760

EUROTHERM

Installation,
Operation &
Configuration
Manual

3.0 INSTALLATION

3.1 Receiving and Unpacking

The Process Monitor/Indicator is shipped in a special pack, designed to ensure adequate protection during transit. Should the outer box show signs of abnormal wear or damage, it should be opened immediatly and the instrument examined.

If there is evidence of damage to the instrument, it must not be operated. The local sales representative should be contacted for instructions.

After removing the instrument from its packing, the packing should be examined before being discarded to ensure that all accessories and documentation have been removed.

3.2 Chassis Removal

If it is desired to remove the instrument chassis from its case before the case is mounted; grasp the serrated portions on each side of the front bezel, squeeze in and pull the chassis from the case.

CAUTION

Do not touch the exposed circuit cards unless precautions are taken to prevent damage by Eletrostatic Discharge (ESD). See Section 7, Maintenance.

3.3 Mounting

a) Prepare the panel cutout as shown in Figure 2.1.

b) If used, install the panel gasket around the cutout on the outside of the panel.

c) Slide the instrument into the cutout from the front of the panel.

d) Position the mounting bracket on the rear of the case with the two clips at the rear of the bracket.

e) Slide the mounting bracket toward the panel until the two clips engage the serrations on the case sides.

f) Hold the case firmly to the panel and press the mounting bracket up against the rear of the panel. Press on the upper right and lower left corners of the bracket to tighten it against the panel. Final tightening by pressing with a screwdriver is helpful.

To remove a mounting bracket, pry the side outward at the clip until it slips out of the serrations.

4.0 Connections and Initial Setup

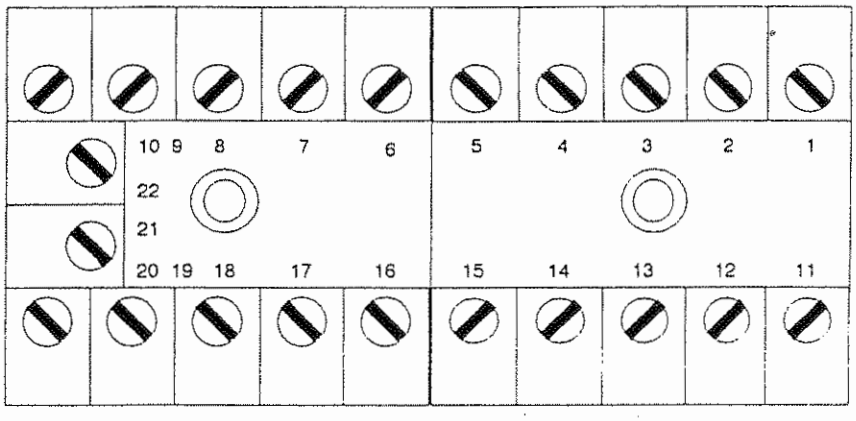


Figure 4.1, Terminal Board

All connections to the instrument are made to the rear terminal board. The printed terminal numbers on the instrument are turned 90° from those shown above.

Terminal Number	Connection
1	Retransmit + or RS422 Rx +
2	Retransmit - or RS422 Rx -
3	RS422/485 Common
4	RS 422 Tx + or RS485 TxRx +
5	RS 422 Tx - or RS 485 TxRx -
6	Strain Gauge +5Vdc Power
7	Circuit, 5 & 24 V Common, also RTD "C" Lead
8	Strain Gauge Internal Cal Resistor Input
9	Signal Input - and RTD Negative "B" Lead
10	Signal Input + and RTD Positive "A" Lead
11	Transmitter Power + 24 Vdc
12	Transmitter Power 24 Vdc Common
13	Alarm No. 2, Normally Closed (NC)
14	Alarm No. 2, Common (C)
15	Alarm No. 2, Normally Open (NO)
16	Contact/Digital Input
17	Contact/Digital Return
18	Alarm No. 1, Normally Closed (NC)
19	Alarm No. 1, Common (C)
20	Alarm No. 1, Normally Open (NO)
21	AC Power, Line
22	AC Power, Neutral

internal link

4.1Thermocouple Inputs

Thermocouple inputs are connected directly to terminals 9 (**negative**) and 10 (**positive**). Terminals 7 and 9 are **not jumpered together.**

4.2 Millivolt, mA (w/shunt) and Vdc Inputs

To measure dc inputs up to 5Vdc, the small "pencil point" slide switch on the rear terminal board **must** be in the "TC OFF" position and terminals 7 and 9 **must be jumpered together.** DC sources are connected directly to terminals 9 (negative) and 10 (positive). For current inputs, the shunt resistor (usually 250 Ω, converting 4 to 20 mA into 1 to 5 Vdc) is connected directly across terminals 9 and 10 along with the input current leads.

Voltages greater than 5 Vdc are connected to a 1 Meg Ohm, 100:1 voltage divider which results in 0.050 to 1.000 Vdc at the input terminals. See Figure 4.2.

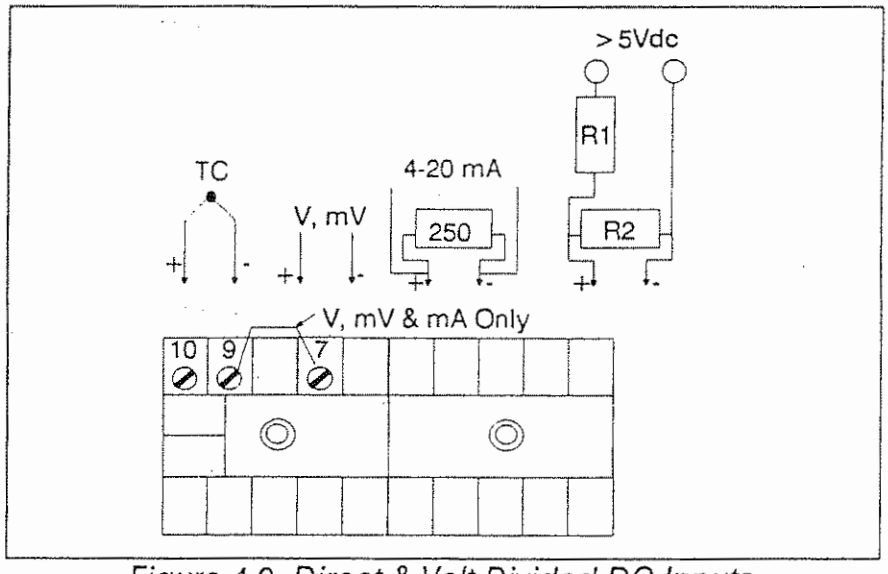


Figure 4.2, Direct & Volt Divided DC Inputs

4.3 Current Input Using Internal Power Supply

With the standard internal 24 Vdc power supply, a 2-wire transmitter can be connected directly to the indicator. An input shunt on the terminal board is used to convert process current (normally 4 to 20 mA) into a 1 to 5 Vdc input signal.

CAUTION

Shorting the transmitter leads places the power supply across the input and may damage the input shunt resistor.

The Input and Common Negative (terminals 9 & 7) are connected with a terminal board jumper. The transmitter positive is connected to the Supply positive (11) and the transmitter negative is connected to the positive Input terminal (10). The shunt is mounted across Input terminals 9 and 10.

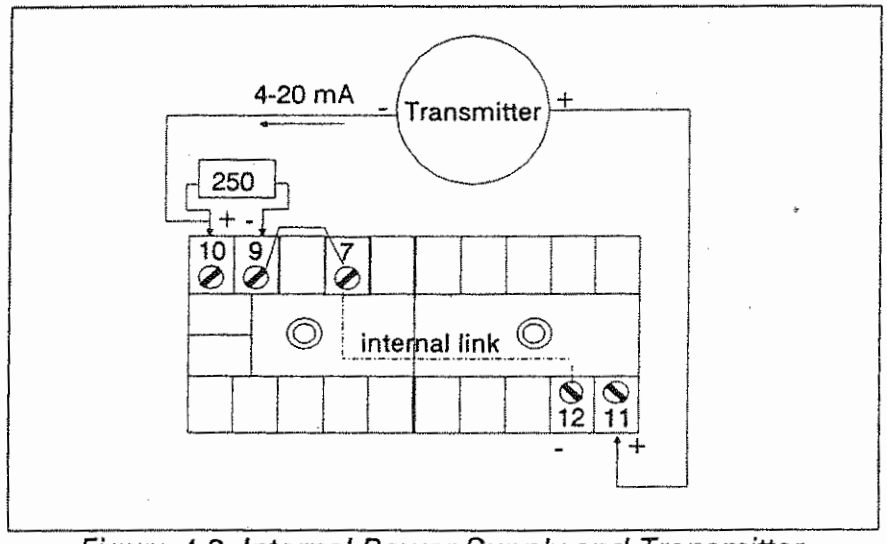


Figure 4.3, Internal Power Supply and Transmitter

4.4 Current Input Using External Power Supply

Connect the transmitter/power supply negative to the negative input terminal (9). Connect the transmitter output to the positive input terminal (10). The shunt is mounted across terminals 9 and 10.

4.5 RTD Inputs

Connection of 3-wire Resistance Temperature Detectors (RTD's) is to terminals 7, 9 and 10. Terminals 9 and 10 each provide identical 200 μA excitation currents to terminal 7. With the required equal resistance leads from the RTD to terminals 9 and 10, the small voltages caused by lead resistance are equal and opposite; thus cancelling out lead resistance effects from the Input reading.

Connection of 2-wire RTD's by jumpering terminals 7 and 9 is not recommended because there can be no compensation for the effects of any lead resistance. 4-wire RTD's are connected as if they were 3-wire devices.

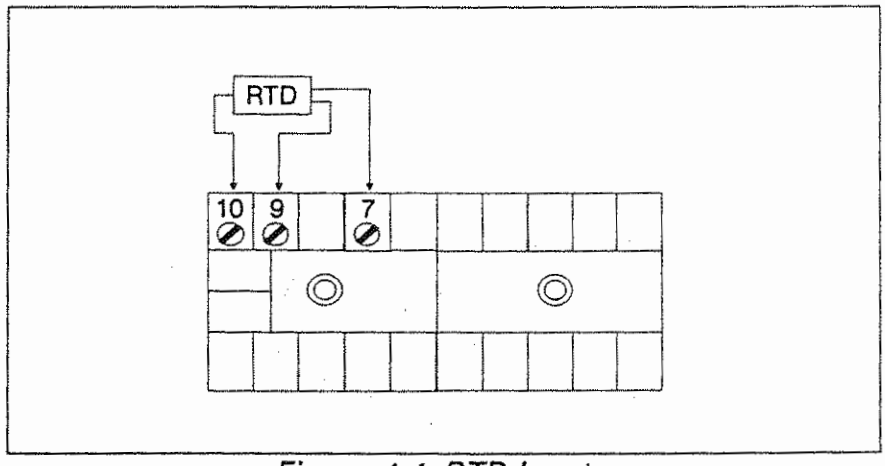


Figure 4.4, RTD Inputs

4.6 Strain Gauge Inputs

As ordered, the indicator is configured for use with TC, mV, V or RTD inputs. For use with Strain Gauges, an initial set-up step is required. Jumper JP1 on the center edge of the input card must be moved to the back (nearset the rear of the case) two of the 3 jumper pins. See Section 3.2 for chassis removal and Section 7.0, Maintenance, for instructions covering the location of internal components.

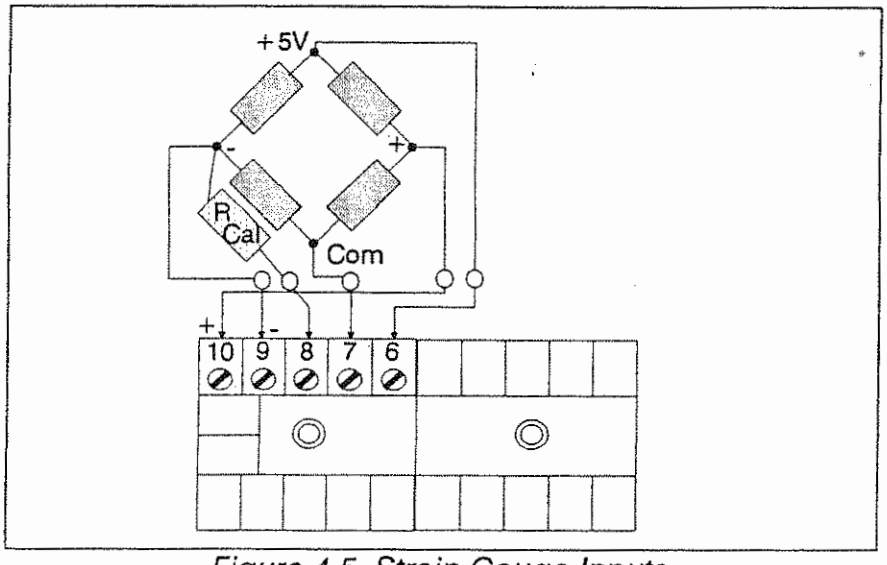


Figure 4.5, Strain Gauge Inputs

These connections are shown for a full bridge using 5 Vdc excitation terminals (+6 and -7) and signal terminals (+10 and -9). Use with a 1/4 or 1/2 bridge requires the addition of external resistors. Terminal 8 can be used for a calibration resistance. Although shown as a part of the Strain Gauge bridge, an external calibration resistor can be connected between terminals 7 and 8. A keyboard entered software command makes the connection between terminals 8 and 9 during calibration.

5.0 CONFIGURATION

5.1 The Display and Keypad

Configuration is done with the four front panel keys in response to displayed menus. Information is displayed using the numbers 0 thru 9 and the following characters (note - letters U & V use the same characters):

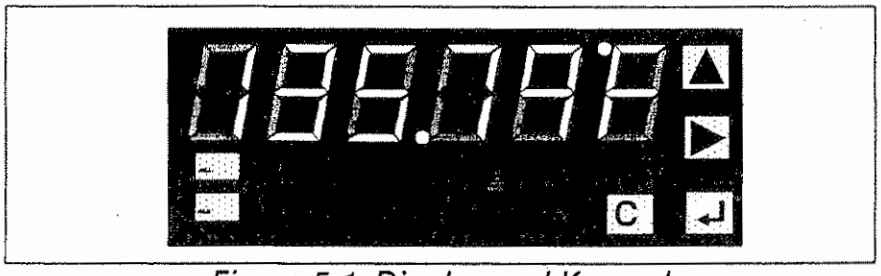


Figure 5.1, Display and Keypad

The menu display representations in this manual will follow the above characters as closely as the typographic font used will allow. Both the displayed characters and separate explanatory words will be shown on the menu flow charts.


Press ENTER to start configuration.


The Up Arrow key is used to page through a menu and to change numbers and selections **which are blinking**.


Access the Operator Menu with the Side Arrow key. Also used to reset the Peak values and to move the cursor during numeric entry.


The CLEAR key is used to erase changes not entered and back up to next higher menu level. Repeated use of Clear exits configuration.

NOTE

If no key is pressed for **3 minutes** while in the Configuration or Operator Menu, the indicator will automatically return to the measured value display. Manual return from any point in any menu is always possible by repeated use of the Clear key.

5.2 Entry of Numbers

Configuration calls for the entry of two types of numbers: Integers (without decimal point) and floating point numbers (with a decimal point included).

Integers are displayed as 5 digits with all leading zero's shown: 00123. When the displays for such entries as Password and Filter Time are accessed, the current value is shown and the first digit on the left end is blinking. If the number to be entered does not have 5 digits, press the Side Arrow one time to move the blinking digit one place to the right. When the first digit to be entered is blinking, use the Up Arrow to change that digit as required.

Pressing the Side Arrow again leaves the digit just set and moves the "blink" one digit to the right to set the next digit. If the digit to be set is passed, continue Side Arrow pushes until the process starts again at the left end. When the required number is displayed, press ENTER.

NOTE

After the ENTER key is pressed, the right end character will then confirm the entry by flashing the two vertical segments in the lower half followed by the two vertical segments in the upper half (similar to the signal for a "touchdown"). This signal is given upon entry of any change to any part of the configuration.

Floating point numbers display as 5 digits with all leading zero's shown: 001.23. When the displays for entries such as: Offset, Point Pairs, etc. are accessed, the current value is shown and the first digit on the left end is blinking. The first Up Arrow digit choice after the "0" is the "-" negative sign. Press the Side Arrow one time to move the decimal point one position to the left until the first digit to be entered is blinking. The decimal point stops moving after the first digit change is made.

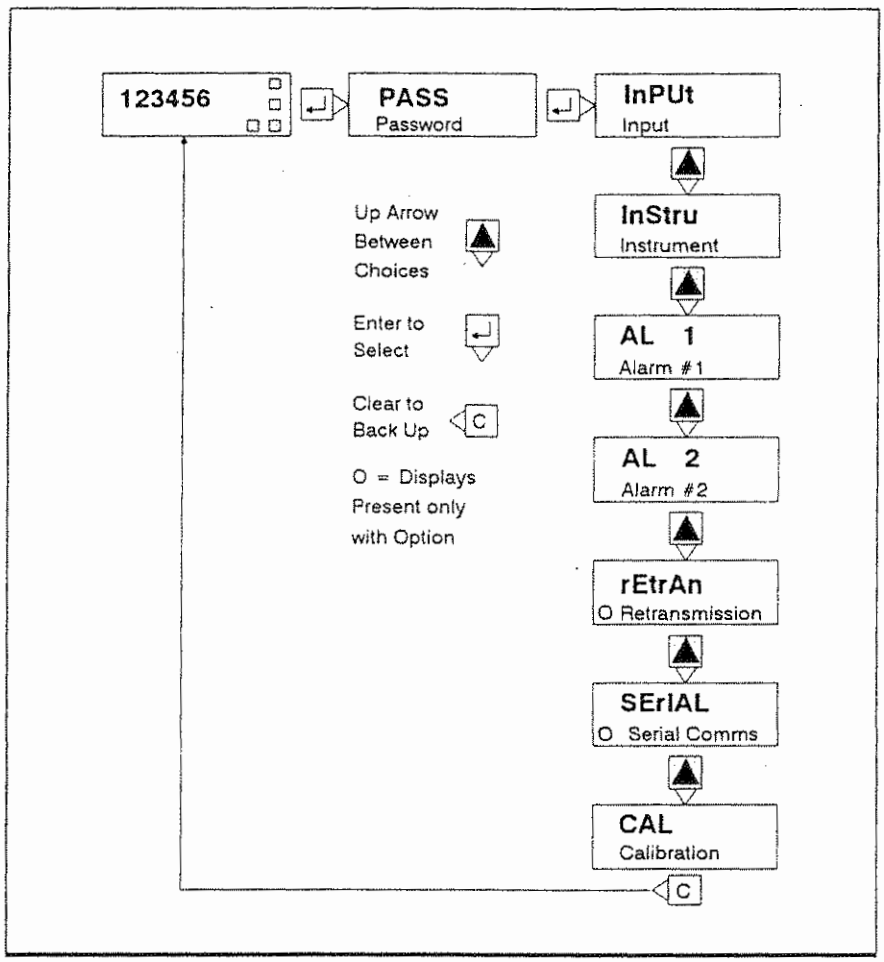
The largest positive number is 99999. The largest negative number is -9999. If the number to be entered is less than 1.0000, continue pressing the Side Arrow. After the decimal point is between the first and second digits, the blinking digit starts to move to the right. The smallest number that can be entered is: 0.0001.

5.3 The Main Configuration Menu

Access to the Configuration Menu requires entry of a password. Press ENTER and then configure the password. The Operator Menu does not require a password and is entered by pressing the Side Arrow key (see Section 6 for details).

00010 See Section 5.2 for instructions on entry of numbers. The Password is defined in the Instrument Menu (see Section 5.5). The password when shipped is "10".

MAIN CONFIGURATION MENU



InPUt Press ENTER with the correct password displayed to access the Input Menu (see Section 5.4). Line Frequency filtering, Linearization, Input Source, Filter Time, Input Offset, External CJC Temp., Displayed Units, Decimal Point position and Linearization Point Pairs are defined in the Input Menu.

InStru The Instrument Menu contains the definition of the Contact Input, determination of Alarm & Strain Guage Access, the software Revision Number and the means for changing the Password.

AL X The **AL 1** and **AL 2** menu's are identical. Both permit the setting of the Alarm Type, Alarm Latching choice, Alarm Setpoint, Deadband Alarm band and Alarm Hysteresis.

rEtrAn The Retransmission Menu Configures the Output Type and the High & Low mesaured values defining the analog output.

CAL The Calibration Menu is used to calibrate the four basic ranges, the Cold Junction Compensation, the RTD excitation current, the Retransmission output and to restore Factory Configuration values entered at manufacture.

CAUTION

It is not necessary to enter the Calibration Menu to set up this instrument to measure an input. Calibration requires connection of specific precision sources. Improper calibration can affect the ability to make an accurate measurement.

5.4 The Input Menu

LinE This choice changes the input filter to reject interference at the ac Line frequency used where the instrument is installed. The choices are 50 Hz and 60 Hz.

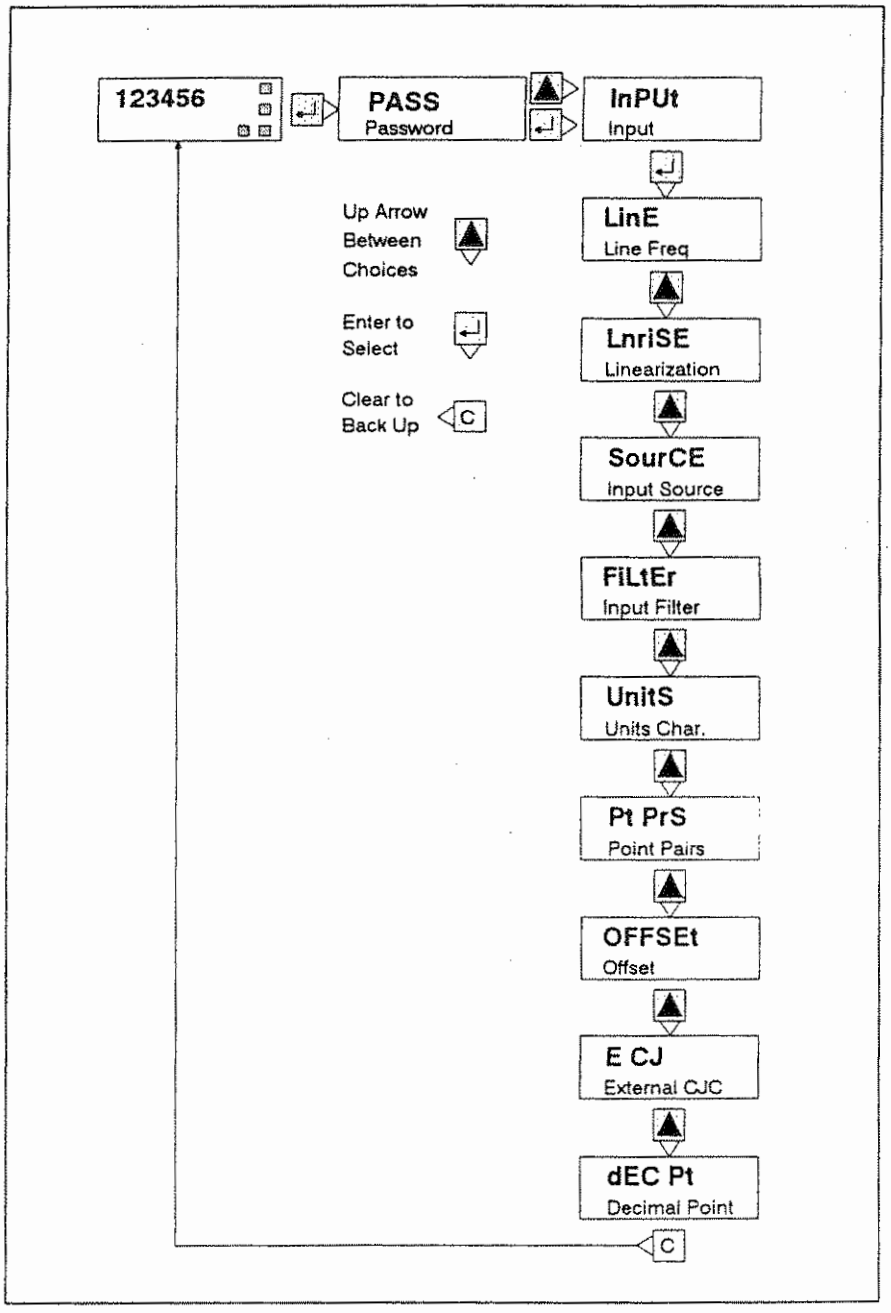
LnriSE The Linearization choice determines whether the measured input value will follow a Thermocouple curve, an RTD curve, a Square Root curve, the 10-point internal curve or respond linearly to the input signal.

SourCE The choices of Source are defined by the choice of Linearization already entered:

Linearization	Source Choice
TC Type	TC or TC w/ external CJC
RTD Type	RTD
Square Root	Volts, Millivolts or Strain Gauge
Custom Curve	TC, TC w/ext CJC, Volts, mV, RTD or Strain Gauge
Linear	TC, TC w/ext CJC, Volts, mV, RTD or Strain Gauge

FiLtEr The input Filter can be set for any value from 0 to 20 seconds. The filter time affects the input measurement. A long filter time can delay the response of the alarms.

INPUT CONFIGURATION MENU



OFFSEt The Offset adjustment can be used to change the displayed measured value by a fixed amount. The entry is in the same units as the displayed value. The maximum offset values are + and - 9999.

E CJ External Cold Junction is used when thermocouples are terminated in a remote box and then connected from that box to the indicator using copper wire. The Ext CJ is the temperature **in deg C or F (as chosen in Units)** at which a TC connection changes from TC (or extension lead) material to copper.

UnitS The character at the right end of the display is reserved for a Units character. The following characters are available: °C, °F, -- (blank), A, b, d, E, G, H, i, J, L, n, o, P, r, t, U and y. Direct RTD inputs **must** use °C or °F. Direct TC inputs **must** have the terminal boards CJC switch in the "ON" position. For °F or °C, the Units must be °F or °C. For °K, choose the blank (- -) and enter "273.18" into the "Offset".

dEC Pt The display Decimal Position entry affects the **display of the measured value only**. It does not affect any of the values entered during configuration. The configured Decimal Position of entered values may be different from the Display Decimal Position. If the number to be displayed is larger than permitted by the Decimal Position choice, the displayed decimal position will change to display the larger number - auto decimal position.

Pt PrS The Point Pairs are used to scale all inputs except direct TC and RTD connections. **No Point Pair entries are needed for direct TC and RTD inputs**. There are 11 Point Pairs defining 10 line segments. Only the first 2 Point Pairs are needed for Linear, Square Root or Strain Gauge scaling. The remaining 9 Point Pairs need be configured only if a Custom Curve is being used. **Except with a Strain Gauge source**, each Point Pair is an input value and its associated display value. Point Pairs are identified as "**in X**" and "**dS X**", where "X" is a number from 1 to 11.

IMPORTANT

The **in2** value is used to automatically set the basic range for Linear, Square Root & Strain Gauge measurements. The **in11** value is used for Custom Curve basic range. This means that reversed ranges (**in2** less positive than **in1**) are not possible. (Reversing the displayed **(dSX)**values is, however possible; so reversed electrical input connections and reversed displayed values achieve the same result).

The basic range in use is displayed when the ENTER key is pressed with the process value displayed.

0 = - 2 to 5V; 1 = ±1.25 V;
2 = ±640 mV; 3 = up to ±160 mV

For correct automatic basic range choice, if in1 is negative; **in2** must be **a positive value at least as great as in1**. Note that the maximum negative input value is determined by the basic range in use - see Example (2), following.

EXAMPLES

1)The Point Pairs for a 4-20 mA (1-5 Volts), 0-1000 PSIG input would be: **in1** = 1.0000, **dS1** = 0.00P, **in2** = 5.0000 and **dS2** = 1000P. The **in X** entries are always made in the input units defined by the Source entry.

2) The connected input varies from -1.0 to 0.0 V representing 0 to 2000 feet. Set **in1** to -1.0 and **dS1** to 0. Since **in2** must be a positive value at least as great as **in1**, set **in2** to 1.0 (not 0.0). The measured input has been doubled, so double the normal **dS2** value from 2000 to 4000. The indicator now displays 0 to 2000 between -1.0 and 0.0 V. The 0.0 to 1.0 V readings of 2000 to 4000 are there but are not used.

High Input - **in2 or in11**	Basic Range Used	Max Negative Input
< 640 mV	160 mV	-160 mV
640 mV to < 1.25 V	640 mV	-640 mV
1.25 V to < 5.00 V	1.25 V	-1.25 V
> 1.25 V	5.00 V	**-2.00** V

3)If less than 11 Point Pairs are needed to define a custom curve, the unneeded Point Pairs **must** be configured with values beyond **and slightly greater than** those in use on lower Point Pairs. Remember, **in11** chooses the basic range. The following example uses 7 Point Pairs and places the remaining 4 beyond the desired linearization:

Point Pair	(inX)	(dSX)	Point Pair	(inX)	(dSX)
1	1.0000	0.0000	8	5.5000	2000.0
2	1.1234	166.67	9	5.5000	2000.0
3	2.3456	333.33	10	5.5000	2000.0
4	2.6789	500.00	11	5.5000	2000.0
5	3.0123	666.67			
6	4.5678	833.33			
7	5.0000	1000.0			

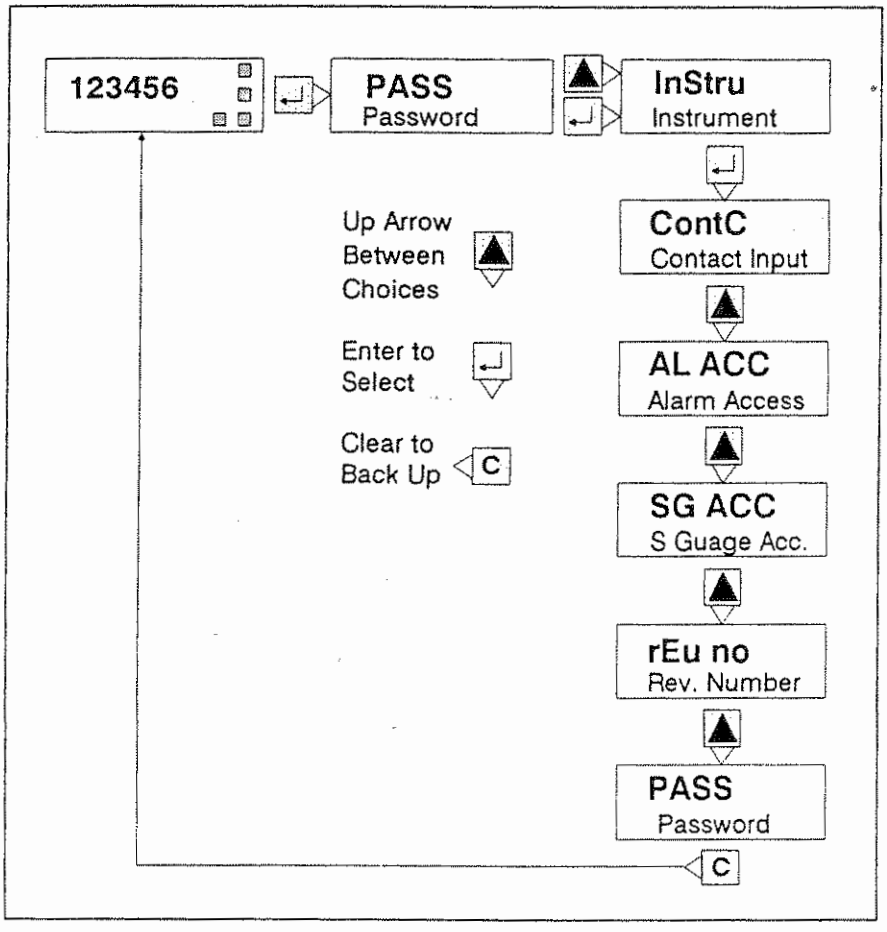
Strain Gauge - Ignoring tare weight (which will be discussed in Secion 6, Operation); Point Pair 1defines the low end output. Set **in1** for the low end output of the strain gauge device (normally 0.0 mV without tare weight). Set **dS1**for the required display value at **in1** (normally 0.0). Point Pair 2 defines the high end output. Set **in2** for the output **in the gauge specified mV/V**. No other Point Pairs are used.

This **ratiometric in2 setting**, using the Strain Gauge's value of millivolts at full scale output **per Volt of excitation**, assures that slight variations in excitation voltage will not affect the accuracy of the measurement. The excitation voltage is 5 Vdc. **dS2** is set for the full rated output value of the Strain Gauge device.

5.5 The Instrument Menu

ContC The Contact Input terminals 16 and 17 can be used to acknowledge Alarms **(AL Acc)**, reset the both the high and low Peak values **(PE dEt)**, adjust Strain Gauge high and low input values **(SG Lo/Hi A)** or do a full (both high and low) Strain Gauge adjustment using a calibration resistor **(SG FI A)**.

INSTRUMENT CONFIGURATION MENU



AL ACC This Alarm Access YES or NO choice determines whether both alarm setpoint, deadband and hysteresis values can be changed (without a password) in the Operator Menu. The NO choice results in **view only** value displays.

SG ACC This Strain Gauge Access YES or NO choice determines whether the Strain Gauge low (tare) and high (full or calibration resistor) values can be adjusted without a password in the Operator Menu.

rEv no This display gives access to the software revision number. Use the Side Arrow key to move the decimal point out to 3 places for the complete rev. number. This number cannot be changed by the user.

PASS The Password can be any number between "0" and "32767". The numbers "0, 1, 2 & 3" are not recommended as secure codes, since one of them will always appear when the ENTER key is first pushed (identifying the basic range in use).

5.6 The Alarm Menu

The alarm menu's for Alarm 1 or Alarm 2 are the same.

Alarm Relays

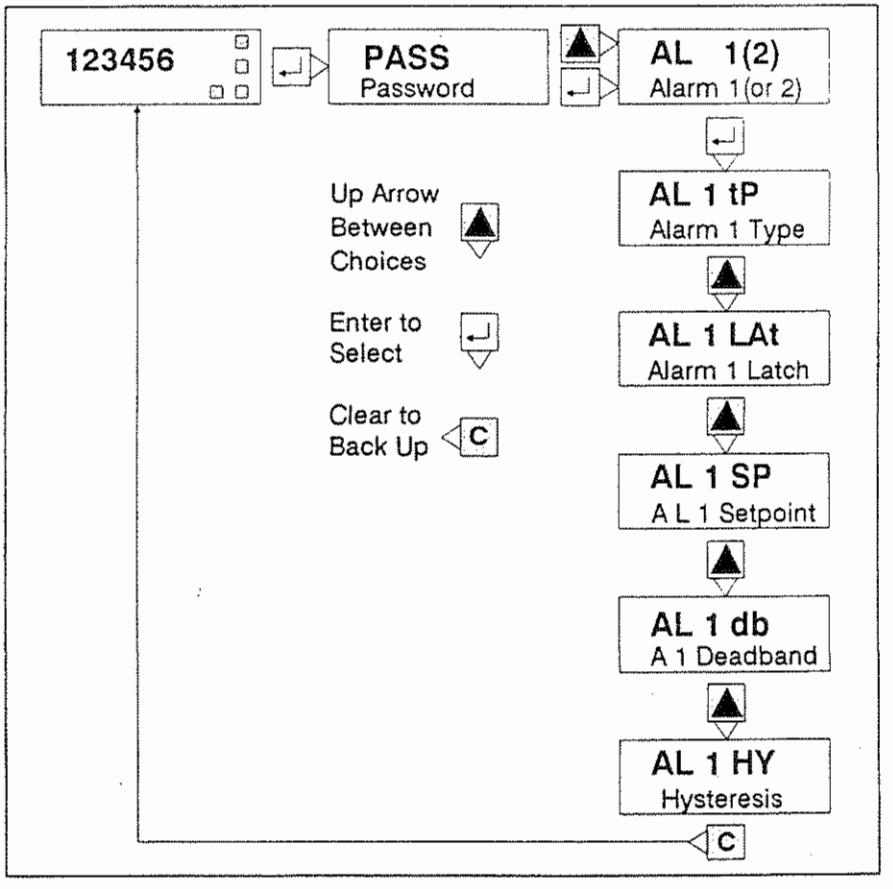
The alarm relay option provides two Single Pole Double Throw (SPDT) relays. These relays are rated at 2 Amps, 240 Vac - 500 VA or 30 Vdc - 60 W. Relay #1 responds to alarm #1 and relay #2 responds to alarm #2. These relays activate when power is applied and de-activate on alarm - **Normally Closed contacts close on alarm.**

AL1 tP The five selections for the Alarm Type are: OFF, lo, hi, deadband and rate. Hi and Lo alarms are active when the measured value is above (Hi) or below (Lo) the setpoint. A deadband alarm is active when the measured value is **either above or below** setpoint by the amount of the deadband entered.

A rate-of-change alarm is active when the measured value is changing by more than the setpoint value **per minute**. Calculations are based on one second samples.

Alarms not in use should be set to OFF to avoid unwanted alarm indications.

ALARM CONFIGURATION MENU



AL1 LAt Alarms can be configured as Not Latched or Latched. Not Latched alarms become active and their associated relay (if present) de-activates (**Normally Closed contacts are closed**) when the measured value passes the setpoint. The front panel alarm indicator for that alarm blinks. When the measured value returns past the setpoint by the amount of any hysteresis (see **AL1 Hy**), the relay activates and the alarm indication is turned off.

Latched alarms become active and their associated relay (if present) de-activates **(Normally Closed contacts are closed)** when the measured value passes the setpoint; and the panel alarm indicator for that alarm blinks.

When a Latched Alarm measured value returns past the setpoint by the amount of any hysteresis, the relay **does not activate** and the alarm indication **continues to blink.** This type of alarm will stay latched until the measured value returns past the setpoint **and** the alarm is acknowledged by a contact input or front panel keypad. An acknowledged alarm indication **changes from "blink" to "'steady on"** until the measured value returns past the setpoint by the amount of any hysteresis.

AL1 SP The alarm Setpoint determines at what measured value (or change in measured value) the alarm becomes active. For high and low alarms, any value equal to or beyond the Setpoint will activate the alarm.

For deadband alarms, any measured value which is **greater than or less than** the Setpoint by the amount of the Deadband causes the alarm to become active.

For rate-of-change alarms, any change in measured value which occurs faster than the Setpoint value **in units per minute** will activate the alarm. A positive Setpoint is entered for an increasing rate-of-change. A negative Setpoint specifies a decreasing rate-of-change. Because input circuit noise can affect rate alarms, the following minimum settings should be observed (μV values must be converted to measured value units):

FILTER SETTING	MEASURED VALUE IN MICROVOLTS
0 seconds	180 μVolts
1 second	120 μVolts
2 seconds	60 μVolts

Filter settings above 2 sec. slow response appreciably and are not recommended for use with rate alarms.

AL1 db The Deadband setting affects only alarms configured for the Deadband alarm type. It should not be confused with hysteresis as described below. Deadband determines the size of the band **both above and below the sepoint** at or beyond which a Deadband alarm becomes active.

AL1 Hy The Hysteresis setting determies the measured value by which the input must return past the setpoint before an alarm is no longer active. Example: A high alarm setpoint of 500 °F with 10 °F Hysteresis. At 500 °F an increasing temperature would cause the alarm to become active. When the temperature went down again, it would have to fall to 490 deg F before the alarm was not active.

Hysteresis is used to prevent an alarm from going in and out rapidly as an input varies about the setpoint. It can also be used to control a volume or pressure by turning on at a low setting and not turning off (Hysteresis) until the pressure or volume has reached its high value.

5.7 The Retransmission Menu

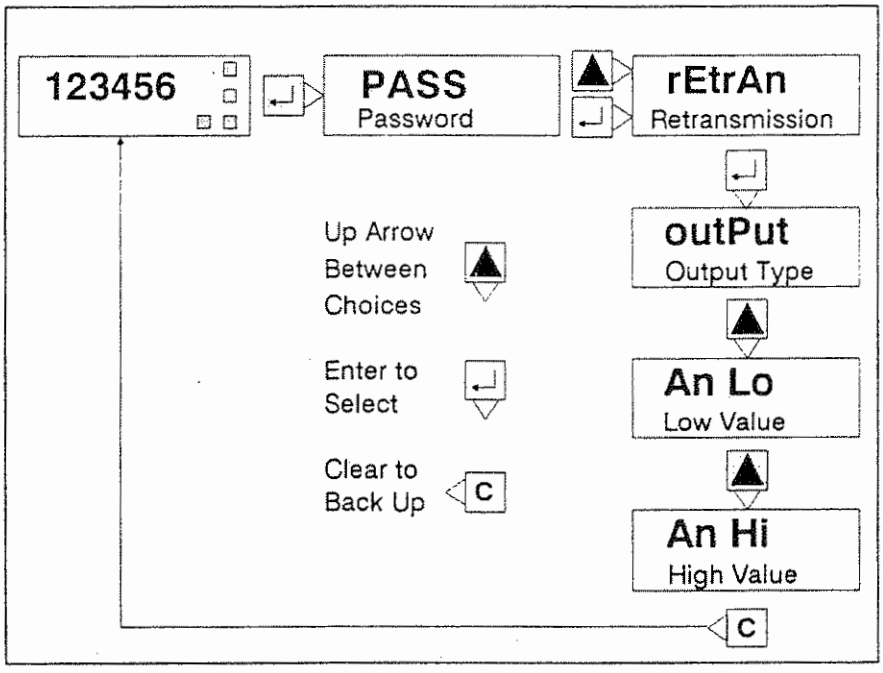
The Retransmission option provides a 0 - 20 or 4 - 20 mA output which follows the **linearized** measured value. This output can be scaled so that the output is over any part (or all) of the measured range.

outPut The output can be chosen as 0 - 20 mA, 4 - 20 mA or OFF. Voltage outputs (0 - 5 V or 1 - 5 V) require a separate 250 Ω resistor across output terminals 1 (+) and 2 (-).

An Lo The Analog Low value determines what measured value causes an output of 0 or 4 mA.

An Hi The Analog High value determines what measured value causes an output of 20 mA.

RETRANSMISSION CONFIGURATION MENU



6.0 OPERATION

The operating controls are the front panel keys and a configurable terminal board contact input. The following functions are (or can be configured to be) available without password entry. The contact input can do **one** of the tasks listed:

Reading of actual electrical input in mV or Ohms	Press Up Arrow
Acknowledge latched alarms (if enabled)	Operator Menu
Reading of high and low peak value since last reset	Operator Menu
Resetting of high and low peak values	Operator Menu
Change alarm SP, hysteresis & deadband (if enabled)	Operator Menu
Adjust strain gauge low and high values (if enabled)	Operator Menu
Ack. both latched alarms together (if enabled)	Contact Input
Resetting of both high and low peak values together	Contact Input
Strain gauge low adjust (if enabled)	Contact Input
Strain gauge high adjust (if enabled)	Contact Input
Strain gauge full - low then high with cal. resistor adjust (if enabled)	Contact Input

6.1 Electrical Input Value

Pressing the up arrow while in normal operating mode (with the measured value displayed) causes the electrical input **in Millivolts** or Ohms (RTD) to be displayed for 1 second. This is useful when checking that the intended input signal is being measured by the indictor.

6.2 The Operator Menu

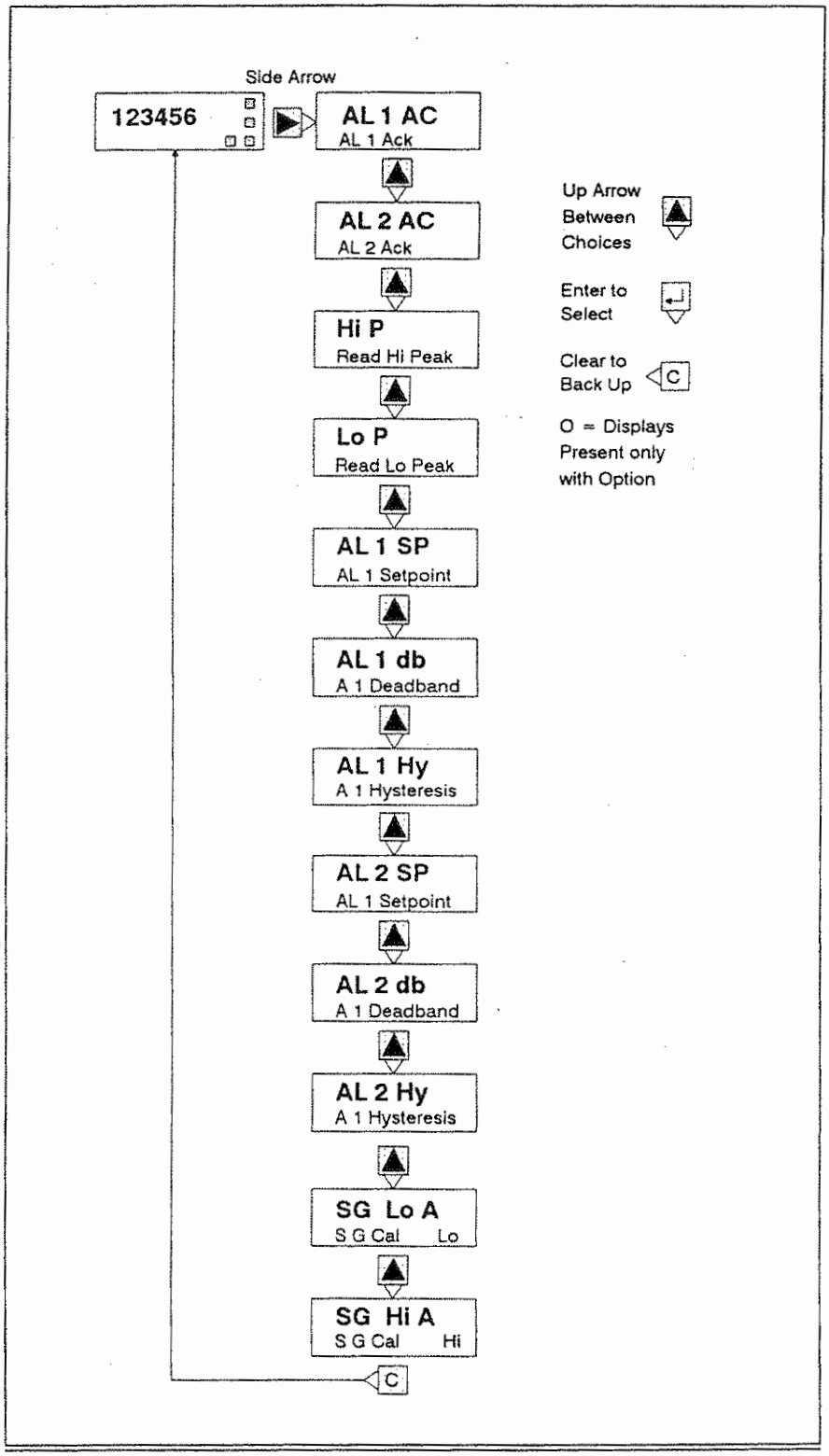
The Operator Menu is accessed by pressing the side arrow key. Several functions of this menu are controlled by password protected configuration. Alarm acknowledge, setpoint change, deadband change, hysteresis change and strain gauge low and high adjustments are enabled or disabled in the Instrument Menu. If disabled, the values for these functions can be seen but not changed in the Operator Menu.

AL1 AC Pressing Enter while on the **AL1 AC** or **AL2 AC** display causes a latched alarm indicator to go from "blink" to "steady on" and permits the latched alarm relay to re-activate when the measured value returns past the setpoint by the amount of any hysteresis.

Hi / Lo P The indicator automatically stores the highest (most positive) and lowest (most negative) measured value displayed since these values were last reset. These values can be read in the Operator Menu by pressing Enter when **Hi P** or **Lo P** is displayed. This displayed peak value will remain until cleared or until the normal 3 minute timeout.

Reset a peak value by pressing the side arrow key while that value is displayed. A reset peak value goes immediatly to the current measured value.

OPERATOR MENU



NOTE

A flashing center bar in the right (units) display character indicates a peak reading.

AL 1 / 2 If enabled in the Instrument Menu, the alarm setpoints, deadband (deadband alarms only) and hysteresis values can be changed in the Operator Menu. These values are accessed by pressing the Enter key on one of the following displays: **AL1 SP, AL1 db, AL1 Hy, AL2 SP, AL2 db or AL2 Hy**. If not enabled, the configured values for these functions can be viewed but not changed.

SG Hi/Lo If enabled in the Instrument Menu, the low and high strain gauge values can be adjusted in the Operator Menu. The low adjust is used to offset any initial value, i.e. tare weight. The high adjust is used to reset the full span strain gauge measurement. High adjust is required after a low adjust has been made to re-establish the input value for the high end.

If the strain gauge sensor contains an internal calibration resistance, the output lead for that resistance should be connected to terminal 8. During **SG Hi A**djust, terminal 8 is connected to terminal 7; temporarily placing the resistance across one arm of the bridge. An external calibration resistance should be connected between terminals 8 & 9.

After pressing Enter to choose **SG HiA** or **SG LoA**, the value to be displayed at the high or low end is shown. The low value is the display with no force on the gauge (usually 0.0). The high value can be one of two numbers: (1) with no calibration resistor in the gauge or connected externally, the high value is the display with a **known force** on the gauge. (2) with a calibration resistor connected, the high value is the display value (usually about 80% of range) derived from information given by the gauge manufacturer.

After the low and high values have been entered, press the Side Arrow key **with no force on the gauge** to adjust the low end. The word "CAL" will appear as the adjustment is made. Press the Up Arrow key to advance to the high adjust.

When a calibration resistor is used, press the Side Arrow key with **no force on the gauge** to adjust the high end. Without a calibration resistor, press the Side Arrow key with a **known force** on the gauge equal to the entered high value. The word "CAL" will appear as the adjustment is made.

CAUTION

Because the high end adjustment process moves the measured value up to 80 - 100% of span, high alarms may be activated temporarily.

6.3 Remote Contact Input

A remote contact connected between terminals 16 & 17 can be used to do many of the Operator Menu functions (see listing on p20). The contact input is configured in the Instrument Menu and can do any **one** of the listed functions. Note the following differences from Operator Menu keypad function:

Alarm Acknowledge - both alarms are acknowledged.

Reset Peak Value - both the high and low peak values are reset.

Strain Gauge Low Adjust - only the low adjust is done **with no force on the gauge.**

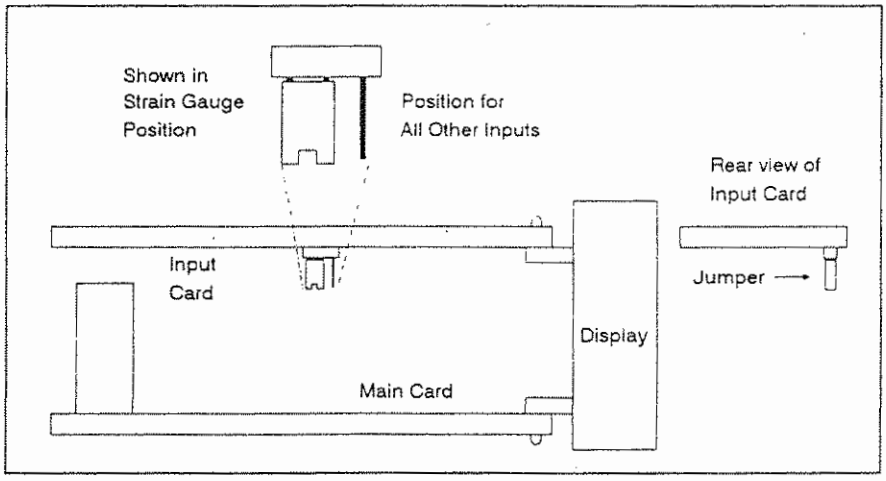
Strain Gauge High Adjust - only the high adjust is done. If a calibration resistor is connected, it is temporarily connected to terminal 7. See **SG Hi** above.

Strain Gauge Full Adjust (SG F A) - this contact input can be used to set both the low and **resistor calibrated** high values. When the contact is closed momentarily, **with no force on the gauge**, the adjustment process is automatic. First, the low adjust is done, then the resistor is temporarily connected to terminal 7 and the high adjust is done. The word "CAL" will appear during this adjustment. See **SG Hi/Lo** above.

7.0 MAINTENANCE

7.1 Strain Gauge Jumper

The jumper on the edge of the input card must be in the rear (nearest the input terminals) position for strain gauge use. It must be in the front (nearest the display) position for all other measurements.



7.2 Warranty Statement

This product is warranted against defects in materials and workmanship for the specified period from the date of shipment. During the warranty period the manufacturer will, at its option, either repair or replace products which prove to be defective.

Warranty service at the buyer's facility can be provided only upon prior agreement by the manufacturer or its representative, and the buyer may be required to pay round-trip travel expenses.

In all cases the buyer has the option of returning the product for Warranty service to a facility designated by the manufacturer or its representatives. The buyer shall prepay shipping charges for products returned to a service facility, and the manufacturer or its representative shall pay for the return of the product to the buyer.

Limitation of Warranty

The foregoing warranty shall not apply to defects arising from:

Improper or inadequate maintenance by the user.

Improper or inadequate site preparation

Unauthorized modification or misuse

Operation of the product in unfavorable environments, especially high temperature, high humidity, corrosive or other damaging atmospheres

Disclaimer

No other warranty is expressed or implied. The manufacturer specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

Exclusive Remedies

The remedies provided above are the buyer's sole and exclusive remedies. The manufacturer shall not be liable for any direct, indirect, special incidental or consequential damages.

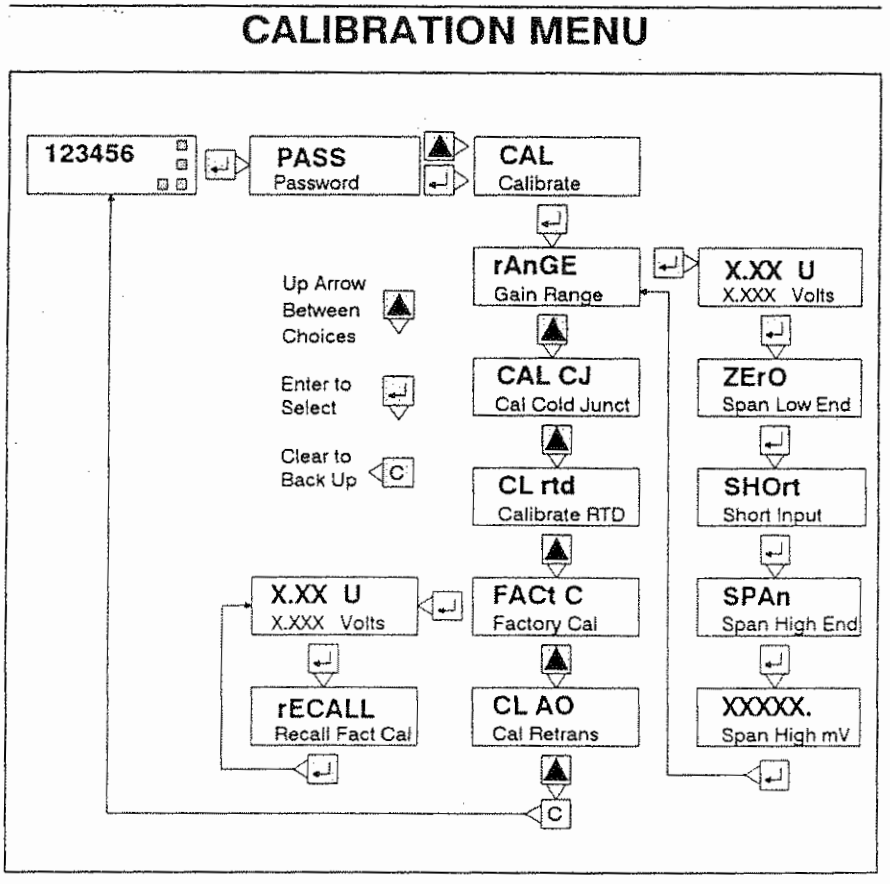
Calibration Accuracy

This product was thoroughly tested to ensure compliance with the published specifications. All instruments used in production and final test are regularly inspected to maintain accuracy of calibration traceable to the National Institute of Standards and Technology. The user should be satisfied that the performance of the product as received meets expectations and, as part of a program of planned maintenance, should periodically check calibration accuracy against reliable standards.

CAUTION

The product chassis should not be removed by other than qualified service personnel. High or lethal voltages may be present at exposed points within the case if power is applied. **See other caution information on the first page of this manual.**

The manufacturer shall not be liable for personal injury or property damage suffered in servicing the product. The product should not be modified or repaired in a manner at variance with procedures established by the manufacturer.



7.3 The Calibration Menu

NOTE

DO NOT USE the Calibration Menu to set up the indicator to measure a specific input. See Section 5 - Configuration.

The calibration function makes it possible to:

Calibrate the various basic ranges using precision signal standards.

Calibrate the termocouple cold junction compensation using a thermocouple at a known controlled temperature or a precision thermocouple simulator.

Calibrate the RTD ranges using precision resistance standards.

Calibrate the retransmission function using a precision 250Ω resistor.

Restore the range, CJC and RTD calibration constants stored at time of manufacture.

CAUTION

While in the Calibration Menu various internal and external signal inputs replace the normal process measurement signals. For this reason, alarms may become active during calibration.

rAnGE There are five basic dc ranges: 40.0 mV, 160 mV, 640 mV, 1.25 V and 5.0 V.. The indicator automatically selects a range based on the configuration.

X.XXX U When Enter is pressed on the **rAnGE** display in the Calibration Menu, the basic range currently in use is the first to appear. Pressing the Up Arrow will then display the other calibration ranges. There is no input for the 40.0 mV range.

ZErO Press Enter to begin low end (zero) calibration. Press the Up Arrow to go directly to the high end (span) calibration.

SHOrt Low end calibration is carried out with the input shorted. Press Enter to calibrate the low end. The word "Cal" is displayed during this step.

SPAn Press Enter to begin high end calibration. Press the Up Arrow to go directly to the Cal CJ menu display.

XXXXX. A high end input is prompted for each basic range: 100 mV for the 160 mV range, 500 mV for the 640 mV range, 1.000 V for the 1.25 V range and 5.000 V for the 5.00 V range. Use a high precision source to apply these values. If other source input values are to be used, change the prompted value (in millivolts) to match the actual connected input value.

CAL CJ Calibration of the thermocouple cold junction requires that the indicator be configured to measure any thermocouple type other than "B". The Units must be °C.

There are three ways to calibrate the CJ: (1) Use a TC simulator to enter 25 °C for the configured TC type. (2) Place an actual connected thermocouple of the configured type into a known temperature (0°C in an ice bath) and change the prompted 25 °C to the known temperature. (3) Short the input and enter the actual measured °C rear terminal board temperature in place of the prompted 25 °C. No.1 is most accurate, No.3 is least accurate.

Press Enter to display the prompted temperature. Adjust the source to match the prompt or adjust the prompt to match the source (see above), press Enter to calibrate.

CL rtd RTD calibration requires the use of high precision resistance standards: 300 Ohms for Pt100 & Ni120, 1500 Ohms for Pt 500 and 3000 Ohms for Pt1000.

CAUTION

Accurate calibration of RTD inputs requires that the 160 mV, 640 mV and 1.25 V dc ranges be calibrated first.

Press Enter to display the first prompted resistance. Use the Up Arrow to select the required resistance for the RTD in use. Adjust the source to match the prompt or adjust the prompt to match the source. To assure maximum accuracy, **do not use an input resistance that is less than 50% of the prompted resistance** for the range being calibrated. Press Enter to calibrate.

FACt C Factory Calibration means recalling the calibration constants for each range that were stored in EEPROM memory at manufacture. This step does not change any configuration entered in Section 5. Factory Calibration does change the effects of any calibration done after receipt by the user.

r1500 Factory Calibration constants are stored for 160 mV, 640 mV, 1.25 V, 5.00 V, 300Ω, 1500 Ω, 3000 Ω, CJC and Retransmission. Use the Up Arrow to select the range or function to be recalled.

rECALL Press Enter to recall the Factory Calibration for the selected range or function.

CL AO Calibration of the Analog Output requires that a 250 Ω resistor be connected across the retransmission terminals 1 (+) and 2 (-) and these terminals be connected to the input terminals 10 (+) and 9 (-). Press Enter to start calibration.

CAUTION

Accurate calibration of Retramsmission output requires that the 5.00 V range be properly calibrated.

C AOut Press Enter to start analog output. "Cal" will be displayed during calibration. During calibration the analog output goes to the 4 mA and 20 mA limits.