

NEW

**LOOP or AC SIGNAL POWERED
EXPLOSION PROOF METER WITH
SERIAL I/O, I.R.D.A. & > 30 INPUT SIGNALS**

**MODEL
LPX**

FEATURES:

- Loop, AC Signal or External Power
- 4 1/2 LED Digits
- Intrinsically Safe by Design
- I.R.D.A. Programmable
- RS232, 485 or USB Serial
- Remote Display Capability
- 5-48VDC or 100-240VAC Power
- Custom Input for any Transducer
- Zero, Span, D.P., Hold, Peak, and more via I.R. Serial or Hardware
- OTEK's Exclusive Lifetime Warranty
- Adjustable Display Position



APPLICATIONS:

- Harsh & Hazardous Locations
- Hard to Reach Areas
- High Reliability Applications

If You Don't See It
Ask For It!



**SPECIFICATIONS @ 25°C
(Industrial Grade)**

Loop Powered Models:

- 5.5V With LED Display
- 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 = 0-1.0000, Others On Request
- Serial I/O: RS232E (Parasitic)

NEW: AC SIGNAL POWERED:

- Power: From P.T. or CT, 100mW
- Accuracy: $\pm 0.5\%$ of F. S. for A, V, W or Hz
- Isolation: None (use P.T. and/or CT).

Powered Models:

- Loop Burden: 1.0V @ 20mA; 50 Ohms
- Current Requirement @ 5V: 4mA
(w/o microcontroller) = 24mA
- Current Requirement @ 5V: 10mA
(with microcontroller) = 30mA
- Power Input: USB & 5-48VDC or 100-240 VAC

DESCRIPTION

The World's Largest Loop Powered Instrument Manufacturer since 1974 brings you its Model **LPX** which is a variation of the World's First Loop Powered Meter with Serial I/O, the **LPM** and **LPE**.

The **LPX** has several added features such as Industry Standard **I.R.D.A.** communications (I/O) that eliminates the need to stop the hazardous process to re-scale or calibrate the meter.

Serial I/O via RS232, 485 or USB to give you on-site data via wires. Provisions for Signal Conditioners to convert T.C., **RTD**, S-G, etc. at your request.

The compact **E.P.** housing is the smallest in the market, yet it is fully Class I, Div. 1 & 2 Certified with 3 NPT ports and the display can be rotated 90 degrees inside the case!

OTHER SPECIFICATIONS

- Display: 4 1/2 LED Digits 0.4", 6 O'Clock Viewing Angle
- 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: ± 2 VDC
- Op./Storage Temp: -10 + 60/ -20 + 70°C
- MTBF: >100,000 Hours
- Serial I/O: RS232/485/USB, 300-19.2Kb (8N1)
- RS232E Power: Parasitic From RS232, when loop powered
- RH: 5-95% RH Non-Condensing
- Temperature Coefficient: 50PPM/°C
- Explosion Proof FM & CSA: Class I, Div. 1 GPS. B-G EX & 1 ECex: IM2, Exd1
- I.R.D.A.: 9600 Baud

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OTTEK™
CORP.
SINCE 1974

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TUCSON, AZ. 85714 U.S.A.

MADE
IN
USA



THE SIGNAL CONDITIONERS:

Option 00: 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.

Option 01: 4-20mA Externally Powered: It only drops 1V @ 20mA (10 Ohms) but the "LPX" needs 5VDC @ 20mA to operate (including the back-light or LEDs).

Option 02: 4-30VDC Signal Powered: Another OTEK innovation. The voltage signal powers an LDO to protect the LPX 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 04-08 (externally powered).

Options 04-08: VDC Externally Powered: Input impedance is 1Mega Ohms. (See power input Digit 4).

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

Options 10-13: 20mA - 200mADC: Since the LPX 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!.

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 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 23: 5 Amps 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 LPX but make sure the connections are "Perfect" to electrical codes. The C.T. might have "Lethal" High Voltage without a "Shunt" (Open) and the LPX will "Smoke". See OTEK's New ACS & CTT models for C.T. powered instruments (Pat. #7,626,378).

Option 24: Strain-Gage (<1000 Ohm Type): Here we use high accuracy and stability constant current (~1mA) source, and a differential amplifier to convert the 2 or 3mV/V (typical) sensitivity of your "Load-cell". Specify your Strain-Gage sensitivity and full scale and the SPM's display at Zero and Full Scale Please!

Accuracy: $\pm 0.05\%$ of F.S.

Option 25: Strain-Gage ($\geq 1K < 4K$ Ohm): These are typically "Monolithic" S-G that require constant voltage (preferably) excitation. We use 4.096V for high stability and accuracy. Specify your S-G impedance and sensitivity and the SPM's display at Zero and Full Scale.

Accuracy: $\pm 0.1\%$ of F.S.

Note on S-G: Some S-G offer +/- 1VDC or 4-20mA condition output. Use Option 9 and specify.

Option 26: RTD (PT100): We excite your 2, 3 or 4 wire RTD with 200uA to avoid the "self heating" effect. The range of the LPX 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 legacy 0.00392 TC (known as ANSI 392) contact OTEK and use Option "09".

Option 27: RTD (PT1000): Same as PT100 except it is 1000 Ohms at 0°C instead of 100 Ohms @ 0°C. The same technique is used. For copper RTD (10 Ohm), contact OTEK.

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 LPX at the connector base. Make sure the connections from the LPX 6" wires and your TC are as close to the LPX's entrance as possible to avoid errors and calibrate after connecting. If you short out the LPX's TC wires together, the LPX will read the ambient temperature due to its built-in C.J.C.

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

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

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 to 440 Hz power line frequency measurement. Use Option # "33" or see our ACS Powerless™ Series, or Option 42 for signal powered.

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.

Option 35: pH (Acidity): We use a FET input (1015) amplifier and calibrate the LPX for 0-14.00 pH using the Industry's standard + 413 mV = +7pH coefficient.
Accuracy: +0.05% of F.S.

Option 36: ORP(Oxygen Reduction Potential):

Our FET amplifier (109) accepts the industry standard 2000mV.F.S. of the probe and the LPX displays it in % (0-100.00%)

Option 37: 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**).

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 40: 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, 45-440Hz. Burden 0.1W, Accy.& Lin. :+/- 0.5% of F.S.

Option 41: 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**.

Option 42: Hertz (Frequency) Signal Powered:

Warning! No Isolation! This option uses the same power technique as Option 40 above and the same precautions and warnings apply. Here we use a "Zero Crossing" detector and a F-V converter to give you the **A.C.** line frequency display with 0.1 Hz resolution. Range: VAC: 50-150VAC/Frequency: 30-440Hz; Accuracy & Linearity: ±0.05% of F.S.

Option 43: Signal Powered AC Watts: Warning! No Isolation! Here we combine the powerless VAC & AAC options to arrive at real power calculations through our **CPU** and **DAC**. The same warnings and precautions of Options 40 & 41 apply. Range: VAC: 50-150; AAC: 0.1 - 5A; Frequency: 45-440 Hz; Accuracy & Linearity: ±0.1% of F.S.; Conversion: True RMS. Contact **OTEK** for other functions.

Note: For watts, use Fig. 40 & 41. Do **NOT** reverse connectors.

SERIAL I/O: (DIGIT 4): All Serial I/O connectors are plug-in euro style and accept 26-20 ga. wire. Standard baud rate is 9600 but range is 300-19,200 all ASCII, 8N1 open protocol. The V2.0 USB (Option 6) allows powering of the LPX from the port.

IRDA: As part of the Serial I/O, it complies with current standards.

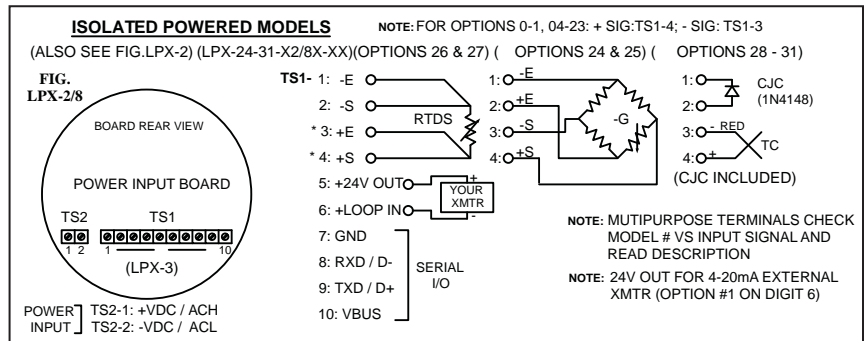
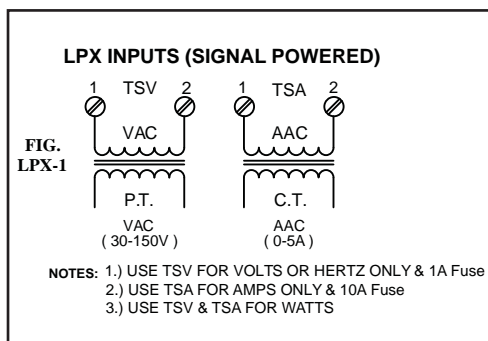
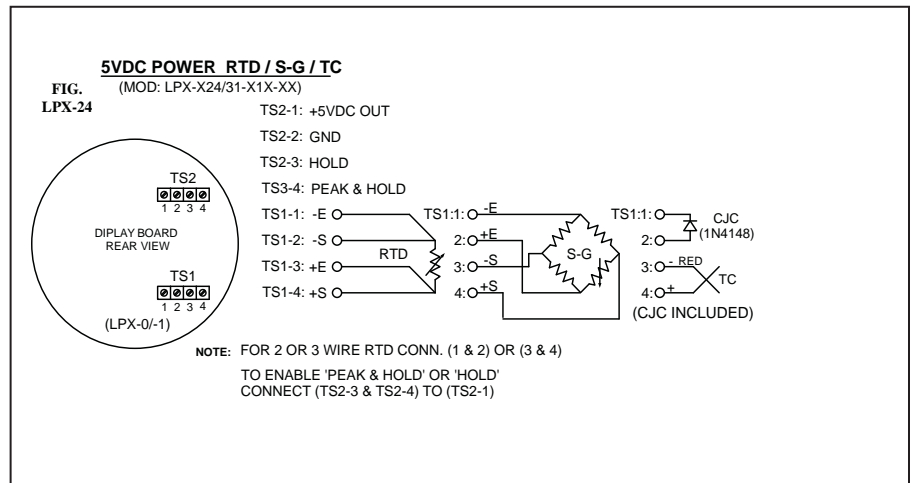
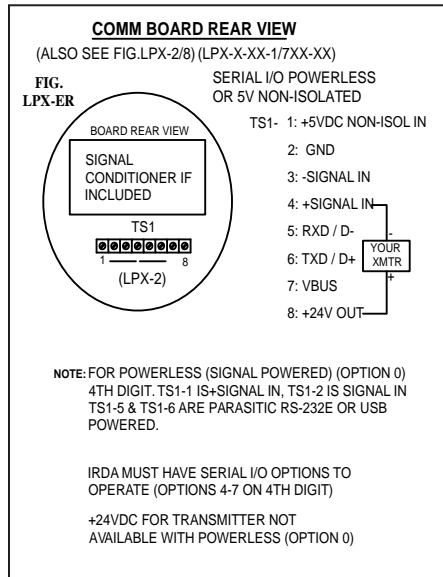
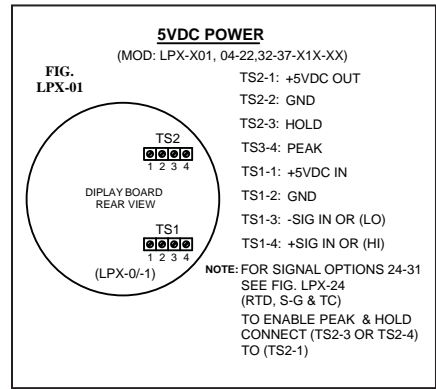
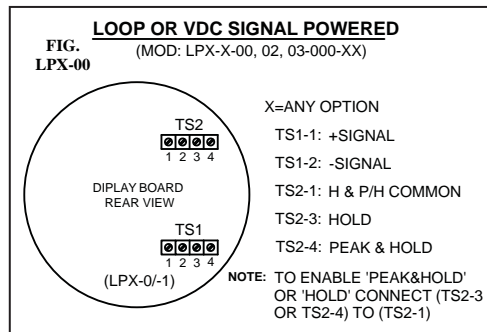
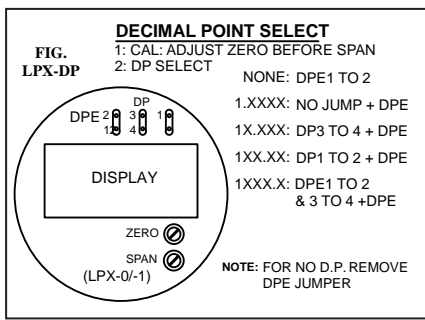
Note: USB drive free at www.otekcorp.com

POWER INPUT (DIGIT 5): Here you have the most extensive selection of power inputs, including OTEK's exclusive Powerless™ (Signal Powered for 4-20mA, VDC & AC, V, A, W & Hz) options.

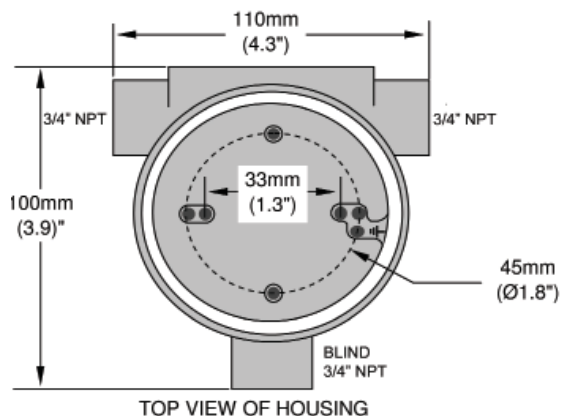
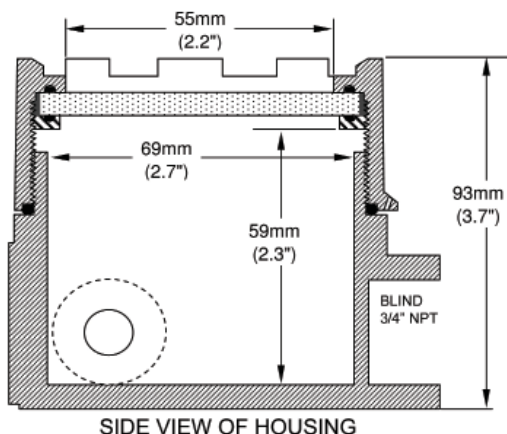
OUTPUTS (DIGIT 6): Option 1 provides non-isolated 24 VDC@30mA (5-24 VDC-DC), eliminating the need for additional/external power for your transmitter.

Option 2 converts the input signal (after the signal conditioner) to a 4-20mA current loop signal with internal compliance and is capable of driving up to 1K Ohm loads.

DISPLAY (DIGIT 7): 0.4" high efficiency red (other displays available on request) LED.



LPX MECHANICAL INFORMATION

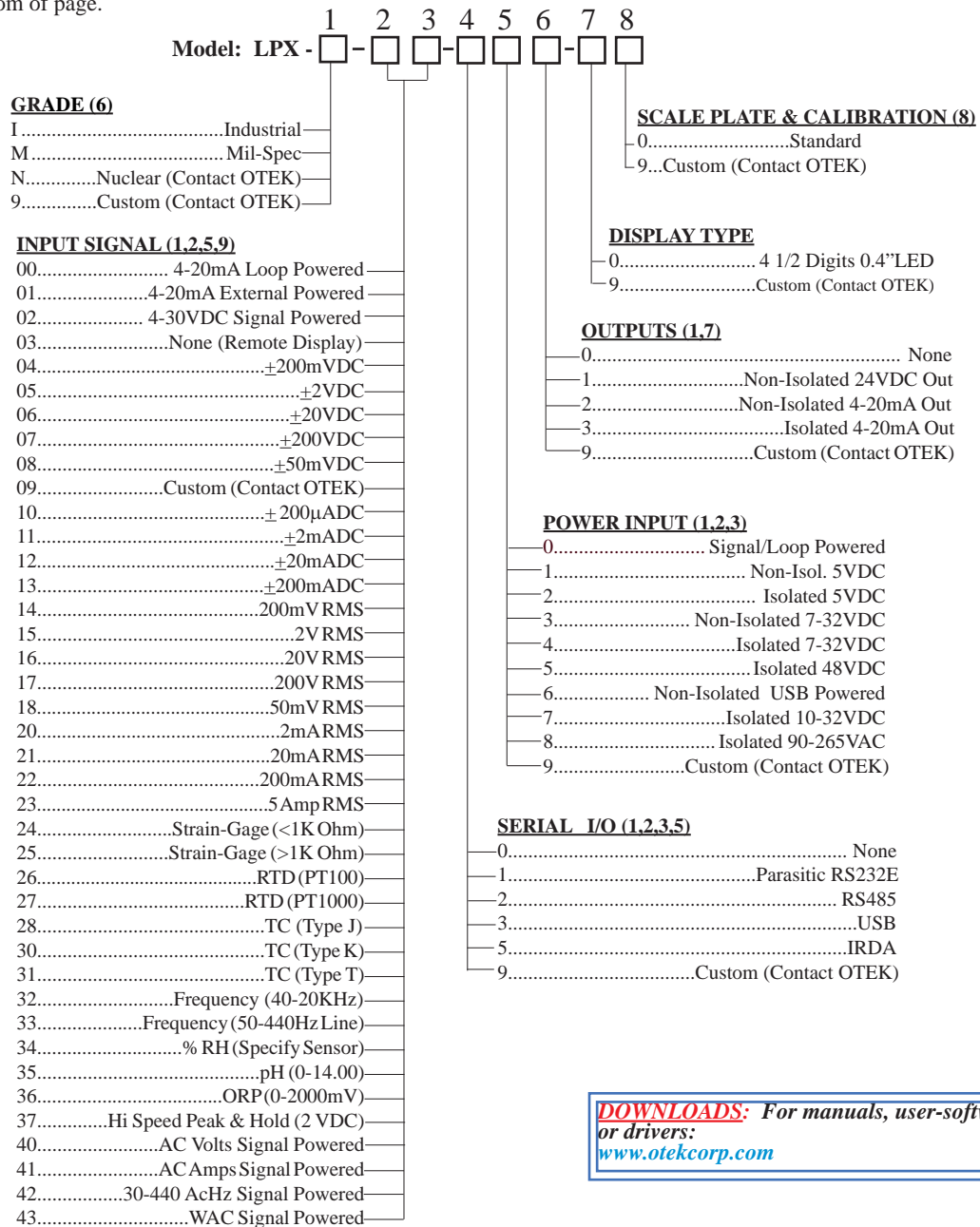


NOTE: Do not remove cover in hazardous area, remove cover and select decimal point desired in safe area.

LPX SERIES ORDERING INFORMATION 9-9-14

NOTES: Please READ BEFORE building part number:

1. If digits 2 & 3 are options 00 or 02, then digit 4 must be option 0 or 1, and digits 5 and 6 must be 0.
2. If digits 2 & 3 are options 40, 41, 42 or 43, then digits 4, 5 & 6 must be option 0.
3. If digit 5 is option 6, then digit 4 must be option 3.
4. See notes at bottom of page.



DOWNLOADS: For manuals, user-software or drivers:
www.otekcorp.com

NOTES (Continued):

5. Warning: Options 40-43 (H.V.A.C.) are NOT isolated from Serial I/O (digit 4, options 1-3). Use. P.T. Serial I/O digit 4, option 5 (IRDA) is isolated.
6. Otek will build to certain nuclear or MIL-standards but testing and confirmation of compliance, if required, will need to be done by a third party and at customer's expense.
7. 24VDC@30mA out DC-DC for Transmitter non-isolated from input signal. 4-20mA output is not isolated from signal input. Max Load: 1K Ohm.
8. Standard calibration is 0-20,000 counts for V Input, 0-10,000 for 4-20mA (0-100.00%) or specify custom.
9. Option 03 on digit 2&3 is for remote display/control only.