will indicate OK. If any one of the parameters is out of range then a warning message will be presented.

Wheel Speed: This is the rotational speed that the filter wheel.

Internal Temperature: This is the internal temperature of the MCT360 Online sensor

Power Rails: These are the values of the three DC power supplies used in the MCT360
COOLER: This presents the operational diagnostics of the optional thermocooled detector.

Cooler Target: This is the set point of the detector temperature
Cooler Temp: This is the actual temperature of the detector
Cooler Drive: This is an indication, in the range of 0-100%, of the drive needed by the cooler to achieve the cooler target. The hotter the sensor the higher the cooler drive.

FILTERS: This presents the detector signal levels for the six filters that may be fitted to the gauge. Values are given for both external and internal filters. A bar graph comparison for each filters INT and EXT values may be presented by touching the F# of the filter. The preamplifier gain value is also presented. This value is an indication of the amplification required to bring the detector signals into the range required by the processing electronics.
Ranges of Diagnostic Parameters:

The following table gives the range of values for each of the diagnostic parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Nominal Value</th>
<th>Min. Value</th>
<th>Max. Value</th>
<th>Warning Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Filters</td>
<td>3.0-8.0</td>
<td>0.5</td>
<td>10.0</td>
<td>Above 9.9 “High Signals”</td>
</tr>
<tr>
<td>External Filters.</td>
<td>3.0-8.0</td>
<td>0.5</td>
<td>9.9</td>
<td>Above 9.9 “High signals”</td>
</tr>
<tr>
<td>+ 5 V</td>
<td>5.00</td>
<td>4.8</td>
<td>5.2</td>
<td>Outside Min/Max “VCC Fault”</td>
</tr>
<tr>
<td>+ 15 V</td>
<td>15.00</td>
<td>14.0</td>
<td>16.0</td>
<td>Outside Min/Max “VP Fault”</td>
</tr>
<tr>
<td>- 15 V</td>
<td>15.00</td>
<td>14.0</td>
<td>16.0</td>
<td>Outside Min/Max “VN Fault”</td>
</tr>
<tr>
<td>Motor Speed</td>
<td>1500</td>
<td>950</td>
<td>3500</td>
<td>Outside Min/Max “High/Low Motor”</td>
</tr>
<tr>
<td>Filter Wheel Slot</td>
<td>No slot switch input for &gt; 400 ms</td>
<td></td>
<td></td>
<td>“Motor Stopped”</td>
</tr>
<tr>
<td>Gain</td>
<td>X5-X10</td>
<td>1</td>
<td>100</td>
<td>Above X64 “Low Signals”</td>
</tr>
<tr>
<td>Cooler Drive</td>
<td>15%</td>
<td>0.1%</td>
<td>100%</td>
<td>Above 75% “Cooler Fault”</td>
</tr>
<tr>
<td>Pre-Gain</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td>Cooler Temp</td>
<td>20.0</td>
<td>0.2</td>
<td>65</td>
<td>0.0 “Detector Fault</td>
</tr>
<tr>
<td>Internal Temp</td>
<td>35</td>
<td>0.0</td>
<td>100</td>
<td>Above 65 “High Board Temp”</td>
</tr>
</tbody>
</table>

Refer to page 31 for more details of the sensor’s self diagnostics and Fault Message system.
6.10 Miscellaneous

This Menu Choice gives access to a series of general ‘housekeeping’ parameters used by the gauge. Touch the blue button next to MISCELLANEOUS

<table>
<thead>
<tr>
<th>Miscellaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page 1</td>
</tr>
<tr>
<td><strong>Change Password</strong></td>
</tr>
<tr>
<td><strong>Instrument ID</strong></td>
</tr>
<tr>
<td><strong>Digits (Precision)</strong></td>
</tr>
<tr>
<td><strong>NIR Version</strong></td>
</tr>
<tr>
<td><strong>OI Version</strong></td>
</tr>
<tr>
<td><strong>Serial No</strong></td>
</tr>
</tbody>
</table>

Page 1

Change Password. This allows the default password of 0000 to be changed to any other four digit number. Touch the number to get the pop up numeric keypad and set the new four digit number.

Instrument ID: This allows the gauge to be given a discrete ID value that is used when multiple gauges and connected using an RS485 network.

Digits (Precision). This allows the number of digits after the decimal point to be set. The range is

<table>
<thead>
<tr>
<th>Digits</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>XX</td>
</tr>
<tr>
<td>1</td>
<td>XX.X</td>
</tr>
<tr>
<td>2</td>
<td>XX.XX</td>
</tr>
<tr>
<td>3</td>
<td>XX.XXX</td>
</tr>
</tbody>
</table>

NIR Version: This present the software version number of the code installed in the gauge CPU.

OI Version: This presents the software version number of the code installed in the display interface CPU

Serial Number: This is a field where the serial number of the gauge may be entered for future reference
Page 2
This page only has data when optional sensor heater control system is installed.

Target: This is the set point at which the heater will control the sensor temperature. Prop/Int/Deadband: These are the control parameters of the heater control module.

Page 3
Prod Code Lock. This locks the Product Code Selection requiring the user to enter a password to gain access to the code selection menu.

Solids. Activation of this feature makes the MCT360 readout in % solids rather than % moisture.
6.11 Analogs

This menu selection allows the analog output of the sensor to be scaled for the range of moisture being measured. Touch the blue button next to ANALOGS.

![Analogs Menu]

The UP arrow in the top left of the screen will select each of the three analog outputs available from the gauge.

Analog Hi: This is the value of moisture (or other constituent) at which the gauge will output 20 mA or 10V.

Analog Lo: This is the value of moisture (or other constituent) at which the gauge will output 4 mA or 0 volts

Output mA: This is the actual mA value that is being sent out the analog channel. Measuring the analog signal with a multimeter will give the same value as presented.

Output Mode: This allows the selection of either mA or Volts

Constituent: This allows either of the three measured constituents to be allocated to this Analog channel. Setting the value to 1 sends Constituent 1 out Analog channel 1, setting the value to 2 sends Constituent 2 out Analog channel 1 etc.
Trimming the Analog Output signals

The accuracy of the mA signal may be ‘tuned’ by using the Fix mA buttons and the Adjust button.

Instructions:

1. Touch the Fix 2 mA button.
2. Measure the mA output of the gauge
3. Touch the Adjust value to get the pop up numeric keypad. Enter the value measured in step 2. Touch the Enter key to correct the 2 mA reading.
4. Touch the Fix 18 mA button.
5. Measure the mA output of the gauge.
6. Touch the Adjust value to get the pop up numeric keypad. Enter the value measured in step 5. Touch the Enter key to correct the 18 mA reading.
7. Repeat step 2 and 5 to verify that the mA outputs are correct.
6.12 Field Bus

This menu selection provides setup details of any of the optional field bus interfaces that may be installed in the MCT sensor.

Ethernet & Ethernet IP

![Ethernet setup interface](image)

Profibus

![Profibus setup interface](image)
7.0 Accessories

7.1 Window Air Purge Assembly

This assembly installs around the optical window to protect it from air borne contaminants. Air is connected via the ¼ inch (6mm) pipefitting and a sintered insert disperses the air around the optical window.

Clean, dry, oil free air at 2-3 psig < 5 scfm should be connected. Only a nominal supply is required, high airflow in the tube tends to create a vortex and actually sucks dust into the tube.

7.2 Product Loss Sensors

These are photoelectric proximity sensors that mount to the sensor. They “sense” the presence of the product under the sensor. When the product disappears they provide an input contact to the HOLD input in the Operator Interface, to freeze the sensor’s readings and analog outputs until the product returns.

7.3 Network Interfaces

The MCT360 may be fitted with a variety of interface modules that provide the sensor’s output data in the correct format for the network into which it is operating. Refer to the instructions provided with each option module for installation and output formats.

7.4 Cooling System

The MCT360 sensor may be fitted with a cooling system to allow the sensor to be installed in environments where the temperature is greater than 70 C (158 F). The cooling tube is molded into the base of all MCT360 sensors and may be used with either water or air-cooling media. When used with air-cooling a Vortec Cooling Element will be provided. This element provides a stream of cold air to the panel. The requirements for either cooling media are as follows:

7.4.1 Air Cooling

Connect the Vortec cooling element to the inlet port on the cooling panel. Connect a ¼” (6mm) inlet tube to the inlet of the cooler element. Supply clean, dry air at 80 – 100psi (6-7 bars) to the cooler.

7.4.2 Water Cooling

Connect a ¼: (6mm) tube to the inlet and outlet connectors on the cooling panel. Supply cold water (65-80F/20-27C) at an approximate flow rate of 1cfm (0.3 liters/min).
8.0 Output Signals

The MCT360 has the following signal interfaces available for connection to other devices.

Analog Outputs:
Four, isolated 4-20mA or 0-10V (selectable).
Load resistance 500 ohms Max.

8.1 Serial Communications

The MCT360 provides a choice of serial output formats, RS232 and RS485.

RS232 is suitable for a single gauge to computer connection over a distance of up to 100 feet (30 meters).

RS485 is suitable for connection of multiple gauges on a cable up to 3 miles (4.86Km) long.

8.1.1 Serial Requirements

1. RS232/485: Baud Rate: 9600 to 38400 (9600 default)
   Parity: None
   Data Bits: 8
   Stop Bits: 1

2. Cables: RS 232: 9 pin ‘D’ serial cable wired pin to pin
   RS 485: Shielded twisted pair.
9.0 Customer Wiring Connections

All wiring connections are made to three quick-disconnect connectors mounted on the rear of the sensor enclosure. These connectors may have different signals coming to them from inside the sensor. The following diagrams show the standard configurations for these connectors.

**POWER**

<table>
<thead>
<tr>
<th>Terminal #</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Live</td>
</tr>
<tr>
<td>2</td>
<td>Neutral</td>
</tr>
<tr>
<td>Gnd Symbol</td>
<td>Ground</td>
</tr>
</tbody>
</table>

**ANALOG Connector – Standard configuration**

<table>
<thead>
<tr>
<th>Terminal #</th>
<th>Signal</th>
<th>Constituent #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gnd</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>4-20 mA</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Gnd</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>4-20 mA</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Gnd</td>
<td>3 Replaced by temperature if fitted</td>
</tr>
<tr>
<td>6</td>
<td>4-20mA</td>
<td>3 Replaced by temperature if fitted</td>
</tr>
</tbody>
</table>
DIGITAL Connector (RS232, RS485 & Hold) – Standard Configuration

<table>
<thead>
<tr>
<th>Terminal #</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RS485 A</td>
</tr>
<tr>
<td>2</td>
<td>RS485 B</td>
</tr>
<tr>
<td>3</td>
<td>RS232 Tx</td>
</tr>
<tr>
<td>4</td>
<td>RS232 Rx</td>
</tr>
<tr>
<td>5</td>
<td>Digital Gnd</td>
</tr>
<tr>
<td>6</td>
<td>Hold Input</td>
</tr>
</tbody>
</table>

Note:
When sensors are fitted with network interface cards this Digital connector may be wired to meet the network format or it may be replaced with the network’s approved connector.
Analog/Digital Connector

Use the end of the Dust Cover to un-screw the ‘Retaining Ring’ in order to remove the 6 pin connector.

The ‘Flat part’ of the connector fits into the ‘Housing’, mating with a similar ‘Flat part’.
10.0 Maintenance

Tools required for maintenance on the MCT sensor and Operator Interface are:

- Flat blade screwdriver
- 7/64” Allen Key
- 3/32” Allen Key
- 5/64” Allen key
- 1/16” Allen Key

10.1 Maintenance

The MCT requires little or no routine maintenance.

10.1.1 Sensor Window

The ‘Clean Window Software’ continuously monitors the cleanliness of the MCT window. When the system detects a dirty window, a warning message will be displayed on the OI screen. The window needs to be cleaned to remove the contamination from it. Use a soft lint-free cloth or paper towel and glass cleaner fluid to remove dirt from the window. **DO NOT USE AN ABRASIVE CLEANER TO CLEAN THE WINDOW.**

The window may be cleaned with the air purge shroud in place or the shroud may be removed to fully expose the window. Remove the four Allen screws that hold the shroud to the sensor. Clean the window and re-fit the shroud.

10.2 Self Diagnostic Warnings

The MCT has built-in self-diagnostic software that monitors key elements of the sensor’s operation. When this software detects a fault, it transmits a fault status bit out the serial port and presents a warning message on the Operator Interface. If the optional maintenance alarm board is fitted the alarm contact will also be triggered. **When any fault is activated the moisture and other active constituent displays will give a 0.0 reading. The analog output associated with these constituents will also go to 0.0mA (or 0.0 volts)**
The screen warning messages are:

<table>
<thead>
<tr>
<th>Screen Message</th>
<th>Description</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Signals</td>
<td>INT or EXT filters above 10.0</td>
<td>Check for proper product placement or no product</td>
</tr>
<tr>
<td>Low Signals</td>
<td>AGC Gain is above X64</td>
<td>Check for proper product placement or no product</td>
</tr>
<tr>
<td>High Motor Speed</td>
<td>Motor rpm above 3500</td>
<td>Call PSC</td>
</tr>
<tr>
<td>Low Motor Speed</td>
<td>Motor Speed below 950</td>
<td>Call PSC</td>
</tr>
<tr>
<td>Motor stopped</td>
<td>Wheel motion not detected</td>
<td>Call PSC</td>
</tr>
<tr>
<td>VCC Fault</td>
<td>High/Low 5v power</td>
<td>Measure 5v with multimeter</td>
</tr>
<tr>
<td>VN Fault</td>
<td>High/Low –15v power</td>
<td>Measure –15v with multimeter</td>
</tr>
<tr>
<td>VP Fault</td>
<td>High/Low +15v power</td>
<td>Measure +15v with multimeter</td>
</tr>
<tr>
<td>Dirty Window</td>
<td>Window contamination</td>
<td>Clean the window</td>
</tr>
<tr>
<td>High Board Temp</td>
<td>Internal Temp &gt; 65’</td>
<td>Fit Cooling System</td>
</tr>
<tr>
<td>Detector Fault</td>
<td>Detector Cooler Temp at 0.0C</td>
<td>Replace detector/cable</td>
</tr>
<tr>
<td>Cooler Fault</td>
<td>Cooler Drive above 75%</td>
<td>Replace detector/cable</td>
</tr>
</tbody>
</table>

**Note:** High and Low signals may occur when conveyor belts are empty due to the sensor ‘seeing’ a highly reflective or very dark conveyor. When the product returns the fault warning message will disappear and the sensor will operate correctly. If these fault messages appear when the sensor is viewing product then some form of corrective action is required.
10.3 Corrective Maintenance

The MCT sensor and Operator Interface are modular in construction and an experienced electronic maintenance technician can replace any damaged components.

The following components may be replaced in the field:

- Main Circuit Board
- Lamp
- Filter Wheel Motor
- Detector
- Power Supply
- Dome Mirror

Replacement of these parts requires that the MCT be removed from its plant location and brought to a clean room or maintenance shop.

MCT Enclosure

The MCT sensor has two-part cast aluminum housing. The two sections are held together by four machine screws. These screws are held captive in the bottom half of the housing. Unscrew the four screws and place the upper half to one side.

Lamp Replacement

This operation requires that the optical bench be removed from the bottom half of the sensor enclosure.

1. Unplug the analog cable from the main PCB.
2. Unplug the digital cable from the main PCB.
3. Locate the 6 screws that hold the optical bench into the enclosure.
4. Remove these screws and gently lift out the optical bench. The optical bench will still be connected to the power supply by the AC input cable. Remove this cable from the power supply.
5. Remove the two Allen screws that hold the power supply to the main board.
6. Disconnect the DC cable harness from the main board.
7. Unplug the lamp from the power supply.
8. Lay the sensor on its side and locate the two Allen screws that hold the lamp into the optical bench.
9. Remove both screws and take out the damaged lamp.
10. Install a new lamp assembly; do not touch the lamp glass with bare fingers.
11. Re-fit the retaining screws.
12. Re-connect the lamp to the power supply.
13. Re-connect the power supply harness and the power supply assembly to the main board.
14. Re-connect the AC cable to the power supply.
15. Re-install the optical bench in the bottom half of the enclosure.
16. Re-connect the Analog and digital cable to their respective sockets on the main board.
Motor Replacement

This operation requires that the optical bench be removed from the bottom half of the sensor enclosure.

1. Unplug the analog cable from the main PCB.
2. Unplug the digital cable from the main PCB.
3. Locate the 6 screws that hold the optical bench into the enclosure.
4. Remove these screws and gently lift out the optical bench. The optical bench will still be connected to the power supply by the AC input cable. Remove this cable from the power supply.
5. Remove the two Allen screws that hold the power supply to the main board.
6. Disconnect the DC cable harness from the main board.
7. Remove the four Allen crews that hold the dome mirror/detector plate assembly to the optical bench. Disconnect the detector from the main board and set the assembly aside.
8. Remove the two Allen screws that hold the motor in the optical bench. Unplug the old motor from the main board.
9. Install the new motor; connect it to the main board.
10. Re-install the dome mirror/detector plate assembly and re-connect the detector to the main board.
11. Re-connect the power supply harness and the power supply assembly to the main board.
12. Re-connect the AC cable to the power supply.
13. Re-install the optical bench in the bottom half of the enclosure.
14. Re-connect the Analog and digital cable to their respective sockets on the main board.

Main Board Replacement

This operation does not require the optical bench to be removed from the sensor enclosure.

1. Remove the top half of the sensor enclosure.
2. Remove the four Allen screws that hold the main board to the optical bench.
3. Gently lift up the main board and disconnect all the cable connectors from the board.
4. Connect the various connectors to the main board and locate the new board on the top of the optical bench.
5. Re-install the four Allen screws.

Note: A main board replacement will require that many of the MCT setup and calibration parameters, be re-configured to match the new boards’ operation with that of the original board. Consult PSC for advice on this.
Detector Replacement

This operation does not require the optical bench to be removed from the sensor enclosure.

1. Remove the top cover from the sensor.
2. Unplug the detector from the main board.
3. Remove the two Allen screws that hold the detector in place.
4. Install a new detector and re-fit the Allen screws.
5. Plug the detector to the main board.

Power Supply Replacement

This operation requires that the optical bench be removed from the bottom half of the sensor enclosure.

1. Unplug the analog cable from the main PCB.
2. Unplug the digital cable from the main PCB.
3. Locate the 6 screws that hold the optical bench into the enclosure.
4. Remove these screws and gently lift out the optical bench. The optical bench will still be connected to the power supply by the AC input cable. Remove this cable from the power supply.
5. Remove the two Allen screws that hold the power supply to the main board.
6. Disconnect the DC cable harness from the main board.
7. Lay the power supply assembly on the bench and take out the power supply module.
8. Install a new power supply on the plate. Make sure the insulating paper is fitted under the power supply.
9. Re-connect the power supply harness and the power supply assembly to the main board.
10. Re-connect the AC cable to the power supply.
11. Re-install the optical bench in the bottom half of the enclosure.
12. Re-connect the Analog and digital cable to their respective sockets on the main board.
## 11.0 Replacement Parts List

### Sensor

<table>
<thead>
<tr>
<th>P/N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>300035-6</td>
<td>Main Board (A1149-06)</td>
</tr>
<tr>
<td>200025</td>
<td>Power Supply (GPC408)</td>
</tr>
<tr>
<td>200022A</td>
<td>Detector Assembly</td>
</tr>
<tr>
<td>200019A</td>
<td>Lamp Assembly</td>
</tr>
<tr>
<td>360006A</td>
<td>Motor Assembly</td>
</tr>
<tr>
<td>200013</td>
<td>Dome Mirror</td>
</tr>
<tr>
<td>200010A</td>
<td>Sensor OI Cable Connector Assembly</td>
</tr>
<tr>
<td>300027A</td>
<td>Analog I/O Connector Assembly</td>
</tr>
<tr>
<td>300028A</td>
<td>Digital I/O Connector Assembly</td>
</tr>
<tr>
<td>300002A</td>
<td>Power Connector Assembly</td>
</tr>
<tr>
<td>300030</td>
<td>Analog/Digital Cable Plug</td>
</tr>
<tr>
<td>300032A</td>
<td>AC Power Cord – USA</td>
</tr>
<tr>
<td>300033A</td>
<td>AC Power Cord – UK</td>
</tr>
<tr>
<td>300034A</td>
<td>AC Power Cord – Europe</td>
</tr>
<tr>
<td>300031</td>
<td>I/O Connector Dust Cover</td>
</tr>
<tr>
<td>300003A</td>
<td>DC Power Harness</td>
</tr>
</tbody>
</table>
### Wall Operator Interface

<table>
<thead>
<tr>
<th>P/N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>210-350</td>
<td>LCD Module</td>
</tr>
<tr>
<td>900-125-02</td>
<td>LCD Interface Board</td>
</tr>
<tr>
<td>210008</td>
<td>Cable Connector Assembly</td>
</tr>
</tbody>
</table>
Appendix 1 – Special Features

Backdoor Password

If the password for the MCT360 has been forgotten or is unknown then a special ‘backdoor’ password will allow the user/engineer to view and change the old password.

To use this ‘backdoor’ system proceed as follows:

At the Password request enter the number 6811, and then press ENTER.

This will allow access to the SETUP SELECT Menu; then select the MISCELLANEOUS menu.

View or change the current PASSWORD.

Language Shortcut

To return the MCT screens to English from any other selected language enter 9999 at the password request. This will instantly set the language used on all screens to English.
Appendix II  Engineering Menu

The MCT360 gauge contains a ‘hidden’ engineering menu that presents several other customization functions of the gauge.

This menu should only be accessed by people experienced in the setup of the MCT360 for specific applications.

Access to the Engineering Menu is gained by using a special password.

At the password request enter the number 2882 and press ENTER. This will allow access to the menu. The parameters listed in the Engineering Menu are presented on six pages. Touch the page number to access each page.

Engineering Functions are separated into six different sub menus

GENERAL  CONSTITUENTS  CONSTANTS  THERMOCOUPLE
LANGUAGES  EEPROM
**GENERAL:** This submenu groups together some basis housekeeping functions of the gauge. As the same gauge software is used by the bench versions of the MCT360 some of the parameters presented may not be relevant to the MCT360 online gauge.

Damp Mode: This allows the moisture reading to be presented in a choice of three formats.

Damped: This is a running average mode with a time based smoothing applied.

RTA: This is a fixed time average mode whereby the gauge averages the reading over a selected time period and then presents the average at the end of the time period.

Gated: This is an average value calculated from an input contact closure to start and stop the averaging

Pre Gain: This parameter is a user selectable gain factor that is used to adjust the size of the reflected filter signals. It has three settings, 0, 1 and 2.

AGC Gain: This is the auto fine gain parameter as presented in Diagnostics

Bench: This parameter must be turned OFF for the MCT360 Online Gauge. However if the MCT360 is used as an offline gauge it may be switched on to use the Bench Style sample averaging function.

Dead Band: This is the range of the ‘static sample smoothing’ feature.
**Sampler: Insertion sample probe.**

Purge: This is the time over which the cleaning air blows into the sampler to eject any sample.

Fill: This is the time over which the sample is allowed to fill the sample cup.

Measure: This is the time over which the gauge calculates an average of the moisture content of the sample held in the cup.

Delay: This is a short time delay before the sequence repeats.

**Signal Gain System**

The MCT has a software adjustable preamp gain factor. This factor is the gain applied to the filter signals coming from the detector. The amplification applied is split into two components:

**Pre-Gain:** This is a manually settable course gain factor that selects a pre-amp gain resistor to amplify the detector signals.

Gain: This is a fine, software controlled, gain that amplifies the detector signal to achieve a value of 7.0v on the largest filter value.

**Pre-Gain and Gain adjustments:**

The Pre-Gain feature allows the pre-amplifier gain to be adjusted to allow the MCT to operate on a wide range of differing colored products. Very dark products do not reflect well and will need a higher pre-gain setting. Very white or light products reflect light well and will need a lower pre-gain setting. The Pre-Gain has four manually adjustable settings:

<table>
<thead>
<tr>
<th>Pre-Gain</th>
<th>Gain Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>x1</td>
</tr>
<tr>
<td>1</td>
<td>x10 (Default)</td>
</tr>
<tr>
<td>2</td>
<td>x15</td>
</tr>
<tr>
<td>3</td>
<td>x20</td>
</tr>
</tbody>
</table>

The Gain setting is a fine gain that is controlled by the microprocessor. It is automatically adjusted to set the filter values at a level of 7.0volts. If the gain value on the product goes above x10 then the Pre-Gain value needs to be increased.
CONSTITUENTS: This page allows for the number of gauge constituents to be turned off/on

Moisture Constituent: This constituent cannot be turned off

FuncAtro: This allows the moisture constituent to be set to operate in a DRY basis measurement format. See Appendix III for more details of this mode of moisture calculation.

Algorithm (Log): This allows the moisture constituent to use a log function in its measurement algorithm

Constituent 2 & 3: These constituents may be activated or deactivated and each may use the Log math function in their measurement algorithm.

Temperature: The Gauge may be fitted with an optional product temperature sensor. This parameter activates this option

Changing Constituent Titles: The Constituent Titles may be customized for different applications and/or languages. Touch the blue title name and a keypad will be presented. Type in the new name and touch ENTER to save it.

For Chinese and Russian language variants a list of pre-coded titles will be presented rather than a keypad. Select a title from the list and touch ENTER to save. If the list does not contain the desired title, then use the PSC Viewer software to change the title.
Qwerty keyboard for customizing Constituent Titles

First page of Chinese Constituent Titles
CONSTANTS: This page provides for the selection of the filters used by each measurement algorithm.
**Thermocouple:** This page allows for the setup and adjustment of the optional product temperature sensor that can be fitted to the gauge.

**Languages:** This page allows for the selection of the language used on the MCT300 screens.
**EEPROM**: This page allows the sensors software to be saved, restored or set back to the factory default settings.

**USE THESE COMANDS WITH CAUTION AS THEY WILL ERASE ANY CUSTOMIZED SETTINGS THAT MAY BE IN THE GAUGE**
Appendix III – Dry Basis Measurements

It is common for some industries, particularly the wood panel industry to calculate the moisture in the wood particles as a percentage of the dry material rather than a percentage of the wet material.

\[
\text{Wet \%} = \frac{\text{Wet Weight} - \text{Dry Weight}}{\text{Wet Weight}}
\]

\[
\text{Dry \%} = \frac{\text{Wet Weight} - \text{Dry Weight}}{\text{Dry Weight}}
\]

Conversion from Wet \% to Dry \% is as follows:

\[
\% \text{ Dry} = \frac{\% \text{ Wet}}{100-\% \text{ Wet}} \times 100
\]

Conversion from \% Dry to \% wet is as follows:

\[
\% \text{ Wet} = \frac{\% \text{ Dry}}{100+\% \text{ Dry}} \times 100
\]

The MCT360 may be configured to present moisture on a dry basis by selecting DRY: Y in the Engineering Menu.

This selection does the following to the sensor parameters:
1. The displayed moisture readings are presented in the Dry Basis.
2. An asterisk appears in front of the ‘Moisture’ word in the display to alert users that the sensor is in the DRY mode.
3. The Calibration routine is modified to allow dry basis RFM and laboratory values to be used.

Online Trim Adjustments

When operating in the Dry Basis Mode, a change to the Zero parameter of the calibration will not make the same adjustment to the moisture reading. This is because the moisture reading is being modified by the wet to dry conversion factor.

To allow users to make a simple trim adjustment to the sensors reading and additional calibration parameter is presented in the Cal parameters when in the Dry Basis Mode.

This is: OFFSET.

The default setting for it is 0.00.

To make a reduction in the displayed moisture reading of 0.5, make the OFFSET be –0.5.

To make an increase to the moisture reading of 0.8, make the OFFSET be + 0.8.

When initially calibrating a sensor ALWAYS set the OFFSET to 0.00.
Appendix IV - Calibration Check Standard – MCT360 Series

The Process Sensors Calibration Check Standard provides users of the MCT360 Series NIR Transmitters with a quick way of verifying that the sensor’s calibration has not altered over time.

The standard simulates moisture levels as follows:

<table>
<thead>
<tr>
<th>Color</th>
<th>Moisture Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>Low</td>
</tr>
<tr>
<td>Blue</td>
<td>High</td>
</tr>
</tbody>
</table>

Connection of the Standard to the MCT Sensor

Locate the standard on the light shroud. Make sure that the key on the Standard mates with the slot on the light tube and then tighten the hand screw to ‘lock’ the standard in place.

How to Use the Calibration Check Standards

The Check Standards should be used on a periodic basis, daily, weekly or monthly, to check that the sensor is remaining stable and thus giving the correct moisture values.

The standards may be used in two ways:

a) As a quick low/high check of the sensors’ reading. In this manner it allows users to gain confidence in the stability of the sensor and in the accuracy of the initial calibration.

b) As a way of transferring the calibration from one sensor to another. In this manner a newly purchased or repaired sensor can be quickly put into operation without the need for actual samples of product.

Quick Calibration Check

Using the standards to check the stability of the MCT360 requires that it be correctly calibrated using samples of the product(s) on which it is measuring. As soon as the sensor is satisfactorily calibrated, the reading of the low and high sides of the standard should to be noted.

1. Clip the standard onto the light tube.

2. Rotate the standard selector knob to the LOW position and tighten the locking nut.

3. With the MCT set on the same CAL Channel as used to measure the product, make a note of the MCT reading

4. Rotate the standard selector knob to the HIGH position and lock into place. Note the MCT360 reading.
At any time in the future, inserting the check standard, and selecting the respective reflectors, will give the same values as previously noted above. If the MCT does not give the same readings to +/- 0.2, then the calibration of the MCT360 may be in error.

**Using the Check Standards with multiple calibration channels**

When the MCT360 is operating with multiple calibration codes, it is important to only use the check standard on the same Cal Channel. The differences in the calibration coefficients for the various products (zero & span) will give different readings for the check standards.

Users may wish to use a vacant Cal Channel as a designated ‘CAL CHECK CHANNEL’. Doing this will allow two convenient values to be setup for the low and high standards.

To use this method, decide on a low reading for the low standard, say 2.0 and a high value for the high standard, say 8.0. Now use the calibration development routine to calculate the zero & span values that make the MCT360 sensor read the 2.0 and 8.0 values. As the Cal Development routine requires 3 data pairs, one set of values needs to be entered twice. Finally store this zero & span value in the CAL CHECK CHANNEL, say # 9.

When using the standards make sure that this CAL CHECK CHANNEL is selected prior to inserting the standards.

**Calibration Transfer**

Once the values given by the two standards are known for a specific product calibration, they can be used as ‘stable samples’ for calibrating other sensors.

The known values for the standards should be used as the LAB values in the Cal Development routine.

1. For a new or repaired sensor set the span to 25.0.
2. Select the Low standard and note the MCT360 reading.
3. Select the High standard and note the MCT360 reading.
4. Select the CAL DEVELOPMENT routine.
5. Enter the data pairs of MCT reading and known standard values. Enter the High standard twice to get the 3 data pairs.
6. Compute the zero and span values that will make the sensor read the values of the standards.
7. Save these settings in the desired Cal Channel.
Appendix V – Powder Sampler Accessory

The MCT Powder Sampler is an accessory that allows the MCT sensor to make measurements on products that are free falling inside enclosed ducts. It consists of a stainless steel tube, on the end of, which is a sample cup complete with glass viewing window. The sampler’s routine is controlled by s software routine in the sensor and an external solenoid valve. The routine allows the cup to fill, the sensor to make and average reading the sample is then ejected from the cup and the sequence repeats. A typical cycle time is 40 seconds.

Installation

The sampler should be located in the process duct so that the sampler cup extends into the product flow.

Insertion Depth

The length of the welding spud supplied with the sampler determines the insertion depth of the sampler. The following table gives the relationship between the length of the welding spud and the insertion depth of the sampler.

<table>
<thead>
<tr>
<th>Spud Length (inches)</th>
<th>Insertion Depth (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>102</td>
</tr>
<tr>
<td>3.5</td>
<td>89</td>
</tr>
<tr>
<td>3.0</td>
<td>76</td>
</tr>
<tr>
<td>2.5</td>
<td>64</td>
</tr>
<tr>
<td>2.0</td>
<td>51</td>
</tr>
<tr>
<td>1.5</td>
<td>38</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spud Length (inches)</th>
<th>Insertion Depth (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>102</td>
</tr>
<tr>
<td>4.5</td>
<td>114</td>
</tr>
<tr>
<td>5.0</td>
<td>127</td>
</tr>
<tr>
<td>5.5</td>
<td>140</td>
</tr>
<tr>
<td>6.0</td>
<td>152</td>
</tr>
<tr>
<td>6.5</td>
<td>165</td>
</tr>
</tbody>
</table>

Installation of the welding spud.

- Cut a 3.25” (82.5 mm) hole in the duct at the desired location.
- Cut the welding spud to the length that will give the insertion depth desired.
- Weld the spud to the duct around the hole. Ensure that one of the bolt holes is located at the 12 o’clock position.
- Bolt the sampler to the spud.
- Bolt the sensor to the sampler in the desired orientation. It may be installed in one of four positions. Sensor up, down, right or left.
Install a support bracket for the sensor. The sensor must not be left to hang from the sampler without any additional support!

The solenoid box should be mounted close to the installation of the sensor & sampler. A ¼” (6 mm) airline should be connected to inlet air port in the solenoid enclosure, and an air line from the solenoid box air outlet to the ‘tee’ fitting on the sampler.

The Operator Interface should be mounted at a convenient location for operator interaction AC power connected.

Connect a three-wire cable between the operator interface plug and the terminal strip in the solenoid enclosure as shown in the attached drawing.

Sequence Timer Setup

The time sequence for the cycles of the sampler is held in the sensor memory. Access to the times are made via the Engineering Menu selected from the Operator Interface. The times control the sequence that allows the sampler to fill with sample, the sensor to take a reading and then the sample to be ejected.

The sequence of events is as follows:

- Purge (Sample is blown out of the sample cup)
- Fill (Sample is allowed to fill the sample cup)
- Measure/sample (sensor will take a moisture reading)
- Delay (delay between the presentation of the moisture reading and the start of a new cycle)

It will take one cycle of the sampler before the sensor will present the moisture content of the sampled product.

The factory set time sequence of the sequence timer is as follows:

- Purge = 10 seconds
- Fill = 20 seconds
- Sample = 10 seconds
- Delay = 2 seconds.

These times can be adjusted to optimize the sequence to the flow rate of the product.
Changing the Sequence Times

Use the Operator Interface.
Select Miscellaneous from the main menu.
At the password request, set the password to 2882, then press ENTER.
This will access the Engineering menu.

Select General and set the sampler to be ON

**SAMPLER: ON**

Touch the number values for each item in the sampler cycle and enter the desired times access the times for the various cycles.

- **SAMP PURGE = 0010**
- **SAMP FILL = 0020**
- **SAMP MEAS = 0010**
- **SAM DELAY = 0002**
Connections for Sampler

Sampler (Air purge) connections.
Appendix VI MCT360 Series Default Parameters

**User Parameters** – No Password needed

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Moisture</th>
<th>Constit 1</th>
<th>Constit 2</th>
<th>Product Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero</td>
<td>-20.0</td>
<td>-40.0</td>
<td>-20.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Span</td>
<td>25.0</td>
<td>50.0</td>
<td>25.0</td>
<td>N/A</td>
</tr>
<tr>
<td>Damping</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Alarm High</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Alarm Low</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Analog High</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Analog Low</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Analog Output</td>
<td>mA</td>
<td>mA</td>
<td>mA</td>
<td>mA</td>
</tr>
<tr>
<td>Emissivity</td>
<td></td>
<td></td>
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<td>0.9</td>
</tr>
<tr>
<td>Type</td>
<td></td>
<td></td>
<td></td>
<td>IR/TC</td>
</tr>
<tr>
<td>Scale</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
</tbody>
</table>

Cooler Target 20C
Pre Gain X1
Password 0000
Inst ID 9
Digits 1
Prod Code Lock OFF
Solids OFF

**Heater Control**
Target 25
Prop 10
Int 0.6
Deadband 0.2

**Engineering Parameters** – Special Password needed

General
Damp Mode Yes
Bench OFF
Max Cal 50
Pre Gain 1
Dead Band 0.1
Cooler  ON
Sampler  OFF
When sampler is ON
Purge    10
Fill     20
Meas     10
Delay    2

**Constituents**
Moisture ON
Atro    OFF
Log     OFF
Constituent 2 OFF
Log     OFF
Constituent 3 OFF
Log     OFF
Temperature OFF

**Constants**
Moisture Constituent 2 Constituent 3
K1 = 1.0 K6 = 1.0 K4 = 1.0
C2 = 0.3 C5 = 1.0 C2 = 1.0
C3 = 0.7
All others 0.0 All others 0.0 All others 0.0
Declaration of Conformity
European Standards

Equipment: MCT360 Series Moisture Gauges

The above equipment complies with the following European Directives.


In order to achieve this, the instrument was tested to the following standards:

For EMC
EN55022 Class B. EN61000-3-2 and EN61000-3-3 Generic Emission standard for Residential, Commercial and Light Industry.

For LVD
EN61010-1 (1993) Safety requirements for electrical equipment for measurement, control and laboratory use-General requirements

Manger Responsible: Ian Johnson
Position: QC Manager
Date: August 1st 2009
If you have any questions or need technical service, please contact Process Sensors Corporation’s Technical Department:

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info@processsensors.com

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