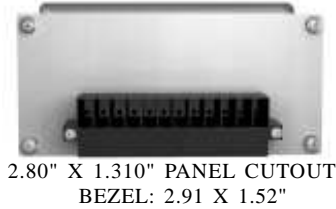


**WORLDS
FIRST**

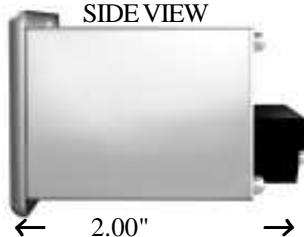
LOOP POWERED LED PANEL METER WITH SERIAL I/O & USB FOR I.S. - MIL-SPEC - NUCLEAR & INDUSTRIAL

**MODEL
LPE**

REARVIEW



SIDE VIEW



FEATURES:

- 4 1/2 0.6" LED Digits
- Low Burden: $\leq 5\text{VDC}$
- Metal or Plastic Housing
- Also 5-48VDC & 100-240VAC Powered
- RS232, 485 or USB I/O
- Captive Screw Terminal Connector
- NEMA 4X, EMI/RFI Gaskets
- Serial Input Remote Display
- No Feed Through Noise
- 28VDC Power For Transmitter
- Lifetime Warranty

Front View



NEW: VDC MULTIRANGE 2-500V!

SPECIFICATIONS @ 25°C (Industrial Grade)

DESCRIPTION

Another World's First By **OTEK**! To complement it's world's first **LCD** (Model LPM) **Loop Powered** Meter, **OTEK** developed the exact counter part of it but with super high efficiency 0.56" **LED** display, RS232E and all **Loop Powered**!

Several Configurations are Available:

1. **Loop Powered:** Just connect 2 wires (+ & - Loop)
2. **Loop Powered with RS232E:** Just connect 5 wires
3. **USB, 5, 12, 24 or 48VDC Input Power:** Just connect 4 wires
4. **100-240VAC Input Power:** Just connect 4 wires
5. **Power for Transmitter:** Just connect 4 wires
6. **Serial In Remote Display:** Just connect 3 wires

The Connector: Seismic Qualified Captive & Plug-In

The Housing: Aluminum Nickel Plated or Plastic, Seismic Qualified. Optional **Sanitary & Explosion Proof**.

Adjustments: Front panel adjustments, or via Serial Port.

The Serial I/O: (Optional): RS232E for Loop Powered RS232D, 485 or USB for external power.

The Grades:

- a. Intrinsically Safe (IS) by design, for CLI, Div. 1 & 2.
- b. Mil-Specs: To Your Requirements.
- c. Nuclear: 10CFR1050B
- d. Industrial: -10 + 70°C, 5-95% RH

The Technology: ASIC Nanotechnology for greater reliability.

Loop Powered Models:

- Burden: 5VDC Max. (7V For "S" Version)
- Max. Input Current: 36mA, Max. Volts: 30V
- Min. Input Current: 3.6mA
- Accuracy & Linearity: $\pm 0.01\%$ of F.S. ± 1 Digit
- Span Adjustment: ± 3000 Counts of F.S. (10,000)
- Zero Adjustment: ± 3000 Counts of Zero (00000)
- Standard Calibration: 4-20 = 0-10000, Others On Request
- Serial I/O: RS232E

NOTE: Display brightness is proportional to loop current.

Powered Models:

- Loop Burden: 0.5V @ 20mA; 25 Ohms (w/o microcontroller)
- Current Requirement @ 5V: 25mA (w/o microcontroller)
- Current Requirement @ 5V: 30mA (with microcontroller)
- Power Input: USB, 5VDC, 5-48VDC, 100-240VAC

OTHER SPECIFICATIONS

- Display: LED, 0.56" High, High Efficiency
- Input Type: Differential & Single Ended. 10M For VDC
- Common Mode R.R.: 100dB @ 50/60 Hz
- Conversion Rate: 2.5/Second
- Step Response: 0.8 Sec. (0-90% of F.S)
- Common Mode Voltage: $\pm 2\text{VDC}$
- Op./Storage Temp: -10 + 70/ -20 + 70°C
- MTBF: >100,000 Hours
- Serial I/O: RS232/485/USB, 300-19.2KB (8N1)
- RH: 5-95% RH Non-Condensing
- Temperature Coefficient: 50PPM/°C
- Plastic Case: 94VO Textured Black
- Metal Case: Aluminum Nickel Plated
- Sanitary Case: To 250°F Steam Cleaning
- Explosion Proof For Class I, Div. 1 & 2 Certified
- Decimal Points Only Available In Micro-Processor Versions (Serial I/O)

520-748-7900

FAX: 520-790-2808

E-MAIL: sales@otekcorp.com

http://www.otekcorp.com

OTEK™
CORP.
SINCE 1974

4016 E. TENNESSEE ST.
TUCSON, AZ. 85714 U.S.A.

MADE
IN
USA



THE SIGNAL CONDITIONERS:

Option 0: 4-20mA Powered:

First introduced in 1975, the current flows through a Zener and "Shunt" resistor. The Zener clamps the voltage to about 3.5 Volts and the voltage across the Shunt is measured and displayed. Because an LED acts as a Zener, instead of a Zener the LEDs of the backlite are used to power the meter. If the "burden" (3.5 - 4.5V) is too high for your application, use the externally powered Option 01.

Connections:

Red: +Loop

Black: - Loop

Options 1-8: Externally Powered:

It only needs 5VDC @ 30mA to operate (including the backlight or LEDs).

NEW: 2-500 VDC Multirange

(Requires external 2 deck switch for range & decimal point). Use Option #9 and specify multirange.

Option A: 4-30VDC Signal Powered:

Another OTEK innovation. The voltage signal powers an **LDO** to protect the **LPE** and a divider network is used to measure and display the signal. If the relatively low impedance (500 Ohms) and current (3-20mA) required by this Powerless™ technique is unacceptable, use Options 2-8 (externally powered).

Option B: 20-50VDC Powerless™

To this we add a Zener in series with the **LDO** (of Option 02) to extend its range. Use Options 2-8 if your signal cannot drive the **LPE's** load of about 1K Ohm and 20mA. Options A-B are used normally to monitor power supplies. Use Option "09" for 50V + input signals.

Option C & D:

These are higher sensitivity (10uV) versions of Option 5. Zin is 1 MEG Ohm. Same Connections.

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

Connections:

To Be Determined

Options E-M: V & mA RMs:

Here we use a **True RMS-DC** Converter for accurate ($\pm 0.05\%$) measurement of sine waves up to 10KHz ($\pm 0.5\%$, 10-20KHz) and SCR's fired to $\pm 2\%$. Input impedances vs. range are the same as for VDC ranges.

Option N: 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 **LPE** but make sure the connections are "Perfect" to electrical codes. The C.T. might have "**Lethal**" **High Voltage** without a "Shunt" (Open) and the **LPE** will "Smoke". See OTEK's New **ACS** models for **C.T.** powered instruments (Patent Pending).

Option P: Strain-Gage (<350Ohm

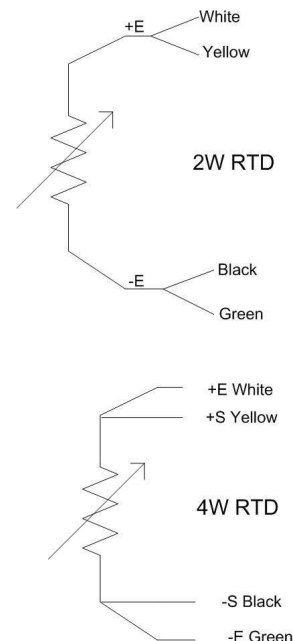
Type): Here we use a "tracking" \pm excitation of ± 2.5 VDC and a differential amplifier to convert the 2 or 3mV/V (typical) sensitivity of your "Loadcell". Specify your Strain-Gage sensitivity and full scale and the **LPE's** display at Zero and Full Scale Please!

Option Q: 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 **LPE's** display at Zero and Full Scale.

Option R: RTD (PT100):

We excite your 2, 3 or 4 wire RTD with 200uA to avoid the "self heating" effect. The range of the **LPE** is the same as your **RTD** typically -200°C to +800°C (-328 + 1562°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/°C. For 1000 Ohm RTD & legacy 0.00392 TC (known as ANSI 392) contact OTEK and use Option "09".



Option S: 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 **LPE** at the connector base. Make sure the connections from your **TC** are as close as possible to avoid errors and calibrate after connecting. If you short out the **LPE's** TC wires together, the **LPE** will read the ambient temperature due to its built-in C.J.C.

Contact OTEK for types "K," "T" and others.

Options T: 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.

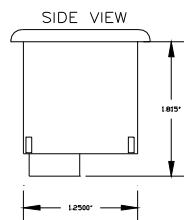
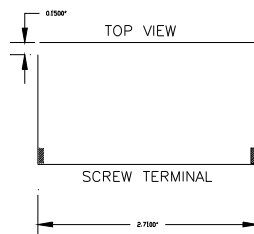
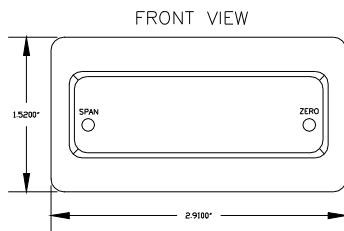
Option U: %RH: This conditioner is designed to interface to a typical (capacitance type) 2-3pF/% of **RH** made by several manufacturers. Use Option "09" and contact **OTEK** to specify your sensor's specifications.

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

Accuracy: +0.05% of F.S.

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

Option X: Hi Speed Peak & Hold (P&H): Now you can capture fast transients greater than 50 microseconds (even faster soon) with resolution greater than 0.1% of F.S. and retention of greater than 10 years (Due to OTEK's new and patent-pending **P&H Option**).



PANEL CUT-OUT
2.75" X 1.30"

Input: V or mADC (Specify Range). Contact **OTEK** for V/mA RMS or Loop Powered).

Accuracy: +/- 0.1% of F.S. +/- 1 Digit

Linearity & Resolution: +/- of F.S.

Response time: >20KHz (<50us)

Retention: >10 years (with power on).

Option Y: Signal Powered for VAC: No power supply req'd! Just connect to your P.T.(non-isolation) and display value. Analog meter replacement, range: 40-150VAC, 50-400Hz. Burden 0.1W, Accy.& Lin. +/- 0.5% of F.S.

Option Z: Signal Powered Amps AC: No Power Supply Req'd! Just connect to your C.T. & P.T. range: VAC: 40-150; AAC: 0-5Amp; 50-400Hz; burden; 0.1W Accy. & Lin.; +/- 0.5% of F.S.

Note: NO Isolation, use with P.T. & C.T. only. Must use shunt on C.T. 0.05% Ohm, 3W. **Warning** No isolation connect D.P. if req'd before Powering.

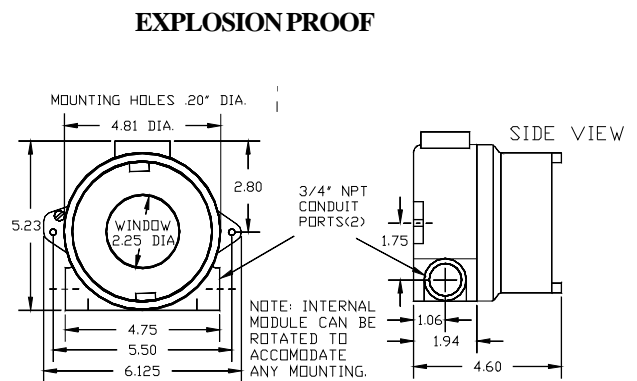
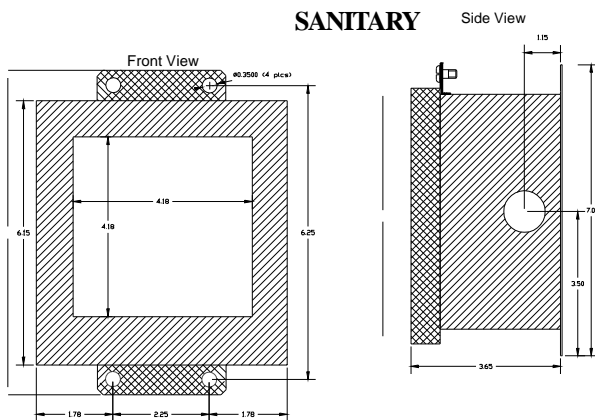
More: New Signal Conditioners will be added as per your requests and popularity, such as Ohms, Conductivity, Shock, Vibration, Position etc. Contact **OTEK**.

Connections: See User's Manual for typical connections.

NOTES:

1. Do Not Connect To Pins 1, 2 & 3 (For Special Functions Only)
2. Standard Serial I/O Settings are 8N1. 9600Kb Baud Rate, Address and Decimal Point are serially programmable.

For Loop Powered Just Connect "+ Loop" to Pin 6, "-Loop" to Pin 7. All Others See User's Manual at www.otekcorp.com/otekdwld/lpm-ledpmmanual.pdf



LPE SERIES

ORDERING INFORMATION 1-14-10

Model: LPE - 1 2 3 - 4 5 6 7 8

<p>GRADE (1)</p> <p>I Industrial</p> <p>M Mil-Spec</p> <p>N Nuclear (Contact Otek)</p> <p>S Intrinsically Safe</p> <p>9 Custom</p> <p>INPUT TYPE (2)</p> <p>0 4-20mA Loop Power</p> <p>1 External Power 4-20mA</p> <p>2 External Power 2mA F.S.</p> <p>3 External Power 20mA F.S.</p> <p>4 External Power 200mA F.S.</p> <p>5 External Power 2V F.S.</p> <p>6 External Power 20V F.S.</p> <p>7 External Power 200V F.S.</p> <p>8 External Power 2V Ratiometric</p> <p>9 Custom</p> <p>A Signal Powered 4-30VDC</p> <p>B Signal Powered 20-50VDC</p> <p>C ±200mVDC</p> <p>D ±50mVDC</p> <p>E 200mV RMS</p> <p>F 2V RMS</p> <p>G 20V RMS</p> <p>H 200V RMS</p> <p>J 50mV RMS</p> <p>K 2mA RMS</p> <p>L 20mA RMS</p> <p>M 200mA RMS</p> <p>N 5 Amp RMS</p> <p>P Strain-Gage (350 Ohm)</p> <p>Q Strain-Gage (>1K Ohm)</p> <p>R RTD (PT100)</p> <p>S TC (Type J)</p> <p>T Frequency (50-60Hz Line)</p> <p>U % RH (Specify Sensor)</p> <p>V pH (0-14.00)</p> <p>W ORP (0-2000mV)</p> <p>X High Speed Peak & Hold (2VDC)</p> <p>Y VAC Signal Powered (P.T.)</p> <p>Z AAC Signal Powered (P.T. & C.T.)</p>	<p>RANGE/CALIBRATION</p> <p>0 Standard</p> <p>9 Custom</p> <p>CASE STYLE (5)</p> <p>0 Standard Metal</p> <p>1 Standard Metal NEMA 4X</p> <p>2 Sanitary</p> <p>3 Explosion Proof</p> <p>4 Plastic</p> <p>9 Custom</p> <p>POWER FOR TRANSMITTER (3)</p> <p>0 None</p> <p>1 Included</p> <p>SERIAL I/O (4)</p> <p>0 None</p> <p>1 Parasitic (Loop Powered) RS232E</p> <p>2 Powered RS232D</p> <p>3 Powered RS485</p> <p>4 Powered USB</p> <p>9 Custom (Specify)</p>
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NEW: 2-500 VDC Multirange! Use #9 on 2nd digit & specify multirange.

NOTES:

1. Contact OTEK for M, N & S Grades. **“Intrinsically Safe”** by design. No Certificate Available Until Further Notice. Otek will build to certain MIL-standards but testing and confirmation of compliance, if required, will need to be done by a third party and at customer's expense.
2. Options 0, A, B, Y and Z must use Option 0 (Powerless) on Digit 3. Others must use Options 1-8 or 9 on Digit #3. See signal cond. description. Options R & S must specify range of interest within 300° (F or C) span. Contact OTEK for other RTD/TC types.
3. Power for transmitter (28VDC@20mA) NOT available with power input options 0 or 2.
4. Only RS232E is available with **Signal Powered**, others powered. Must have serial I/O to implement processor's functions (if required).
5. Maximum of 3 Units Inside Sanitary Case. Specify Option 9 and Describe.

POWER INPUT (2,3)

- 0 Non-Isolated Powerless™
- 1 Non-Isolated 5VDC
- 2 Non-Isolated 6-14VDC
- 3 Non-Isolated USB Powered
- 4 Isolated 5VDC +/- 10%
- 5 Isolated 12VDC +/- 10%
- 6 Isolated 24VDC +/- 10%
- 7 Isolated 48VDC +/- 10%
- 8 Isolated 100-240VAC
- 9 Custom

Other Case Compatible Models:
PM, BCDPM, LPM, LEDPM, HI-QREM

***TERMINAL DESCRIPTION (See Notes)**

1. Analog Ground N.U.
2. + Reference In N.U.
3. - Reference In N.U.
4. See User's Manual
5. See User's Manual
6. + Loop
7. - Loop
8. RXD/B/D+ (Receive In)
9. TXD/A/D- (Transmit Out)
10. See User's Manual
11. See User's Manual
12. See User's Manual

*See User's Manual at www.otekcorp.com/otekdwld/lpm-ledpmmanual.pdf