Verifying the Calibrators Conductivity Calibration Module

The M300 Conductivity Calibration Module should be returned to Mettler Toledo Thornton periodically for “NIST Traceable” re-calibration. If desired it can be checked on site. A precision "NIST Traceable" resistance meter is needed to perform the verification. Each calibrator consists of nine precision resistors: six for the resistivity signal and three for the temperature signal.

Verify the Resistance Signal:
1. Connect one lead of the ohmmeter to pin #1 of the calibrator.
2. Connect the other lead of the ohmmeter to pin #6 of the calibrator.
3. Set the knob to a specific resistance value and measure the resistance. Compare the ohmmeter reading to the actual value printed on the calibrator label.
4. Repeat for the other resistance ranges.

Verify the Temperature:
1. Connect one lead of the ohmmeter to pin #4 of the calibrator.
2. Connect the other lead of the ohmmeter to pin #6 of the calibrator.
3. Set the knob to a specific temperature value and measure the resistance. Compare the ohmmeter reading to the actual value printed on the calibrator label.

If the calibrator is within performance limits (±0.1% for conductivity, ±0.5 ohms for 1K temperature, +/- 1.5 ohms for 3K temperature and +/- 0.325% for 66K temperature), a verification label can be applied to the calibrator to show the last verification date.

Limited Warranty
Mettler-Toledo Thornton, Inc. warrants products it manufactures against defects in materials and workmanship for 12 months from the date of shipment from Thornton. Items returned for warranty must be properly packaged, shipped prepaid and insured, and be accompanied by a Return Materials Authorization Number assigned by Thornton Customer Service.
6. Press the down key until “Verify” flashes.
7. Press the ENTER key.
8. Compare the readings on the display to the values on the M300 Calibrator label. Verify all ranges. If measurements are noisy, take the average of several readings for comparison.
9. If the instrument reading is within ±0.5% of the values for the resistance and temperature listed on the calibrator, the instrument is within proper calibration. However, a calibration may be performed to “fine tune” the instrument.
10. Repeat this procedure for the other channel if available.

* If you wish to obtain direct readings with calibrators in the normal measuring mode, it is necessary to select “None” for (temperature) Compensation and set the cell constants and temperature factors to “M” = 1.0000 and “A” = 0.0000 for the channel to be verified. After verification, set the Compensation and cell constant and temperature factors back to the settings for the particular sensor connected.

Instrument Calibration
Complete calibration covers the following ranges and resistance points.

<table>
<thead>
<tr>
<th>Range</th>
<th>Point 1</th>
<th>Point 2</th>
<th>Point 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance 1</td>
<td>1.0 Mohms</td>
<td>10.0 Mohms</td>
<td>–</td>
</tr>
<tr>
<td>Resistance 2</td>
<td>100.0 kohms</td>
<td>1.0 Mohms</td>
<td>–</td>
</tr>
<tr>
<td>Resistance 3</td>
<td>10.0 kohms</td>
<td>100.0 kohms</td>
<td>–</td>
</tr>
<tr>
<td>Resistance 4</td>
<td>1.0 kohms</td>
<td>10.0 kohms</td>
<td>–</td>
</tr>
<tr>
<td>Resistance 5</td>
<td>100 Ohms</td>
<td>1.0 kohms</td>
<td>–</td>
</tr>
<tr>
<td>Temperature</td>
<td>1000 Ohms</td>
<td>3.0 kohms*</td>
<td>66 kohms*</td>
</tr>
</tbody>
</table>

* Not used for conductivity sensor Pt1000 RTDs

To perform a calibration, press the Cal key on the M300. The display will show the following:

Calibrate Sensor
Channel A Conductivity

Use the up arrow key to toggle to:

Calibrate Meter
Channel A Resistance 1

You may now choose which channel of the meter to calibrate by pressing the right arrow key until “Channel A” flashes. Press the up arrow key to select the desired channel. Mettler-Toledo Thornton recommends that both channels be calibrated unless verification shows the channels to be within specification.

Press the ENTER key.

Set the dial on the M300 Calibrator to the 1M Resistance position and using the arrow keys, edit the Point1 value to equal the actual resistance value on the label of the M300 Calibrator.

Wait for the R1 value to stabilize and press the Enter key.

You are now ready to calibrate the second point of Resistance1. Set the dial on the M300 Calibrator to the 10M Resistance position and using the arrow keys, edit Point2 value to equal the actual resistance value on the label of the M300 Calibrator.

Wait for the R2 value to stabilize and press the Enter key.

Save Calibration Yes
Press ENTER to Exit

Press the ENTER key.

You have now successfully completed calibration of the resistance1 range
Repeat the above procedure for resistance ranges 2, 3, 4, 5 and Temperature range.