

WORDS
FIRST

LCD LOOP POWERED METER WITH SERIAL & USB I/O FOR I.S. - MIL-SPEC - NUCLEAR & HI-REL INDUSTRIAL

MODEL
LPM

4 1/2 DIGITS BACKLIT



Span

Zero



← 1.75 →

SIDE
VIEW

FEATURES:

- Full 4 1/2 Digits (.1.9.9.9.9) 1/2" High
- Loop Powered, Low Burden
- 100% Metal Housing Nickel Plated
- Captive Screw Terminal Connector
- Wide Zero & Span Adjustments
- Loop Powered Backlight
- NEMA 4X, EMI/RFI Gaskets
- RS232, 485 or USB I/O
- Remote Display With Serial Input
- No Input Reflected Noise
- Stand Alone/SCADA/DCS Use
- 28VDC Power For Transmitter
- Lifetime Warranty

4 1/2 DIGIT REFLECTIVE



REAR VIEW



2.80" X 1.310" PANEL CUTOUT
BEZEL: 2.91 X 1.52"

NEW: VDC MULTIRANGE 2-500V! SPECIFICATIONS @ 25°C

DESCRIPTION

OTEK's New **LPM** Series brings the latest technology to your process! The single I.C. A/D can perform all the functions by itself or when the Serial I/O option is included, it can become a microprocessor based DPM with Serial I/O, Scaling, Zero Offset, Peak & Hold, Decimal Point and more. And all **Loop Powered!**

You can also use the **LPM** as serial input **Remote Display**.

The **LPM** is available in several configurations:

1. **Loop Powered Stand Alone** with or without backlight.
Only 2 wires to connect!
2. **Externally Powered (VDC) mA/V DPM**
3. **U.S.B. Powered** Your PC provides the power (5VDC).
The compact metal case is Seismic Tested. The "EURO" screw connector is screwed to the case.

ADJUSTMENTS: Front panel adjustments; **Span** is on the left, **Zero** on the right.

BURDEN on your 4-20mA Loop is as low as 0.1V for externally powered models and as high as 5.5V for Loop Powered with backlight.

POWER FOR TRANSMITTER: 28VDC @ 20mA available on externally powered models (Options 1-8). See Note 7. Consumes 200mA @ 5VDC (1 Watt).

INTRINSICALLY SAFE Approval: Pending for CLI, Div. 1 & 2 GPS. A-G. See Note #5.

MIL-SPEC & NUCLEAR Qualified versions are built to your requirements. Contact **OTEK**.

The **HOUSING** is plastic or machined aluminum, nickel plated. **Sanitary & Explosion Proof** can be pipe, panel, wall or conduit mounted.

(Industrial Grade)

Loop Powered Models:

- Burden: 4.5V Max. With Red Backlight (7V for "S" Grade)
- 5.5V With Green Backlight
- Max. Input Current: 36mA, Max. Volts: 30V
- Min. Input Current: 3.6mA without μ Processor
- 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 (Parasitic)

Powered Models:

- Loop Burden: 1.0V @ 20mA; 50 Ohms (w/o microcontroller)
- Loop Burden: 0.1V @ 20mA; 5 Ohms (with microcontroller)
- Current Requirement @ 5V: 1mA + Backlight (20mA) (w/o microcontroller)
- Current Requirement @ 5V: 10mA + Backlight (20mA) (with microcontroller)
- Power Input: USB, 5VDC, 5-48VDC & 100-240VAC On Request

OTHER SPECIFICATIONS

- Display: LCD, 4 1/2 Digits 0.5", 6 O'Clock Viewing Angle
- Input Type: Differential & Single Ended. 10M For VDC
- Common Mode R.R.: 100dB @ 50/60 Hz
- Conversion Rate: 2 1/2/Second
- Step Response: 0.8 Sec. (0-90% of F.S)
- Common Mode Voltage: ± 2 VDC
- Op./Storage Temp: -10 + 60/ -20 + 70°C
- MTBF: >100,000 Hours
- Serial I/O: RS232/485/USB, 300-19, 2KBB (8N1)
- RS232 Power: Parasitic From RS232, when loop powered
- RH: 5-95% RH Non-Condensing
- Temperature Coefficient: 50PPM/°C
- Sanitary Case: To 250°F Steam Cleaning Compatible
- Explosion Proof For Class I, Div. 1 & 2 Certified
- Decimal Points Only Available in μ Processor Versions (Serial I/O)

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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 backlight 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

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 **LPM** 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 **LPM'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 **LPM** and contact us for feasibility and cost.

Connections:

To Be Determined

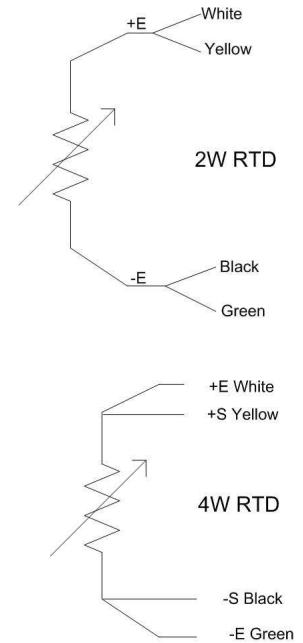
Options E-M: V & mA RMs: Here we use a **True RMS-DC** Converter for accurate ($\pm 0.05\%$) measurement of sine waves up to 10KHz ($\pm 0.5\%$, 10-20KHz) and SCR's fired to $\pm 2\%$. Input impedances vs. range are the same as for VDC ranges.

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 **LPM** but make sure the connections are "Perfect" to electrical codes. The **C.T.** might have "**Lethal**" **High Voltage** without a "Shunt" (Open) and the **LPM** 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 **FPM'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 **LPM's** display at Zero and Full Scale.

Option R: RTD (PT100): We excite your 2, 3 or 4 wire RTD with 200 μ A to avoid the "self heating" effect. The range of the **LPM** 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 **OTTEK** 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 **LPM** at the connector base. Make sure the connections from the **LPM** and your TC are as close to the **LPM** as possible to avoid errors and calibrate after connecting. If you short out the **LPM's** TC wires together, the **LPM** will read the ambient temperature due to its built-in C.J.C.

Contact **OTTEK** for types "K," "T" and others.

Options T: Frequency Input:

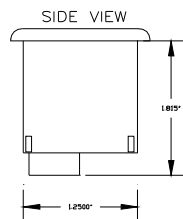
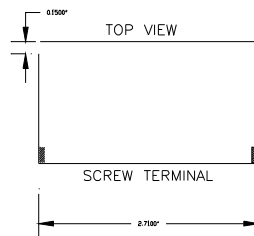
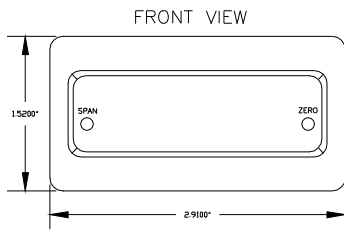
We use an **F-V** to accept frequencies from 40 - 20KHz and amplitudes from 1-400V peak or dry contact or open collector transistor (O.C.T.) for 50 or 60Hz power line frequency measurement. Use Option #"33" or see our **ACS** Powerless™ Series.

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 **LPM** 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**).

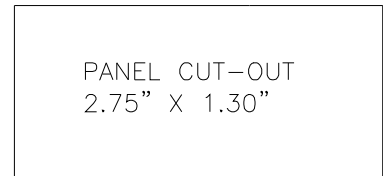


Option Z: Signal Powered Amps AC: No Power Supply Req'd! Just connect to your C.T. & P.T. range: VAC: 40-150; AAC; 0-5Amp; 50-400Hz; burden; 0.1W Accy. & Lin.; +/- 0.5% of F.S.

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.

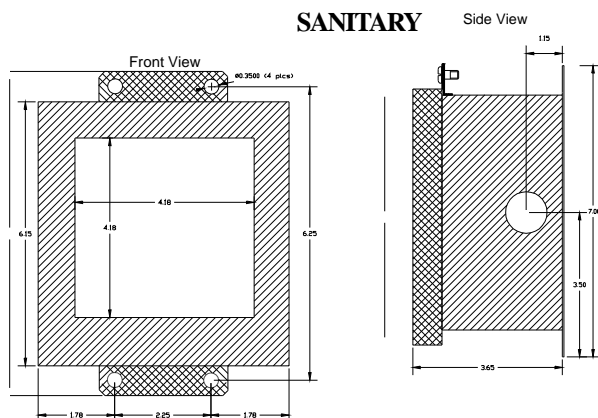


NOTES:

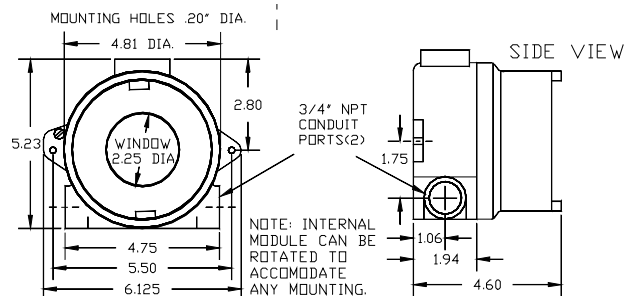
1. Do Not Connect To Pins 1, 2 & 3 (For Special Functions Only)
2. Standard Serial I/O Settings are 8N1. 9600Kb Baud Rate, Address and Decimal Point are serially programmable.

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-ledpmanual.pdf

SANITARY



EXPLOSIONPROOF



LPM SERIES

ORDERING INFORMATION 1-14-10

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



GRADE (1)

- I Industrial
- M Mil-Spec
- N Nuclear (Contact Otek)
- S Intrinsically Safe
- 9 Custom

INPUT TYPE (2)

- 0 4-20mA Loop Power
- 1 External Power 4-20mA
- 2 External Power 2mA F.S.
- 3 External Power 20mA F.S.
- 4 External Power 200mA F.S.
- 5 External Power 2V F.S.
- 6 External Power 20V F.S.
- 7 External Power 200V F.S.
- 8 External Power 2V Ratiometric
- 9 Custom
- A Signal Powered 4-30VDC
- B Signal Powered 20-50VDC
- C ±200mVDC
- D ±50mVDC
- E 200mV RMS
- F 2V RMS
- G 20V RMS
- H 200V RMS
- J 50mV RMS
- K 2mA RMS
- L 20mA RMS
- M 200mA RMS
- N 5 Amp RMS
- P Strain-Gage (350 Ohm)
- Q Strain-Gage (>1K Ohm)
- R RTD (PT100)
- S TC (Type J)
- T Frequency (50-60Hz Line)
- U % RH (Specify Sensor)
- V pH (0-14.00)
- W ORP (0-2000mV)
- X High Speed Peak & Hold (2VDC)
- Y VAC Signal Powered (P.T.)
- Z AAC Signal Powered (P.T. & C.T.)

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

RANGE/CALIBRATION

- 0 Standard
- 9 Custom

CASE STYLE (5)

- 0 Standard Metal
- 1 Standard Metal NEMA 4X
- 2 Sanitary
- 3 Explosion Proof
- 4 Plastic
- 9 Custom

POWER FOR TRANSMITTER (3)

- 0 None
- 1 Included

SERIAL I/O (4)

- 0 None
- 1 Parasitic (Loop Powered) RS232E
- 2 Non-Isolated Powered RS232D
- 3 Non-Isolated Powered RS485
- 4 Non-Isolated Powered USB
- 9 Custom (Specify)

BACKLIGHT

- 0 None
- 1 Positive Image Red
- 2 Positive Image Green
- 3 Negative Image Red
- 4 Negative Image Green
- 9 Custom

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.