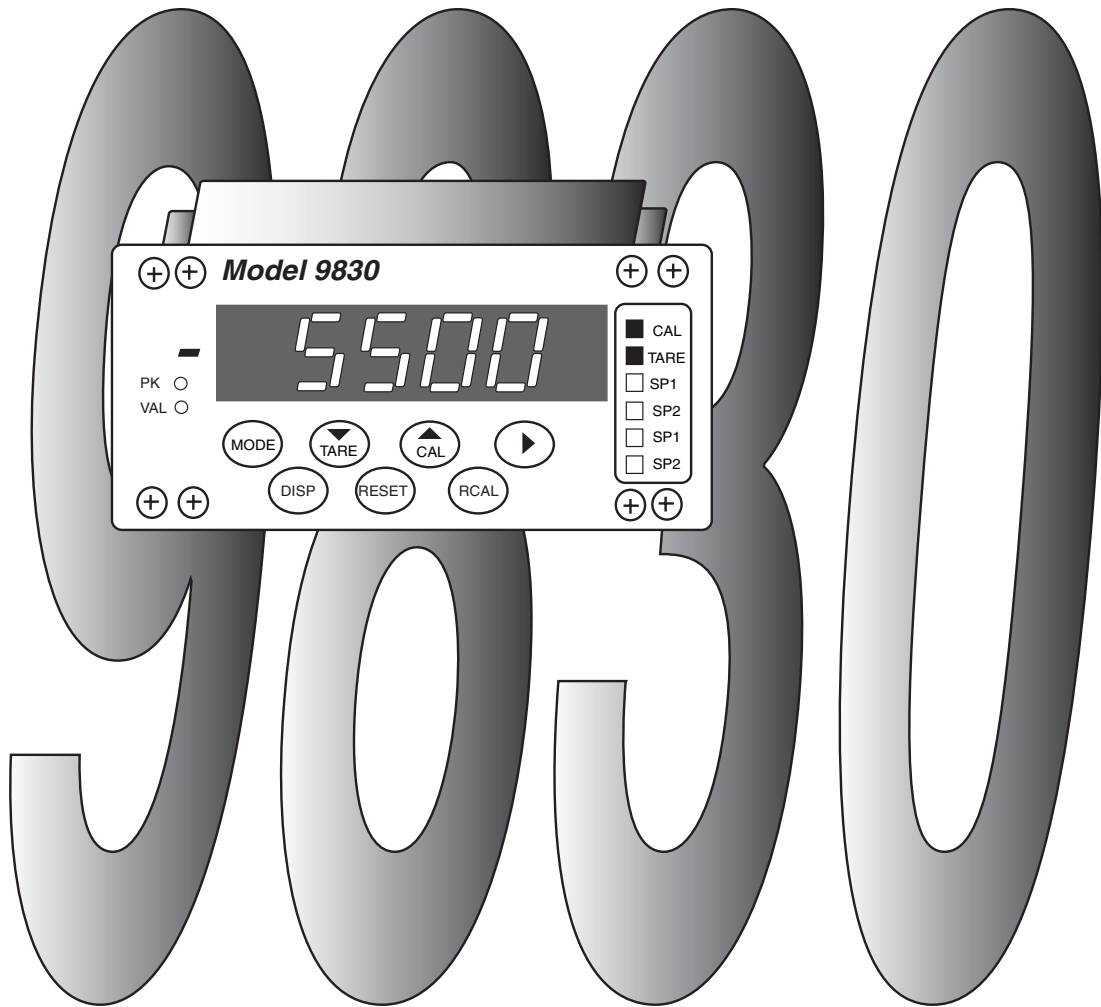


INSTRUCTION MANUAL

Model



*Strain Gage Indicator with
Enhanced Performance Features*

interface

ADVANCED FORCE MEASUREMENT

7401 E. BUTHERUS DR. • SCOTTSDALE, AZ 85260

www.interfaceforce.com

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DESCRIPTION

The Model 9830 is an enhanced performance, microprocessor-based digital indicator capable of interfacing directly to a low level strain gage load cell transducer. An internal, high gain, fully-differential amplifier and a 16-bit analog-to-digital converter combine to accurately digitize the input signal. A 5Vdc @ 60mA or 10Vdc @ 120mA, short circuit protected, transducer excitation supply is also provided. Self-calibrating ± 10 Vdc and 4-20mA analog output signals are standard with this instrument. A programmable digital filter with exponential smoothing and programmable motion window provide optimum response to step inputs. A front panel RCAL switch provides a convenient calibration feature. TARE and CALIBRATION are easily performed via front panel pushbuttons.

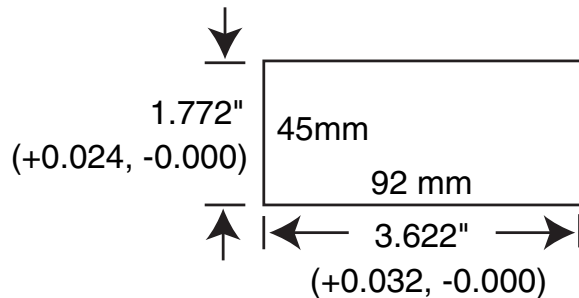
SPECIFICATIONS

Excitation voltage:	5 or 10Vdc, internal jumper selectable
Excitation current:	60mA @ 5Vdc, 120mA @ 10Vdc
Input amp gain:	100 or 200
Input impedance:	1000 megohm (min)
Input bias current:	10nA (max)
Zero tempco:	1uV/degC (typ)
Gain tempco:	20ppm/degC (typ)
CMRR:	120dB @ 50-60Hz
Signal input range:	± 25 mV at Input amp gain = 200 ± 50 mV at Input amp gain = 100
Max internal counts:	$\pm 32,768$ over signal input range
Max display range:	$\pm 99,999$
Sensitivity:	0.8uV/internal count at input amp gain = 200
Conversion rate:	120 samples/second
Analog Filter:	2-pole, 1000Hz low pass
Digital Filter:	Exponential smoothing filter with adjustable smoothing constant and filter window
Nonlinearity:	$\pm 0.01\%$ ± 1 internal count
Step Response:	25ms (without digital filtering)
Analog Outputs:	± 10 Vdc and 4-20mA (self-calibrating)
Serial Output:	Bi-directional RS232 with internally selectable baud rates
Operating range:	-10 to 50 degC
Input Power:	115 or 230 Vac (solder pad jumper selectable)
Pkg dimensions:	3.78W x 1.89H x 5.13D

INSTALLATION AND WIRING

INSTALLATION

The Model 9830 enclosure is designated for panel mounting in a 1/8 DIN cutout. The cutout dimensions are shown below.



To panel mount the 9830, perform the following steps.

1. Rotate the four pawl screws (outside screws in each corner) several turns counter-clockwise to retract the pawls. Make sure the pawls retract enough to clear the back of the mounting panel. The pawls may be retracted to accomodate panel thicknesses up to 0.25 inches (6.35mm).
2. Insert the instrument into the panel cutout.
3. Position the pawls so that their elongated dimension overlaps the panel cutout, then tighten the screws. Do not over-tighten.
4. Installation complete.

WIRING

Reference Figures 3 and 4 for TRANSDUCER and I/O wiring information. Power is applied with a 3-prong AC power cord. The instrument is protected by a 250V, 250mA fast acting 5mm fuse. The fuse holder is an integral part of the input power connector. A spare fuse is provided in the fuse holder. Internal solder jumpers are provided to allow 115Vac or 230Vac operation (Reference Figure 6 on page 5).

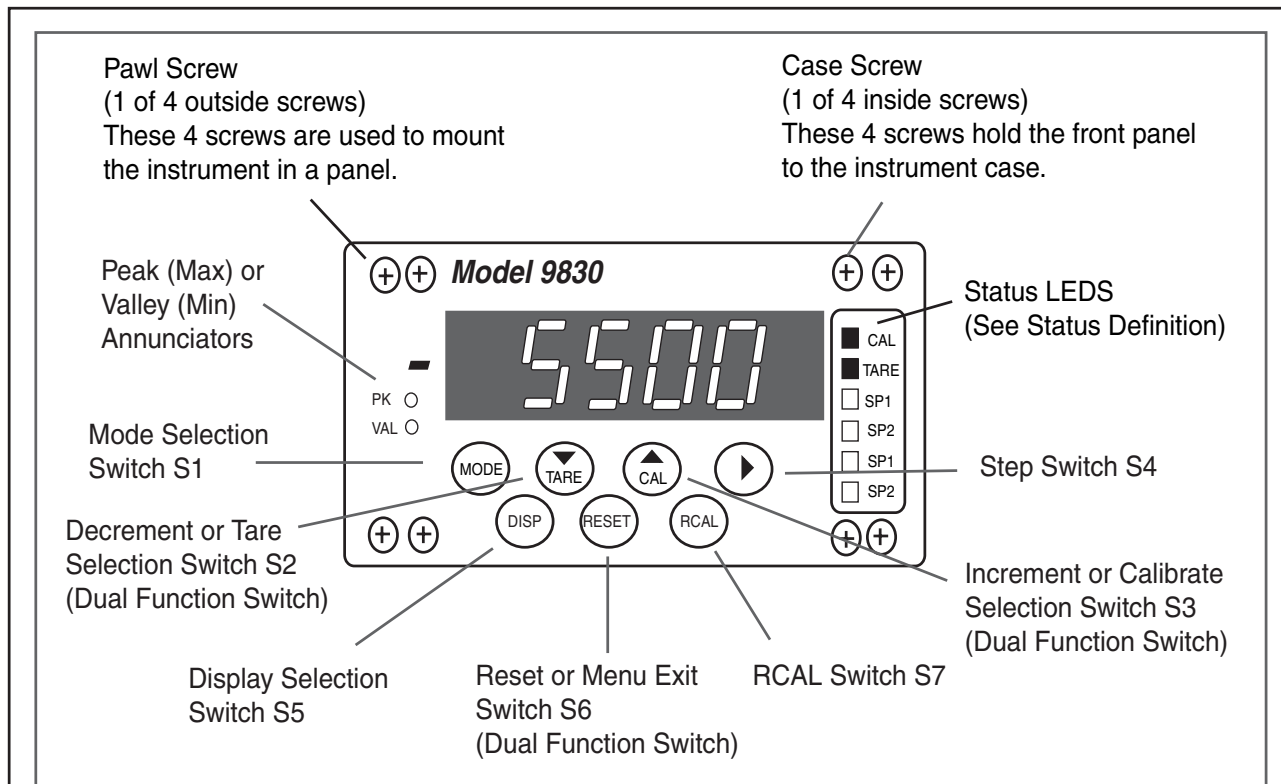


Figure 1. Model 9830 Front Panel View

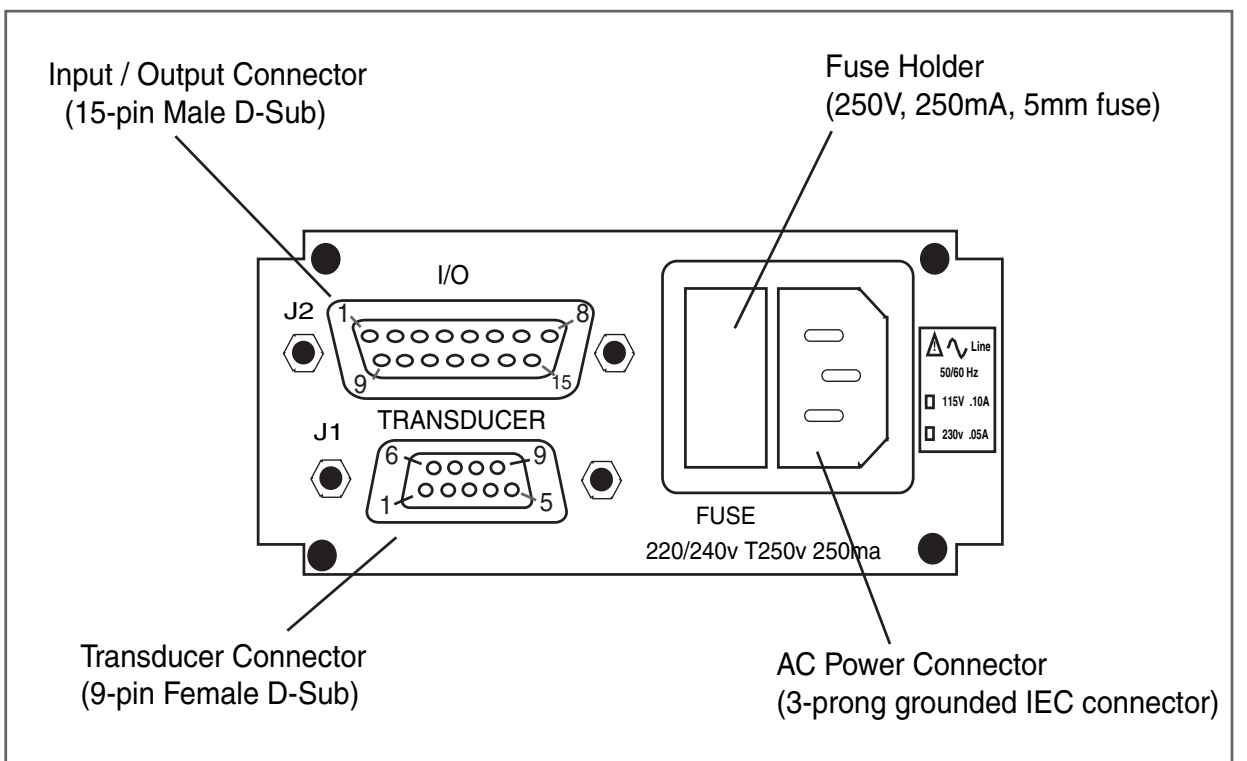


Figure 2. Model 9830 Rear Panel View

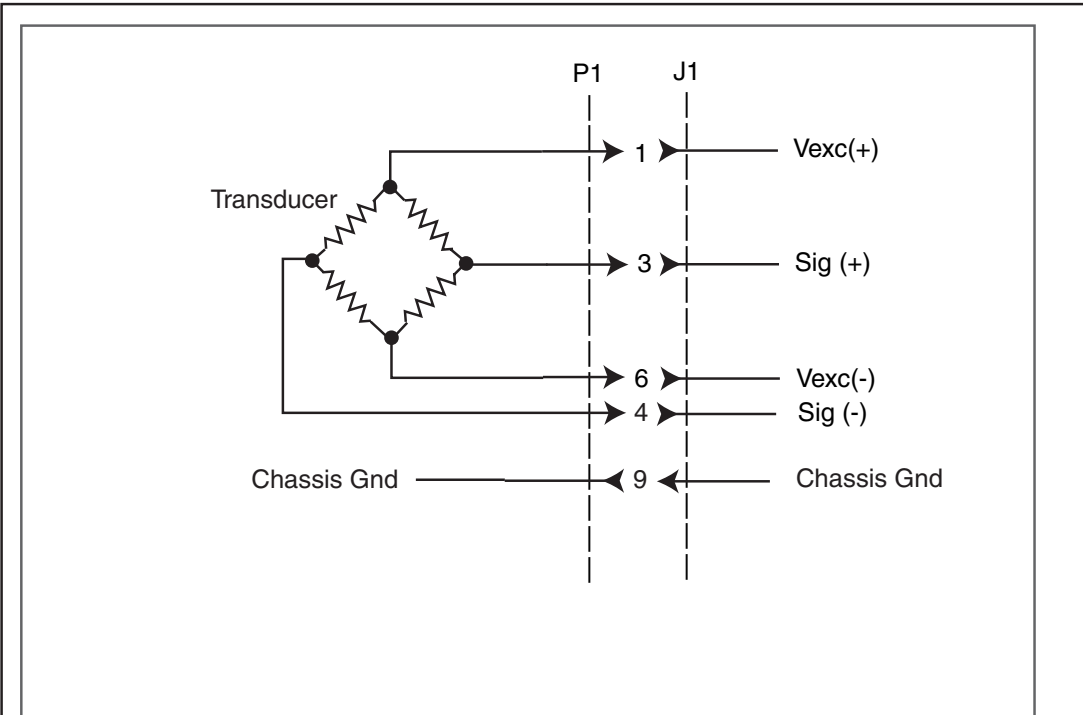


Figure 3. Transducer Wiring

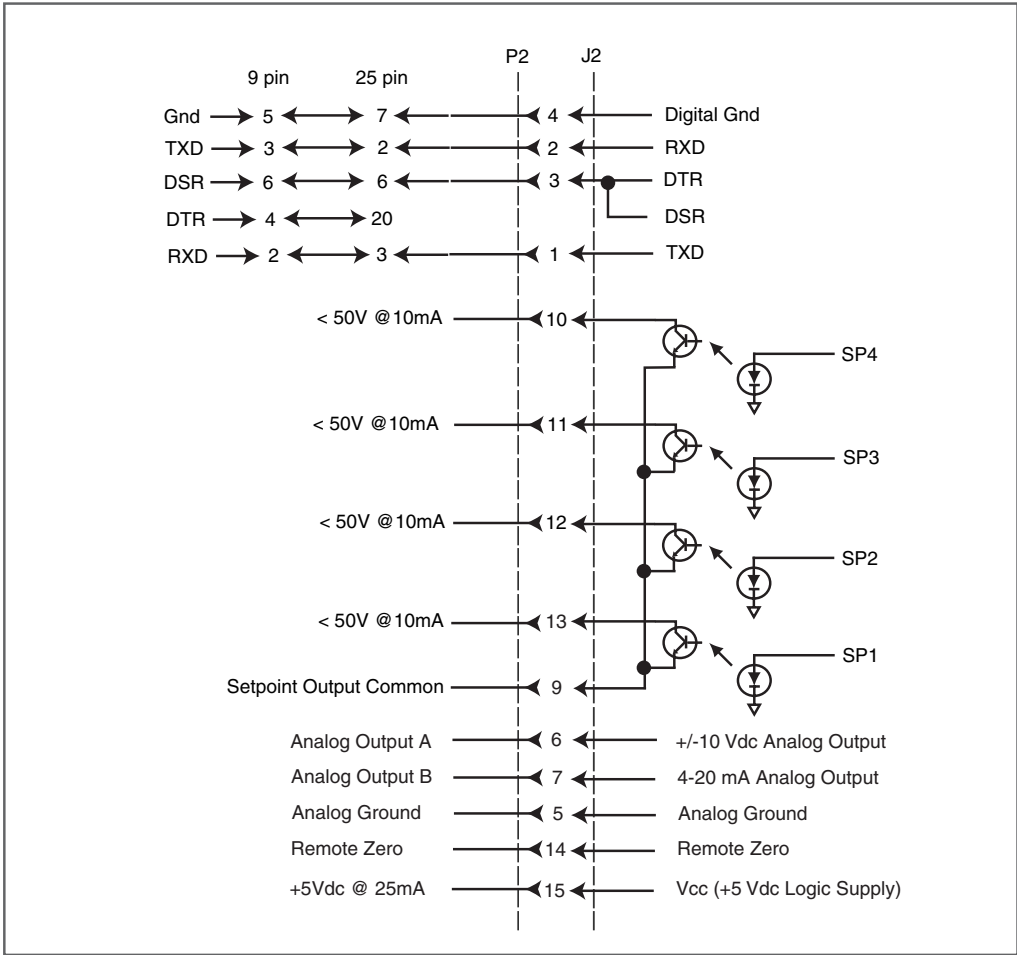


Figure 4. I/O Wiring

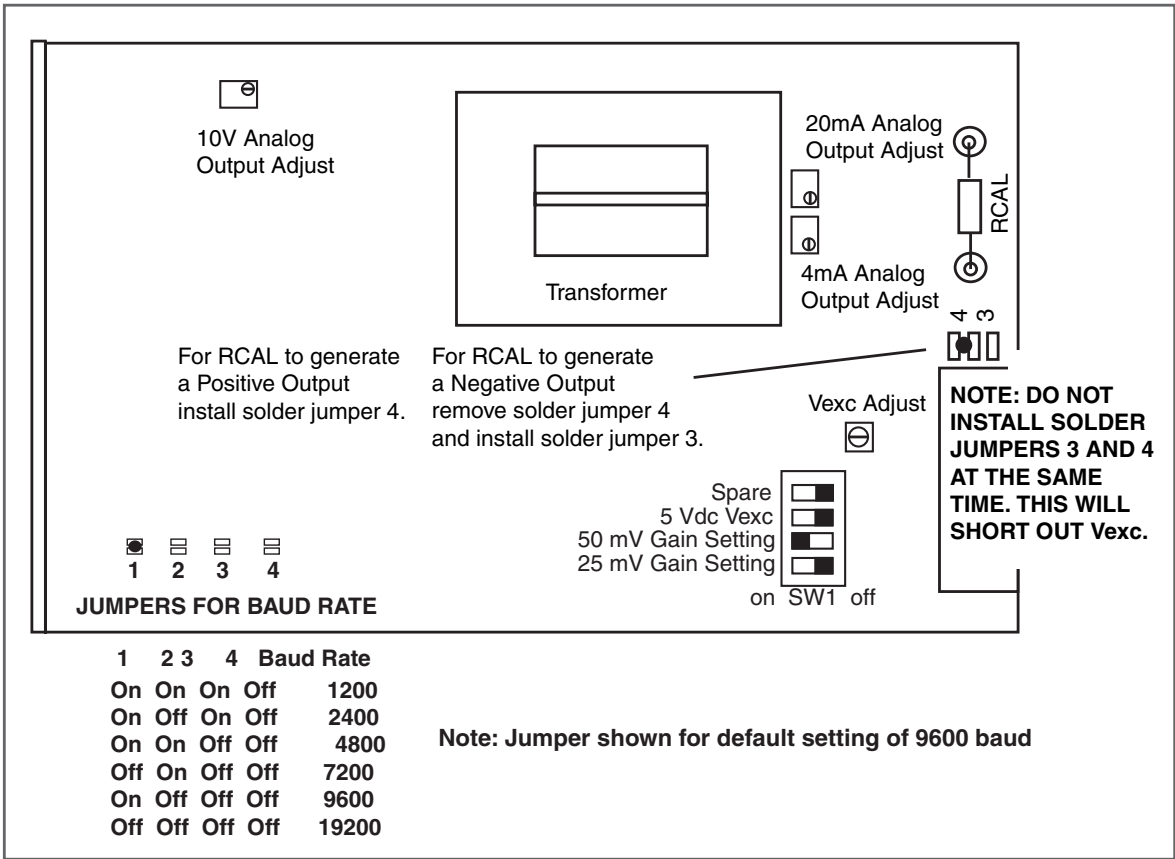


Figure 5. Location of Switches, Jumpers and Potentiometers (Top View)

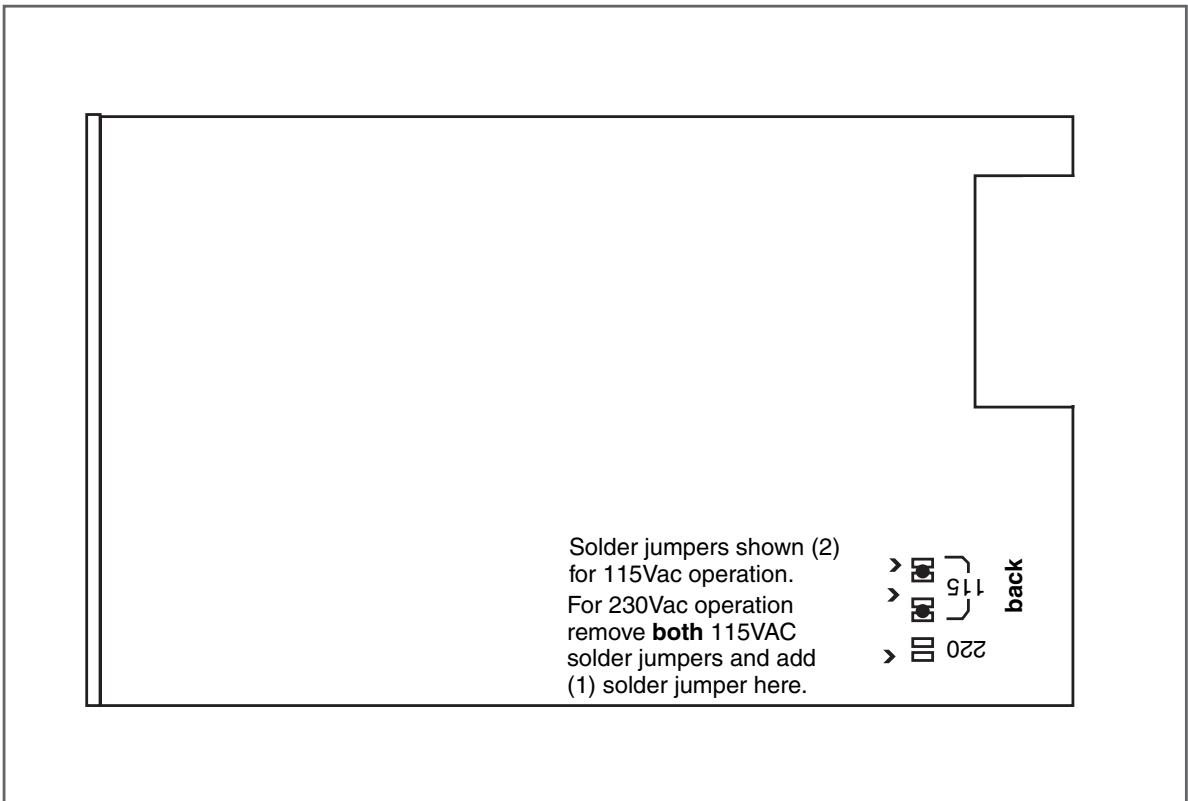
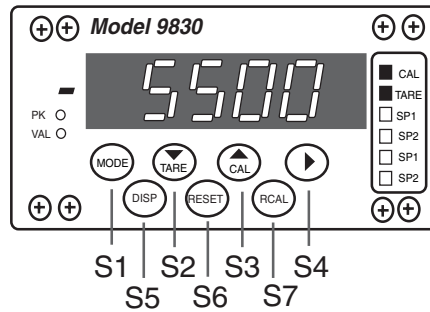


Figure 6. Location of Jumpers for AC Line Voltage Selection (Bottom View)

SWITCH AND FUNCTION DEFINITIONS

SWITCH DEFINITIONS



Mode Selection Switch (S1)

S1 is used to cycle through the various programmable functions of the 9830. The sequence is as follows. The designators, in (), identify text that will be displayed. The settable values are shown in { }

	Factory Default Settings
Full Scale CAL Switch Disabled (CAL Off) or Enabled (CAL On)	(CAL Off)
Filter Window Value (bAnd) {001 to 999}	{010}
Filter Value (FILtEr) {00 to 99}	{95}
Decimal Point (dP) {x.xxxx, xx.xxx, xxx.xx, xxxx.x, xxxxx}	{xxxxx}
Calibration Number (CAL) {00001 to ±99999}	{10000}
Full Scale Number (FS) {00001 to ±99999}	{10000}
Setpoint 1 to Monitor (SP -) {Instantaneous, Peak, Valley, Peak-Valley}	{Instantaneous}
Setpoint 1 to be (SP HI) {High Setpoint} or (SP LO) {Low Setpoint}	{High Setpoint}
Set Setpoint 1 Value (Set SP) {00000 to ±99999}	{99999}
Setpoint 2 to Monitor (SP -) {Instantaneous, Peak, Valley, Peak-Valley}	{Instantaneous}
Setpoint 2 to be (SP HI) {High Setpoint} or (SP LO) {Low Setpoint}	{High Setpoint}
Set Setpoint 2 Value (Set SP) {00000 to ±99999}	{99999}
Setpoint 3 to Monitor (SP -) {Instantaneous, Peak, Valley, Peak-Valley}	{Instantaneous}
Setpoint 3 to be (SP HI) {High Setpoint} or (SP LO) {Low Setpoint}	{High Setpoint}
Set Setpoint 3 Value (Set SP) {00000 to ±99999}	{99999}
Setpoint 4 to Monitor (SP -) {Instantaneous, Peak, Valley, Peak-Valley}	{Instantaneous}
Setpoint 4 to be (SP HI) {High Setpoint} or (SP LO) {Low Setpoint}	{High Setpoint}
Set Setpoint 4 Value (Set SP) {00000 to ±99999}	{99999}
Hysteresis for Low Setpoints (HL) {000 to 200}	{000}
Hysteresis for High Setpoints (HH) {000 to 200}	{000}
Depress Mode Again to Exit (AgAIIn)	

While in the Mode Selection sequence, the indicator is no longer monitoring the input signal. To exit, depress S1, once, after the Decimal Point selection is completed.

Decrement or Tare Switch (S2)

This switch serves two functions, depending on the present status of S1. If the meter is in the Mode Selection sequence, this switch decrements the flashing digit.

If the meter is in its normal operating mode, S2 becomes the TARE switch. Depressing S2 will automatically zero the readout, illuminate the TARE LED and zero the analog output. Depressing and holding S2 depressed for approximately 3 seconds will UNTARE the readout and extinguish the TARE LED. TARING is accomplished by storing the reading prior to TARING and subtracting this value from all subsequent readings.

SWITCH DEFINITIONS (CONT)

Increment or Cal Switch (S3)

This switch serves two functions, depending on the present status of S1. If the instrument is in the Mode Selection sequence, this switch will increment the flashing digit.

If the instrument is in its operating mode, S3 becomes an AUTO CAL switch. *CAUTION: If CAL function has been activated, depressing this switch will cause the instrument to recalibrate its full scale reading. Be sure to read the CALIBRATION INSTRUCTIONS before using this switch.*

Step Switch (S4)

When the instrument is in the Mode Selection sequence, this switch allows the user to cycle through the digits. Used in conjunction with S2 and S3, it allows rapid updating of the Set Point, Hysteresis and Cal values.

Display Switch (S5)

This switch cycles the readout to display:

	Annunciator(s) Illuminated
Peak-Valley	Peak and Valley
Peak	Peak
Valley	Valley
Instantaneous Value	None

While in the Peak-Valley, Peak or Valley readout mode, the RESET switch (S6) resets the readout to the instantaneous value

Reset or Exit Switch (S6)

This switch also serves two functions, depending on the present status of S1. If the instrument is in the Mode Selection sequence, this switch is used to Exit this sequence and return to the normal display mode. Any selections made during the Mode Selection sequence, prior to that selected just before exiting, will be saved and remembered in non-volatile memory.

If the instrument is in the normal display mode this switch will reset the Peak, Valley and Peak-Valley readings to the instantaneous value.

RCAL Switch (S7)

This switch activates a reed relay, which places a fixed resistor across Sig(-) and Vexc(-) for a positive RCAL reading, or across Sig(+) and Vexc(-) for a negative RCAL reading. Solder jumpers 3 and 4 determine which RCAL reading is generated (Reference Figure 6).

FUNCTION DEFINITIONS

Filter Value (FILtEr) {00 to 99}

The 9830 uses a filter based on exponential smoothing, a digital averaging technique where the recent conversions are given more weight than the older conversions. The weighting factor is the value of (FILtEr). The formula for the exponential filter is:

$$S_t = (1-F)C_{t-1} + FS_{t-1}$$

where S_t = the new smoothed value

S_{t-1} = the previous smoothed value

C_{t-1} = actual value of most recent conversion

F = (FILtEr)/100

Higher (FILtEr) values produce stronger filtering. 99 = maximum filtering.

00 = no filtering. **The factory default value is 95**, a compromise between display stability and response time appropriate for general purpose work.

Filter Band (bAnd) {001 to 999}

To permit a heavy filter and still have fast response to a step input change, the filter operates only inside a stable band. If two consecutive conversions have a difference greater than the **bAnd B**, the filter automatically sets $F=0$, permitting maximum response. When the difference is again within the **bAnd B**, the filter returns to the selected $F = (\text{FILtEr})/100$ value.

Where B is referred to the input signal in mV,

band value $B = (\text{bAnd})/100$ on the 50 mV range

band value $B = (\text{bAnd})/200$ on the 25 mV range

Examples:

1. $B = 5.0$ mV or 0.5 mV/V with $\text{bAnd} = 500$, 50 mV input range, excitation = 10V

2. $B = 2.5$ mV or 0.5 mV/V with $\text{bAnd} = 500$, 25 mV input range, excitation = 5 V

The factory default is (bAnd) = 10.

Decimal Point (dP) {x.xxxx, xx.xxx, xxx.xx, xxxx.x, xxxxx}

dP allows selection of decimal point locations for display. The locations selectable are shown in { } above. The Increment and Decrement switches are used to shift decimal places.

Calibration Number (CAL) {00001 to 99,999}

(CAL) is equal to the desired reading corresponding to the calibration load, whether the load is actual, simulated, or from RCAL. The number is entered prior to performing the calibration.

Examples:

1. A 75.34 lb weight is being used to calibrate a 100 lb load cell.
depending on the resolution desired.

(CAL) may be set to 75.340, 75.34 or 75.3

2. A 10,000 lbf load cell is known to have a rated output of
2.123 mV/V. A simulator with 2 mV/V output is used to calibrate
9421.

the 9830. (CAL) = $10000 * 2 / 2.123 =$

FUNCTION DEFINITIONS (CONT)

Full Scale Number (FS) {00001 to ± 99999}

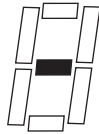
(FS) is for scaling the analog outputs of the indicator. Both the $\pm 10V$ output and the 4-20 mA outputs are automatically scaled by (FS). (FS) = the display value that corresponds to the full scale spans of the outputs, either 10V or 16 mA. Changing the (FS) has no effect until a calibration is performed. The scaling is accomplished along with the calibration procedure. The TARE function operates on the analog output the same as it does on the digital display. The analog output is a continuously amplified analog signal even though the gain is digitally controlled. Therefore the polarity of the analog output is always the same as the signal input. The 4-20 mA output is unipolar and therefore must always be used with a positive input signal.

Examples:

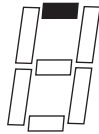
1. A 9830 is to read 10000 on the display and produce 5.000 V output with a 10,000 lbf load cell loaded to capacity. $(FS) = 10000 \cdot 10V / 5V = 20000$.
2. A 9830 is to read 2000.0 on the display and produce a 10 mA span output with a 2000 lbf load cell loaded to capacity. $(FS) = 2000.0 \cdot 16mA / 10mA = 3200.0$.
The output will then be 4 mA at zero load and 14 mA at capacity.

Setpoint 1 to Monitor (SP1 -) {SP1 -, SP1 $\bar{}$, SP1 $\underline{}$, SP1 \square }

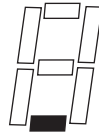
This function allows Setpoint 1 to monitor the instantaneous, peak, valley or peak minus valley displays. The Increment or Decrement switches are used to cycle through the various displays. To signify which display is being monitored, the least significant 7-segment display will be illuminated as shown below.



INSTANT



PEAK



VALLEY



PEAK-VALLEY

Setpoint 1 to be (SP1 HI) {SP1 HI, SP1 LO}

This allows Setpoint 1 to be a High or Low Setpoint. The Increment or Decrement switches are used to cycle through the HI or LO selection.

A High Setpoint is disabled when the compared value is less than the Setpoint value. The High Setpoint is enabled when the compared value is equal to or greater than the Setpoint value.

A Low Setpoint is disabled when the compared value is greater than the Setpoint value. The Low Setpoint turns on when the compared value is equal to or less than the Setpoint value.

Set Setpoint 1 Value (SEt SP) {00000 to ± 99,999}

Setpoint 1 can be set for any value from 00000 to $\pm 99,999$. This value along with the previous selection of SP HI or SP LO determines when the optically isolated open-collector output transistors are activated and the SP1 annunciator illuminated.

For Setpoints 2, 3 and 4, refer to Setpoint 1 setup, shown above.

Hysteresis Low (HL) {000 to 200}

HL is the hysteresis value for all Setpoints set to SP LO. HL determines the value the displayed reading must exceed the Setpoint value by before deactivating their respective opto isolated open-collector output(s).

Hysteresis High (HH) {000 to 200}

HH is the hysteresis value for all Setpoints set to SP HI. HH determines the value the displayed reading must get below the Setpoint value by before deactivating their respective opto isolated open-collector output(s).

OPERATING INSTRUCTIONS

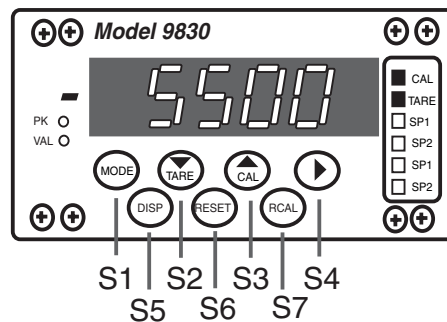
TURN-ON INSTRUCTIONS

Reference Figures 3 and 4 for proper input and output signal wiring.

1. Apply power to the instrument.
2. Verify the instrument readout blanks momentarily, then displays the value of the input signal.

PROGRAM INSTRUCTIONS

Four front panel switches (S1, S2, S3 and S4) allow the user to program Filter Window (bAnd), Filter 1- (FILtEr), Decimal Point (dP), Calibration Number (CAL), Full Scale Number (FS), Setpoint to Monitor (SP -), Setpoint to be (SP HI), Setpoint Value (Set SP), Hysteresis Low (HL) and Hysteresis High (HH) values.



1. Depress MODE (S1) once.

The text **CODE** will be displayed. Depress the switches in the sequence shown.

S3 - S2 - S3

The text **CAL OFF** will be displayed. This disables the CAL function of the INCREMENT/CAL switch. To enable the CAL function depress the INCREMENT or DECREMENT switch. The text **CAL ON** will be displayed. Depressing the MODE switch will enable the CAL function. To exit the MODE sequence without enabling the INCREMENT/CAL switch, depress the RESET switch.

2. Depress MODE (S1) switch once.

The text **bAnd** followed by the current value of the Filter Window will be displayed. Use S2, S3 and/or S4 to change the current value. To store the selected value in non-volatile memory, depress the MODE switch. To exit the MODE sequence, without storing the new value in non-volatile memory depress the RESET switch. Reference Filter Window in the Function Definitions section for more information.

3. Depress MODE (S1) switch once.

The text **FILtEr** followed by the current setting of the Filter value will be displayed. Use S2, S3 and/or S4 to change the value. To store the selected value in non-volatile memory, depress the MODE switch. To exit the MODE sequence, without storing the new value in non-volatile memory, depress the RESET switch. Reference Filter Value in the Function Definitions section for more information.

PROGRAM INSTRUCTIONS (CONT)

4. Depress MODE (S1) switch once.

The text **dP** followed by the decimal point location will be displayed. Use S2 or S3 to locate the decimal point. To store the selected value in non-volatile memory, depress the MODE switch. To exit the MODE sequence, without storing the new value in non-volatile memory depress the RESET switch. Reference Decimal Point in the Function Definitions section for more information.

5. Depress MODE (S1) switch once.

The text **CAL** followed by the current value of the Calibration Number will be displayed. Use S2, S3 and/or S4 to change the current value. To store the selected value in non-volatile memory, depress the MODE switch. To exit the MODE sequence, without storing the new value in non-volatile memory depress the RESET switch. Reference Calibration Number in the Function Definitions section for more information.

6. Depress MODE (S1) switch once.

The text **FS** followed by the current value of the Full Scale Number will be displayed. Use S2, S3 and/or S4 to change the current value. To store the selected value in non-volatile memory, depress the MODE switch. To exit the MODE sequence, without storing the new value in non-volatile memory depress the RESET switch. Reference Full Scale Number in the Function Definitions section for more information.

7. Depress MODE (S1) switch once.

The text **SP1 -** will be displayed. Use S2 and S3 to change the parameter SP1 is to monitor. To store the selected parameter in non-volatile memory, depress the MODE switch. To exit the MODE sequence, without storing the new parameter in non-volatile memory depress the RESET switch. Reference SP1 to Monitor in the Function Definitions section for more information.

8. Depress MODE (S1) switch once.

The text **SP1 HI or SP1 LO** will be displayed. Depressing S2 or S3 alternates SP1 HI and SP1 LO. To store the selected parameter in non-volatile memory, depress the MODE switch. To exit the MODE sequence, without storing the new parameter in non-volatile memory depress the RESET switch. Reference SP1 HI in the Function Definitions section for more information.

PROGRAM INSTRUCTIONS (CONT)

9. Depress MODE (S1) switch once.

The text **SEt SP** will be displayed momentarily, followed by the current value of Setpoint 1. Use S2, S3 and/or S4 to set a new value. To store the selected parameter in non-volatile memory, depress the MODE switch. To exit the MODE sequence, without storing the new parameter in non-volatile memory depress the RESET switch. Reference Set SP in the Function Definitions section for more information.

10. Depress MODE (S1) switch once.

The text **SP2 -** will be displayed. Reference SP1 - setup instructions on Page 11 to set SP2 -.

11. Depress MODE (S1) switch once.

The text **SP2 HI or SP2 LO** will be displayed. Reference SP1 HI setup instructions on Page 11 to set SP2 HI or SP2 LO.

12. Depress MODE (S1) switch once.

The text **SEt SP** will be displayed momentarily, followed by the current value of Setpoint 2. Reference SEt SP setup instructions above to set a new value for Setpoint 2.

13. Depress MODE (S1) switch once.

The text **SP3 -** will be displayed. Reference SP1 - setup instructions on Page 11 to set SP3 -.

14. Depress MODE (S1) switch once.

The text **SP3 HI or SP3 LO** will be displayed. Reference SP1 HI setup instructions on Page 11 to set SP3 HI or SP3 LO.

15. Depress MODE (S1) switch once.

The text **SEt SP** will be displayed momentarily, followed by the current value of Setpoint 3. Reference SEt SP setup instructions above to set a new value for Setpoint 3.

16. Depress MODE (S1) switch once.

The text **SP4 -** will be displayed. Reference SP1 - setup instructions on Page 11 to set SP4 -.

PROGRAM INSTRUCTIONS (CONT)

17. Depress MODE (S1) switch once.

The text **SP4 HI or SP4 LO** will be displayed. Reference SP1 HI setup instructions on Page 11 to set SP4 HI or SP4 LO.

18. Depress MODE (S1) switch once.

The text **SEt SP** will be displayed momentarily, followed by the current value of Setpoint 4. Reference SEt SP setup instructions above to set a new value for Setpoint 4.

19. Depress MODE (S1) switch once.

The text **HL** will be displayed momentarily, followed by the current value of Hysteresis Low. Use S2, S3 and/or S4 to set a new value for HL. To store the new value of HL in non-volatile memory, depress the MODE switch. To exit the MODE sequence, without storing the new value, depress the RESET switch.

20. Depress MODE (S1) switch once.

The text **HH** will be displayed momentarily, followed by the current value of Hysteresis High. Use S2, S3 and/or S4 to set a new value for HH. To store the new value of HH in non-volatile memory, depress the MODE switch. To exit the MODE sequence, without storing the new value, depress the RESET switch.

21. Depress MODE (S1) switch once.

The text **AgAIn** will be displayed. Depress MODE switch one more time to exit the MODE sequence.

CALIBRATION INSTRUCTIONS

The Interface Model 9830 can be calibrated using (2) different methods.

1. The first method uses actual or simulated ZERO and FULL SCALE (FS) inputs. Actual inputs may come from a strain gage transducer loaded with calibrated weights. Simulated inputs may come from a strain gage bridge simulator.
2. The second method utilizes an RCAL resistor to simulate a load on a strain gage bridge. The RCAL resistor is activated when the RCAL (S7) switch is depressed. Reference Figure 3 for location of S7.

ACTUAL OR SIMULATED LOAD METHOD

1. Connect the strain gage transducer to the instrument using Figure 3 as a reference. Do not apply any load to the transducer.
2. Apply power to the instrument.

NOTE: If the instrument was previously calibrated and no new calibration is required, do not proceed any further. All previous calibration information is stored in non-volatile EEPROM and is ready for use when power to the instrument is reapplied.

3. Calculate the CAL NUMBER (CAL) by verifying the load that will be used to calibrate the Model 9830.

Example: If a 500 pound load is used to calibrate and the desired readout is 500.0, the CAL NUMBER will be 5000. The decimal point can be selected later. If the desired readout is 500 then the CAL NUMBER will be 500.

4. Calculate the FS NUMBER (FS). This is the value used, by the microprocessor, to set the full scale analog output.

Example: If the CAL NUMBER is 5000, but the +10 Vdc analog output is desired at 7500, set the FS NUMBER to 7500. If +10 Vdc is desired at 5000, set the FS NUMBER to 5000.

5. Program in the CAL NUMBER. Reference **PROGRAM INSTRUCTIONS**, Step 5 on Page 11 to set the CAL NUMBER.
6. Program in the FS NUMBER. Reference **PROGRAM INSTRUCTIONS**, Step 6 on Page 11 to set the FS NUMBER.
7. The TARE and CAL LED's on the front panel should be illuminated.
8. Depress and hold the TARE (S2) switch. The TARE LED will extinguish and the instrument will display the UNTARED reading.

CALIBRATION INSTRUCTIONS (CONT)

9. Enable the CAL switch. Reference **PROGRAM INSTRUCTIONS** Step 1 on Page 10 to enable the CAL switch.

Note: Enabling the CAL switch allows only one attempt at calibrating the instrument. If calibration is not successful, repeat the whole calibration procedure.

10. Apply no load to the transducer.
11. Depress the TARE (S2) switch once. The TARE LED should illuminate and the readout should be ZERO \pm 1 digit.
12. Apply the FULL SCALE load to the transducer. If a strain gage simulator is used, set it to the the desired mV/V setting. The instrument should display a value greater than **01000**. For optimum performance the readout should be closer to **32000**. Ignore the decimal point.
13. Depress the CAL (S3) switch once. The CAL LED should turn on and the readout will display the CAL NUMBER \pm 1 digit.
14. The CALIBRATION sequence is now complete.

NOTE: Calibration information (tare and slope values) are maintained in non-volatile memory and are updated each time the CAL switch is depressed. TARING the display stores the new tare value, but does not change the scale factor (slope value).

RCAL METHOD

1. Connect the strain gage transducer to the instrument using Figure 3 as a reference. Do not apply any load to the transducer.
2. Verify that an internal RCAL resistor is provided with the instrument.
3. Apply power to the instrument.

NOTE: If the instrument was previously calibrated and no new calibration is required, do not proceed any further. All previous calibration information is stored in non-volatile EEPROM and is ready for use when power to the instrument is reapplied.

4. Set the CAL NUMBER to the full scale value provided with the RCAL resistor.

Example: If the RCAL resistor supplied with the instrument creates an output equivalent to 80% of a full scale 500 pound load, set the CAL number to 400.00, 0400.0 or 0400.

CALIBRATION INSTRUCTIONS (CONT)

5. The TARE and CAL LED's on the front panel should be illuminated.
6. Depress the TARE (S2) switch once. The TARE LED should extinguish. The instrument should now display the UNTARED reading.
7. Depress the MODE (S1) switch once. Enable the CAL switch by selecting CAL ON. Depress the MODE switch once more, then exit the MODE sequence by depressing RST (S6).
8. Depress the CAL(S3) switch once. The CAL LED should extinguish. The instrument should now display the UNCALIBRATED reading.
9. With no load on the transducer, verify the readout is approximately zero.
10. Depress the TARE(S2) switch once. The TARE LED should illuminate and the readout should be ZERO ±1 digit.
11. Depress and hold the RCAL switch. The display should read a value greater than **01000**. For optimum performance the readout should be closer to **19000**. Ignore decimal point.

While holding down the RCAL switch, depress the CAL (S3) switch once. The CAL LED should turn on and the readout should display the CAL NUMBER ±1 digit.

12. The RCAL CALIBRATION sequence is now complete.

NOTE: Calibration information (tare and slope values) are maintained in non-volatile memory and are updated every time CALIBRATION Steps 9 and 10 are performed. TARING the display does not change the scale factor (slope value) calculated when Step 10 is completed.

SERIAL RS232 COMMUNICATIONS

General Information

See Figure 4 on page 4 for RS232 connections and wiring information.

See Figure 5 on page 5 for setting baud rate. The unit is pre-wired for 9600 baud.

The data is transmitted in the following format:

One Start Bit;
Eight Data Bits;
No Parity Bit;
One Stop Bit

Transmissions from the Model 9830 are controlled by sending XOFF (ASCII code decimal 19, DC3) to suspend character transmission and XON (ASCII code decimal 17, DC1) to start transmission. All transmissions to the Model 9830, including XON and XOFF, must terminate with a CR (hex OD) and only a CR.

Note: do not send a line feed.

The RS232 port is active only in the data display mode and will not respond in while in the MODE sequence.

RS232 Programming Data

The RS232 data is transmitted in 8 sequential bytes, in binary or bit significant format, depending on the parameter. The data has the following significance.

Byte

Description

- 1** Status Byte: Setpoint Status
The status is contained in one byte and is bit significant
A logical 1 indicates setpoint value exceeded.

Bit	Status of	Bit	Status of
0	SP1	4	Not Used
1	SP2	5	Not Used
2	SP3	6	Not Used
3	SP4	7	Not Used

- 2** Function Byte: ID of transmitted function

Value	Function
1	Instantaneous
8	Peak minus Valley
65	Peak
66	Valley

- 3-6** Data Byte: Binary representation of data
The data value is represented in 2's complement where bytes 3 is the most significant byte and byte 6 is the least significant byte.

- 7** Decimal Point Byte:
The decimal is represented as an exponent

The value for x.xxxx is 1
The value for xx.xxx is 2
The value for xxx.xx is 3
The value for xxxx.x is 4
The value for xxxxx is 5

- 8** EOT Byte: This byte indicates end of transmission - transmitted as hex OA.

SERIAL RS232 COMMUNICATIONS (CONT)

Examples of Transmitted Data

	Byte	1	2	3	4	5	6	7	8
Value in Hex		00	01	FF	FF	FB	EB	03	0A
Value in Decimal		0	1	255	255	251	235	3	10
No SP Exceeded									
Instantaneous Display									
Displayed Number = -10.45									
Decimal = xxx.xx									
EOT									

	Byte	1	2	3	4	5	6	7	8
Value in Hex		02	42	FF	FE	76	CE	03	0A
Value in Decimal		2	66	255	254	123	206	3	10
SP 2 Exceeded									
Valley Display									
Displayed Number = -993.78									
Decimal = xxx.xx									
EOT									

Commands

The XON and XOFF commands only affect the transmission of data from the selected displayed function. The unit responds to all other commands independent of the XON/XOFF. All commands are ASCII strings and must terminate with a CR (hex 0D) and only a CR. The RS232 port is active only when in the data display mode and will not respond to commands if the unit is in the MODE sequence

(S)elect Commands

To select or change the function being displayed and being transmitted by the RS232 port, send the Model 9830 an ASCII string (S\$) consisting of two characters, SX, where X is a hex number.

S\$	Function
S0	Instantaneous
S8	Peak minus Valley
SA	Peak
SB	Valley
SE	Reset

Examples written in Basic. These examples assumed that the RS232 port was opened with buffer #2. The following code changes the displayed and transmitted function.

Example 1

Print #2, "S0" Changes the function to Instantaneous

Example 2

X\$="SA"

Print #2, X\$ Changes the function to Peak

SERIAL RS232 COMMUNICATIONS (CONT)

(M)ODE COMMANDS

To change a MODE item, send an 8 character ASCII string to the Model 9830. The 1st character is always M. The 2nd character identifies the item being changed. The other characters are the item's new value.

String Transmitted	Menu Item Changed
MA00nnn	Sets Filter Window (bAnd) to nnn where 001 < nnn < 999
MW000nn	Sets Filter 1-alpha (FILtEr) to nn where 00 < nn < 99
MC ₊ nnnnn	Sets Calibration value (CAL) to ₊ nnnnn
ME ₊ nnnnn	Sets Full Scale value (FS) to ₊ nnnnn
MG ₊ 0000n	Sets decimal pt (dP) to n where 1 < n < 5
MI+000nn	Sets SP1 to monitor function (See Table below)
MJ+0000x	Sets SP1 to HI or LO where x is H or L
MK ₊ nnnnn	Sets the value of SP1 to ₊ nnnnn
ML ₊ 000nn	Sets SP2 to monitor function (See Table below)
MM+0000x	Sets SP2 to HI or LO where x is H or L
MN ₊ nnnnn	Sets the value of SP2 to ₊ nnnnn
MO ₊ 000nn	Sets SP3 to monitor function (See Table below)
MP+0000x	Sets SP3 to HI or LO where x is H or L
MQ ₊ nnnnn	Sets the value of SP3 to ₊ nnnnn
MR ₊ 000nn	Sets SP4 to monitor function (See Table below)
MS+0000x	Sets SP4 to HI or LO where x is H or L
MT ₊ nnnnn	Sets the value of SP4 to ₊ nnnnn
MU ₊ 000nn	Sets Hysteresis High (HH) to nnn where 000 < nnn < 200
MV+00nnn	Sets Hysteresis Low (HL) to nnn where 000 < nnn < 200
	nn Function for SP
	00 Instantaneous
	01 Peak-Valley
	02 Peak
	03 Valley

Examples written in BASIC. These examples assumed that the RS232 port was opened with buffer #2.

The following code changes the indicated menu item.

```
Example 1
X$ = "ME+12000"
PRINT #2, X$      'changes FS value to +12000
```

```
Example 2
PRINT #2, "MI+00003 'changes SP1 to monitor valley
```

(T)are and (P)reset Commands

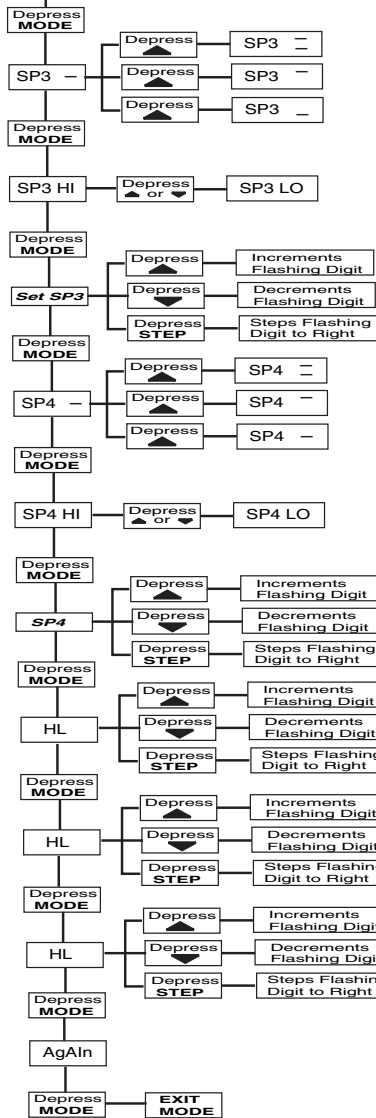
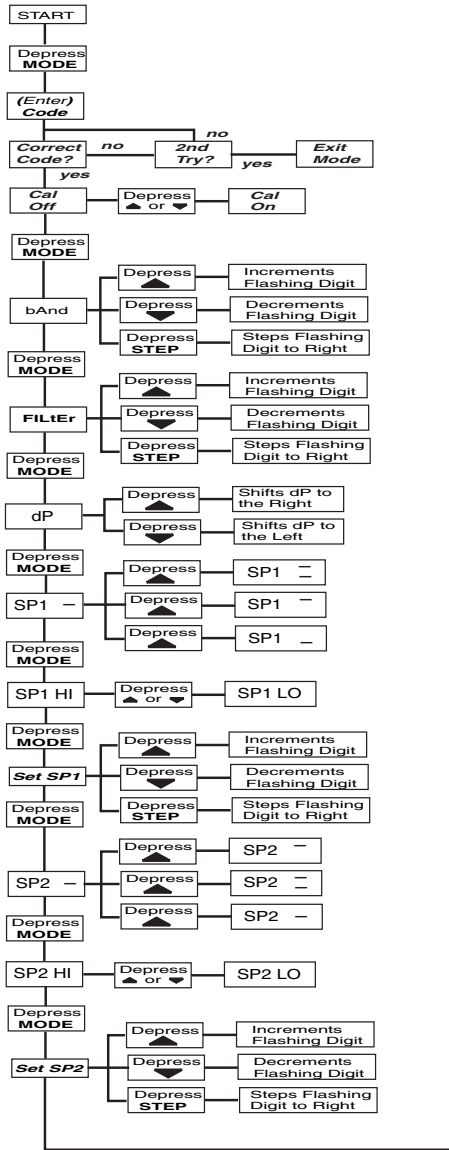
String Transmitted	Menu Item Changed
TT	Tare or Zero
TU	Untare or Unzero
TA ₊ nnnnn	Sets the tare value to ₊ nnnnn

Examples written in BASIC. These examples assumed that the RS232 port was opened with buffer #2.

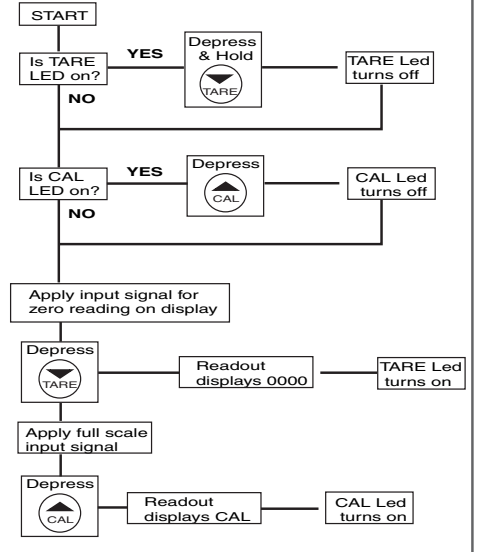
```
Example 1
PRINT #2, "TT"      'initiates an autozero or autotare
```

```
Example 2
X$ = "TA-00108"
Print #2, X$      'Set the tare value to -108
```

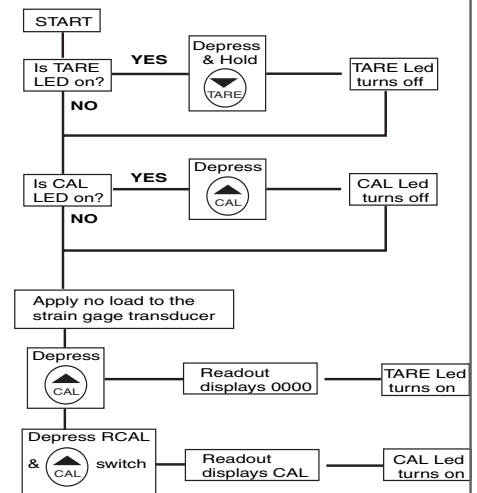
MODEL 9830 PROGRAM MENU DIAGRAM



CALIBRATION PROCEDURE USING ACTUAL OR SIMULATED LOADS



CALIBRATION PROCEDURE USING RCAL RESISTOR



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