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NOTES, WARNINGS and CAUTIONS

Information that is especially important to note is identified by following labels:

- **NOTE**
- **WARNING or CAUTION**
- **IMPORTANT**
- **TIP**

NOTE: Provides you with information that is important to successfully setup and use the Programmable Digital Meter.

CAUTION or WARNING: Tells you about the risk of electrical shock.

CAUTION, WARNING or IMPORTANT: Tells you of circumstances or practices that can effect the instrument's functionality and must refer to accompanying documents.

TIP: Provides you helpful hints.

PART 1
INTRODUCTION
1.1 Description

Note ☞ This device can be purchased as monitor (read process value only) or as a controller.

- The iLD Big Display Strain and Process monitors can measure a wide variety of DC voltage and current inputs for all common load cells, pressure transducers and strain gauge type of transducer. The voltage /current inputs are fully scaleable to virtually all engineering units, with selectable decimal point, perfect for use with pressure, flow or other process input.

- The iLD monitor features a large, three color programmable display with capability to change a color every time when Alarm is triggered. The standard features include built-in excitation for transducers, selectable as 10V @ 60 mA or 5 V @ 40 mA. (Built-in excitation is not available with optional isolated RS-232/485 Serial Communication). Universal power supply accepts 100 to 240 Vac.

1.2 Safety Considerations

This device is marked with the international caution symbol. It is important to read this manual before installing or commissioning this device as it contains important information relating to Safety and EMC (Electromagnetic Compatibility).

This instrument is protected in accordance with Class II of EN 61010 (115/230 AC power connections). Installation of this instrument should be done by qualified personnel. In order to ensure safe operation, the following instructions should be followed.

This instrument has no power-on switch. An external switch or circuit-breaker shall be included in the building installation as a disconnecting device. It shall be marked to indicate this function, and it shall be in close proximity to the equipment within easy reach of the operator. The switch or circuit-breaker shall meet the relevant requirements of IEC 947–1 and IEC 947-3 (International Electrotechnical Commission). The switch shall not be incorporated in the main supply cord.

Furthermore, to provide protection against excessive energy being drawn from the main supply in case of a fault in the equipment, an overcurrent protection device shall be installed.

Note ☞

- Do not exceed voltage rating on the label located on the top of the instrument housing.
- Always disconnect power before changing signal and power connections.
- Do not use this instrument on a work bench without its case for safety reasons.
- Do not operate this instrument in flammable or explosive atmospheres.
- Do not expose this instrument to rain or moisture.
- Unit mounting should allow for adequate ventilation to ensure instrument does not exceed operating temperature rating.
- Use electrical wires with adequate size to handle mechanical strain and power requirements. Install without exposing bare wire outside the connector to minimize electrical shock hazards.

EMC Considerations

- Whenever EMC is an issue, always use shielded cables.
- Never run signal and power wires in the same conduit.
- Use signal wire connections with twisted-pair cables.
- Install Ferrite Bead(s) on signal wires close to the instrument if EMC problems persist.

Failure to follow all instructions and warnings may result in injury!

1.3 Before You Begin

Inspecting Your Shipment:

Remove the packing slip and verify that you have received everything listed. Inspect the container and equipment for signs of damage as soon as you receive the shipment. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent. The carrier will not honor damage claims unless all shipping material is saved for inspection. After examining and removing the contents, save the packing material and carton in the event reshipment is necessary.

Customer Service:

If you need assistance, please call the nearest Customer Service Department, listed in this manual.

Manuals, Software:

The latest Operation and Communication Manual as well as free configuration software and ActiveX controls are available from **the website listed in this manual or on the CD-ROM enclosed with your shipment**.

Tip ☞ For first-time users: Refer to the QuickStart Manual for basic operation and set-up instructions.

Tip ☞ If you have the Serial Communications/Ethernet Option you can easily configure the controller on your computer or on-line.

To Disable Outputs:

Standby Mode is useful during setup of the instrument or when maintenance of the system is necessary. When the instrument is in standby, it remains in the ready condition but all outputs are disabled. This allows the system to remain powered and ready to go.

When the instrument is in "RUN" Mode, **push ↵ twice** to disable all outputs and alarms. It is now in "STANDBY" Mode. **Push ↵ once** more to resume "RUN" Mode.

Tip ☞ **PUSH ↵ TWICE** to disable the system during an **EMERGENCY**.

To Reset the Meter:

When the controller is in the "MENU" Mode, **push ▼ once** to direct controller one step backward of the top menu item.

Push ▼ twice to reset controller, prior to resuming "Run" Mode except after "Alarms", that will go to the "Run" Mode without resetting the controller.

PART 2
SETUP
2.1 Mounting

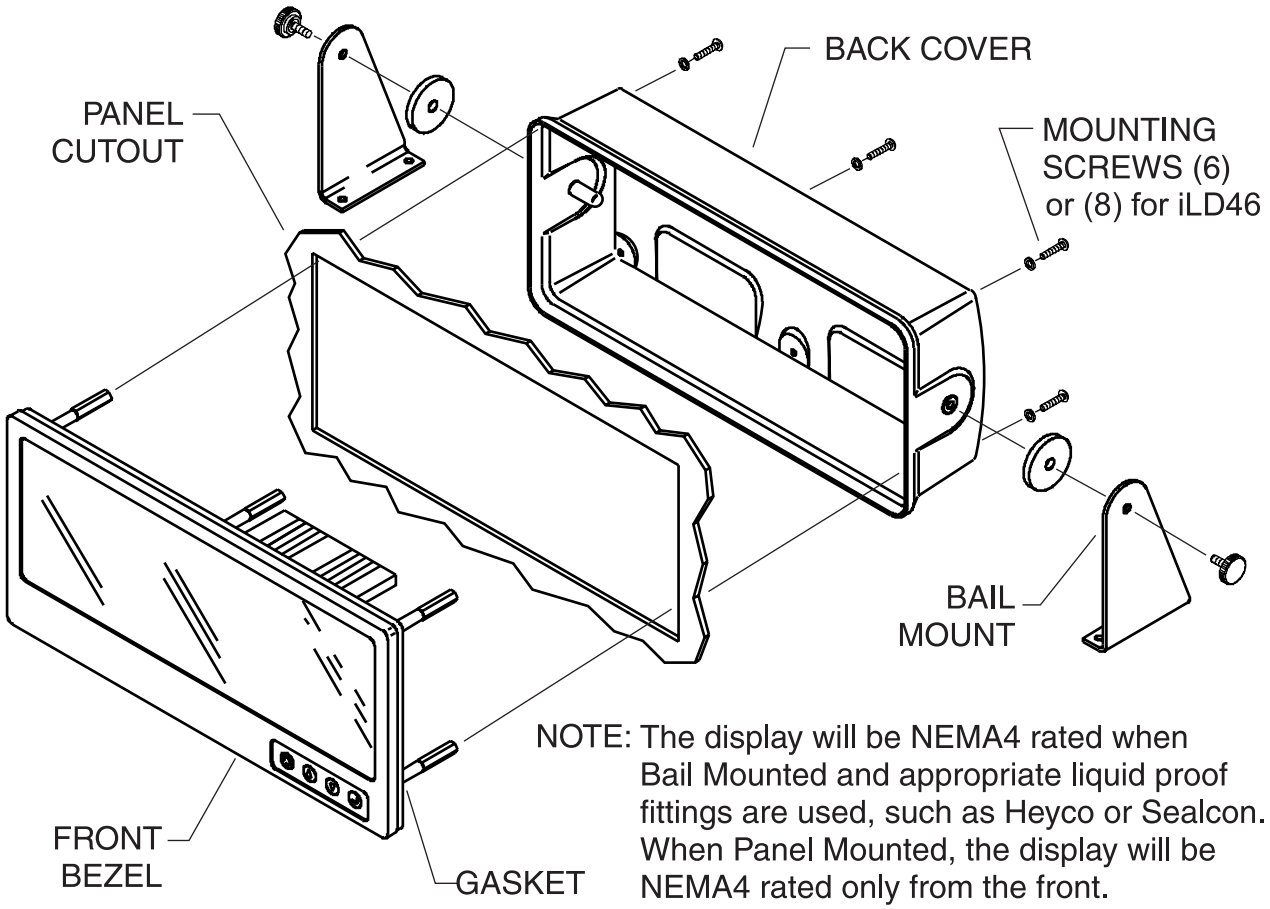


Figure 2.1 Mounting

Mounting iLD Big Display Through Panel:

1. Using the panel cutout diagram shown above, cut an opening in the panel.
2. Remove six (or eight) screws at the back of iLD Big Display to remove back cover.
3. Insert the unit into the opening from the front of the panel so the gasket seals between the bezel and the front of the panel.
4. Pass all wiring through customer drilled holes in back cover and connect wiring to terminal blocks.
5. Align back cover to iLD Big Display and reinstall screws.

Mounting iLD Big Display on Bail:

1. Remove six (or eight) screws at the back of iLD Big Display to remove back cover.
2. Pass all wiring through customer drilled holes in back cover and connect wiring to terminal blocks.
3. Align back cover to iLD Big Display and reinstall screws.
4. Mark the location of mounting screws on the flat surface.
5. Be sure to leave enough room around the bail to allow for removal and rotation of the display.
6. The display can be rotated for the best viewing angle.

Table 2.1 Front Panel Annunciators

1	Output 1/Setpoint 1/ Alarm 1 indicator
2	Output 2/Setpoint 2/ Alarm 2 indicator
/ MENU	Changes display to Configuration Mode and advances through menu items*
/ PK/GRS	Used in Program Mode and Peak or Gross Recall*
/ TARE	Used in Program Mode and to Tare your reading*
/ ENTER	Accesses submenus in Configuration Mode and stores selected values*

* See Part 3 Operation: Configuration Mode

2.2 Rear Panel Connections

The rear panel connections are shown in Figures 2.2 and 2.3.

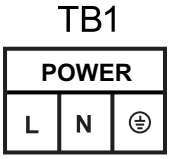


Figure 2.2 Rear Panel Power Connections

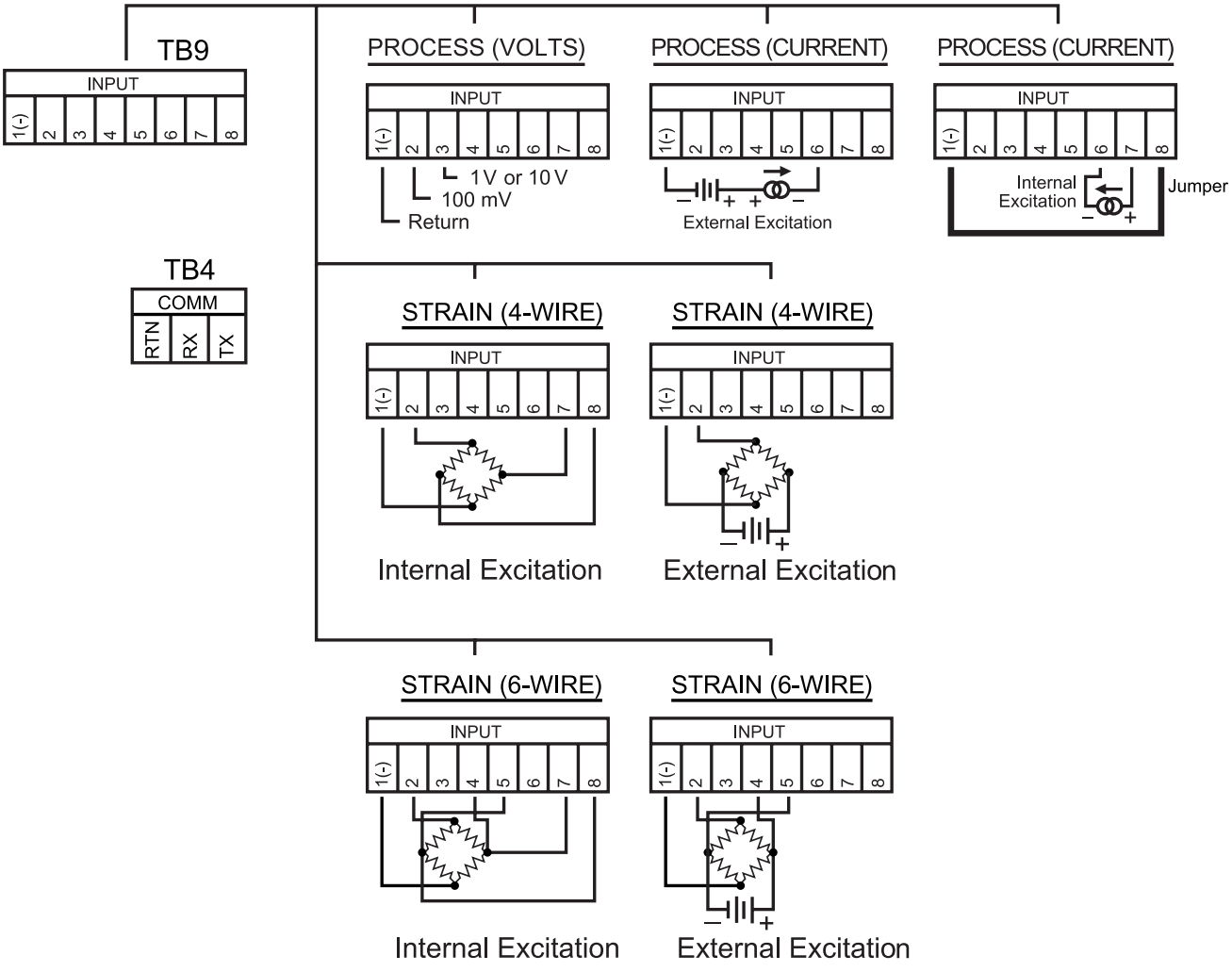


Figure 2.3 Rear Panel Input Connections

Table 2.2 Rear Panel Connector

POWER	AC Power Connector: All models
INPUT	Input Connector: TB9
OPTION	Based on one of the following models: RS-232C or RS-485

2.3 Electrical Installation

2.3.1 Power Connections

Caution: Do not connect power to your device until you have completed all input and output connections. Failure to do so may result in injury!

Connect the main power connections as shown in Figure 2.4.

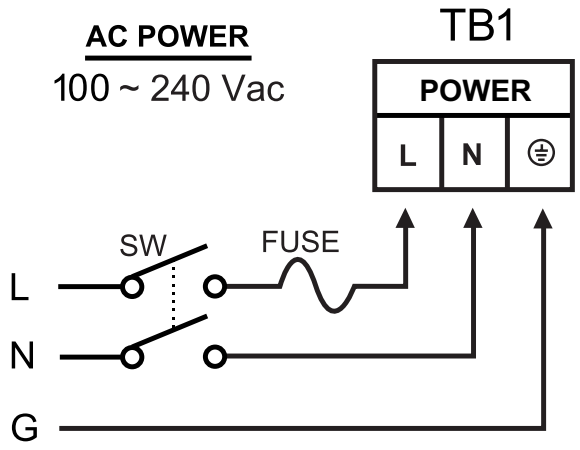


Figure 2.4 Main Power Connections

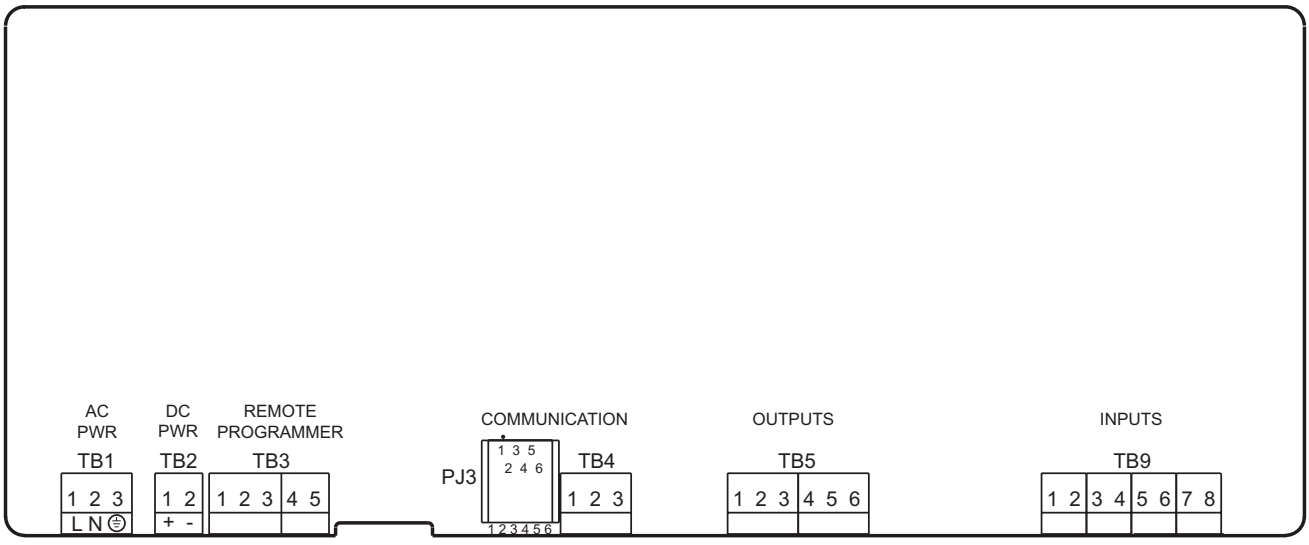


Figure 2.5 Inside Cover Rear View

2.3.2 Strain Gauge

The figure below shows the wiring hookup for 4-wire bridge input.

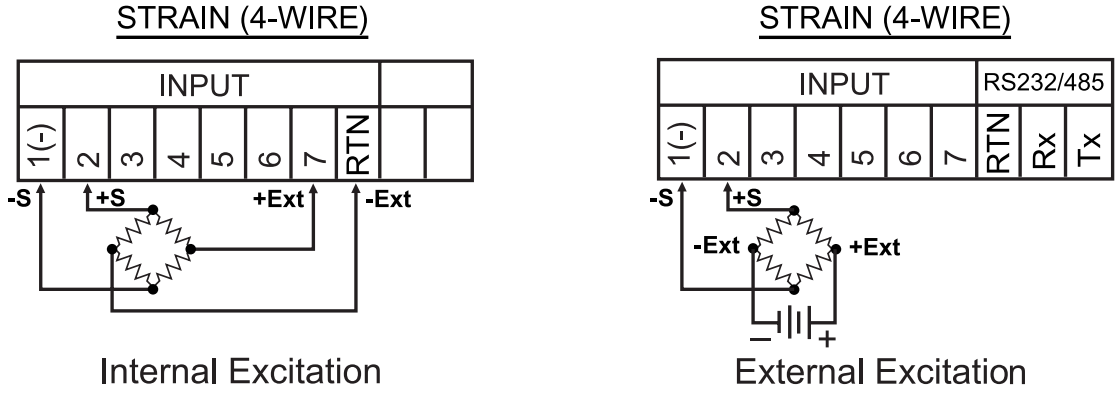


Figure 2.6

a) 4-Wire Voltage/Bridge Input with Internal Excitation Wiring Hookup

b) 4-Wire Bridge Input with External Excitation Wiring Hookup

In 4-Wire connections the voltage drop across long excitation lead wires of strain gauge bridge may cause measurement errors. The output of a strain gauge bridge also depends on the stability of excitation voltage. To correct for voltage drop and changes in excitation voltage, 6-wire input configuration and ratio measurement are used.

Note ☞ In order for the Ratiometric to work properly, the External Excitation should not drop below 4.6 Vdc.

The figure below shows 6-wire hookup for 6-wire bridge input.

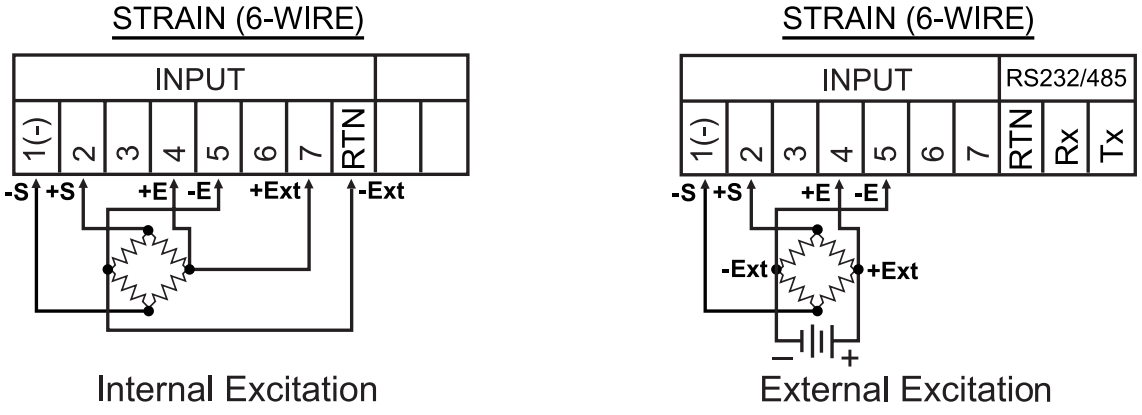


Figure 2.7

a) 6-Wire Bridge Input with Internal Excitation and Ratio Measurement Wiring Hookup

b) 6-Wire Bridge Input with External Excitation and Ratio Measurement Wiring Hookup

The figure below shows Voltage (bridge with amplified output) input with internal excitation.

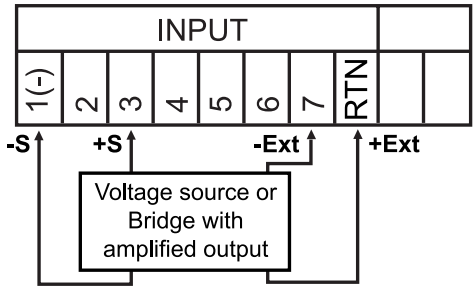
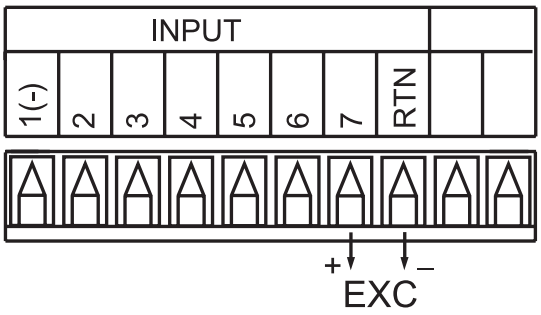


Figure 2.8 4-Wire Voltage Input (Bridge with Amplified Output) with Internal Excitation

Where: +S: signal plus, -S: signal return, +Ext: excitation plus, -Ext: excitation return
+E: plus excitation sense, -E: minus excitation sense.

This meter is capable of supplying 5 or 10 Vdc sensor excitation. The excitation output connection and location of S2 pin selection jumper are shown below.

Note ☞ If your meter has an excitation option, then communication is not available.



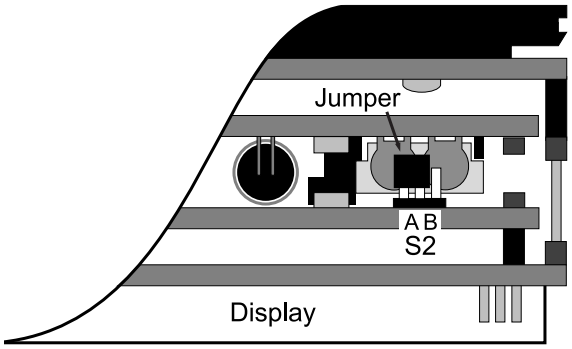


Figure 2.9
a) Excitation Output **b) Top View Location of S2**

Install jumpers according to the table below.

Table 2.3 Jumper Connections

Excitation Output	S2	
	A	B
10 V	Close	Open
5 V	Open	Close

Note ☞ Factory default is 10 V.

2.3.3 Process Current

The figure below shows the wiring hookup for Process Current 0 – 20 mA.

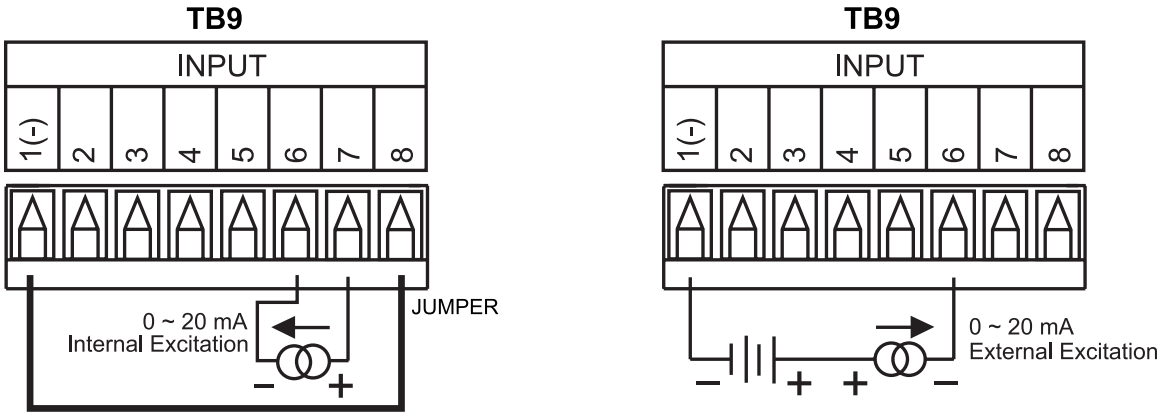


Figure 2.10 Process Current Wiring Hookup (Internal and External Excitation)

When configuring your instrument, select Process Type in the Input Type Menu (see Part 3).

2.3.4 Process Voltage

The figure below shows the wiring hookup for Process Voltage 0 – 100 mV, 0 – 1 V, 0 – 10 V.

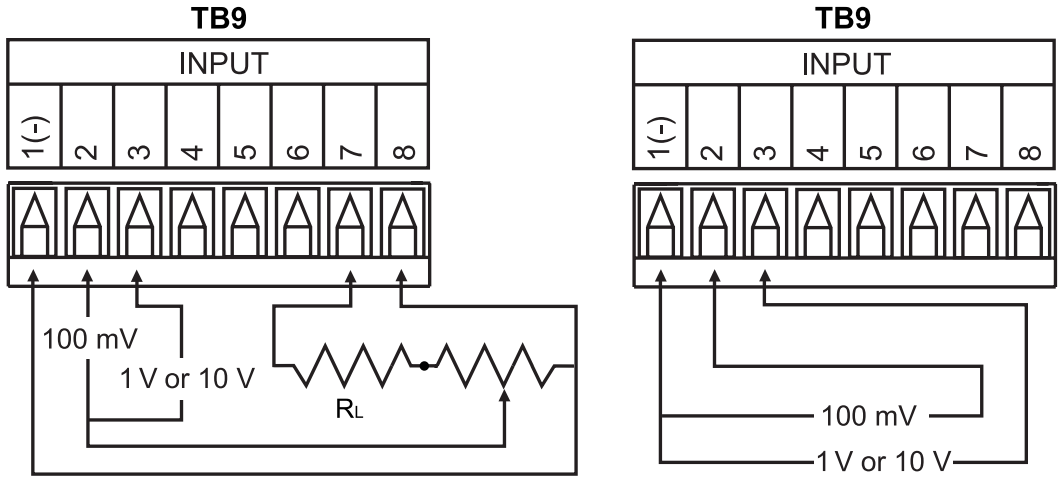


Figure 2.11
a) Process Voltage Wiring Hookup with Sensor Excitation
b) Process Voltage Wiring Hookup without Sensor Excitation

R_L - Voltage limiting resistor, which allows conversion of the 24 Vdc internal excitation voltage to the appropriate process input value. For instance: if the potentiometer value is equal to 10 kΩ, the minimum R_L is 14 kΩ for 10 V process input.

When configuring your instrument, select Process Type in the Input Type Menu (see Part 3).

2.3.5 Communication Output

This device may have a programmable communication output. The RS-232 and RS-485 Output Connection are shown below.

Figure 2.12
a) RS-232 Output Wiring Hookup b) RS-485 Output Wiring Hookup

PART 3
OPERATION: Configuration Mode
3.1 Introduction

The instrument has two different modes of operation. The first, Run Mode, is used to display values for the Process Variable, and to display or clear Peak and Valley values. The other mode, Menu Configuration Mode, is used to navigate through the menu options and configure the controller. Part 3 of this manual will explain the Menu Configuration Mode. For your instrument to operate properly, the user must first "program" or configure the menu options.

Turning your Controller On for the First Time

The device becomes active as soon as it is connected to a power source. It has no On or Off switch. The device at first momentarily shows the software version number, followed by reset RSt, and then proceeds to the Run Mode.

Table 3.1 Button Function in Configuration Mode

MENU	• To enter the Menu, the user must first press button. • Use this button to advance/navigate to the next menu item. The user can navigate through all the top level menus by pressing . • While a parameter is being modified, press to escape without saving the parameter.
PK/GRS (UP)	• Press the up button to scroll through “flashing” selections. When a numerical value is displayed press this key to increase value of a parameter that is currently being modified. • Holding the button down for approximately 3 seconds will speed up the rate at which the set point value increments. • In the Run Mode press causes the display to flash the PEAK or GROSS value – press again to return to the Run Mode.
TARE (DOWN)	• Press the down button to go back to a previous Top Level Menu item. • Press this button twice to reset the controller to the Run Mode. • When a numerical value is flashing (except set point value) press to scroll digits from left to right allowing the user to select the desired digit to modify. • When a setpoint value is displayed press to decrease value of a setpoint that is currently being modified. Holding the button down for approximately 3 seconds will speed up the rate at which the setpoint value is decremented. • In the Run Mode press causes the display to flash the TARE value to tare your reading (zeroing) - press again to return to the Run Mode.
ENTER	• Press the enter button to access the submenus from a Top Level Menu item. • Press to store a submenu selection or after entering a value — the display will flash a StRd message to confirm your selection. • To reset flashing Peak or Valley press . • In the Run Mode, press twice to enable Standby Mode with flashing Stby.

Note ☞ **Reset:** Except for Alarms, modifying any settings of the menu configuration will reset the instrument prior to resuming Run Mode.

3.2 Menu Configuration

Note ☞ It is recommended that you put the controller in the Standby Mode for any configuration change other than Setpoints & Alarms.

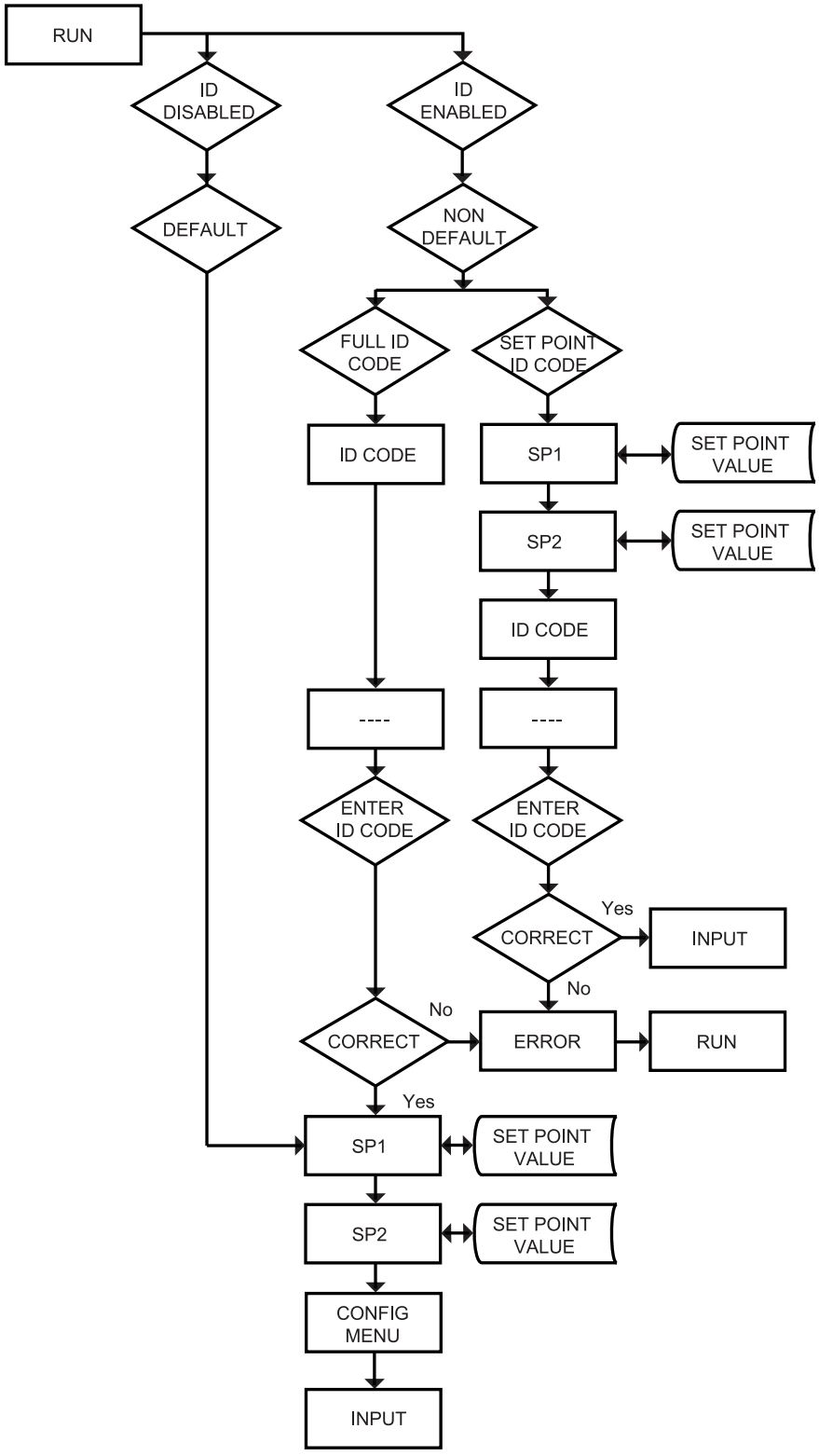


Figure 3.1 Flow Chart for ID and Setpoints

3.2.1 ID Number

SEE ID MENU SELECTION IN CONFIGURATION SECTION FOR ENABLE/DISABLE OR CHANGE ID CODE.

Note ☞ If ID Code is **Disabled** or set as **Default** (0000) the menu will skip ID step to Setpoint Menu.

If ID Code is set to **Full** Security Level and user attempts to enter the Main Menu, they will be prompted for an ID Code.

If ID Code is set to **Setpoint/ID** Security Level and user attempts to enter the Configuration Menu, they will be prompted for an ID Code.

ENTERING YOUR NON-DEFAULT FULL SECURITY ID NUMBER.

Press ⟲	**1)** Display shows Id.
Press ↵	**2)** Display advances to _ _ _ _.
Press ▲ & ▼	**3)** Press ▲ to increase digit 0-9. Press ▼ to activate next digit (flashing). Continue to use ▲ and ▼ to enter your 4-digit ID code.
Press ↵	**4)** If the correct ID code is entered, the menu will advance to the Setpoint 1 Menu, otherwise an error message ERRo will be displayed and the instrument will return to the Run Mode.

Note ☞ To change ID Code, see ID Menu in the Configuration section.

ENTERING YOUR NON-DEFAULT SETPOINT/ID SECURITY ID NUMBER.

Press ⟲	**5)** Display shows SP1 Setpoint 1 Menu.
Press ⟲	**6)** Display shows SP2 Setpoint 2 Menu.
Press ⟲	**7)** Display shows Id ID Code Menu.
Press ↵	**8)** Display advances to _ _ _ _.
Press ▲ & ▼	**9)** Use ▲ and ▼ to change your ID Code.
Press ↵	**10)** If correct ID Code is entered, the display will advance to the INPt Input Menu, otherwise the error message ERRo will be displayed and the controller will return to the Run Mode.

Note ☞ To prevent unauthorized tampering with the setup parameters, the instrument provides protection by requiring the user to enter the ID Code before allowing access to subsequent menus. If the ID Code entered does not match the ID Code stored, the controller responds with an error message and access to subsequent menus will be denied.

Tip ☞ Use numbers that are easy for you to remember. If the ID Code is forgotten or lost, call customer service with your serial number to access and reset the default to 0000.

3.2.2 Set Points

SETPOINT 1:

Press ⟲ **1)** Press ⟲, if necessary until SP 1 prompt appears.
Press ⏎ **2)** Display shows previous value of “Setpoint 1”.
Press ▲ & ▼ **3)** Press ▲ and ▼ to increase or decrease Setpoint 1 respectively.

Note ☞ Holding ▲ & ▼ buttons down for approximately 3 seconds will speed up the rate at which the Setpoint value increments or decrements.

Press ▲ & ▼ **4)** Continue to use ▲ and ▼ to enter your 4-digit Setpoint 1 value.
Press ⏎ **5)** Display shows StRd stored message momentarily and then advances to SP2 only, if a change was made, otherwise press ⟲ to advance to SP2 Setpoint 2 Menu.

SETPOINT 2:

Press ⏎ **6)** Display shows previous value of “Setpoint 2”.
Press ▲ & ▼ **7)** Press ▲ and ▼ to increase or decrease Setpoint 2 respectively.

Note ☞ Holding ▲ & ▼ buttons down for approximately 3 seconds will speed up the rate at which the setpoint value increments or decrements.

Press ⏎ **8)** Display shows StRd stored message momentarily and then advances to CNFG only, if a change was made, otherwise press ⟲ to advance to CNFG Configuration Menu.

3.2.3 Configuration Menu

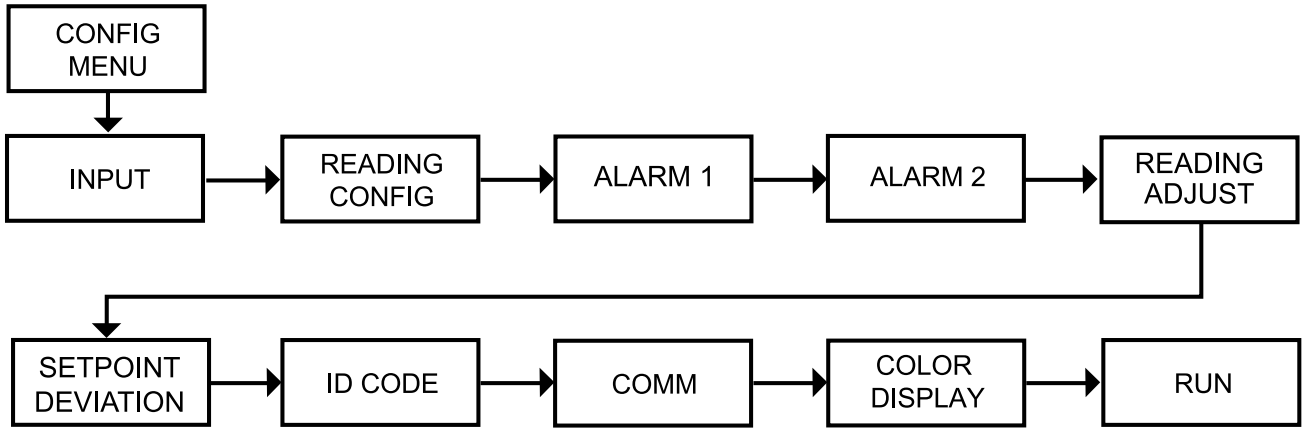


Figure 3.2 Flow Chart for Configuration Menu

Enter Configuration Menu:

Press ⊙ **1)** Press ⊙, if necessary, until CNFG prompt appear.
Press ⊙ **2)** Display advances to INPt Input Menu.
Press ⊙ **3)** Pressing and releasing ⊙ to scroll through all available menus of Configuration section.

3.2.4 Input Type Menu

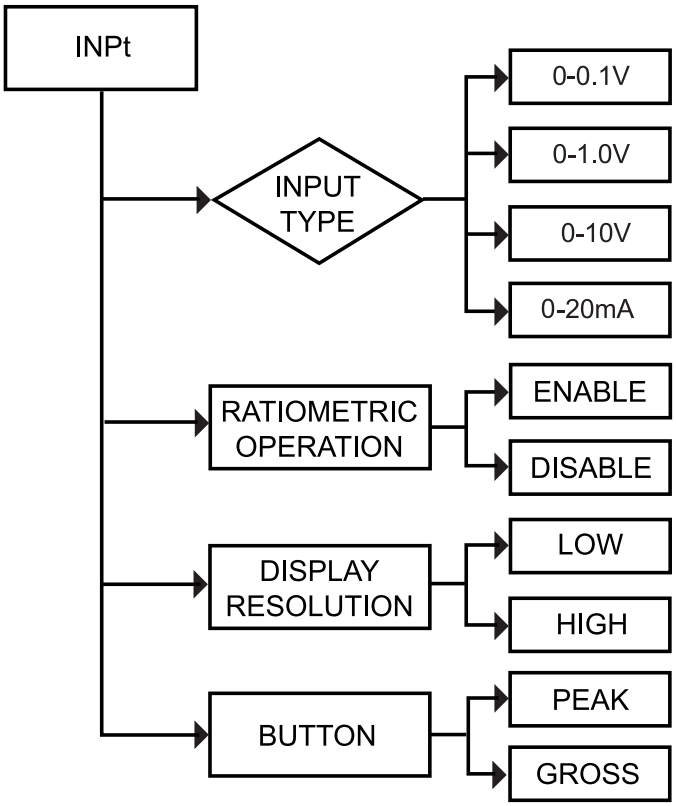


Figure 3.3 Flow Chart for Input Type Menu

ENTER INPUT TYPE MENU:

Press ⟲ **1)** Press ⟲, if necessary, until CNFG prompt appears.
Press ⟳ **2)** Display advances to INPt Input Menu.
Press ⟳ **3)** Display flashes 0-0.1, 0-1.0, 0-10 or 0-20 (0 to 100 mV, 0 to 1 V, 0 to 10 V or 0 to 20 mA).

INPUT TYPE MENU:

Press ⟰ **4)** Scroll through the available selection of input ranges 0-0.1, 0-1.0, 0-10 or 0-20 to the selection of your choice.
Press ⟳ **5)** Display shows StRd stored message momentarily and then advances to the Rt16 Ratiometric operation submenu.

Input Types:	100 mV	1 V	10 V	0 – 20 mA
Display:	0-0.1	0-1.0	0-10	0-20

Note ☞ To have ±100 mV you need to connect to 0-1 V.

RATIOMETRIC OPERATION SUBMENU:

Press ⟳ **6)** Display flashes previous selection of ENbL Enable or dSbL Disable.
Press ⟰ **7)** Scroll through the available selection ENbL or dSbL (flashing).
Press ⟳ **8)** Display shows StRd stored message momentarily and then advances to RESO Display Resolution Submenu.

Note ☞ The Ratiometric operations are typically used for Strain gauge monitor. If your instrument is configured as Process (voltage and current), set Rt16 to dSbLdisable Ratiometric operations.

Note ☞ If ENbL Ratiometric operations **Enabled** was selected, the changes to the excitation voltage will be compensated through Ratio measurement. If dSbL Ratiometric operation **Disabled** was selected, any changes to the excitation voltage will effect the output of strain gauge bridge and, as a result, a reading of the instrument.

DISPLAY RESOLUTION SUBMENU:

Press ⟲ **9)** Display flashes previous selection of LO Low or HI High resolution.
Press ⟳ **10)** Scroll through the available selection LO or HI (flashing).
Press ⟳ **11)** Display shows StRd stored message momentarily and then advances to bUtN Button Selection Submenu.

Note ☞ If LO Low Resolution was selected the resolution of the display is 10 µV. If HI High Resolution was selected the resolution of the display is 1 µV. In case of High Resolution, the maximum input signal is 10 mV.

BUTTON SELECTION SUBMENU:

Press ↵ **12)** Display flashes previous selection of GROS Gross or PEAK Peak.

Press ▲ **13)** Scroll through the available selection GROS or PEAK to the selection of your choice.

Press ↵ **14)** Display shows StRd stored message momentarily and then advances to RdG Reading Configuration Menu.

Note ☞ If GROS was selected, in the Run Mode pressing ▲ button causes the display to flash Gross value (value measured without zeroing of the display).
If PEAK was selected, in the Run Mode pressing ▲ button causes the display to flash Peak value.

Note ☞ 0 - 20 mA current input used for process measurement only.
For 4 - 20 mA Input select 0 - 20 mA and adjust the Input/Reading accordingly. To adjust 4 - 20 mA input, see example under INPUT/READING Submenu.

3.2.5 Reading Configuration

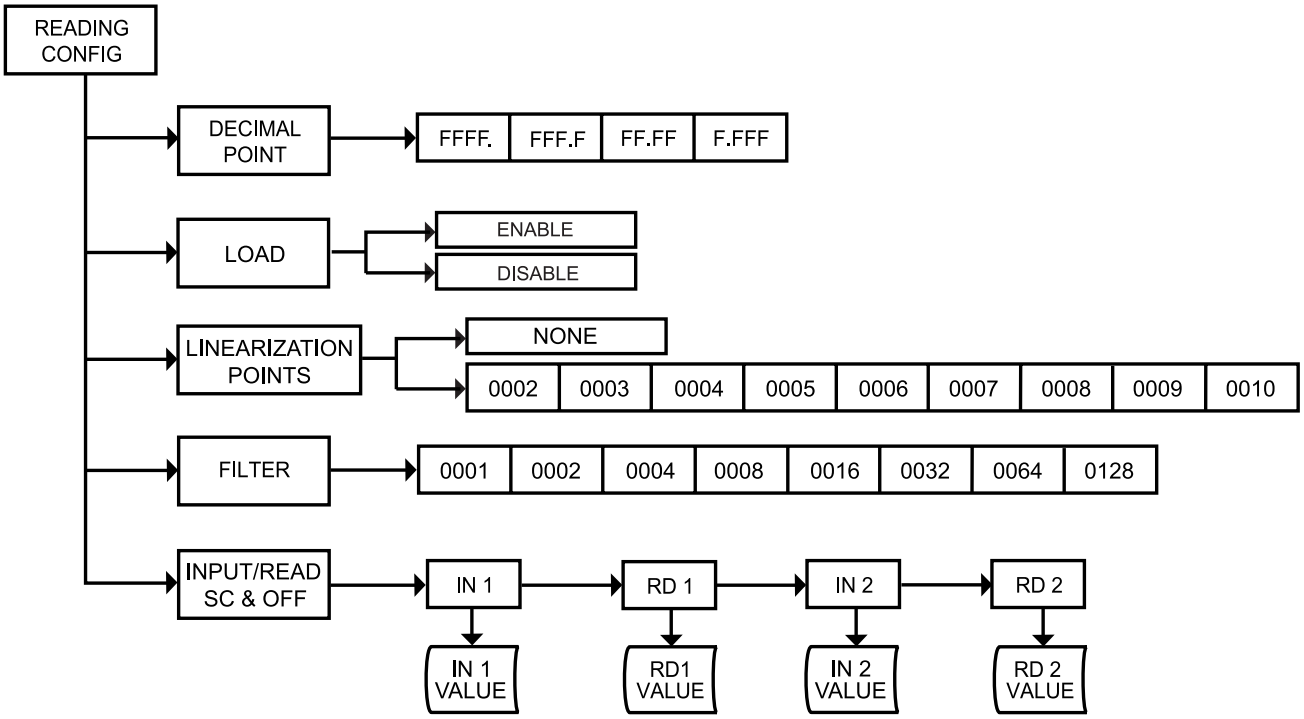


Figure 3.4 Flow Chart for Reading Configuration Menu

ENTER READING CONFIGURATION MENU:

Press ⟲ **1)** Press ⟲, if necessary, until CNFG prompt appears.
Press ⏎ **2)** Display advances to INPt Input Menu.
Press ⟲ **3)** Display advances to RdG Reading Configuration Menu.
Press ⏎ **4)** Display advances to dEC Decimal Point.

DECIMAL POINT SUBMENU:

Press ⏎ **5)** Display flashes previous selection for Decimal location.
Press ▲ **6)** Scroll though the available selections and choose Decimal location: FFFF, FFF.F, FF.FF or F.FFF
Press ⏎ **7)** Display shows StRd stored message momentarily only, if changes were made, otherwise press ⟲ to advance to LOAd Known/Unknown Loads Submenu.

Note ☞ Decimal Point is passive.

KNOWN/UNKNOWN LOADS SUBMENU:

Press ↵ **8)** Display flashes previous selection of ENbL Enable or dSbL Disable.

Press ▲ **9)** Scroll though the available selection of ENbL or dSbL (flashing).

Press ↵ **10)** Display shows StRd stored message momentarily and then advances to L.PNt Linearization Points Submenu.

Tip ☞ If ENbL Known Loads scaling method was selected, calculate the input values to the instrument based on the actual signal being received. If dSbL Without Known Loads scaling method was selected, calculate input values to the instrument based on the transducer specification.

LINEARIZATION POINTS SUBMENU:

Press ↵ **11)** Display flashes previous selection of Linearization Points Submenu.

Press ▲ **12)** Scroll though the available selections: 0002, 0003, 0004, 0005, 0006, 0007, 0008, 0009, 0010 - up to 10 Linearization Points can be selected. Default is 0002.

Tip ☞ If display flashes NONE, your instrument has only 2 linearization points.

Press ↵ **13)** Display shows StRd stored message momentarily only, if a change was made, otherwise press ↵ to advance to the FLtR Filter Constant Submenu.

Linearization Points allow users to customize the Transducer curve.

FILTER CONSTANT SUBMENU:

Press ↵ **14)** Display flashes previous selection for Filter Constant.

Press ▲ **15)** Scroll though the available selections: 0001, 0002, 0004, 0008, 0016, 0032, 0064, 0128. - Default is 0004

Press ↵ **16)** Display shows StRd stored message momentarily only, if a change was made, otherwise press ↵ to advance to IN.Rd Input/Reading Submenu.
The Filter Constant Submenu allows the user to specify the number of readings stored in the Digital Averaging Filter.

Tip ☞ For PID control select filter value 0001-0004. A filter value of 2 is approximately equal to 1 second RC low pass time constant.

3.2.6 Input/Reading (Scale and Offset) Menu

Input voltage or current can be converted or scaled into values appropriate for the process or signal being measured. So, a reading may be displayed, for example, in units of weight or velocity instead of in amperes and volts.

The instrument determines Scale and Offset values based on two user-provided input values entered with the corresponding readings.
There are two methods to scale this meter to display readings in engineering units. The **first** method is to scale with known loads. Do this by applying known loads to a transducer connected to a meter, or by simulating the output of the transducer with voltage or current simulator.
The **second** method is to scale without known inputs. Do this by calculating input values based on transducer specifications and manually entering them through the front panel push-buttons.

Example 1: Scaling with Known Loads (On-Line Calibration).

Note ☞ When entering the input or reading values, disregard the position of the decimal point.

Note ☞ If ENbL Enabled Load Submenu was selected, instrument is ready for scaling with Known Loads method.

	Apply a known load equal to approximately 0% of the transducer range.
Press ↵	**17)** Press ↵ at the IN.Rd prompt. Display shows IN 1 Input 1 Submenu.
Press ↵	**18)** Display shows the actual signal being received.
Press ↵	**19)** Display advances to Rd 1 Reading 1 Submenu.
Press ↵	**20)** Display shows last stored Reading 1 value with 1st digit flashing.
Press ▲ & ▼	**21)** Use ▲ and ▼ buttons to enter Rd 1 value. This value corresponds to Input 1 in terms of some meaningful engineering units. To show Input 1 as zero percent enter Rd 1 value = 0000.
Press ↵	**22)** Display shows IN 2 Input 2 Submenu.
	Apply a known load equal to approximately 100% of the transducer range.
Press ↵	**23)** Display shows the actual signal being received.
Press ↵	**24)** Display advances to Rd 2 Reading 2 Submenu.
Press ↵	**25)** Display shows last stored Reading 1 value with 1st digit flashing.
Press ▲ & ▼	**26)** Use ▲ and ▼ buttons to enter Rd 2 value. This value corresponds to Input 2 in terms of some meaningful engineering units. To show Input 2 as 100% enter Rd 2 value = 0100.

Note ☞ This scaling method based on 2 input values entered with 2 corresponding reading. Up to 10 linearization points can be selected to customize the transducer curve. To select linearization points see “L.PNt” Submenu.

Tip ☞ Max scale should not be more than 50% FS because of noise related issues.

Press ↵ **27)** Display flashes StRd stored message momentarily and then advances to ALR1 only, if a change was made, otherwise advances to ALR1 Alarm 1 Menu.

Example 2: Scaling without Known Loads.

Tip ☞ If dSbL Disabled **Load** Submenu was selected, instrument is ready for scaling Without Known Loads method.

To scale without known inputs, calculate inputs based on transducer specifications and manually enter them on the via front panel push-buttons. The following example assumes load cells with this specification:

Maximum Load: 100.0 lb
Output: 3.0 mV/V
Sensor Excitation 10 V
Maximum Sensor Output = 3.0 (mV/V) x 10 (V) = 30 mV

1. Determine the correct values for Inputs (IN 1 and IN 2).
Calculate IN 1 and IN 2 using the following equation:

IN = (Sensor Output) x (Converison Number) x (Multiplier)

Tip ☞ Conversion number is a coefficient of conversion between input values and real full display range (10000 counts). See **Table 3.2** below for proper conversion number.

Table 3.2 Conversion Table

INPUT RANGE	CONVERSION NUMBER
0 ~ 100 mV	10000 / (100 x 1) = 100 cts/mV
0 ~ 1 V	10000 / (1000 x 1) = 10 cts/mV
0 ~ 10 V	10000 / (1000 x 10) = 1 cts/mV
0 ~ 20 mA	10000 / (20 x 1) = 500 cts/mV

Example =
0 - 1 V = 0 - 100.0
In 1 = 0
Rd 1 = 0
Inp 2 = 9999
Rd 2 = 100.0

Tip ☞ Multiplier determined by the Input Resolution setting (RESO in the INPt Menu). See **Table 3.3** below for proper multiplier.

Table 3.3 Input Resolution Multiplier

INPUT RANGE	RESOLUTION	
	LOW	HIGH
0 ~ 100 mV	1.0	10.0
0 ~ 1 V	1.0	10.0
0 ~ 10 V	1.0	10.0
0 ~ 20 mA	1.0	10.0

Determine IN 1 and IN 2 Input Range and Resolution. For our transducer select 0 ~ 100 mV range and LOW resolution (10 µV)

IN 1 = 0 (mV) X 100 (cts/mV) x 1.0 = 0
IN 2 = 30 (mV) X 100 (cts/mV) x 1.0 = 3000

2. Determine correct values for Display Reading (Rd 1 and Rd 2). In most cases, Rd 1 and Rd 2 are equal to the minimum and the maximum of the transducer output range.

Rd 1 = 0000
Rd 2 = 100.0

3. Scaling the controller.

Press ↵	**28)** Press ↵ at the IN.Rd prompt. Display shows IN 1 Input 1 Submenu.
Press ↵	**29)** Display shows last stored Input 1 value with 1st digit flashing.
Press ▲ & ▼	**30)** Use ▲ and ▼ buttons to enter IN 1 value (0000).
Press ↵	**31)** Display advances to Rd 1 only, if a change was made, otherwise press ↵ to advance to Rd 1 Reading 1 Submenu.
Press ↵	**32)** Display shows last stored Reading 1 value with 1st digit flashing.
Press ▲ & ▼	**33)** Use ▲ and ▼ buttons to enter Rd 1 value (0000).
Press ↵	**34)** Display IN 2 Input 2 Submenu.
Press ↵	**35)** Display shows last stored Input 2 value with 1st digit flashing.
Press ▲ & ▼	**36)** Use ▲ and ▼ buttons to enter IN 2 value (3000).
Press ↵	**37)** Display advances to Rd 2 only, if a change was made, otherwise press ↵ to advance to Rd 2 Reading 2 Submenu.
Press ↵	**38)** Display shows last stored Reading 2 value with 1st digit flashing.
Press ▲ & ▼	**39)** Use ▲ and ▼ buttons to enter Rd 2 value (1000).
Press ↵	**40)** Display flashes StRd stored message momentarily and then advances to ALR1 only, if a change was made, otherwise advances to ALR1 Alarm 1 Menu.

Note ☞ This scaling method based on 2 input values entered with 2 corresponding reading. Up to 10 linearization points can be selected to customize the transducer curve. To select linearization points see “L.PNt” Submenu.

Example 3: Scaling with Current/Voltage Transducer (Process) Input.

The following example include details for a specific scenario in which a 4 - 20 mA input is to be represented as a measurement of 0 - 100 percent.

Press ↵ **41)** Press ↵ at the IN.Rd prompt. Display shows IN 1 Input 1 Submenu.
Press ↵ **42)** Display shows Input 1 value with 1st digit flashing.
Press ▲ & ▼ **43)** Use ▲ and ▼ buttons to enter IN 1 value.

The IN 1 value = min. input value x conversion number from Table 3.1
Enter 4 mA as 4 (mA) x 500 = 2000

Press ↵ **44)** Display advances to Rd 1 Reading 1 Submenu.
Press ▲ & ▼ **45)** Use ▲ and ▼ buttons to enter Rd 1 value.

This value corresponds to Input 1 in terms of some meaningful engineering units. To show 4 mA as zero percent enter Rd 1 value = 0000.

Press ↵ **46)** Display IN 2 Input 2 Submenu.
Press ↵ **47)** Display shows IN 2 Input 2 value with 1st digit flashing.

The IN 2 value = max. input value x conversion number from Table 3.1
Enter 20 mA as 20 (mA) x 500 = 10000 (entered as 9999)

Press ▲ & ▼ **48)** Use ▲ and ▼ buttons to enter IN 2 value.
Press ↵ **49)** Display advances to Rd 2 Reading 2 Submenu.
Press ▲ & ▼ **50)** Use ▲ and ▼ buttons to enter Rd 2 value.

To show 20 mA as 100 percent enter Rd 2 value = 0100

Press ↵ **51)** Display flashes StRd stored message momentarily and then advances to ALR1 only, if a change was made, otherwise advances to ALR1 Alarm 1 Menu.

3.2.7 Alarm 1 Menu

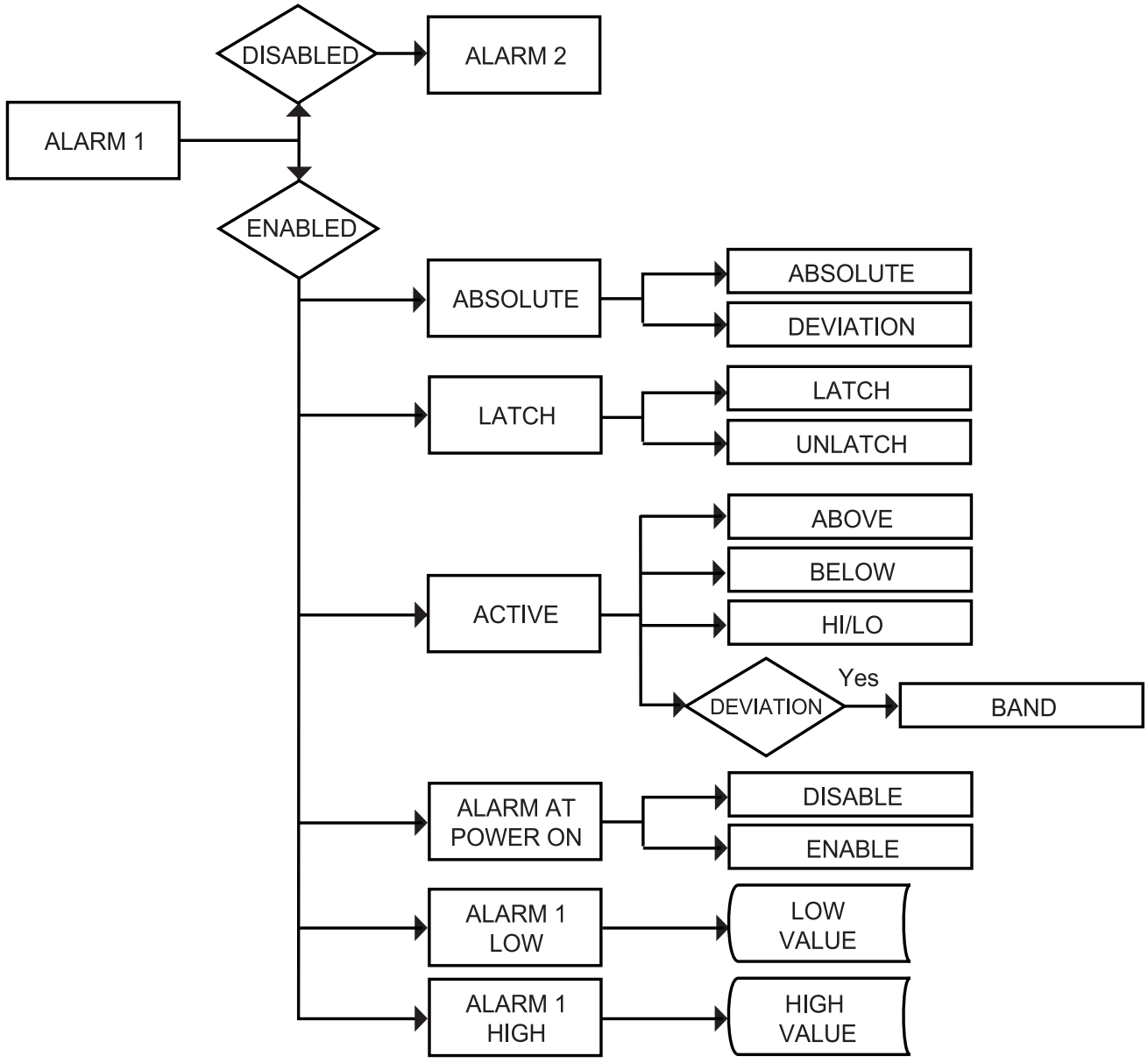


Figure 3.5 Flow Chart for Alarm 1

ENTER ALARM 1 MENU:

Press ⟲ **1)** Press ⟲, if necessary, until CNFG prompt appears.
Press ⟳ **2)** Display advances to INPt Input Menu.
Press ⟲ **3)** Press ⟲, if necessary, until Display advances to ALR1 Alarm 1 Menu.
Press ⟳ **4)** Display advances to Alarm 1 EnbL Enable or dSbL Disable Submenu and flashes the previous selection.

ALARM 1 ENABLE/DISABLE SUBMENU:

Press ▲ **5)** Scroll though the available selection until ENbL displays to use Alarm 1.

Press ↵ **6)** Display shows StRd stored message momentarily and then advances to AbSo only if it was changed, otherwise press ↵ to advance to AbSo Alarm 1 Absolute/Deviation Submenu.

Note ☞ If dSbL Alarm 1 **Disabled** was selected, all submenus of Alarm 1 Menu will be skipped and meter advances to ALR2 Alarm 2 Menu. If ENbL Alarm 1 **Enabled** was selected, Output 1 would be automatically Disabled, and reassigned as Alarm 1.

ALARM 1 ABSOLUTE/DEVIATION SUBMENU:

Press ↵ **7)** Display flashes previous selection. Press ▲ to AbSo Absolute or _dEV Deviation.

Press ↵ **8)** Display shows StRd stored message momentarily and then advances to LtcH only if it was changed, otherwise press ↵ to advance to LtcH Alarm 1 Latch/Unlatch Submenu.

Absolute Mode allows Alarm 1 to function independently from Setpoint 1. If the process being monitored does not change often, then "Absolute" Mode is recommended.

Deviation Mode allows changes to Setpoint 1 to be made automatically to Alarm 1. Deviation mode is typically the ideal mode if the process value changes often. In Deviation Mode, set Alarm 1 a certain number of degrees or counts away from Setpoint 1 — this relation remains fixed even if Setpoint 1 is changed.

ALARM 1 LATCH/UNLATCH SUBMENU:

Press ↵ **9)** Display flashes previous selection. Press ▲ to LtcH Latched or UNLt Unlatched.

Press ↵ **10)** Display shows StRd stored message momentarily and then advances to Ct.CL only, if it was changed, otherwise press ↵ to advance to Ct.CL Contact Closure Submenu.

Latched Mode: Relay remains "latched" until reset. To reset already latched alarm, select Alarm Latch and press ▲ twice (i.e. Unlatch and then back to Latch) or from a Run Mode, push ↵ twice to put the controller in Standby Mode and then push ↵ one more time to return to the Run Mode.

Unlatched Mode: Relay remains latched only as long as the alarm condition is true.

ACTIVE SUBMENU:

Press ↵ **11)** Display flashes previous selection. Press ▲ to scroll through the available selections: AboV Above, bELo Below, HI.Lo HI/Low and bAnd Band. (Band is active if _dEV Deviation was selected).

Press ↵ **12)** Display shows StRd stored message momentarily and then advances to A.P.oN only if it was changed, otherwise press ↵ to advance to A.P.oN Alarm Enable/Disable at Power On Submenu.

Above: Alarm 1 condition triggered when the process variable is greater than the Alarm Hi Value (Low value ignored).

Below: Alarm 1 condition triggered when the process variable is less than the Alarm Low Value (Hi value ignored).

Hi/Low: Alarm 1 condition triggered when the process variable is less than the Alarm Low Value or above the Hi Value.

Band: Alarm 1 condition triggered when the process variable is above or below the "band" set around Setpoint 1. Band equals Hi Value (Low Value ignored). A "band" is set around the Setpoint by the instrument only in the "Deviation" Mode.

ALARM ENABLE/DISABLE AT POWER ON:

Press ↵ **15)** Display flashes previous selection. Press ▲ to ENbL enable or dSbL disable.

Press ↵ **16)** Display shows StRd stored message. momentarily and then advances to ALR.L only if it was changed, otherwise press ↵ to advance to the ALR.L Alarm 1 Low Value Submenu.

Note ☞ If the alarm is enabled at Power On, the alarm will be active right after reset. If the alarm is disabled at Power On, the alarm will become enabled when the process value enters the non alarm area. The alarm is not active while the process value is approaching Setpoint 1.

ALARM 1 LOW VALUE SUBMENU:

Press ↵ **17)** Display flashes 1st digit of previous value. Use ▲ and ▼ to enter new value.

Press ▲ & ▼ **18)** Use ▲ and ▼ to enter Alarm 1 Low Value.

Press ↵ **19)** Display shows StRd storage message momentarily and then advances to ALR.H only, if it was changed, otherwise press ↵ to advance to ALR.H Alarm 1 Hi Value Submenu.

ALARM 1 HI VALUE SUBMENU:

Press ↵ **20)** Display flashes 1st digit of previous value. Use ▲ and ▼ to enter new value.

Press ▲ & ▼ **21)** Use ▲ and ▼ to enter Alarm1 Hi Value.

Press ↵ **22)** Display shows StRd stored message momentarily and then advances to the next menu only, if it was changed, otherwise press ↵ to advance to the next menu.

Note ☞ If the input wires of the meter get disconnected or broken, it will display **+ OL** Input (+) Overload message. For safety purposes you can set up your alarm to be triggered when input is open.

3.2.8 Alarm 2

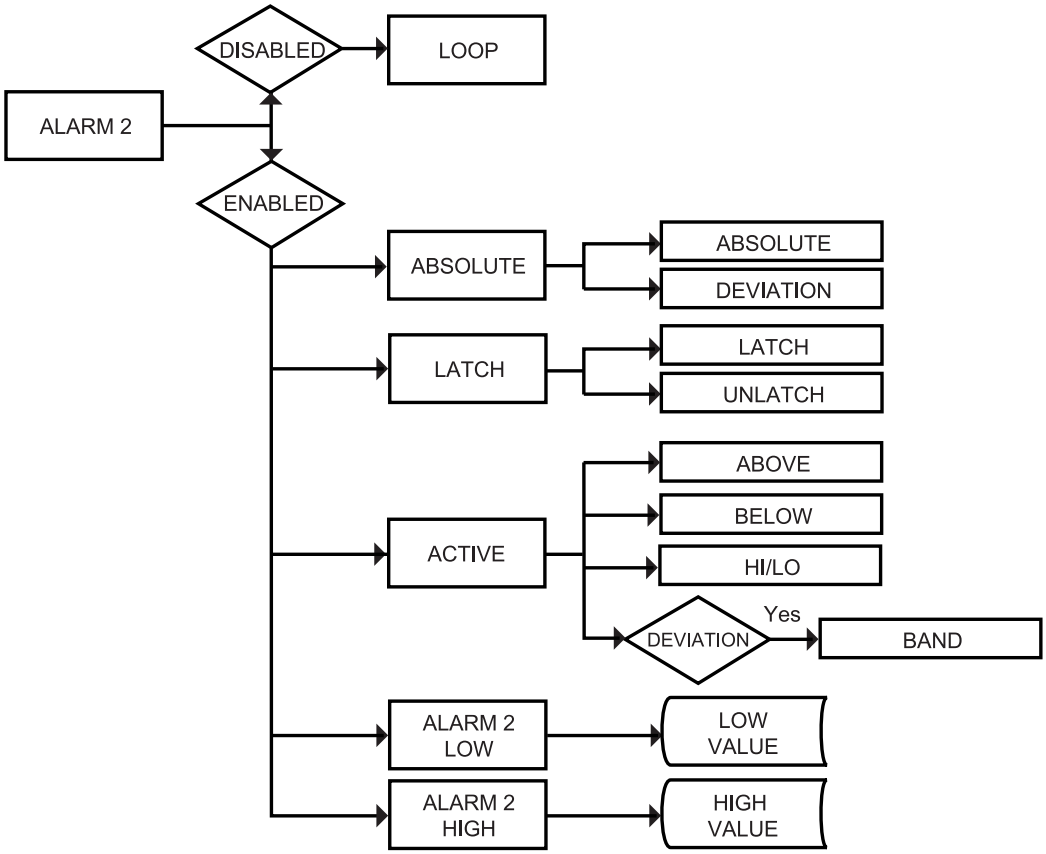


Figure 3.6 Flow Chart for Alarm 2

ENTER ALARM 2 MENU:

Press ⊙ **1)** Press ⊙, if necessary, until CNFG prompt appears.
Press ⊙ **2)** Display advances to INPt Input Menu.
Press ⊙ **3)** Press ⊙, if necessary, until Display advances to ALR2 Alarm 2 Menu.
Press ⊙ **4)** Display advances to Alarm 2 ENbL Enable or dSbL Disable Submenu.

ALARM 2 ENABLE/DISABLE SUBMENU:

Press ⊙ **5)** Display flashes previous selection. Press ▲ until ENbL displays to use Alarm 2.
Press ⊙ **6)** Display shows StRd stored message momentarily and then advances to AbSo only if it was changed, otherwise press ⊙ to advance to AbSo Absolute/Deviation Submenu.

If dSbL Alarm 2 **Disabled** was selected, all submenus of Alarm 2 will be skipped and meter advances to LOOP Loop Break Time Menu.

Note ☞ The remaining Alarm 2 menu items are identical to Alarm 1 Menu. Modifying Alarm Settings will not reset the instrument.

3.2.9 Reading Adjust Menu

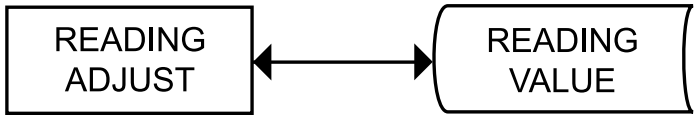


Figure 3.7 Flow Chart for Reading Adjust Menu

ENTER READING ADJUST MENU:

Press ⟲ **1)** Press ⟲, if necessary, until CNFG prompt appears.
Press ⏎ **2)** Display advances to INPt Input Menu.
Press ⟲ **3)** Press ⟲, if necessary, until Display advances to R.AdJ Reading Adjust Menu.

READING ADJUST VALUE SUBMENU:

Press ⏎ **4)** Display flashes 1st digit of previous Reading Adjust value.
Press ▲ & ▼ **5)** Press ▲ and ▼ buttons to enter a new Reading Adjust value (-1999 to 9999).
Press ⏎ **6)** Display shows StRd stored message momentarily and then advances to SP.dV Setpoint Deviation Menu.

Reading Offset Adjust allows the user to fine tune a minor error of the transducer, however some applications may require a large offset adjust. (Displayed Process Value = Measured Process Value ±R.ADJ). Reading Adjust value is adjustable between -1999 to 9999.

3.2.10 Setpoint Deviation Menu

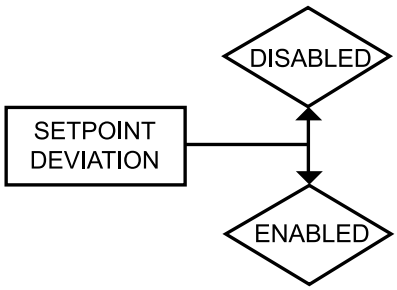


Figure 3.8 Flow Chart for Setpoint Deviation Menu

ENTER SETPOINT DEVIATION MENU:

Press ⟲ **1)** Press ⟲, if necessary, until CNFG prompt appears.
Press ↵ **2)** Display advances to INPt Input Menu.
Press ⟲ **3)** Press ⟲, if necessary, until Display advances to SP.dV Setpoint Deviation Menu.

SETPOINT DEVIATION ENABLE/DISABLE SUBMENU:

Press ↵ **4)** Display advances to Setpoint Deviation ENbL Enable or dSbL. Disable Submenu and flashes the previous selection.
Press ▲ **5)** Scroll through the available selections: ENbL or dSbL.
Press ↵ **6)** Display shows StRd stored message momentarily and then advances to the next menu item.

Setpoint Deviation menu, if “enabled”, allows changes to Setpoint 1 to be made automatically to Setpoint 2. This mode is very helpful if the Process Value changes often. In Setpoint Deviation Mode, set SP2 a certain number of counts away from SP1 - this relation remains fixed when SP1 is changed. For instance: Setting SP1=200 and SP2=20 and enabling SP.dV means that the absolute value of SP2=220. Moving SP1 to 300, the absolute value of SP2 becomes 320.

3.2.11 ID CODE

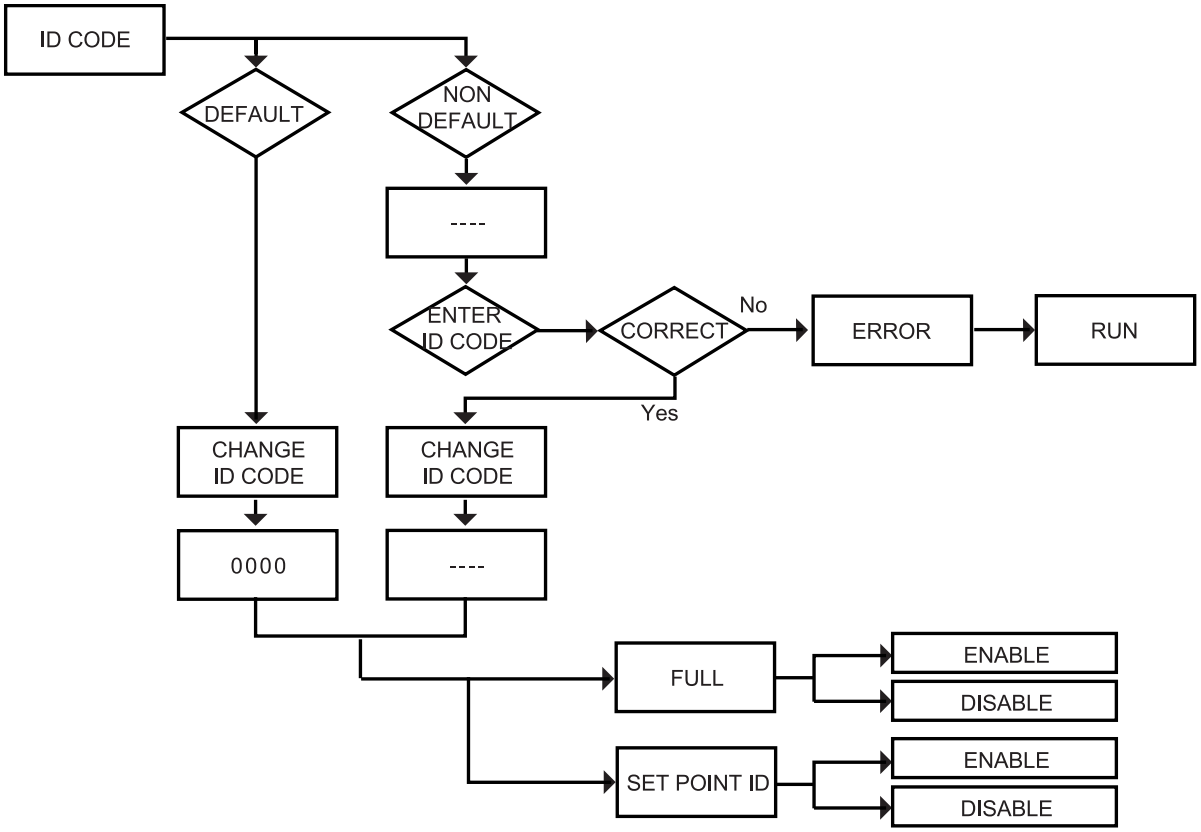


Figure 3.9 Flow Chart for ID Code

ENTER ID CODE MENU:

Press ⏎ **1)** Press ⏎, if necessary, until CNFG prompt appears.
Press ⏎ **2)** Display advances to INPt Input Menu.
Press ⏎ **3)** Press ⏎, if necessary, until Display advances to Id ID Code Menu.

ENTERING OR CHANGING YOUR (NON-DEFAULT) ID CODE:

Press ⏎ **4)** Display advances to ____ with 1st under score flashing.
Press ▲ & ▼ **5)** Press ▲ and ▼ to enter your 4-digit "ID Code" number.
Press ⏎ **6)** Display advances to CH.Id Change ID Code Submenu.

Note ☞ If entered "ID Code" is incorrect display shows ERRo Error message momentarily and then skips to the Run Mode.

Press ⏎ **7)** Display flashes the first digit of previous entered "ID Code" number.
Press ▲ & ▼ **8)** Press ▲ and ▼ buttons to enter your new "ID Code" number.
Press ⏎ **9)** Display shows StRd stored message momentarily and then advances to the FULL Full Security Submenu.

ENTERING OR CHANGING YOUR (DEFAULT) ID CODE:

Enter Id menu (Repeat steps from 1 to 3).

Press ↵ **10)** Display advances to CH.Id Change ID Code Submenu.
Press ↵ **11)** Display shows 0000 message with flashing 1st digit.

Note ☞ If you want to change your default “ID Code” you can do it now, otherwise press ↵ and menu will skip to FULL Full Security Submenu.

Press ▲ & ▼ **12)** Press ▲ and ▼ buttons to enter your new “ID Code” number.
Press ↵ **13)** Display shows StRd stored message momentarily and then advances to the FULL Full Security Submenu.

FULL SECURITY LEVEL SUBMENU:

Press ↵ **14)** Display flashes ENbL Enable or dSbL Disable.
Press ▲ **15)** Scroll through the available selections: “Enable” or “Disable”.
Press ↵ **16)** Display shows StRd stored message momentarily and then advances to SP.Id Setpoint/ID Submenu.

Note ☞ If "Full" Security Level is "Enabled" and the user attempts to enter the Main Menu, they will be prompted for an ID Code. The ID Code should be correct to enter the instrument Menu item.

SETPOINT/ID SECURITY LEVEL SUBMENU:

Note ☞ This Security Level can be functional only if FULL Security Level is Disabled.

Press ↵ **17)** Display flashes ENbL Enable or dSbL Disable.
Press ▲ **18)** Scroll through the available selections: “Enable” or “Disable”.
Press ↵ **19)** Display shows StRd stored message momentarily and then advances to COMM Communication Submenu.

Note ☞ If **"Setpoint/ID"** Security Level is **"Enabled"** and the user attempts to advance into the CNFG Configuration Menu, he will be prompted for ID Code number. The ID Code should be correct to proceed into the Configuration Menu, otherwise display will show an Error and skip to the Run Mode.

Note ☞ If **“Full”** and **“Setpoint/ID”** Security Levels are "**Disabled**", the ID code will be “Disabled” and user will not be asked for ID Code to enter the Menu items (“ID” Submenu will not show up in “ID/Setpoint” Menu).

3.2.12 COMMUNICATION OPTION

Purchasing the controller with Serial Communications permits an instrument to be configured or monitored from an IBM PC compatible computer using software available from **the website listed on the cover page of this manual or on the CD-ROM enclosed with your shipment**.
For complete instructions on the use of the Communications Option, refer to the Serial Communications Reference Manual.

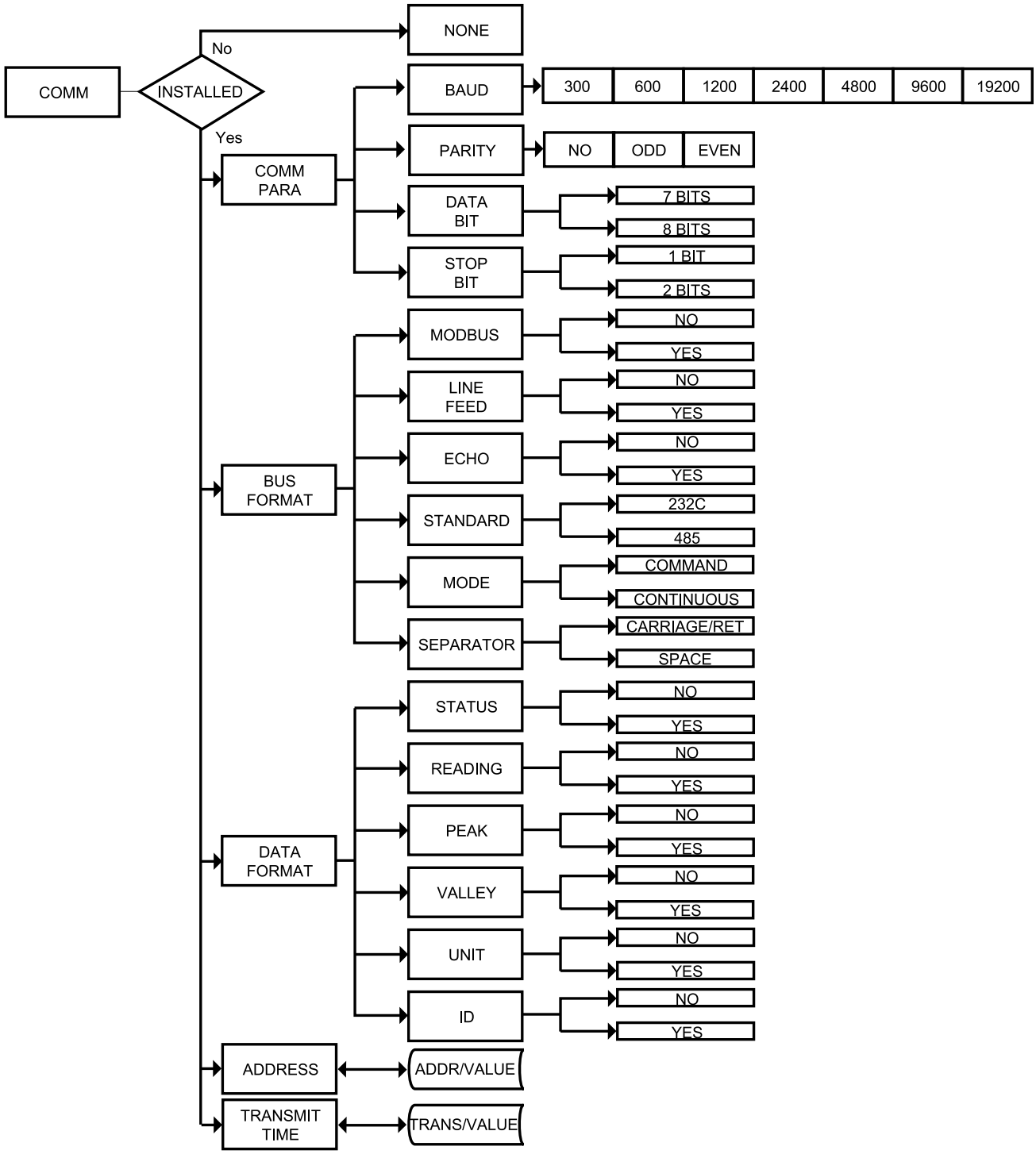


Figure 3.10 Flow Chart for Communication Option

ENTER COMMUNICATION OPTION MENU:

Press ⟲ **1)** Press ⟲, if necessary, until CNFG prompt appears.
Press ⟳ **2)** Display advances to INPt Input Menu.
Press ⟲ **3)** Press ⟲, if necessary, until Display advances to COMM Communication Options Menu.
Press ⟳ **4)** Display advances to C.PAR Communication Parameters Submenu.

Note ☞ If Communication Option is not installed, the display shows NONE and skips to the Color Display Menu.

COMMUNICATION PARAMETERS SUBMENU:

Allows the user to adjust Serial Communications Settings of the instrument. When connecting an instrument to a computer or other device, the Communications Parameters must match. Generally the default settings (as shown in **Section 5**) should be utilized.

Press ⟳ **5)** Display advances to bAUd Baud Submenu.

BAUD SUBMENU:

Press ⟳ **6)** Display flashes previous selection for bAUd value.
Press ⟰ **7)** Scroll through the available selections: 300, 600, 1200, 2400, 4800, 9600, 19.2K.
Press ⟳ **8)** Display shows StRd stored message momentarily and then advances to PRtY only, if it was changed, otherwise press ⟲ to advance to PRtY Parity Submenu.

PARITY SUBMENU:

Press ⟳ **9)** Display flashes previous selection for “Parity”.
Press ⟰ **10)** Scroll through the available selections: NO, ODD, EVEN.
Press ⟳ **11)** Display shows StRd stored message momentarily and then advances to dAtA only, if it was changed, otherwise press ⟲ to advance to dAtA Data Bit Submenu.

DATA BIT SUBMENU:

Press ⟳ **12)** Display flashes previous selection for “Data Bit”.
Press ⟰ **13)** Scroll through the available selections: 7-BIT, 8-BIT.
Press ⟳ **14)** Display shows StRd stored message and then advances to StOP only, if it was changed, otherwise press ⟲ to advance to StOP Stop Bit Submenu.

STOP BIT SUBMENU:

Press ↵ **15)** Display flashes previous selection for “Stop Bit”.
Press ▲ **16)** Scroll through the available selections: 1-BIT, 2-BIT.
Press ↵ **17)** Display shows StRd stored message momentarily and then advances to bUS.F only, if it was changed, otherwise press ↵ to advance to bUS.F Bus Format Submenu.

BUS FORMAT SUBMENU:

Determines Communications Standards and Command/Data Formats for transferring information into and out of the controller via the Serial Communications Bus. Bus Format submenus essentially determine how and when data can be accessed via the Serial Communications of the device.

Press ↵ **18)** Display advances to M.bUS Modbus Submenu.

MODBUS PROTOCOL SUBMENU:

Press ↵ **19)** Display flashes previous selection for M.bUS.
Press ▲ **20)** Scroll through the available selections: NO, YES.
Press ↵ **21)** Display shows StRd stored message momentarily and then advances to _LF_ only, if it was changed, otherwise press ↵ to advance to _LF_ Line Feed submenu.

Note ☞ To select iSeries Protocol, set Modbus submenu to “No”.
To select Modbus Protocol, set Modbus submenu to “Yes”.

Note ☞ If Modbus Protocol was selected, the following Communications Parameters must be set as: No Parity, 8-bit Data Bit, 1-Stop Bit. Do not attempt to change these parameters.

LINE FEED SUBMENU:

Determines if data sent from the instrument will have a Line Feed appended to the end - useful for viewing or logging results on separate lines when displayed on communications software at a computer.

Press ↵ **22)** Display flashes previous selection for “Line Feed”.
Press ▲ **23)** Scroll through the available selections: NO, YES.
Press ↵ **24)** Display shows StRd stored message momentarily and then advances to ECHO only, if it was changed, otherwise press ↵ to advance to ECHO Echo Submenu.

ECHO SUBMENU:

When valid commands are sent to the instrument, this determines whether the command will be echoed to the Serial Bus. Use of echo is recommended in most situations, especially to help verify that data was received and recognized by the controller.

Press ↵ **25)** Display flashes previous selection for “Echo”.
Press ▲ **26)** Scroll through the available selections: NO, YES.
Press ↵ **27)** Display flashes StRd stored message momentarily and then advances to StNd only if it was changed, otherwise press ↵ to advance to StNd Communication Standard Submenu.

COMMUNICATION INTERFACE STANDARD SUBMENU:

Determines whether device should be connected to an RS-232C serial port (as is commonly used on IBM PC-compatible computers) or via an RS-485 bus connected through appropriate RS-232/485 converter. When used in RS-485 Mode, the device must be accessed with an appropriate Address Value as selected in the Address Submenu described later.

Press ↵ **28)** Display flashes previous selection for “Standard”.
Press ▲ **29)** Scroll through the available selections: 232C, 485.
Press ↵ **30)** Display shows StRd stored message momentarily and then advances to ModE only, if it was changed, otherwise press ↵ to advance to ModE Data Flow Mode Submenu.

DATA FLOW MODE SUBMENU:

Determines whether the instrument will wait for commands and data requests from the Serial Bus or whether the instrument will send data automatically and continuously to the Serial Bus. Devices configured for the RS-485 Communications Standard operate properly only under Command Mode.

Press ↵ **31)** Display flashes previous selection for “Mode”.
Press ▲ **32)** Scroll through the available selections: CMd_ “Command”, CoNt “Continuous”.
Press ↵ **33)** Display shows StRd stored message momentarily and then advances to SEPR only, if it was changed, otherwise press ↵ to advance to SEPR Data Separation Submenu.

DATA SEPARATION CHARACTER SUBMENU:

Determines whether data sent from the device in Continuous Data Flow Mode will be separated by spaces or by Carriage Returns.

Press ↵ **34)** Display flashes previous selection for “Separation” Submenu.
Press ▲ **35)** Scroll through the available selections: SPCE “Space” or _cR_ “Carriage Return”.
Press ↵ **36)** Display shows StRd stored message momentarily and then advances to dAt.F only, if it was changed, otherwise press ↵ to advance to dAt.F Data Format Submenu.

DATA FORMAT SUBMENU:

Preformatted data can be sent automatically or upon request from the controller. Use the Data Format Submenus to determine what data will be sent in this preformatted data string. Refer to the ***Communications Manual*** for more information about the data format. At least one of the following suboptions must be enabled and hence output data to the Serial Bus.

Note ☞ This menu is applicable for Continuous Mode of RS-232 communication.

Press ↵ **37)** Display advances to **StAt** Alarm Status Submenu.

ALARM STATUS SUBMENU:

Includes Alarm Status bytes in the data string.

Press ↵ **38)** Display flashes previous selection for “Status” (alarm status).
Press ▲ **39)** Scroll through the available selections: NO, YES.
Press ↵ **40)** Display shows **StRd** stored message momentarily and then advances to **RdnG** only, if it was changed, otherwise press ↵ to advance to **RdnG** Reading Submenu.

MAIN READING SUBMENU:

Includes Main Reading in the data string.

Press ↵ **41)** Display flashes previous selection for “Reading”.
Press ▲ **42)** Scroll through the available selections: NO, YES.
Press ↵ **43)** Display shows **StRd** stored message momentarily and then advances to **PEAK** only, if it was changed, otherwise press ↵ to advance to **PEAK** Peak Submenu.

PEAK VALUE SUBMENU:

Includes Peak Value in the data string.

Press ↵ **44)** Display flashes previous selection for **PEAK** Submenu.
Press ▲ **45)** Scroll through the available selections: NO, YES.
Press ↵ **46)** Display shows **StRd** stored message momentarily and then advances to **GROS** only, if it was changed, otherwise press ↵ to advance to **GROS** Gross Submenu.

GROSS VALUE SUBMENU:

Includes Gross Value in the data string.

Press ↵ **47)** Display flashes previous selection for “Gross”.
Press ▲ **48)** Scroll through the available selections: NO, YES.
Press ↵ **49)** Display shows **StRd** stored message momentarily and then advances to **UNIt** only, if it was changed, otherwise press ↵ to advance to **UNIt** Temperature Unit Submenu.

UNIT SUBMENU: (not applicable)

Press ↵ **50)** Display flashes previous selection for UNIt.
Press ▲ **51)** Scroll through the available selections: NO, YES.
Press ↵ **52)** Display shows StRd stored message momentarily and then advances to AddR only, if it was changed, otherwise press ↵ to advance to AddR Address Setup Submenu.

ADDRESS SETUP SUBMENU:

Note ☞ This menu is applicable to the RS-485 Option only.

Press ↵ **53)** Display advances to “Address Value” (0000 to 0199) Submenu.

ADDRESS VALUE SUBMENU:

Press ↵ **54)** Display flashes 1st digit of previously stored Address Value.
Press ▲ & ▼ **55)** Press ▲ and ▼ to enter new “Address Value”.
Press ↵ **56)** Display shows StRd stored message momentarily and then advances to tR.tM only, if it was changed, otherwise press ↵ to advance to tR.tM Transmit Time Interval Submenu.

TRANSMIT TIME INTERVAL SUBMENU:

Note ☞ This menu is applicable if “Continuous” Mode was selected in the “Data Flow Mode” Submenu and the device is configured as an RS-232C Standard device. Also, one or more options under the Data Format Submenu must be enabled.

Press ↵ **57)** Display advances to “Transmit Time Value” Submenu.

TRANSMIT TIME INTERVAL VALUE SUBMENU:

Determines the interval at which data will be emitted to the RS-232 Serial Bus when the instrument is in Continuous Data Flow Mode.

Press ↵ **58)** Display flashes 1st digit of previous “Transmit Time Value” in seconds.
Press ▲ & ▼ **59)** Press ▲ and ▼ to enter new “Transmit Time Value”, e.g. 0030 will send the data every 30 seconds in Continuous Mode.
Press ↵ **60)** Display shows StRd stored message momentarily and then advances to COLR only, if it was changed, otherwise press ↵ to advance to COLR Color Display Selection Menu.

Note ☞ **For more details, refer to the Communication Manual available at the website listed in the cover page of this manual or on the CD-ROM enclosed with your shipment.**

3.2.13 DISPLAY COLOR SELECTION

This submenu allows the user to select the color of the display.

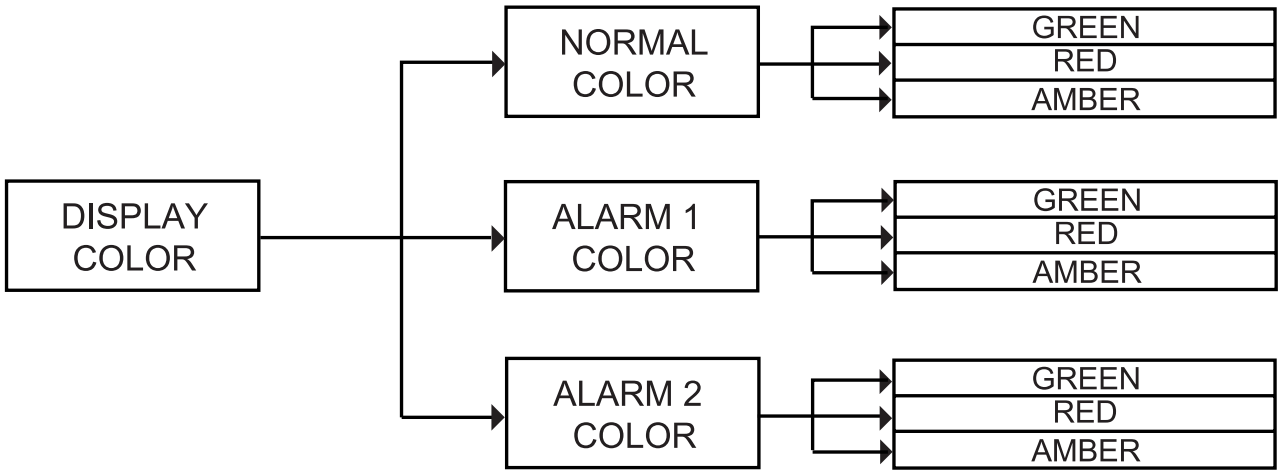


Figure 3.11 Flow Chart for Display Color Selection

ENTER DISPLAY COLOR SELECTION MENU:

Press ⟲ **1)** Press ⟲, if necessary, until CNFG prompt appears.
Press ⏎ **2)** Display advances to INPt Input Menu.
Press ⟲ **3)** Press ⟲, if necessary, until Display advances to COLR Display Color Selection Menu.
Press ⏎ **4)** Display advances to N.CLR Normal Color Submenu.

NORMAL COLOR DISPLAY SUBMENU:

Press ⏎ **5)** Display flashes the previous selection for “Normal Color”.
Press ▲ **6)** Scroll through the available selections: GRN, REd or AMbR.
Press ⏎ **7)** Display shows StRd stored message momentarily and then advances to 1.CLR only, if it was changed, otherwise press ⟲ to advance to 1.CLR Alarm 1 Display Color Submenu.

The menu below allows the user to change the color of display when alarm is triggered.

ALARM 1 DISPLAY COLOR SUBMENU:

Press ⏎ **8)** Display flashes previous selection for “Alarm 1 Color Display”.
Press ▲ **9)** Scroll through the available selections: GRN, REd or AMbR.
Press ⏎ **10)** Display shows StRd stored message momentarily and then advances to 2.CLR only, if it was changed, otherwise press ⟲ to advance to 2.CLR Alarm 2 Display Color Submenu.

ALARM 2 DISPLAY COLOR SUBMENU:

Press ↵ **11)** Display flashes previous selection for “Alarm 2 Color Display”.
Press ▲ **12)** Scroll through the available selections: GRN, REd or AMbR.
Press ↵ **13)** Display shows StRd stored message momentarily and then momentarily shows the software version number, followed by RSt Reset, and then proceeds to the Run Mode.

Tip ☞ IN ORDER TO DISPLAY ONE COLOR, SET THE SAME DISPLAY COLOR ON ALL THREE SUBMENUS ABOVE.

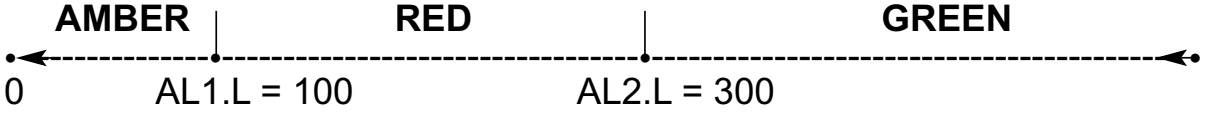
Note ☞ If user wants the Display to change color every time when both Alarm 1 and Alarm 2 are triggered, the Alarm values should be set in such a way that Alarm 1 value is always on the top of Alarm 2 value, otherwise value of Alarm 1 will overwrite value of Alarm 2 and Display Color would not change when Alarm 2 is triggered.

Example 1:
Output 1 & Output 2 = SSR
Alarm Setup: Absolute, Above, Alarm 2 HI Value “ALR.H” = 200, Alarm 1 HI Value “ALR.H” = 400
"Color Display" Setup: Normal Color “N.CLR” = Green, Alarm 1 Color “1.CLR” = Amber, Alarm 2 Color “2.CLR” = Red

Display Colors change sequences:

Example 2:
Output 1 & Output 2 = Pulse
Alarm Setup: Absolute, Below, Alarm 2 Low Value “ALR.L” = 300, Alarm 1 Low Value “ALR.L” = 100
Color Display Setup: "N.CLR" = Green, "1.CLR" = Amber, "2.CLR" = Red

Display Colors change sequences:



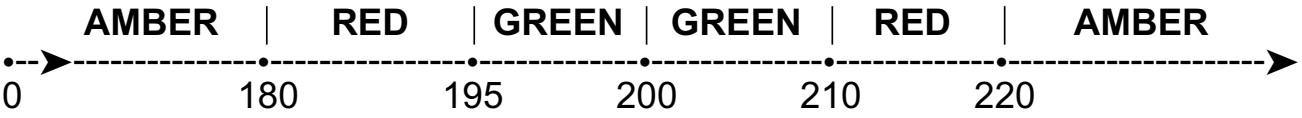
Example 3:
Output 1 = Analog Output (Alarm 1 disabled), Setpoint 1 = 300,
Output 2 = Relay, Setpoint 2 = 200
Alarm 1 & 2 Setup: Deviation, Band, “ALR.H” = 10
Color Display Setup: “N.CLR” = Green, “1.CLR” = Amber, “2.CLR” = Red

Display Colors change sequences:

Tip ☞ Alarm 1 is designed to monitor the Process Value around the Setpoint 1.
Alarm 2 is designed to monitor the Process Value around the Setpoint 2.

Example 4:
Output 1 = Relay, Setpoint 1 = 200
Output 2 = Relay, Setpoint 2 = 200
Alarm 1 Setup: Deviation, Band, “ALR.H” = 20
Alarm 2 Setup: Deviation, Hi/Low, “ALR.H” = 10, “ALR.L” = 5
Color Display Setup: “N.CLR” = Green, “1.CLR” = Amber, “2.CLR” = Red

Display colors change sequences:



Note ☞ **Reset:** The instrument automatically resets after the last menu of the Configuration Mode has been entered. After the instrument resets, it advances to the Run Mode.

PART 4
SPECIFICATIONS

Accuracy at 25ºC
±0.5ºC temp nominal
0.03% rdg ±0.03% range process and strain

Resolution
10 / 1 µV

Temperature Stability
50 ppm/°C

NMRR
60 dB

CMRR
120 dB

A/D Conversion
Dual slope

Reading Rate
3 samples per second

Digital Filter
Programmable

Display
4-digit or 6-digit, 7-segment LED
57.2 mm (2.25") or 101.6mm (4.00”)
red, green and amber programmable colors for process variable and set points

Warm up to Rated Accuracy
60 min.

INPUT
Input Types
Analog Voltage, Analog Current

Voltage Input
0 to 100 mV, 0 to 1 V (±100 mV), 0 to 10 Vdc

Input Impedance
10 MΩ for 100 mV
1 MΩ for 1V or 10 Vdc

Current Input
0 to 20 mA (5 ohm load)

Linearization Points
Up to 10 Linearization Points

Configuration
Single-ended

Polarity
Unipolar

Step Response
0.7 sec for 99.9%

Decimal Selection
None, 0.1, 0.01 or 0.001

Setpoint Adjustment
-1999 to 9999 counts

Span Adjustment
0.001 to 9999 counts

Offset Adjustment
-1999 to 9999

NETWORK AND COMMUNICATIONS (Optional -C24, -C4EI, not available with excitation)
Ethernet: Standards Compliance IEEE 802.3 10Base-T
Supported Protocols: TCP/IP, ARP, HTTPGET

RS-232/RS-422/RS-485/MODBUS: Selectable from menu; both ASCII and modbus protocol selectable from menu. Programmable 300 to 19.2 K baud; complete programmable setup capability; program to transmit current display, alarm status, min/max, actual measured input value and status..

RS-485
Addressable from 0 to 199

Connection
Screw terminals

ALARM 1 & 2
Programmable to Display Color Change

Operation
High/low, above/below, band, latch/unlatch, normally open/normally closed and process/deviation; front panel configurations

EXCITATION (optional in place of Communication)
5 Vdc @ 40 mA
10 Vdc @ 60 mA

INSULATION
Power to Input/Output
2500 Vac per 1 minute test
(RS-232/485, Input or Output)
Between Inputs
500 Vac per 1 minute test

Approvals
See Approval Section

GENERAL

Power
100-240 Vac +/-10%, 50/60 Hz
22.5 W

Environmental Conditions
0 to 40°C (32 to 104°F),
90% RH non-condensing

Installation Category
II per EN61010-1

Equipment Class
II per EN61010-1

Pollution Degree
2 per EN61010-1

Protection
NEMA-4x (IP65) front bezel

Dimensions
Refer to Quickstart Specifications.

Weight
Refer to Quickstart Specifications.

PART 5
FACTORY PRESET VALUES

Table 5.1 Factory preset value

MENU ITEMS	FACTORY PRESET VALUES	NOTES
Set Point 1 (SP1)	000.0	
Set Point 2 (SP2)	000.0	
Input:		
Input Type (INPT)	0 to 100 mV (0 - 0.1)	
Ratiometric operation (RTIO)	Enable (ENBL)	
Display Resoultion (RESO)	Low (LO)	
▲ Button	Peak (PEAK)	
Reading Configuration (RDG):		
Decimal Point (DEC.P)	FFF.F	
Linearization Point (L.PNT)	0002	
Filter value (FLTR)	0004	
Input/Reading (IN.RD) Scale and Offset	0-100 mV = 0-9999	
Alarm 1 & 2:		
Alarm 1 (ALR1), Alarm 2 (ALR2)	Disable (DSBL)	
Absolute/Deviation (ABSO/DEV)	Absolute (ABSO)	
Latch/Unlatch (LTCH/UNLT)	Unlatch (UNLT)	
Contact Closure (CT.CL)	Normally Open (N.O.)	
Active (ACTV)	Above (ABOV)	
Alarm At Power On (A.P.ON)	Disable (DSBL)	Alarm 1 only
Alarm Low (ALR.L)	-100.0	
Alarm High (ALR.H)	400.0	
Setpoint Deviation:		
Set Point Deviation	Disable (DSBL)	
ID:		
ID Value	0000	
Full ID (FULL)	Disable (DSBL)	
Set Point ID (ID.SP)	Disable (DSBL)	

Table 5.1 Factory preset value (continued)

MENU ITEMS	FACTORY PRESET VALUES	NOTES
Communication Parameters:		
Baud Rate (BAUD)	9600	
Parity (PRTY)	Odd	
Data bit (DATA)	7 bit	
Stop Bit	1 bit	
Modbus Protocol (M.BUS)	No	
Line Feed (LF)	No	
Echo (ECHO)	Yes	
Standard Interface (STND)	RS-232 (232C)	
Command Mode (MODE)	Command (CMD)	
Separation (SEPR)	Space (SPCE)	
Alarm Status (STAT)	No	
Reading (RDNG)	Yes	
Peak	No	
Gross (GROS)	No	
Units (UNIT)	No	
Multipoint Address (ADDR)	0001	
Transmit Time (TR.TM)	0016	
Display Color (COLR):		
Normal Color (N.CLR)	Green (GRN)	
Alarm 1 Color (1.CLR)	Red (RED)	
Alarm 2 Color (2.CLR)	Amber (AMBR)	

APPROVAL INFORMATION

1. Electromagnetic Compatibility (EMC)

This device conforms with requirements of EMC Directive 89/336/EEC, amended by 93/68/EEC. This instrument complies with the following EMC Immunity Standards as tested per EN 50082-2, 1995 (Industrial environment)

Phenomena	Test Specification	Basic Standard
Electrostatic Discharge	+/- 4 kV contact discharge +/- 8 kV air discharge	IEC 1000-4-2 Performance Criteria B
Radio Frequency electromagnetic field.	27 - 1000 MHz 10 V/m 80% AM (1 KHz)	IEC 1000-4-3 Performance Criteria A
Radio Frequency electromagnetic field. Pulse modulated.	900 MHz 10 V/m 50% Duty cycle @ 200 Hz	IEC 1000-4-3 Performance Criteria A
Fast Transients	+/- 2 kV (ac mains) +/- 1 kV (dc, signal I/O) 5/50 ns Tr/Th, 5 KHz rep. freq.	IEC 1000-4-4 Performance Criteria B
Radio Frequency conducted	0.15 - 80 MHz 10 V/m 80% AM (1 KHz)	IEC 1000-4-6 Performance Criteria A

This instrument complies with the following EMC Emission Standards as tested per EN 50081-1, 1992 (Residential, Commercial and Light Industrial)

Phenomena	Frequency Range	Limits	Basic Standard
Radiated Emission	30-230 MHz 230-1000 MHz	30 dB_V/m at 10 m 37 dB_V/m at 10 m quasi peak	CISPR 22 Class B
Conducted Emission	0.15-0.5 MHz 0.5-5 MHz 5-30 MHz	66-56 dB_V quasi peak 56 dB_V quasi peak 60 dB_V quasi peak	CISPR 22 Class B

2. Safety

This device conforms with Low Voltage Directive 73/23/EEC, amended by 93/68/EEC. The following LVD requirements have been met to comply with EN 61010-1, 1993 (Electrical equipment for measurement, control and laboratory use)

1. Pollution Degree 2
2. Installation Category II
3. Double Insulation
4. Class II Equipment (100-240 Vac Powered Units)

NOTES

NOTES

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **61 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **five (5) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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