

**NEW**

# 1/8 DIN SIGNAL POWERED METERS (DC & AC) OR EXTERNALLY POWERED

\* > 40 INPUT SIGNALS \* ANY COLOR LED

**MODEL  
SPM**

### FEATURES:

- **NEW!** White LED for any color filter
- 4 1/2 Digits .6" LED/LCD or 3 1/2 or 4 Digits 0.8" LED
- Signal Powered For: 4-20mADC, V/mADC or AC Volts, Amps, Watts and Hertz
- 5, 10-32VDC or 90-265VAC Power
- Outputs: 4-20mA, Relays (4)
- Serial Comm.: RS232, 485, USB
- Lifetime Warranted
- Intrinsically Safe by Design

### APPLICATIONS:

- D.C.S./SCADA
- Shipboard/Avionics
- Nuclear & Mil-Spec

### DESCRIPTION:

With over 30 years in the **Digital Panel Meter** field, we had to bring you the best that technology would allow. The **SPM** is a combination of that expertise and newest technology in an industry's standard 1/8 DIN package. We started with a universal display (4 1/2 digit LCD or LED) and embedded Sigma-Delta A/D. We added

a "Bussed" mother board that we can add any of hundreds of designs from our 30+ years library to deliver the industry's only "Lifetime Warranted" Digital Panel Meter. Whether for Systems or just to monitor, control and/or communicate via Serial I/O. The modular construction of the **SPM** allows **O TEK** to customize to your needs without expensive N.R.E., set-ups or minimum orders.

**Controller:** When you order Serial I/O. (Digit 4 Options 1-3), you can order analog out (Digit 6) and/or relays (Digit 7) and we include math functions, X-Y tables & polynomials with it!

**Displays:** You can order the large 0.8" 3 1/2 or 4 digit **LED** or the 0.6" 4 1/2 **LED** or .5" **LCD**. The **LCD** is Reflective or Backlit.

**NEW** white LED displays are now available! Standard filter is red. For other colors use Option 9 on 8th digit and specify color (depending on availability).

(Option 0) 4 1/2 LED .6"



(Option 4) 4 1/2 LCD .5"



(Option 2) 3 1/2 LED .8"



(Option 6) 4 LED .8"



### SPECIFICATIONS @ 25°C

#### Loop Powered:

- Input Range: 3-36mA
- Burden: 5V Max.
- Acc. & Linearity: ±0.01% of F.S. ± 1 Digit

#### VDC Signal Powered:

- Input Range: 4-30 VDC
- Input Current: 3-25mADC
- Accuracy & Linearity: ±0.1% of F.S.
- mADC Powered: On Request

#### VAC Signal Powered (P.T.): (For V, W & Hz)

- Isolation from Signal: None
- Input Range: 50-150VAC
- Input Current: Approximately 25mA AC
- Acc. & Linearity: ±0.2% of F.S. ± 1 Digit
- Meas. Method: True RMS
- Frequency Range: 40-440Hz

#### AC Signal Powered (C.T.): (For A & W)

- Isolation for Amps: 500 V
- Isolation for Watts: None
- Input Range: 0.1 -5A F.S.
- Over-Range: 7.5A (5 Sec.)
- Burden: Approximately 1VRMS @ 5A
- Acc. & Linearity: ±0.2% of F.S. ± 1 Digit
- Frequency Range: 40-440Hz
- Meas. Method: True RMS

#### External Power & Common Specifications:

- (All Plus Sensor's Accuracy)
- Acc. & Linearity: ±0.01% of F.S. ± 1 Digit
  - C.M.R.R.: 100dB @ 50-60Hz
  - Temp. Coef.: ±100PPM/°C
  - Conversion Rate: 2 1/2 Seconds
  - Conversion Type: Sigma-Delta
  - Step Response: 0.8 Seconds (10-90%)
  - Input Type: Diff. & S.E. (2V Max.)
  - Baud Rate: 1200-19.2KB
  - Protocol: ASCII (8N1)
  - Temp. Range: -10 + 70°C
  - Humidity: 5-95% N.C.
  - Nuclear: To 10CFR50C
  - Mil-Specs: To Specifications
  - Housing: ABS, 94V0 or Metal
  - Connector: Screw Terminal

IF YOU DON'T  
SEE IT,  
ASK FOR IT!



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SINCE 1974

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TUCSON, AZ. 85714 U.S.A.



## SPM SERIES continued

### HOW IT WORKS:

**Current Loop Powered:** We use a Zener to clamp the voltage to 5V max. and monitor the Loop's current (we invented it in 1974). (Digits 2 & 3, Option 00). Must use Option 0 on Digit 5.

**VDC Signal Powered:** We monitor the voltage with high impedance and clamp it to a safe level to power the **SPM**. (Digits 2 & 3, Option 02). Must use Option 0 on Digit 5.

**AC Signal Powered:** For VAC & Hz we use a capacitor limiting rectifier to power the **SPM** and monitor the VAC with an RMS-DC converter. For Hz we use an F-V for accurate conversion. For A.A.C. we invented (Patent Pending) a C-V converter to extract the current from your C.T. for power and monitor the signal with RMS-DC. (Digits 2 & 3, Options 40-43). Must use Option 0 on Digit 5.

**Externally Powered:** Non-Isolated 5VDC or isolated 5-48VDC or 90-265VAC 50/60Hz is optional (Digit 5, Options 1-7). Max Power: 2Watts

**Serial I/O:** When ordered, (Digit 4), the **CPU** controls the Baud Rate (300-9600 Baud), the relays, analog output, math functions, linearization polynomial (9th) & X-Y tables.

### Control & Power Out (Digit 6):

You can order 4-20mA as standard, or 0-5V, 0-20mA or 0-24mA on request, or you can order the isolated 30VDC (30mA) or Non-Isolated 28VDC out for your transmitter.

**Relays/O.C.T.:** You must order the Serial I/O Option to get the relays/O.C.T. options. Standard is normally open (N.O. SPST). On request we can give you normally closed (N.C.). All are 1A @ 120VAC rated. The O.C.T. are normally off, com. emitter 30VDC/100mA max.

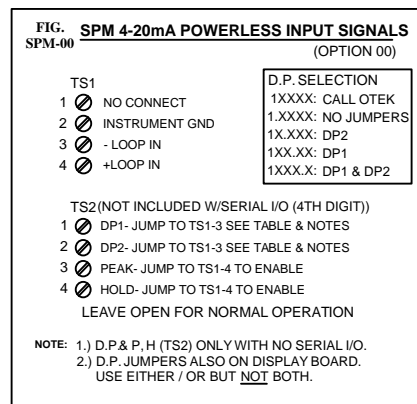
### THE SIGNAL CONDITIONERS:

#### (2nd & 3rd DIGITS)

#### 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). Must use Option 0 on Digit 5.

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

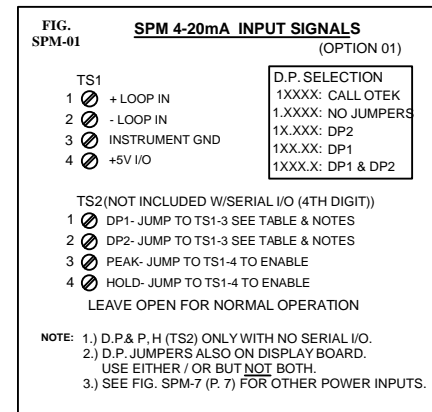


#### Option 01: 4-20mA Externally

**Powered:** It only drops 1V @ 20mA (50 Ohms). The "**SPM**" needs 5VDC @ 20mA to operate (including the backlight or LEDs). Note: Digit 5 can not be Option 0. **Accuracy:**  $\pm 0.05\%$  of F.S.

Digits 4, 5 & 6 must be Option "0".

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

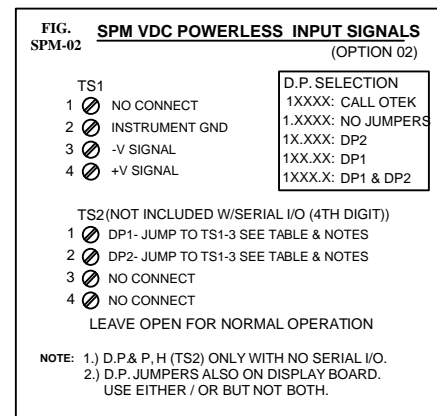


#### Option 02: 4-30VDC

#### Signal Powered:

Another **OTEK** innovation. The voltage signal powers an **LDO** to protect the **SPM** and a divider network is used to measure and display the signal. If the input resistance of this Option is too low (~ 500 Ohms), use options 04-08. Note: Digits 4 must be Option "1." Digit 5 & 6 must be Option "0."

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



**SPM SERIES continued**

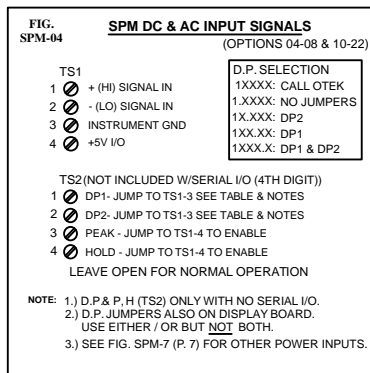
**Option 03: Serial Input Remote Display:**

Here you can use the **SPM** as a remote display with modified (STD.) ASCII to alphanumeric display for DCS SCADA, PLC systems. Note: Serial input options 1-3 on Digit 4 must be ordered.

**Options 04-08: VDC Externally Powered:**

Input impedance is 1 Mega Ohms on all VDC ranges.

**Accuracy:** ±0.05% of F.S.

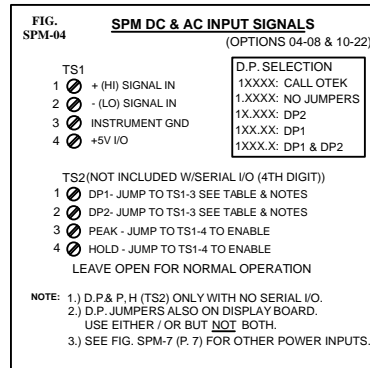


**Option 09: Custom:** Use this option to describe any custom input, scale or modification to the **SPM** and contact us for feasibility and cost.

**Options 10-13: 200µA - 200mADC:**

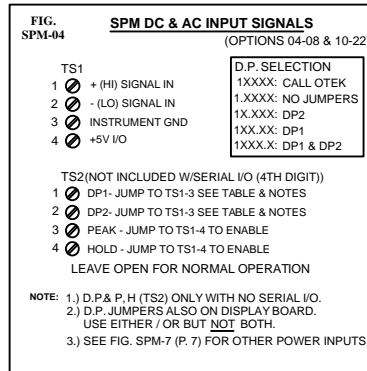
Since the **SPM** is 200mV full scale (20,000 Counts) the "Shunt" resistors used are 1K, 100, 10 or 1 Ohm. Don't forget that maximum display is 19,999 not 20,000!

**Accuracy:** ±0.05% of F.S.



**Options 14-22:**

**V & mA RMS:** Here we use a **True RMS-DC** Converter for accurate (± 0.05%) measurement of sine waves up to 10KHz (± 0.1% for 10-20KHz) and SCR;s fired to ± 1%. Input impedances vs. range are the same as for VDC & mADC ranges. **Warning: No Isolation!**

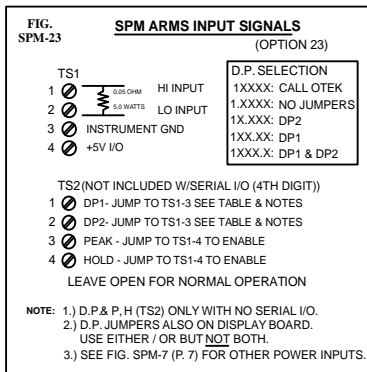


**Option 23: 5Amps AC:**

Specifically for current transformers (**C.T.**) this option requires an externally mounted (supplied) 0.05 Ohm, 0.1% 5 Watt resistor. You can mount the "Shunt" at your **C.T.** or next to the **SPM** but make sure the connections are "Perfect" to electrical codes. The C.T. might have "**Lethal**" High Voltage without a "Shunt" (Open) and the **SPM** will "Smoke". See OTEK's New **ACS & CTT** models for **C.T.** powered instruments (Patent # 7,626,378).

**Warning: No Isolation!**

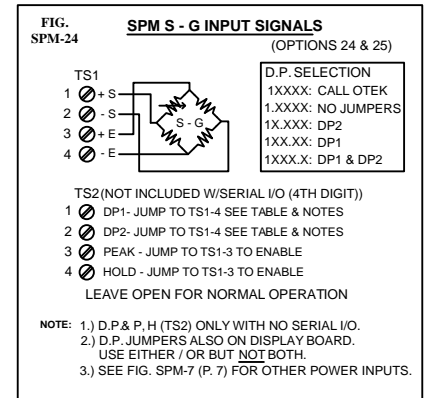
**Accuracy:** ±0.05% of F.S.



**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:** ±0.05% of F.S.

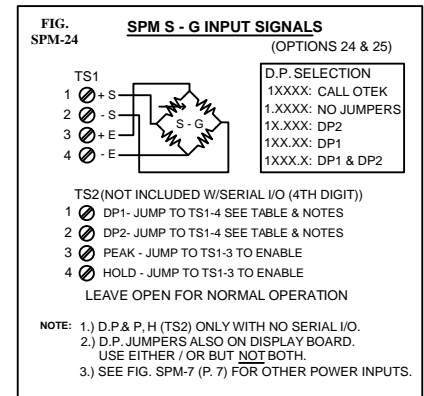


**Option 25: Strain-Gage (≥1K < 4K Ohm):**

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:** ±0.1% of F.S.

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



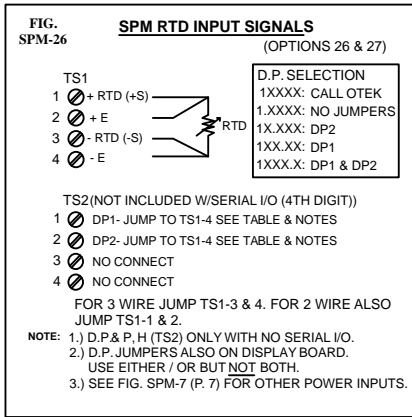
**SPM SERIES continued**

**Option 26: RTD (PT100):** We excite your 2, 3 or 4 wire RTD with 200µA to avoid the "self heating" effect. The range of the **SPM** 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: If you order Serial I/O (Options 1-3, Digit 4), you can change °C to °F and RTD type via serial port.

**Accuracy:** ±0.5% of F/C plus sensor's error.

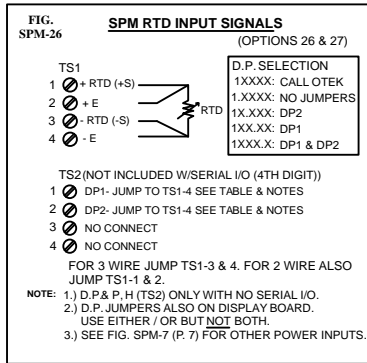
Note: For 2 wire, jump - S to -E and +S to +E. For 3 wire only jump -S to -E.



**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**. Same connection as Option 26 apply.

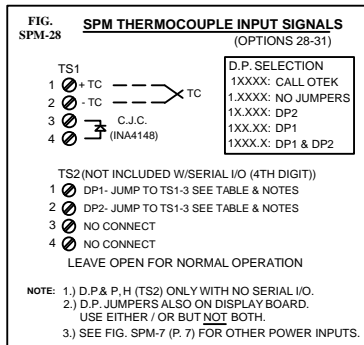
**Accuracy:** ±0.05% of F/C plus sensor's error. Note: For long distances use a 4-20mA transmitter such as our **900** or **LPT** series.



**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 **SPM** at the connector base. Make sure the connections from the **SPM** and your **TC** are as close to the **SPM's** entrance as possible to avoid errors. If you short out the **SPM's** +**TC** & -**TC** together, the **SPM** will read the ambient temperature due to its built-in C.J.C. Note: If you order Serial I/O you can change °C to F and TC type via serial port.

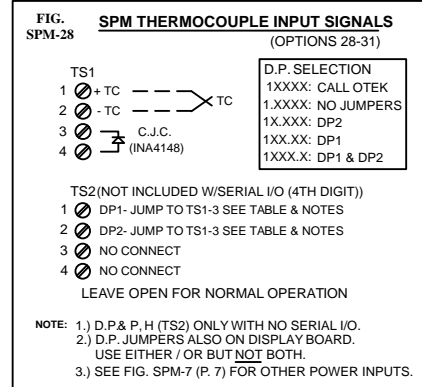
**Accuracy:** ± 2° F/C of signal input.



**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 apply.

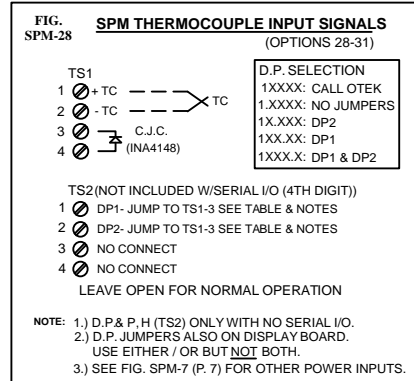
**Accuracy:** ± 2° F/C of signal input



**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 apply.

**Accuracy:** ± 2° F/C of signal input.

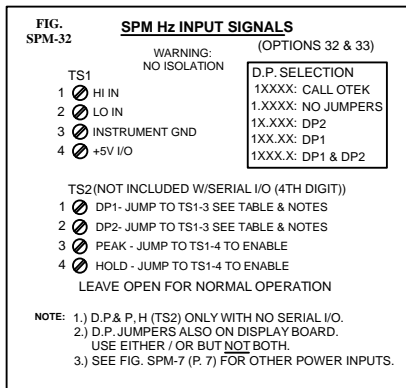


**SPM SERIES continued**

**Options 32-33: Frequency Input:**

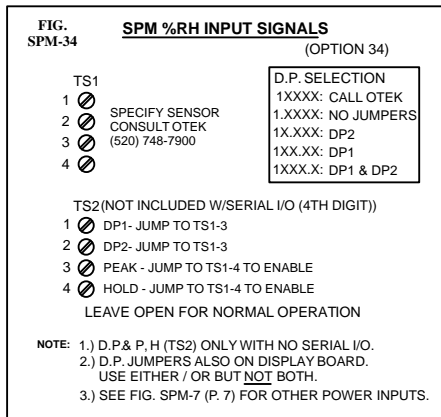
We use an **F-V** to accept frequencies from 40 - 20KHz and amplitudes from 1-400V peak or dry contact or open collector transistor (O.C.T.). For 50 to 440 Hz power line frequency measurement. Use Option #33" or see our **ACS** Powerless™ Series.

**Accuracy:** ±0.05% of F.S.



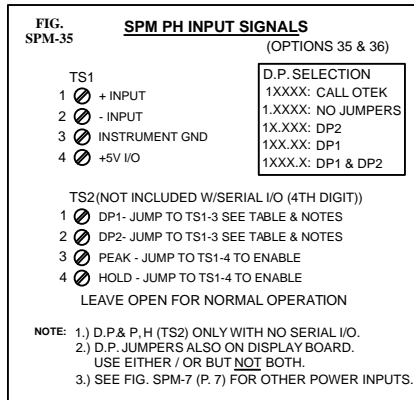
**Option 34: %RH:** This conditioner is designed to interface to a typical (capacitance type) 2-3pF/% of **RH** made by several manufacturers. Use Option "09" and contact **OTEK** to specify your sensor's specifications.

**Accuracy:** ± 2% RH of signal input.



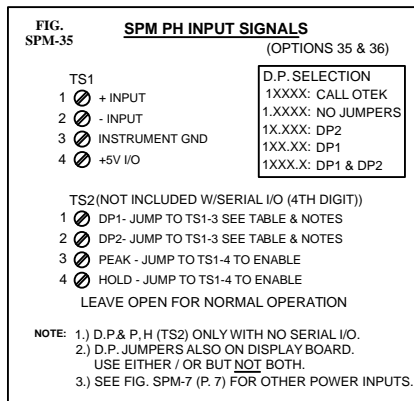
**Option 35: pH (Acidity):** We use a FET input (10<sup>15</sup>) amplifier and calibrate the **SPM** for 0-14.00 pH using the Industry's standard ± 413 mV = ± 7pH co-efficient. Note: Not temperature compensated.

**Accuracy:** ±0.05% of F.S.



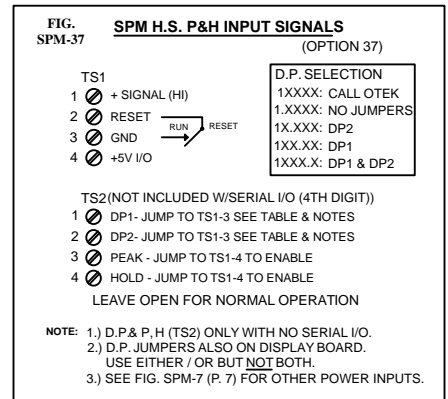
**Option 36: ORP (Oxygen Reduction Potential):** Our FET amplifier (10<sup>9</sup>) accepts the industry standard 2000mV F.S. of the probe and the **SPM** displays it in % (0-100.00%).

**Accuracy:** ±0.05% of F.S.



**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).



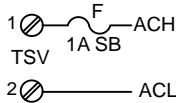
**SPM SERIES continued**

**Note: Options 40-43 only available with Powerless™ power input (Digit 5, Option 0)**

**Option 40: VAC Signal Powered:**

**Warning! No Isolation!** This option uses the AC Voltage Signal to power the **SPM**. Since the **SPM** uses about 30mA @ 5VDC, we use a coupling capacitor AC-DC converter to generate 5VDC and not to "Load" the signal with a transformer. Consequently, your signal source should be capable of producing about 150mW without overloading it, otherwise use Options 14-17 (externally powered). Range: 50-150VAC; Method: RMS Calibrated; Accuracy & Linearity: ±0.5% of F.S. Best and safest when driven by a P.T. (Potential Transformer. **Always turn power off before connecting!**

FIG. SPM-40 **SPM V/Hz POWERLESS** (OPTIONS 40,42 & 43)



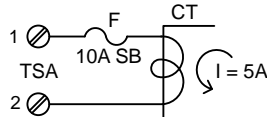
NOTES: FOR WATTS USE FIGS. SPM-40&41

Frequency Range: 50-440 Hz.

**Option 41: AAC Signal Powered:**

**Warning! No Isolation!** (Pat. Pend.) OTEK's Patents (#726,626,378 & 4,908,569) permit the extraction of power from a regular **C.T.** (Current Transformer) to power the **SPM** without distorting the signal. Since this option is designed to be powered from a C.T., it should not be connected directly to the mains without limiting the current and proper electrical grounding. **Lethal Voltage** might be present at the C.T. secondary (output) if the secondary is open. **Always turn power off before connecting!** Range (at C.T. output): 0.1-5AAC; Overload: 50%/30 seconds; Peak: 100%/1 second; Conversion: True RMS; Accuracy & Linearity: ±0.05% of F.S.; Burden on C.T.: <150mW.

FIG. SPM-41 **SPM ACC POWERLESS** (OPTIONS 41& 43)



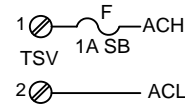
NOTES: FOR WATTS USE FIGS. SPM-40&41

Frequency Range: 45-65 Hz.

**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: 30-450Hz; Accuracy & Linearity: ±0.05% of F.S.

FIG. SPM-40 **SPM V/Hz POWERLESS** (OPTIONS 40,42 & 43)



NOTES: FOR WATTS USE FIGS. SPM-40&41

Frequency Range: 50-440 Hz.

**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: 45-65Hz; 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): WARNING: No Isolation From Signal.**

**Option "0": No Serial I/O:**

Only options 0 on digit 6 is available when option "0" on 5th digit is selected.

**Option 1:** RS232: 1200-19.2kb, all ASCII (8N1) open protocol screw connector terminals.

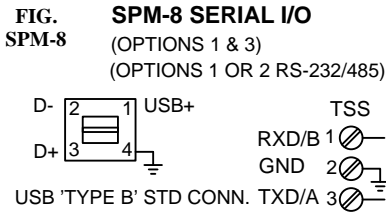
**Option 2:** RS485: 1200-19.2kb, all ASCII (8N1) open protocol screw connector.

WARNING: Serial I/O **MUST** use C.T. & P.T. on input options 40-43 for isolation. OTEK assumes no liability.

**SPM SERIES continued**

**Option 3:** USB: 1200-19.2kb, all ASCII (8N1) open protocol "USB Type B."

Any terminal program (Hyperterminal, Procomm, Kermit) will work with OTEK's serial com. ports. For USB download our Driver at [www.otekcorp.com/Support/Downloads/PC-USB-Driver](http://www.otekcorp.com/Support/Downloads/PC-USB-Driver).



**Power/Input (DIGIT 5):**

**Option 0: Powerless™:** The **SPM** is powered from the signal that it measures. ONLY available for options 00, 02 and 40 through 43 of input signal (Digits 2 & 3). **WARNING:** Any other I/Os are NOT isolated from signal. Options 40-43 (Digits 2 & 3) could have lethal potentials!

See specific Option # & Connections

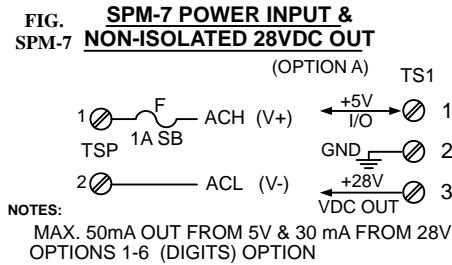
**Option 1 or 7: Non-Isolated 5 or 7-32 VDC Power:** See Specific Option # & Connections.

All listed I/O options (except Powerless™) are available. Power requirements vary with options included. The **SPM** with No Control and Power Out (Digit 6, Option 0) requires under 150 mW (30 mA@5VDC) for LED and under 100 mW with LCD display.

**Options 2-6: Isolated Power**

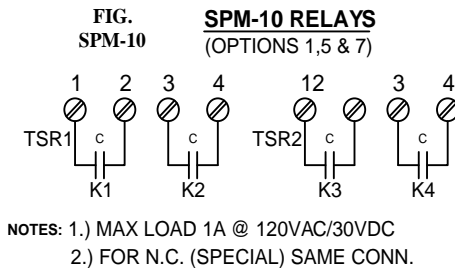
These options offer minimum isolation of 500 VAC or DC and their efficiency is about 80%. Again, add all the options: power x1.2 to arrive at total power required. Options 3, 4, 5 & 7 have wide input range, all others +/- 5%.

Option 7 is non-isolated 7-32 VDC/input range.



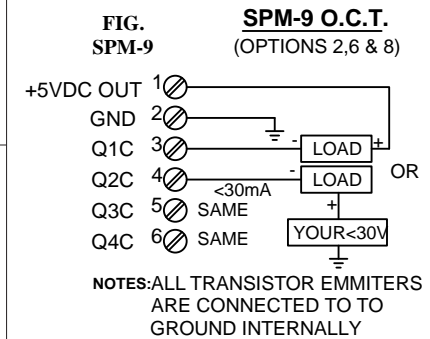
**CONTROL & POWER OUT (DIGIT 6):** Not available with Powerless™ inputs.

**Option 1: Relays (4):** Standard outputs are SPST, N.O. of all 4 relays. For N.C. of all 4 relays or SPDT of only 2 relays or other contact combination select option 9 and specify. Contacts are rated at 1 amp at 120 VAC/30 VDC resistive load. Also applies to option 5 & 7 (Relays). Power required by each relay is 200 mW (40mA@5VDC) x 4=800 mW. (Contact OTEK for 10 A contacts).



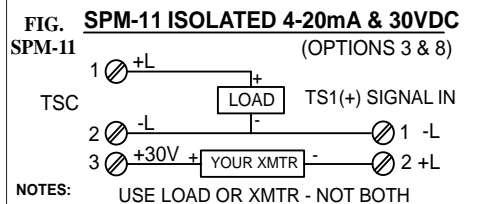
**Option 2: Open Collector Transistors (O.C.T):**

Four O.C.T are included and all are common emitter (sinking) to digital ground (terminal TS1-2). The 5 VDC internal powers is available at terminal TS1-1. Maximum current allowed per O.C.T. (From the internal 5 VDC) is 20mA/O.C.T. if external VCC is used, the maximum VCE is 30 VDC and 30 mA per O.C.T. Switching time is under one (1) uSecond.



**Option 3: Isolated 4-20 mA:** (Must include serial I/O options 1-3 Digit 4)

This option is offset & scaled via the serial port (digit 4) and can be configured for 4-20, 0-20 or 0-24 mA or 0-5 VDC via internal jumpers (standard is 4-20 mA). This option requires under 200 mA@5VDC internal power due to step up from 5-30 VDC compliance. Accuracy & linearity is +/- .1% of setting and can drive up to 1K ohms load. Also see Option B.

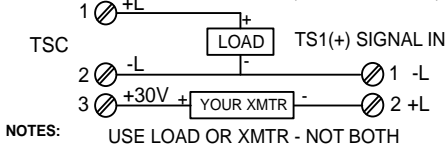


**SPM SERIES continued**

**Option 4: Isolated 30 VDC**

You can use it to exite your transmitter at up to 25mA. It consumes under one (1) watt at full load. Also see Option A.

**FIG. SPM-11 ISOLATED 4-20mA & 30VDC**  
SPM-11 (OPTIONS 3 & 8)



**Option 5-8: Combinations of Option 1-4.**

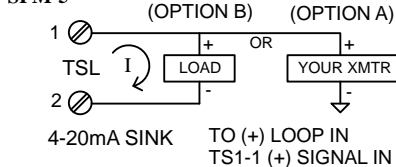
Don't forget to add all power requirements of each option desired.

See Options 1-4 & Connections.

**Option A: Non-Isolated 28VDC For Transmitters.**

It converts the internal 5 VDC to 28 VDC and requires under 0.8 watts@5 VDC with max current output of 25mADC.

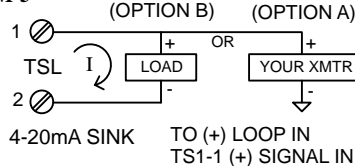
**FIG. SPM-5 ANALOG OUT**  
SPM-5



**Option B: Non-Isolated 4-20 mA Out.**

This option converts the SPM to a low-cost transmitting DPM. The output is referenced to the SPM's Signal input after it has been conditioned by the signal conditioner (such as strain-gage, Hz, PH, etc.), and it has its own zero and span potentiometers for your customized range. Standard connections are for sourcing with burden under 700 ohms @ 20 mA. For external compliance and sinking, select option #9 and specify "external compliance" (you supply the VDC power for the 4-20mA transmitter). Minimum voltage is 5 VDC plus your load. Max is 30 VDC plus your load. Accuracy and linearity is +/- 0.05% of full scale. Power requirement is 800mW@5VDC internal compliance or 50mW with external (yours) compliance. Also see Option 3.

**FIG. SPM-5 ANALOG OUT**  
SPM-5



**CASE TYPE (DIGIT 7):**

**Option 0, Plastic:** ABS 94VO black is standard. All options have 2 piece plug-in screw terminal connectors and seismic tested mounting slides (2).

**Option 1, Metal:** Aluminum machined, nickel plated (ready for EMI/RFI compliance), black powder coated.

**Option 2 & 3, Nema 4X:** We add a neoprene or monel gasket for full front panel water proof. (No Span or Zero front panel adjustments).

**Option 9, Custom:** Use this to specify your needs. M&N options, digit 1 automatically get metal housings (Option 3).

**DISPLAY TYPE (DIGIT 8):**

Option 0,1, 3 & 4: -1.9.9.9.9  
Option 2: -1.9.9.9, 0.8" High  
Option 6: 9.9.9.9, 0.8" with negative sign & overrange LEDs above and below MSD.

**Zero & Span Adjustments:**

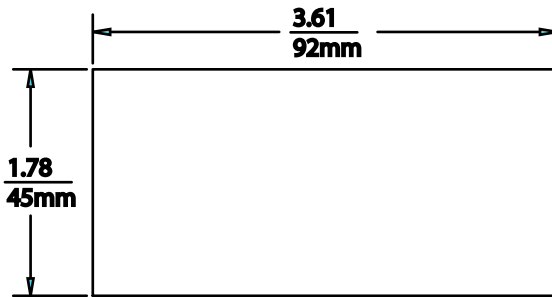
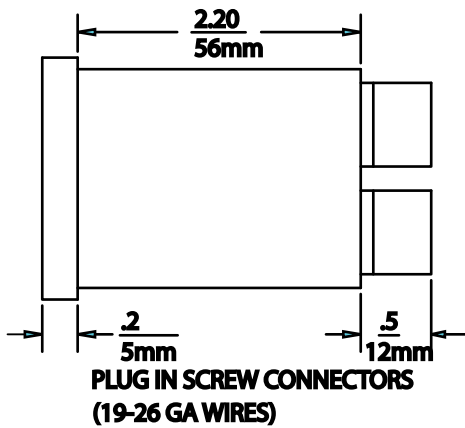
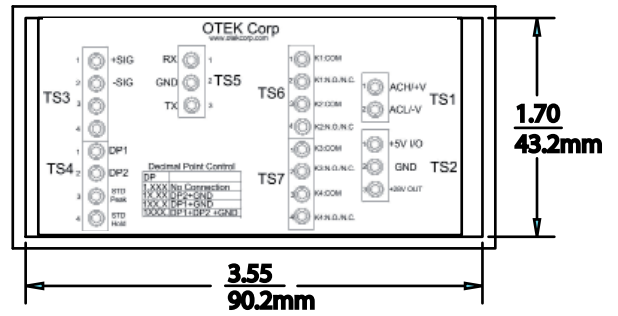
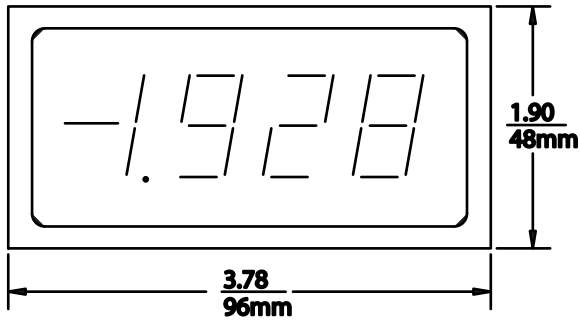
(Zero on right, span on left). Always adjust zero before span. NOTE: Nema 4X, Mil-STD and nuclear have no front panel adjustments. Unit must be removed from housing for calibration (Normally not required).

**CONNECTORS:** All connectors are 2 piece plug-in on 3.5 mm centers. Min-max gauge accepted is 26-16.

# SPM MECHANICAL INFORMATION

ACTUAL DISPLAY WILL VARY

ACTUAL CONNECTORS WILL VARY



IF YOU DON'T  
SEE IT,  
ASK FOR IT!

# SPM SERIES ORDERING INFORMATION 11-21-11

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

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

	1	2	3	4	5	6	7	8
Model: SPM -								
<b>GRADE (1)</b>								
I.....Industrial								
M.....Mil-Spec								
N.....Nuclear (Contact OTEK)								
9.....Custom (Contact OTEK)								
<b>INPUT SIGNAL (1 &amp; 2)</b>								
00.....4-20mA Loop Powered								
01.....4-20mA External Powered								
02.....4-30VDC Signal Powered								
03.....Serial Input Remote Display								
04.....+200mVDC								
05.....+2VDC								
06.....+20VDC								
07.....+200VDC								
08.....+50mVDC								
09.....Custom (Contact OTEK)								
10.....+ 200µADC								
11.....+2mADC								
12.....+20mADC								
13.....+200mADC								
14.....200mV RMS								
15.....2V RMS								
16.....20V RMS								
17.....200V RMS								
18.....50mV RMS								
20.....2mA RMS								
21.....20mA RMS								
22.....200mA RMS								
23.....5 Amp RMS								
24.....Strain-Gage (<1K Ohm)								
25.....Strain-Gage (>1K Ohm)								
26.....RTD (PT100)								
27.....RTD (PT1000)								
28.....TC (Type J)								
30.....TC (Type K)								
31.....TC (Type T)								
32.....Frequency (40-20KHz)								
33.....Frequency (50-440Hz Line)								
34.....% RH (Specify Sensor)								
35.....pH (0-14.00)								
36.....ORP (0-2000mV)								
37...Hi Speed Peak & Hold (2 VDC)								
40.....VAC Signal Powered								
41.....AAC Signal Powered								
42.....50-440 AcHz Signal Powered								
43.....WAC Signal Powered								
<b>DISPLAY TYPE (6)</b>								
0.....4 1/2 Digits 0.6" Red LED								
1.....4 1/2 Digits 0.5" LCD								
2.....3 1/2 Digits 0.8" Red LED								
3.....4 1/2 Digits 0.5" Red Backlit LCD								
4.....4 1/2 Digits 0.5" Green Backlit LCD								
6.....4 digits 0.8" Red LED								
9.....Custom (Contact OTEK)								
<b>CASE (5)</b>								
0.....Plastic								
1.....Metal								
2.....Plastic/Nema 4X								
3.....Metal/Nema 4X								
9.....Custom (Contact OTEK)								
<b>CONTROL &amp; POWER OUT(4)</b>								
0.....None								
1.....Relays (4)								
2.....O.C.T. (4)								
3.....Isol. 4-20mA								
4.....Isol. 30VDC For XMTR								
5.....Relays & Isol. 4-20mA								
6.....O.C.T. & Isol. 4-20mA								
7.....Relays & Isol. 30VDC For XMTR								
8.....O.C.T. & Isol. 30 VDC for XMTR								
9.....Custom (Contact OTEK)								
A.....Non-Isol. 28 VDC For XMTR								
B.....Non-Isol. 4-20 mA Out								
<b>POWER INPUT</b>								
0.....Powerless™								
1.....Non - Isolated 5VDC								
2.....Isolated 5VDC								
3.....Isolated 7-32VDC								
4.....Isolated 90-265VAC								
5.....Isolated 9-36VDC								
6.....Isolated 48VDC								
7.....Non-Isolated 7-32VDC								
9.....Custom (Contact OTEK)								
<b>SERIAL I/O (3 &amp; 4)</b>								
0.....None								
1.....RS232								
2.....RS485								
3.....USB								
9.....Custom (Contact OTEK)								

**NOTES:**

1. 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.
2. See "ACS" series for V, A, W, Hz, AC Powerless.
3. Serial I/O is **NOT** isolated from signal. Must have serial I/O (Digit 4) for control options (1-8) on Digit 6.
4. Control Outputs (Digit 6) must order any serial I/O (Digit 4) and Power Inputs (Digit 5) options 1-7.
5. Nema 4x Front Panel Only.
6. LED std. color is red. For orange, yellow, green or blue use Option #9 and specify color.