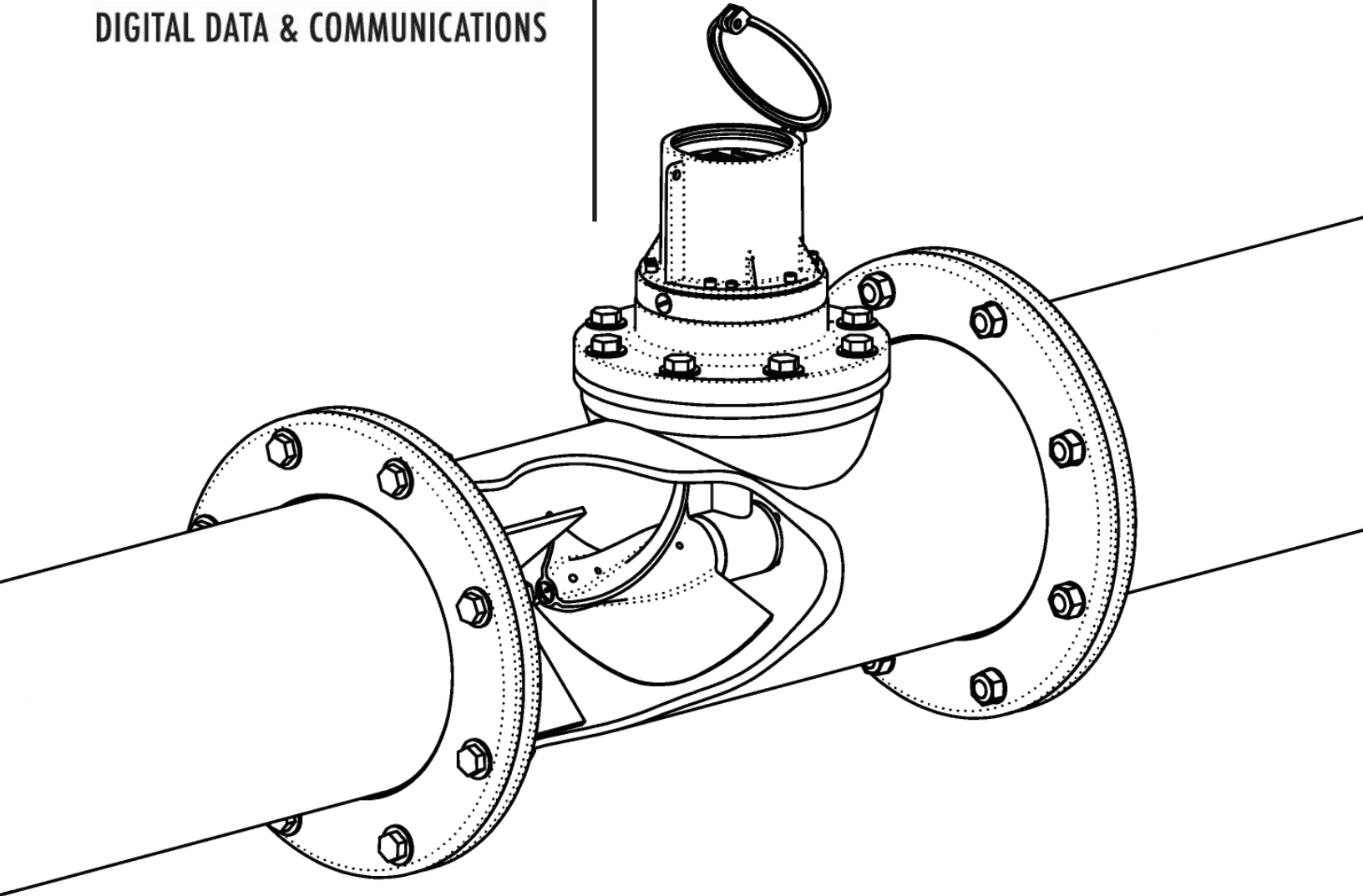




FlowCom™ Register

DIGITAL DATA & COMMUNICATIONS



**FC101 FlowCom Register
INSTALLATION, OPERATION & MAINTENANCE MANUAL**

FOR
Water Specialties Propeller Meter™

30119-50 Rev. 1.4
November, 2009
Software Revision 2.3

Table Of Contents

	Page
Warranty Statement	1
Safety Warnings	2
Section I – Introduction	
1.1 Description.....	3
1.2 Features	3
1.3 Model Number Identification.....	3
Section II – Installation	
2.1 Retrofitting Instruction For A Mechanical-to-Electronic Conversion Kit.....	5
2.2 Retrofitting Instruction For An Electronic Register Pulse Input Connection Kit	8
2.3 Meter-mounted Electronic Register Pulse Input Connection.....	8
2.4 Remote-mounted Electronic Register Pulse Input Connection	9
Section III – Output Wiring Connection	
3.1 Wiring Diagrams.....	10
3.2 Housing Label	13
3.3 4-20mA Test Modes	13
3.4 LCD Output Symbol Clarifications.....	14
Section IV – Programming	
4.1 Accessing The Configuration Menu	15
4.2 Document Changes	15
4.3 Menu Table Of Contents	16
4.4 Menu Navigation	17-26
4.5 Configuration Examples.....	27-29
Section V – Product Specifications	
5.1 Specifications	30
5.2 Dimensions	31
5.3 Housing	31
5.4 Parts List	32
Section VI – Product Maintenance	
6.1 Battery Replacement.....	33
Section VII – Troubleshooting	
7.1 Inaccurate Rate And Total Readings.....	34
7.2 No Optically-isolated Pulse Or Dry Contact Switch Output.....	34
7.3 No 4-20mA Transmitter Output	34
7.4 Non-Responsive Rate And Total Readings.....	34
7.5 Blank LCD Display.	34
7.6 Circuit Board Connections	35

WARRANTY STATEMENT

Manufacturer warrants all products of its manufacture to be free from defects in workmanship and material under normal use and service. This warranty extends for a period of twelve (12) months after date of shipment, unless altered by mutual agreement between the purchaser and manufacturer prior to the shipment of the product. If this product is believed to be defective, purchaser shall notify manufacturer and will return the product to the manufacturer, postage paid, within twelve (12) months after date of shipment by the manufacturer. If the purchaser believes the return of the product to be impractical, manufacturer shall have the option, but will not be required, to inspect the product wherever located. In any event, if the purchaser requests the manufacturer visit their location, the purchaser agrees to pay the non-warranty expenses of travel, lodging and subsistence for the field service response. If the product is found by the manufacturer's inspection to be defective in workmanship or material, the defective part or parts will either be repaired or replaced, at manufacturer's election, free of charge, and if necessary the product will be returned to purchaser, transportation prepaid to any point in the United States. If inspection by the manufacturer of such product does not disclose any defect of workmanship or material, manufacturer's regular service repair charges will apply. Computing devices sold but not manufactured by McCrometer, Inc. are covered only by the original manufacturer's written warranty. Hence, this warranty statement does not apply.

THE FOREGOING WARRANTY IS MANUFACTURER'S SOLE WARRANTY, AND ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE NEGATED AND EXCLUDED. THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, GUARANTEES, REPRESENTATIONS, OBLIGATIONS OR LIABILITIES ON THE PART OF THE MANUFACTURER.

Purchaser's sole remedy and manufacturer's sole obligation for alleged product failure, whether under warranty claim or otherwise, shall be the aforesated obligation of manufacturer to repair or replace products returned within twelve months after date of original shipment. The manufacturer shall not be liable for, and the purchaser assumes and agrees to indemnify and save harmless the manufacturer in respect to, any loss or damage that may arise through the use by the purchaser of any of the manufacturer's products.

If you experience problems with your FlowCom register, please contact your local factory representative for assistance. You may also contact Customer Service at the factory directly at 951-652-6811. Be prepared to provide the serial number off of your meter or FlowCom register (this information is located on the lid of the register).

When returning McCrometer products to the factory for repair or warranty consideration, a return authorization number (RA) must be obtained from the factory and referenced on the outside of the box of the products you are returning. The products should be shipped back to the factory at:

McCrometer
3255 West Stetson Avenue
Hemet CA 92545

Safety Warnings

When installing, operating, and maintaining McCrometer equipment where hazards may be present, you must protect yourself by wearing Personal Protective Equipment (PPE) and be trained to enter confined spaces. Examples of confined spaces are manholes, pumping stations, pipelines, pits, septic tanks, sewage digesters, vaults, degreasers, storage tanks, boilers, and furnaces.

You must follow all state and local laws, as well as Occupational Health and Safety Administration (OSHA) regulations concerning Personal Protective Equipment, confined-space entry, and exposure to bloodborne pathogens. Specific requirements can be found in the OSHA section of the Code of Federal Regulations: *29 CFR, 1910.132 - 1910.140, Personal Protective Equipment; CFR Title 29, Part 1910.146, Permit-Required Confined-Spaces; and 29 CFR, 1910.1030, Bloodborne Pathogens.*

WARNING!

Never enter a confined space without first testing the air at the top, middle, and bottom of the space. The air may be toxic, oxygen deficient, or explosive. Do not trust your senses to determine if the air is safe. You cannot see or smell many toxic gases.

WARNING!

Never enter a confined space without the proper safety equipment. You may need a respirator, gas detector, tripod, lifeline, and other safety equipment.

WARNING!

Never enter a confined space without standby/rescue personnel within earshot. Standby/rescue personnel must know what action to take in case of an emergency.

WARNING!

Pressurized pipes should only be tapped, cut, or drilled by qualified personnel. If possible, depressurize and drain the pipe before attempting any installation.

SECTION I – INTRODUCTION

1.1 Description

The FlowCom Register displays a flowmeter’s flowrate and volumetric total. Available are optional outputs: scaled pulse and/or industry standard 4-20mA signal. The FlowCom can be fitted to any new or existing Water Specialties propeller flowmeter.

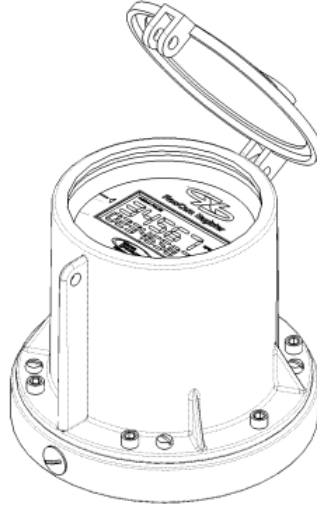


Figure 1: FC101 Electronic Register

1.2 Features

- Retrofits to any existing Water Specialties propeller meters
- Four output options: Contact Closure, Open Collector, Optically Isolated, and 4-20mA Loop
- Unique Units of Measurement for Rate, Total, 4-20mA and Pulse Outputs
- 6–10 Year Battery Life
- NEMA 4X Enclosure with Non-intrusive Register Programming
- Remote and Meter-Mounted Models
- Factory sealed enclosure protects electronics

1.3 Model Number Identification

Model Number	Power	Output(s)	See Figure No.
FC101-00-K/R - Meter Mount	Battery	None	2
FC101-10-K/R - Remote Mount			3
FC101-01-K/R - Meter Mount		Open Collector Pulse	4
FC101-11-K/R - Remote Mount			5
FC101-02-K/R - Meter Mount	4-20mA Loop/ DC Power	4-20mA/Optically Isolated Pulse	4
FC101-12-K/R - Remote Mount			5
FC101-03-K/R - Meter Mount		4-20mA/Contact Closure Pulse	4
FC101-13-K/R - Remote Mount			5

Note:

1. Add the suffix “-K” at the end of the model numbers for the retrofit kit models (e.g. FC101-01-K).
2. Add the suffix “-R” at the end of the model numbers for the register only
3. Meter to remote register and output cables are available in 10-foot increments, from 10 to 100 feet.
4. Unless otherwise specified models with output(s) are provided with a 6-foot output cable.

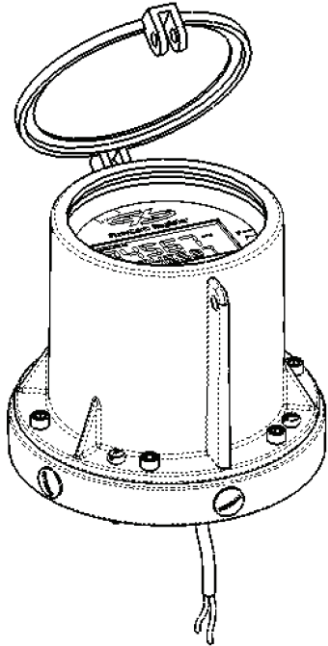


Figure 2: Meter Mount Models without Optional Output

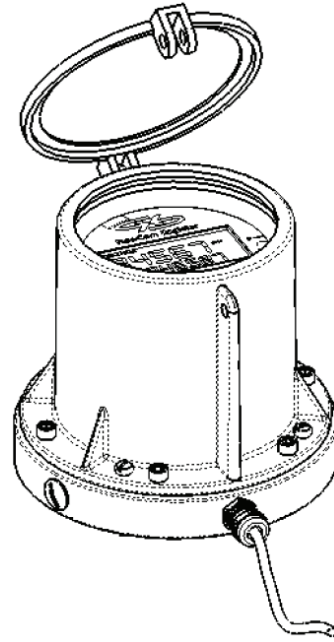


Figure 3: Remote Mount Models without Optional Output

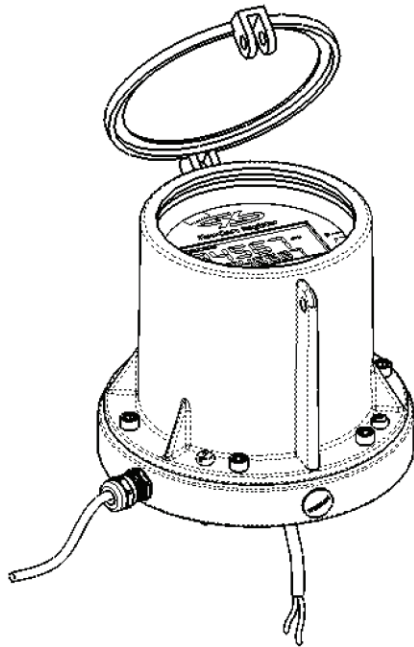


Figure 4: Meter Mount Models with Optional Output

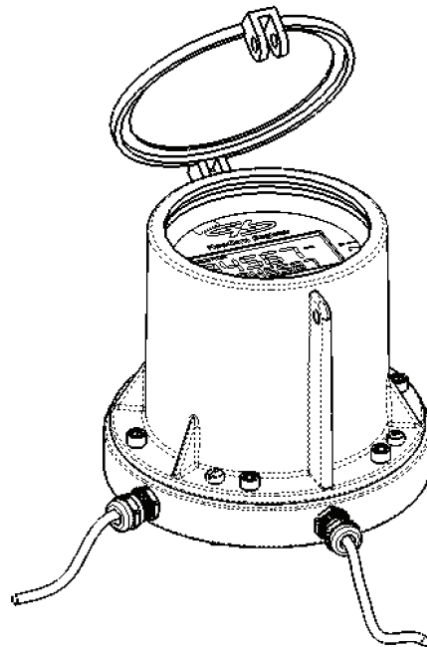


Figure 5: Remote Mount Models with Optional Output

SECTION II – INSTALLATION

2.1 Retrofitting Instruction For A Mechanical-To-Electronic Conversion Kit

Step 1. After unpacking the register assembly, verify that the meter serial number engraved on the enclosure lid is correct. Then confirm the information on a silver label located under the enclosure lid and on the bottom of the base plate (Figure 6.)



Figure 6: Silver Identification Label

Step 2. Check the parts received against the parts lists on Page 31.

Step 3. Remove pressure from the pipeline.

Step 4. Remove the meter head assembly from the pipeline.

Step 5. Remove the entire totalizer or indicator-totalizer register assembly. Register models with totalizers have four bonnet screws and models with both the indicators and totalizers have four bonnet screws and two register screws (Figure 7 and Figure 8).

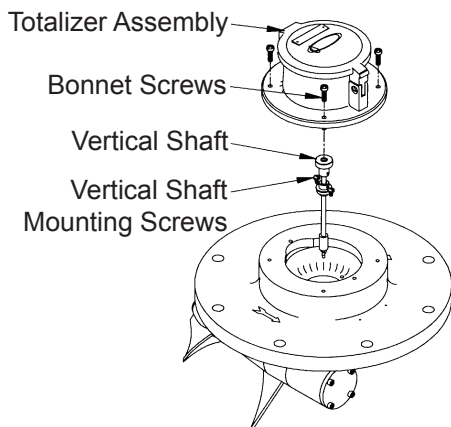


Figure 7: Meter Head Assembly with Totalizer

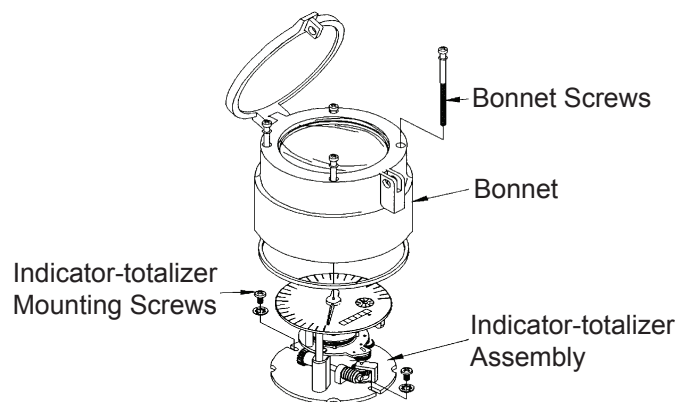


Figure 8: Indicator-totalizer Assembly

Step 6. For ML and LP meters: Remove the V-shaft by loosening the two screws holding the V-shaft from the inside of the meter head.

For ML and LP meters with extensions and for OF and VF meters: pull vertical shaft out only enough (approximately 1") for removal of miter gear frame assembly so that the vertical shaft can be used later for pulling the sensor input cable out of the drop pipe.

Step 7. For ML, LP, and OF meters: remove the miter gear frame assembly by releasing the four screws out of the back of the gearbox (Figure 9).

Caution: The gearbox oil will begin draining as soon as the seal is broken.

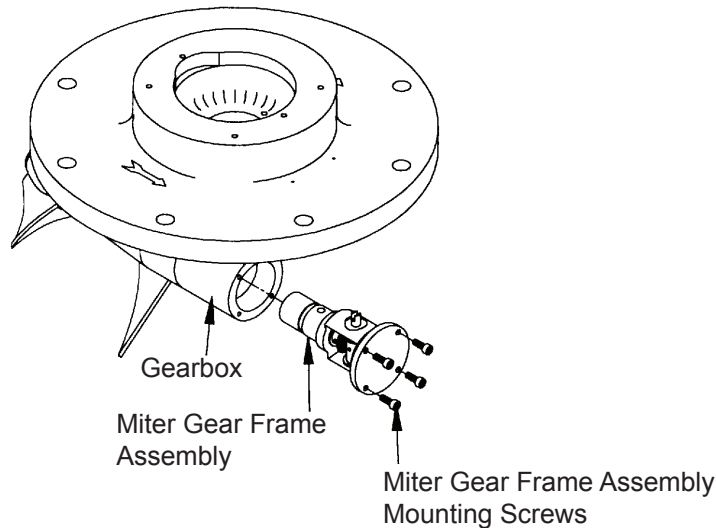


Figure 9: Miter Gear Frame Assembly Inside The Gearbox

For VF meters: remove the propeller and the separator-spindle assembly (Figure 10).

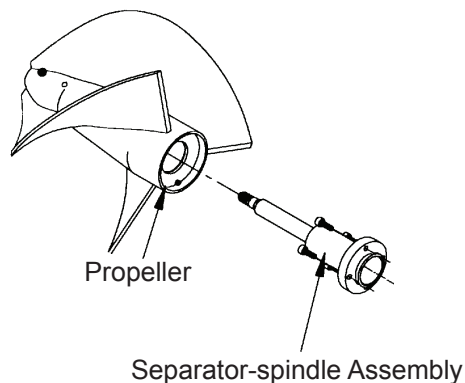


Figure 10: Propeller And Separator-spindle Assembly

Step 8. Make sure the gearbox or drop pipe and separator/spindle assembly are dry and free of oil.

Step 9. For ML and LP meters: push the sensor assembly through the back of the gearbox all the way into the separator/spindle assembly. Rotate the sensor assembly so that the sensor cable can be fed through gearbox up over the meter head. Put a thin film of silicon grease on the O-ring and secure the back plate of the gearbox with four screws (Figure 11).

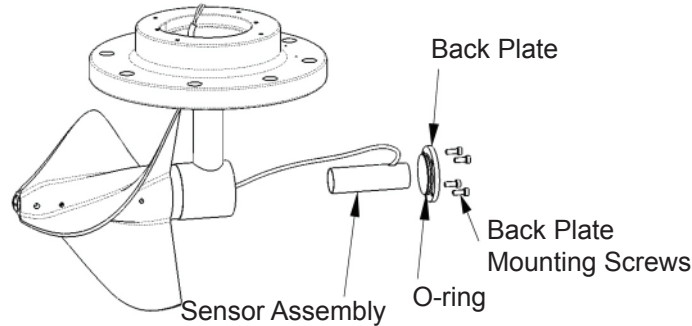


Figure 11: Propeller And Separator-spindle Assembly

For OF and 24" to 54" ML meters: attach pulling fixture T-2730-2 to bottom tip of existing vertical shaft assembly (Figure 12). Tighten both set screws on the fixture with a 0.062 Allen wrench for a secure connection to the vertical shaft tip. Loop sensor cable through hook on fixture and secure with a small piece of tape. Keep the sensor cable tight to allow passage through drop pipe bushings

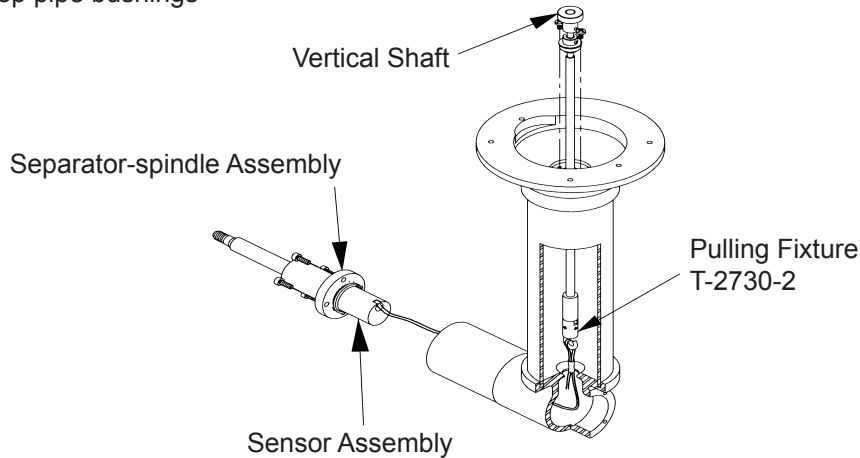


Figure 12: OF Meter Gearbox With Sensor And Separator-spindle Assemblies

For VF meters: push the sensor assembly all the way into separator/spindle assembly and then tighten the set screw to secure the position of the sensor assembly (Figure 13). **Note:** The sensor cable must be positioned as shown.

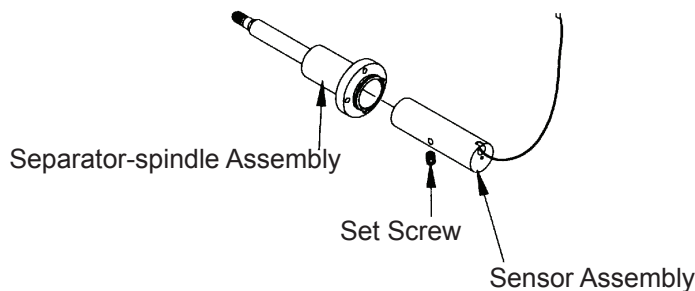


Figure 13: Sensor and Separator-spindle Assembly

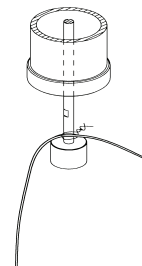


Figure 14: Sensor Cable Via The Vertical Shaft

Then tie the sensor cable to the magnet end of the vertical shaft to assist in pulling the cable through (Figure 14). Leave approximately a 4" tale from the knot to the end connector so that magnet and cables can pass through the drop pipe end. At last, reinstall the propeller and separator/spindle assembly.

2.2 Retrofitting Instruction For An Electronic-To-Electronic Upgrade Kit

Remove the original electronic register/remote-register meter adapter from the meter head to expose the sensor cable. If the existing sensor cable coming out of the meter head has an in-line rectifier connection, the rectifier connection should be detached. If there is a ground lug wire on the sensor cable shield, the ground wire should be removed from the sensor cable (Figures 15 and 16).

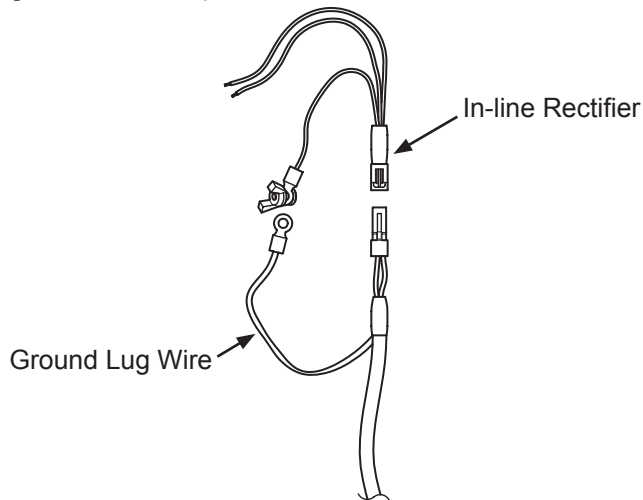


Figure 15: Sensor Cable With In-line Rectifier Removed



Figure 16: Sensor Cable Ready For Connection

2.3 Meter-mounted Electronic Register Pulse Input Connection

The connection shown below is typical of all Water Specialties Electronic Propeller Flow Meters.

Step 1. Clean the meter head surface of all dirt, glue, gaskets, etc.

Step 2. Verify that an O-ring is installed at the bottom of the electronic register base plate.

Step 3. Connect the sensor cable to the in-line terminal block. The red wire of the pulse input cable is the positive (+) and the black wire is the negative (-) (Figure17). **Caution:** Be careful not to drop the register assembly.

Step 4. Secure the electronic register to the meter head with the four 1-1/4" long screws provided (Figure18).

Step 5. Spin the propeller and verify that the rate display responds.

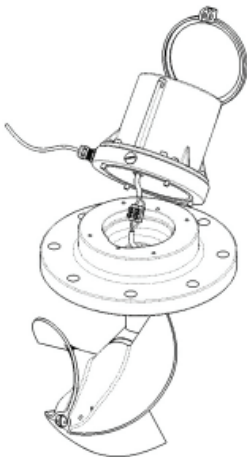


Figure 17: Sensor Cable Connecting To Pulse Input Cable

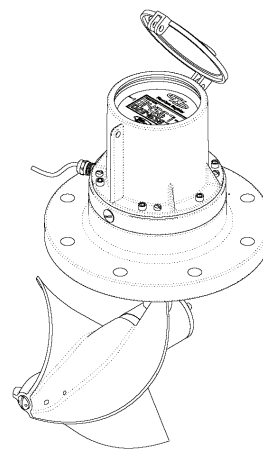


Figure 18: Register Mounted To A Meter Head

2.4 Remote-mounted Electronic Register Pulse Input Connection

Step 1. Verify that the rate display of the new electronic register responds before installing the electronic register at a remote location by connecting the pulse input cable to the sensor cable and then spinning the propeller. The red wire of the pulse input cable is the positive (+) and the black wire is the negative (-).

Caution: Be careful not to drop the register assembly.

Step 2. Mount the electronic register at the determined remote location. The mounting holes on the electronic register are equally spaced on a bolt circle with a diameter of 4.625 inches. The diameter of the mounting holes is 0.2 inches.

Step 3. For upgrading from an old remote-mounted electronic register to a new model, the existing remote-register meter adapter and cable can be utilized for connection to the new electronic register by connecting the existing cable to the new electronic register pulse input cable.

Caution: Do not cut off the pulse input cable completely from the new electronic register. The pulse input cable is permanently connected to the electronic register within the enclosure.

For installing a remote-mounted electronic register at a new location, pull the pulse input cable through a conduit and then through the water tight connector. Connect the sensor cable to the pulse input cable, and then tighten the water-tight connector. Verify that an O-ring is installed at the bottom of the remote-register meter adapter, and mount the adapter to the meter head (Figure 19).

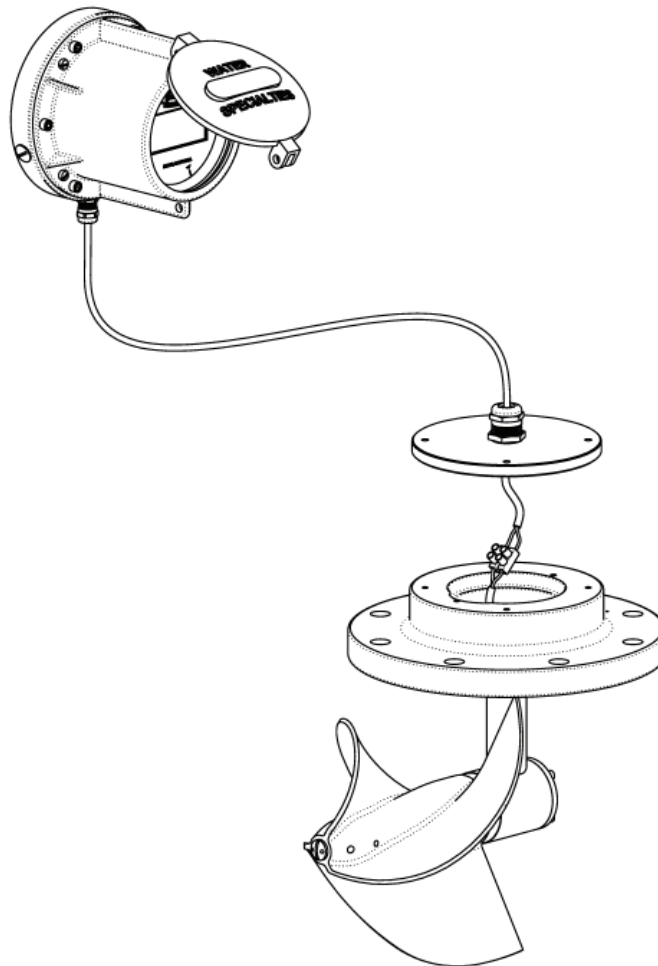


Figure 19: Electronic Register With No Optional Output Mounted To A Remote Location

SECTION III - Output Wiring Connection
3.1 Wiring Diagrams

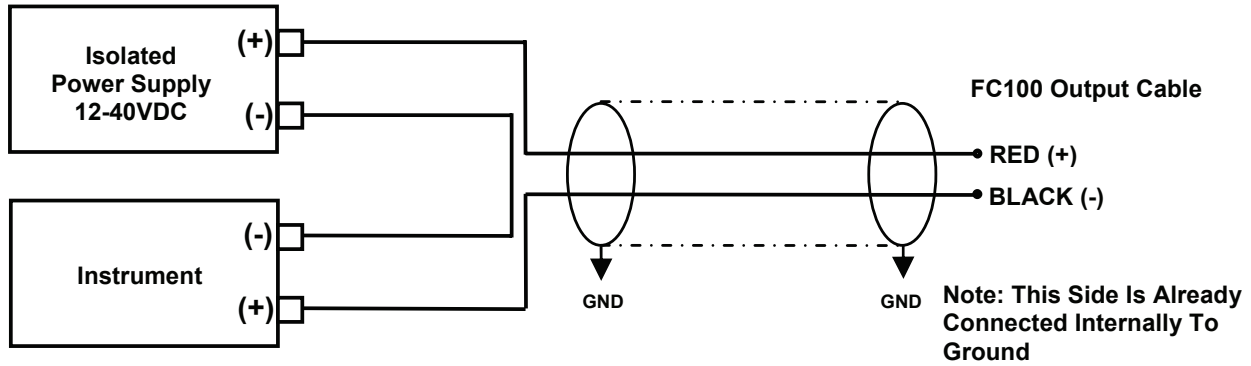


Figure 20 **Output Type:** 4-20mA Current Loop (Meter-mounted version)
Housing Label: 1 (Figure 22)

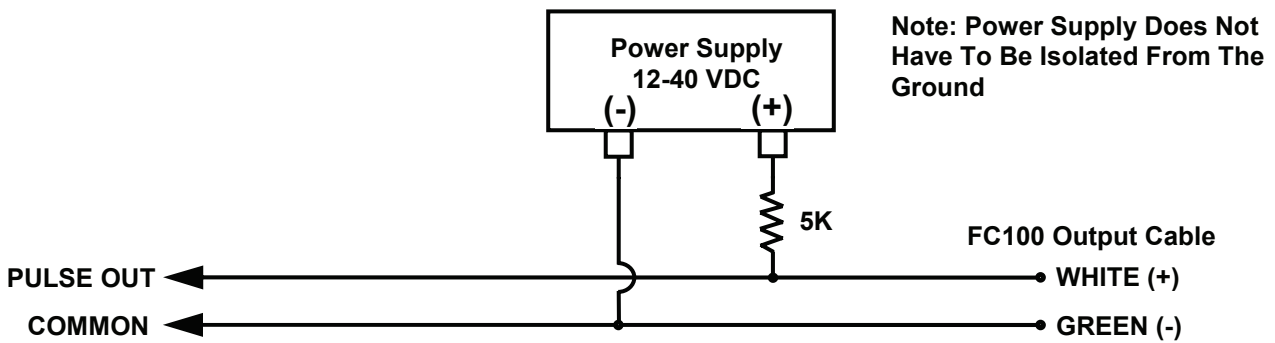


Figure 21 **Output Type:** Optically Isolated Connection
Housing Label: 1 (Figure 22)

3.1 Wiring Diagrams (Continued)

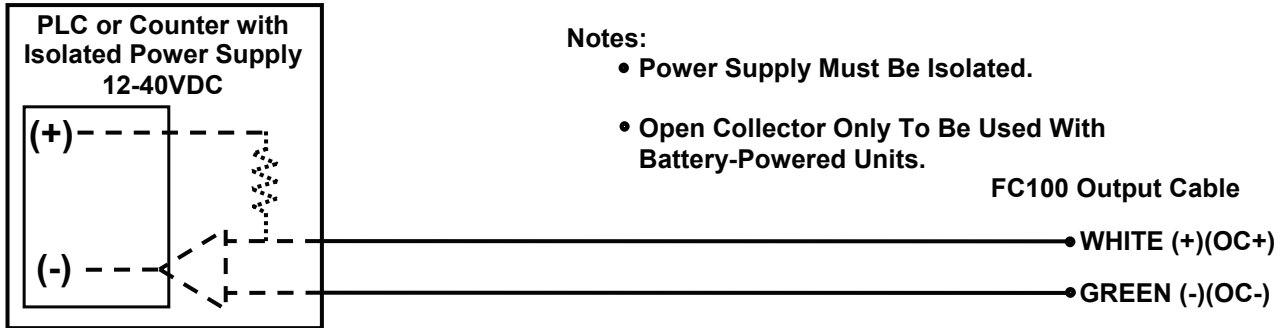


Figure 22 **Output Type:** Open Collector Powered by Instrument with Internal Resistor
Housing Label: 2 (Figure 23)

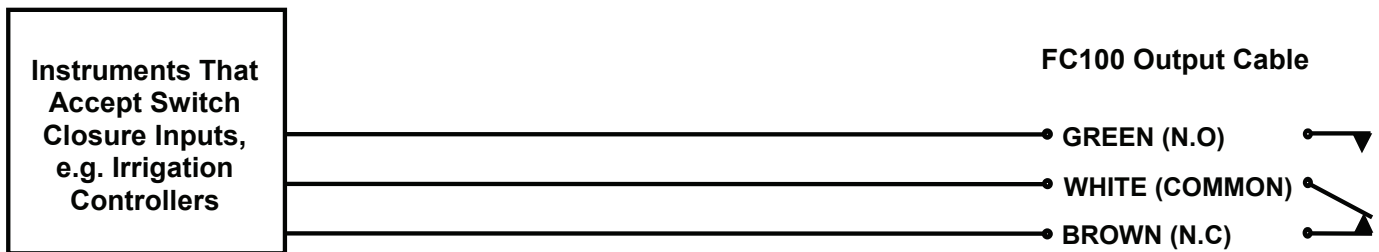


Figure 23 **Output Type:** Dry Contact Switch Closure
Housing Label: 2 (Figure 23)

3.1 Wiring Diagrams (Continued)

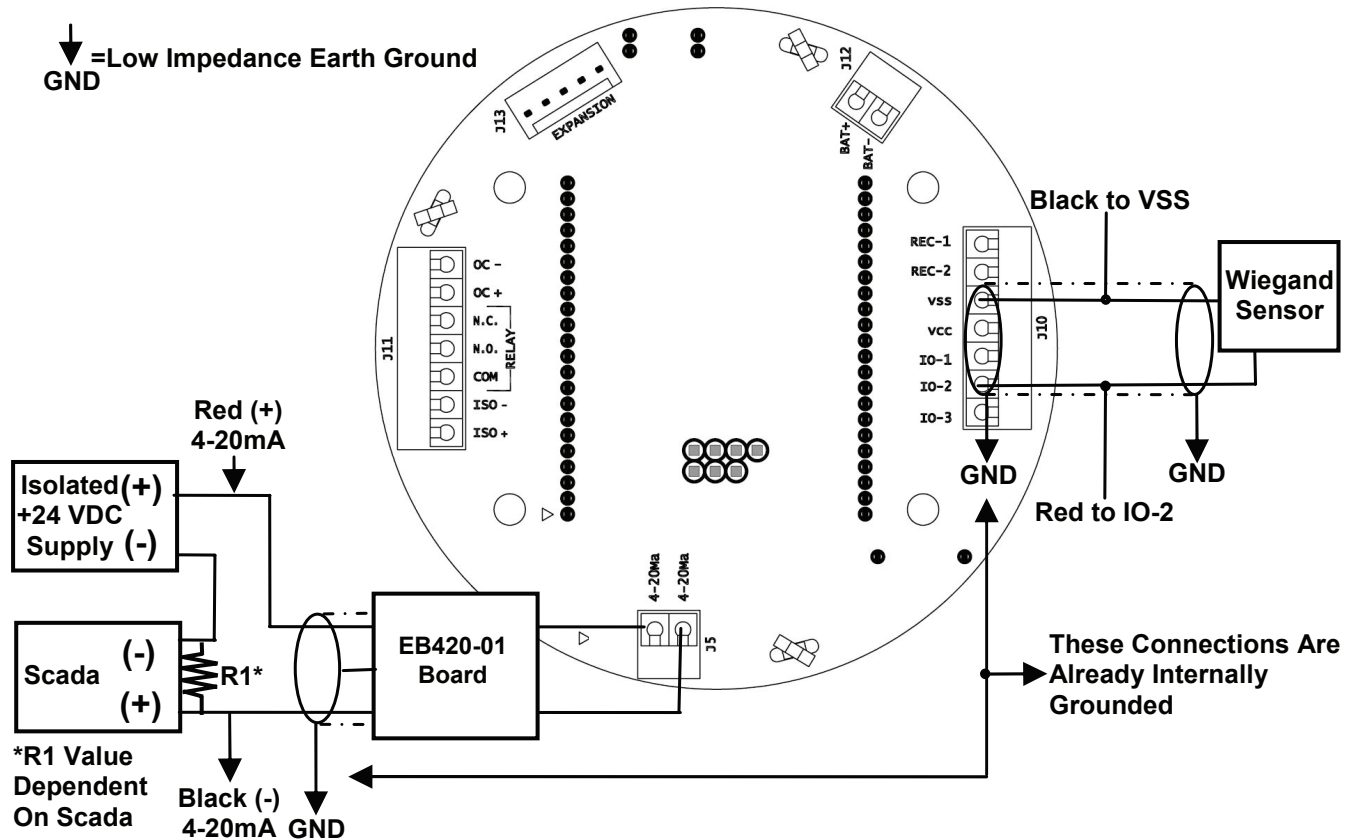
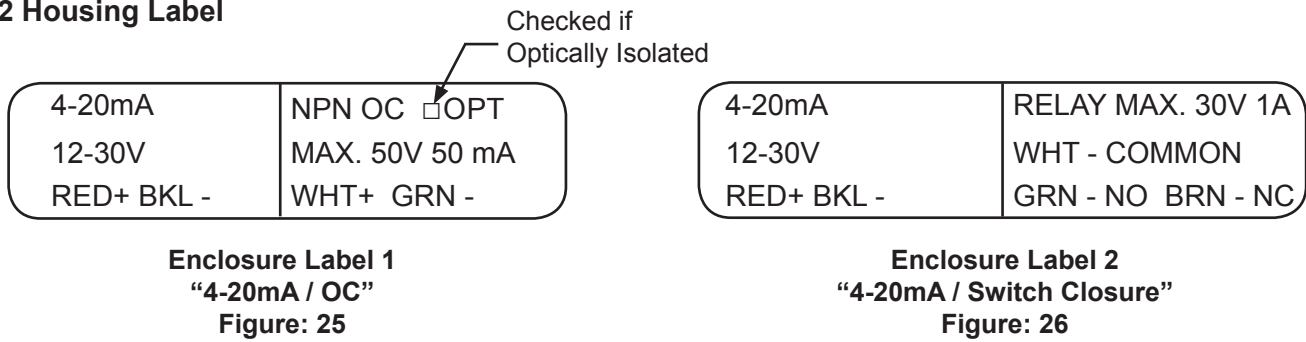


Figure 24 **Output Type: 4-20mA Current Loop (Remote-mounted version) In The Presence Of Environmental Noise (VFDs, RF Transmitters, etc.) *IMPORTANT: SEE NOTES.**
Housing Label: 1 (Figure 22)

***IMPORTANT NOTES:** 4-20mA Current Loop In Presence Of Environmental Noise (VFDs, RF Transmitters etc.)

- The +24VDC Power Supply must be isolated by insuring that the -24VDC is NOT tied to earth ground
- To ensure that the power supply for 4-20mA output loop is properly isolated from the earth ground, check voltage between earth ground and negative power supply terminal. You should see floating values, in approximate range of 4V to 8V.
- The shield for the Wiegand sensor must be connected to earth ground. Insure the shield for the sensor is not connected to VSS.
- To locate good earth ground, measure impedance between any of the non-powered 4-20mA terminals and the chosen ground spot. The ohmmeter should show a very low reading, lower than 1Ω.

3.2 Housing Label



3.3 4-20mA Connection To Water Specialties Instrumentation

IN60 – Flow Computer

Connection	To	Connection
IN60 Term. Strip Pin 16 (Iso. +12 VDC)		FC101 Output Cable Red (+)
IN60 Term. Strip Pin 4 (input)		FC101 Output Cable Blk (-)

IN41 – 10” Chart Recorder

Connection	To	Connection
IN41 TB-2 (-)		FC101 Output Cable Red (+)
IN 41 TB-2 (+)		Separate 24 VDC Supply (+)
Separate 24 VDC Supply (-)		FC101 Output Cable Blk (-)

IN48 – 12” Chart Recorder (Sold After 05/1993)

Connection	To	Connection
IN48 J11 (+)		FC101 Output Cable Red (+)
IN48 J11 (-)		IN48 J2 (-)
IN48 J2 (+)		FC101 Output Cable Blk (-)

IN48 – 12” Chart Recorder (Sold Before 05/1993)

Connection	To	Connection
IN48 J6 (+)		FC101 Output Cable Red (+)
IN48 J6 (-)		IN48 J10 (-)
IN48 J10 (+)		FC101 Output Cable Blk (-)
250 Ohm resister from IN48 J6 (+) and IN48 J6 (-)		

3.3 4-20mA Test Modes

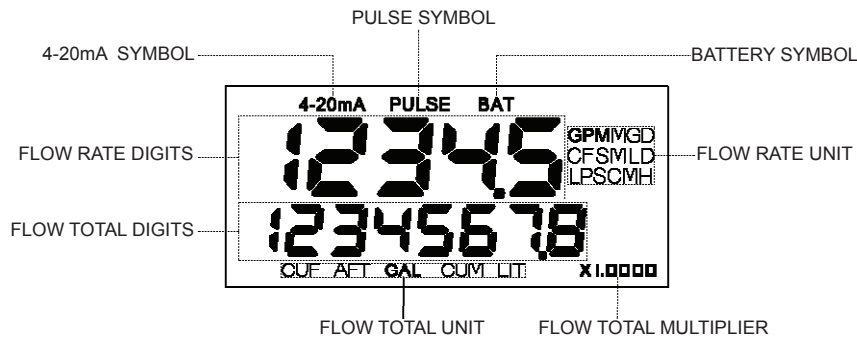
Whether or not there is flow in the pipeline, the 4-20mA output can be tested to confirm that the wiring interconnections are connected properly.

- To output 4mA, use two magnetic wands to activate the left and lower triangles simultaneously.
- To output 20mA, use two magnetic wands to activate the left triangle and the right **P** simultaneously.
- Individually select any triangle or P to exit the test mode.



Figure 27: Typical FC101 Face

3.4 LCD Output Symbol Clarifications



FC101 Screen Symbols
Figure: 28

SCENARIO	RESULT
The 4-20mA full scale is not defined and the 4-20mA loop is either powered or not powered.	There is no 4-20mA output and the “4-20mA” symbol is <i>off</i> .
The 4-20mA full scale is defined and the 4-20mA loop is powered.	There is a 4-20mA output and the “4-20mA” symbol is <i>on</i> .
The 4-20mA full scale is defined and the 4-20mA loop is powered, but the output value is over 21.5mA.	There is a 4-20mA output and the “4-20mA” symbol is <i>flashing</i> .
The pulse increment value is not defined.	There is no pulse output and the “PULSE” symbol is <i>off</i> .
The 4-20mA loop is not powered, the pulse increment value is defined and the pulse type is set as an optically-isolated open collector or a relay switch.	There is no pulse output and the “PULSE” symbol is <i>flashing</i> .
The 4-20mA loop is not powered, the pulse increment value is defined and the pulse type is set as an open collector.	There is a pulse output and the “PULSE” symbol is <i>on</i> .
The 4-20mA loop is powered, the pulse increment value is defined and the pulse type is set as an optically-isolated open collector or a relay switch.	There is a pulse output and the “PULSE” symbol is <i>on</i> .
The 4-20mA loop is powered, the pulse increment value is defined and the pulse type is set as an optically-isolated open collector or a relay switch, but the output frequency is greater than the limit of the selected pulse type.	There is a pulse output and the “PULSE” symbol is <i>flashing</i> .
The battery level is ok.	The “BAT” symbol is <i>off</i> .
The 4-20mA loop is either powered or not powered, and battery level meets low battery criteria.	The “BAT” symbol is <i>on</i> .

SECTION IV – PROGRAMMING

4.1 Accessing The Configuration Menu

Hold the magnetic wand as noted in Figure 29 below. After five seconds the register should enter the configuration menu. The register will switch back to run mode by either selecting the run mode from the configuration menu or by not activating the configuration menu for sixty seconds.

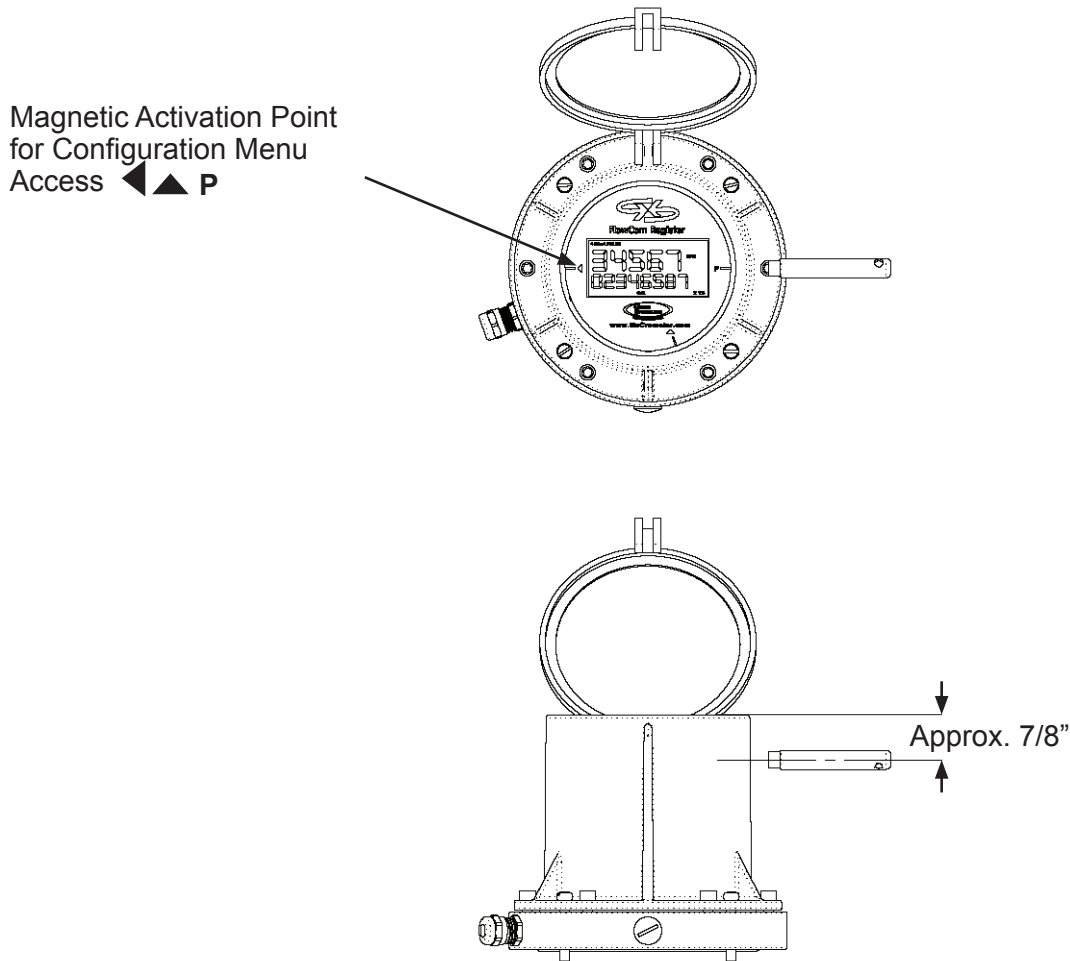


Figure: 29 Magnetic Wand Activation Points For Configuration Menu

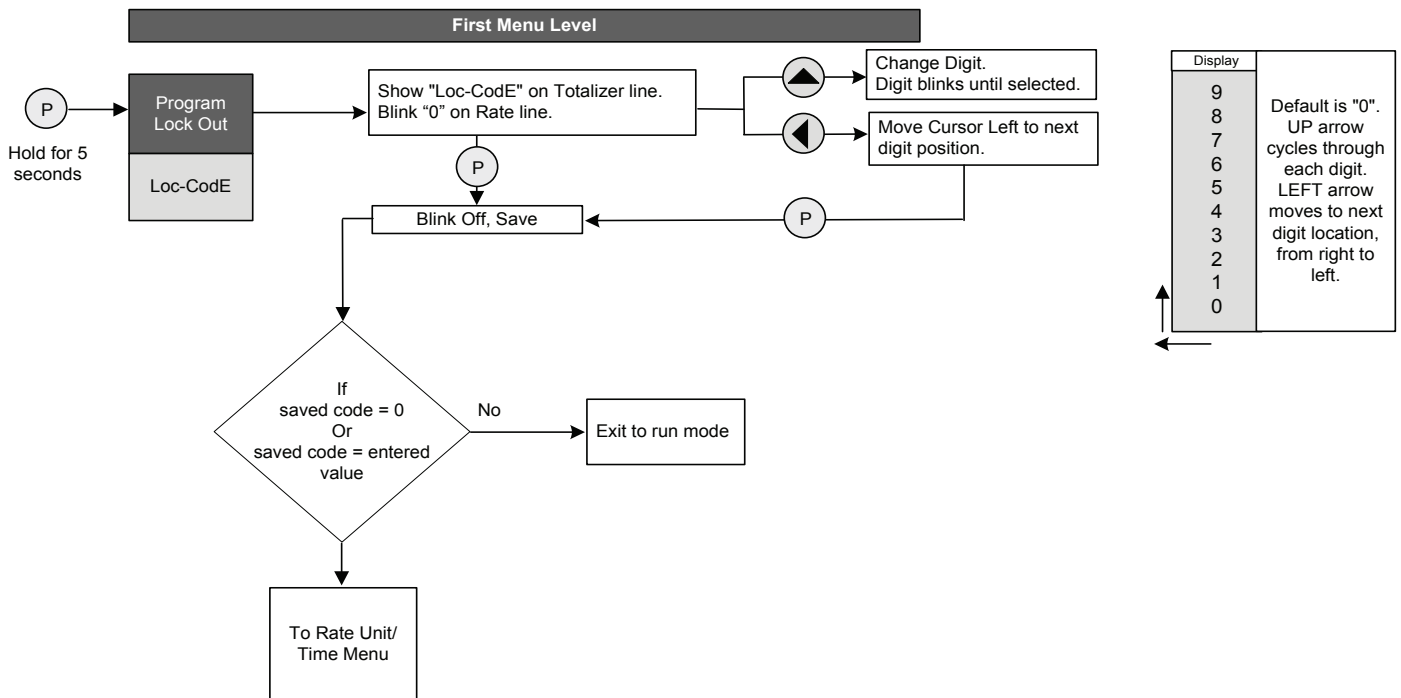
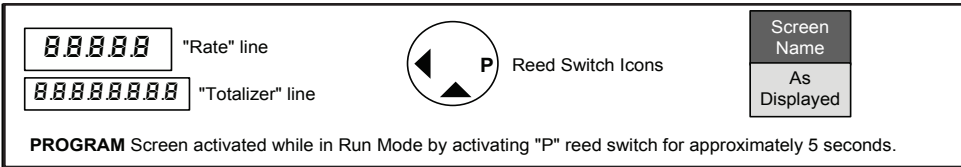
4.2 Document Changes

Each register ships with two silver identification labels. The label contains basic setting information for the register. If changes are made to the register settings the labels should be marked as required. Forward the changes to the factory so the records can be updated.

4.3 Menu Table Of Contents

First Menu Level			Second Menu Level		
Menu Title	Display	Description	Menu Title	Display	Description
Program Lock Out	Loc-CodE	Enter w/ preset code	Parent Meter Serial #	Par-SER	Sets Meter Serial No.
Rate Unit/Time	rAtE-Un	Sets Unit/Time	Register Serial #	SERno	Sets Register Serial No.
Rate Format	rAtE-For	Sets Rate Decimal Place	Set Lock Code	Set-CodE	Sets new Lock Code
Totalizer Unit	tot-Un	Sets Unit	GPR Decimal Place	GPr-dP	Sets GPR Decimal Place
Totalizer Decimal Place	tot-dP	Sets Decimal Place	Gallons Per Revolution	GPr	Sets GRR Digits
Totalizer Multiplier	Tot-FAct	Sets Multiplier	Smoothing	Smooth	Turns Smoothing on/off
20 mA Unit	20mA-Un	Sets 20 mA Unit	Trim 4 mA	4mA-AdJ	Adjusts 4 mA Zero
20mA DP	20mA-dP	Sets 20mA Decimal Place	Trim 20mA	20mA-AdJ	Adjusts 20mA FS
20mA FS	20mA-FS	20mA Full Scale	Pulse Type	PLS-tYPE	Sets Pulse Type
Pulse Unit	PLS-Un	Sets Pulse Unit	Pulse Width	PLSwidth	Sets Pulse Width in ms
Pulse Decimal Place	PLS-dP	Sets Pulse Decimal Place	Reset Total	RESEttot	Zeroes Total
Pulse Increment	PLS-Inc	Sets Pulse Value	Disable Reset Total	DIS-rSt	Permanent Reset Disable
Calibration Percent	CAL-Pct	Adjusts Meter Accuracy	Set Total	Set-tot	Sets Total
Go to Menu or Run	-Go to		Auxiliary Input	Au-InP	Sets operation of input
			Low Flow Cutoff	Lo-Cut	Sets Min. Flowrate
			Pulses per revolution	PLS-Inc	Sensor Pulses per rev.
			Go to Menu or Run	-Go to	

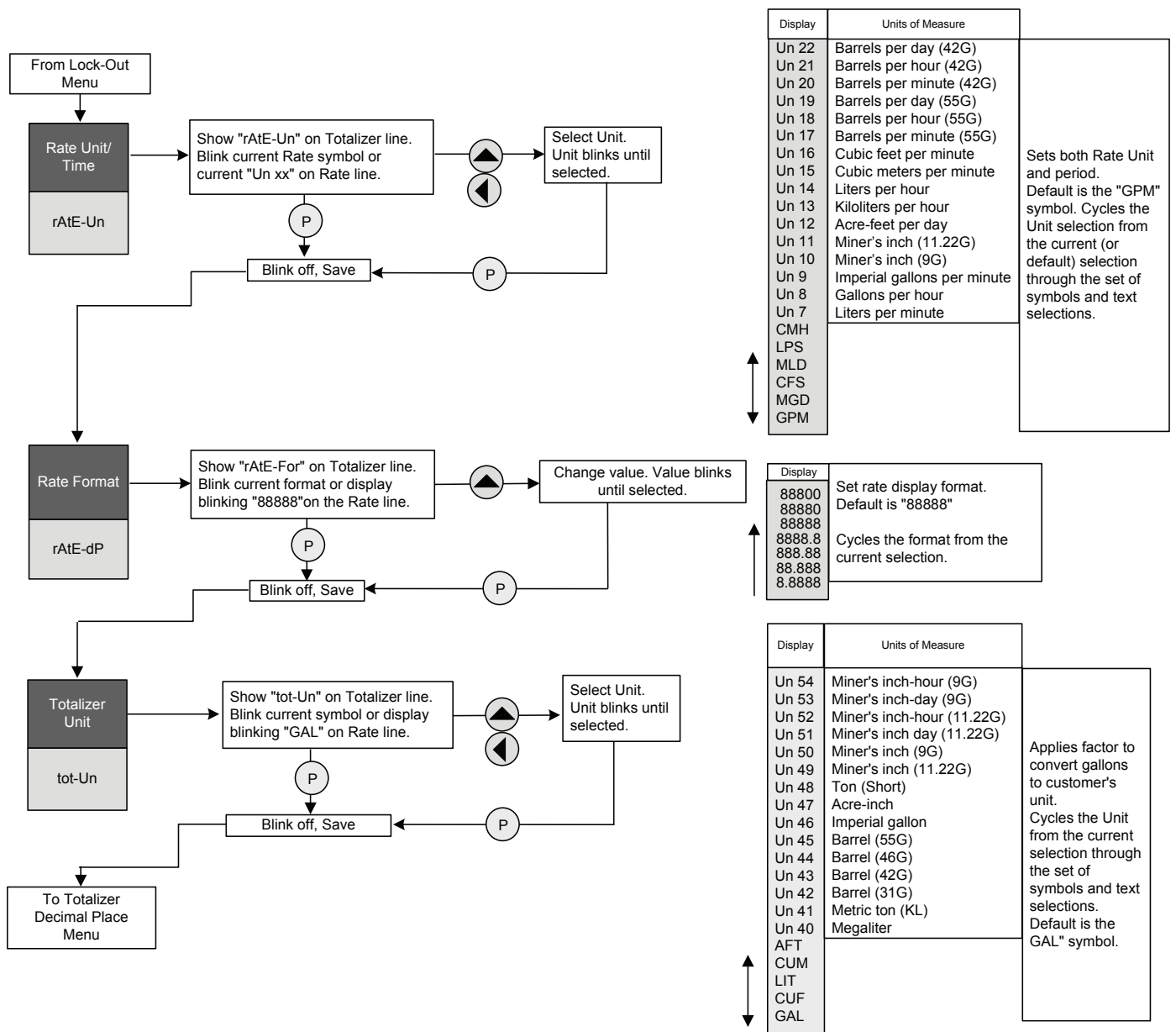
4.4 Menu Navigation



Note:

1. If a lock code has been programmed then the user will be asked for the code upon entering into programming mode.

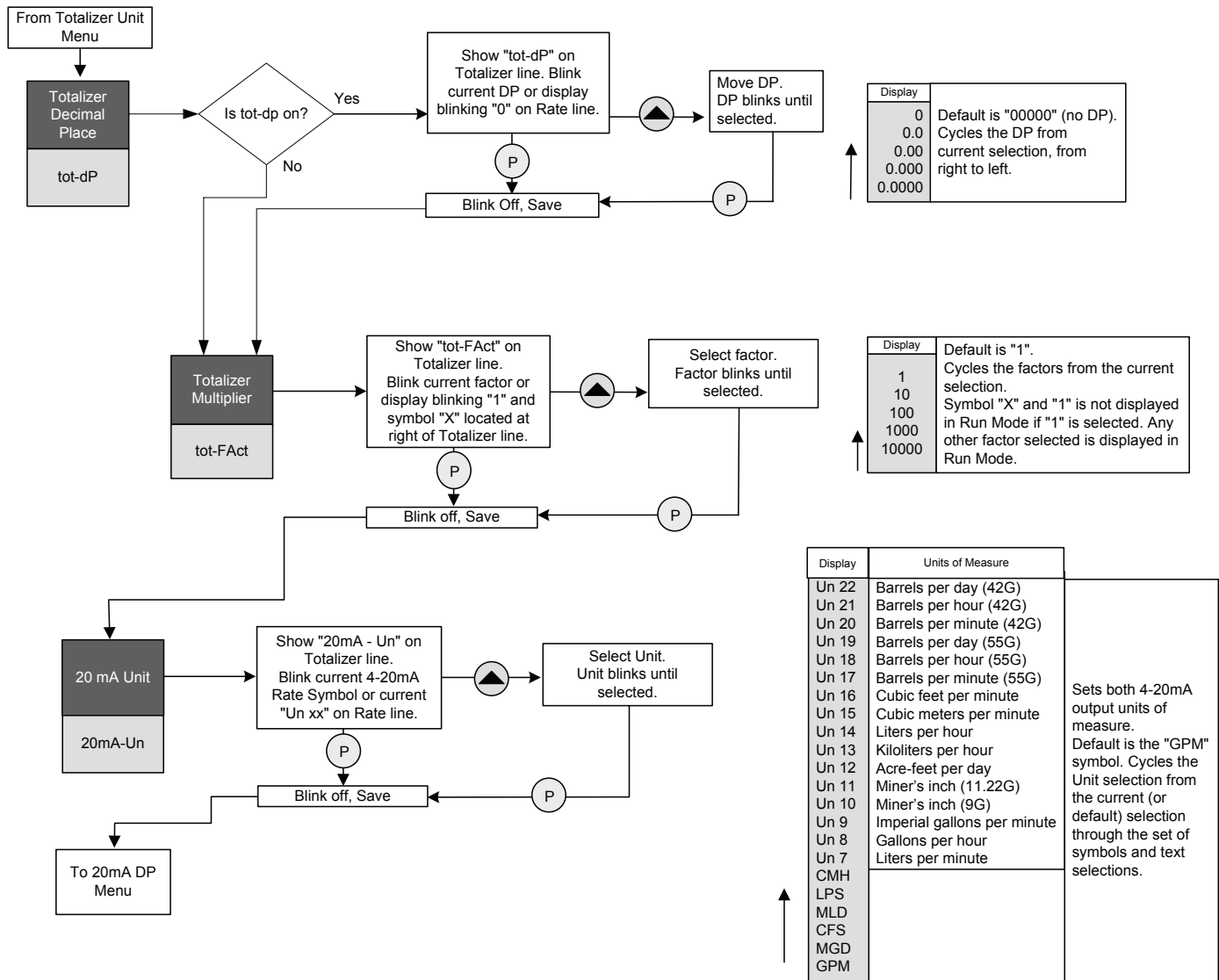
4.4 Menu Navigation (Continued)



Notes:

1. "Un XX" are units of measures that do not have an abbreviated symbol directly on the display.
2. The rate unit selection for the flow rate and 4-20mA full scale is chosen from the same menu table.
3. The total unit selection for the total and pulse output increment is chosen from the same menu table.

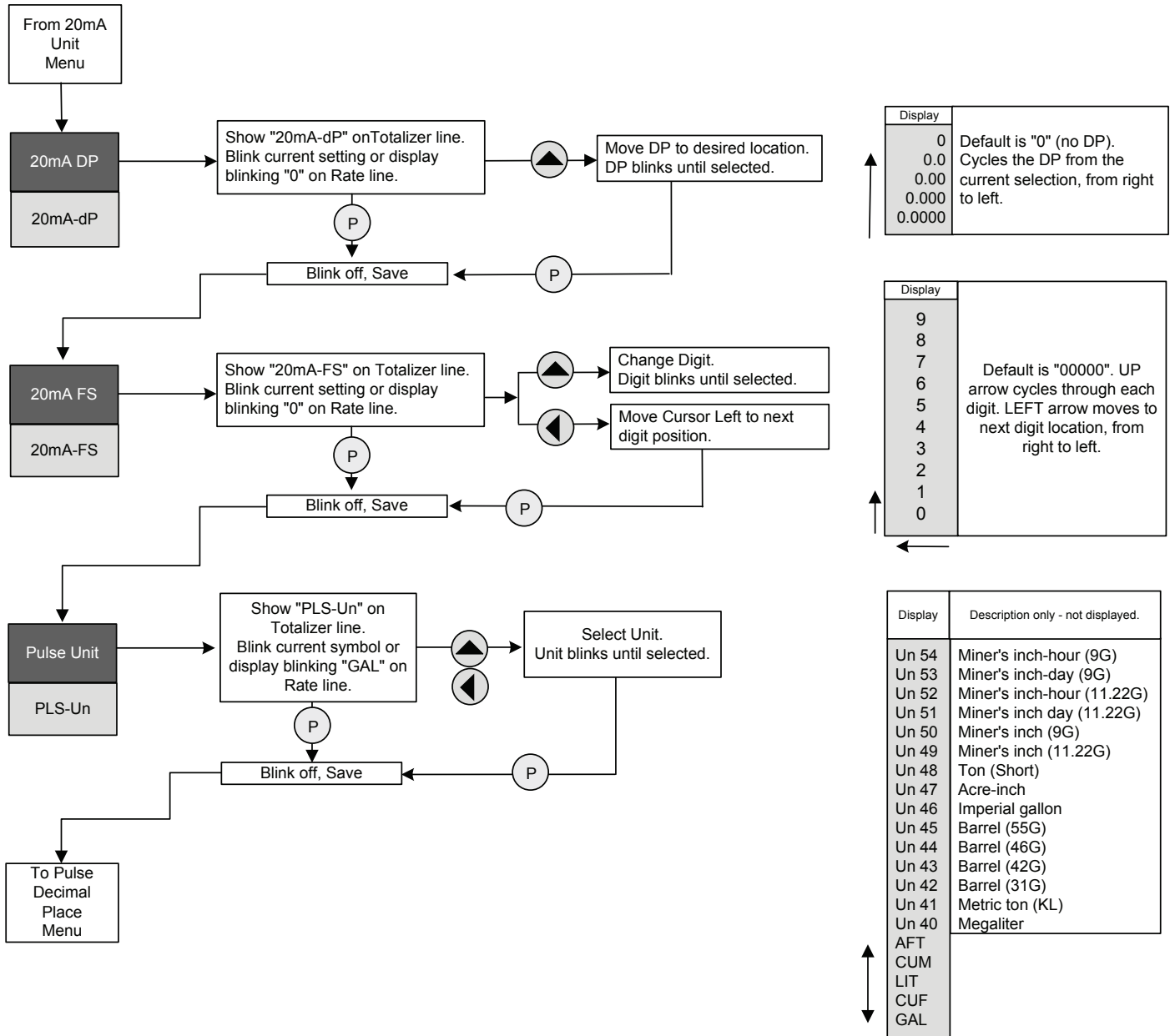
4.4 Menu Navigation (Continued)



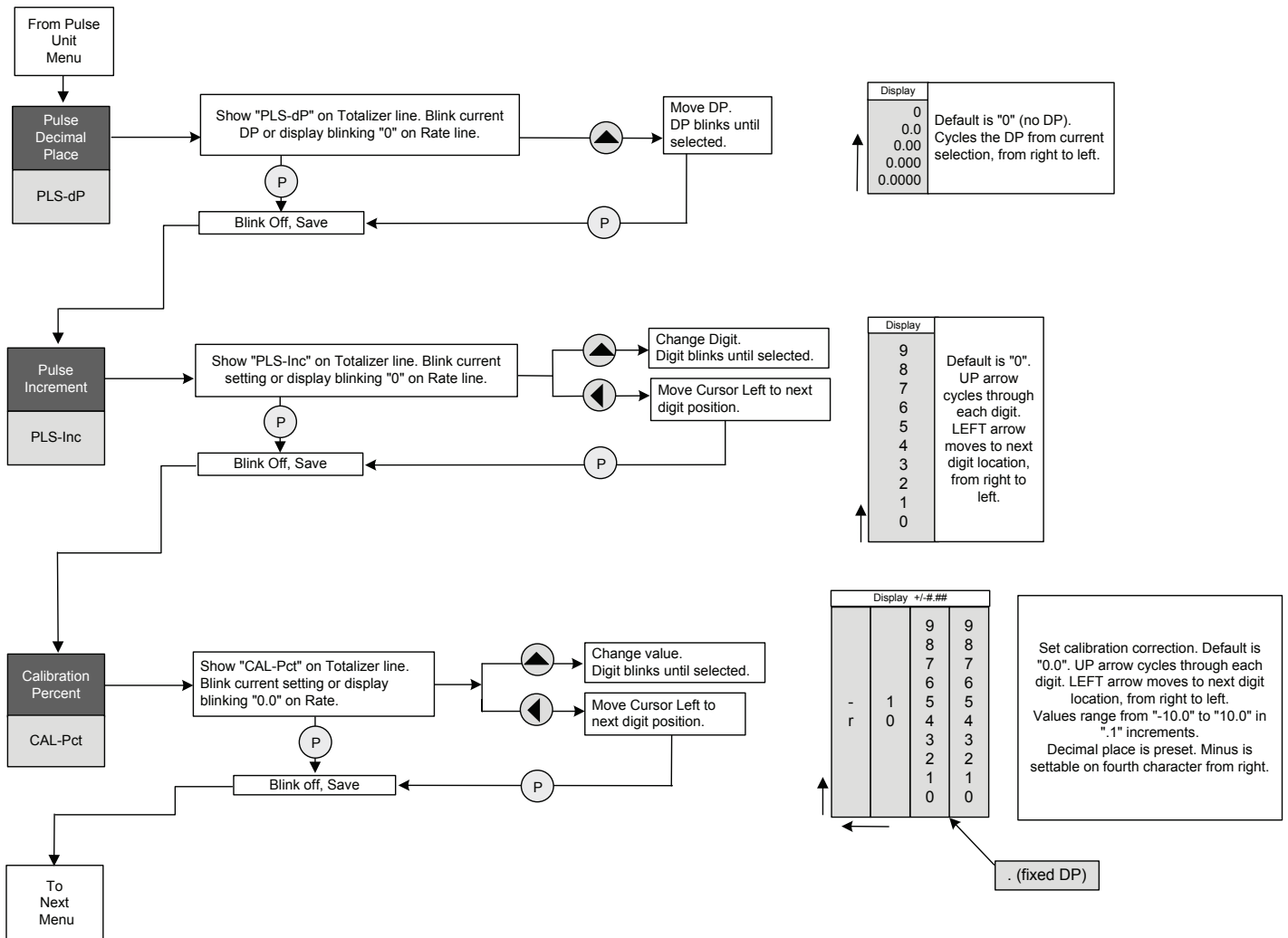
Note:

1. The cumulative total can either have a decimal point or a multiplier setting but not both simultaneously.

4.4 Menu Navigation (Continued)



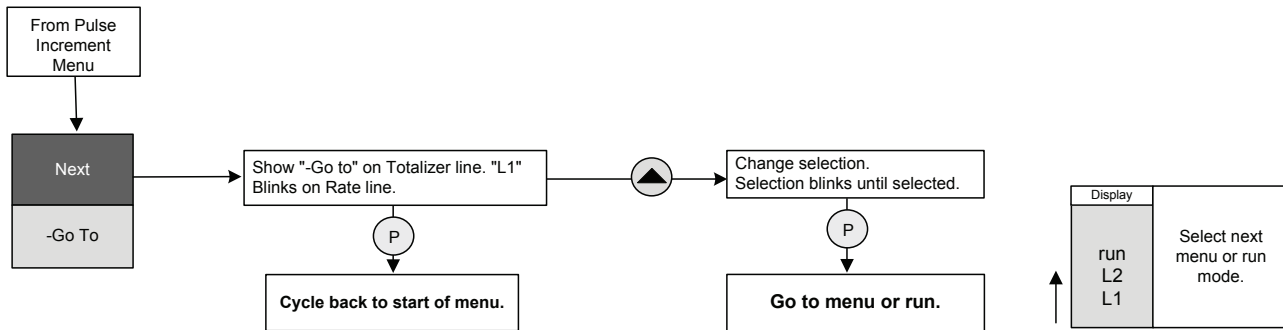
4.4 Menu Navigation (Continued)



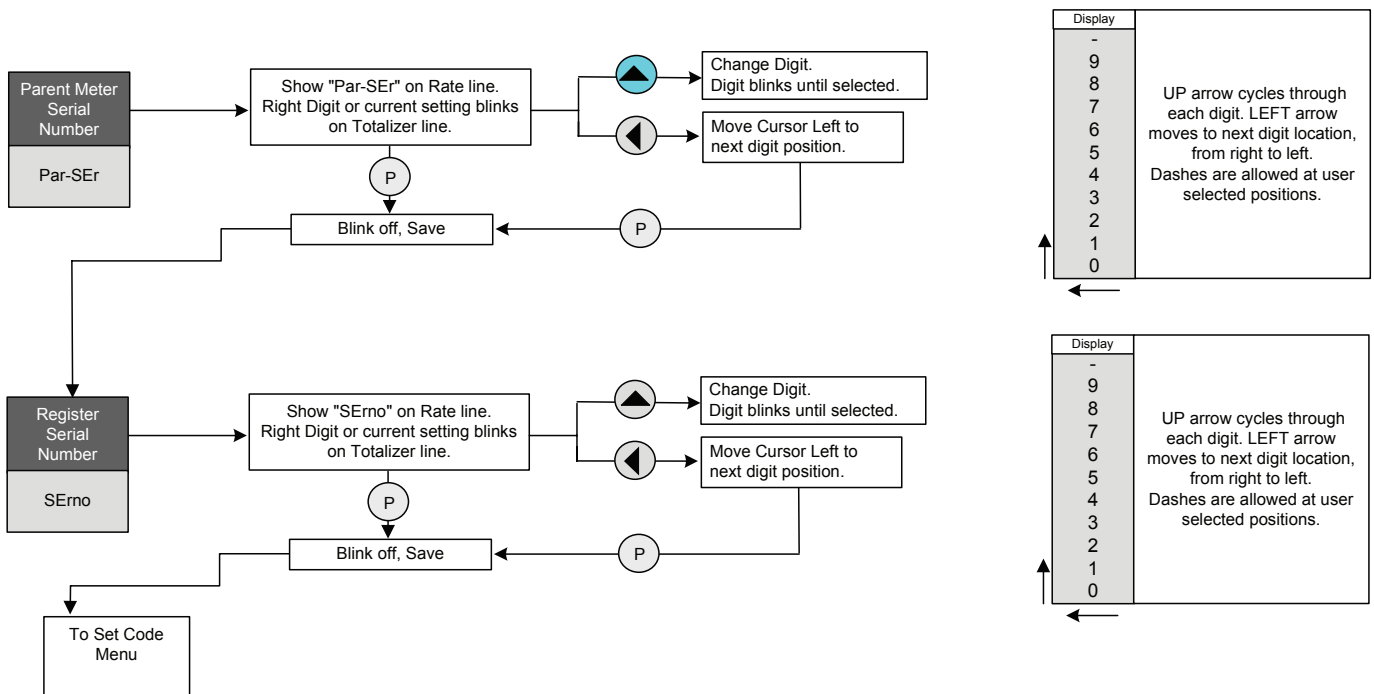
Notes:

1. Pulse increment is used to set the amount of volume that initiates one pulse output. For example, as the pulse unit of measure is set to "Gallon" and the Pulse Increment is set to "1000", then one pulse will be generated for every 1000 gallons of fluid flowing through the system.
2. The type of pulse output is set by the pulse type in menu L2. The type of pulse output is set by the pulse type in menu L2.

4.4 Menu Navigation (Continued)



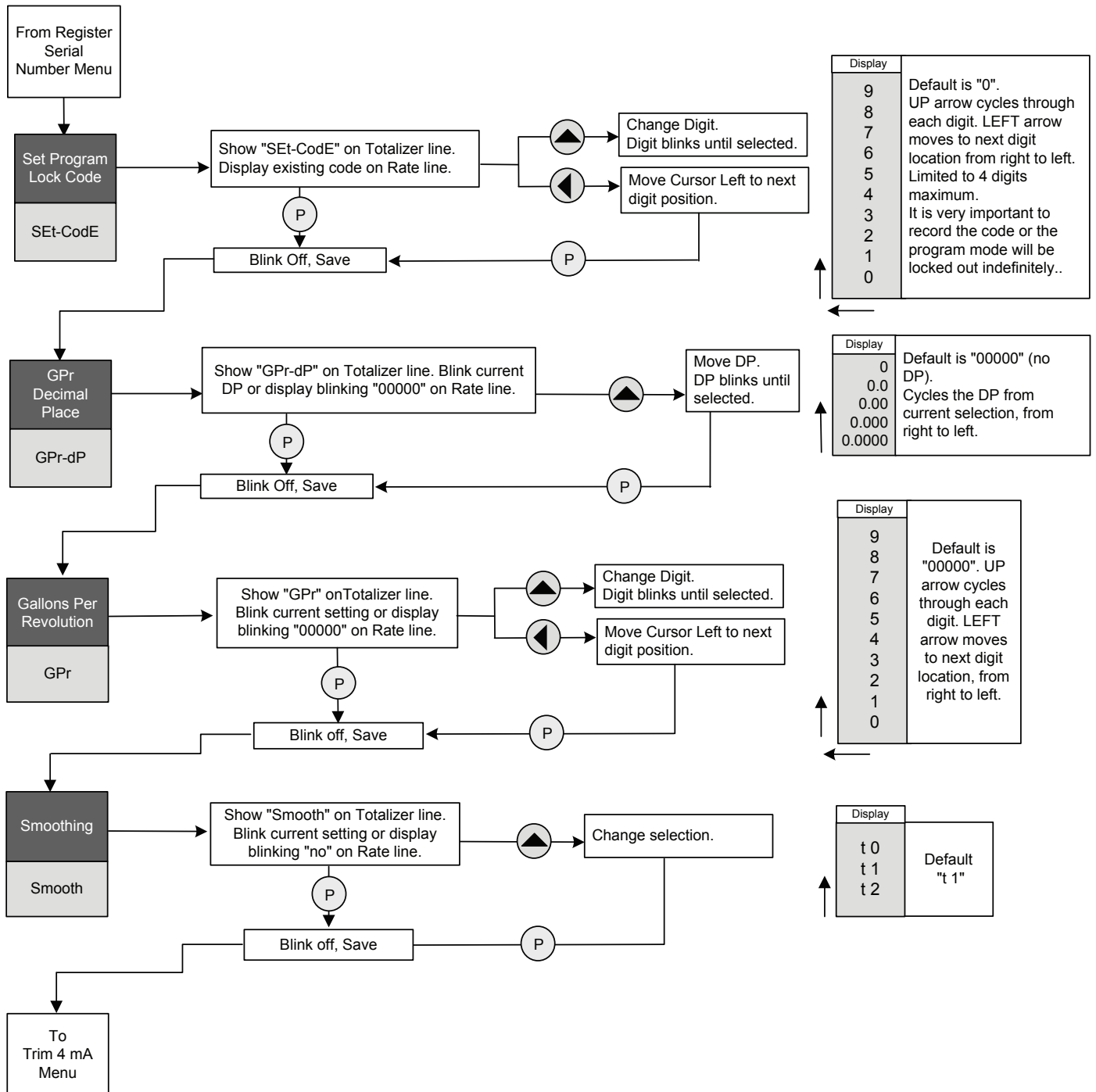
Second Menu Level



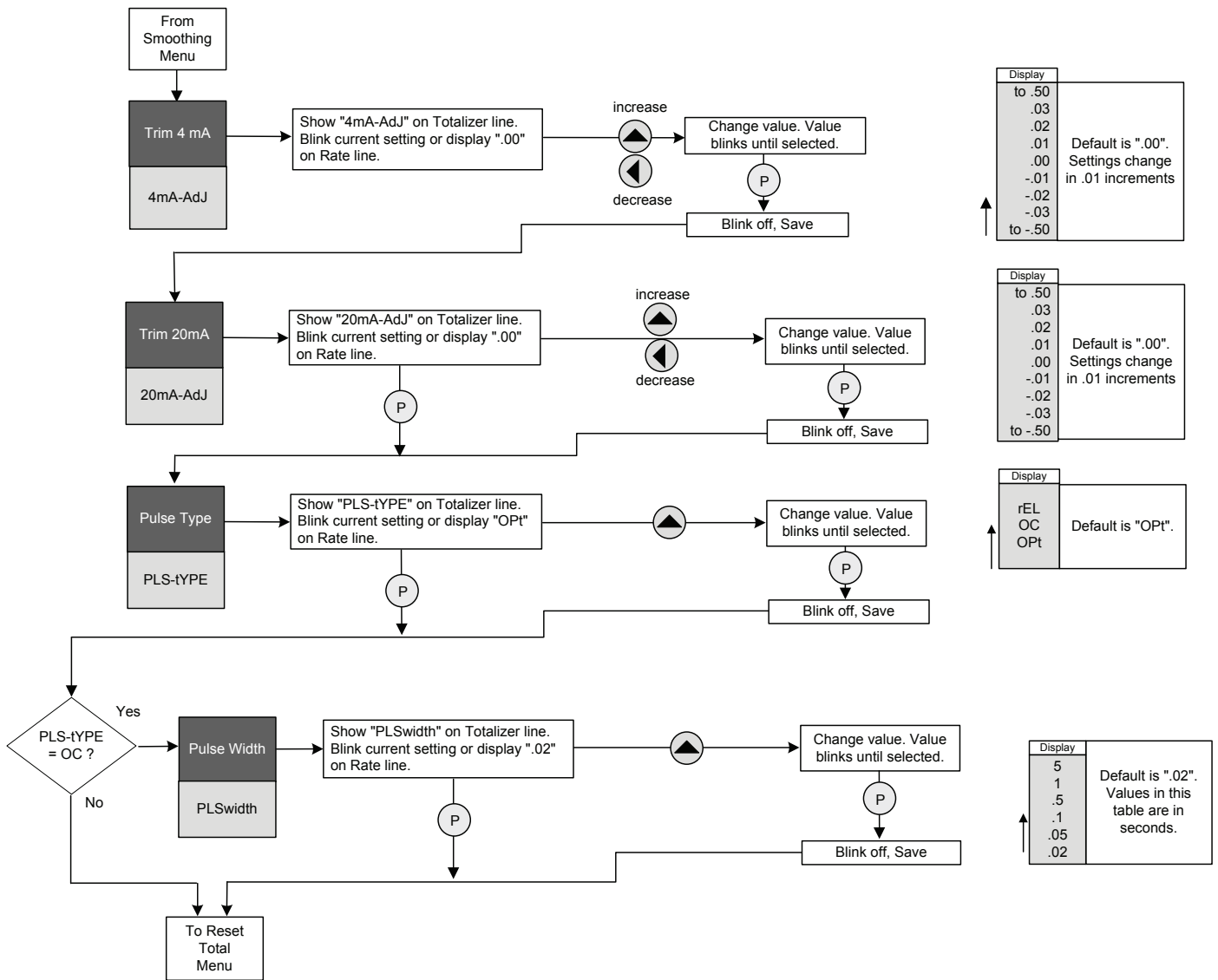
Note:

1. Each electronic register has a unique serial number separate from the meter (parent) serial number.

4.4 Menu Navigation (Continued)



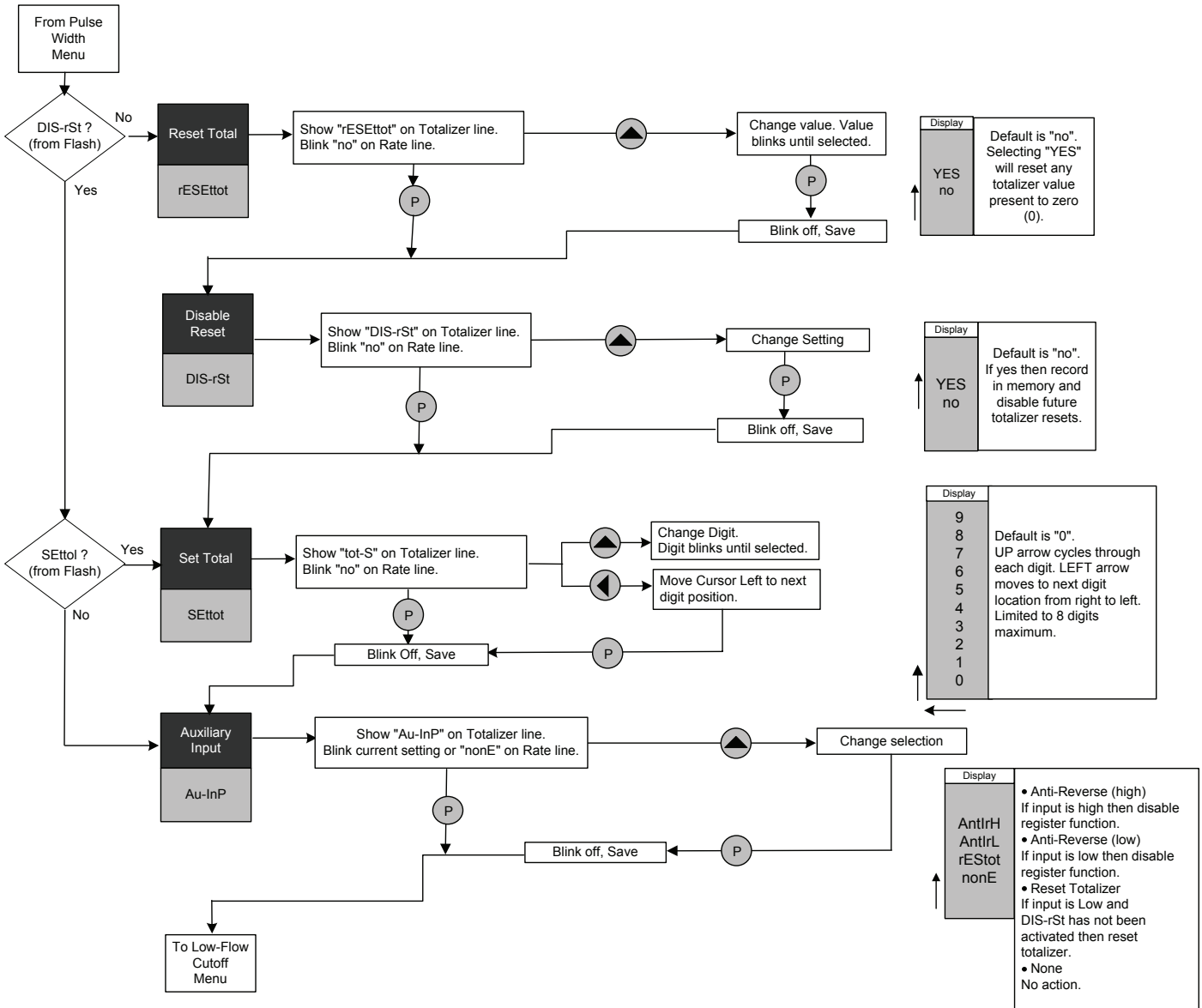
4.4 Menu Navigation (Continued)



Note:

1. The pulse width setting is only available for a standard open collector output.
2. 4-20mA can be calibrated by adjusting the 4mA and 20mA trim values.

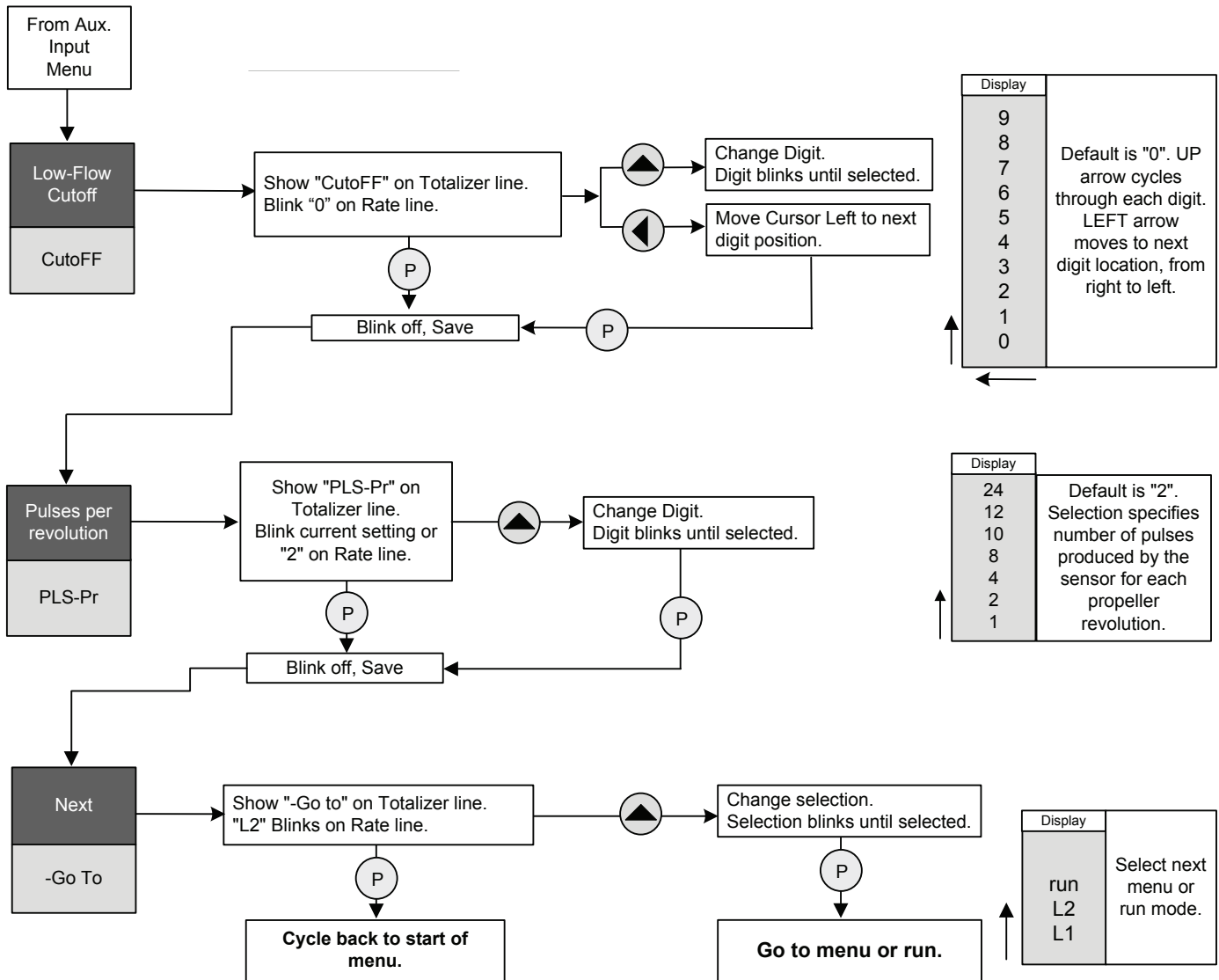
4.4 Menu Navigation (Continued)



Note:

1. The ability to reset the cumulative total can be *permanently* disabled. Once the reset is disabled, the Reset Total function will no longer appear in the menu.
2. The Auxiliary Input function is available for usage to stop the register from totalizing and transmitting. The factory should be consulted if this feature is required.

4.4 Menu Navigation (Continued)



Note:

1. Entering the correct pulses per revolution is very important. Contact the factory regarding the pulses per revolution if unknown.

4.5 Configuration Examples

4.5.1 Example 1: Register With DC-powered Optically-isolated O.C. Pulse Output

Meter Size : 6"
 Gallons Per Revolution: 1.4815
 Rate Units: Cubic Feet per Second
 Totalizer Units: Acre Feet x 0.001
 4-20mA Full Scale: 2.5 CFS
 Switch Closure Output: 1 Switch for Every 1000 Gallons
 Sensor Type: 2 PPR

Configuration Settings:

Menu Item Display	Menu Item Description	Item Selection
rAtE-Un	Rate Unit	CFS
rAtE-dP	Rate Format	888.88
tot-Un	Totalizer Unit	AFT
tot-dP	Totalizer Decimal Place	0.000
tot-Fact	Totalizer Multiplier	(Not applicable with a tot-dP setting)
20mA-Un	20 mA Unit	CFS
20mA-dP	20 mA dp	0.0
20mA-FS	20 mA FS	2.5
PLS-Un	Pulse Units	GAL
PLS-dP	Pulse Decimal Place	0
PLS-Inc	Pulse Increment	1000
SErno	Reg. Serial Number	(Serial number is set at the factory)
GPr-dP	GPR Decimal Place	0.0000
GPr	Gallons Per Rev	1.4815
Smooth	Smoothing	t1
4mA-AdJ	Trim 4mA	.00 (Adjusted during 4-20mA calibration)
20mA-AdJ	Trim 20mA	.00 (Adjusted during 4-20mA calibration)
PLS-tYPE	Pulse Type	rEL
PLSwidth	Pulse Width	(Not applicable for the dry contact switch output)
Au-InP	Auxiliary Input	nonE
Cut-dP	Low-Flow Cutoff DP	0
CutoFF	Low-Flow Cutoff	0
PLS-Pr	Pulse Per Rev	2

Note:

1. The dry contact switch pulse output commonly used on Scada and irrigation systems. The dry contact switch pulse length is not adjustable.

4.5.2 Example 2: Register With Battery-powered O.C. Pulse Output

Meter Size : 24"
 Gallons Per Revolution: 37.0
 Rate Units: MGD
 Totalizer Units: Gallons x 10000
 Open Collector Pulse Output: 1 Pulse for Every 0.01 Acre Foot
 Pulse Width: 0.1 milliseconds
 Sensor Type: 2 PPR

Configuration Settings:

Menu Item Display	Menu Item Description	Item Selection
rAtE-Un	Rate Unit	MGD
rAtE-dP	Rate Format	8888.8
tot-Un	Totalizer Unit	GAL
tot-dP	Totalizer Decimal Place	(Not applicable with a tot-Fact setting)
tot-Fact	Totalizer Multiplier	X 10000
20mA-Un	20 mA Unit	GAL
20mA-dP	20 mA dp	0
20mA-FS	20 mA FS	0 (4-20mA full scale not defined)
PLS-Un	Pulse Units	AFT
PLS-dP	Pulse Decimal Place	0.00
PLS-Inc	Pulse Increment	0.01
Par-Ser	Parent Serial Number	(Serial number is set at the factory)
SErno	Reg. Serial Number	(Serial number is set at the factory)
GPr-dP	GPR Decimal Place	00000
GPr	Gallons Per Rev	37
Smooth	Smoothing	t1
4mA-AdJ	Trim 4mA	.00 (Adjusted during 4-20mA calibration)
20mA-AdJ	Trim 20mA	.00 (Adjusted during 4-20mA calibration)
PLS-tYPE	Pulse Type	OC
PLSwidth	Pulse Width	0.1
Au-InP	Auxiliary Input	nonE
Cut-dP	Low-Flow Cutoff DP	0
CutoFF	Low-Flow Cutoff	0
PLS-Pr	Pulse Per Rev	2

Note:

1. Optically-isolated open collector and dry contact switch closure outputs are not applicable because they both require DC power. The pulse width length is an option only for the standard open collector pulse output.

4.5.3 Example 3: Register With 4-20mA Transmitter Output

Meter Size : 4"
 Gallons Per Revolution: 0.5
 Rate Units: Liters Per Hour
 Totalizer Units: Metric Ton x 1
 4-20mA FS: 100 LPM
 Sensor type: 2 PPR

Configuration Settings:

Menu Item Display	Menu Item Description	Item Selection
rAtE-Un	Rate Unit	Un 14 (No symbol on display)
rAtE-dP	Rate Format	88888
tot-Un	Totalizer Unit	Un 7 (No symbol on display)
tot-dP	Totalizer Decimal Place	0
tot-Fact	Totalizer Multiplier	X 1
20mA-Un	20 mA Unit	Un 7 (Un 7 is an reference to a rate unit)
20mA-dP	20 mA dp	0
20mA-FS	20 mA FS	100
PLS-Un	Pulse Units	GAL
PLS-dP	Pulse Decimal Place	0
PLS-Inc	Pulse Increment	0 (No pulse output defined)
Par-Ser	Parent Serial Number	(Serial number is set at the factory)
SErno	Reg. Serial Number	(Serial number is set at the factory)
GPr-dP	GPR Decimal Place	0000.0
GPr	Gallons Per Rev	0.5
Smooth	Smoothing	t1
4mA-AdJ	Trim 4mA	.00 (Adjusted during 4-20mA calibration)
20mA-AdJ	Trim 20mA	.00 (Adjusted during 4-20mA calibration)
PLS-tYPE	Pulse Type	Opt (Type is irrelevant since there the pulse increment is not defined)
PLSwidth	Pulse Width	(Not applicable for the optically-isolate open collector pulse output)
Au-InP	Auxiliary Input	nonE
Cut-dP	Low-Flow Cutoff DP	0
CutoFF	Low-Flow Cutoff	0
PLS-Pr	Pulse Per Rev	2

Note:

1. In this example, units of measures “Un XX” are used at three different settings. There will not be any unit of measure symbol on the display. The cumulative total is using “Un 7” from the set of total units, and the 4-20mA is using “Un 7” from the set of rate units.

SECTION V – Product Specifications

5.1 Specifications

<p>Environmental</p> <p>Operating Temp.: -4°F to 158°F (-20°C to 70°C)</p> <p>Storage Temperature: -40°F to 158°F (-40°C to 70°C)</p> <p>Housing Rating: NEMA 4X</p>	<p>4-20mA Analog</p> <p>Power Requirements: 12 to 30VDC</p> <p>Transmission: 5,000 feet max.</p> <p>4mA/20mA Trim: .01mA to .50mA</p> <p>Engineering/Time Units: 22 different units</p>
<p>Input Signal</p> <p>Input Compatibility: Water Specialties Flowmeters</p> <p>Remote Distance: 100 feet max.</p>	<p>Pulse Outputs</p> <p>Engineering Units: 20 different units</p> <p>Optically Isolated Pulse:</p> <p>Collector to emitter voltage: 50V @ 50mA max.</p> <p>Pulse Width: 80 ms</p> <p>Max Pulses Per Minute: 30</p> <p>Signal Distance: 500 feet max.</p> <p>Open Collector Pulse:</p> <p>Collector to emitter voltage: 50V @ 50mA max.</p> <p>Pulse Width: adjustable</p> <p>Max Pulses Per Minute: 30</p> <p>Signal Distance: 500 feet max.</p> <p>Contact Closure:</p> <p>Contact Rating: 30V @ 1 Amp Max.</p> <p>Pulse Width: 80 ms</p> <p>Max Counts Per Minute: 30</p> <p>Signal Distance: 500 feet</p>
<p>Rate Functions</p> <p>Display: 5-digit</p> <p>Rate Units: 22 different units</p> <p>Totalizer Functions</p> <p>Display: 8-Digit</p> <p>Totalizer Units: 20 different units</p> <p>Accuracy: 0.25%</p> <p>Non-Volatile Storage: Updated hourly</p> <p>Scaling Factor: .0001 to 10000</p>	<p>Power Requirement</p> <p>Battery Type: Lithium 3.6 V</p> <p>Battery Life: 6 - 10 Years</p> <p>Optional 4-20mA: Loop powered</p>
<p>Programming</p> <p>Program Access: Magnetic wand (included)</p> <p>Programming: Menu driven</p> <p>Access Lockout: 4-digit code</p> <p>Test Modes: 4 mA and 20mA test modes</p> <p>Totalizer Reset: Programming</p> <p>Total Reset Disable: Programming (permanent)</p> <p>Calibration Adjustment: + or - .01% to 10%</p>	

5.2 Dimensions

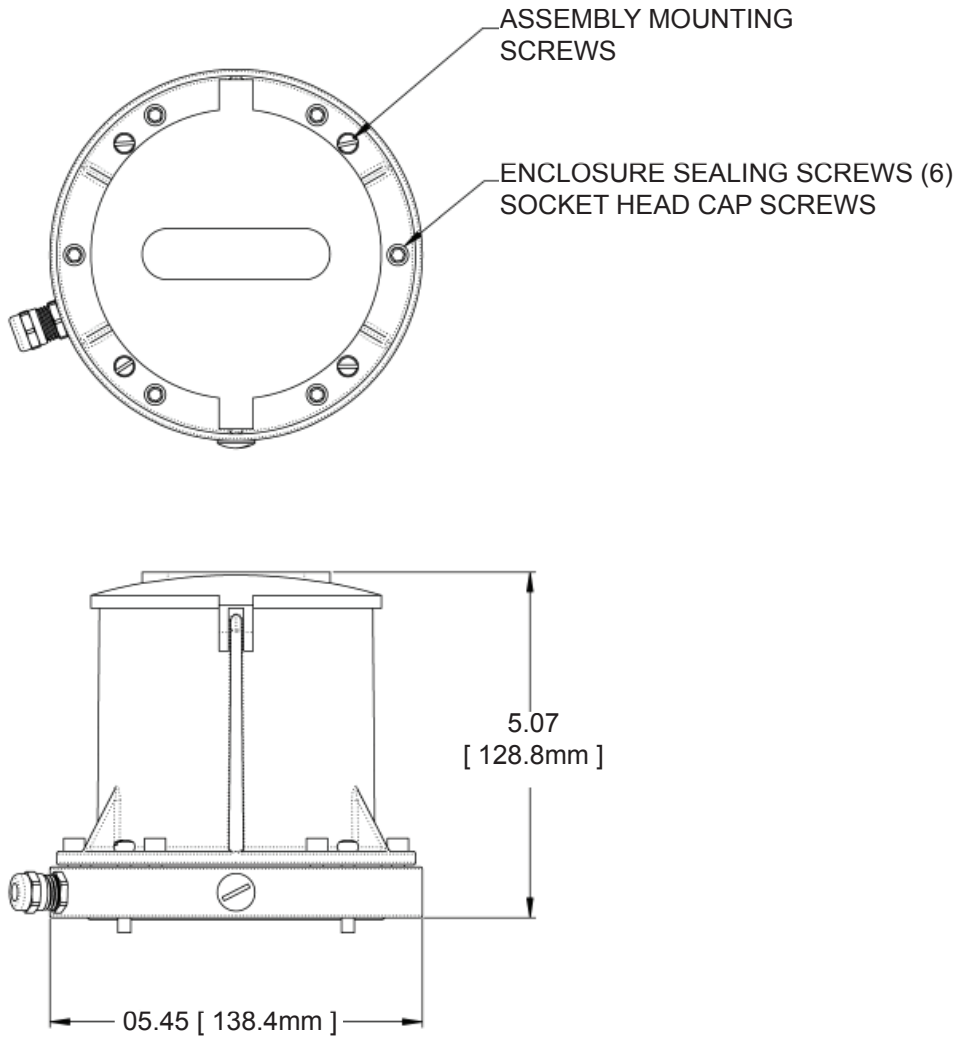


Figure 30: FlowCom Housing

5.3 Housing

The enclosure assembly is sealed by six socket head cap screws. The enclosure cover and base are made of aluminum and coated for all weather use.

5.4 Parts List

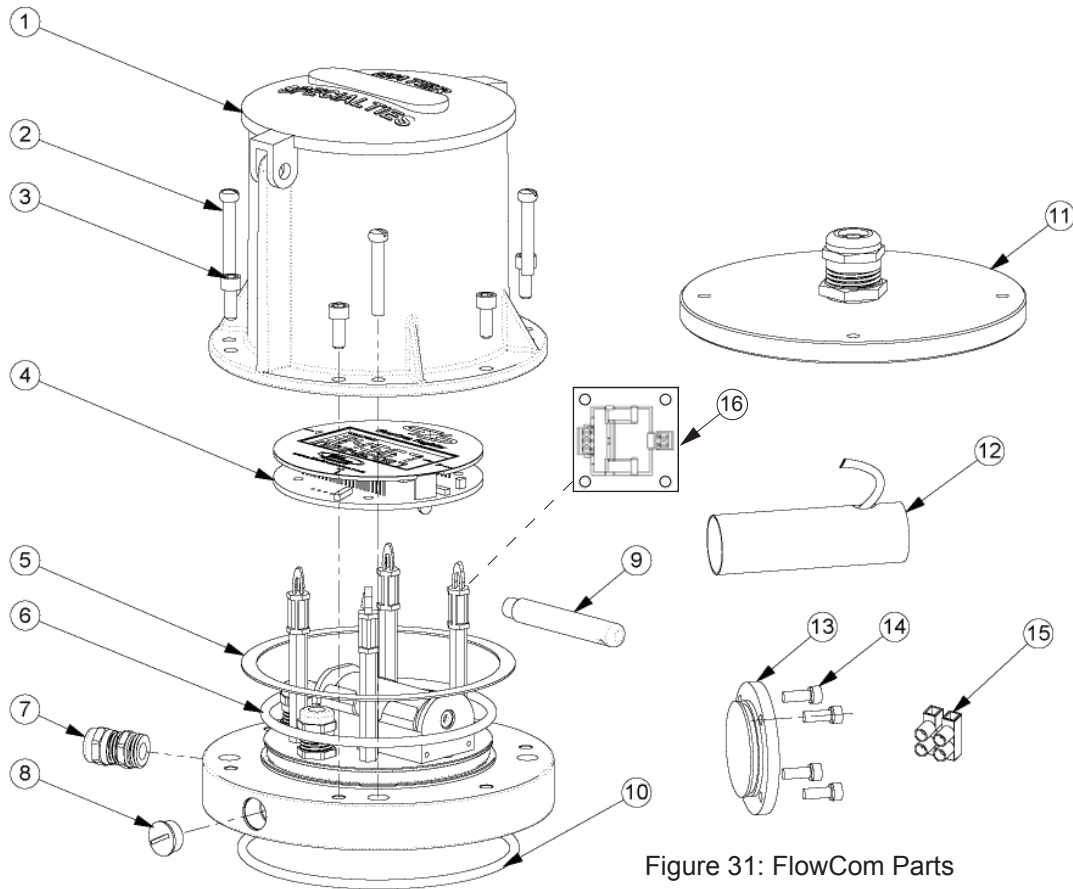


Figure 31: FlowCom Parts

Ref.	Part Number	Description	Qty
1	R0710-60	Canopy Enclosure Water Specialties	1
2	10247-00	Screw 10-32 x 1.25" Long Fillister Head	4
3	10585	Screw 10-32 x 0.5" Long Socket Head Cap	6
4	FCR100-01	Electronic Register Water Specialties	1
5	10262	Gasket Flat	1
6	10180-00	O-Ring -237 Buna	1
7	EJ112-00	Fitting Cable Compression PG7	*
8	EJ538-00	Plug PG7 Slotted	*
9	FC100-M	Magnet Wand	2
10	1-1551-38	O-Ring -243 Buna	1
11	3-4397-2	Meter Head Cover W/ O-Ring & Cable Out	1
12	4-2730-4-*	Sensor Pulse Transmitter	1
13	2-2731-1	Gear Box Cover w/ O-Ring	1
14	1-1103-8-7	Screw 8-32 x 7/16" Long	4
15	1-1707-19 or -20	In-line Terminal (-19) 2 wire (-20) 3 wire for remote	1
16	EB420-01	4-20mA Protection Board	1
.	EZ100-00	Battery C 3.6V Lithium	1
.	10015-00	Dry Pack	2

*Quantity is based on the model selected.

*Recommended parts for technicians: FC100-M (2 each), EZ100-00 (qty as req.), 10015-00 (qty as req.)

SECTION VI – PRODUCT MAINTENANCE

6.1 Battery Replacement

To replace the battery the canopy enclosure must be removed. The time period which the enclosure is opened should be minimized to reduce moisture and contamination. The battery holder may have a zip tie or other locking mechanism in place which can be removed.

- Step 1. Make a note of the enclosure to base orientation prior to disassembly.
- Step 2. Remove the enclosure retaining screws and then the cover.
- Step 3. Inspect the inside environment of the enclosure and look for damage of any type.
- Step 4. Remove the existing battery and discard it following the local government standards.
- Step 5. Install the new battery.
- Step 6. Verify that the register turns on.
- Step 7. Replace the existing dry packs with new dry packs if available.
- Step 8. Apply O-ring lube to the cover O-ring (Figure 21).
- Step 9. Install the cover and screws.
- Step 10. If required re-install tamper evident components

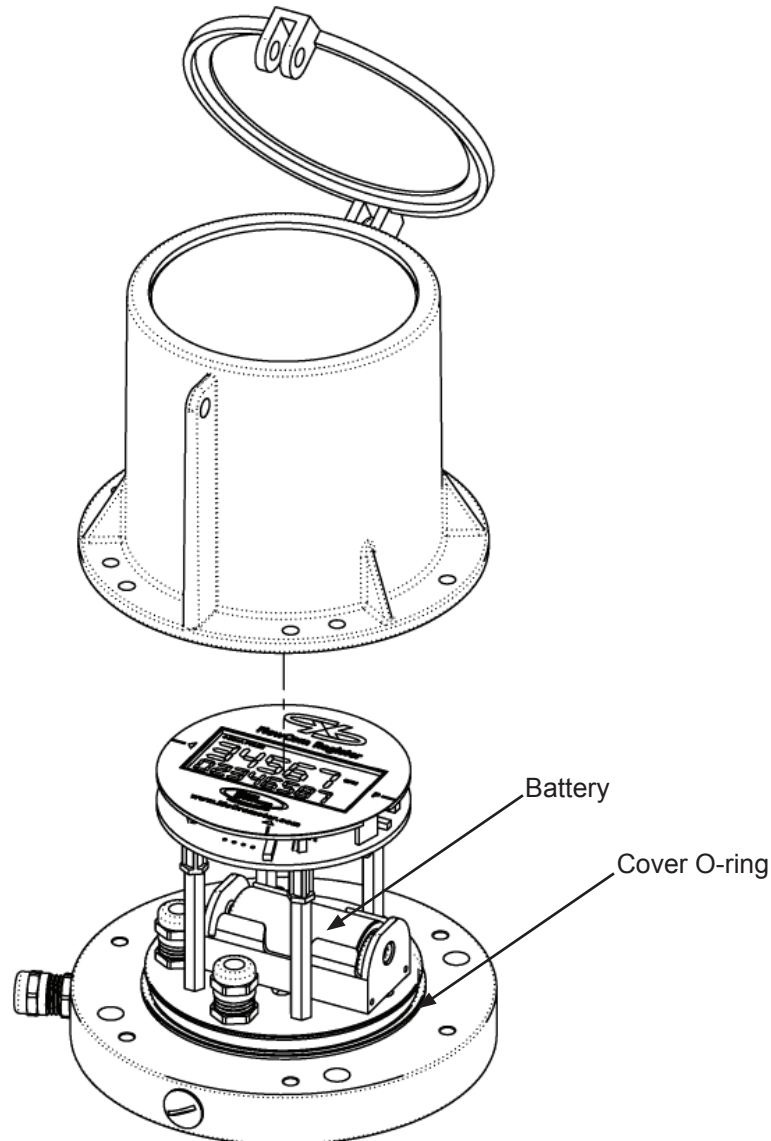


Figure 32: Canopy Enclosure Removed For Battery Replacement

SECTION VII – TROUBLESHOOTING

7.1: Inaccurate Rate And Total Readings.

- A. Check the gallons per revolution (GPR) and pulses per revolution (PPR) settings. The electronic register could be programmed with incorrect GPR and PPR values.
- B. Check that the input sensor cable's shield wire is connected to the earth ground, per instructions on tag. Also, check the connection of the shield wire on the outside instrumentation side of the output cable, per instructions on tag.
- C. If there is known noisy process instrumentation close to the installation, such as variable frequency drives, use the crimped green wire to connect any of the screws on the FlowCom's canopy to a known good earth ground, such as a copper rod inserted 4' (four feet) into the ground.

7.2: No Optically-isolated Pulse Or Dry Contact Switch Output.

- A. Verify that both the 4-20mA loop power and DC power to the optically-isolated pulse/dry contact switch are present and connected to the correct output wires.
- B. Check if the power source has the correct pulse voltage and current.
- C. Make sure the ground wire inside the output cable is grounded on the instrument side.
- D. Check whether a pull-up resistor is required to produce a signal.

7.3: No 4-20mA Transmitter Output.

- A. Check that the negative side of the 24VDC (-24VDC) loop power supply is not connected to earth ground. To do this, turn off the 24VDC power supply and use a standard ohm meter to verify that the -24VDC connection is not shorted to the earth ground.
- B. Check whether the 4-20mA loop is connected properly and powered.
- C. Verify that the 20mA unit and full scale are set up in the program configurations.

7.4: Non-responsive Rate And Total Readings.

Check the connection between the sensor cable and the pulse input cable.

7.5: Blank LCD Display.

Check whether the 4-20mA loop is powered and/or the battery inside the canopy enclosure is installed properly.

7.6 Circuit Board Connections

The circuit board does not have any serviceable components. Each register is shipped with the cables connected to the appropriate input and output connections per the customer requirements. The circuit board layout is contained in this manual as a technical support reference.

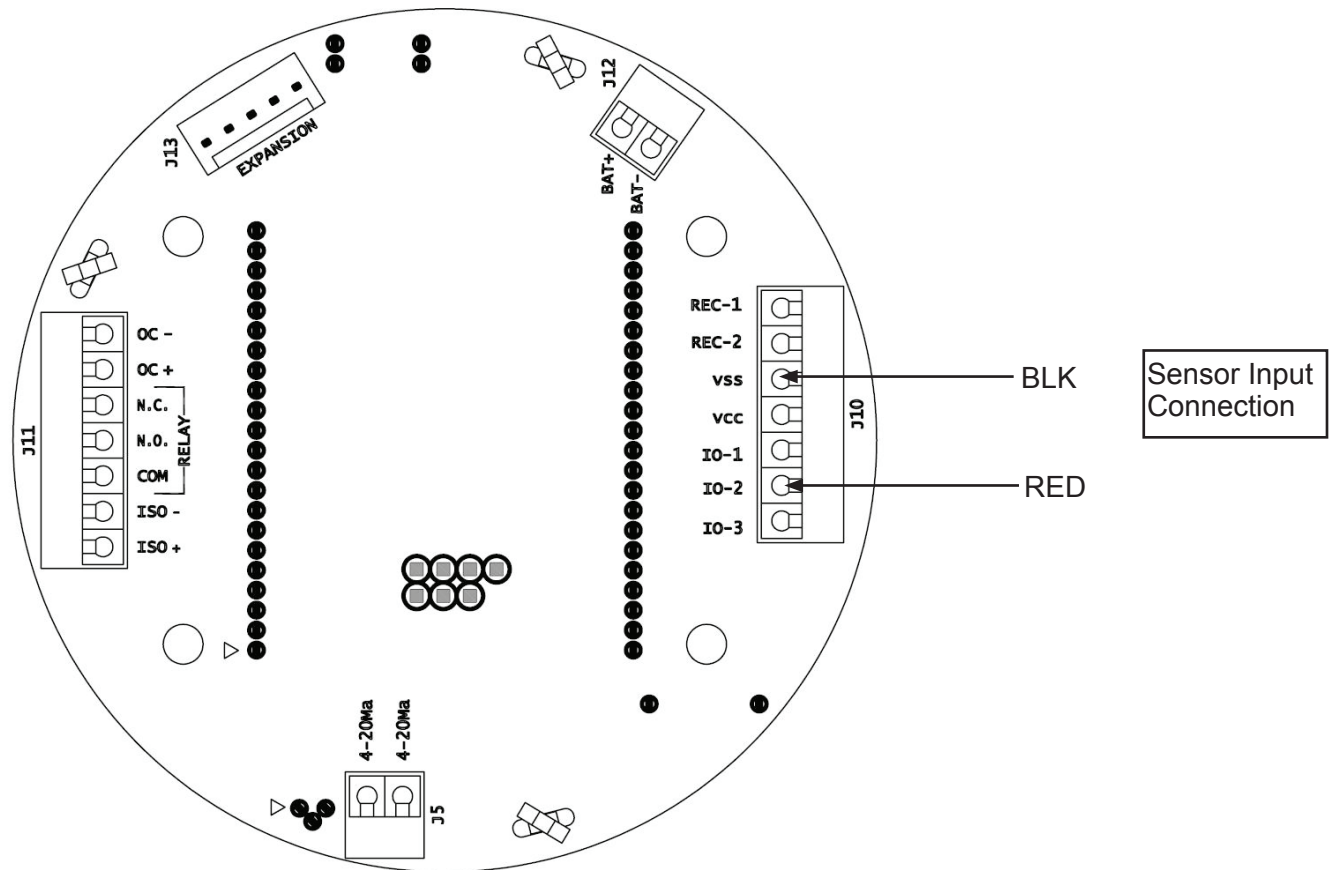


Figure 33: FlowCom Circuit Board

NOTES

OTHER McCROMETER PRODUCTS INCLUDE:



Magnetic Flowmeters



Magnetic Flowmeters



Magnetic Flowmeters



Propeller Flowmeters



Flowmeters And Flow Straighteners



For Propeller Flowmeters



Propeller Flowmeters



Differential Pressure Flowmeters

The Space Saver Solution



Differential Pressure Flowmeters



Differential Pressure Flowmeters

Electronic Instrumentation for Remote Display and Control

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