

SOTERA[®]

SYSTEMS

Operation and Safety Manual



825P - 850P

CE Approved

Digital Pulse Output Meters
with 4-20 mA output



PROUDLY
Made in
USA

 **Tuthill**

Excellence at work. Excellence in life.

Dear Sotera Customer,

Thank you for buying a Sotera product. Sotera Systems represents a new age in transfer and measuring equipment. This manual contains valuable information about your new equipment and its operating and service requirements. Please take a few minutes to review this material carefully.

Sotera's mission is to provide fluid handling systems that deliver the most accurate, safe, convenient, and economical transfer systems for users of chemicals.

If, for any reason, any of the products do not meet your performance expectations, we want to hear from you. Your comments and suggestions are requested and appreciated. Thank you again for buying a Sotera Systems product. We look forward to serving you in the future.



Safety Instructions

To ensure safe and efficient operation, it is essential to read and follow each of the following warnings and precautions.

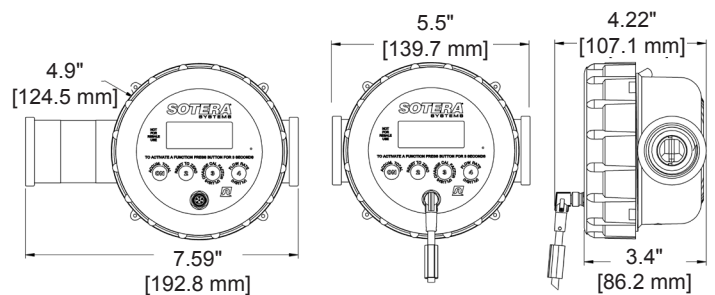
1. Agricultural herbicides flowing through the meter may be harmful to your health. Use and disposal of these products is controlled by federal, state, and local laws and procedures.
2. Conform to fluid manufacturer's recommended handling procedures when using product and when cleaning meter.
3. Do not exceed an internal meter pressure of 120 PSI / 8.2 Bars.
4. Improper use or installation of this product can cause serious bodily injury or death.
5. The 825 & 850 Digital Meter is not for use with flammable fluids. **DO NOT** use with fluids with a flash-point below 100°F (such as gasoline and alcohol).
6. **DO NOT remove printed circuit board!** Damage to LCD could occur, and warranty is void.



Not for use with fluids that have a flash point below 100°F (37.8°C, ie: gasoline, alcohol). Refer to NFPA 325M (Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids) for flash points of common liquids. Static electricity buildup and discharge could result in arc and explosion!

Technical Information

Flow Ports	1" NPT inlet / outlet ports, female threads (3/4" BSPP also available)
Flow Range	2 to 20 U.S GPM / 7.6 to 75.7 LPM
Pressure	120 PSI / 8.2 Bar maximum @ 70° F / 21° C 50 psi / 3.4 Bars maximum @ 130° F / 54° C
Temperature	Min. operating temperature = 0° F / 17° C Max. operating temperature = 130° F / 54° C Meter can be stored at lower temperatures but display may not work below 0° F.
Accuracy	± 0.5%
Units of Measure	Ounces, pints, quarts, liters, gallons; special calibration option also available.
Range	9999 current total; 10,000,000 accumulated total
Materials of Construction	
Body	Polypropylene
Chamber	Polyphenylene sulfide (PPS) and 303 Stainless Steel
Wetted Seals	Fluorocarbon (EPDM optional)
Weather & Dust Body Seal	BUNA-N
Display	LCD (Liquid Crystal Display)
Power	Two CR2032 Lithium batteries and external 5 - 24 VDC (see page 7)



General Description

The Sotera 825P and 850P Meters are nutating disk, positive displacement meters that use magnetic coupling to convert fluid flow into digital display information. The meter can store and display the current total, or cumulative total in any of five programmed units (ounces, pints, quarts, liters, and gallons) or special units (e.g. per acre volume). The meter can be calibrated without dispensing fluid by selecting a calibration factor from the 20 stored settings. Power is supplied by two CR2032 batteries that can be replaced in the field. 825P / 850P models feature pulse output and 4-20ma output for connection to fluid management systems and batch controllers for the control and monitoring of dispensed fluid.

Fluid Compatibility

The 825P & 850P Digital Meters will handle most pesticides, automotive fluids (except gasoline), and mild acids. It is also compatible with the following fluids**:

100 Surpass® EC	Gramoxone Inteon™
3.38EC Pursuit®	Guardsman®
Aatrex 4L®	Harness xtra®
Abate 4E®	Karate®
Agrotain®	Laddock S-12®
Apron®	Lasso Micro Tech®
Assure II®	Lumax™
Atrazine 4L	Manifest™
Banvel SFG®	Marksman®
Banvel®	Maxim®
Bicep®	Methyl Parathion
Blazer®	Motor Oil
Broadstrike®+	Nufos®
Broadstrike®+	Oil.Adend®
Camix™	Phosphoric Acid
Caustic Soda (50%)	Poast HC®
Clarity®	Poast Plus®
Command®3ME	Poast®
Conclude®	Princep 4L®
Conclude®extra	Prowl®
Contour	Prowl®
Detail™	Reflex®
Diesel Exhaust Fluid (DEF)	Rezult®
Diesel Fuel	Ridomil Gold®
Doubleplay®	Roundup®
Dual II®	Sodium Hydroxide(50%)
Dual®	Squadron®
Dual®	Storm®
Eptam 7E®	Superboll®
Ethylene Glycol	Surpass®
Fallowmaster®	Topnotch®
Flexstar®	Touchdown®
Frontier®	Treflan®
Fultime®	Treflan™
Furadan®	Treflan™ HFP
Fusion®	Water
Gramoxone Extra®	

* Requires EPDM Seals.

**Trademark information on page 15.

The 825P & 850P Digital Meters are NOT compatible with very strong acids or if fluid flash point is below 100°F(38°C). If in doubt about compatibility of a specific fluid, contact supplier of fluid to check for any adverse reactions to the following wetted materials.

Polypropylene Body	Stainless Steel Screws / Shaft
Fluorocarbon Seals	PPS Chamber

Installation

Use PTFE tape or thread compound on all threaded joints.

1. Determine direction for fluid flow and point arrow on meter body in that direction.
2. Thread hose or pipe into ports until snug. Be careful not to cross thread when starting threads.

Installation Hint

To prevent cross threading, turn the pipe / hose backwards (counterclockwise) until you feel it engage threads, then tighten.

Changing Meter Readout Position

If it is necessary to change position of the meter readout, follow these steps (Refer to exploded view).

1. Unscrew meter cap (item 1, page 10). Use a strap type oil filter wrench or 5" open jaw type wrench if too tight to unscrew by hand.
2. Insert a wide, flat-head screwdriver into the upper slot and gently pry up electronics module (see Figure 1).

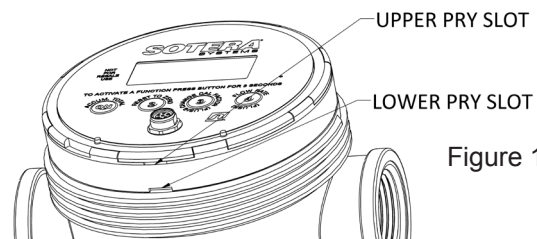


Figure 1

3. Gently rotate electronics module to desired location.

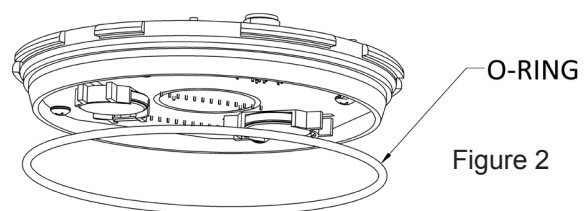


Figure 2

5. Press electronics module down into meter cover in the correct orientation.
6. Thread on meter cap until hand tight. To check tightness, there should be approximately 1/16" gap between the cap and ridge on outlet port (see figure 3).

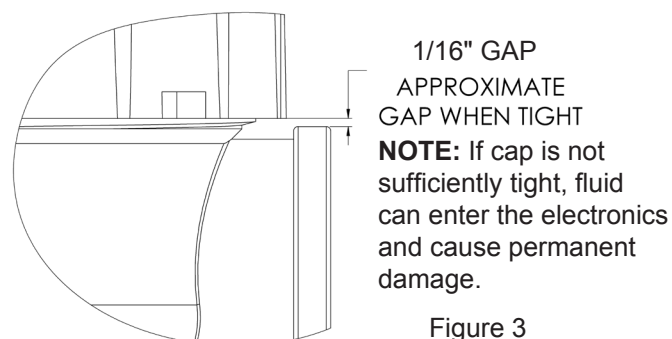


Figure 3

Operational Functions



- Turns meter on when off.
- Displays accumulated total as long as it is pressed. If accumulated total is larger than 9999, the numbers will scroll across the screen.



- When held for 3 seconds, it resets current total to zero. Also resets to normal operating mode when in CAL or FLSH mode.



- When held for 3 seconds, it allows changes to the calibration factor displayed in the bottom left corner. Repeated pressing will step the number up to 19 and back to zero. When desired number is displayed, press button (2) to lock in the new number and return to normal operation.



- When held for 3 seconds, flow rate is displayed. Fluid dispensed is still added to the accumulated total and current total. Press button (4) to return to normal operation.

Use

CAUTION: Meter will count air if you dispense air. Before initial operation or when air has entered the system, prime the meter by dispensing fluid until all trapped air has been removed. Meter is now ready to operate.

1. Press (ON) button to turn meter on. Current total, unit of measure, and calibration factor are displayed. The meter also turns on automatically and begins recording when fluid starts flowing through it.



2. Hold button (2) for one second to reset current total to "0.00."
3. Begin dispensing.

NOTE: Meter display automatically goes blank after 60 seconds of inactivity and automatically comes back on when flow resumes. No data is lost during periods of inactivity.

CAUTION: Wear proper safety equipment when handling hazardous fluids.

Calibration Using the CAL Factor

The **THINNER** the fluid, the **LOWER** the CAL number.

The **THICKER** the fluid, the **HIGHER** the CAL number.

- CAL 4 is set for thin fluids like water.
- CAL 19, the highest number is set for very thick fluids like cold molasses.
- Each number changes the meter accuracy by about 1%.



CAL Factor

Table #1: Suggested CAL Factor settings for Common Fluids

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
				Water		Kerosene		GRAMOXONE INTEON™ @ 50° F		Antifreeze @ 70° F		ROUNDUP® @ 50° F TREFLAN™ @ 50° F	ATRAZINE 4L @ 70° F	10W Oil @ 70° F	DUAL® @ 70° F		BICEP® @ 70° F		Molasses @ 32° F

Note: The suggested CAL factors are for REFERENCE ONLY.

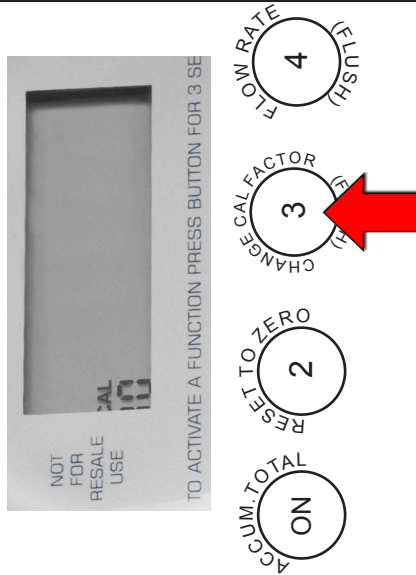
Calibration Procedure using CAL Factor

Changing the CAL Factor

- Hold button ③ until the display only shows CAL and number.
- Press ③ repeatedly until you reach the desired number. Note – number will step up to 19, then back to zero.
- Press ② to return to normal operating mode.

Calibration Procedure

A) Set CAL factor to 10.



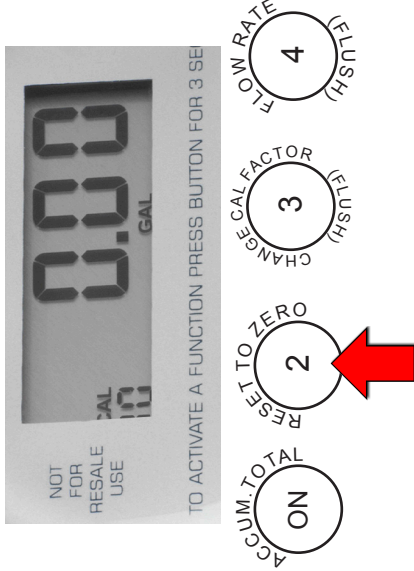
Hold button ③ for three seconds. Press 3 again until the number 10 shows below “CAL” (NOTE: If you go past 10 keep pressing ③ because the number will return to 0 after passing 19).

Press ② to get back to normal operating mode.

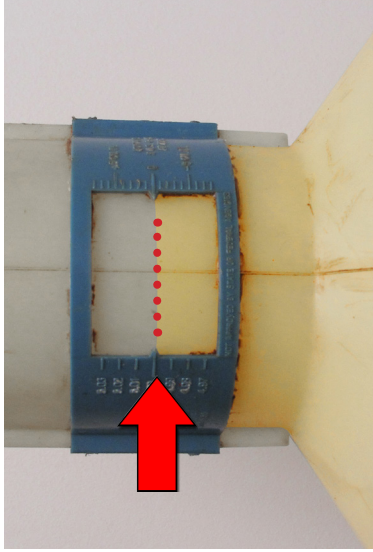
NOTE: If your fluid is listed on Table 1, use that number in step A above in place of 10.

B) Prime pump and meter by dispensing 2 - 3 gallons of fluid back into the bulk tank.

With the outlet valve closed and the pump still running, reset the meter to 0.00.

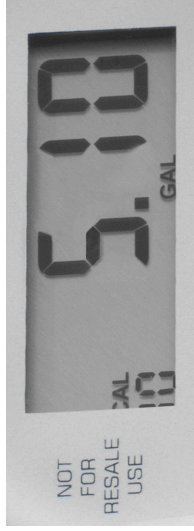


C) Fill the Proving Can exactly to the 5.0 gallon line. Focus on the Proving Can, do not look at the meter at this point. Keep the hose end nozzle wide open as long as possible for best accuracy.



D) Adjust Meter CAL Factor.

- If meter reads high, increase the CAL factor. Each CAL # changes the accuracy by about 1%. For a 5 gallon proving can, 1% = 0.05 gallons.



- If 5.10 is displayed, this is 2% over 5.00; the CAL factor should be changed to CAL 12.



- If the meter reads low, lower the CAL factor. For example, if 4.90 is displayed, it is 2% less than 5.00, so the CAL factor should be set to 8.



- When finished with the CAL factor procedure, press ② to return to normal mode and to reset the meter to 0.00. The meter is now calibrated and ready to use.

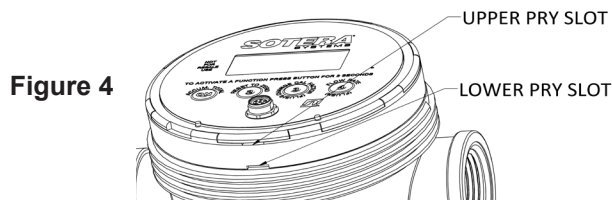
Batteries

NOTE: Low battery icon will appear when batteries require replacement. Meter still functions properly for several days after the icon appears. Neither calibration, current total or totalizer quantities will be lost when you replace batteries.

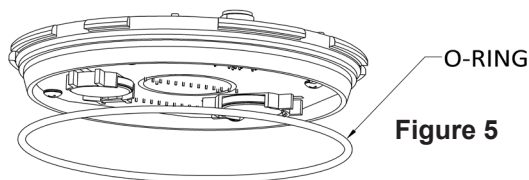
To Replace Batteries (refer to exploded view).

1. Unscrew meter cap (item 1, page 10). Use a strap type oil filter wrench or large 5" jaw pipe wrench if needed.
2. Insert a flat-head screw driver into the top slot (see Figure 4) and gently pry up electronics module.

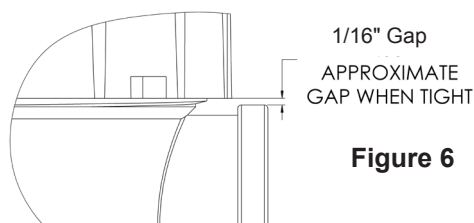
CAUTION: DO NOT get fluid or dirt in electronics area.



3. Remove old batteries and insert new batteries, making sure battery polarity is correct, or meter damage could occur (positive side facing up when installed).
4. As noted in Figure 5, reinstall O-ring on electronics module. Align sensor receptacle in proper location. Press module gently down into meter cover.



5. Thread on meter cap until hand tight. To check tightness, there should be approximately 1/16" gap between cap and ridge on outlet port. (See Figure 6).



NOTE: If cap is not sufficiently tight, fluid can enter the electronics and cause permanent damage.

Repair

If any meter components are damaged, they should be replaced. See meter kits drawing on page 10 for correct replacement part information before ordering.

Maintenance



CAUTION

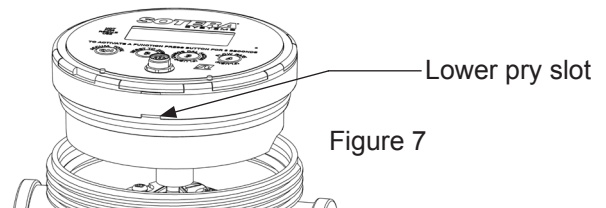
Follow fluid manufacturer's recommended procedures for handling and disposing of metered fluids.

Meter should be flushed between uses with water to prevent chemicals from drying and plugging meter.

Thorough Cleaning (refer to exploded view)

If meter is plugged due to hardened chemical or debris, do the following:

1. Drain all fluid from meter.
2. Unscrew meter cap (item 1, page 10). Use a strap type oil filter wrench or large 5" jaw pipe wrench if necessary.
3. Insert a flat-head screwdriver in the lower slot (see Figure 7) and turn to pry up meter cover (item 6).



4. The meter chamber (item 8, page 10) can now be removed.
5. Rinse all meter components with flushing fluid. **DO NOT** submerge display assembly. **Be careful not to get any fluid or dirt in the electronics module. Permanent damage to the electronics will occur.**
6. Reassemble meter.

CALIBRATION NOTE: Over time, the chamber inside the meter will wear, requiring the meter to be re-calibrated with water. When this should be done depends on the amount and type of fluid dispensed. In most crop protection fluid uses (less than 1000 gallons of a clean fluid per year), the meter will remain accurate for many years without recalibration. On the other hand, dispensing an abrasive fluid may require more frequent recalibration.

The 825P / 850P meter is designed to be calibrated with clean water for safe handling. See "Water Calibration" section in Appendix - B.

Storage

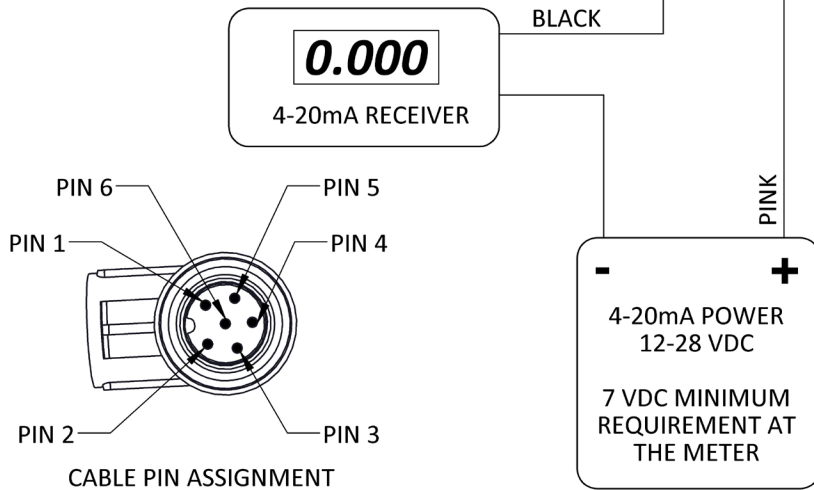
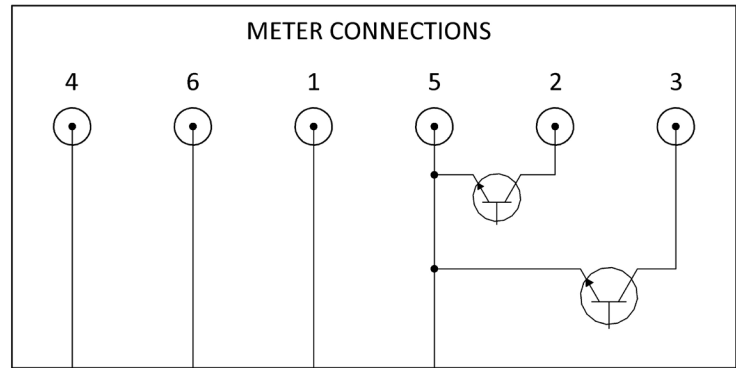
Store in a cool, dry place. Drain out all fluid that could freeze in the meter.

Electrical Wiring Information

CONNECTOR PINOUT		
FUNCTION	PIN	COLOR
5-24 VDC	1	BROWN
GROUND	5	GREY
4-20 mA SUPPLY	6	PINK
4-20 mA RETURN	4	BLACK
PULSE OUTPUT (S+)	2	WHITE
AIR DETECT (S+) *	3	BLUE

PULSE OUTPUT AND AIR DETECT ARE CURRENT SINKING OUTPUTS (OPEN COLLECTOR)

* THE AIR DETECT OUTPUT IS NOT AVAILABLE ON 825P MODELS



PULSE AND AIR DETECT OPERATIONAL LIMITS	
100 mA MAXIMUM PER OUTPUT	
24 VDC MAXIMUM PER OUTPUT	
PULSE WIDTHS ARE A FIXED 10 mS ON TIME	

RECOMMENDED PULL-UP RESISTOR VALUES		
5 VDC	330 Ohm	1/8 WATT MIN
12 VDC	1k Ohm	1/4 WATT MIN
24 VDC	2.4k Ohm	1/2 WATT MIN

825P / 850P Series Digital Meters are equipped with an integral pulser for use with Fuel Management Systems and batching equipment. These meters must also be connected to an auxiliary external power supply to operate the pulsing feature. 5-24 VDC external power is required for the pulse outputs on pins 2 and 3 to operate. Failure to attach external power can cause premature battery failure. **External power must be from 5 - 24 VDC.**

NOTE: When powering the 4-20mA loop, a **minimum of 7 VDC is required** at the 825P/850P meter for consistent operation.

The manufacturer of the 4-20mA receiver will supply voltage drop information as well as their minimum voltage requirements in their literature.

NOTE: If the meter is to be used in environments with high levels of EMC or RF sensitive equipment, connect the braided shield of the cable to an earth ground.

The 825P / 850P meters are designed to conduct ESD and EMC surges through the braided shield.

NOTE: The pulse width for volumetric output and air detect is 10ms.

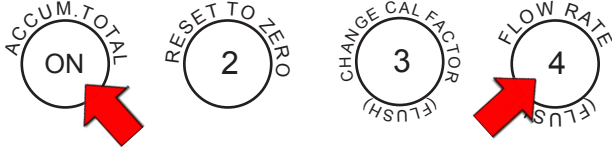
DO NOT connect the braided shield to the ground of the Power Supply, or the 4-20mA loop power.

DO NOT install or operate this meter in an explosive atmosphere!

Pulse Output Configuration and Flow Rate

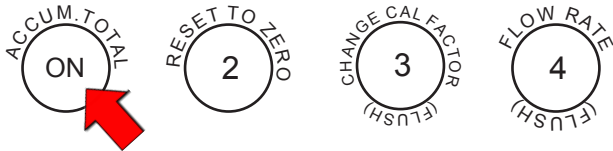
Pulse Output Configuration

A) Press the **ON** and **4** buttons simultaneously for 3 seconds.

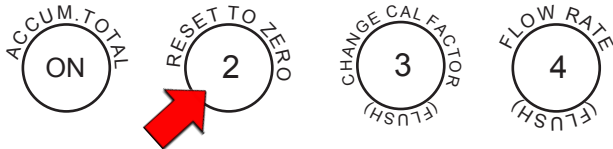


- Rate icon will display.
- Current pulse options will be displayed (1 - 5) in the large left most digit.

B) Press the **ON** button repeatedly until the desired pulse output configuration number is displayed.



C) Press button **2** to save and return to normal operating mode.

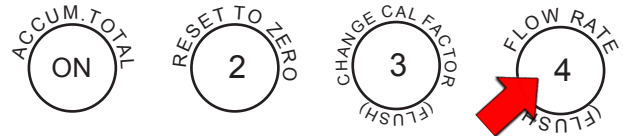


Regardless of unit of measure selection, the meter will generate a 4mA output at 0-1 GPM and scale linearly to 4-20mA from 1 - 25 GPM. At 25 GPM or higher, output stays at 20mA.

See chart on page 15 for 4 - 20 mA specifications.

Flow Rate

A) "When button **4** is held for 3 seconds, flow rate is displayed. Fluid dispensed is still added to the accumulated total and current total.



"Rate" icon will be displayed.

Meter will continue to display flow rate until button **4** is pushed again.

NOTE: 4-20 mA out and pulse output are always active and not impacted by flow rate display.

Pulse Configuration Options

Pulse width is 10 ms.

		Gallons		Liters		Raw	
		Option 1** 100:1	Option 2 10:1	Option 3 25:1	Option 4 10:1	Option 5 Raw	
Configured Unit of Measure	Gal**	100	10	94.64	37.85		
	Quart	25	2.5	23.66	9.46		
	Liters	26.42	2.64	25	10		
	Pint	Raw counts, equivalent to 117 - 125 counts per gallon.					
	Oz	Raw counts, equivalent to 117 - 125 counts per gallon.					
	Special	Raw counts, equivalent to 117 - 125 counts per gallon.					

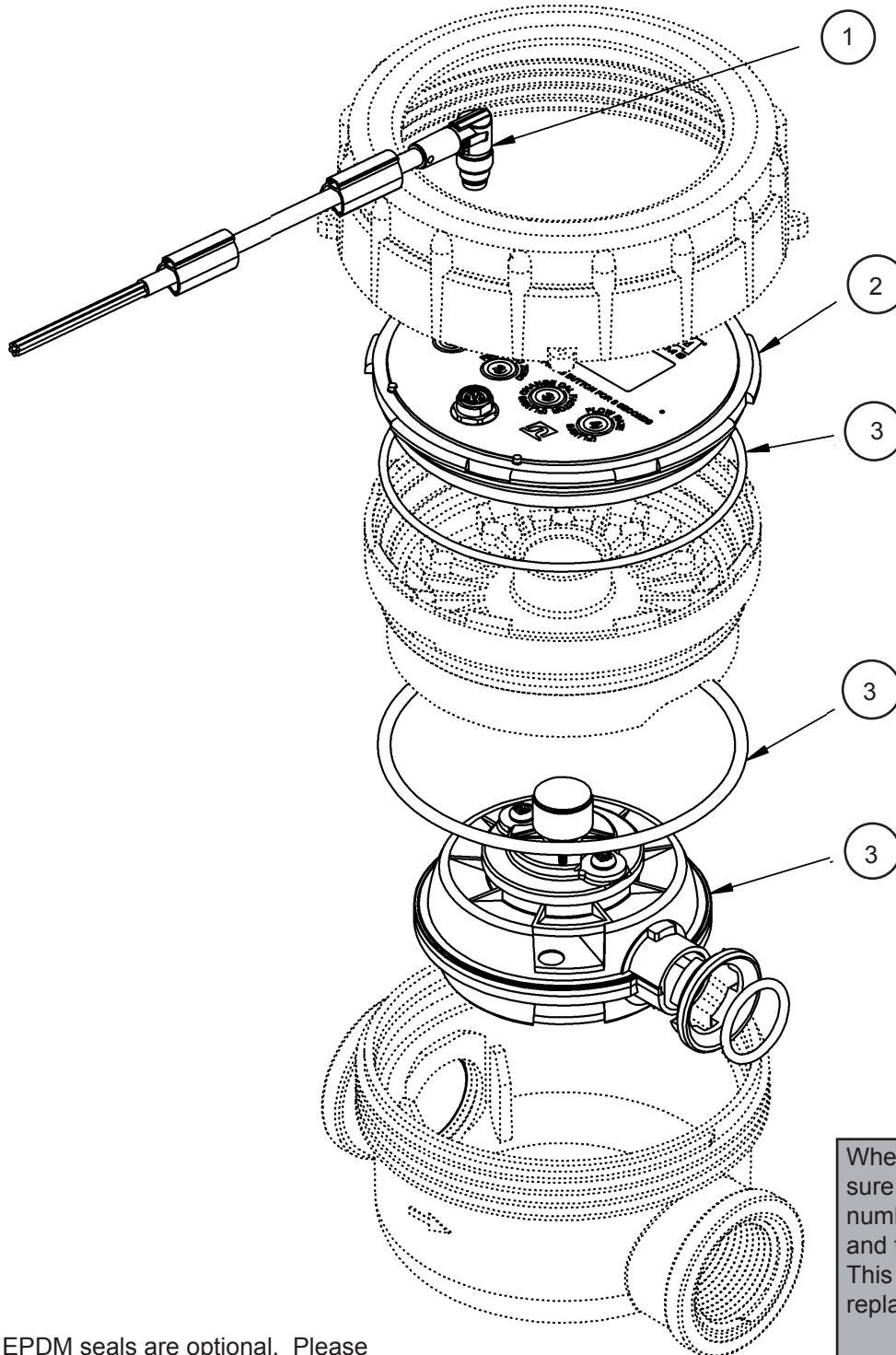
Internal pulse resolution per unit of measure (raw count).

**Option 1 and Gallons are the factory default.

Troubleshooting Guide

Problem	Possible Cause	Solution	Notes
Meter won't turn on.	<ul style="list-style-type: none"> Dead batteries Damaged or contaminated electronics module. 	<ul style="list-style-type: none"> Replace batteries. Replace electronics module & gaskets. 	Seal to electronic chamber is broken if display label is removed or punctured.
Flashing decimal.	Current total has rolled over.	Reset display to zero by pressing button ②.	Meter will continue to operate normally.
Flashing or dim display.	Low batteries.	Replace batteries.	Use CR2032 batteries.
Leaking fluid at inlet/outlet port.	<ul style="list-style-type: none"> Need thread sealant. Cross-threaded port. 	<ul style="list-style-type: none"> Add Teflon pipe tape to joint. Replace body. 	
Fluid flows; meter won't count.	<ul style="list-style-type: none"> Meter disk sticking. Damaged driver or magnet. Meter failure. 	<ul style="list-style-type: none"> Clean out meter chamber. Repair or replace chamber assembly. Repair or replace meter. 	
Meter reads high.	<ul style="list-style-type: none"> Air in system. Wrong calibration factor. 	<ul style="list-style-type: none"> Prime system, fix suction leak at pump. Use a higher calibration factor. See 1-Step procedure. See "Check Meter" in Appendix-A. 	Meter will count air. Chemical formulations sometimes change.
Meter reads low by 10% or less.	Wrong calibration factor.	<ul style="list-style-type: none"> Use a lower calibration factor. See 1-Step procedure on page 5. 	Chemical formulations sometimes change. Temperature also affects accuracy.
Meter reads low by more than 10%.	<ul style="list-style-type: none"> Meter chamber is worn. Chamber is partially plugged. Damaged or very worn chamber. 	<ul style="list-style-type: none"> Recalibrate meter with water. See Appendix-B. See "Check Meter" in Appendix-A. Clean chamber. Replace chamber and recalibrate meter. 	
Meter is not consistent	Air in system. Particulates in fluid. Worn or damaged meter chamber.	Prime system, fix suction leak at pump. Put screen in front of meter. Clean chamber. Replace chamber.	40 mesh minimum.
Err0	<ul style="list-style-type: none"> Calibration error. Damaged chamber. 	<ul style="list-style-type: none"> Recalibrate meter with more accurate container. Replace chamber. 	Indicates fluid calibration is out of acceptable window. Volumetric container may be off, there may be air in the system, or the meter chamber may be damaged.
Err1	<ul style="list-style-type: none"> Damaged electronics. Software fault. 	<ul style="list-style-type: none"> Repair or replace electronics. Press ② then recalibrate meter 	Contact factory.
Err2	Bad eeprom.	Replace electronics.	Meter still functions, but all data will be lost if batteries are removed.

825P / 850P Meter Parts List			
Item #	Part #	Description	Qty.
1	KITCBL	Power and Signal Cable	1
2	KIT825P	Replacement Electronics Kit	1
2	KIT850P	Replacement Electronics Kit	1
3	825F1582	Meter Chamber Kit and Seals	1



NOTE: EPDM seals are optional. Please specify what seals your meter is equipped with when ordering your kit.

When ordering repair parts, be sure to give the replacement part number, the date of manufacture, and the meter series number. This will ensure the correct replacement part is supplied.

**Toll free Customer Care
Number:**

800 634-2695

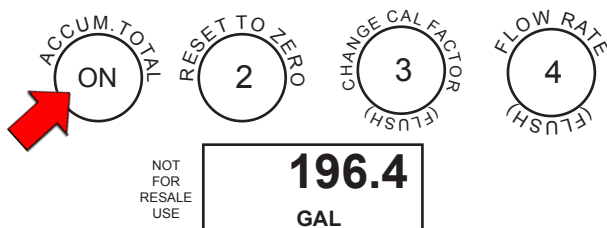
APPENDIX - A

TO CHANGE UNITS OF MEASURE

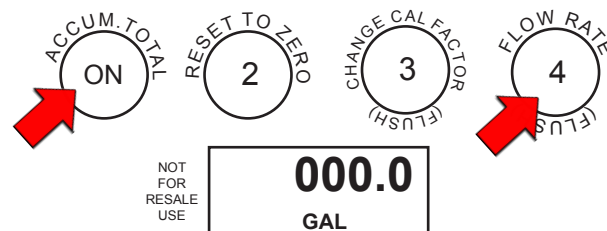
The units of measure can be changed to ounces (OZ), pints (PT), quarts (QT), gallons (GAL), or liters (LITER) without recalibrating the meter. If special units are desired, see note below.

1. Hold buttons ② and ④ for three seconds. Display will show current software revision level (i.e: **r1.02**).
2. Press button ③. Display will show the current units.
3. To change units, press the ① button repeatedly until the desired unit is displayed.
4. Press button ②. Display will show firmware revision.
5. To return to normal operating mode press button ② again.
6. The units selected will be displayed. Current or accumulated total will change to reflect the new units.

2. Press ① to display accumulated total. If over 9999, display will scroll across the screen.



Hold buttons ① and ④ for 5 seconds to reset accumulated total.



Special Units

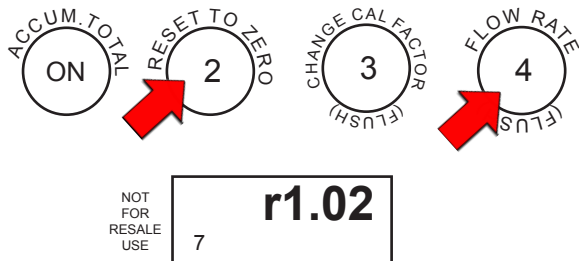
To use special units, you need to know how many ounces are in your special unit. Here is an example: You want to use "acres" as your "special" unit. The fluid is to be applied at 18 ounces per acre. These are the additional steps to set the meter to "special" units (ignore steps 4 & 5 above):

1. After selecting "special" in step #3 above, press button ②.
2. Enter the number of ounces in a special unit by pressing button ④ to increment the digit, and the ① button to move the flashing digit to the right. If you make a mistake, press button ② to start back at the left most digit. Per our example, we would enter 018.0.
3. Press the ① button again. Current firmware will display.
4. To get back to the normal operating mode, press button ②.

4. Press button ② twice to get back to normal operating mode.

RESET ACCUMULATED TOTAL

Press ② and ④ simultaneously and hold for 3 seconds.



Display will read the version of the software loaded in the meter (example: "r1.02").

METER CHECK

You can check the calibration in your meter.

1. Set to CAL 4 (See "to change the calibration factor").
2. Hold button ③ and ④ for 3 seconds. Meter will display "FLSH".
3. Hold buttons ① & ③ together. A number will display that indicates the pulses per unit used to calculate flow (ie: pulses per gallon). When new, this number is between 120.0-127.0 pulses per gallon.

If you find a number higher than 127, recalibrate with water (see Appendix-B). If this number is lower than 120, the meter chamber may need to be replaced.

4. Press ② to get back to normal operating mode.

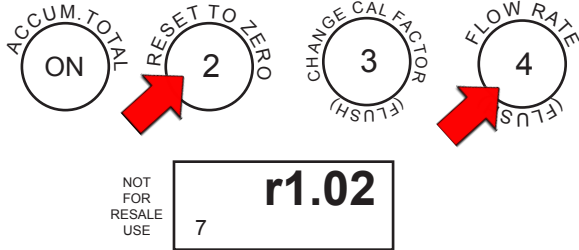
FLSH (FLUSH) MODE

The 825P/850P Meter can be flushed without adding to the totalizer. Turn meter on by pressing the ① button. Press ③ and ④ simultaneously and hold for 3 seconds. Display will show FLSH. Flush meter with suitable fluid (water is suitable for most herbicides). When completed, press ② to leave FLSH mode and return to normal operation. Quantity of fluid flushed will not be added to total.

The 825P / 850P meter is designed to be re-calibrated with water for safe handling. Over time, the chamber inside the meter will wear. Recalibrating the meter with clean water will insure that Table #1 (calibration table page 4) is most accurate.

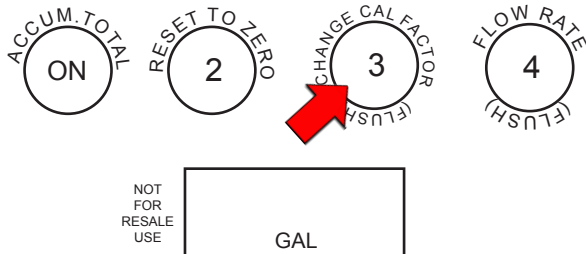
You will need a container of known volume, at least 5 gallons or larger. Do not exceed a 60 gallon container.

1. Press the (2) & (4) buttons simultaneously and hold for 3 seconds.



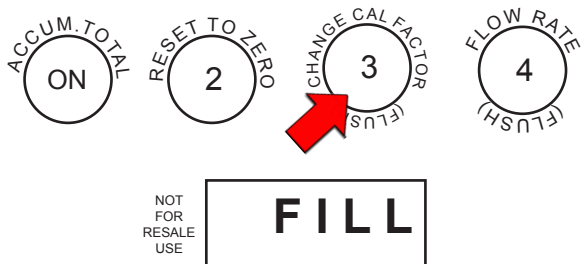
The display will read the version of the software loaded in the meter (example: "r1.02").

2. Press button (3) to enter calibration mode.



The unit of measure will be displayed.

3. Press button (3).



The display will read "FILL".

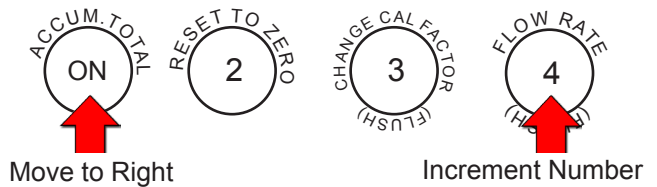
4. Now dispense water into your container. "FILL" will flash on the display.

5. After dispensing, press the (ON) button.



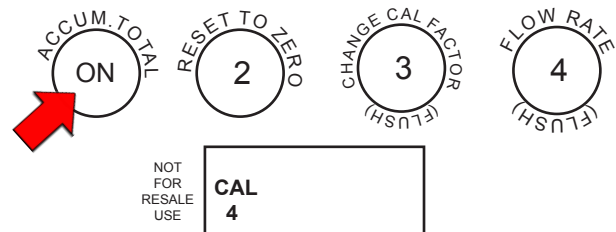
The left digit of the display will blink.

6. Press the (4) button to increment the digit to the amount of fluid dispensed (example: 05.00). Press the (ON) button to move to the right.



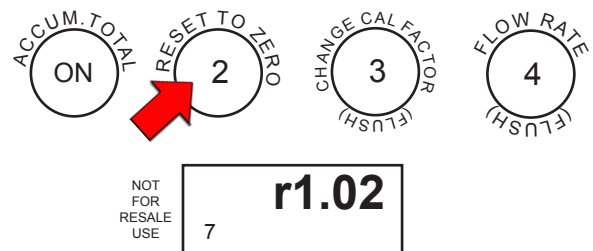
If you make a mistake, press button (2) to start back at the left- most digit.

7. After number is loaded, press the (ON) button again to accept.



8. Display now shows CAL 4 .

Since you are calibrating with water, accept this by pressing the (ON) button again. If calibrating with a fluid other than water, see Appendix-C. Display will again show "r1.02".



Note: If the value entered is out of an acceptable range, the display will read "Err0" and the meter will revert to the previous settings. See Troubleshooting Guide for more information.

9. Press (2) to get back to the normal operating mode.

APPENDIX-C

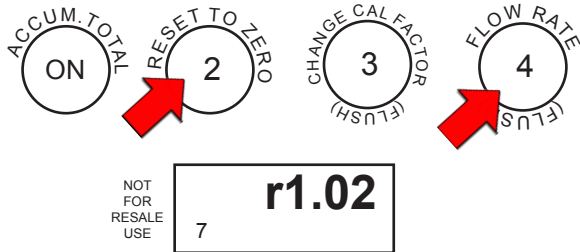
Fluid Calibration (other than water)

CAUTION: DO NOT perform this calibration unless you understand fully how CAL factors work.

CAUTION: Calibrating with a fluid other than water voids Table #1 (calibration table page 4). After calibration, set the meter to CAL 4, and use the meter on CAL 4 (unless you input a different number during step 9 below).

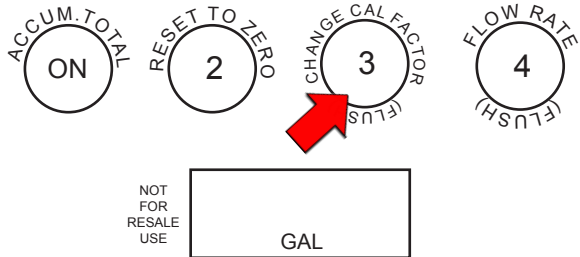
You will need a container of known volume, at least 5 gallons or larger. Do not exceed a 60 gallon container.

1. Press the (2) & (4) buttons at the same time and hold for 3 seconds.



The display will read the version of the software loaded in the meter (example: "r1.02").

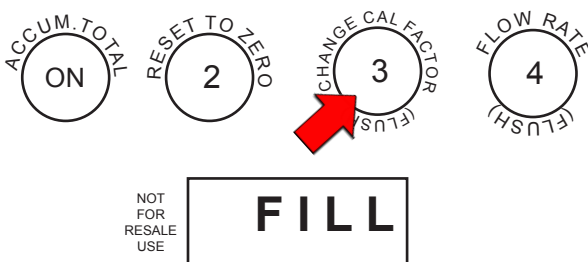
2. Press button (3) to enter calibration mode.



The unit of measure will be displayed.

3. Press the (ON) button to change unit of measure, if required. This is **ONLY** necessary if calibrating a different unit of measure.

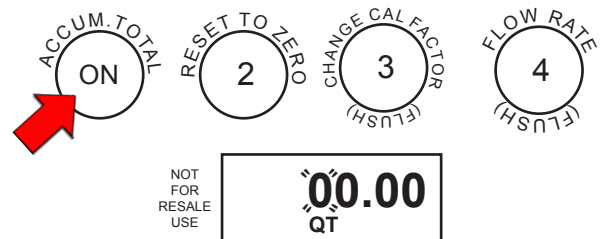
4. Press button (3).



The display will read "FILL".

4. Now dispense fluid into your container. "FILL" will flash on the display. For best results, dispense fluid at the same flow rate that will be used in actual use.

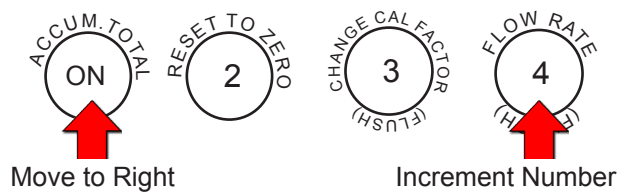
5. After dispensing, press the (ON) button.



The left digit of the display will blink.

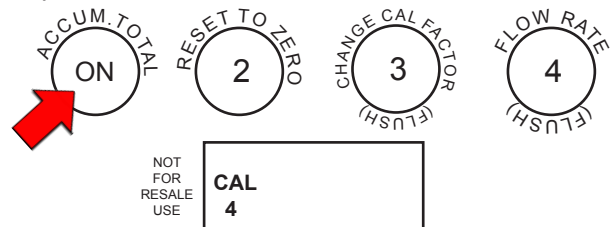
7. Press the (4) button to increment the digit to the amount of fluid dispensed (example: 05.00).

Press the (ON) button to move to the right.



If you make a mistake, press button (2) to start back at the left-most digit.

8. After number is loaded, press the (ON) button again to accept.



9. Display now shows CAL 4.

This is the default for water. Check Table 1 for your fluid. Press (3) to change the Cal #. Press (ON) to accept. Display will again Show "r1.02".



NOTE: IF YOU ACCEPT CAL 4, USE THE METER ON CAL 4 WHEN DISPENSING THIS FLUID.

NOTE: If the value entered is out of an acceptable range, the display will read "Err0" and the meter will revert to the previous settings. See Troubleshooting Guide for more information.

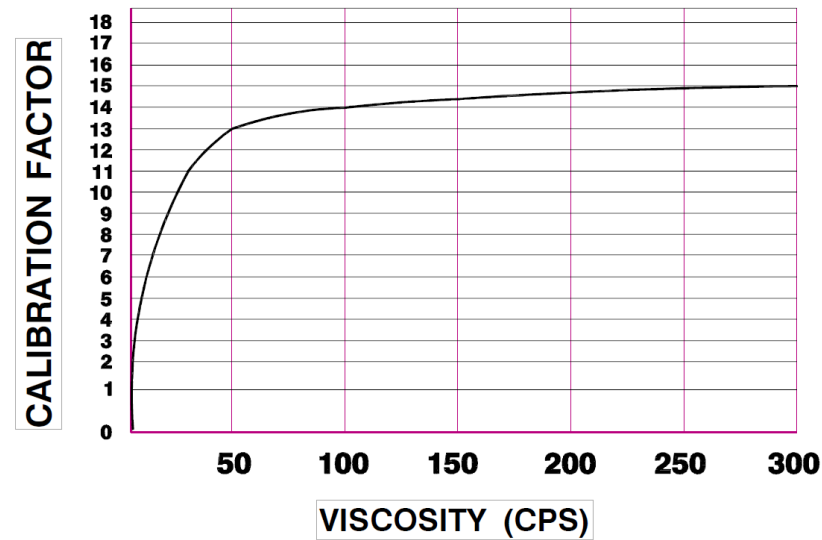
10. Press (2) to get back to the normal operating mode.

APPENDIX - D Flow Performance

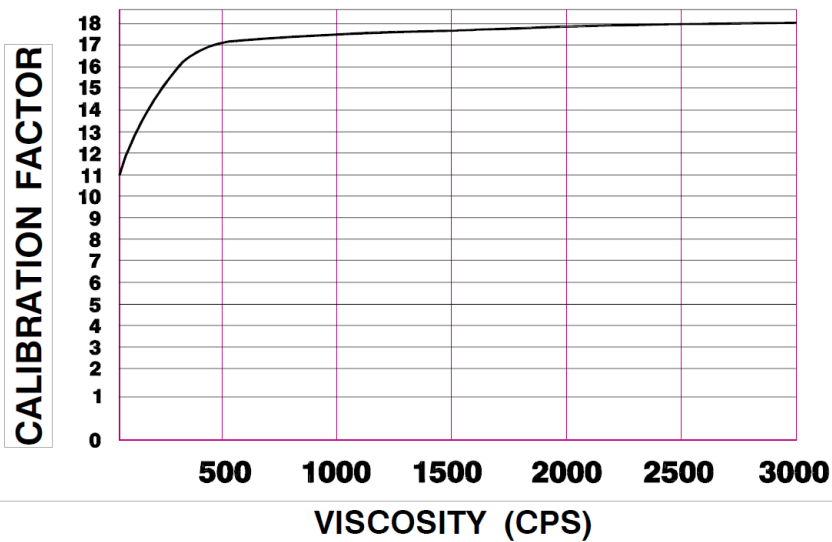
METER CALIBRATION FACTOR SELECTION BASED ON FLUID VISCOSITY



Low
Viscosity
(thin)
Fluids



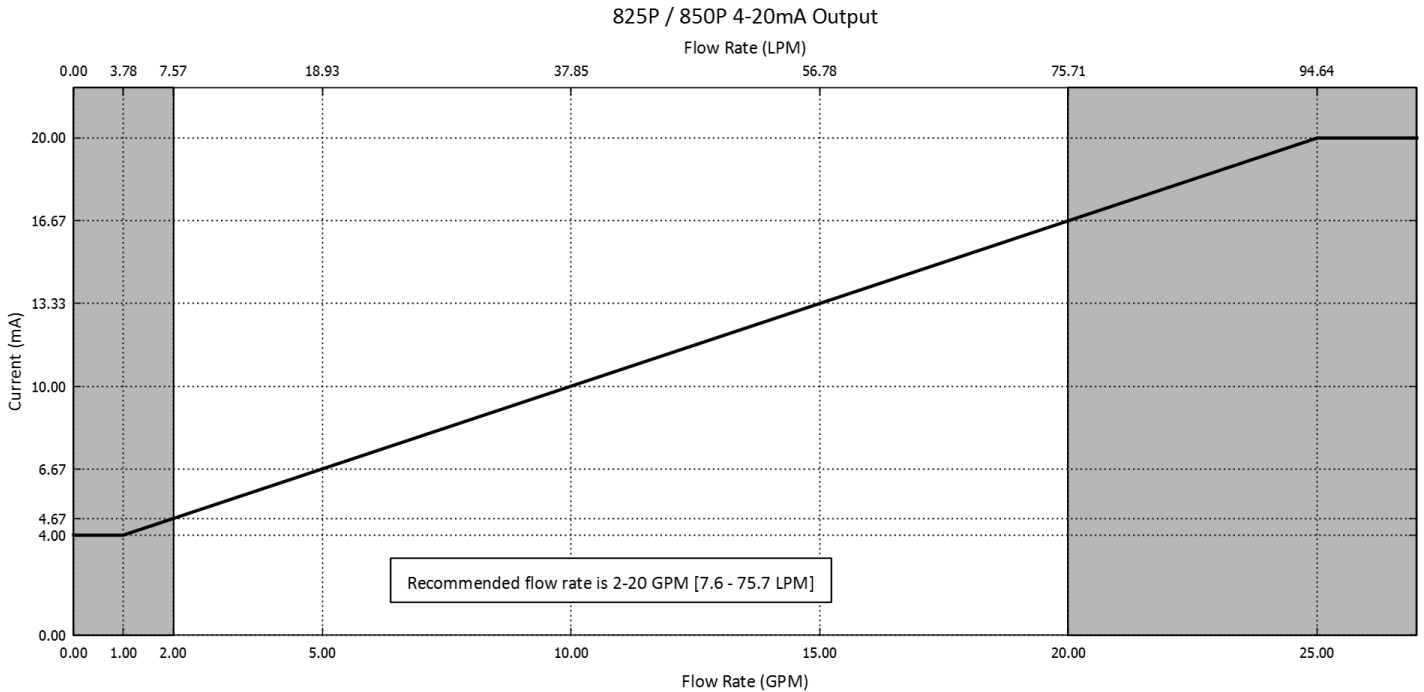
Medium
Viscosity
Fluids



High
Viscosity
(very thick)
Fluids

NOTE: Graphs are accurate with original factory calibration, or a water calibration. See page 10.

4 - 20 mA Output Information



Trademark Information

(from page 3)

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CE Certification Information

The 825P and 850P meters bearing the CE mark have been certified to the following European directives:

2011/65/EU = Restriction of the use of certain hazardous substances in electrical and electronic equipment.

2004/108/EC = Electromagnetic Compatibility

The following standards were used to test and show compliance:

Emissions

EN 55011:2009/A1:2010 Group 1, Class B, Industrial, Scientific, and Medical (ISM) Equipment

Immunity

EN 61326-1:2006, Electrical Equipment for Measurement, Control and Laboratory Use

IEC 61000-4-2: ESD

IEC 61000-4-3: Radiated Immunity

IEC 61000-4-4: EFT

IEC 61000-4-6: Conducted Immunity

IEC 61000-4-8: Magnetic Field

Tuthill supplies a high quality shielded power and signal cable with the 825P and 850P Series that meets the criteria for CE certification. Substitution of the provided cable may impair Immunity resistance.

Bonding of the cable screen is not required to meet CE certification and ground loops may introduce noise and false counts.

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