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It is the policy of NEWPORT to comply with all worldwide safety and EMC/EMI regulations that apply. NEWPORT is constantly pursuing certification of its products to the European New Approach Directives. NEWPORT will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct but NEWPORT Electronics, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, patient connected applications.

PATENT NOTICE: The “Meter Case Bezel Design” is a trademark of NEWPORT Electronics, Inc., registered in the U.S.. This product is covered by one or more of the following patents: U.S. Pat. No. Des. 336,895; 5,274,577 / CANADA 2052599; 2052600 / ITALY 1249456; 1250938 / FRANCE BREVET No. 91 12756 / SPAIN 2039150; 2048066 / UK PATENT No. GB2 249 837; GB2 248 954 / GERMANY DE 41 34398 C2. OTHER INTERNATIONAL PATENTS PENDING.

This device is marked with the international caution symbol. It is important to read the Setup Guide before installing or commissioning this device as it contains important information relating to safety and EMC.
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SECTION 1 GETTING STARTED

1.1 Unpacking

Remove the packing list and verify that you have received all equipment. If you have any questions, contact the nearest Customer Service Department, as listed on the cover of this manual.

Upon receipt of shipment, inspect the container and equipment for any signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

Note: The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing materials and carton in the event reshipment is necessary.

1.2 Safety and EMC Considerations

This instrument is a Class III device (8 to 50 Vdc). Always use a power supply, which complies with EN 60950 safety standard.

EMC Considerations

• Whenever EMC is an issue, always use shielded cables.
• Never run signal and power wires in the same conduit.
• Use signal wire connections with twisted-pair cables.
• Install Ferrite Bead(s) on signal wires close to the instrument if EMC problems persist.

Failure to follow all instructions and warnings may result in injury!

1.3 General Description

The MTX Series transmitter accepts platinum 100 ohm sensor type RTDs and will produce a standard 4-20 mA output signal proportional to that produced by its attached RTD input. The transmitter does NOT provide isolation between its input and the 4-20 mA output; therefore, an ungrounded RTD is suggested to prevent possible ground loops.

The transmitter provides amplification, common-mode rejection and controlling the current draw from an 8-to-50 Vdc source to produce the 4-to-20 mA output signal. As much as 800 ohms dropping resistance may be used in the power leads of the MTX when the unit is energized from a 24 Vdc source because of the small compliance voltage needed by the unit.
1.4 Available Ranges

As specified in Table 1-1, the transmitter has 10 ranges. Depending upon the range, the transmitter can measure temperature span as narrow as 180°F or as wide as 1000°F. A multi-turn, top-accessible potentiometer provides fine span tuning. A second top-accessible, multi-turn potentiometer provides a zero adjustment which allows placement of the 4-mA output temperature within +/- 25% for Fahrenheit and +/- 10% for Celsius of nominal span (refer to Section 3.0, Calibrating the Transmitter, for more details). Models MTX-*-L are transmitters with the 4-20mA output linearized to temperature.

Table 1-1. Range/Models

<table>
<thead>
<tr>
<th>Range</th>
<th>Model</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>-40 to 140°F</td>
<td>P01</td>
<td>P01-L</td>
</tr>
<tr>
<td>0 to 200°F</td>
<td>P02</td>
<td>P02-L</td>
</tr>
<tr>
<td>0 to 300°F</td>
<td>P03</td>
<td>P03-L</td>
</tr>
<tr>
<td>0 to 500°F</td>
<td>P04</td>
<td>P04-L</td>
</tr>
<tr>
<td>0 to 750°F</td>
<td>P05</td>
<td>P05-L</td>
</tr>
<tr>
<td>0 to 1000°F</td>
<td>P06</td>
<td>P06-L</td>
</tr>
<tr>
<td>-0 to 100°C</td>
<td>P07</td>
<td>P07-L</td>
</tr>
<tr>
<td>-0 to 150°C</td>
<td>P08</td>
<td>P08-L</td>
</tr>
<tr>
<td>-0 to 250°C</td>
<td>P09</td>
<td>P09-L</td>
</tr>
<tr>
<td>-0 to 400°C</td>
<td>P10</td>
<td>P10-L</td>
</tr>
</tbody>
</table>
1.5 Ordering Guide

The model number describes the functionality of the transmitter.

<table>
<thead>
<tr>
<th>Model</th>
<th>Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTX-P01</td>
<td>-40 to 140°F</td>
</tr>
<tr>
<td>P02</td>
<td>-0 to 200°F</td>
</tr>
<tr>
<td>P03</td>
<td>-0 to 300°F</td>
</tr>
<tr>
<td>P04</td>
<td>-0 to 500°F</td>
</tr>
<tr>
<td>P05</td>
<td>-0 to 750°F</td>
</tr>
<tr>
<td>P06</td>
<td>-0 to 1000°F</td>
</tr>
<tr>
<td>P07</td>
<td>-0 to 100°C</td>
</tr>
<tr>
<td>P08</td>
<td>-0 to 150°C</td>
</tr>
<tr>
<td>P09</td>
<td>-0 to 250°C</td>
</tr>
<tr>
<td>P10</td>
<td>-0 to 400°C</td>
</tr>
<tr>
<td>-L</td>
<td>4-20mA output linearized to temperature</td>
</tr>
<tr>
<td>FS</td>
<td><strong>Factory Scaling Option:</strong></td>
</tr>
</tbody>
</table>

**Factory Scaling available for additional charge. Consult factory.**

To order additional transmitters, write MTX followed by the model letter and number. For example:

MTX-P02 = RTD Transmitter with a temperature range of -0 to 200°F.

or

MTX-P02-L = RTD Transmitter with the 4-20mA output linearized to temperature and a temperature range of -0 to 200°F.

1.6 Shock Resistance

Lightweight MTX transmitter circuit boards are fabricated from rigid, shock resistant materials with the components soldered to the circuit board.

The MTX transmitter's small size permits mounting into thermowells or wall mounting in confined areas.
2.0 CONNECTING POWER AND SIGNAL INPUTS

1. Verify that the transmitter is connected for the correct power voltage rating.
2. Connect the power supply to pin 4 and the resistance load to pin 5.
3. Connect the sensor to pins 1, 2 and 3.

The transmitter has no power on switch, so it will be in operation as soon as you apply power.

![Figure 2-1 Power Input Setup](image)

+PS and -PS screws accept 2mm (13 gauge) or lighter wire. Input range is 8-50 Vdc.

<table>
<thead>
<tr>
<th>Table 2-1. Screw-Terminal Pin Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>

![Figure 2-2 Pin Assignment](image)
3.0 CALIBRATING THE TRANSMITTER

Calibration Setup:

1. Insert the reference RTD.
2. Connect RTD simulator.
3. Connect DMM monitor and power supply.

To calibrate the transmitter, follow these steps (refer to Figure 3-1):

1. Locate the model number in Table 3-1 or 3-2 and set the resistance source to the LO-IN value.
2. Adjust the Zero potentiometer until the milliammeter reads 4.00 mA.
3. Set the resistance source to the HI-IN value (in your appropriate table) and read the output current on the milliammeter.
4. Adjust the Span potentiometer to obtain the 20 mA on the milliammeter.
5. Set the resistance source to LO-IN resistance. If the output current is not 4.00 mA, repeat steps 2 through 7.
6. When calibration is complete, remove the transmitter from the setup.
3.0 CALIBRATING THE TRANSMITTER (Continued)

An RTD calibrator may be used in place of the resistance source - refer to Figure 3-2.

![Calibration Setup Diagram]

**Figure 3-2. Calibration Setup (RTD Simulator)**

**Table 3-1. Fahrenheit Temperature to OHMS Conversion Chart**

<table>
<thead>
<tr>
<th>Value</th>
<th>P01</th>
<th>P02</th>
<th>P03</th>
<th>P04</th>
<th>P05</th>
<th>P06</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTX-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>($)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LO IN</td>
<td>84.27 Ω</td>
<td>92.95 Ω</td>
<td>92.95 Ω</td>
<td>92.95 Ω</td>
<td>92.95 Ω</td>
<td>92.95 Ω</td>
</tr>
<tr>
<td>HI IN</td>
<td>123.24 Ω</td>
<td>135.85 Ω</td>
<td>156.96 Ω</td>
<td>197.71 Ω</td>
<td>246.74 Ω</td>
<td>293.56 Ω</td>
</tr>
</tbody>
</table>

**Table 3-2. Celsius Temperature to OHMS Conversion Chart**

<table>
<thead>
<tr>
<th>Value</th>
<th>P07</th>
<th>P08</th>
<th>P09</th>
<th>P10</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTX-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>($)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LO IN</td>
<td>100 Ω</td>
<td>100 Ω</td>
<td>100 Ω</td>
<td>100 Ω</td>
</tr>
<tr>
<td>HI IN</td>
<td>138.51 Ω</td>
<td>157.33 Ω</td>
<td>194.10 Ω</td>
<td>247.09 Ω</td>
</tr>
</tbody>
</table>
4.0 SPECIFICATIONS

INPUT
Configuration: Non-isolated input
Transducer types: Platinum RTD
Burnout indication: Upscale over-range indication, 40 mA max.

OUTPUT
Linear range: 4 to 20 mAdc
Current Output limits: <2 to >40 mA (open RTD)
Compliance (supply-voltage): 8 to 50 Vdc
Reverse polarity protection: 350 V peak
Maximum loop resistance: (Supply Voltage - 8V)/20 mA

ACCURACY
Hysteresis and repeatability: Within ±0.1% of FS
Linearity with respect to input: ± 0.1% of FS
For -L models: linearity with respect to temperature: ± 0.2% of FS
Power supply effect: Within ±0.01%/V
Temperature effect: Zero and Span: Within ±0.1% FS/°F

ENVIRONMENTAL
Operating temperature: -40 to 185°F (-40 to 85°C)
Storage temperature: -50 to 250°F (-45 to 121°C)
Humidity: To 90% (non-condensing)

MECHANICAL
Weight: less than 1.2 oz (34g)
Diameter: 1.75 in (44.34 mm)
Height (including barriers): 1.25 in (31.75 mm)
4.0 SPECIFICATIONS (Continued)

Figure 4-1. Case Dimensions

Figure 4-2. Transmitter Block Diagram
NEWPORT Electronics, Inc. warrants this unit to be free of defects in materials and workmanship for a period of one (1) year from the date of purchase. In addition to NEWPORT's standard warranty period, NEWPORT Electronics will extend the warranty period for one (1) additional year if the warranty card enclosed with each instrument is returned to NEWPORT.

If the unit should malfunction, it must be returned to the factory for evaluation. NEWPORT’s Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by NEWPORT, if the unit is found to be defective it will be repaired or replaced at no charge. NEWPORT’s WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of NEWPORT’s control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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Direct all warranty and repair requests/inquiries to the NEWPORT Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO NEWPORT, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM NEWPORT'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting NEWPORT:
1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR NON-WARRANTY REPAIRS, consult NEWPORT for current repair charges. Have the following information available BEFORE contacting NEWPORT:
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2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

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