PD6701 Field-Mount Loop-Powered Feet & Inches Level Meter

Instruction Manual

vantageview

SAFE TOUCH™

- NEMA 4X, IP66 Loop-Powered Field-Mount Feet & Inches Level Meter
- 4-20 mA Input with ±0.03% Accuracy
- 3.0 Volt Drop (6.0 Volt Drop with Backlight)
- Easy Field Scaling in Engineering Units without Applying an Input
- 0.6" (15.2 mm) Feet & Inches Upper Display With 1/8 or 1/16 Resolution
- 0.4" (10.2 mm) 7 Alphanumeric Characters Lower Display for Tag, Volume, or Percent
- Display Level in Feet & Inches and Volume, Percent or Decimal Height Simultaneously
- Display Mountable at 0°, 90°, 180°, & 270°
- SafeTouch™ Through-Window Button Programming
- 20-Segment Tank Side Level Indicator Bargraph
- Open Collector Output Assignable to High or Low Alarm
- HART® Protocol Transparent
- Loop or External DC-Powered Backlight Standard
- Operating Temperature Range: -40 to 75°C (-40 to 167°F)
- Conformal Coated PCBs for Dust and Humidity Protection
- Password Protection
- 32-Point Linearization
- Wide Viewing Angle
- Flanges for Wall or Pipe Mounting
- Plastic NEMA 4X, IP66 Enclosure
- Three 3/4" NPT Threaded Conduit Openings (Two Plugs Installed)
- 2" U-Bolt Kits Available
- Stainless Steel Tag Available
- 3-Year Warranty

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PRECISION DIGITAL

Disclaimer

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⚠ CAUTION

- Read complete instructions prior to installation and operation of the meter.

⚠ WARNINGS

- Risk of electric shock or personal injury.
- 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.
- Failure to follow installation guidelines could result in death or serious injury. Make sure only qualified personnel perform the installation.

⚠ WARNING
Cancer and Reproductive Harm - www.P65Warnings.ca.gov

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. See Warranty Information and Terms & Conditions on www.predig.com for complete details.

Introduction

The PD6701 is a rugged, field-mount, loop-powered indicator specifically designed for level applications in harsh environmental conditions. The meter displays level in easy to read and understand feet, inches, and fractions of an inch; and a 20-segment tank level indicator. The lower display can show a custom unit or tag, percent full, or a second scale for the 4-20 mA input used to indicate volume.

The meter derives all of its power from the 4-20 mA loop. It is programmed using the four SafeTouch through-window buttons, without removing the cover, and can be scaled with or without a calibration signal. The upper display will read up to 699 ft. – 11 15/16 inches. The alphanumeric volume/tag display will read up to 9,999,999. The alphanumeric display can also be programmed to show any combination of numbers and letters up to seven characters long for use as engineering units and/or the process identification tag. The backlight lets you see the display under any lighting condition and can be powered from either the 4-20 mA loop or from a separate DC power supply.

The enclosure is provided with three threaded conduit holes and integrated pipe or wall mounting slotted flanges.

Ordering Information

Model	Description
PD6701-0K1	Explosion-Proof Loop-Powered Feet & Inches Level Meter with backlight

Accessories

Model	Description
PDAPLUG75P	3/4" NPT Plastic Conduit Plug
PDA1024-01	24 VDC Power Supply for DIN Rail
PDA6846	Steel 2" U-Bolt Kit. All Material: Zinc Plated Steel; (1) U-Bolt for 2" Pipe with (2 each) Washers, Lock Washers, and Nuts.
PDA6846-SS	Stainless Steel 2" U-Bolt Kit. All Material: Stainless Steel; (1) U-Bolt for 2" Pipe with (2 each) Washers, Lock Washers, and Nuts.
PDA-SSTAG	Custom Stainless Steel Tag (see website for convenient ordering form)

Table of Contents

Table of Figures

Specifications

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

General

Display	Feet & Inches	0.60" (15.2 mm) high 0 to 699FT 11 15/16 IN 7-segment, programmable 1/16 or 1/8 fraction display
	Seven characters (Tag &/or Volume)	0.4" (10.2 mm) high 14-segment, 7-digits
	Tank Level Indicator	20-segments
Display Orientation	Display may be mounted at 90° increments up to 270° from default orientation.	
Display Assignment	Upper display: Feet & inches Lower display may be assigned to custom unit or tag, volume, volume and tag, percent height, percent height and tag, or off.	
Display Update Rate	Ambient > -25°C: 2 Updates/Second Ambient < -25°C: 1 Update/5 Seconds	
Backlight	White; Loop-powered or externally powered. Backlight can be enabled or disabled via alternative wiring of terminal block. Loop-powered backlight brightness will increase as the input signal current increases. Externally powered backlight has consistent brightness.	
Externally Powered Backlight	**Voltage Range:**	**Maximum Power**
	9-36 VDC	**9 VDC** / 0.2 W **12 VDC** / 0.25 W **24 VDC** / 0.5 W **36 VDC** / 0.75 W
Overrange And Underrange	Level display flashes to 699FT 11 15/16 IN Volume display flashes 9999999 if overrange, -9999999 if underrange.	
Programming Method	Four SafeTouch through-window buttons when cover is installed. Four internal pushbuttons when cover is removed.	
Noise Filter	Programmable low (LO), medium (MED), high (HI), or off (OFF)	
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	Programmable password restricts modification of programmed settings.	
Non-Volatile Memory	All programmed settings 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	
Environmental	Operating temperature range: -40 to 75°C Storage temperature range: -40 to 75°C Relative humidity: 0 to 90% non-condensing	
Connections	Screw terminals accept 12 to 22 AWG wire	
Enclosure	NEMA 4X, IP65 plastic field enclosure Color: grey Three ¾" NPT threaded conduit openings. Two ¾" NPT plastic conduit/stopping plug with 1.29" wrenching flats and screwdriver slot.	
Mounting	May be mounted directly to conduit. Two slotted flanges for wall mounting or NPS 1½" to 2½" or DN 40 to 65 mm pipe mounting. See *Dimensions* on page *6*.	
Overall Dimensions	5.67" x 5.25" x 4.18" (W x H x D) (144 mm x 133 mm x 106 mm)	
Weight	1.65 lbs (26.4 oz, 0.75 kg)	
Warranty	3 years parts and labor. See Warranty Information and Terms & Conditions on www.predig.com for complete details.	

Input

Input	4-20 mA	
Accuracy	±0.03% of calibrated span ±1 count	
Maximum Voltage Drop & Equivalent Resistance	**Without Backlight or with Externally Powered Backlight**	**With Loop-Powered Backlight**
	3.0 VDC @ 20 mA	6.0 VDC @ 20 mA
	150 Ω @ 20 mA	300 Ω @ 20 mA
Temperature Drift	50 PPM/°C from -40 to 75°C ambient	
Multi-Point Linearization	2 to 32 points, level and volume independently programmed.	
Minimum Span	Input 1 & Input 2: 0.10 mA	
Calibration Range	An *Error* message will appear if input 1 and input 2 signals are too close together.	
	Input Range	**Minimum Span Input 1 & Input 2**
	4-20 mA	0.10 mA
Input Overload	Over current protection to 2 A max.	
HART Transparency	The meter does not interfere with existing HART communications; it displays the 4-20 mA primary variable and it allows the HART communications to pass through without interruption. The meter is not affected if a HART communicator is connected to the loop. The meter does not display secondary HART variables.	

Open Collector Output

Rating	Isolated open collector, sinking NPN 30 VDC @ 150 mA max.
Alarm Output	Assign to level or volume for high or low alarm trip point.
Deadband	0-100% FS, user selectable
Acknowledge	Front panel ENTER button and external RESET terminals resets output and screen indication.

Safety Information

WARNINGS

- Read complete instructions prior to installation and operation of the meter.
- Installation and service should be performed only by trained service personnel. Service requiring replacement of internal components must be performed at the factory.
- If the meter is installed in a high voltage environment and a fault or installation error occurs, high voltage may be present on any lead.

Installation

Wiring connectors are accessed by opening the enclosure. To access electrical connectors, remove the 2 captive screws, then disconnect the ribbon cable from the display module and set the display module aside.

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.

Pre-Installed Conduit Plug

The PD6701 is supplied with two pre-installed conduit plugs for installations that do not require the use of all three conduit entries.

WARNING

- In hazardous areas, conduit and conduit/stopping plugs require the application of non-setting (solvent free) thread sealant. It is critical that all relevant hazardous area guidelines be followed for the installation or replacement of conduit or plugs.

Mounting

The PD6701 has two slotted mounting flanges that may be used for pipe mounting or wall mounting. Alternatively, the unit may be supported by the conduit using the conduit holes provided.

Refer to *Figure 1* and *Figure 2*.

WARNING

- Do not attempt to loosen or remove flange bolts while the meter is in service.

Dimensions

All units: inches [mm]

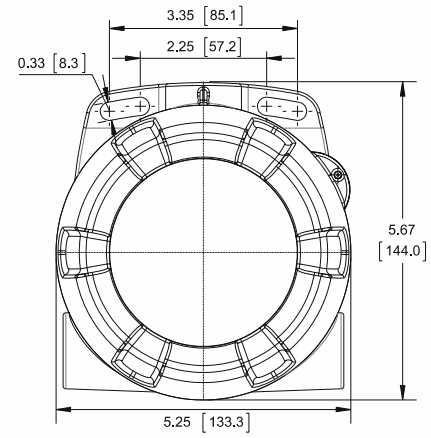


Figure 1. Enclosure Dimensions – Front View

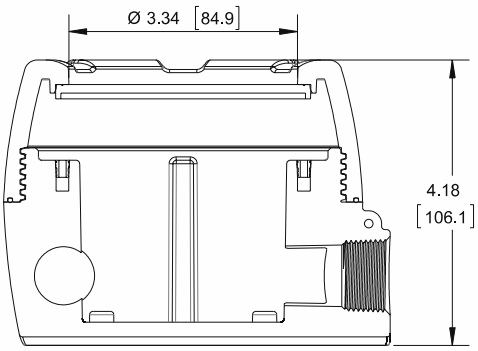


Figure 2. Enclosure Dimensions – Side Cross Section View

Connections

To access the connectors, remove the enclosure cover and unscrew the two captive screws that fasten the display module. Disconnect the ribbon cable and remove the display module. Signal connections are made to a four-terminal connector in the base of the enclosure.

SIGNAL +	4-20 mA signal input positive terminal connection
SIGNAL -	4-20 mA signal return/negative terminal connection when not using loop powered backlight.
BACKLIGHT +	+9-30 VDC when powering backlight from external supply.
BACKLIGHT -	4-20 mA signal return/negative terminal when using the installed loop powered backlight or ground/negative when powering backlight from external supply.
OUTPUT+	NPN open collector output positive.
OUTPUT-	NPN open collector output negative.
RESET +	Contact closure alarm acknowledge pull up to 3 VDC.
RESET-	Contact closure alarm acknowledge ground/negative.

Refer to *Figure 3* for terminal positions.

WARNINGS

- Observe all safety regulations. Electrical wiring should be performed in accordance with all agency requirements and applicable national, state, and local codes to prevent damage to the meter and ensure personnel safety.
- Static electricity can damage sensitive components.
- Observe safe handling precautions for static-sensitive components.
- Use proper grounding procedures/codes.
- If the meter is installed in a high voltage environment and a fault or installation error occurs, high voltage may be present on any lead or terminal.

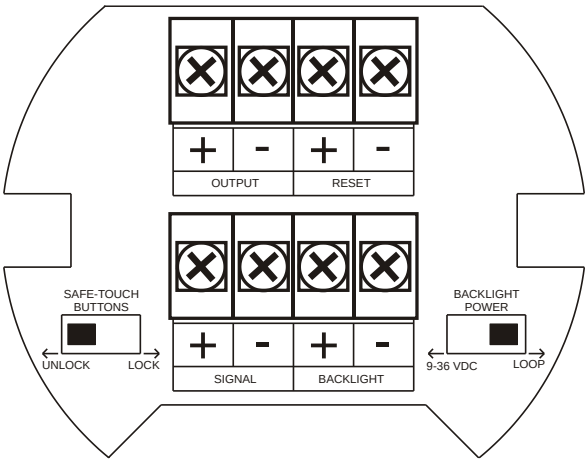


Figure 3. Connector Board

Wiring Diagrams

Signal connections are made to a four-terminal connector mounted in the base of the enclosure per *Figure 3. Connector Board.* The enclosure also provides one internal and one external earth grounding screw.

For installations that don't use the backlight, the maximum voltage drop is 3 V and connections are made per *Figure 4*.

For installations that use the backlight powered from the meter, the maximum voltage drop is 6 V and connections are made per *Figure 5*.

For installations that use the backlight powered from an external source, the maximum voltage drop is 3 V and connections are made per *Figure 6*.

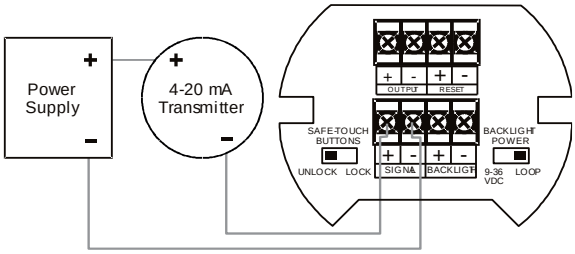


Figure 4. Connections without Backlight

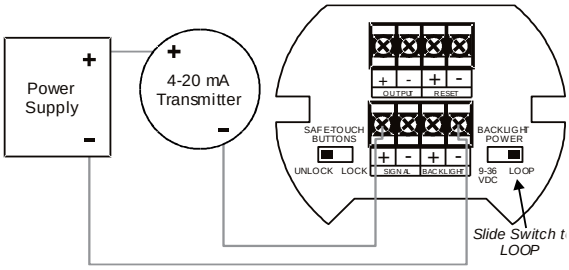


Figure 5. Connections with Loop-Powered Backlight

Loop-powered backlight brightness will increase as the input signal current increases. If constant backlight brightness is desired, the backlight should be powered by an external source.

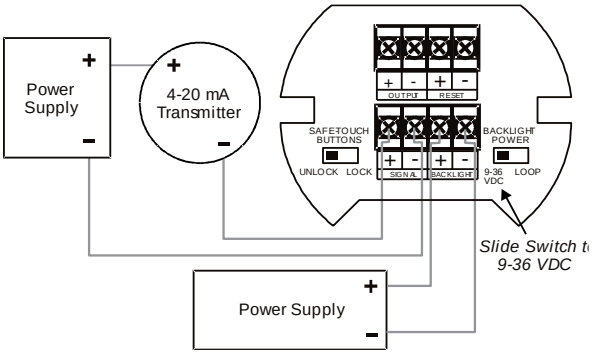


Figure 6. Connections with Externally-Powered Backlight

It is possible to use the same transmitter (signal loop) power supply for the externally powered backlight. The backlight circuit will draw 25 mA in addition to the loop circuit.

External Acknowledge Connection

External acknowledge connections are made to two terminals labeled RESET. Connect to a contact closure source such as a relay or a pushbutton as shown in *Figure 7*.

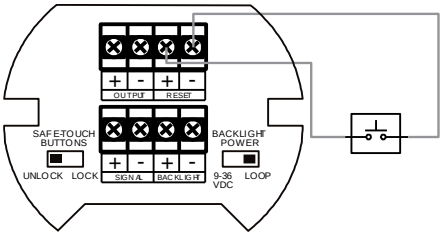


Figure 7. External Alarm Reset/Acknowledge Connections

Open Collector Output Connections

Output connections are made to two terminals labeled OUTPUT. Connect to an input device such as alarm indicator as shown in *Figure 8* or drive a relay as shown in *Figure 9*.

WARNING

- To avoid damaging the PD6701's amplifying components, use care not to wire incorrectly or exceed output ratings. A diode, such as 1N4000 series, will provide protection from relay transients.

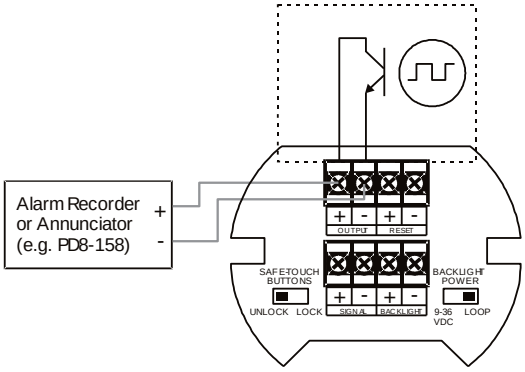


Figure 8. Connection to Device with Internal Pull-Up

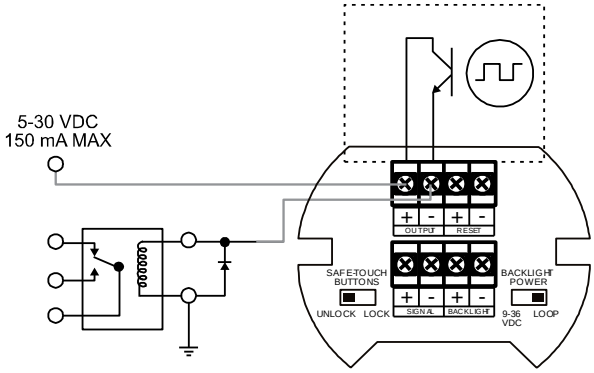


Figure 9. Output Connections

Setup and Programming

There is **no need to recalibrate** the meter for milliamps when first received from the factory.

The meter is ***factory calibrated*** for milliamps prior to shipment. The calibration equipment is traceable to NIST standards.

Overview

Setup and programming is done through the infrared through-window SafeTouch buttons or using the mechanical buttons when uncovered. There are two slide switches located on the connector board. One is used to select backlight power and the other is to lock or unlock the SafeTouch Buttons.

After all connections have been completed and verified, connect the ribbon cable to the display module, fasten the display module to the base, install enclosure cover, and then apply power.

SafeTouch Buttons

The PD6701 is equipped with four sensors that operate as through-window buttons so that it can be programmed and operated without removing the cover and exposing the electronics to the environment. These buttons can be disabled for security by selecting the LOCK setting on the SAFE-TOUCH BUTTONS switch located on the connector board in the base of the enclosure.

SafeTouch Button Operation

To actuate a button, press and remove one finger to the window directly over the marked button area. Remove finger to at least 4 inches away from the window in between button activations. SafeTouch and mechanical buttons may be held to cycle through menus or digits in place of repeatedly pushing a button. The sensors are disabled when a mechanical button is pressed and will automatically be re-enabled after 60 seconds of inactivity.

SafeTouch Button Tips and Troubleshooting

The SafeTouch buttons are designed to filter normal levels of ambient interference and to protect against false triggering, however, it is recommended that the SafeTouch buttons be disabled (slide switch to LOCK) if there is an infrared interference source in line-of-sight to the display.

SafeTouch Button Tips:

- To the extent possible, install the display facing away from sunlight, windows, reflective objects and any sources of infrared interference.
- Keep the window clean.
- Tighten the cover securely.
- Use a password to prevent tampering.
- If the cover has not been installed and secured tightly, it may take a moment for the SafeTouch buttons to properly self-calibrate when the cover is tightened.

⚠ IMPORTANT

- SafeTouch buttons will not work if two or more buttons are detected as being pressed simultaneously. As a result, be careful to avoid triggering multiple buttons or reaching across one button location to press another.

Buttons and Display

Button Symbol	Description
MENU	**Menu**
RESET	**Right arrow/ Reset**
DISPLAY	**Up arrow/ Display**
ENTER	**Enter/ Alarm Acknowledge**

Symbol	Status
FT	Feet
IN	Inches and Fractional Inches
	20-Segment Tank Level Indicator Bargraph
	Password Enabled

Menu Button

- Press the **Menu** button to enter Programming Mode.
- Press the **Menu** button during Programming Mode to return to the previous menu selections.
- Hold the **Menu** button for 1.5 seconds at any time to exit Programming Mode and return to *Run Mode*.
- Press and hold the **Menu** button for 5 seconds to access the *Advanced Features* of the meter.

Right / Reset Button

- Press the Right arrow button to reset the maximum or minimum value while it is being displayed (see **Up / Display Button** below).
- Press the **Right** arrow button to move to the next digit or decimal position during programming.
- Press **Right** to go backward through most selection menus.

Up / Display Button

- Press Display when in Run Mode to cycle through displaying the maximum value, minimum value, and the loop input value in mA. The display will time out in 12 seconds. Press Display again to resume normal lower display operation (lower display will read RESUME).
- Press the **Up** arrow button to scroll forward through the menus, decimal point, or to increment the value of a digit.

Enter Button

- Press the **Enter** button to access a menu or to accept a setting.
- Press **Enter** to acknowledge alarm (if enabled).

Main Menu Display Functions & Messages

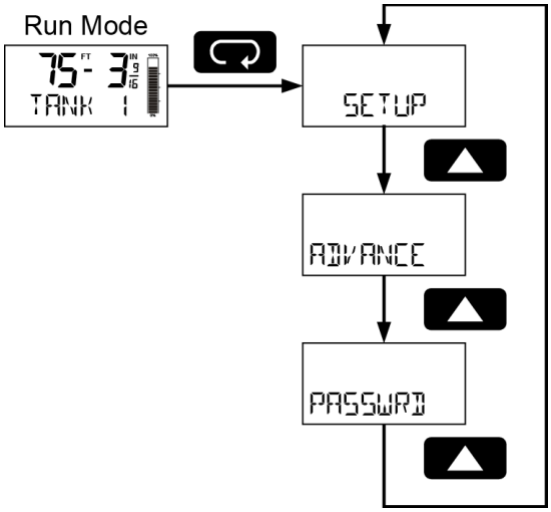
The meter displays various functions and messages during setup, programming, and operation. The following table shows the main menu functions and messages in the order they appear in the menu.

Display	Parameter	Action/Setting
SETUP	*Setup*	Enter *Setup* menu
SCALE	*Scale*	Enter the *Scale* menu for feet and inches
INPUT 1	*Input 1*	Set input 1 value in mA
DSPLY 1	*Display 1*	Set display 1 feet and inches
INPUT 2	*Input 2*	Set input 2 value in mA
DSPLY 2	*Display 2*	Set display 2 feet and inches
SAVE ?	*Save*	Save entered scale parameters
SPN ERR	*Span Error*	Scale point 1 and 2 span error
FRACTN	*Fraction*	Enter the *Program* menu
1/16th	*1/16th*	Set display for 1/16th inch fractions
OFF	*Off*	Turn off inch fraction display
1/8th	*1/8th*	Set display for 1/8th inch fractions
PERCENT	*Percent*	Scale the tank indicator full and empty values
0 PCT	*0 Percent*	Set the tank empty value
100 PCT	*100 Percent*	Set the tank full value
DISPLAY	*Display*	Enter *Lower Display* menu
TAG	*Tag*	Display a custom unit or tag
VOLUME	*Volume*	Display volume
VOL+TAG	*Volume + Tag*	Display volume and custom tag
PCT HT	*Percent Height*	Display percent height
PCT+TAG	*Percent Height + Tag*	Display percent height and custom tag

Main Menu

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

Press **MENU** button to enter *Programming Mode* then press the **Up Arrow** button to scroll through the main menu.



Hold **MENU**, at any time, to exit and return to *Run Mode*. Changes made to settings prior to pressing **ENTER** are not saved.

Press the **MENU** button during *Programming Mode* to return to the previous menu selections.

Changes to the settings are saved to memory only after pressing **ENTER**.

The display moves to the next menu every time a setting is accepted by pressing **ENTER**.

Setting Up the Meter (SETUP)

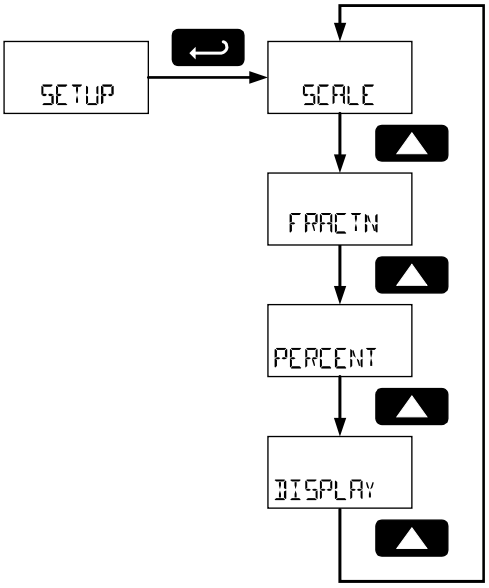
The *Setup* menu is used to select:

1. Feet and inches display scale
2. Inch fraction display mode
3. Tank indicator full value
4. Lower display selection

Press the **ENTER** button to access any menu or press **UP** arrow button to scroll through choices.

Hold **MENU**, at any time, to exit and return to Run Mode. Changes made to settings prior to pressing **ENTER** are not saved.

Press the **MENU** button during Programming Mode to return to the previous menu selections.



Setting Numeric Values

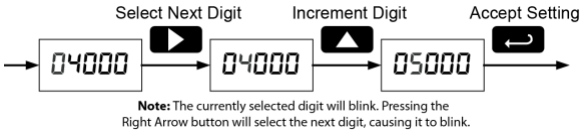
The numeric values are set using the **RIGHT** and **UP** arrow buttons. Press **RIGHT** arrow to select next digit and **UP** arrow to increment digit.

The digit being changed blinks.

Press the **ENTER** button, at any time, to accept a setting.

Hold **MENU**, at any time, to exit and return to Run Mode. Changes made to settings prior to pressing **ENTER** are not saved.

Press the **MENU** button during Programming Mode to return to return to the previous menu selections.



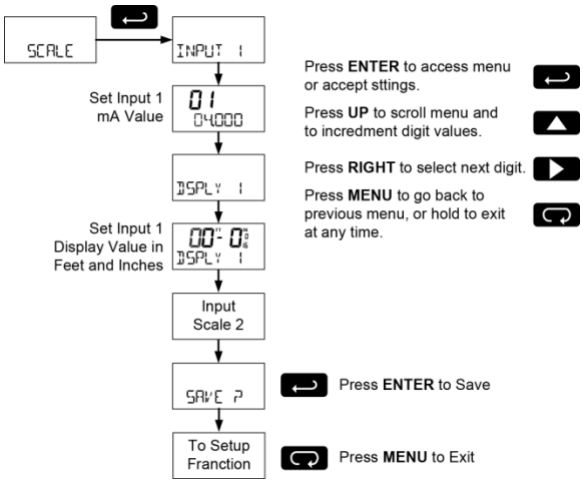
Note: The currently selected digit will blink. Pressing the Right Arrow button will select the next digit, causing it to blink.

Scaling the Meter (SCALE)

The 4-20 mA input can be scaled to display the process in engineering units. To scale the meter, enter the value in milliamps (mA) for input 1, and then the corresponding engineering units display value. Do the same for input 2.

After entering the display 2 value, confirm the new scale by pressing **ENTER** at the *Save* menu.

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



For instructions on using multipoint scaling, see *Level Input Multipoint Linearization* (MULTIPT), page *18*.

For instructions on how to program numeric values see *Setting Numeric Values* on page *12*.

Minimum Input Span

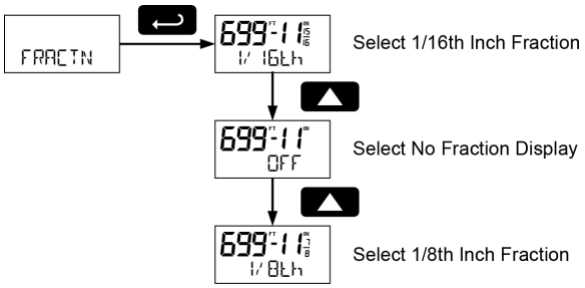
The minimum input span is the minimum difference between input 1 and input 2 signals required to complete the calibration or scaling of the meter. The minimum span is 0.10 mA.

Scale Error Message (SPN ERR)

If the minimum span is not maintained, the meter will show a span error (SPN ERR) and revert to input 2, allowing the appropriate input signals to be applied.

Selecting Inch Fraction Display Mode (FRACTN)

The display may be programmed to display fractions of an in 1/8th or 1/16th increments, or to show no fraction.

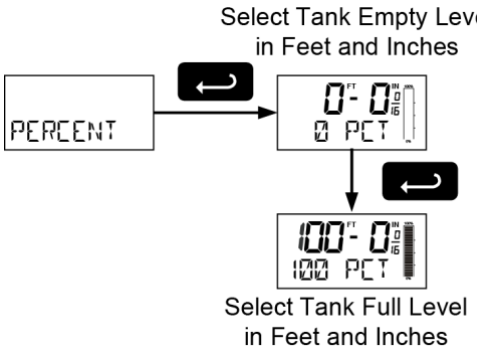


Scaling the Tank Level Indicator (PERCENT)

The display includes a 20-segment tank height indicator. This menu sets full and empty values, in feet and inches, for the tank height indicator.

This value may differ from the 20 mA full-scale and 4 mA empty-scale values programmed in the *Scale* menu. This is ideal for level transmitters that output less than 20 mA at the maximum height of the tank or pit or more than 4 mA at the minimum height.

As an example, when using a level transmitter that outputs 20 mA at 250 feet, the tank height indicator may be set for 100 feet, 0 inches. At 100 feet 0 inches on the display, the tank height indicator will show as full, even though the input is not 20 mA.



Configuring the Lower Display (DISPLAY)

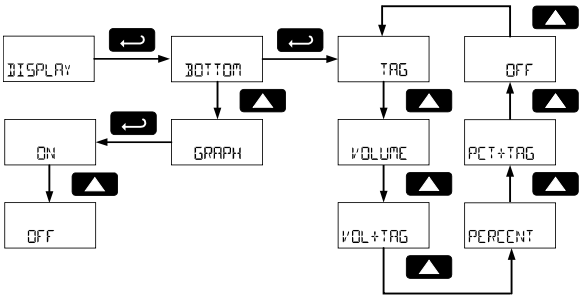
The lower display may be configured to display a custom tag (TAG), volume (VOLUME), volume and tag (VOL+TAG), percent of full height (PCT HT), or percent of full height and tag (PCT+TAG) or be blank (OFF).

A custom tag may be up to seven alphanumeric characters programmed for identification (e.g. TANK 3) or for engineering units (e.g. GALLONS).

Volume is a separate, second scale of the input process variable. This is configured in *Volume Display Scaling* (VOLSCAL) on page *17*.

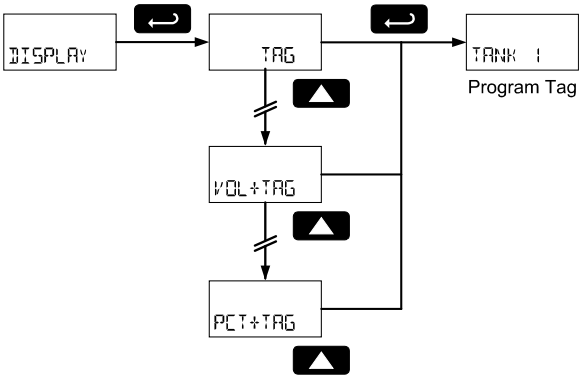
Percent full height shows the percent full of the tank height level indicator programmed in the *Scaling the Tank Level Indicator* (PERCENT) menu, on page *13*.

The tank level indicator (GRAPH) may also be turned on or off from the display menu.

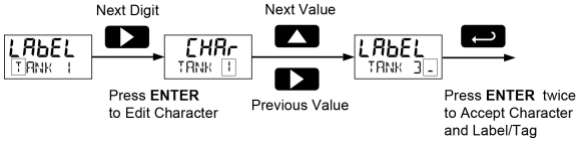


Setting the Tag (TAG)

Any lower display setting that includes a tag will require the tag to be entered.



The fully alphanumeric values for the tag are set using the **RIGHT** button to select the digit, the **UP** and **RIGHT** arrow buttons to select the digit reading, and the **ENTER** button to confirm and select the next digit.

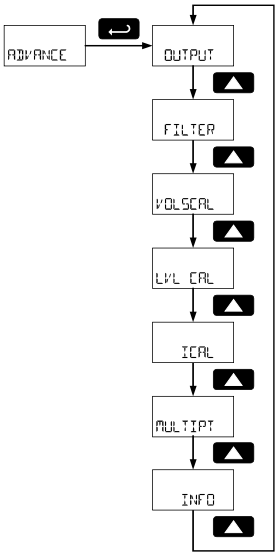


Advanced Features Menu (ADVANCE)

To simplify the setup process, functions not needed for most applications are located in the *Advanced Features Menu*. Access the *Advanced Features Menu* by pressing **ENTER** at the ADVANCE menu in the *Main* Menu defined on page *11*.

The *Advanced Features Menu* is used to select:

1. Open collector output configuration (OUTPUT)
2. Input filter (FILTER)
3. Volume display scale (VOLSCAL)
4. Live signal level display calibration (LVL CAL)
5. Internal Calibration (ICAL)
6. Multipoint linearization for level (MULTIPT)
7. Meter system information display (INFO)



Advanced Features Menu & Display Messages

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

Display	Parameter	Action/Setting
OUTPUT	*Output*	Enter output menu
OFF	*Off*	Disable output
ALARM	*Alarm Output*	Enter alarm output menu
LEVEL	*Level Alarm*	Assign alarm output to level
SET	*Set Point*	Set alarm set point
RESET	*Reset Point*	Set alarm reset point
VOLUME	*Volume Alarm*	Assign alarm output to volume
FILTER	*Filter*	Set noise filter
LO	*Filter Low*	Set noise filter to low setting
MED	*Filter Medium*	Set noise filter to medium setting
HI	*Filter High*	Set noise filter to high setting
OFF	*Filter Off*	Disable noise filter
VOLSCAL	*Volume Scale*	Scale the volume display
NO PTS	*Number of Points*	Set the number of points for volume scaling
INPUT 1	*Input 1*	Set volume input 1 on the level display
DSPLY 1	*Display 1*	Set volume display 1
INPUT 2	*Input 2*	Set volume input 2 on the level display
DSPLY 2	*Display 2*	Set volume display 2

Display	Parameter	Action/Setting
SAVE ?	*Save*	Save entered volume scale parameters
LVL CAL	*Level Calibration*	Calibrate the level display
INPUT 1	*Input 1*	Calibrate input 1 value
DSPLY 1	*Display 1*	Set display 1 feet and inches
INPUT 2	*Input 2*	Calibrate input 2 value
DSPLY 2	*Display 2*	Set display 2 feet and inches
SAVE ?	*Save*	Save entered calibration parameters
ICAL	*Internal Calibration*	Enter internal reference calibration
4mA	*4 mA*	Calibrate input at 4 mA
20mA	*20 mA*	Calibrate input at 20 mA
ERRSPAN	*Error Span*	Error with calibration point 1 and 2 span
MULTIPT	*Multipoint*	Set level display multipoint linearization
DISABLE	*Disable*	Disable multipoint linearization
ENABLE	*Enable*	Enable multipoint linearization
INFO	*Meter Information*	Show software number and version, or reset to factory defaults
SOFT	*Software*	Software number
VERSION	*Software Version*	Software version

For instructions on how to program numeric values, see *Setting Numeric Values* on page *12*.

Alarm Output (OUTPUT)

The PD6701 is equipped with an NPN open collector output that may be set up for high or low alarm trip point based on the level display (LEVEL) or the volume scale (VOLUME). The output may be disabled by selecting OFF.

When the alarm is enabled for level and the alarm set point has been reached, the level display will flash, accompanied by the lower display alternating between normal display and ALARM. A tank height indicator segment will flash at the level the alarm is set to while the level indicator is at or above the alarm point.

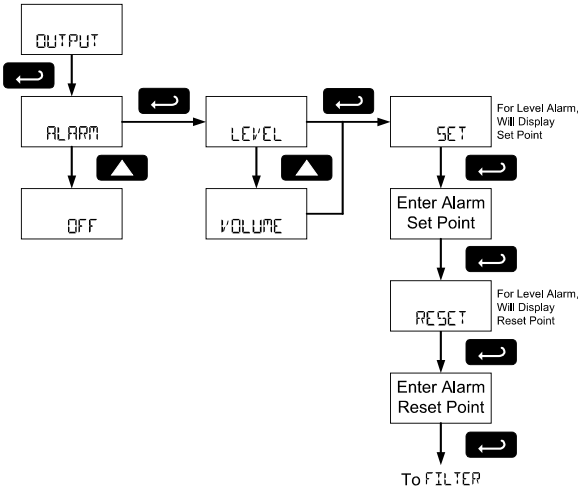
When the alarm is enabled for volume and the alarm set point has been reached, the lower display will flash, alternating between its normal display and ALARM.

To set a high alarm, program the set point value to be greater than the reset point.

To set a low alarm, program the set point value to be less than the reset point.

To acknowledge an alarm, press the **ENTER** button once for acknowledge prompt and a second time to confirm. Acknowledging an alarm will turn off the alarm output and stop the display from flashing. The lower display will continue to alternate between its normal display and ALARM until the alarm condition is cleared.

The alarm status will show on the display even if the output is not wired.



Input Signal 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 can be set to low (LO), medium (MED), high (HI), or off (OFF). The higher the filter setting, the longer the averaging time and so the longer the display may take to find its final value.

The filter contains a noise filter bypass feature so that while small variations in the signal will be filtered out, large, abrupt changes to the input signal are displayed immediately.

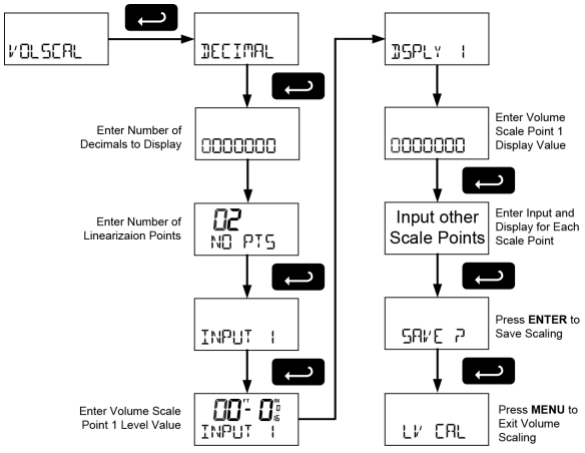
Volume Display Scaling (VOLSCAL)

Volume may be scaled as a function of the feet and inches level display. It may use up to 32-point linearization. The multi-point linearization can be used to linearize the display for non-linear signals such as those from level transmitters used to measure volume in odd-shaped tanks.

To display the volume, select a lower display including the volume display in the *Display* menu as shown in *Configuring the Lower Display* (DISPLAY) on page *14*.

To scale the volume display, enter the level in feet and inches for input 1, and then the corresponding volume display value. Do the same for input 2.

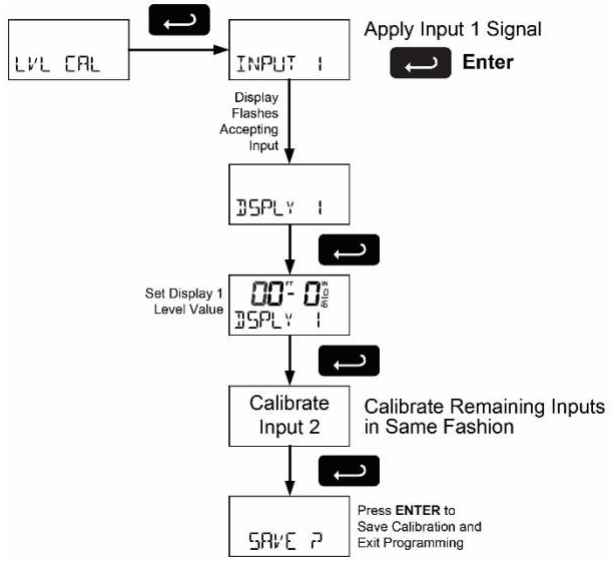
After entering the display 2 value, confirm the new volume scale by pressing **ENTER** at the *Save* menu.



Level Input Live Signal Calibration (LVL CAL)

The meter can be calibrated using a current source instead of scaling. This process will override previously programmed scaling of the level display.

The use of a calibrated signal source is strongly recommended.



Internal Calibration (ICAL)

There is **no need to recalibrate** the meter when first received from the factory. The meter is **factory calibrated** prior to shipment. The calibration equipment is traceable to NIST standards

The internal calibration is the meter's master calibration that makes scaling the meter without a signal source possible. Use of a calibrated signal source is necessary to perform an internal calibration of the meter. Check calibration of the meter at least every 12 months. Incorrect calibration will affect the ability of the meter to properly read, scale, and display the input.

Notes:

The signal source must have a full-scale accuracy of 0.002% or better between 4 and 20 mA in order to maintain the specified accuracy of the meter.

Allow the meter to warm up for at least 15 minutes before performing the calibration procedure.

Press and hold the **MENU** button for 5 seconds to enter the *Advanced Features* menu. Press the **UP** arrow button to scroll to the *Internal Calibration* menu (ICAL) and press **ENTER**.

The meter displays 4 mA. Apply a 4.000 mA signal and press **ENTER**. The display flashes for a moment while the meter is accepting the signal.

After the signal is accepted, the meter displays 20 mA. Apply a 20.000 mA signal and press **ENTER**. The display flashes for a moment while the meter is accepting the signal.

Calibration Error Message (SPN ERR)

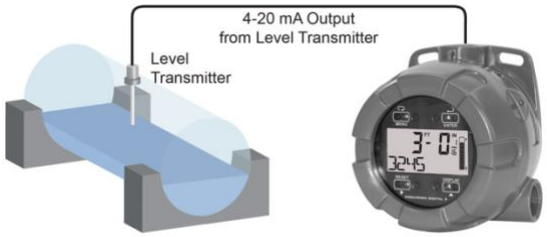
An error message indicates that the calibration process was not successful. After the error message is displayed, the meter will revert to the 4 mA calibration menu. The error message might be caused by inadvertently leaving the signal at the previous level or not maintaining the minimum span. Press the **MENU** button to cancel the current calibration process if necessary.

Level Input Multipoint Linearization (MULTIPT)

This menu enables multipoint linearization for scaling and calibrating of the level display.

Setting MULTIPT to ENABLE allows the level display to be scaled or calibrated using up to 32 points. See *Scaling the Meter* (SCALE) on page *13* and *Level Input Live Signal Calibration* (LVL CAL) on page *18*, to include a *Number of Points* (NO PTS) parameter before entering *Input 1*.

32-point linearization can be used to linearize the display for non-linear signals.



PD6701 Displaying Height in Feet and Inches and Volume (Using Multi-Point Linearization Feature) in Gallons in a Round Horizontal Tank.

Information (INFO)

The *Information* menu shows the software identification number and version number.

To determine the software version of a meter:

Go to the *Information* menu (INFO) and press **ENTER** button.

Continue pressing **ENTER** to scroll through the software release number and software version.

Following the information display, the meter will exit the *Advanced Features* menu and return to run mode.

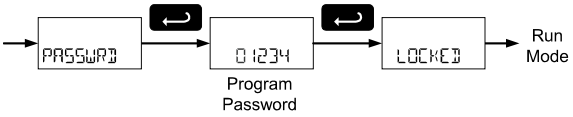
Setting Up the Password (PASSWRD)

The *Password* menu is used to program a five-digit password to prevent unauthorized changes to the programmed parameter settings. A password protected meter will display LOCKED when the **MENU** button is pressed.

Locking the Meter

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

For instructions on how to program numeric values see *Setting Numeric Values*, page *12*.

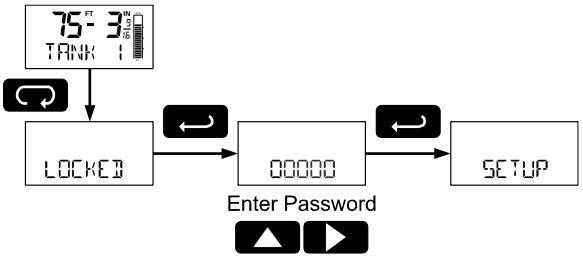


Record the password for future reference. If appropriate, it may be recorded in the space provided.

Model:	
Serial Number:	
Password:	__ __ __ __ __

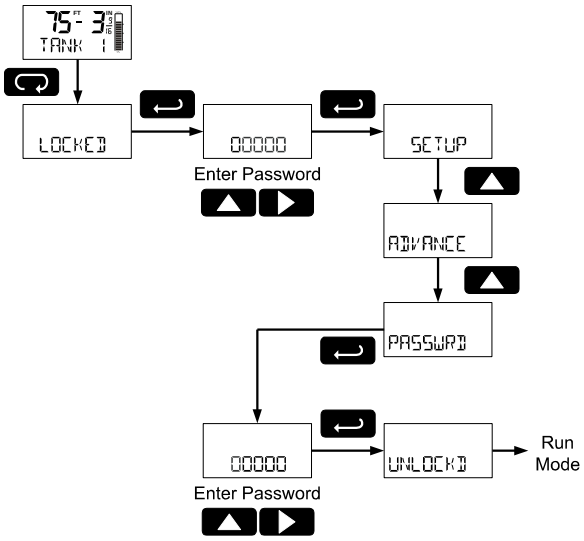
Making Changes to a Password Protected Meter

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



Disabling Password Protection

To disable the password protection, access the *Password* menu and enter the correct password, as shown below.



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

If the password entered is incorrect, the meter displays the message LOCKED and returns to Run Mode. To try again, repeat the above procedure.

Did you forget the password?

The password may be disabled by entering a master password. If you are authorized to make changes, enter the master password 50865 to unlock the meter.

Operation

Front Panel Buttons Operation

Button Symbol	Description
MENU	Press to Enter or Exit Programming Mode
RESET	Used to Reset Maximum and Minimum Values
DISPLAY	Press to Cycle Displaying Maximum Value, Minimum Value, and Input Current in mA Press to Resume Run Mode in Lower Display
ENTER	Press to Acknowledge Alarm (if Enabled)

Display Maximum, Minimum, and Input Current

The maximum and minimum values and the measured input loop current may be displayed temporarily on the lower display. To display these values, press the **DISPLAY** button. The meter will display the word MAXIMUM on the lower display and the maximum value reached (since the last maximum reset) on the upper display. Press the **DISPLAY** button again and the meter will display the word MINIMUM on the lower display and the minimum value reached on the upper display. Pressing the **RESET** button while either of these values is displayed will reset that value to the current display value.

Press the **DISPLAY** button a third time and the meter will display LOOP MA on the lower display, followed by the measured input current in milliamps (mA). The current display will remain for 10 seconds and then the lower display will return to normal run mode as programmed in *Configuring the Lower Display* (DISPLAY) on page *14*. Press the **DISPLAY** button a fourth time to return to the normal operation. The meter will display RESUME followed by the run mode lower display.

Reset Meter to Factory Defaults

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

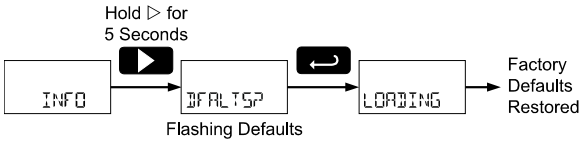
Instructions to load factory defaults:

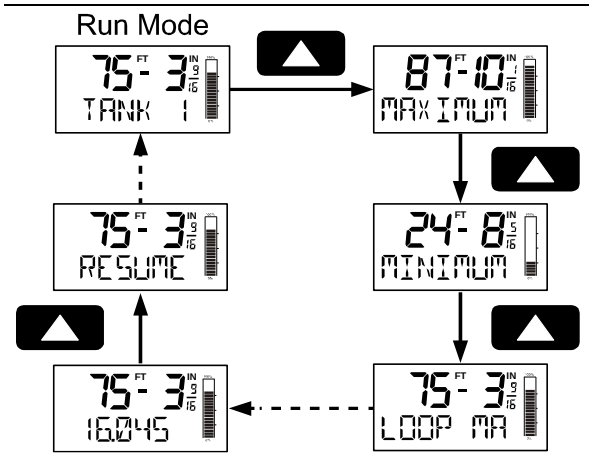
Enter the *Advanced* features menu.

Press and hold **RESET** button when INFO is shown. For information on navigating to the *Information* menu, refer to *Advanced Features Menu* (ADVANCE) on page *15*.

Press **ENTER** when DFALTSP prompt is flashing.

Note: If **ENTER** is not pressed within three seconds, the prompt will stop flashing return to run mode.





Factory Defaults & User Settings

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

Model: _____

S/N: _____

Date: _____

Parameter	Display	Default Setting	User Setting
Basic Setup			
Input 1	INPUT 1	4.000 mA	
Display 1	DSPLY 1	00ft 00in 0/16	
Input 2	INPUT 2	20.00 mA	
Display 2	DSPLY 2	100ft 00in 0/16	
Fraction	FRACTN	1/16th	
Tank Indicator 0%	0 PCT	0ft 00in 0/16	
Tank Indicator 100%	100 PCT	100ft 00in 0/16	
Display	DISPLAY	Tag	
Bar Graph	GRAPH	On	
Tag	TAG	TANK 1	
Advanced Features			
Output	OUTPUT	Off	
Filter	FILTER	Low	
Volume Scale Number of Points	NO PTS	02	
Volume Scale Input 1	INPUT 1	00ft 00in 0/16	
Volume Display 1	DSPLY 1	0	
Volume Scale Input 2	INPUT 2	100ft 00in 0/16	
Volume Display 2	DSPLY 2	100,000	
Multipoint	MULTIPT	Disable	
Password			
Password	PASSWRD	00000 (unlocked)	

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 *Diagnostics* menu and consult the recommendations described below.

Troubleshooting Tips

Symptom	Check/Action
No display or faint display	Check input signal connections. Perform hard reset by shorting S+ and S- terminals.
Level display unsteady	Increase filter setting in *Advanced* menu.
Meter displays error message during calibration (ERROR)	Check signal connections. Verify minimum input span requirements
Level display flashing 699ft 11in.	Check input signal and scaling within range of 699ft 11in.
Meter flashes 9999999 or -999999	Check level display within volume scale range of 9999999 and -999999.
Display response is too slow	Check filter setting to see if it can be lowered to LO or OFF.
If the display locks up or the meter does not respond at all	Perform hard reset by shorting S+ and S- terminals.
Backlight does not appear.	Backlight may not be noticeable under good lighting conditions. Check connections are as shown in *Figure 5. Connections with Loop-Powered Backlight* or *Figure 6. Connections with Externally-Powered Backlight* on page *8*.
SafeTouch buttons do not respond	Mechanical buttons may have been pushed. The SafeTouch buttons will be re-enabled automatically 60 seconds after the last button push. If slide switch on connector board is in Lock position, switch to Unlock. Sunlight can interfere with the sensors. It is recommended to shield the window from sunlight while operating the buttons by standing so as to block direct sunlight.
Other symptoms not described above	Call Technical Support for assistance.

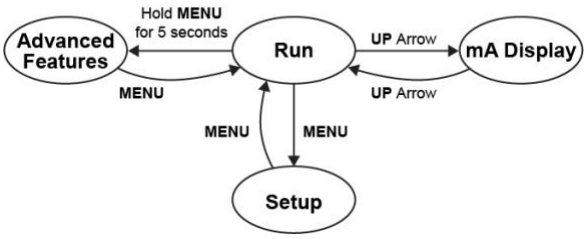
Quick User Interface Reference

Pushbutton	Function
MENU	Go to programming mode or leave programming. Hold for 5 seconds to enter *Advanced Features* menu directly.
RIGHT Arrow	Move to next digit. Go to previous menu or alphanumeric character selection. Reset max or min while displayed.
UP Arrow	Move to next selection or increment digit. Cycle through maximum, minimum, and mA display mode.
ENTER	Accept selection/value and move to next selection. Acknowledge alarms.

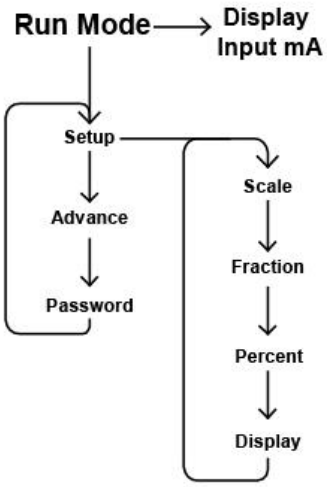
To enter the Advanced Features Menu, hold the **Menu** button for 5 seconds.

Max/Min Mode
While in Run Mode, pressing **Up** Arrow will initiate MAX/MIN Mode. **Up** Arrow toggles between MAX & MIN displays, and **Right** Arrow resets the MAX/MIN to the current value. Press **Menu** or wait 10 seconds to return to Run Mode. Pressing **Enter/Ack** will disable the 10 second timeout and continuously display Max or Min.

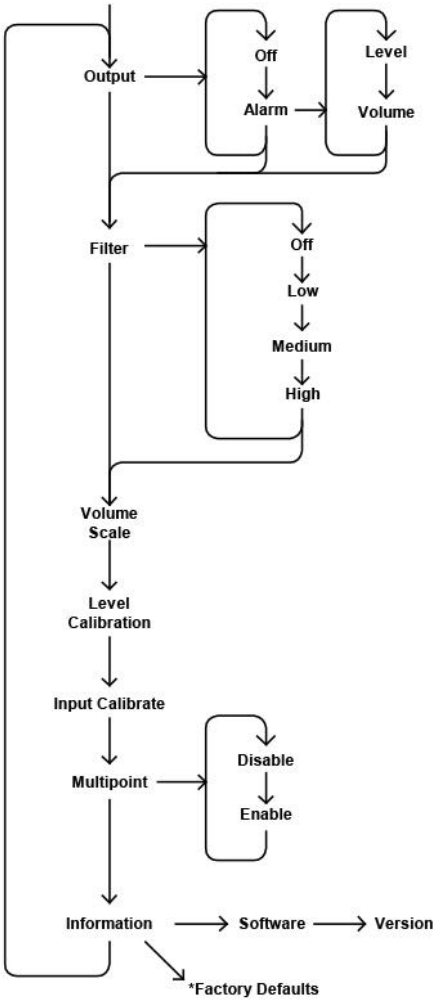
Operation Modes



Main Menu



Advanced Menu



*Access by holding **Right/Reset** for 3 seconds

Contact Precision Digital

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