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User Manual
PAX2D – 1/8 DIN Digital Input Panel Meter

Revision C
Released 08/15

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in this literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the unit.

CAUTION: Risk of Danger.
Read complete instructions prior to installation and operation of the unit.

CAUTION: Risk of electric shock.

3RSD
PROCESS CONTROL EQUIPMENT

CE

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ORDERING INFORMATION

Meter Part Numbers

MODEL NO.	DESCRIPTION	PART NUMBER
PAX2D	Digital Input Panel Meter	PAX2D000

Option Card and Accessories Part Numbers

TYPE	MODEL NO.	DESCRIPTION	PART NUMBER
Option Cards	PAXCDS	Dual Setpoint Relay Output Card	PAXCDS10
		Quad Setpoint Relay Output Card	PAXCDS20
		Quad Setpoint Sinking Open Collector Output Card	PAXCDS30
		Quad Setpoint Sourcing Open Collector Output Card	PAXCDS40
		Dual Triac/Dual SSR Drive Digital Output Card	PAXCDS50
		Quad Form C Relay Digital Output Card	PAXCDS60 *
	PAXCDC [1]	RS485 Serial Communications Card with Terminal Block	PAXCDC10
		Extended RS485 Serial Communications Card with Dual RJ11 Connector	PAXCDC1C
		RS232 Serial Communications Card with Terminal Block	PAXCDC20
		Extended RS232 Serial Communications Card with 9 Pin D Connector	PAXCDC2C
		DeviceNet Communications Card	PAXCDC30
		Profibus-DP Communications Card	PAXCDC50
	PAXCDL	Analog Output Card	PAXCDL10
Accessories	CBLUSB	USB Programming Cable Type A-Mini B	CBLUSB01
	RCP	Replacement Case with knock-out features.	RCPX2H00

Notes:

1. For Modbus communications use RS485 Communications Output Card and configure communication (tYPE) parameter for Modbus.

* This card is not suitable for use in older PAX2 models. For proper installation, 3 case knock-out features must be present on the top case surface. To update a case to include these knock-outs, a replacement case is available.

Using This Manual

This manual contains installation and programming instructions for the PAX2D and all applicable option cards. To make installing the option card easier, it is recommended to use the Installation Guide provided with the card.

Only the portions of this manual that apply to the application need to be read. Minimally, we recommend that General Specifications, Reviewing the Front Buttons and Display, and Crimson® Programming Software portions of this manual be read in their entirety.

We recommend that unit programming be performed using Crimson programming software. When using Crimson, the programming portion of this manual serves as an overview of the programming options that are available through Crimson. The programming section of the manual will serve to provide expanded explanations of some of the PAX2D programming features found in Crimson. For users who do not intend to use Crimson to program their unit, this manual includes information to provide for a user to program one, or all, of the programming parameters using the unit's keypad.

To find information regarding a specific topic or mnemonic, it is recommended that the manual be viewed on a computer and the "find" function be used. The alternate method of finding information is to identify the programming parameter involved and review the information contained in the section of the manual that pertains to that parameter.

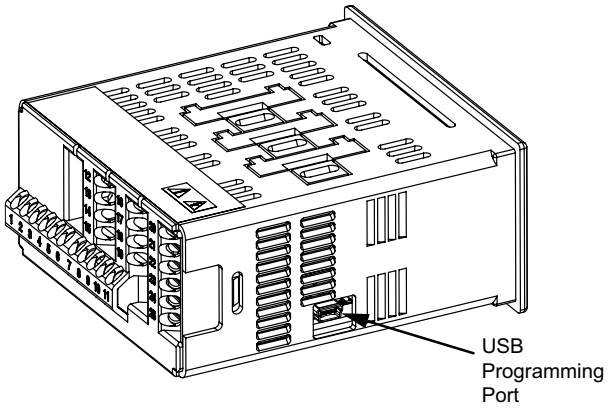
Crimson Programming Software

Crimson® software is a Windows® based program that allows configuration of the PAX® from a PC. Crimson offers standard drop-down menu commands, that make it easy to program the unit. The unit's program can then be saved in a PC file for future use.

Programming Using Crimson:

Crimson is included on the Flash Drive that is shipped with the PAX2. Check for updates to Crimson at http://www.redlion.net/crimson2.

- Install Crimson. Follow the installation instructions provided by the source from which Crimson is being downloaded or installed.
- Using a USB Type A-Mini B cable, plug the Mini B end of the cable into the PAX2 USB Programming Port.
- Plug the other end of the USB cable into an available USB port on the PC.
- Apply power to the PAX2. See Troubleshooting, on page 34, for error message resolution.
- Start Crimson.
- Click the Crimson "Link" tab.
- Click "Extract…"
    - o Crimson will extract the current program settings from the PAX2.
    - o If the PAX2 has not been programmed, the extracted file will contain factory settings. Note that the PAX2 factory settings vary based on the option cards installed.
- A programming selection screen will appear. Double click on an applicable programming selection and make program specific parameter selections. When completed, click "Close" and continue selecting applicable programming selections and making appropriate parameter selections. Continue until all necessary programming parameters have been configured.
- When all programming selections have been made, save the configuration file.
- Download the configuration file to the PAX2 by clicking the "Link" tab and selecting "Update".



General Meter Specifications

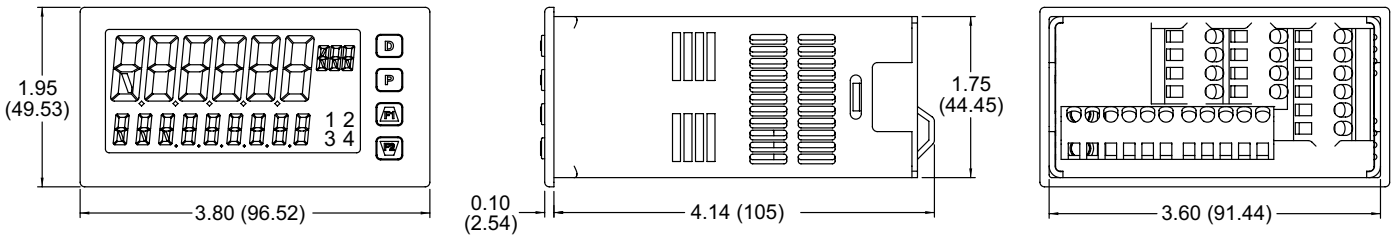
1. **DISPLAY**: Negative image LCD
   Top Line - 6 digit, 0.71" (18 mm), with tri-color backlight (red, green or orange), display range: -199,999 to 999,999;
   Bottom Line - 9 digit, 0.35" (8.9 mm), with green backlight, display range: - 199,999,999 to 999,999,999
2. **POWER**:
   AC Power: 40 to 250 VAC, 50/60 Hz, 20 VA
   DC Power: 21.6 to 250 VDC, 8 W
   Isolation: 2300 Vrms for 1 min. to all inputs and outputs.
3. **SENSOR POWER**: +18 VDC, ±5% @ 60 mA max., short circuit protected
4. **ANNUNCIATORS**:
   Line 1 Units Display – Programmable 3 digit units annunciator with tri-color backlight (red, green or orange)
   Setpoint Output Status Indicators - Red backlight color
   1 - Setpoint 1 output
   2 - Setpoint 2 output
   3 - Setpoint 3 output
   4 - Setpoint 4 output
5. **KEYPAD**: 2 programmable function keys, 4 keys total
6. **COUNTER DISPLAYS**: 6-digit (top line) or 9-digit (bottom line)
   Top Line Display Range: -199,999 to 999,999
   Bottom Line Display Range: -199,999,999 to 999,999,999
   Over Range Display: OUEr
   Under Range Display: UndEr
   Display Designators: CtA, Ctb, CtC (top line), A, b, C (bottom line)
   Maximum Count Rates: 50% duty cycle, count mode dependent
   If setpoints disabled: 35 KHz for all modes except Quadrature x4 (32 KHz)
   If setpoint(s) enabled: 20 KHz for any mode except Quadrature x1 (19 KHz), Quadrature x2 (17 KHz) and Quadrature x4 (10 KHz)
7. **RATE DISPLAYS**: 6-digit (top or bottom line)
   Rate A or Rate B Display Range: 0 to 999,999
   Rate C, Rate Max (High) or Min (Low) Display Range: -199,999 to 999,999
   Over Range Display: OUEr
   Under Range Display: UndEr
   Display Designators: rtA, rtb, rtC, Hi, Lo (top or bottom line)
   Maximum Frequency: 50 KHz
   Minimum Frequency: 0.001 Hz
   Display Update Time: 0.1 to 999.9 seconds
   Accuracy: ±0.01%
8. **SIGNAL INPUTS (INPUT A and INPUT B)**:
   See Section 2.0 Setting the DIP Switches for complete input specifications. DIP switch selectable inputs accept pulses from a variety of sources including switch contacts, TTL outputs, magnetic pickups and all standard RLC sensors. Inputs accept current sinking or current sourcing outputs and provide selectable input filtering for low frequency signals or switch contact debounce.
   DUAL COUNT MODES:
   When any dual count mode is used, then User Inputs 1 and/or 2 will accept the second signal of each signal pair. The user inputs do not have the Logic/Mag, HI/LO Freq, and Sink/Source input setup switches. The user inputs are inherently a logic input with no low frequency filtering. Any mechanical contacts used for these inputs in a dual count mode must be debounced externally. The user input may only be selected for sink/source by the User Input Active parameter (USrACt) .
9. **USER INPUTS**: Three programmable user inputs
   Max. Continuous Input: 30 VDC
   Isolation To Sensor Input Common: Not isolated.
   Response Time: 12 msec. max.
   Logic State: User Selectable for sinking (active low) or sourcing (active high)

INPUT STATE	SINKING INPUTS	SOURCING INPUTS
	20KΩ pull-up to +3.3V	20KΩ pull-down
Active	V_{IN} < 1.1 VDC	V_{IN} > 2.2 VDC
Inactive	V_{IN} > 2.2 VDC	V_{IN} < 1.1 VDC

10. **PRESCALER OUTPUT:**
    NPN Open Collector: I_{SNK} = 100 mA max. @ V_{OL} = 1 VDC max. V_{OH} = 30 VDC max. Duty cycle 25% min. and 50 % max.
11. **MEMORY**: Nonvolatile memory retains all programmable parameters and count values when power is removed.
12. **ENVIRONMENTAL CONDITIONS**:
    Operating Temperature Range: 0 to 50 °C
    Storage Temperature Range: -40 to 60 °C
    Vibration to IEC 68-2-6: Operational 5-150 Hz, 2 g
    Shock to IEC 68-2-27: Operational 25 g (10 g relay)
    Operating and Storage Humidity: 0 to 85% max. RH non-condensing
    Altitude: Up to 2000 meters
13. **CERTIFICATIONS AND COMPLIANCES**:
    CE Approved
    EN 61326-1 Immunity to Industrial Locations
    Emission CISPR 11 Class A
    IEC/EN 61010-1
    RoHS Compliant
    UL Listed: File #E179259
    Type 4X Indoor Enclosure rating (Face only)
    IP65 Enclosure rating (Face only)
    IP20 Enclosure rating (Rear of unit)
    Refer to EMC Installation Guidelines section of the bulletin for additional information.
14. **CONNECTIONS**: High compression cage-clamp terminal block
    Wire Strip Length: 0.3" (7.5 mm)
    Wire Gauge Capacity: 26 to 16 AWG (0.14 to 1.5 mm^2)
    Torque: 4.4-5.3 inch-lbs (0.5-0.6 N-m)
15. **CONSTRUCTION**: This unit is rated Type 4X/IP65 for indoor use only. IP20 Touch safe. Installation Category II, Pollution Degree 2. One piece bezel/ case. Flame resistant. Synthetic rubber keypad. Panel gasket and mounting clip included.
16. **WEIGHT**: 8 oz. (226.8 g)

DIMENSIONS In inches (mm)

Note: Recommended minimum clearance (behind the panel) for mounting clip installation is 2.1" (53.4) H x 5.5" (140) W.



OPTION CARDS

WARNING: Disconnect all power to the unit before installing option cards.

Adding Option Cards

The PAX2 can be fitted with up to three option cards. The details for each option card can be reviewed in the specification section below. Only one card from each function type can be installed at a time. The function types include Setpoint Alarms (PAXCDS), Communications (PAXCDC), and Analog Output (PAXCDL). The option cards can be installed initially or at a later date.

COMMUNICATION CARDS (PAXCDC)

A variety of communication protocols are available for the PAX2. Only one PAXCDC card can be installed at a time. *Note: For Modbus communications use RS485 Communications Output Card and configure communication (tYPE) parameter for Modbus.*

SERIAL COMMUNICATIONS CARD: PAXCDC1_ and PAXCDC2_
- **Type**: RS485 or RS232
- **Communication Type**: Modbus ASCII, RLC Protocol (ASCII), and Modbus RTU
- **Isolation To Sensor & User Input Commons**: 500 Vrms for 1 min. Not Isolated from all other commons.
- **Data**: 7/8 bits
- **Baud**: 1200 to 38,400
- **Parity**: no, odd or even
- **Bus Address**: Selectable 0 to 99 (RLC Protocol), or 1 to 247 (Modbus Protocol), Max. 32 meters per line (RS485)
- **Transmit Delay**: Selectable for 0 to 0.250 sec (+2 msec min)

DEVICENET™ CARD: PAXCDC30
- **Compatibility**: Group 2 Server Only, not UCMM capable
- **Baud Rates**: 125 Kbaud, 250 Kbaud, and 500 Kbaud
- **Bus Interface**: Phillips 82C250 or equivalent with MIS wiring protection per DeviceNet™ Volume I Section 10.2.2.
- **Node Isolation**: Bus powered, isolated node
- **Host Isolation**: 500 Vrms for 1 minute between DeviceNet™ and unit input common.

PROFIBUS-DP CARD: PAXCDC50
- **Fieldbus Type:** Profibus-DP as per EN 50170, implemented with Siemens SPC3 ASIC
- **Conformance:** PNO Certified Profibus-DP Slave Device
- **Baud Rates:** Automatic baud rate detection in the range 9.6 Kbaud to 12 Mbaud
- **Station Address:** 0 to 125, set by rotary switches.
- **Connection:** 9-pin Female D-Sub connector
- **Network Isolation:** 500 Vrms for 1 minute between Profibus network and sensor and user input commons. Not isolated from all other commons.

SETPOINT CARDS (PAXCDS)

The PAX2 has 6 available setpoint alarm output option cards. Only one PAXCDS card can be installed at a time. (Logic state of the outputs can be reversed in the programming.) These option cards include:

DUAL RELAY CARD: PAXCDS10
- **Type**: Two FORM-C relays
- **Isolation To Sensor & User Input Commons**: 2000 Vrms for 1 min.
- **Contact Rating**:
  - One Relay Energized: 5 amps @ 120/240 VAC or 28 VDC (resistive load).
  - Total current with both relays energized not to exceed 5 amps
- **Life Expectancy**: 100 K cycles min. at full load rating. External RC snubber extends relay life for operation with inductive loads

QUAD RELAY CARD: PAXCDS20
- **Type**: Four FORM-A relays
- **Isolation To Sensor & User Input Commons**: 2300 Vrms for 1 min.
- **Contact Rating**:
  - One Relay Energized: 3 amps @ 240 VAC or 30 VDC (resistive load).
  - Total current with all four relays energized not to exceed 4 amps
- **Life Expectancy**: 100K cycles min. at full load rating. External RC snubber extends relay life for operation with inductive loads

QUAD SINKING OPEN COLLECTOR CARD: PAXCDS30
- **Type**: Four isolated sinking NPN transistors.
- **Isolation To Sensor & User Input Commons**: 500 Vrms for 1 min. Not Isolated from all other commons.
- **Rating**: 100 mA max @ V_{SAT} = 0.7 V max. V_{MAX} = 30 V

QUAD SOURCING OPEN COLLECTOR CARD: PAXCDS40
- **Type**: Four isolated sourcing PNP transistors.
- **Isolation To Sensor & User Input Commons**: 500 Vrms for 1 min. Not Isolated from all other commons.
- **Rating**: Internal supply: 18 VDC unregulated, 30 mA max. total
  External supply: 30 VDC max., 100 mA max. each output

DUAL TRIAC/DUAL SSR DRIVE CARD: PAXCDS50
- **Triac**:
  - **Type**: Isolated, zero crossing detection
  - **Voltage**: 260 VAC max., 20 VAC min.
  - **Max Load Current**: 1 Amp @ 25°C
    0.75 Amp @ 50°C
    Total load current with both triacs ON not to exceed 1.5 Amps
  - **Min Load Current**: 5 mA
  - **Off State Leakage Current**: 1 mA max @ 60 Hz
  - **Operating Frequency**: 20-400 Hz
- **SSR Drive**:
  - **Type**: Two isolated sourcing PNP Transistors.
  - **Isolation To Sensor & User Input Commons**: 500 Vrms for 1 min. Not Isolated from all other commons.
  - **Rating**:
    Output Voltage: 18/24 VDC (unit dependent) ± 10%, 30 mA max. total both outputs

QUAD FORM C RELAY CARD: PAXCDS60
- **Type**: Four FORM-C relays
- **Isolation To Sensor & User Input Commons**: 500 Vrms for 1 min.
- **Contact Rating**:
  - Rated Load: 3 Amp @ 30 VDC/125 VAC
  - Total Current With All Four Relays Energized not to exceed 4 amps
- **Life Expectancy**: 100 K cycles min. at full load rating. External RC snubber extends relay life for operation with inductive loads

LINEAR DC OUTPUT (PAXCDL)

Either a 0(4)-20 mA or 0-10 V retransmitted linear DC output is available from the analog output option card. The programmable output low and high scaling can be based on various display values. Reverse slope output is possible by reversing the scaling point positions.

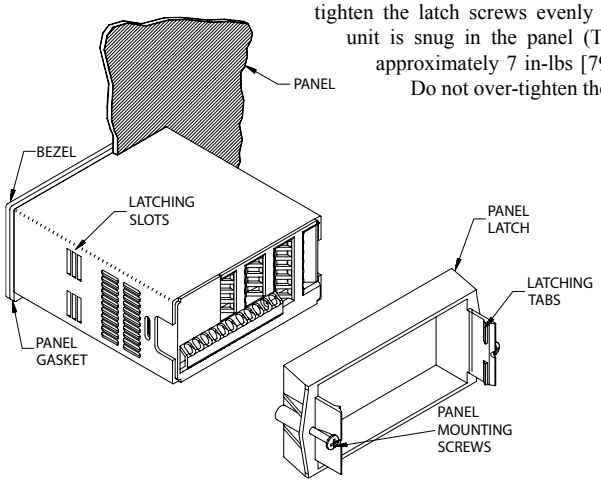
ANALOG OUTPUT CARD: PAXCDL10
- **Types**: 0 to 20 mA, 4 to 20 mA or 0 to 10 VDC
- **Isolation To Sensor & User Input Commons**: 500 Vrms for 1 min. Not Isolated from all other commons.
- **Accuracy**: 0.17% of FS (18 to 28 °C); 0.4% of FS (0 to 50 °C)
- **Resolution**: 1/3500
- **Compliance**: 10 VDC: 10 KΩ load min., 20 mA: 500 Ω load max.
- **Powered**: Self-powered
- **Response Time**: 50 msec max., 10 msec typical

1.0 Installing the Meter

Installation

The PAX2 meets Type 4X/IP65 requirements when properly installed. The unit is intended to be mounted into an enclosed panel. Prepare the panel cutout to the dimensions shown. Remove the panel latch from the unit. Slide the panel gasket over the rear of the unit to the back of the bezel. The unit should be installed fully assembled. Insert the unit into the panel cutout.

While holding the unit in place, push the panel latch over the rear of the unit so that the tabs of the panel latch engage in the slots on the case. The panel latch should be engaged in the farthest forward slot possible. To achieve a proper seal, tighten the latch screws evenly until the unit is snug in the panel (Torque to approximately 7 in-lbs [79N-cm]). Do not over-tighten the screws.



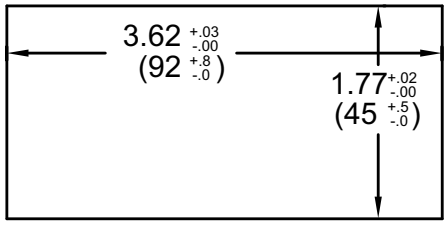
Installation Environment

The unit should be installed in a location that does not exceed the operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

The bezel should only be cleaned with a soft cloth and neutral soap product. Do NOT use solvents. Continuous exposure to direct sunlight may accelerate the aging process of the bezel.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

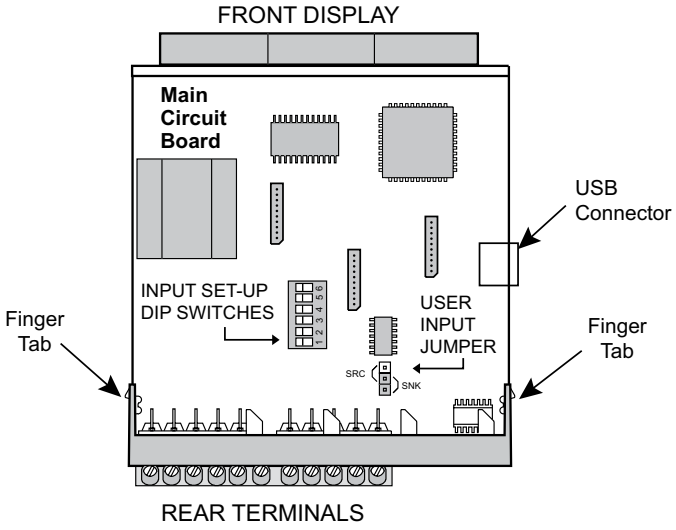
PANEL CUT-OUT



2.0 Setting the DIP Switches

To access the switches, remove the unit base from the case by firmly squeezing and pulling back on the side rear finger tabs. This should lower the latch below the case slot (which is located just in front of the finger tabs). It is recommended to release the latch on one side, then start the other side latch.

Warning: Exposed line voltage exists on the circuit boards. Remove all power to the unit AND load circuits before removing the unit from its case.



SETTING THE INPUT DIP SWITCHES

The unit has six DIP switches for Input A and Input B terminal set-up that must be set before applying power.

■ Factory Setting

SWITCHES 1 and 4

LOGIC: Input trigger levels V_{IL} = 1.5 V max.; V_{IH} = 3.75 V min.
MAG: 200 mV peak input sensitivity; 100 mV hysteresis; maximum voltage: ± 40 V peak (28 Vrms); Input impedance: 3.9 KΩ @ 60 Hz; Must also have SRC switch ON. (Not recommended with counting applications.)

SWITCHES 2 and 5

SNK.: Adds internal 7.8 KΩ pull-up resistor to +5 VDC, I_{MAX} = 0.7 mA.
SRC.: Adds internal 3.9 KΩ pull-down resistor, 7.3 mA max. @ 28 VDC, V_{MAX} = 30 VDC.

SWITCHES 3 and 6

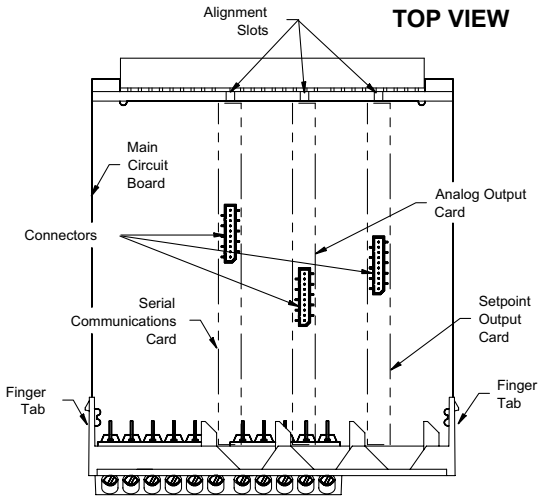
HI Frequency: Removes damping capacitor and allows max. frequency.

LO Frequency: Adds a damping capacitor for switch contact bounce. Also limits input frequency to maximum 50 Hz and input pulse widths to minimum 10 msec.

3.0 Installing Option Cards

The option cards are separately purchased cards that perform specific functions. These cards plug into the main circuit board of the unit. The option cards have many unique functions when used with the PAX2.

CAUTION: The option card and main circuit board contain static sensitive components. Before handling the cards, discharge static charges from your body by touching a grounded bare metal object. Ideally, handle the cards at a static controlled clean workstation. Also, only handle the cards by the edges. Dirt, oil or other contaminants that may contact the cards can adversely affect circuit operation.



WARNING: Exposed line voltage exists on the circuit boards. Remove all power to the unit AND load circuits before removing the unit from its case.

To Install:

1. **For option card specific installation instructions, see the installation instructions provided with the option card being installed.**
2. When handling the main circuit board, hold it by the rear cover. When handling the option card, hold it by the terminal block.
3. Remove the main assembly from the rear of the case by squeezing both finger holds on the rear cover and pulling the assembly out of the case. Or use a small screwdriver to depress the side latches and pull the main assembly out of the case. Do not remove the rear cover from the main circuit board.
4. Locate the appropriate option card slot location on the main circuit board. Align the option card terminal block with the slot terminal block position on the rear cover. Align the option card connector with the main circuit board option card connector and then press to fully engage the connector. Verify the tab on the option card rests in the alignment slot on the display board.
5. If installing an option card that includes a terminal block on the top of the option card, a knock-out on the top of the PAX case will need to be removed to allow the top terminal block to be inserted later. Locate the ⊓ shaped knock-out that aligns with the option slot for which the option card is being installed. Carefully remove the knock-out, being careful not to remove additional knock-outs. Trim knock-out tabs (gates) that remain on the case. The top terminal block on the option card will need to be removed before completing step 6.
6. Slide the assembly back into the case. Be sure the rear cover latches engage in the case. If option card includes a top terminal block, install top terminal block at this time.

4.0 Wiring the Meter

WIRING OVERVIEW

Electrical connections are made via screw-clamp terminals located on the back of the unit. All conductors should conform to the meter's voltage and current ratings. All cabling should conform to appropriate standards of good installation, local codes and regulations. It is recommended that the power supplied to the unit (DC or AC) be protected by a fuse or circuit breaker.

When wiring the unit, compare the numbers embossed on the back of the unit case against those shown in wiring drawings for proper wire position. Strip the wire, according to the terminal block specifications (stranded wires should be tinned with solder). Insert the lead into the correct terminal and then tighten the terminal until the wire is secure (Pull wire to verify tightness).

EMC INSTALLATION GUIDELINES

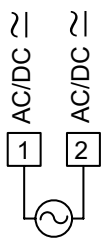
Although Red Lion Controls Products are designed with a high degree of immunity to Electromagnetic Interference (EMI), proper installation and wiring methods must be followed to ensure compatibility in each application. The type of the electrical noise, source or coupling method into a unit may be different for various installations. Cable length, routing, and shield termination are very important and can mean the difference between a successful or troublesome installation. Listed are some EMI guidelines for a successful installation in an industrial environment.

1. A unit should be mounted in a metal enclosure, which is properly connected to protective earth.
2. Use shielded cables for all Signal and Control inputs. The shield connection should be made as short as possible. The connection point for the shield depends somewhat upon the application. Listed below are the recommended methods of connecting the shield, in order of their effectiveness.
   a. Connect the shield to earth ground (protective earth) at one end where the unit is mounted.
   b. Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is over 1 MHz.
3. Never run Signal or Control cables in the same conduit or raceway with AC power lines, conductors, feeding motors, solenoids, SCR controls, and heaters, etc. The cables should be run through metal conduit that is properly grounded. This is especially useful in applications where cable runs are long and portable two-way radios are used in close proximity or if the installation is near a commercial radio transmitter. Also, Signal or Control cables within an enclosure should be routed as far away as possible from contactors, control relays, transformers, and other noisy components.
4. Long cable runs are more susceptible to EMI pickup than short cable runs.
5. In extremely high EMI environments, the use of external EMI suppression devices such as Ferrite Suppression Cores for signal and control cables is effective. The following EMI suppression devices (or equivalent) are recommended:
   Fair-Rite part number 0443167251 (RLC part number FCOR0000)
   Line Filters for input power cables:
   Schaffner # FN2010-1/07 (Red Lion Controls # LFIL0000)
6. To protect relay contacts that control inductive loads and to minimize radiated and conducted noise (EMI), some type of contact protection network is normally installed across the load, the contacts or both. The most effective location is across the load.
   a. Using a snubber, which is a resistor-capacitor (RC) network or metal oxide varistor (MOV) across an AC inductive load is very effective at reducing EMI and increasing relay contact life.
   b. If a DC inductive load (such as a DC relay coil) is controlled by a transistor switch, care must be taken not to exceed the breakdown voltage of the transistor when the load is switched. One of the most effective ways is to place a diode across the inductive load. Most RLC products with solid state outputs have internal zener diode protection. However external diode protection at the load is always a good design practice to limit EMI. Although the use of a snubber or varistor could be used.
   RLC part numbers: Snubber: SNUB0000
   Varistor: ILS11500 or ILS23000
7. Care should be taken when connecting input and output devices to the instrument. When a separate input and output common is provided, they should not be mixed. Therefore a sensor common should NOT be connected to an output common. This would cause EMI on the sensitive input common, which could affect the instrument's operation.

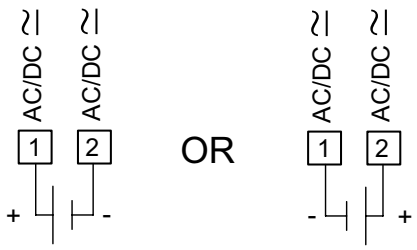
Visit RLC's web site at http://www.redlion.net/emi for more information on EMI guidelines, Safety and CE issues as they relate to Red Lion Controls products.

4.1 POWER WIRING

AC Power



DC Power



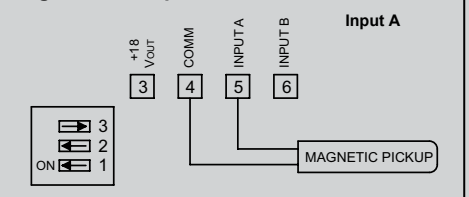
The power supplied to the unit shall employ a 15 Amp UL approved circuit breaker for AC input and a 1 Amp, 250 V UL approved fuse for DC input. It shall be easily accessible and marked as a disconnecting device to the installed unit. This device is not directly intended for connection to the mains without a reliable means to reduce transient over-voltages to 1500 V.

4.2 INPUT SIGNAL WIRING

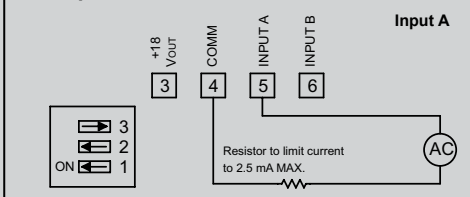
CAUTION: Sensor input common is NOT isolated from user input common. In order to preserve the safety of the unit application, the sensor input common must be suitably isolated from hazardous live earth referenced voltage; or input common must be at protective earth ground potential. If not, hazardous voltage may be present at the User Inputs and User Input Common terminals. Appropriate considerations must then be given to the potential of the user input common with respect to earth ground; and the common of the isolated option cards with respect to input common.

If you are wiring Input B, connect signal to Terminal 6 instead of 5, and set DIP switches 4, 5, and 6 to the positions shown for 1, 2, and 3.

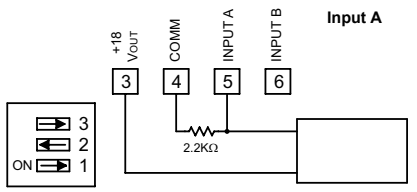
Magnetic Pickup



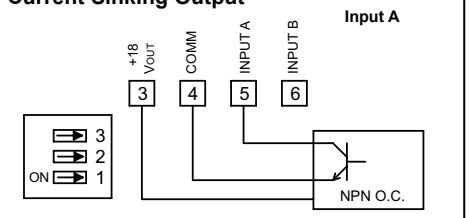
AC Inputs From Tach Generators, Etc.



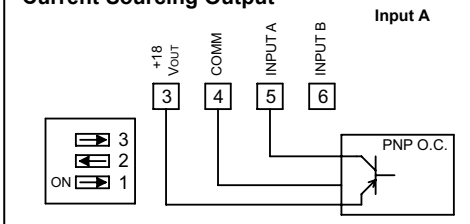
Two Wire Proximity, Current Source



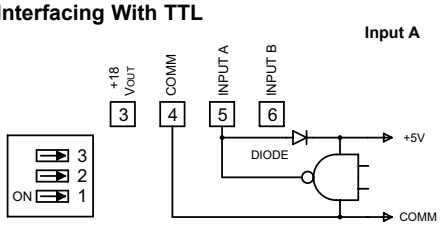
Current Sinking Output



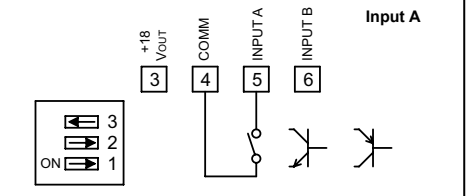
Current Sourcing Output



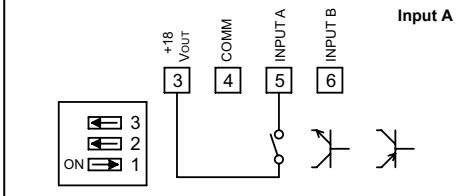
Interfacing With TTL



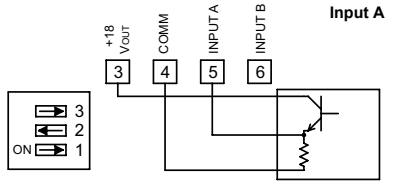
Switch or Isolated Transistor; Current Sink



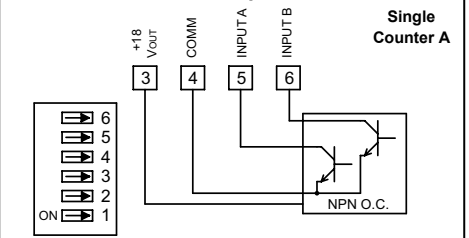
Switch or Isolated Transistor; Current Source



Emitter Follower; Current Source

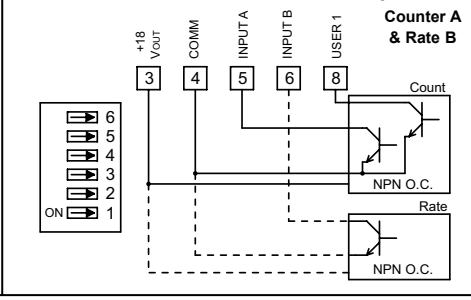


Quad; Current Sink Output

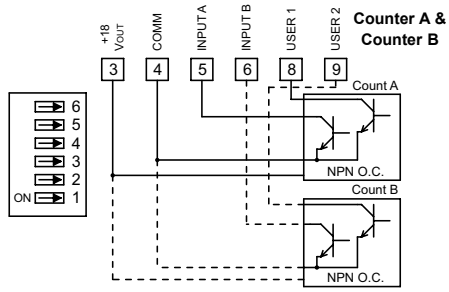


If using single Counter B, then wire signal to 6, and Quad/Direction to 9. Set switches as shown.

Dual Quad/Count; Current Sink Output



Dual Quad/Quad; Current Sink Output



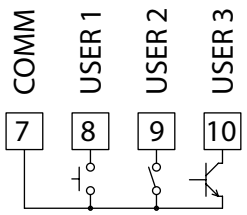
Shaded areas not recommended for counting applications.

4.3 USER INPUT WIRING

If User Input 1 and/or 2 are wired for quadrature or directional counting, an additional switching device should not be connected to that User Input terminal. User Input terminal does not need to be wired in order to remain in inactive state.

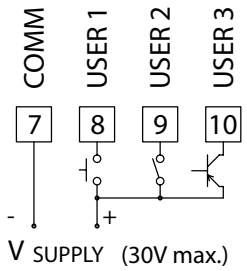
Sinking Logic (USrACt LO)

When the USrACt parameter is programmed to LO, the user inputs are internally pulled up to +3.3 V with 20 KΩ resistance. The input is active when it is pulled low (<1.1 V).



Sourcing Logic (USrACt HI)

When the USrACt parameter is programmed to HI, the user inputs are internally pulled down to 0 V with 20 KΩ resistance. The input is active when a voltage greater than 2.2 VDC is applied.



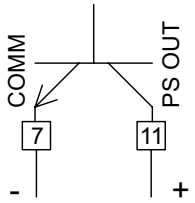
4.4 SETPOINT (ALARMS) WIRING

4.5 SERIAL COMMUNICATION WIRING

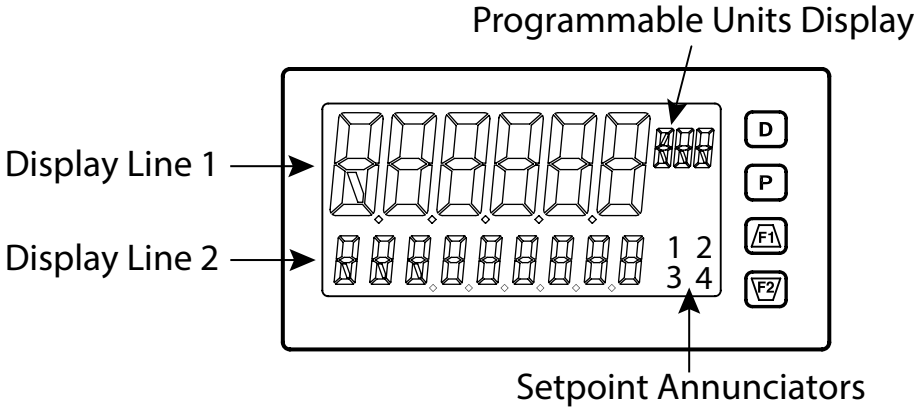
4.6 ANALOG OUTPUT WIRING

See appropriate option card bulletin for wiring details.

4.7 PRESCALER OUTPUT WIRING (NPN O.C.)



5.0 FRONT PANEL KEYS AND DISPLAY OVERVIEW



KEY	DISPLAY MODE OPERATION	PROGRAMMING MODE OPERATION
D	Index through enabled Line 2 display values	Return to the previous menu level (momentary press) Quick exit to Display Mode (press and hold)
P	Enter full programming mode or access the parameter and hidden display loops; Press and hold to skip parameters and go directly to Code or Programming Menu	Access the programming parameter menus, store selected parameter and index to next parameter
F1	User programmable Function key 1; hold for 3 seconds for user programmable second function 1 Index through enabled Line 1 values (factory setting)	Increment selected parameter value; Hold F1 and momentarily press F2 key to increment next decade or **D** key to increment by 1000's
F2	User programmable Function key 2; hold for 3 seconds for user programmable second function 2 Reset Line 1 (factory setting)	Decrement selected parameter value; Hold F2 and momentarily press F1 key to decrement next decade or **D** key to decrement by 1000's

DISPLAY LINE 1

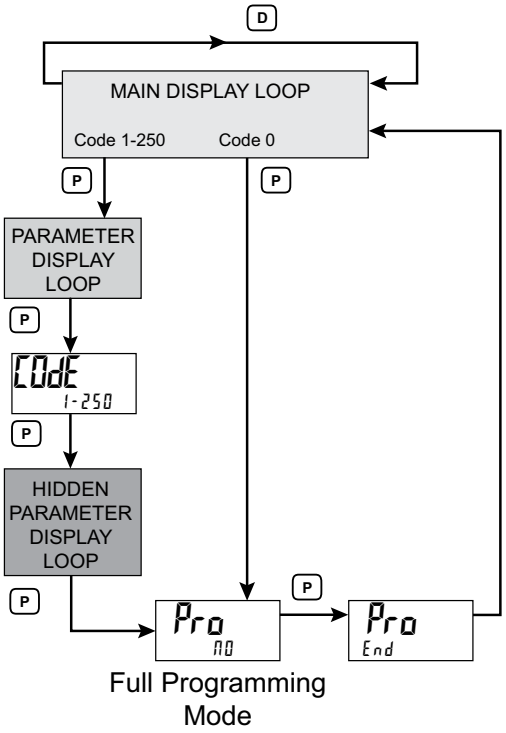
Line 1 is the large, 6-digit top line display. Counter values, rate values and the maximum (Hi) and minimum (Lo) rate capture values can be shown on Line 1. The 3-digit Units mnemonic characters can be used to indicate which Line 1 display value is shown. Standard or custom mnemonics are available for the Line 1 values. See Line 1 parameters in the Display Parameters programming section for configuration details.

DISPLAY LINE 2

Line 2 is the smaller, 9-digit bottom line display. Counter values, rate values, rate capture values, setpoint values and parameter List A/B status can all be shown on the Line 2 display. The display loops described below are used to view, reset and modify the selected display values, based on the Line 2 Value Access setting programmed for each available value. See Line 2 parameters in the Display Parameters programming section for configuration details.

Line 2 Display Loops

The PAX2D offers three display loops to allow users quick access to needed information.



Main Display Loop

In the Main display loop, the D key is pressed to sequence through the selected Line 2 values. A left justified 2 or 3-character mnemonic indicates which Line 2 value is currently shown. When in the Main display loop, the Function keys F1 and F2 perform the user functions programmed in the User Input parameter section.

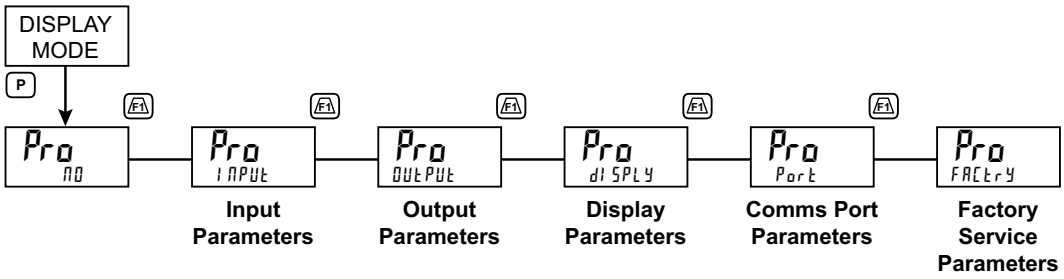
Parameter and Hidden Parameter Display Loops

These Display loops provide quick access to selected parameters that can be viewed and modified on Line 2 without having to enter Full Programming mode. These values include Parameter List A/B selection, setpoints, scale factors, counter load values and display (color, intensity and contrast) settings. To utilize the Parameter or Hidden Parameter Display Loops, a security code (1-250) must be programmed. (See Programming Security Code in the Display Parameters programming section for details.)

The Parameter Display Loop is accessed by pressing the **P** key. The selected Parameter Display Loop values can be viewed and/or changed per the Line 2 Value Access setting programmed for each available value. The Hidden Parameter Display Loop follows the Parameter display loop, and can only be accessed when the correct security code is entered at the Code prompt. Combining the two parameter loops provides an area for parameters that require general access and/or protected or secure access depending on the application needs.

While in the Parameter and Hidden Parameter loops, pressing the **D** key will return the unit to the Main Display Loop. To directly access the Code prompt, press and hold the **P** key. This can be done from the Main display loop or at any point during the Parameter display loop. Also, to directly access Full Programming mode while in the Hidden Parameter loop, press and hold the **P** key to bypass any remaining Hidden Parameter loop values.

6.0 Programming The PAX2D



It is recommended that program settings be recorded as programming is performed. A blank Parameter Value Chart is provided at the end of this bulletin.

PROGRAMMING MODE ENTRY

The Programming Mode is entered by pressing the **P** key. Full Programming Mode will be accessible unless the unit is programmed to use the Parameter loop or Hidden Parameter loop on the Line 2 display. In this case, programming access will be limited by a security code and/or a hardware program lock. (Refer to the previous section for details on Line 2 display loops and limited programming access.) Full Programming Mode permits all parameters to be viewed and modified. In this mode, the front panel keys change to Programming Mode Operations and certain user input functions are disabled.

MODULE ENTRY

The Programming Menu is organized into five modules. These modules group together parameters that are related in function. The F1 and F2 keys are used to select the desired module. The displayed module is entered by pressing the **P** key.

MODULE MENU

Upon entering a module, a parameter selection sub-menu is provided to choose the specific parameter type for programming. For example, this includes counter, rate and user input under the Input Parameter menu. Use the F1 and F2 keys to select the desired parameter type, and press the **P** key to enter the parameter menu.

PARAMETER MENU

Upon entering the Parameter Menu, the **P** key is pressed to advance to a specific parameter to be changed. After completing the parameter menu, or upon pressing the **D** key, the display returns to the initial entry point for the parameter menu. For each additional press of the **D** key, the display returns to the previous level within the module until exiting the module entirely.

SELECTION/VALUE ENTRY

For each parameter, the top line display shows the parameter while the bottom line shows the selections/value for that parameter. The F1 and F2 keys are used to move through the selections/values for the parameter. Pressing the **P** key, stores and activates the displayed selection/value. This also advances the unit to the next parameter.

Numerical Value Entry

If the parameter is programmed for enter (EntEr), the F1 and F2 keys are used to change the parameter values in any of the display loops.

The F1 and F2 keys will increment or decrement the parameter value. When the F1 or F2 key is pressed and held, the value automatically scrolls. The longer the key is held the faster the value scrolls.

For large value changes, press and hold the F1 or F2 key. While holding that key, momentarily press the opposite arrow key (F2 or F1) to shift decades (10's 100's, etc), or momentarily press the **D** key and the value scrolls by 1000's as the arrow key is held. Releasing the arrow key removes the decade or 1000's scroll feature. The arrow keys can then be used to make small value changes as described above.

As an alternative, a Select and Set value entry method is provided. This can be used in combination with the value scrolling described above. To change the selected digit in the numerical value, press both the F1 and F2 keys simultaneously. The next digit to the left will be selected (flashing). If both keys are pressed and held, the selected digit will scroll from right to left until one or both keys are released.

Once a digit is selected, the arrow keys are used to increment or decrement that digit to the desired number.

PROGRAMMING MODE EXIT

To exit the Programming Mode, press and hold the **D** key (from anywhere in the Programming Mode) or press the **P** key with Pro no displayed. This will commit any stored parameter changes to memory and return the unit to the Display Mode. If a parameter was just changed, the **P** key must be pressed to store the change before pressing the **D** key. (If power loss occurs before returning to the Display Mode, verify recent parameter changes.)

PROGRAMMING TIPS

It is recommended to start with the Input Parameters and proceed through each module in sequence. If lost or confused while programming, press and hold the **D** key to exit programming mode and start over. It is recommended that program settings be recorded as programming is performed. When programming is complete lock out programming with a user input or lock-out code.

Factory Settings may be completely restored in the Factory Service Operations module. This is useful when encountering programming problems.

6.1 INPUT PARAMETERS (INPUT)

INPUT SELECT

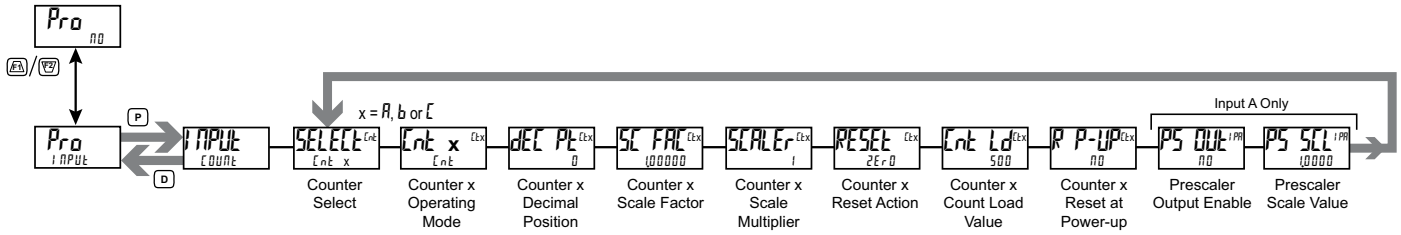
COUNT RATE USER

Select the Count, Rate or User Input to be programmed.

6.1.1 COUNTER INPUT PARAMETERS (COUNT)

This section details the programming for Counter A and the Prescaler Output, Counter B, and Counter C. For maximum input frequency, the counters not being used should be set to mode NONE. The Prescaler should be set to no when it is not in use. When set to NONE or no, the remaining related parameters are not accessible. A Select Parameter List feature for Scale Factors and Count Load values is explained in the User Input programming section.

In the display depictions shown in this section, "x" represents A, B, or C for the counter being programmed.

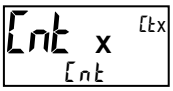


COUNTER SELECT

Cnt A Cnt b Cnt C

Select the Counter to be programmed.

COUNTER OPERATING MODE



Choose the operating mode for the selected counter.

Counter A Selections

SELECTION	MODE	DESCRIPTION
NONE	None	Does not count.
Cnt	Count X1	Adds Input A falling edge.
CntUd	Count X1 w/direction	Adds Input A falling edge if Input B is high. Subtracts Input A falling edge if Input B is low.
dCntUd	Dual Count X1 w/direction	Adds Input A falling edge if User 1 is high. Subtracts Input A falling edge if User 1 is low.
AddAdd	Dual Input X1 Add/Add	Adds Input A falling edge and Input B falling edge.
AddSub	Dual Input X1 Add/Subtract	Adds Input A falling edge. Subtracts Input B falling edge.
QUAd1	Quad X1	Adds Input A rising edge when Input B is high. Subtracts Input A falling edge when Input B is high
QUAd2	Quad X2	Adds Input A rising edge when Input B is high and Input A falling edge when Input B is low. Subtracts Input A falling edge when Input B is high and Input A rising edge when Input B is low.
QUAd4	Quad X4	Adds Input A rising edge when Input B is high, Input A falling edge when Input B is low, Input B rising edge when Input A is low, and Input B falling edge when Input A is high. Subtracts Input A falling edge when Input B is high, Input A rising edge when Input B is low, Input B rising edge when Input A is high, and Input B falling edge when Input A is low.
dQUAd1	Dual Count Quad X1	Adds Input A rising edge when User 1 is high. Subtracts Input A falling edge when User 1 is high.
dQUAd2	Dual Count Quad X2	Adds Input A rising edge when User 1 is high and Input A falling edge when User 1 is low. Subtracts Input A falling edge when User 1 is high and Input A rising edge when User 1 is low.
Cnt2	Count X2	Adds Input A rising and falling edges.
CntUd2	Count X2 w/direction	Adds Input A rising and falling edges if Input B is high. Subtracts Input A rising and falling edge if Input B is low.
dCtUd2	Dual Count X2 w/direction	Adds Input A rising and falling edges if User 1 is high. Subtracts Input A rising and falling edge if User 1 is low.

Counter B Selections

SELECTION	MODE	DESCRIPTION
NONE	None	Does not count.
bAtCH	Batch	Counter B internally counts the number of output activations of the selected setpoint(s). The count source is selected in the Yes/No sub-menu shown for each setpoint (bAt S1 thru bAt S4).
Cnt	Count X1	Adds Input B falling edge.
dCntUd	Dual Count X1 w/direction	Adds Input B falling edge if User 2 is high. Subtracts Input B falling edge if User 2 is low.
dqUAd1	Dual Count Quad X1	Adds Input B rising edge when User 2 is high. Subtracts Input B falling edge when User 2 is high.
dqUAd2	Dual Count Quad X2	Adds Input B rising edge when User 2 is high and Input B falling edge when User 2 is low. Subtracts Input B falling edge when User 2 is high and Input B rising edge when User 2 is low.
Cnt2	Count X2	Adds Input B rising and falling edges.
dCtUd2	Dual Count X2 w/direction	Adds Input B rising and falling edges if User 2 is high. Subtracts Input B rising and falling edge if User 2 is low.

Counter C Selections

SELECTION	MODE	DESCRIPTION
NONE	None	Does not count.
Cnt A	Counter A	Counter C counts the incoming pulses from Counter A input as per Counter A mode of operation. The signal is scaled only according to Counter C parameters.
Cnt b	Counter B	Counter C counts the incoming pulses from Counter B input as per Counter B mode of operation. The signal is scaled only according to Counter C parameters.
Add Ab	Counter A + Counter B	Counter C counts the incoming pulses from Counter A and B inputs as per Counter A and B modes of operation. The result is scaled only according to Counter C parameters. (Example: If Counter A is set for Count X1 mode and Counter B is set for Count X2 mode, then Counter C will increment by 1 for each pulse received on Input A and increment by 2 for each pulse received on Input B. Counter C scale settings are then applied and the result displayed.)
Sub Ab	Counter A – Counter B	Counter C counts the incoming pulses from Counter A and B inputs as per Counter A and B modes of operation and subtracts the B counts from the A counts. The result is scaled only according to Counter C parameters. (Example: If Counter A is set for Count X1 mode and Counter B is set for Count X2 mode, then Counter C will increment by 1 for each pulse received on Input A and decrement by 2 for each pulse received on Input B. Counter C scale settings are then applied and the result displayed.)

Note: Counter A, B and C must all be reset at the same time for the math to be performed on the display values.

bAtCH	Batch	Counter C internally counts the number of output activations of the selected setpoint(s). The count source is selected in the Yes/No sub-menu shown for each setpoint (bAt S1 thru bAt S4).
SLAVE	Slave	Counter C functions as a serial slave display. See Serial Communications section for details.

COUNTER DECIMAL POSITION

dEC Pt Ctx / 0

0 0.00 0.0000
0.0 0.000 0.00000

This selects the decimal point position for the selected counter, and any setpoint value assigned to that counter. The selection will also affect that counter's scale factor calculations.

COUNTER SCALE FACTOR

SC FAC Ctx / 1.00000

0.00001 to 9.99999

The number of input counts for the selected counter is multiplied by the scale factor and the scale multiplier to obtain the desired process value. A scale factor of 1.00000 will result in the display of the actual number of input counts. For **Add Ab** and **Sub Ab** modes of operation, the math is performed on the input signals and then the result is scaled by Counter C scaling. To achieve correct results, both Input A and Input B must provide the same amount of pulses per unit of measurement. (Details on scaling calculations are explained at the end of this section.) Scale Factor values can also be entered during Program Lockout, if enabled in the Parameter Display loop. See "Line 2 Display Access" in the Display Parameter Module.

COUNTER SCALE MULTIPLIER

SCALEr Ctx / 1

10 1 0.1 0.01

The number of input counts for the selected counter is multiplied by the scale multiplier and the scale factor to obtain the desired process value. (Details on scaling calculations are explained at the end of this section.)

COUNTER RESET ACTION

RESEt Ctx / ZEro

ZEro Cnt Ld

When the selected counter is reset, it returns to zero or the counter count load value. This reset action applies to all selected counter resets, except a setpoint generated counter auto reset programmed in the Setpoint Output Parameter Module.

COUNTER COUNT LOAD VALUE

Cnt Ld Ctx / 500

-199999 to 999999

When Reset To Count Load action is chosen, the selected counter will reset to this value. Count Load values can also be entered during Program Lockout, if enabled in the Parameter Display loop. See "Line 2 Display Access" in the Display Parameter Module.

COUNTER RESET AT POWER-UP

R P-UP Ctx / NO

NO YES

The selected counter may be programmed to reset at each unit power-up.

◇◇◇

The next two parameters will only appear when programming Counter A.

PRESCALER OUTPUT ENABLE

PS OUt 1PA / NO

NO YES

This enables the prescaler output. The prescaler output is useful for providing a lower frequency scaled pulse train to a PLC or another external counter. On each falling edge of Input A, the prescaler output register increments by the prescaler scale value (PS SCL). When the register equals or exceeds 1.0000, a pulse is output and the register is lowered by 1.0000. The prescaler register is reset to zero whenever Counter A is reset (except for Setpoint Counter Auto Reset). (See Prescaler Output Figure.)

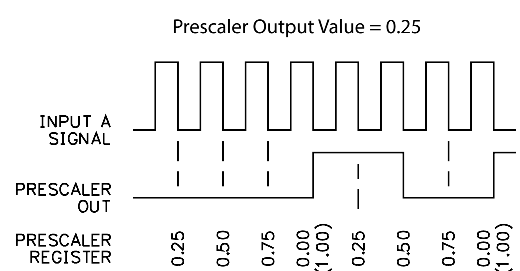
PRESCALER SCALE VALUE

PS SCL 1PA / 1.0000

0.0001 to 1.0000

The prescaler output frequency is the Input A frequency times the prescaler scale value.

PRESCALER OUTPUT FIGURE



SCALING CALCULATION

Each counter has the ability to scale an input signal to a desired display value. This is accomplished by the counter mode (Cnt x), decimal point (dEC Pt), scale factor (SC FAC), and scale multiplier (SCALEr). The scale factor is calculated using:

$$SF\ (SC\ FAC) = \frac{DDD}{(\text{Number of pulses per 'single' unit X CMF X SM})}$$

Where:

Number of pulses per 'single' unit: pulses per unit generated by the process (i.e. # of pulses per foot)

CMF: Counter Mode(Cnt x) times factor of the mode 1,2 or 4.

SM: Scale Multiplier (SCALEr) selection of 10, 1, 0.1 or 0.01.

DDD: Desired Display Decimal (1 =1, 1.0 = 10, 1.00 = 100, etc.)

Example:

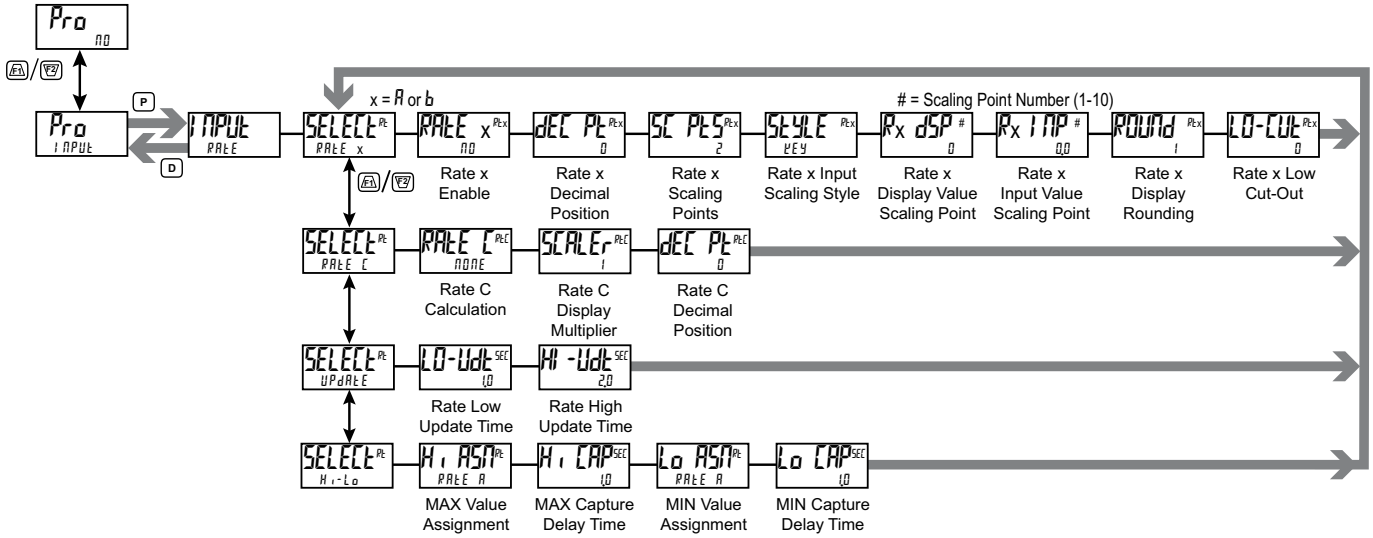
1. Indicate feet to the hundredths (0.00) with 100 pulses per foot:
   Scale Factor would be 100 / (100 x 1 x 1) = 1
   (In this case, the scale multiplier and counter mode factor are 1)
2. Indicate feet with 120 pulses per foot: Scale Factor would be 1 / (120 x 1 x 1) = 0.0083333. (In this case, the scale multiplier of 0.01 could be used: 1 / (120 x 1 x 0.01) = 0.83333 or show to hundredths (0.00): 100 / (120 x 1 x 1) = 0.8333.)

General Rules on Scaling

1. It is recommended that, the scale factor be as close as possible to, but not exceeding 1.00000. This can be accomplished by increasing or decreasing the counter decimal point position, using the scale multiplier, or selecting a different count mode.
2. To double the number of pulses per unit, use counter modes direction X2 or quad X2. To increase it by four times, use counter mode quad X4. Using these modes will decrease the allowable maximum input frequency.
3. A scale factor greater than 1.00000 will cause Counter display rounding. In this case, digit jumps could be caused by the internal count register rounding the display. The precision of a counter application cannot be improved by using a scale factor greater than 1. 00000.
4. The number of pulses per single unit must be greater than or equal to the DDD value in order for the scale factor to be less than or equal to one.
5. Lowering the scale factor can be accomplished by lowering the counter decimal position. (Example: 100 (Hundredths)/10 pulses = 10.000 lowering to 10 (Tenths)/10 = 1.000.)

6.1.2 RATE INPUT PARAMETERS (RATE)

This section details programming for the Rate indicators (A, B and C) and the Maximum and Minimum Rate Capture displays. For maximum input frequency, the Rate indicators should be disabled when they are not in use. When Rate Enable (Rate A and B) or Rate Calculation (Rate C) is set to no or NONE, the remaining related parameters are not accessible. In the display depictions shown in this section, "x" represents A or B for the rate indicator being programmed.



RATE SELECTION

SELECt RATE A

RATE A RATE C Hi-Lo
RATE b UPdAtE

Select the Rate parameters to be programmed.

RATE ENABLE

RATE x no

no YES

Select YES to measure the rate (speed) of pulses on the corresponding Input. Rate measurement is independent of the corresponding Counter count modes.

RATE DECIMAL POSITION

dEC Pt 0

0 0.00 0.0000
0.0 0.000

This selects the decimal point position for the selected Rate indicator.

RATE SCALING POINTS

SC PtS 2

2 to 10

This parameter sets the number of scaling points for the Rate Scaling function. The number of scaling points used depends on the linearity of the process and the display accuracy required.

About Scaling Points

Each scaling point is specified by two programmable parameters: A desired Rate Display Value (Rx dSP) and a corresponding Rate Input Value (Rx INP). Scaling points are entered sequentially in ascending order of Rate Input value. Each scaling point defines the upper endpoint of a linear segment, with the lower endpoint being the previous scaling point.

Linear Application – 2 Scaling Points

Linear processes use two scaling points to provide a linear Rate display from 0 up to the maximum input frequency. For typical zero based frequency measurements, the lower point is set to display 0 for 0 Hz input (factory setting) and the upper point set to display the desired value for a given input frequency. For non-zero based applications, the lower point is set to the desired display for 0 Hz input.

Non-linear Application – Up to 10 Scaling Points

For non-linear processes, up to 10 scaling points may be used to provide a piece-wise linear approximation representing the non-linear function. The Rate Display will be linear between sequential scaling points. Thus, the greater the number of scaling points, the greater the conformity accuracy. The Crimson software provides several linearization equations for common Rate applications.

RATE INPUT SCALING STYLE

KEy APPLy

Rate Input values for scaling points can be entered by using the Key-in or the Applied style described below.

Key-in:

Enter the Rate Input value by pressing the F1 or F2 keys. This value is always in pulses per second (Hz).

Applied:

The existing programmed Rate Input value will appear. To retain this value, press the **P** key to continue to the next parameter. To enter a new value, apply an external rate signal to the appropriate input terminal. Press the F2 key and the applied input frequency (in Hz) will be displayed. To insure the correct reading, wait until a consistent reading is displayed, then press the **P** key to accept this value as the Rate Input Value and continue to the next parameter. Follow the same procedure if using more than 2 scaling points.

RATE DISPLAY VALUE SCALING POINT 1

0 to 999999

For all zero-based applications (display value 0 for 0 Hz input), the Display Value and Input Value for Scaling Point 1 should be set to 0 and 0.0 respectively. For non-zero based applications, enter the desired Display Value for a 0 Hz input.

RATE INPUT VALUE SCALING POINT 1

0.0 to 99999.9

Normally the Rate Input Value for Scaling Point 1 is 0.0.

RATE DISPLAY VALUE SCALING POINT 2

0 to 999999

Enter the desired Rate Display Value for Scaling Point 2.

RATE INPUT VALUE SCALING POINT 2

0.0 to 99999.9

Enter the corresponding Rate Input Value for Scaling Point 2, by using the Input Scaling Style selected.

RATE DISPLAY ROUNDING

1 5 20 100
2 10 50

Rounding values other than '1' round the Rate display to the nearest increment selected (e.g. rounding of '5' causes 122 to round to 120 and 123 to round to 125). Rounding starts at the least significant digit of the Rate display.

RATE LOW CUT-OUT

0 to 999999

The Low Cut Out value forces the Rate display to zero when the Rate display falls below the value entered.

RATE SCALING

To scale the Rate, enter a Scaling Display value with a corresponding Scaling Input value. (The Display and Input values can be entered by Key-in or Applied Methods.) These values are internally plotted to a Display value of 0 and Input value of 0 Hz. A linear relationship is formed between these points to yield a rate display value that corresponds to the incoming input signal rate.

KEY-IN SCALING METHOD CALCULATION

If a display value versus input signal (in pulses per second) is known, then those values can be entered into Scaling Display (Rx dSP) and Scaling Input (Rx InP). No further calculations are needed.

If only the number of pulses per 'single' unit (i.e. # of pulses per foot) is known, then it can be entered as the Scaling Input value and the Scaling Display value will be entered as the following:

RATE PER	DISPLAY (Rx dSP)	INPUT (Rx InP)
Second	1	# of pulses per unit
Minute	60	# of pulses per unit
Hour	3600	# of pulses per unit

NOTES:

1. If # of pulse per unit is less than 10, then multiply both Input and Display values by 10.
2. If # of pulse per unit is less than 1, then multiply both Input and Display values by 100.
3. If the Display value is raised or lowered, then Input value must be raised or lowered by the same proportion (i.e. Display value for per hour is entered by a third less (1200) then Input value is a third less of # of pulses per unit). The same is true if the Input value is raised or lowered, then Display value must be raised or lowered by the same proportion.

EXAMPLE:

1. With 15.1 pulses per foot, indicate feet per minute in tenths. Scaling Display = 60.0 Scaling Input = 15.1.
2. With 0.25 pulses per gallon, indicate whole gallons per hour. (To have greater accuracy, multiply both Input and Display values by 10.) Scaling Display = 36000 Scaling Input = 2.5.

RATE C PARAMETERS

RATE C CALCULATION

Select the calculation for the Rate C display.

SELECTION	MODE	DESCRIPTION
NONE	None	Rate C disabled.
Add Ab	SUM (A+B)	Rate C shows the sum of Rate A and Rate B.
Sub Ab	DIFFERENCE (A-B)	Rate C shows the difference of Rate A and Rate B.
Pct Ab	RATIO (A/B)	Rate C shows the percentage of Rate A to Rate B.
Pct At	PERCENT OF TOTAL (A/A+B)	Rate C shows the percentage of Rate A to the total of Rate A and Rate B.
Pct dr	PERCENT DRAW (A-B/B)	Rate C shows the percent draw between Rate A and Rate B.

RATE C DISPLAY MULTIPLIER

SCALEr RtE
1

1 10 100 1000

Set the Display Multiplier to obtain the desired Rate C display resolution. For Rate C percentage calculations, the result is internally multiplied by 100 to show percent as a whole number. By using a Display Multiplier of 10, 100 or 1000, along with the proper decimal point position, percentage can be shown in tenths, hundredths or thousandths respectively.

RATE C DECIMAL POSITION

dEC Pt RtE
0

0 0.00 0.0000
0.0 0.000

Select the decimal point position for Rate C.

RATE UPDATE PARAMETERS

SELECt Rt
UPdAtE

RATE LOW UPDATE TIME (DISPLAY UPDATE)

Lo-Udt SEC
1.0

0.1 to 999.9 seconds

The Low Update Time is the minimum amount of time between display updates for all enabled Rate displays. Small Low Update Time values may increase the possibility of the display indicating an unstable input (jittery display). The factory setting of 1.0 will update the display at a minimum of every second.

RATE HIGH UPDATE TIME

Hi -Udt SEC
2.0

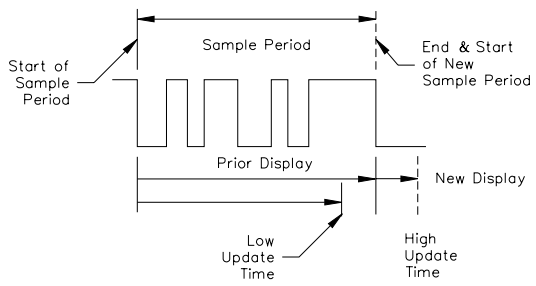
0.2 to 999.9 seconds

The High Update Time is the maximum amount of time before the enabled Rate displays are forced to zero. (For more explanation, refer to Input Frequency Calculation.) The High Update Time must be higher than the Low Update Time and higher than the desired slowest readable speed (one divided by pulses per second). The factory setting of 2.0, will force the display to zero for speeds below 0.5 Hz or a pulse every 2 seconds.

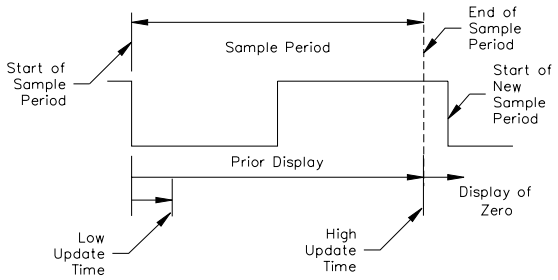
INPUT FREQUENCY CALCULATION

The unit determines the input frequency by summing the number of falling edges received during a sample period of time. The sample period begins on the first falling edge. At this falling edge, the unit starts accumulating time towards Low Update and High Update values. Also, the unit starts accumulating the number of falling edges. When the time reaches the Low Update Time value, the unit looks for one more falling edge to end the sample period. If a falling edge occurs (before the High Update Time value is reached), the Rate display will update to the new value and the next sample period will start on the same edge. If the High Update Time value is reached (without receiving a falling edge after reaching Low Update Time), then the sample period will end but the Rate display will be forced to zero. The High Update Time value must be greater than the Low Update Time value. Both values must be greater than 0.0. The input frequency calculated during the sample period, is then shown as a Rate value

RATE VALUE CALCULATED



ZERO RATE CALCULATED



determined by either scaling method.

RATE MAXIMUM/MINIMUM CAPTURE PARAMETERS

SELECt Rt
Hi-Lo

MAXIMUM CAPTURE VALUE ASSIGNMENT

Hi ASn Rt
RAtE A

RAtE A RAtE b RAtE C

Select the Rate display to which the Maximum Capture value is assigned.

MAXIMUM CAPTURE DELAY TIME

Hi CAP SEC
1.0

0.0 to 999.9 seconds

When the assigned Rate value is above the present Maximum rate value for the entered amount of time, the unit will capture that Rate value as the new Maximum value. A delay time helps to avoid false captures of sudden short spikes.

MINIMUM CAPTURE VALUE ASSIGNMENT

Lo ASn Rt
RAtE A

RAtE A RAtE b RAtE C

Select the Rate display to which the Minimum Capture value is assigned.

MINIMUM CAPTURE DELAY TIME

Lo CAP SEC
1.0

0.0 to 999.9 seconds

When the assigned Rate value is below the present Minimum rate value for the entered amount of time, the unit will capture that Rate value as the new Minimum value. A delay time helps to avoid false captures of sudden short spikes.

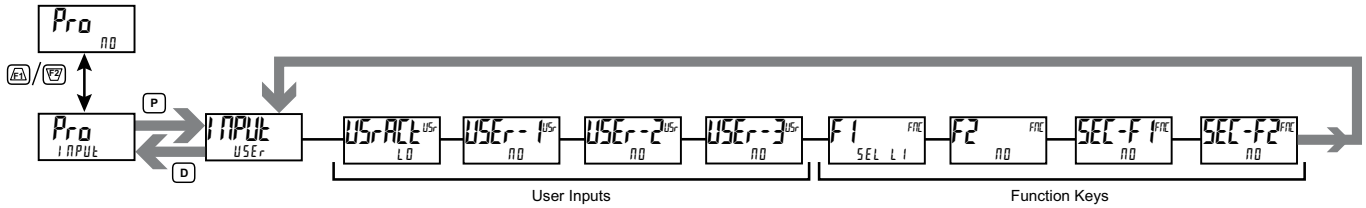
6.1.3 USER INPUT/FUNCTION KEY PARAMETERS (USEr)

This section details the programming for the rear terminal User Inputs and front panel Function Keys. Three user inputs are individually programmable to perform specific unit control functions. While in the Display Mode, the function is executed when the user input transitions to the active state. (Refer to the user input specifications for response times.) Certain User input functions are disabled in Programming Mode. Two front panel function keys, F1 and F2, are also individually programmable to perform specific unit control functions. While in the Display Mode, the primary function is executed when the key is pressed. Holding the F1 or F2 function key for three seconds executes a secondary function. It is possible to program a secondary function without a primary function. The front panel key functions are disabled while in Programming Mode.

In most cases, if more than one user input and/or function key is programmed for the same function, the maintained (level trigger) actions will be performed while at least one of those user inputs or function keys are activated. The momentary (edge trigger) actions are performed every time any of those user inputs or function keys transition to the active state.

The List user function has a value assignment sublist, which appears when the **P** key is pressed and LIST is selected. The function will only be performed for the assignment values selected as YES. If a user input or function key is configured for a function with a sublist, then that sublist will need to be scrolled through each time to access the remaining user inputs or function keys following the sublist.

Note: In the following explanations, not all selections are available for both user inputs and front panel function keys. Displays are shown with each selection. Those selections showing both displays are available for both. If a display is not shown, it is not available for that selection. In the parameter explanations, USEr-n represents all user inputs. Fn represents both function keys and second function keys.



USER INPUT ACTIVE STATE

LO HI

Select the desired active state for the User Inputs. Select LO for sink input, active low. Select HI for source input, active high.

NO FUNCTION

No function is performed if activated. This is the factory setting for all user inputs and second function keys.

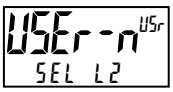
PROGRAMMING MODE LOCK-OUT

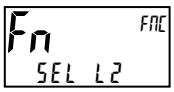
Programming Mode is locked-out, as long as activated (maintained action). A security code can be configured to allow programming access during lock-out.

SELECT LINE 1 DISPLAY

When activated (momentary action), the display advances to the next Line 1 display that has been made available (in the Display Module, Line 1/Select sub-menu). This is the factory setting for function key F1.

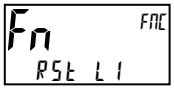
SELECT LINE 2 DISPLAY





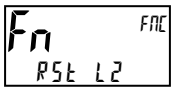
When activated (momentary action), the display advances to the next Line 2 display that has been made available (in the Display Module, Line 2/Access sub-menu).

RESET LINE 1 DISPLAY



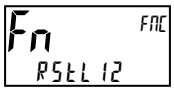
When activated (momentary action), resets the current Line 1 Display value. This is the factory setting for function key F2.

RESET LINE 2 DISPLAY



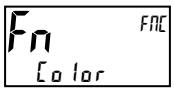
When activated (momentary action), resets the current Line 2 Display value.

RESET LINE 1 AND LINE 2 DISPLAYS



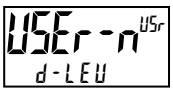
When activated (momentary action), resets both the current Line 1 Display value and Line 2 Display value.

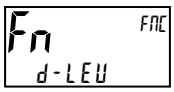
CHANGE DISPLAY COLOR



When activated (momentary action), Line 1 will change color green to red, red to orange, orange to green.

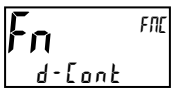
ADJUST DISPLAY INTENSITY LEVEL





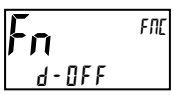
When activated (momentary action), the display intensity changes to the next intensity level.

ADJUST DISPLAY CONTRAST LEVEL



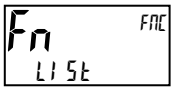
When activated (momentary action), the display contrast changes to the next higher level.

TURN OFF METER DISPLAY



Turns off the display backlight when activated. If a user input is used, the backlight is off when the user input is active (maintained action). If a front panel key is used, the backlight will toggle for each key press (momentary action). The backlight is always on in programming mode.

SELECT PARAMETER LIST



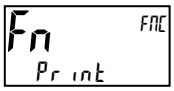
Two lists of values are available to allow the user to switch between two sets of Setpoints, Scale Factors, Counter Load values and Units mnemonics. The two lists are List A and List B. If a user input is used to select the list then List A is selected when the user input is not active and List B is selected when the user input is active (maintained action). If a front panel key is used to select the list then the list will toggle for each key press (momentary action). The display will only indicate which list is active when the list is changed.

A submenu is used to select whether the programmed Units Mnemonics are included in the List function. Select YES in the submenu to have different Units Mnemonics for List A and List B. Select NO to display the same mnemonics regardless of the list selected.

To program the values for List A and List B, first complete the programming of all the parameters with List A selected. Exit programming and switch to List B. Re-enter programming and program the desired values for the parameters included in the List.

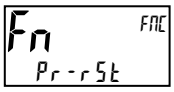
DISPLAY	DESCRIPTION	FACTORY
UNITS	Units Mnemonics	NO

PRINT REQUEST



The unit issues a block print through the serial port when activated, and the serial type is set to rLC. The data transmitted during a print request and the serial type is programmed in Port (Serial) module. If the user input is still active after the transmission is complete (about 100 msec), an additional transmission occurs. As long as the user input is held active, continuous transmissions occur.

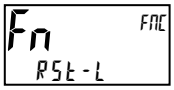
PRINT REQUEST AND RESET DISPLAYS



The unit issues a block print through the serial port when activated just like the Print Request function. In addition, when activated (momentary action), the unit performs a reset of the displays configured as YES in the sublist. Both the Print and Reset actions will only function when the serial type parameter (tYPE) is set to Red Lion protocol (rLC).

DISPLAY	DESCRIPTION	FACTORY
Cnt A	Counter A	NO
Cnt b	Counter B	NO
Cnt C	Counter C	NO
Hi	Maximum	NO
Lo	Minimum	NO

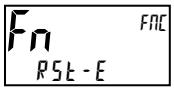
MAINTAINED (LEVEL) RESET AND INHIBIT



The unit performs a reset and inhibits the displays configured as YES in the sublist, as long as activated (maintained action).

DISPLAY	DESCRIPTION	FACTORY
Cnt A	Counter A	NO
Cnt b	Counter B	NO
Cnt C	Counter C	NO
Hi	Maximum	NO
Lo	Minimum	NO

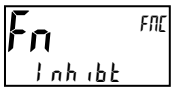
MOMENTARY (EDGE) RESET



When activated (momentary action), the unit resets the displays configured as YES in the sublist.

DISPLAY	DESCRIPTION	FACTORY
Cnt A	Counter A	NO
Cnt b	Counter B	NO
Cnt C	Counter C	NO
Hi	Maximum	NO
Lo	Minimum	NO

INHIBIT



The unit inhibits the displays configured as YES in the sublist, as long as activated (maintained action).

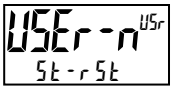
DISPLAY	DESCRIPTION	FACTORY
Cnt A	Counter A	NO
Cnt b	Counter B	NO
Cnt C	Counter C	NO
Hi	Maximum	NO
Lo	Minimum	NO

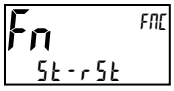
STORE DISPLAY

The unit holds (freezes) the displays configured as YES in the sublist, as long as activated (maintained action). Internally, the counters and max and min values continue to update.

DISPLAY	DESCRIPTION	FACTORY
Cnt A	Counter A	NO
Cnt b	Counter B	NO
Cnt C	Counter C	NO
Hi	Maximum	NO
Lo	Minimum	NO

STORE AND RESET DISPLAY

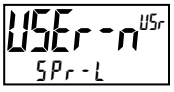


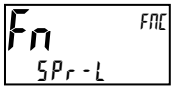


The unit holds (freezes) the displays and then performs a reset of the displays configured as YES in the sublist, as long as activated (maintained action).

DISPLAY	DESCRIPTION	FACTORY
Cnt A	Counter A	NO
Cnt b	Counter B	NO
Cnt C	Counter C	NO
Hi	Maximum	NO
Lo	Minimum	NO

SETPOINT DEACTIVATE (RESET) MAINTAINED (LEVEL)

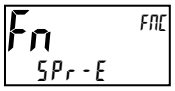




The unit deactivates (resets) the setpoint outputs configured as YES in the sublist, as long as activated (maintained action).

DISPLAY	DESCRIPTION	FACTORY
S1	Setpoint 1	NO
S2	Setpoint 2	NO
S3	Setpoint 3	NO
S4	Setpoint 4	NO

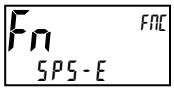
SETPOINT DEACTIVATE (RESET) MOMENTARY (EDGE)



When activated (momentary action), the unit deactivates (resets) the setpoint outputs configured as YES in the sublist.

DISPLAY	DESCRIPTION	FACTORY
S1	Setpoint 1	NO
S2	Setpoint 2	NO
S3	Setpoint 3	NO
S4	Setpoint 4	NO

SETPOINT ACTIVATE (SET) MOMENTARY (EDGE)



When activated (momentary action), the unit activates (sets) the setpoint outputs configured as YES in the sublist.

DISPLAY	DESCRIPTION	FACTORY
S1	Setpoint 1	NO
S2	Setpoint 2	NO
S3	Setpoint 3	NO
S4	Setpoint 4	NO

SETPOINT ACTIVATE (SET) MAINTAINED (LEVEL)

The unit activates (sets) the setpoint outputs configured as YES in the sublist, as long as activated (maintained action).

DISPLAY	DESCRIPTION	FACTORY
S1	Setpoint 1	NO
S2	Setpoint 2	NO
S3	Setpoint 3	NO
S4	Setpoint 4	NO

HOLD SETPOINT STATE

The unit holds the state of the setpoint outputs configured as YES in the sublist, as long as activated (maintained action).

DISPLAY	DESCRIPTION	FACTORY
S1	Setpoint 1	NO
S2	Setpoint 2	NO
S3	Setpoint 3	NO
S4	Setpoint 4	NO

6.2 OUTPUT PARAMETERS (OUtPUt)

OUTPUT SELECT

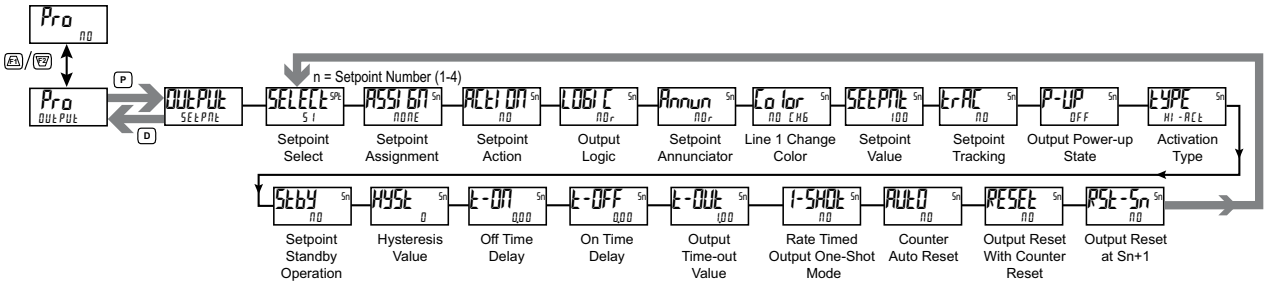
SEtPnt ANALOG

Select the Setpoint or Analog output to be programmed. The Analog output selection only appears if an analog output option card is installed in the unit.

6.2.1 SETPOINT OUTPUT PARAMETERS (SEtPnt)

This section details the programming for the setpoints. To have output capabilities, a setpoint option card needs to be installed into the PAX2D (see Ordering Information). Depending on the card installed, there will be two or four setpoint outputs available. If no output card is installed, programming for the setpoints is still available. An Exchange Parameter Lists feature for setpoint values is explained in User Input programming. For maximum input frequency, unused setpoints should be configured for NO action.

The Setpoint Assignment and Setpoint Output Action determine setpoint feature availability. The Setpoint Parameter Availability chart illustrates this.



SETPOINT PARAMETER AVAILABILITY

PARAMETER	DESCRIPTION	COUNTER ASSIGNMENT			RATE ASSIGNMENT		
		TIMED OUT t-Out	BOUNDARY bOUnd	LATCH LAtCH	TIMED OUT t-Out	BOUNDARY bOUnd	LATCH LAtCH
LOGIC	Setpoint Output Logic	Yes	Yes	Yes	Yes	Yes	Yes
Annun	Setpoint Annunciator	Yes	Yes	Yes	Yes	Yes	Yes
Color	Setpoint Line 1 Color	Yes	Yes	Yes	Yes	Yes	Yes
SEtPnt	Setpoint Value	Yes	Yes	Yes	Yes	Yes	Yes
trAC	Setpoint Tracking	Yes	Yes	Yes	Yes	Yes	Yes
P-UP	Setpoint Output Power-up State	No	No	Yes	No	No	Yes
tYPE	Setpoint Activation Type	No	Yes	No	Yes	Yes	Yes
StbY	Standby Operation	No	Yes	No	Yes	Yes	Yes
HYSt	Setpoint Hysteresis	No	No	No	Yes	Yes	No
t-On	Setpoint On Time Delay	No	No	No	Yes	Yes	Yes
t-OFF	Setpoint Off Time Delay	No	No	No	No	Yes	No
t-Out	Setpoint Output Time-out Value	Yes	No	No	Yes	No	No
1-SHOt	Rate Timed Output One-shot	No	No	No	Yes	No	No
AUtO	Counter Auto Reset	Yes	No	Yes	No	No	No
rESEt	Output Reset with Manual Reset	Yes	No	Yes	No	No	No
rSt-Sn	Setpoint Output Reset at Sn+1	Yes	No	Yes	No	No	No

SETPOINT SELECT

S1 S2 S3 S4

Select the Setpoint output to be programmed. The "Sn" in the following parameters will reflect the chosen setpoint number. After the chosen setpoint is completely programmed, the display returns to the Setpoint Select menu. Repeat steps for each setpoint to be programmed.

The number of outputs available is setpoint output card dependent (2 or 4). If no output card is installed, programming is still available for all setpoints. This allows the Line 1 color change feature to provide a visual indication when a setpoint value has been reached, even if no setpoint output card is being used.

SETPOINT ASSIGNMENT

NONE Cnt x RATE x

Select the display to which the setpoint is assigned.

SELECTION	DISPLAY VALUE
NONE	Manual Mode operation (See SERIAL RLC PROTOCOL)
Cnt x	Counter Display Value (x = A, B or C)
RATE x	Rate Display Value (x = A, B or C)

SETPOINT ACTION

NO LATCH t-OUt bOUNd

Select the desired Setpoint Output Action. Choose NO (no action) if a setpoint is unused or for manual mode operation. See "Setpoint (Alarm) Figures for Rate" for a visual detail of Rate Assigned setpoint actions.

For Counter Assignments:

LATCH	LATCH Action - The setpoint output activates when the count value equals the setpoint value. The output remains active until reset.
t-OUt	TIMED OUT Action - The setpoint output activates when the count value equals the setpoint value and deactivates after the Time Out value.
bOUNd	BOUNDARY Action - The setpoint output activates when the count value is greater than or equal to (for tYPE = HI-ACt) or less than or equal to (for tYPE = LO-ACt) the setpoint value. The setpoint output will deactivate when the count value is less than (for tYPE = HI-ACt) or greater than (for tYPE = LO-ACt) the setpoint value.

For Rate Assignments:

LATCH	LATCH Action - The setpoint output activates when the rate value is equal to the setpoint value. The setpoint output remains active until reset. If after reset, the rate value is greater than or equal to (for tYPE = HI-ACt) or less than or equal to (for tYPE = LO-ACt) the setpoint value, the output will reactivate.
t-OUt	TIMED OUT Action - The setpoint output cycles when the rate value is greater than or equal to (for tYPE = HI-ACt) or less than or equal to (for tYPE = LO-ACt) the setpoint value. The Setpoint Time Out (t-OUt) and Setpoint On Delay (t-On) values determine the cycling times. One-shot mode provides a single output pulse (t-OUt) rather than on/off cycling.
bOUNd	BOUNDARY Action - The setpoint output activates when the rate value is greater than or equal to (for tYPE = HI-ACt) or less than or equal to (for tYPE = LO-ACt) the setpoint value. The setpoint output will deactivate (Auto reset) as determined by the Hysteresis value.

OUTPUT LOGIC

NOr rEU

Enter the output logic of the alarm output. The NOr logic leaves the output operation as normal. The rEu logic reverses the output logic. In rEU, the alarm states in the Setpoint Alarm Figures are reversed.

SETPOINT ANNUNCIATOR

NOr rEU FLASH OFF

The NOr mode displays the corresponding setpoint annunciators of "on" alarm outputs. The rEU mode displays the corresponding setpoint annunciators of "off" alarms outputs. The FLASH mode flashes the corresponding setpoint annunciators of "on" alarm outputs. The OFF mode disables display setpoint annunciators.

LINE 1 CHANGE COLOR

NO CHG GrEEN OrANGE rEd
GrnOrG rEdOrG rEdGrn LINE 1

This parameter allows the Line 1 Display to change color, or alternate between two colors, when the alarm is activated. When multiple alarms are programmed to change color, the highest numbered active alarm (S4-S1) determines the display color.

The NO CHG selection will maintain the color displayed prior to the alarm activation. The LINE 1 selection sets the display to the Display (Line 1) Color (Color).

SETPOINT VALUE

-199999 to 999999

Enter desired setpoint alarm value. Setpoint values can also be entered in the Display Mode during Program Lockout when the setpoint is programmed as Entr in the Display (Line 2) Access parameters. The decimal point position is determined by the Setpoint Assignment value.

SETPOINT TRACKING

NO S2 S4 CLd b
S1 S3 CLd A CLd C

If a selection other than NO is chosen, then the value of the setpoint being programmed ("n") will track the entered selection's value. Tracking means that when the selection's value is changed, the "n" setpoint value will also change (or follow) by the same amount.

OUTPUT POWER-UP STATE

OFF ON SAVE

OFF will deactivate the output at power up. ON will activate the output at power up. SAVE will restore the output to the same state it was at before the unit was powered down.

ACTIVATION (BOUNDARY) TYPE

HI-ACt LO-ACt

HI-ACt activates the output when the assigned display value (ASSIGN) equals or exceeds the setpoint value. LO-ACt activates the output when the assigned display value is less than or equal to the setpoint.

SETPOINT STANDBY OPERATION

NO YES

This parameter only applies to low acting setpoint activation (boundary) type setpoints. Select YES to disable a low acting setpoint at power-up, until the assigned display value crosses into the output "off" area. Once in the output "off" area, the setpoint will function per the description for low acting activation (boundary) type.

HYSTERESIS VALUE

HYST Sn
0

0 to 59999

The hysteresis value is added to (for TYPE = LO-ACT), or subtracted from (for TYPE = HI-ACT), the setpoint value to determine at what value to deactivate the associated setpoint output. Hysteresis is only available for Rate assigned setpoints.

ON TIME DELAY

t-ON Sn
0.00

0.00 to 599.99 seconds

This is the amount of time the assigned Rate display must meet the setpoint activation requirements (below setpoint for Low Acting and above setpoint for High Acting), before the setpoint output activates. If the Rate Setpoint Action is Timed-Out, this is the amount of time the output is OFF during the ON/OFF output cycling. This parameter is only available for Rate assigned setpoints.

OFF TIME DELAY

t-OFF Sn
0.00

0.00 to 599.99 seconds

This is the amount of time the assigned Rate display must meet the setpoint deactivation requirements (below hysteresis for High Acting and above hysteresis for Low Acting), before the setpoint output deactivates. This parameter is only available for Rate assigned setpoints.

OUTPUT TIME-OUT

t-OUt Sn
1.00

0.00 to 599.99 seconds

If the setpoint action is Timed Out and the setpoint is assigned to Counter, then this is the amount of time the output will activate once the count value equals the setpoint value. If the setpoint action is Timed Out and the setpoint is assigned to Rate, then this is the amount of time the output is ON during the ON / OFF output cycling. If Rate Timed Output One-Shot mode is enabled, then this is the time duration for the one-shot output pulse.

RATE TIMED OUTPUT ONE-SHOT

1-SHOt Sn
NO

NO YES

If the setpoint action is Timed Out and the setpoint is assigned to Rate, select YES to have the output activate for a single pulse (one-shot) when the assigned Rate display meets the setpoint activation requirements. Select NO for ON / OFF output cycling per the "Setpoint (Alarm) Figures For Rate" diagram.

COUNTER AUTO RESET

AUtO Sn
NO

NO rSt-St CLd-St
rSt-En CLd-En

This automatically resets the display value of the Setpoint Assigned Counter each time the setpoint value is reached. The automatic reset can occur at output start or output end if the setpoint output action is programmed for timed output mode. The counter may be reset to zero or the count load value. This reset may be different from the counter reset action programmed in the Input Parameter (INPUt) menu section.

SELECTION	ACTION
NO	No Auto Reset
rSt-St	Reset to Zero at the Start of output activation
CLd-St	Reset to Count Load value at the Start of output activation
rSt-En	Reset to Zero at the End of output activation (timed out only)
CLd-En	Reset to Count Load at the End of output activation (timed out only)

OUTPUT RESET WITH COUNTER RESET

rESEt Sn
NO

NO YES

Selecting YES causes the Setpoint output to deactivate (reset) when the Setpoint Assigned Counter is reset. The only exception is when the assigned counter is reset by a setpoint generated counter auto reset.

OUTPUT RESET AT Sn+1

RSt-Sn Sn
NO

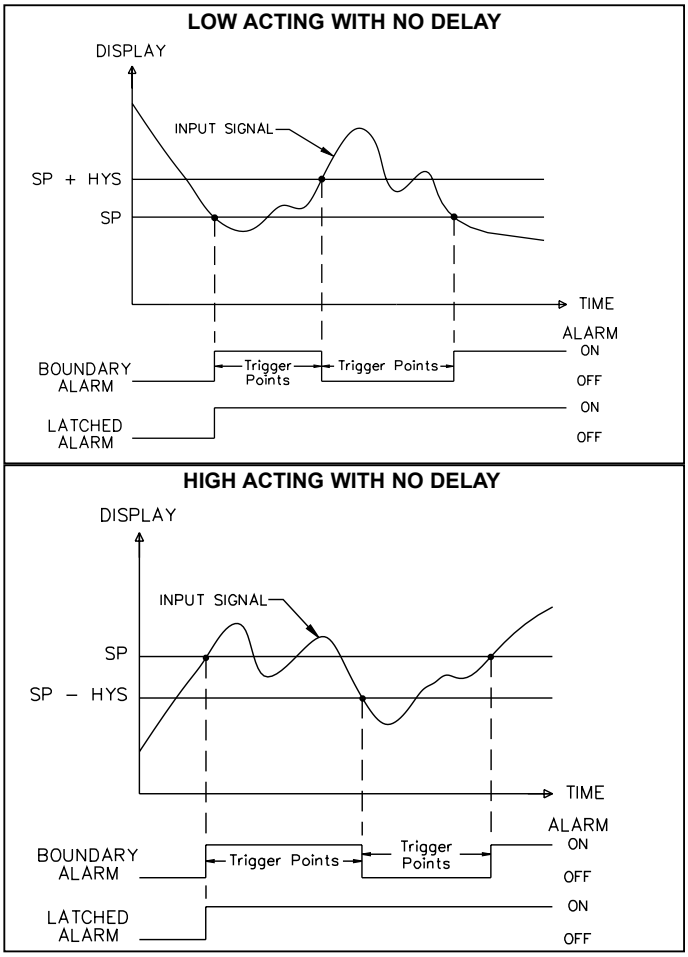
NO Sn-Str Sn-End

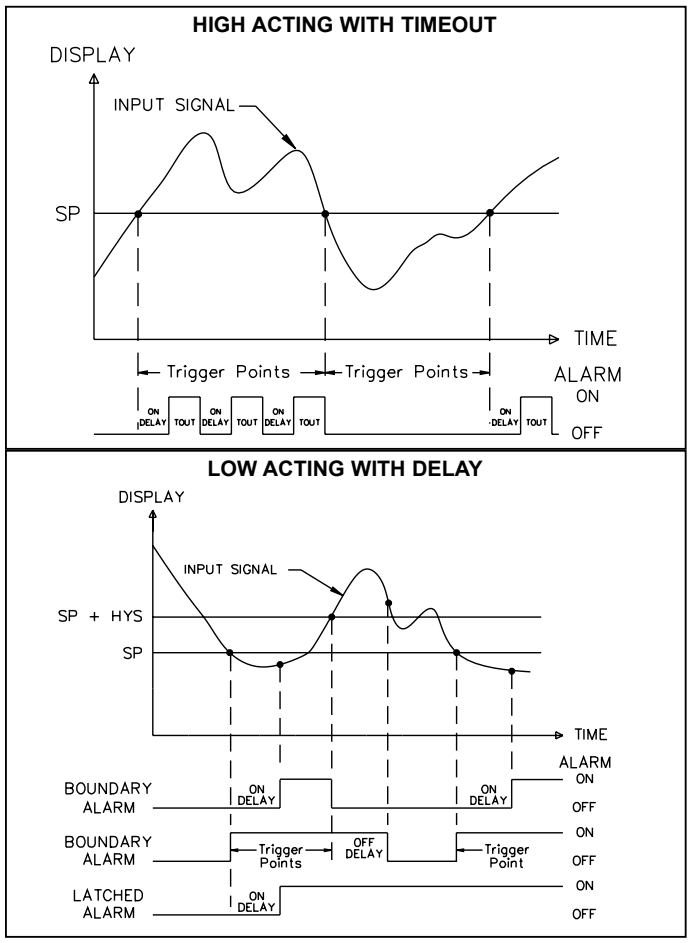
Selecting Sn-Str causes the setpoint output to deactivate (reset) when setpoint Sn + 1 activates. (Example: S1 deactivates when S2 activates, and S4 when S1 activates.) The last setpoint will wrap around to the first.

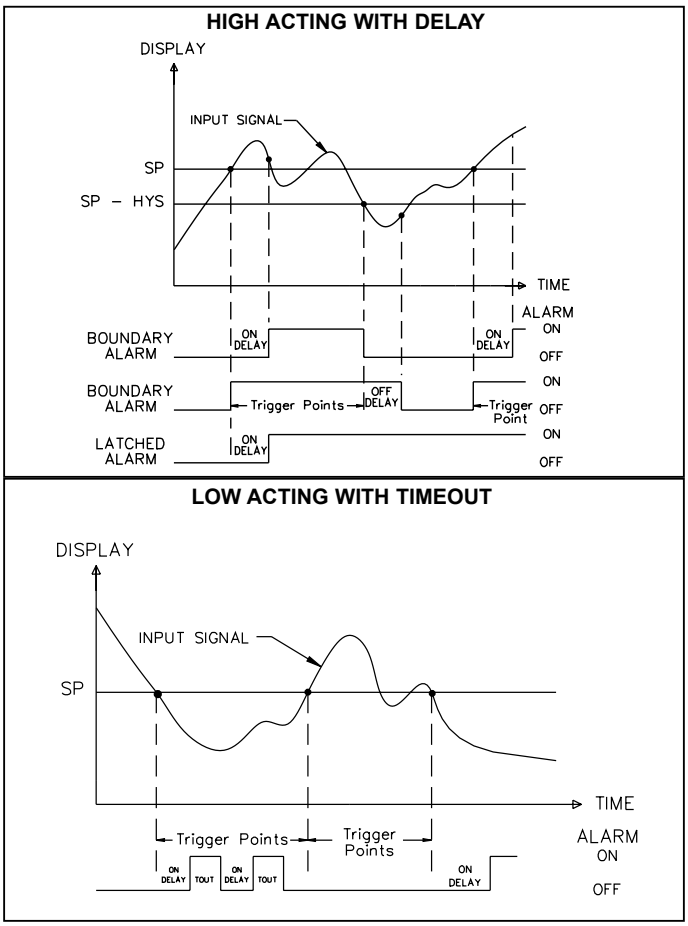
Selecting Sn-End causes the setpoint output to deactivate (reset) when setpoint Sn + 1 activates and then times out (deactivates). This selection only applies if the Sn + 1 setpoint action is Timed Out. (Example: S1 deactivates when S2 is activated and then times out.) The last setpoint will wrap around to the first. This parameter is only available for Counter assigned setpoints.

Setpoint (Alarm) Figures for Rate

(For Reverse Logic, The Alarm state is opposite.)

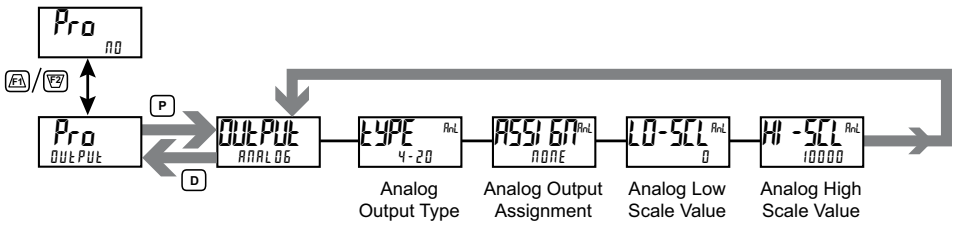






6.2.2 ANALOG OUTPUT PARAMETERS (ANALOG)

This section is only accessible with the optional PAXCDL Analog card installed (see Ordering Information).



ANALOG OUTPUT TYPE

4-20 0-10 0-20

Enter the analog output type. For 0-20 mA or 4-20 mA use terminals 18 and 19. For 0-10 V use terminals 16 and 17. Only one range can be used at a time.

ANALOG OUTPUT ASSIGNMENT

Enter the source for the analog output to retransmit:

SELECTION	DISPLAY VALUE
NONE =	Manual Mode operation . (See Serial RLC Protocol in the Communications Port module).
Cntxx =	Counter Display Value (x = A, B or C)
RATE x =	Rate Display Value (x = A, B or C)
Hi =	Maximum Display Value
Lo =	Minimum Display Value
S1-S4 =	Setpoint Value (S1-S4)

ANALOG LOW SCALE VALUE

-199999 to 999999

Enter the Display Value that corresponds to 0 mA (0-20 mA) , 4 mA (4-20 mA) or 0 VDC (0-10 VDC).

ANALOG HIGH SCALE VALUE

-199999 to 999999

Enter the Display Value that corresponds to 20 mA (0-20 mA) , 20 mA (4-20 mA) or 10 VDC (0-10 VDC).

6.3 DISPLAY PARAMETERS (dISPLY)

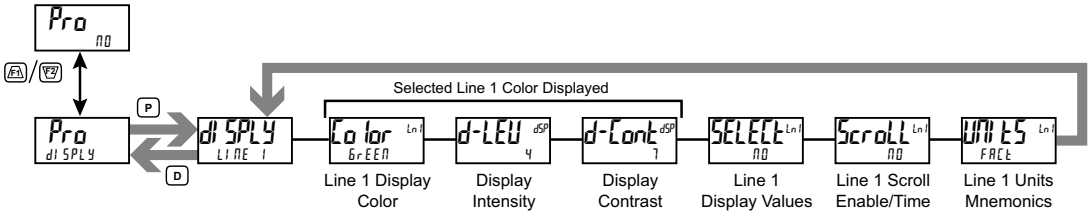
DISPLAY LINE SELECT

dISPLY / LINE 1 — LINE 1 LINE 2

Select the Display Line to be programmed.

6.3.1 LINE 1 PARAMETERS (LINE 1)

This section details programming for the Line 1 (Top Line) Display. The Input, Gross, Tare, Total, Maximum (HI) and Minimum (LO) capture values and setpoints can be shown on the Line 1 display. The 3-digit Units mnemonic characters can be used to indicate which Line 1 display value is shown. Standard or custom mnemonics are available for Line 1 values.



LINE 1 DISPLAY COLOR

Color Ln1 / GrEEN — GrEEN rEd OrANGE

Enter the desired Display Line 1 and programmable Units Display color.

DISPLAY INTENSITY LEVEL

d-LEV dSP / 4 — 1 to 4

Enter the desired Display Intensity Level (1-4) by using the arrow keys. The display will actively dim or brighten as the levels are changed. This parameter can also be accessed in the Parameter display loop when enabled.

DISPLAY CONTRAST LEVEL

d-Cont dSP / 7 — 0 to 15

Enter the desired Display Contrast Level (0-15) by using the arrow keys. The display contrast / viewing angle will actively adjusts up or down as the levels are changed. This parameter can also be accessed in the Parameter display loop when enabled.

LINE 1 DISPLAY VALUE SELECT/ENABLE

SELECt Ln1 / NO — NO YES

Enter YES to select which values will be shown on the Line 1 display. A sub-menu provides Yes/No selection for each available Line 1 value. Values set to YES in the sub-menu will be displayable on Line 1.

DISPLAY	DESCRIPTION	FACTORY
Cnt A	Counter A	YES
Cnt b	Counter B	NO
Cnt C	Counter C	NO
RAtE A	Rate A	NO
RAtE b	Rate B	NO
RAtE C	Rate C	NO
Hi	Max Value	NO
Lo	Min Value	NO

LINE 1 DISPLAY SCROLL ENABLE/TIME

ScroLL Ln1 / NO — NO 1 to 15 seconds

If Line 1 Display Scrolling is desired, set the scroll time in seconds.

LINE 1 UNITS MNEMONIC(S)

UNItS Ln1 / FACt — OFF LAbEL CUSt FACt

Select the mode for Line 1 Units Mnemonic(s). See LINE 1 UNITS MNEMONIC DIAGRAM for programming details.

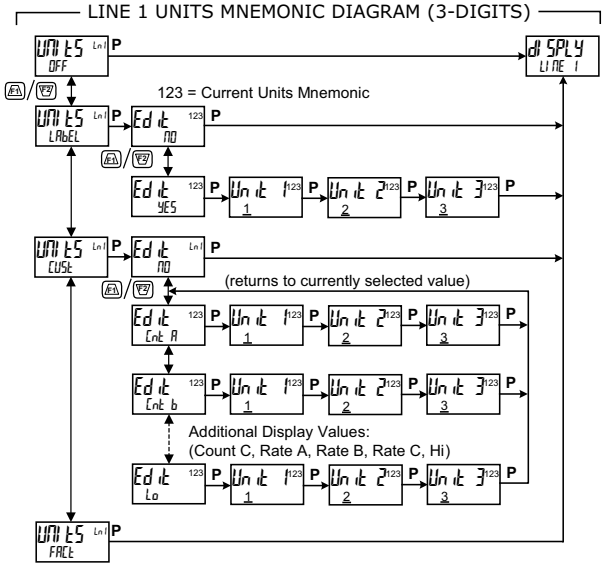
SELECTION	MODE	DESCRIPTION
OFF	OFF	No Line 1 mnemonic shown.
LAbEL	LABEL	Single programmable mnemonic shown for all Line 1 values.
CUSt	CUSTOM	Custom programmable mnemonics shown for each Line 1 value.
FACt	FACTORY	Factory default mnemonics shown for each Line 1 value.

The characters available for the programmable modes include:

A b C d E F G H I J K L M N O P Q R S t U V W y Z 0 1
2 3 4 5 6 7 8 9 a c e g h i m n o q r u w - = [ ] ° _ blank

Two character spaces are required to display this character.

LINE 1 UNITS MNEMONIC DIAGRAM (3-DIGITS)



6.3.2 LINE 2 PARAMETERS (LINE 2)

This section details programming for the Line 2 (Bottom Line) Display. The Counter values, Rate values, Rate Capture values, Setpoint values and Parameter List A/B status can all be shown on the Line 2 display. The display loops described below are used to view, reset and modify the selected display values, based on the Line 2 Value Access setting programmed for each available value.

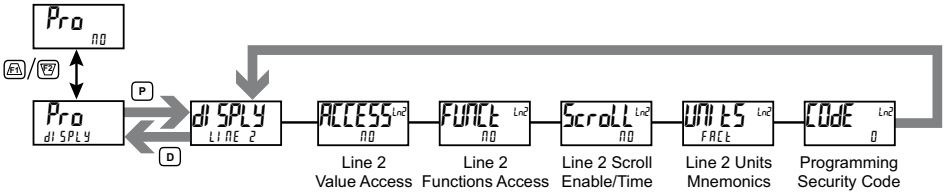
Main Display Loop

In the Main Display Loop, the selected values can be consecutively read on Line 2 by pressing the **D** key. A left justified 2 or 3-character mnemonic indicates which Line 2 value is currently shown. When in the Main display loop, the Function keys F1 and F2 perform the User functions programmed in the User Input program section.

Parameter Display Loop and Hidden Parameter Loop

These display loops provide quick access to selected parameters that can be viewed and modified on Line 2 without having to enter Full Programming Mode. These values include Parameter List A/B selection, Setpoints, Scale Factors, Counter Load values and Display Settings (color, intensity and contrast). To utilize the Parameter or Hidden Parameter loops, a security code (1-250) must be programmed. (See Programming Security Code at the end of this section.)

The Parameter display loop is accessed by pressing the **P** key. The selected Parameter display loop values can be viewed and/or changed per the Line 2 Value Access setting programmed for each available value. The Hidden Parameter Loop follows the Parameter display loop, and can only be accessed when the correct security code is entered at the Code prompt.



LINE 2 VALUE ACCESS

ACCESS Ln2 no — no yes

Select yes to program the Value Access setting for each available Line 2 parameter. Line 2 values can be made accessible in either the Main (**D** key), Parameter (**P** key) or Hidden (**P** key following code entry) display loops.

Each parameter must be configured for one of the following settings. Not all settings are available for each parameter, as shown in the Parameter Value Access table.

SELECTION	DESCRIPTION
LOC	Not viewed on Line 2 Display (Factory Default Setting)
d-rEAd	View in Main display loop. Cannot change or reset.
d-rSt	View and reset in Main display loop.
d-Entr	View and change in Main display loop
P-rEAd	View in Parameter display loop. Cannot change or reset.
P-Entr	View and change in Parameter display loop
HidE	View and change in Hidden Parameter display loop

LINE 2 FUNCTIONS ACCESS

FUNCt Ln2 no — no yes

Select yes to display the following list of functions that can be made available at the end of the Parameter (P-Entr) or Hidden (HidE) display loops. Each Line 2 Function can be programmed for LOC, P-Entr, or HidE.

The more critical and frequently used functions should be first assigned to the User Inputs and User Function keys, however if more functions are needed than what can be obtained with user inputs and function keys, these will provide a means to provide that access. Refer to Input module, User sub-menu section for a description of the function.

SELECTION	DESCRIPTION
r-L1	Reset Line 1 Display Value
r-CtA	Reset Counter A
r-Ctb	Reset Counter B
r-CtC	Reset Counter C
r-AbC	Reset Counters A, B and C
r-Hi	Reset Maximum Rate Capture Value
r-Lo	Reset Minimum Rate Capture Value
r-HL	Reset Max and Min Rate Capture Values
Print	Print Request (Block Print)

LINE 2 PARAMETER VALUE ACCESS

DISPLAY	DESCRIPTION	NOT VIEWED	MAIN DISPLAY LOOP (D KEY)			PARAMETER DISPLAY LOOP (P KEY)		HIDDEN LOOP
		LOC	d-rEAd	d-rSt	d-Entr	P-rEAd	P-Entr	HidE
Cnt A	Counter A	X	X	X				
Cnt b	Counter B	X	X	X				
Cnt C	Counter C	X	X	X				
RAtE A	Rate A	X	X					
RAtE b	Rate B	X	X					
RAtE C	Rate C	X	X					
Hi	Max Value	X	X	X				
Lo	Min Value	X	X	X				
LiSt	Parameter List A/B	X	X		X	X	X	X
Snx	Setpoint Value (S1-S4) *	X	X		X	X	X	X
SC FAC	Scale Factor A, B, C *	X				X	X	X
Cnt Ld	Counter Load A, B, C *	X				X	X	X
Color	Line 1 Display Color	X				X	X	X
d-LEV	Display Intensity Level	X				X	X	X
d-Cont	Display Contrast Level	X				X	X	X

* Indicates multiple value entries.