

NEW

4-20mA TRANSMITTING PANEL METER WITH SERIAL I/O, MATH FUNCTIONS & ALARMS

**MODEL
TPM****FEATURES:**

- Large 0.6" 4 1/2 LED Digits
- 750 OHM Load or Free 100 OHM Load on 4-20 Out
- 4-20 & 0-20mA Outputs
- 10-32VDC Power Input or 5VDC or 100-240VAC
- RS232, 485 & USB I/O
- Relays & O.C.T. Output
- V/mADC & RMS, TC, RTD, S-G, pH, ORP, %RH, Frequency Inputs and more
- CMTBF.: >100,000 Hours
- **OTEK's** Exclusive Lifetime Warranty

**OTHER 1/8 DIN PRODUCTS:**

- SPM: Signal Powered Meter
- Din-Bar: Bargraph Meter
- OJ2000: 8" Digits DPM
- HI-Q112: Serial In Display
- See www.otekcorp.com-selection charts

SPECIFICATIONS @ 25°C

- Accuracy & Linearity: $\pm 0.05\%$ of F.S.
- C.M.R.R.: 100dB @ 50-60Hz
- Temperature Coefficient: ± 100 PPM/°C
- Conversion Rate: 2.5/Second
- Step Response: 0.1 Sec. 0-90%
- Output Load: 0-750 or 0-100 OHMS
- Baud Rate: 1200 - 19.2KB
- Protocol: ASCII (8N1)
- Temp. Range: -20 + 70°C
- Humidity: 5-95% RH N.C.
- Housing: ABS, 94VO/Metal
- Nuclear: To 10CFR50C (Class 1 E)
- Mil-Spec: To Specifications
- Connector: Screw Terminal

DESCRIPTION:

Now you can eliminate your 4-20mA transmitter and bring your sensors signal directly to the **TPM**, monitor it, display it, transmit it and control your process with one compact meter-transmitter. The **TPM** will condition/excite your sensor, display the process, transmit (4-20mA and/or serial) the data and control it (4-20mA or relays). The **TPM** can be powered from your existing 24VDC power supply (typical) or we can put a DC-DC Isolated Converter to accept 5-48VDC or 100-240VAC 50-60Hz power supply. The modular construction of the **TPM** allows **OTEK** to install any signal conditioner (our 30+ years Library keeps on growing) listed and if we don't have it, we will make it.

The Transmitter: Programmable for either 0-16mA or 4-20mA and can operate as low as 5VDC plus your load. The DAC has a resolution of 15 Bits (10 μ A)! With 5VDC power you can drive up to 100 OHM loads (2V) with 24 VDC or 100-240VAC you can drive up to 750 OHM loads (15V).

The Communications: You can order the **TPM** with or without the main **CPU**. Without it: all calibrations and scaling are done via the front panel zero and span. Range, D.P. selection, DAC output (4-20mA) and other features are via internal jumpers. With the **CPU** you have Serial I/O (RS232, 485 or USB) access to all configuration menus via the Serial Port including Polynomials and math (+, -, X, \div , & square root) and X-Y tables for linearization, alarm set points (serial out), range selection, peak & hold, etc. and can even use your **TPM** as a remote display and computer controlled transmitter. Imagine the possibilities! (SCADA, DCS, Intranet).

Alarms: The **TPM** has 4 relays (SPST, N.O., N.C. on request) or 8 **O.C.T.** N.O. that are controlled by the **CPU** hence Serial I/O must be ordered (See Notes 3 & 6).

The Grades: A. Industrial (I) - See Specifications, B. Nuclear (N) - To 10CFR50-B through our qualifier **NI** and C. Mil-Specs (M) - To specific requirements.

The Power Inputs: A. Non-Isolated 5VDC, B. Isolated 24VDC +/- 10%, C. Isolated 100-240VAC 50-60Hz and D. Custom to your needs.

If You Don't See It,
Ask For It!

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USA



TPM continued

THE SIGNAL CONDITIONERS

Options 04-08: VDC Externally

Powered: Input impedance is 10 Mega Ohms on all VDC ranges.

Specs: See Front Page

Connections:

10KHz ($\pm 0.1\%$ for 10-20KHz) and SCR;s fired to $\pm 1\%$. Input impedances vs. range are the same as for VDC & mADC ranges.

Connections:

Option 25: Strain-Gage ($\geq 1K < 5K$ Ohm): These are typically "Monolithic" **S-G** that require constant current (preferably) excitation. We use 100 μ A and diff. op. amp for high stability and accuracy. **Specify** your S-G impedance and sensitivity and the **TPM's**

Option 09: Custom: Use this option to describe any custom input, scale or modification to the **TPM** and contact us for feasibility and cost.

Connections:

Option 23: 5Amps AC: Specifically for current transformers (**C.T.**) this option requires an externally mounted (supplied) 0.05 Ohm, 0.1% 3 Watt resistor. You can mount the "Shunt" at your **C.T.** or next to the **TPM** but make sure the connections are "Perfect" to electrical codes. The C.T. might have "**Lethal**" **High Voltage** without a "Shunt" (Open) and the **TPM** will "Smoke". See OTEK's New **ACS** & **CTT** models for **C.T.** powered instruments (Patent Pend.)

Connections:

Option 26: RTD (PT100): We excite your 2 or 3 or 4 wire RTD with 200 μ A to avoid the "self heating" effect. The range of the **TPM** is the same as your **RTD** typically -200 $^{\circ}$ C to +800 $^{\circ}$ C (-328 + 1562 $^{\circ}$ F). You can place the decimal point at will (typically -200.0 to 800.0 (-328.0 to 1562.0)). The **PT100** has a temperature coefficient of 0.00385 Ohms/Ohm/ $^{\circ}$ C. (For legacy 0.00392 TC (known as ANSI 392) contact **OTEK** and use Option "09".)

Connections:

Note: For 2 wire, jump - S to - E and +S to +E. For 3 wire only Jump -S to -E.

Options 10-13: 200 μ A - 200mADC:

Since the **TPM** is 200mV full scale (20,000 Counts) the "Shunt" resistors used are 1K, 100, 10 or 1 Ohm. Don't forget that maximum display is 19,999 not 20,000!.

Connections:

Option 24: Strain-Gage (350 Ohm Type): Here we use a "tracking" \pm excitation of ± 2.5 VDC and a differential amplifier to convert the 2 or 3mV/V (typical) sensitivity of your "Loadcell". Specify your Strain-Gage sensitivity and full scale and the **TPM's** display at Zero and Full Scale Please!

Connections:

Option 27: RTD (PT1000): Same as PT100 except it is 1000 Ohms at 0 $^{\circ}$ C instead of 100 Ohms @ 0 $^{\circ}$ C. The same technique is used for copper **RTD** (10 Ohm), contact **OTEK**. Same connections as Option 26 apply.

Connections:

Options 14-22: V & mA RMs:

Here we use a **True RMS-DC** Converter for accurate ($\pm 0.05\%$) measurement of sine waves up to

TPM continued

Option 28: Thermocouple (Type J):

This **TC** has a range of -210 to + 760°C (-350 + 1390°F). Its color is white (+) and Red (-), cold junction (CJ) is inside the **TPM** at the connector base. Make sure the connections from the **TPM** and your **TC** are as close to the **TPM's** entrance as possible to avoid errors. If you short out the **TPM's +TC & -TC** together, the **TPM** will read the ambient temperature due to its built-in C.J.C.

Connections:

Option 30: TC (Type K): This is yellow (+) and red (-) and has a range of -270 + 1370°C (-440 + 2500°F). The same notes as Option 28.

Connections:

Option 31: TC (Type T): This blue (+) and red (-) **TC** wire has the range of -270 + 400°C (-440 + 750°F). Same notes as Option 28.

Connections:

Options 32-33: Frequency Input:

We use an **F-V** to accept frequencies from 40 - 20KHz and amplitudes from 1-400V peak or dry contact or open collector transistor (O.C.T.). For 50 or 60Hz power line frequency measurement. Use Option # "33" or see our **ACS** Powerless™ Series.

Connections:

Option 34: %RH: This conditioner is designed to interface to a typical (capacitance type) 2-3pF/% of **RH** made by several manufacturers. Use Option "09" and contact **OTEK** to specify your sensor's specifications.

Connections:

Option 35: pH (Acidity): We use a FET input (10¹⁵) amplifier and calibrate the **TPM** for 0-14.00 pH using the Industry's standard ± 413 mV = ± 7pH co-efficient.

Connections:

Option 36: ORP (Oxygen Reduction Potential): Our FET amplifier (10⁹) accepts the industry standard 2000mV F.S. of the probe and the **TPM** displays it in % (0-100.00%).

Connections:

More: New Signal Conditioners will be added as per your requests and popularity, such as Ohms, Conductivity, Shock, Vibration, Position etc. Contact **OTEK**.

NOTES:

- 1. **Self Diagnostics:** The **TPM** will test all segments and I/O Signals for about 13 seconds on power up.

All Models Dec. Points, Peak & Hold: See User's Manual

TPM SERIES

ORDERING INFORMATION 1-27-09

Model: TPM-

<p>GRADE (1)</p> <p>I Industrial</p> <p>M Mil-Spec</p> <p>N Nuclear</p> <p>9 Custom (Please Specify)</p> <p>INPUT SIGNAL (4)</p> <p>04..... ±200mVDC</p> <p>05..... ±2VDC</p> <p>06..... ±20VDC</p> <p>07..... ±200VDC</p> <p>08..... ±50mVDC</p> <p>09 Custom (Specify)</p> <p>10..... ± 200µADC</p> <p>11..... ±2mADC</p> <p>12..... ±20mADC</p> <p>13..... ±200mADC</p> <p>14 200mV RMS</p> <p>15 2V RMS</p> <p>16 20V RMS</p> <p>17 200V RMS</p> <p>18 50mV RMS</p> <p>20 2mA RMS</p> <p>21 20mA RMS</p> <p>22 200mA RMS</p> <p>23 5 Amp RMS</p> <p>24..... Strain-Gage (350 Ohm)</p> <p>25 Strain-Gage (>1K Ohm)</p> <p>26 2, 3 or 4W RTD (PT100)</p> <p>27 2, 3 or 4W RTD (PT1000)</p> <p>28 TC (Type J)</p> <p>30 TC (Type K)</p> <p>31 TC (Type T)</p> <p>32 Frequency (40-20KHz)</p> <p>33..... Frequency (50-60Hz Line)</p> <p>34 % RH (Specify Sensor)</p> <p>35..... pH (0-14.00)</p> <p>36..... ORP (0-2000mV)</p>	<p>CASE</p> <p>0 Plastic</p> <p>1 Metal</p> <p>9 Custom (Specify)</p> <p>RANGE/CALIBRATION (4)</p> <p>0 Standard</p> <p>9 Custom (Specify)</p> <p>POWER INPUT & 4-20mA Out (2)</p> <p>0 Non-Isolated 5VDC and none</p> <p>1Non-Isolated 5VDC & 4-20mA(100Ω)</p> <p>2Isolated 5VDC & 4-20mA(100Ω)</p> <p>3 Isolated 24VDC and None</p> <p>4 Isolated 24VDC & 4-20mA(750Ω)</p> <p>5 Isolated 100-240VAC and None</p> <p>6 ...Isolated 100-240VAC & 4-20mA(750Ω)</p> <p>9 Custom (Specify)</p> <p>SERIAL I/O(3)</p> <p>0 None</p> <p>1 RS232</p> <p>2 RS485</p> <p>3 USB</p> <p>9 Custom(Specify)</p>
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NOTES:

1. Mil-Specs to your requirements. Nuclear: To 10CFR50-C (Class 1E)
2. Standard 100-Ohm Load Max. of 4-20mA out only available with 5VDC power (Options 1 & 2). 750 OHM load only available with Options 4 & 6.
3. Serial I/O is not isolated from the signal. Must have serial I/O to implement processor's functions (if req'd).
4. Specify calibration F.S. signal vs. display and 4-20mA out
Standard (Option 9:) FS = 0-10000 = 4-20mA

MECHANICAL INFORMATION

