

FPS-2000

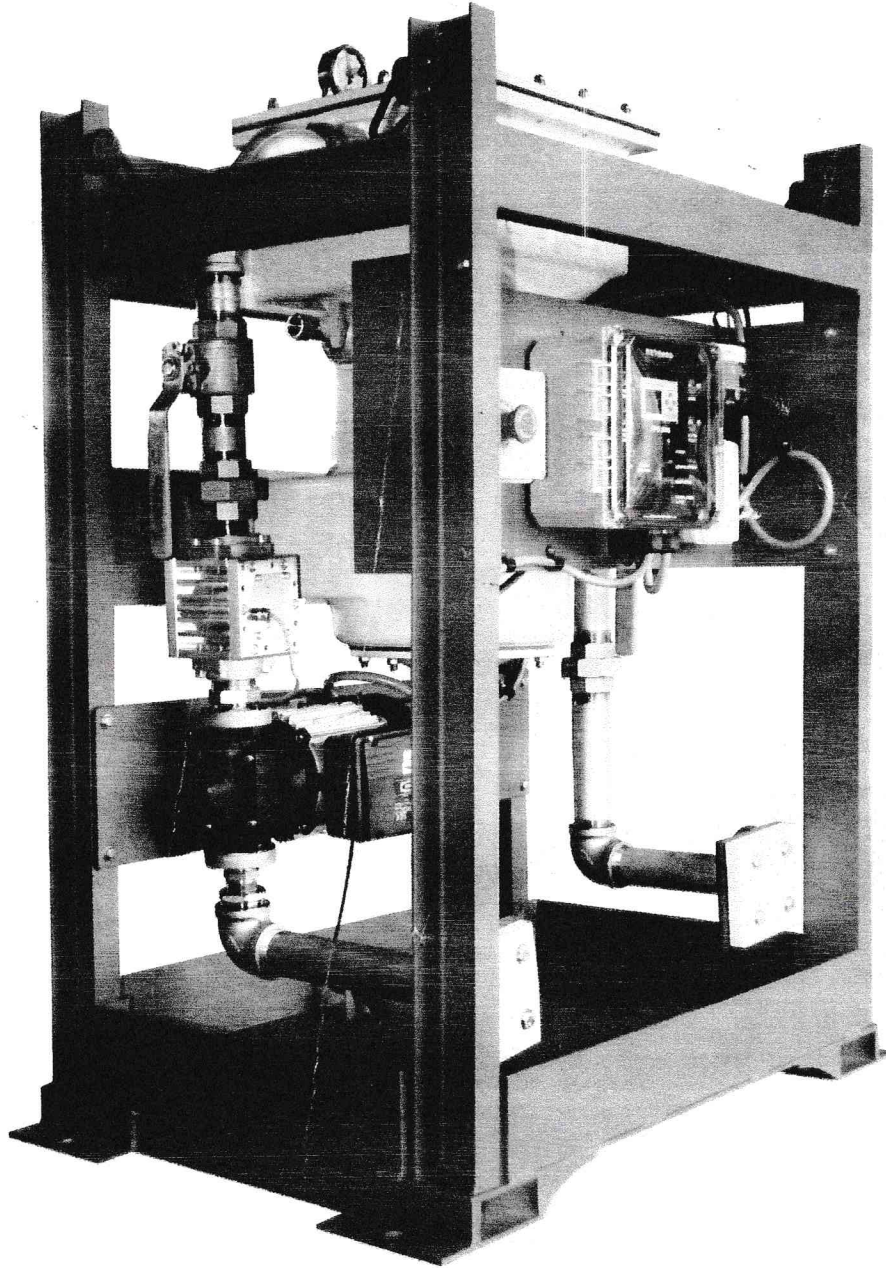


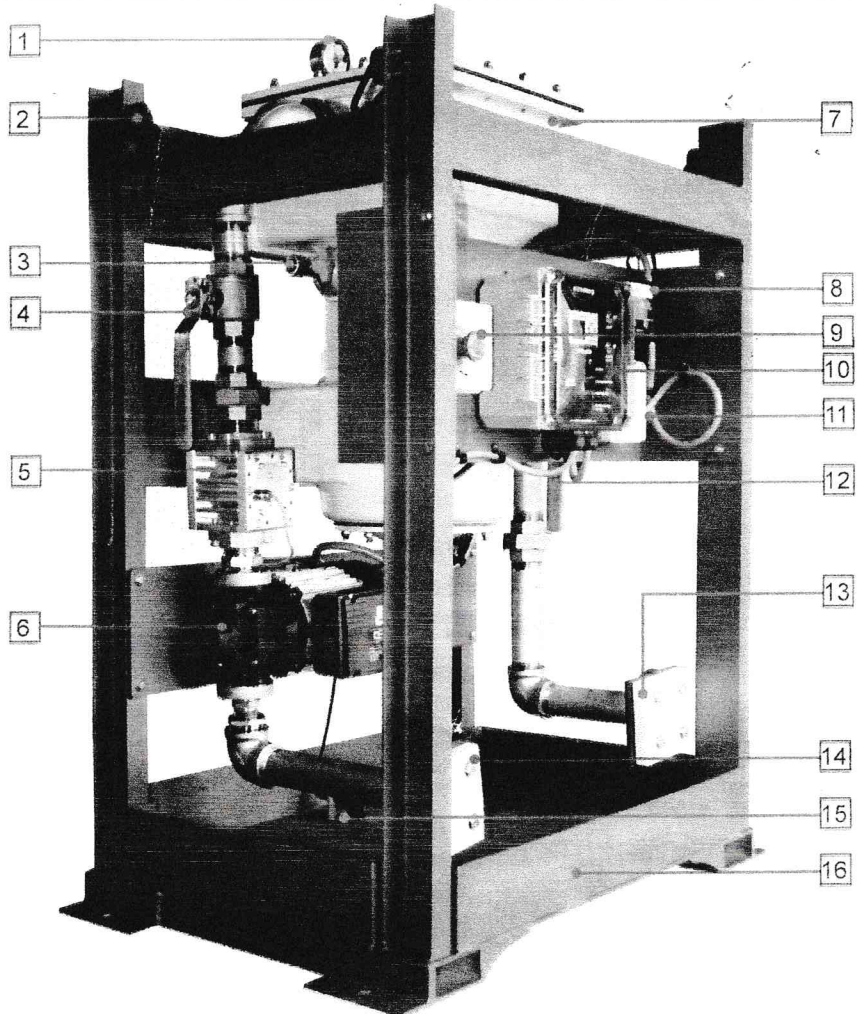
Table of Contents

System Overview.....	3
Control Panel Overview.....	4
Technical Specifications	5
Electrical and Installation.....	6
Tank Diagram	7
Initial Setup.....	8
Digital Timer Instructions: Set Date and Time	9
Digital Timer Instructions: Set Schedule Timer.....	10
Digital Timer Instructions: Set Manual Timer.....	11
Digital Timer: Alarms.....	12
Backflushing Instructions.....	13
Filter Element Replacement.....	14
Flow Meter Remote Display: Overview	15
Flow Meter Remote Display: Operating Instructions	16
Flow Meter Remote Display: Operating Instructions Cont.....	17
Flow Meter Remote Display: Operating Instructions Cont.....	18
Flow Meter Remote Display: Battery Replacement.....	19
Troubleshooting.....	20

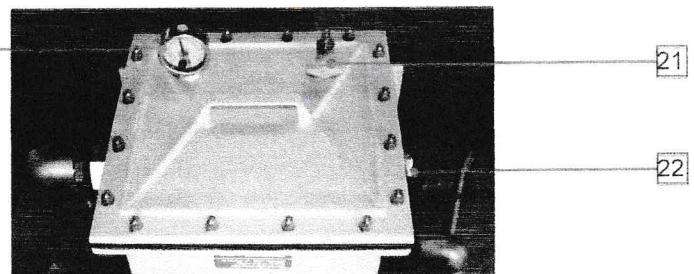
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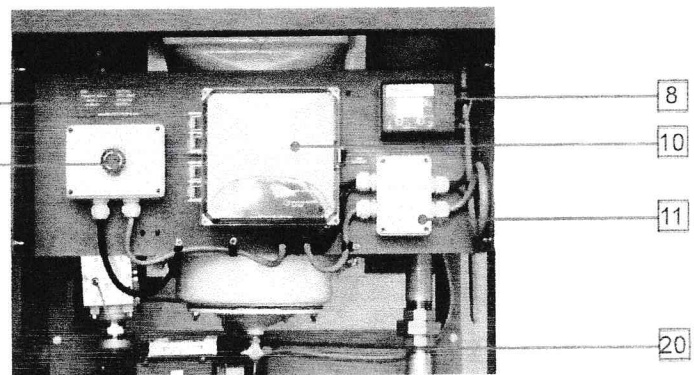
1. Vacuum gauge
2. Lifting ring (x4)
3. Priming port for fuel/water separator
4. 1 1/2" full port valve (Outlet Side)
5. Flow meter sensor
6. Pump
7. SWK-2000/130MK-G fuel/water separator
8. Flow meter remote display
9. Emergency stop button
10. Control panel
11. Dry contacts
12. 1 1/2" full port valve (Inlet Side)
13. Inlet
14. Outlet
15. Spill sensor
16. Drip pan
17. Water sensor
18. Drain valve
19. Serial number plate
20. Drain valve
21. Filter vent
22. Vacuum sensor



Top View of Fuel/Water Separator

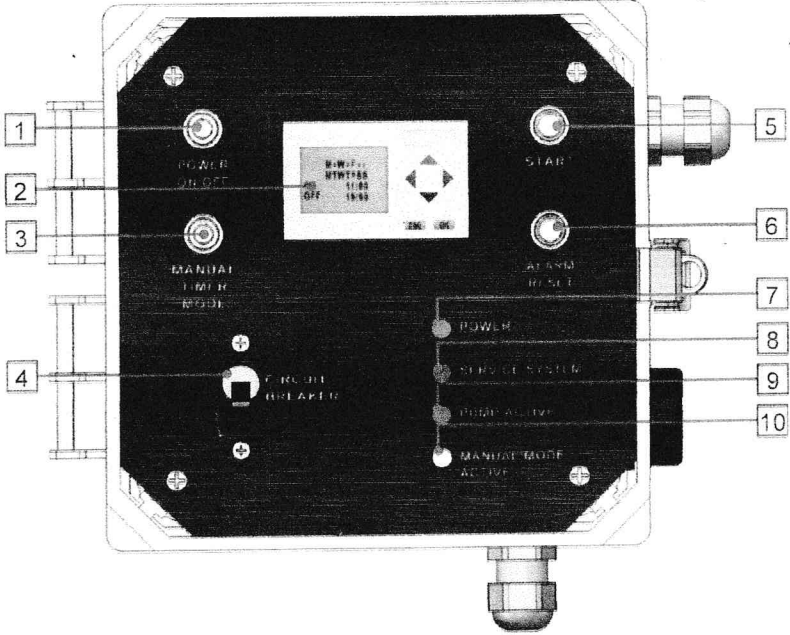


Front View of Control

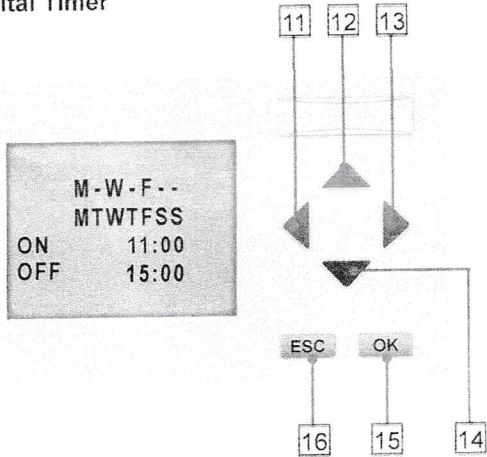


Control Panel

- 1. Power button
 - 2. Digital timer
 - 3. Manual timer mode button
 - 4. Circuit breaker
 - 5. Start button
 - 6. Alarm reset button
 - 7. Power on light - indicates when system is on
 - 8. Service system light - indicates an alarm has been triggered and user must service the system
 - 9. Pump active light - indicates fuel polishing system is running
 - 10. Manual timer mode active light - indicates system is operating in manual timer mode (not schedule timer mode)
-
- 11. Left key
 - 12. Up key
 - 13. Right key
 - 14. Down key
 - 15. OK key
 - 16. Escape key



Digital Timer



Technical Specifications

Flow Rate	Approximately 1,600 GPH (6,056 LPH)	
Dimensions (Width x Depth x Height)	36" x 24" x 46" (914mm x 610mm x 1,168mm)	
Circuit Breaker	15 Amps	
Motor Amp. Draw	9.5 Amps Full Load	
System Max. Amp.	12 A 120V @ 60 Hz	6 A 220V @ 50 Hz
Pump	Sintered steel rotor with resin vanes	
Suction Capability (primed)	15 ft vertical lift (1 1/2" lines)	
Timer	Digital PLC	
Inlet	1 1/2" 4-bolt flange x 1 1/2" Female NPT	
Outlet	1 1/2" 4-bolt flange x 1 1/2" Female NPT	
Piping	Stainless steel	
Filter Torque Values	Bowl Retainer Ring	ca. 20 Nm (177 in-lbs)
	Lid	ca. 20 Nm (177 in-lbs)

Warning

- The system has been developed to be used with diesel fuel only. DO NOT USE WITH GASOLINE.
- The system is designed to meet environmental standards for safe operation (NOT for use with fluids that have a flash point below 100°F (38°C), e. g.: Gasoline, alcohol,...)

Primary Inspection

- Upon delivery inspect the system for any damage that may have occurred during shipment.
- Inspect the interior of the unit for mechanical or electrical damage.
- If the unit is damaged upon delivery, contact the shipping company immediately.

Electrical

- Installation of unit should only be performed by qualified installation personnel who have thoroughly read and understands the installation instructions covered in this manual.
- To avoid the risk of electric shock, make sure that the power supply is disconnected. Ensure that the power supply is at zero volts with a multimeter before making any electrical connections.
- To ensure operator safety the system must be connected to properly grounded power sources.
- Make sure that your unit and power supply are configured for the same voltage rating.
- Dry contacts are for external use.
- External control voltage must be supplied by customer.

Piping

Use quality approved fuel line materials with at least 1 1/2" inner diameter line. Smaller plumbing will place excessive load on the motor and shorten its life. A full port ball valve should be installed on the inlet and outlet ports of the system.

The pickup line(s) (suction) should originate from the lowest point of the tank, approximately half the tube diameter from the bottom, and should be connected directly to the inlet. For optimal performance, ensure that this line is free and nothing is restricting flow. It is recommended to install a foot valve to keep the system primed, especially if the system is located above the lowest possible fuel level in the tank.

If the system is mounted below tank top level, a priming tee should be installed on the highest point of the suction line to be able to easily prime the systems suction line.

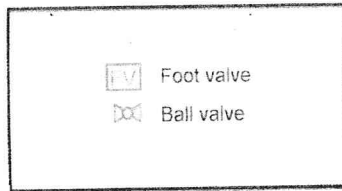
The return line(s) (discharge) should be connected to the outlet and enter the tank as far as possible from the pick up tube and extending 2/3 down into the tank. For optimal performance, ensure that the outlet, discharge or return, line(s) are free and nothing is restricting their flow.

The suction line of the system must be independent and separate from the suction line of the engine. Do not integrate into engine fuel system.

When installing this unit, FLEXIBLE CONNECTIONS MUST BE USED TO REDUCE STRESS on the plumbing and prevent damage to the unit.

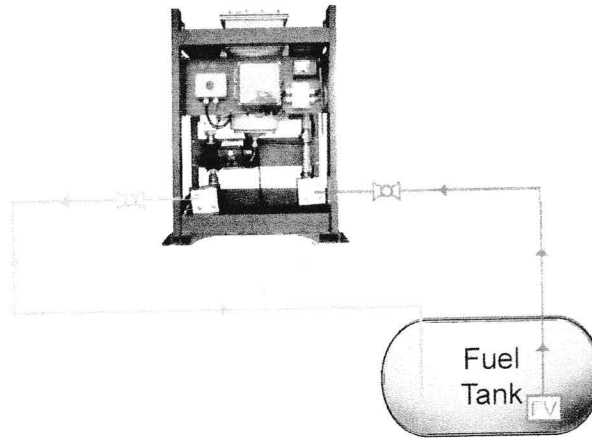
Refer to Diag. 2 on next page.

Hoses, piping, solenoid valves and foot valves shown in the diagrams below are not provided with the system and must be provided by the user/contractor, unless agreed upon otherwise.



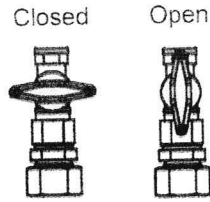
Single Tank Diagram

Diag. 2

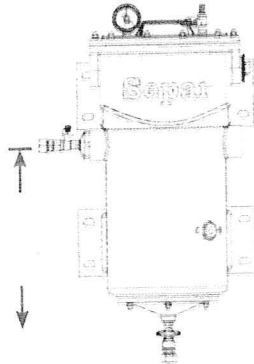


1 Open the fuel supply valve. Prime fuel system and ensure that there are no leaks. Prime the filter through the priming port located on the left side of the filter.

Push and turn to open priming port and pump fuel into it.



This will prime the filter with fuel up to the level of the priming port.



2 Set gauge pressure indicator (red needle) slightly to the left of the black needle prior to operation.



The gauge will indicate maximum vacuum pressure during system operation. When the indicator reaches 15 in-Hg, it is time to drain or change the filter element.



3 Choose timer mode:

Manual Timer Mode

Operate in this mode if system will run one set time.

- Must press manual timer mode button to activate / deactivate.
- Manual timer mode light will be ON.
- Pump will start upon pressing the start button.
- Pump will automatically shut off after the preset run time.

Schedule Timer Mode

Operate in this mode if system will start/stop automatically on the programmed days of the week and times.

- Must press manual timer mode button to activate / deactivate.
- Manual timer mode light will be OFF.
- Pump will automatically start and stop according to the preset date and time.

4 Press start button. Power on indicator will be lit.

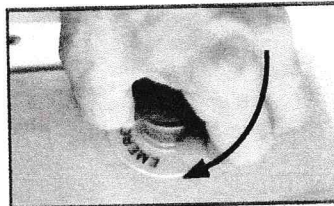
If in manual timer mode, pump will immediately begin running.

If in schedule timer mode, pump will only begin running if within programmed date/time to run.

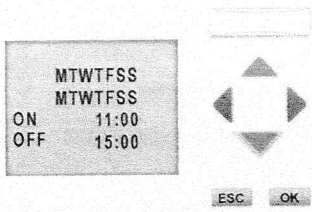
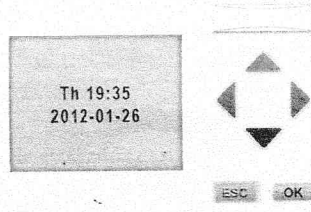
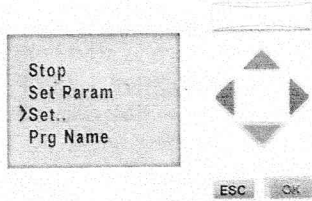
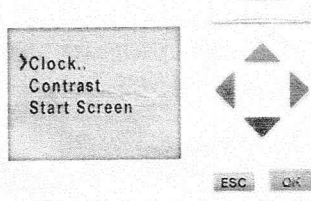
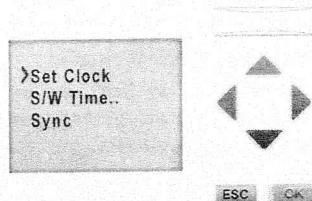
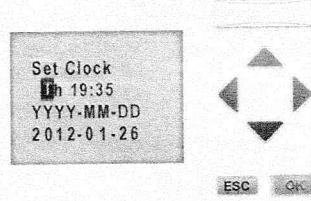
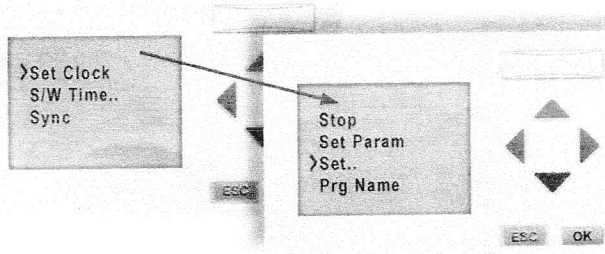
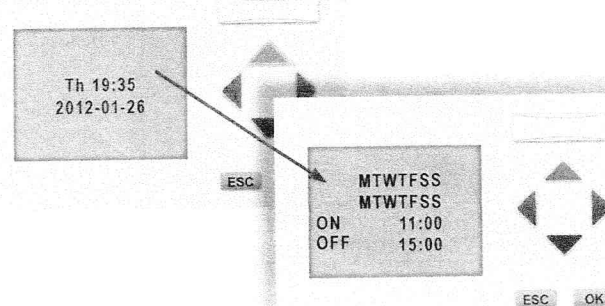
Verify the pump is operating by checking vacuum gauge located on the filter. Gauge will be reading 0-5 in-Hg of vacuum.

Emergency Stop Button

The emergency stop button is located beside the control panel. Turn clockwise and press down to shut down the operation. Press the reset button. Then press the start button to resume operation.



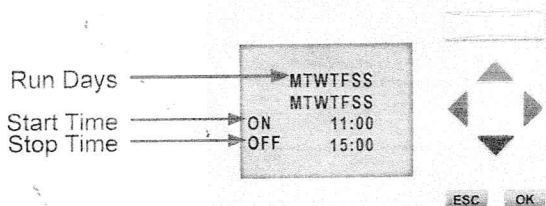
Digital Timer Instructions: Set Date and Time

<p>1 Starting at the program screen, press DOWN key to view current time screen.</p> 	<p>2 The current date and time is displayed. Time is shown as 24 hr clock. Date is shown YYYY-MM-DD. Press ESC key.</p> 
<p>3 Use the DOWN arrow to move the cursor to Set.. option. Press OK key to continue.</p> 	<p>4 Select Clock.. option. Press OK key to continue.</p> 
<p>5 Select Set Clock option and press OK key to continue.</p> 	<p>6 Flashing black box indicates your selection. Use LEFT/RIGHT key to move selection. Use UP/DOWN key to change date and time. Press OK key when finished and to return to previous menu.</p> 
<p>7 Press ESC key. Press ESC key again to return to current time screen.</p> 	<p>8 Now shown is the current time screen. Press UP key to return to program screen.</p> 

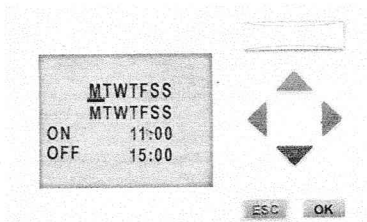
Digital Timer Instructions: Set Schedule Timer

1 When using this method, follow sequence exactly or damage to program can occur (non-warrantable situation).

A. Ensure the breaker is ON.
 B. Move the red power switch to the ON position and power indicator light is on.
 C. Ensure timer mode is switched to Schedule Timer.



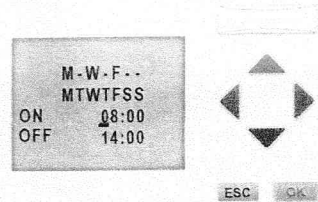
2 Hold the ESC key until flashing underline appears under the first day of the week. This flashing underline indicates your selection. Use the LEFT/RIGHT keys to move between the dates, start time, and stop time.



3 **Change the run days**
 With the flashing underline in the days row, press the OK key until flashing box appears. Use the LEFT/RIGHT key to move between days. Use the UP/DOWN key to program run days. A dash(-) indicates the system will not run on that day. Press OK key when finished and the cursor will return to flashing underline.



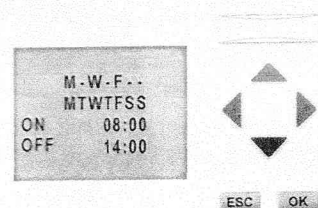
4 **Change the run time**
 With the flashing underline in the days row, use the LEFT/RIGHT key to move to start time (ON). Press OK key until flashing box appears. Use UP/DOWN key to change time. Press OK key when finished and the cursor will return to flashing underline. Repeat with stop time (OFF).



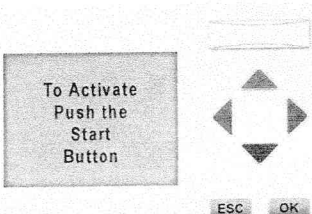
5 Press ESC to save. Flashing underline will disappear.



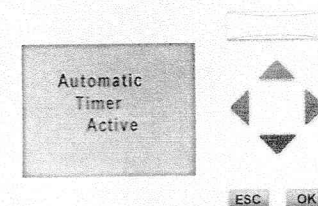
6 Setting the schedule timer is finished. In this example, system will run on Monday, Wednesday and Friday. System will start at 8:00 am and stop at 2:00 pm.



7 Every 5 seconds, screen will request user to push Start button to activate program.



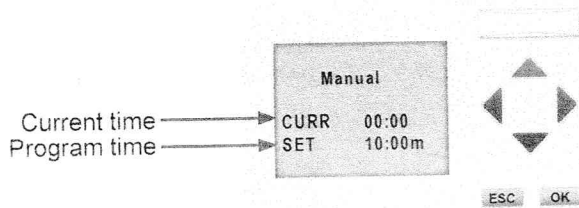
8 Afterwards, every 5 seconds screen will indicate the schedule timer is active.



Digital Timer Instructions: Set Manual Timer

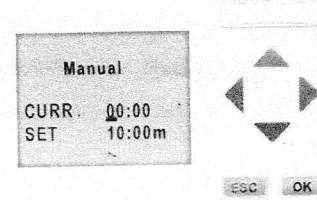
1

Top row indicates current time.
Bottom row indicates program time.



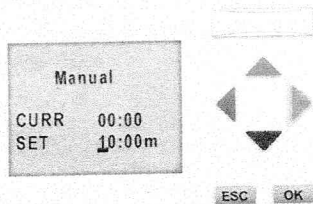
2

Press and hold ESC key until flashing underline appears. This indicates your selection.



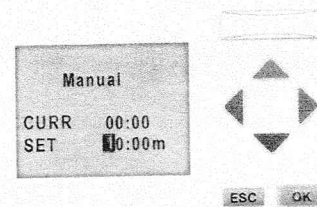
3

Use RIGHT arrow key to move underline to program time (SET).



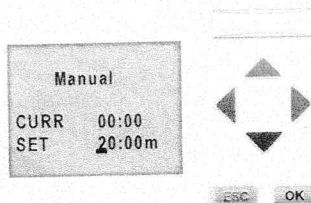
4

Press OK key and flashing box appears. Use UP/DOWN key to change time. The "m" indicates minutes and can be changed to "h" for hours. When finished, press OK key.



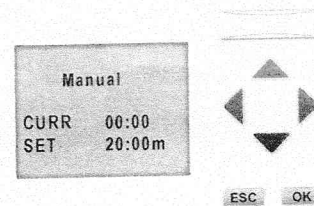
5

Flashing box will return to flashing underline. Press ESC to save. Flashing underline will disappear.



6

In the screen shown below, the system is set to run for 20 minutes and will stop once the time has expired.

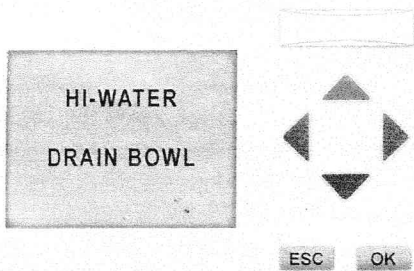


There are three different alarms installed in the unit.

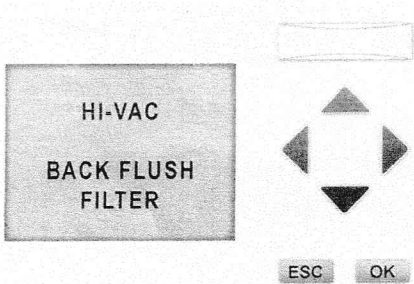
If one of the alarms should sound: De-energize system when servicing unit.

1. Follow the directions displayed on the screen.
2. Press RESET/STOP button
3. Wait at least 2 minutes, then press START to restart the unit.

If you have successfully cleared the alarms, the unit should restart.

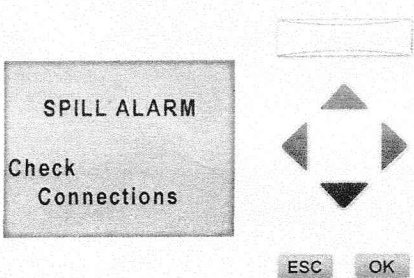


High Water Alarm



High Vacuum Alarm


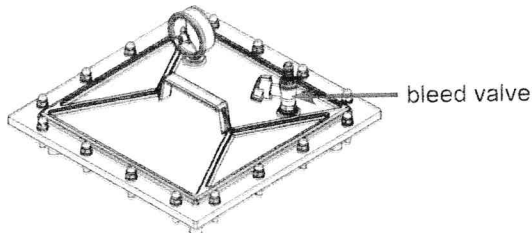

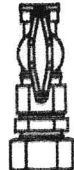
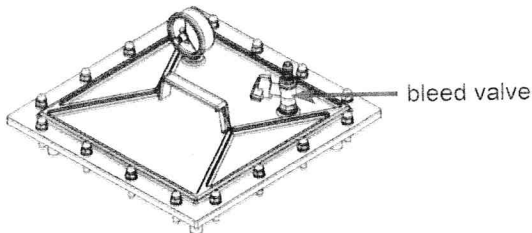
Backflushing procedure can be executed up to 5 times before replacing the filter element.




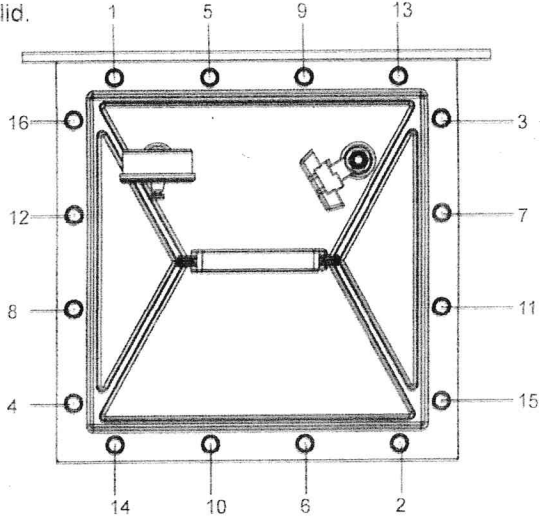
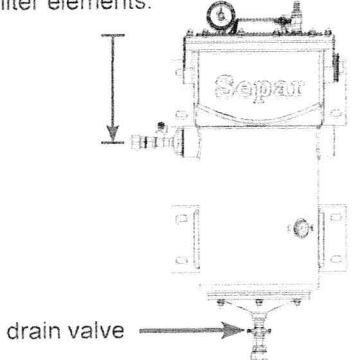
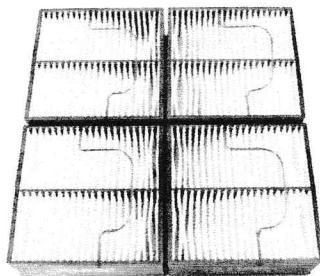
Spill Alarm

Backflushing Instructions

Prior to servicing the filters, ensure that the unit is OFF. Press the red, emergency stop button. Backflushing is for particulate and water removal only and will *not* remove sludge once embedded in the filter media.

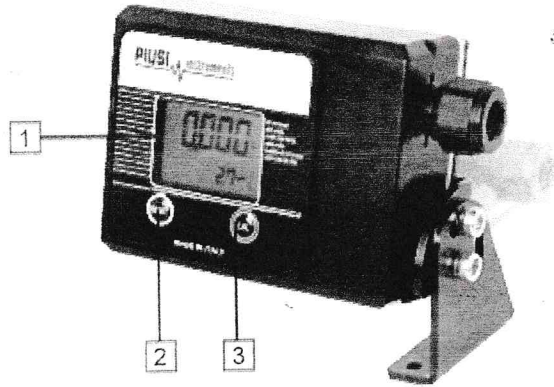
<p>1 Turn the system off. Shut off the fuel supply valve and isolate unit before servicing the filter.</p> 	<p>2 Open the bleed valve. This will break the vacuum in the filter allowing water and small particles to be released from the filter elements.</p> 
<p>3 Allow water and dirt to settle into bowl. Large droplets of water/dirt will fall to the bottom of the bowl.</p>	<p>4 <i>PUSH</i> in and turn counter-clockwise to open drain valve.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Closed</p>  </div> <div style="text-align: center;"> <p>Open</p>  </div> </div>
<p>5 Drain out the water/dirt that has accumulated in the bottom of the bowl.</p>	<p>6 Close drain valve by turning clockwise. Allow dirt and water to settle again. As the fuel is drained out of the separator in step 5, more dirt and water will be flushed from the filter and will collect in the bottom of the bowl.</p>
<p>7 If necessary repeat step 5 to 6. Open fuel supply valve.</p>	<p>8 Prime the filter and close the bleed valve.</p> 

Prior to servicing the filters, ensure that the unit is OFF.

<p>1</p> <p>Turn the system off. Shut off the fuel supply valve and isolate unit before servicing the filter.</p> 	<p>2</p> <p>Loosen the lid screws evenly in the following sequence. Remove lid.</p> 								
<p>3</p> <p>For easier element removal, open drain valve (<i>PUSH</i> in and turn counter-clockwise) to lower fuel level to bottom of filter elements.</p> 	<p>4</p> <p>Lift out filter elements by the handles. It may be necessary to loosen the filter elements with a blade screwdriver. Replace with new filter elements and re-fit the spring cassette. This filter requires four elements.</p> 								
<p>5</p> <p>Inspect lid gasket. Replace if necessary.</p>	<p>6</p> <p>Fit lid checking for correct positioning. Evenly tighten in the sequence shown in step 1 (torque value ca. 20 Nm (177 in-lbs)).</p>								
<p>7</p> <p>If the fuel level is above the filter, open the fuel supply valve and vent valve, prime fuel system and ensure there are no leaks. If the filter does not automatically fill with fuel, it will be necessary to fill the filter using the primary port on the side of the filter housing and slowly pump fuel in the unit until it exits the vent valve.</p>	<p>Replacement Filter Element</p> <table border="1"> <thead> <tr> <th>Element #</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>01810</td> <td>10 Micron x 4 per system</td> </tr> <tr> <td>01830</td> <td>30 Micron x 4 per system</td> </tr> <tr> <td>01860S</td> <td>60 Micron (Stainless Steel) x 4 per system</td> </tr> </tbody> </table>	Element #	Description	01810	10 Micron x 4 per system	01830	30 Micron x 4 per system	01860S	60 Micron (Stainless Steel) x 4 per system
Element #	Description								
01810	10 Micron x 4 per system								
01830	30 Micron x 4 per system								
01860S	60 Micron (Stainless Steel) x 4 per system								

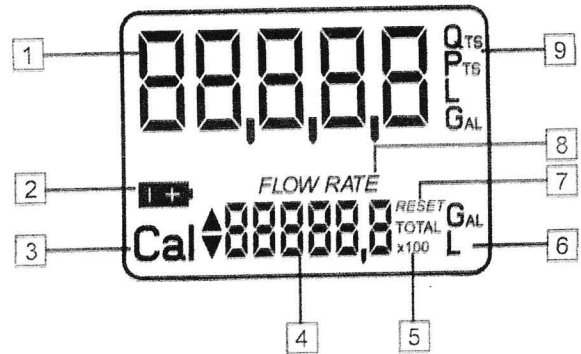
Remote Display

1. LCD display
2. Reset button
3. CAL button



LCD Display

1. Volume dispensed from when the RESET button was last pressed
2. Indication of battery charge
3. Indication of calibration mode
4. Totals register that indicates 2 types of totals:
Total that cannot be reset (TOTAL)
Resettable total (TOTAL RESET)
5. Indication of multiplication factor (x10/x100)
6. Indication of type of measurement of Total
7. Indication of type of total (Total or Reset Total)
8. Indication of Flow Rate mode
9. Indication of unit of measurement of Partial
Qts=Quarts
Pts=Pints
L=Liters
Gal=Gallons



Daily Operation

Reset Total:

Indicates the quantity dispensed since the last RESET Total resetting. The RESET Total cannot be reset until the Partial has been reset, while vice-versa, the Partial can always be reset without resetting the RESET Total. The unit of measurement of the 2 Totals can be the same as the Partial or else different according to the factory or user settings.

General Total:

The General Total register (Total) can never be reset by the user. It continues to rise for the entire operating life of the meter.

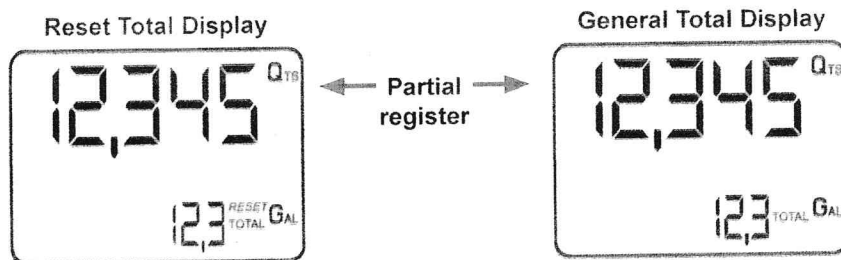
Switchover from Reset Total to General Total display is automatic and tied to phases and times that are factory set and cannot be changed by user.

Partial register:

Positioned in the top part of the display indicates the quantity dispensed since the RESET key was last pressed.

Notes:

6 Digits are available for Totals, plus two icons x10 / x100. The increment sequence is the following:
 0.0 • 99999.9 • 999999 • 100000 x10
 • 999999 x10 • 100000 x100
 • 999999 x100



Meter is supplied with a factory calibration that ensures precise measuring in most operating conditions.

Configuration of Unit of Measurement

The meter features a menu with which the user can select the main measurement unit:

- Qts=Quarts
- Pts=Pints
- L=Liters
- Gal=Gallons

The combination of the unit of measurement of the Partial register and that of the Totals is predefined according to the following table.

Combination Number	Unit of Measurement Partial Register	Unit of Measurement Totals Register
1	Liters (L)	Liters (L)
2	Gallons (Gal)	Gallons (Gal)
3	Quarts (Qts)	Gallons (Gal)
4	Pints (Pts)	Gallons (Gal)

Continued on next page...

Continuation of Configuration of Unit of Measurement.

To choose between the 4 available combinations:

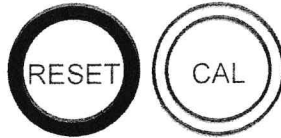
Step 1

Wait for the meter to go to standby.



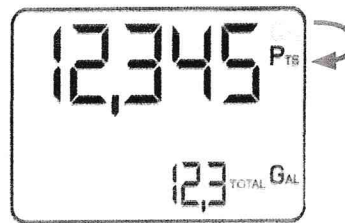
Step 2

Press the CAL key and RESET key together. Keep them pressed until "UNIT" appears on the screen together with the unit of measurement set at the time.



Step 3

Every short press of the RESET key will change the various combinations of the unit of measurement.



Step 4

Press the CAL key at length to store the new chosen setting. The meter will pass through the start cycle and will then be ready to dispense the set units...



Important:

The Reset Total and Total registers will be automatically changed to the new unit of measurement. No new calibration is required after changing the unit of measurement.

Dispensing in Normal Mode

This is dispensing during which, while the count is made, the Partial and Reset Total are displayed at the same time.

Should one of the 2 keys RESET or CAL be accidentally pressed during counting, this will have no effect.

A few seconds after dispensing has ended, on the lower register, the display switches from Reset Total to General Total; the word RESET above the word TOTAL disappears, and the Reset Total is replaced by the General Total. This situation is called standby and remains stable until the user operates the meter again.

Resetting the Partial Register

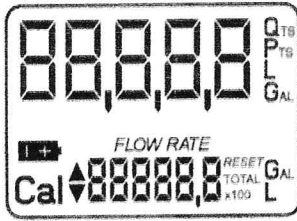
Step 1

The Partial register can be reset by pressing the RESET key when the meter is in standby, meaning when the display screen shows the word "TOTAL".



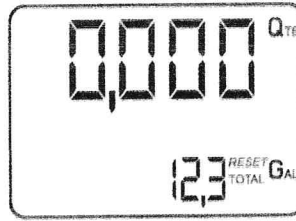
Step 2

After pressing the RESET key, during reset, the display screen first of all shows all the lit-up digits and then all the digits are not lit up.



Step 3

At the end of the process, a display page is first of all show with the reset Partial and the Reset Total.



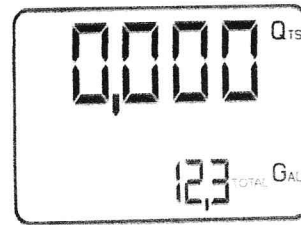
Step 4

After a few moments, the Reset Total is replaced by the NON resettable Total (Total).



Resetting the Reset Total

The Reset Total resetting operation can only be performed after resetting the Partial register. The Reset Total can in fact be reset by pressing the RESET key at length while the display screen shows RESET TOTAL as on the display shown to the right.



Schematically, the steps to be taken are:

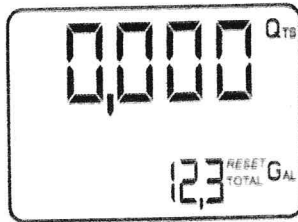
Step 1

Wait for the display to show normal standby display (with Total only displayed).



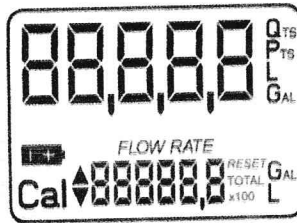
Step 2

Press the RESET key quickly. The meter starts to reset the partial.



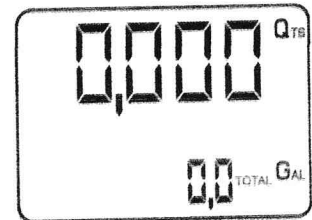
Step 3

The display screen again shows all segments of the display lit up followed by all the segments not lit up.



Step 4

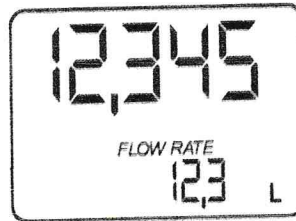
Finally shows the display screen where the reset Reset Total is shown.



Dispensing with Flow Rate Mode Display

It is possible to dispense fluids, displaying at the same time:

1. The dispensed partial
2. The Flow Rate in [Partial Unit/minute]



Procedure to enter this mode:

Step 1

Wait for the remote display to go to standby, meaning the display screen shows Total only.



Step 2

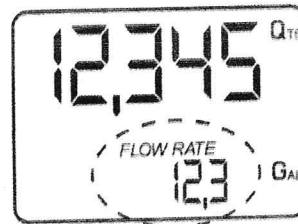
Quickly press the CAL key and start dispensing.

To return to Normal mode, press CAL key again.



Important:

The flow rate is measured with reference to the unit of measurement of the Partial.



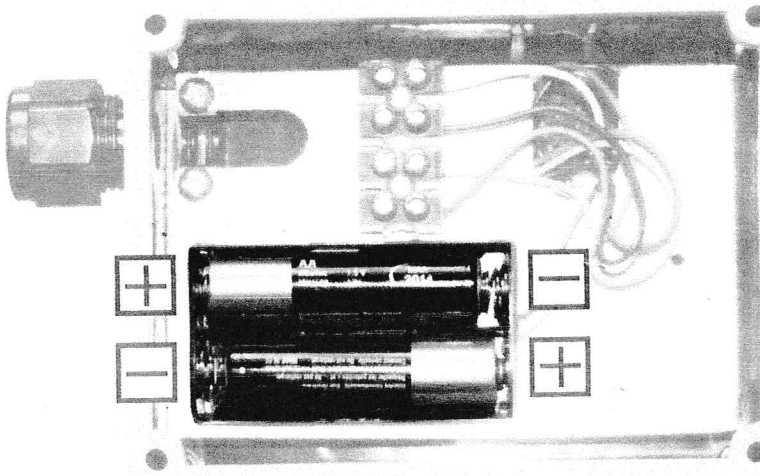
Notes:

If one of the two keys RESET or CAL is pressed during the count, this will have no effect. Flow rate is updated every 0.7 seconds. Consequently, the display could be relatively unstable at lower flow rates. Even though in this mode they are not displayed, both the Reset Total and the General Total (Total) increase. Their value can be checked after dispensing has terminated returning to Normal mode, by quickly pressing CAL.

Battery Replacement

Remote Display requires two AA batteries.

- Step 1.** Remove remote display from system by loosening the two screws.
- Step 2.** Loosen the 4 screws that secure the rear lid.
- Step 3.** Remove lid and gasket.
- Step 4.** Remove batteries.
- Step 5.** Place in new batteries ensuring the positive pole is positioned as indicated on the battery compartment and shown below.
- Step 6.** Place gasket and lid back on with the 4 screws.
- Step 7.** Remote display will display the same Reset Total, same Total, and same Partial indicated before batteries were changed and does not need to be recalibrated.



Problem

Possible Causes

No fuel delivery

- Pump does not run
- Pump and filter are not primed
- Fuel supply or discharge line blocked. Check the alarm
- Lift is too high
- Air leak in fuel supply to pump
- Inlet or outlet valve closed
- Foot (check) valve installed backwards or plugged

Insufficient fuel delivered

- Air leak at inlet
- Lift too high
- Pump worn
- Inoperative foot valve
- Piping improperly installed or dimensioned
- Filter/water separator plugged

Rapid pump wear

- Pump has been run dry or insufficient fuel
- Plumbing on inlet side not appropriately dimensioned.
- Pump requires too much power
- Air in plumbing lines
- Liquid too viscous

Noisy operation

- Insufficient fuel supply
- Air leaks in the inlet pipe
- Air or gas on the suction side

Motor does not turn or turns intermittently

- Control power not available
- Tripped circuit breaker on control board
- Pump failed and seized
- Motor failure

Pump leaks fuel

- Loose pump plumbing fittings
- Worn pump shaft seal
- Excessive heat from over head storage tank
- Worn pump o-rings or seals