PD6300 Pulse Input Rate/Totalizer
Instruction Manual

PROVU SERIES

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- Pulse, Open Collector, NPN, PNP, TTL, Switch Contact, Sine Wave (Coil), Square Wave Inputs
- Gate Function for Rate Display of Slow Pulse Rates
- NEMA 4X, IP65 Front
- Universal 85-265 VAC or 12/24 VDC Input Power
- Large Dual-Line 6-Digit Display, 0.60" & 0.46"
- Isolated 24 VDC @ 200 mA Transmitter Power Supply
- Programmable Displays & Function Keys
- Sunlight Readable Display
- Rate Displayed as Units per Second, Minute, Hour, or Day
- Total, Grand Total or Non-Resettable Grand Total
- 9-Digit Totalizer with Total Overflow Feature
- K-Factor Calibration or Scale with up to 32-Point Linearization
- 2 or 4 Relays + Isolated 4-20 mA Output for Rate or Total
- External 4-Relays & Digital I/O Expansion Modules
- RS-232 & RS-422/485 Serial Communication Options
- -40 to 65°C Operating Temperature Range

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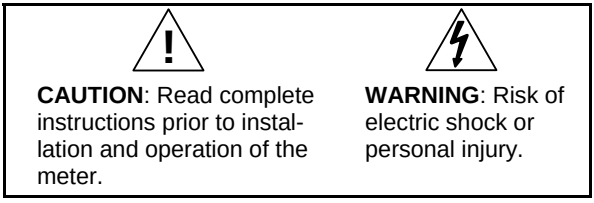
The information contained in this document is subject to change without notice. Precision Digital makes no representations or warranties with respect to the contents hereof; and specifically disclaims any implied warranties of merchantability or fitness for a particular purpose.



Warning

This product is not recommended for life support applications or applications where malfunctioning could result in personal injury or property loss. Anyone using this product for such applications does so at his/her own risk. Precision Digital Corporation shall not be held liable for damages resulting from such improper use.

Limited Warranty

Precision Digital Corporation warrants this product against defects in material or workmanship for the specified period under "Specifications" from the date of shipment from the factory. Precision Digital's liability under this limited warranty shall not exceed the purchase value, repair, or replacement of the defective unit.

Registered Trademarks

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INTRODUCTION

The PD6300 is a multipurpose, easy to use pulse rate/totalizer ideal for flow rate, total, and control applications. It accepts pulse (e.g. ±40 mV to ±8 V), square wave (0-5 V, 0-12 V, or 0-24 V), open collector, NPN, PNP, TTL or switch contact signals. Three of the front panel buttons can be custom-programmed for specific operation.

The basic model includes an isolated 24 VDC transmitter power supply that can be used to power the input transmitter or other devices. An additional isolated 24 VDC power supply is included with the 4-20 mA output option.

A fully loaded PD6300 pulse rate/totalizer meter has the following: four SPDT relays, 4-20 mA output, and two 24 VDC power supplies. The PD6300 capabilities may be enhanced by adding the following external expansion modules: four SPST relays (creating an eight-relay rate/totalizer), two digital I/O modules with four inputs and four outputs each, and RS-232 or RS-485 communication adapters.

The eight relays can be used for alarm indication or process control applications. The 4-20 mA isolated output, serial communications, and digital I/O options make the PD6300 an excellent addition to any system.

ORDERING INFORMATION

85-265 VAC* Model	12/24 VDC* Model	Options Installed
PD6300-6R0	PD6300-7R0	No options
PD6300-6R2	PD6300-7R2	2 relays
PD6300-6R3	PD6300-7R3	4-20 mA output
PD6300-6R4	PD6300-7R4	4 relays (PD1104**)
PD6300-6R5	PD6300-7R5	2 relays &4-20 mA output
PD6300-6R7	PD6300-7R7	4 relays & 4-20 mA output (PD1107**)
*All models may be powered from AC or DC, see Specifications for details. **Model number for replacement option card.		

Accessories

Model	Description
PDA1002	DIN-Rail mounting kit for two expansion modules
PDA1004	4 SPST (Form A) relays
PDA1044	4 digital inputs & 4 digital outputs (2 may be connected)
PDA1200	Meter copy cable
PDA1232	RS-232 serial adapter
PDA1485	RS-422/485 serial adapter
PDA7485-I	RS-232 to RS-422/485 isolated converter
PDA8232-N	USB to RS-232 non-isolated converter
PDA8485-I	USB to RS-422/485 isolated converter
PDA2811	1 Meter Plastic NEMA 4X Enclosure
PDA2812	2 Meter Plastic NEMA 4X Enclosure
PDX6901	Suppressor (snubber): 0.01 µF/470 Ω, 250 VAC

SPECIFICATIONS

Except where noted all specifications apply to operation at +25°C.

General

DISPLAY	Main display: 0.6" (15 mm) high, red LEDs Second display: 0.46" (12 mm) high, red LEDs 6 digits: each (-99999 to 999999), with lead zero blanking.
DISPLAY INTENSITY	Eight user selectable intensity levels
DISPLAY UPDATE RATE	Rate: 10 per second; up to 1 per 100 seconds (and is a function of Low Gate setting) Total: 10 per second (fixed)
OVERRANGE	Display flashes 999999
PROGRAMMING METHODS	Four front panel buttons, digital inputs, PC and multi-point linearization utility, or cloning using Copy function.
RECALIBRATION	All ranges are calibrated at the factory to read frequency in Hz. No recalibration required.
MAX/MIN DISPLAY	Max/min readings reached by the process are stored until reset by the user or until power to the meter is turned off.
PASSWORD	Three programmable passwords restrict modification of programmed settings and two prevent resetting the totals. Pass 1: Allows use of the F1–F3 function keys Pass 2: Allows use of the F1–F3 function keys and changing the set/reset points Pass 3: Restricts all programming and F1–F3 keys and Digital Inputs Total: Prevents resetting the total manually Gtotal: Prevents resetting the grand total manually
NON-VOLATILE MEMORY	All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.
POWER OPTIONS	85-265 VAC 50/60 Hz, 90-265 VDC, 20 W max or jumper selectable 12/24 VDC ± 10%, 15 W max
FUSE	Required external fuse: UL Recognized, 5 A max, slow blow; up to 6 meters may share one 5 A fuse
ISOLATED TRANSMITTER POWER SUPPLY	Terminals P+ & P-: 24 VDC ± 10% @ 200 mA max (standard), (12/24 VDC powered models rated @ 100 mA max). 5 or 10 VDC @ 50 mA max, selectable with internal jumper J4.
ISOLATION	4 kV input/output-to-power line 500 V input-to-output or output-to-P+ supply

OVERVOLTAGE CATEGORY	Installation Overvoltage Category II: Local level with smaller transient overvoltages than Installation Overvoltage Category III.
ENVIRONMENTAL	Operating temperature range: -40 to 65°C Storage temperature range: -40 to 85°C Relative humidity: 0 to 90% non-condensing
CONNECTIONS	Removable screw terminal blocks accept 12 to 22 AWG wire, RJ45 for external relays, digital I/O, and serial communication adapters.
ENCLOSURE	1/8 DIN, high impact plastic, UL 94V-0, color: black
MOUNTING	1/8 DIN panel cutout required: 3.622" x 1.772" (92 mm x 45 mm) Two panel mounting bracket assemblies are provided.
TIGHTENING TORQUE	Screw terminal connectors: 5 lb-in (0.56 Nm)
OVERALL DIMENSIONS	4.68" x 2.45" x 5.64" (119 mm x 62 mm x 143 mm) (W x H x D)
WEIGHT	9.5 oz (269 g)
WARRANTY	3 years parts & labor

Rate Input

INPUTS	Field selectable: Pulse or square wave 0-5 V, 0-12 V, or 0-24 V @ 30 kHz; TTL; open collector 4.7 kΩ pull-up to 5 V @ 30 kHz; NPN or PNP transistor, switch contact 4.7 kΩ pull-up to 5 V @ 40 Hz.
LOW VOLTAGE MAG PICKUP (Isolated)	Sensitivity: 40 mVp-p to 8Vp-p
MINIMUM INPUT FREQUENCY	0.001 Hz Minimum frequency is dependent on high gate setting.
MAXIMUM INPUT FREQUENCY	30,000 Hz
INPUT IMPEDANCE	Pulse input: Greater than 300 kΩ @ 1 kHz. Open collector/switch input: 4.7 kΩ pull-up to 5 V.
ACCURACY	±0.03% of calibrated span ±1 count
TEMPERATURE DRIFT	Rate display is not affected by changes in temperature.
MULTI-POINT LINEARIZATION	2 to 32 points
LOW-FLOW CUTOFF	0-999999 (0 disables cutoff function)

DECIMAL POINT	Up to five decimal places or none: d.ddddd, d.dddd, d.ddd, d.dd, d.d, or dddddd
CALIBRATION	May be calibrated using K-factor, internal calibration, or by applying an external calibration signal.
K-FACTOR	Field programmable K-factor converts input pulses to rate in engineering units. May be programmed from 0.00001 to 999,999 pulses/unit.
CALIBRATION RANGE	Input 1 signal may be set anywhere in the range of the meter; input 2 signal may be set anywhere above or below input 1 setting. Minimum input span between any two inputs is 10 Hz. An Error message will appear if the input 1 and input 2 signals are too close together.
FILTER	Programmable contact de-bounce filter: 40 to 999 Hz maximum input frequency allowed with low speed filter.
TIME BASE	Second, minute, hour, or day
GATE	Low gate: 0.1-99.9 seconds High gate: 2.0-999.9 seconds

Rate/Totalizer

DISPLAY ASSIGNMENT	The main (Big) and small (Little) displays may be assigned to rate, total, grand total, alternate R & T, units, and set point.
RATE DISPLAY INDICATION	-99999 to 999999, lead zero blanking. “R” LED illuminates while displaying rate or frequency.
TOTAL DISPLAY & TOTAL OVERFLOW	0 to 999,999; automatic lead zero blanking. “T” LED is illuminated while displaying total or grand total. Up to 999,999,999 with total-overflow feature. “oF” is displayed to the left of total overflow and ▲ LED is illuminated.
ALTERNATING DISPLAY	Either display may be programmed to alternate between rate and total or rate and grand total every 10 seconds.
TOTAL DECIMAL POINT	Up to five decimal places or none: d.ddddd, d.dddd, d.ddd, d.dd, d.d, or dddddd Total decimal point is independent of rate decimal point.
TOTALIZER	Calculates total based on rate and field programmable multiplier to display total in engineering units. Time base must be selected according to the time units in which the rate is displayed.
TOTALIZER ROLLOVER	Totalizer rolls over when display exceeds 999,999,999. Relay status reflects display.

TOTALIZER PRESETS	Up to eight, user selectable under setup menu. Any set point can be assigned to total and may be programmed anywhere in the range of the meter for total alarm indication.
PROGRAMMABLE DELAY ON RELEASE	0.1 and 999.9 seconds; applied to the first relay assigned to total or grand total. If the meter is programmed to reset total to zero automatically when the preset is reached, then a delay will occur before the total is reset.
TOTAL RESET	Via front panel button, external contact closure on digital inputs, automatically via user selectable preset value and time delay, or through serial communications.
TOTAL RESET PASSWORD	Total and grand total passwords may be entered to prevent resetting the total or grand total from the front panel.
NON-RESETTABLE TOTAL	The grand total can be programmed as a non-resettable total by entering the password “050873”.  **Caution!** Once the Grand Total has been programmed as “non-resettable” the feature **cannot** be disabled.

Relays

RATING	2 or 4 SPDT (Form C) internal and/or 4 SPST (Form A) external; rated 3 A @ 30 VDC and 125/250 VAC resistive load; 1/14 HP @ 125/250 VAC for inductive loads
NOISE SUPPRESSION	Noise suppression is recommended for each relay contact switching inductive loads; see page 24 for details.
RELAY ASSIGNMENT	Relays may be assigned to rate, total, or grand total.
DEADBAND	0-100% of span, user programmable
HIGH OR LOW ALARM	User may program any alarm for high or low trip point. Unused alarm LEDs and relays may be disabled (turn off).
RELAY OPERATION	Automatic (non-latching) Latching (requires manual acknowledge) Sampling (based on time) Pump alternation control (2 to 8 relays) Off (disable unused relays) Manual control mode

RELAY RESET	User selectable via front panel buttons, digital inputs, or PC 1. Automatic reset only (non-latching), when the input passes the reset point or total is reset to zero. 2. Automatic + manual reset at any time (non-latching) 3. Manual reset only, at any time (latching) 4. Manual reset only after alarm condition has cleared (L) *Note: Front panel button or digital input may be assigned to acknowledge relays programmed for manual reset.*
TIME DELAY	0 to 999.9 seconds, on & off relay time delays Programmable and independent for each relay.
FAIL-SAFE OPERATION	Programmable and independent for each relay. *Note: Relay coil is energized in non-alarm condition. In case of power failure, relay will go to alarm state.*
AUTO INITIALIZATION	When power is applied to the meter, relays will reflect the state of the input to the meter.

Isolated 4-20 mA Transmitter Output

OUTPUT SOURCE	Rate/process, total, grand total, max, min, set points 1-8, or manual control mode
SCALING RANGE	1.000 to 23.000 mA for any display range.
CALIBRATION	Factory calibrated: 4.000 to 20.000 = 4-20 mA output
ANALOG OUT PROGRAMMING	23.000 mA maximum for all parameters: Overrange, underrange, max, min, and break
ACCURACY	± 0.1% FS ± 0.004 mA
TEMPERATURE DRIFT	0.005% of calibrated span/°C from 0 to 65°C ambient, 0.01% of calibrated span/°C from -40 to 0°C ambient *Note: Analog output drift is separate from input drift.*
ISOLATED TRANSMITTER POWER SUPPLY	Terminals I+ & R: 24 VDC ± 10% @ 40 mA maximum; may be used to power the 4-20 mA output or other devices. Refer to Figure 6 on page 20 and Figure 14 on page 25.
EXTERNAL LOOP POWER SUPPLY	35 VDC maximum

OUTPUT LOOP RESISTANCE

Power supply	Minimum	Maximum
24 VDC	10 Ω	700 Ω
35 VDC (external)	100 Ω	1200 Ω

Serial Communications

METER ADDRESS	1 - 247
BAUD RATE	300 - 19,200 bps
TRANSMIT TIME DELAY	Programmable between 0 and 199 ms or transmitter always on for RS-422 communication
DATA	8 bit (1 start bit, 1 stop bit)
PARITY	None
TURN AROUND DELAY	Less than 2 ms (fixed)

Note: Refer to the PDC Serial Communication Protocol manual located at www.predig.com for details.

PDA1044 Digital Input & Output Expansion Module

CHANNELS	4 digital inputs & 4 digital outputs per module
SYSTEM	Up to 2 modules for a total of 8 inputs & 8 outputs
DIGITAL INPUT LOGIC HIGH	3 to 5 VDC
DIGITAL INPUT LOGIC LOW	0 to 1.25 VDC
DIGITAL OUTPUT LOGIC HIGH	4.75 to 5 VDC
DIGITAL OUTPUT LOGIC LOW	0 to 0.4 VDC
SOURCE CURRENT	10 mA maximum output current
SINK CURRENT	1.5 mA minimum input current
+5 V TERMINAL	To be used as pull-up for digital inputs only Connect normally open pushbuttons across +5 V & DI1-4.

COMPLIANCE INFORMATION

Safety

UL & c-UL LISTED	USA & Canada UL 508 Industrial Control Equipment
UL FILE NUMBER	E160849
FRONT PANEL	UL Type 4X, NEMA 4X, IP65; panel gasket provided
LOW VOLTAGE DIRECTIVE	EN 61010-1:2001 Safety requirements for measurement, control, and laboratory use

Electromagnetic Compatibility

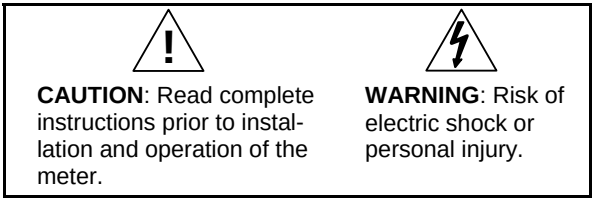
EMISSIONS	EN 55022:1998/A1:2000/A2:2003 Class A ITE emissions requirements
Radiated Emissions	Class A
AC Mains Conducted Emissions	Class A
IMMUNITY	EN 61000-6-2:2001 EMC heavy industrial generic immunity standard
RFI - Amplitude Modulated	80 -1000 MHz 10 V/m 80% AM (1 kHz)
Electrical Fast Transients	±2kV AC mains, ±1kV other
Electrostatic Discharge	±4kV contact, ±8kV air
RFI - Conducted	10V, 0.15-80 MHz, 1kHz 80% AM
AC Surge	±2kV Common, ±1kV Differential
Surge	1KV (CM)
Power-Frequency Magnetic Field	3 A/m 70%V for 0.5 period
Voltage Dips	40%V for 5 & 50 periods
Voltage Interruptions	<5%V for 250 periods

Note:

Testing was conducted on PD6300 meters installed through the covers of grounded metal enclosures with cable shields grounded at the point of entry representing installations designed to optimize EMC performance.

Declaration of Conformity available at www.predig.com

SAFETY INFORMATION



Warning!

Hazardous voltages exist within enclosure. Installation and service should be performed only by trained service personnel.

INSTALLATION

There is no need to remove the meter from its case to complete the installation, wiring, and setup of the meter for most applications. Instructions are provided for 12 VDC meter power and for 5 or 10 V transmitter power applications, see page 18.

Unpacking

Remove the meter from box. Inspect the packaging and contents for damage. Report damages, if any, to the carrier.

If any part is missing or the meter malfunctions, please contact your supplier or the factory for assistance.

Panel Mounting Instructions

- Prepare a standard 1/8 DIN panel cutout – 3.622" x 1.772" (92 mm x 45 mm). Refer to Figure 1 for more details.
- Clearance: allow at least 6.0" (152 mm) behind the panel for wiring.
- Panel thickness: 0.04" - 0.25" (1.0 mm - 6.4 mm). Recommended minimum panel thickness to maintain Type 4X rating: 0.06" (1.5 mm) steel panel, 0.16" (4.1 mm) plastic panel.
- Remove the two mounting brackets provided with the meter (back-off the two screws so that there is ¼" (6.4 mm) or less through the bracket. Slide the bracket toward the front of the case and remove).
- Insert meter into the panel cutout.
- Install mounting brackets and tighten the screws against the panel. To achieve a proper seal, tighten the mounting bracket screws evenly until meter is snug to the panel along its short side. DO NOT OVER TIGHTEN, as the rear of the panel may be damaged.

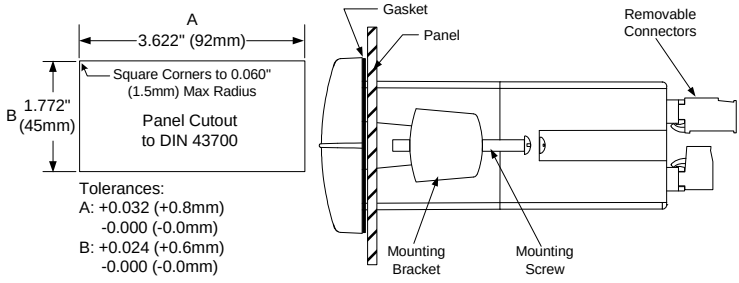


Figure 1: 1/8 DIN Panel Cutout and Mounting

Mounting Dimensions

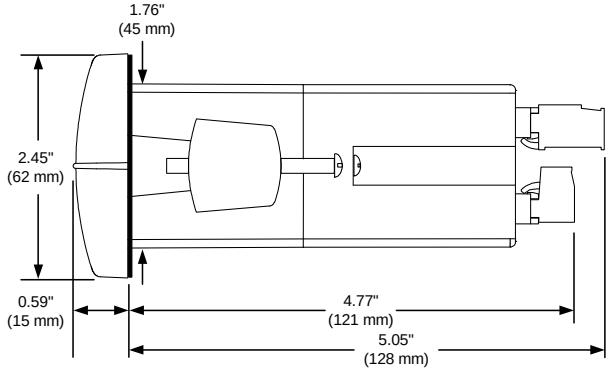


Figure 2: Meter Dimensions - Side View

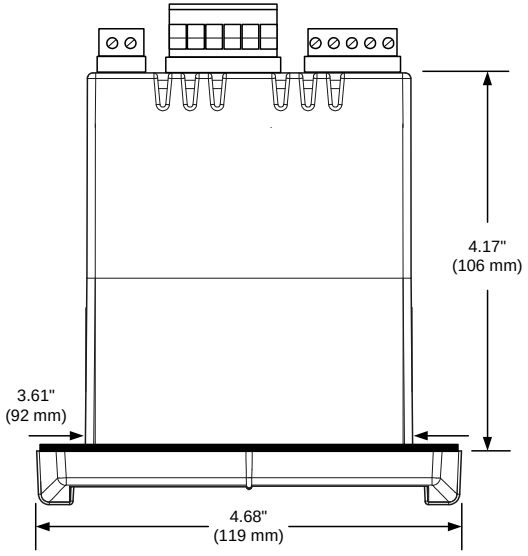


Figure 3: Meter Dimensions - Top View

Configuration for 12 or 24 VDC Power Option

Warning!

Do not exceed voltage rating of the selected configuration.

Meters equipped with the 12/24 VDC power option are shipped from the factory ready to operate from 24 VDC.

To configure the meter for 12 VDC power:

1. Remove all the connectors.
2. Unscrew the back cover.
3. Slide the back cover about 1 inch.
4. Configure the J9 jumper, located behind the power connector, for 12 V as shown below.

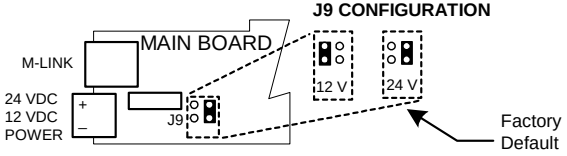


Figure 4: Jumper Configuration for 12/24 VDC Power

Transmitter Supply Voltage Selection (P+, P-)

All meters, including models equipped with the 12/24 VDC power option, are shipped from the factory configured to provide 24 VDC power for the transmitter or sensor.

If the transmitter requires 5 or 10 VDC excitation, the internal jumper J4 must be configured accordingly.

To access the voltage selection jumper:

1. Remove all the connectors.
2. Unscrew the back cover.
3. Slide the back cover about 1 inch.
4. Configure the J4 jumper, located behind the input signal connector, for the desired excitation voltage as shown.

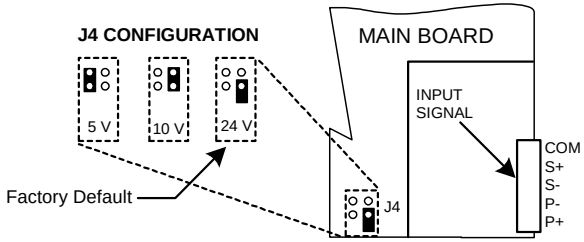


Figure 5: Transmitter Supply Voltage Selection

Connections

All connections are made to removable screw terminal connectors located at the rear of the meter.

Caution!	Use copper wire with 60°C or 60/75°C insulation for all line voltage connections. Observe all safety regulations. Electrical wiring should be performed in accordance with all applicable national, state, and local codes to prevent damage to the meter and ensure personnel safety.

Connectors Labeling

The connectors' label, affixed to the meter, shows the location of all connectors available with requested configuration.

Warning!

Do not connect any equipment other than Precision Digital's expansion modules, cables, or meters to the RJ45 M-LINK connector. Otherwise damage will occur to the equipment and the meter.

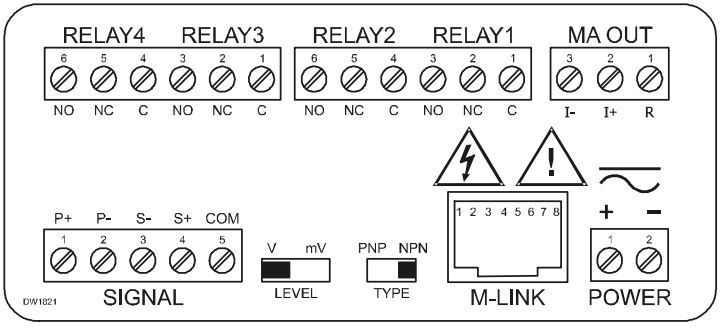


Figure 6: Connector Labeling for Fully Loaded PD6300

Power Connections

Power connections are made to a two-terminal connector labeled POWER on Figure 6. The meter will operate regardless of DC polarity connection. The + and - symbols are only a suggested wiring convention.

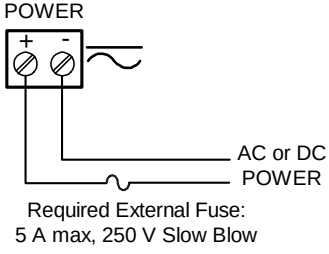


Figure 7: Power Connections

Signal Connections

Signal connections are made to a five-terminal connector labeled SIGNAL on Figure 6. The COM (common) terminal is the return for the input signals.

The following figures show examples of signal connections.

Setup and programming is performed through the front panel buttons.

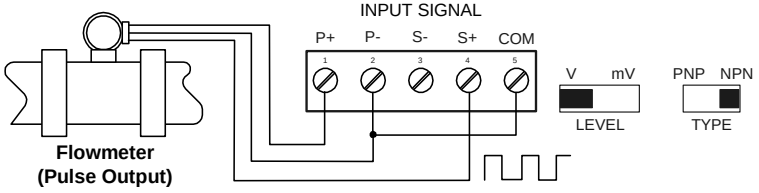


Figure 8: Flowmeter Powered by Internal Power Supply

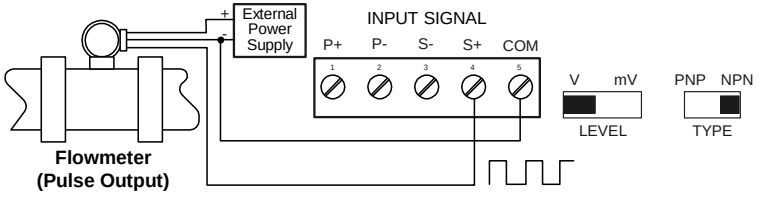


Figure 9: Flowmeter Powered by External Supply

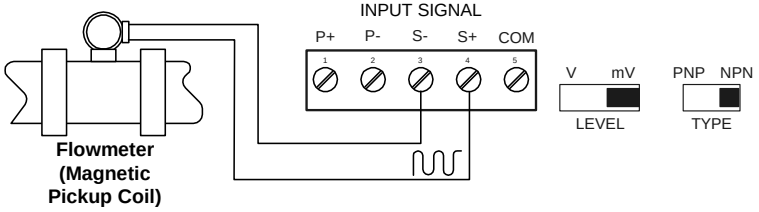


Figure 10: Self-Powered Magnetic Pickup Coil Flowmeter

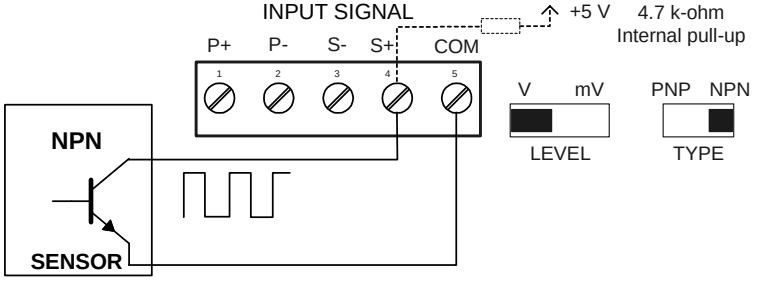


Figure 11: NPN open Collector Input

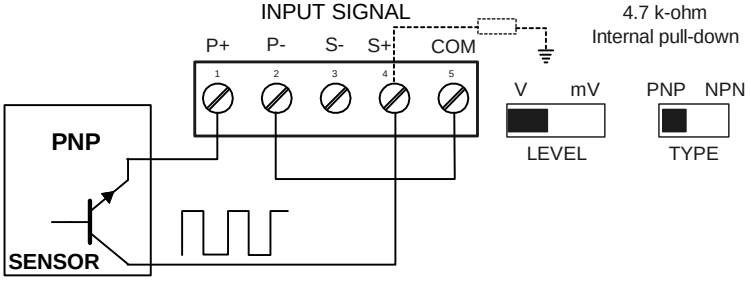


Figure 12: PNP Sensor Powered by Internal Supply

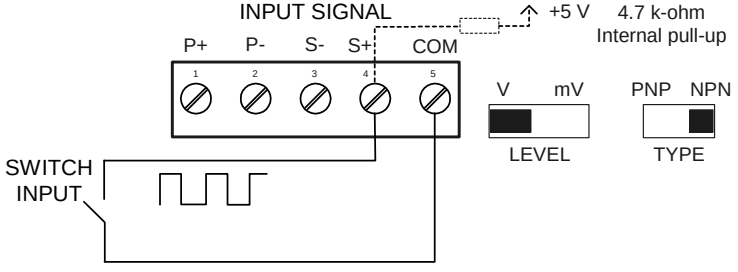


Figure 13: Switch Input Connections

Serial Communications

Serial communications connection is made to an RJ45 connector labeled M-LINK on Figure 6. Use PDA1232 for RS-232 interfacing or the PDA1485 for RS-422/485 interfacing. The same port is used for interfacing with all expansion modules (e.g. external relays, digital I/O).

Use the PDA1200 meter copy cable for meter-to-meter interfacing for cloning purposes (*i.e.* copying settings from one meter to other meters).

Relay Connections

Relay connections are made to two six-terminal connectors labeled RELAY1 – RELAY4 on Figure 6. Each relay's C terminal is common only to the normally open (NO) and normally closed (NC) contacts of the corresponding relay. The relays' C terminals should not be confused with the COM (common) terminal of the INPUT SIGNAL connector.

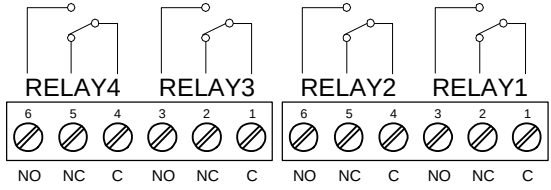


Figure 11: Relay Connections

Switching Inductive Loads

The use of suppressors (snubbers) is strongly recommended when switching inductive loads to prevent disrupting the microprocessor's operation. The suppressors also prolong the life of the relay contacts. Suppression can be obtained with resistor-capacitor (RC) networks assembled by the user or purchased as complete assemblies. Refer to the following circuits for RC network assembly and installation:

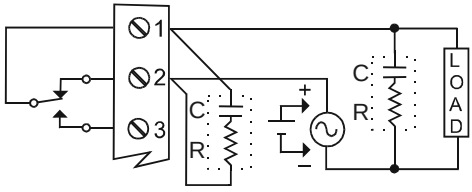


Figure 12: AC and DC Loads Protection

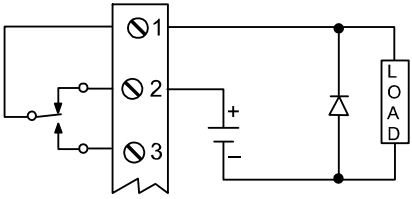
Choose R and C as follows:

R: 0.5 to 1 Ω for each volt across the contacts

C: 0.5 to 1 µF for each amp through closed contacts

Notes:

1. Use capacitors rated for 250 VAC.
2. RC networks may affect load release time of solenoid loads. Check to confirm proper operation.
3. Install the RC network at the meter's relay screw terminals. An RC network may also be installed across the load. Experiment for best results.



Use a diode with a reverse breakdown voltage two to three times the circuit voltage and forward current at least as large as the load current.

Figure 13: Low Voltage DC Loads Protection

RC Networks Available from Precision Digital

RC networks are available from Precision Digital and should be applied to each relay contact switching an inductive load. Part number: PDX6901.

4-20 mA Output Connections

Connections for the 4-20 mA transmitter output are made to the connector terminals labeled MA OUT. The 4-20 mA output may be powered internally or from an external power supply.

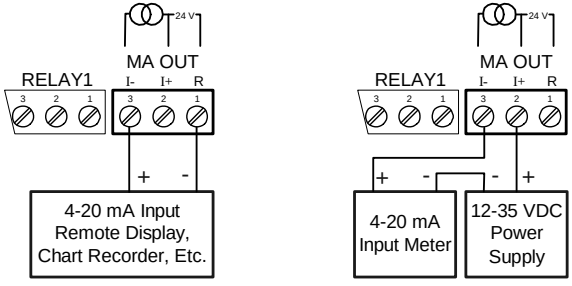


Figure 14: 4-20 mA Output Connections

Analog Output Transmitter Power Supply

The internal 24 VDC power supply powering the analog output may be used to power other devices, if the analog output is not used. The I+ terminal is the +24 V and the R terminal is the return. This power supply is capable of sourcing up to 40 mA.

External Relay & Digital I/O Connections

The relay and digital I/O expansion modules PDA1004 & PDA1044 are connected to the meter using the CAT5 cable provided with each module. The two RJ45 connectors on the expansion modules are identical and interchangeable; they are used to connect additional modules to the system.

Note: The jumper located between the RJ45 connectors of the PDA1044 must be removed on the second digital I/O module in order for the system to recognize it as module #2.

Warning!

Do not connect or disconnect the expansion modules with the power on!
More detailed instructions are provided with each optional expansion module.

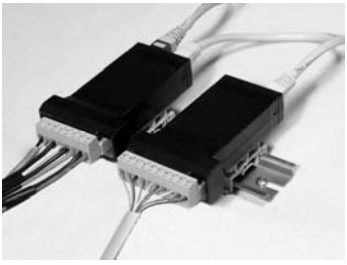


Figure 15: Expansion Modules & DIN Rail Mounting Kit

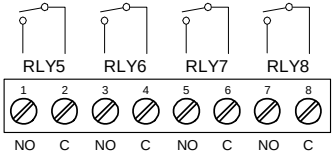


Figure 16: External Relays Module Connections

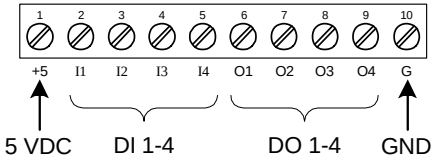


Figure 17: Digital I/O Module Connections

SETUP AND PROGRAMMING

- The meter has been factory calibrated to read input frequencies in Hz (pulses/sec). The calibration equipment is certified to NIST standards.
- Use the *K-Factor* menu to match the rate/totalizer with a flowmeter's k-factor (pulse/unit of measure).
- Or use the *Scale* menu to scale the pulse input (pulse/sec) without a signal source.
- Or use *Cal* menu to calibrate the rate/totalizer using a signal source.

Overview

There are two switches, located to the right of the input connector, which must be configured according to the input level and type. Jumper J4 located inside the meter, behind the input signal connector, is used to select the excitation voltage (24 V*, 10 V or 5 V) which is supplied to the P+ and P- wiring terminals.

Setup and programming is done through the front panel buttons.

After power and input signal connections have been completed and verified, apply power to the meter.

**Default setting*

Front Panel Buttons and Status LED Indicators

Button Symbol	Description
MENU	**Menu**
F1	**Right arrow/F1**
F2	**Up arrow/F2**
F3	**Enter/F3**

LED	Status
1-8	Alarm 1 – 8 indicator
R	Rate indicator
T	Total indicator
▲	Total overflow indicator

- Press the Menu button to enter or exit the Programming Mode at any time.
- Press the Right arrow button to move to the next digit during digit or decimal point programming.
- Press the Up arrow button to scroll through the menus, decimal point, or to increment the value of a digit.
- Press the Enter button to access a menu or to accept a setting.
- Press and hold the Menu button for three seconds to access the advanced features of the meter.

Display Functions and Messages

The meter displays various functions and messages during setup, programming, and operation. The following table shows the main menu functions and messages in the order they appear in the menu.

Display	Parameter	Action/Setting Description
rESEt	*Reset*	Press Enter to access the *Reset* menu
rSt t	*Reset total*	Press Enter to reset total
rSt Gt	*Reset grand total*	Press Enter to reset grand total
rSt Hi	*Reset high*	Press Enter to reset max display
rSt Lo	*Reset low*	Press Enter to reset min display
rSt HL	*Reset high & low*	Press Enter to reset max & min displays
ContrL	*Control*	Enter *Control* menu
Auto	*Automatic*	Press Enter to set meter for automatic operation
mAn	*Manual*	Press Enter to manually control relays or analog output operation
SEtuP	*Setup*	Enter *Setup* menu
inPut	*Input*	Enter *Input* selection menu
totAL	*Total*	Enable or disable totalizer features
dEc Pt	*Decimal point*	Set decimal point for rate, total, grand total
dSPLAY	*Display*	Enter the *Display* menu
b iG	*Big display*	Press Enter to assign the Main display parameter (default: PV or rate)
L itLE	*Little display*	Press Enter to assign the small display parameter (default: total)
d- Int	*Display intensity*	Set display intensity level from 1 to 8
rELAY	*Relay*	Enter the *Relay* menu
ASS iGn	*Assignment*	Assign relays to rate, total, or grand total
AS iGn 1	*Assign 1*	Relay 1 assignment
rAtE	*Rate*	Assign relay to rate

Display	Parameter	Action/Setting Description
totAL	*Total*	Assign relay to total
G totAL	*Grand total*	Assign relay to grand total
rLY 1	*Relay 1*	Relay 1 setup
Act 1	*Action 1*	Set relay 1 action
Auto	*Automatic*	Set relay for automatic reset
A-mAn	*Auto-manual*	Set relay for automatic & manual reset any time
LAtCH	*Latching*	Set relay for latching operation (relays assigned to rate)
Lt-CLr	*Latching-cleared*	Set relay for latching operation with manual reset only after alarm condition has cleared (relays assigned to rate)
ALtErn	*Alternate*	Set relay for pump alternation control (relays assigned to rate)
SAmPL	*Sampling*	Set relay for sampling operation
OFF	*Off*	Disable relay and front panel status LED
SEt 1	*Set 1*	Program set point 1
rSt 1	*Reset 1*	Program reset point 1
rLY 2	*Relay 2*	Relays 2-8 setup *Note: Relays 5-8 are shown, only if expansion relay module is installed.*
FAiLSF	*Fail-safe*	Enter *Fail-safe* menu
FLS 1	*Fail-safe 1*	Set relay 1 fail-safe operation
on	*On*	Enable fail-safe operation
oFF	*Fail-safe off*	Disable fail-safe operation
dELAY	*Delay*	Enter relay *Time Delay* menu
dLY 1	*Delay 1*	Enter relay 1 time delay setup
On 1	*On*	Set relay 1 On time delay
OFF 1	*Off*	Set relay 1 Off time delay
Aout	*Analog output*	Enter the *Analog output* scaling menu
diS 1	*Display 1*	Program display 1 value
Out 1	*Output 1*	Program output 1 value (e.g. 4.000 mA)

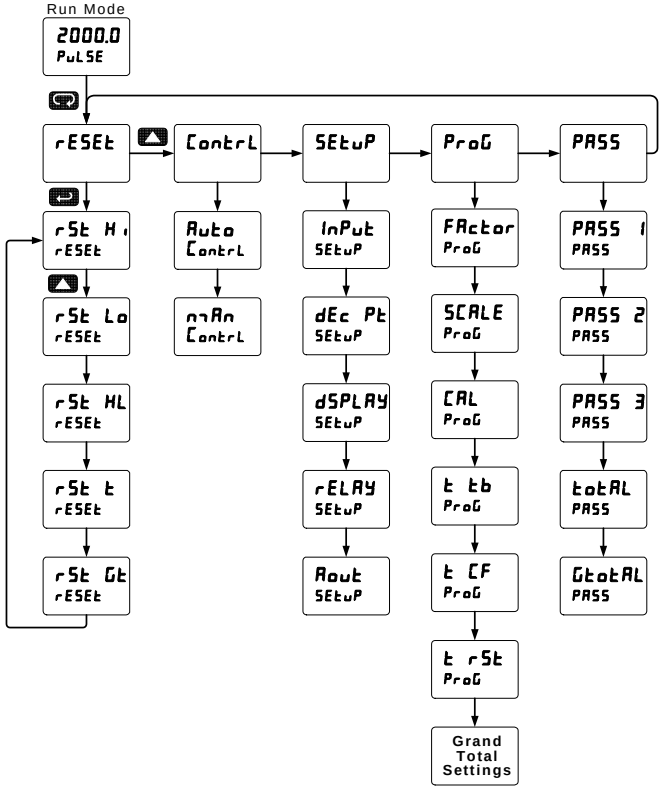
Display	Parameter	Action/Setting Description
dISP 2	*Display 2*	Program display 2 value
Out 2	*Output 2*	Program output 2 value (e.g. 20.000 mA)
ProG	*Program*	Enter the *Program* menu
FACtor	*K-factor Scaling*	Programs unit to convert input pulse to rate in engineering units
SCALE	*Scale*	Enter the *Scale* menu
CAL	*Calibrate*	Enter the *Calibrate* menu
InP 1	*Input 1*	Calibrate input 1 signal or program input 1 value
dISP 1	*Display 1*	Program display 1 value
InP 2	*Input 2*	Calibrate input 2 signal or program input 2 value (up to 32 points)
dISP 2	*Display 2*	Program display 2 value (up to 32 points)
Error	*Error*	Error, calibration not successful, check signal or programmed value
t tb	*Total time base*	Program total time base
t CF	*Total conversion factor*	Program total conversion factor
t rSt	*Total reset*	Program total reset mode: auto or manual
Gt tb	*Grand total time base*	Program grand total time base
Gt CF	*Grand total conversion factor*	Program grand total conversion factor
Gt rSt	*Grand total reset*	Program grand total reset mode: auto or manual
Auto	*Automatic*	Press Enter to set automatic total reset
t dLY	*Time delay*	Program time delay for total auto reset
mAn	*Manual*	Press Enter to reset total manually
PASS	*Password*	Enter the *Password* menu
PASS 1	*Password 1*	Set or enter Password 1
PASS 2	*Password 2*	Set or enter Password 2

Display	Parameter	Action/Setting Description
PASS 3	*Password 3*	Set or enter Password 3
totAL	*Total password*	Set or enter password for manual reset
GtotAL	*Grand total password*	Set or enter password for manual reset
nonrSt	*Non-resettable*	Non-resettable grand total set after entering “050873” for Gtotal password
unLoc	*Unlocked*	Program password to lock meter
Locd	*Locked*	Enter password to unlock meter
999999	*Flashing display*	Overrange condition

Main Menu

The main menu consists of the most commonly used functions: *Reset, Control, Setup*, *Program*, and *Password*.

- Press Menu button to enter Programming Mode then press the Up arrow button to scroll through the main menu.



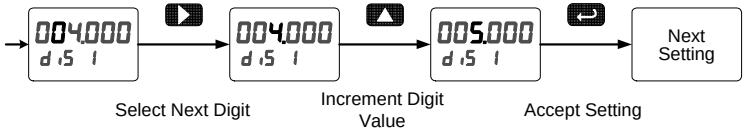
- Press Menu, at any time, to exit and return to Run Mode. Changes made to settings prior to pressing Enter are not saved.
- Changes to the settings are saved to memory only after pressing Enter.
- The display moves to the next menu every time a setting is accepted by pressing Enter.

Setting Numeric Values

The numeric values are set using the Right and Up arrow buttons. Press the Right arrow to select the next digit and Up arrow to increment digit value.

The digit being changed is displayed brighter than the rest.

Press the Enter button, at any time, to accept a setting or Menu button to exit without saving changes.



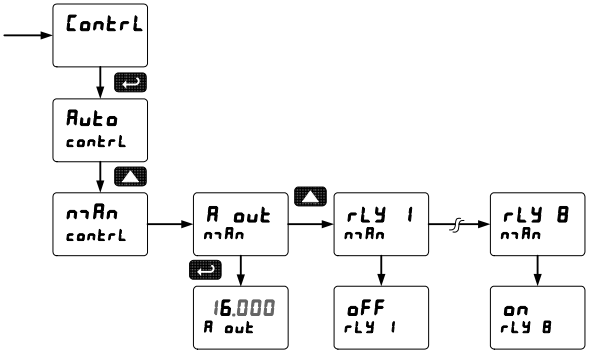
Note: The decimal point is set in the Setup-decimal point menu.

Reset Menu (rESEt)

The *Reset* menu is used to reset the maximum or minimum reading (peak or valley) reached by the process; both may be reset at the same time by selecting “reset high & low” (rSt HL).

Control Menu (Contrl)

The *Control* menu is used to control the 4-20 mA analog output and the relays manually, ignoring the input. Each relay and analog output can be programmed independently for manual control. Selecting automatic control sets all relays and the analog output for automatic operation.

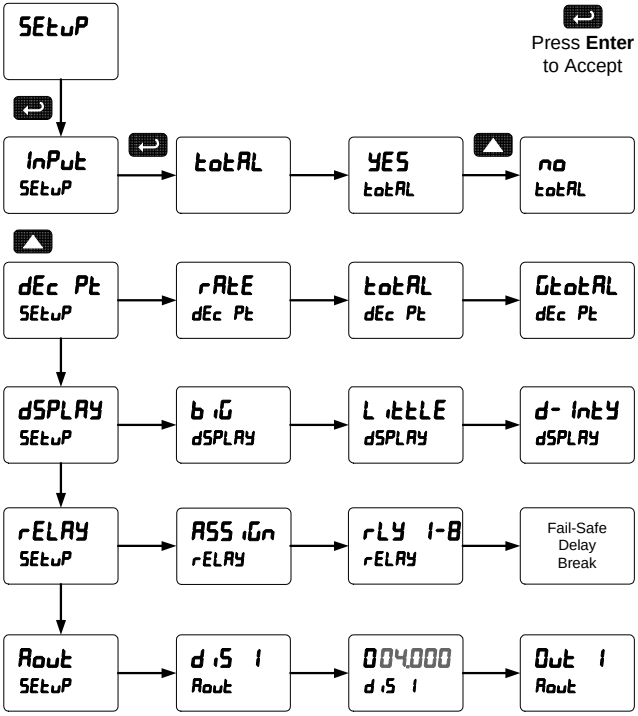


Setting Up the Rate/Totalizer Meter (SEtuP)

The *Setup* menu is used to select:

1. Enable or disable totalizer features
2. Decimal point position
3. Display parameter and intensity
4. Relay operation
5. 4-20 mA analog output scaling

Press the Enter button to access any menu or press Up arrow button to scroll through choices. Press the Menu button to exit at any time.



Setting the Input Signal (InPut)

There are two switches, located to the right of the input connector, which must be configured according to the input level and type. Jumper J4 located inside the meter, behind the input signal connector, is used to select the excitation voltage (24 V*, 10 V or 5 V) which is supplied to the P+ and P- wiring terminals.

**Default setting*

Enter the Input menu to enable or disable the totalizer features.

Setting the Totalizer Features (totAL)

Enable or disable the totalizer features by selecting "YES" or "no" after the input type has been set up. If the totalizer features are disabled, all the totalizer features and functions are hidden from the menus.

Note: The totalizer continues working in the background.

Setting the Decimal Point (dEc Pt)

The decimal point may be set with up to five decimal places or with no decimal point at all. The rate, total, and grand total decimal points are independent.

Pressing the Right arrow moves the decimal point one place to the right until no decimal point is displayed then it moves to the leftmost position.

Setting the Display Parameter & Intensity (dSPLAY)

The main display (b iG) can be programmed to display:

1. Rate value
2. Total or grand total
3. Relay set points
4. Max & min values

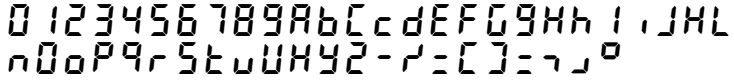
The small display (L itEtE) can be programmed to display:

1. Rate value
2. Total or grand total
3. Relay set points
4. Max & min values
5. Engineering units or custom legends
6. Off (no display)

Display Intensity: The meter has eight display intensity levels to give the best performance under various lighting conditions. Select intensity 8 for outdoor applications.

Character Set for Engineering Units Display (d un it)

The small display can be programmed to show engineering units or custom legends using the following 7-segment character set.



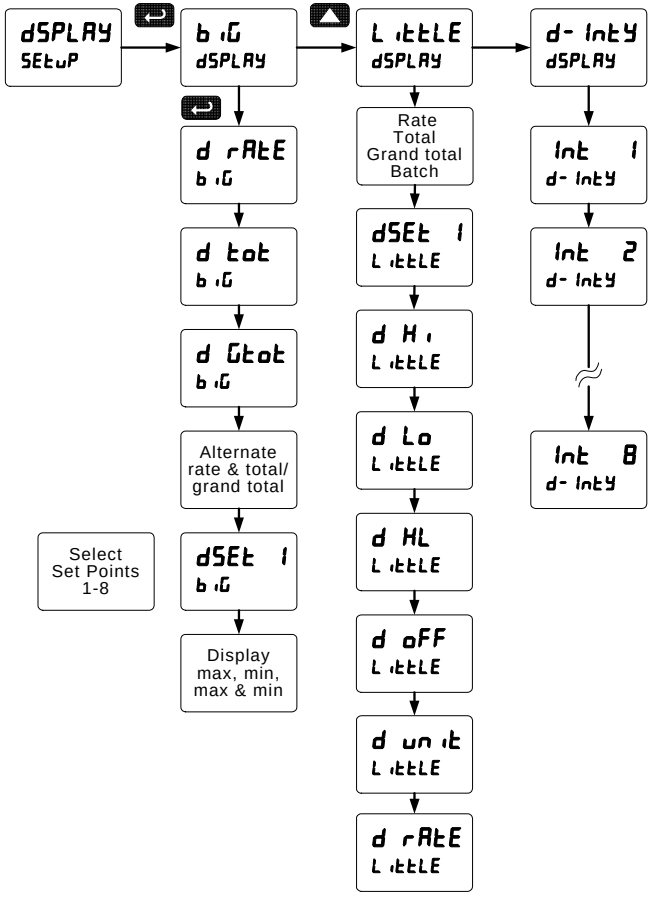
To create the letter “m” use the characters “n” followed by “r” to get “nr”.

To create the letter “w” use the characters “u” followed by “J” to get “uJ”.

See the flow chart on the next page to access the display units menu.

Display Setup Menu

1. Press the Up arrow to change selection
2. Press Enter to accept setting
3. Press Menu to exit programming



After setting up the input and the display, press the Menu button to exit programming and skip the rest of the setup menu. Press the Menu button again and the Up arrow to reach the *Program* menu and complete the scaling or calibration of the meter.

Programming the Rate/Totalizer (PrOG)

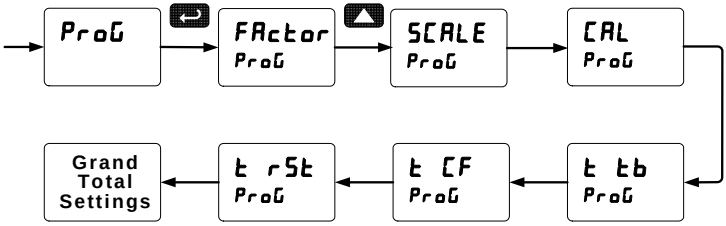
It is **very important** that one reads the following information before programming the meter:

- The meter has been factory calibrated to read input frequencies in Hz (pulses/sec). The calibration equipment is certified to NIST standards.
- Use the *K-Factor* menu to match the rate/totalizer with a flowmeter's k-factor (pulse/unit of measure).
- Or use the *Scale* menu to scale the pulse input (pulse/sec) without a signal source.
- Or use *Cal* menu to calibrate the rate/totalizer using a signal source.

The *Program* menu contains the following menus:

1. K-Factor calibration
2. Scale without a signal source
3. Calibrate with a calibrated signal source
4. Total time base & conversion factor
5. Grand total time base & conversion factor
6. Total reset mode for total & grand total

The process inputs may be calibrated or scaled to any display value within the range of the meter.



Additional parameters, not needed for most applications, are programmed in the *Advanced Features* menu; see *Advanced Features Menu*, page 65.

Multi-Point Calibration & Scaling

The meter is set up at the factory for 2-point linear calibration. The number of points for multi-point calibration/scaling is set up in the *Advanced Features* menu. Up to 32 linearization points may be selected. See page 69 for details.

Multi-Point Linearization Utility

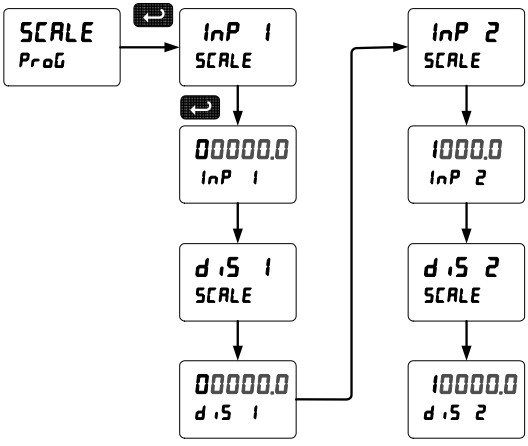
The meter can be programmed for multi-point scaling using the free PC-based Multi-Point Linearization Utility available at www.predig.com/provu_linearizer.

In order to program the meter using a computer, the meter must be connected using an RS-232 or RS-485 serial adapter, see ORDERING INFORMATION on page 7 for details.

Scaling the Meter (SCALE)

The pulse inputs can be scaled to display the process variable in engineering units.

A signal source is not needed to scale the meter; simply program the inputs and corresponding display values.



For instructions on how to program numeric values see *Setting Numeric Values*, page 34.

Error Message (Error)

An error message indicates that the calibration or scaling process was not successful. After the error message is displayed, the meter reverts to input 2 during calibration or scaling and to input 1 during internal calibration, allowing the appropriate input signal to be applied or programmed.

The error message might be caused by any of the following conditions:

1. Input signal is not connected to the proper terminals or it is connected backwards.
2. Wrong signal selection in *Setup* menu.
3. Minimum input span requirements not maintained.
4. Input 1 signal inadvertently applied to calibrate input 2.

Minimum Input Span

The minimum allowed input span is 10 Hz, which is the minimum difference between input 1 and input 2 signals required to complete the calibration or scaling of the meter.

Gate Function (GATE)

The gate function is used for displaying slow pulse rates. Using the programmable gate, the meter is able to display pulse rates as slow as 0.1 pulse every 99.9 seconds. The gate function can also be used to obtain a steady display reading with a fluctuating input signal.

The gate function (**GATE**) is the first option in the Advanced Features menu. There are two settings for the GATE, low gate (**Lo G**) and high gate (**Hi G**).

Low Gate (Lo G)

For most applications, low gate setting should be left at 1.0 second. Increase low gate setting to obtain a steadier rate display. The rate display will update in accordance with the low gate setting, for example if low gate is set at 10.0, the display will update every 10 seconds; changes in rate between updates will not be reflected until next display update.

High Gate (Hi G)

Set the high gate value to correspond to the highest expected pulse (lowest pulse rate). For instance if the meter must display a rate when there is 1 pulse coming into the meter every 10 seconds, set the high gate to 11.0 seconds. When the signal is removed from the meter, the display will show the last reading for 11 seconds; then it will read zero.

Contact De-Bounce Filter (FiLtEr)

The filter function (FiLtEr) can be used for applications where the meter is set up to count pulses generated by switch contacts. The filter value can be set anywhere between 2 and 50, the higher the value, the greater the filtering.

The filter function (FiLtEr) is the second option in the Advanced Features menu. There are two settings, Hi SPd (high speed) and Lo SPd (low speed), press **ENTER** when Lo SPd is displayed to enable filter function. Program the filter value, so that there are no extra counts when contact closure is completed.

Gate Settings

Slow Pulse Rate		
Low Gate* (sec)	High Gate (sec)	Min Freq** (Hz)
1.0	2.0	0.5000
1.0	10.0	0.1000
1.0	20.0	0.0500
1.0	100.0	0.0100
1.0	200.0	0.0050
1.0	400.0	0.0025
1.0	800.0	0.0012
1.0	999.9	0.0010

*Low gate setting is the rate display update and can be used to stabilize display reading with fluctuating signal.

**Minimum frequency is dependent on high gate setting.

Filter Settings

Contact De-Bounce Filter		
Filter Setting	Speed Setting	Max Freq (Hz)
2	Lo SPd	999
4	Lo SPd	499
8	Lo SPd	249
16	Lo SPd	124
32	Lo SPd	62
40	Lo SPd	50
50	Lo SPd	40
N/A	Hi SPd	30,000

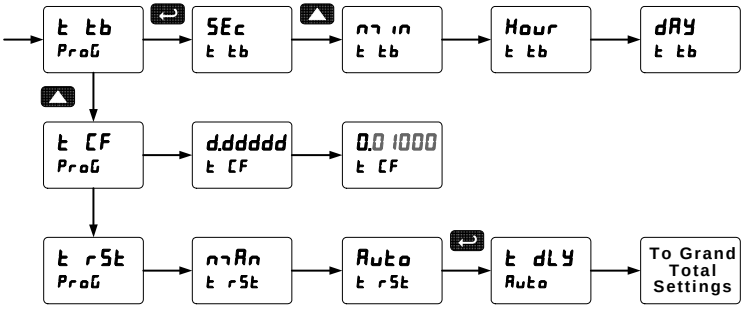
Time Base, Total Conversion Factor & Total Reset

The time base, total conversion factor, and total reset menus are located in the *Program* menu.

The total and grand total have their own independent settings. This means that one can be displaying the value in gallons while the other displays in million gallons, liters, m^3, etc.

Total & Grand Total Reset

The totals can be programmed for manual or automatic reset. In the automatic reset mode, a programmable time delay is available to reset the total or grand total after the assigned preset is reached.



Non-Resettable Totalizer

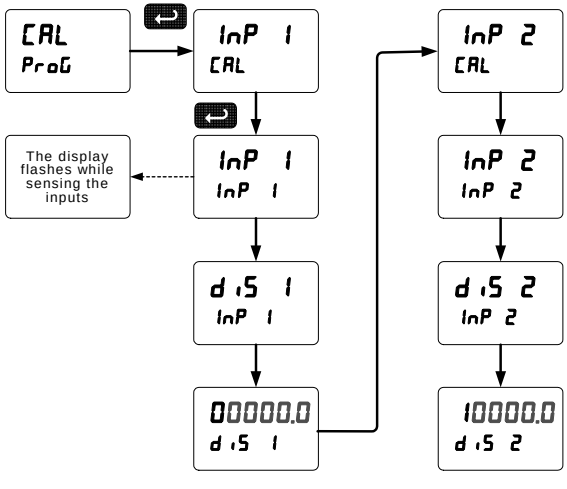
The total and grand total can be password-protected to prevent unauthorized resets. The grand total can be programmed as a non-resettable total, see page 63 for details.

Calibrating the Meter with External Source (CAL)

To scale the meter without a signal source refer to Scaling the Meter (SCALE) page 40.

The meter can be calibrated to display the process variable in engineering units by applying the appropriate input signal and following the calibration procedure.

The use of a calibrated signal source is strongly recommended to calibrate the meter.



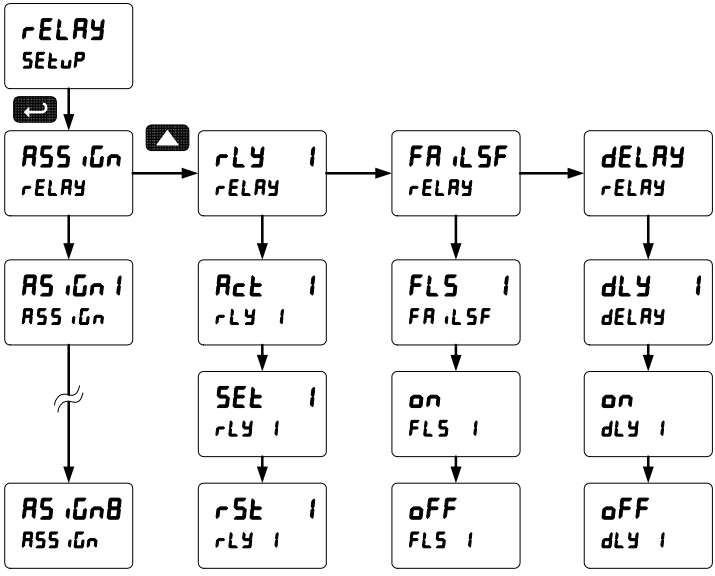
Warm up the meter for at least 15 minutes before performing calibration to ensure specified accuracy.

Setting the Relay Operation (rELAY)

This menu is used to set up the operation of the relays.

CAUTION! During setup, the relays do not follow the input and they will remain in the state found prior to entering the Relay menu.

1. Relay assignment
    a. Rate for low and high alarm
    b. Total
    c. Grand total
2. Relay action
    a. Automatic reset only (non-latching)
    b. Automatic + manual reset at any time (non-latching)
    c. Latching (manual reset only)
    d. Latching with Clear (manual reset only after alarm condition has cleared)
    e. Pump alternation control (automatic reset only)
    f. Sampling (the relay is activated for a user-specified time)
    g. Off (relay and status LED disabled)
3. Set and reset points
4. Fail-safe operation
    a. On (enabled)
    b. Off (disabled)
5. Time delay
    a. On delay (0-999.9 seconds)
    b. Off delay (0-999.9 seconds)

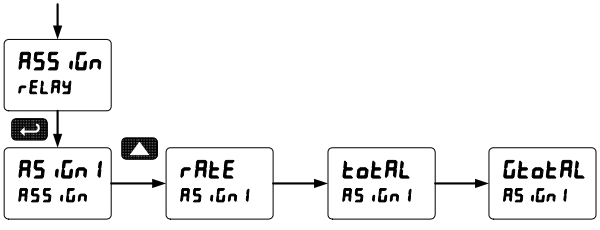


Note: The setup of relays 2-8 follows the same pattern shown here for relay 1.

Relay Assignment (ASS iGn)

The relays can be assigned to any of the following parameters:

1. Rate for low or high alarm indication
2. Total for alarm indication
3. Grand total for alarm indication

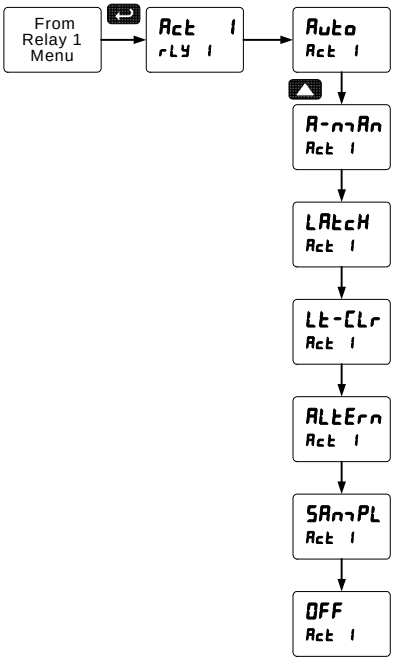


Setting the Relay Action

Operation of the relays is programmed in the *Action* menu. The relays may be set up for any of the following modes of operation:

1. Automatic reset (non-latching)
2. Automatic + manual reset at any time (non-latching)
3. Latching (manual reset only, at any time)
4. Latching with Clear (manual reset only after alarm condition has cleared)
5. Pump alternation control (automatic reset only)
6. Sampling (the relay is activated for a user-specified time)
7. Off (relay and status LED disabled)

The following graphic shows relay 1 action setup; relay 2-8 are set up in a similar fashion.

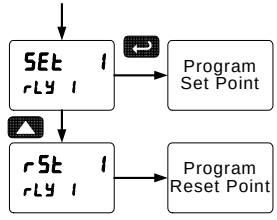


Programming Set and Reset Points

High alarm indication: program set point above reset point.

Low alarm indication: program set point below reset point.

The deadband is determined by the difference between set and reset points. Minimum deadband is one display count. If the set and reset points are programmed with the same value, the relay will reset one count below the set point.



Setting Fail-Safe Operation

In fail-safe mode of operation, the relay coil is energized when the process variable is within safe limits and the relay coil is de-energized when the alarm condition exists. The fail-safe operation is set independently for each relay. Select **on** to enable or select **oFF** to disable fail-safe operation.

Programming Time Delay

The *On* and *Off* time delays may be programmed for each relay between 0 and 999.9 seconds. The relays will transfer only after the condition has been maintained for the corresponding time delay.

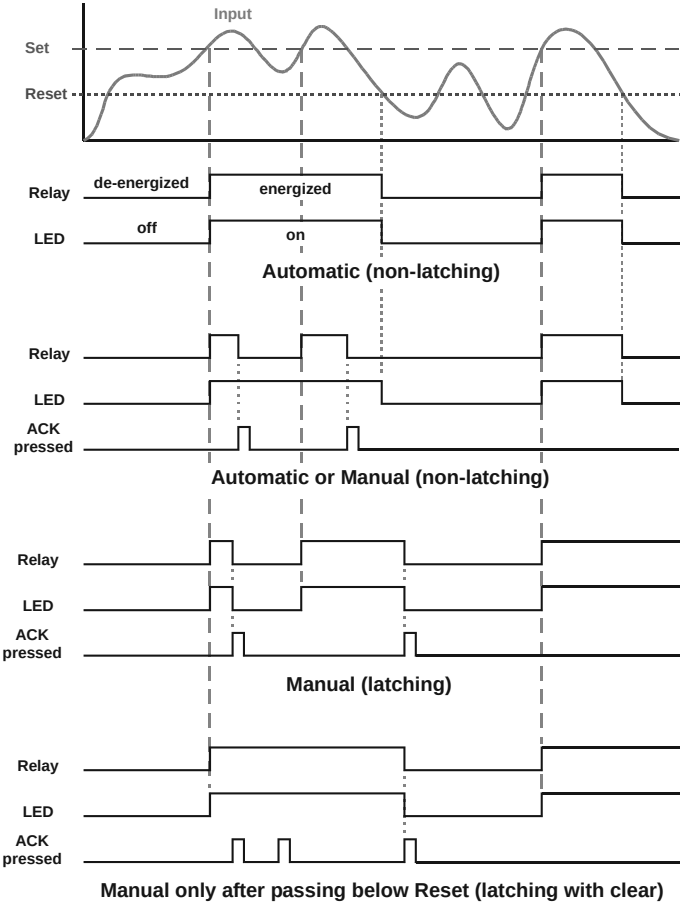
The *On* time delay is associated with the set point.

The *Off* time delay is associated with the reset point.

Relay and Alarm Operation Diagrams

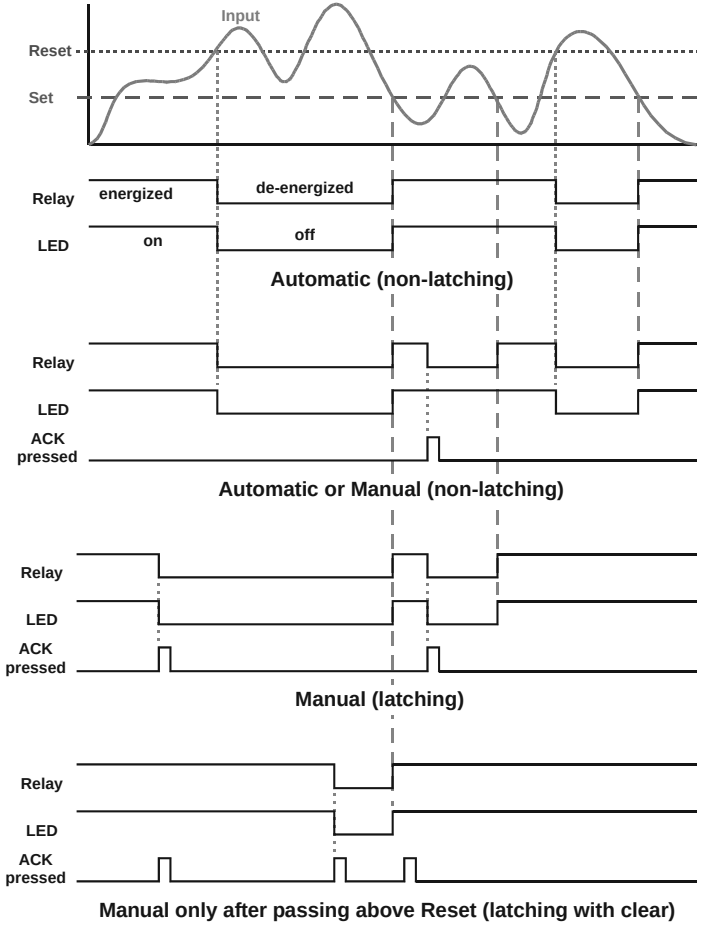
The following graphs illustrate the operation of the relays, status LEDs, and ACK button.

High Alarm Operation (Set > Reset)



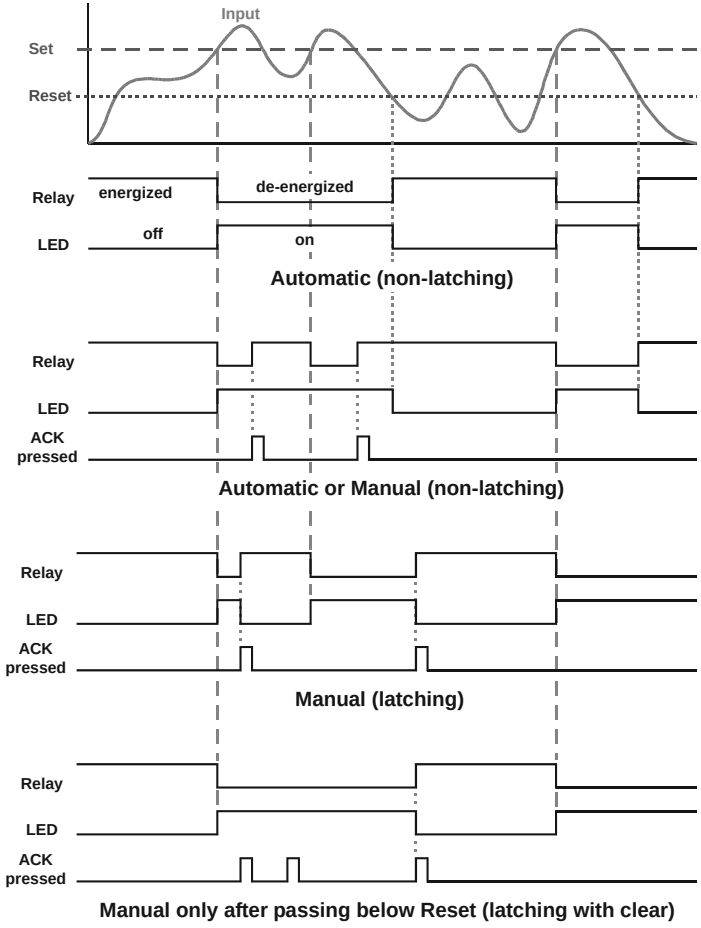
For Manual reset mode, ACK can be pressed anytime to turn "off" relay. To detect a new alarm condition, the signal must go below the set point, and then go above it.

Low Alarm Operation (Set < Reset)



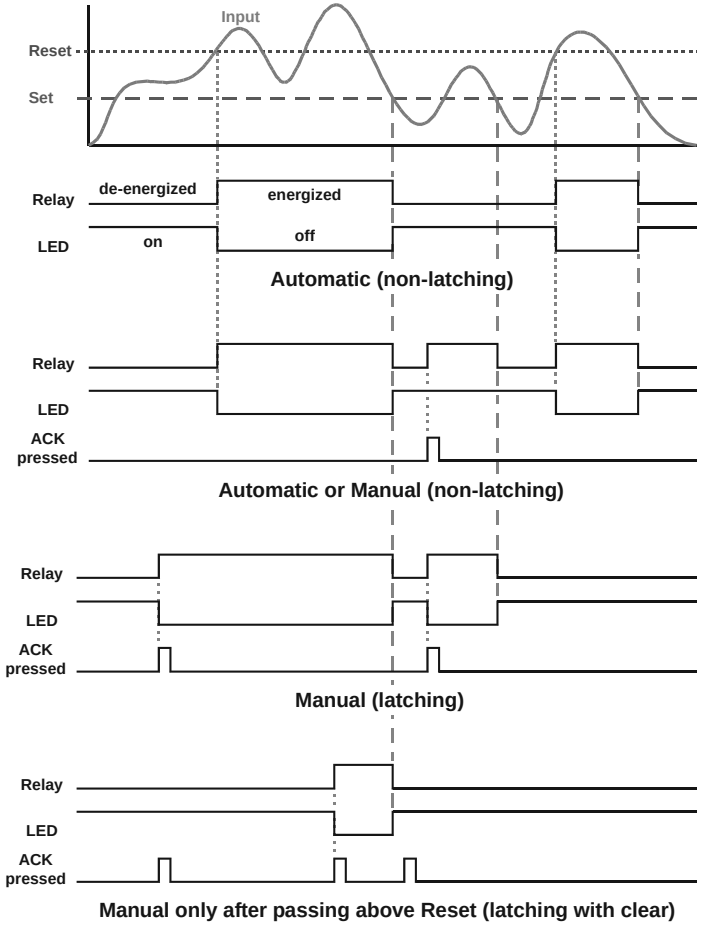
For Manual reset mode, ACK can be pressed anytime to turn "off" relay. For relay to turn back “on”, signal must go above set point and then go below it.

High Alarm with Fail-Safe Operation (Set > Reset)



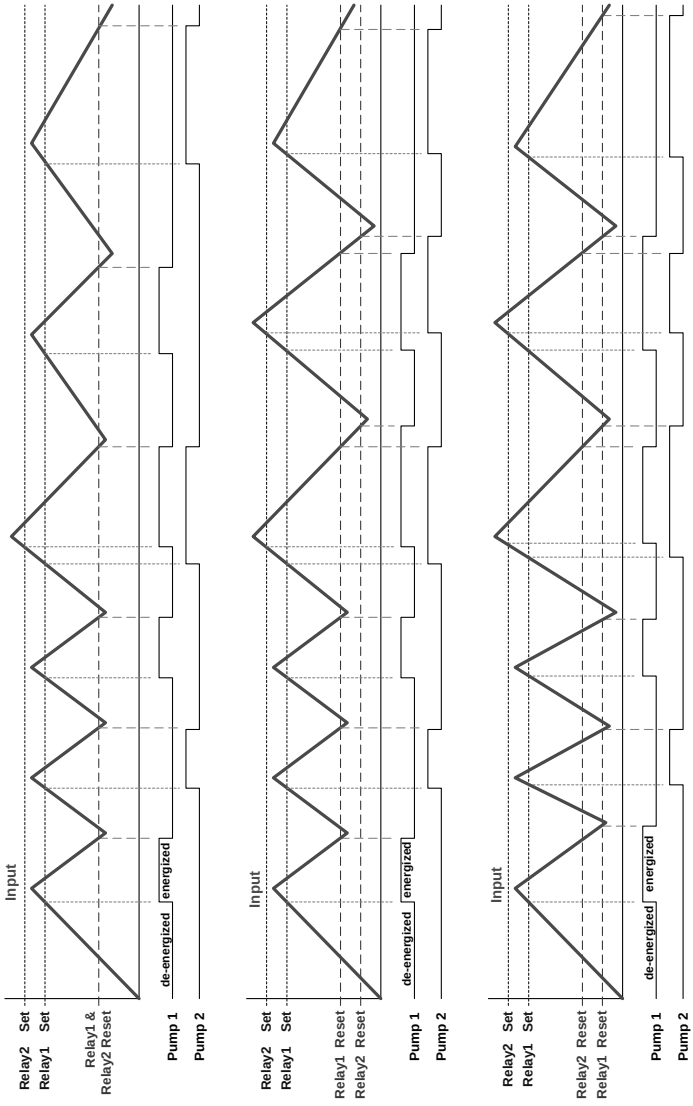
Note: Relay coil is energized in non-alarm condition.
In case of power failure, relay will go to alarm state.

Low Alarm with Fail-Safe Operation (Set < Reset)

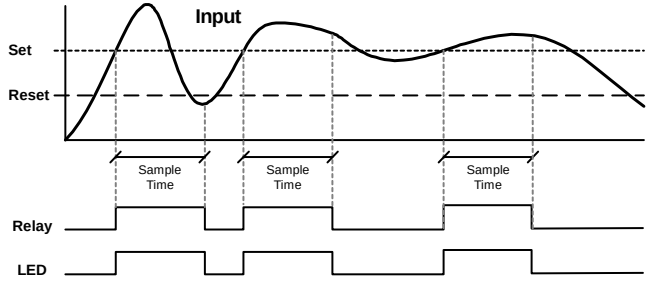


Note: Relay coil is energized in non-alarm condition.
In case of power failure, relay will go to alarm state.

Pump Alternation Control Operation



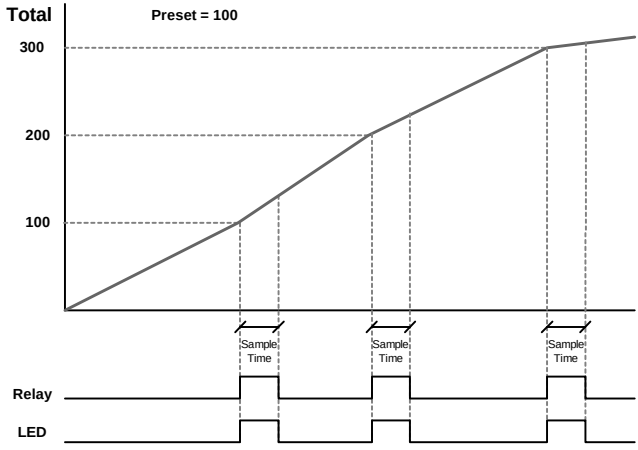
Rate Relay Sampling Operation



When the signal crosses the set point, the relay trips and the sample time starts. After the sample time has elapsed, the relay resets. The cycle repeats every time the set point is crossed, going up for high alarms and going down for low alarms.

The sample time can be programmed between 0.1 and 5999.9 seconds.

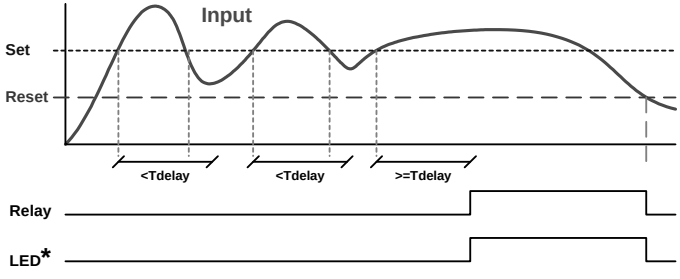
Total Relay Sampling Operation



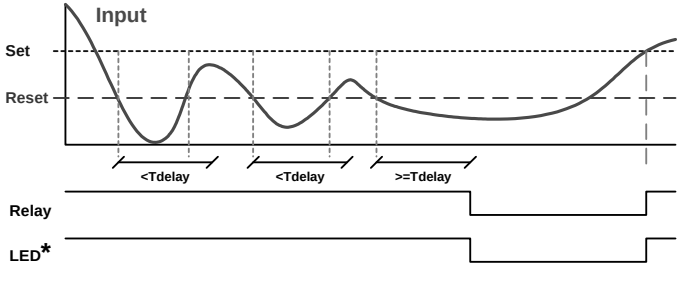
When the total reaches the preset, the relay trips and the sample time starts. After the sample time has elapsed, the relay resets. The cycle repeats every time the preset value is added to the total.

Time Delay Operation

The following graphs show the operation of the time delay function.



On Time Delay



Off Time Delay

When the signal crosses the set point, the *On* time delay timer starts and the relay trips when the time delay has elapsed. If the signal drops below the set point (high alarm) before the time delay has elapsed, the *On* time delay timer resets and the relay does not change state. The same principle applies to the *Off* time delay.

* Note: If "*Automatic or Manual* (rSTMn)" reset mode is selected, the LED follows the reset point and not the relay state when the relay is acknowledged.

Relay Operation Details

Overview

The relay capabilities of the meter expand its usefulness beyond simple indication to provide users with alarm and control functions. These capabilities include front panel alarm status LEDs as well as either 2 or 4 optional internal relays and/or 4 external relays expansion module. Typical applications include high or low temperature, level, pressure or flow alarms, control applications such as simple on/off pump control, and pump alternation control for up to 8 pumps. There are four basic ways the relays can be used:

1. High or Low Alarms with Latching or Non-Latching Relays
2. Simple On/Off Control with 100% Adjustable Deadband
3. Sampling (Based on Time)
4. Pump Alternation Control for up to 8 Pumps

Relays Auto Initialization

When power is applied to the meter, the front panel LEDs and alarm relays will reflect the state of the input to the meter. The following table indicates how the alarm LEDs and relays will react on power-up based on the set and reset points:

Alarm #	HI or LO Alarm	Set Point	Reset Point	Power-Up Reading	Relay & LED
1	HI	1000	500	499	Off
2	LO	700	900	499	On
3	LO	250	400	499	Off
4	HI	450	200	499	On

Fail-Safe Operation

The following table indicates how the relays behave based on the fail-safe selection for each relay:

Fail-Safe Selection	Non-Alarm State		Alarm State		Power Failure
	NO	NC	NO	NC	
Off	Open	Closed	Closed	Open	Relays go to non-alarm state
On	Closed	Open	Open	Closed	Relays go to alarm state

Note: NO = Normally Open, NC = Normally Closed. This refers to the condition of the relay contacts when the power to the meter is off.

Front Panel LEDs

The LEDs on the front panel provide status indication for the following:

LED	Status
1	Alarm 1
2	Alarm 2
3	Alarm 3
4	Alarm 4

LED	Status
5	Alarm 5
6	Alarm 6
7	Alarm 7
8	Alarm 8

The meter is supplied with four alarm points that include front panel LEDs to indicate alarm conditions. This standard feature is particularly useful for alarm applications that require visual-only indication. The LEDs are controlled by the set and reset points programmed by the user. When the display reaches a set point for a high or low alarm, the corresponding alarm LED will turn on. When the display returns to the reset point the LED will go off. The front panel LEDs respond differently for latching and non-latching relays.

For non-latching relays, the LED is always off during normal condition and always on during alarm condition, regardless of the state of the relay (e.g. Relay acknowledged after alarm condition).

For latching relays, the alarm LEDs reflect the status of the relays, regardless of the alarm condition. The following tables illustrate how the alarm LEDs function in relation to the relays and the acknowledge button (Default: F3 key assigned to ACK):

Latching and Non-Latching Relay Operation

The relays can be set up for latching (manual reset) or non-latching (automatic reset) operation.

Relay terminology for following tables

Terminology	Relay Condition
On	Alarm (Tripped)
Off	Normal (Reset)
Ack	Acknowledged

The On and Off terminology does not refer to the status of the relay's coil, which depends on the fail-safe mode selected.

Warning!

In latching relay mode, latched relays will reset (unlatch) when power is cycled.

Non-Latching Relay (AUto)

Automatic reset only

Condition	LED	Relay
Normal	Off	Off
Alarm	On	On
Ack (No effect)	On	On
Normal	Off	Off

In this application, the meter is set up for automatic reset (non-latching relay). Acknowledging the alarm while it is still present has no effect on either the LED or the relay. When the alarm finally goes away, the relay automatically resets and the LED also goes off.

Non-Latching Relay (A-mAn)

Automatic + manual reset at any time

Condition	LED	Relay
Normal	Off	Off
Alarm	On	On
Normal	Off	Off
Next Alarm	On	On
Ack	On	Off
Normal	Off	Off

In this application, the meter is set up for automatic and manual reset at any time (non-latching relay). The LED and the relay automatically reset when the meter returns to the normal condition.

The next time an alarm occurs, the operator acknowledges the alarm manually while the alarm condition still exists. This causes the relay to reset, but the LED stays on until the meter returns to the normal condition.

Latching Relay (LAtcH)

Manual reset any time

Condition	LED	Relay
Normal	Off	Off
Alarm	On	On
Ack	Off	Off

In this application, the meter is set up for manual reset at any time. Acknowledging the alarm even if the alarm condition is still present resets the relay and turns off the LED.

Latching Relay (LE-CLr)

Manual reset only after alarm condition has cleared

Condition	LED	Relay
Normal	Off	Off
Alarm	On	On
Ack (No effect)	On	On
Normal	On	On
Ack	Off	Off

In this application, the meter is set up for manual reset only after the signal passes the reset point (alarm condition has cleared). Acknowledging the alarm while it is still present has no effect on either the LED or the relay. When the alarm is acknowledged after it returns to the normal state, the LED and the relay go off. Notice that the LED remains on, even after the meter returns to the normal condition. This is because, for latching relays, the alarm LED reflects the status of the relay, regardless of the alarm condition.

Acknowledging Relays

There are two ways to acknowledge relays programmed for manual reset:

- Via the programmable front panel function keys F1-F3 (Default: F3 assigned to ACK)
- Remotely via a normally open pushbutton wired across one of the digital inputs and the +5 V terminals on the digital I/O modules.

When the ACK button or the assigned digital input is closed, all relays programmed for manual reset are acknowledged.

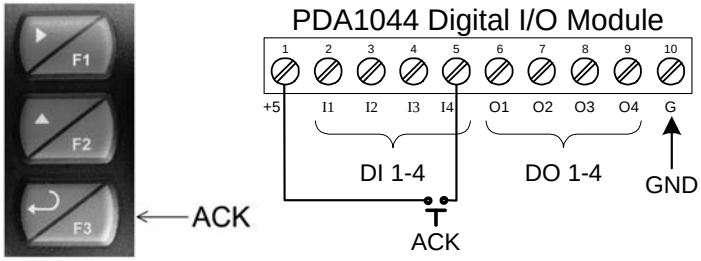


Figure 18: Acknowledge Relays w/Function Key or Digital Input

Pump Alternation Control Applications (ALtErn)

For pump control applications where two or more similar pumps are used to control the level of a tank or a well, it is desirable to have all the pumps operate alternately. This prevents excessive wear and overheating of one pump over the lack of use of the other pumps.

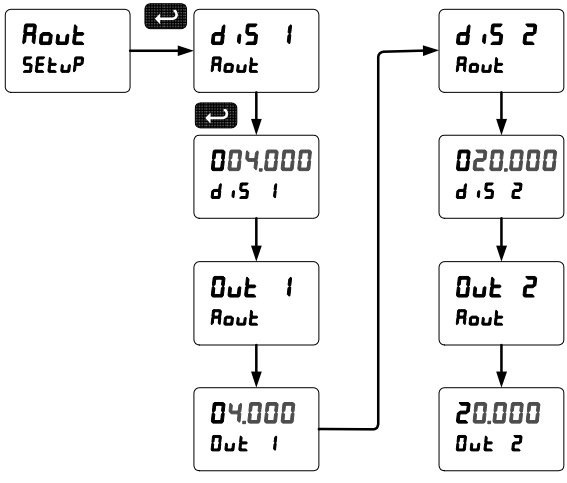
Up to 8 relays can be set up to alternate every time an on/off pump cycle is completed. The set points and reset points can be programmed, so that the first pump on is the first pump off.

Scaling the 4-20 mA Analog Output (Aout)

The 4-20 mA analog output can be scaled to provide a 4-20 mA signal for any display range selected.

No equipment is needed to scale the analog output; simply program the display values to the corresponding mA output signal.

The *Analog Output* menu is used to program the 4-20 mA output based on display values.



For instructions on how to program numeric values see *Setting Numeric Values*, page 34.

Setting Up the Password (PASS)

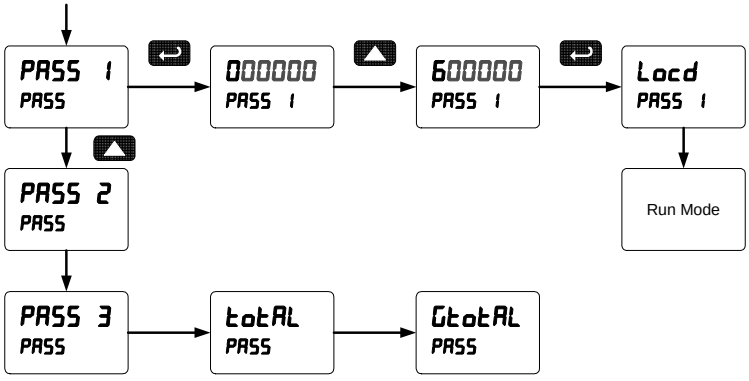
The *Password* menu is used for programming three levels of security to prevent unauthorized changes to the programmed parameter settings and to program the non-resettable totalizer.

Pass 1: Allows use of the F1–F3 function keys
Pass 2: Allows use of the F1–F3 function keys and changing the set/reset points
Pass 3: Restricts all programming and F1–F3 keys and Digital Inputs
Total: Prevents resetting the total manually
Gtotal: Prevents resetting the grand total manually

Protecting or Locking the Meter

Enter the *Password* menu and program a six-digit password.

For instructions on how to program numeric values see *Setting Numeric Values*, page 34.



Record the password for future reference. If appropriate, it may be recorded in the space provided.

Model:	
Serial Number:	
Password 1:	__ __ __ __ __ __
Password 2:	__ __ __ __ __ __
Password 3:	__ __ __ __ __ __
Total	__ __ __ __ __ __
GTotal	__ __ __ __ __ __

Total Reset Password & Non-Resettable Total

The total and the grand total can be password-protected to prevent unauthorized total resets.

The grand total can be programmed as a non-resettable total by entering the password “050873”.

Caution!

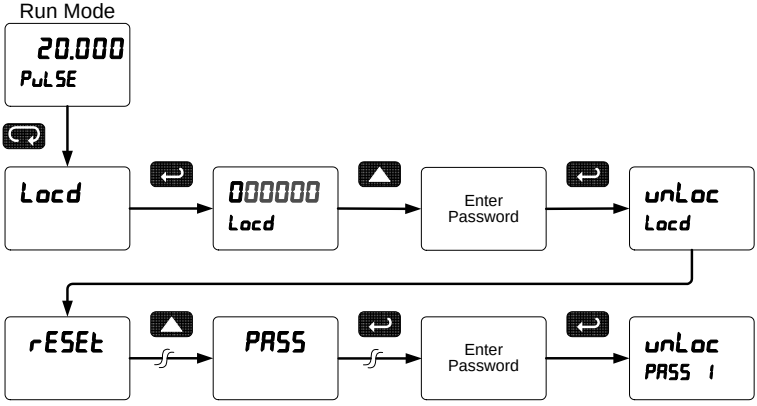
Once the Grand Total has been programmed as “non-resettable” the feature **cannot** be disabled.

Making Changes to a Password Protected Meter

If the meter is password protected, the meter will display the message Locd (*Locked*) when the Menu button is pressed. Press the Enter button while the message is being displayed and enter the correct password to gain access the menu. After exiting the programming mode, the meter returns to its password protected condition.

Disabling Password Protection

To disable the password protection, access the *Password* menu and enter the correct password twice, as shown below. The meter is now unprotected until a new password is entered.



If the correct six-digit password is entered, the meter displays the message unLoc (unlocked) and the protection is disabled until a new password is programmed.

If the password entered is incorrect, the meter displays the message Locd (Locked) for about two seconds, and then it returns to Run Mode. To try again, press Enter while the *Locked* message is displayed.

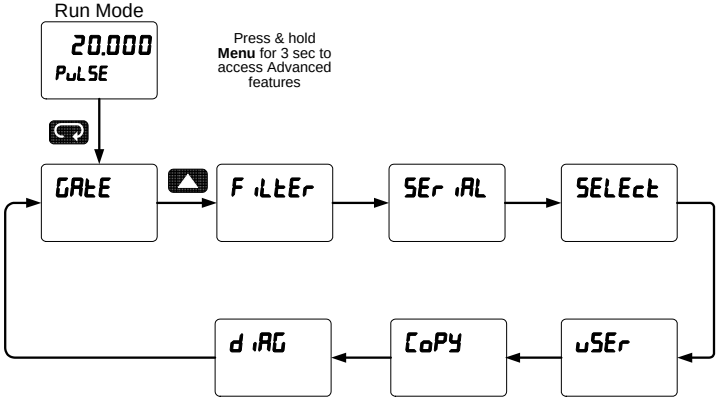
Did you forget the password?

The password may be disabled by entering a master password. If you are authorized to make changes, enter the master password 508655 to unlock the meter.

Advanced Features Menu

To simplify the setup process, functions not needed for most applications are located in the *Advanced Features* menu.

Press and hold the Menu button for three seconds to access the advanced features of the meter.



Advanced Features Menu & Display Messages

The following table shows the functions and messages of the *Advanced Features* menu in the order they appear in the menu.

Display	Parameter	Action/Setting
FiLtEr	*Filter*	Set the Contact De-bounce filter value
SEr iAL	*Serial*	Set serial communication parameters
AddrES	*Address*	Set meter address
bAud	*Baud rate*	Select baud rate
tr dLY	*Transmit delay*	Set transmit delay for serial communication
SELECt	*Select*	Enter the Select menu (function, cutoff, out)
Functn	*Math Function*	Select linear, square root, programmable exponent, or round horizontal tank function
LinEAr	*Linear*	Set meter for linear function and select number of linearization points
no PtS	*Number of points*	Set meter for 2 to 32-point linearization
SQuArE	*Square root*	Set meter for square root extraction
ProG E	*Programmable exponent*	Set meter for programmable exponent and enter exponent value
rHt	*Round horizontal tank*	Set meter for round horizontal tank volume calculation
diAnr	*Diameter*	Enter the tank's diameter in inches
LEnGtH	*Length*	Enter the tank's length in inches
CutoFF	*Cutoff*	Set low-flow cutoff
AoutPr	*Analog output programming*	Program analog output parameters
SourcE	*Source*	Select source for the 4-20 mA output
O-rAnG	*Overrange*	Program mA output for display overrange
u-rAnG	*Underrange*	Program mA output for display underrange
brEAK	*Loop Break*	Set relay condition if loop break detected
ForcE	*Force*	Force analog output value for loop break
IGnorE	*Ignore*	Ignore loop break condition
mAnAX	*Maximum*	Program maximum mA output allowed

Display	Parameter	Action/Setting
mA in	*Minimum*	Program minimum mA output allowed
CAL ib	*Calibrate*	Calibrate 4-20 mA output (internal reference source used for scaling the output)
4 mA	*4 mA output*	Enter mA output value read by milliamp meter with at least 0.001 mA resolution
20 mA	*20 mA output*	Enter mA output value read by milliamp meter with at least 0.001 mA resolution
uSEr	*User I/O*	Assign function keys and digital I/O
F1	*F1 function key*	Assign F1 function key
F2	*F2 function key*	Assign F2 function key
F3	*F3 function key*	Assign F3 function key
LL I 1	*Logic level input 1*	Assign logic level input 1 – 8, if expansion modules are connected
LL O 1	*Logic level output 1*	Assign logic level output 1 – 8, if expansion modules are connected
CoPY	*Copy*	Enter copy function
SEnd	*Send*	Send meter settings to another meter
donE	*Done*	Copy function completed
d iAG	*Diagnostics*	Display parameter settings
inPut	*Input*	Input selection
Functn	*Function*	Function selected
SCALE	*Scale*	Scaling parameter
CutoFF	*Cutoff*	Cutoff value
dSPLAY	*Display*	Display assignments
rELAY	*Relays*	Relay settings
Aout	*Analog output*	Analog output scaling
AoutPr	*Analog output programming*	Analog output programming
SEr iAL	*Serial*	Serial communication settings
LEd t	*LED test*	Test all LEDs
inFo	*Information*	Display software and S/N information

Serial Communications (SEr AL)

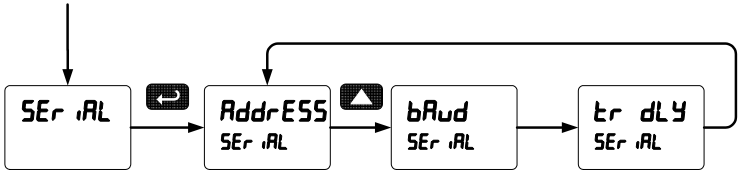
The meter is equipped with serial communications capability as a standard feature using PDC Serial Communication Protocol.

To communicate with a computer or other data terminal equipment, an RS-232 or RS-422/485 adapter option is required; see *Ordering Information* on page 7 for details.

Warning!

Do not connect any equipment other than Precision Digital's expansion modules, cables, or meters to the RJ45 M-LINK connector. Otherwise damage will occur to the equipment and the meter.

Note: More detailed instructions are provided with each optional serial communications adapter.

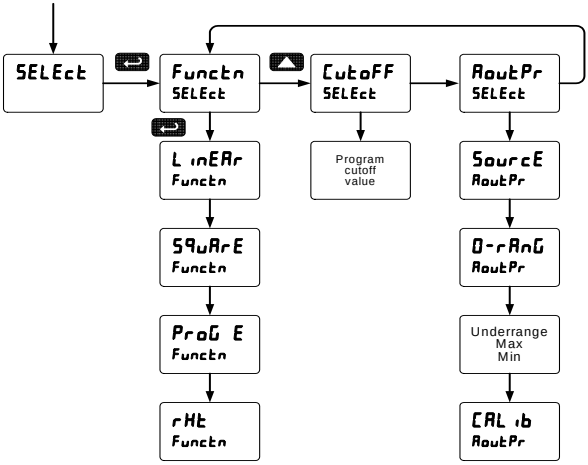


When using more than one meter in a multi-drop mode, each meter must be provided with its own unique address. The address may be programmed from 1 to 247. The transmit delay may be set between 0 and 199 ms.

The PD6300 can also be connected to another PD6300 allowing the user to copy all the settings from one meter to another, using the *Copy* function.

Select Menu (SELECt)

The *Select* menu is used to select the math function applied to the input (linear), low-flow cutoff, and analog output programming. The multi-point linearization is part of the linear function selection.



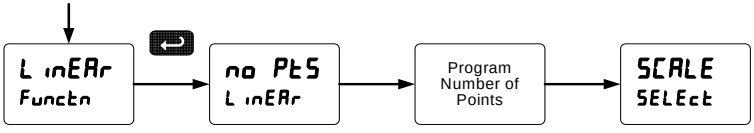
Math Function Selection (Functn)

The *Function* menu is used to select the math function applied to the input: linear, where the multi-point linearization is part of the linear function selection.

Meters are set up at the factory for linear function with 2-point linearization. The linear function provides a display that is linear with respect to the input signal.

Multi-Point Linearization (L inEAr)

Meters are set up at the factory for linear function with 2-point linearization. Up to 32 linearization points can be selected under the linear function. The multi-point linearization can be used to linearize the display for non-linear signals.



Square Root Linearization (SQUARE)

Note: Although this option may appear in the menu the functionality is not available in the PD6300 series products.

Programmable Exponent Linearization (PROG E)

Note: Although this option may appear in the menu the functionality is not available in the PD6300 series products.

Round Horizontal Tank Linearization (rHt)

Note: Although this option may appear in the menu the functionality is not available in the PD6300 series products.

Caution!

Attempting to program any of the three functions noted above may affect any multi-point linearization previously programmed.

Low-Flow Cutoff (CutoFF)

The low-flow cutoff feature allows the meter to be programmed so that the often-unsteady output from a differential pressure transmitter, at low flow rates, always displays zero on the meter.

The cutoff value may be programmed from 0 to 999999. The meter will display zero below the cutoff value. Programming the cutoff value to zero disables the cutoff feature.

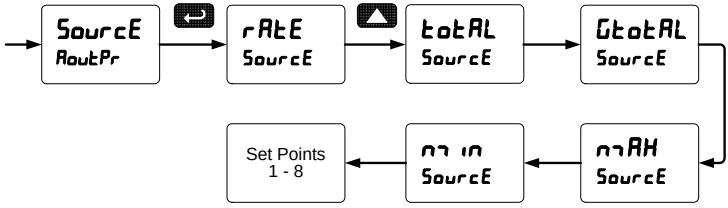
Analog Output Programming (AoutPr)

The *Analog Output Programming* menu is used to program the behavior of the 4-20 mA output. The following parameters and functions are programmed in this menu:

1. Source: Source for generating the 4-20 mA output (e.g. PV)
2. Overrange: Analog output value with display in overrange condition
3. Underrange: Analog output value with display in underrange condition
4. Max: Maximum analog output value allowed regardless of input
5. Min: Minimum analog output value allowed regardless of input
6. Calibrate: Calibrate the internal 4-20 mA source reference used to scale the 4-20 mA output

Analog Output Source

The source for generating the 4-20 mA output may be assigned to the rate/process variable, total, grand total, maximum or minimum value reached by the rate/process, or one of the set points.

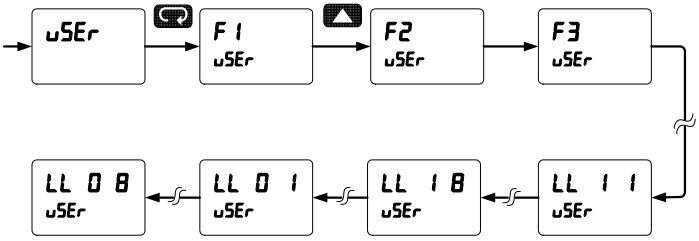


Analog Output Calibration

To perform the analog output calibration it's recommended to use a milliamp meter with a resolution of at least 0.1 µA to measure the output current. The values saved internally during this procedure are used for scaling the 4-20 mA output in the *Setup* menu.

Programmable Function Keys User Menu (uSEr)

The *User* menu allows the user to assign the front panel function keys F1, F2, F3 and up to eight digital inputs to access most of the menus or to activate functions immediately (e.g. Reset max & min). Up to eight digital outputs can be assigned to a number of actions and functions executed by the meter (e.g. Alarms, relay acknowledgement, etc.).



Function Keys & Digital I/O Available Settings

Display	Description	Display	Description
AcK	Acknowledge relays	bIG Hi	Max on big display
rESEt	Reset menu	bIG Lo	Min on big display
rSt t	Reset total	bIG HL	Max/min big display
rSt Gt	Reset grand total	LittLE	Little display menu
rSt Hi	Reset max	Lit Hi	Max on little display
rSt Lo	Reset min	Lit Lo	Min on little display
rSt HL	Reset max & min	Lit HL	Max/min little display
rELAY	Relay menu	diSAbL	Disable function key
SEt 1	Set point 1 - 8	mnEnu	Menu button
rLY d	Disable relay	rIGht	Right arrow button
rLY E	Enable relay	uP	Up arrow button
O HoLd	Relay output hold	EntEr	Enter button
dSPLAY	Display menu	ALm1 1	Alarm 1 – 8
bIG	Big display menu		

Meter Copy Function (CoPY)

The *Copy* function is used to copy (or clone) all the settings from one meter to other meters requiring exactly the same setup and programming (*i.e*. type of input, scaling, decimal point, filter, gate, etc.).

Warning!

Only the PDA1200 meter copy cable must be used for meter-to-meter interfacing. The PDA1200 is a special eight-conductor flat cable with two wires swapped. Using standard CAT5 or other cable will cause damage to both meters.

PDA1200 Meter Copy Cable

Figure 19: Meter Copy Connection

Copy Function Requirements

To successfully copy settings from one meter to another, both meters must have:

1. *Same software version*
2. *Same baud rate setting*

See *Determining Software Version*, page 77 for instructions.

Meter Copy or Cloning Instructions

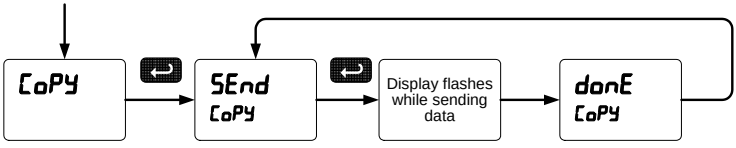
Caution!	*Do not connect the two meters to the same signal source while cloning. Internal calibration may be affected.*

1. Connect two meters using a PDA1200 meter copy cable.

Warning!

Using standard CAT5 or other cable will cause damage to both meters.
Use PDA1200 meter copy cable only.

2. Do not connect the two meters to the same signal source.
3. Power up both meters. Leave Clone meter in Run Mode.
4. Enter the *Advanced Features* menu of the Master meter see *Advanced Features Menu* page 65.
5. Scroll to the *Copy* function using the Up arrow button then press Enter.
6. The meter displays the message SEnd. Press Enter, the display flashes while sending data. The message donE is displayed when copying is completed.



7. The Clone meter displays the message CPy rC while being programmed then the message donE when copying is completed. The meter initializes and returns to Run Mode using the same settings as the Master.
8. If meter to be cloned does not respond to the data being sent, refer to ***Copy Function Requirements*** above.

METER OPERATION

The meter accepts pulses (e.g. ±40mV to ± 8V), square wave (0-5, 0-12V, or 0-24V), open collector, NPN, PNP, TTL, or switch contact signals and displays these signals in engineering units from -99999 to 999999.

The dual-line display can be customized by the user to operate in such a way as to satisfy a specific application. Typically the main display is used for the process variable; while the second display is used engineering units, custom legend, or set point indication.

Front Panel Buttons Operation

Button Symbol	Description
	Press to enter or exit Programming Mode, view settings, or exit max/min readings
	Press to reset max/min readings or other parameter/function assigned through the *User* menu
	Press to display max/min readings or other parameter/function assigned through the *User* menu
	Press to acknowledge relays or other parameters/function assigned through the *User* menu

Function Keys Operation

During operation, the programmable function keys operate according to the way they have been programmed in the *Advanced Features – User* menu.

The table above shows the factory default settings for F1, F2, and F3.

Maximum/Minimum Readings

The max & min readings (peak & valley) reached by the process can be displayed either continuously or momentarily:

1. Display briefly by assigning to the F1-F3 function keys or to the digital inputs in the *User* menu.
2. Display continuously by assigning either display to max/min through the *Display* menu.

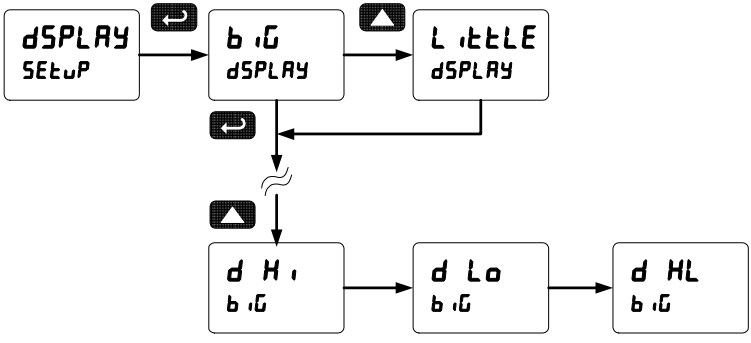
Any of the F1-F3 function keys (buttons) and the digital inputs can be programmed to reset the max & min readings. The meters are set at the factory to display the max reading by pressing the Up arrow/F2 button and to use the Right arrow/F1 button to access the *Reset* menu.

To display max reading using function key with factory defaults:

1. Press Up arrow/F2 button to display maximum reading since the last reset/power-up.
2. To reset max/min press Right arrow/F1 button to access the Reset menu. The max & min displays are reset to actual values.
3. Press Menu to exit max/min display reading.

To display max/min readings continuously:

Assign either display to Max (d HI), Min (d Lo), or toggle between Max and Min (d HL) every 10 seconds.



TROUBLESHOOTING

The rugged design and the user-friendly interface of the meter should make it unusual for the installer or operator to refer to this section of the manual. However, due to the many features and functions of the meter, it's possible that the setup of the meter does not agree with what an operator expects to see.

If the meter is not working as expected, refer to the *Diagnostics* menu and recommendations below.

Diagnostics Menu (d iAG)

The *Diagnostics* menu is located in the *Advanced Features* menu, to access *Diagnostics* menu see *Advanced Features Menu*, page 65.

It provides an easy way to view the programmed parameter settings for troubleshooting purposes. Press the Enter button to view the settings and the Menu button to exit at any time.

For a description of the diagnostic messages, *see Advanced Features Menu &* Display Messages, page 66.

Determining Software Version

To determine the software version of a meter:

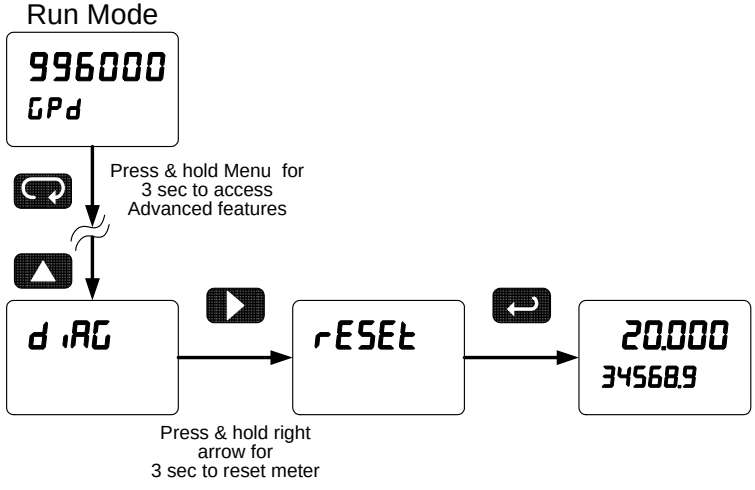
1. Go to the *Diagnostics* menu (d iAG) and press Enter button.
2. Press Up arrow button and scroll to Information menu (InFo).
3. Press Enter to access the software number (SFt), version (UEr), and serial number (Sn) information. Write down the information as it is displayed. Continue pressing Enter until all the information is displayed.
4. The meter returns to Run Mode after displaying all the settings.

Reset Meter to Factory Defaults

When the parameters have been changed in a way that is difficult to determine what's happening, it might be better to start the setup process from the factory defaults.

Instructions to load factory defaults:

1. Enter the *Advanced Features* menu. See *Advanced Features Menu*, page 65.
2. Press Up arrow to go to *Diagnostics* menu
3. Press and hold Right arrow for five seconds, press Enter when display flashes rESEt.
   Note: If Enter is not pressed within three seconds, the display returns to the *Diagnostics* menu.
4. The meter goes through an initialization sequence (similar as on power-up), and loads the factory default settings.



Factory Defaults & User Settings

The following table shows the factory setting for most of the programmable parameters on the meter. Next to the factory setting, the user may record the new setting for the particular application.

Model: _____ S/N: _____ Date: _____

Parameter	Display	Default Setting	User Setting
Input type	inPut	4-20 mA	
Total	YES	Total enabled	
Filter	F iLtEr	Hi Spd	
Function	Functn	Linear	
Number of points	no PtS	2	
Input 1	inP 1	00000.0	
Display 1	diS 1	00000.0	
Input 2	inP 2	10000.0	
Display 2	diS 2	10000.0	
Decimal point	ddddd.d	1 place	
Cutoff value	CutoFF	0.000 (disabled)	
Display assignment	dSPLAY		
Big display (Main)	biG	Rate/Process	
Little display (Small)	LittLE	Total value	
Display intensity	d- Int Y	6	
Total time base	t tb	Second	
Total conversion factor	t CF	1.000	
Total reset	t rSt	Manual	
Grand total time base	Gt tb	Second	
Grand total conversion factor	t CF	1.000	
Grand total reset	t rSt	Manual	
Relay 1 assignment	RS iGn 1	Total	
Relay 2 assignment	RS iGn2	Total	
Relay 3 assignment	RS iGn3	Rate	

Parameter	Display	Default Setting	User Setting
Relay 4 assignment	rS.Gn4	Rate	
Relay 1 action	Act 1	Automatic	
Relay 1 set point	SEt 1	100.0	
Relay 1 reset point	rSt 1	000.0	
Relay 2 action	Act 2	Automatic	
Relay 2 set point	SEt 2	200.0	
Relay 2 reset point	rSt 2	000.0	
Relay 3 action	Act 3	Automatic	
Relay 3 set point	SEt 3	300.0	
Relay 3 reset point	rSt 3	250.0	
Relay 4 action	Act 4	Automatic	
Relay 4 set point	SEt 4	400.0	
Relay 4 reset point	rSt 4	350.0	
Fail-safe relay 1	FLS 1	Off	
Fail-safe relay 2	FLS 2	Off	
Fail-safe relay 3	FLS 3	Off	
Fail-safe relay 4	FLS 4	Off	
On delay relay 1	On 1	0.0 sec	
Off delay relay 1	OFF 1	0.0 sec	
On delay relay 2	On 2	0.0 sec	
Off delay relay 2	OFF 2	0.0 sec	
On delay relay 3	On 3	0.0 sec	
Off delay relay 3	OFF 3	0.0 sec	
On delay relay 4	On 4	0.0 sec	
Off delay relay 4	OFF 4	0.0 sec	
Display 1 analog out	d.S 1	0.0	
Output 1 value	Out 1	4.000 mA	
Display 2 analog out	d.S 2	10000.0	
Output 2 value	Out 2	20.000 mA	
Source analog output	SourcE	Rate/process	

Parameter	Display	Default Setting	User Setting
Overrange output	O-rAnG	21.000 mA	
Underrange output	u-rAnG	3.000 mA	
Maximum output	mAX	23.000 mA	
Minimum output	mIn	0.000 mA	
Serial address	AddrES	001	
Baud rate	bAud	2400	
Transmit delay	tr dLY	10 ms	
F1 function key	F1	Reset max & min	
F2 function key	F2	Big display: Max (Hi)	
F3 function key	F3	Acknowledge relays	
Logic level input 1	LL I1	Menu	
Logic level input 2	LL I2	Right arrow	
Logic level input 3	LL I3	Up arrow	
Logic level input 4	LL I4	Enter	
Logic level output 1	LL O1	Alarm 1	
Logic level output 2	LL O2	Alarm 2	
Logic level output 3	LL O3	Alarm 3	
Logic level output 4	LL O4	Alarm 4	
Password 1	PASS 1	000000 (unlocked)	
Password 2	PASS 2	000000 (unlocked)	
Password 3	PASS 3	000000 (unlocked)	
Total password	totAL	000000 (unlocked)	
Grand total password	GtotAL	000000 (unlocked)	

Troubleshooting Tips

Symptom	Check/Action
No display at all	Check power at power connector
Not able to change setup or programming, Locd is displayed	Meter is password-protected, enter correct six-digit password to unlock
Meter displays Error during calibration	Check: 1. Signal connections 2. Minimum input span requirements
Meter displays 1. 999999 2. -99999	Check: 1. Input selected in *Setup* menu 2. Corresponding signal at Signal connector
Display is unstable	Check: 1. Input signal stability and value 2. Display scaling vs. input signal 3. Filter and gate values
Display response is too slow	Check filter and gate values
Display reading is not accurate	Check: 1. Scaling or calibration
Display does not respond to input changes, reading a fixed number	Check: 1. Display assignment, it might be displaying max, min, or set point.
Display alternates between 1. Hi and a number 2. Lo and a number	Press Menu to exit max/min display readings.
Relay operation is reversed	Check: 1. Fail-safe in *Setup* menu 2. Wiring of relay contacts
Relay and status LED do not respond to signal	Check: 1. Relay action in *Setup* menu 2. Set and reset points
Meter not communicating with application programs	Check: 1. Serial adapter and cable 2. Serial settings 3. Meter address and baud rate
If the display locks up or the meter does not respond at all	Cycle the power to reboot the microprocessor.
Other symptoms not described above	Call Technical Support for assistance.

Alphabetical List of Display Functions & Messages

Display	Parameter	Action/Setting Description
20 mA	*20 mA output*	Enter mA output value read by milliamp meter with at least 0.001 mA resolution
4 mA	*4 mA output*	Enter mA output value read by milliamp meter with at least 0.001 mA resolution
999999	*Flashing display*	Overrange condition
AcK	*Acknowledge*	Acknowledge relays
Act 1	*Action 1*	Set relay 1 action
AddrES	*Address*	Set meter address
ALm 1	*Alarm 1*	Assign digital output to Alarm 1 – 8
ALtErn	*Alternate*	Set relay for pump alternation control (relays assigned to rate)
A-mAn	*Auto-manual*	Set relay for automatic & manual reset any time
Aout	*Analog output*	Analog output scaling
AoutPr	*Analog output programming*	Analog output programming
AS iGn 1	*Assign 1*	Relay 1 assignment
ASS iGn	*Assignment*	Assign relays to rate, total, or grand total
Auto	*Automatic*	Press Enter to set meter for automatic operation
Auto	*Automatic*	For automatic reset
bAud	*Baud rate*	Select baud rate
b iG	*Big display*	Press Enter to assign the Main display parameter (default: PV or rate)
b iG Hi	*Max on big display*	Assign digital input to display max on the main display
b iG HL	*Max/min big display*	Assign digital input to toggle max/min on the main display
b iG Lo	*Min on big display*	Assign the digital input to display min on the main display
CAL	*Calibrate*	Enter the *Calibrate* menu

Display	Parameter	Action/Setting Description
CAL ib	*Calibrate*	Calibrate 4-20 mA output (internal reference source used for scaling the output)
Contrl	*Control*	Enter *Control* menu
CoPY	*Copy*	Enter copy function
CutoFF	*Cutoff*	Cutoff value
dEc Pt	*Decimal point*	Set decimal point for rate, total, grand total
dELAY	*Delay*	Enter relay *Time Delay* menu
d iAG	*Diagnostics*	Display parameter settings
d iAmtr	*Diameter*	Enter the tank's diameter in inches
d- Int Y	*Display intensity*	Set display intensity level from 1 to 8
d iS 1	*Display 1*	Program display 1 value
d iS 2	*Display 2*	Program display 2 value
d iSAbL		Disable function key
dLY 1	*Delay 1*	Enter relay 1 time delay setup
donE	*Done*	Copy function completed
dSPLAY	*Display*	Enter the *Display* menu
EntEr	*Enter Button*	Assign digital input to Enter button
Error	*Error*	Error, calibration not successful, check signal or programmed value
F 1	*F1 function key*	Assign F1 function key
F2	*F2 function key*	Assign F2 function key
F3	*F3 function key*	Assign F3 function key
FA iLSF	*Fail-safe*	Enter *Fail-safe* menu
F iLtEr	*Filter*	Set noise filter value
FLS 1	*Fail-safe 1*	Set relay 1 fail-safe operation
ForcE	*Force*	Force analog output value for loop break
Functn	*Function*	Select linear, square root, programmable exponent, or round horizontal tank function
G totAL	*Grand total*	Assign relay to grand total
Gt CF	*Grand total con-*	Program grand total conversion factor

Display	Parameter	Action/Setting Description
	version factor	
GE rSE	*Grand total reset*	Program grand total rest mode: auto or manual
GE tb	*Grand total time base*	Program grand total time base
GtotAL	*Grand total password*	Set or enter password for manual reset
InFo	*Information*	Display software and S/N information
InP 1	*Input 1*	Calibrate input 1 signal or program input 1 value
InP 2	*Input 2*	Calibrate input 2 signal or program input 2 value (up to 32 points)
InPut	*Input*	Input selection
LAtCH	*Latching*	Set relay for latching operation (relays assigned to rate)
LEd t	*LED test*	Test all LEDs
LEnGth	*Length*	Enter the tank's length in inches
LinEAr	*Linear*	Set meter for linear function and select number of linearization points
Lit Hi	*Max on little display*	Assign digital input to display max on the small display
Lit HL	*Max/min little display*	Assign the digital input to toggle max/min on the small display
Lit Lo	*Min on little display*	Assign digital input to display min on the small display
LittLE	*Little display*	To assign the small display parameters
LL 1 1	*Logic level input 1*	Assign logic level input 1 – 8, if expansion modules are connected
LL 0 1	*Logic level output 1*	Assign logic level output 1 – 8, if expansion modules are connected
Locd	*Locked*	Enter password to unlock meter
Lt-CLr	*Latching-cleared*	Set relay for latching operation with manual reset only after alarm condition has cleared (relays assigned to rate)
mAn	*Manual*	To manually control

Display	Parameter	Action/Setting Description
mAH	*Maximum*	Program maximum mA output allowed
mEnu	*Menu button*	Assign digital input to Menu button
mA in	*Minimum*	Program minimum mA output allowed
no PtS	*Number of points*	Set meter for 2 to 32-point linearization
nonrSt	*Non-resettable*	Non-resettable grand total set after entering "050873" for Gtotal password
0 HoLd		Relay output hold
OFF	*Off*	Disable relay and front panel status LED
OFF 1	*Off*	Set relay 1 Off time delay
On 1	*On*	Set relay 1 On time delay
O-rAnG	*Overrange*	Program mA output for display overrange
Out 1	*Output 1*	Program output 1 value (e.g. 4.000 mA)
Out 2	*Output 2*	Program output 2 value (e.g. 20.000 mA)
PASS	*Password*	Enter the *Password* menu
PASS 1	*Password 1*	Set or enter Password 1
PASS 2	*Password 2*	Set or enter Password 2
PASS 3	*Password 3*	Set or enter Password 3
ProG	*Program*	Enter the *Program* menu
ProG E	*Programmable exponent*	Set meter for programmable exponent and enter exponent value
rAtE	*Rate*	Assign relay to rate
rELAY	*Relay*	Enter the *Relay* menu
rESEt	*Reset*	To access the *Reset* menu
rht	*Round horizontal tank*	Set meter for round horizontal tank volume calculation
r iGht		Right arrow button
rLY 1	*Relay 1*	Relay 1 setup
rLY 2	*Relay 2*	Relays 2-8 setup *Note: Relays 5-8 are shown, only if expansion relay module is installed.*
rLY d		Disable relay

Display	Parameter	Action/Setting Description
rLY E		Enable relay
rSt 1	*Reset 1*	Program reset point 1
rSt Gt	*Reset grand total*	To reset grand total
rSt Hi	*Reset high*	Press Enter to reset max display
rSt HL	*Reset high & low*	Press Enter to reset max & min displays
rSt Lo	*Reset low*	Press Enter to reset min display
rSt t	*Reset Total*	Reset total
SAmPL	*Sampling*	Set relay for sampling operation
SCALE	*Scale*	Enter the *Scale* menu
SELECt	*Select*	Enter the Select menu (function, cutoff, out)
SEnd	*Send*	Send meter settings to another meter
SEr iAL	*Serial*	Set serial communication parameters
SEt 1	*Set 1*	Program set point 1
SEtuP	*Setup*	Enter *Setup* menu
SourcE	*Source*	Select source for the 4-20 mA output
SquArE	*Square root*	Set meter for square root extraction
t CF	*Total conversion factor*	Program total conversion factor
t dLY	*Time delay*	Program time delay for total auto reset
t rSt	*Total reset*	Program total rest mode: auto or manual
t tb	*Total time base*	Program total time base
totAL	*Total*	Enable or disable totalizer features
tr dLY	*Transmit delay*	Set transmit delay for serial communication
unLoc	*Unlocked*	Program password to lock meter
uP	*Up arrow button*	To assign digital input to up arrow button
u-rAnG	*Underrange*	Program mA output for display underrange
uSEr	*User I/O*	Assign function keys and digital I/O

How to Contact Precision Digital

- For Technical Support please
  Call: (800) 610-5239 or (508) 655-7300
  Fax: (508) 655-8990
  Email: support@predig.com
- For Sales Support or to place an order please
  Call: (800) 343-1001 or (508) 655-7300
  Fax: (508) 655-8990
  Email: sales@predig.com
- For the latest version of this manual please visit
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