

# SMALLEST POWERLESS™ SMART DPM

\*LOOP/SIGNAL POWERED \*SERIAL I/O  
\*4 1/2 DIGITS \*>20 INPUT SIGNALS

MODEL  
6K

### Features:

- <150mW@5VDC
- Powerless™ or 5-32VDC/90-265 VAC
- 232/485/USB I/O
- Explosion Proof
- Led Multicolor
- Replaces OTEK'S 6000 Series (1980)
- Only 2 1/4x1 1/2x2 1/4"
- Plug-In connectors
- Power for transmitter
- Lifetime Warranty (Ltd)



SNAP RING



SANITARY



NEMA 4X



EXPLOSION PROOF

### Specifications@25°C (See

#### Individual Options:

#### Mainframe:

- Display: 4 1/2 LED 0.4"
- Accuracy: +/- 0.01%
- Resolution: 0.005%
- Linearity: +/- 0.005%
- Power: <150mW@5VDC
- Temp. Coef.: 50 PPM
- Sampling Rate: 3/Sec.
- OP/Store Temp: -20+70/-20-80°C
- Humidity: 5-95% rH N. C.
- CMTBF: >100,000 hrs
- RS232, 485, or USB: 300-19.2 KB (8N1)
- Sanitary Case: Water tight, steam clean to 250°F
- Explosion Proof: Class 1, Div. 1 & 2 certified.



If You Don't See It  
Ask For It!

### Description:

Finally! A system panel meter that has all the features of units four times its size and just snaps-in your panel. No tools/hardware required!

The new series **6K** replaces **FF&F** our old (1980) series 6000 but with the latest technology (for indefinite life expectancy) such as Sigma-Delta A/D, **CPU**, any Serial I/O, any power input (or loop/VDC signal powered). The **6K** also has over 20 input signal conditioners built in, and all these features come in a snap-in case only 2.5" (64)x 1.5" (36)x 2.0 (50). Where can you get so much for so little?

The Display: Choose from 4 1/2 digits (1.9.9.9.9) 0.4" LED red (standard) or any other color (red, orange, yellow, green or blue).

The A/D: Either stand alone Sigma-Delta A/D or controlled by CPU via serial I/O (232/485 or USB) or your choice, all **SV&V** (software verifications and validation) for high reliability (sister products are used in nuclear applications, outer space and under seas).

Serial I/O: RS232, 485 or USB options give you access to the **6K**  $\mu$ C with all its SV & V proven power, such as polynomials, X-Y tables, math functions, decimal points & display. You can use the **6K** as a serial input remote display. Hyperterminal, PROCOMM, Kermit compatible.

The Power: **OTEK** invented (1975) and coined the term "Powerless™"-meaning **Signal Powered** for either current loops, DC or AC signals, even with parasitic Serial I/O. You can also specify 5-48 VDC or 90-265VAC or 100-330VDC. Need others? Just contact us.

The Signal Conditioners: We have over 20 input signal conditioners (see description) or our "**SC**" series, which was developed over the last 35 years. If you don't see it, ask for it!

The Case: Either "Snap-In" panel mount plastic 94-VO, explosion proof (Class I, Div 1, GPS. B-G, Ex & 1ECex: IM2, Exd1) or sanitary for >250°steam cleaning in food industry.

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**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 "6K" needs 5VDC @ 20mA to operate (including the backlight or LEDs).

**Option 02: 4-30VDC Signal Powered:**

Another OTEK innovation. The voltage signal powers an LDO to protect the 6K 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).

**Option 02: Serial Input Remote**

**Display:** This option offers no input signal so you can use the 6K as a remote display. It replaces OTEK's HI-Q111 in form, fit and function with latest componetry and added features. Note: Select desired serial input on Digit 7 and refer to User's Manual (see ordering information).

**Options 03: Serial Input Remote**

**Display:** This option offers no input signal so you can use the 6K as a remote display. The 6K replaces OTEK's HIQ111 form, fit and function with latest componentry and added features. Note: Select desired serial input on Digit 7 and refer to the User's Manual (see ordering information).

**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 6K and contact us for feasibility and cost.

**Options 10-13: 200uA - 200mADC:**

Since the 6K 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 6K but make sure the connections are "Perfect" to electrical codes. The C.T. might have "**Lethal**" High Voltage without a "Shunt" (Open) and the 6K will "Smoke". See OTEK's New **ACS & CTT** models for **C.T.** powered instruments (Patent #7,626,378).

**Option 24: Strain-Gage (<1000**

**Ohm Type):** Here we use a highly accurate and stable 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 6K'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 6K'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 6K 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".

Note: Use serial port to change °C to °F.

**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.

Note: Use serial port to change °C to °F.

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

Note: Use serial port to change °C to °F.

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**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.

Note: Use serial port to change °C to °F.

**Option 31: TC (Type T):** This blue (+) and red (-) TC wire has the range of -270<sup>0</sup> + 400°C (-440 + 750°F). Use same notes as Option 28.

Note: Use serial port to change °C to °F.

**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.

**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 **6K** 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 **6K** 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, 50-400Hz. Burden 0.1W, Accy.& Lin. : ±.5% of F.S.

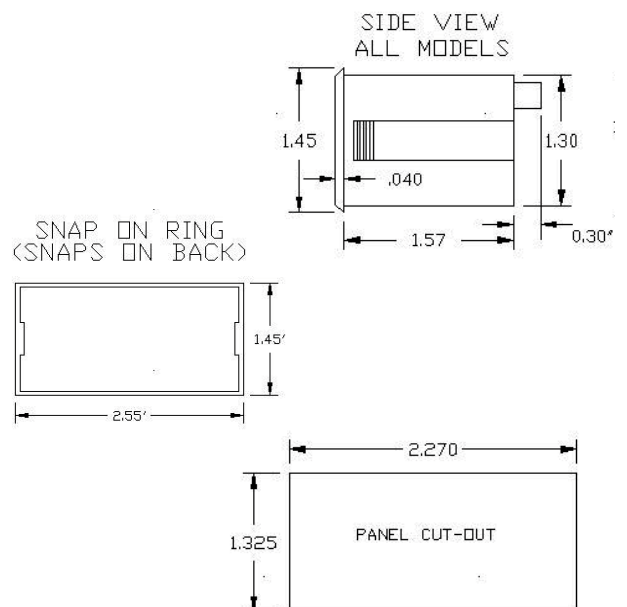
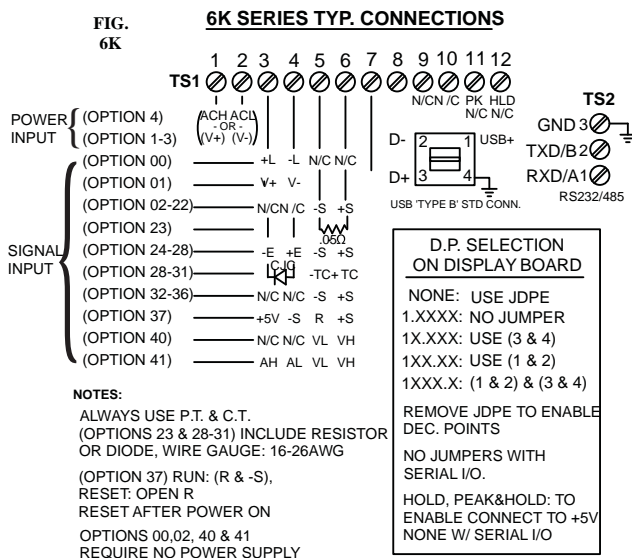
**Option 41: Signal Powered Amps AC:** No Power Supply Req'd! Just connect to your C.T. & P.T. range: VAC: 40-150; AAC; 0-5Amp; 50-400Hz; burden; 0.1W Accy. & Lin.; ± 0.5% of F.S.

**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.

Yel: VAC Hi, White & Black VAC Lo & Amp Lo, Red: Amp Hi.

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

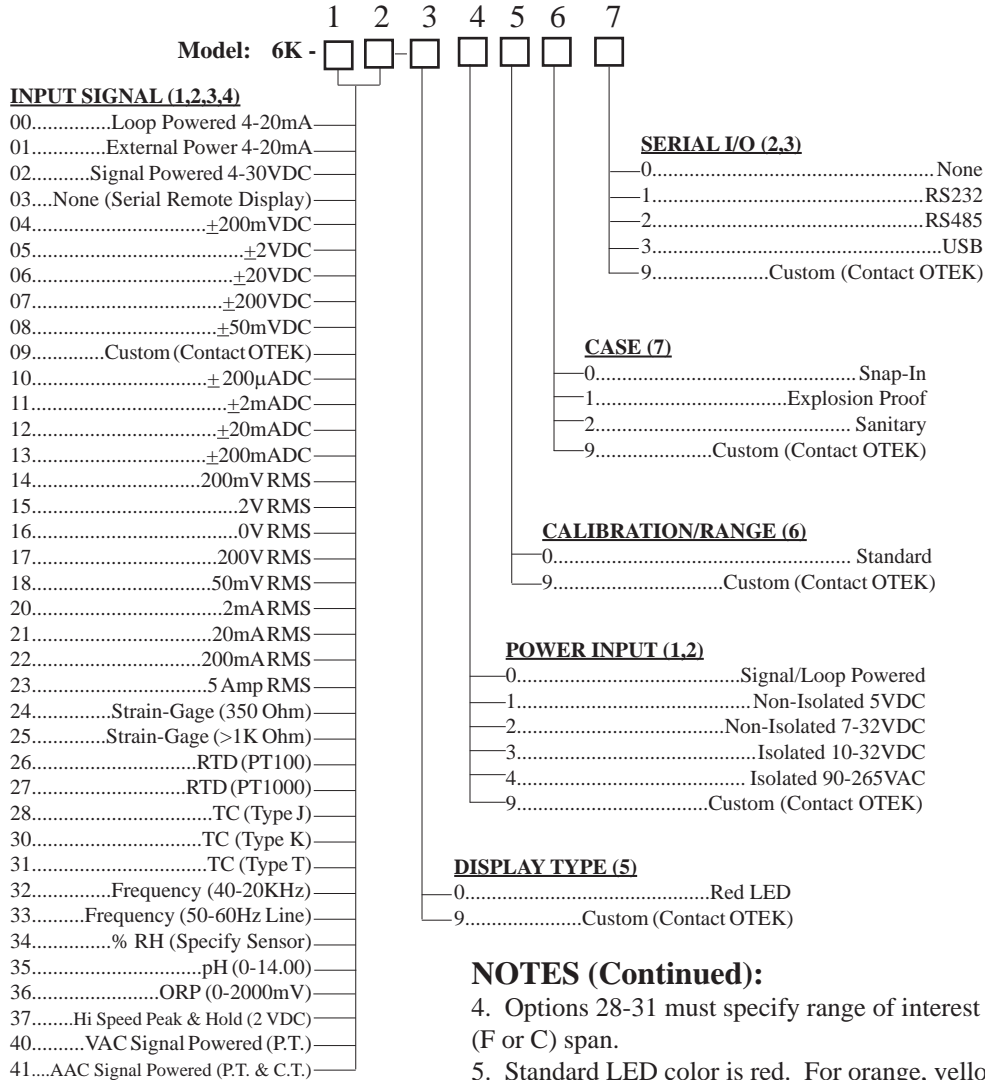
## 6K MECHANICAL INFORMATION



# 6K ORDERING INFORMATION 4/29/13

**NOTE: Please READ BEFORE building part number:**

1. If digit 1 & 2 is option 00, digit 4 must be option 0.
2. If digit 1 & 2 is option 02, 40 or 41, digit 4 must be option 0 and digit 7 must be option 0.
3. If digit 1 & 2 is option 03, digit 7 must be option 1, 2 or 3.



**NOTES (Continued):**

4. Options 28-31 must specify range of interest within 300° (F or C) span.
5. Standard LED color is red. For orange, yellow, green or blue, use Option #9 and specify color.
6. Standard calibration is 0-10,000 counts for V Input, 0-10,000 for 4-20mA (0-100.00%) or per sensor's range.
7. Sanitary case can hold up to three 6K's. If using more than 1 unit per case, choose option 9 and describe.

**DOWNLOADS:** For manuals, user-software or drivers: [www.otekcorp.com](http://www.otekcorp.com)