MAGNA Temperature Input Large Digit Displays
Available for Pt100 RTD or Thermocouple Input

Features
- Choice of 2-1/4", 4", 6" or 8" digit heights, 4 digits.
- Choice of normal or outside viewing brightness
- Choice of panel mount, wall mount or suspension mount.
- Choice of 95-264 Vac or 11-30 Vdc power.
- Optional front panel programmable analog output, dual 5A relays, and serial data output.
- Standard PC programmable analog output and dual 120 mA AC/DC solid state relays.
- Sealed to NEMA-4 (IP65).
- Only 3.0" (75 mm) deep.

Description
MAGNA Series Large Digit Temperature Displays can be ordered for four RTD types (DIN Pt100, ANSI Pt100, nickel or copper), or for seven thermocouple types (J, K, T, E, N, R, S). Four red LED digits show temperatures in °C or °F and 1° or 0.1° resolution.

Viewing distances up to 320 ft (100 m) are achieved with large digits for reading across a plant floor or an outdoor yard. Four digit heights are available: 57 mm (2-1/4"), 102 mm (4.0"), 150 mm (5.9"), and 200 mm (7.9"). A rule of thumb is that viewing distance in feet is 40 times digit height in inches, or in metric terms, that viewing distance in meters is digit height in millimeters divided by 2. Segmented digits are used for normal brightness 2-1/4" and 4.0" digits. Individual 5 mm LED pixels are used for larger digits and for outdoor brightness versions.

The display consists of a MAGNA serial input display and a Laureate temperature transmitter with a streaming RS485 output. The transmitter can be mounted inside or outside of the display housing, as ordered. Remote transmitter mounting allows long RS485 cable runs while keeping the RTD or thermocouple leads short.

Environmental sealing to IP65 (NEMA-4X) is standard. Electrical connections are via watertight compression glands. A built-in heater is optional for outdoor operation down to -25°C. Mounting options are panel mount, wall mount or suspension mount.

Optional outputs are an isolated analog output, dual 5A relays for alarm or control, and an RS232 or RS485 serial data output. These options are implemented by add-on boards and are programmable from the display’s front panel keypad.

Standard outputs that come with the Laureate transmitter are an isolated analog output and dual 120 mA solid state AC/DC relays. Their setup requires connection to a PC via the transmitter’s RS485 port, and it uses Laurel’s free Instrument Setup Software.

Specifications

<table>
<thead>
<tr>
<th>Display</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Readout</td>
<td>4 red LED digits</td>
</tr>
<tr>
<td>Digit Height</td>
<td>57 mm (2-1/4&quot;), 102 mm (4.0&quot;), 150 mm (5.9&quot;), or 200 mm (7.9&quot;)</td>
</tr>
<tr>
<td>Brightness</td>
<td>Indoor or outdoor brightness as ordered.</td>
</tr>
<tr>
<td></td>
<td>Five keypad adjustable brightness levels.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Power (standard)</td>
<td>100-240 Vac</td>
</tr>
<tr>
<td>DC Power (optional)</td>
<td>11-30 Vdc</td>
</tr>
<tr>
<td>Max Consumption</td>
<td>30 VA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RTD Input (if ordered)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration, Pt 100 DIN</td>
<td>Per IEC 751 (ITS-90)</td>
</tr>
<tr>
<td>Calibration, Pt 100 ANSI</td>
<td>NIST Monograph 126</td>
</tr>
<tr>
<td>Calibration, Ni 120</td>
<td>DIN 43760</td>
</tr>
<tr>
<td>Max error at 25°C, Pt100</td>
<td>± 0.04°C (±0.07°F) ± 0.01% of reading</td>
</tr>
<tr>
<td>Span tempco</td>
<td>± 0.003% of reading/°C</td>
</tr>
<tr>
<td>Zero tempco</td>
<td>± 0.03 deg/deg</td>
</tr>
<tr>
<td>Provision for calibration</td>
<td>Multiplier of RTD resistance plus offset in degrees</td>
</tr>
<tr>
<td>Connection</td>
<td>2, 3 or 4-wire</td>
</tr>
<tr>
<td>RTD Metal</td>
<td>Alpha</td>
</tr>
<tr>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>Platinum (DIN)</td>
<td>0.003850</td>
</tr>
<tr>
<td>Platinum (ANSI)</td>
<td>0.003902</td>
</tr>
<tr>
<td>Nickel</td>
<td>0.00672</td>
</tr>
<tr>
<td>Copper</td>
<td>0.00427</td>
</tr>
</tbody>
</table>

**Thermocouple Input (if ordered)**

- Calibration
- Overall Accuracy at 25°C ±0.01% of full span ± conformity error
- Span Tempco ±0.003% of reading/°C
- Reference Junction Accuracy 0.5°C, 10°C to 40°C
- Span Tempco ±0.003% of reading/°C
- Input Resistance 1 GΩ
- InputCurrent 100 µA
- Max Lead Resistance 1 kΩ max for rated accuracy
- Overvoltage Protection 125 Vac
- NMR at 50/60 Hz 80 dB plus selectable digital filter
- CMR, DC-60 Hz 120 dB with 500 ohm imbalance
- CMV, DC-60 Hz 250 Vac from power and earth grounds

<table>
<thead>
<tr>
<th>Thermocouple Types</th>
<th>Thermocouple Range</th>
<th>Conformity Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>-210°C to +760°C (-347°F to +1400°F)</td>
<td>±0.09°C (±0.16°F)</td>
</tr>
<tr>
<td>K</td>
<td>-244°C to +1372°C (-408°F to +2501°F)</td>
<td>±0.1°C (±0.17°F)</td>
</tr>
<tr>
<td>T</td>
<td>0°C to +400°C (32°F to 752°F) -257°C to 0°C (-430°F to +32°F)</td>
<td>±0.03°C (±0.05°F) ±0.2°C (±0.36°F)</td>
</tr>
<tr>
<td>E</td>
<td>-240°C to +1000°C (-400°F to +1830°F)</td>
<td>±0.18°C (±0.32°F)</td>
</tr>
<tr>
<td>N</td>
<td>-245°C to +1300°C (-410°F to +2370°F)</td>
<td>±0.10°C (±0.17°F)</td>
</tr>
<tr>
<td>R</td>
<td>-45°C to +1768°C (-49°F to +3214°F)</td>
<td>±0.17°C (±0.31°F)</td>
</tr>
<tr>
<td>S</td>
<td>-46°C to +1768°C (-51°F to +3213°F)</td>
<td>±0.12°C (±0.22°F)</td>
</tr>
</tbody>
</table>

**Analog Output (with option board)**

- Output Levels 0-20 mA or 4-20 mA into 0 to 500 Ohms, 0.4 µA resolution. 0-10V into loads > 600Ω, 0.2 mV resolution. -10 to+10V into loads > 600Ω, 0.4 mV resolution.
- Resolution 16 bits
- Accuracy 0.1% of range
- Stability 50 ppm/°C
- Output Isolation Isolated from input and power
- Scaling From front panel keypad
- Special Features Forward or reverse action possible

**Relay Outputs (with option board)**

- Relay Type 2 Alarms rated 5A, 250VAC, SPDT
- Relay Setup From front panel keypad
- Special Features Adjustable hysteresis Manual or automatic in-flight compensation. Energize or de-energize on trip. Adjustable timers to set energize and de-energize delays. In-band and out-of-band alarm function.

**Serial Data Output (with option board)**

- Output Types RS232 or RS485, addressable, on demand or continuous output.
### Special Features
- Can include time and date with RTC option fitted.

### Analog Output (standard from transmitter)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Levels</td>
<td>4-20 mA, 0-20 mA, 0-10 Vdc, -10 to +10 Vdc (selectable)</td>
</tr>
<tr>
<td>Output Isolation</td>
<td>16 bits (65,536 steps)</td>
</tr>
<tr>
<td>Output Error</td>
<td>±0.02% of output span ± overall input error</td>
</tr>
<tr>
<td>Compliance at 20 mA</td>
<td>10V (0-500Ω load)</td>
</tr>
<tr>
<td>Compliance at 10V</td>
<td>2 mA (5 kΩ load or higher)</td>
</tr>
<tr>
<td>Output Isolation</td>
<td>250V rms working, 2.3 kV rms per 1 minute test</td>
</tr>
<tr>
<td>Step Response Time</td>
<td>100 ms</td>
</tr>
</tbody>
</table>

### Relay Outputs (standard from transmitter)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay Type</td>
<td>Two solid state relays, SPST, normally open, Form A</td>
</tr>
<tr>
<td>Load Rating</td>
<td>120 mA at 140 Vac or 180 Vdc</td>
</tr>
<tr>
<td>Special Features</td>
<td>Actuate above or below setpoint, latching or non-latching, disabled</td>
</tr>
<tr>
<td></td>
<td>Span hysteresis, split hysteresis, deviation band around setpoint</td>
</tr>
<tr>
<td></td>
<td>Programmable output time delay, 1 to 128 readings</td>
</tr>
</tbody>
</table>

### Environmental

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Temperature</td>
<td>-20°C to +55°C</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0°C to 50°C, non-condensing.</td>
</tr>
<tr>
<td>Sealing</td>
<td>-25°C to 50°C, non-condensing, with MHT AC heater option.</td>
</tr>
<tr>
<td>Electrical Connections</td>
<td>NEMA-4 (IP65) standard, all-round</td>
</tr>
<tr>
<td>Mounting</td>
<td>Wall mount, suspension mount, or panel mount</td>
</tr>
</tbody>
</table>

### Number of Digits & Case Dimensions

<table>
<thead>
<tr>
<th>Display Format</th>
<th>![Display Format Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digit height</td>
<td>Case width x height</td>
</tr>
<tr>
<td>57 mm (2.2&quot;) digits</td>
<td>376 x 155 mm (14.8&quot; x 6.1&quot;)</td>
</tr>
<tr>
<td>102 mm (4.0&quot;) digits</td>
<td>434 x 196 mm (16.7&quot; x 7.7&quot;)</td>
</tr>
<tr>
<td>150 mm (5.9&quot;) digits</td>
<td>514 x 247 mm (20.2&quot; x 9.8&quot;)</td>
</tr>
<tr>
<td>200 mm (7.9&quot;) digits</td>
<td>664 x 298 mm (26.1&quot; x 11.7&quot;)</td>
</tr>
<tr>
<td>Case depth</td>
<td>75 mm (3.0&quot;)</td>
</tr>
</tbody>
</table>

### Notes:
- Models with 57 mm (2.2") digits come with the larger 6-digit case.
- For panel mount versions, add 18 mm (0.7") to case width and height for the bezel and 25 mm (1.0") for cable glands in back of the case.
## Ordering Guide

Create a model number in this format: **M84-P385C-MAO1-MT2**

<table>
<thead>
<tr>
<th>Base Model</th>
<th>M24UM</th>
<th>2” (57 mm) digit height, 4 digits. Display to 8.8.8.8.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M44</td>
<td>4” (102 mm) digit height, 4 digits. Display to 8.8.8.8.</td>
</tr>
<tr>
<td></td>
<td>M64</td>
<td>6” (150 mm) digit height, 4 digits. Display to 8.8.8.8.</td>
</tr>
<tr>
<td></td>
<td>M84</td>
<td>8” (200 mm) digit height, 4 digits, Display to 8.8.8.8.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signal Input</th>
<th>P385C</th>
<th>Pt100 DIN RTD, -202°C to 850°C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P385F</td>
<td>Pt100 DIN RTD, -331°F to 1562°F</td>
</tr>
<tr>
<td></td>
<td>P392C</td>
<td>Pt100 ANSI RTD, -202°C to 631°C</td>
</tr>
<tr>
<td></td>
<td>P392F</td>
<td>Pt100 ANSI RTD, -331°F to 1168°F</td>
</tr>
<tr>
<td></td>
<td>N672C</td>
<td>Ni120 RTD, -100°C to +260°C</td>
</tr>
<tr>
<td></td>
<td>N672F</td>
<td>Ni120 RTD, -148°F to +500°F</td>
</tr>
<tr>
<td></td>
<td>C427C</td>
<td>Cu10 RTD, -100°C to +260°C</td>
</tr>
<tr>
<td></td>
<td>C427F</td>
<td>Cu10 RTD, -148°F to +500°F</td>
</tr>
</tbody>
</table>

**Note:** The same RTD signal conditioner can be user configured for all RTD types listed and °C or °F, as well as for resistance ranges 0 to 20, 200, 2K, 20K, 200K ohms. Indicate if signal conditioner is to be inside main housing or remote.

<table>
<thead>
<tr>
<th>Signal Input</th>
<th>JC</th>
<th>Thermocouple Type J, -210°C to 760°C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>JF</td>
<td>Thermocouple Type J, -347°F to 1400°F</td>
</tr>
<tr>
<td></td>
<td>KC</td>
<td>Thermocouple Type K, -347°C to 1372°C</td>
</tr>
<tr>
<td></td>
<td>KF</td>
<td>Thermocouple Type K, -408°F to 2501°F</td>
</tr>
<tr>
<td></td>
<td>TC</td>
<td>Thermocouple Type T, -257°C to 400°C</td>
</tr>
<tr>
<td></td>
<td>TF</td>
<td>Thermocouple Type T, -430°F to 752°F</td>
</tr>
<tr>
<td></td>
<td>EC</td>
<td>Thermocouple Type E, -240°C to 1000°C</td>
</tr>
<tr>
<td></td>
<td>EF</td>
<td>Thermocouple Type E, -400°F to 1830°F</td>
</tr>
<tr>
<td></td>
<td>NC</td>
<td>Thermocouple Type N, -240°C to 1000°C</td>
</tr>
<tr>
<td></td>
<td>NF</td>
<td>Thermocouple Type N, -410°F to 2370°F</td>
</tr>
<tr>
<td></td>
<td>SC</td>
<td>Thermocouple Type S, -46°C to 1768°C</td>
</tr>
<tr>
<td></td>
<td>SF</td>
<td>Thermocouple Type S, -51°F to 3214°F</td>
</tr>
<tr>
<td></td>
<td>RC</td>
<td>Thermocouple Type R, -45°C to 1768°C</td>
</tr>
<tr>
<td></td>
<td>RF</td>
<td>Thermocouple Type R, -49°F to 3213°F</td>
</tr>
</tbody>
</table>

**Note:** The same signal conditioner can be user configured for all thermocouple types listed and °C or °F. Indicate if signal conditioner is to be inside main housing or remote.

<table>
<thead>
<tr>
<th>Analog Output Board</th>
<th>MAO1</th>
<th>4-20 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MAO2</td>
<td>0-10V</td>
</tr>
<tr>
<td></td>
<td>MAO3</td>
<td>0-10V to +10V</td>
</tr>
</tbody>
</table>

**Note:** Front panel programmable. At time of order, specify factory default reading for top and bottom of output range.

<table>
<thead>
<tr>
<th>Relay Output Board</th>
<th>MRL1</th>
<th>Two 5A, 250 Vac relays</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MRL2</td>
<td>Four 5A, 250 Vac relays</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Serial Data Output Board</th>
<th>MO232</th>
<th>RS232</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MO485</td>
<td>RS485 with Modbus ASCII</td>
</tr>
</tbody>
</table>

| Standard Outputs  | - Isolated 4-20 mA, 0-20 mA, 0-10V, -10 to +10V analog output, and two 120 mA AC/DC solid state relays. Requires PC for programming. |

<table>
<thead>
<tr>
<th>Case and Mounting</th>
<th>MT1</th>
<th>Panel mount, black NEMA-4 (IP65) case</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MT2</td>
<td>Wall mount, black NEMA-4 (IP65) case</td>
</tr>
<tr>
<td></td>
<td>MT3</td>
<td>Suspension mount, black NEMA-4 (IP-65) case</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meter Modifying Options</th>
<th>MRDLV</th>
<th>Daylight viewing brightness instead of normal indoor brightness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MHTR</td>
<td>AC heater for operation down to -25°C (-13°F)</td>
</tr>
<tr>
<td></td>
<td>MPS2</td>
<td>11-30 Vdc power instead of normal 85-265 Vac power</td>
</tr>
</tbody>
</table>