User's Guide

DPF260
Digital Input Panel Meter

LP0947A

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3RSD
PROCESS CONTROL EQUIPMENT

CE

- COUNT, DUAL COUNTER WITH MATH FUNCTIONS
- RATE, DUAL RATE WITH MATH FUNCTIONS
- SLAVE DISPLAY
- UNIVERSAL AC/DC POWER SUPPLY
- 6 / 9 DIGIT DUAL LINE/TRI-COLOR DISPLAY WITH 0.71" & 0.35" DIGITS
- 10 POINT RATE SCALING FOR NON-LINEAR PROCESSES
- PROGRAMMABLE UNITS DISPLAY
- BUS CAPABILITIES; DEVICENET, MODBUS, AND PROFIBUS-DP
- BUILT-IN USB PROGRAMMING PORT ENABLING UNIT CONFIGURATION WITH DP6-SOFT PROGRAMMING SOFTWARE
- NEMA 4X/IP65 SEALED FRONT BEZEL

DESCRIPTION

The DPF260 Digital Panel Meter offers many features and performance capabilities that are not available on standard panel meters. The basic meter is a dual counter and dual rate meter all in the same package. A third counter and third rate display allows the user to do simple math functions. The optional plug-in output cards allow the opportunity to configure the meter for present applications, while providing easy upgrades for future needs.

Highlighting the DPF260 is a dual line, display with a large 0.71" tri-color 6 digit top display line and a 0.35", 9 digit green bottom display line. The meter also offers programmable units display providing the ability to tag the display with units of measure. Display color change capability provides machine operators a visual indication of changing conditions, even when the operator is not close enough to read the actual display value. In addition, a universal power supply provides the ultimate in flexibility for both AC and DC power.

The meter accepts digital inputs from a variety of sources including switch contacts, outputs from CMOS or TTL circuits and magnetic pickups. The meter can process directional, uni-directional or Quadrature signals simultaneously. The meter accepts input signals up to 50 KHz maximum depending on the count mode and function configurations programmed. Each input signal can be independently scaled to various process values.

The meter provides a MAX and MIN rate reading memory with programmable capture time. The capture time is used to prevent detection of false max or min readings which may occur during start-up or unusual process events.

The meter has up to four setpoint outputs, implemented on plug-in option cards. The plug-in cards provide dual FORM-C relays, quad FORM-A, or either quad sinking or quad sourcing open collector logic outputs. The setpoint alarms can be configured to suit a variety of control and alarm requirements.

Communication and bus capabilities are also available as option cards. These include RS232 and RS485. The DPF260 can be programmed to utilize Modbus protocol. With Modbus, the user has access to most configuration parameters. Readout values and setpoint alarm values can be controlled through the bus. Additionally, the meter has a feature that allows a remote computer to directly control the outputs of the meter.

The DPF260 includes a built-in USB programming port. With a Windows® based program, made available by Omega, configuration data can be downloaded to the DPF260 without the need of any additional option cards.

A linear DC output signal is available as an optional plug-in card. The card provides either 20 mA or 10 V signals. The output can be scaled independent of the input range and can track any of the counter, rate, max or min displays, or any setpoint value.

After the meter has been initially configured, the parameter programming may be locked out from further modification in its entirety, or allowing selected values accessible for quick entry.

The meter has been specifically designed for harsh industrial environments. With NEMA 4X/IP65 sealed bezel,extensive testing of noise effects with regard to CE requirements, the meter provides a tough reliable application solution.

SAFETY SUMMARY

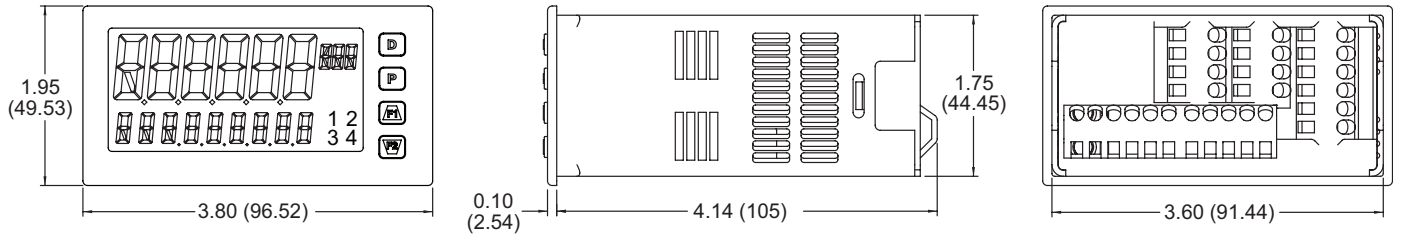
All safety related regulations, local codes and instructions that appear in this literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection 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.

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.



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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: OVEr
   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: OVEr
   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, and magnetic pickups. 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 #E70366
    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: One 14 AWG (2.55 mm) solid, two 18 AWG (1.02 mm) or four 20 AWG (0.61 mm)
15. **CONSTRUCTION**: This unit is rated NEMA 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)

OPTIONAL PLUG-IN OUTPUT CARDS

WARNING: Disconnect all power to the unit before installing plug-in cards.

Adding Option Cards

The DPF260 meters can be fitted with up to three optional plug-in cards. The details for each plug-in 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 (LDP6-CDS), Communications (LDP6-CDC), and Analog Output (LDP6-CDL). The plug-in cards can be installed initially or at a later date.

COMMUNICATION CARDS (LDP6-CDC)

A variety of communication protocols are available for the DPF260 meter. Only one LDP6-CDC card can be installed at a time. *Note: For Modbus communications use RS485 Communications Output Card and configure communication (tYPE) parameter for Modbus.*

LDP6-CDC10 - RS485 Serial (Terminal)
LDP6-CDC1C - RS485 Serial (Connector)
LDP6-CDC20 - RS232 Serial (Terminal)
LDP6-CDC2C - RS232 Serial (Connector)

SERIAL COMMUNICATIONS CARD

Type: RS485 or RS232
Communication Type: RLC Protocol (ASCII), Modbus RTU, and Modbus ASCII
Isolation To Sensor & User Input Commons: 500 Vrms for 1 min.
Working Voltage: 50 V. 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)

SETPOINT CARDS (LDP6-CDS)

The DPF260 meter has 4 available setpoint alarm output plug-in cards. Only one LDP6-CDS card can be installed at a time. (Logic state of the outputs can be reversed in the programming.) These plug-in cards include:

LDP6-CDS10 - Dual Relay, FORM-C, Normally open & closed
LDP6-CDS20 - Quad Relay, FORM-A, Normally open only
LDP6-CDS30 - Isolated quad sinking NPN open collector
LDP6-CDS40 - Isolated quad sourcing PNP open collector

DUAL RELAY CARD

Type: Two FORM-C relays
Isolation To Sensor & User Input Commons: 2000 Vrms for 1 min.
Working Voltage: 240 Vrms
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

Type: Four FORM-A relays
Isolation To Sensor & User Input Commons: 2300 Vrms for 1 min.
Working Voltage: 250 Vrms
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

Type: Four isolated sinking NPN transistors.
Isolation To Sensor & User Input Commons: 500 Vrms for 1 min.
Working Voltage: 50 V. 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

Type: Four isolated sourcing PNP transistors.
Isolation To Sensor & User Input Commons: 500 Vrms for 1 min.
Working Voltage: 50 V. 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

LINEAR DC OUTPUT (LDP6-CDL)

Either a 0(4)-20 mA or 0-10 V retransmitted linear DC output is available from the analog output plug-in 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.

LDP6-CDL10 - Retransmitted Analog Output Card

ANALOG OUTPUT CARD

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.
Working Voltage: 50 V. 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 typicat

PROGRAMMING SOFTWARE

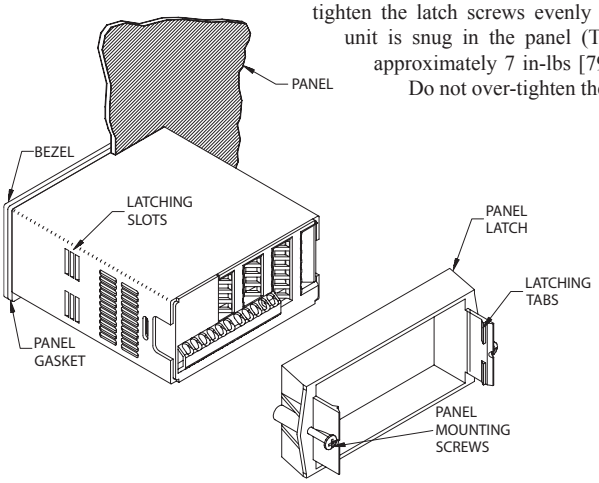
DP6-SOFT is a Windows® based program that allows configuration of the meter from a PC. The software offers standard drop-down menu commands, that make it easy to program the meter. The meter's program can then be saved in a PC file for future use.

1.0 Installing the Meter

Installation

The DPF260 meets NEMA 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.



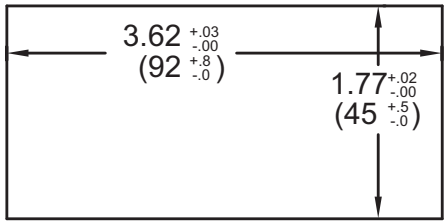
Installation Environment

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.

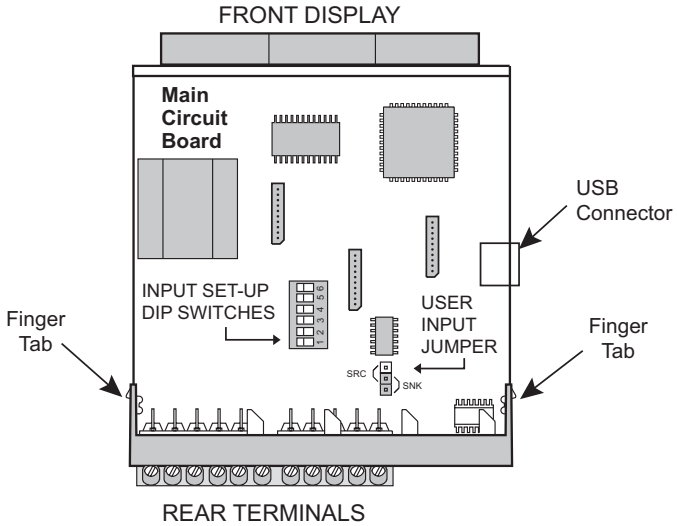
PANEL CUT-OUT



2.0 Setting the DIP Switches

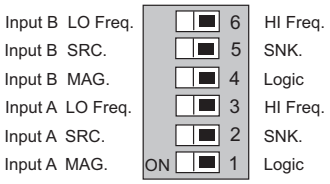
To access the switches, remove the meter base from the case by firmly squeezing and pulling back on the side rear finger tabs. This should lower the latch below the case slot (which is located just in front of the finger tabs). It is recommended to release the latch on one side, then start the other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

Warning: Exposed line voltage exists on the circuit boards. Remove all power to the meter and load circuits before accessing inside of the meter.



SETTING THE INPUT DIP SWITCHES

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



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

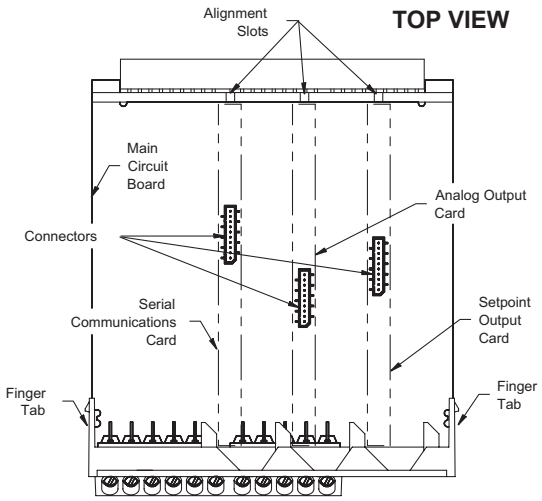
HI Frequency: Removes damping capacitor and allows max. frequency.

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 Plug-In Cards

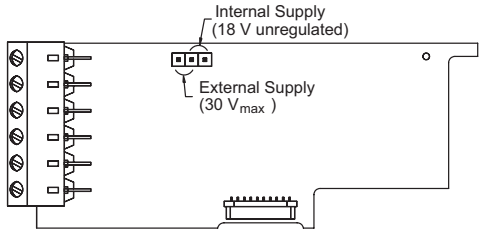
The plug-in cards are separately purchased optional cards that perform specific functions. These cards plug into the main circuit board of the meter. The plug-in cards have many unique functions when used with the DPF260.

CAUTION: The plug-in 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.



To Install:

1. With the meter removed from the case, locate the plug-in card connector for the card type to be installed. The types are keyed by position with different main circuit board connector locations. When installing the card, hold the meter by the rear terminals and not by the front display board.
   If installing the Quad sourcing Plug-in Card (LDP6-CDS40), set the jumper for internal or external supply operation before continuing.



2. Install the plug-in card by aligning the card terminals with the slot bay in the rear cover. Be sure the connector is fully engaged and the tab on the plug-in card rests in the alignment slot on the display board.
3. Slide the meter base back into the case. Be sure the rear cover latches fully into the case.
4. Apply the plug-in card label to the bottom side of the meter in the designated area. Do Not Cover the vents on the top surface of the meter. The surface of the case must be clean for the label to adhere properly.

4.0 Wiring the Meter

WIRING OVERVIEW

Electrical connections are made via screw-clamp terminals located on the back of the meter. 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 meter (DC or AC) be protected by a fuse or circuit breaker.

When wiring the meter, compare the numbers embossed on the back of the meter case against those shown in wiring drawings for proper wire position. Strip the wire, leaving approximately 0.3" (7.5 mm) bare lead exposed (stranded wires should be tinned with solder). Insert the lead under the correct screw-clamp terminal and tighten until the wire is secure (Pull wire to verify tightness). Each terminal can accept up to one #14 AWG (2.55 mm) wire, two #18 AWG (1.02 mm), or four #20 AWG (0.61 mm).

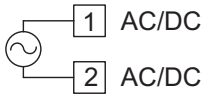
EMC INSTALLATION GUIDELINES

Although this meter is 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
   Line Filters for input power cables:
   Schaffner # FN2010-1/07
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. 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.
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.

4.1 POWER WIRING

AC Power



DC Power

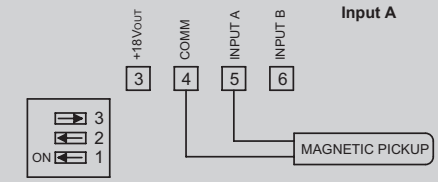
The power supplied to the meter shall employ a 15 Amp UL approved circuit breaker for AC input and a 1 Amp, 250 V UL approved fuse for DC input. It shall be easily accessible and marked as a disconnecting device to the installed unit. This device is not directly intended for connection to the mains without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

4.2 INPUT SIGNAL WIRING

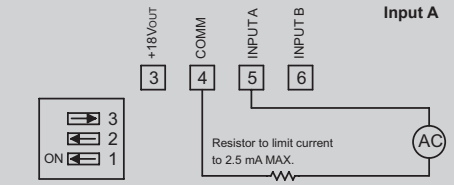
CAUTION: Sensor input common is NOT isolated from user input common. In order to preserve the safety of the meter application, the sensor input common must be suitably isolated from hazardous live earth referenced voltage; or input common must be at protective earth ground potential. If not, hazardous 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 plug-in 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.

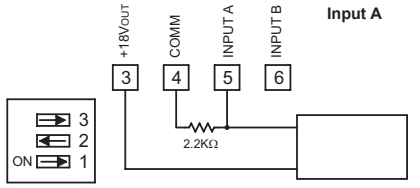
Magnetic Pickup



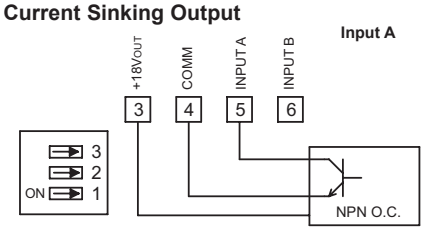
AC Inputs From Tach Generators, Etc.



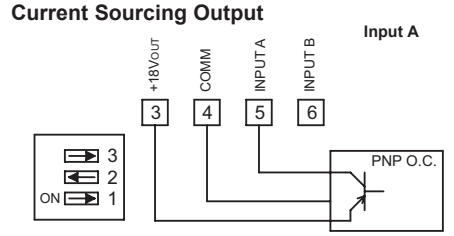
Two Wire Proximity, Current Source



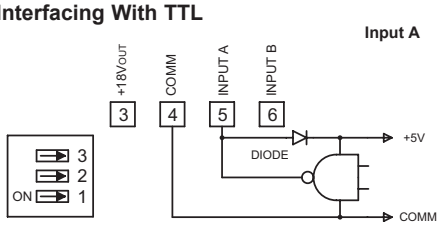
Current Sinking Output



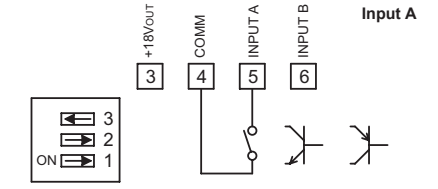
Current Sourcing Output



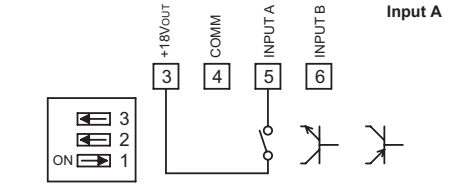
Interfacing With TTL



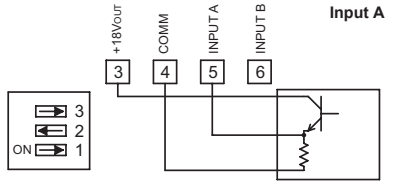
Switch or Isolated Transistor; Current Sink



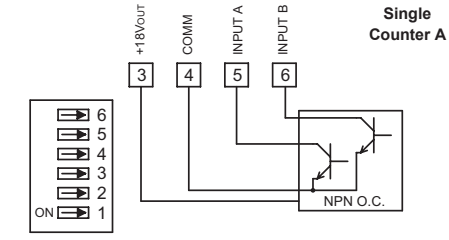
Switch or Isolated Transistor; Current Source



Emitter Follower; Current Source

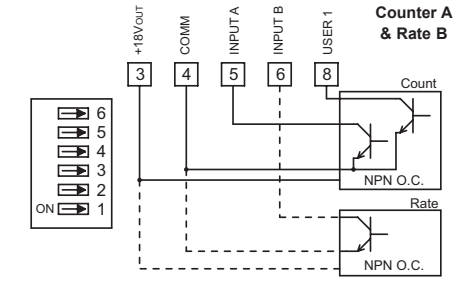


Quad; Current Sink Output

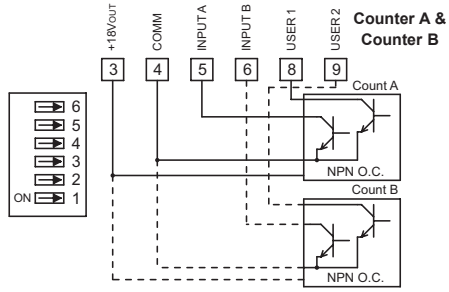


If using single Counter B, then wire signal to 6, and Quad/Direction to 9. Set switches as shown.

Dual Quad/Count; Current Sink Output



Dual Quad/Quad; Current Sink Output



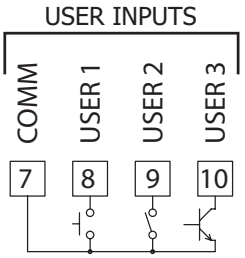
Shaded areas not recommended for counting applications.

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.

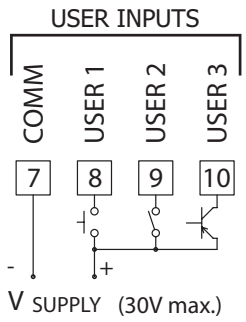
Sinking Logic (USrACt LO)

When the USrACt parameter is programmed to LO, the user inputs of the meter 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 of the meter 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.



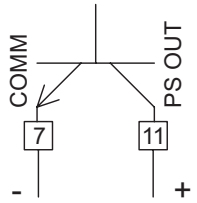
4.4 SETPOINT (ALARMS) WIRING

4.5 SERIAL COMMUNICATION WIRING

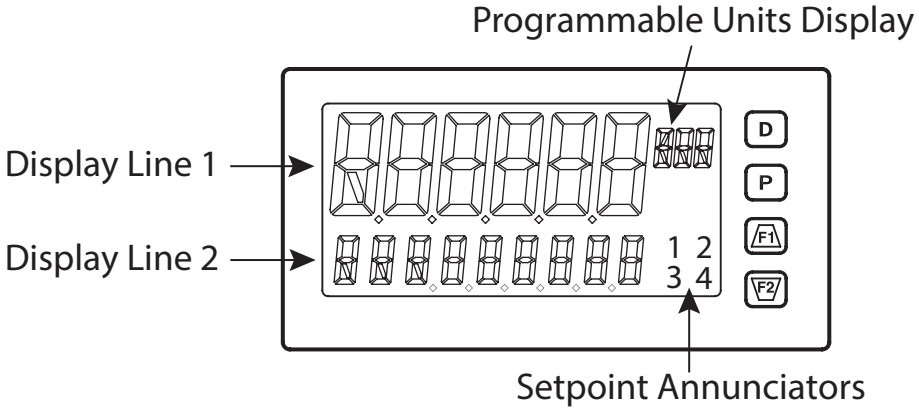
4.6 ANALOG OUTPUT WIRING

See appropriate plug-in 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

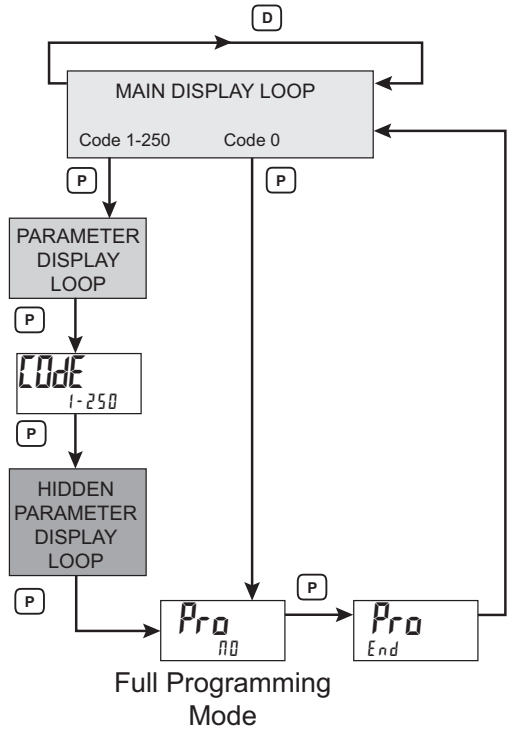
Line 1 is the large, 6-digit top line display. Counter values, rate values and the maximum (Hi) and minimum (Lo) rate capture values can be shown on Line 1. The 3-digit Units mnemonic characters can be used to indicate which Line 1 display value is shown. Standard or custom mnemonics are available for 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 DPF260 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.

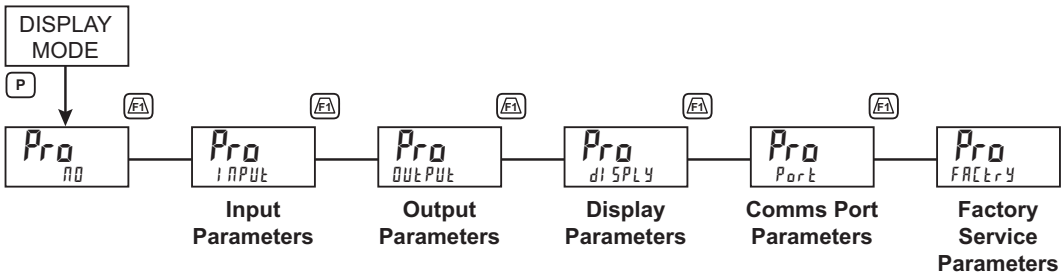
Parameter and Hidden Parameter Display Loops

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 meter 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 DPF260



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 meter 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 meter 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 meter 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.

INPUT PARAMETERS (INPUT)

INPUT SELECT

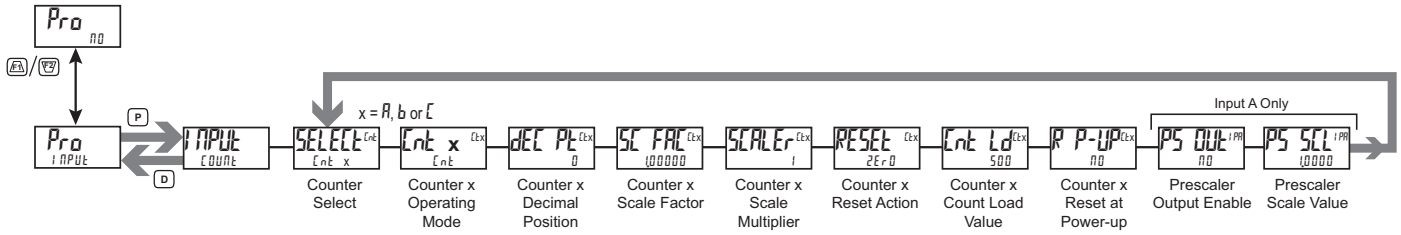
COUNT RATE USER

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

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.

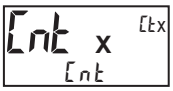


COUNTER SELECT

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 meter 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.)

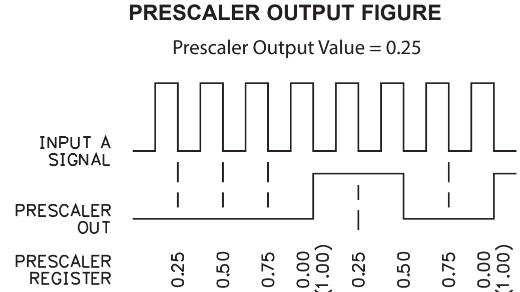
PRESCALER SCALE VALUE

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:

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

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:

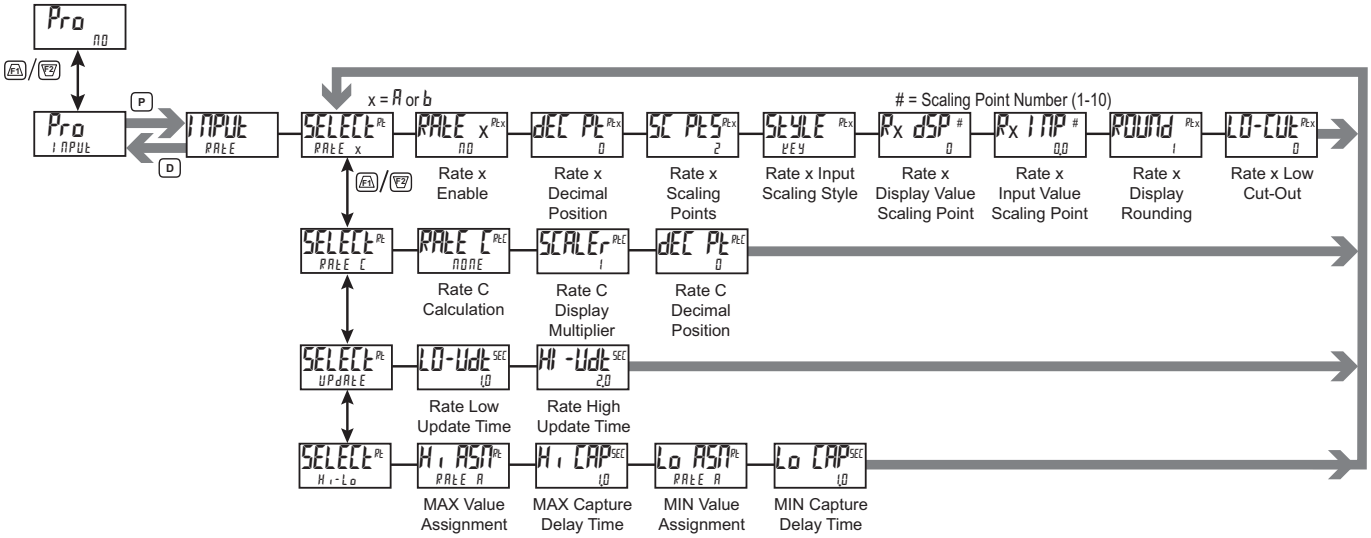
1. Indicate feet to the hundredths (0.00) with 100 pulses per foot: Scale Factor would be 100 / (100 x 1 x 1) = 1 (In this case, the scale multiplier and counter mode factor are 1)
2. Indicate feet with 120 pulses per foot: Scale Factor would be 1 / (120 x 1 x 1) = 0.0083333. (In this case, the scale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

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

RATE A RATE C Hi-Lo
RATE b UPdAtE

Select the Rate parameters to be programmed.

RATE ENABLE

no YES

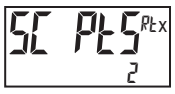
Select YES to measure the rate (speed) of pulses on the corresponding Input. Rate measurement is independent of the corresponding Counter count modes.

RATE DECIMAL POSITION

0 0.00 0.0000
0.0 0.000

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

RATE SCALING POINTS



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 DP6-SOFT 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

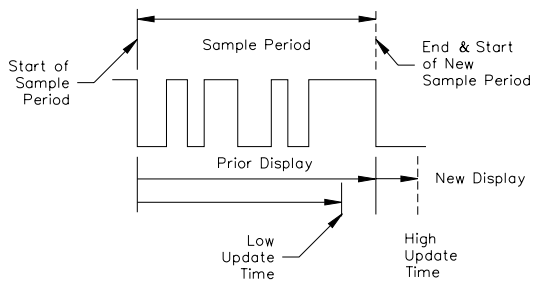
0.2 to 999.9 seconds

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.

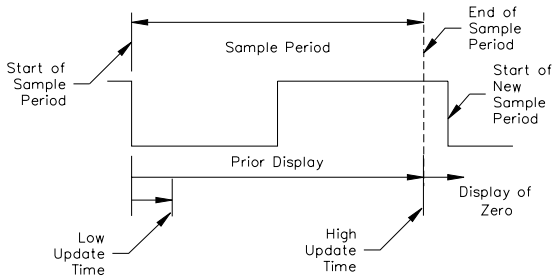
INPUT FREQUENCY CALCULATION

The meter 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 meter starts accumulating time towards Low Update and High Update values. Also, the meter starts accumulating the number of falling edges. When the time reaches the Low Update Time value, the meter 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 determined by either scaling method.

RATE VALUE CALCULATED



ZERO RATE CALCULATED



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 meter 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 meter will capture that Rate value as the new Minimum value. A delay time helps to avoid false captures of sudden short spikes.

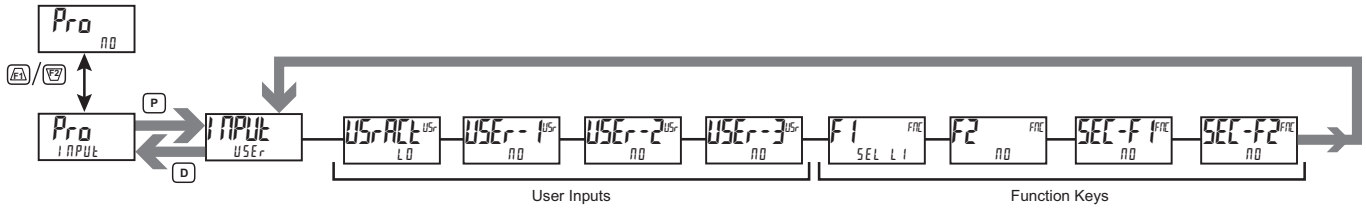
USER INPUT/FUNCTION KEY PARAMETERS (USEr)

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 meter 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 meter 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.

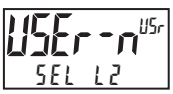
PROGRAMMING MODE LOCK-OUT

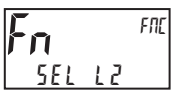
Programming Mode is locked-out, as long as activated (maintained action). A security code can be configured to allow programming access during lock-out.

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



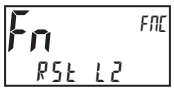


When activated (momentary action), the display advances to the next Line 2 display that has been made available (in the Display Module, Line 2/Access sub-menu).

RESET LINE 1 DISPLAY

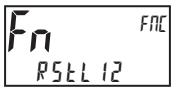
When activated (momentary action), resets the current Line 1 Display value. This is the factory setting for function key F2.

RESET LINE 2 DISPLAY



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

RESET LINE 1 AND LINE 2 DISPLAYS

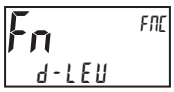


When activated (momentary action), resets both the current Line 1 Display value and Line 2 Display value.

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.

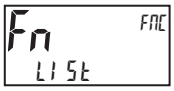
ADJUST DISPLAY CONTRAST LEVEL

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.

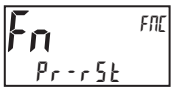
To program the values for List A and List B, first complete the programming of all the parameters with List A selected. Exit programming and switch to List B. Re-enter programming and program the desired values for the parameters included in the List.

DISPLAY	DESCRIPTION	FACTORY
UNITS	Units Mnemonics	NO

PRINT REQUEST

The meter 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 meter issues a block print through the serial port when activated just like the Print Request function. In addition, when activated (momentary action), the meter 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 rLC.

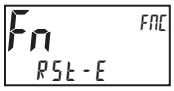
DISPLAY	DESCRIPTION	FACTORY
Cnt A	Counter A	NO
Cnt b	Counter B	NO
Cnt C	Counter C	NO
Hi	Maximum	NO
Lo	Minimum	NO

MAINTAINED (LEVEL) RESET AND INHIBIT

The meter 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

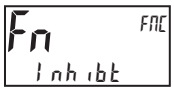
MOMENTARY (EDGE) RESET



When activated (momentary action), the meter 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 meter inhibits the displays configured as YES in the sublist, as long as activated (maintained action).

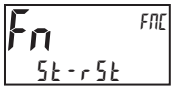
DISPLAY	DESCRIPTION	FACTORY
Cnt A	Counter A	NO
Cnt b	Counter B	NO
Cnt C	Counter C	NO
Hi	Maximum	NO
Lo	Minimum	NO

STORE DISPLAY

The meter 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

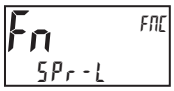
STORE AND RESET DISPLAY



The meter 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

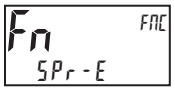
SETPOINT DEACTIVATE (RESET) MAINTAINED (LEVEL)



The meter 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 meter 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 meter 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 meter 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 meter 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

OUTPUT PARAMETERS (OUTPUT)

OUTPUT SELECT

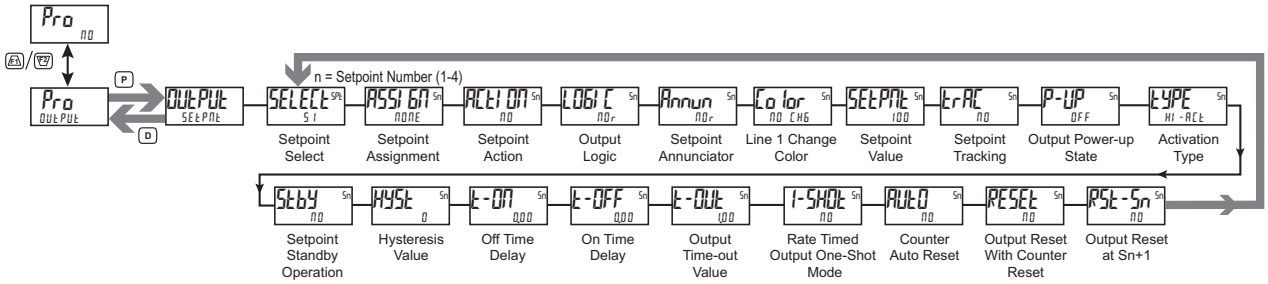
SETPNT ANALOG

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

SETPOINT OUTPUT PARAMETERS (SETPNT)

This section details the programming for the setpoints. To have output capabilities, a setpoint Plug-in card needs to be installed into the DPF260. 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 meter 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-Sr 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

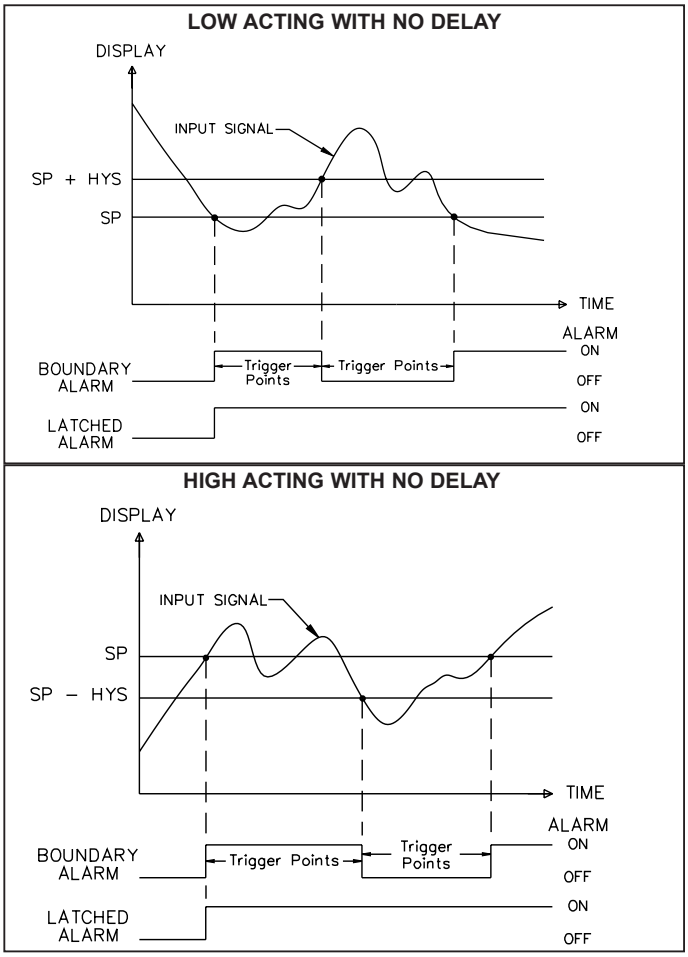
NO Sn-Str Sn-End

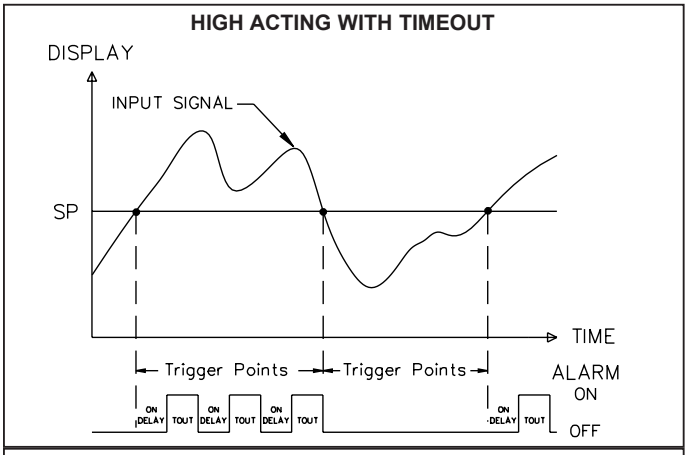
Selecting Sn-Str causes the setpoint output to deactivate (reset) when setpoint Sn + 1 activates. (Example: S1 deactivates when S2 activates, and S4 when S1 activates.) The last setpoint will wrap around to the first.

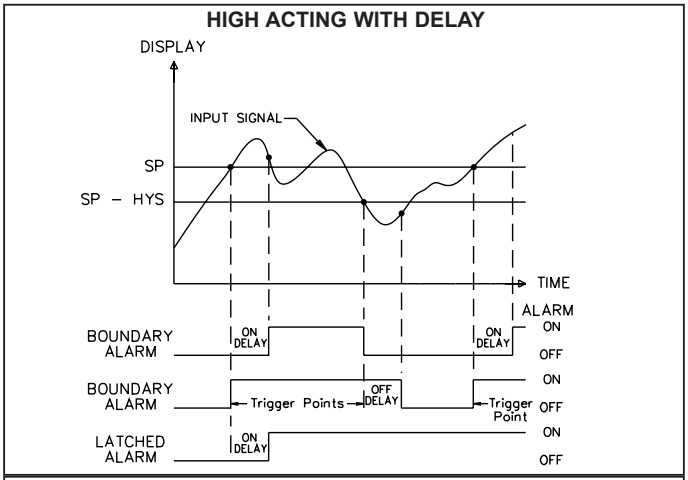
Selecting Sn-End causes the setpoint output to deactivate (reset) when setpoint Sn + 1 activates and then times out (deactivates). This selection only applies if the Sn + 1 setpoint action is Timed Out. (Example: S1 deactivates when S2 is activated and then times out.) The last setpoint will wrap around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

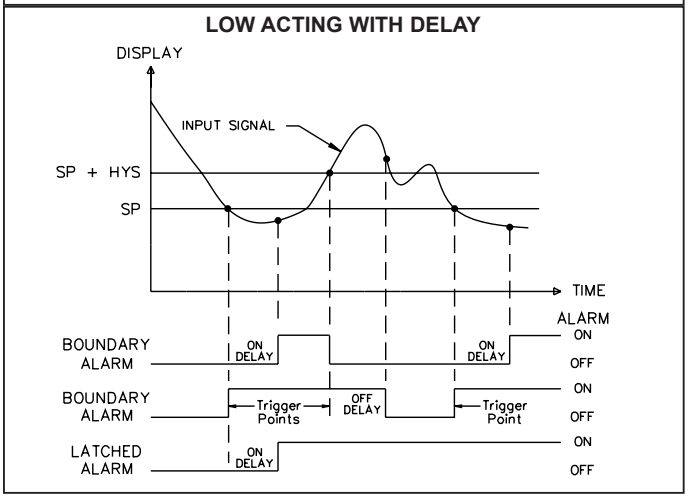
Setpoint (Alarm) Figures for Rate

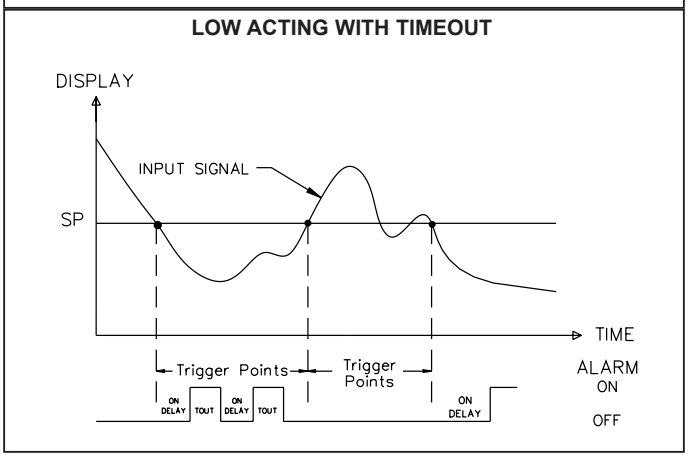
(For Reverse Logic, The Alarm state is opposite.)





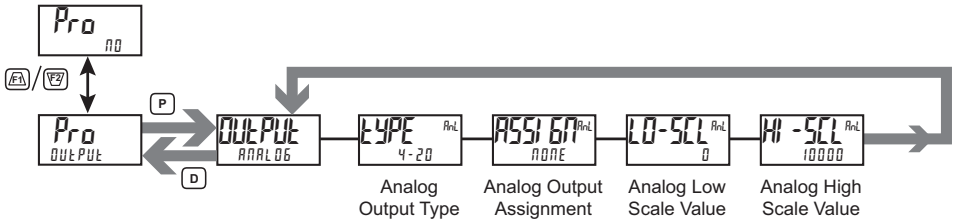






ANALOG OUTPUT PARAMETERS (ANALOG)

This section is only accessible with the optional LDP6-CDL Analog card installed.



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).
Cnt x =	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).

DISPLAY PARAMETERS (dISPLY)

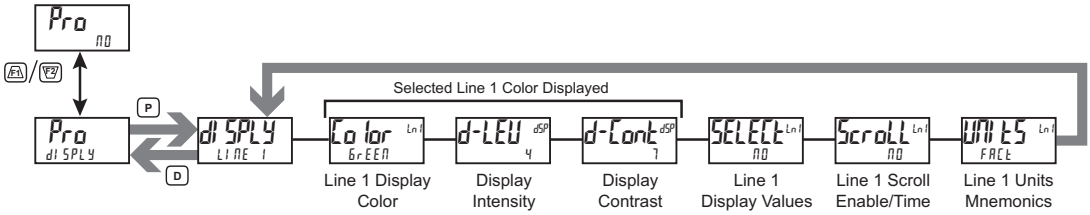
DISPLAY LINE SELECT

dISPLY / LINE 1 — LINE 1 LINE 2

Select the Display Line to be programmed.

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.

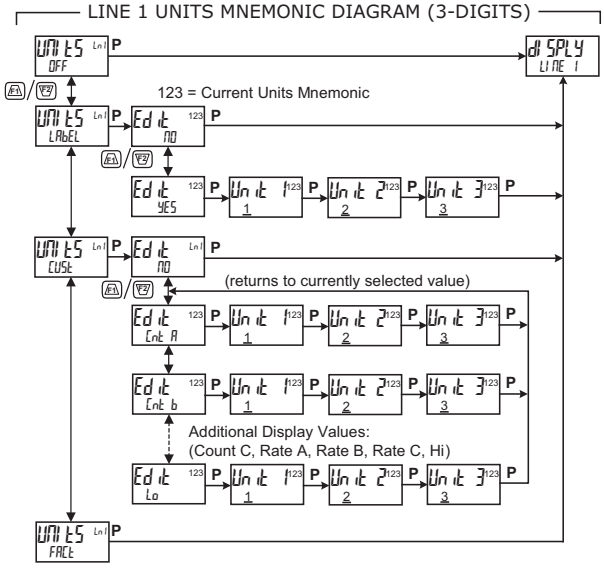
SELECTION	MODE	DESCRIPTION
OFF	OFF	No Line 1 mnemonic shown.
LAbEL	LABEL	Single programmable mnemonic shown for all Line 1 values.
CUSt	CUSTOM	Custom programmable mnemonics shown for each Line 1 value.
FACt	FACTORY	Factory default mnemonics shown for each Line 1 value.

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)



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.

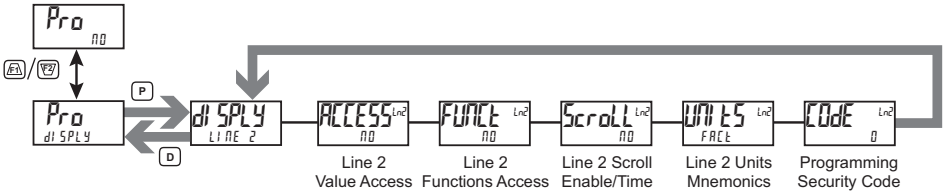
Main Display Loop

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

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

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
Sn	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.

LINE 2 DISPLAY SCROLL ENABLE/TIME

no 1 to 15 seconds

If Line 2 Display Scrolling is desired, set the scroll time in seconds.

LINE 2 UNITS MNEMONIC(S)

OFF CUSt Lb-CSt Lb Ln1
LAbEL FACt Lb-FAC L1-FAC

Select the mode for Line 2 Units Mnemonic(s). See LINE 2 UNITS MNEMONIC DIAGRAM for programming details.

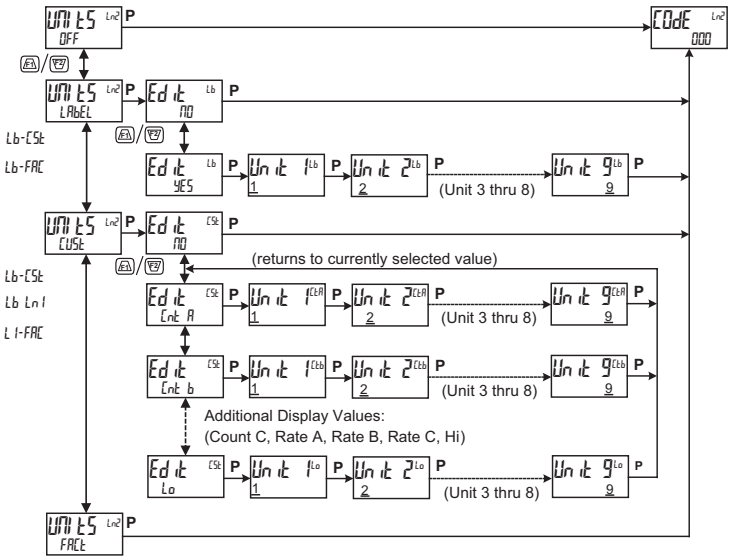
SELECTION	MODE	DESCRIPTION
OFF	OFF	No Line 2 mnemonics shown.
LAbEL	LABEL	Single programmable mnemonic shown as a separate item in the Line 2 Display loop. No individual mnemonics are shown with the other Line 2 Display values.
CUSt	CUSTOM	Individual Custom programmable mnemonics shown with each value in the Line 2 Display loop.
FACt	FACTORY	Individual Factory default mnemonics shown with each value in the Line 2 Display loop.
Lb-CSt	LABEL & CUSTOM	A programmable mnemonic shown as a separate item in the Line 2 Display loop. Also, individual Custom programmable mnemonics shown with each value in the Line 2 Display loop.
Lb-FAC	LABEL & FACTORY	A programmable mnemonic shown as a separate item in the Line 2 Display loop. Also, individual Factory default mnemonics shown with each value in the Line 2 Display loop.
Lb Ln1	LINE 1 INDEXED LABELS	Individual programmable mnemonics, indexed to the Line 1 Display value, are shown as a separate item in the Line 2 Display loop. These same mnemonics are also shown with each value in the Line 2 Display loop.
L1-FAC	LINE 1 INDEXED LABELS & FACTORY	Individual programmable mnemonics, indexed to the Line 1 Display value, are shown as a separate item in the Line 2 Display loop. Also, individual Factory default mnemonics are shown with each value in the Line 2 Display loop.

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 W Y Z 0 1
2 3 4 5 6 7 8 9 a c e g h i m n o u w - = [ ] r ° _ blank

Two character spaces are required to display this character.

LINE 2 UNITS MNEMONIC DIAGRAM (9-DIGITS)



PROGRAMMING SECURITY CODE

0 to 250

To activate either the Parameter or Hidden Parameter display loops, a security code (1-250) must be entered. If a "0" security code is programmed, pressing the **P** key takes you directly to the Full Programming Mode.

The Security Code determines the programming mode and the accessibility of programming parameters. This code can be used along with the Program Mode Lock-out (PLOC) in the User Input Function parameter (Input [User] module).

Two programming modes are available. Full Programming Mode allows all parameters to be viewed and modified. Parameter display loop mode provides access to those selected parameters, that can be viewed and/or modified without entering the Full programming mode.

The following chart indicates the levels of access based on various CodE and User Input PLOC settings.

SECURITY CODE	USER INPUT CONFIGURED	USER INPUT STATE	WHEN P KEY IS PRESSED	FULL PROGRAMMING MODE ACCESS
0	not PLOC	————	Full Programming	Immediate Access
0	PLOC	Not Active	Full Programming	Immediate Access
0	PLOC	Active	Enter Parameter Display Loop	No Access
>0	not PLOC	————	Enter Parameter Display Loop	After Parameter Display Loop with correct code # at CodE prompt.
>0	PLOC	Not Active	Full Programming	Immediate Access
>0	PLOC	Active	Enter Parameter Display Loop	After Parameter Display Loop with correct code # at CodE prompt.

COMMUNICATIONS PORT PARAMETERS (Port)

To select SErIAL, an optional communication card must be installed.

PORT SELECT

USb SErIAL

Select the Communications Port to be programmed.

USB PORT PARAMETERS (USb)

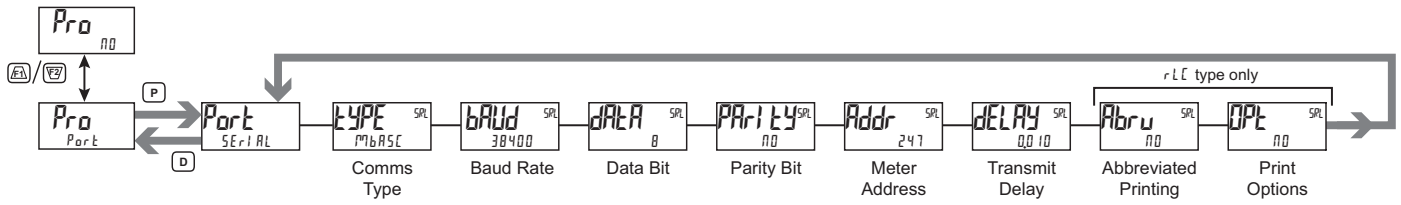
USB CONFIGURATION

AUtO SErIAL

AUtO Meter automatically configures USB port settings to operate with DP6-SOFT configuration software. When a USB cable is attached to DPF260 and PC, the port is internally set to Modbus RTU protocol, 38400 baud, 8 bits, and Unit Address 247. The Serial Port settings programmed below will not change, or show this.

SErIAL Configures USB port to utilize the Serial Port settings and protocol programmed below.

SERIAL PORT PARAMETERS (SErIAL)



COMMUNICATIONS TYPE

MbrtU - Modbus RTU
MbASC - Modbus ASCII
rLC - RLC Protocol (ASCII)

Select the desired communications protocol. Modbus is preferred as it provides access to all meter values and parameters. Since the Modbus protocol is included within the DPF260, the LDP6-CDC4, should not be used. The LDP6-CDC1 (RS485), or LDP6-CDC2 (RS232) card should be used instead.

BAUD RATE

1200 2400 4800 9600 19200 38400

Set the baud rate to match the other serial communications equipment on the serial link. Normally, the baud rate is set to the highest value that all the serial equipment are capable of transmitting and receiving.

DATA BIT

7 8

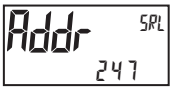
Select either 7 or 8 bit data word lengths. Set the word length to match the other serial communications equipment on the serial link. For MbrtU communication type, data bit setting is fixed at 8 bits.

PARITY BIT

no EVEN Odd

Set the parity bit to match that of the other serial communications equipment on the serial link. The meter ignores the parity when receiving data and sets the parity bit for outgoing data. If no parity is selected with 7 bit word length, an additional stop bit is used to force the frame size to 10 bits. Parity is not available if dAtA is set for 8 bit.

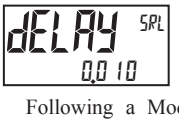
METER UNIT ADDRESS



1 to 247 - Modbus
0 to 99 - RLC Protocol

Select a Unit Address that does not match an address number of any other equipment on the serial link.

TRANSMIT DELAY



0.000 to 0.250 seconds

Following a Modbus command or RLC Transmit Value command, the DPF260 will wait this minimum amount of time in seconds before issuing a serial response

The following programming steps are only available when Communications Type (tYPE) is programmed for rLC.

ABBREVIATED PRINTING

no yES

Select no for full print or Command T transmissions (meter address, mnemonics and parameter data) or yES for abbreviated print transmissions (parameter data only). This will affect all the parameters selected in the print options. If the meter address is 00, it will not be sent during a full transmission.

PRINT OPTIONS

no yES

yES - Enters the sub-menu to select the meter parameters to appear during a print request. For each parameter in the sub-menu, select yES for that parameter information to be sent during a print request or no for that parameter information not to be sent. A print request is sometimes referred to as a block print because more than one parameter information (meter address, mnemonics and parameter data) can be sent to a printer or computer as a block.

DISPLAY	DESCRIPTION	FACTORY SETTING	MNEMONIC
Cnt A	Counter A	yES	CTA
Cnt b	Counter B	no	CTB
Cnt C	Counter C	no	CTC
rAtE A	Rate A	no	RTA
rAtE b	Rate B	no	RTB
rAtE C	Rate C	no	RTC
Hi	Max Value	no	MAX
Lo	Min Value	no	MIN
SC FAC	Scale Factor A & B	no	SFA, SFB
Cnt Ld	Counter Load A & B	no	CLA, CLB
SEtPnt	Setpoint Values	no	SP1 - SP4

SERIAL COMMUNICATIONS

The DPF260 supports serial communications using the optional serial communication cards or via the USB programming port located on the side of the unit. When USB is being used (connected), the serial communication card is disabled. When using the standard RS232 and RS485 option cards, the DPF260 supports both the RLC protocol and also supports Modbus communications. The Modbus option card should not be used with the DPF260, as the DPF260 internal Modbus protocol supports complete unit configuration, and is much more responsive.

USB

The USB programming port is primarily intended to be used to configure the DPF260 with DP6-SOFT. It can also be used as a virtual serial communications port following installation of the USB drivers that are supplied with the software. When the USB port is being used, i.e. the USB cable is connected between DPF260 and PC, all serial communications with the serial option card (if used) is disabled.

USB Cable type required: USB A to Mini-B (not supplied)

DPF260 CONFIGURATION USING DP6-SOFT AND USB

1. Install DP6-SOFT.
2. Supply power to DPF260.
3. Insure USB Configuration (CONFIG) in USB Port Parameters is set to AUtO (factory default setting).
4. Attach USB cable (USB A to Mini-B) between PC and DPF260.
5. Create a new file (File, New) or open an existing DPF260 database within DP6-SOFT.
6. Configure DP6-SOFT Link options (Link, Options) to the serial port which the USB cable is attached (in Step 4).

SERIAL MODBUS COMMUNICATIONS

Modbus Communications requires that the Serial Communications Type Parameter (tYPE) be set to "Mbrtu" or "MbASC".

DPF260 CONFIGURATION USING DP6-SOFT AND SERIAL COMMUNICATIONS CARD

1. Install DP6-SOFT.
2. Install RS232 or RS485 card and connect communications cable from DPF260 to PC.
3. Supply power to DPF260.
4. Configure serial parameters (SERIAL) to Modbus RTU "Mbrtu", 38,400 baud, address 247.
5. Create a new file (File, New) or open an existing DPF260 database within DP6-SOFT.
6. Configure DP6-SOFT Link options (Link, Options) to the serial port which the communication cable is attached (in step 2).

SUPPORTED FUNCTION CODES

FC03: Read Holding Registers

1. Up to 64 registers can be requested at one time.
2. HEX <8000> is returned for non-used registers.

FC04: Read Input Registers

1. Up to 64 registers can be requested at one time.
2. Block starting point can not exceed register boundaries.
3. HEX <8000> is returned in registers beyond the boundaries.
4. Input registers are a mirror of Holding registers.

FC06: Preset Single Register

1. HEX <8001> is echoed back when attempting to write to a read only register.
2. If the write value exceeds the register limit (see Register Table), then that register value changes to its high or low limit. It is also returned in the response.

FC16: Preset Multiple Registers

1. No response is given with an attempt to write to more than 64 registers at a time.
2. Block starting point cannot exceed the read and write boundaries (40001-41280).
3. If a multiple write includes read only registers, then only the write registers will change.
4. If the write value exceeds the register limit (see Register Table), then that register value changes to its high or low limit.

FC08: Diagnostics

The following is sent upon FC08 request:

Module Address, 08 (FC code), 04 (byte count), "Total Comms" 2 byte count, "Total Good Comms" 2 byte count, checksum of the string

"Total Comms" is the total number of messages received that were addressed to the DPF260. "Total Good Comms" is the total messages received by the DPF260 with good address, parity and checksum. Both counters are reset to 0 upon response to FC08 and at power-up.

SUPPORTED EXCEPTION CODES

01: Illegal Function

Issued whenever the requested function is not implemented in the meter.

02: Illegal Data Address

Issued whenever an attempt is made to access a single register that does not exist (outside the implemented space) or to access a block of registers that falls completely outside the implemented space.

03: Illegal Data Value

Issued when an attempt is made to read or write more registers than the meter can handle in one request.

07: Negative Acknowledge

Issued when a write to a register is attempted with an invalid string length.

FREQUENTLY USED MODBUS REGISTER TABLE

Values less than 65,535 will be in (Lo word). Values greater than 65,535 will continue into (Hi word). Negative values are represented by two's complement of the combined (Hi word) and (Lo word).

Note 1: The DPF260 should not be powered down while parameters are being changed. Doing so may corrupt the non-volatile memory resulting in checksum errors.

REGISTER ADDRESS	REGISTER NAME	LOW LIMIT	HIGH LIMIT	FACTORY SETTING	ACCESS	COMMENTS
	FREQUENTLY USED REGISTERS					
40001	Counter A Value (Hi word)	-199999999	999999999	0	Read/Write	
40002	Counter A Value (Lo word)					
40003	Counter B Value (Hi word)	-199999999	999999999	0	Read/Write	
40004	Counter B Value (Lo word)					
40005	Counter C Value (Hi word)	-199999999	999999999	0	Read/Write	
40006	Counter C Value (Lo word)					
40007	Rate A Value (Hi word)	N/A	N/A	N/A	Read Only	
40008	Rate A Value (Lo word)					
40009	Rate B Value (Hi word)	N/A	N/A	N/A	Read Only	
40010	Rate B Value (Lo word)					
40011	Rate C Value (Hi word)	N/A	N/A	N/A	Read Only	
40012	Rate C Value (Lo word)					
40013	Max (Hi) Value (Hi word)	-199999	999999	0	Read/Write	
40014	Max (Hi) Value (Lo word)					
40015	Min (Lo) Value (Hi word)	-199999	999999	0	Read/Write	
40016	Min (Lo) Value (Lo word)					
40017	Setpoint 1 Value (Hi word)	-199999	999999	100	Read/Write	Active List (A or B)
40018	Setpoint 1 Value (Lo word)					
40019	Setpoint 2 Value (Hi word)	-199999	999999	200	Read/Write	Active List (A or B)
40020	Setpoint 2 Value (Lo word)					
40021	Setpoint 3 Value (Hi word)	-199999	999999	300	Read/Write	Active List (A or B)
40022	Setpoint 3 Value (Lo word)					
40023	Setpoint 4 Value (Hi word)	-199999	999999	400	Read/Write	Active List (A or B)
40024	Setpoint 4 Value (Lo word)					
40025	Counter A Scale Factor (Hi word)	1	999999	100000	Read/Write	Active List (A or B)
40026	Counter A Scale Factor (Lo word)					
40027	Counter B Scale Factor (Hi word)	1	999999	100000	Read/Write	Active List (A or B)
40028	Counter B Scale Factor (Lo word)					
40029	Counter C Scale Factor (Hi word)	1	999999	100000	Read/Write	Active List (A or B)
40030	Counter C Scale Factor (Lo word)					
40031	Counter A Count Load (Hi word)	-199999	999999	500	Read/Write	Active List (A or B)
40032	Counter A Count Load (Lo word)					
40033	Counter B Count Load (Hi word)	-199999	999999	500	Read/Write	Active List (A or B)
40034	Counter B Count Load (Lo word)					
40035	Counter C Count Load (Hi word)	-199999	999999	500	Read/Write	Active List (A or B)
40036	Counter C Count Load (Lo word)					
40037	Setpoint Output Register (SOR)	0	15	N/A	Read/Write	Status of Setpoint Outputs. Bit State: 0=Off, 1=On. Bit 3 = S1, Bit 2 = S2, Bit 1 = S3, Bit 0 = S4. Outputs can only be activated/reset with this register when the respective bits in the Manual Mode Register (MMR) are set.
40038	Manual Mode Register (MMR)	0	31	0	Read/Write	Bit State: 0 = Auto Mode, 1 = Manual Mode Bit 4 = S1, Bit 3 = S2, Bit 2 = S3, Bit 1 = S4, Bit 0 = Linear Output
40039	Reset Output Register	0	15	0	Read/Write	Bit State: 1= Reset Output, bit is returned to zero following reset processing; Bit 3 = S1, Bit 2 = S2, Bit 1 = S3, Bit 0 = S4
40040	Analog Output Register (AOR)	0	4095	0	Read/Write	Linear Output Card written to only if Linear Output is in Manual Mode (MMR bit 0 = 1).

SERIAL RLC PROTOCOL COMMUNICATIONS

RLC Communications requires the Serial Communications Type Parameter (tYPE) be set to rLC.

SENDING SERIAL COMMANDS AND DATA TO THE METER

When sending commands to the meter, a string containing at least one command character must be constructed. A command string consists of a command character, a value identifier, numerical data (if writing data to the meter) followed by a command terminator character * or $. The <CR> is also available as a terminator when Counter C is in the SLAVE mode.

Command Chart

COMMAND	DESCRIPTION	NOTES
N	Node (Meter) Address Specifier	Address a specific meter. Must be followed by a two digit node address. Not required when address = 00.
T	Transmit Value (read)	Read a register from the meter. Must be followed by register ID character
V	Value Change (write)	Write to register of the meter. Must be followed by register ID character and numeric data.
R	Reset	Reset a register or output. Must be followed by register ID character.
P	Block Print Request	Initiates a block print output. Registers are defined in programming.

Command String Construction

The command string must be constructed in a specific sequence. The meter does not respond with an error message to invalid commands. The following procedure details construction of a command string:

1. The first characters consist of the Node Address Specifier (N) followed by a 1 or 2 character address number. The address number of the meter is programmable. If the node address is 0, this command and the node address itself may be omitted. For node address 1 through 9, a leading zero character is not required. (The only exception is a numeric transmission when Counter C is set for slave mode.) This is the only command that may be used in conjunction with other commands.
2. After the optional address specifier, the next character is the command character.
3. The next character is the Register ID. This identifies the register that the command affects. The P command does not require a Register ID character. It prints according to the selections made in print options.
4. If constructing a value change command (writing data), the numeric data is sent next.
5. All command strings must be terminated with the string termination characters *, $ or when Counter C is set for slave mode <CR>. The meter does not begin processing the command string until this character is received. See Timing Diagram figure for differences between terminating characters.

Sending Numeric Data

Numeric data sent to the meter must be limited to the digit range shown under transmit details in the Register Identification Chart. Leading zeros are ignored. Negative numbers must have a minus sign. The meter ignores any decimal point and conforms the number to the scaled resolution. (For example: the meter's scaled decimal point position = 0.0 and 25 is written to a register. The value of the register is now 2.5.

Note: Since the meter does not issue a reply to value change commands, follow with a transmit value command for readback verification.

Register Identification Chart

ID	VALUE DESCRIPTION	MNEMONIC	COMMAND	TRANSMIT DETAILS
A	Count A	CTA	T, V, R	9 positive, 8 ½ negative
B	Count B	CTB	T, V, R	9 positive, 8 ½ negative
C	Count C	CTC	T, V, R	9 positive, 8 ½ negative
D	Rate A	RTA	T	6 digit, positive only
E	Rate B	RTB	T	6 digit, positive only
F	Rate C	RTC	T	6 positive, 5 ½ negative
G	Max (Hi) Value	MAX	T, V, R	6 positive, 5 ½ negative
H	Min (Lo) Value	MIN	T, V, R	6 positive, 5 ½ negative
I	Scale Factor A	SFA	T, V	6 digit, positive only
J	Scale Factor B	SFB	T, V	6 digit, positive only
K	Counter Load A	CLA	T, V	6 positive, 5 ½ negative
L	Counter Load B	CLB	T, V	6 positive, 5 ½ negative
M	Setpoint 1	SP1	T, V, R	6 positive, 5 ½ negative
O	Setpoint 2	SP2	T, V, R	6 positive, 5 ½ negative
Q	Setpoint 3	SP3	T, V, R	6 positive, 5 ½ negative
S	Setpoint 4	SP4	T, V, R	6 positive, 5 ½ negative
U	Auto/Manual Register	MMR	T, V	0 – auto, 1 - manual
W	Analog Output Register	AOR	T, V	0 – 4095 normalized
X	Setpoint Register	SOR	T, V	0 – not active, 1 – active

Command String Examples:

1. Node address = 17, Write 350 to Setpoint 1.
   String: N17VM350$
2. Node address = 5, Read Count A value.
   String: N5TA*
3. Node address = 0, Reset Setpoint 4 output.
   String: RS*

RECEIVING DATA FROM THE METER

Data is transmitted by the meter in response to either a transmit command (T), a print block command (P) or User Function print request. The response from the meter is either a full field transmission or an abbreviated transmission. The meter response mode is selected in Serial Port Parameters (Abru).

Full Field Transmission (Address, Mnemonic, Numeric data)

Byte	Description
1, 2	2 byte Node Address field [00-99]
3	<SP> (Space)
4-6	3 byte Register Mnemonic field
7-18	12 byte data field, 10 bytes for number, one byte for sign, one byte for decimal point
19	<CR> carriage return
20	<LF> line feed
21	<SP>* (Space)
22	<CR>* carriage return
23	<LF>* line feed

** These characters only appear in the last line of a block print.*

The first two characters transmitted are the node address, unless the node address assigned = 0, in which case spaces are substituted. A space follows the node address field. The next three characters are the register mnemonic.

The numeric data is transmitted next. The numeric field is 12 characters long (to accommodate the 10 digit totalizer), with the decimal point position floating within the data field. Negative values have a leading minus sign. The data field is right justified with leading spaces.

The end of the response string is terminated with a carriage return <CR> and <LF>. When block print is finished, an extra <SP><CR> <LF> is used to provide separation between the blocks.

Abbreviated Transmission (Numeric data only)

Byte	Description
1-12	12 byte data field, 10 bytes for number, one byte for sign, one byte for decimal point
13	<CR> carriage return
14	<LF> line feed
15	<SP>* (Space)
16	<CR>* carriage return
17	<LF>* line feed

** These characters only appear in the last line of a block print.*

Meter Response Examples:

1. Node address = 17, full field response, Count A = 875
   17 CTA 875 <CR><LF>
2. Node address = 0, full field response, Setpoint 2 = -250.5
   SP2 -250.5<CR><LF>
3. Node address = 0, abbreviated response, Setpoint 2 = 250, last line of block print
   250<CR><LF><SP><CR><LF>

Auto/Manual Mode Register (MMR) ID: U

This register sets the controlling mode for the outputs. In Auto Mode (0) the meter controls the setpoint and analog output. In Manual Mode (1) the outputs are defined by the registers SOR and AOR. When transferring from auto mode to manual mode, the meter holds the last output value (until the register is changed by a write). Each output may be independently changed to auto or manual. In a write command string (VU), any character besides 0 or 1 in a field will not change the corresponding output mode.

U abcde
- e = Analog Output
- d = SP4
- c = SP3
- b = SP2
- a = SP1

Example: VU00011* places SP4 and Analog in manual.

Analog Output Register (AOR) ID: W

This register stores the present signal value of the analog output. The range of values of this register is 0 to 4095, which corresponds to the analog output range per the following chart:

Register Value	Output Signal*		
	0-20 mA	4-20 mA	0-10 V
0	0.00	4.00	0.000
1	0.005	4.004	0.0025
2047	10.000	12.000	5.000
4094	19.995	19.996	9.9975
4095	20.000	20.000	10.000

**Due to the absolute accuracy rating and resolution of the output card, the actual output signal may differ 0.15% FS from the table values. The output signal corresponds to the range selected (0-20 mA, 4-20 mA or 0-10 V).*

Writing to this register (VW) while the analog output is in the Manual Mode causes the output signal level to update immediately to the value sent. While in the Automatic Mode, this register may be written to, but it has no effect until the analog output is placed in the manual mode. When in the Automatic Mode, the meter controls the analog output signal level. Reading from this register (TW) will show the present value of the analog output signal.

Example: VW2047* will result in an output of 10.000 mA, 12.000 mA or 5.000V depending on the range selected.

Setpoint Output Register (SOR) ID: X

This register stores the states of the setpoint outputs. Reading from this register (TX) will show the present state of all the setpoint outputs. A "0" in the setpoint location means the output is off and a "1" means the output is on.

X abcd
- d = SP4
- c = SP3
- b = SP2
- a = SP1

In Automatic Mode, the meter controls the setpoint output state. In Manual Mode, writing to this register (VX) will change the output state. Sending any character besides 0 or 1 in a field or if the corresponding output was not first in manual mode, the corresponding output value will not change. (It is not necessary to send least significant 0s.)

Example: VX10* will result in output 1 on and output 2 off.

COUNTER C SERIAL SLAVE DISPLAY

Counter C may be programmed for SLAVE to act as a serial slave display. In this mode, the carriage return <CR> is added as a valid command terminator character for all serial command strings. The <CR> as a terminator may be very useful for standard serial commands, even if Counter C is never displayed or sent a slave message. The <*> and <$> are also recognized as valid terminators for the serial slave.

The Counter C slave display is right aligned, and has the capacity of displaying six characters on Line 1 or nine characters on Line 2. When less than the full display of characters is received, blank spaces are placed in front of the characters. If more than the full display of characters is received, only the last six (or nine) characters are displayed. The meter has an internal 300 character buffer for the slave display. If more than 300 characters are received, the additional characters are discarded until a <CR> is received. At that point, the last six (or nine) characters in the buffer are displayed.

Counter C processes Numeric and Literal slave transmissions as follows.

Numeric Transmissions

When a string that does not begin with #, T, V, P or R is received, the meter processes it as a Numeric transmission. In this case, only numbers and a minus sign can be displayed. All other characters in the string are discarded. If a minus sign appears anywhere in the string the resulting number will be negative. If a decimal point is desired, it is programmed in Counter C setup and is ignored in the serial string. If no numerical characters are received, then the numeric value will be zero.

The numeric display can be used for setpoint (boundary action only) and analog output functions. The numeric value is retained in Counter C memory until another Numeric transmission is received. If a numeric values is not to be saved to non-volatile memory, send the value as a literal transmission.

Note: Numeric transmissions sent to meter addresses 1 through 9 must have a leading zero character sent with the address (i.e. N01 through N09).

Literal Transmissions

When a string that begins with # is received, the meter processes it as a Literal transmission. In this case, only numeric and alphabetic characters or a minus sign (dash) will be processed. Any other non-alphanumeric character will be discarded. Non-displayable alphabetic characters (M, W and X) will be replaced with a space. A Literal display overrides any Units Mnemonics characters, when shown on Line 2.

A Literal display will replace a Numeric value in the Counter C display. However, it will not remove a previous Numeric value from Counter C memory or prevent the Counter C assigned outputs from functioning with the previous Numeric value.

Displayable Alphabetic Characters:

ASCII	A	b	C	d	E	F	G	H	I	J	K	L	N	O	P	q	r	S	t	U	V	Y	Z
DISPLAY	A	b	C	d	E	F	G	H	I	J	K	L	N	O	P	q	r	S	t	U	V	Y	Z

(Both uppercase and lowercase ASCII characters are accepted.)

Downloading Data from a G3 to a DPF260

Communications:
Port: RS232 Comms Raw Serial Port
Port Driver: <system> Raw Serial Port
Programming:

```
PortPrint(2, "N01" + IntToText(Var1, 10, 6) + "\r");
```

This program is called from the Global On Tick. It sends "N01" (the meter address), followed by the ASCII equivalent of Var1, then a carriage return.

COMMAND RESPONSE TIME

The meter can only receive data or transmit data at any one time (half-duplex operation). When sending commands and data to the meter, a delay must be imposed before sending another command. This allows enough time for the meter to process the command and prepare for the next command.

At the start of the time interval t_1, the computer program prints or writes the string to the com port, thus initiating a transmission. During t_1, the command characters are under transmission and at the end of this period, the command terminating character (*) is received by the meter. The time duration of t_1 is dependent on the number of characters and baud rate of the channel.

$$t_1 = (10 * \#\text{ of characters}) / \text{baud rate}$$

At the start of time interval t_2, the meter starts the interpretation of the command and when complete, performs the command function. This time interval t_2 varies from 2 msec to 15 msec. If no response from the meter is expected, the meter is ready to accept another command.

If the meter is to reply with data, the time interval t_2 is controlled by the use of the command terminating character and the Serial Transmit Delay parameter (dELAY). The standard command line terminating character is "*". This terminating character results in a response time window of the Serial Transmit Delay time (dELAY) plus 15 msec. maximum. The dELAY parameter should be programmed to a value that allows sufficient time for the release of the sending driver on the RS485 bus. Terminating the command line with "$" results in a response time window (t_2) of 2 msec minimum and 15 msec maximum. The response time of this terminating character requires that sending drivers release within 2 msec after the terminating character is received.

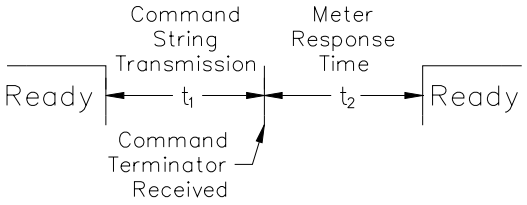
At the beginning of time interval t_3, the meter responds with the first character of the reply. As with t_1, the time duration of t_3 is dependent on the number of characters and baud rate of the channel.

$$t_3 = (10 * \#\text{ of characters}) / \text{baud rate.}$$

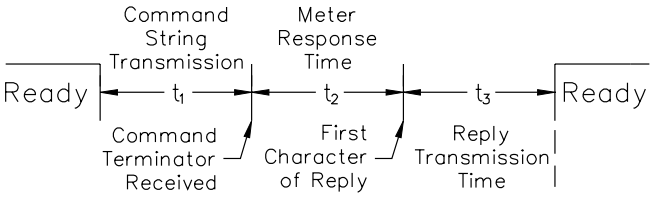
At the end of t_3, the meter is ready to receive the next command. The maximum serial throughput of the meter is limited to the sum of the times t_1, t_2 and t_3.

Timing Diagrams

NO REPLY FROM METER



RESPONSE FROM METER



COMMUNICATION FORMAT

Data is transferred from the meter through a serial communication channel. In serial communications, the voltage is switched between a high and low level at a predetermined rate (baud rate) using ASCII encoding. The receiving device reads the voltage levels at the same intervals and then translates the switched levels back to a character.

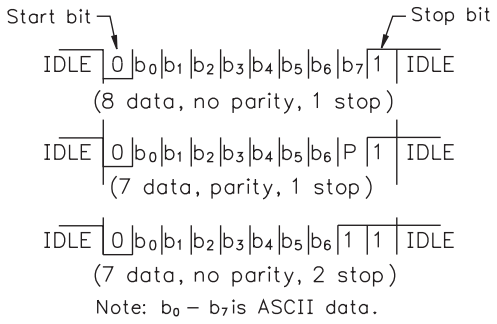
The voltage level conventions depend on the interface standard. The table lists the voltage levels for each standard.

LOGIC	INTERFACE STATE	RS232*	RS485*
1	mark (idle)	TXD,RXD; -3 to -15 V	a-b < -200 mV
0	space (active)	TXD,RXD; +3 to +15 V	a-b > +200 mV
* Voltage levels at the Receiver			

Data is transmitted one byte at a time with a variable idle period between characters (0 to ∞). Each ASCII character is "framed" with a beginning start bit, an optional parity bit and one or more ending stop bits. The data format and baud rate must match that of other equipment in order for communication to take place. The figures list the data formats employed by the meter.

Start bit and Data bits

Data transmission always begins with the start bit. The start bit signals the receiving device to prepare for reception of data. One bit period later, the least significant bit of the ASCII encoded character is transmitted, followed by the remaining data bits. The receiving device then reads each bit position as they are transmitted. Since the sending and receiving devices operate at the same transmission speed (baud rate), the data is read without timing errors.



Character Frame Figure

Parity bit

After the data bits, the parity bit is sent. The transmitter sets the parity bit to a zero or a one, so that the total number of ones contained in the transmission (including the parity bit) is either even or odd. This bit is used by the receiver to detect errors that may occur to an odd number of bits in the transmission. However, a single parity bit cannot detect errors that may occur to an even number of bits. Given this limitation, the parity bit is often ignored by the receiving device. The DPF260 meter ignores the parity bit of incoming data and sets the parity bit to odd, even or none (mark parity) for outgoing data.

Stop bit

The last character transmitted is the stop bit. The stop bit provides a single bit period pause to allow the receiver to prepare to re-synchronize to the start of a new transmission (start bit of next byte). The receiver then continuously looks for the occurrence of the start bit. If 7 data bits and no parity is selected, then 2 stop bits are sent from the DPF260 meter.

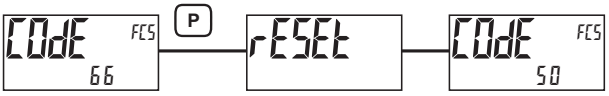
FACTORY SERVICE OPERATIONS (FACtrY)

FACTORY SERVICE CODE

0-250

Enter the Service Code for the desired operation.

RESTORE FACTORY DEFAULTS



Use the F1 and F2 keys to display CodE 66 and press **P**. The meter will flash rESEt and then return to CodE 50. Press the **P** key to return to Display Mode. This will overwrite all user settings with the factory settings. The only exception is the User Mnemonics which retain their programmed values (see Code 69).

RESTORE FACTORY DEFAULTS (w/Units Mnemonics)

Same as Code 66, except the User Mnemonics are also returned to the factory default settings (blank).

MODEL AND CODE VERSION

The meter will briefly display the model (P2d) on Line 1, and the current firmware version (UEr x.xx) on Line 2, and then return to CodE 50.

INPUT A AND B LOGIC SELECTION

The Count Inputs A and B are factory configured for falling edge triggered (active low) operation in single edge count modes. The Counter Operating Mode descriptions in the Input programming section reflect this logic. If an application is better suited to use rising edge triggered (active high) operation, the Input Logic for Input A and/or Input B can be changed by entering Code 55.

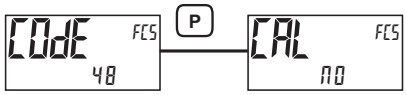
LO-ACt HI-ACt

Selecting HI-ACt sets the Input A logic to rising edge triggered (active high) operation. Be advised that all references to Input A falling edge and Input A rising edge will be reversed for the Counter Operating Mode descriptions.

LO-ACt HI-ACt

Selecting HI-ACt sets the Input B logic to rising edge triggered (active high) operation. Be advised that all references to Input B falling edge and Input B rising edge will be reversed for the Counter Operating Mode descriptions.

METER CALIBRATION



nO rAtE AnLOut

Enter Code 48 and choose Rate or Analog Output calibration.

The only items in the DPF260 meter that can be calibrated are the Rate Indicator accuracy and the Analog Output. The Rate Indicator is scaled in the Rate Input Parameter programming section. The Analog Output signal is scaled in the Analog Output Parameter section. If the Rate display or the Analog Output appears to be indicating incorrectly or inaccurately, refer to the Troubleshooting section to make sure the meter is properly scaled for the application.

If Rate accuracy or Analog Output recalibration is required (generally every 2 years), it should be performed by qualified technicians using appropriate equipment. Calibration does not change any user programmed parameters.

Note: Allow a 30 minute warm-up period before staring calibration.

Rate Accuracy Calibration

-0.0100 to 0.0100 percent

Rate Indicator calibration is done by adjusting the Rate Accuracy Offset value. This value provides a Rate calculation adjustment factor expressed in percent of the display reading. An adjustment range of ± 0.01% is provided, which equals ± 1 count for a display reading of 10,000.

The initial offset value is set during factory test. To calibrate, connect a precision signal generator with an accuracy of 0.005% or better to Input A on the DPF260. (Refer to the Rate Input Parameter programming section for Rate setup details.) Using the Rate A Decimal Point position and Scaling Display parameters, program the meter to read the input frequency with maximum display resolution (i.e. 6-digit display reading). Compare the Rate display to the signal generator output frequency. Adjust the Rate Accuracy Offset value higher (for low Display reading) or lower (for high Display Reading) until the Rate display matches the signal generator.

Analog Output Card Calibration

Before starting, verify that a precision meter with an accuracy of 0.05% or better (voltmeter for voltage output and/or current meter for current output) is connected and ready. Using the chart below, step through the five selections to be calibrated. At each prompt, use the DPF260 F1 and F2 keys to adjust the output so that the external meter display matches the selection being calibrated. When the external reading matches, or if the range is not being calibrated, press the **P** key to advance to the next range. When all the desired ranges have been calibrated, exit programming mode and remove the external meters.

DISPLAY	EXTERNAL METER	ACTION
0.000A	0.00 mA	Adjust if necessary, press **P**
0.004A	4.00 mA	Adjust if necessary, press **P**
0.020A	20.00 mA	Adjust if necessary, press **P**
0.0u	0.00 V	Adjust if necessary, press **P**
10.0u	10.00 V	Adjust if necessary, press **P**

TROUBLESHOOTING

PROBLEM	REMEDIES
No Display At Power-Up	Check power level and power connections.
No Display After Power-Up	Check Display Module: d-LEV, d-Cont, and LINE 1 program settings.
Program Locked-Out	Check for Active User Input, programmed for PLOC. Deactivate User Input.
	Enter proper access code at CodE 0 prompt. (Universal access code = 222)
No Line 1 Display	Check program settings for Line 1 Display Value Select/Enable. Confirm at least one Line 1 Display Value is enabled (YES).
No Line 2 Display	Check program settings for Line 2 Value Access. Confirm at least one Line 2 Parameter Value is enabled in Main Display Loop (d-rEAd, d-rSt, d-Entr).
No Line 1 Units Mnemonic Display	Check program settings for Line 1 Units Mnemonic(s).
Display of OVEr or UndEr	Value exceeds Display capacity of the meter. See General Meter Specifications.
Incorrect Display Value or Not Counting	Check Input wiring, DIP switch setting, Input programming, Scale Factor calculation, Input signal level, User Input Logic setting, lower input signal frequency.
User Input Not Functioning	Check User Input wiring, User Logic setting, User Function settings, User Input being used as a signal input in dual count modes (see Counter Operating Modes).
Modules or Parameters Not Accessible	Check for corresponding plug-in option card.
	Verify parameter is valid in regard to previous program settings.
Error Code: ErrKEY	Keypad is active at power up. Check for depressed or stuck keypad. Press any key to clear Error Code.
Error Code: EE PAr Error Code: EE Pdn	Parameter Data Checksum Error. Press any key to clear Error Code, verify all program settings and cycle power. Contact factory if Error Code returns at next power-up.
Error Code: ErrPro	Parameter Data Validation Error. Press any key to clear Error Code, verify all program settings and cycle power. Contact factory if Error Code returns at next power-up.
Error Code: EE Lin	Linear Output Card Data Validation Error. Press any key to clear Error Code and cycle power. If Error Code returns at next power-up, replace Linear Option Card or contact factory.

PARAMETER VALUE CHART
DPF260

Programmer _____ **Date** _____

Meter# _____ **Security Code** _____

INPUt INPUT SETUP PARAMETERS

CounT Counter Parameters

DISPLAY	PARAMETER	USER SETTING
	COUNTER A PARAMETERS	
Cnt A	Counter A Operating Mode	
dEC Pt	Counter A Decimal Position	
SC FAC	Counter A Scale Factor	
SCALEr	Counter A Scale Multipiler	
RESEt	Counter A Reset Action	
Cnt Ld	Counter A Count Load Value	
R P-UP	Counter A Reset At Power-Up	
PS Out	Prescaler Output Enable	
PS SCL	Prescaler Scale Value	
	COUNTER B PARAMETERS	
Cnt b	Counter B Operating Mode	
dEC Pt	Counter B Decimal Position	
SC FAC	Counter B Scale Factor	
SCALEr	Counter B Scale Multipiler	
RESEt	Counter B Reset Action	
Cnt Ld	Counter B Count Load Value	
R P-UP	Counter B Reset At Power-Up	
	COUNTER C PARAMETERS	
Cnt C	Counter C Operating Mode	
dEC Pt	Counter C Decimal Position	
SC FAC	Counter C Scale Factor	
SCALEr	Counter C Scale Multipiler	
RESEt	Counter C Reset Action	
Cnt Ld	Counter C Count Load Value	
R P-UP	Counter C Reset At Power-Up	

RAtE Rate Parameters

DISPLAY	PARAMETER	USER SETTING
	RATE A PARAMETERS	
RAtE A	Rate A Enable	
dEC Pt	Rate A Decimal Position	
SC PtS	Rate A Scaling Points	
RA dSP 1	Rate A Scaling Point 1 Display	
RA InP 1	Rate A Scaling Point 1 Input	
RA dSP 2	Rate A Scaling Point 2 Display	
RA InP 2	Rate A Scaling Point 2 Input	
RA dSP 3	Rate A Scaling Point 3 Display	
RA InP 3	Rate A Scaling Point 3 Input	
RA dSP 4	Rate A Scaling Point 4 Display	
RA InP 4	Rate A Scaling Point 4 Input	
RA dSP 5	Rate A Scaling Point 5 Display	
RA InP 5	Rate A Scaling Point 5 Input	
RA dSP 6	Rate A Scaling Point 6 Display	
RA InP 6	Rate A Scaling Point 6 Input	
RA dSP 7	Rate A Scaling Point 7 Display	
RA InP 7	Rate A Scaling Point 7 Input	
RA dSP 8	Rate A Scaling Point 8 Display	
RA InP 8	Rate A Scaling Point 8 Input	
RA dSP 9	Rate A Scaling Point 9 Display	
RA InP 9	Rate A Scaling Point 9 Input	
RA dSP 10	Rate A Scaling Point 10 Display	
RA InP 10	Rate A Scaling Point 10 Input	
ROUNd	Rate A Display Rounding	
LO-CUt	Rate A Low Cut-Out	
	RATE B PARAMETERS	
RAtE b	Rate B Enable	
dEC Pt	Rate B Decimal Position	
SC PtS	Rate B Scaling Points	
Rb dSP 1	Rate B Scaling Point 1 Display	
Rb InP 1	Rate B Scaling Point 1 Input	
Rb dSP 2	Rate B Scaling Point 2 Display	
Rb InP 2	Rate B Scaling Point 2 Input	

DISPLAY	PARAMETER	USER SETTING
Rb dSP 3	Rate B Scaling Point 3 Display	
Rb InP 3	Rate B Scaling Point 3 Input	
Rb dSP 4	Rate B Scaling Point 4 Display	
Rb InP 4	Rate B Scaling Point 4 Input	
Rb dSP 5	Rate B Scaling Point 5 Display	
Rb InP 5	Rate B Scaling Point 5 Input	
Rb dSP 6	Rate B Scaling Point 6 Display	
Rb InP 6	Rate B Scaling Point 6 Input	
Rb dSP 7	Rate B Scaling Point 7 Display	
Rb InP 7	Rate B Scaling Point 7 Input	
Rb dSP 8	Rate B Scaling Point 8 Display	
Rb InP 8	Rate B Scaling Point 8 Input	
Rb dSP 9	Rate B Scaling Point 9 Display	
Rb InP 9	Rate B Scaling Point 9 Input	
Rb dSP 10	Rate B Scaling Point 10 Display	
Rb InP 10	Rate B Scaling Point 10 Input	
rOUnd	Rate B Display Rounding	
Lo-CUt	Rate B Low Cut-Out	

DISPLAY	PARAMETER	USER SETTING
	RATE C PARAMETERS	
rAtE C	Rate C Calculation	
SCALEr	Rate C Display Multiplier	
dEC Pt	Rate C Decimal Position	
	RATE UPDATE PARAMETERS	
Lo-Udt	Rate Low Update Time	
Hi-Udt	Rate High Update Time	
	RATE MAX AND MIN CAPTURE	
Hi ASn	Max Capture Value Assignment	
Hi CAP	Max Capture Delay Time	
Lo ASn	Min Capture Value Assignment	
Lo CAP	Min Capture Delay Time	

USEr User Input Parameters

DISPLAY	PARAMETER	USER SETTING
USrACt	User Active State	
USEr-1	User Input 1	
USEr-2	User Input 2	
USEr-3	User Input 3	
F1	Function Key 1	
F2	Function Key 2	
SEC-F1	2nd Function Key 1	
SEC-F2	2nd Function Key 2	

OUtPUt OUTPUT PARAMETERS

SEtPnt Setpoint Output Parameters

DISPLAY	PARAMETER	USER SETTING S1	USER SETTING S2	USER SETTING S3	USER SETTING S4
SELECt	Setpoint Selection				
ASSIGn	Setpoint Source				
ACtIOn	Action For Setpoint				
LOGIC	Output Logic				
Annun	Output Annunciator Light				
Color	Change Color				
SEtPnt	Setpoint Value				
trAC	Setpoint Tracking				
P-UP	Setpoint Output Power-Up State				
tYPE	Setpoint Activation Type				
StbY	Standyby Operation				
HYSt	Hysteresis For Setpoint				
t-On	On Time Delay Setpoint				
t-OFF	Off Time Delay Setpoint				
t-Out	Setpoint Output Time-Out				
1-SHOt	Rate Timed Output One-Shot				
AUtO	Counter Auto Reset				
rESEt	Output Reset W/ Counter Reset				
rSt-Sn	Setpoint Output Reset At Sn+1				

AnALOG Analog Output Parameters

DISPLAY	PARAMETER	USER SETTING
tYPE	Analog Type	
ASSIGn	Analog Assignment	
LO-SCL	Analog Low	
HI-SCL	Analog High	

Port COMMS. PORT PARAMETERS

USb USB Port Parameters

DISPLAY	PARAMETER	USER SETTING
CONFIG	USB Configuration	

SErIAL Serial Port Parameters

DISPLAY	PARAMETER	USER SETTING
tYPE	Communications Type	
bAUd	Baud Rate	
dAtA	Data Bits	
PArItY	Parity Bit	

DISPLAY	PARAMETER	USER SETTING
Addr	Meter Unit Address	
dELAY	Transmit Delay	
Abru	Abbreviated Printing	
OPt	Print Options	
Cnt A	Counter A	
Cnt b	Counter B	
Cnt C	Counter C	
rAtE A	Rate A	
rAtE b	Rate B	
rAtE C	Rate C	
Hi	Rate Maximum	
Lo	Rate Minimum	
SC FAC	Scale Factor A & B	
Cnt Ld	Counter Load A & B	
SEtPnt	Setpoint Values	

dISPLY DISPLAY PARAMETERS

LINE 1 Line 1 Parameters

DISPLAY	PARAMETER	USER SETTING
Color	Line 1 Display Color	
d-LEV	Display Level	
d-Cont	Display Contrast Level	
SELECt	Line 1 Display Value Select	

Cnt A		rAtE b	
Cnt b		rAtE C	
Cnt C		Hi	
rAtE A		Lo	

Scroll	Line 1 Display Scroll Enable/Time	
UnitS	Line 1 Units Mnemonic(s)	

LABEL MNEMONIC		LABEL	
		List A	List B
Unit 1	Line 1 Units Digit 1 (Left)		
Unit 2	Line 1 Units Digit 2 (Center)		
Unit 3	Line 1 Units Digit 3 (Right)		

LIST A CUSTOM MNEMONICS

	Unit 1	Unit 2	Unit 3
Counter A			
Counter B			
Counter C			
Rate A			
Rate B			
Rate C			
Max (HI)			
Min (LO)			

LIST B CUSTOM MNEMONICS

	Unit 1	Unit 2	Unit 3
Counter A			
Counter B			
Counter C			
Rate A			
Rate B			
Rate C			
Max (HI)			
Min (LO)			

LINE 2 Line 2 Parameters

ACCESS LINE 2 VALUE ACCESS

Cnt A		S3	
Cnt b		S4	
Cnt C		SC FAC CtA	
rAtE A		SC FAC Ctb	
rAtE b		SC FAC CtC	
rAtE C		Cnt Ld CtA	
Hi		Cnt Ld Ctb	
Lo		Cnt Ld CtC	
LISt		Color	
S1		d-LEV	
S2		d-Cont	

FUNCt LINE 2 FUNCTIONS ACCESS

r-L1		r-Hi	
r-CtA		r-Lo	
r-Ctb		r-HL	
r-CtC		Print	
r-AbC			

Scroll	Line 2 Display Scroll Enable/Time	
UnitS	Line 2 Units Mnemonic(s)	

LABEL MNEMONIC		LABEL	
		List A	List B
Unit 1	Line 2 Units Digit 1 (Left)		
Unit 2	Line 2 Units Digit 2		
Unit 3	Line 2 Units Digit 3		
Unit 4	Line 2 Units Digit 4		
Unit 5	Line 2 Units Digit 5		
Unit 6	Line 2 Units Digit 6		
Unit 7	Line 2 Units Digit 7		
Unit 8	Line 2 Units Digit 8		
Unit 9	Line 2 Units Digit 9 (Right)		

LIST A CUSTOM MNEMONICS

	1	2	3	4	5	6	7	8	9
Counter A									
Counter B									
Counter C									
Rate A									
Rate B									
Rate C									
Max (HI)									
Min (LO)									

LIST B CUSTOM MNEMONICS

	1	2	3	4	5	6	7	8	9
Counter A									
Counter B									
Counter C									
Rate A									
Rate B									
Rate C									
Max (HI)									
Min (LO)									

CODE	Security Code	

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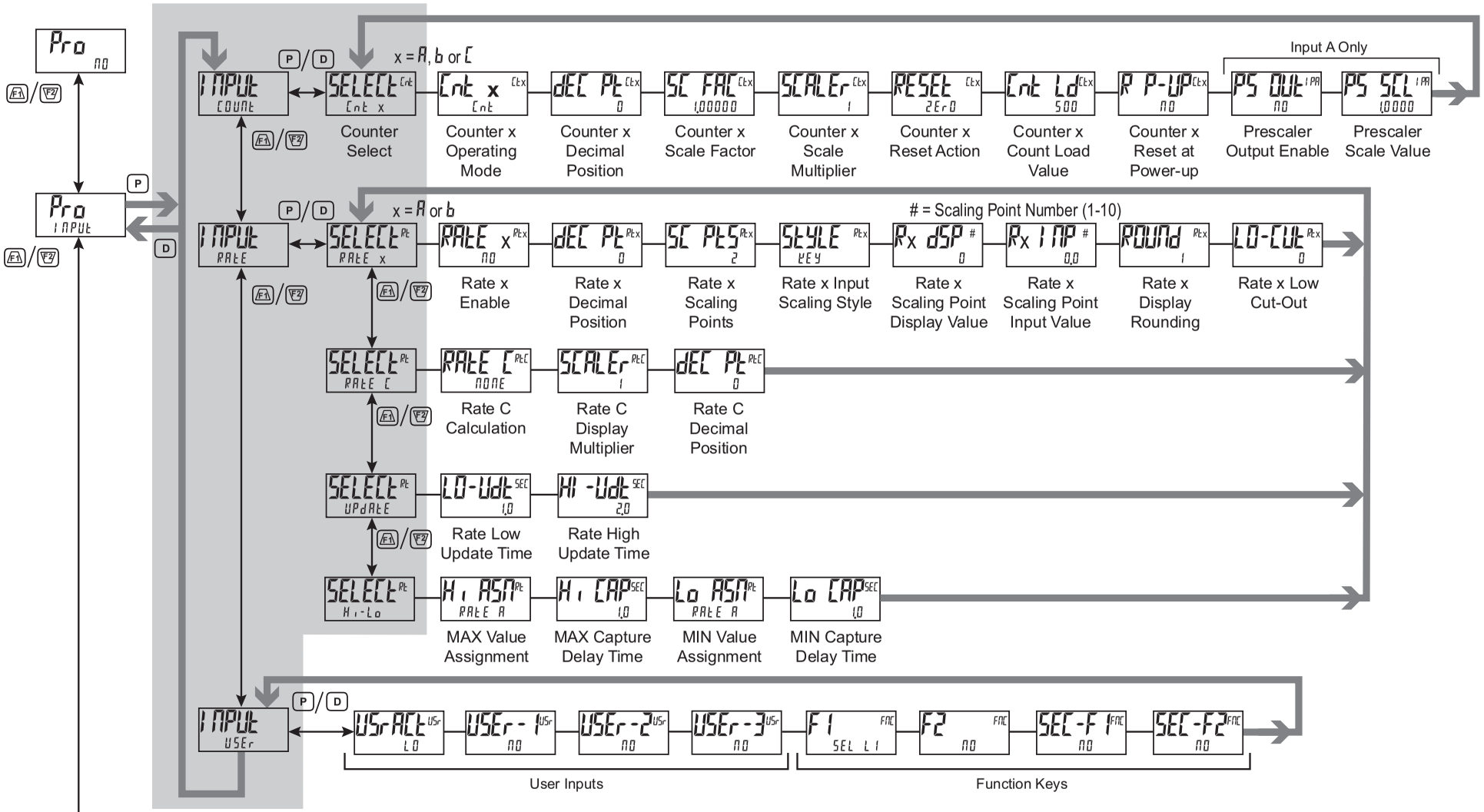
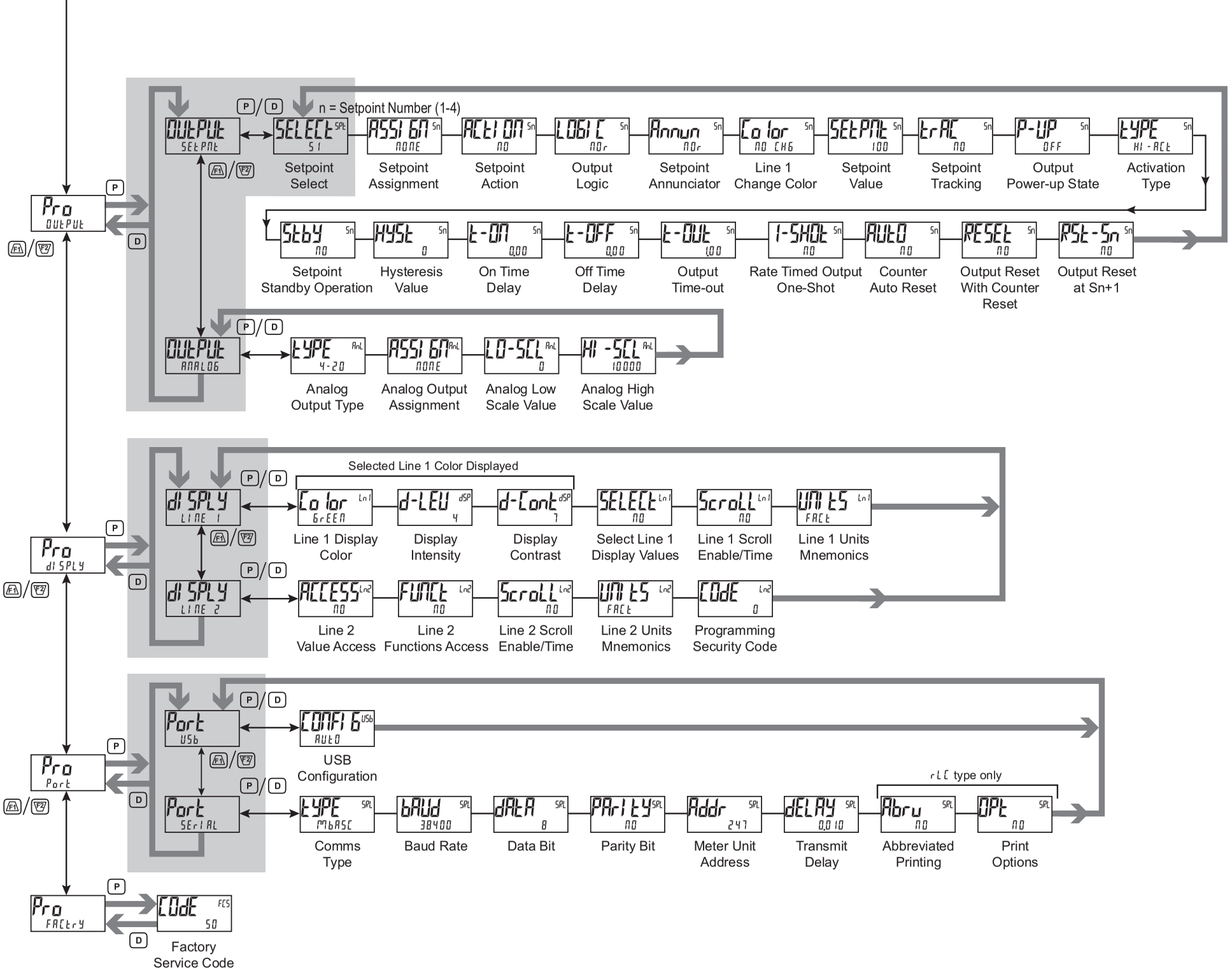
DPF260 PROGRAMMING QUICK OVERVIEW




n = Setpoint Number (1-4)
Pro OUTPUT
OUTPUT SETPNT
SELECT SPt 51
Setpoint Select
ASSIGN Sn NONE
Setpoint Assignment
ACTION Sn NO
Setpoint Action
LOGIC Sn NOr
Output Logic
Annun Sn NOr
Setpoint Annunciator
Color Sn NO CHG
Line 1 Change Color
SETPNT Sn 100
Setpoint Value
trAC Sn NO
Setpoint Tracking
P-UP Sn OFF
Output Power-up State
TYPE Sn HI-ACt
Activation Type
StBy Sn NO
Setpoint Standby Operation
HYSt Sn 0
Hysteresis Value
t-ON Sn 0.00
On Time Delay
t-OFF Sn 0.00
Off Time Delay
t-OUt Sn 1.00
Output Time-out
1-SHOt Sn NO
Rate Timed Output One-Shot
AUtO Sn NO
Counter Auto Reset
rESEt Sn NO
Output Reset With Counter Reset
rSt-Sn Sn NO
Output Reset at Sn+1
OUTPUT ANALOG
TYPE AnL 4-20
Analog Output Type
ASSIGN AnL NONE
Analog Output Assignment
LO-SCL AnL 0
Analog Low Scale Value
HI-SCL AnL 10000
Analog High Scale Value
Pro DISPLY
DISPLY LINE 1
Selected Line 1 Color Displayed
Color Ln1 GrEEN
Line 1 Display Color
d-LEV dSP 4
Display Intensity
d-Cont dSP 7
Display Contrast
SELECt Ln1 NO
Select Line 1 Display Values
ScroLL Ln1 NO
Line 1 Scroll Enable/Time
UNItS Ln1 FACt
Line 1 Units Mnemonics
DISPLY LINE 2
ACCESS Ln2 NO
Line 2 Value Access
FUNCt Ln2 NO
Line 2 Functions Access
ScroLL Ln2 NO
Line 2 Scroll Enable/Time
UNItS Ln2 FACt
Line 2 Units Mnemonics
CODE Ln2 0
Programming Security Code
Pro Port
Port USb
CONFIG USb AUtO
USB Configuration
Port SERIAL
TYPE SRL MbASC
Comms Type
bAUd SRL 38400
Baud Rate
dAtA SRL 8
Data Bit
PArItY SRL NO
Parity Bit
Addr SRL 247
Meter Unit Address
dELAY SRL 0.010
Transmit Delay
rLC type only
Abru SRL NO
Abbreviated Printing
OPt SRL NO
Print Options
Pro FACtry
CODE FCS 50
Factory Service Code

DPF260 Modbus Register Table

4/11/13

REGISTER ADDRESS	REGISTER NAME	LOW LIMIT	HIGH LIMIT	FACTORY SETTING	ACCESS	COMMENTS
	FREQUENTLY USED REGISTERS					
40001	Counter A Value (Hi word)	-999999999	999999999	0	Read/Write	
40002	Counter A Value (Lo word)					
40003	Counter B Value (Hi word)	-999999999	999999999	0	Read/Write	
40004	Counter B Value (Lo word)					
40005	Counter C Value (Hi word)	-999999999	999999999	0	Read/Write	
40006	Counter C Value (Lo word)					
40007	Rate A Value (Hi word)	N/A	N/A	N/A	Read Only	
40008	Rate A Value (Lo word)					
40009	Rate B Value (Hi word)	N/A	N/A	N/A	Read Only	
40010	Rate B Value (Lo word)					
40011	Rate C Value (Hi word)	N/A	N/A	N/A	Read Only	
40012	Rate C Value (Lo word)					
40013	Max (Hi) Value (Hi word)	-199999	999999	0	Read/Write	
40014	Max (Hi) Value (Lo word)					
40015	Min (Lo) Value (Hi word)	-199999	999999	0	Read/Write	
40016	Min (Lo) Value (Lo word)					
40017	Setpoint 1 Value (Hi word)	-199999	999999	100	Read/Write	Active List (A or B)
40018	Setpoint 1 Value (Lo word)					
40019	Setpoint 2 Value (Hi word)	-199999	999999	200	Read/Write	Active List (A or B)
40020	Setpoint 2 Value (Lo word)					
40021	Setpoint 3 Value (Hi word)	-199999	999999	300	Read/Write	Active List (A or B)
40022	Setpoint 3 Value (Lo word)					
40023	Setpoint 4 Value (Hi word)	-199999	999999	400	Read/Write	Active List (A or B)
40024	Setpoint 4 Value (Lo word)					
40025	Counter A Scale Factor (Hi word)	1	999999	100000	Read/Write	Active List (A or B)
40026	Counter A Scale Factor (Lo word)					
40027	Counter B Scale Factor (Hi word)	1	999999	100000	Read/Write	Active List (A or B)
40028	Counter B Scale Factor (Lo word)					
40029	Counter C Scale Factor (Hi word)	1	999999	100000	Read/Write	Active List (A or B)
40030	Counter C Scale Factor (Lo word)					
40031	Counter A Count Load (Hi word)	-199999	999999	500	Read/Write	Active List (A or B)
40032	Counter A Count Load (Lo word)					
40033	Counter B Count Load (Hi word)	-199999	999999	500	Read/Write	Active List (A or B)
40034	Counter B Count Load (Lo word)					
40035	Counter C Count Load (Hi word)	-199999	999999	500	Read/Write	Active List (A or B)
40036	Counter C Count Load (Lo word)					
40037	Setpoint Output Register (SOR)	0	15	N/A	Read/Write	Status of Setpoint Outputs. Bit State: 0=Off, 1=On. Bit 3 = S1, Bit 2 = S2, Bit 1 = S3, Bit 0 = S4. Outputs can only be activated/reset with this register when the respective bits in the Manual Mode Register (MMR) are set.
40038	Manual Mode Register (MMR)	0	31	0	Read/Write	Bit State: 0 = Auto Mode, 1 = Manual Mode Bit 4 = S1, Bit 3 = S2, Bit 2 = S3, Bit 1 = S4, Bit 0 = Linear Output

REGISTER ADDRESS		REGISTER NAME	LOW LIMIT	HIGH LIMIT	FACTORY SETTING	ACCESS	COMMENTS
40039		Reset Output Register	0	15	0	Read/Write	Bit State: 1= Reset Output, bit is returned to zero following reset processing; Bit 3 = S1, Bit 2 = S2, Bit 1 = S3, Bit 0 = S4
40040		Analog Output Register (AOR)	0	4095	0	Read/Write	Linear Output Card written to only if Linear Output is in Manual Mode (MMR bit 0 = 1).
		A/B SELECTION LIST PARAMETERS					**SEE USER LIST FUNCTION IN INPUT MODULE FOR DETAILS**
List A	**List B**	**Setpoint Values**					
40041	40081	Setpoint 1 Value (Hi word)	-199999	999999	100	Read/Write	
40042	40082	Setpoint 1 Value (Lo word)					
40043	40083	Setpoint 2 Value (Hi word)	-199999	999999	200	Read/Write	
40044	40084	Setpoint 2 Value (Lo word)					
40045	40085	Setpoint 3 Value (Hi word)	-199999	999999	300	Read/Write	
40046	40086	Setpoint 3 Value (Lo word)					
40047	40087	Setpoint 4 Value (Hi word)	-199999	999999	400	Read/Write	
40048	40088	Setpoint 4 Value (Lo word)					
		Counter Scale Factor Values					
40049	40089	Counter A Scale Factor (Hi word)	1	999999	100000	Read/Write	1 = 0.00001 (decimal point fixed)
40050	40090	Counter A Scale Factor (Lo word)					
40051	40091	Counter B Scale Factor (Hi word)	1	999999	100000	Read/Write	1 = 0.00001 (decimal point fixed)
40052	40092	Counter B Scale Factor (Lo word)					
40053	40093	Counter C Scale Factor (Hi word)	1	999999	100000	Read/Write	1 = 0.00001 (decimal point fixed)
40054	40094	Counter C Scale Factor (Lo word)					
		Counter Count Load Values					
40055	40095	Counter A Count Load (Hi word)	-199999	999999	500	Read/Write	1 = 1 in least significant digit (disregard decimal point)
40056	40096	Counter A Count Load (Lo word)					
40057	40097	Counter B Count Load (Hi word)	-199999	999999	500	Read/Write	1 = 1 in least significant digit (disregard decimal point)
40058	40098	Counter B Count Load (Lo word)					
40059	40099	Counter C Count Load (Hi word)	-199999	999999	500	Read/Write	1 = 1 in least significant digit (disregard decimal point)
40060	40100	Counter C Count Load (Lo word)					
		INPUT PARAMETERS					**SEE INPUT MODULE FOR PARAMETER DESCRIPTIONS**
		Counter A					
40121		Counter A Operating Mode	0	13	0	Read/Write	0 = None 1 = Count 2 = Count U/D 3 = Dual Count U/D 4 = Add/Add 5 = Add/Sub 6 = Quad x1 7 = Quad x2 8 = Quad x4 9 = Dual Quad x1 10 = Dual Quad x2 11 = Count x2 12 = Count U/D x2 13 = Dual Count U/D x2
40122		Counter A Decimal Point	0	5	0	Read/Write	0 = 0, 1 = 0.0, 2 = 0.00, 3 = 0.000, 4 = 0.0000, 5 = 0.00000
40123		Counter A Scale Multiplier	0	3	0	Read/Write	0 = 1, 1 = 0.1, 2 = 0.01, 3 = 10
40124		Counter A Reset Action	0	1	0	Read/Write	0 = Reset to Zero, 1 = Reset to Counter A Count Load Value
40125		Counter A Reset at Power-up	0	1	0	Read/Write	0 = No, 1 = Yes
40126		Input A Active Count Edge (Logic)	0	1	0	Read/Write	0 = Falling Edge, 1 = Rising Edge
40127		Prescaler Output Enable	0	1	0	Read/Write	0 = No, 1 = Yes
40128		Prescaler Output Scale Value	1	10000	10000	Read/Write	1 = 0.0001

REGISTER ADDRESS	REGISTER NAME	LOW LIMIT	HIGH LIMIT	FACTORY SETTING	ACCESS	COMMENTS
	Counter B					
40131	Counter B Operating Mode	0	7	0	Read/Write	0 = None 3 = Dual Count U/D 6 = Count x2 1 = Batch 4 = Dual Quad x1 7 = Dual Count U/D x2 2 = Count 5 = Dual Quad x2
40132	Counter B Decimal Point	0	5	0	Read/Write	0 = 0, 1 = 0.0, 2 = 0.00, 3 = 0.000, 4 = 0.0000, 5 = 0.00000
40133	Counter B Scale Multiplier	0	3	0	Read/Write	0 = 1, 1 = 0.1, 2 = 0.01, 3 = 10
40134	Counter B Reset Action	0	1	0	Read/Write	0 = Reset to Zero, 1 = Reset to Counter B Count Load Value
40135	Counter B Reset at Power-up	0	1	0	Read/Write	0 = No, 1 = Yes
40136	Input B Active Count Edge (Logic)	0	1	0	Read/Write	0 = Falling Edge, 1 = Rising Edge
40137	Counter B Batch Count Source	0	15	0	Read/Write	Bit State: 0 = No, 1 = Yes Bit 3 = S4, Bit 2 = S3, Bit 1 = S2, Bit 0 = S1
	Counter C					
40141	Counter C Operating Mode	0	6	0	Read/Write	0 = None 3 = Add (A+B) 6 = Slave 1 = Counter A 4 = Subtract (A-B) 2 = Counter B 5 = Batch
40142	Counter C Decimal Point	0	5	0	Read/Write	0 = 0, 1 = 0.0, 2 = 0.00, 3 = 0.000, 4 = 0.0000, 5 = 0.00000
40143	Counter C Scale Multiplier	0	3	0	Read/Write	0 = 1, 1 = 0.1, 2 = 0.01, 3 = 10
40144	Counter C Reset Action	0	1	0	Read/Write	0 = Reset to Zero, 1 = Reset to Counter C Count Load Value
40145	Counter C Reset at Power-up	0	1	0	Read/Write	0 = No, 1 = Yes
40146	Counter C Batch Count Source	0	15	0	Read/Write	Bit State: 0 = No, 1 = Yes Bit 3 = S4, Bit 2 = S3, Bit 1 = S2, Bit 0 = S1
	Rate A					
40151	Rate A Enable	0	1	0	Read/Write	0 = No, 1 = Yes
40152	Rate A Decimal Point	0	4	0	Read/Write	0 = 0, 1 = 0.0, 2 = 0.00, 3 = 0.000, 4 = 0.0000
40153	Rate A Low Cut-Out Value (Hi word)	0	999999	0	Read/Write	1 = 1 in least significant digit (disregard decimal point)
40154	Rate A Low Cut-Out Value (Lo word)					
40155	Rate A Display Rounding	0	6	0	Read/Write	0 = 1, 1 = 2, 2 = 5, 3 = 10, 4 = 20, 5 = 50, 6 = 100
40156	Rate A Scaling Points	2	10	2	Read/Write	Number of Rate A Linearizer Scaling Points
40157	Scaling Pt.1 Display Value (Hi word)	0	999999	0	Read/Write	1 = 1 in least significant digit (disregard decimal point)
40158	Scaling Pt.1 Display Value (Lo word)					
40159	Scaling Pt.1 Input Value (Hi word)	0	999999	0	Read/Write	1 = 0.1Hz
40160	Scaling Pt.1 Input Value (Lo word)					
40161	Scaling Pt.2 Display Value (Hi word)	0	999999	1000	Read/Write	1 = 1 in least significant digit (disregard decimal point)
40162	Scaling Pt.2 Display Value (Lo word)					
40163	Scaling Pt.2 Input Value (Hi word)	0	999999	10000	Read/Write	1 = 0.1Hz
40164	Scaling Pt.2 Input Value (Lo word)					
thru	Scaling Pts. 3 thru 9 Values	…	…	…	Read/Write	Registers 40165-40192 hold values for Scaling Points 3 thru 9.
40193	Scaling Pt.10 Display Value (Hi word)	0	999999	0	Read/Write	1 = 1 in least significant digit (disregard decimal point)
40194	Scaling Pt.10 Display Value (Lo word)					
40195	Scaling Pt.10 Input Value (Hi word)	0	999999	0	Read/Write	1 = 0.1Hz
40196	Scaling Pt.10 Input Value (Lo word)					
	Rate B					
40201	Rate B Enable	0	1	0	Read/Write	0 = No, 1 = Yes
40202	Rate B Decimal Point	0	4	0	Read/Write	0 = 0, 1 = 0.0, 2 = 0.00, 3 = 0.000, 4 = 0.0000
40203	Rate B Low Cut-Out Value (Hi word)	0	999999	0	Read/Write	1 = 1 in least significant digit (disregard decimal point)
40204	Rate B Low Cut-Out Value (Lo word)					

REGISTER ADDRESS	REGISTER NAME	LOW LIMIT	HIGH LIMIT	FACTORY SETTING	ACCESS	COMMENTS
40205	Rate B Display Rounding	0	6	0	Read/Write	0 = 1, 1 = 2, 2 = 5, 3 = 10, 4 = 20, 5 = 50, 6 = 100
40206	Rate B Scaling Points	2	10	2	Read/Write	Number of Rate B Linearizer Scaling Points
40207	Scaling Pt.1 Display Value (Hi word)	0	999999	0	Read/Write	1 = 1 in least significant digit (disregard decimal point)
40208	Scaling Pt.1 Display Value (Lo word)					
40209	Scaling Pt.1 Input Value (Hi word)	0	999999	0	Read/Write	1 = 0.1Hz
40210	Scaling Pt.1 Input Value (Lo word)					
40211	Scaling Pt.2 Display Value (Hi word)	0	999999	1000	Read/Write	1 = 1 in least significant digit (disregard decimal point)
40212	Scaling Pt.2 Display Value (Lo word)					
40213	Scaling Pt.2 Input Value (Hi word)	0	999999	10000	Read/Write	1 = 0.1Hz
40214	Scaling Pt.2 Input Value (Lo word)					
thru	Scaling Pts. 3 thru 9 Values	…	…	…	Read/Write	Registers 40215-40242 hold values for Scaling Points 3 thru 9.
40243	Scaling Pt.10 Display Value (Hi word)	0	999999	0	Read/Write	1 = 1 in least significant digit (disregard decimal point)
40244	Scaling Pt.10 Display Value (Lo word)					
40245	Scaling Pt.10 Input Value (Hi word)	0	999999	0	Read/Write	1 = 0.1Hz
40246	Scaling Pt.10 Input Value (Lo word)					
	Rate C					
40251	Rate C Calculation	0	1	0	Read/Write	0 = None 2 = Difference (A-B) 4 = Pct.of Total (A/A+B) 1 = Sum (A+B) 3 = Ratio (A/B) 5 = Pct.Draw (A-B/B)
40252	Rate C Display Multiplier	0	3	0	Read/Write	0 = 1, 1 = 10, 2 = 100, 3 = 1000
40253	Rate C Decimal Point	0	4	0	Read/Write	0 = 0, 1 = 0.0, 2 = 0.00, 3 = 0.000, 4 = 0.0000
	Rate Update					
40254	Rate Low Update Time	1	9999	10	Read/Write	1 = 0.1 Sec (decimal point fixed)
40255	Rate High Update Time	2	9999	20	Read/Write	2 = 0.2 Sec (decimal point fixed)
	Rate Hi/Lo Capture					
40256	Max (Hi) Capture Value Assignment	0	2	0	Read/Write	0 = Rate A, 1 = Rate B, 2 = Rate C
40257	Max (Hi) Capture Delay Time	0	9999	10	Read/Write	1 = 0.1 Sec (decimal point fixed)
40258	Min (Lo) Capture Value Assignment	0	2	0	Read/Write	0 = Rate A, 1 = Rate B, 2 = Rate C
40259	Min (Lo) Capture Delay Time	0	9999	10	Read/Write	1 = 0.1 Sec (decimal point fixed)
	User Input / Function Keys					
40271	User Input Active State	0	1	0	Read/Write	0 = Active Low, 1 = Active High
40272	User Input 1 Action	0	23	0	Read/Write	0 = NO 7 = Color 14 = RSt-L 21 = SPS-L 1 = PLOC 8 = d-LEV 15 = RSt-E 22 = SPS-E 2 = SEL L1 9 = d-Cont 16 = Inhibt 23 = SPHOLd 3 = SEL L2 10 = d-OFF 17 = StorE 4 = RSt L1 11 = LISt 18 = St-rSt 5 = RSt L2 12 = Print 19 = SPr-L 6 = RStL12 13 = Pr-rSt 20 = SPr-E
40273	User Input 1 Assignment	0	31	0	Read/Write	Counter/Hi/Lo Asn (Bit State: 0 = No, 1 = Yes): Bit 0 = CTA, Bit 1 = CTB, Bit 2 = CTC, Bit 3 = Hi, Bit 4 = Lo Setpoint Asn: Bit 0 = S1, Bit 1 = S2, Bit 2 = S3, Bit 3 = S4 List Asn: Bit 3 = Units Mnemonics
40274	User Input 2 Action	0	23	0	Read/Write	Same as User Input 1 Action
40275	User Input 2 Assignment	0	31	0	Read/Write	Same as User Input 1 Assignment
40276	User Input 3 Action	0	23	0	Read/Write	Same as User Input 1 Action
40277	User Input 3 Assignment	0	31	0	Read/Write	Same as User Input 1 Assignment

REGISTER ADDRESS	REGISTER NAME	LOW LIMIT	HIGH LIMIT	FACTORY SETTING	ACCESS	COMMENTS
40278	User F1 Key Action	0	22	1	Read/Write	0 = NO 6 = Color 12 = Pr-rSt 18 = SPr-L 1 = SEL L1 7 = d-LEV 13 = RSt-L 19 = SPr-E 2 = SEL L2 8 = d-Cont 14 = RSt-E 20 = SPS-L 3 = RSt L1 9 = d-OFF 15 = Inhibt 21 = SPS-E 4 = RSt L2 10 = LISt 16 = StorE 22 = SPHOLd 5 = RSt L12 11 = Print 17 = St-rSt
40279	User F1 Key Assignment	0	31	0	Read/Write	Same as User Input 1 Assignment
40280	User F2 Key Action	0	22	3	Read/Write	Same as User F1 Key Action
40281	User F2 Key Assignment	0	31	0	Read/Write	Same as User Input 1 Assignment
40282	User F1 Second Action	0	22	0	Read/Write	Same as User F1 Key Action
40283	User F1 Second Action Assignment	0	31	0	Read/Write	Same as User Input 1 Assignment
40284	User F2 Second Action	0	22	0	Read/Write	Same as User F1 Key Action
40285	User F2 Second Action Assignment	0	31	0	Read/Write	Same as User Input 1 Assignment
	OUTPUT PARAMETERS					**SEE OUTPUT MODULE FOR PARAMETER DESCRIPTIONS**
	Setpoint 1					
40291	Assignment	0	6	0	Read/Write	0 = None, 1 = Counter A, 2 = Counter B, 3 = Counter C, 4 = Rate A, 5 = Rate B, 6 = Rate C
40292	Action	0	3	0	Read/Write	0 = No, 1 = Latch, 2 = Timed Out, 3 = Boundary
40293	Output Logic	0	1	0	Read/Write	0 = Normal, 1 = Reverse
40294	Annunciator	0	3	0	Read/Write	0 = Off, 1 = Normal, 2 = Reverse, 3 = Flash
40295	Color	0	7	0	Read/Write	0 = No Change, 1 = Green, 2 = Orange, 3 = Red, 4 = Grn/Org, 5 = Red/Org, 6 = Red/Grn, 7 = Line 1 Color
40296	Tracking	0	7	0	Read/Write	0 = No, 1 = S1, 2 = S2, 3 = S3, 4 = S4, 5 = CntLd A, 6 = CntLd B, 7 = CntLd C
40297	Power-up State	0	2	0	Read/Write	0 = Off, 1 = On, 2 = Save
40298	Activation Type	0	1	0	Read/Write	0 = Low Acting, 1 = High Acting
40299	Standby Operation	0	1	0	Read/Write	0 = No, 1 = Yes
40300	Hysteresis	0	59999	0	Read/Write	1 = 1 Display Unit
40301	On Time Delay	0	59999	0	Read/Write	1 = 0.01 Second
40302	Off Time Delay	0	59999	0	Read/Write	1 = 0.01 Second
40303	Output Time-out	0	59999	100	Read/Write	1 = 0.01 Second
40304	Rate Timed Output One-Shot	0	1	0	Read/Write	0 = No, 1 = Yes
40305	Counter Auto Reset	0	4	0	Read/Write	0 = No, 1 = Zero at Start, 2 = CntLd at Start, 3 = Zero at End, 4 = CntLd at End
40306	Output Reset with Counter Reset	0	1	0	Read/Write	0 = No, 1 = Yes
40307	Output Reset at Sn+1	0	2	0	Read/Write	0 = No, 1 = Reset at Sn+1 Start, 2 = Reset at Sn+1 End
	Setpoint 2					
40311	Assignment	0	6	0	Read/Write	0 = None, 1 = Counter A, 2 = Counter B, 3 = Counter C, 4 = Rate A, 5 = Rate B, 6 = Rate C
40312	Action	0	3	0	Read/Write	0 = No, 1 = Latch, 2 = Timed Out, 3 = Boundary
40313	Output Logic	0	1	0	Read/Write	0 = Normal, 1 = Reverse
40314	Annunciator	0	3	0	Read/Write	0 = Off, 1 = Normal, 2 = Reverse, 3 = Flash
40315	Color	0	7	0	Read/Write	0 = No Change, 1 = Green, 2 = Orange, 3 = Red, 4 = Grn/Org, 5 = Red/Org, 6 = Red/Grn, 7 = Line 1 Color
40316	Tracking	0	7	0	Read/Write	0 = No, 1 = S1, 2 = S2, 3 = S3, 4 = S4, 5 = CntLd A, 6 = CntLd B, 7 = CntLd C
40317	Power-up State	0	2	0	Read/Write	0 = Off, 1 = On, 2 = Save

REGISTER ADDRESS	REGISTER NAME	LOW LIMIT	HIGH LIMIT	FACTORY SETTING	ACCESS	COMMENTS
40318	Activation Type	0	1	0	Read/Write	0 = Low Acting, 1 = High Acting
40319	Standby Operation	0	1	0	Read/Write	0 = No, 1 = Yes
40320	Hysteresis	0	59999	0	Read/Write	1 = 1 Display Unit
40321	On Time Delay	0	59999	0	Read/Write	1 = 0.01 Second
40322	Off Time Delay	0	59999	0	Read/Write	1 = 0.01 Second
40323	Output Time-out	0	59999	100	Read/Write	1 = 0.01 Second
40324	Rate Timed Output One-Shot	0	1	0	Read/Write	0 = No, 1 = Yes
40325	Counter Auto Reset	0	4	0	Read/Write	0 = No, 1 = Zero at Start, 2 = CntLd at Start, 3 = Zero at End, 4 = CntLd at End
40326	Output Reset with Counter Reset	0	1	0	Read/Write	0 = No, 1 = Yes
40327	Output Reset at Sn+1	0	2	0	Read/Write	0 = No, 1 = Reset at Sn+1 Start, 2 = Reset at Sn+1 End
	Setpoint 3					
40331	Assignment	0	6	0	Read/Write	0 = None, 1 = Counter A, 2 = Counter B, 3 = Counter C, 4 = Rate A, 5 = Rate B, 6 = Rate C
40332	Action	0	3	0	Read/Write	0 = No, 1 = Latch, 2 = Timed Out, 3 = Boundary
40333	Output Logic	0	1	0	Read/Write	0 = Normal, 1 = Reverse
40334	Annunciator	0	3	0	Read/Write	0 = Off, 1 = Normal, 2 = Reverse, 3 = Flash
40335	Color	0	7	0	Read/Write	0 = No Change, 1 = Green, 2 = Orange, 3 = Red, 4 = Grn/Org, 5 = Red/Org, 6 = Red/Grn, 7 = Line 1 Color
40336	Tracking	0	7	0	Read/Write	0 = No, 1 = S1, 2 = S2, 3 = S3, 4 = S4, 5 = CntLd A, 6 = CntLd B, 7 = CntLd C
40337	Power-up State	0	2	0	Read/Write	0 = Off, 1 = On, 2 = Save
40338	Activation Type	0	1	0	Read/Write	0 = Low Acting, 1 = High Acting
40339	Standby Operation	0	1	0	Read/Write	0 = No, 1 = Yes
40340	Hysteresis	0	59999	0	Read/Write	1 = 1 Display Unit
40341	On Time Delay	0	59999	0	Read/Write	1 = 0.01 Second
40342	Off Time Delay	0	59999	0	Read/Write	1 = 0.01 Second
40343	Output Time-out	0	59999	100	Read/Write	1 = 0.01 Second
40344	Rate Timed Output One-Shot	0	1	0	Read/Write	0 = No, 1 = Yes
40345	Counter Auto Reset	0	4	0	Read/Write	0 = No, 1 = Zero at Start, 2 = CntLd at Start, 3 = Zero at End, 4 = CntLd at End
40346	Output Reset with Counter Reset	0	1	0	Read/Write	0 = No, 1 = Yes
40347	Output Reset at Sn+1	0	2	0	Read/Write	0 = No, 1 = Reset at Sn+1 Start, 2 = Reset at Sn+1 End
	Setpoint 4					
40351	Assignment	0	6	0	Read/Write	0 = None, 1 = Counter A, 2 = Counter B, 3 = Counter C, 4 = Rate A, 5 = Rate B, 6 = Rate C
40352	Action	0	3	0	Read/Write	0 = No, 1 = Latch, 2 = Timed Out, 3 = Boundary
40353	Output Logic	0	1	0	Read/Write	0 = Normal, 1 = Reverse
40354	Annunciator	0	3	0	Read/Write	0 = Off, 1 = Normal, 2 = Reverse, 3 = Flash
40355	Color	0	7	0	Read/Write	0 = No Change, 1 = Green, 2 = Orange, 3 = Red, 4 = Grn/Org, 5 = Red/Org, 6 = Red/Grn, 7 = Line 1 Color
40356	Tracking	0	7	0	Read/Write	0 = No, 1 = S1, 2 = S2, 3 = S3, 4 = S4, 5 = CntLd A, 6 = CntLd B, 7 = CntLd C
40357	Power-up State	0	2	0	Read/Write	0 = Off, 1 = On, 2 = Save
40358	Activation Type	0	1	0	Read/Write	0 = Low Acting, 1 = High Acting
40359	Standby Operation	0	1	0	Read/Write	0 = No, 1 = Yes
40360	Hysteresis	0	59999	0	Read/Write	1 = 1 Display Unit
40361	On Time Delay	0	59999	0	Read/Write	1 = 0.01 Second

REGISTER ADDRESS	REGISTER NAME	LOW LIMIT	HIGH LIMIT	FACTORY SETTING	ACCESS	COMMENTS
40362	Off Time Delay	0	59999	0	Read/Write	1 = 0.01 Second
40363	Output Time-out	0	59999	100	Read/Write	1 = 0.01 Second
40364	Rate Timed Output One-Shot	0	1	0	Read/Write	0 = No, 1 = Yes
40365	Counter Auto Reset	0	4	0	Read/Write	0 = No, 1 = Zero at Start, 2 = CntLd at Start, 3 = Zero at End, 4 = CntLd at End
40366	Output Reset with Counter Reset	0	1	0	Read/Write	0 = No, 1 = Yes
40367	Output Reset at Sn+1	0	2	0	Read/Write	0 = No, 1 = Reset at Sn+1 Start, 2 = Reset at Sn+1 End
	Analog Output					
40371	Type	0	2	1	Read/Write	0 = 0-20 mA, 1 = 4-20 mA, 2 = 0-10 V
40372	Assignment	0	12	0	Read/Write	0 = None, 1 = Counter A, 2 = Counter B, 3 = Counter C, 4 = Rate A, 5 = Rate B, 6 = Rate C, 7 = Hi (max), 8 = Lo (min), 9 = S1, 10 = S2, 11 = S3, 12 = S4
40373	Analog Low Scale Value (Hi word)	-199999	999999	0	Read/Write	Display value that corresponds with 0 V, 0 mA or 4 mA output
40374	Analog Low Scale Value (Lo word)					
40375	Analog High Scale Value (Hi word)	-199999	999999	10000	Read/Write	Display value that corresponds with 10 V or 20 mA output
40376	Analog High Scale Value (Lo word)					
	DISPLAY PARAMETERS				**SEE DISPLAY MODULE FOR PARAMETER DESCRIPTIONS**	
	Line 1					
40381	Line 1 Display Color	0	2	0	Read/Write	0 = Green, 1 = Red, 2 = Orange
40382	Display Intensity Level	1	4	4	Read/Write	1 = Min., 4 = Max.
40383	Display Contrast Level	0	15	7	Read/Write	
40384	Line 1 Display Value Enable	0	255	1	Read/Write	Bit State: 0 = No (Disabled), 1 = Yes (Enabled) Bit 0 = Count A, Bit 1 = Count B, Bit 2 = Count C, Bit 3 = Rate A, Bit 4 = Rate B, Bit 5 = Rate C, Bit 6 = Hi (max), Bit 7 = Lo (min)
40385	Line 1 Display Scroll Enable/Time	0	15	0	Read/Write	0 = No Scroll, 1-15 = Scroll Time in Seconds
40386	Line 1 Units Mnemonic Mode	0	3	3	Read/Write	0 = Off, 1 = Label, 2 = Custom, 3 = Factory
40387	Line 1 Units Mnemonic Digit 1 (Left)	0	57	0	Read/Write	Label Mnemonic Mode only. Active List (A or B). 0 = 9 = I 18 = Q 27 = 2 36 = 8 45 = m(r) 54 = J 1 = A 10 = J 19 = R 28 = O 37 = 9 46 = o 55 = r 2 = b 11 = K 20 = S 29 = 1 38 = d 47 = q 56 = ° 3 = C 12 = L 21 = t 30 = 2 39 = c 48 = r 57 = _ 4 = d 13 = M (l) 22 = U 31 = 3 40 = E 49 = u 5 = E 14 = M (r) 23 = Y 32 = 4 41 = g 50 = w(r) 6 = F 15 = n 24 = W (l) 33 = 5 42 = h 51 = - 7 = G 16 = O 25 = W (r) 34 = 6 43 = i 52 = = 8 = H 17 = P 26 = y 35 = 7 44 = n 53 = [
40388	Line 1 Units Mnemonic Digit 2 (Center)	0	57	0	Read/Write	Label Mnemonic Mode only. Active List (A or B).
40389	Line 1 Units Mnemonic Digit 3 (Right)	0	57	0	Read/Write	Label Mnemonic Mode only. Active List (A or B).
	Line 2					
40401	Line 2 Security Code Value	0	250	0	Read/Write	
40402	Line 2 Display Scroll Enable/Time	0	15	0	Read/Write	0 = No Scroll, 1-15 = Scroll Time in Seconds
40403	Line 2 Units Mnemonic Mode	0	7	3	Read/Write	0 = Off, 1 = Label, 2 = Custom, 3 = Factory, 4 = Label & Custom, 5 = Label & Factory, 6 = Line 1 Indexed Label, 7 = Line 1 Indexed Label & Factory
40404	Line 2 Units Mnemonic Digit 1 (Left)	0	54	0	Read/Write	Label Mnemonic Mode. 0 = 9 = I 18 = Q 27 = O 36 = 9 45 = o 54 = _ 1 = A 10 = J 19 = r 28 = 1 37 = d 46 = u 2 = b 11 = K 20 = S 29 = 2 38 = c 47 = W(r) 3 = C 12 = L 21 = t 30 = 3 39 = E 48 = - 4 = d 13 = M (l) 22 = U 31 = 4 40 = 9 49 = = 5 = E 14 = M (r) 23 = W (l) 32 = 5 41 = h 50 = [6 = F 15 = n 24 = W (r) 33 = 6 42 = i 51 =] 7 = G 16 = O 25 = y 34 = 7 43 = n 52 = r 8 = H 17 = P 26 = 2 35 = 8 44 = m(r) 53 = °

REGISTER ADDRESS	REGISTER NAME	LOW LIMIT	HIGH LIMIT	FACTORY SETTING	ACCESS	COMMENTS
40405	Line 2 Units Mnemonic Digit 2	0	54	0	Read/Write	Label Mnemonic Mode only. Active List (A or B).
40406	Line 2 Units Mnemonic Digit 3	0	54	0	Read/Write	
40407	Line 2 Units Mnemonic Digit 4	0	54	0	Read/Write	
40408	Line 2 Units Mnemonic Digit 5	0	54	0	Read/Write	
40409	Line 2 Units Mnemonic Digit 6	0	54	0	Read/Write	
40410	Line 2 Units Mnemonic Digit 7	0	54	0	Read/Write	
40411	Line 2 Units Mnemonic Digit 8	0	54	0	Read/Write	
40412	Line 2 Units Mnemonic Digit 9 (Right)	0	54	0	Read/Write	
40413	Line 2 Counter A Display Access	0	2	0	Read/Write	0=LOC, 1=d-rEAd, 2=d-rSt
40414	Line 2 Counter B Display Access	0	2	0	Read/Write	0=LOC, 1=d-rEAd, 2=d-rSt
40415	Line 2 Counter C Display Access	0	2	0	Read/Write	0=LOC, 1=d-rEAd, 2=d-rSt
40416	Line 2 Rate A Display Access	0	1	0	Read/Write	0=LOC, 1=d-rEAd
40417	Line 2 Rate B Display Access	0	1	0	Read/Write	0=LOC, 1=d-rEAd
40418	Line 2 Rate C Display Access	0	1	0	Read/Write	0=LOC, 1=d-rEAd
40419	Line 2 Max (Hi) Value Access	0	2	0	Read/Write	0=LOC, 1=d-rEAd, 2=d-rSt
40420	Line 2 Min (Lo) Value Access	0	2	0	Read/Write	0=LOC, 1=d-rEAd, 2=d-rSt
40421	Line 2 List A/B Selection Access	0	5	0	Read/Write	0=LOC, 1=d-rEAd, 2=d-Entr, 3=P-rEAd, 4=P-Entr, 5=HidE
40422	List A/B Parameter Assignment	0	15	0	Read/Write	Selects List A/B Parameter values (Bit State: 0 = No, 1 = Yes): Bit 3 = Units Mnemonics
40423	Line 2 Setpoint 1 Value Access	0	5	0	Read/Write	0=LOC, 1=d-rEAd, 2=d-Entr, 3=P-rEAd, 4=P-Entr, 5=HidE
40424	Line 2 Setpoint 2 Value Access	0	5	0	Read/Write	0=LOC, 1=d-rEAd, 2=d-Entr, 3=P-rEAd, 4=P-Entr, 5=HidE
40425	Line 2 Setpoint 3 Value Access	0	5	0	Read/Write	0=LOC, 1=d-rEAd, 2=d-Entr, 3=P-rEAd, 4=P-Entr, 5=HidE
40426	Line 2 Setpoint 4 Value Access	0	5	0	Read/Write	0=LOC, 1=d-rEAd, 2=d-Entr, 3=P-rEAd, 4=P-Entr, 5=HidE
40427	Line 2 Scale Factor A Display Access	0	3	0	Read/Write	0=LOC, 1=P-rEAd, 2=P-Entr, 3=HidE
40428	Line 2 Scale Factor B Display Access	0	3	0	Read/Write	0=LOC, 1=P-rEAd, 2=P-Entr, 3=HidE
40429	Line 2 Scale Factor C Display Access	0	3	0	Read/Write	0=LOC, 1=P-rEAd, 2=P-Entr, 3=HidE
40430	Line 2 Count Load A Display Access	0	3	0	Read/Write	0=LOC, 1=P-rEAd, 2=P-Entr, 3=HidE
40431	Line 2 Count Load B Display Access	0	3	0	Read/Write	0=LOC, 1=P-rEAd, 2=P-Entr, 3=HidE
40432	Line 2 Count Load C Display Access	0	3	0	Read/Write	0=LOC, 1=P-rEAd, 2=P-Entr, 3=HidE
40433	Line 2 Display Color Access	0	3	0	Read/Write	0=LOC, 1=P-rEAd, 2=P-Entr, 3=HidE
40434	Line 2 Display Intensity Level Access	0	3	0	Read/Write	0=LOC, 1=P-rEAd, 2=P-Entr, 3=HidE
40435	Line 2 Display Contrast Level Access	0	3	0	Read/Write	0=LOC, 1=P-rEAd, 2=P-Entr, 3=HidE
	Line 2 User Function Access					
40451	Reset Line 1 Function Access	0	2	0	Read/Write	0=LOC, 1=P-Entr, 2=HidE
40452	Reset Counter A Function Access	0	2	0	Read/Write	0=LOC, 1=P-Entr, 2=HidE
40453	Reset Counter B Function Access	0	2	0	Read/Write	0=LOC, 1=P-Entr, 2=HidE
40454	Reset Counter C Function Access	0	2	0	Read/Write	0=LOC, 1=P-Entr, 2=HidE
40455	Reset Counter A,B,C Function Access	0	2	0	Read/Write	0=LOC, 1=P-Entr, 2=HidE
40456	Reset Max (Hi) Function Access	0	2	0	Read/Write	0=LOC, 1=P-Entr, 2=HidE
40457	Reset Min (Lo) Function Access	0	2	0	Read/Write	0=LOC, 1=P-Entr, 2=HidE
40458	Reset Max & Min Function Access	0	2	0	Read/Write	0=LOC, 1=P-Entr, 2=HidE
40459	Print Request Function Access	0	2	0	Read/Write	0=LOC, 1=P-Entr, 2=HidE
	PORT PARAMETERS				**SEE PORT MODULE FOR PARAMETER DESCRIPTIONS**	
	USB					
40481	USB Configuration	0	1	0	Read/Write	0 = Automatic, 1 = Serial

REGISTER ADDRESS		REGISTER NAME	LOW LIMIT	HIGH LIMIT	FACTORY SETTING	ACCESS	COMMENTS
		Serial					
40482		Type	0	2	2	Read/Write	0 = RLC Protocol (ASCII), 1 = Modbus RTU, 2 = Modbus ASCII
40483		Baud Rate	0	5	5	Read/Write	0=1200, 1=2400, 2=4800, 3=9600, 4=19200, 5=38400
40484		Data Bits	0	1	1	Read/Write	0 = 7 Bits, 1 = 8 Bits
40485		Parity	0	2	0	Read/Write	0 = None, 1 = Even, 2 = Odd
40486		Address	0	99	247	Read/Write	RLC Protocol: 0-99
			1	247			Modbus: 1-247
40487		Transmit Delay	0	250	10	Read/Write	1 = 0.001 Seconds
40488		Abbreviated Transmission (RLC only)	0	1	0	Read/Write	0 = No, 1 = Yes (Not used with Modbus communications type)
40489		Print Options (RLC only)	0	2047	1	Read/Write	0 = No, 1 = Yes (Not used with Modbus communications type) Bit 0 = Count A, Bit 1 = Count B, Bit 2 = Count C, Bit 3 = Rate A, Bit 4 = Rate B, Bit 5 = Rate C, Bit 6 = Hi (max), Bit 7 = Lo (min), Bit 8 = Scale Factors, Bit 9 = Count Load Values, Bit 10 = Setpoint Values
40490		Load Serial Settings	0	1	0	Read/Write	Changing 40481-40487 will not update the unit until this register is written with a 1. After the write, the communicating device must be changed to new unit settings and this register returns to 0.
		DISPLAY SELECTION					
40504		Line 1 Display (Top Line)	0	8	1	Read/Write	0 = No Display, 1 = Count A, 2 = Count B, 3 = Count C, 4 = Rate A, 5 = Rate B, 6 = Rate C, 7 = Max (Hi), 8 = Min (Lo)
40505		Line 2 Display (Bottom Line)	0	13	0	Read/Write	0 = No Display, 1 = Count A, 2 = Count B, 3 = Count C, 4 = Rate A, 5 = Rate B, 6 = Rate C, 7 = Max (Hi), 8 = Min (Lo), 9 = List A/B, 10 = S1, 11 = S2, 12 = S3, 13 = S4
		UNITS MNEMONICS					
List A	List B	**Line 1 Units Label Mode (A/B List)**					**SEE USER LIST FUNCTION IN INPUT MODULE FOR DETAILS**
40601	40801	Line 1 Units Mnemonic Digit 1 (Left)	0	57	0	Read/Write	Label Mnemonic Mode only. Active List (A or B). 0 = 9 = I 18 = 27 = 36 = 45 = m(r) 54 = J 1 = A 10 = J 19 = P 28 = O 37 = 9 46 = o 55 = r 2 = b 11 = K 20 = S 29 = i 38 = 3 47 = q 56 = ° 3 = C 12 = L 21 = t 30 = 2 39 = c 48 = r 57 = - 4 = d 13 = M(l) 22 = U 31 = 3 40 = P 49 = u 5 = E 14 = M(r) 23 = Y 32 = 4 41 = 9 50 = w(r) 6 = F 15 = n 24 = W(l) 33 = 5 42 = h 51 = - 7 = G 16 = O 25 = W(r) 34 = 6 43 = ı 52 = _ 8 = H 17 = P 26 = y 35 = 7 44 = n 53 = [
40602	40802	Line 1 Units Mnemonic Digit 2	0	57	0	Read/Write	
40603	40803	Line 1 Units Mnemonic Digit 3 (Right)	0	57	0	Read/Write	
List A	List B	**Line 1 Units Custom Mode (A/B List)**					
40604	40804	Counter A Mnemonic - Digit 1 (Left)	0	57	0	Read/Write	Custom Mnemonic Mode.
40605	40805	Counter A Mnemonic - Digit 2 (Center)	0	57	0	Read/Write	
40606	40806	Counter A Mnemonic - Digit 3 (Right)	0	57	0	Read/Write	
40607	40807	Counter B Mnemonic - Digit 1	0	57	0	Read/Write	
40608	40808	Counter B Mnemonic - Digit 2	0	57	0	Read/Write	
40609	40809	Counter B Mnemonic - Digit 3	0	57	0	Read/Write	
40610	40810	Counter C Mnemonic - Digit 1	0	57	0	Read/Write	
40611	40811	Counter C Mnemonic - Digit 2	0	57	0	Read/Write	
40612	40812	Counter C Mnemonic - Digit 3	0	57	0	Read/Write	
40613	40813	Rate A Mnemonic - Digit 1	0	57	0	Read/Write	
40614	40814	Rate A Mnemonic - Digit 2	0	57	0	Read/Write	
40615	40815	Rate A Mnemonic - Digit 3	0	57	0	Read/Write	
40616	40816	Rate B Mnemonic - Digit 1	0	57	0	Read/Write	

REGISTER ADDRESS		REGISTER NAME	LOW LIMIT	HIGH LIMIT	FACTORY SETTING	ACCESS	COMMENTS
40617	40817	Rate B Mnemonic - Digit 2	0	57	0	Read/Write	
40618	40818	Rate B Mnemonic - Digit 3	0	57	0	Read/Write	
40619	40819	Rate C Mnemonic - Digit 1	0	57	0	Read/Write	
40620	40820	Rate C Mnemonic - Digit 2	0	57	0	Read/Write	
40621	40821	Rate C Mnemonic - Digit 3	0	57	0	Read/Write	
40622	40822	Max (Hi) Mnemonic - Digit 1	0	57	0	Read/Write	
40623	40823	Max (Hi) Mnemonic - Digit 2	0	57	0	Read/Write	
40624	40824	Max (Hi) Mnemonic - Digit 3	0	57	0	Read/Write	
40625	40825	Min (Lo) Mnemonic - Digit 1	0	57	0	Read/Write	
40626	40826	Min (Lo) Mnemonic - Digit 2	0	57	0	Read/Write	
40627	40827	Min (Lo) Mnemonic - Digit 3	0	57	0	Read/Write	
List A	List B	**Line 2 Units Label Mode (A/B List)**					
40628	40828	Line 2 Units Mnemonic Digit 1 (Left)	0	54	0	Read/Write	Label Mnemonic Mode. 0 = 1 = A 2 = b 3 = C 4 = d 5 = E 6 = F 7 = G 8 = H 9 = I 10 = J 11 = K 12 = L 13 = M(l) 14 = M(r) 15 = n 16 = O 17 = P 18 = q 19 = r 20 = S 21 = t 22 = U 23 = W(l) 24 = W(r) 25 = y 26 = Z 27 = 0 28 = 1 29 = 2 30 = 3 31 = 4 32 = 5 33 = 6 34 = 7 35 = 8 36 = 9 37 = a 38 = c 39 = e 40 = g 41 = h 42 = i 43 = n 44 = m(r) 45 = o 46 = u 47 = W(r) 48 = - 49 = : 50 = [51 =] 52 = ' 53 = ° 54 = _
40629	40829	Line 2 Units Mnemonic Digit 2	0	54	0	Read/Write	
40630	40830	Line 2 Units Mnemonic Digit 3	0	54	0	Read/Write	
40631	40831	Line 2 Units Mnemonic Digit 4	0	54	0	Read/Write	
40632	40832	Line 2 Units Mnemonic Digit 5	0	54	0	Read/Write	
40633	40833	Line 2 Units Mnemonic Digit 6	0	54	0	Read/Write	
40634	40834	Line 2 Units Mnemonic Digit 7	0	54	0	Read/Write	
40635	40835	Line 2 Units Mnemonic Digit 8	0	54	0	Read/Write	
40636	40836	Line 2 Units Mnemonic Digit 9 (Right)	0	54	0	Read/Write	
List A	List B	**Line 2 Units Custom Mode (A/B List)**					
40637	40837	Counter A Mnemonic - Digit 1 (Left)	0	54	0	Read/Write	Custom Mnemonic Mode.
40638	40838	Counter A Mnemonic - Digit 2	0	54	0	Read/Write	
40639	40839	Counter A Mnemonic - Digit 3	0	54	0	Read/Write	
40640	40840	Counter A Mnemonic - Digit 4	0	54	0	Read/Write	
40641	40841	Counter A Mnemonic - Digit 5	0	54	0	Read/Write	
40642	40842	Counter A Mnemonic - Digit 6	0	54	0	Read/Write	
40643	40843	Counter A Mnemonic - Digit 7	0	54	0	Read/Write	
40644	40844	Counter A Mnemonic - Digit 8	0	54	0	Read/Write	
40645	40845	Counter A Mnemonic - Digit 9 (Right)	0	54	0	Read/Write	
40646	40846	Counter B Mnemonic - Digit 1	0	54	0	Read/Write	
40647	40847	Counter B Mnemonic - Digit 2	0	54	0	Read/Write	
40648	40848	Counter B Mnemonic - Digit 3	0	54	0	Read/Write	
40649	40849	Counter B Mnemonic - Digit 4	0	54	0	Read/Write	
40650	40850	Counter B Mnemonic - Digit 5	0	54	0	Read/Write	
40651	40851	Counter B Mnemonic - Digit 6	0	54	0	Read/Write	
40652	40852	Counter B Mnemonic - Digit 7	0	54	0	Read/Write	
40653	40853	Counter B Mnemonic - Digit 8	0	54	0	Read/Write	

REGISTER ADDRESS		REGISTER NAME	LOW LIMIT	HIGH LIMIT	FACTORY SETTING	ACCESS	COMMENTS
40654	40854	Counter B Mnemonic - Digit 9	0	54	0	Read/Write	
40655	40855	Counter C Mnemonic - Digit 1	0	54	0	Read/Write	
40656	40856	Counter C Mnemonic - Digit 2	0	54	0	Read/Write	
40657	40857	Counter C Mnemonic - Digit 3	0	54	0	Read/Write	
40658	40858	Counter C Mnemonic - Digit 4	0	54	0	Read/Write	
40659	40859	Counter C Mnemonic - Digit 5	0	54	0	Read/Write	
40660	40860	Counter C Mnemonic - Digit 6	0	54	0	Read/Write	
40661	40861	Counter C Mnemonic - Digit 7	0	54	0	Read/Write	
40662	40862	Counter C Mnemonic - Digit 8	0	54	0	Read/Write	
40663	40863	Counter C Mnemonic - Digit 9	0	54	0	Read/Write	
40664	40864	Rate A Mnemonic - Digit 1	0	54	0	Read/Write	
40665	40865	Rate A Mnemonic - Digit 2	0	54	0	Read/Write	
40666	40866	Rate A Mnemonic - Digit 3	0	54	0	Read/Write	
40667	40867	Rate A Mnemonic - Digit 4	0	54	0	Read/Write	
40668	40868	Rate A Mnemonic - Digit 5	0	54	0	Read/Write	
40669	40869	Rate A Mnemonic - Digit 6	0	54	0	Read/Write	
40670	40870	Rate A Mnemonic - Digit 7	0	54	0	Read/Write	
40671	40871	Rate A Mnemonic - Digit 8	0	54	0	Read/Write	
40672	40872	Rate A Mnemonic - Digit 9	0	54	0	Read/Write	
40673	40873	Rate B Mnemonic - Digit 1	0	54	0	Read/Write	
40674	40874	Rate B Mnemonic - Digit 2	0	54	0	Read/Write	
40675	40875	Rate B Mnemonic - Digit 3	0	54	0	Read/Write	
40676	40876	Rate B Mnemonic - Digit 4	0	54	0	Read/Write	
40677	40877	Rate B Mnemonic - Digit 5	0	54	0	Read/Write	
40678	40878	Rate B Mnemonic - Digit 6	0	54	0	Read/Write	
40679	40879	Rate B Mnemonic - Digit 7	0	54	0	Read/Write	
40680	40880	Rate B Mnemonic - Digit 8	0	54	0	Read/Write	
40681	40881	Rate B Mnemonic - Digit 9	0	54	0	Read/Write	
40682	40882	Rate C Mnemonic - Digit 1	0	54	0	Read/Write	
40683	40883	Rate C Mnemonic - Digit 2	0	54	0	Read/Write	
40684	40884	Rate C Mnemonic - Digit 3	0	54	0	Read/Write	
40685	40885	Rate C Mnemonic - Digit 4	0	54	0	Read/Write	
40686	40886	Rate C Mnemonic - Digit 5	0	54	0	Read/Write	
40687	40887	Rate C Mnemonic - Digit 6	0	54	0	Read/Write	
40688	40888	Rate C Mnemonic - Digit 7	0	54	0	Read/Write	
40689	40889	Rate C Mnemonic - Digit 8	0	54	0	Read/Write	
40690	40890	Rate C Mnemonic - Digit 9	0	54	0	Read/Write	
40691	40891	Max (Hi) Mnemonic - Digit 1	0	54	0	Read/Write	
40692	40892	Max (Hi) Mnemonic - Digit 2	0	54	0	Read/Write	
40693	40893	Max (Hi) Mnemonic - Digit 3	0	54	0	Read/Write	
40694	40894	Max (Hi) Mnemonic - Digit 4	0	54	0	Read/Write	
40695	40895	Max (Hi) Mnemonic - Digit 5	0	54	0	Read/Write	
40696	40896	Max (Hi) Mnemonic - Digit 6	0	54	0	Read/Write	
40697	40897	Max (Hi) Mnemonic - Digit 7	0	54	0	Read/Write	
40698	40898	Max (Hi) Mnemonic - Digit 8	0	54	0	Read/Write	

REGISTER ADDRESS		REGISTER NAME	LOW LIMIT	HIGH LIMIT	FACTORY SETTING	ACCESS	COMMENTS
40699	40899	Max (Hi) Mnemonic - Digit 9	0	54	0	Read/Write	
40700	40900	Min (Lo) Mnemonic - Digit 1	0	54	0	Read/Write	
40701	40901	Min (Lo) Mnemonic - Digit 2	0	54	0	Read/Write	
40702	40902	Min (Lo) Mnemonic - Digit 3	0	54	0	Read/Write	
40703	40903	Min (Lo) Mnemonic - Digit 4	0	54	0	Read/Write	
40704	40904	Min (Lo) Mnemonic - Digit 5	0	54	0	Read/Write	
40705	40905	Min (Lo) Mnemonic - Digit 6	0	54	0	Read/Write	
40706	40906	Min (Lo) Mnemonic - Digit 7	0	54	0	Read/Write	
40707	40907	Min (Lo) Mnemonic - Digit 8	0	54	0	Read/Write	
40708	40908	Min (Lo) Mnemonic - Digit 9	0	54	0	Read/Write	
41001-41010		Slave ID	N/A	N/A	N/A	Read Only	RLC-PAX2D <a><b><0100h><0040h><0040h><0010h> <a> = SP Card Status. "0"-No Card, "2"-Dual SP, "4"-Quad SP <b> = Linear Card Status. "0"-Not Installled, "1"-Installed <0100h> = Version Number (1.00 or higher) <0040h><0040h> = 64 Register Writes/Reads (Max.) <0010h> = 16 Register GUID/Scratch
41101-41116		GUID/Scratch	N/A	N/A	N/A	Read/Write	Reserved

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WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **25 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **two (2) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

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

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

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

RETURN REQUESTS/INQUIRIES

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

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

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

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

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

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

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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