Loop Leader Series

UL LISTED
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PD6626 & PD6628 Only

Ex IECEx

CE

Loop-Powered Totalizer

- 4-20 mA Input
- Loop-Powered Flow Rate/Totalizer
- 1.5 Volt Drop (4.5 Volt Drop with Backlight)
- Display Rate & Total Simultaneously
- Loop-Powered Backlight with Red Backlight for Alarm Conditions
- NEMA 4X, IP65 Front
- -40 to 167°F (-40 to 75°C) Safe Area Operating Temperature Range
- Free PC-Based USB Programming Software
- 5-Digit Alphanumeric Top Line
- 8-Digit Alphanumeric Bottom Line
- 8-Digit Total & Grand Total Display with 13 Digits Using Top Line
- 20-Segment Bargraph with Numeric Percent Indication
- Conformal Coated PCBs for Dust & Humidity Protection
- Two Open Collector Outputs Standard
- Dual-Line Display
- 1/8 DIN Shallow Depth Case
- Optional Loop-Powered Solid-State Relays
- Optional 4-20 mA Analog Output
- UL & C-UL 61010 Listed for Electrical Safety
- UL & C-UL Listed as Intrinsically Safe and Nonincendive
- ATEX and IECEx Certified as Intrinsically Safe

PRECISION DIGITAL CORPORATION

PRECISION DIGITAL

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Disclaimer

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.

⚠ **!** **CAUTION**: *Read complete instructions prior to installation and operation of the meter.*	⚠ ⚡ **WARNING**: *Risk of electric shock or personal injury.*

⚠ ⚡ **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

These loop-powered 1/8 DIN flow rate/totalizers can be installed virtually anywhere to provide convenient and informative display of flow rate and total from a 4-20 mA signal. One of the most convenient features of these instruments is their ability to display both flow rate and total at the same time. For instance, flow rate is typically displayed on the 5-digit alphanumeric top line and flow total or grand total is typically displayed on the 8-digit alphanumeric bottom line.

Both of these lines use 14-segment, alphanumeric characters for clear indication of tags, units or alarm messages. Further enhancing the display on these instruments is a 20-segment bargraph available on the PD6624/8 that also includes a numeric value of the percentage the bargraph represents.

These flow rate/totalizers can be installed virtually anywhere because they get their power from the 4-20 mA loop and therefore require no separate power source. And they only drop 1.5 V (4.5 V with backlight), so they add very little burden to the loop. Additional features that allow these instruments to be installed virtually anywhere include a NEMA 4X, IP65 front panel, an operating temperature range of -40 to 167°F (-40 to 75°C) (for safe area products), conformally coated PCBs, and a backlit LCD that can be read in bright sunlight or dimly lit areas. Finally, there are intrinsically safe and nonincendive versions of these instruments that can be installed in hazardous areas.

Free, PC-based, software that connects to the meter via a micro USB cable is available for programming and setup of the meters. In addition, the meter can be programmed, setup and operated via the four front panel buttons. Three of these buttons can be used as function keys. In addition, a digital input is standard and is particularly useful for remote reset of the total or to start/stop a timer/batch.

All models come equipped with two open collector outputs and are available with two solid state relays and 4-20 mA analog output options. The open collector outputs are useful for alarm indication or sending a pulse to indicate when a certain amount of total has been accumulated. The relays can be programmed for alarm indication, on/off control, sample taking, or simple batch control.

Ordering Information
General Purpose Instruments

Loop Leader PD6622 • Standard Decimal Models – General Purpose	
Model	Description
PD6622–LNN	Loop-Powered, General Purpose, No Options
PD6622–L2N	Loop-Powered, General Purpose, Two Solid State Relays
PD6622–L3N	Loop-Powered, General Purpose, 4-20 mA Analog Output
PD6622–L5N	Loop-Powered, General Purpose, Two Solid State Relays and 4-20 mA Analog Output

Loop Leader PD6624 • Bargraph Models – General Purpose	
Model	Description
PD6624–LNN	Loop-Powered, General Purpose, Bargraph, No Options
PD6624–L2N	Loop-Powered, General Purpose, Bargraph, Two Solid State Relays
PD6624–L3N	Loop-Powered, General Purpose, Bargraph, 4-20 mA Analog Output
PD6624–L5N	Loop-Powered, General Purpose, Bargraph, Two Solid State Relays and 4-20 mA Analog Output

Hazardous Area Instruments

Loop Leader PD6626 • Standard Decimal Models – Hazardous Area	
Model	Description
PD6626–LNN	Loop-Powered, Hazardous Area, No Options
PD6626–L2N	Loop-Powered, Hazardous Area, Two Solid State Relays
PD6626–L3N	Loop-Powered, Hazardous Area, 4-20 mA Analog Output
PD6626–L5N	Loop-Powered, Hazardous Area, Two Solid State Relays and 4-20 mA Analog Output

Loop Leader PD6628 • Bargraph Models – Hazardous Area	
Model	Description
PD6628–LNN	Loop-Powered, Hazardous Area, Bargraph, No Options
PD6628–L2N	Loop-Powered, Hazardous Area, Bargraph, Two Solid State Relays
PD6628–L3N	Loop-Powered, Hazardous Area, Bargraph, 4-20 mA Analog Output
PD6628–L5N	Loop-Powered, Hazardous Area, Bargraph, Two Solid State Relays and 4-20 mA Analog Output

Note: All models come with two open collector outputs standard.

Enclosures

Enclosures	
Model	Description
PDA2301	NEMA 4X Plastic Enclosure
PDA2501	Plastic NEMA 4X Enclosure
PDA2601	Stainless Steel NEMA 4X Enclosure
PDA2701	Painted Steel NEMA 4 Enclosure
PDA2801	Low-Cost Plastic NEMA 4X Enclosure
PDA3407	Internally Mount NEMA 4X Plastic Enclosure

Specifications

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

Input

Input	4-20 mA
Accuracy	±0.02% of span ±1 count, Square root and programmable exponent: 10-100% FS
Voltage Drop	*Without Backlight*: 1.5 V maximum, *With backlight*: 4.5 V maximum
Equivalent Resistance	*With backlight off*: 75 Ω @ 20 mA *With backlight on*: 225 Ω @ 20 mA
Input Overload	Over current protection to 1 A maximum Over voltage protection to 30 VDC max (between mA+ and mA-/BL-)
Temperature Drift	25 PPM/°C from -40 to 75°C ambient
Function	Linear, square root, or programmable exponent
Low-Flow Cutoff	0.0 to 999,999.9
HART Transparency	Analog input will not interfere with existing HART communications on the wired 4-20 mA signal

Display

Display	Dual-line LCD with backlight. Both lines 14-segment alphanumeric. Top: 0.7" (17.8 mm), Bottom: 0.4" (10.2 mm). Display may be programmed to turn red and flash a user-defined message on alarm condition.
Backlight	Powered by 4-20 mA loop. Intensity varies with signal level
Top Line	5 digits (-9999 to 99999) or 5 characters (all capital & most lower-case letters)
Bottom Line	8 digits (-9,999,999 to 99,999,999; separated by commas) or 8 characters (all capital & most lower-case letters)
Bargraph	20 segments, numeric percent indication at top (PD6624 & PD6628 only)
Decimal Point	Up to four decimal places on top line and up to seven decimal places on bottom line
Commas	Commas to indicate 1000s (e.g. 88,987,628) on bottom line
Dual-Scale Feature	The input can be displayed in different scales on the top and bottom lines. For instance, the top line could display the flow in GPM and the bottom line could display that same input in CFM.
Alarm Indication	Red backlight, flashing display, alarm symbol (!); Symbols are not available on bargraph models. Bargraph segment flashes on alarm.
Alarm Message	On or Off; user programmable, 8 characters maximum. Displayed every 10 seconds for 1 second on bottom line.
Display Update Rate	Ambient > -10°C: 1 Update/Second Ambient = -20°C: 1 Update/2 Seconds From -20°C to -40°C the update rate slows down 1 second for every -2°C (e.g. at -24°C, 1 update/4 seconds).
Overrange	Top: 99999; Bottom: 99,999,999 (flashing)
Underrange	Top: -9999; Bottom: -9,999,999 (flashing)

General

Environmental	*Operating temperature range:* -40 to 75°C for safe area products -40 to 70°C for hazardous area products *Storage temperature range:* -40 to 85°C *Relative humidity:* 0 to 90% non-condensing Printed circuit boards are conformally coated.
Programming Method	Front panel & Free PC-based USB programming software
Enclosure & Materials	Enclosure: 1/8 DIN, IP65, NEMA 4X front panel, high impact plastic, NORYL® polyphenylene ether & polystyrene blend (PPE PS) resin, UL 94V-0, Color: gray Gasket: Silicone Rubber Faceplate: LEXAN® polycarbonate (PC) Film Buttons: Silicone rubber
Noise Filter	Averages the input signal over a period of time between 1 and 16 seconds to dampen the effects of a noisy signal that causes a jumpy display.
Filter Bypass	0.0 to 99.9% of full scale. Input signal changes greater than bypass value are displayed immediately.
Recalibration	Recalibration is recommended at least every 12 months.
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	There are three password types available: Main, Total, and Grand Total. The Main password prevents access to the meter Programming Mode. Total and Grand Total passwords prevent resetting the total and grand total, respectively.
Non-Volatile Memory	All programmed settings and total and grand total values are stored in non-volatile memory for a minimum of ten years if power is lost.
Normal Mode Rejection	64 dB at 50/60 Hz
Connections	Removable screw terminals accept 12 to 22 AWG wire
DI Digital Input Contacts	2.1 VDC on contact. Connect normally open contacts across DI+ to DI-
DI Digital Input Logic Levels	Logic High: 2.4 to 30 VDC (max) Logic Low: 0 to 0.9 VDC
Tightening Torque	*Screw terminal connectors:* 4.5 lb-in (0.5 Nm) *Mounting screws:* 8.0 lb-in max. (0.9 Nm)
Overall Dimensions	4.68" x 2.45" x 3.79" (119 mm x 62 mm x 96 mm) (W x H x D)
Weight	8.7 oz (247g) with option board
Warranty	3 years parts and labor

Rate/Totalizer

Rate Display Capability	Top display: -9999 to 99999; bottom display: -9,999,999 to 99,999,999 (with commas)
Total & Grand Total Display Capability	Top display: -9999 to 99999; bottom display: -9,999,999 to 99,999,999 (with commas)
13-Digit Total & Grand Total Capability	Up to 9,999,999,999,999 using both lines with 13-digit total feature enabled.
Total & Grand Total Indication	On bottom display; "T" indicates total and "GT" indicates grand total (not available on bargraph models)
Total Decimal Point	Up to four decimal places on top, up to seven decimal places on bottom. Total decimal point is independent of rate decimal point.
Totalizer	Calculates total based on rate and rate units to display total in engineering units. A custom factor must be programmed if using custom defined units.
Time Base	Seconds, Minutes, Hours, Days
Totalizer Rollover	Totalizer rolls over when display exceeds 99,999,999 (9,999,999,999,999 if 13-digit limit enabled). Relay status reflects display.
Total & Grand Total Reset	Via front panel button or external contact closure on digital input
Total & Grand Total Reset Passwords	Total and grand total passwords may be entered to prevent resetting the total or grand total unless a password is entered.
Non-Resettable Grand Total	Grand total reset may be disabled through the meter interface. Grand total reset may be permanently disabled by selecting YES at the PERMLOCK menu. *Caution: Once the Grand Total has been programmed as "non-resettable" the feature cannot be disabled*

Batch Control

Methods	Automatic or Manual, count up or count down
Manual Batch Start	Pressing F1 function key starts the batch
Manual Batch Pause/Stop	Pressing F3 once pauses the batch, pressing it twice cancels the batch
Automatic Batching	The Loop Leader can be used as an automatic batch controller where batches run continuously without operator input
Batching Relay Operation	Single or dual-relay batching with optional preclose for dual-stage operation
Batch Preset	Set via F2 function key anywhere between 0.0001 to 99,999 based on batch total decimal point. If batch total is assigned to bottom, the preset can be up to 8 digits.
Batch Preclose	For two-stage batch application, a preclose value can be set to close the main flow line.
Automatic Batch Restart Delay	1 to 9,999 seconds. The batch will automatically restart after completion of the last batch.

Common Open Collector & Relay (Alarm) Specifications

High or Low Alarm	User programmable for high or low alarm
Alarm Deadband	0-100% FS, user programmable
On & Off Time Delay	0 to 9,999 seconds
Fail-Safe Operation	Independent for each open collector and relay. Fail-safe on, the output is on under normal conditions. Fail-safe off, the output is on under alarm conditions
Alarm Operation	Automatic, automatic with manual override, latching (manual reset anytime), latching with reset after cleared (manual reset only after alarm has cleared)
Alarm Indication	Red backlight, Flashing display, Alarm symbol (!); (symbols not available on bargraph models); Bargraph segment flashes on alarm.
Alarm Message	On or Off; User programmable, 8 characters maximum; Displayed every 10 sec for 1 sec on bottom
Alarm Acknowledge	Front panel ACK button or external digital input resets output and screen indication
Auto Initialization	When power is applied to the meter, open collectors and relays will reflect the state of the input to the meter
Timer Output	One-shot or Continuous. Off Time Delay: 1 sec to 99:59:59 (hrs:min:sec). On Time: 1 sec to 99:59:59 (hrs:min:sec)
Stopwatch	Output turns on when started and off when stopped

Open Collector Output

Rating	Two NPN, Isolated open collector, 5-30 VDC @ 150 mA maximum
Output Assignment	Pulse, Alarm, Timer, Total Reset, Stopwatch on/off, or Disable
Pulse Output Source	Rate, Total, Grand Total, or Test Frequency
Pulse Output Factor	0.000001 to 999,999.9
Pulse Width	0.5 ms @ 1 kHz; 500 ms @ 1 Hz; 50% duty cycle
Pulse Output Frequency	1,000 Hz maximum
Quadrature Pulse Output	Available for Output 2 (90° behind Output 1)
Alarm Output Source	Assign to Rate, Total, Grand Total or Digital Input

Solid State Relays

Rating	*250 VAC/VDC @ 1A resistive*
	75VA; 250VAC; 0.6A pilot duty (inductive) – UL Code D300
	25VA; 250VDC; 0.6A pilot duty (inductive) – UL Code R300
Noise Suppression	Metal oxide varistors across outputs
Relay Assignment	Alarm, Sample, Timer, Batch, Stopwatch on/off, or Disable
Alarm Output Source	Assign to Rate, Total, Grand Total, or Digital Input
Relay Runtime	Meter will keep track of how long each relay has operated and display this information
Relay Cycles	Meter will keep track of how many times the relays have cycled and display this information

4-20 mA Transmitter Output

Accuracy	±0.05% FS ±0.001mA
Output Source	Rate, total, re-transmit; reverse scaling allowed
Scaling Range	1.00 to 23.0 mA
Disable	High impedance state, less than 1 mA
Calibration	Factory calibrated 4.00 to 20.00 mA
Underrange	1.0 mA, 3.5 mA, or 3.8 mA (If input < 3.5 mA); or Off; user selectable
Overrange	20.5 mA, 20.8 mA, or 23.0 mA (If input > 20.5 mA); or Off; user selectable
Isolation	500 V input-to-output
Temperature Drift	0.5 µA/°C max from -40 to 75°C ambient
External Loop Power Supply	7.0 VDC to 30.0 VDC maximum
Output Loop Resistance	10-750 Ω @ 24 VDC; 10-1100 Ω @ 30 VDC

MeterView XL Programming Software

System Requirements	Microsoft® Windows® 7 & 10
Communications	USB 2.0 (Standard USB A to Micro USB B)
Configuration	Configure meters one at a time
Configuration Files	Generate with or without meter connected; Save to file for later use
USB Power Connection	Meter is powered by USB connection during programming

General Compliance Information

Electromagnetic Compatibility

EMC Emissions	- CFR 47 FCC Part 15 Subpart B Class A emissions requirements (USA) - AS/NZS CISPR 11:2004 Class A ISM emissions requirements (Australia) - EN 55011:2009/A1:2010 Group 1 Class A ISM emissions requirements (EU) - ICES-001 Issue 4 ISM emissions requirements (Canada)
EMC Emissions and Immunity	EN 61326-1:2013 EMC requirements for Electrical equipment for measurement, control, and laboratory use – Inductrial Use

PD6626 & PD6628 Compliance Information

Safety

UL & C-UL Listed	USA & Canada UL 61010-1, 3rd Edition; CAN/CSA-C22.2 No. 61010-1-12, 3rd Edition
UL File Number	E160849
Front Panel	UL Type 4X, NEMA 4X, IP65; panel gasket provided
Low Voltage Directive	IEC 61010-1:2010 (Third Edition) Safety requirements for electrical equipment for measurement, control, and laboratory use
Additional Standards	UL 50E

Hazardous Area Approvals

ATEX   **Certificate Number:** CML 17ATEX2015X

$C\epsilon$ 0518   Ex ia IIC T4 Ga

⟨Ex⟩   II 1G   -40°C ≤ Ta ≤ 70°C

IECEx   **Certificate Number:** IECEx CML 17.0008X

Ex ia IIC T4 Ga

Tamb = -40°C to +70°C

UL & C-UL **UL File Number:** E494837

Class I, Division 1, Groups A, B, C and D T4
Class I, Division 2, Groups A, B, C and D T4
Ex ia IIC T4 (Canada); Class I Zone 0, Zone 1,
AEx ia IIC T4 (U.S.);
Class I Zone 2, Group IIC T4 (U.S.)
PROCESS CONTROL EQUIPMENT FOR USE IN HAZARDOUS LOCATIONS

ATEX/IECEx Assessment Standards

ATEX	IECEx
EN 60079-0:2012+A11:2013 EN 60079-11:2012	IEC 60079-0:2011 Ed. 6 IEC 60079-11:2011 Ed. 6

UL Assessment Standards

United States Standards	Canadian National Standards
UL 913, Eighth Edition UL 60079-0, Sixth Edition UL 60079-11, Sixth Edition Standard No. UL 121201, 9th Edition	CSA C22.2 No. 60079-0:15 CSA C22.2 No. 60079-11:14 CAN/CSA C22.2 No. 213-17

ATEX/IECEx Special Conditions for Safe Use

The following conditions relate to safe installation and/or use of the equipment.

- The permitted ambient temperature range for the PD6606/PD6608 is -40°C to 70°C.
- The equipment must be installed in an enclosure which provides a minimum degree of protection of IP20 for the equipment connections.
- Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. This is particularly important if the equipment is installed in a zone 0 location. In addition, the equipment shall only be cleaned with a damp cloth.
- The equipment loop/power port must be connected to an intrinsically safe barrier with $U_o \geq 11V$.
- Entity parameters must meet the following requirements:
  U_i: 30 V; I_i: 175 mA; C_i: 0 µF; L_i: 0 µH; P_i: 1.0 W
- For ATEX Certification, barrier and transmitter must be ATEX Certified with Entity Parameters and must be connected per manufacturer's instructions.

For European Community:

The PD6606/PD6608 must be installed in accordance with the Essential Health & Safety Requirements of Directive 2014/34/EU, the product certificates CML 17ATEX2015X and IECEx CML 17.0008X, and the product manual.

UL/C-UL Special Conditions for Safe Use

- Associated apparatus may be in a Division 2 or Zone location if so approved.
- Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. This is particularly important if the equipment is installed in a zone 0 location. In addition, the equipment shall only be cleaned with a damp cloth.
- The equipment shall be installed in a tool secured enclosure which provides a minimum degree of protection of IP20 for the equipment connections.
- Entity parameters must meet the following requirements:
  U_i: 30 V; I_i: 175 mA; C_i: 0 µF; L_i: 0 µH; P_i: 1.0 W

I.S. Equipment Entity Parameters	Required Relationship Between Entity Parameters	I.S. Barrier Entity Parameters
V max (or Ui)	≥	Voc or Vt (or Uo)
I max (or Ii)	≥	Isc or It (or Io)
P max, Pi	≥	Po
Ci + Ccable	≤	Ca (or Co)
Li + Lcable	≤	La (or Lo)

- **For Division 2 and Zone 2 Applications:** Division 2 and Zone 2 installations do NOT require the use of an intrinsically-safe barrier or intrinsically-safe entity parameters. Class I, Division 2, Groups A, B, C, and D T4 and Class I, Zone 2, Group IIC T4, -40C <= Ta <= +70C.
  Ratings: V = 30 V dc, I = 30 mA; Relay Ratings: 250V ac/dc 1A

For North American Community:

Installation and service of this device and/or associated apparatus (barrier) should be performed only by trained service personnel and must be installed in accordance with the manufacturer's control drawing, Article 504 of the National Electric Code (ANSI/NFPA 70) for installation in the United States, or Section 18 of the Canadian Electrical Code for installations in Canada.

⚠	WARNING! AVERTISSEMENT!	**EXPLOSION HAZARD** – Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous **RISQUE D'EXPLOSION** – NE PAS BRANCHER NI DÉBRANCHER SOUS TENSION.

Year of Construction

This information is contained within the serial number with the first four digits representing the year and month in the YYMM format.

Safety Information

<table>
<tr>
<td align="center">⚠️ !

CAUTION: Read complete instructions prior to installation and operation of the meter.</td>
<td align="center">⚡

WARNING: Risk of electric shock or personal injury.</td>
</tr>
</table>

⚡

Warning!

- *Hazardous voltages exist within enclosure. Installation and service should be performed only by trained service personnel.*
- *Service requiring replacement of internal components must be performed at the factory.*
- *Control room equipment must not use or generate more than 250 VRMS or VDC.*
- *Hazardous location installation instructions for associated apparatus (barrier) must be followed when installing this equipment.*
- *For safe installation of an ATEX approved transmitter in series with PD6626/PD6628 loop-powered meters, the hazardous location installation instructions for the transmitter, PD6626/PD6628 loop-powered meter, and associated apparatus (barrier) must be compatible.*
- *PD6626/PD6628 Series Loop-Powered meters do not add capacitance or inductance to the loop under normal or fault conditions.*
- *Substitution of components may impair hazardous location safety.*
- *Equipment contains non-metallic materials and therefore special care and consideration should be made to the performance of these materials with respect to chemicals which may be present in a hazardous environment.*

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.

PD6626 and PD6628 installation must be performed in accordance with Control Drawing LIM6600-2 in order to meet agency approval ratings.

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 below, for more details.

- Clearance: allow at least 4.0" (102 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.
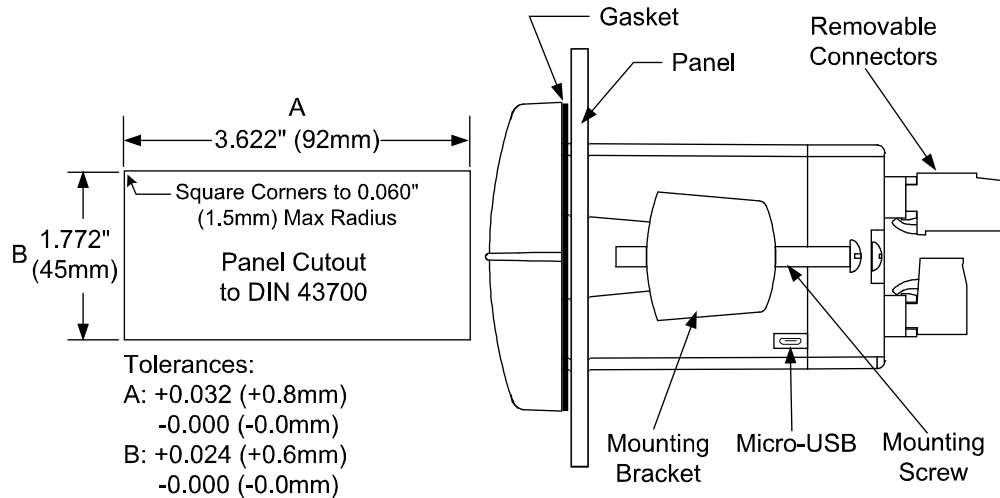
Figure 1. 1/8 DIN Panel Cutout Dimensions and Panel Mounting Details
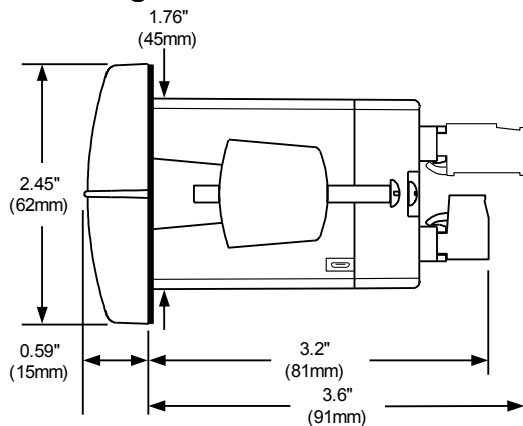
Mounting Dimensions
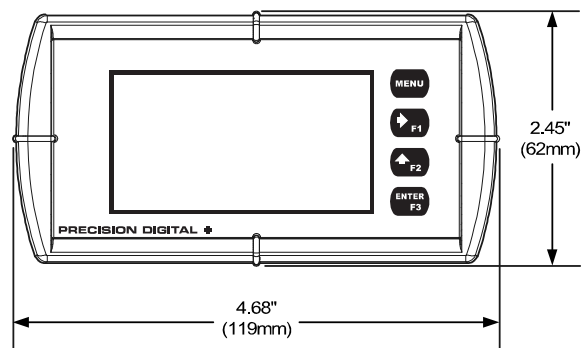
Figure 2. Meter Dimensions - Side View

Figure 3. Meter Dimensions - Front View

Connections

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

This section is only intended for PD6622 and PD6624 safe area installations.

PD6626 and PD6628 installation must be performed in accordance with Control Drawing LIM6600-2 in order to meet agency approval ratings.

> ⚠ *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.

Figure 4. Connector Labeling for Fully Loaded Meter

Safe Area Current Loop (4-20 mA) Connections

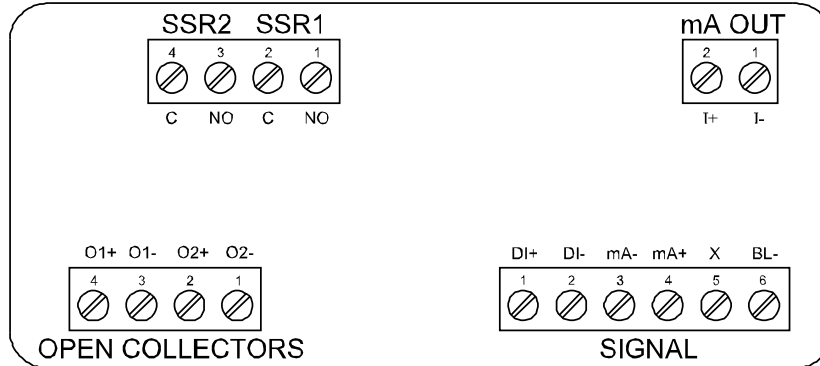Signal connections are made to a six-terminal connector labeled SIGNAL on Figure 4. The following figures show a 4-20 mA current loop connected to the meter. The first figure shows the connection without the backlight and the second shows the connection with the backlight (the backlight may also be disabled/enabled in the ＳＹＳＴＥＭ menu). The meter is powered by the 4-20 mA current loop.

There are no switches or jumpers to set up for the input. Setup and programming is performed through the front panel buttons or PC-based software.
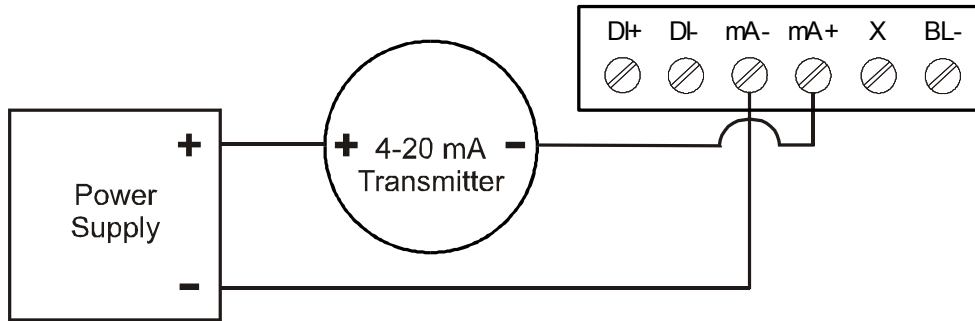
Figure 5. 4-20 mA Input Connection without Backlight
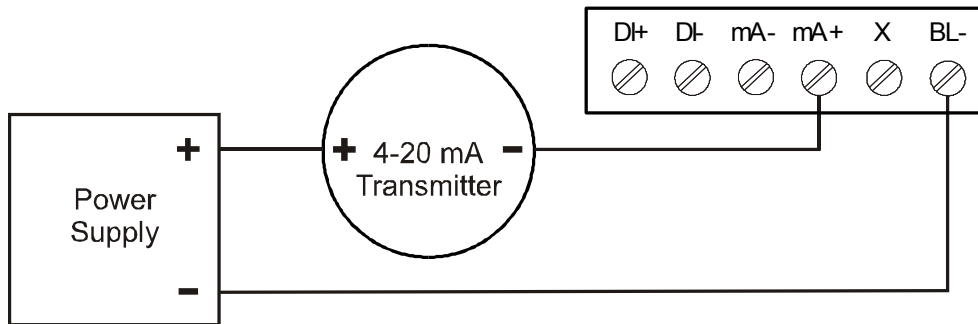
Figure 6. 4-20 mA Input Connection with Backlight

The current input is protected against current overload up to 1 amp. The display may or may not show a fault condition depending on the nature of the overload.

Safe Area Digital Input Connection

A digital input is standard on the meter. This digital input is connected with a normally open contact across DI+ and DI-, or with an active low signal applied to DI+ and DI-.
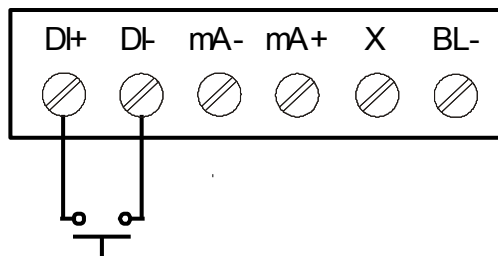
Figure 7. Digital Input Connections

Safe Area 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 must be powered from an external power supply.
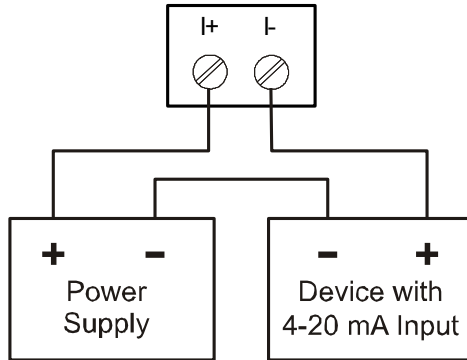
Figure 8. 4-20 mA Output Connections

Safe Area Solid State Relay Connections

Relay connections are made to a four-terminal connector labeled SSR1 and SSR2 in Figure 4. Each relay's C terminal is common only to the normally open (NO) contact of the corresponding relay.
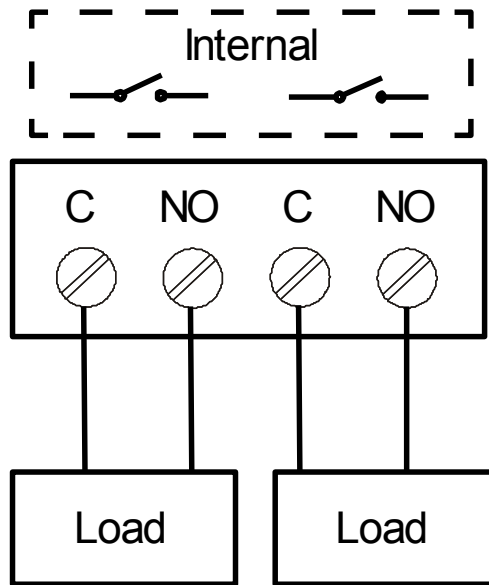
Figure 9. Solid State Relay Connections

Safe Area Open Collector Outputs

Open collector output 1 and 2 connections are made to terminals labeled O1+ and O1-, and O2+ and O2-. Connect the alarm or pulse input device as shown below.
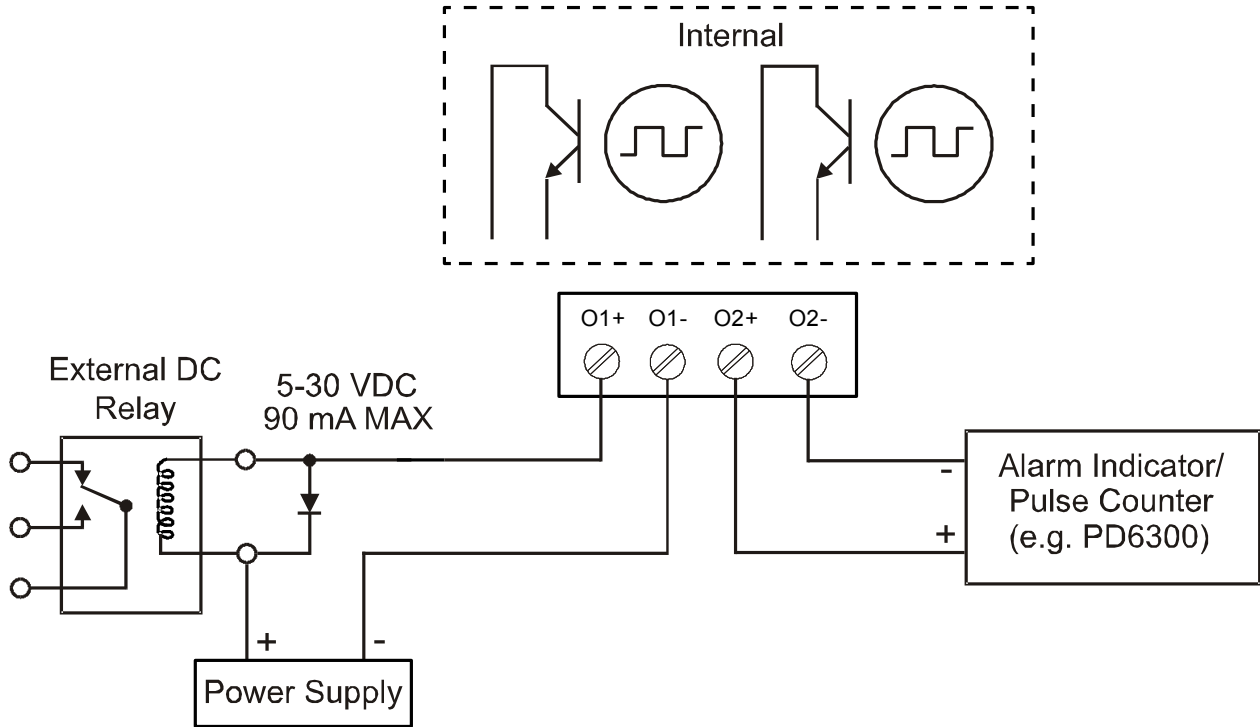
Figure 10. Open Collector Output Connections

Setup and Programming

> The meter is factory calibrated prior to shipment to display 0 to 100, which corresponds to the 4-20 mA input. The calibration equipment is traceable to NIST standards.

Overview

There are no jumpers to set; setup and programming is done through the front panel buttons or PC-based software.

The meter may be powered via the micro-USB connection located on the right side of the meter for the purposes of programming only. The backlight will not work while the meter is powered via the USB connection.

Front Panel Buttons and Status LED Indicators

PD6622/PD6626   **PD6624/PD6628**

Button Symbol	Description		LCD	Status
MENU	Menu		**!**	Alarm Indicator (PD6622 Only)
Right-Arrow/F1	Right-Arrow/F1		🔒	Password Protection Indicator (PD6622 Only)
Up-Arrow/F2	Up-Arrow/F2		**G**	Grand Total Indicator (PD6622 Only)
ENTER F3	Enter/F3		**T**	Total Indicator (PD6622 Only)

- Press the **Menu** button to enter or exit the *Programming Mode* at any time.
- Press or hold the **Right-Arrow** button to scroll forward through the menus, select digits during numeric programming, select characters during text programming, or decrement the value of a digit or character selected with the **Up-Arrow** button.
- Press and hold the **Right-Arrow** button to zero or clear digits/characters while in data-entry mode.
- Press or hold the **Up-Arrow** button to scroll backwards through the menus or to increment the value of a digit or character.
- Press the **Enter** button to access a menu or to accept a setting or programmed digit/character value.

MeterView XL Programming Software

The meter can also be programmed using PC-based MeterView XL software. This software greatly simplifies the programming process and also allows the user to save configuration files for later use.

The meter connects to the PC via a provided micro-USB cable and is powered by the USB connection, so no additional power is needed during programming.

| ⚠ CAUTION! | Care should be exercised to avoid ground loops when connecting the USB to an active loop (e.g. power supply, transmitter, loop-powered meter, etc.). It is recommended to connect the (mA+) terminal of the meter to the (-) terminal of a two-wire transmitter. |

Display Functions & 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.

Parameter	Action/Setting Description	Parameter	Action/Setting Description
INPUT	Program the meter 4-20 mA input	TOT RST	Program the open collector for total reset
SCALE RATE	Scale the rate input	STPWATCH	Program the open collector to turn on while the stopwatch is running
UNITS	Select the display units		
/SECOND	Units per second	RELAY	Program the meter's relay outputs
/MINUTE	Units per minute	OUTPUT 1	Relay 1 setup
/HOUR	Units per hour	OUTPUT2	Relay 2 setup
/DAY	Units per day	DISABLE	Disable the relay
GAL/(T)	Gallons per time unit (T)	ALARM	Program relay for alarm functionality
L/(T)	Liters per time unit (T)	SAMPLE	Program relay for sample functionality
IGAL/(T)	Imperial gallons per time unit (T)		
M3/(T)	Cubic meters per time unit (T)	TIMER	Program relay as a timer
BBL/(T)	Barrels per time unit (T)	BATCH	Program the relay for batch control functionality
BUSH/(T)	Bushels per time unit (T)		
cuYD/(T)	Cubic Yards per time unit (T)	STPWATCH	Program relay to turn on while the stopwatch is running
cuFt/(T)	Cubic Feet per time unit (T)		
cuIn/(T)	Cubic Inches per time unit (T)	INFO	View relay run time and cycle count
L.BBL/(T)	Liquid barrels per time unit (T)		
BBBL/(T)	Beer barrels per time unit (T)	4-20 mA	Program the meter's 4-20 mA output
HECtL/(T)	Hectoliter per time unit (T)		
AF/(T)	Acre-Foot per time unit (T)	RATE	Transmit a value based on the rate display
CUSTOM/(T)	Custom unit per time unit (T)		
INPUT 1	Program input 1 value	TOTAL	Transmit a value based on the total display
INP 1	Enter the input 1 value		
DISP 1	Program display 1 value	RETRANS	Retransmit the 4-20 mA input signal
DSP 1	Enter the display 1 value		
INPUT 2	Program input 2 value (up to 32 points)	DISABLE	Disable the 4-20 mA output
		CONTROL	Program manual or automatic operation for the outputs
INP 2	Enter the input 2 value		
DISP 2	Program display 2 value (up to 32 points)	OC 1	Open collector 1
		OC2	Open collector 2
DSP 2	Enter the display 2 value	RELAY 1	Relay 1
SAVE?	Save programmed units, input, and display values	RELAY2	Relay 2
		4-20 mA	4-20 mA output
OUTPUT	Program the meter's available outputs	AUTO	Set selected output to automatic operation
		MANUAL	Manually control selected output operation
OPEN COLLECTR	Program the meter's open collector outputs		
		ADVANCED	Program the meter's advanced features
OUTPUT 1	Open collector 1 setup		
OUTPUT2	Open collector 2 setup	RATE	Advanced 4-20 mA rate input programming
DISABLE	Disable the open collector		
PULSE	Program the open collector for pulse output	FUNCTION	Select linear, square root, or programmable exponent function
ALARM	Program the open collector for alarm output	LINEAR	Set meter for linear function and select number of linearization points
TIMER	Program the open collector as a timer		
		SQROOT	Set meter for square root extraction
		EXPONENT	Set meter for programmable exponent and enter exponent value

Parameter	Action/Setting Description	Parameter	Action/Setting Description
SCALECAL	Scale or calibrate the 4-20 mA input	GTOTAL	Program the grand total reset password
SCALE RATE	Scale the rate 4-20 mA input	USER	Assign function keys and digital input
CAL RATE	Calibrate the rate 4-20 mA input		
TOTAL	Advanced total programming	F1	Assign F1 function key
COUNT	Program the totalizer functionality	F2	Assign F2 function key
LIMIT	Set the number of digits used for the total	F3	Assign F3 function key
		DI	Assign digital input
8--DIGIT	Eight digits max (99,999,999)	DISP FN	Set the function key or digital input to display a value
13--DIGIT	Thirteen digits max (9,999,999,999,999) Requires top and bottom line to display entire number, total will roll over to zero when it exceeds the limit.	DISPLAY	Cycle max, min, rate, total, and grand total
		D RATE	Display the rate
INITIAL	Set the total to start at a specific number	D TOTAL	Display the total
		DISP GT	Display the grand total
RESET	Enable or disable the ability to reset the total	PCTRATE	Display the rate's percentage of max (20 mA)
ENABLE	Enable total reset (default)	D UNITS	Display the rate, total, and grand total units
DISABLE	Disable total reset		
GTOTAL	Advanced grand total programming	D TAG	Display the tags
		DISPMIN	Display the minimum rate value
COUNT	Program the totalizer functionality	DISPMAX	Display the maximum rate value
LIMIT	Set the number of digits used for the total	MIN MAX	Display the minimum and maximum rate value
8--DIGIT	Eight digits max (99,999,999)	D mA IN	Display the current mA input value
13--DIGIT	Thirteen digits max (9,999,999,999,999) Requires top and bottom line to display entire number, total will roll over to zero when it exceeds the limit.	D mAOUT	Display the current mA output value
		MENU FN	Set the function key or digital input to access a menu
INITIAL	Set the total to start at a specific number	RLYINFO	Go to relay information menu (INFO)
RESET	Enable or disable the ability to reset the grand total	MANCTRL	Go to output control menu (CON--TROL)
ENABLE	Enable grand total reset (default)	TIMR OC1	Open collector 1 timer
DISABLE	Disable grand total reset	TIMR OC2	Open collector 2 timer
PERMLOCK	Set grand total as non-resettable	TIMER R1	Relay 1 timer
CUTOFF	Set low-flow cutoff	TIMER R2	Relay 2 timer
DISABLE	Disable low-flow cutoff	TIMERFN	Set the function key or digital input to start or stop a timer
ENABLE	Enable low-flow cutoff		
FILTER	Set noise filter value	STRTALL	Start all timers
10 SEC	1 second	STOPALL	Stop all timers
20 SEC	2 seconds	SSTPALL	Start or stop all timers
40 SEC	4 seconds	OC1	Start/stop open collector 1 timer
80 SEC	8 seconds	OC2	Start/stop open collector 2 timer
160 SEC	16 seconds	RLY1	Start/stop relay 1 timer
OFF	Turn filter off	RLY2	Start/stop relay 2 timer
BYPASS	Set filter bypass (0.0 to 99.9% FS)	START	Start the selected timer output
PASSWRD	Set a password for the meter	STOP	Stop the selected timer output
MAIN	Program the main meter password	STR--STP	Start or stop the selected timer output
TOTAL	Program the total reset password	BATCHFN	Set the function key or digital input to batch control

Parameter	Action/Setting Description	Parameter	Action/Setting Description
START	Start a batch	ENABLE	Enable the backlight (default)
STOP	Stop a batch	DISABLE	Disable the backlight
STR--STP	Start or stop a batch	INFO	View meter software, version, and model, and change the meter identifier tag
PRESET	Preset batch amount		
ALARMFN	Set the function key or digital input to acknowledge an alarm or access set points	SFT	The software ID number
		VER	The software version
ACK	Acknowledge all active alarms	MODEL	The meter hardware model number
SETPOINT	Access all output set points		
SETPTOC1	Access open collector 1 set point	IDTAG	The meter identifier tag Press **Enter** to edit tag
SETPTOC2	Access open collector 2 set point		
SETPTR1	Access relay 1 set point	ICAL	Internal calibration used for scaling
SETPTR2	Access relay 2 set point	DISPLAY	Program the meter's display
SWATCHFN	Set the function key or digital input to activate stopwatch	UNITS	Change the display units within the selected unit class
START	Start the stopwatch	DECPT	Change the decimal point location
STOP	Pause/Stop the stopwatch	RATE	Program the rate decimal point
STR--STP	Start or stop the stopwatch	TOTAL	Program the total decimal point
HOLD FN	Set the function key or digital input to hold an output	GTOTAL	Program the grand total decimal point
HOLDOUT	Hold all outputs	COMMA	Enable or disable the use of a comma to separate the thousands place on the bottom display
HLDUNHLD	Hold or un-hold all outputs		
OC 1÷2	Hold/un-hold open collector outputs		
RLY 1÷2	Hold/un-hold relay outputs	ENABLE	Enable comma (default)
mAOUT	Hold/un-hold 4-20 mA output	DISABLE	Disable comma
HOLD	Hold selected output	TOP	Set what to display on the top line
HLDUNHLD	Hold or un-hold selected output	RATE	Display the rate
DISABLE	Disable the function key or digital input	RATE÷U	Display the rate and its units alternating
RST FN	Set the function key or digital input to reset a value	TOTAL	Display the total
RESET	Reset min, max, or max/min PV value	TOTAL÷U	Display the total and its units alternating
R MINMAX	Reset max and min PV value	GTOTAL	Display the grand total
RST T	Reset the total	TAG	Display the tag
RST GT	Reset the grand total	UNITS	Display the units
RST TGT	Reset the total and grand total	PRESET	Display the preset value
HINT	Display hint text on first key press and execute action on second key press	STPWATCH	Display the stopwatch
		TIMR OC1	Display open collector 1 timer
		TIMR OC2	Display open collector 2 timer
		TIMER R1	Display relay 1 timer
OFF	Turn the hint function off	TIMER R2	Display relay 2 timer
ON	Turn the hint function on	MIN	Display minimum value
SYSTEM	Program system settings	MAX	Display maximum value
ROUTCAL	Calibrate the analog output	MIN MAX	Display alternating min and max
DEFAULT	Reset meter to factory defaults	BOTTOM	Set what to display on the bottom line
TOTAL	Enable or disable the totalizer		
ENABLE	Enable the totalizer (Default)	TOTAL	Display the total
DISABLE	Disable the totalizer (see PD6602 manual)	TOTAL÷U	Display the total and its units alternating
BACKLITE	Enable or disable the display backlight	TOT÷TAG	Display the total and its tag alternating
		T÷U÷RU	Display the total, its units, and the rate units alternating

Parameter	Action/Setting Description	Parameter	Action/Setting Description
GTOTAL	Display the grand total	UNITS	Display the units
GT÷UNITS	Display the grand total and its units alternating	PRESET	Display the preset value
GT÷TAG	Display the grand total and its tag alternating	STPWATCH	Display the stopwatch
		TIMR OC1	Display open collector 1 timer
GT÷U÷RU	Display the grand total, units, and rate units alternating	TIMR OC2	Display open collector 2 timer
		TIMER R1	Display relay 1 timer
RATE	Display the rate	TIMER R2	Display relay 2 timer
RATE÷TU	Display the rate and the total's units alternating	TAG÷RU	Display the tag and rate units alternating
RATE÷U	Display the rate and its units alternating	TAG÷TU	Display the tag and total units alternating
RATE÷TAG	Display the rate and its tag alternating	OFF	Disable the bottom display
R UNITS	Display the rate units	R PCT	Display the rate's percentage of full scale
T UNITS	Display the total units	mA IN	Display the current mA input value
TAG	Display the tag	mA OUT	Display the current mA output value

Main Menu

The main menu consists of all the meter's programmable functions: *Input*, *Output, Advanced,* and *Display*.

- Press **Menu** button to enter *Programming Mode* then press the **Right-Arrow** button to move forward through the menu and the **Up-Arrow** button to move back.

- Press **Menu** at any time to go back one level or press & hold 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/F3** to confirm the setting or pressing **Enter/F3** at the 5RVE? screen when available.

Run Mode

5286
384182,

MENU

SETUP INPUT ↔ SETUP OUTPUT ↔ SETUP ADVANCED ↔ SETUP DISPLAY

ENTER F3

SCALE UNITS | OPEN COLLECTR | ADV RATE | DSPLY UNITS

SCALE INPUT 1 | OUT RELAY | ADV TOTAL | DSPLY DECPT

SCALE DISP 1 | OUT 4-20 mA | ADV GTOTAL | DSPLY COMMA

SCALE INPUT 2 | OUT CONTROL | CUTOFF | DSPLY BARGRAPH*

SCALE DISP 2 | | FILTER | DSPLY TOP

SAVE? | | PASSWRD | DSPLY BOTTOM
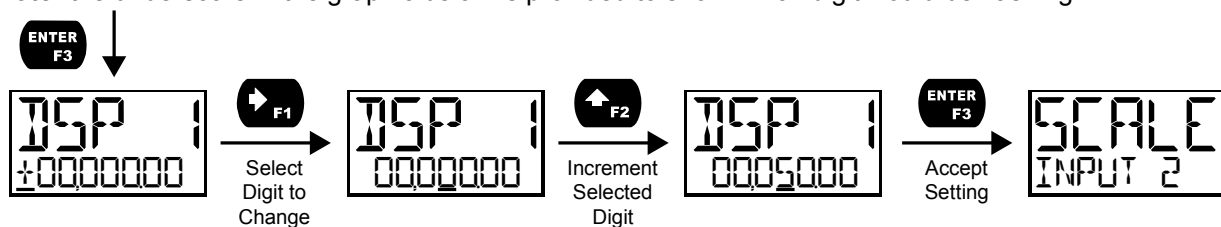
USER

SYSTEM

*PD6624/8 Only
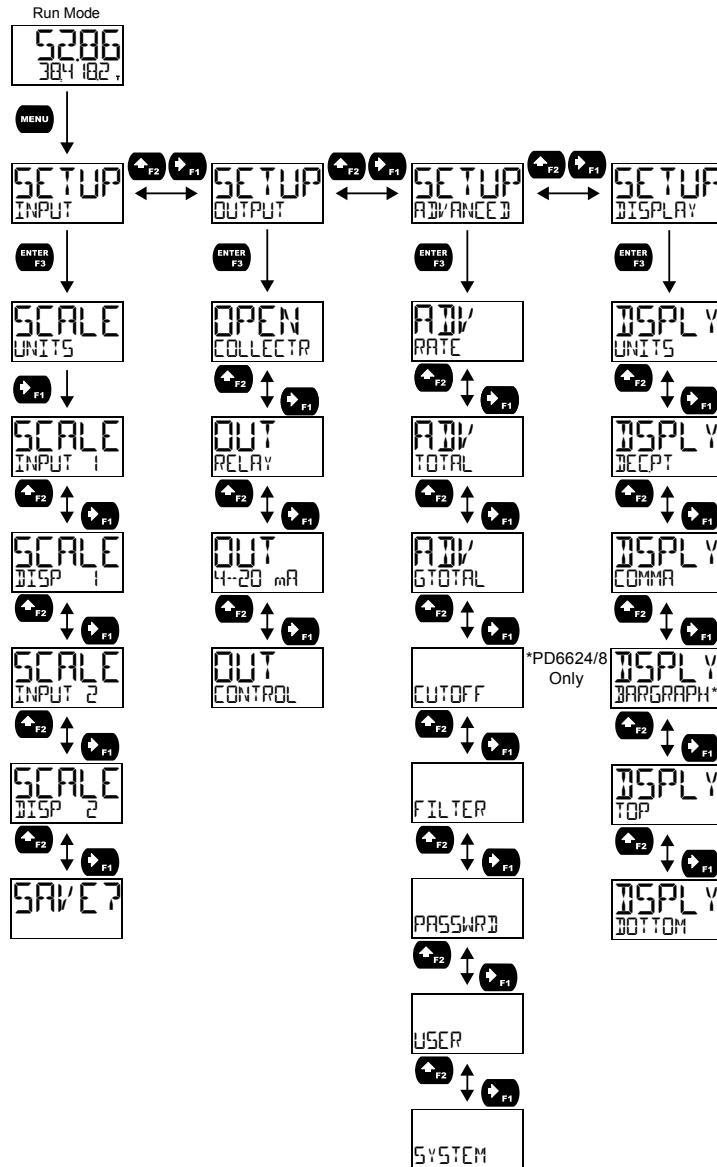
Setting Numeric Values

The numeric values are set using the **Right** and **Up-Arrow** buttons. Press **Right-Arrow** to select next digit and **Up-Arrow** to increment digit value. The selected digit will flash.

Press and hold **Up-Arrow** to auto-increment the display value. If you have made a mistake or would like to enter a new value, select the left-most digit and press and hold the **Right-Arrow** button until all digits reset to zero.

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

Note: the underscore in the graphic below is provided to show which digit would be flashing.

ENTER F3

DSP 1 +0000000 → (F1) Select Digit to Change → DSP 1 0000000 → (F2) Increment Selected Digit → DSP 1 0005000 → ENTER F3 Accept Setting → SCALE INPUT 2
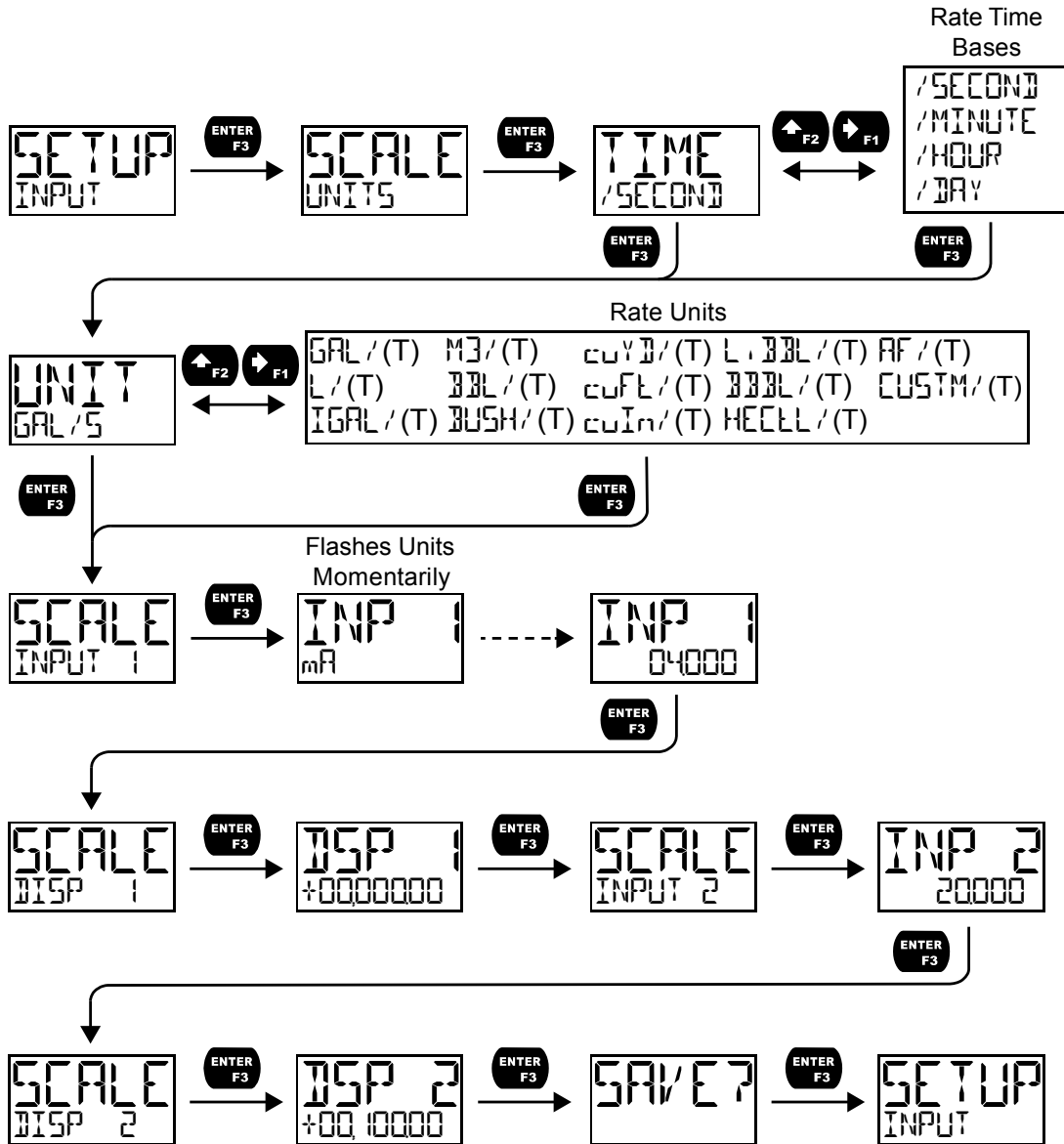
Setting Up the Input Signal (INPUT)

It is **very important** to read the following information before proceeding to program the meter:

- The meter is factory calibrated prior to shipment to display 0-100 gal/s, which corresponds to the 4-20 mA input. The calibration equipment is traceable to NIST standards.
- A calibrated signal source is not needed to scale the meter.

Enter the *Input* menu to scale the meter to display the 4-20 mA input. The input is capable of accepting any signal from 4 to 20 mA.

Rate Time Bases

/SECOND
/MINUTE
/HOUR
/DAY

SETUP INPUT → SCALE UNITS → TIME /SECOND

Rate Units

UNIT GAL/S

GAL/(T) M3/(T)   cuYD/(T) L·BBL/(T) AF/(T)
L/(T)   BBL/(T) cuFt/(T) BBBL/(T) CUSTM/(T)
IGAL/(T) BUSH/(T) cuIn/(T) HECtL/(T)

Flashes Units Momentarily

SCALE INPUT 1 → INP 1 mA ----→ INP 1 04.000

SCALE DISP 1 → DSP 1 +00.0000 → SCALE INPUT 2 → INP 2 20.000

SCALE DISP 2 → DSP 2 +00.10000 → SAVE? → SETUP INPUT

Available Unit Classes and Units

The meter has preprogrammed rate and time base units. The following are available units to choose from:

Rate Time Bases (TIME)	
/SECOND	Units per second
/MINUTE	Units per minute
/HOUR	Units per hour
/DAY	Units per day

Rate Units (RATE)	
GAL/(T)	Gallons per time unit (T)
L/(T)	Liters per time unit (T)
IGAL/(T)	Imperial gallons per time unit (T)
M3/(T)	Cubic meters per time unit (T)
BBL/(T)	Barrels per time unit (T)
BUSH/(T)	Bushels per time unit (T)
cuYD/(T)	Cubic Yards per time unit (T)
cuFt/(T)	Cubic Feet per time unit (T)
cuIn/(T)	Cubic Inches per time unit (T)
L.BBL/(T)	Liquid barrels per time unit (T)
BBBL/(T)	Beer barrels per time unit (T)
HECtL/(T)	Hectoliter per time unit (T)
AF/(T)	Acre-Foot per time unit (T)
CUSTOM/	Custom unit per time unit (T)

Note: for access to additional predefined units, you must disable the totalizer. See Disabling the Totalizer (TOTAL) on page 44.

Setting Custom Units (CUSTOM)

When the desired unit of measure is not available, a custom unit may be programmed. Select the CUSTOM menu in order to enter a custom unit name.

Text values are set using the *Right* and *Up-Arrow* buttons. Press *Right-Arrow* to select next character and *Up-Arrow* to increment character value. The selected character will flash. Press and hold the *Up* or *Right-Arrow* buttons to auto-increment or decrement the character. Press *Enter* to accept the character.
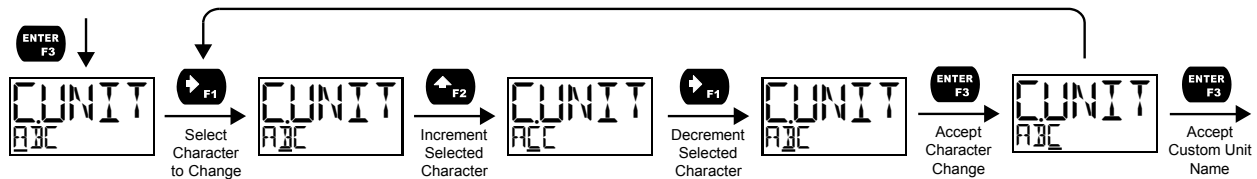
Notes:

- Press and hold the *Right Arrow* while no character is being edited to erase all characters to the right of the flashing character
- Press and hold *Up* or *Right Arrow* to auto-increment or decrement a selected character.
- All text values, including tags and alarm messages, are set in a similar fashion.

Scaling the 4-20 mA Input

The 4-20 mA input can be scaled to the appropriate values for a given application. The 4-mA input (input 1) should have a corresponding display value (display 1) which represents the low end of the process value range being measured by the transmitter. Likewise, the 20-mA input (input 2) should have a display value (display 2) which represents the high end of the process value range.

For example: If the meter is setup to accept a 4-20 mA input and display the flow of a pipe whose rate of flow is between 0 and 100 gal/s, the transmitter would send a 4-mA signal when there is zero flow and a 20-mA signal when there is maximum flow. The meter should be programmed to interpret these inputs on a display range of 0-100, so that at 4-mA the meter will display 0 and at 20-mA the meter will display 100.

Processes which require a non-linear scale can be accommodated using the linear (LINEAR), exponent (EXPONENT), and square root (SQROOT) functions available in the Advanced menu. See Signal Input Conditioning Functions (FUNCTION) on page 40.

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

Setting the Display Features (DISPLAY)

The meter's display functions may be programmed using the *Display* menu. This menu consists of the following submenus: *Units*, *Decimal Point*, *Comma*, *Bargraph* (PD6624/8 Only), *Top*, and *Bottom*.
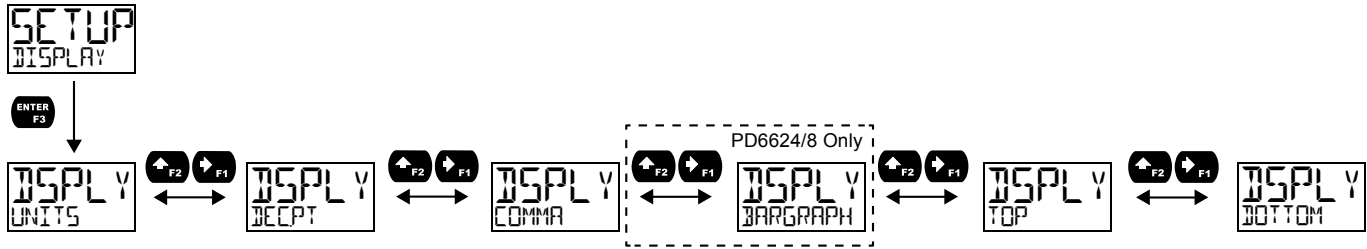

Changing the Units (UNITS)

It is possible to change the display units without the need to re-scale the meter. When selecting a new unit from within the DISPLAY menu (e.g. changing from gallons/sec. (GAL/S) to liters/sec. (L/S)), the meter will automatically convert the display values to display the new unit. Enter the UNITS menu, select a new unit of measure from the list of predefined units, and press the *Enter* button. If entering a custom unit (CUSTM), a custom conversion factor will need to be entered.

Changing the Decimal Point Location (DECPT)

The decimal point may be set with up to seven decimal places or with no decimal point at all.
Pressing the *Right Arrow* moves the decimal point one place to the right until no decimal point is displayed, and then it moves to the leftmost position. Pressing the *Up-Arrow* moves the decimal point one place to the left.
The decimal point location is set independently for the rate, total and grand total.
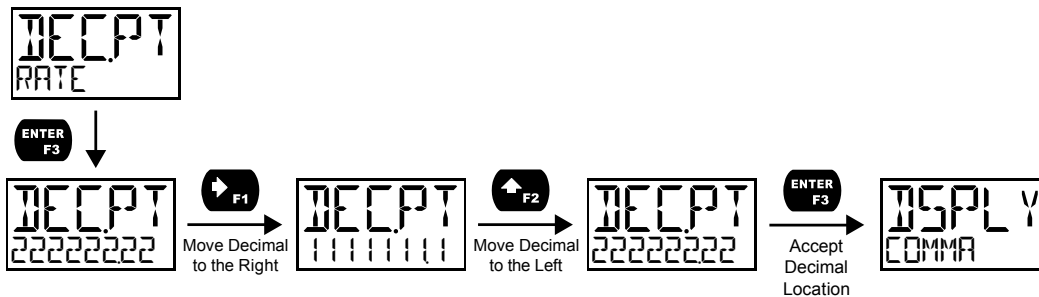
Enabling or Disabling the Comma on the Bottom Display (COMMA)

The bottom display is set to show a comma separating the thousands and millions place by default if a numeric value is being displayed. This feature can be disabled or enabled using the *Comma* menu.
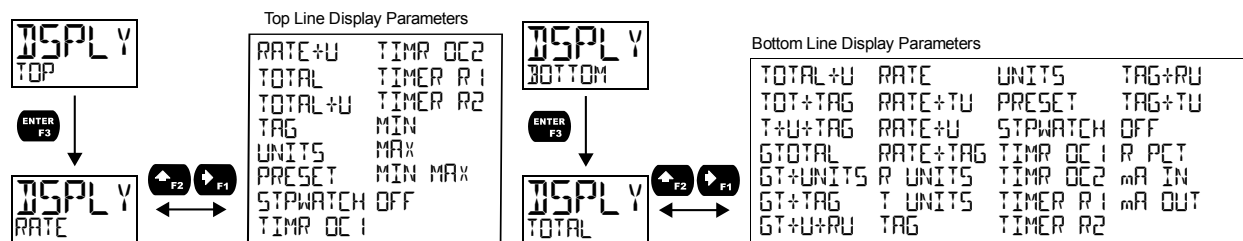
Programming the Bargraph (PD6624 & PD6628 Only)

The PD6624 and PD6628 come equipped with a bargraph display for applications where a visual representation of the rate or total's percentage of full scale is desirable. This feature can be changed to represent either rate, a percentage of the rate, or total, or disabled, using the *Bargraph* menu (BARGRAPH). If the bargraph is set to represent total, the total full scale will need to be set.

Changing What is Displayed (TOP and BOTTOM)

The two display lines (*Top* and *Bottom*) can be programmed to display different values. Use the *Top* and *Bottom* menus to make these changes. If PV2 is enabled, additional options will be available for displaying the second PV on the bottom display.

Top Line Display Parameters

RATE÷U	TIMR OC2
TOTAL	TIMER R1
TOTAL÷U	TIMER R2
TAG	MIN
UNITS	MAX
PRESET	MIN MAX
STPWATCH OFF	
TIMR OC1	

Bottom Line Display Parameters

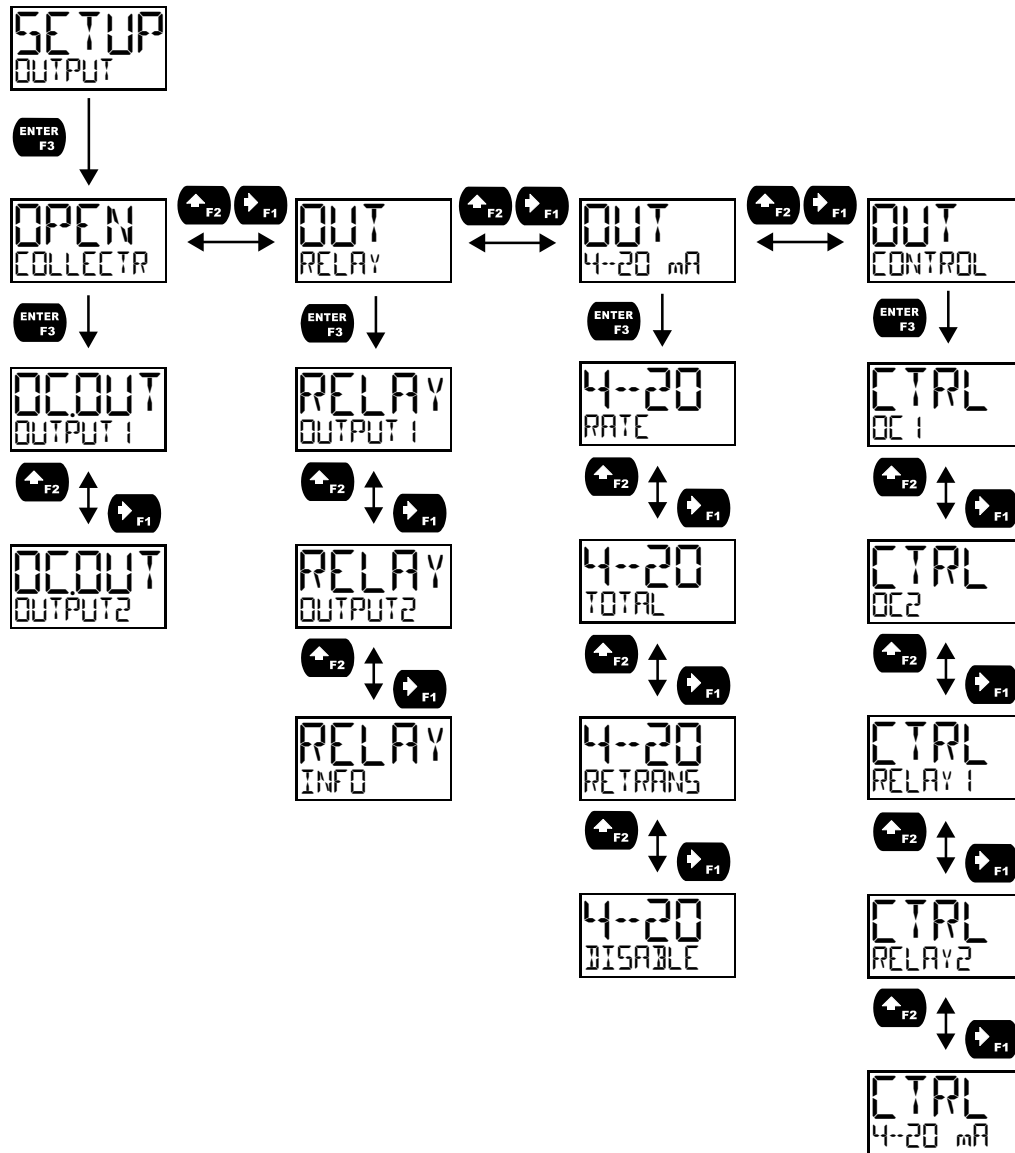| TOTAL÷U	RATE	UNITS	TAG÷RU
TOT÷TAG	RATE÷TU	PRESET	TAG÷TU
T÷U÷TAG	RATE÷U	STPWATCH	OFF
GTOTAL	RATE÷TAG	TIMR OC1	R PCT
GT÷UNITS	R UNITS	TIMR OC2	mA IN
GT÷TAG	T UNITS	TIMER R1	mA OUT
GT÷U÷RU	TAG	TIMER R2	

The top display (TOP) can display:

- Rate
- Rate and its units alternating
- Total
- Total and its units alternating
- Grand Total
- Tag
- Units
- Preset batch value
- Stopwatch
- Open Collector 1 or 2 Timer
- Relay 1 or 2 Timer
- Minimum Value, Maximum Value, or Both
- Off (Blank)

The bottom display (BOTTOM) can display:

- Total (with units or tag alternating)
- Total, its units, and the rate units alternating
- Grand total (with units or tag alternating)
- Grand total, units, and rate units alternating
- Rate (with units or tag alternating)
- Rate and the total's units alternating
- Rate or total units
- Tag
- Units
- Preset batch value
- Stopwatch
- Open Collector 1 or 2 Timer
- Relay 1 or 2 Timer
- Tag and rate units alternating
- Tag and total units alternating
- Off (Blank)
- Rate's percentage of max scale
- mA input value
- mA output value

Programming the Outputs (OUTPUT)

Depending on the purchased model, the meter may be available with two open collector outputs, two solid state relays, and one 4-20 mA output. The *Output* menu will only show options for the available outputs. See Ordering Information on page 5 for details.

SETUP			
OUTPUT			

ENTER F3 ↓

OPEN COLLECTR	OUT RELAY	OUT 4-20 mA	OUT CONTROL
↓ ENTER F3	↓ ENTER F3	↓ ENTER F3	↓ ENTER F3
OC.OUT OUTPUT 1	RELAY OUTPUT 1	4-20 RATE	CTRL OC 1
↕ F2 F1	↕ F2 F1	↕ F2 F1	↕ F2 F1
OC.OUT OUTPUT2	RELAY OUTPUT2	4-20 TOTAL	CTRL OC2
	↕ F2 F1	↕ F2 F1	↕ F2 F1
	RELAY INFO	4-20 RETRANS	CTRL RELAY 1
		↕ F2 F1	↕ F2 F1
		4-20 DISABLE	CTRL RELAY2
			↕ F2 F1
			CTRL 4-20 mA

Open Collector Outputs (OPEN COLLECTR)

The meter is equipped with two NPN open collector outputs that may be set up for pulse outputs, alarms, timed pulses, total reset, or disabled.

Pulse outputs can be set to transmit the rate, total, or grand total. Output 2 may be used to generate a quadrature output based on the other open collector output. An output test mode is also selectable to generate pulses at a constant programmable frequency.

Alarms are available based on the PV value or the digital input. The alarm status will show on the display even if the output is not wired.

A timer output (TIMER) turns the open collector on and off at the specified time intervals. The timer can be set as single-shot or continuous timer.

A total reset output generates a pulse whenever the total is reset, regardless of the reset method used. The On time is programmable between 0 and 9,999 seconds.

The stopwatch output (STPWATCH) allows the open collector to be manually activated by starting the stopwatch. The stopwatch count can be displayed on the top or bottom line.

The output may be disabled by selecting DISABLE.
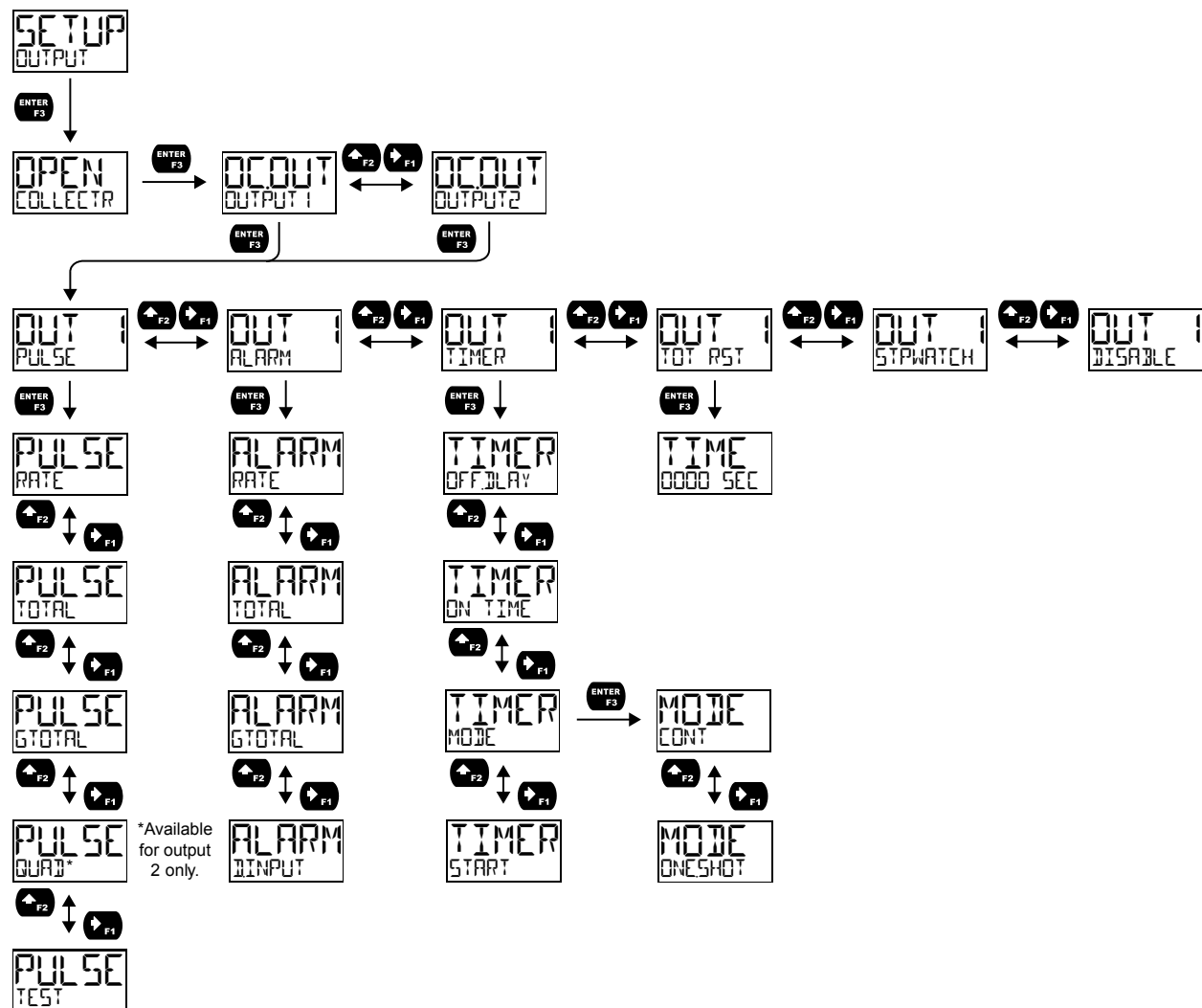
Pulse (PULSE)

Pulse outputs may be assigned to output the rate, total, or grand total at a programmable factor. If the output is assigned to rate, the factor is a multiplier that determines the number of pulses generated based on the rate. For example, if the meter display shows 100 gallons/second and the factor is set to 2, the number of pulses generated per second would be 200. If the output is assigned to total or grand total, the k-factor corresponds to the number of pulses generated per unit of measure. For example, if the k-factor is 0.001 and the units are gallons, one pulse will be generated for every 1,000 gallons. The maximum frequency is 1,000 Hz.

Setting output 2 to quadrature will duplicate the other open collector output, but lag by 90 degrees out of phase. The other output should be programmed as desired for the quadrature output function and must be a pulse (PULSE) output selection. The quadrature maximum frequency for both outputs is 500 Hz.

The TEST option will output a fixed number of pulses per second based on the FREQ value entered.
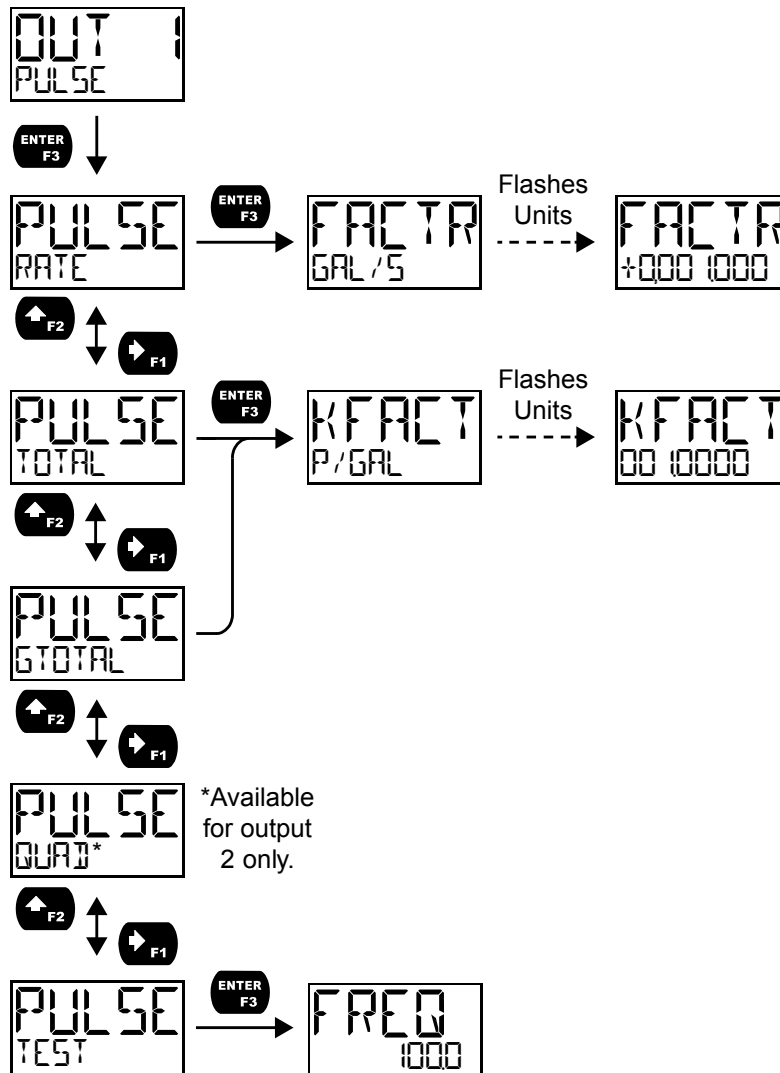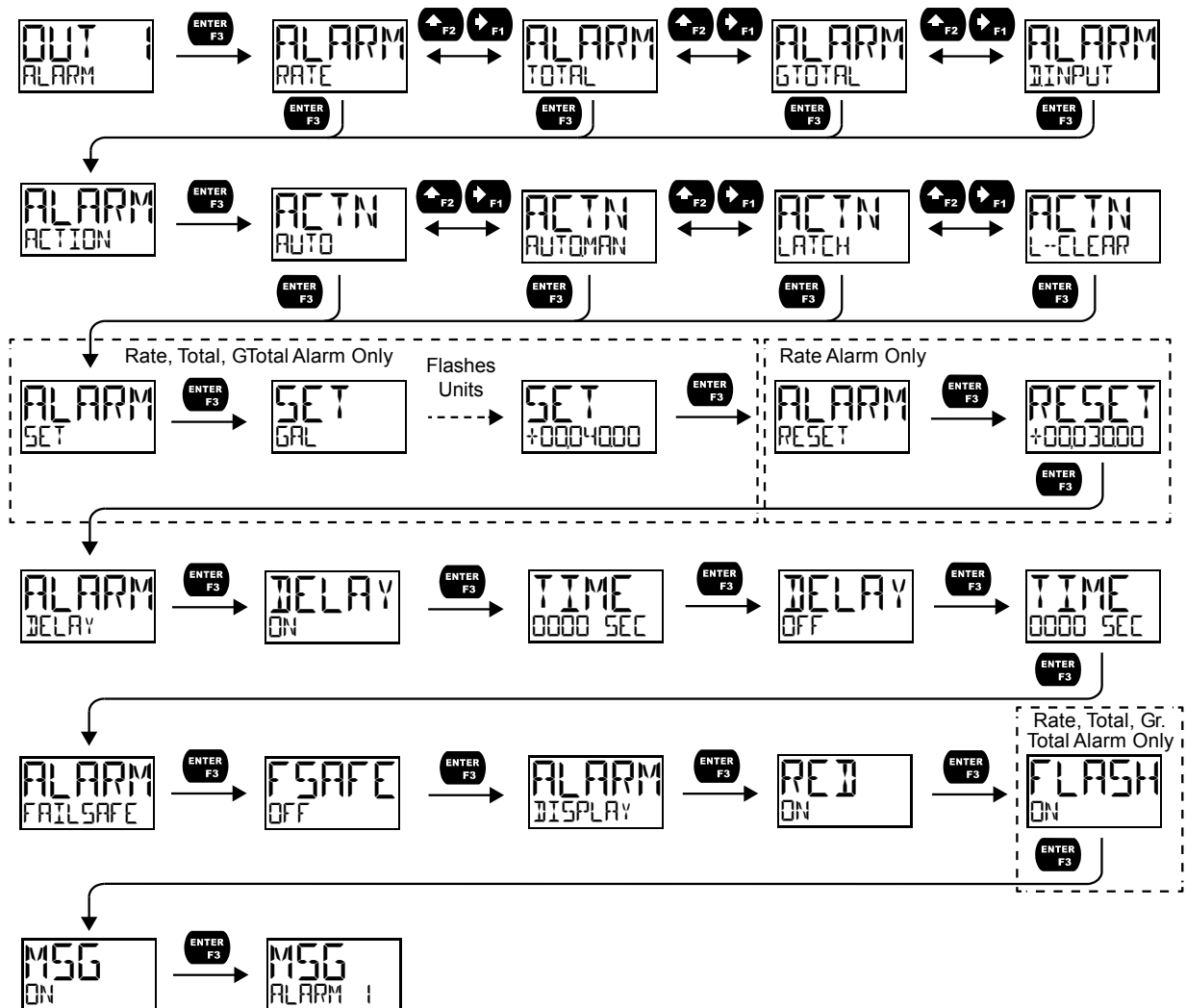
Alarm (ALARM)

Alarm outputs may be assigned to the rate, total, grand total, or the digital input. When assigned to the rate, the alarm may be set as either a high alarm or a low alarm. Alarm actions (AUTO, AUTOMAN, LATCH, L-CLEAR) determine how and when the alarm should be reset. They operate as follows:

- **Automatic (AUTO):** Alarm will reset automatically once the alarm condition has cleared.
- **Automatic/Manual (AUTOMAN):** Alarm will reset automatically once the alarm condition has cleared but can also be reset using the *Enter* button (or whichever function key is set to acknowledge).
- **Latching (LATCH):** Alarm will **not** reset automatically even if the alarm condition has cleared. Press the *Enter* button at any time to acknowledge the alarm.
- **Latching with Reset after Clear (L-CLEAR):** Alarm must be reset manually and can only be done so after the alarm condition has cleared. Press the *Enter* (ACK) button after the alarm condition has cleared to reset the alarm.

If the alarm is set to rate, a set and reset point must be programmed. The set point is the display value at which the alarm will turn on and the reset point is the display value at which the alarm will turn off. If the set point is lower than the reset point, the alarm will be a low alarm; if the set point is higher than the reset point, the alarm will be a high alarm. If the alarm is set to total or grand total, only a set point needs to be programmed. The digital input alarm will engage whenever the digital input is triggered.

For all alarms, a delay before the alarm is turned on or off may be set, as well as a failsafe feature which will inverse the on/off programming.

Alarm states will be displayed on the meter even if no open collector output is physically connected. The alarm indicator (!) will display as well as optional red LED backlight, flashing rate, total, or grand total value (rate, total, or grand total alarms only), and a programmable alarm message.
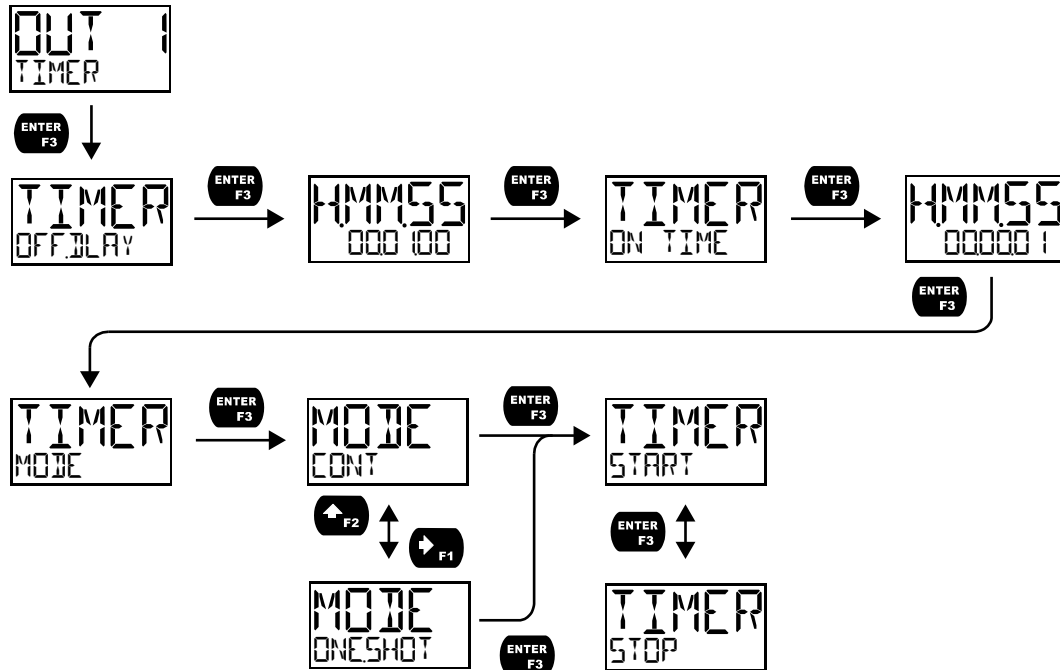
Timer (TIMER)

The timer output may be set to generate the timed pulse only once (ONESHOT) or continuously (CONT).

The timer output produces a constant width pulse at a constant frequency, if set as continuous timer. Program the *Off Delay* (OFF.DLAY) from 1 second to 99 hours 59 minutes and 59 seconds. This is the time it takes from selecting START to turning on the output and for how long the output is off in continuous mode.

Program the *On Time* (ONTIME) for the active low pulse from 1 second to 99 hours 59 minutes and 59 seconds (pulse width). This is the period of time for which the output will remain on.

Select *Start* (START) to begin outputting the constant timed pulse.

Select *Stop* (STOP) to end outputting the constant timed pulse.

Function keys or the digital input may be assigned to start and stop timer functions (see the USER menu in *Advanced*).

Stopwatch (STPWATCH)

The stopwatch function may be used to manually run and control a process for a specific time interval up to 99 hrs., 59 min, and 59 seconds. The stopwatch function may be assigned to any open collector. There are three settings needed to use the function effectively.

1. Assign stopwatch to either top or bottom display line
2. Assign the open collector or relay to control the process (on/off)
3. Assign a function key or digital input to start/stop the stopwatch

Application Example

In order to maintain consistency of a product, it is necessary to take and test samples at different times throughout the day. The stopwatch function is used to open and close a solenoid valve to know the exact amount of time needed to complete the desired sample. Once this is determined, the timer function can be used to automatically take a sample (batch) based on the time determined using the stopwatch function.

Setup: Assign the following to *Stopwatch Function*
- Bottom display line
- Relay 1
- F3: Start/Stop

Procedure
- Press F3 to start the stopwatch; relay 1 turns on and the process starts running.
- Press F3 to stop the stopwatch; relay 1 turns off and the process stops.
- The bottom display indicates the time it took to complete the sample.

Solid State Relay Outputs (RELAY)

The meter is optionally equipped with two solid state relays that may be set up for alarms, sample, timer, or batch control. Alternatively, they may be disabled.

Alarms are available based on the rate, total, or grand total value, or the digital input. The alarm status will show on the display even if the output is not wired.

Sample will engage the relay for a programmed period of time when either the total or the grand total have reach a programmed amount.

A timer output (TIMER) turns the relay on and off at the specified time intervals. The timer can be set as single-shot or continuous timer.

For use in batch control applications, the meter relays may be set to batch. This will enable the batch control features of the meter.

The stopwatch output (STPWATCH) allows the relay to be manually activated by starting the stopwatch. The stopwatch count can be displayed on the top or bottom line.

The output may be disabled by selecting DISABLE.

> ⚠️ **Caution!** During setup, the relays do not follow the input and they will remain in the state found prior to entering the Relay menu.
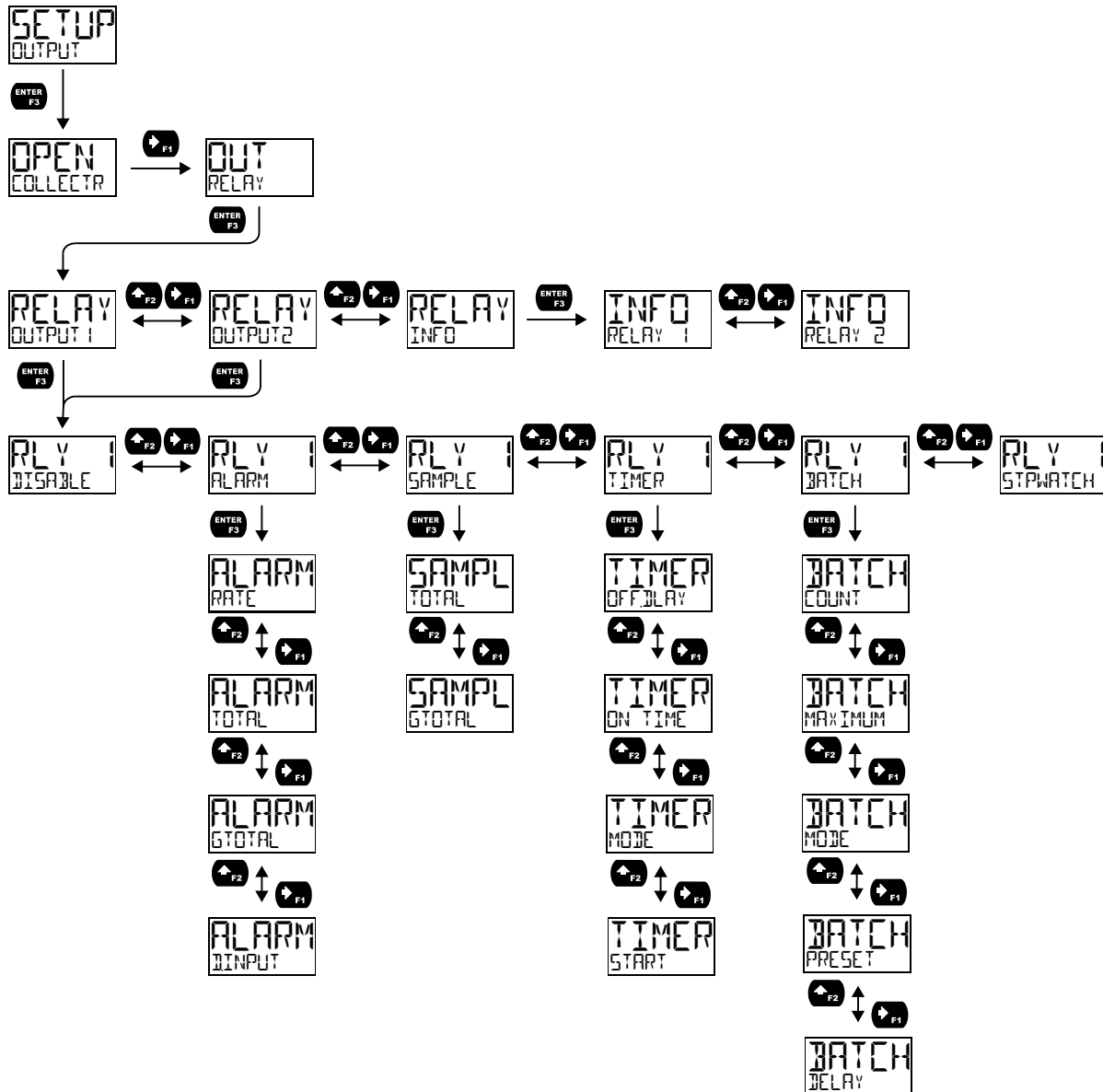
Alarm (ALARM)

Alarm outputs may be assigned to the rate, total, or grand total values, or the digital input. When assigned to the rate, the alarm may be set as either a high alarm or a low alarm. Alarm actions (AUTO, AUTOMAN, LATCH, L-CLEAR) determine how and when the alarm should be reset. They operate as follows:

- **Automatic (AUTO):** Alarm will reset automatically once the alarm condition has cleared.
- **Automatic/Manual (AUTOMAN):** Alarm will reset automatically once the alarm condition has cleared but can also be reset using the *Enter* button (or whichever function key is set to acknowledge).
- **Latching (LATCH):** Alarm will **not** reset automatically even if the alarm condition has cleared. Press the *Enter* button at any time to acknowledge the alarm.
- **Latching with Reset after Clear (L-CLEAR):** Alarm must be reset manually and can only be done so after the alarm condition has cleared. Press the *Enter* (ACK) button after the alarm condition has cleared to reset the alarm.

If the alarm is set to rate, a set and reset point must be programmed. The set point is the display value at which the alarm will turn on and the reset point is the display value at which the alarm will turn off. If the set point is lower than the reset point, the alarm will be a low alarm; if the set point is higher than the reset point, the alarm will be a high alarm. If the alarm is set to total or grand total, only a set point needs to be programmed. The digital input alarm will trigger whenever the digital input is triggered.

For all alarms, a delay before the alarm is turned on or off may be set, as well as a failsafe feature which will inverse the on/off programming.
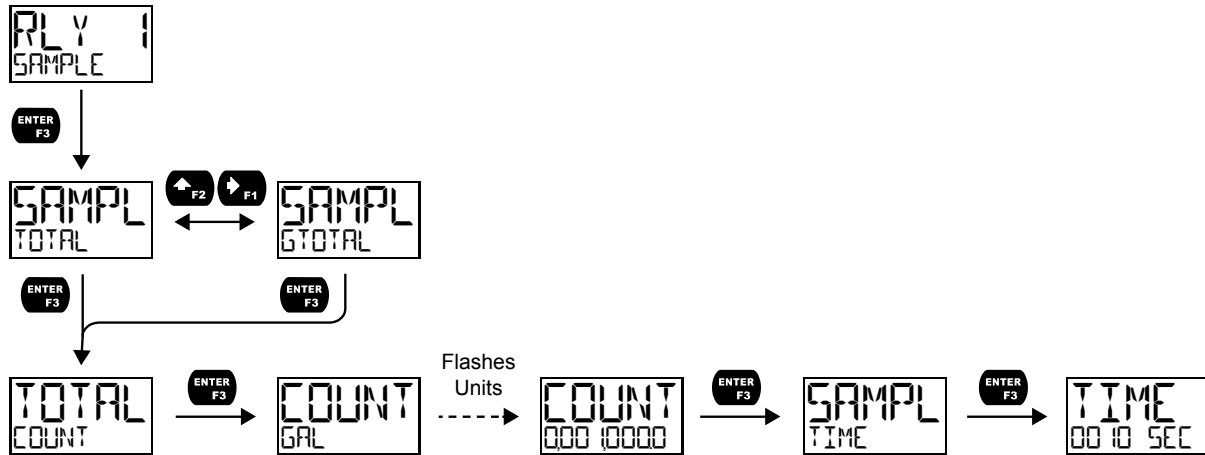
Alarm states will be displayed on the meter even if no relay output is physically connected. The alarm indicator (!) will display as well as optional red LED backlight, flashing rate, total, or grand total value (rate, total, or grand total alarms only), and a programmable alarm message.
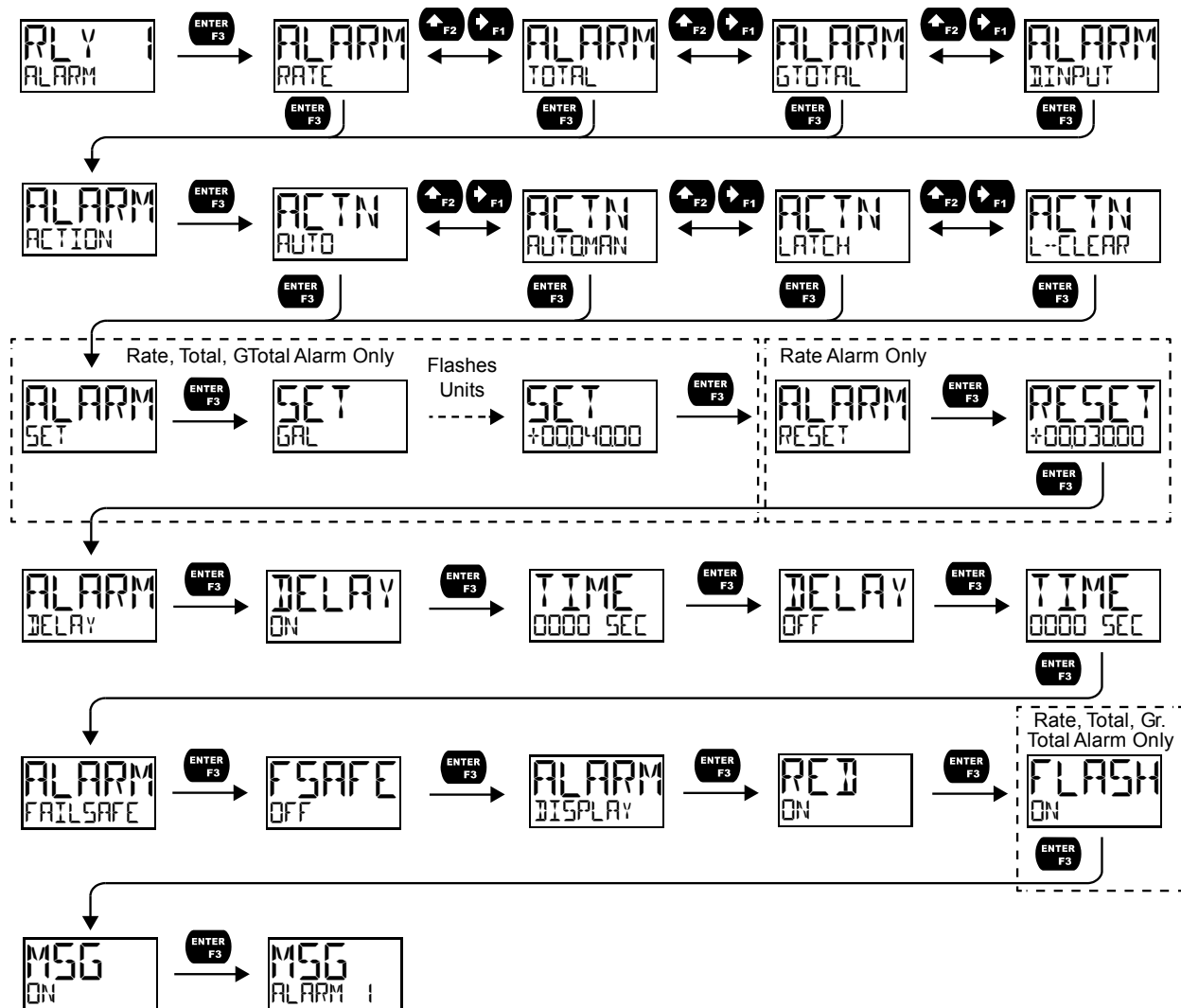
Sample (SAMPLE)

A relay set to sample will trigger when the total or grand total value has incremented by a programmed amount. The relay can be programmed to stay on for a specified amount of time.

For example: if a relay is set to sample the total with a COUNT of 1,000 and a TIME of 10 seconds, the relay will engage for 10 seconds whenever the total has incremented by 1,000 (e.g. 1000, 2000, 3000).

RLY 1 SAMPLE

SAMPL TOTAL ⟷ SAMPL GTOTAL

Flashes Units

TOTAL COUNT → COUNT GAL ⟶ COUNT 0.00 10000 → SAMPL TIME → TIME 00 10 SEC

Timer (TIMER)

The timer output may be set to generate the timed pulse only once (ONESHOT) or continuously (CONT).

The timer output produces a constant width pulse at a constant frequency, if set as continuous timer.

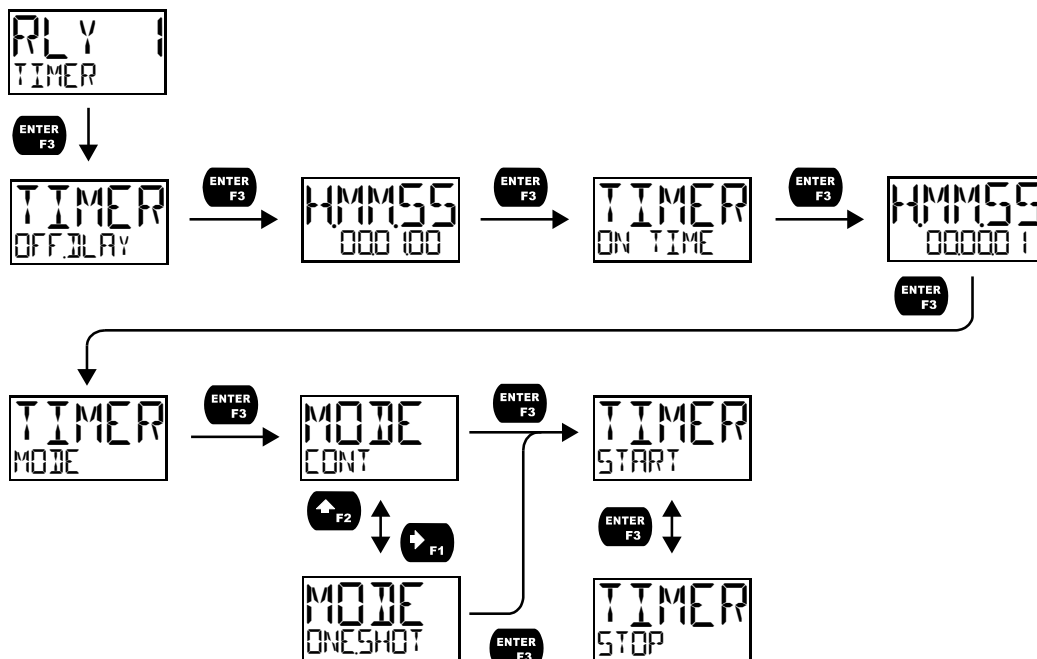Program the *Off Delay* (OFF.DLAY) from 1 second to 99 hours 59 minutes and 59 seconds. This is the time it takes from selecting START to turning on the output and for how long the output is off in continuous mode.

Program the *On Time* (ONTIME) for the active low pulse from 1 second to 99 hours 59 minutes and 59 seconds (pulse width). This is the period of time for which the output will remain on.

Select *Start* (START) to begin outputting the constant timed pulse.

Select *Stop* (STOP) to end outputting the constant timed pulse.

Function keys or the digital input may be assigned to start and stop timer functions (see the USER menu in *Advanced*).

RLY 1 TIMER

TIMER OFF.DLAY → HMMSS 000 100 → TIMER ON TIME → HMMSS 000001

TIMER MODE → MODE CONT → TIMER START

MODE ONESHOT

TIMER STOP

Batch Control (BATCH)

Selecting batch control for relay 1 will enable batching features on the meter. The top display will be changed to show the total and the bottom display will be changed to display the preset batch amount. The function keys will be changed so that F1 starts a batch, F2 opens the preset menu to allow the preset value to be changed, and F3 stops the currently running batch. Enabling batch control for relay 1 will allow access to the BATCH menu under relay 2 (this menu does not appear by default).

Batch Control Relay 1

The batch total can be set to count UP or DOWN. The batch MAXIMUM is the max preset amount that can be batched. Batching can be set to either manual or automatic operation (MANUAL or AUTO). If setting batching to automatic, a delay before the next batch is started must be programmed. The PRESET amount is the value at which the batch will stop and can be programmed up to the value assigned in the MAXIMUM menu. An on and off delay may be set for batching relays.
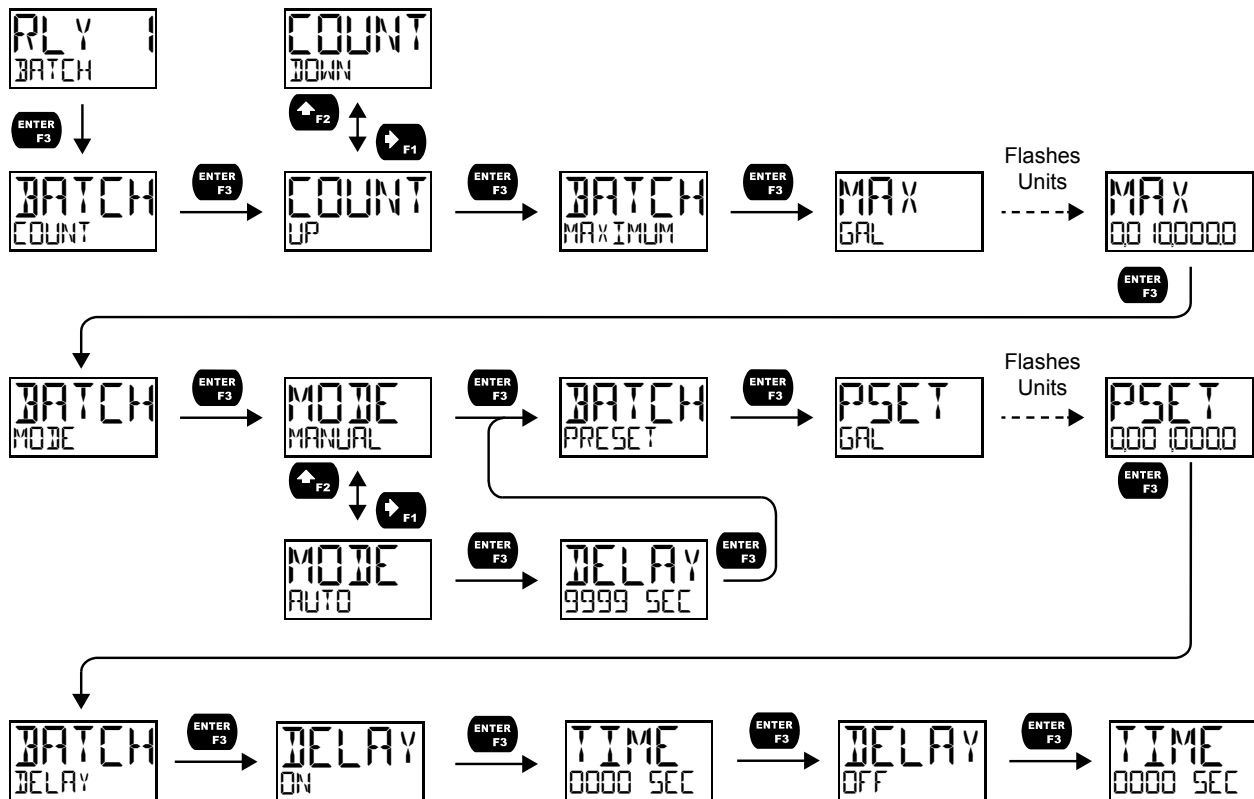
Batch Control Relay 2

The BATCH option only appears under relay 2 if relay 1 has also been set to batch control. The second relay may be programmed as a preclose relay or as another batching relay with its own preset amount.
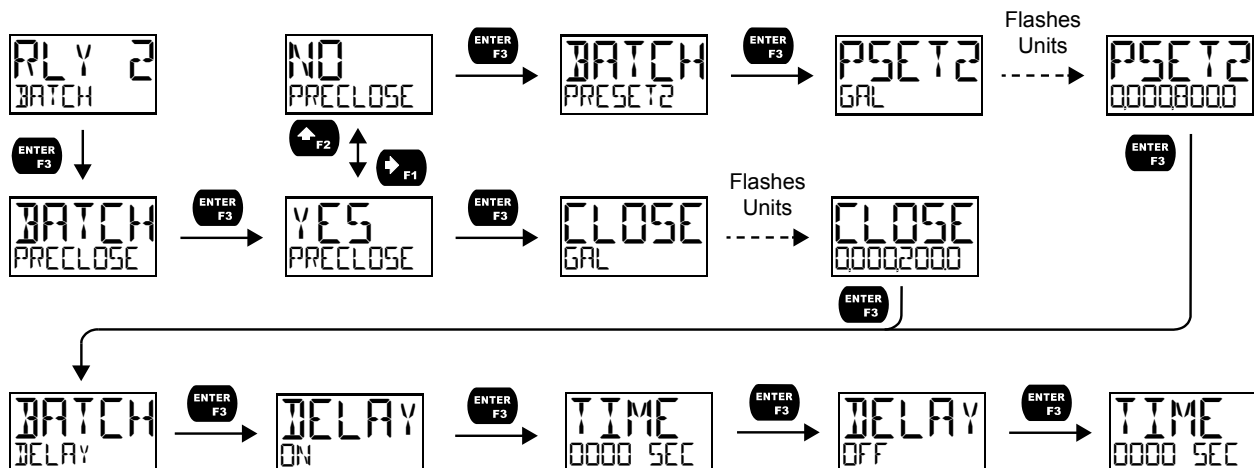
Stopwatch (STPWATCH)

The stopwatch function may be used to manually run and control a process for a specific time interval up to 99 hrs., 59 min, and 59 seconds. The stopwatch function may be assigned to any relay. There are three settings needed to use the function effectively.

1. Assign stopwatch to either top or bottom display line
2. Assign the open collector or relay to control the process (on/off)
3. Assign a function key or digital input to start/stop the stopwatch

Application Example

In order to maintain consistency of a product, it is necessary to take and test samples at different times throughout the day. The stopwatch function is used to open and close a solenoid valve to know the exact amount of time needed to complete the desired sample. Once this is determined, the timer function can be used to automatically take a sample (batch) based on the time determined using the stopwatch function.

**Setup:** Assign the following to *Stopwatch Function*
- Bottom display line
- Relay 1
- F3: Start/Stop

Procedure
- Press F3 to start the stopwatch; relay 1 turns on and the process starts running.
- Press F3 to stop the stopwatch; relay 1 turns off and the process stops.
- The bottom display indicates the time it took to complete the sample.

Relay Information (INFO)

The relay information menu shows run times and cycle counts for each relay. These values may be cleared at any time by selecting the *Clear* option (CLEAR?).
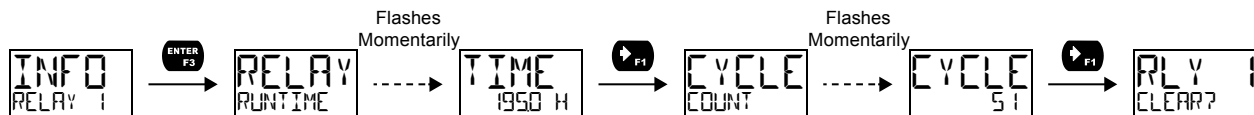
4-20 mA Output (4-20 mA)

The *4-20 mA* menu is used to scale the 4-20 mA output based on display values. This menu is not present on models without a 4-20 mA output option.

The 4-20 mA analog output (if equipped) can be scaled to provide a 4-20 mA signal for the rate or total display range or to simply retransmit the 4-20 mA input. The output may be disabled (DISABLE), and will only output the minimum signal.

Overrange and underrange values determine what mA signal the meter will output if the mA input is underrange (<3.5 mA) or overrange (>20.5 mA). This value may be set to 1-mA, 3.5-mA, 3.8-mA, 20.5-mA, 20.8-mA, 23-mA, or disabled.

No equipment is needed to scale the analog output; simply program two display values and corresponding mA output signals.
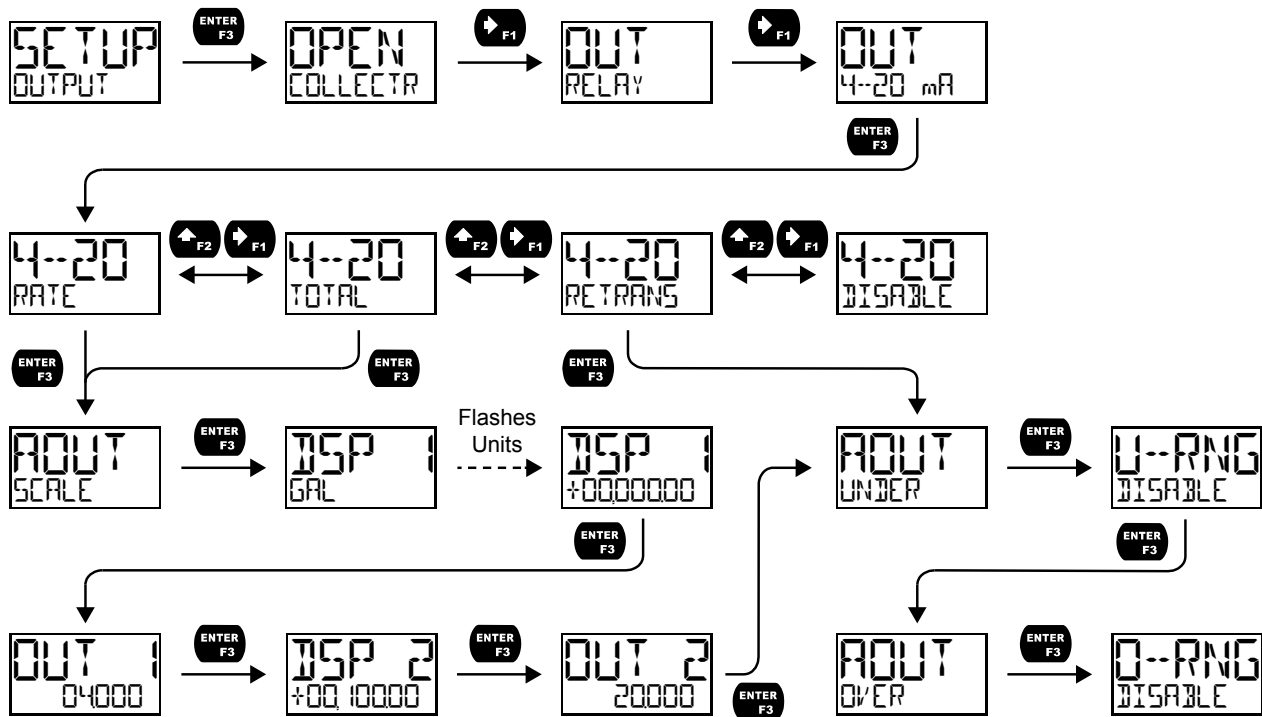
Rate or Total (RATE or TOTAL)

To scale the analog output, enter display value 1 and a corresponding analog output value for this display, then enter display value 2 and a corresponding analog output value for this display value. This will provide a linearly scaled analog output.

Retransmit (RETRANS)

This option will retransmit the 4-20 mA analog input without the need to scale the output.

Output Control (CONTROL)

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

Advanced Features Menu (ADVANCED)

To simplify the setup process, functions not needed for most applications are located in the *Advanced Features* menu. The options under advanced features include: *advanced rate, total, and grand total setup*, *cutoff*, *filter*, *password*, *function key programming*, and *system settings*.
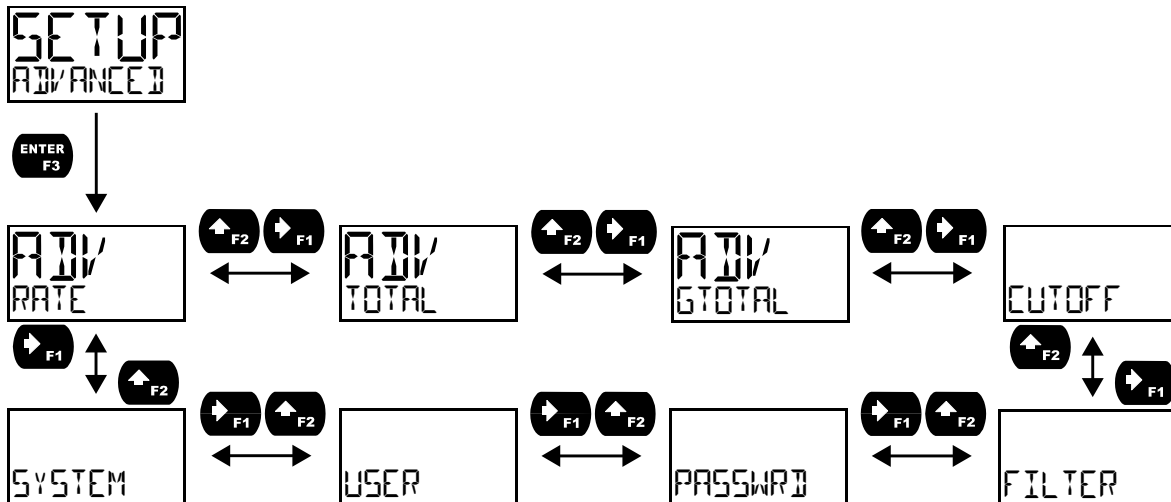
Advanced Rate, Total, and Grand Total Setup (ADV RATE, TOTAL, GTOTAL)

The *Advanced Rate* menu contains options to apply signal input conditioning functions to the input and scale/calibrate the input signal. The *Advanced Total* and *Advanced Grand Total* menus contain options to change how the value is incremented and if it can be manually reset by the user.
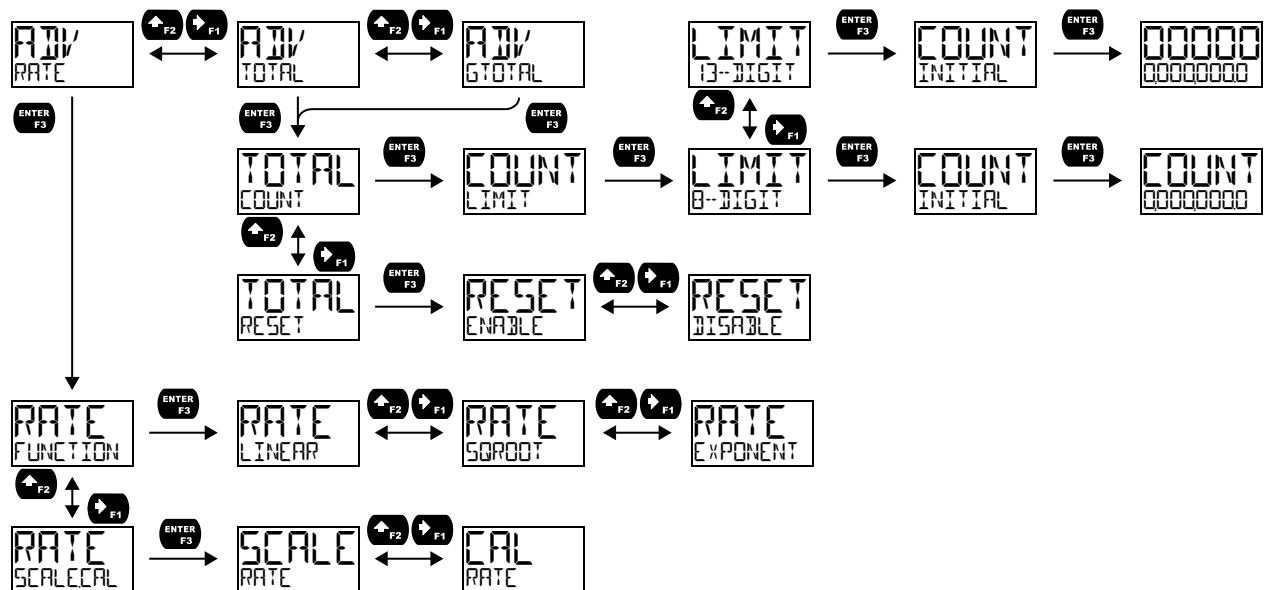
Signal Input Conditioning Functions (FUNCTION)

The *Function* menu is used to select the signal input conditioner applied to the input: linear, square root, or programmable exponent calculation. 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.

Square Root Linearization (SQROOT)

The square root function can be used to linearize the signal from a differential pressure transmitter and display flow rate in engineering units.

Programmable Exponent Linearization (EXPONENT)

The programmable exponent can be used to linearize the signal from level transmitters in open-channel flow applications using weirs and flumes.

Multi-Point Linearization (LINEAR)

Meters are set up at the factory for linear function with 2-point linearization. Up to 32 linearization points can be selected for the scaled value under the linear function. Multi-point linearization can be used to linearize the display for non-linear signals to convert level to flow using weirs and flumes with complex exponent.

Advanced Total and Grand Total Programming (ADV TOTAL & ADV GTOTAL)

The advanced total and grand total menu contain the count (COUNT) and reset (RESET) menus. The count menu allows the digit limit to be selected between 8-digit (bottom line only) and 13-digit (uses top and bottom line to display full number) and an initial value at which the total or grand total should begin counting to be set.

When using a 13-digit total or grand total, press the function key assigned to display (default: F1) to view the full amount once the value has exceeded 100,000,000 (decimal places are automatically truncated). If a 13-digit total or grand total is displayed on the bottom line and the value has exceeded eight digits, the truncated value will flash to indicate that it is not the complete value. To display 13-digit grand total, assigned the top and bottom line to grand total.

The reset menu allows the resetting of total or grand total to zero to be enabled or disabled.

Non-Resettable Grand Total

The grand total reset may be permanently disabled by selecting YES at the PERMLOCK menu after disabling grand total reset. **Use caution** when selecting the PERMLOCK feature as, once grand total reset has been permanently locked, it cannot be unlocked.

Advanced Scaling and Calibration (SCALECAL)

This menu offers options to scale or calibrate the meter.

Scaling the Input (SCALE)

The scale menu in the *Advanced* menu is the same as the scale menu in the *Input* menu. See Setting Up the Input Signal (INPUT) on page 24 for details about scaling the meter.

Calibrating the Input (CAL)

> To scale the meter without a signal source, refer to Setting Up the Input Signal (INPUT), page 24.

The meter can be calibrated to display the process in engineering units by applying the appropriate input signal and following the calibration procedure. The CAL menu should be used with a live signal coming from a 4-20 mA transmitter connected to the process being measured.

During calibration, the mA input value will be displayed as INP 1 and INP 2. Adjust the input source until the desired mA value is shown. The use of a calibrated signal source is strongly recommended.
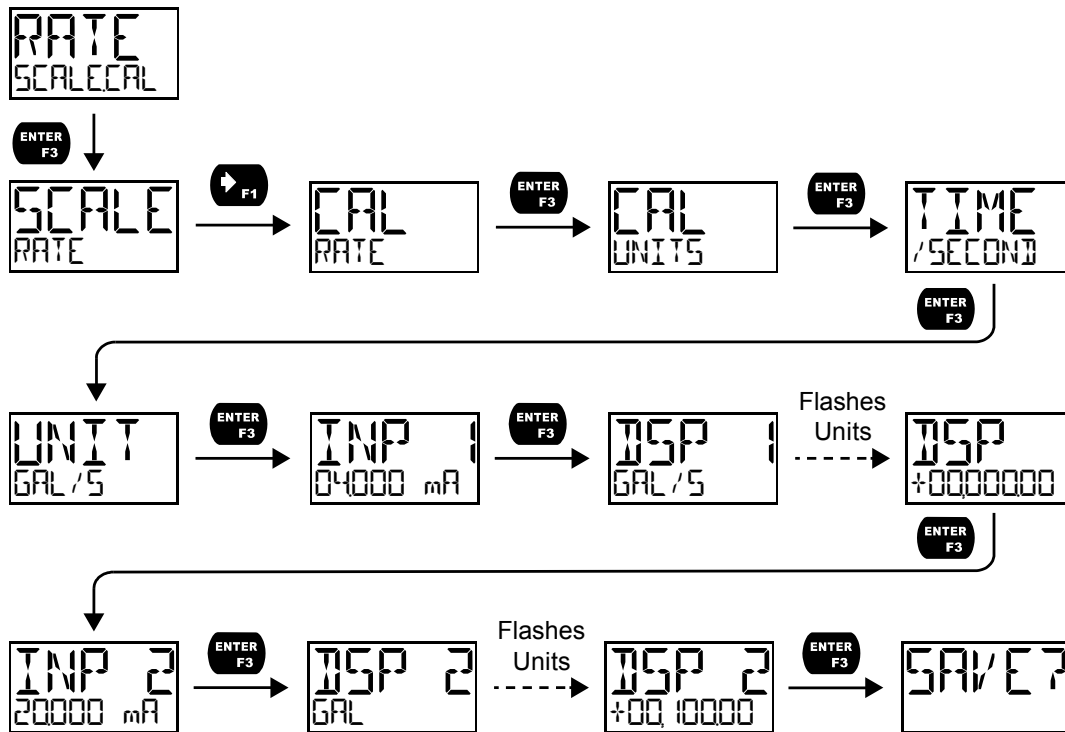
1. After accessing the SCALECAL menu, press the **Right-Arrow** button to scroll to the *Calibration* menu (CAL RATE) and press *Enter*.
2. Select the appropriate units for the desired process variable, then press **Enter**. For information on units, see Available Unit Classes and Units on page 25.
3. The meter displays INP 1. Apply a known signal and press **Enter**. The display will flash while accepting the signal.
4. After the signal is accepted, the meter displays DSP 1. Enter a corresponding display value for the signal input, and press **Enter** to accept.
5. The meter displays INP 2. Apply a known signal and press **Enter**. The display will flash while accepting the signal.
6. After the signal is accepted, the meter displays DSP 2. Enter a corresponding display value for the signal input and press **Enter** to accept.
7. After completing calibration, the SAVE? display will need to be acknowledged using the **Enter** key before calibration will take effect.

Low-Flow Cutoff (CUTOFF)

The low-flow cutoff feature allows the meter to be programmed so that the output from a flowmeter always displays zero on the meter at low flow rates.
The cutoff value may be programmed from 0 to 999999.9. The meter will display zero below the cutoff value. The cutoff may also be disabled to display negative values.

Noise Filter (FILTER)

The noise filter is available for unusually noisy signals that cause an unstable process variable display. The noise filter averages the input signal over a certain period. The filter level determines the length of time over which the signal is averaged. The filter level can be set between 1 and 16 seconds or turned off. The higher the filter level, the longer the averaging time and so the longer it takes the display to settle to its final value. Setting the filter level to off disables the filter function.

Noise Filter Bypass (BYPAS)

The noise filter bypass changes the behavior of the meter so that small variations in the signal are filtered out but large abrupt changes in the input signal are displayed immediately. The bypass value determines the minimum amount of signal change to be displayed immediately. All signal changes smaller than the bypass value are filtered or averaged by the meter. The noise filter bypass may be set between 0.0 and 99.9% of full scale.

Enabling Password Protection (PASSWRD)

The *Password* menu is used for programming security to prevent unauthorized changes to the pro-grammed parameter settings. There are three password types available: *Main*, *Total*, and *Grand Total*. The *Main* password prevents access to the meter *Programming Mode*. *Total* and *Grand Total* passwords prevent resetting of and changes to the total and grand total, respectively.
In order to set a password, enter the *Password* menu and program a five-digit password. When the *Main* password has been enabled, the lock icon will display in the lower right of the display (PD6622/26 only). For instructions on how to program numeric values see *Setting Numeric Values*, page 23.
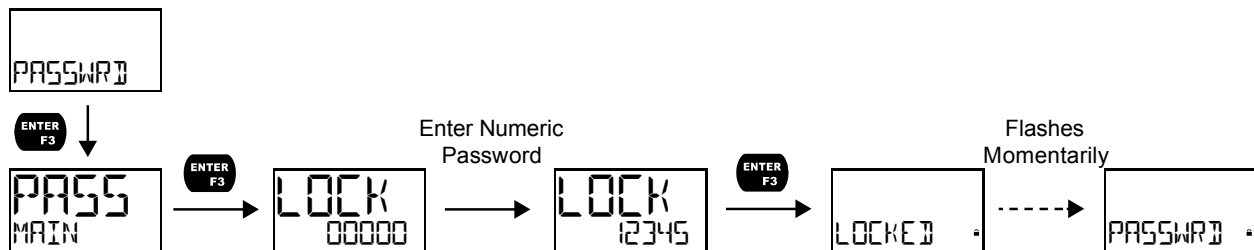
Making Changes to a Password Protected Meter

If the *Main* password is enabled, the meter will display the message LOCKED when the *Menu* button is pressed. If the *Total* or *Grand Total* passwords are enabled, the meter will display the message LOCKED when trying to reset or change the total or grand total. Press the *Enter* button while the message is being displayed and enter the correct password to gain access to the menu. After exiting *Programming Mode*, the meter returns to its password protected condition.

Disabling Password Protection

To disable the *Main, Total, or Grand Total* passwords, access the *Password* menu and clear the desired password either by pressing and holding the **Right Arrow** button until all digits reset to zero or manually changing all of the digits to zero. When the **Enter** button is pressed, the meter will display UNLOCKED and will no longer require a password to access *Programming Mode*, or a password to reset or change the total or grand total, depending on which password was cleared.

Note: If the meter is password protected and the password has been forgotten, the password may be overridden using the master password: **50865**

Programmable Function Keys User Menu (USER)

The *User* menu allows the user to assign the front panel function keys F1, F2, and F3, and the digital input (located on the signal input connector) to access some of the menus or to activate certain functions immediately (e.g. reset max & min, hold relay states, etc.). This allows the meter to be greatly customized for use in specialized applications.
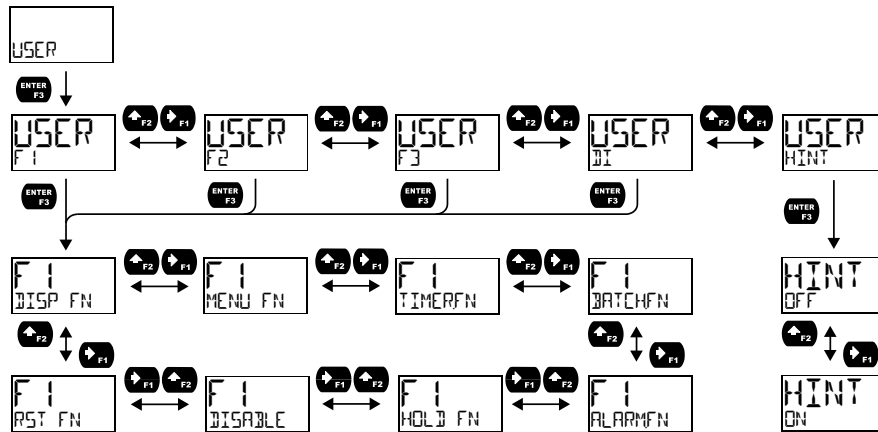
Function Keys & Digital Input Available Settings

Refer to the following table for descriptions of each available function key or digital input setting.

| Display	Description	Display	Description
DISP FN	Set the function key or digital input to display a value	BATCHFN	Set the function key or digital input to batch control
DISPLAY	Cycle max, min, rate, total, and grand total	START	Start a batch
D RATE	Display the rate	STOP	Stop a batch
D TOTAL	Display the total	STR-STP	Start or stop a batch
DISP GT	Display the grand total	PRESET	Preset batch amount
PCTRATE	Display the rate's percentage of max (20 mA)	ALARMFN	Set the function key or digital input to acknowledge an alarm
D UNITS	Display rate, total, and grand total units	ACK	Acknowledge all active alarms
D TAG	Display the tags	SETPOINT	View all output set points
DISPMIN	Display the minimum rate value	SETPTOC1	View open collector 1 set points
DISPMAX	Display the maximum rate value	SETPTOC2	View open collector 2 set points
MIN MAX	Display the minimum and maximum rate value	SETPTR1	View relay 1 set points
		SETPTR2	View relay 2 set points
D mA IN	Display the current mA input value	SWATCHFN	Set the function key or digital input to activate stopwatch
D mAOUT	Display the current mA output value		
MENU FN	Set the function key or digital input to access a menu	START	Start the stopwatch
RLY INFO	Go to relay information menu (INFO)	STOP	Pause/Stop the stopwatch
MANCTRL	Go to output control menu (CONTROL)	STR-STP	Start or stop the stopwatch
TIMR OC1	Open collector 1 timer	HOLD FN	Set the function key or digital input to hold an output
TIMR OC2	Open collector 2 timer	HOLDOUT	Hold all outputs
TIMER R1	Relay 1 timer	HLDUNHLD	Hold or un-hold all outputs
TIMER R2	Relay 2 timer	OC 1+2	Hold/un-hold open collector outputs
TIMERFN	Set the function key or digital input to start or stop a timer	RLY 1+2	Hold/un-hold relay outputs
STRTALL	Start all timers	mAOUT	Hold/un-hold 4-20 mA output
STOPALL	Stop all timers	HOLD	Hold selected output
SSTPALL	Start or stop all timers	HLDUNHLD	Hold or un-hold selected output
OC1	Start/stop open collector 1 timer	DISABLE	Disable function key or digital input
OC2	Start/stop open collector 2 timer	RST FN	Set the function key or digital input to reset a value
RLY1	Start/stop relay 1 timer	RESET	Reset min, max, or max/min PV value
RLY2	Start/stop relay 2 timer	R MINMAX	Reset max and min PV value
START	Start the selected timer output	RST T	Reset the total
STOP	Stop the selected timer output	RST GT	Reset the grand total
STR-STP	Start or stop the selected timer output	RST TGT	Reset the total and grand total

Enabling the Function Key Hint Feature (HINT)

Enabling the function key hint feature will cause a hint message to be displayed when pressing the F1, F2, or F3 function keys. This text gives a brief description of what the button is programmed to do. Pressing that function key a second time will execute that action.

The hint feature does not affect the digital input (DI) which is intended for immediate execution.

Changing System Settings (SYSTEM)

The System menu contains the following menus: *Analog Output Calibration*, *Restore Factory Defaults*, *Totalizer*, *Backlight*, *Information*, and *Internal Calibration*.
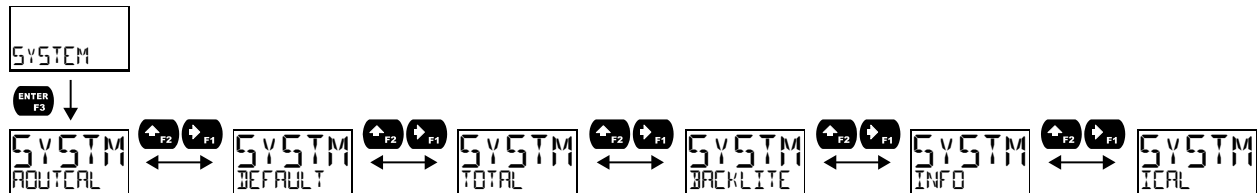

Analog Output Calibration (AOUTCAL)

To perform the analog output calibration, it is 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.

Resetting the Meter to Factory Defaults (DEFAULT)

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. To load factory defaults, enter the DEFAULT menu under the SYSTEM menu and press enter twice in quick succession. The meter will load the default settings and restart.
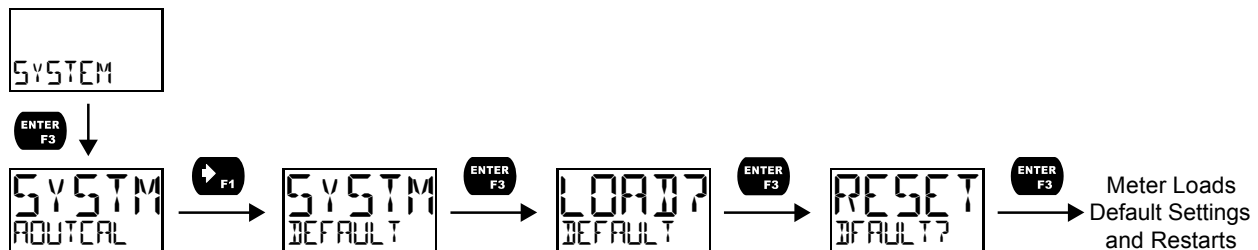
Disabling the Totalizer (TOTAL)

The totalizer can be disabled using the TOTAL menu. With the totalizer disabled, the meter will behave as a PD6602 or PD6604 process meter. Refer to the PD6602/4 instruction manual for instructions about programming a PD6602 or PD6604 process meter.

Enabling or Disabling the Backlight (BACKLITE)

The backlight may be enabled or disabled using the *Backlight* menu. The backlight is enabled by default, but the input must be wired appropriately in order for the backlight to function. See Safe Area Current Loop (4-20 mA) Connections on page 14. The voltage drop is the same if the backlight is not wired or if it is disabled in the menu.

Viewing System Information (INFO)

System information, such as software number, software version, model number, and system tag, may be viewed in the INFO menu. Press the **Right Arrow** button to cycle through all available meter information. Press **Menu** to go back to the previous menu.

### Calibrating the Internal mA Reference (ICAL)

> The meter is factory calibrated prior to shipment to display 0 to 100, which corresponds to the 4-20 mA input. The calibration equipment is traceable to NIST standards.

The use of calibrated signal sources is necessary to calibrate the internal source of the meter. The meter's internal source is what allows the user to scale the meter without applying a signal.

Check calibration of the meter at least every 12 months.

Note: Allow the meter to warm up for at least 5 minutes before performing the internal source calibration procedure.

The *Internal Calibration* menu is part of the *Advanced* menu. Internal Calibration is performed as follows:

1. Press the **Menu** button to enter *Programming Mode*.
2. Press the **Right Arrow** button **twice** and press **Enter** to access the **Advanced** menu.
3. Press the **Up-Arrow** button and press **Enter** to access the **System** menu.
4. Press the **Up-Arrow** button and press **Enter** to access the **ICAL** menu.
5. The meter displays *low* input current message (4000 mA). Apply a 4-mA signal and press **Enter**. The display flashes for a moment while the meter is accepting the low input signal.
6. After the display stops flashing, the display moves to the *high* input calibration (20000 mA). Apply the high input signal and press **Enter**. The display will flash again while the meter is accepting the high input signal.
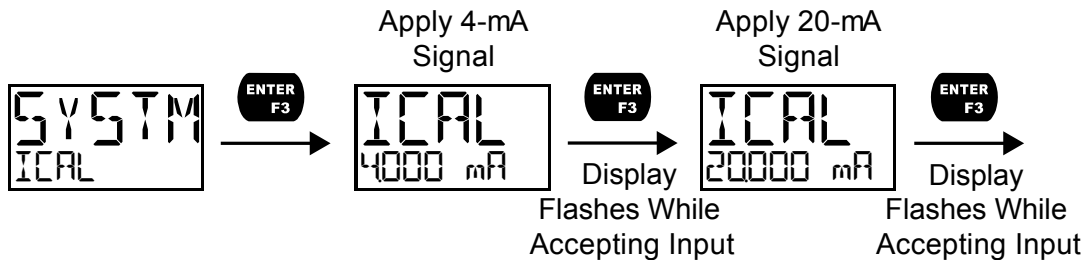
Meter Operation

The meter is capable of accepting a 4-20 mA current signal and displaying it in engineering units from -9,999 to 99,999 on the top line or from -9,999,999 to 99,999,999 on the bottom line. For example, a 4-20 mA signal could be displayed as -50.00 to 50.00.

The dual-line display can be customized by the user to operate in such a way as to satisfy a specific application. Typically, the top line is used for the rate variable while the bottom line is used for total, grand total, engineering units, or custom tag.

Front Panel Buttons Operation

Button Symbol	Description
MENU	Press to enter or exit *Programming Mode*, view settings, or exit max/min readings
F1	Press to display grand total, max/min readings, or other parameter/function assigned through the *User* menu
F2	Press to reset total, grand total, max/min readings, or other parameter/function assigned through the *User* menu
ENTER F3	Press to acknowledge alarms 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.

A hint message may be enabled in order to provide a description of what each function key does prior to executing their assigned function. See Enabling the Function Key Hint Feature (HINT) on page 44.

Digital Input Operation

A digital input is standard on the meter. This digital input is programmed identically to function keys F1, F2, and F3. The input is triggered with a contact closure between DI+ and DI-, or with an active low signal. During operation, the digital input operates according to the way it has been programmed in the *Advanced Features – User* menu.

Maximum/Minimum Readings

The max & min readings (peak & valley) reached by the rate variable can be displayed either continuously or momentary:

1. Display briefly by pressing the F1 key (default) or assigning to any of the other function keys or to the digital input in the *User* menu.
2. Display continuously by pressing the *Enter* button while the max/min is being displayed to lock the display. Press *Enter* again to unlock.

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

Changing Engineering Units

It is possible to change the display units without the need to re-scale the meter. The UNITS menu within the DISPLAY menu allows the unit of measure to be changed (e.g. from gallons/second (GAL/S) to liters/second (L/S)) and the meter will automatically convert the display values to the new unit of measure. If entering a custom unit (CUSTOM), a custom conversion factor will need to be entered. See Changing the Units (UNITS) on page 26.

Troubleshooting

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 recommendations below.

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.

To load factory defaults:
1. Press the *Menu* button to enter *Programming Mode*.
2. Press the *Up-Arrow* button **twice** and press *Enter* to access the *Advanced* menu.
3. Press the *Up-Arrow* button and press *Enter* to access the *System* menu.
4. Press the *Right-Arrow* button and press *Enter* to access the *Default* menu.
5. Press *Enter* twice in quick succession. The meter will load default settings and restart.
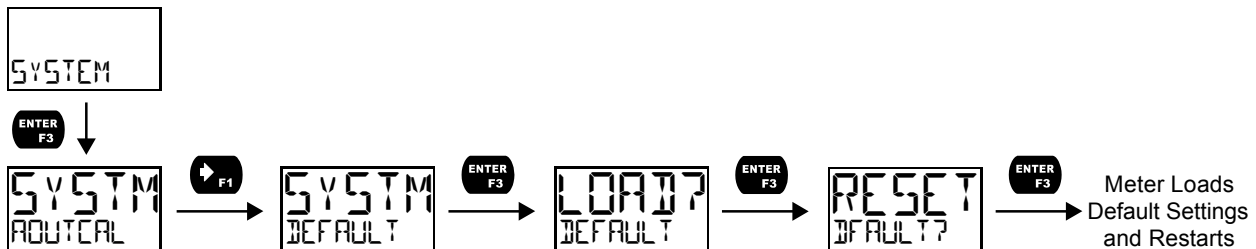
Determining Software Version

To determine the software version of a meter:
1. Press the *Menu* button to enter *Programming Mode*.
2. Press the *Up-Arrow* button **twice** and press *Enter* to access the *Advanced* menu.
3. Press the *Up-Arrow* button and press *Enter* to access the *System* menu.
4. Press the *Up-Arrow* button **twice** and press *Enter* to access the *Info* menu.
5. Press the *Right-Arrow* button to cycle through the meter information. When done, press the *Menu* button to return to the previous menu.

Factory Default Settings

The following table shows the factory setting for most of the programmable parameters on the meter.

Parameter	Display	Default Setting	Parameter	Display	Default Setting
Input Menu			Batch Count	BATCH COUNT	Up
Rate Units	UNITS	Gallons/second	Batch Max	BATCH MAXIMUM	10,000
Input 1	INP 1	4.000 mA	Batch Mode	BATCH MODE	Manual
Display 1	DSP 1	0.00	Batch Preset	BATCH PRESET	1,000
Input 2	INP 2	20.000 mA	Batch On Delay	DELAY ON	0 seconds
Display 2	DSP 2	100.00	Batch Off Delay	DELAY OFF	0 seconds
Output Menu			Timer Off Delay	OFFDLAY	1 minute
Open Collector Output 1	OUTPUT 1	Disabled	Timer On Time	ON TIME	1 second
			Timer Mode	MODE	Continuous
Pulse Factor	FACTOR	1.0	Relay Output 2	RELAY 2	Disabled
Test Frequency	FREQ	100	Set Point	SET	90.00
Alarm	ALARM	Rate	Reset Point	RESET	80.00
Alarm Action	ACTION	AUTO	Message Text	MSG EDIT	ALARM 4
Set Point	SET	20.00	4-20 mA Output	4-20 mA	Rate
Reset Point	RESET	10.00	**Advanced Menu**		
Alarm On Delay	DELAY ON	0 seconds	Signal Conditioning Function	FUNCTION	Linear (2 pts)
Alarm Off Delay	DELAY OFF	0 seconds			
Alarm Failsafe	FAILSAFE	OFF	Count Limit	COUNT LIMIT	8-Digit
Red LED	RED	ON	Count Initial	COUNT INITIAL	0
Flash PV	FLASH	ON	Total Reset	TOTAL RESET	Enabled
Alarm Message	MSG	ON	GTotal Reset	GTOT RESET	Disabled
Message Text	MSG EDIT	ALARM 1	Non-Resettable Grand Total	PERMLOCK	No
Timer Off Delay	OFFDLAY	1 minute			
Timer On Time	ON TIME	1 second	Low Cutoff	CUTOFF	Enabled: 0
Timer Mode	MODE	Continuous	Filter	FILTER	2.0 seconds
Open Collector Output 2	OUTPUT 2	Disabled	Filter Bypass	BYPAS	0.4 PCT
			Main Password	MAIN	00000 (Unlocked)
Set Point	SET	40.00	Total Password	TOTAL	00000 (Unlocked)
Reset Point	RESET	30.00	GTot Password	GTOTAL	00000 (Unlocked)
Message Text	MSG EDIT	ALARM 2	Function Key 1	F1	Display
Relay Output 1	RELAY 1	Disabled	Function Key 2	F2	Reset
Alarm	ALARM	Rate	Function Key 3	F3	Acknowledge
Alarm Action	ACTION	AUTO	Digital Input	DI	Reset Total
Set Point	SET	70.00	Function Key Hint Feature	HINT	Disabled
Reset Point	RESET	60.00			
Alarm On Delay	DELAY ON	0 seconds	Totalizer	TOTAL	Enabled
Alarm Off Delay	DELAY OFF	0 seconds	Backlight	BACKLIGHT	Enabled
Alarm Failsafe	FAILSAFE	OFF	**Display Menu**		
Red LED	RED	ON	Unit of Measure	UNITS	Gallons
Flash PV	FLASH	ON	Decimal Point Location	DECPT	Rate: 2; Total: 1; Grand Total: 0
Alarm Message	MSG	ON			
Message Text	MSG EDIT	ALARM 3	Comma	COMMA	Enabled
Sample Count	TOTAL COUNT	1,000 gallons	Top Line	TOP	Rate
Sample Time	TOTAL TIME	10 seconds	Bottom Line	BOTTOM	Total

Troubleshooting Tips

Symptom	Check/Action
No display at all	1. Check that the 4-20 mA current loop is providing at least 3.5 mA to the meter. 2. Check that the voltage drop of all devices connected to the 4-20 mA current loop does not exceed the max rating of the loop power supply.
Not able to change setup or programming, LOCKED is displayed	Meter is password-protected, enter correct five-digit password to unlock.
Meter display flashes: 1. 99999 2. --9999	Check that the number of digits required for the scaled value does not exceed the maximum digits for the display line. If it does, try adjusting the decimal point location for less precision or changing the PV display to the bottom line.
Display is unstable	Check: 1. Input signal stability and value. 2. Display scaling vs. input signal. 3. Filter and bypass values (increase).
Display response is too slow	Check filter and bypass values
Display reading is not accurate	Check: 1. Signal input conditioner selected: Linear, square root, etc. 2. Scaling or calibration
Display does not respond to input changes, reading a fixed number	Check display assignment. It might be displaying max, min, or set point.
Display shows MAX, MIN, RATE, TOTAL, or GTOT and a number	Max or min display has been locked. Press **Enter** to unlock max/min display readings.
Relay operation is reversed	Check fail-safe settings in *Output* menu
Relays do not respond to signal	Check: 1. Relay action in *Output* menu 2. Set and reset points 3. Check manual control menu
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.

Note: Certain sequences of events can cause unexpected results. To solve these issues, it is best to start fresh from factory defaults and map changes ahead of time, rather than at random. See Reset Meter to Factory Defaults *on page 47 for details on resetting the meter.*

PRECISION DIGITAL ÷

EU Declaration of Conformity for PD6622 & PD6624

Issued in accordance with ISO/IEC 17050-1:2004.

We,

Precision Digital Corporation
233 South Street
Hopkinton, MA 01748 USA

as the manufacturer, declare under our sole responsibility that the product(s),

Model PD6622 and PD6624 Loop-Powered Process Meters

to which this declaration relates, is in conformity with the European Union Directives shown below:

2014/35/EU	**Low Voltage Directive**
2014/30/EU	**EMC Directive**
2011/65/EU	**RoHS Directive**

This conformity is based on compliance with the application of harmonized or applicable technical standards and, when applicable or required, a European Union notified body certification.

Standards:

EN 55011:2016
EN 60079-0:2012+A11:2013
EN 60079-11:2012
EN 61010-1:2010
EN 61326-1:2013

Product Markings: C E

Signed for and on behalf of Precision Digital Corporation:

Jeffrey Peters

Name: Jeffrey Peters
Company: Precision Digital Corporation
Title: President
Date: 02/12/2018   Document No: DoC PD6622 {021218}

PRECISION DIGITAL ÷

EU Declaration of Conformity for PD6626 & PD6628

Issued in accordance with ISO/IEC 17050-1:2004 and ATEX Directive 2014/34/EU.

We,

Precision Digital Corporation
233 South Street
Hopkinton, MA 01748 USA

as the manufacturer, declare under our sole responsibility that the product(s),

Model PD6626 and PD6628 Loop Powered Rate/Totalizer

to which this declaration relates, is in conformity with the European Union Directives shown below:

2014/35/EU	**Low Voltage Directive**
2014/34/EU	**ATEX Directive**
2014/30/EU	**EMC Directive**
2011/65/EU	**RoHS Directive**

This conformity is based on compliance with the application of harmonized or applicable technical standards and, when applicable or required, a European Union notified body certification.

Standards:

EN 55011:2016
EN 60079-0:2012+A11:2013
EN 60079-11:2012
EN 61010-1:2010
EN 61326-1:2013

EC Type Examination Certificate: CML 17ATEX2015X

Product Markings: ⟨Ex⟩ II 1 G
Ex ia IIC T4 Ga
Tamb = -40°C to +70°C

ATEX Notified Body for EC Type Examination Certificate: Certification Management Limited, NB 2503
Unit 1 Newport Business Park, New Port Road,
Ellesmere Port CH65 4LZ, UK

ATEX Quality Assurance Notification No.:   SIRA 10 ATEX M462

ATEX Notified Body for Quality Assurance: Sira Certification Service, NB 0518
Unit 6, Hawarden Industrial Park
Hawarden, Deeside, CH5 3US, UK

Signed for and on behalf of Precision Digital Corporation:

Jeffrey Peters

Name: Jeffrey Peters
Company: Precision Digital Corporation
Title: President
Date: 02/12/2018   Document No: DoC PD6626 {021218}

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