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SAFETY

Explosion and Fire Hazards

WARNING

IMPROPER GROUNDING, POOR VENTILATION, OPEN FLAMES OR SPARKS CAN CAUSE A HAZARDOUS CONDITION AND RESULT IN AN EXPLOSION OR FIRE AND CAUSE SERIOUS INJURY.

- Be sure the fluid system is properly grounded. See your pump instruction manual for details.
- If there is static sparking or if you feel an electric shock while using the meter, stop dispensing immediately. Identify and correct the problem before continuing.
- Provide fresh air ventilation. This will avoid the buildup of fumes from the fluid being dispensed.
- Do not smoke while dispensing flammable fluids.
- Keep the dispensing area free of debris including solvents, rags and spilled gasoline.

Meter Hazards

WARNING

EQUIPMENT MISUSE CAN CAUSE THE METER TO RUPTURE OR MALFUNCTION AND CAUSE SERIOUS INJURY.

- This equipment is for professional use only.
- Read all instructions, tags and labels before operating the equipment.
- Use the equipment only for its intended purpose.
- Do not modify or alter the equipment.
- Do not leave equipment unattended while dispensing.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure level of the lowest rated system component.
- Use only extensions and nozzles that are designed for use with this equipment.
- Use only fluids and solvents that are compatible with the equipment. Read all fluid and solvent manufacturer's warnings.
- Tighten all fluid connections before operating this equipment.
- Do not stop or deflect leaks with hands, body, gloves or rags.
- Do not dispense towards any person or any part of the body.
- Do not place hands or fingers over the end of or into the dispense valve.
- Comply with all local, state, and federal fire, electrical and safety regulations
- Use of this product in a manner other than specified in this manual may result in impaired operation or damage to equipment.

WARNING

THIS METER IS DESIGNED TO DISPENSE A WIDE RANGE OF CHEMICALS. CONSULT FACTORY FOR CHEMICAL COMPATIBILITY.

METER BUTTONS



Figure 1: Meter buttons

<div>10</div> <div>1</div> <div>0.1</div>	Enters the batch quantity to be dispensed.
<div>TOTAL</div>	Displays the accumulated total of fluid dispensed as well as the resettable total during <i>Manual</i> and <i>Auto Batch Mode</i> .
<div>AUTO</div>	Enters and exits <i>Manual</i> or <i>Auto Batch</i> mode.
<div>RESET</div>	<ul style="list-style-type: none"> Clears the dispensed quantity in <i>Manual Mode</i>. Clears the dispensed quantity and reset the meter for the next batch in <i>Auto Batch Mode</i>. Resets the resettable total dispensed while pressing TOTAL.
<div>O</div>	Used to stop the flow through an <i>Emergency Override</i> .

Table 1: Button descriptions

LCD DISPLAY

	1. Displays resettable total, accumulated total and Scale Factor
	2. Displays unit of measure
	3. Arrows indicate when in count up or count down
	4. Preset batch quantity
	5. History icon
	6. Auto indicates unit is in <i>Auto Batch Mode</i>
	7. Low battery icon

Table 2: LCD display description meter installation

METER INSTALLATION

Relieve System Pressure

WARNING

THIS EQUIPMENT STAYS PRESSURIZED UNTIL THE PRESSURE IS MANUALLY RELIEVED.

1. Turn off the power supply to the pump or close the shutoff valve.
2. Dispense any fluid in the system into a waste container by opening the meter.
3. Open all bleed-type master air valves and fluid meter in the system.
4. Leave the meter open until ready to pressurize the system.

To reduce the risk of injury from fluid spray from the meter, follow this procedure when you:

- Are instructed to relieve pressure.
- Stop dispensing.
- Check, clean or service any system equipment.
- Clean or install nozzles.

Grounding

WARNING

MOVEMENT OF FLUIDS THROUGH THE DISPENSING SYSTEM CREATES STATIC ELECTRICITY. STATIC ELECTRICITY CAN CAUSE VOLATILE FUMES RESULTING IN AN EXPLOSION AND FIRE. THE DISPENSING SYSTEM MUST BE GROUNDED.

Grounding reduces the risk of static sparking. Ground all system components according to local, state and federal codes. Consult the pump user manual and other system components to ground the following:

- Pump: follow manufacturer's recommendations.
- Air and fluid hoses: use only grounded hoses.
- Air compressor: follow manufacturers recommendations.
- Fluid supply container: follow the local code.

Flushing Procedure

CAUTION

IF THIS INSTALLATION IS NEW OR IF THE FLUID IN THE LINES IS CONTAMINATED, FLUSH THE SYSTEM BEFORE INSTALLING THE METER(S).

NOTE: If the system has multiple dispense positions, begin at the position farthest from the pump and move towards the pump.

1. Close fluid dispense valves at every position.
2. Once the main fluid outlet valve at the pump is closed and the air pressure to the pump motor is properly adjusted, the air valve is opened.
3. Slowly open the main fluid valve.
4. Place the hose end in a waste container. Make sure the hose is secure so no fluid leaks during flushing.
5. Slowly open the dispense valve and allow enough fluid to pass through it to ensure that the system is clean.
6. Close the valve and repeat for all dispense positions.

Attach Meter to Hose

Close the drain valve before starting this procedure.

1. Attach swivel to meter. Apply Loctite® 243 thread sealant, or equivalent, to the male end of the hose. See *Figure 2*.



Figure 2: Apply thread sealant

2. Insert the metal end of the hose into the swivel. See *Figure 3*.



Figure 3: Insert hose into swivel

3. Tighten completely with an open ended, adjustable wrench. See *Figure 4*.



Figure 4: Use wrench to tighten

NOTE: The threaded end of the meter always has female threads. The metal end of the hose must have male threads. The inlet and outlet swivel connections are either 1/2 in. NPT or 1/2 in. BSPP, depending on meter model.

Attach Nozzle to Meter

1. On the opposite end, apply Loctite 243 sealant, or equivalent, to the end of the nozzle.
2. Thread the nozzle onto the meter (*Figure 5*) and screw it in tightly with an open-ended, adjustable wrench (*Figure 6*).



Figure 5: Thread nozzle onto meter



Figure 6: Tighten nozzle with wrench

3. Open all dispense position shutoff valves.
4. Start the pump to pressurize the system.
5. Purge all air from the fluid lines and dispense valve(s) before use.

METER OPERATION

NOTE: The keypad **AUTO** button is used to toggle between *Manual Mode* and *Auto Batch Mode*.

Manual Mode

In *Manual* mode the meter operates as a free-flow dispensing handle.

1. Pull the trigger to begin the flow. The display shows the amount dispensed.
2. When the desired amount has been dispensed, release the trigger to stop the flow.
3. Press **RESET** once to reset the counter display to zero.



Figure 7: Manual mode screen

Auto Batch Mode

To enter *Auto Batch* programming mode, press **AUTO** until a digit and colon appear. See *Figure 8*. The meter is now ready to select the desired batch number.

- The 0 is flashing in front of the colon. This is the batch number icon.
- Batch 0 is for *Manual Mode*. See "*Manual Mode*".
- Batches 1...5 are for auto batching amounts, up to 99 units.
- Different batch amounts can be stored in each option.
- Batch 6 is for batches from 1...999 units.

1. Press **TOTAL** to cycle through the batch number icons to select the new batch or *Manual Mode*.
2. When the desired batch number icon displays, press **10**, **1** and **0.1** to change the batch size.

To batch in options 1...5:

- Press **10** to increase a batch by 10 units.
- Press **1** to increase a batch by 1 unit.
- Press **0.1** to increase a batch by 0.1 of a unit.



Figure 9: Auto batch mode, option 1

To batch in option 6:

- Press **10** to increase a batch in increments of 100 units.
- Press **1** to increase a batch in increments of 10 units.
- Press **0.1** to increase a batch in increments of 1 unit.



Figure 10: Auto batch mode, option 6

NOTE: See "*Count Up and Count Down Modes*" on page 9.

- After the batch size is selected, press **AUTO** to lock in the batch and dispense fluid.



Figure 11: Auto batch mode display

- Pull the trigger to begin flow. The solenoid valve in the meter automatically locks the dispensing valve in the full open position.
- Release the trigger, allowing it to fall back. The flow automatically shuts off after the batch quantity has dispensed. After the batch quantity has been dispensed the meter is a free-flow dispensing handle until you press **RESET**.

NOTE: In case of an emergency or to interrupt a batch, the meter is equipped with an *Emergency Override*.

- Top off the fluid at the end of the batch. To top off the fluid, pull the trigger to begin flow and release it when the desired amount is pumped.
- Press **RESET** when finished. The display resets and the meter is now ready to dispense the next batch.

Count Up and Count Down Modes

- In *Auto Batch Mode*, press **RESET**. The count up and count down arrows flash in the display.



Figure 12: Count up arrow



Figure 13: Count down arrow

- Press **TOTAL** to toggle between count up and count down.
- Press **RESET** to select count up or count down.

NOTE: In the count up option, the meter counts up to the preprogrammed batch amount. In the count down option, the meter counts down from the preprogrammed batch amount to zero. Batch 6 is always in count down mode.

- Press **AUTO** to lock in the batch quantity when batch size is selected. The screen flashes and the batch number icon no longer displays.



Figure 14: Count up mode

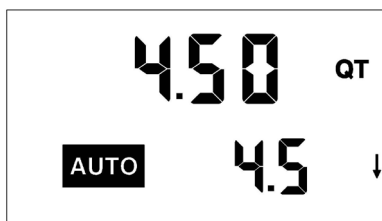


Figure 15: Count down mode

- If the meter is in count up mode, the display shows zeros.
- If the meter is in count down mode, the set batch size appears on the screen.

OPERATING MODE FUNCTIONS

These functions operate the same in Manual mode and Auto Batch mode.

Resettable and Accumulated Totals

The meter has two flow totalizers, *Resettable Total* and *Accumulated Total*.

1. Press and hold **TOTAL** to display the *Accumulated Total*. After holding for three seconds, the display changes to the *Resettable Total*. **RESETTOTAL** displays the total fluid dispensed since the *Resettable Total* was last set back to zero.



Figure 16: Resettable total display

2. Press **RESET** while viewing the **RESETTOTAL** to set it back to zero.
3. Release **TOTAL** to return to the operating screen.

NOTE: The *Accumulated Total* cannot be reset unless the user changes from English units to metric units or from metric to English units. See "Change Unit of Measure" on page 12.

Emergency Override

In case of emergency or to interrupt a batch, the meter is equipped with an *Emergency Override* that closes the valve, immediately stopping fluid flow.

Press the red **O** to activate the *Emergency Override*. The override closes the valve, immediately stopping fluid flow.

After an *Emergency Override*, batching can continue by pulling up on the trigger.

History

This option allows the user to review the previous five batches dispensed with the meter.

Press and hold **10** to view the five previous batches.

- Batches are displayed on screen, one at a time, beginning with the most recent and cycling through to the oldest.
- Batches continue to cycle as long as **10** is held down.



Figure 17: Batch history

Two seconds after releasing **10**, the display automatically returns to the normal operating screen.

NOTE: History cannot be erased unless the user changes from English to metric or from metric to English units. See "Change Unit of Measure" on page 12.

Flow Rate

This option allows you to see the rate at which fluid is flowing through the meter instantaneously.

Press and hold **10** while fluid is flowing through the meter. The *Flow Rate* appears in the bottom right corner of the display.

- The *Flow Rate* remains on the display as long as **10** is held down.
- Release **10** to return the display to the normal operating screen.

NOTE: *Flow Rate* can only be displayed if fluid is flowing through the meter.

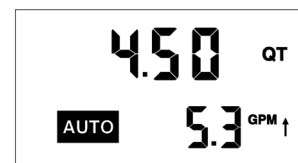


Figure 18: Flow rate

Error Codes

SF0 (Scale Factor 0) The Scale Factor setting for the meter is set to 0.000.

To input a valid Scale Factor for the meter, follow the instructions in "Change Scale Factor" on page 12.

All other error codes are for factory purposes only. To clear the meter, press **RESET**.

SERVICE

Low Battery

When the batteries need to be changed, a progression of warnings appears on the meter screen.

The *Low Battery* icon appears in the lower left corner of the display when the batteries are getting low and should be changed.

The *Low Battery* icon flashes when the battery power is too low, and meter functions are disabled.

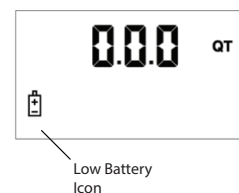


Figure 19: Low battery warning

Changing the Batteries

The battery compartment is located in the lower case on the underside of the trigger guard.

1. Turn the unit face down.
2. Unscrew the two screws.
3. Remove the battery door to expose the batteries.



Figure 20: Replacing the batteries

4. Replace the old batteries. The meter takes four AA, alkaline batteries.

NOTE: Battery polarity markings are inside the battery compartment.

5. Dispose of used batteries properly, according to local regulations.

NOTE: Changing the batteries does not affect any of the programmed values or totals.

CHANGE FACTORY SETTINGS

Each meter is calibrated at the factory for use with motor oil. The unit of measure is selected prior to shipment.

Verify Firmware Version

Press and hold **TOTAL** and **1** simultaneously to display the firmware version and code checksum.

The last two digits on the lower right are the firmware version. Meters with version 17 or higher use the procedure outlined in this manual for changing the unit of measure and Scale Factor.

Programming

To change the factory settings, follow these steps.

1. Press and hold **TOTAL** and **AUTO** simultaneously. PrG appears on the display.
2. Release **TOTAL** and **AUTO**.
3. Press and release these buttons in order: **1**, **AUTO**, **10**, **0.1**, and **TOTAL**. The current unit of measure flashes, indicating the meter is ready to be programmed.



Figure 21: Entering programming mode

Change Unit of Measure

The meter comes with an option to choose four different units of measure.

NOTE: The unit of measure is flashing in *Programming Mode*.

1. Press **TOTAL** to scroll through the four options: *PT, QT, GAL, L*.
2. When the desired unit of measure is displayed, press **RESET** to select it. The unit of measure stops flashing.
3. If L (liters) is selected, the decimal point will be flashing. The decimal point can either be changed to a comma or a period. To do this press **TOTAL**.
4. If no Scale Factor changes are necessary, see "*Save Changes*".

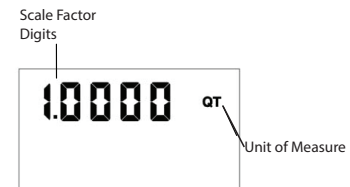


Figure 22: Unit of measure display

⚠ CAUTION

CHANGING THE UNIT OF MEASUREMENT FROM METRIC TO ENGLISH OR FROM ENGLISH TO METRIC CLEARS THE RESETTABLE TOTAL AND ACCUMULATED TOTAL.

Change Scale Factor

⚠ WARNING

CHANGING THE SCALE FACTOR CHANGES THE ACCURACY OF THE METER, POTENTIALLY CAUSING IT TO OVERFILL OR UNDER FILL. THIS HAS THE POTENTIAL TO CAUSE A MECHANICAL BREAKDOWN.

1. Press **RESET** to advance through the scale factor digits.
2. Press **TOTAL** to change the selected number.

NOTE: All digits can be scrolled between 0 and 9 except the first. The first digit can only be toggled from 0 to 1 or from 1 to 0.

3. Press **RESET** to advance to the next digit in the scale factor.
4. Repeat steps 2 and 3 for all five digits.

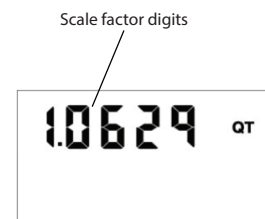


Figure 23: Scale factor display

Save Changes

To save changes and exit programming mode:

1. Press and hold **TOTAL** and **AUTO** simultaneously.
2. The display will flash three times and go blank.
3. Press **RESET** and the display will turn back on.

Verify Changes

1. Verify the unit of measure is correct.
2. Press and hold **TOTAL** and **AUTO** at the same time to verify the Scale Factor is correct.

CALCULATE SCALE FACTOR

A Scale Factor is a number used to adjust meter accuracy. The Scale Factor is set at the factory using motor oil with a viscosity of 10W.

The primary use for Scale Factor recalibration is to batch fluids with different viscosities. If the fluid has a lower viscosity, more fluid can slip past the meter gears without being detected. Changing the Scale Factor adjusts the meter to compensate for the loss.

The meter multiplies each pulse by the Scale Factor number to correct the accuracy when it converts to the specified units. The reading is then always correct.

For an approximate Scale Factor for fluids of different viscosities, consult the charts on the next page.

NOTE: The meter's original Scale Factor is written on the trigger when it is calibrated at the factory. It may have been revised after field installation. Use the Scale Factor showing on the display, not on the trigger.

WARNING

CHANGING THE SCALE FACTOR WILL CHANGE THE ACCURACY OF THE METER, POTENTIALLY CAUSING IT TO OVERFILL OR UNDER FILL. THIS HAS THE POTENTIAL TO CAUSE A MECHANICAL BREAKDOWN.

To view the current scale factor, press and hold **TOTAL** and **AUTO** at the same time.

Absolute Scale Factor

For absolute Scale Factor, perform this test:

1. Run a measured amount of fluid through the meter. For example, if the meter delivers 4.20 quarts and the display shows only 4.00 quarts, the Scale Factor needs to be adjusted.
2. Divide the amount the meter delivered (4.20) by the amount shown on the display (4.00). The error factor is (1.05).
3. The existing Scale Factor is 1.0123. See *"Verify Changes" on page 12* to check the current Scale Factor.
4. To calculate a new factor: $1.0123 \text{ (existing Scale Factor)} \times 1.05 \text{ (error factor)} = 1.0629 \text{ (new Scale Factor)}$.
5. Enter that number as described in *"Change Scale Factor" on page 12*.

NOTE: Use the Scale Factor shown on the display, not on the trigger.

Chart of Approximate Scale Factors

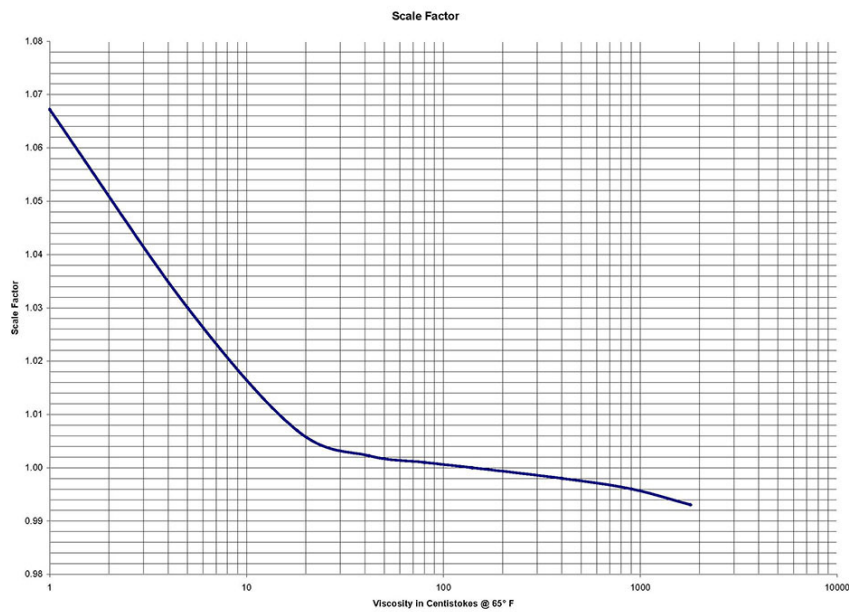


Figure 24: Scale factors for fluids with different viscosities

Fluid	Viscosity	Scale Factor
Water/anti-freeze	5	1.044
Anti-freeze	18	1.007
Brake Fluid	42	1.004
ATF	80	1.002
10W	140	1.000
80W-90	450	0.999
140W	1800	0.993

Table 3: Fluid viscosity and scale factor

DIMENSIONS

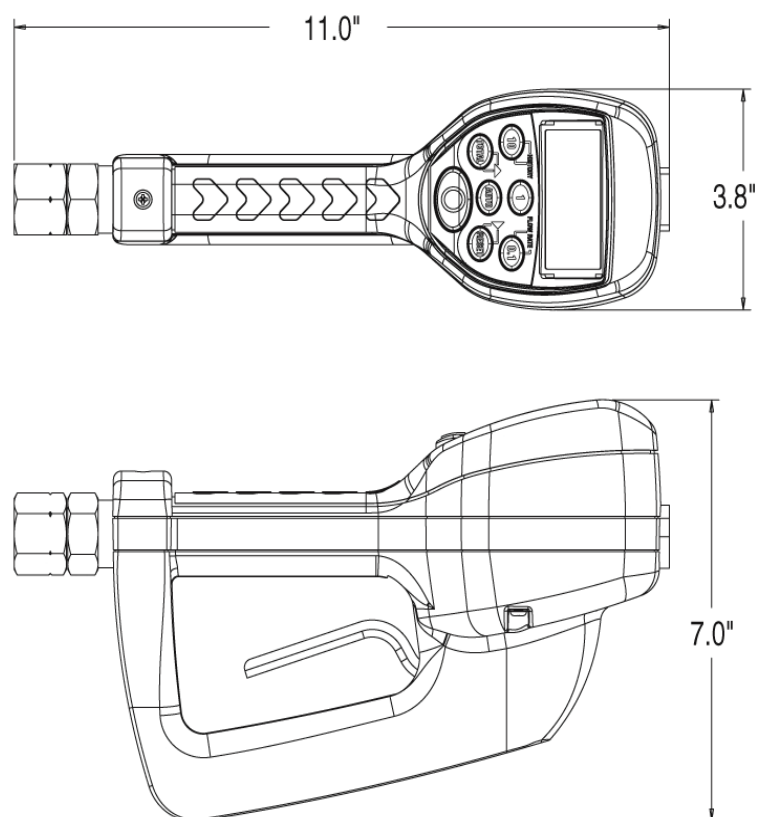


Figure 25: Meter dimensions

SPECIFICATIONS

Maximum flow *	10 gpm (38 lpm)
Minimum flow *	0.25 gpm (1 lpm)
Operating pressure (maximum)	1000 psi (67 bar)
Operating pressure (minimum)	5 psi (0.35 bar)
Operating temperature (maximum)	120° F (50° C)
Operating temperature (minimum)	20° F (–5° C)
Accuracy (general)	+/- 0.5%
Accuracy (anti-freeze)	+/- 1.5%
5-digit LCD display	Quarts, Pints, Gallons, Liters
Inlet and outlet connections	1/2" NPT (1/2" BSPP)
* Minimum and maximum flow range will vary with fluid viscosity	

PARTS

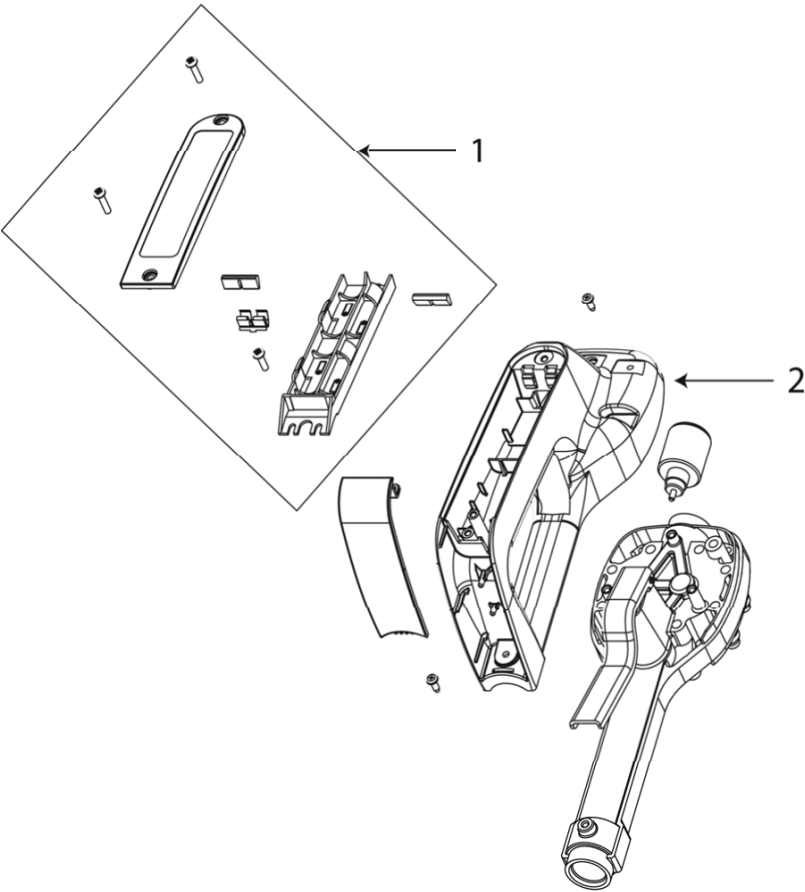


Figure 26: Parts: back of meter

Item	Description	Part Number
1	Battery holder assembly	64103-026
2	Bottom case with screws	64103-003

Table 4: Part numbers: back of meter

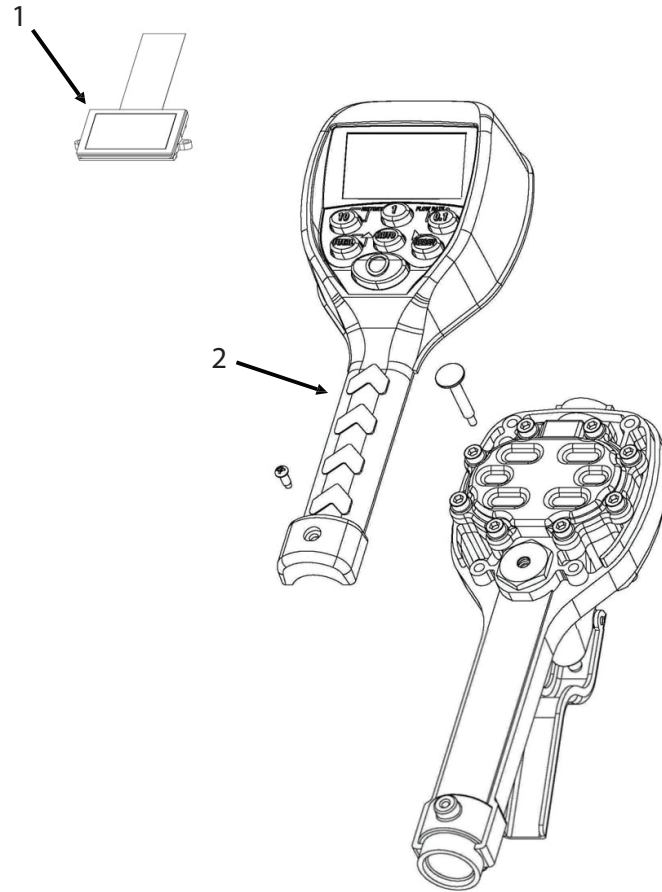


Figure 27: Parts: front of meter

Item	Description	Part Number
1	Display assembly	64103-023
2	EPM2 Adv. register assembly	64103-025
Not shown	Swivel, NPT, special fluids	64082-003
Not shown	Rubber boot	65546-001
Not shown	Swivel, NPT Buna	64082-001
Not shown	SS swivel, NPT ALFAS	64082-005

Table 5: Part numbers: front of meter

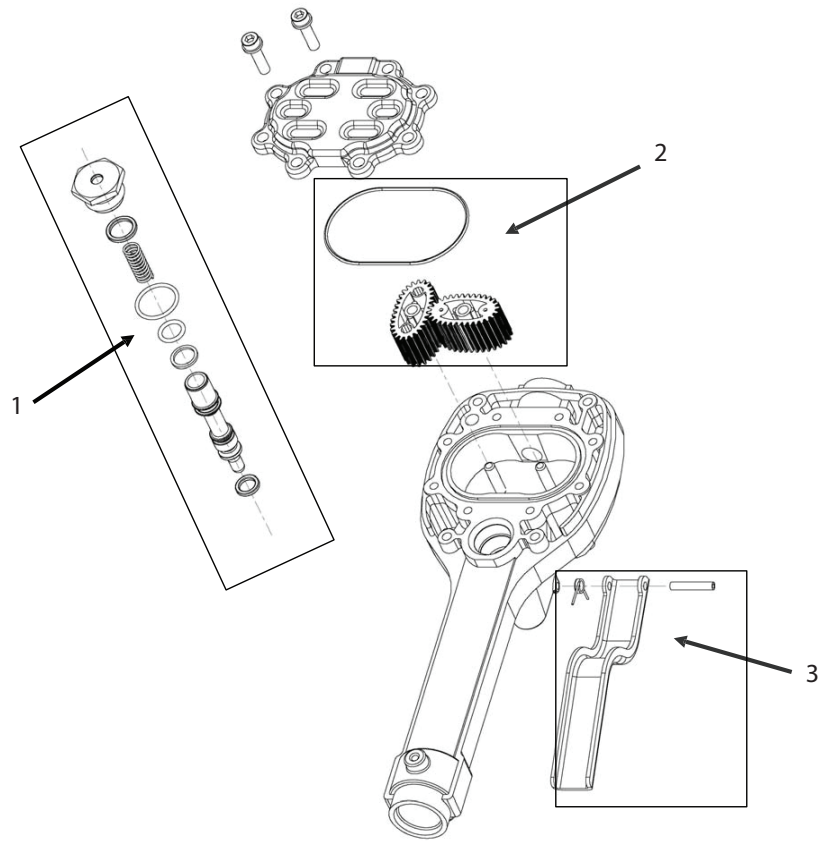


Figure 28: Parts: inside meter

Item	Description	Part Number
1a	Valve assembly ALFAS	64103-016
1b	Valve assembly Buna	64103-010
1c	Valve assembly EPDM	64103-011
2a	Gear service kit, LCP gears, ALFAS O-ring	62896-003
2b	Gear service kit, Derlin gears, Buna O-ring	62896-001
2c	Gear service kit, LCP gears, EPDM O-ring	62896-005
3	Trigger Assembly	64103-005

Table 6: Interior parts list

TROUBLESHOOTING

⚠ WARNING

RELIEVE THE PRESSURE PRIOR TO CHECKING OR REPAIRING THE METER. MAKE SURE ALL VALVES, CONTROLS AND PUMPS ARE OPERATING CORRECTLY.

Symptom	Possible Cause	Remedy
Battery icon is displayed	The batteries are low	Replace batteries
Blank display	The meter is asleep	Press RESET
	There is a loose battery connection	Remove battery pack and check battery connection / press RESET
	The batteries are dead	Replace batteries / press RESET
Meter does not latch for batching	The meter is not in <i>AUTO</i> mode	Press AUTO and program batch size
	The meter was not reset after prior batch	Press RESET
	The batteries are low	Check for the battery icon / replace the batteries / press RESET
Slow or no fluid flow	The filter is clogged	Clean or replace the filter in the swivel nut
	The pump pressure is low	Turn up the pump pressure
	Foreign material is jamming the meter	Contact your local distributor for repair
Meter is inaccurate	The Scale Factor not correct for the fluid	Enter program mode, check and reset Scale Factor

Control. Manage. Optimize.

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