

**NEW**

# AUTOMATIC TRICOLOR SWITCHBOARD BARGRAPH FOR MIL-SPEC, NUCLEAR & HI-REL INDUSTRIAL USES WITH > 20 INPUT SIGNAL CONDITIONERS

**MODEL SEB**

### FEATURES:

- New: VDC/A.C. Signal Powered (No power supply required)
- 51 Automatic Tricolor Bars (RGY)
- 4 Digits ( 9.9.9.9 -1.9.9.9)
- RS232/485/USB Serial I/O
- Fits Industry's Std.4" ANSI or 1/4 DIN Panel Cut-Out, But Only 1" Deep
- Use As Indicator/Controller/Remote Display on DCS/SCADA
- Optional 10-32VDC or 90-265VAC Power Input
- Power For Transmitter (28VDC@20mA)
- NEMA 4X Front Panel
- Replaces Many Old Bargraphs
- Lifetime Warranty



### SPECIFICATIONS @ 25°C 5VDC Power (Industrial Grade)

- Accuracy & Linearity: See description section.
- Bargraph Resolution: 2% (51 Segments)
- Span & Zero Range: ± 3000 Counts
- C.M.V. - Signal to - Power: 2VDC Max.
- Digits: 0.6", 4(9.9.9.9) 0.01% Resolution
- Temperature Coefficient: 50 PPM
- Operating/Storage Temp: 0-60/-20 + 80°C
- Power Consumption: 150mW @ 5VDC + Options
- Environmental: NEMA 4X , 5-95% RH N.C.
- Serial I/O 300-19.2KB (8N1 Setting)
- All ASCII I/O, Address: 255
- **CMTBF:** 100,000+ Hours

**Note:** See description section for individual specifications.

### DESCRIPTION

Now you can replace that Old analog or digital "Switchboard" meters with OTEK's latest Nano & Sigma Delta A/D Technology worthy of its Lifetime Warranted products. The New SEB (Switchboard LED Bargraph) complements the new breed of Programmable Intelligent Controllers, with features only found in other OTEK's Mil-Spec, Nuclear and Outerspace versions. The new nanotechnology used with proven firmware (SV & V) and Sigma Delta A/D reduces the number of components and cost without compromising in quality.

You can use the SEB as stand alone or part of a DCS, SCADA, or PLC system via its Serial and/or Analog I/O. Only order what you need!

**GRADES:** 4 grades are available: Hi-Rel Industrial (see specs.), Mil-Spec to specific standards, Nuclear to 10CFR50-B to your specific list and custom to your requirements. Contact OTEK for available "Off The Shelf" specs. **NOTE:** M & N grades are supplied in a metal housing, I grade in plastic or metal.

**ANALOG INPUTS:** Over 40 input signals are accepted. If we don't have it, we'll make it.

**ANALOG OUTPUT:** Optional 0-1mA, 0-20mA or 0-5VDC all isolated and reversed scale are available on request.

**POWERLESS™:** Another OTEK innovation (Pat. #4,908,569 & 7,626,378) allows the SEB to be signal powered (no power supply). See ordering information.

**EXTERNALLY POWERED:** Here you have access to ALL the SEB's features such as relays, analog out, USB, RS232C, RS485, math functions, X-Y tables, polynomials, floating point and more.

**DISPLAY:** The 51 segment automatic tricolor bargraph can be programmed for any direction (up or down), any start (bottom, top, middle), segmented or pointer color change as limits are reached or fixed.

**A. C. SIGNAL POWERED:** No power supply is required! The SEB draws its parasitic power (~50mA) from the signal it measures. Again, RS232E is available to help you control the process. Warning! No isolation. Use P.T. and C.T. (No control outputs).

**POWER OUTPUT FOR 4-20mA TRANSMITTER:** Either isolated 30VDC @ 20mA (Options 4, 7 or 8) or Non-Isolated 28VDC @ 20mA (Option E).

**GRADES:** Nuclear: For Class 1E; Mil: To specific Mil-Stds; Industrial: Per these specifications.

Other Bargraphs: LSB, LBD, LPB, HI-Q Series.

**Warranty: Lifetime Ltd.**

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



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**OTEK™ CORP.**  
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**SEB 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). (Digit 2, Option 0).

**VDC SIGNAL POWERED:** We monitor the voltage with high impedance and clamp it to a safe level to power the **SEB**. (Digit 2, Option 2).

**AC SIGNAL POWERED:** For VAC & Hz we use a capacitor limiting rectifier to power the **SEB** 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 (Patented) a C-V converter to extract the current from your C.T. for power and monitor the signal with RMS-DC. (Digit 2, Options Q-T). ~250mW.

**EXTERNALLY POWERED:** Non-Isolated 5VDC or isolated 5-36VDC or 90-265VAC 50/60Hz is optional (Digit 3, Options 1-8). Max Power: 150mW, plus options. Power: ~500mW plus options.

**DISPLAY (Digit 4):** 0-100% & 0-1,000 counts or use #9 and specify (configurable).

**SERIAL I/O:** When ordered, (Digit 5), the **CPU** controls the Baud Rate (300-9600 Baud), the relays, analog output, math functions, linearization polynomial (9th) & X-Y tables.

**CONTROL AND POWER OUT (Digit 6):** Not for powerless models. 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. See ordering information for power consumption of each option.

**RELAYS/O.C.T.(Only for powered models):** Either four (4) relays (SPDT) rated contacts at 10A@120 VAC resistive, with ~10mS response; with built in varistors or 8 open collector transistors rated at 30 VDC/30mADC common emitter, with < 1uS response.

**THE SIGNAL CONDITIONERS: (2ND DIGIT)**

**OPTION 1: 4-30VDC SIGNAL POWERED**

Another **OTEK** innovation. The voltage signal powers an **LDO** to protect the **SEB** 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 powered models. Power Input must be Option 0 (Powerless).  
**Accuracy:** ±0.1% of F.S. **Power consumption:** ~250mW.

**OPTION 2: 4-20mA EXTERNALLY POWERED:** It only drops 0.1V @ 20mA (5 Ohms) but the "**SEB**" needs 5VDC @ 50mA to operate. Power Input must be Options 1-9.  
**Accuracy:** ±0.05% of F.S.

**OPTIONS 3-6: VDC & mADC EXTERNALLY POWERED:** Input impedance is 1 Mega Ohms on all VDC ranges and 100 Ohm on 2mA & 1 Ohm on 200 mA range.

**Accuracy:** ±0.05% of F.S.

**OPTIONS 7, 8 & A:** **V & mA RMSs:** 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!**

**Accuracy:** ±0.1% of F.S.

**OPTION 9: CUSTOM** Use this option to describe any custom input, scale or modification to the **SEB** and contact us for feasibility and cost.

**OPTION B: 5 AMPS 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 **SEB** but make sure the connections are "Perfect" to electrical codes. The C.T. might have "**Lethal**" **High Voltage** without a "Shunt" (Open) and the **SEB** will "Smoke". See **OTEK's** New **ACS** & **CTT** models for **C.T.** powered instruments (Patented) or Option "R."  
**Warning: No Isolation!**  
**Accuracy:** ±0.05% of F.S.

**OPTION C: STRAIN-GAGE (<1000 Ohm Type):** Here we use a high accuracy and stability constant current (~1 mADC), 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 **LSB's** display at Zero and Full Scale Please!

**Accuracy:** ±0.05% of F.S.

**OPTION D: STRAIN-GAGE (≥1K < 5K 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 **LSB'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.

**SEB Series continued**

**OPTION E: RTD (PT100):** We excite your 2, 3 or 4 wire RTD with 200 $\mu$ A to avoid the "self heating" effect. The range of the **SEB** is the same as your **RTD** typically -200 $^{\circ}$ C to +800 $^{\circ}$ C (-328 + 1562 $^{\circ}$ 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/ $^{\circ}$ C. To change from  $^{\circ}$ C to  $^{\circ}$ F or PT100 to ANSI 392, see simple commands via serial port.

**Accuracy:**  $\pm 0.5\%$  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 F: RTD (PT1000):** Same as PT100 except it is 1000 Ohms at 0 $^{\circ}$ C instead of 100 Ohms @ 0 $^{\circ}$ C. The same technique is used. For copper **RTD** (10 Ohm), contact **OTEK**. Same connection as Option E apply.

**Accuracy:**  $\pm 0.5\%$  of F/C plus sensor's error.

Note: For long distances use a 4-20mA transmitter such as our **900** or **LPT** series.

**OPTIONS G&H: 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 Options H or S.

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

**OPTION J: THERMOCOUPLE**

**(TYPE J):** This **TC** has a range of -210 to + 760 $^{\circ}$ C (-350 + 1390 $^{\circ}$ F). Its color is white (+) and Red (-), cold junction (CJ) is inside the **SEB** at the connector base. Make sure the connections from the **SEB** and your **TC** are as close to the **SEB's** entrance as possible to avoid errors. If you short out the **SEB's** +**TC** & -**TC** together, the **SEB** will read the ambient temperature due to its built-in C.J.C. (Cold Junction Compensation).

**NOTE:** You can change from  $^{\circ}$ C to  $^{\circ}$ F and TC type via simple commands on serial port.

**Accuracy:**  $\pm 2^{\circ}$  F/C of signal input.

**OPTION K: TC (TYPE K):** This is yellow (+) and red (-) and has a range of -270 + 1370 $^{\circ}$ C (-440 + 2500 $^{\circ}$ F). The same notes as Option G.

**Accuracy:**  $\pm 2^{\circ}$  F/C of signal input

**For Other TC use #9 and Specify.**

**OPTION L: %RH:** This conditioner is designed to interface to a typical (capacitance type) 2-3pF/% of **RH** made by several manufacturers. Use Option 9 and contact **OTEK** to specify your sensor's specifications.

**Accuracy:**  $\pm 2\%$  RH of signal input.

**OPTION M: PH (ACIDITY):** We use a FET input (10<sup>15</sup>) amplifier and calibrate the **SEB** for 0-14.00 pH using the Industry's standard  $\pm 413$  mV =  $\pm 7$ pH coefficient.

Bargraph display is 0-100% or use #9 and specify.

Note: Not temperature compensated.

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

**OPTION N: ORP (OXYGEN REDUCTION POTENTIAL):** Our FET amplifier (10<sup>9</sup>) accepts the industry standard 2000mV F.S. of the probe and the **SEB** displays it in % (0-100.00%).

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

**OPTION P: HI SPEED PEAK**

**& HOLD (P&H):** Now you can capture fast transients greater than 5 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:** 2VDC/mADC F.S. (Specify Range). Contact OTEK for V/mA or RMS.

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

**Linearity & Resolution:** +/- 0.1% of F.S.

**Response time:** >200KHz (<5us)

**Retention:** >10 years (with power on)

## SEB Series continued

**Note: Options Q-T only available with Powerless™ Signal power input (Option 0).**

**(Pat. # 4,908,569)**

**Option Q: VAC Signal Powered:**  
**Warning! No Isolation!** This option uses the AC Voltage Signal to power the **LSB**. Since the **LSB** 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 7 or 8 (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!***

**Option R: AAC Signal Powered:**

**Warning! No Isolation!** (Pat.# 7,626,378)

**O**TEK's Patented technique permits the extraction of power from a regular **C.T.** (Current Transformer) to power the **LSB** 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.

**Option S: Hertz (Line Frequency)**

**Signal Powered: Warning! No Isolation!** This option uses the same power technique as Option Q 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: 30-100Hz. Accuracy & Linearity: ±0.5% of F.S.

For 400 Hz line use #9 and specify range.

**Option T: 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 Q & R apply. Range: VAC: 50-150; AAC: 0.1 - 5A; Frequency: 40-450Hz; Accuracy & Linearity: ±0.1% of F.S.; Conversion: True RMS. Hz: 45-65.

**POWER/INPUT (DIGIT 3):**

**OPTION 0: POWERLESS™ :**

The **SEB** is powered from the signal that it measures. **ONLY** available for options 1 and Q through T of input signal (Digit 2).

**WARNING:** Any other I/Os are **NOT** isolated from signal. Options Q-T (Digits 2 & 3) could have lethal potentials!

**OPTION 1: NON-ISOLATED 5 VDC POWER:**

All listed I/O options (except Powerless™) are available. Power requirements vary with options included. The **SEB** with No Control or Power Out (Digit 6, Option 0) requires under 150 mW (30 mA@5VDC). Please add all the options power to the basic **SEB**.

**OPTIONS 6-8: ISOLATED POWER**

These options offer minimum isolation of 500 VAC or DC and their efficiency is about 80%. Again, add all the options. See ordering information.

**DISPLAY (4TH DIGIT):** Standard display is 0-F.S. input=0-100% and 0-1000 counts. Any other, use #9 and specify. Also, see digit #9 for scale plate printing.

**SERIAL I/O (5TH DIGIT):**  
**WARNING:** No Isolation From Signal.

**OPTION 1:** Parasitic RS232E. Only for powerless models (Option 0 on 3rd digit).

**OPTION 2:** RS232D: 1200-19.2kb, all ASCII (8N1) open protocol "DB9."

**OPTION 3:** RS485: 1200-19.2kb, all ASCII (8N1) open protocol screw "connector."

**OPTION 4:** USB: 1200-19.2kb, all ASCII (8N1) open protocol "USB Type B" connector.

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

**CONTROL & POWER OUT (DIGIT 6): (ONLY POWERED MODELS)**

**OPTION 1: RELAYS (4):** SPDT, 10A@120VAC or 30 VDC resistive. Varistors (250V) included. Settable via serial port as alarms. Response time: ~10mS, silver contacts. Power required: 50mA@5VDC/relay. Total: 200mA@5V.

**SEB Series continued**

**OPTION 2: OPEN COLLECTOR TRANSISTORS (O.C.T):**

Four O.C.T are included and all are common emitter (sinking) to digital ground. The 5 VDC internal power is available. 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 (RETRANSMISSION):** (Only for Powered Models)

This option is offset & scaled via the serial port (digit 5) 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. Accuracy & linearity is +/- .1% of setting and can drive up to 1K ohms load. Also see Option B. Power consumption: 200mA@5VDC.

**OPTION 4: ISOLATED 30 VDC**

You can use it to excite your transmitter at up to 25mA. It consumes under one (1) watt at full load. Also see Option E. Power consumption: 200mA@5VDC.

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

Don't forget to add all power requirements of each option desired. Worst case is 2 watts.

**OPTION E: NON-ISOLATED 28 VDC & 4-20 MA OUT.**

This option converts the SEB to a low-cost transmitting DPM. The output is referenced to the SEB'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. In addition, this option gives you 28 VDC non-isolated to power your transmitter. 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 10 VDC plus your load. Max is 30 VDC plus your load. Accuracy and linearity is +/- 0.05% of full scale. Power requirement is 400mA@5VDC internal compliance or 50mW with external (yours) compliance.

**OTHER SPECIFICATIONS**

- Bars: 51 & 4 Digits (9.9.9.9)
- Power For Transmitter: 28VDC@20mA (requires 1 Watt Power Input)
- Input Type: Differential & Single Ended. 1M Ohms For VDC
- All Configurations via Serial Port For Added Security
- 5VDC Powered: 40mA @ 5V
- Zero & Span Adjustments: On Rear (See Note 5) or Via Serial Port
- Z in For V: 1 MEG Ohms
- Z in For mA: See Ordering Information on Digit 2.

**GRADES:** 4 grades are available, all with the same high reliability and tested and approved for:

**I** Industrial, **M** to specific Mil-Specs, **N** Nuclear to 10CFR50B and **S** Intrinsically Safe for Class I Div. 1.(See Note 1) Contact **OTEK** for more details.

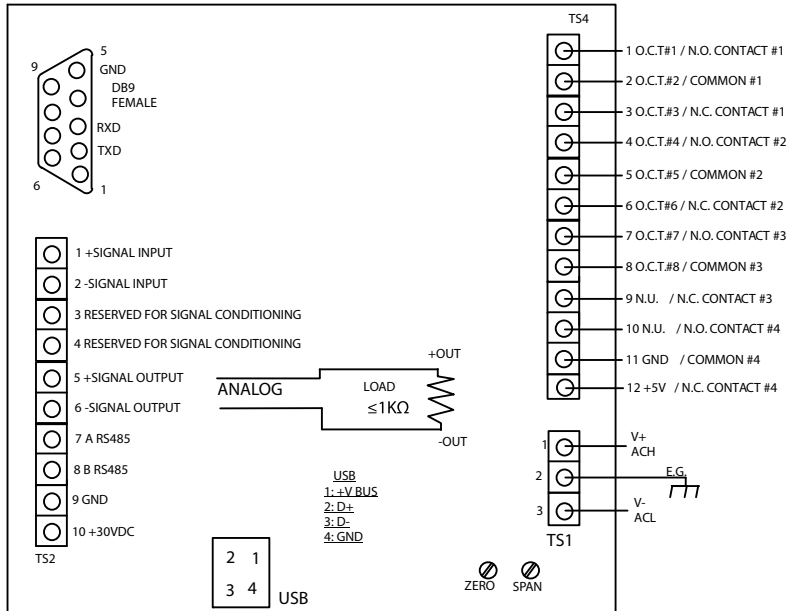
**HOUSINGS:** Either plastic, metal, explosion proof or sanitary to 250°F Steam cleaning.

**ENVIRONMENTAL:**

- Op/Storage Temp.: -10 + 70°/-20 + 80°C
- Humidity: 5-95RH Non-Condensing
- MTBF: >100,000 Hours

**SEB SERIES continued**

FIG SEB-4 LSB / SEB SERIES WITH CONTROL OUTPUTS(DIGIT 6, OPTION 1-E)

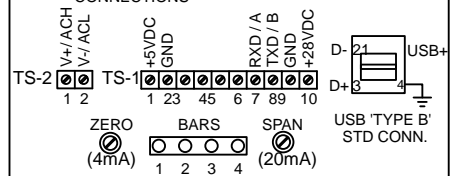


NOTE: SEE FIG. SEB-5 FOR MODELS W/O CONTROL OUTPUT

**TYPICAL CONNECTIONS**  
(No Control Outputs, Digit 6, Option 0)  
Input Signal 1 & Q-T

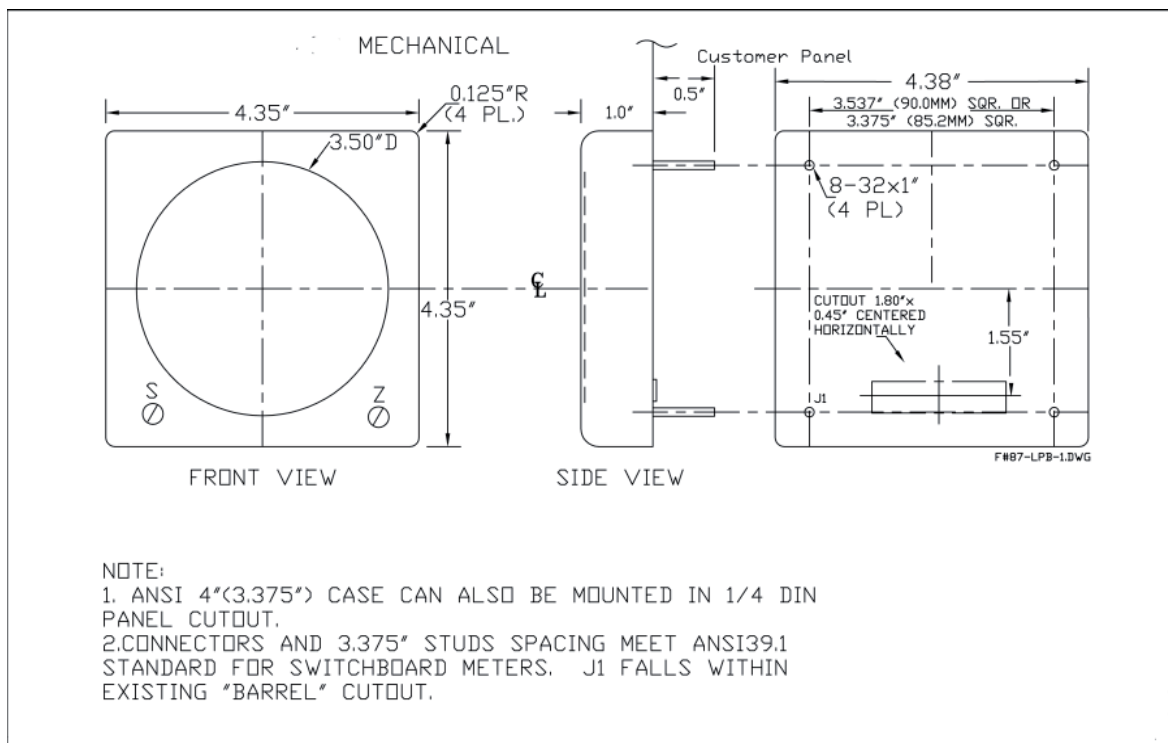
**FIG. CONNECTIONS**  
**SEB-5** (FOR SEB/LSB/LPB)

- NOTES:**
- 1.) DON'T CONNECT UN-NAMED TERMINALS
  - 2.) CONFIRM P/N BEFORE CONNECTING
  - 3.) ALWAYS ADJUST ZERO BEFORE SPAN
  - 4.) DON'T REMOVE FACTORY JUMPERS
  - 5.) TS2 ONLY FOR ISOLATED POWER IN
  - 6.) TS1-3 THRU TS1-6 FOR SIGNAL INPUT
  - 7.) TS1-7 THRU TS1-9 FOR SERIAL ONLY
  - 8.) USE THIS FOR MODELS LSB OR SEB-XXX-XX0-XXX (NO CONTROL OUTPUTS) & SEE INPUT SIGNALS TYPICAL CONNECTIONS



**NOTES:** FOR SEB/LSB MODELS WITH CONTROLLING OUTPUTS (SEB/LSB-XXX-XX1/8-XXX) SEE FIG. SEB-4

**SEB MECHANICAL INFORMATION**



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

1. If digit 2 is option 1, Q, R, S or T, then digit 5 and digit 6 must be option 0.
2. See notes below.

	1	2	3	4	5	6	7	8	9
Model: SEB -	□	□	□	□	□	□	□	□	□
<b>GRADE (1)</b>									
I.....Industrial									
M.....Mil-Spec									
N.....Nuclear (Contact OTEK)									
9.....Custom (Contact OTEK)									
<b>E.S. INPUT SIGNAL/Z in (2, 5)</b>									
1.....4-30VDC Signal Powered									
2.....4-20mA External Powered									
3.....200mVDC/1M Ohms									
4.....500 VDC/1M Ohms									
5.....2mADC/100 Ohms									
6.....200mADC/1 Ohms									
7.....200mVRMS/1M Ohms									
8.....500VRMS/1M Ohms									
9.....Custom (Contact OTEK)									
A.....2mARMS/100 Ohms									
B.....5ARMS/0.05 Ohms									
C.....Strain Gage<1000 Ohms									
D.....Strain Gage>1000 Ohms									
E.....RTD PT100 (100 Ohms)									
F.....RTD PT1000 (1K Ohms)									
G.....Frequency 40-20 KHz									
H.....Frequency 50-60HZ Line									
J.....TC Type J									
K.....TC Type K									
L.....%RH (Specify Sensor)									
M.....pH (0-14.00)									
N.....ORP (0-2000 mV)									
P.....High Speed Peak & Hold, 2 V									
Q.....VAC Signal Powered (P.T.)									
R.....AAC Signal Powered (5A C.T.)									
S.....40-70 Hertz Signal Powered (P.T.)									
T.....Watts AC Signal Powered (P.T. & C.T.)									
<b>SCALE PLATE</b>									
0.....Standard 0-100%									
9.....Custom (Contact OTEK)									
<b>RANGE/CALIBRATION</b>									
0.....Standard									
9.....Custom (Contact OTEK)									
<b>HOUSING &amp; MOUNTING (6)</b>									
0.....Plastic & 3.375"									
1.....Plastic & 90mm									
2.....Metal & 3.375"									
4.....Explosion Proof									
5.....Sanitary									
9.....Custom (Contact OTEK)									
<b>CONTROL OUTPUTS(8)</b>									
0.....(50mA) None									
1.....Relays (4 ea.)									
2.....Non-Isol. Open Collector Xtrs. (4 ea.)									
3.....Isolated Retransmission (4-20mA)									
4.....Isolated 30VDC for Transmitter									
5.....Isolated Relays & 4-20mA Out									
6.....Isolated O.C.T. & 4-20mA									
7.....Isolated Relays & 30VDC Out									
8.....Isolated O.C.T. & 30VDC Out									
9.....Custom (Contact OTEK)									
E.....Non-Isol. 28VDC & 4-20mA Out									
<b>SERIAL I/O (4,7)</b>									
1.....Parasitic RS232E									
2.....RS232									
3.....RS485									
4.....USB									
9.....Custom (Contact OTEK)									
<b>POWER INPUT(7)</b>									
0.....Powerless (Signal Powered)									
1.....Non-Isolated 5VDC									
6.....Isolated 90-265VAC									
7.....Non-Isolated USB Powered									
8.....Isolated 9-36VDC									
9.....Custom (Contact OTEK)									
<b>DISPLAY CONFIGURATION (3)</b>									
0.....Standard									
9.....Custom (Contact OTEK)									

**NOTES:**

1. Contact **OTEK** for other ranges and for M & N grades and available specs. 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 description. Input Options 1 & Q-t must have option "0" (No control outputs) on Digit 6. Use #9 and specify for ranges not listed.
3. Standard display configurations is (Digit 4): Colors are 0-10% = red, 10-20% = amber, 20-80% = green, 80-90% = amber, 90-100% = red. Field configurable only with serial communication options (Digit 5).
4. Maximum power consumption (all options): 2 Watts
5. Specify sensor manufacturer and type for pH and % RH.
6. Zero and SPAN adjustments are behind the unit.
7. USB powered is limited to 0.5A @ 5V (V2.0). Contact OTEK for maximum loading. Requires Serial I/O. For Digit 2, Options 1, Q-T and Digit 3, Option "0", Digit 6 must be "0" (no control outputs).
8. (mA=Current Consumption of each option @5VDC).